

# pathSolutions™

**PathSolutions**

**TotalView**

**6**

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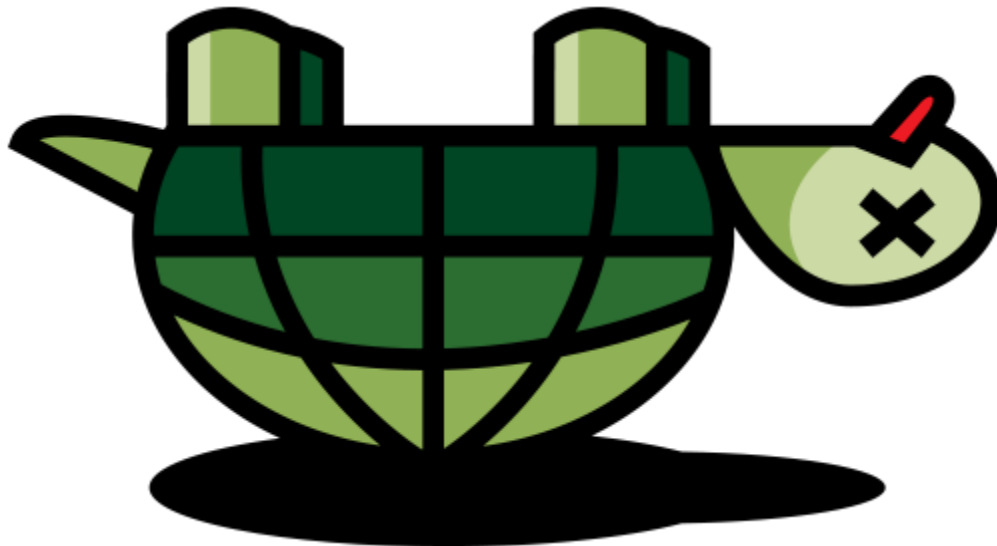
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Don't Turtle Your Network

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## Preface

Most network devices are constantly collecting statistics relating to the health of each interface. Network engineers rarely have the budget, time, and resources to access this wealth of information, and very few products exist that can help engineers detect and analyze problems before they affect users.

PathSolutions' TotalView was created to help provide this information (collected by switches, routers, servers, and other network devices) in an advanced and easy to use format, to identify the root cause of network problems, and maintain maximum network performance.

## Audience

Network administrators with various levels of expertise can benefit from PathSolutions' TotalView, as the product offers not only a rapid view of network health, but also in-depth analysis of specific issues.

To install and use PathSolutions' TotalView, a network administrator should be able to set up a managed switch with an IP address and an SNMP read-only community string.

## Conventions

The following conventions are used in this manual:

*Italic*

Used for emphasis and to signify the first use of a glossary term.

`Courier`

Used for URLs, host names, email addresses, registry entries, and other system definitions.

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**Note:** Notes are called out to inform you of specific information that is relevant to the configuration or operation of PathSolutions' TotalView. Notes may occasionally be used to describe best practices for using the system.

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## Technical Support

For technical support:

[Support@PathSolutions.com](mailto:Support@PathSolutions.com)

(877) 748-1444 (7x24 tier 1 telephone support)

(408) 748-1777 Select 1 for tier 2 support

## Overview

PathSolutions' TotalView is designed to disclose network weaknesses that cause data and VoIP stability issues. By monitoring all network interfaces for utilization, packet loss, and errors, it becomes easy to determine exactly where network faults exist.

PathSolutions' TotalView goes one step further by providing insight into the specific error or issue that is causing degradation so a rapid resolution can be applied.

Continuous monitoring of all interfaces provides the ability to generate alerts if any interface degrades below a level that will support VoIP services.

PathSolutions' TotalView also maintains a history of utilization and errors on all interfaces so you can troubleshoot VoIP and network problems after they occur.

All network devices that support SNMP can be queried for link status and health information.

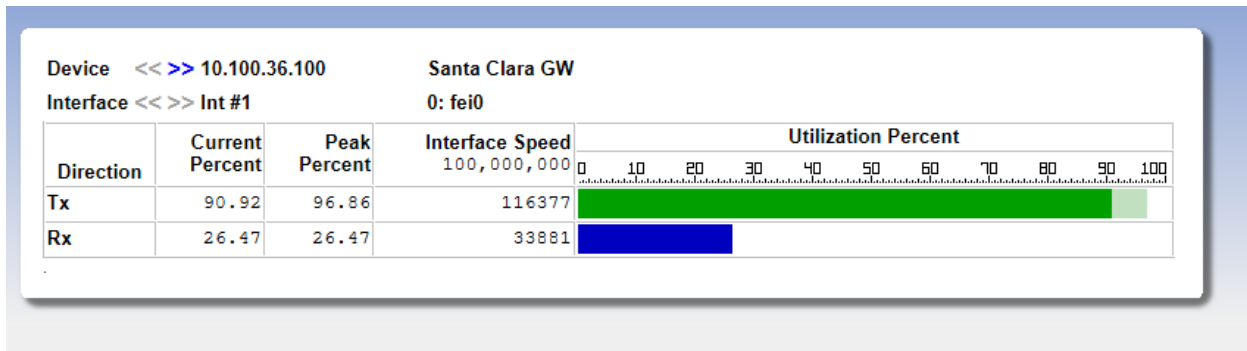


## Standard Features

PathSolutions' TotalView is a Windows service that uses SNMP to monitor statistics and utilization for each interface on switches, routers, and servers. If data-link errors or utilization rates rise above a settable threshold, you can use the generated web pages to help you determine the source of the network problems. This will help you to maintain a healthy network.

### Immediate Current Utilization of any Link

Easily view the current utilization of any monitored network link from a web browser. No need to set up a packet analyzer or analyzer port on your switch just to see what's happening on an interface.



A high-water mark is kept so you can track the peak utilization of a link over time.

### Daily Network Weather Reports™

Every day, a report will be emailed to you outlining the health of your network. This helps you to keep track of the general level of errors and overall utilization of your network.

- Keep track of utilization rates on your Internet links and other WAN links to determine if you need to add bandwidth
- Maintain an active reminder of available interfaces (never get stuck running out of switch interfaces as you continue to add workstations to your network)
- Network Weather Reports can be fully customized
- Easy to Understand Web-based Statistics
- PathSolutions' TotalView collects statistics and displays them in an easy to disseminate format via web pages
- Web-based statistics viewing allows you to check on the health of your network from any browser

### Quick Setup with the Built-in Webserver

PathSolutions' TotalView built-in web server helps to speed up installation so more time can be spent analyzing errors rather than configuring the system.

## Web-Based Monitoring

The web pages allow you to quickly locate the interfaces that have high error rates or high utilization rates.

**pathSolutions TotalView** Poll frequency: 00:05:00  
Last poll: 2/12/2015 3:05:45 PM  
Network health: DEGRADED (0.9%)

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Device Summary <<>> ● Healthy ● Suppressed issue ● Issue ? Comm fail Lock Config

General Traffic PoE STP Inventory Description Support Financials Uptime

| Device Name                              | Device IP Address | Manage Device        | OSI Services      |   |   |   |   |   |     | # of Int | Oper Up | Oper Down | Admin Down        | Location                            | Contact |  |
|--|-------------------|----------------------|-------------------|---|---|---|---|---|-----|----------|---------|-----------|-------------------|-------------------------------------|---------|--|
|  |                   |                      | 1                 | 2 | 3 | 4 | 5 | 6 | 7   |          |         |           |                   |                                     |         |  |
| <b>VoIP Gateways (2 devices)</b>         |                   |                      |                   |   |   |   |   |   |     |          |         |           |                   |                                     |         |  |
| San Francisco GW                         | 10.100.37.100     | Telnet SSH Web HTTPS | ●●●●              | ● | ● | ● | ● | ● | 1   | 1        | 0       | 0         | San Francisco     | ShoreTel                            |         |  |
| Santa Clara GW                           | 10.100.36.100     | Telnet SSH Web HTTPS | ●●●●              | ● | ● | ● | ● | ● | 1   | 1        | 0       | 0         | Headquarters      | ShoreTel                            |         |  |
| <b>Distribution Network (18 devices)</b> |                   |                      |                   |   |   |   |   |   |     |          |         |           |                   |                                     |         |  |
| Barbera                                  | 10.100.37.5       | Telnet SSH Web HTTPS | ●                 |   |   |   |   |   | 33  | 14       | 19      | 0         | Santa Clara       | Tim Titus                           |         |  |
| Bardolino                                | 10.100.36.18      | Telnet SSH Web HTTPS | ●●                |   |   |   |   |   | 26  | 6        | 20      | 0         | San Francisco     | www.tp-link.com                     |         |  |
| Bordeaux                                 | 192.168.202.4     | Telnet SSH Web HTTPS | ●                 |   |   |   |   |   | 115 | 3        | 48      | 0         | Sunnyvale         | Sally Toner                         |         |  |
| Cabernet                                 | 192.168.202.3     | Telnet SSH Web HTTPS | ●                 |   |   |   |   |   | 37  | 3        | 26      | 0         |                   |                                     |         |  |
| Chardonnay                               | 10.100.36.54      | Telnet SSH Web HTTPS | ●●                | ● | ● | ● | ● | ● | 28  | 3        | 25      | 0         | Santa Clara       | Sally Toner                         |         |  |
| Corvina                                  | 10.100.36.61      | Telnet SSH Web HTTPS | ●●●               | ● | ● | ● | ● | ● | 33  | 7        | 26      | 4         | Hangzhou China    | Hangzhou H3C Technologies Co., Ltd. |         |  |
| Gamay                                    | 10.100.37.2       | Telnet SSH Web HTTPS | ●                 | ● | ● | ● | ● | ● | 25  | 6        | 19      | 0         | Santa Clara, CA   | Tim Titus                           |         |  |
| Graciano                                 | 10.100.36.40      | Telnet SSH Web HTTPS | ●                 |   |   |   |   |   | 53  | 2        | 51      | 0         | San Francisco     | Sally Toner                         |         |  |
| Grenache                                 | 10.100.37.53      | Telnet SSH Web HTTPS | ●                 |   |   |   |   |   | 25  | 2        | 23      | 0         | Sunnyvale, CA     | noc@pathsolutions.com               |         |  |
| Malbec                                   | 10.100.36.75      | Telnet SSH Web HTTPS | ●●                | ● | ● | ● | ● | ● | 24  | 11       | 13      | 0         | Santa Clara       | Sally Toner                         |         |  |
| Merlot                                   | 10.100.36.48      | Telnet SSH Web HTTPS | ●●●●              | ● | ● | ● | ● | ● | 31  | 7        | 24      | 0         | Santa Clara, CA   | noc@pathsolutions.com               |         |  |
| Muscat                                   | 10.100.36.51      | Telnet SSH Web HTTPS | ●                 |   |   |   |   |   | 48  | 6        | 42      | 0         | Santa Clara, CA   | Tim Titus                           |         |  |
| Palomino                                 | 10.100.36.20      | Telnet SSH Web HTTPS | ●●                | ● | ● | ● | ● | ● | 27  | 4        | 23      | 0         | Sacramento        | Steve Sisk                          |         |  |
| Pinot                                    | 10.100.36.53      | Telnet SSH Web HTTPS | ●●                |   |   |   |   |   | 27  | 12       | 15      | 0         | Santa Clara       | Sally Toner                         |         |  |
| Riesling                                 | 10.100.36.70      | Telnet SSH Web HTTPS | ●                 |   |   |   |   |   | 36  | 22       | 7       | 0         |                   |                                     |         |  |
| Sauvignon                                | 10.100.36.20      | Telnet SSH Web HTTPS | ●●                |   |   |   |   |   | 51  | 6        | 45      | 0         | San Francisco, CA | noc@pathsolutions.com               |         |  |
| Shiraz                                   | 10.100.37.3       | Telnet SSH Web HTTPS | ●                 |   |   |   |   |   | 34  | 6        | 20      | 0         | Santa Clara       | Sally Toner                         |         |  |
| Zinfandel                                | 10.100.36.27      | Telnet SSH Web HTTPS | ●●                |   |   |   |   |   | 42  | 4        | 38      | 0         | snmplocation      | who@where                           |         |  |
| <b>Edge Network (8 devices)</b>          |                   |                      |                   |   |   |   |   |   |     |          |         |           |                   |                                     |         |  |
| Atlanta                                  | 10.100.37.1       | Telnet SSH Web HTTPS | ●●●               | ● | ● | ● | ● | ● | 3   | 2        | 1       | 1         | Atlanta, GA       | Sally Toner x 4005                  |         |  |
| Denver                                   | 10.100.36.60      | Telnet SSH Web HTTPS | ●●●               | ● | ● | ● | ● | ● | 3   | 2        | 1       | 1         | Denver, CO        | sally@pathsolutions.com             |         |  |
| Miami                                    | 10.100.38.3       | Telnet SSH Web HTTPS | ●●●               | ● | ● | ● | ● | ● | 3   | 2        | 1       | 0         |                   |                                     |         |  |
| Honolulu                                 | 10.100.36.5       | Telnet SSH Web HTTPS | ●●●               | ● | ● | ● | ● | ● | 3   | 2        | 1       | 1         |                   |                                     |         |  |
| Honolulu                                 | 10.100.38.1       | Telnet SSH Web HTTPS | ●●●               | ● | ● | ● | ● | ● | 3   | 2        | 1       | 1         |                   |                                     |         |  |
| New York                                 | 192.168.202.1     | Telnet SSH Web HTTPS | ●●●               | ● | ● | ● | ● | ● | 3   | 2        | 1       | 1         | New York, NY      | sally@pathsolutions.com             |         |  |
| Internet                                 | 10.100.36.1       | Telnet SSH Web HTTPS | ●●●               | ● | ● | ● | ● | ● | 2   | 2        | 0       | 0         | San Francisco, CA | Tim Titus x4413                     |         |  |
| Zinfandel                                | 10.100.36.25      | Telnet SSH Web HTTPS | ●●                |   |   |   |   |   | 42  | 4        | 38      | 0         | snmplocation      | who@where                           |         |  |
| <b>Cisco ASA Firewall (1 devices)</b>    |                   |                      |                   |   |   |   |   |   |     |          |         |           |                   |                                     |         |  |
| CiscoASA                                 | 10.100.36.4       | Telnet SSH Web HTTPS | ●                 |   |   |   |   |   | 24  | 7        | 17      | 0         | Santa Clara, CA   | Tim Titus x111                      |         |  |
| <b>Servers (2 devices)</b>               |                   |                      |                   |   |   |   |   |   |     |          |         |           |                   |                                     |         |  |
| REDSONJA                                 | 10.100.36.12      | Telnet SSH Web HTTPS | ●●●●              | ● | ● | ● | ● | ● | 19  | 14       | 5       | 0         | Santa Clara, CA   | Sally Toner                         |         |  |
| VELMA                                    | 10.100.36.10      | Telnet SSH Web HTTPS | ●●                |   |   |   |   |   | 1   | 1        | 0       | 0         | Santa Clara, CA   | Tim Titus                           |         |  |
| Total Devices:                           |                   | 31                   | Total interfaces: |   |   |   |   |   |     | 803      | 166     | 637       | 9                 |                                     |         |  |

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PathSolutions' TotalView web pages can be viewed from any standard browser, anywhere on your intranet.

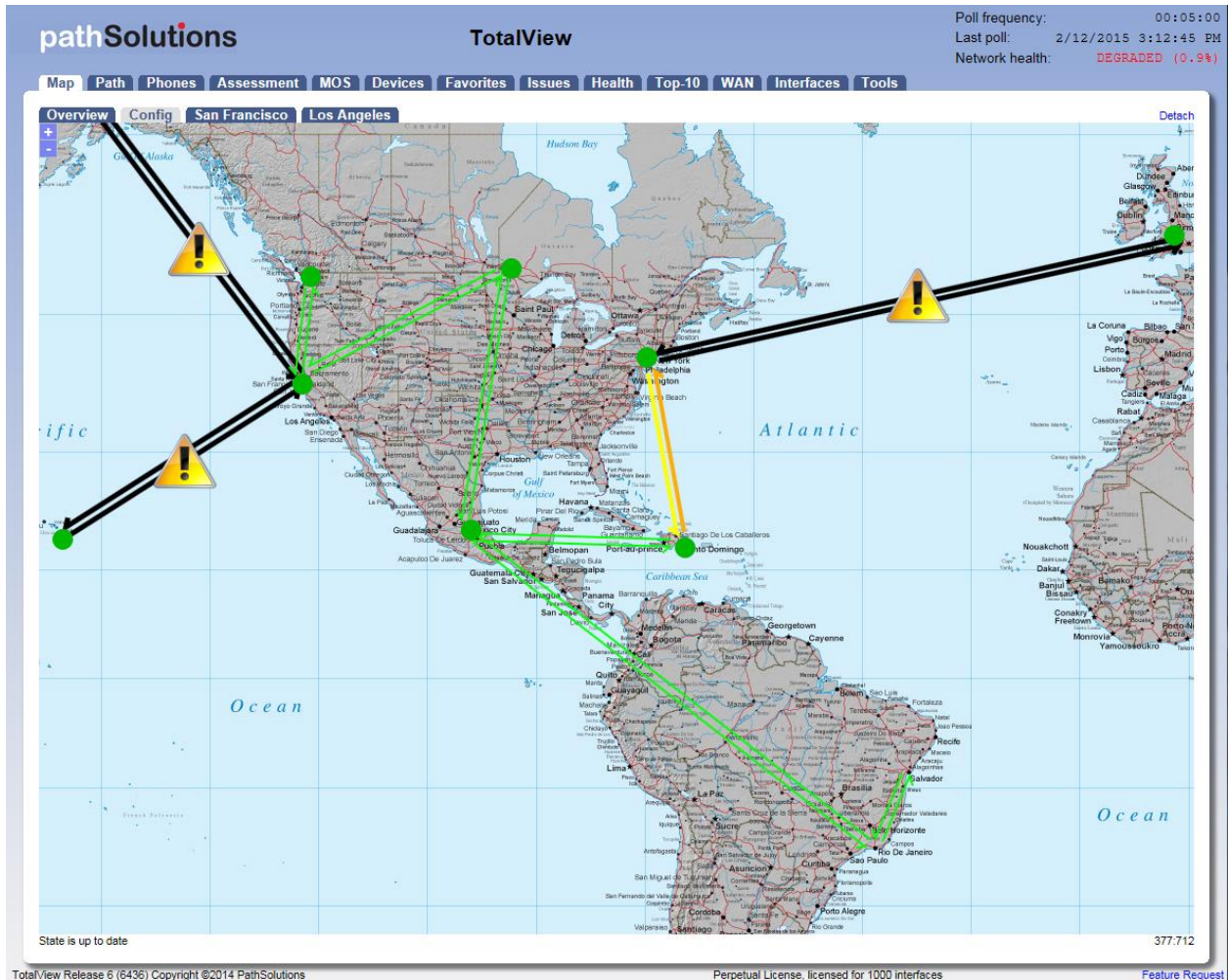
Errors and utilization information is collected for each interface and is presented in a format that allows you to easily determine the source of the problem.

## Analysis Engine

The errors are analyzed by an analysis engine that helps to guide you to possible solutions to the problems with each specific interface. This gives the Network Prescription™ the ability to diagnose the root cause of the problem without having to utilize additional tools or combine datasets from multiple locations.

### Dynamic Network Map

PathSolutions' TotalView includes a dynamically updating network map with zoom and a click and drag user interface. This capability gives you an "eagle's eye" view of what your network is doing at the current point in time. The map updates every 5 seconds and audible alerts play when links or devices go down so you are able to remedy the problem immediately. TotalView also provides Multiple Map Views for Multiple Locations.



## Quick and Easy Installation and Configuration

The initial installation and configuration can be completed in roughly 12 minutes for virtually any sized network with the Quick Config Wizard. This wizard will automatically scan your network and configure PathSolutions' TotalView to monitor all of the interfaces that are discovered.

## No Desktop Security Concerns

Running as a Windows service, PathSolutions' TotalView provides benefits over console based monitoring tools:

- No need to remain logged in to the console for monitoring to occur
- Desktop resources (desktop real estate and system tray space) on the console are not used

## Rapid Re-Configuration when your Network Changes

When your network changes and devices are added or removed, you can rapidly update your configuration using the Quick Config Wizard. It will detect new interfaces, include them in your configuration, and start monitoring again.

The screenshot displays the PathSolutions TotalView web interface. At the top, it shows the 'pathSolutions TotalView' logo and navigation tabs like 'Map', 'Path', 'Phones', 'Assessment', 'MOS', 'Devices', 'Favorites', 'Issues', 'Health', 'Top-10', 'WAN', 'Interfaces', and 'Tools'. The main content area is divided into several sections:

- Device Summary:** A table listing device information for 'Barbera'.
 

| Device Name | Device IP Address | Manage Device        | OSI Services |   |   |   |   |   |    | # of Int | Oper Up | Oper Down | Admin Down  | Location  | Contact |
|-------------|-------------------|----------------------|--------------|---|---|---|---|---|----|----------|---------|-----------|-------------|-----------|---------|
|             |                   |                      | 1            | 2 | 3 | 4 | 5 | 6 | 7  |          |         |           |             |           |         |
| Barbera     | 10.1.100.37.5     | Telnet SSH Web HTTPS | •            |   |   |   |   |   | 33 | 14       | 19      | 0         | Santa Clara | Tim Titus |         |
- Interface Summary:** A table showing interface details for 'Int #2'.
 

| Interface Number | Favorite | IP Address | Description   | Ignore Int | Avg Packet Size | Historical Broadcast Percent |         | Last Poll Broadcast Percent |        | Last Poll Utilization Percent |        |
|------------------|----------|------------|---|------------|-----------------|------------------------------|---------|-----------------------------|--------|-------------------------------|--------|
|                  |          |            |   |            |                 | Tx                           | Rx      | Tx                          | Rx     | Tx                            | Rx     |
| Int #2           | Favorite |            | fe.1.2: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 2 (Trunk Port Connected to Gamay) | Ignore     | 18 bytes        | 25.554%                      | 15.000% | 0.000%                      | 0.000% | 0.000%                        | 0.000% |
- Interface Performance:** Includes a 'Current Utilization' graph showing bits per second (Tx and Rx) over time, and a 'Packet Loss' graph showing errors per polling period. A summary table is also present:
 

|        | Tx      | Rx      |
|--------|---------|---------|
| Min    | 0 kbps  | 0 kbps  |
| Avg    | 4 kbps  | 3 kbps  |
| Max    | 10 kbps | 10 kbps |
| 95th   | 5 kbps  | 5 kbps  |
| 95th % | 0.006%  | 0.006%  |
- Network Prescription™:** A section indicating 'No errors detected on this interface. No prescription recommended.'
- Interface Notes:** A table for recording notes with columns for Date/Time, Username, and Note.

At the bottom of the interface, it shows 'TotalView Release 6 (6436) Copyright ©2014 PathSolutions', 'Perpetual License, licensed for 1000 interfaces', and a 'Feature Request' link.

## **Advanced Email Reporting**

Email templates are included for devices, interfaces, and overall health monitoring. Templates can be easily modified to include a variety of data elements.

## **Emailed Graphs**

Graphs for any interface or device can be included in emailed reports.

## **Parent/Child Relationships for Outage Alerting**

Parent-Child relationships can be established for each device so alerts are not generated for devices located behind other devices. This insures that you receive outage alerts for only the specific device that went down and not all devices behind that device.

# VoIP Assessment Features

The VoIP Assessment features are the Phones, Path, Assessment, and MOS tabs. In the Tools tab, the VoIP Tools sub-tab is also available.

## Phones Tab

PathSolutions' TotalView makes it easy to discover where all of your VoIP phones are connected to the network. The Phones tab shows each phone and the health of the connection to the network.

**TotalView**

Poll frequency: 00:05:00  
 Last poll: 2/12/2015 3:22:43 PM  
 Network health: DEGRADED (0.9%)

Map
Path
Phones
Assessment
MOS
Devices
Favorites
Issues
Health
Top-10
WAN
Interfaces
Tools

Update Information updated as of: 2/12/2015, 3:24:02 PM
Download Excel

VoIP devices discovered on the network First Previous Next Last

| VoIP Device IP Address | VoIP Device MFG | VLAN | PoE     | Switch and interface where VoIP device is Connected |            |  |               | MAC Addresses | Peak Daily Error Rate | Peak Daily Utilization |    |
|------------------------|-----------------|------|---------|---|------------|--|---------------|---------------|-----------------------|------------------------|----|
|                        |                 |      |         | Switch  | Interface  | Interface Description  | MAC Addresses |               |                       | Tx                     | Rx |
|                        | Polycom         | 1    | 6.49 W  | ● Barbera   | Int #23    | fe.1.23: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 23                            | 1             | 0.000%        | 0.001%                | 0.000%                 |    |
|                        | Aastra          | 1    | 6.49 W  | ● Barbera   | Int #19    | fe.1.19: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 19 (Aastra Phone in Guest Rm) | 1             | 0.000%        | 0.001%                | 0.000%                 |    |
| 10.100.37.6            | Mitel           | 1    | 6.49 W  | ● Barbera   | Int #3     | fe.1.3: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 3 (Andy Bohart Phone)          | 1             | 0.000%        | 0.002%                | 0.000%                 |    |
| 10.100.37.8            | Mitel           | 1    | 6.49 W  | ● Barbera   | Int #5     | fe.1.5: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 5 (Ray Kissner Phone)          | 1             | 0.000%        | 0.002%                | 0.000%                 |    |
| 10.100.37.7            | Mitel           | 1    | 6.49 W  | ● Barbera   | Int #9     | fe.1.9: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 9 (Damon Tribble Phone)        | 1             | 0.000%        | 0.002%                | 0.000%                 |    |
| 10.100.36.100          | ShoreTel        | 1    | 12.94 W | ● Malbec  | Int #20    | ifc20 (Slot: 1 Port: 20): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 20       | 1             | 0.000%        | 0.011%                | 0.001%                 |    |
| 10.100.36.101          | ShoreTel        | 1    | 12.94 W | ● Palomino  | Int #2     | Fa0/2: FastEthernet0/2   | 1             | 25.641%       | 0.001%                | 0.000%                 |    |
| 10.100.36.164          | Cisco           | 1    | 12.94 W | ● Pinot   | Int #10017 | Fa0/17: FastEthernet0/17 (2nd Floor Cube B-07)   | 1             | 0.000%        | 0.008%                | 0.000%                 |    |
| 10.100.37.100          | ShoreTel        | 1    | -       | ● Shiraz  | Int #24    | g24: Ethernet Interface (First Floor Closet 1)   | 1             | 0.000%        | 0.002%                | 0.001%                 |    |

Records 1-9 of 9 displayed (100 per page)

VoIP devices discovered on the network First Previous Next Last

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[Feature Request](#)

## Path Tab

The Call Path feature displays health and configuration information of every link involved in a call from a starting IP address to an ending IP address. This provides unprecedented visibility into any problems that previously occurred on all involved links.

pathSolutions

TotalView

Poll frequency: 00:05:00  
 Last poll: 3/2/2015 4:49:36 PM  
 Network health: DEGRADED (1.7%)

Map
Path
Phones
Assessment
MOS
Devices
Favorites
Issues
Health
Top-10
WAN
Interfaces
Tools

Update IP, MAC, and ARP information updated as of: 3/2/2015, 4:29:22 PM

**Current mapping from one IP address to another IP address**

**Source IP Address:** 
Note: The mapping will display the path that packets currently take. If the network configuration or state was different at a previous point in time, the mapping may not reflect the previous conditions.

**Destination IP Address:**

Forward Historical
Reverse Historical
Forward Current
Reverse Current

**Mapping from 10.100.36.1 to 10.100.36.5**

**Outbound**

**Int #2** Fa0/1: FastEthernet0/1

IP Address: 10.70.151.1

Duplex: Half

Speed: 100,000,000 bps

Peak Error Rate: 5.581%

Peak Utilization Rate: 2.562% Tx

Queueing: FIFO

**Inbound**

**Int #17** ifc17 (Slot: 1 Port: 17): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 17

Duplex: Half

Speed: 100,000,000 bps

Peak Error Rate: 21.768%

Peak Utilization Rate: 100.000% Rx

**Outbound**

**Int #7** ifc7 (Slot: 1 Port: 7): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 7

Duplex: Full

Speed: 100,000,000 bps

Peak Error Rate: 0.737%

Peak Utilization Rate: 99.972% Tx

**Inbound**

**Int #10012** Fa0/12: FastEthernet0/12 (Sauv-Zinf-Internet)

Duplex: Full

Speed: 100,000,000 bps

Peak Error Rate: 0.000%

Peak Utilization Rate: 2.751% Rx

**Outbound**

**Int #10010** Fa0/10: FastEthernet0/10 (To Hawaii)

Duplex: Half

Speed: 100,000,000 bps

Peak Error Rate: 0.092%

Peak Utilization Rate: 0.010% Tx

Queueing:

**Inbound**

**Int #2** Fa0/0: FastEthernet0/0

IP Address: 10.100.36.5

Duplex: Half

Speed: 100,000,000 bps

Peak Error Rate: 0.000%

Peak Utilization Rate: 0.009% Rx

**Destination IP: 10.100.36.5**

## Current Utilization Call Path

PathSolutions' TotalView also permits viewing the current utilization of all links between two IP addresses.

Solving call-in-progress problems is now easy because you have visibility into real-time usage information of all involved links.

### Assessment Tab

PathSolutions' TotalView with the assessment module also gives you the ability to acutely analyze your bandwidth constrained links and their QoS configuration on the Assessment tab.

**TotalView**

Poll frequency: 00:05:00  
 Last poll: 2/12/2015 3:54:02 PM  
 Network health: DEGRADED (1.9%)

Map
Path
Phones
Assessment
MOS
Devices
Favorites
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WAN
Interfaces
Tools

**Bandwidth constrained interfaces**
Comprehensive Assessment Report

| Name     | Interface Number | IP Address     | Description                          | Interface Speed | Queueing Configuration       | Maximum Simultaneous Calls | Status |      |
|----------|------------------|----------------|--------------------------------------|-----------------|------------------------------|----------------------------|--------|------|
|          |                  |                |                                      |                 |                              |                            | Admin  | Oper |
| Atlanta  | Int #3           |                | Se0/0: Serial0/0                     | 1,536,000       | Weighted Fair Queueing (WFQ) | 23                         | down   | down |
| Atlanta  | Int #3           |                | Se0/0: Serial0/0                     | 1,536,000       | Weighted Fair Queueing (WFQ) | 23                         | down   | down |
| Denver   | Int #2           | 192.168.201.1  | Se0/0: Serial0/0                     | 256,000         | First In First Out (FIFO)    | 3                          | up     | up   |
| Denver   | Int #3           |                | Se0/1: Serial0/1                     | 1,544,000       | Weighted Fair Queueing (WFQ) | 23                         | down   | down |
| Honolulu | Int #1           |                | Se0/0/0: Serial0/0/0                 | 1,544,000       | Weighted Fair Queueing (WFQ) | 23                         | down   | down |
| NewYork  | Int #2           | 192.168.201.2  | Se0/0: Serial0/0 (Link to Atlanta)   | 256,000         | Weighted Fair Queueing (WFQ) | 3                          | up     | up   |
| NewYork  | Int #3           |                | Se0/1: Serial0/1 (Link to Sunnyvale) | 1,544,000       | Weighted Fair Queueing (WFQ) | 23                         | down   | down |
| SCWANRTR | Int #5           |                | T1 0/0/0: T1 0/0/0                   | 1,544,000       | Undetermined                 | 23                         | up     | down |
| SCWANRTR | Int #6           |                | T1 0/0/1: T1 0/0/1                   | 1,544,000       | Undetermined                 | 23                         | up     | down |
| SCWANRTR | Int #7           | 38.104.140.182 | Se0/0/0/0: Serial0/0/0/0             | 1,536,000       | Weighted Fair Queueing (WFQ) | 23                         | up     | down |
| SCWANRTR | Int #8           | 38.112.59.94   | Se0/0/1/0: Serial0/0/1/0             | 1,536,000       | Weighted Fair Queueing (WFQ) | 23                         | up     | down |
| SCWANRTR | Int #9           | 169.254.249.30 | Tu1: Tunnel1                         | 9,000           | First In First Out (FIFO)    | 0                          | up     | up   |
| SCWANRTR | Int #10          | 169.254.249.26 | Tu2: Tunnel2                         | 9,000           | First In First Out (FIFO)    | 0                          | up     | up   |

**Recommendations**

- Weighted Fair Queueing (WFQ) is employed**  
 Weighted Fair Queueing should not be utilized on links slower than 10megs in a VoIP environment, as it does not provide adequate prioritization for VoIP packets. Custom queueing or Modular Qos CL should be enabled to ensure bandwidth protection for VoIP packets.
- First In First Out (FIFO) Queueing is employed**  
 FIFO Queueing should not be utilized on links slower than 10megs in a VoIP environment, as it does not provide any prioritization for VoIP packets. Custom queueing or Modular Qos CL should be enabled to ensure bandwidth protection for VoIP packets.

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## VoIP Tools

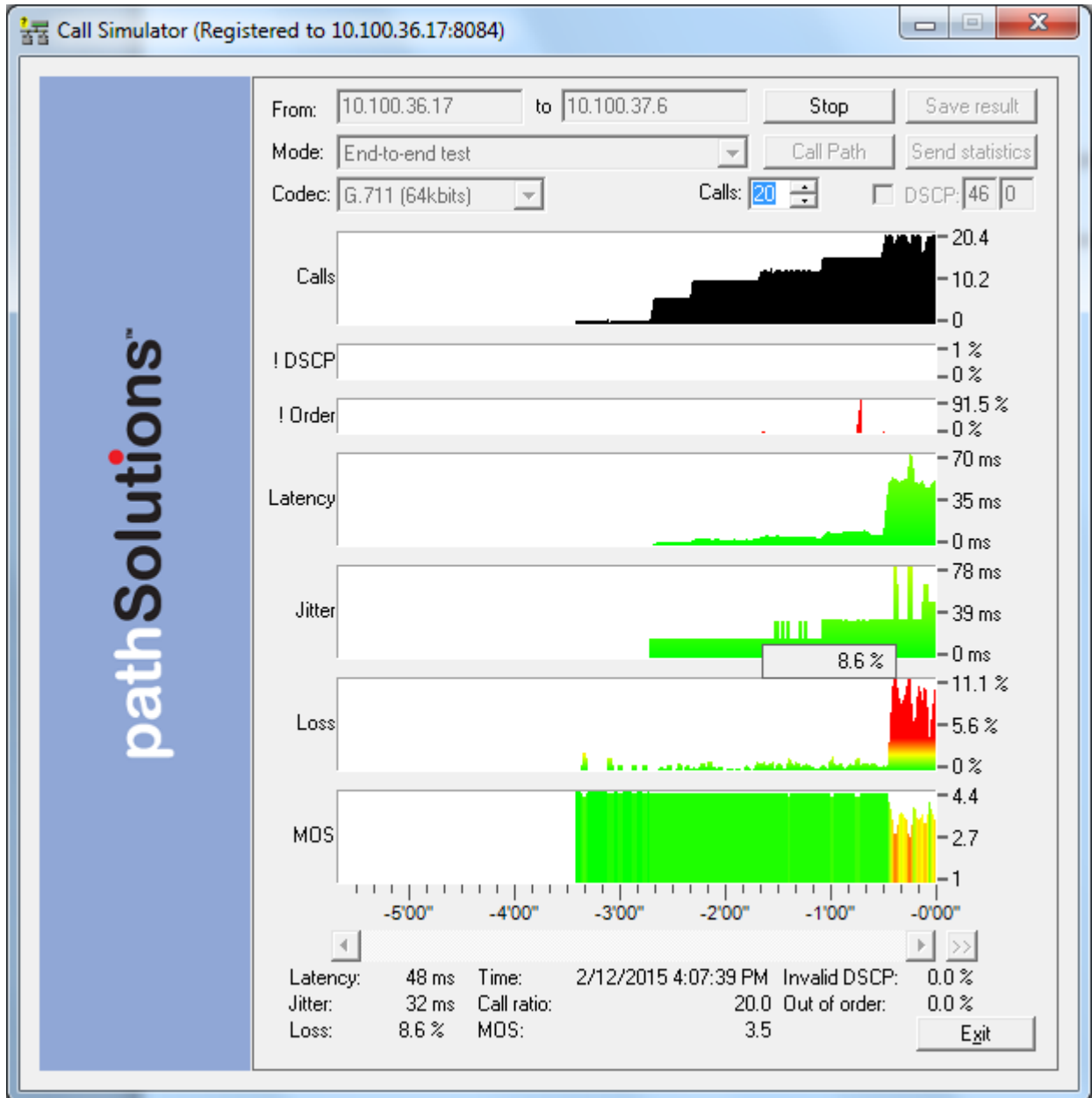
### Network Address Translation

Network Address Translation can cause one-way voice problems. PathSolutions' TotalView provides a unique tool "Check Address Translation" to help determine if NAT is occurring.

The screenshot shows the PathSolutions TotalView interface. At the top left is the 'pathSolutions' logo and 'TotalView' text. On the top right, it displays 'Poll frequency: 00:05:00', 'Last poll: 2/9/2015 7:01:41 PM', and 'Network health: DEGRADED (1.1%)'. Below this is a navigation bar with tabs: Map, Path, Phones, Assessment, MOS, Calls, Devices, Favorites, Issues, Health, Top-10, WAN, Interfaces, and Tools. The 'Tools' tab is active. A white box contains the following content: 'Update IP, MAC, and ARP information updated as of: 2/9/2015, 6:06:28 PM', 'Download Excel Download IP, MAC, and ARP information to a spreadsheet', and a row of buttons: 'IP to MAC Search', 'MAC to Interface Search', 'MAC to IP Search', and 'VoIP Tools'. Below this is a grey box with the text 'Use these tools to validate and troubleshoot VoIP Networks.' and two buttons: 'VoIP Call Simulation Client Download Call Simulation client (email link)' and 'Check Address Translation Check for address translation from a web client to this server (email link)'.

## Call Simulator

A VoIP Call Simulation Client is provided to help assess the capability of your network. Various numbers of calls can be simulated and the performance of the network can be evaluated during the simulation.



## Device Latency, Jitter, Loss, and MOS Score


PathSolutions' TotalView is able to provide visibility into the DSCP, Packet Order, Latency, Jitter, Packet Loss, and MOS score for any monitored device.

With this feature, you can monitor network devices that are in remote offices and have continuous visibility into the capabilities of the connection to that office.

# Power over Ethernet Monitoring

PoE allows you to watch the status and monitor the power usage for your PoE switches to make sure that you are not getting close to limitations of the switch. It also monitors the power draw for each port on the switch so you can determine where high-power drawing devices are connected to and quickly determine any power faults.

**Note:** PoE Historical Utilization can be optionally tracked over time by enabling data retention of PoE stats. This permits organizations to track their power usage and generate reports showing when and where additional power is being drawn from PoE switches. See Appendix B on how to enable reporting and how to extract data from the database.



## TotalView

Poll frequency: 00:05:00  
 Last poll: 2/9/2015 6:56:43 PM  
 Network health: DEGRADED (1.1%)

Map Path Phones Assessment MOS Calls Devices Favorites Issues Health Top-10 WAN Interfaces Tools

**Device Summary** ● Healthy ● Suppressed issue ● Issue ? Comm fail Lock Config

[General](#) [Traffic](#) [PoE](#) [STP](#) [Inventory](#) [Description](#) [Support](#) [Financials](#) [Uptime](#)

| Power Supply (PSU) |                   |       |        |                |                     |                     |                 |
|--------------------|-------------------|-------|--------|----------------|---------------------|---------------------|-----------------|
| Device Name        | Device IP Address | Group | Status | Rating (Watts) | Present Consumption | % Power Utilization | Alarm Threshold |
| ● Barbera          | 10.100.37.5       | 1     | On     | 39 W           | 17 W                | 44%                 | 11%             |

**Interface Summary** <<>>

[General](#) [Traffic](#) [PoE](#) [STP](#) [Details](#) [Poll](#) [CDP/LLDP](#) [Connected](#)

| Interface Number | Favorite | IP Address | Description  | Ignore Int | PoE | PSU | State            | Connected Device |           |          |
|------------------|----------|------------|--|------------|-----|-----|------------------|------------------|-----------|----------|
|                  |          |            |  |            |     |     |                  | Max Draw         | PoE Class | Priority |
| ● Int #1         | Favorite |            | fe.1.1: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 1                                    | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| ● Int #2         | Favorite |            | fe.1.2: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 2 (Trunk Port Connected to Gamay)    | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| ● Int #3         | Favorite |            | fe.1.3: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 3 (Andy Bohart Phone)                | Ignore     | Yes | 1   | Delivering Power | 6.49 W           | Low Power | Low      |
| ● Int #4         | Favorite |            | fe.1.4: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 4                                    | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| ● Int #5         | Favorite |            | fe.1.5: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 5 (Ray Kisser Phone)                 | Ignore     | Yes | 1   | Delivering Power | 6.49 W           | Low Power | Low      |
| ● Int #6         | Favorite |            | fe.1.6: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 6                                    | Ignore     | Yes | 1   | Delivering Power | 6.49 W           | Low Power | Low      |
| Int #7           | Favorite |            | fe.1.7: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 7 (Mary Ludloff Phone)               | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| Int #8           | Favorite |            | fe.1.8: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 8                                    | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| ● Int #9         | Favorite |            | fe.1.9: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 9 (Damon Tribble Phone)              | Ignore     | Yes | 1   | Delivering Power | 6.49 W           | Low Power | Low      |
| Int #10          | Favorite |            | fe.1.10: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 10                                  | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| Int #11          | Favorite |            | fe.1.11: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 11 (Polycom Phone in Conference Rm) | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| Int #12          | Favorite |            | fe.1.12: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 12                                  | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| Int #13          | Favorite |            | fe.1.13: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 13                                  | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| Int #14          | Favorite |            | fe.1.14: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 14                                  | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| Int #15          | Favorite |            | fe.1.15: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 15                                  | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| Int #16          | Favorite |            | fe.1.16: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 16                                  | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| Int #17          | Favorite |            | fe.1.17: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 17                                  | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| ● Int #18        | Favorite |            | fe.1.18: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 18                                  | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| ● Int #19        | Favorite |            | fe.1.19: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 19 (Aastra Phone in Guest Rm)       | Ignore     | Yes | 1   | Delivering Power | 6.49 W           | Low Power | Low      |
| ● Int #20        | Favorite |            | fe.1.20: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 20                                  | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| ● Int #21        | Favorite |            | fe.1.21: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 21                                  | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| ● Int #22        | Favorite |            | fe.1.22: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 22                                  | Ignore     | Yes | 1   | Searching        | -                | -         | -        |
| ● Int #23        | Favorite |            | fe.1.23: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 23                                  | Ignore     | Yes | 1   | Delivering Power | 6.49 W           | Low Power | Low      |
| ● Int #24        | Favorite |            | fe.1.24: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 24                                  | Ignore     | Yes | 1   | Searching        | -                | -         | -        |

# Spanning Tree Monitoring

Knowing what your network is doing at Layer-2 helps to prevent unknown glitches from occurring. By tracking STP information at the switch level as well as the interface level, it's easy to determine when your last STP root bridge election occurred, and which device is acting as the root bridge. Also know which interfaces are active as well as listening so you don't cause a reconfiguration by disconnecting the wrong interface.

TotalView

Poll frequency: 00:05:00  
 Last poll: 3/2/2015 4:54:23 PM  
 Network health: DEGRADED (1.7%)

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Device <<>>
● Healthy ● Suppressed ● Issue ? Comm fail

General Traffic PoE STP Inventory Description Support Financials Uptime

| Device Name | Device IP Address | Protocol  | Version | Priority | Topology            |         |             |           | Root Bridge | Root Cost | Root Port | Hold Time |
|-------------|-------------------|-----------|---------|----------|---------------------|---------|-------------|-----------|-------------|-----------|-----------|-----------|
|             |                   |           |         |          | Last change         | Changes | Root Bridge | Root Cost |             |           |           |           |
| ● Brunello  | 10.100.37.16      | ieee8021d | -       | 32768    | 39 days 01:18:50.90 | 67      | Barbera     | 200000    | Int #7      | 600       |           |           |

Interface <<>>

General Traffic PoE STP Details Poll CDP/LLDP Connected

| Interface Number | IP Address | Description | Priority | State      | Enable | Path Cost | Designated |         |                  | Forward Transactions |    |
|------------------|------------|-------------|----------|------------|--------|-----------|------------|---------|------------------|----------------------|----|
|                  |            |             |          |            |        |           | Root       | Cost    | Bridge           |                      |    |
| Int #1           | 1:1        |             | -        | -          | -      | -         | -          | -       | -                | -                    |    |
| ● Int #2         | 2:2        |             | 128      | forwarding | ●      | 2000000   | Barbera    | 2000000 | Brunello         | 8002                 | 8  |
| ● Int #3         | 3:3        |             | 128      | blocking   | ●      | 200000    | Barbera    | 19      | 800000a0c81d85f4 | 800f                 | 3  |
| ● Int #4         | 4:4        |             | 128      | forwarding | ●      | 2000000   | Barbera    | 2000000 | Brunello         | 8004                 | 1  |
| ● Int #5         | 5:5        |             | 128      | blocking   | ●      | 2000000   | Barbera    | 0       | Barbera          | 8018                 | 2  |
| Int #6           | 6:6        |             | -        | -          | -      | -         | -          | -       | -                | -                    | -  |
| ● Int #7         | 7:7        |             | 128      | forwarding | ●      | 200000    | Barbera    | 0       | Barbera          | 8012                 | 1  |
| Int #8           | 8:8        |             | -        | -          | -      | -         | -          | -       | -                | -                    | -  |
| ● Int #9         | 9:9        |             | 128      | forwarding | ●      | 2000000   | Barbera    | 2000000 | Brunello         | 8009                 | 1  |
| Int #10          | 10:10      |             | -        | -          | -      | -         | -          | -       | -                | -                    | -  |
| ● Int #11        | 11:11      |             | 128      | blocking   | ●      | 2000000   | Barbera    | 38      | Shiraz           | 8011                 | 16 |
| Int #12          | 12:12      |             | -        | -          | -      | -         | -          | -       | -                | -                    | -  |
| Int #13          | 13:13      |             | -        | -          | -      | -         | -          | -       | -                | -                    | -  |
| Int #14          | 14:14      |             | -        | -          | -      | -         | -          | -       | -                | -                    | -  |
| Int #15          | 15:15      |             | -        | -          | -      | -         | -          | -       | -                | -                    | -  |
| Int #16          | 16:16      |             | -        | -          | -      | -         | -          | -       | -                | -                    | -  |
| Int #17          | 17:17      |             | -        | -          | -      | -         | -          | -       | -                | -                    | -  |
| Int #18          | 18:18      |             | -        | -          | -      | -         | -          | -       | -                | -                    | -  |
| Int #19          | 19:19      |             | -        | -          | -      | -         | -          | -       | -                | -                    | -  |
| Int #20          | 20:20      |             | -        | -          | -      | -         | -          | -       | -                | -                    | -  |
| Int #21          | 21:21      |             | -        | -          | -      | -         | -          | -       | -                | -                    | -  |
| Int #22          | 22:22      |             | -        | -          | -      | -         | -          | -       | -                | -                    | -  |
| Int #23          | 23:23      |             | -        | -          | -      | -         | -          | -       | -                | -                    | -  |
| Int #24          | 24:24      |             | -        | -          | -      | -         | -          | -       | -                | -                    | -  |

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# Inventory

Managing your network inventory has never been easier. For any make/model of device discovered on your network, Manufacturer, Model, Serial Number, Hardware, Firmware, and Software details are now reported on the inventory tab.

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TotalView

Poll frequency: 00:05:00  
 Last poll: 2/16/2015 4:38:27 PM  
 Network health: DEGRADED (1.04)

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Device Summary <<>>
● Healthy
● Suppressed issue
● Issue
? Comm fail
Lock Config

[General](#)
[Traffic](#)
[PoE](#)
[STP](#)
[Inventory](#)
[Description](#)
[Support](#)
[Financials](#)
[Uptime](#)

| Device Name                              | Device IP Address | Inventory                      |                    |                          | Code Revision |   |                                   |
|--|-------------------|--------------------------------|--------------------|--------------------------|---------------|---|-----------------------------------|
|  |                   | Manufacturer                   | Model              | Serial Num               | Hardware      | Firmware                                      | Software                          |
| <b>VoIP Gateways (2 devices)</b>         |                   |                                |                    |                          |               |   |                                   |
| ● San Francisco GW                       | 10.100.37.100     | ShoreTel, Inc                  |                    |                          |               |   |                                   |
| ● Santa Clara GW                         | 10.100.36.100     | ShoreTel, Inc                  |                    |                          |               |   |                                   |
| <b>Distribution Network (18 devices)</b> |                   |                                |                    |                          |               |   |                                   |
| ● Barbera                                | 10.100.37.5       | Enterseys Networks, Inc.       | A2H124-24P         | 0613383225E              |               | 01.00.50                                      | 03.03.02.0002                     |
| ● Bardolino                              | 10.100.36.18      | TP-LINK TECHNOLOGIES CO., LTD. |                    |                          |               |   |                                   |
| ● Bordeaux                               | 192.168.202.4     | D-Link Corporation             | DXS3250            | BH70158000649            | 00.00.01      | 1.0.0.25                                      | 1.1.0.11                          |
| ● Cabernet                               | 192.168.202.3     | HSB2SB1                        | PowerConnect 3424  | CN-DUJ393-28298-744-0058 | 00.00.01      | 1.0.1.01                                      | 2.0.0.20                          |
| ● Chardonmay                             | 10.100.36.54      | Hewlett-Packard                | J9019A             | CN720VW0PB               |               | Q.10.02                                       | Q.11.67                           |
| ● Corvina                                | 10.100.36.61      | H3C                            | S5600-26C-PWR      | 210235A11GX083000001     | REV.C         | 514   | 3.10 Release 1702P42              |
| ● Gamay                                  | 10.100.37.2       | ADTRAN, Inc.                   | 1200500L1          | G23G8789                 | 1             | 1   | 13.15.00                          |
| ● Graeciano                              | 10.100.36.40      | Allied Telesis Labs Ltd        |                    |                          |               |   |                                   |
| ● Grenache                               | 10.100.37.53      | CISCO SYSTEMS, INC.            |                    |                          |               |   |                                   |
| ● Malbec                                 | 10.100.36.75      | Nortel                         | 5520-24T-PWR       | SDNIT2075K               | 32            | 5.0.0.3                                       | v5.0.6.026                        |
| ● Merlot                                 | 10.100.36.48      | Extreme Networks               | 800138             | 0531G-00251              | 00-04         |   | 7.6.3.6                           |
| ● Muscat                                 | 10.100.36.51      | Nortel Networks                | 470-48T            | ACC1002PX                | #01           | 3.6.0.7                                       | v3.6.4.08                         |
| ● Palomino                               | 10.100.38.2       | cisco                          | WS-C3550-24PWR-SMI | CAT0718Z2GH              | D0            | 12.2(44)SE6                                   | 12.2(44)SE6                       |
| ● Pinot                                  | 10.100.36.53      | CISCO SYSTEMS, INC.            | WS-C3560-24PS-S    | CAT0947R1GA              | V05           | 12.2(55)SE1                                   | 12.2(55)SE1                       |
| ● Riesling                               | 10.100.36.70      | Juniper Networks               |                    |                          |               |   |                                   |
| ● Sauvignon                              | 10.100.36.20      | Avaya                          | 4850GTS-PWR+       | 12JPS12H70HE             | 10            | 5.6.2.1                                       | v5.6.3.025                        |
| ● Shiraz                                 | 10.100.37.3       | NETGEAR                        | Netgear GS7xxTP-AT | 1WW6265M002BC            | 00.01.02      | 1.0.1.0                                       | V5.2.0.11                         |
| ● Zinfandel                              | 10.100.36.27      | Cisco Systems, Inc.            | NSK-C5020P-BF      | SSI13480F6J              | 0.0           |   |                                   |
| <b>Edge Network (8 devices)</b>          |                   |                                |                    |                          |               |   |                                   |
| ● Atlanta                                | 10.100.37.1       | Cisco                          | 2621XM chassis     | FTX0921C0MG              | #####         | 12.2(8r) [mong 8r], RELEASE SOFTWARE (fc1)    |                                   |
| ● Denver                                 | 10.100.36.60      | Cisco                          | 2610 chassis       | JAB0333026P (1953273269) | 0x202         |   |                                   |
| ● Miami                                  | 10.100.38.3       | Cisco                          | CISCO2851          | FTX1031A21Z              | V03           | 12.4(1r) [hqluong 1r], RELEASE SOFTWARE (fc1) | 15.1(4)M8, RELEASE SOFTWARE (fc2) |
| ● Honolulu                               | 10.100.36.5       | Cisco                          | CISCO2811          | FTX1044A37B              | V03           |   |                                   |
| ● Honolulu                               | 10.100.38.1       | Cisco                          | CISCO2811          | FTX1044A37B              | V03           |   |                                   |
| ● NewYork                                | 192.168.202.1     | Cisco                          | 2610 chassis       | JAD0418016T (4052845898) | 0x203         |   |                                   |
| ● Internet                               | 10.100.36.1       | Cisco                          | 2621 chassis       | JAD0626CGJC (3208410732) | 0x00          |   |                                   |
| ● Zinfandel                              | 10.100.36.25      | Cisco Systems, Inc.            | NSK-C5020P-BF      | SSI13480F6J              | 0.0           |   |                                   |
| <b>Cisco ASA Firewall (1 devices)</b>    |                   |                                |                    |                          |               |   |                                   |
| ● CiscoASA                               | 10.100.36.4       | cisco Systems Inc.             | ASA5505            | JMX14354DLX              | V08           | 1.0(12)13                                     | 8.2(1)                            |
| <b>Servers (2 devices)</b>               |                   |                                |                    |                          |               |   |                                   |
| ● REDSONJA                               | 10.100.36.12      |                                |                    |                          |               |   |                                   |
| ● VELMA                                  | 10.100.36.10      | INTEL CORPORATION              |                    |                          |               |   |                                   |

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Feature Request

# Description

You can optionally manually enter a description for any or all of your devices using the “Devices” tab in the Config Tool.

The screenshot displays the TotalView interface with the 'Devices' tab selected. The network health is shown as 'DEGRADED (1.0%)'. The main content area shows a table of devices categorized into several groups:

- VoIP Gateways (2 devices):**
  - San Francisco GW (10.100.37.100) - ShoreGear 2
  - Santa Clara GW (10.100.36.100) - ShoreGear 1
- Distribution Network (18 devices):**
  - Barbera (10.100.37.5) - Barbera
  - Bardolino (10.100.36.18) - TP-Link TLSG3424P
  - Bordeaux (192.168.202.4) - Dlink XStack DXS 3250
  - Cabernet (192.168.202.3) - Switch - Dell PowerConnect 3424
  - Chardonnay (10.100.36.54) - Switch - HP ProCurve 2510-24
  - Corvina (10.100.36.61) - POE Switch - H3C POE S5600
  - Gamay (10.100.37.2) - Switch - Adtran NetVanta 1224
  - Graciano (10.100.36.40) - POE Switch - Allied Telesis AT-x900-48FE
  - Grenache (10.100.37.53) - Device
  - Malbec (10.100.36.75) - Device
  - Merlot (10.100.36.48) - Switch - Extreme Network Summit 300
  - Muscat (10.100.36.51) - Switch - Nortel Baystack 470-48T
  - Palomino (10.100.38.2) - Cisco Catalyst Switch 3550
  - Pinot (10.100.36.53) - POE Switch - Cisco Catalyst 3560
  - Riesling (10.100.36.70) - Device
  - Sauvignon (10.100.36.20) - Sauvignon - Avaya
  - Shiraz (10.100.37.3) - Device
  - Zinfandel (10.100.36.27) - Device
- Edge Network (8 devices):**
  - Atlanta (10.100.37.1) - Cisco 2600 - Atlanta
  - Denver (10.100.36.60) - Cisco C2600-I-M - Denver
  - Miami (10.100.38.3) - Cisco 2600 w/ Redundant Power Supply
  - Honolulu (10.100.36.5) - Cisco 2800 - Hawaii
  - Honolulu (10.100.38.1) - Cisco 2800 - Hawaii
  - NewYork (192.168.202.1) - Cisco C2600-I-M - New York
  - Internet (10.100.36.1) - Cisco C2600-J1S3-M
  - Zinfandel (10.100.36.25) - Cisco Nexus 5000 - Server Rm
- Cisco ASA Firewall (1 devices):**
  - CiscoASA (10.100.36.4) - ASA Firewall
- Servers (2 devices):**
  - REDSONJA (10.100.36.12) - RedSonja 2008 Server
  - VELMA (10.100.36.10) - Windows 2000 Server

At the bottom of the interface, there is a footer with the following text: 'TotalView Release 6 (6436) Copyright ©2014 PathSolutions', 'Perpetual License, licensed for 1000 interfaces', and a 'Feature Request' link.

# Support

The Support tab provides Contract ID, Expiration Date, and Contract Phone number for your devices. You can enter this information using the "Device" tab in the Config Tool for easy access to this information in one location.

pathSolutions TotalView

Poll frequency: 00:05:00  
Last poll: 2/16/2015 4:59:29 PM  
Network health: **DEGRADED (1.34)**

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Device Summary <<>> ● Healthy ● Suppressed issue ● Issue ? Comm fail

General Traffic PoE STP Inventory Description Support Financials Uptime

| Device Name                              | Device IP Address | Expiration Date | Contract ID       | Contract Phone |
|--|-------------------|-----------------|-------------------|----------------|
| <b>VoIP Gateways (2 devices)</b>         |                   |                 |                   |                |
| ● Santa Clara GW                         | 10.100.36.100     | 12/31/2013      | RU8-22312         | 800-555-3200   |
| ● San Francisco GW                       | 10.100.37.100     | 12/31/2013      | RU8-22312         | 800-555-3200   |
| <b>Distribution Network (21 devices)</b> |                   |                 |                   |                |
| ● Chardonnay                             | 10.100.36.54      | 10/31/2014      | HK89-312          | 800-555-0911   |
| ● Barbera                                | 10.100.37.5       | 12/01/2013      | RE-7281-383       | 800-555-1213   |
| ● Bardolino                              | 10.100.36.18      | -               | -                 | -              |
| ● Brunello                               | 10.100.37.16      | 12/01/2013      | RE-7281-332       | 800-555-3122   |
| ● Cabernet                               | 192.168.202.3     | -               | -                 | -              |
| ● EAP900H                                | 10.100.36.7       | -               | -                 | -              |
| ● Corvina                                | 10.100.36.61      | -               | -                 | -              |
| ● Gamay                                  | 10.100.37.2       | 12/31/2014      | KR07-8718-12-7301 | 888-555-1321   |
| ● Grenache                               | 10.100.37.53      | -               | -                 | -              |
| ● Bordeaux                               | 192.168.202.4     | -               | -                 | -              |
| ● Malbec                                 | 10.100.36.75      | -               | -                 | -              |
| ● Merlot                                 | 10.100.36.48      | 10/31/2014      | IJ08-3121-00-3208 | 888-555-1321   |
| ● Muscat                                 | 10.100.36.51      | 10/31/2014      | IJ08-3121-00-3208 | 888-555-1321   |
| ● Falomino                               | 10.100.38.2       | -               | -                 | -              |
| ● Pinot                                  | 10.100.36.53      | 10/31/2014      | IJ08-3121-00-3208 | 888-555-1321   |
| ● Sauvignon                              | 10.100.36.20      | -               | -                 | -              |
| ● SFO-OGB-HP5500                         | 63.147.175.6      | -               | -                 | -              |
| ● Shiraz                                 | 10.100.37.3       | 12/01/2014      | RE-7281-383       | 800-555-1213   |
| ● Zinfandel                              | 10.100.36.25      | -               | -                 | -              |
| ● Riesling                               | 10.100.36.70      | 12/01/2015      | -                 | -              |
| ● Atlanta                                | 10.100.37.1       | -               | -                 | -              |
| <b>Edge Network (8 devices)</b>          |                   |                 |                   |                |
| ● Atlanta                                | 192.168.202.2     | 02/01/2014      | 127-726-321UV56   | 650-555-8710   |
| ● Denver                                 | 10.100.36.60      | 02/01/2014      | 127-726-321UV56   | 650-555-8710   |
| ● GatewaySwitch                          | 38.102.148.186    | 12/31/2014      | KR07-8718-33-7183 | 888-555-1321   |
| ● Honolulu                               | 10.100.36.5       | -               | -                 | -              |
| ● Internet                               | 10.100.36.1       | 12/31/2014      | KR07-8718-12-7301 | 888-555-1321   |
| ● Miami                                  | 10.100.38.3       | -               | -                 | -              |
| ● NewYork                                | 192.168.201.2     | 12/31/2014      | KR07-8718-12-7301 | 888-555-1321   |
| ● SCWANRTR                               | 38.102.148.163    | 12/31/2014      | KR07-8718-33-7182 | 888-555-1321   |
| <b>Servers (1 devices)</b>               |                   |                 |                   |                |
| ● VELMA                                  | 10.100.36.10      | 06/01/2014      | 87-382-781-7211   | 408-555-8781   |

# Financials

The Financials tab provides financial operation information about your equipment. Ensure that you aren't running equipment older than expected while gaining insights into the operational costs of your network. You can see the Manufacturer Date, when the device was Deployed, Procurement Cost, Amortization Months, Annual Support Cost, and Monthly Operating Cost.

**pathSolutions**
**TotalView**
Poll frequency: 00:05:00  
Last poll: 3/2/2015 5:01:10 PM  
Network health: DEGRADED (1.74)

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Device <<>>
● Healthy ● Suppressed ● Issue ? Comm fail
General Traffic PoE STP Inventory Description Support **Financials** Uptime

| Device Name                              | Device IP Address | Compliance |             | Costs            |              |                     |                        |
|--|-------------------|------------|-------------|------------------|--------------|---------------------|------------------------|
|  |                   | MFG Date   | Deploy Date | Procurement Cost | Amort Months | Annual Support Cost | Monthly Operating Cost |
| <b>VoIP Gateways (2 devices)</b>         |                   |            |             |                  |              |                     |                        |
| ● Santa Clara GW                         | 10.100.36.100     | -          | 12/31/2011  | \$3,435          | 48           | \$168               | \$85.56                |
| ● San Francisco GW                       | 10.100.37.100     | -          | 12/31/2011  | \$3,435          | 48           | \$168               | \$85.56                |
| <b>Distribution Network (21 devices)</b> |                   |            |             |                  |              |                     |                        |
| ● Chardonnay                             | 10.100.36.54      | 5/14/2007  | 10/31/2012  | \$983            | 48           | \$57                | \$25.23                |
| ● Brunello                               | 10.100.37.16      | 6/13/2011  | 12/01/2011  | \$765            | 48           | \$42                | \$19.44                |
| ● Barbera                                | 10.100.37.5       | 3/24/2008  | 12/01/2011  | \$2,350          | 48           | \$120               | \$58.96                |
| ● Bardolino                              | 10.100.36.18      | -          | -           |                  |              |                     |                        |
| ● Cabernet                               | 192.168.202.3     | -          | -           |                  |              |                     |                        |
| ● EAP900H                                | 10.100.36.7       | -          | -           |                  |              |                     |                        |
| ● Corvina                                | 10.100.36.61      | -          | -           |                  |              |                     |                        |
| ● Gamay                                  | 10.100.37.2       | 6/4/2006   | 12/31/2012  | \$890            | 48           | \$51                | \$22.79                |
| ● Grenache                               | 10.100.37.53      | -          | -           |                  |              |                     |                        |
| ● Bordeaux                               | 192.168.202.4     | -          | -           |                  |              |                     |                        |
| ● Malbec                                 | 10.100.36.75      | -          | -           |                  |              |                     |                        |
| ● Merlot                                 | 10.100.36.48      | 8/1/2005   | 10/31/2012  | \$2,450          | 48           | \$128               | \$61.71                |
| ● Muscat                                 | 10.100.36.51      | -          | 10/31/2012  | \$4,362          | 48           | \$259               | \$112.46               |
| ● Palomino                               | 10.100.38.2       | 4/28/2003  | -           |                  |              |                     |                        |
| ● Pinot                                  | 10.100.36.53      | 11/21/2005 | 10/31/2012  | \$3,482          | 48           | \$230               | \$91.71                |
| ● Sauvignon                              | 10.100.36.20      | -          | -           |                  |              |                     |                        |
| ● SFO-COB-HP5500                         | 63.147.175.6      | 6/7/2010   | -           |                  |              |                     |                        |
| ● Shiraz                                 | 10.100.37.3       | -          | 12/01/2012  | \$582            | 48           | \$35                | \$15.04                |
| ● Zinfandel                              | 10.100.36.25      | 11/30/2009 | -           |                  |              |                     |                        |
| ● Riesling                               | 10.100.36.70      | -          | -           |                  |              |                     |                        |
| ● Atlanta                                | 10.100.37.1       | 5/23/2005  | -           |                  |              |                     |                        |
| <b>Edge Network (8 devices)</b>          |                   |            |             |                  |              |                     |                        |
| ● Atlanta                                | 192.168.202.2     | 5/23/2005  | 02/01/2012  | \$1,280          | 48           | \$135               | \$37.92                |
| ● Denver                                 | 10.100.36.60      | 8/16/1999  | 02/01/2012  | \$1,280          | 48           | \$135               | \$37.92                |
| ● GatewaySwitch                          | 38.102.148.186    | 10/25/1999 | 12/31/2012  | \$892            | 48           |                     | \$18.58                |
| ● Honolulu                               | 10.100.36.5       | 10/29/2006 | -           |                  |              |                     |                        |
| ● Internet                               | 10.100.36.1       | 6/24/2002  | 12/31/2012  | \$1,280          | 48           | \$135               | \$37.92                |
| ● Miami                                  | 10.100.38.3       | 7/30/2006  | -           |                  |              |                     |                        |
| ● NewYork                                | 192.168.201.2     | 5/1/2000   | 12/31/2012  | \$1,280          | 48           | \$135               | \$37.92                |
| ● SCWANRTR                               | 38.102.148.163    | 4/28/2008  | 12/31/2012  | \$767            | 48           | \$43                | \$19.56                |
| <b>Servers (1 devices)</b>               |                   |            |             |                  |              |                     |                        |
| ● VELMA                                  | 10.100.36.10      | -          | 06/01/2012  | \$2,480          | 48           | \$136               | \$63.00                |
| <b>Core Network (3 devices)</b>          |                   |            |             |                  |              |                     |                        |
| ● SC_Server                              | 10.0.12.5         | 2/21/2011  | 2/1/2013    | \$4,520          | 60           | \$267               | \$97.58                |
| ● SC_User_SW1                            | 10.0.12.6         | 2/21/2011  | 2/1/2013    | \$4,520          | 60           | \$267               | \$97.58                |
| ● SC_User_SW2                            | 10.0.12.7         | 2/21/2011  | 2/1/2013    | \$4,520          | 60           | \$267               | \$97.58                |
| <b>Cisco ASA FireWall (1 devices)</b>    |                   |            |             |                  |              |                     |                        |
| ● CiscoASA                               | 10.100.36.4       | 8/30/2010  | -           |                  |              |                     |                        |
| <b>Totals:</b>                           |                   |            |             | <b>\$45,553</b>  |              | <b>\$2,778</b>      | <b>\$1,124</b>         |

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# Uptime

The Uptime tab allows you to see uptime information and when a device last rebooted. You can aid in troubleshooting any device that goes down.

TotalView

Poll frequency: 00:05:00  
 Last poll: 2/16/2015 4:38:27 PM  
 Network health: DEGRADED (1.04)

Map Path Phones Assessment MOS **Devices** Favorites Issues Health Top-10 WAN Interfaces Tools

Device Summary <<>> ● Healthy ● Suppressed issue ● Issue ? Comm fail [Lock Config](#)
General Traffic PoE STP Inventory Description Support Financials **Uptime**

| Device Name                              | Device IP Address | SNMP Version | SNMP Reliability | Uptime       |               |                |               | Device Last Reboot   |
|--|-------------------|--------------|------------------|--------------|---------------|----------------|---------------|----------------------|
|  |                   |              |                  | Daily Uptime | Weekly Uptime | Monthly Uptime | Yearly Uptime |                      |
| <b>VoIP Gateways (2 devices)</b>         |                   |              |                  |              |               |                |               |                      |
| ● San Francisco GW                       | 10.100.37.100     | SNMPV2C      | 98.61%           | 99.939%      | 96.171%       | 97.122%        | 74.268%       | 455 days 20:38:10.96 |
| ● Santa Clara GW                         | 10.100.36.100     | SNMPV2C      | 98.63%           | 100.000%     | 100.000%      | 100.000%       | 97.439%       | 456 days 22:20:04.96 |
| <b>Distribution Network (18 devices)</b> |                   |              |                  |              |               |                |               |                      |
| ● Barbera                                | 10.100.37.5       | SNMPV2C      | 97.28%           | 98.193%      | 95.202%       | 95.778%        | 81.349%       | 216 days 21:25:53.00 |
| ● Bardolino                              | 10.100.36.18      | SNMPV2C      | 96.62%           | 97.000%      | 96.915%       | 98.132%        | 94.444%       | 37 days 10:28:49.73  |
| ● Bordeaux                               | 192.168.202.4     | SNMPV2C      | 99.24%           | 99.932%      | 99.502%       | 99.385%        | 93.317%       | 18 days 01:10:24.31  |
| ● Cabernet                               | 192.168.202.3     | SNMPV2C      | 98.29%           | 99.049%      | 97.763%       | 97.910%        | 82.517%       | 38 days 06:44:26.11  |
| ● Chardonnay                             | 10.100.36.54      | SNMPV2C      | 98.94%           | 100.000%     | 100.000%      | 100.000%       | 99.507%       | 201 days 02:35:31.40 |
| ● Corvina                                | 10.100.36.61      | SNMPV2C      | 99.01%           | 100.000%     | 100.000%      | 100.000%       | 98.524%       | 188 days 21:47:26.74 |
| ● Gamay                                  | 10.100.37.2       | SNMPV2C      | 97.33%           | 98.256%      | 95.615%       | 96.095%        | 82.498%       | 216 days 01:43:35.86 |
| ● Graciano                               | 10.100.36.40      | SNMPV2C      | 99.19%           | 100.000%     | 100.000%      | 100.000%       | 98.290%       | 188 days 21:45:30.46 |
| ● Grenache                               | 10.100.37.53      | SNMPV2C      | 97.90%           | 99.432%      | 97.307%       | 96.920%        | 94.310%       | 36 days 09:50:25.16  |
| ● Malbec                                 | 10.100.36.75      | SNMPV2C      | 98.89%           | 100.000%     | 99.998%       | 99.998%        | 97.771%       | 271 days 01:52:50.79 |
| ● Merlot                                 | 10.100.36.48      | SNMPV2C      | 99.02%           | 100.000%     | 100.000%      | 100.000%       | 98.290%       | 216 days 21:20:24.99 |
| ● Muscat                                 | 10.100.36.51      | SNMPV2C      | 99.37%           | 100.000%     | 100.000%      | 100.000%       | 98.290%       | 216 days 21:01:38.78 |
| ● Palomino                               | 10.100.38.2       | SNMPV2C      | 98.71%           | 100.000%     | 100.000%      | 100.000%       | 98.293%       | 84 days 00:34:31.98  |
| ● Pinot                                  | 10.100.36.53      | SNMPV2C      | 98.86%           | 100.000%     | 100.000%      | 100.000%       | 98.046%       | 216 days 21:17:39.87 |
| ● Riesling                               | 10.100.36.70      | SNMPV2C      | 99.79%           | 100.000%     | 100.000%      | 100.000%       | 65.610%       | 28 days 03:02:29.10  |
| ● Sauvignon                              | 10.100.36.20      | SNMPV2C      | 99.42%           | 100.000%     | 100.000%      | 100.000%       | 97.210%       | 146 days 02:15:41.83 |
| ● Shiraz                                 | 10.100.37.3       | SNMPV2C      | 97.62%           | 99.200%      | 97.459%       | 97.276%        | 82.480%       | 215 days 04:38:20.00 |
| ● Zinfandel                              | 10.100.36.27      | SNMPV2C      | 99.07%           | 100.000%     | 100.000%      | 100.000%       | 99.756%       | 378 days 00:17:45.48 |
| <b>Edge Network (8 devices)</b>          |                   |              |                  |              |               |                |               |                      |
| ● Atlanta                                | 10.100.37.1       | SNMPV2C      | 95.10%           | 98.334%      | 93.544%       | 92.068%        | 82.917%       | 88 days 01:59:42.45  |
| ● Denver                                 | 10.100.36.60      | SNMPV2C      | 99.32%           | 100.000%     | 100.000%      | 100.000%       | 91.178%       | 216 days 21:12:06.39 |
| ● Miami                                  | 10.100.38.3       | SNMPV2C      | 99.21%           | 100.000%     | 100.000%      | 100.000%       | 98.537%       | 188 days 21:47:55.31 |
| ● Honolulu                               | 10.100.36.5       | SNMPV2C      | 99.32%           | 100.000%     | 100.000%      | 100.000%       | 98.727%       | 83 days 23:40:51.11  |
| ● Honolulu                               | 10.100.38.1       | SNMPV2C      | 99.32%           | 100.000%     | 100.000%      | 100.000%       | 98.780%       | 83 days 23:40:51.24  |
| ● NewYork                                | 192.168.202.1     | SNMPV2C      | 99.32%           | 100.000%     | 100.000%      | 100.000%       | 83.680%       | 216 days 21:05:20.12 |
| ● Internet                               | 10.100.36.1       | SNMPV2C      | 99.32%           | 100.000%     | 100.000%      | 100.000%       | 97.039%       | 200 days 08:03:29.80 |
| ● Zinfandel                              | 10.100.36.25      | SNMPV2C      | 99.07%           | 100.000%     | 100.000%      | 100.000%       | 97.522%       | 378 days 00:17:47.91 |
| <b>Cisco ASA Firewall (1 devices)</b>    |                   |              |                  |              |               |                |               |                      |
| ● CiscoASA                               | 10.100.36.4       | SNMPV2C      | 99.75%           | 100.000%     | 100.000%      | 100.000%       | 89.507%       | 271 days 00:24:39.00 |
| <b>Servers (2 devices)</b>               |                   |              |                  |              |               |                |               |                      |
| ● REDSONJA                               | 10.100.36.12      | SNMPV2C      | 99.70%           | 100.000%     | 100.000%      | 100.000%       | 96.578%       | 68 days 13:21:57.46  |
| ● VELMA                                  | 10.100.36.10      | SNMPV2C      | 98.63%           | 100.000%     | 100.000%      | 100.000%       | 97.378%       | 136 days 01:53:03.34 |
| Total Devices:                           |                   | 31           | Avg: 98.70%      |              |               |                |               | 185 days 19:56:40.00 |

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Feature Request

## Requirements

The PathSolutions' TotalView Service installs on a Windows server (or workstation acting as a server), and can be viewed from web browsers on the network. The following are requirements for the server and the client web browser.

### Server Requirements

The system requirements may be low, depending on the size of your network. As your network grows, you may need to increase the base system requirements.

#### Small Network Server Requirements

For networks with less than 1,000 total interfaces, the following hardware requirements are required:

- ✓ Pentium 200 MHz processor or faster (Virtual server is fine)
- ✓ 40 MB of free disk space
- ✓ 256 MB of RAM for the service (512 MB RAM minimum for the server)
- ✓ 100 MBPS Network Interface Card
- ✓ Runs on both 32 and 64 bit Windows deployments
- ✓ Operating systems:
  - Windows 2000 Server/Advanced Server
  - Windows Server 2003
  - Windows Server 2008
  - Windows Server 2012
  - Windows 2000 Professional
  - Windows XP Professional
  - Windows Vista
  - Windows 7
  - Windows 8

#### Medium Network Server Requirements

For networks with more than 1,000 interfaces, but less than 5,000 interfaces, the following hardware requirements are suggested:

- ✓ Pentium 800 MHz processor or faster (Virtual server is fine)
- ✓ 1 GB of free disk space
- ✓ 1 GB of RAM for the service (2 GB RAM minimum for the server)
- ✓ 100 MBPS Network Interface Card
- ✓ Virtual Machine supported up to 5,000 interfaces. Physical hardware is recommended above 5,000 interfaces due to Disk IO performance.
- ✓ Runs on both 32 and 64 bit Windows deployments
- ✓ Operating systems:
  - Windows 2000 Server/Advanced Server
  - Windows Server 2003
  - Windows Server 2008
  - Windows Server 2012

## Large Network Server Requirements

For networks with more than 5,000 interfaces, the following hardware requirements are suggested:

- ✓ Pentium 1 GHz processor or faster (Virtual server not recommended)
- ✓ 10 GB of free disk space
- ✓ 3 GB of RAM for the service (4 GB RAM minimum for the server)
- ✓ 100 MBPS Network Interface Card, configured for full-duplex operation
- ✓ 15,000k rpm hard drive
- ✓ Runs on both 32 and 64 bit Windows deployments
- ✓ Operating systems:     Windows 2000 Advanced Server  
                                  Windows Server 2003  
                                  Windows Server 2008  
                                  Windows Server 2012

## Virtual Server Requirements

Running the solution on a virtual server is fully supported for deployments below 5,000 interfaces. The server should be configured with a fixed (static) MAC address for licensing purposes.

## Installation

Installation and configuration of PathSolutions' TotalView takes roughly 12 minutes for most networks.

You must have a valid PathSolutions' TotalView License to use the software. This will usually arrive in the form of an email from PathSolutions:

**pathSolutions**



**Don't Turtle Your Network**

### PathSolutions License

Thank you for acquiring PathSolutions software.

Customer Name: Rubies  
Start date: 2/9/2015 12:00:00 AM  
End date: 2/24/2015 12:00:00 AM  
Interfaces: 1000

It is recommended that you [register on the PathSolutions website](#) to be informed of updates and new features as they are released.

### Requirements

- Make sure that the computer where the software is installed meets the [system requirements](#).
- All network switches, routers, gateways, and servers should have IP addresses and SNMP read-only community strings configured. SNMP configuration assistance for certain devices is available on our [website](#), or contact [support@PathSolutions.com](mailto:support@PathSolutions.com).

### Installation

1. Download and run the installer:  
[http://www.PathSolutions.com/download/TotalView5\(R6006\).msi](http://www.PathSolutions.com/download/TotalView5(R6006).msi)
2. After the program is installed, the QuickConfig wizard will run. Enter the following information into the QuickConfig wizard to activate the license:

Customer number: 1508060  
Customer location: HQ

If you have any questions, please contact [Support@PathSolutions.com](mailto:Support@PathSolutions.com) or call us at 1-877-748-1444.

License information can be obtained from your PathSolutions reseller or directly from PathSolutions.

PathSolutions license support: 1-877-748-1777  
[Support@PathSolutions.com](mailto:Support@PathSolutions.com)

To set up PathSolutions' TotalView on your machine, use the provided link in the email to download the latest version from the PathSolutions website.

PathSolutions' TotalView should be installed on a server or workstation that has a permanent connection to the network.

## QuickConfig Wizard

Double-click on the installation program and follow the instructions on the screen. The Quick Config Wizard will auto-configure PathSolutions' TotalView for you and begin monitoring in just a few minutes.

The QuickConfig Wizard has four steps after Activation:

- Step 1: Network Address Ranges
- Step 2: SNMP Community Strings
- Step 3: Issue Thresholds
- Step 4: Emailed Reports

After installation is complete, PathSolutions' TotalView will scan your network for devices and begin monitoring.

## Activation

You will be asked to enter your subscription information to activate your subscription.

**Activation**

In order to activate your license, you will need to provide a customer number, customer location, and your contact information. This information will be validated against our subscription server to activate your license.

Customer Number: 910334

Customer Location: LAB

Contact Name: Ruby Rojas

Contact Phone: 408-505-8354

Contact Email: ruby@gemstones.com

MAC Address: 78-2b-cb-b6-d7-d6

<<Previous   Next>>   Cancel

Enter all fields from your subscription email.

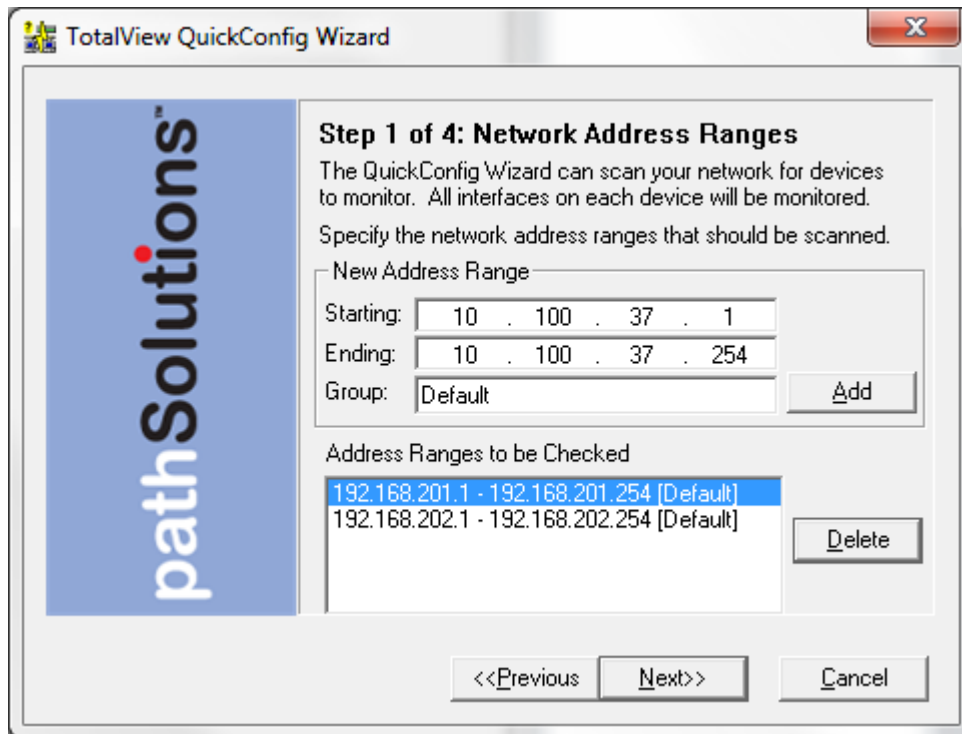
---

**Note:** Customer Number and Customer Location fields are case sensitive. These fields must be entered exactly as they are specified in the subscription email.

---

## Step 1: Network Address Ranges

The first step allows you to specify the network range or ranges that should be scanned to discover network devices such as switches and routers.



Enter a starting IP address and an ending IP address for each network range that should be scanned. A group name can be assigned to each IP address range that is added.

---

**Note:** Run the Quick Config Wizard once with just a couple of subnets and notice the results. Then you can re-run the Quick Config Wizard and add successive subnets.

**Note:** The list of what PathSolutions' TotalView discovers can be examined and adjusted with the Configuration Tool.

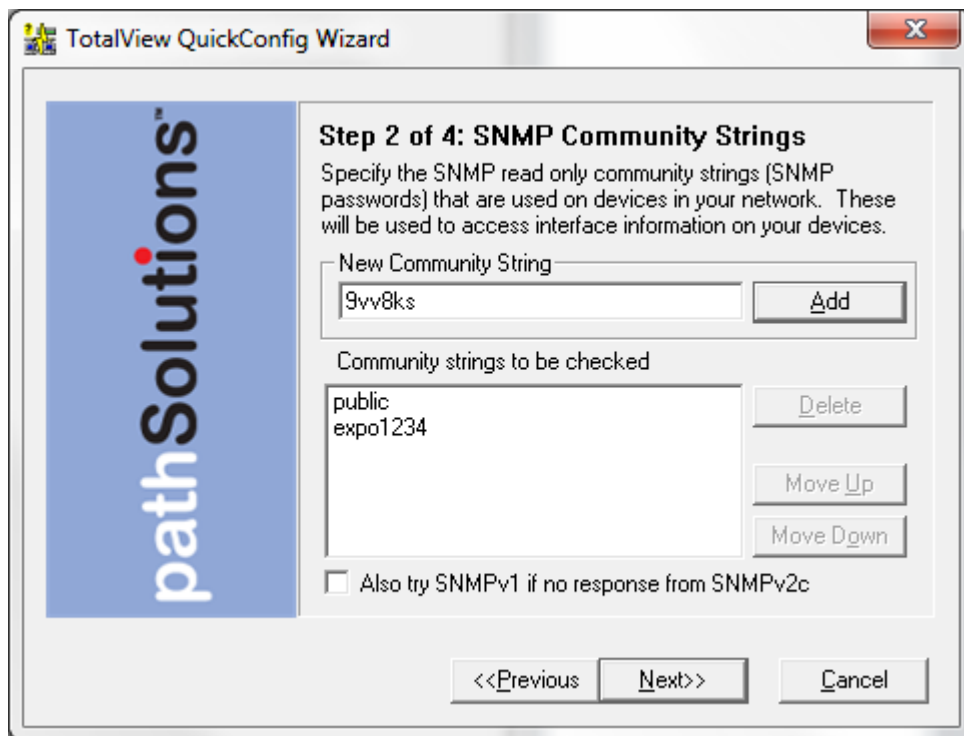
**Note:** If a device is in the Network Address Range to be monitored but does not appear on the Device List Page in TotalView:

- 1) Use the Poll Device to see if it communicates via the SNMP string. If it Does respond to SNMP via the Poll Device:
  - 2) The next thing to check is that your Number of Interfaces does not exceed your Licensed Interface Count. Your Interface Count can be seen at the Bottom of the "Device" page. If your Interface Count is fine:
  - 3) Check the SwMonIgnore.cfg file to make sure it was not set to be ignored. The SwMonIgnore.cfg file can be found in C:\Program Files (x86)\PathSolutions\TotalView.
- 

Click "Next" to continue.

## Step 2: SNMP Community Strings

The second step allows you to select what SNMP read only community strings should be used with this scan.



Enter all of the SNMP read-only community strings that are used in your network to help ensure that network devices are identified.

---

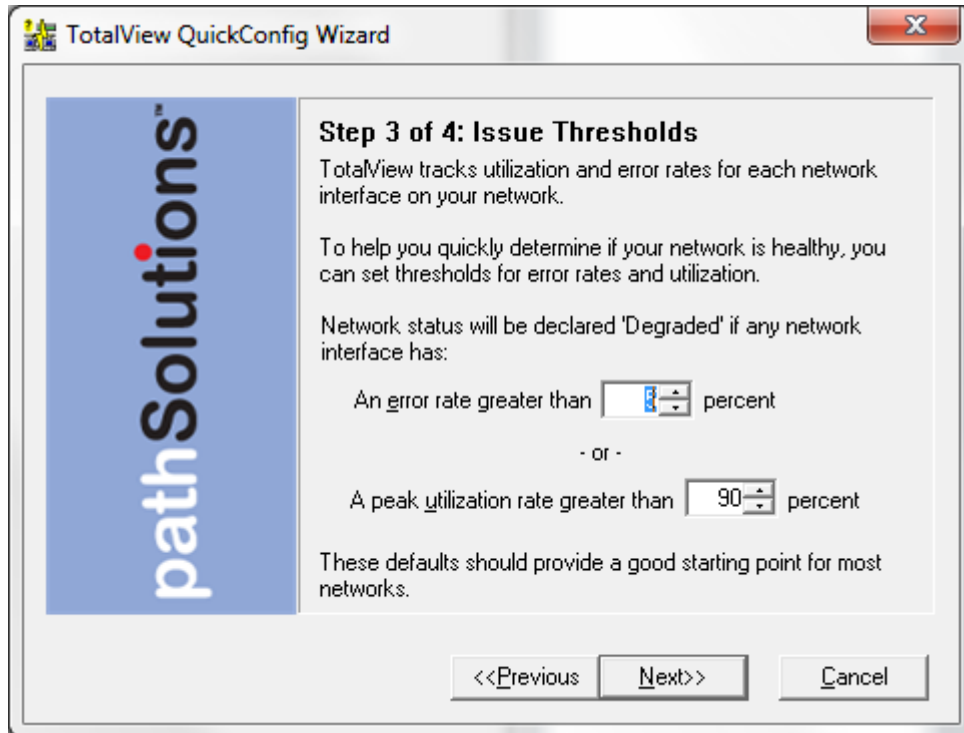
**Note:** On Cisco devices, the “@” sign should not be used in a community string as it is reserved for special use in fetching bridge tables with the Cisco’s Community String Indexing feature.

---

Click "Next" to continue.

### Step 3: Issue Thresholds

The third step will ask what thresholds to use for determining if your network is healthy or not:



If an interface has an error rate higher than 5%, network status will be changed to 'Degraded'.

If an interface has a peak utilization rate (transmitted or received) over 90%, network status will be changed to 'Degraded'.

These numbers can be adjusted to suit your specific network environment and your tolerance for errors.

Click "Next" to continue.



## Step 4: Emailed Reports

The fourth step will ask if you want to receive daily emailed network 'Weather Reports':

**TotalView QuickConfig Wizard**

**Step 4 of 4: Emailed Reports**

TotalView can email a daily network "Weather Report" to help you keep track of your network health.

Do you want to receive these reports?  Yes  No

Send to:   
Example: jdoe@hotmail.com, flb@aol.com

Send from:   
Example: noc@company.com

Mail server IP address:   
(or DNS name) Example: mail.company.com

Enter the Internet SMTP email addresses that should receive the daily report. You can enter multiple email addresses by using a semicolon, comma or space character between each email address.

Enter the email address that these messages should be sent from (make sure to use an Internet SMTP email address -- e.g. bob@company.com). If the email address does not exist, the email will bounce back to the "Send from" user's mailbox.

You will need to enter the IP address or DNS hostname of your SMTP mail server address. This mail server should allow SMTP forwarding if you intend to send to individuals at other domain names. See Appendix C for additional information on SMTP email forwarding.

After entering this information, you can click "Test" to send a test email. If there is a problem sending an email, you will be presented with detailed information how to resolve the problem.

Click "Finish" to complete the wizard.

After clicking "Finish", the wizard will scan the network ranges for network devices that support SNMP. The monitoring service will be started, and you will be presented with a web page displaying which devices are being monitored.

That is all that is necessary to install and configure the program. You should be able to immediately analyze errors on your network.

The network Weather Report emails are sent out at midnight local time, detailing the status of your network for the previous day.

## Re-Configuring when your Network Changes

If you have new interfaces on your network, you can re-run the Quick Config Wizard to scan your network and determine what changes have occurred.

To re-run the Quick Config Wizard, click on "Start". Then choose "Programs", "PathSolutions", "TotalView", and "Quick Config Wizard".

You don't have to change any configurations already set with the Quick Config Wizard. Just click "Next" to every screen and the network will be scanned for new interfaces.

## Automatic Re-Configuration

The Quick Config wizard can be run in automatic mode from a scheduled task if it is desired for new devices to be automatically discovered on a regular basis.

```
MonitorWizard.exe /a
```

When run in automatic mode, the program will not ask any questions but will scan the previous IP address ranges, will use the previous SNMP community strings, and add any new devices to the service. The service will then be stopped and then re-started to have the new devices added.

To change what IP address ranges and SNMP community strings are used in the automatic scan, edit the wizard.ini file:

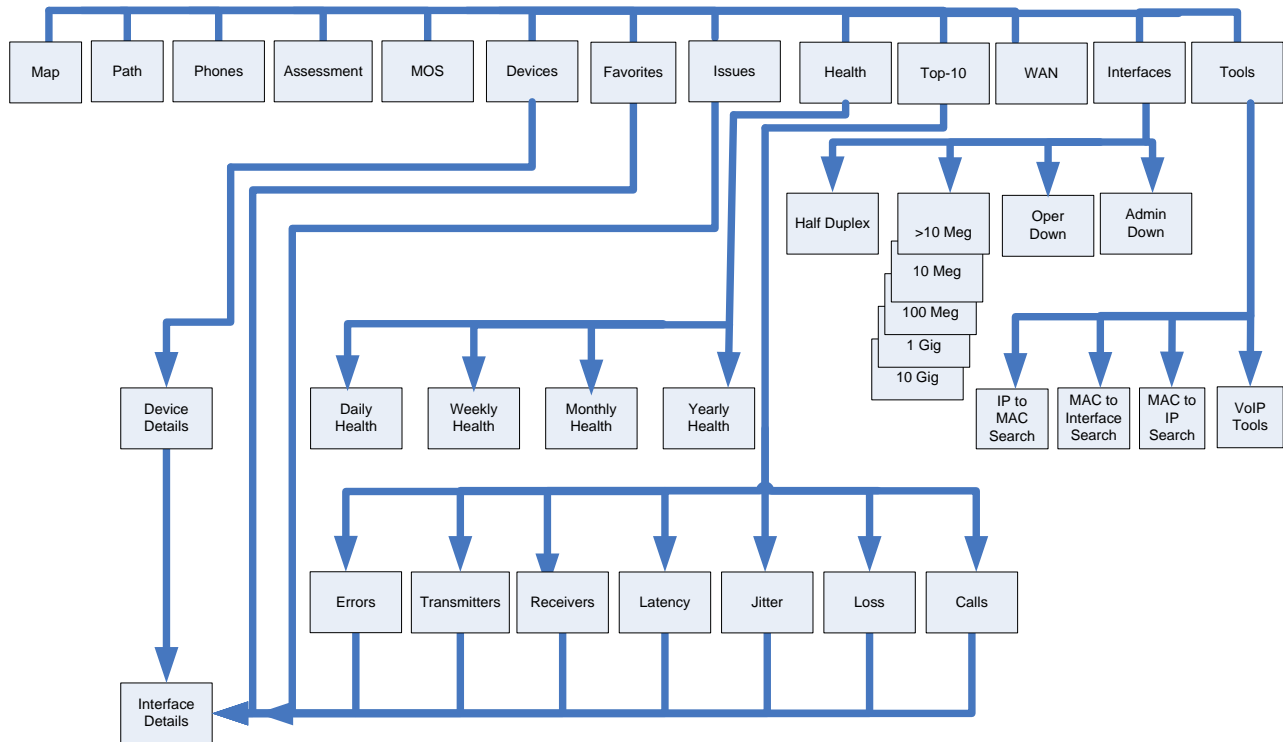
```
/#10.100.47.1 - 10.100.47.254 [Default]/  
/#10.100.56.1 - 10.100.56.254 [Default]/  
/#192.168.136.1 - 192.168.136.10 [Edge Network]/  
/#192.168.110.1 - 192.168.110.10 [Edge Network]/  
/public/
```

Make sure all slashes '/' and pound signs '#' are maintained.

# Using the Web Interface

## Navigation Map

The PathSolutions' TotalView Web layout is easy to follow, and easy to navigate between switches and interfaces.



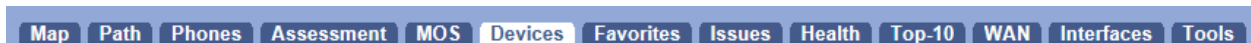
The top row of the navigation map includes a number of tabs that define different areas of the product.

## Web Page Headers

At the top of each web page, general information is displayed: Polling Frequency, Last Poll Time, and Network Health.

## Tabs

Navigating using the web interface is accomplished by using the tabs at the top of the web page:



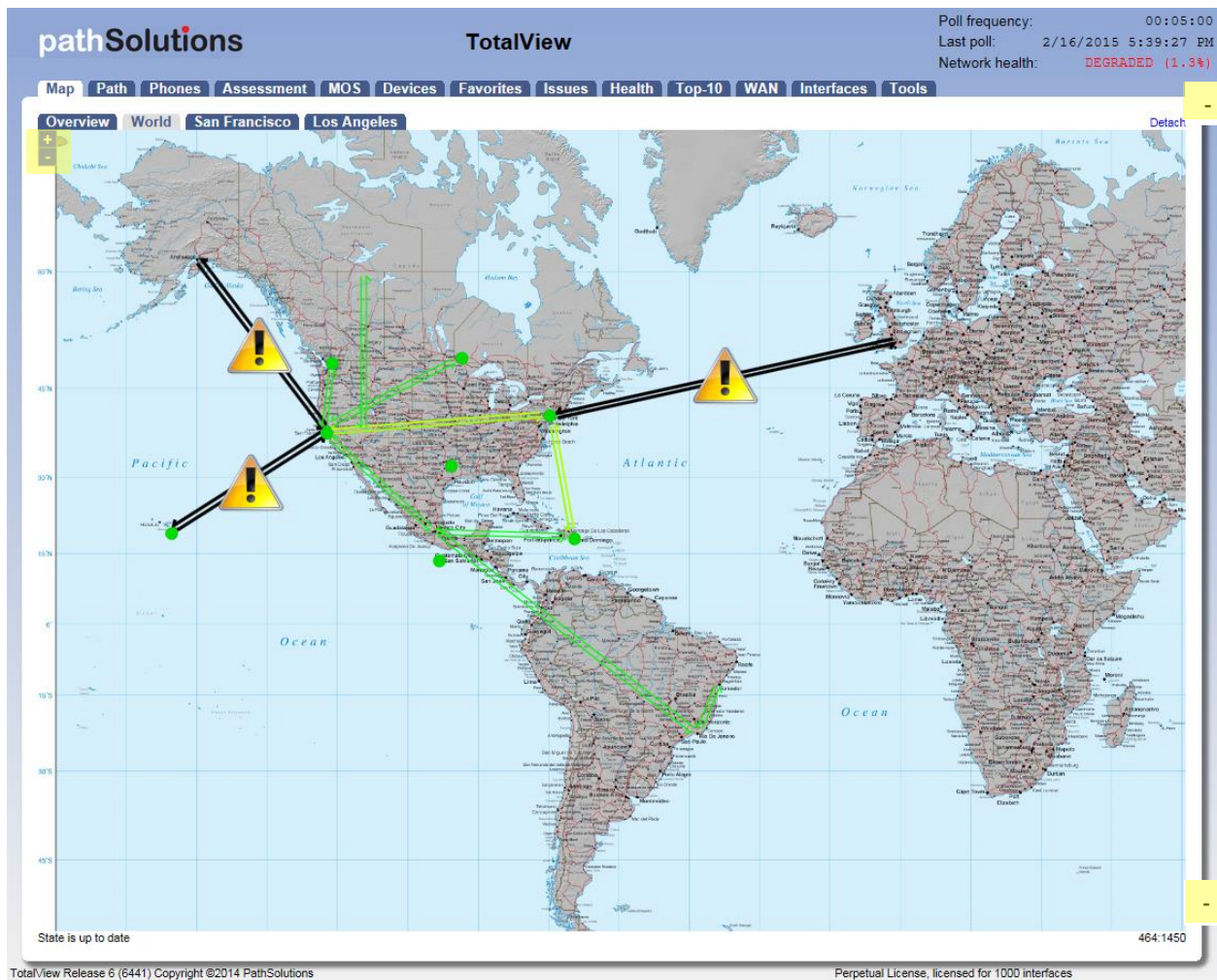
Each tab covers a specific area relating to the health of your network.

## Map

TotalView's Dynamic Network Map will tell you what is working and not working within **5 seconds** of an outage. Multiple maps and locations can be created for display.

TotalView's Dynamic Network Maps provide audible and visual cues that are designed to instantly alert you of network issues. Visual cues indicate the utilization level—links will show as a thin green line if lightly utilized and become thicker as network utilization increases while a thick red line indicates heavy utilization. Links will change to a thick black line if the link is down.

Ping points are also available to show if a device is reachable or not, adding further validation of network stability. Audible alerts play when links or devices go down so you can know what's happening immediately and start to remedy the problem.



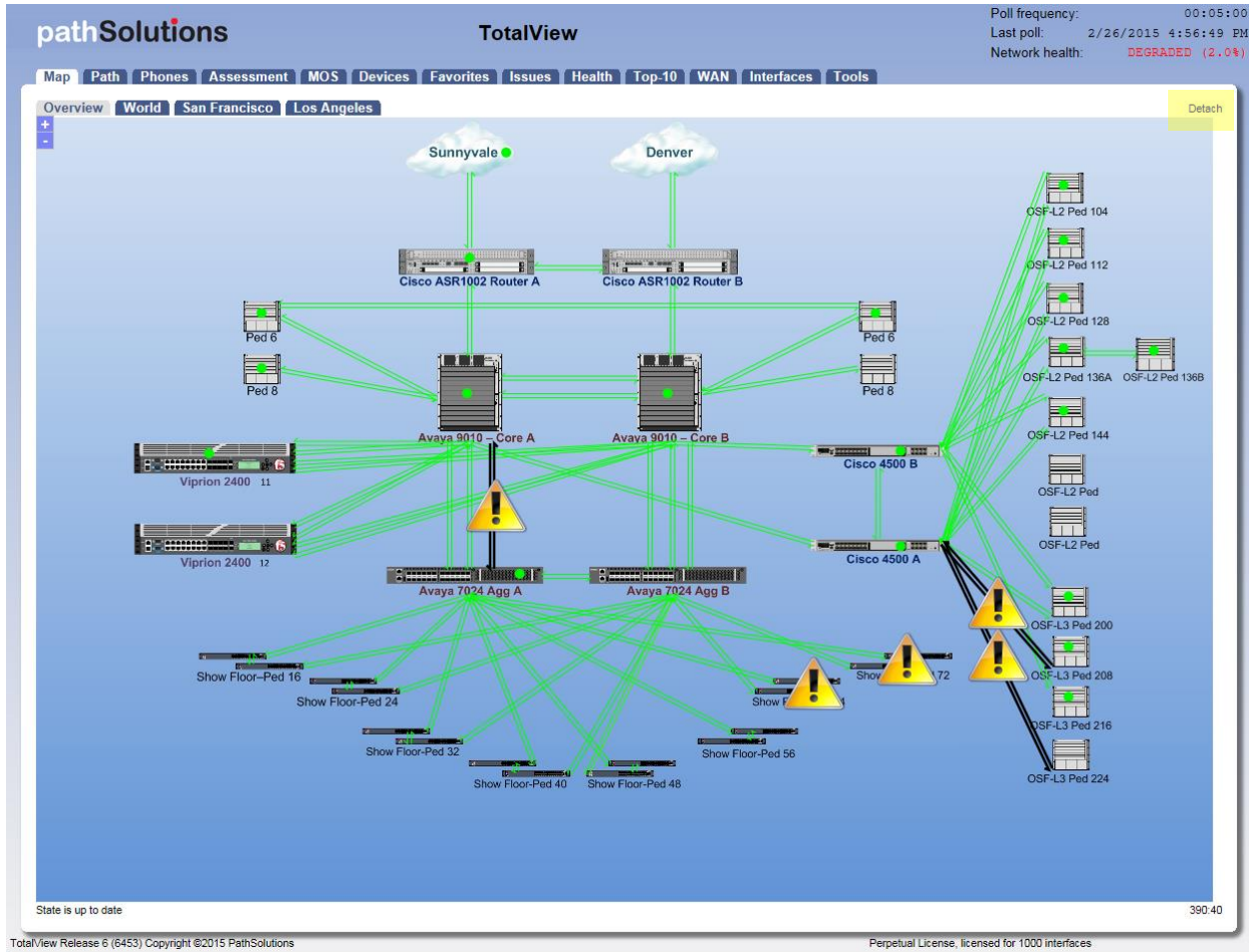
Links and Ping Points can be added to this map via the “Config Tool”. To pinpoint locations for adding lines, use the **XY coordinates** indicated in the lower right corner of the web page. See pages 154-156 for more details on using the “Config Tool” to create links on the map.

To pan around the map, click and drag anywhere on the background of the map. To zoom in or out on any section of the map use the **+** or **-** feature on the top left of the map screen.

Click on any line to display a Daily Graph for the monitored interface.

You can use the “Detach” link in the upper right corner to open a detached view of the network map for full page viewing.

| Legend | Line Color | Description   |
|--------|------------|---|
|        | Green      | <10% utilized (lightly utilized)                        |
|        | Yellow     | ~50% utilized   |
|        | Red        | >90% utilized (heavy utilized)                          |
|        | Black      | Interface is down                                       |
|        | White      | Communication failure (could not read interface status) |



## Devices Tab

The Device tab view shows you a list of your monitored network devices and information about each.

### General Sub-tab

The "General" sub-tab allows you to manage the device as well as learn about the device capabilities.

The screenshot shows the TotalView interface with the 'Devices' tab selected. The 'General' sub-tab is active. The table displays the following data:

| Device Name                              | Device IP Address | Manage Device        | OSI Services |   |   |   |   |   |     | # of Int          | Oper Up | Oper Down | Admin Down        | Location                            | Contact |  |
|--|-------------------|----------------------|--------------|---|---|---|---|---|-----|-------------------|---------|-----------|-------------------|-------------------------------------|---------|--|
|  |                   |                      | 1            | 2 | 3 | 4 | 5 | 6 | 7   |                   |         |           |                   |                                     |         |  |
| <b>VoIP Gateways (2 devices)</b>         |                   |                      |              |   |   |   |   |   |     |                   |         |           |                   |                                     |         |  |
| San Francisco GW                         | 10.100.37.100     | Telnet SSH Web HTTPS | ●            | ● | ● | ● | ● | ● | 1   | 1                 | 0       | 0         | San Francisco     | ShoreTel                            |         |  |
| Santa Clara GW                           | 10.100.36.100     | Telnet SSH Web HTTPS | ●            | ● | ● | ● | ● | ● | 1   | 1                 | 0       | 0         | Headquarters      | ShoreTel                            |         |  |
| <b>Distribution Network (18 devices)</b> |                   |                      |              |   |   |   |   |   |     |                   |         |           |                   |                                     |         |  |
| Barbera                                  | 10.100.37.5       | Telnet SSH Web HTTPS | ●            |   |   |   |   |   | 33  | 14                | 19      | 0         | Santa Clara       | Tim Titus                           |         |  |
| Bardolino                                | 10.100.36.18      | Telnet SSH Web HTTPS | ●            | ● |   |   |   |   | 26  | 6                 | 20      | 0         | San Francisco     | www.tp-link.com                     |         |  |
| Bordeaux                                 | 192.168.202.4     | Telnet SSH Web HTTPS | ●            |   |   |   |   |   | 115 | 3                 | 48      | 0         | Sunnyvale         | Sally Toner                         |         |  |
| Cabernet                                 | 192.168.202.3     | Telnet SSH Web HTTPS | ●            |   |   |   |   |   | 37  | 3                 | 26      | 0         |                   |                                     |         |  |
| Chardonnay                               | 10.100.36.54      | Telnet SSH Web HTTPS | ●            | ● |   |   |   |   | 28  | 3                 | 25      | 0         | Santa Clara       | Sally Toner                         |         |  |
| Corvina                                  | 10.100.36.61      | Telnet SSH Web HTTPS | ●            | ● | ● |   |   |   | 33  | 7                 | 26      | 4         | Hangzhou China    | Hangzhou H3C Technologies Co., Ltd. |         |  |
| Gamay                                    | 10.100.37.2       | Telnet SSH Web HTTPS | ●            |   |   |   |   |   | 25  | 6                 | 19      | 0         | Santa Clara, CA   | Tim Titus                           |         |  |
| Graciano                                 | 10.100.36.40      | Telnet SSH Web HTTPS | ●            |   |   |   |   |   | 53  | 2                 | 51      | 0         | San Francisco     | Sally Toner                         |         |  |
| Grenache                                 | 10.100.37.53      | Telnet SSH Web HTTPS | ●            |   |   |   |   |   | 25  | 2                 | 23      | 0         | Sunnyvale, CA     | noc@pathsolutions.com               |         |  |
| Malbec                                   | 10.100.36.75      | Telnet SSH Web HTTPS | ●            | ● |   |   |   |   | 24  | 11                | 13      | 0         | Santa Clara       | Sally Toner                         |         |  |
| Merlot                                   | 10.100.36.48      | Telnet SSH Web HTTPS | ●            | ● | ● |   |   |   | 31  | 7                 | 24      | 0         | Santa Clara, CA   | noc@pathsolutions.com               |         |  |
| Muscat                                   | 10.100.36.51      | Telnet SSH Web HTTPS | ●            | ● |   |   |   |   | 48  | 6                 | 42      | 0         | Santa Clara, CA   | Tim Titus                           |         |  |
| Palomino                                 | 10.100.38.2       | Telnet SSH Web HTTPS | ●            | ● |   |   |   |   | 27  | 4                 | 23      | 0         | Sacramento        | Steve Sisk                          |         |  |
| Pinot                                    | 10.100.36.53      | Telnet SSH Web HTTPS | ●            | ● |   |   |   |   | 27  | 12                | 15      | 0         | Santa Clara       | Sally Toner                         |         |  |
| Riesling                                 | 10.100.36.70      | Telnet SSH Web HTTPS | ●            |   |   |   |   |   | 36  | 22                | 7       | 0         |                   |                                     |         |  |
| Sauvignon                                | 10.100.36.20      | Telnet SSH Web HTTPS | ●            | ● |   |   |   |   | 51  | 6                 | 45      | 0         | San Francisco, CA | noc@pathsolutions.com               |         |  |
| Shiraz                                   | 10.100.37.3       | Telnet SSH Web HTTPS | ●            |   |   |   |   |   | 34  | 6                 | 20      | 0         | Santa Clara       | Sally Toner                         |         |  |
| Zinfandel                                | 10.100.36.27      | Telnet SSH Web HTTPS | ●            | ● |   |   |   |   | 42  | 4                 | 38      | 0         | snmplocation      | who@where                           |         |  |
| <b>Edge Network (8 devices)</b>          |                   |                      |              |   |   |   |   |   |     |                   |         |           |                   |                                     |         |  |
| Atlanta                                  | 10.100.37.1       | Telnet SSH Web HTTPS | ●            | ● | ● |   |   |   | 3   | 2                 | 1       | 1         | Atlanta, GA       | Sally Toner x 4005                  |         |  |
| Denver                                   | 10.100.36.60      | Telnet SSH Web HTTPS | ●            | ● | ● |   |   |   | 3   | 2                 | 1       | 1         | Denver, CO        | sally@pathsolutions.com             |         |  |
| Miami                                    | 10.100.38.3       | Telnet SSH Web HTTPS | ●            | ● | ● |   |   |   | 3   | 2                 | 1       | 0         |                   |                                     |         |  |
| Honolulu                                 | 10.100.36.5       | Telnet SSH Web HTTPS | ●            | ● | ● |   |   |   | 3   | 2                 | 1       | 1         |                   |                                     |         |  |
| Honolulu                                 | 10.100.38.1       | Telnet SSH Web HTTPS | ●            | ● | ● |   |   |   | 3   | 2                 | 1       | 1         |                   |                                     |         |  |
| New York                                 | 192.168.202.1     | Telnet SSH Web HTTPS | ●            | ● | ● |   |   |   | 3   | 2                 | 1       | 1         | New York, NY      | sally@pathsolutions.com             |         |  |
| Internet                                 | 10.100.36.1       | Telnet SSH Web HTTPS | ●            | ● | ● |   |   |   | 2   | 2                 | 0       | 0         | San Francisco, CA | Tim Titus x4413                     |         |  |
| Zinfandel                                | 10.100.36.25      | Telnet SSH Web HTTPS | ●            | ● |   |   |   |   | 42  | 4                 | 38      | 0         | snmplocation      | who@where                           |         |  |
| <b>Cisco ASA Firewall (1 devices)</b>    |                   |                      |              |   |   |   |   |   |     |                   |         |           |                   |                                     |         |  |
| CiscoASA                                 | 10.100.36.4       | Telnet SSH Web HTTPS | ●            |   |   |   |   |   | 24  | 7                 | 17      | 0         | Santa Clara, CA   | Tim Titus x111                      |         |  |
| <b>Servers (2 devices)</b>               |                   |                      |              |   |   |   |   |   |     |                   |         |           |                   |                                     |         |  |
| REDSONJA                                 | 10.100.36.12      | Telnet SSH Web HTTPS | ●            | ● | ● |   |   |   | 19  | 14                | 5       | 0         | Santa Clara, CA   | Sally Toner                         |         |  |
| VELMA                                    | 10.100.36.10      | Telnet SSH Web HTTPS | ●            | ● |   |   |   |   | 1   | 1                 | 0       | 0         | Santa Clara, CA   | Tim Titus                           |         |  |
| Total Devices:                           |                   | 31                   |              |   |   |   |   |   |     | Total interfaces: | 803     | 166       | 637               | 9                                   |         |  |

The first column includes a green dot, red dot, yellow dot, or a ? Status indicator. If a device has an interface that is healthy, the status for the device will be green. If a device has an interface that is degraded (utilization or error rate is higher than the configured threshold), the status for the device will be red. An interface will be yellow if an interface is manually marked as suppressed by the user. Suppressing an interface can be done by clicking on the status (colored dot) and selecting to suppress that particular interface. A red ? will be shown if there is communication failure with that device.

The first column will show a Green, Red, or Yellow Dot. A Green dot means the device is healthy, a Red Dot means the device is degraded according to your Issue Thresholds, and a Yellow dot means that the device has been suppressed to not display as degraded.

The Device Name (programmed into the switch as the system name, hostname, or sysName) is displayed in the second column. To change this, you should login to the device and change the device's internal name (hostname) or "sysName". Refer to the device manufacturer's documentation to determine how to change this information.

If you click on the device name, it will link to a summary of the device, listing all of the interfaces that exist on the device, along with detailed information about the device. Refer to the "Interface Summary" section on page 49.

The managed IP address of the device is listed in the third column.

The Manage Device column includes links to Telnet, SSH, Web, and HTTP into the device, as well as the syslog information received from the device.

The OSI Services column includes information relating to the OSI services that the device provides. A layer-2 switch would display as providing OSI layer 2 services. A router would display as providing layer 2 and layer 3 services.

The # of Int column displays the total number of interfaces on the device.

The Oper up column displays the total number of operationally up interfaces on the device. These Interfaces are in use.

The Oper down column displays the total number of operationally shut down interfaces on the device. These interfaces are not in-use and will have an inactive link light.

The Admin down column displays the total number of administratively shut down interfaces on the device. These interfaces have been manually disabled by the network administrator and will not function if a node is connected to the interface.

The Location column of information displays the location of the device. This information is configured on the switch as the location or "sysLocation" of the device. Refer to the device manufacturer's documentation to determine how to change this information.

The Contact column of information displays the contact for the device. This information is configured on the device as the contact or "sysContact" of the switch. Refer to the device manufacturer's documentation to determine how to change this information.

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**Note:** If PathSolutions' TotalView reads an email address in the sysContact field, it will create a web link to the email address.

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### Traffic Sub-tab

The “Traffic” sub-tab displays information about the device’s packets and broadcasts seen:

The screenshot shows the TotalView interface with the 'Traffic' sub-tab selected. The table below represents the data shown in the interface:

| Device Name                              | Device IP Address | Avg Daily Packets |         | Avg Daily Broadcasts |         | Avg Daily Broadcast Rate |         | Last Poll Broadcast Rate |         |
|--|-------------------|-------------------|---------|----------------------|---------|--------------------------|---------|--------------------------|---------|
|  |                   | Tx                | Rx      | Tx                   | Rx      | Tx                       | Rx      | Tx                       | Rx      |
| <b>VoIP Gateways (2 devices)</b>         |                   |                   |         |                      |         |                          |         |                          |         |
| San Francisco GW                         | 10.100.37.100     | 88k               | 82k     | 0                    | 9k      | 0.047%                   | 10.036% | 0.000%                   | 20.377% |
| Santa Clara GW                           | 10.100.36.100     | 177k              | 169k    | 1k                   | 1,886k  | 0.666%                   | 91.738% | 0.000%                   | 57.377% |
| <b>Distribution Network (18 devices)</b> |                   |                   |         |                      |         |                          |         |                          |         |
| Barbera                                  | 10.100.37.5       | 892k              | 892k    | 1,370k               | 376k    | 60.567%                  | 29.650% | 67.024%                  | 30.071% |
| Bardolino                                | 10.100.36.18      | 4,165k            | 4,553k  | 14,165k              | 51,820k | 77.275%                  | 91.923% | 4.865%                   | 94.187% |
| Bordeaux                                 | 192.168.202.4     | 43,250k           | 43,467k | 1,131k               | 148k    | 2.550%                   | 0.341%  | 6.270%                   | 0.841%  |
| Cabernet                                 | 192.168.202.3     | 17,105k           | 17,146k | 282k                 | 254k    | 1.627%                   | 1.464%  | 4.453%                   | 4.029%  |
| Chardonnay                               | 10.100.36.54      | 76k               | 71k     | 1,140k               | 722k    | 93.681%                  | 91.030% | 9.375%                   | 83.881% |
| Corvina                                  | 10.100.36.61      | 74k               | 70k     | 856k                 | 153k    | 91.989%                  | 68.417% | 91.678%                  | 68.956% |
| Gamay                                    | 10.100.37.2       | 72k               | 72k     | 24k                  | 37k     | 25.306%                  | 34.373% | 54.834%                  | 79.977% |
| Graciano                                 | 10.100.36.40      | 79k               | 80k     | 0                    | 407k    | 0.000%                   | 83.564% | 0.000%                   | 84.295% |
| Grenache                                 | 10.100.37.53      | 151k              | 101k    | 2k                   | 99k     | 1.836%                   | 49.564% | 2.073%                   | 49.383% |
| Malbec                                   | 10.100.36.75      | 9,205k            | 8,974k  | 45,722k              | 9,353k  | 83.240%                  | 51.033% | 49.254%                  | 18.313% |
| Merlot                                   | 10.100.36.48      | 1,894k            | 1,894k  | 16k                  | 187k    | 0.850%                   | 9.006%  | 38.940%                  | 20.901% |
| Muscat                                   | 10.100.36.51      | 2,250k            | 2,085k  | 10,308k              | 1,692k  | 82.080%                  | 44.792% | 75.396%                  | 39.304% |
| Palomino                                 | 10.100.38.2       | 125k              | 136k    | 0                    | 0       | 0.000%                   | 0.000%  | 0.000%                   | 0.000%  |
| Pinot                                    | 10.100.36.53      | 5,594k            | 5,647k  | 0                    | 0       | 0.000%                   | 0.000%  | 0.000%                   | 0.000%  |
| Riesling                                 | 10.100.36.70      | 87k               | 457k    | 0                    | 165k    | 0.041%                   | 26.590% | 0.000%                   | 0.000%  |
| Sauvignon                                | 10.100.36.20      | 43,743k           | 45,283k | 11,442k              | 235k    | 20.735%                  | 0.518%  | 20.383%                  | 0.548%  |
| Shiraz                                   | 10.100.37.3       | 424k              | 425k    | 175k                 | 179k    | 29.214%                  | 29.747% | 46.797%                  | 46.504% |
| Zinfandel                                | 10.100.36.27      | 76k               | 78k     | 67k                  | 984k    | 46.882%                  | 92.633% | 16.962%                  | 87.653% |
| <b>Edge Network (8 devices)</b>          |                   |                   |         |                      |         |                          |         |                          |         |
| Atlanta                                  | 10.100.37.1       | 2,112k            | 2,113k  | 9k                   | 18k     | 0.468%                   | 0.858%  | 0.874%                   | 1.951%  |
| Denver                                   | 10.100.36.60      | 2,058k            | 2,051k  | 4k                   | 174k    | 0.223%                   | 7.848%  | 0.266%                   | 8.371%  |
| Miami                                    | 10.100.38.3       | 29k               | 12k     | 0                    | 0       | 0.000%                   | 0.000%  | 0.000%                   | 0.000%  |
| Honolulu                                 | 10.100.36.5       | 131k              | 114k    | 8k                   | 176k    | 6.365%                   | 60.647% | 6.392%                   | 60.364% |
| Honolulu                                 | 10.100.38.1       | 131k              | 114k    | 8k                   | 176k    | 6.365%                   | 60.647% | 6.392%                   | 60.444% |
| NewYork                                  | 192.168.202.1     | 2,923k            | 2,907k  | 4k                   | 14k     | 0.170%                   | 0.491%  | 0.264%                   | 0.903%  |
| Internet                                 | 10.100.36.1       | 1,357k            | 1,385k  | 9k                   | 1,445k  | 0.692%                   | 51.051% | 0.802%                   | 42.610% |
| Zinfandel                                | 10.100.36.25      | 76k               | 78k     | 67k                  | 984k    | 46.882%                  | 92.633% | 16.962%                  | 87.649% |
| <b>Cisco ASA Firewall (1 devices)</b>    |                   |                   |         |                      |         |                          |         |                          |         |
| CiscoASA                                 | 10.100.36.4       | 113k              | 3,102k  | 3,337k               | 6,487k  | 96.708%                  | 67.651% | 57.349%                  | 62.429% |
| <b>Servers (2 devices)</b>               |                   |                   |         |                      |         |                          |         |                          |         |
| REDSONJA                                 | 10.100.36.12      | 328k              | 355k    | 7k                   | 312k    | 2.327%                   | 46.783% | 2.642%                   | 47.734% |
| VELMA                                    | 10.100.36.10      | 38k               | 41k     | 3k                   | 154k    | 8.154%                   | 78.808% | 8.929%                   | 82.414% |

This permits you to determine the average daily broadcast rate and compare it to the last poll broadcast rate to help identify devices that are transmitting or receiving a high level of broadcasts.

**Note:** If a device is transmitting a high percentage of broadcasts, it is more likely that one of its interfaces is receiving a high percentage of broadcasts from one of its ports, and then transmitting those broadcasts to all interfaces on the device. Click on the device and look for interfaces that are receiving a high broadcast rate to determine the device that is broadcasting.

### PoE Sub-tab

The “PoE” tab shows information on the status and power consumption of the devices, the percentage of utilization that is running, and the level of alarms that have been set to alert you if power is running low.

The screenshot shows the TotalView interface with the PoE sub-tab selected. The table displays power supply information for various device groups. The columns include Device Name, Device IP Address, Group, Status, Rating (Watts), Present Consumption, % Power Utilization, and Alarm Threshold.

| Device Name                              | Device IP Address | Group | Status | Rating (Watts) | Present Consumption | % Power Utilization | Alarm Threshold |
|--|-------------------|-------|--------|----------------|---------------------|---------------------|-----------------|
| <b>VoIP Gateways (2 devices)</b>         |                   |       |        |                |                     |                     |                 |
| San Francisco GW                         | 10.100.37.100     | -     | -      | -              | -                   | -                   | -               |
| Santa Clara GW                           | 10.100.36.100     | -     | -      | -              | -                   | -                   | -               |
| <b>Distribution Network (18 devices)</b> |                   |       |        |                |                     |                     |                 |
| Barbera                                  | 10.100.37.5       | 1     | On     | 39 W           | 17 W                | 44%                 | 11%             |
| Bardolino                                | 10.100.36.18      | -     | -      | -              | -                   | -                   | -               |
| Bordeaux                                 | 192.168.202.4     | -     | -      | -              | -                   | -                   | -               |
| Cabernet                                 | 192.168.202.3     | -     | -      | -              | -                   | -                   | -               |
| Chardonnay                               | 10.100.36.54      | -     | -      | -              | -                   | -                   | -               |
| Corvina                                  | 10.100.36.61      | 1     | On     | 300 W          | 0 W                 | 0%                  | 80%             |
| Gamay                                    | 10.100.37.2       | -     | -      | -              | -                   | -                   | -               |
| Graciano                                 | 10.100.36.40      | -     | -      | -              | -                   | -                   | -               |
| Grenache                                 | 10.100.37.53      | -     | -      | -              | -                   | -                   | -               |
| Malbec                                   | 10.100.36.75      | 1     | On     | 320 W          | 0 W                 | 0%                  | 80%             |
| Merlot                                   | 10.100.36.48      | 1     | On     | 376 W          | 3 W                 | 1%                  | 90%             |
| Muscat                                   | 10.100.36.51      | -     | -      | -              | -                   | -                   | -               |
| Palomino                                 | 10.100.38.2       | 1     | On     | 360 W          | 15 W                | 4%                  | -n/a-           |
| Pinot                                    | 10.100.36.53      | 1     | On     | 370 W          | 25 W                | 7%                  | -n/a-           |
| Riesling                                 | 10.100.36.70      | -     | -      | -              | -                   | -                   | -               |
| Sauvignon                                | 10.100.36.20      | 1     | On     | 855 W          | 0 W                 | 0%                  | 80%             |
| Shiraz                                   | 10.100.37.3       | 1     | On     | 192 W          | 0 W                 | 0%                  | 95%             |
| Zinfandel                                | 10.100.36.27      | -     | -      | -              | -                   | -                   | -               |
| <b>Edge Network (8 devices)</b>          |                   |       |        |                |                     |                     |                 |
| Atlanta                                  | 10.100.37.1       | -     | -      | -              | -                   | -                   | -               |
| Denver                                   | 10.100.36.60      | -     | -      | -              | -                   | -                   | -               |
| Miami                                    | 10.100.38.3       | -     | -      | -              | -                   | -                   | -               |
| Honolulu                                 | 10.100.36.5       | -     | -      | -              | -                   | -                   | -               |
| Honolulu                                 | 10.100.38.1       | -     | -      | -              | -                   | -                   | -               |
| NewYork                                  | 192.168.202.1     | -     | -      | -              | -                   | -                   | -               |
| Internet                                 | 10.100.36.1       | -     | -      | -              | -                   | -                   | -               |
| Zinfandel                                | 10.100.36.25      | -     | -      | -              | -                   | -                   | -               |
| <b>Cisco ASA Firewall (1 devices)</b>    |                   |       |        |                |                     |                     |                 |
| CiscoASA                                 | 10.100.36.4       | -     | -      | -              | -                   | -                   | -               |
| <b>Servers (2 devices)</b>               |                   |       |        |                |                     |                     |                 |
| REDSONJA                                 | 10.100.36.12      | -     | -      | -              | -                   | -                   | -               |
| VELMA                                    | 10.100.36.10      | -     | -      | -              | -                   | -                   | -               |

This allows you to quickly determine if there are any high-power drawing devices that are connected to the switch or if there are any power faults.

### STP Sub-tab

The "STP" tab shows the device's Spanning Tree information:

The screenshot shows the STP sub-tab in TotalView. At the top right, it displays 'Poll frequency: 00:05:00', 'Last poll: 2/17/2015 4:12:43 PM', and 'Network health: DEGRADED (1.0%)'. Below the navigation tabs, there is a 'Device Summary' section with a legend for device status (Healthy, Suppressed issue, Issue, Comm fail) and a 'Lock Config' link. The main table is titled 'STP' and has columns: Device Name, Device IP Address, Protocol, Version, Priority, Last change, Changes, Root Bridge, Root Cost, Root Port, and Hold Time. The table is grouped into several sections: VoIP Gateways (2 devices), Distribution Network (18 devices), Edge Network (8 devices), Cisco ASA Firewall (1 device), and Servers (2 devices). Each row represents a device with its specific STP configuration details.

| Device Name                              | Device IP Address | Protocol  | Version | Priority | Topology             |         | Root Bridge | Root Cost | Root Port      | Hold Time |
|--|-------------------|-----------|---------|----------|----------------------|---------|-------------|-----------|----------------|-----------|
|  |                   |           |         |          | Last change          | Changes |             |           |                |           |
| <b>VoIP Gateways (2 devices)</b>         |                   |           |         |          |                      |         |             |           |                |           |
| San Francisco GW                         | 10.100.37.100     | -         | -       | -        | -                    | -       | -           | -         | -              | -         |
| Santa Clara GW                           | 10.100.36.100     | -         | -       | -        | -                    | -       | -           | -         | -              | -         |
| <b>Distribution Network (18 devices)</b> |                   |           |         |          |                      |         |             |           |                |           |
| Barbera                                  | 10.100.37.5       | ieee8021d | Unknown | 32768    | 26 days 00:35:27.00  | 79      | Barbera     | 0         | -              | 600       |
| Bardolino                                | 10.100.36.18      | ieee8021d | -       | 32768    | 19 days 03:33:35.00  | 118830  | Merlot      | 20010     | Int #2         | 0         |
| Bordeaux                                 | 192.168.202.4     | ieee8021d | rstp    | 32768    | 19 days 00:38:28.57  | 5       | Bordeaux    | 0         | -              | 100       |
| Cabernet                                 | 192.168.202.3     | ieee8021d | -       | 32768    | 39 days 06:15:48.45  | 1       | Bordeaux    | 19        | Int #1         | 100       |
| Chardonnay                               | 10.100.36.54      | ieee8021d | -       | 32768    | 196 days 03:42:46.35 | 18231   | Merlot      | 200010    | Int #15        | 600       |
| Corvina                                  | 10.100.36.61      | Unknown   | -       | 32768    | 189 days 21:16:43.16 | 0       | Corvina     | 0         | -              | 0         |
| Gamay                                    | 10.100.37.2       | ieee8021d | -       | 32768    | 0 days 06:14:45.07   | 125     | Barbera     | 19        | Int #24        | 300       |
| Graciano                                 | 10.100.36.40      | ieee8021d | -       | 32768    | -                    | 0       | Graciano    | 0         | -              | 100       |
| Grenache                                 | 10.100.37.53      | ieee8021d | -       | 32768    | 0 days 08:58:23.55   | 0       | Barbera     | 19        | Int #35        | 100       |
| Malbec                                   | 10.100.36.75      | ieee8021d | -       | 32768    | 4 days 05:39:04.73   | 51519   | Merlot      | 10        | Int #3         | 100       |
| Merlot                                   | 10.100.36.48      | ieee8021d | -       | 32768    | 19 days 01:07:01.00  | 396     | Merlot      | 0         | -              | 100       |
| Muscat                                   | 10.100.36.51      | ieee8021d | -       | 32768    | 196 days 03:40:30.07 | 50620   | Merlot      | 10        | Int #2         | 100       |
| Palomino                                 | 10.100.38.2       | ieee8021d | -       | 32769    | 64 days 00:36:57.00  | 8       | Palomino    | 0         | -              | 100       |
| Pinot                                    | 10.100.36.53      | ieee8021d | -       | 32769    | 19 days 03:34:00.00  | 17011   | Merlot      | 29        | Int #6         | 100       |
| Riesling                                 | 10.100.36.70      | -         | -       | -        | -                    | -       | -           | -         | -              | -         |
| Sauvignon                                | 10.100.36.20      | ieee8021d | -       | 32768    | 2 days 20:52:56.66   | 2       | Merlot      | 39        | Int #7         | 100       |
| Shiraz                                   | 10.100.37.3       | ieee8021d | -       | 32768    | 2 days 07:54:03.07   | 21      | Barbera     | 38        | Int #1         | 100       |
| Zinfandel                                | 10.100.36.27      | Unknown   | -       | 32769    | 19 days 03:34:01.00  | 128     | Merlot      | 43        | Int #436244480 | 1         |
| <b>Edge Network (8 devices)</b>          |                   |           |         |          |                      |         |             |           |                |           |
| Atlanta                                  | 10.100.37.1       | -         | -       | -        | -                    | -       | -           | -         | -              | -         |
| Denver                                   | 10.100.36.60      | -         | -       | -        | -                    | -       | -           | -         | -              | -         |
| Miami                                    | 10.100.38.3       | -         | -       | -        | -                    | -       | -           | -         | -              | -         |
| Honolulu                                 | 10.100.36.5       | -         | -       | -        | -                    | -       | -           | -         | -              | -         |
| Honolulu                                 | 10.100.38.1       | -         | -       | -        | -                    | -       | -           | -         | -              | -         |
| NewYork                                  | 192.168.202.1     | -         | -       | -        | -                    | -       | -           | -         | -              | -         |
| Internet                                 | 10.100.36.1       | -         | -       | -        | -                    | -       | -           | -         | -              | -         |
| Zinfandel                                | 10.100.36.25      | Unknown   | -       | 32769    | 19 days 03:34:04.00  | 128     | Merlot      | 43        | Int #436244480 | 1         |
| <b>Cisco ASA Firewall (1 devices)</b>    |                   |           |         |          |                      |         |             |           |                |           |
| CiscoASA                                 | 10.100.36.4       | -         | -       | -        | -                    | -       | -           | -         | -              | -         |
| <b>Servers (2 devices)</b>               |                   |           |         |          |                      |         |             |           |                |           |
| REDSONJA                                 | 10.100.36.12      | -         | -       | -        | -                    | -       | -           | -         | -              | -         |
| VELMA                                    | 10.100.36.10      | -         | -       | -        | -                    | -       | -           | -         | -              | -         |

Determine when your last STP root bridge election occurred and which device is acting as the root bridge. Also know which interfaces are active as well as listening so you don't cause a reconfiguration by disconnecting the wrong interface.

### Inventory Sub-tab

The “Inventory” tab shows details about a device’s internal information. For any make/model of device discovered on your network, the Manufacture Date, Model, Serial Number , Hardware, Firmware and Software OS revisions are reported.

The screenshot displays the 'Inventory' sub-tab in the TotalView interface. At the top, there are navigation tabs: Map, Path, Phones, Assessment, MOS, Devices, Favorites, Issues, Health, Top-10, WAN, Interfaces, Tools. The 'Inventory' tab is selected. Below the navigation, there are status indicators (Healthy, Suppressed issue, Issue, Comm fail) and a 'Lock Config' button. The main content is a table with columns: Device Name, Device IP Address, Manufacturer, Model, Serial Num, Hardware, Firmware, and Software. The table is organized into sections: VoIP Gateways (2 devices), Distribution Network (18 devices), Edge Network (8 devices), Cisco ASA Firewall (1 device), and Servers (2 devices). A 'Download Excel' button is visible above the table header.

| Device Name                              | Device IP Address | Inventory                      |                    |                           | Code Revision |  |                                    |
|--|-------------------|--------------------------------|--------------------|---------------------------|---------------|--|------------------------------------|
|  |                   | Manufacturer                   | Model              | Serial Num                | Hardware      | Firmware                                       | Software                           |
| <b>VoIP Gateways (2 devices)</b>         |                   |                                |                    |                           |               |  |                                    |
| San Francisco GW                         | 10.100.37.100     | ShoreTel, Inc                  |                    |                           |               |  |                                    |
| Santa Clara GW                           | 10.100.36.100     | ShoreTel, Inc                  |                    |                           |               |  |                                    |
| <b>Distribution Network (18 devices)</b> |                   |                                |                    |                           |               |  |                                    |
| Barbera                                  | 10.100.37.5       | Enterasys Networks, Inc.       | A2H124-24P         | 08133832225E              |               | 01.00.50                                       | 03.03.02.0002                      |
| Bardolino                                | 10.100.36.18      | TP-LINK TECHNOLOGIES CO., LTD. |                    |                           |               |  |                                    |
| Bordeaux                                 | 192.168.202.4     | D-Link Corporation             | DXS3250            | BH7Q15B000649             | 00.00.01      | 1.0.0.25                                       | 1.1.0.11                           |
| Cabernet                                 | 192.168.202.3     | HSB2SB1                        | PowerConnect 3424  | CN-QUJ393-28298-744-0058  | 00.00.01      | 1.0.1.01                                       | 2.0.0.20                           |
| Chardonnay                               | 10.100.36.54      | Hewlett-Packard                | J9019A             | CN720WXX0PB               |               | Q.10.02  | Q.11.67                            |
| Corvina                                  | 10.100.36.61      | H3C                            | S5600-26C-PWR      | 210235A11GX093000001      | REV.C         | 514  | 3.10 Release 1702P42               |
| Gamay                                    | 10.100.37.2       | ADTRAN, Inc.                   | 1200500L1          | G23G8789                  | 1             | 1  | 13.15.00                           |
| Graciano                                 | 10.100.36.40      | Allied Telesis Labs Ltd        |                    |                           |               |  |                                    |
| Grenache                                 | 10.100.37.53      | CISCO SYSTEMS, INC.            |                    |                           |               |  |                                    |
| Malbec                                   | 10.100.36.75      | Nortel                         | 5520-24T-PWR       | SDNIT2075K                | 32            | 5.0.0.3  | v5.0.6.026                         |
| Merlot                                   | 10.100.36.48      | Extreme Networks               | 800138             | 0531G-00251               | 00-04         |  | 7.6.3.6                            |
| Muscat                                   | 10.100.36.51      | Nortel Networks                | 470-48T            | ACC1002PX                 | #01           | 3.6.0.7  | v3.6.4.08                          |
| Falomino                                 | 10.100.38.2       | cisco                          | WS-C3550-24PWR-SM1 | CAT071822GH               | DD            | 12.2(44)SE6                                    | 12.2(44)SE6                        |
| Pinot                                    | 10.100.36.53      | CISCO SYSTEMS, INC.            | WS-C3560-24PS-S    | CAT0947R1GA               | V05           | 12.2(55)SE1                                    | 12.2(55)SE1                        |
| Riesling                                 | 10.100.36.70      | Juniper Networks               |                    |                           |               |  |                                    |
| Sauvignon                                | 10.100.36.20      | Avaya                          | 4850GTS-PWR+       | 12JP512H70HE              | 10            | 5.6.2.1  | v5.6.3.025                         |
| Shiraz                                   | 10.100.37.3       | NETGEAR                        | Netgear GS7xxTP-AT | 1WW6265M002BC             | 00.01.02      | 1.0.1.0  | V5.2.0.11                          |
| Zinfandel                                | 10.100.36.27      | Cisco Systems, Inc.            | NSK-C5020P-BF      | SSI13490F6J               | 0.0           |  |                                    |
| <b>Edge Network (8 devices)</b>          |                   |                                |                    |                           |               |  |                                    |
| Atlanta                                  | 10.100.37.1       | Cisco                          | 2621XM chassis     | FTX0921C0MG               | #####         | 12.2(8r) [cmong 8r], RELEASE SOFTWARE (fc:1)   |                                    |
| Denver                                   | 10.100.36.60      | Cisco                          | 2610 chassis       | JAB0333028P (1953273289)  | 0x202         |  |                                    |
| Miami                                    | 10.100.38.3       | Cisco                          | CISCO2851          | FTX1031A212               | V03           | 12.4(1r) [hqluong 1r], RELEASE SOFTWARE (fc:1) | 15.1(4)M8, RELEASE SOFTWARE (fc:2) |
| Honolulu                                 | 10.100.36.5       | Cisco                          | CISCO2811          | FTX1044A37B               | V03           |  |                                    |
| Honolulu                                 | 10.100.38.1       | Cisco                          | CISCO2811          | FTX1044A37B               | V03           |  |                                    |
| NewYork                                  | 192.168.202.1     | Cisco                          | 2610 chassis       | JADD0418016T (4052845898) | 0x203         |  |                                    |
| Internet                                 | 10.100.36.1       | Cisco                          | 2621 chassis       | JADD0626CGJC (3208410732) | 0x00          |  |                                    |
| Zinfandel                                | 10.100.36.25      | Cisco Systems, Inc.            | NSK-C5020P-BF      | SSI13490F6J               | 0.0           |  |                                    |
| <b>Cisco ASA Firewall (1 device)</b>     |                   |                                |                    |                           |               |  |                                    |
| CiscoASA                                 | 10.100.36.4       | cisco Systems Inc.             | ASA5505            | JMX14354DLX               | V08           | 1.0(12)13                                      | 8.2(1)                             |
| <b>Servers (2 devices)</b>               |                   |                                |                    |                           |               |  |                                    |
| REDSOJA                                  | 10.100.36.12      |                                |                    |                           |               |  |                                    |
| VELMA                                    | 10.100.36.10      | INTEL CORPORATION              |                    |                           |               |  |                                    |

An Inventory Excel spreadsheet can be downloaded by clicking on the “Download Excel” button.

## Description Sub-tab

The Description tab shows the description that you manually entered in the “Config Tool” for the device.

The screenshot shows the TotalView interface with the 'Description' sub-tab selected. The main content area displays a table of devices grouped into several categories:

- VoIP Gateways (2 devices):**
  - San Francisco GW (10.100.37.100) - ShoreGear 2
  - Santa Clara GW (10.100.36.100) - ShoreGear 1
- Distribution Network (10 devices):**
  - Barbera (10.100.37.5) - Barbera
  - Bardolino (10.100.36.18) - TP-Link TLQG3424P
  - Bordeaux (192.168.202.4) - Dlink XStack DKS 3250
  - Cabernet (192.168.202.3) - Switch - Dell PowerConnect 3424
  - Chardonnay (10.100.36.54) - Switch - HP ProCurve 2510-24
  - Corvina (10.100.36.61) - POE Switch - H3C POE S5600
  - Gamay (10.100.37.2) - Switch - Adtran NetVanta 1224
  - Graciano (10.100.36.40) - POE Switch - Allied Telesis AT-x900-48FE
  - Grenache (10.100.37.53) - Device
  - Malbec (10.100.36.75) - Device
  - Merlot (10.100.36.48) - Switch - Extreme Network Summit 300
  - Muscat (10.100.36.51) - Switch - Nortel Baystack 470-48T
  - Falomino (10.100.38.2) - Cisco Catalyst Switch 3550
  - Pinot (10.100.36.53) - POE Switch - Cisco Catalyst 3560
  - Riesling (10.100.36.70) - Device
  - Sauvignon (10.100.36.20) - Sauvignon - Aveya
  - Shiraz (10.100.37.3) - Device
  - Zinfandel (10.100.36.27) - Device
- Edge Network (8 devices):**
  - Atlanta (10.100.37.1) - Cisco 2600 - Atlanta
  - Denver (10.100.36.60) - Cisco C2600-IM - Denver
  - Miami (10.100.38.3) - Cisco 2800 w/ Redundant Power Supply
  - Honolulu (10.100.36.5) - Cisco 2800 - Hawaii
  - Honolulu (10.100.38.1) - Cisco 2800 - Hawaii
  - NewYork (192.168.202.1) - Cisco C2600-IM - New York
  - Internet (10.100.36.1) - Cisco C2600-J1S3-M
  - Zinfandel (10.100.36.25) - Cisco Nexus 5000 - Server Rm
- Cisco ASA Firewall (1 devices):**
  - CiscoASA (10.100.36.4) - ASA Firewall
- Servers (2 devices):**
  - REDSONJA (10.100.36.12) - RedSonja 2008 Server
  - VELMA (10.100.36.10) - Windows 2000 Server

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Feature Request

If a device goes offline and all that you see is a red ?, you will no longer see any SNMP device name or information. Manually typing in a Device Description using the Config Tool will allow you to see a description on what device went offline.

### Support sub-tab

The “Support” tab will display support contract information for each monitored device:

The screenshot shows the TotalView interface with the 'Support' tab selected. The table below represents the data shown in the interface:

| Device Name                              | Device IP Address | Expiration Date | Contract ID       | Contract Phone |
|--|-------------------|-----------------|-------------------|----------------|
| <b>VoIP Gateways (2 devices)</b>         |                   |                 |                   |                |
| ● Santa Clara GW                         | 10.100.36.100     | 12/31/2013      | RU8-22312         | 800-555-3200   |
| ● San Francisco GW                       | 10.100.37.100     | 12/31/2013      | RU8-22312         | 800-555-3200   |
| <b>Distribution Network (21 devices)</b> |                   |                 |                   |                |
| ● Chardonnay                             | 10.100.36.54      | 10/31/2014      | HK89-312          | 800-555-0911   |
| ● Brunello                               | 10.100.37.16      | 12/01/2013      | RE-7281-332       | 800-555-3122   |
| ● Barbera                                | 10.100.37.5       | 12/01/2013      | RE-7281-383       | 800-555-1213   |
| ● Bardolino                              | 10.100.36.18      | -               | -                 | -              |
| ● Cabernet                               | 192.168.202.3     | -               | -                 | -              |
| ● EAP900H                                | 10.100.36.7       | -               | -                 | -              |
| ● Corvina                                | 10.100.36.61      | -               | -                 | -              |
| ● Gamay                                  | 10.100.37.2       | 12/31/2014      | KR07-8718-12-7301 | 888-555-1321   |
| ● Grenache                               | 10.100.37.53      | -               | -                 | -              |
| ● Bordeaux                               | 192.168.202.4     | -               | -                 | -              |
| ● Malbec                                 | 10.100.36.75      | -               | -                 | -              |
| ● Merlot                                 | 10.100.36.48      | 10/31/2014      | IJ08-3121-00-3208 | 888-555-1321   |
| ● Muscat                                 | 10.100.36.51      | 10/31/2014      | IJ08-3121-00-3208 | 888-555-1321   |
| ● Palomino                               | 10.100.38.2       | -               | -                 | -              |
| ● Pinot                                  | 10.100.36.53      | 10/31/2014      | IJ08-3121-00-3208 | 888-555-1321   |
| ● Sauvignon                              | 10.100.36.20      | -               | -                 | -              |
| ● SFO-COB-HP5500                         | 63.147.175.6      | -               | -                 | -              |
| ● Shiraz                                 | 10.100.37.3       | 12/01/2014      | RE-7281-383       | 800-555-1213   |
| ● Zinfandel                              | 10.100.36.25      | -               | -                 | -              |
| ● Riesling                               | 10.100.36.70      | 12/01/2015      | -                 | -              |
| ● Atlanta                                | 10.100.37.1       | -               | -                 | -              |
| <b>Edge Network (8 devices)</b>          |                   |                 |                   |                |
| ● Atlanta                                | 192.168.202.2     | 02/01/2014      | 127-726-321UV56   | 650-555-8710   |
| ● Denver                                 | 10.100.36.60      | 02/01/2014      | 127-726-321UV56   | 650-555-8710   |
| ● GatewaySwitch                          | 38.102.148.186    | 12/31/2014      | KR07-8718-33-7183 | 888-555-1321   |
| ● Honolulu                               | 10.100.36.5       | -               | -                 | -              |
| ● Internet                               | 10.100.36.1       | 12/31/2014      | KR07-8718-12-7301 | 888-555-1321   |
| ● Miami                                  | 10.100.38.3       | -               | -                 | -              |
| ● NewYork                                | 192.168.201.2     | 12/31/2014      | KR07-8718-12-7301 | 888-555-1321   |
| ● SCWANRTR                               | 38.102.148.163    | 12/31/2014      | KR07-8718-33-7182 | 888-555-1321   |
| <b>Servers (1 devices)</b>               |                   |                 |                   |                |
| ● VELMA                                  | 10.100.36.10      | 06/01/2014      | 87-382-781-7211   | 408-555-8781   |
| <b>Core Network (3 devices)</b>          |                   |                 |                   |                |
| ● SC_Server                              | 10.0.12.5         | -               | XF-827AZ-212      | 888-555-3415   |
| ● SC_User_SW1                            | 10.0.12.6         | -               | XF-827AZ-212      | 888-555-3415   |
| ● SC_User_SW2                            | 10.0.12.7         | -               | XF-827AZ-212      | 888-555-3415   |
| <b>Cisco ASA FireWall (1 devices)</b>    |                   |                 |                   |                |
| ● CiscoASA                               | 10.100.36.4       | -               | -                 | -              |

This information can be entered via the Configuration Tool.

The system will send an email if any of the support contracts are within 30 days of expiration to help make sure support contracts don't lapse.

## Financials

The Financials tab provides financial insights into the operational costs of your network in one location. You can add additional information to manage inventory and track and amortize operational costs and compliance requirements. Ensure that you aren't running equipment older than expected.

Enter and track when a device was Deployed, Procurement Cost, Amortizations Months, Annual Support Cost, and Monthly Operating Cost.

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TotalView

Poll frequency: 00:05:00  
 Last poll: 2/17/2015 4:30:45 PM  
 Network health: DEGRADED (3.1%)

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Device Summary <<>>
● Healthy
● Suppressed issue
● Issue
? Comm fail

General Traffic PoE STP Inventory Description Support Financials Uptime

| Device Name                              | Device IP Address | Compliance |             | Costs            |              |                     |                        |
|--|-------------------|------------|-------------|------------------|--------------|---------------------|------------------------|
|  |                   | MFG Date   | Deploy Date | Procurement Cost | Amort Months | Annual Support Cost | Monthly Operating Cost |
| <b>VoIP Gateways (2 devices)</b>         |                   |            |             |                  |              |                     |                        |
| ● Santa Clara GW                         | 10.100.36.100     | -          | 12/31/2011  | \$3,435          | 48           | \$168               | \$85.56                |
| ● San Francisco GW                       | 10.100.37.100     | -          | 12/31/2011  | \$3,435          | 48           | \$168               | \$85.56                |
| <b>Distribution Network (21 devices)</b> |                   |            |             |                  |              |                     |                        |
| ● Chardonnay                             | 10.100.36.54      | 5/14/2007  | 10/31/2012  | \$983            | 48           | \$57                | \$25.23                |
| ● Barbera                                | 10.100.37.5       | 3/24/2008  | 12/01/2011  | \$2,350          | 48           | \$120               | \$58.96                |
| ● Bardolino                              | 10.100.36.18      | -          | -           |                  |              |                     |                        |
| ● Brunello                               | 10.100.37.16      | 6/13/2011  | 12/01/2011  | \$765            | 48           | \$42                | \$19.44                |
| ● Cabernet                               | 192.168.202.3     | -          | -           |                  |              |                     |                        |
| ● EAP900H                                | 10.100.36.7       | -          | -           |                  |              |                     |                        |
| ● Corvina                                | 10.100.36.61      | -          | -           |                  |              |                     |                        |
| ● Gamay                                  | 10.100.37.2       | 6/4/2006   | 12/31/2012  | \$890            | 48           | \$51                | \$22.79                |
| ● Grenache                               | 10.100.37.53      | -          | -           |                  |              |                     |                        |
| ● Bordeaux                               | 192.168.202.4     | -          | -           |                  |              |                     |                        |
| ● Malbec                                 | 10.100.36.75      | -          | -           |                  |              |                     |                        |
| ● Merlot                                 | 10.100.36.48      | 8/1/2005   | 10/31/2012  | \$2,450          | 48           | \$128               | \$61.71                |
| ● Muscat                                 | 10.100.36.51      | -          | 10/31/2012  | \$4,362          | 48           | \$259               | \$112.46               |
| ● Palomino                               | 10.100.38.2       | 4/28/2003  | -           |                  |              |                     |                        |
| ● Pinot                                  | 10.100.36.53      | 11/21/2005 | 10/31/2012  | \$3,482          | 48           | \$230               | \$91.71                |
| ● Sauvignon                              | 10.100.36.20      | -          | -           |                  |              |                     |                        |
| ● SFO-OOB-HP5500                         | 63.147.175.6      | 6/7/2010   | -           |                  |              |                     |                        |
| ● Shiraz                                 | 10.100.37.3       | -          | 12/01/2012  | \$582            | 48           | \$35                | \$15.04                |
| ● Zinfandel                              | 10.100.36.25      | 11/30/2009 | -           |                  |              |                     |                        |
| ● Riesling                               | 10.100.36.70      | -          | -           |                  |              |                     |                        |
| ● Atlanta                                | 10.100.37.1       | 5/23/2005  | -           |                  |              |                     |                        |
| <b>Edge Network (8 devices)</b>          |                   |            |             |                  |              |                     |                        |
| ● Atlanta                                | 192.168.202.2     | 5/23/2005  | 02/01/2012  | \$1,280          | 48           | \$135               | \$37.92                |
| ● Denver                                 | 10.100.36.60      | 8/16/1999  | 02/01/2012  | \$1,280          | 48           | \$135               | \$37.92                |
| ● GatewaySwitch                          | 38.102.148.186    | 10/25/1999 | 12/31/2012  | \$892            | 48           |                     | \$18.58                |
| ● Honolulu                               | 10.100.36.5       | 10/29/2006 | -           |                  |              |                     |                        |
| ● Internet                               | 10.100.36.1       | 6/24/2002  | 12/31/2012  | \$1,280          | 48           | \$135               | \$37.92                |
| ● Miami                                  | 10.100.38.3       | 7/30/2006  | -           |                  |              |                     |                        |
| ● NewYork                                | 192.168.201.2     | 5/1/2000   | 12/31/2012  | \$1,280          | 48           | \$135               | \$37.92                |
| ● SCHWANRTR                              | 38.102.148.163    | 4/28/2008  | 12/31/2012  | \$767            | 48           | \$43                | \$19.56                |
| <b>Servers (1 devices)</b>               |                   |            |             |                  |              |                     |                        |
| ● VELMA                                  | 10.100.36.10      | -          | 06/01/2012  | \$2,480          | 48           | \$136               | \$63.00                |
| <b>Core Network (3 devices)</b>          |                   |            |             |                  |              |                     |                        |
| ● SC_Server                              | 10.0.12.5         | 2/21/2011  | 2/1/2013    | \$4,520          | 60           | \$267               | \$97.58                |
| ● SC_User_SW1                            | 10.0.12.6         | 2/21/2011  | 2/1/2013    | \$4,520          | 60           | \$267               | \$97.58                |
| ● SC_User_SW2                            | 10.0.12.7         | 2/21/2011  | 2/1/2013    | \$4,520          | 60           | \$267               | \$97.58                |
| <b>Cisco ASA Firewall (1 devices)</b>    |                   |            |             |                  |              |                     |                        |
| ● CiscoASA                               | 10.100.36.4       | 8/30/2010  | -           |                  |              |                     |                        |
| <b>Totals:</b>                           |                   |            |             | \$45,553         |              | \$2,778             | \$1,124                |

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### Uptime Sub-tab

The "Uptime" tab displays current status information on the device:

The screenshot shows the 'Uptime' sub-tab in the TotalView interface. It displays a table with columns for Device Name, Device IP Address, SNMP Version, SNMP Reliability, and Uptime (Daily, Weekly, Monthly, Yearly). The table is categorized into several groups: VoIP Gateways (2 devices), Distribution Network (18 devices), Edge Network (8 devices), Cisco ASA Firewall (1 device), and Servers (2 devices). A summary row at the bottom indicates 31 total devices with an average SNMP Reliability of 97.45%.

| Device Name                              | Device IP Address | SNMP Version | SNMP Reliability | Uptime       |               |                |               | Device Last Reboot   |
|--|-------------------|--------------|------------------|--------------|---------------|----------------|---------------|----------------------|
|  |                   |              |                  | Daily Uptime | Weekly Uptime | Monthly Uptime | Yearly Uptime |                      |
| <b>VoIP Gateways (2 devices)</b>         |                   |              |                  |              |               |                |               |                      |
| San Francisco GW                         | 10.100.37.100     | SNMPV2C      | 93.75%           | 99.878%      | 96.171%       | 97.000%        | 74.207%       | 456 days 20:07:16.96 |
| Santa Clara GW                           | 10.100.36.100     | SNMPV2C      | 94.12%           | 100.000%     | 100.000%      | 100.000%       | 97.439%       | 457 days 21:49:10.96 |
| <b>Distribution Network (18 devices)</b> |                   |              |                  |              |               |                |               |                      |
| Barbera                                  | 10.100.37.5       | SNMPV2C      | 96.03%           | 97.968%      | 95.366%       | 95.617%        | 81.334%       | 217 days 20:55:01.00 |
| Bardolino                                | 10.100.36.18      | SNMPV2C      | 96.84%           | 97.015%      | 96.915%       | 98.044%        | 94.437%       | 38 days 09:57:59.16  |
| Bordeaux                                 | 192.168.202.4     | SNMPV2C      | 98.96%           | 99.929%      | 99.510%       | 99.361%        | 93.312%       | 19 days 00:39:33.77  |
| Cabernet                                 | 192.168.202.3     | SNMPV2C      | 98.47%           | 98.985%      | 97.732%       | 97.812%        | 82.505%       | 39 days 06:16:31.49  |
| Chardonnay                               | 10.100.36.54      | SNMPV2C      | 99.03%           | 100.000%     | 100.000%      | 100.000%       | 99.507%       | 202 days 02:04:41.15 |
| Corvina                                  | 10.100.36.61      | SNMPV2C      | 99.09%           | 100.000%     | 100.000%      | 100.000%       | 98.524%       | 189 days 21:16:35.62 |
| Gamay                                    | 10.100.37.2       | SNMPV2C      | 95.88%           | 98.198%      | 95.639%       | 95.902%        | 82.471%       | 217 days 01:12:42.97 |
| Graciano                                 | 10.100.36.40      | SNMPV2C      | 99.26%           | 100.000%     | 100.000%      | 100.000%       | 98.290%       | 189 days 21:14:35.46 |
| Grenache                                 | 10.100.37.53      | SNMPV2C      | 97.20%           | 99.385%      | 97.398%       | 96.800%        | 94.295%       | 37 days 09:19:33.62  |
| Malbec                                   | 10.100.36.75      | SNMPV2C      | 99.00%           | 100.000%     | 99.998%       | 99.998%        | 97.771%       | 272 days 01:21:59.14 |
| Merlot                                   | 10.100.36.48      | SNMPV2C      | 99.09%           | 100.000%     | 100.000%      | 100.000%       | 98.290%       | 217 days 20:49:34.69 |
| Muscat                                   | 10.100.36.51      | SNMPV2C      | 99.41%           | 100.000%     | 100.000%      | 100.000%       | 98.290%       | 217 days 20:30:42.75 |
| Palomino                                 | 10.100.38.2       | SNMPV2C      | 98.98%           | 100.000%     | 100.000%      | 100.000%       | 98.293%       | 85 days 00:03:38.56  |
| Pinot                                    | 10.100.36.53      | SNMPV2C      | 99.07%           | 100.000%     | 100.000%      | 100.000%       | 98.046%       | 217 days 20:46:48.45 |
| Riesling                                 | 10.100.36.70      | SNMPV2C      | 98.31%           | 100.000%     | 100.000%      | 100.000%       | 65.610%       | 29 days 02:31:33.14  |
| Sauvignon                                | 10.100.36.20      | SNMPV2C      | 99.46%           | 100.000%     | 100.000%      | 100.000%       | 97.210%       | 147 days 01:45:02.81 |
| Shiraz                                   | 10.100.37.3       | SNMPV2C      | 96.83%           | 99.056%      | 97.422%       | 97.122%        | 82.420%       | 216 days 04:08:00.00 |
| Zinfandel                                | 10.100.36.27      | SNMPV2C      | 99.20%           | 100.000%     | 100.000%      | 100.000%       | 99.756%       | 378 days 23:46:51.68 |
| <b>Edge Network (8 devices)</b>          |                   |              |                  |              |               |                |               |                      |
| Atlanta                                  | 10.100.37.1       | SNMPV2C      | 96.00%           | 98.049%      | 93.241%       | 91.717%        | 82.873%       | 89 days 01:28:50.34  |
| Denver                                   | 10.100.36.60      | SNMPV2C      | 96.15%           | 100.000%     | 100.000%      | 100.000%       | 91.178%       | 217 days 20:41:13.60 |
| Miami                                    | 10.100.38.3       | SNMPV2C      | 95.65%           | 100.000%     | 100.000%      | 100.000%       | 98.537%       | 189 days 21:17:03.46 |
| Honolulu                                 | 10.100.36.5       | SNMPV2C      | 96.15%           | 100.000%     | 100.000%      | 100.000%       | 98.727%       | 84 days 23:09:58.70  |
| Honolulu                                 | 10.100.38.1       | SNMPV2C      | 96.15%           | 100.000%     | 100.000%      | 100.000%       | 98.780%       | 84 days 23:09:58.83  |
| NewYork                                  | 192.168.202.1     | SNMPV2C      | 96.30%           | 100.000%     | 100.000%      | 100.000%       | 83.680%       | 217 days 20:34:25.51 |
| Internet                                 | 10.100.36.1       | SNMPV2C      | 96.43%           | 100.000%     | 100.000%      | 100.000%       | 97.039%       | 201 days 07:32:35.47 |
| Zinfandel                                | 10.100.36.25      | SNMPV2C      | 99.20%           | 100.000%     | 100.000%      | 100.000%       | 97.522%       | 378 days 23:46:54.00 |
| <b>Cisco ASA Firewall (1 device)</b>     |                   |              |                  |              |               |                |               |                      |
| CiscoASA                                 | 10.100.36.4       | SNMPV2C      | 98.18%           | 100.000%     | 100.000%      | 100.000%       | 89.507%       | 271 days 23:53:28.00 |
| <b>Servers (2 devices)</b>               |                   |              |                  |              |               |                |               |                      |
| REDSONJA                                 | 10.100.36.12      | SNMPV2C      | 98.46%           | 100.000%     | 100.000%      | 100.000%       | 96.578%       | 69 days 12:50:55.27  |
| VELMA                                    | 10.100.36.10      | SNMPV2C      | 94.44%           | 100.000%     | 100.000%      | 100.000%       | 97.378%       | 137 days 01:22:08.15 |
| Total Devices:                           |                   | 31           | Avg: 97.45%      |              |               |                |               | 186 days 19:25:50.00 |

The version of SNMP that is being used to communicate with the device along with the reliability of communication with the device is displayed. SNMP Reliability is the amount of packet loss seen to/from the device when trying to collect information from it. It measures the last poll (last 5 minutes typically).

The uptime (as reported by the device) is also displayed, along with an average uptime of all devices. This can help track when a device was last rebooted. The uptime metrics measures the amount of time over the specified period that TotalView could not communicate with the device.

Uptime is tracked Daily, Weekly, Monthly, and Yearly for all devices which makes it easy to determine the percentage of availability per device for the specific periods to help measure SLA's.



## Interface Summary

If you click on a device name, it will display the Interface Summary for that device:

The Interface Summary will list the specific switch information that you selected and a table showing all of the interfaces on the switch.

## Interface Summary Fields: General Tab

The interface summary table includes the following fields when the "General" sub-tab is chosen:

The screenshot shows the PathSolutions TotalView interface. At the top right, it displays 'Poll frequency: 00:05:00', 'Last poll: 2/18/2015 3:31:31 PM', and 'Network health: DEGRADED (1.2%)'. The main navigation bar includes 'Map', 'Path', 'Phones', 'Assessment', 'MOS', 'Devices', 'Favorites', 'Issues', 'Health', 'Top-10', 'WAN', 'Interfaces', and 'Tools'. The 'Interfaces' tab is selected, showing a 'Device Summary' for 'Malbec' (IP: 10.100.36.75) with a 'DEGRADED' status. Below this is the 'Interface Summary' table with the following columns: Interface Number, Favorite, IP Address, Description, Ignore Int, Peak Daily Error Rate, Peak Daily Utilization (Tx, Rx), Interface Speed, Duplex, Port VLAN ID, and Status (Admin, Oper). The table lists 24 interfaces, with Int #23 showing a red status and a peak error rate of 41.327%.

| Interface Number | Favorite | IP Address   | Description  | Ignore Int | Peak Daily Error Rate | Peak Daily Utilization Tx | Peak Daily Utilization Rx | Interface Speed | Duplex | Port VLAN ID | Status Admin | Status Oper |
|------------------|----------|--------------|--|------------|-----------------------|---------------------------|---------------------------|-----------------|--------|--------------|--------------|-------------|
| Int #1           | Favorite |              | ifc1 (Slot: 1 Port: 1): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 1 (To Bardolino) | Ignore     | 0.000%                | 0.001%                    | 0.000%                    | 1,000,000,000   | Full   | none         | up           | up          |
| Int #2           | Favorite | 10.100.36.75 | ifc2 (Slot: 1 Port: 2): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 2 (To Pinot)     | Ignore     | 1.152%                | 0.279%                    | 1.239%                    | 100,000,000     | Full*  | none         | up           | up          |
| Int #3           | Favorite |              | ifc3 (Slot: 1 Port: 3): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 3 (To Merlot)    | Ignore     | 0.148%                | 1.227%                    | 0.268%                    | 100,000,000     | Full*  | none         | up           | up          |
| Int #4           | Favorite |              | ifc4 (Slot: 1 Port: 4): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 4                | Ignore     | 0.000%                | 0.000%                    | 0.000%                    | -               | -      | none         | up           | down        |
| Int #5           | Favorite |              | ifc5 (Slot: 1 Port: 5): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 5                | Ignore     | 0.000%                | 0.000%                    | 0.000%                    | -               | -      | none         | up           | down        |
| Int #6           | Favorite |              | ifc6 (Slot: 1 Port: 6): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 6                | Ignore     | 0.000%                | 0.000%                    | 0.000%                    | -               | -      | none         | up           | down        |
| Int #7           | Favorite |              | ifc7 (Slot: 1 Port: 7): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 7                | Ignore     | 0.000%                | 0.011%                    | 0.000%                    | 100,000,000     | Full*  | none         | up           | up          |
| Int #8           | Favorite |              | ifc8 (Slot: 1 Port: 8): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 8                | Ignore     | 0.000%                | 0.001%                    | 0.000%                    | 1,000,000,000   | Full   | none         | up           | up          |
| Int #9           | Favorite |              | ifc9 (Slot: 1 Port: 9): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 9                | Ignore     | 0.000%                | 0.000%                    | 0.000%                    | -               | -      | none         | up           | down        |
| Int #10          | Favorite |              | ifc10 (Slot: 1 Port: 10): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 10             | Ignore     | 0.000%                | 0.000%                    | 0.000%                    | -               | -      | none         | up           | down        |
| Int #11          | Favorite |              | ifc11 (Slot: 1 Port: 11): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 11             | Ignore     | 0.000%                | 0.016%                    | 0.001%                    | 1,000,000,000   | Full   | none         | up           | up          |
| Int #12          | Favorite |              | ifc12 (Slot: 1 Port: 12): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 12             | Ignore     | 0.000%                | 0.000%                    | 0.000%                    | -               | -      | none         | up           | down        |
| Int #13          | Favorite |              | ifc13 (Slot: 1 Port: 13): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 13             | Ignore     | 0.000%                | 0.000%                    | 0.000%                    | -               | -      | none         | up           | down        |
| Int #14          | Favorite |              | ifc14 (Slot: 1 Port: 14): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 14             | Ignore     | 0.000%                | 0.000%                    | 0.000%                    | -               | -      | none         | up           | down        |
| Int #15          | Favorite |              | ifc15 (Slot: 1 Port: 15): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 15             | Ignore     | 0.000%                | 0.011%                    | 0.002%                    | 100,000,000     | Full*  | none         | up           | up          |
| Int #16          | Favorite |              | ifc16 (Slot: 1 Port: 16): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 16             | Ignore     | 0.000%                | 0.000%                    | 0.000%                    | -               | -      | none         | up           | down        |
| Int #17          | Favorite |              | ifc17 (Slot: 1 Port: 17): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 17             | Ignore     | 0.000%                | 0.012%                    | 0.002%                    | 100,000,000     | Full*  | none         | up           | up          |
| Int #18          | Favorite |              | ifc18 (Slot: 1 Port: 18): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 18             | Ignore     | 0.000%                | 0.000%                    | 0.000%                    | -               | -      | none         | up           | down        |
| Int #19          | Favorite |              | ifc19 (Slot: 1 Port: 19): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 19             | Ignore     | 0.000%                | 0.000%                    | 0.000%                    | -               | -      | none         | up           | down        |
| Int #20          | Favorite |              | ifc20 (Slot: 1 Port: 20): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 20             | Ignore     | 0.000%                | 0.012%                    | 0.001%                    | 100,000,000     | Full*  | none         | up           | up          |
| Int #21          | Favorite |              | ifc21 (Slot: 1 Port: 21): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 21             | Ignore     | 0.000%                | 0.001%                    | 0.000%                    | 1,000,000,000   | Full   | none         | up           | up          |
| Int #22          | Favorite |              | ifc22 (Slot: 1 Port: 22): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 22             | Ignore     | 0.000%                | 0.000%                    | 0.000%                    | -               | -      | none         | up           | down        |
| Int #23          | Favorite |              | ifc23 (Slot: 1 Port: 23): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 23             | Ignore     | 41.327%               | 0.000%                    | 0.001%                    | 1,000,000,000   | Full   | none         | up           | up          |
| Int #24          | Favorite |              | ifc24 (Slot: 1 Port: 24): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 24             | Ignore     | 0.000%                | 0.000%                    | 0.000%                    | -               | -      | none         | up           | down        |

The first column includes a green or red status indicator. If a device has an interface that is healthy the status for the device will be green. If an interface is degraded (utilization or error rate is higher than the configured threshold), the status for the interface will be red, and the Error Rate or Utilization Rate will be marked in red. An interface will be yellow if an interface is manually marked as suppressed by the user. Suppressing an interface can be done by clicking on the status (colored dot) and selecting to suppress that particular interface.

**Note:** If the status indicator shows up blank, then the interface is operationally shut down, and is not relevant.

The Interface Number column is the interface number on the device. Each device manufacturer will create a unique number for each interface. You can use this interface number to correlate physical interfaces on the switch. Clicking on the interface number will display the "Interface Details" page. Refer to the "Interface Details" section for more information.

The third column is the IP address associated with the interface (if any). Routers and servers will generally have an IP address assigned to each interface, whereas switches may only have an IP address associated with the management interface. If multiple IP addresses are associated with an interface, it will appear on the tooltip if you hover over the IP address field.

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The Description column is the interface description. This information is provided by the device as a way of describing the interface. It may contain information on the type of interface, or the interface identifier used on the device.

The Peak Daily Error Rate column is the error rate of the interface. The error rate is calculated as a combination of all inbound and outbound errors on the interface, compared to the number of packets that have passed through the interface.

If the error rate is above the error threshold, it will be displayed in red.

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**Note:** There are some devices that do not report error information correctly, and can lead you to believe that there are faults on interfaces that actually are functioning correctly. If you perceive errors on an interface that is abnormal, contact the device manufacturer to attempt to determine more about its SNMP reporting capabilities.

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The Peak Daily Tx column is daily peak utilization transmitted data. This statistic reports the maximum transmitted utilization on the interface (as a percentage of bandwidth) that was seen over the past 24 hour period.

If this statistic is over the utilization threshold, it will be displayed in red.

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**Note:** If PathSolutions TotalView is unable to read the correct interface speed from the device, this number may not be accurate.

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The Peak Daily Rx column is daily peak utilization received data. This statistic reports the maximum received utilization on an interface (as a percentage of bandwidth) that was seen over the past 24 hour period.

If this statistic is over the utilization threshold, it will be displayed in red.

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**Note:** If PathSolutions TotalView is unable to read the correct interface speed from the device, this number may not be accurate.

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The Interface Speed column is interface speed, rated in bits per second. If the interface is operationally shut down, or the device does not report a valid speed, then the speed is listed as "Unknown".

The Duplex column shows the duplex status of the interface. Duplex information cannot easily be determined from different switch manufacturers, so this field is calculated based on the presence or absence of collisions. If there are any collisions on the interface, then the interface must be half-duplex. If there are no collisions on the interface, then the interface may be full-duplex, or it may be a half-duplex interface that has not yet received any collisions.

The Port VLAN ID column shows the default VLAN ID for the interface. This is the VLAN that will be assigned by default to all un-tagged packets on this interface.

The Status column shows the operational and administrative status of the interface. If the network administrator has configured an interface to be shut down it will be listed as "down" in this column.

## Interface Summary Fields: Traffic Tab

The interface summary table includes the following fields when the “Traffic” sub-tab is chosen:

The screenshot shows the PathSolutions TotalView interface. At the top right, it displays 'Poll frequency: 00:05:00', 'Last poll: 2/18/2015 3:36:37 PM', and 'Network health: DEGRADED (1.2%)'. The navigation bar includes 'Map', 'Path', 'Phones', 'Assessment', 'MOS', 'Devices', 'Favorites', 'Issues', 'Health', 'Top-10', 'WAN', 'Interfaces', and 'Tools'. The 'Devices' section is active, showing a 'Device Summary' for 'Malbec' (10.100.36.75) with a 'Healthy' status. Below this is the 'Interface Summary' table, which is the focus of the document.

| Interface Number | Favorite | IP Address   | Description  | Ignore Int | Avg Packet Size | Historical Broadcast Percent |         | Last Poll Broadcast Percent |         | Last Poll Utilization Percent |        |
|------------------|----------|--------------|--|------------|-----------------|------------------------------|---------|-----------------------------|---------|-------------------------------|--------|
|                  |          |              |  |            |                 | Tx                           | Rx      | Tx                          | Rx      | Tx                            | Rx     |
| Int #1           | Favorite |              | ifc1 (Slot: 1 Port: 1): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 1 (To Bardolino) | Ignore     | 1 bytes         | 85.692%                      | 69.450% | 69.042%                     | 2.703%  | 0.000%                        | 0.000% |
| Int #2           | Favorite | 10.100.36.75 | ifc2 (Slot: 1 Port: 2): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 2 (To Pinot)     | Ignore     | 1 bytes         | 62.875%                      | 3.669%  | 10.875%                     | 5.547%  | 0.032%                        | 0.026% |
| Int #3           | Favorite |              | ifc3 (Slot: 1 Port: 3): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 3 (To Merlot)    | Ignore     | 0 bytes         | 24.389%                      | 76.848% | 21.831%                     | 9.642%  | 0.015%                        | 0.017% |
| Int #4           | Favorite |              | ifc4 (Slot: 1 Port: 4): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 4                | Ignore     | 0 bytes         | 47.208%                      | 92.380% | 0.000%                      | 0.000%  | 0.000%                        | 0.000% |
| Int #5           | Favorite |              | ifc5 (Slot: 1 Port: 5): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 5                | Ignore     | 1 bytes         | 99.036%                      | 25.037% | 0.000%                      | 0.000%  | 0.000%                        | 0.000% |
| Int #6           | Favorite |              | ifc6 (Slot: 1 Port: 6): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 6                | Ignore     | 33 bytes        | 97.532%                      | 1.557%  | 0.000%                      | 0.000%  | 0.000%                        | 0.000% |
| Int #7           | Favorite |              | ifc7 (Slot: 1 Port: 7): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 7                | Ignore     | 1 bytes         | 99.348%                      | 0.001%  | 98.906%                     | 0.000%  | 0.002%                        | 0.000% |
| Int #8           | Favorite |              | ifc8 (Slot: 1 Port: 8): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 8                | Ignore     | 4 bytes         | 98.257%                      | 42.859% | 98.906%                     | 0.000%  | 0.000%                        | 0.000% |
| Int #9           | Favorite |              | ifc9 (Slot: 1 Port: 9): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 9                | Ignore     | -               | 0.000%                       | 0.000%  | 0.000%                      | 0.000%  | 0.000%                        | 0.000% |
| Int #10          | Favorite |              | ifc10 (Slot: 1 Port: 10): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 10             | Ignore     | 93 bytes        | 98.563%                      | 91.011% | 0.000%                      | 0.000%  | 0.000%                        | 0.000% |
| Int #11          | Favorite |              | ifc11 (Slot: 1 Port: 11): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 11             | Ignore     | 1 bytes         | 94.849%                      | 3.143%  | 57.883%                     | 1.862%  | 0.000%                        | 0.000% |
| Int #12          | Favorite |              | ifc12 (Slot: 1 Port: 12): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 12             | Ignore     | -               | 0.000%                       | 0.000%  | 0.000%                      | 0.000%  | 0.000%                        | 0.000% |
| Int #13          | Favorite |              | ifc13 (Slot: 1 Port: 13): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 13             | Ignore     | -               | 0.000%                       | 0.000%  | 0.000%                      | 0.000%  | 0.000%                        | 0.000% |
| Int #14          | Favorite |              | ifc14 (Slot: 1 Port: 14): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 14             | Ignore     | 424 bytes       | 13.266%                      | 1.144%  | 0.000%                      | 0.000%  | 0.000%                        | 0.000% |
| Int #15          | Favorite |              | ifc15 (Slot: 1 Port: 15): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 15             | Ignore     | 0 bytes         | 98.253%                      | 0.000%  | 97.959%                     | 0.000%  | 0.002%                        | 0.000% |
| Int #16          | Favorite |              | ifc16 (Slot: 1 Port: 16): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 16             | Ignore     | -               | 0.000%                       | 0.000%  | 0.000%                      | 0.000%  | 0.000%                        | 0.000% |
| Int #17          | Favorite |              | ifc17 (Slot: 1 Port: 17): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 17             | Ignore     | 0 bytes         | 98.953%                      | 0.402%  | 88.026%                     | 0.000%  | 0.003%                        | 0.001% |
| Int #18          | Favorite |              | ifc18 (Slot: 1 Port: 18): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 18             | Ignore     | -               | 0.000%                       | 0.000%  | 0.000%                      | 0.000%  | 0.000%                        | 0.000% |
| Int #19          | Favorite |              | ifc19 (Slot: 1 Port: 19): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 19             | Ignore     | 2 bytes         | 99.236%                      | 39.698% | 0.000%                      | 0.000%  | 0.000%                        | 0.000% |
| Int #20          | Favorite |              | ifc20 (Slot: 1 Port: 20): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 20             | Ignore     | 0 bytes         | 92.336%                      | 1.010%  | 73.562%                     | 6.765%  | 0.003%                        | 0.001% |
| Int #21          | Favorite |              | ifc21 (Slot: 1 Port: 21): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 21             | Ignore     | 0 bytes         | 93.422%                      | 82.742% | 67.062%                     | 56.991% | 0.000%                        | 0.000% |
| Int #22          | Favorite |              | ifc22 (Slot: 1 Port: 22): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 22             | Ignore     | 2 bytes         | 11.389%                      | 0.048%  | 0.000%                      | 0.000%  | 0.000%                        | 0.000% |
| Int #23          | Favorite |              | ifc23 (Slot: 1 Port: 23): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 23             | Ignore     | 0 bytes         | 86.565%                      | 84.448% | 0.000%                      | 99.035% | 0.000%                        | 0.000% |
| Int #24          | Favorite |              | ifc24 (Slot: 1 Port: 24): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 24             | Ignore     | -               | 0.000%                       | 0.000%  | 0.000%                      | 0.000%  | 0.000%                        | 0.000% |

The Interface Number, IP Address, and Description columns will remain unchanged from the “General” tab.

The Average Packet Size column will show the average packet size tracked per interface. Knowing if an interface is typically used for large or small packets allows you to configure queuing and enable proper policies (jumbo frames) to further improve the performance of a link.

The Historical Broadcast Percent columns show the historical (all time) broadcast percentages. This field will inform you of the activity on the link regarding its general broadcast percentage rate to be used as a comparison against the Last Poll Broadcast Percentage.

The Last Poll Broadcast Percent columns show the broadcast percentage of the last polling period. This information can be compared with the Historical Broadcast percentage to determine if an interface is transmitting or receiving a higher broadcast rate during the last poll than its overall historical average.

The Last Poll Utilization Percent columns show the Last Poll utilization percentage. This is useful for determining which interfaces were the most heavily utilized on the network during the last polling period.

## Interface Summary Fields: PoE Tab

The interface summary table includes the following fields when the “PoE” sub-tab is chosen:

The screenshot displays the TotalView interface with the PoE tab selected. It features two main tables: 'Power Supply (PSU)' and 'Interface'. The 'Power Supply (PSU)' table lists device details like name, IP, group, status, rating, consumption, and power utilization. The 'Interface' table lists various interfaces with their numbers, IP addresses, descriptions, and PoE-related settings. A tooltip for interface Int #10006 indicates a power range of 12.95 Watts to 25.50 Watts.

The Interface Number, IP Address, and Description columns will remain unchanged from the “PoE” tab.

The PoE column will show you if power is turned on and available for that interface.

The PoE PSU column shows the specific Power Supply Unit (PSU) that powers the interface. This number will either be a 1 or a 2. If the number in the PSU column shows a 1 it is PoE device. And if the PSU column shows a 2 it is a PoE+ device.

The State column will show you if power is being delivered to that interface.

The Max Draw column will show you the maximum wattage that can be drawn by that interface. Hovering over the **Max Draw number** will show a minimum to maximum range of power that the interface can draw.

The ninth column, the PoE Class, will be a number from 0 to 4 depending on the Class of PoE.

| <b>Class</b> | <b>Plain Language Description</b> | <b>Power Range (Watts)</b> |
|--------------|-----------------------------------|----------------------------|
| 0            | Unclassified                      | 0.44-12.94                 |
| 1            | Very Low Power                    | 0.44-3.84                  |
| 2            | Low Power                         | 3.84-6.49                  |
| 3            | Mid Power                         | 6.49-12.95                 |
| 4            | PoE+ / Type II Devices            | >12.95                     |

And the tenth column shows the power priority configured on ports enabled for PoE which can be Low, High, or Critical. The switch invokes configured PoE priorities only when it cannot deliver power to all active PoE ports.

## Interface Summary Fields: STP Tab

The interface summary table includes the following fields when the “STP” sub-tab is chosen:

The screenshot shows the TotalView interface with the STP tab selected. The interface summary table displays the following data:

| Interface Number | IP Address   | Description   | Priority | State      | Enable | Path Cost | Root   | Cost | Designated Bridge | Port | Forward Transactions |
|------------------|--------------|---|----------|------------|--------|-----------|--------|------|-------------------|------|----------------------|
| Int #1           | 10.100.36.53 | Vl1: Vlan1  | 0        | unknown    | -      | 0         | Gamay  | 0    | Gamay             | -    | 0                    |
| Int #10001       |              | Fa0/1: FastEthernet0/1 (Trunk Port Connected to Merlot) | -        | -          | -      | -         | -      | -    | -                 | -    | -                    |
| Int #10002       |              | Fa0/2: FastEthernet0/2 (Cube A-02)                      | 128      | forwarding | ●      | 19        | Merlot | 29   | Pinot             | 8004 | 1                    |
| Int #10003       |              | Fa0/3: FastEthernet0/3 (Cube A-03)                      | -        | -          | -      | -         | -      | -    | -                 | -    | -                    |
| Int #10004       |              | Fa0/4: FastEthernet0/4 (Trunk Port Connected to Malbec) | 128      | forwarding | ●      | 19        | Merlot | 10   | 8000001bba19a401  | 8002 | 1                    |
| Int #10005       |              | Fa0/5: FastEthernet0/5 (To Wireless Access Point)       | 128      | forwarding | ●      | 19        | Merlot | 29   | Pinot             | 8007 | 1                    |
| Int #10006       |              | Fa0/6: FastEthernet0/6 ((( )))                          | -        | -          | -      | -         | -      | -    | -                 | -    | -                    |
| Int #10007       |              | Fa0/7: FastEthernet0/7 (Connection to Denver)           | 128      | forwarding | ●      | 100       | Merlot | 29   | Pinot             | 8009 | 1                    |
| Int #10008       |              | Fa0/8: FastEthernet0/8 (Cube A-07)                      | -        | -          | -      | -         | -      | -    | -                 | -    | -                    |
| Int #10009       |              | Fa0/9: FastEthernet0/9 (( ))                            | -        | -          | -      | -         | -      | -    | -                 | -    | -                    |
| Int #10010       |              | Fa0/10: FastEthernet0/10 (To Hawaii)                    | 128      | forwarding | ●      | 19        | Merlot | 29   | Pinot             | 800c | 1                    |
| Int #10011       |              | Fa0/11: FastEthernet0/11 (2nd Floor Cube B-02)          | -        | -          | -      | -         | -      | -    | -                 | -    | -                    |
| Int #10012       |              | Fa0/12: FastEthernet0/12 (Sauv-Zinf-Internet)           | 128      | forwarding | ●      | 19        | Merlot | 29   | Pinot             | 800e | 1                    |
| Int #10013       |              | Fa0/13: FastEthernet0/13 (To Velma)                     | 128      | forwarding | ●      | 100       | Merlot | 29   | Pinot             | 800f | 1                    |
| Int #10014       |              | Fa0/14: FastEthernet0/14 (Sally)                        | 128      | forwarding | ●      | 19        | Merlot | 29   | Pinot             | 8010 | 1                    |
| Int #10015       |              | Fa0/15: FastEthernet0/15 (Tim)                          | 128      | forwarding | ●      | 19        | Merlot | 29   | Pinot             | 8011 | 1                    |
| Int #10016       |              | Fa0/16: FastEthernet0/16 (2nd Floor Cube B-06)          | -        | -          | -      | -         | -      | -    | -                 | -    | -                    |
| Int #10017       |              | Fa0/17: FastEthernet0/17 (2nd Floor Cube B-07)          | 128      | forwarding | ●      | 19        | Merlot | 29   | Pinot             | 8013 | 1                    |
| Int #10018       |              | Fa0/18: FastEthernet0/18 (2nd Floor Cube B-08)          | -        | -          | -      | -         | -      | -    | -                 | -    | -                    |
| Int #10019       |              | Fa0/19: FastEthernet0/19 (2nd Floor Cube B-09)          | 128      | forwarding | ●      | 19        | Merlot | 29   | Pinot             | 8015 | 1                    |
| Int #10020       |              | Fa0/20: FastEthernet0/20 (Visitor Bldg Cube B)          | -        | -          | -      | -         | -      | -    | -                 | -    | -                    |
| Int #10021       |              | Fa0/21: FastEthernet0/21 (Visitor Bldg Cube C)          | -        | -          | -      | -         | -      | -    | -                 | -    | -                    |
| Int #10022       |              | Fa0/22: FastEthernet0/22 (Visitor Bldg Cube D)          | -        | -          | -      | -         | -      | -    | -                 | -    | -                    |
| Int #10023       |              | Fa0/23: FastEthernet0/23 (Visitor Bldg Cube E)          | -        | -          | -      | -         | -      | -    | -                 | -    | -                    |
| Int #10024       |              | Fa0/24: FastEthernet0/24 (Visitor Bldg Cube F)          | -        | -          | -      | -         | -      | -    | -                 | -    | -                    |

The Interface Number, IP Address, and Description columns will remain unchanged from the “STP” tab.

The State column will show which of port state the interface is: Blocking, Listening, Learning, Forwarding, or Disabled.

The Enable column shows if the interface is enabled for STP.

The Path Cost column will show the Path Cost of the interface.

The Root column will show the Designated Root of the interface.

The Cost Column will show the Designated STP Cost of the interface.

The Bridge Column shows the Designated Bridge for the interface.

The Port Column shows the Designated Port for the interface.

The Forward Transactions Column shows the Interface Forward Transactions for the interface.

## Interface Summary Fields: Details Tab

The interface summary table includes the following fields when the “Details” sub-tab is chosen:

The screenshot shows the TotalView interface with the 'Interface Summary' tab selected. The device 'Maibec' is highlighted. The interface summary table is as follows:

| Interface Number | Favorite | IP Address   | Description  | Ignore Int | X | Queue Type | MAC Address  | MTU  | Type           | Last Changed         |
|------------------|----------|--------------|--|------------|---|------------|--------------|------|----------------|----------------------|
| Int #1           | Favorite | 10.100.36.75 | if:1 (Slot: 1 Port: 1): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 1 (To Bardolino) | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 189 days 20:26:38.75 |
| Int #2           | Favorite | 10.100.36.75 | if:2 (Slot: 1 Port: 2): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 2 (To Pinot)     | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 197 days 06:05:07.76 |
| Int #3           | Favorite |              | if:3 (Slot: 1 Port: 3): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 3 (To Merlot)    | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 209 days 00:59:55.29 |
| Int #4           | Favorite |              | if:4 (Slot: 1 Port: 4): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 4                | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 218 days 20:44:00.54 |
| Int #5           | Favorite |              | if:5 (Slot: 1 Port: 5): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 5                | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 18 days 18:17:13.05  |
| Int #6           | Favorite |              | if:6 (Slot: 1 Port: 6): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 6                | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 196 days 03:29:29.50 |
| Int #7           | Favorite |              | if:7 (Slot: 1 Port: 7): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 7                | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 190 days 20:48:52.25 |
| Int #8           | Favorite |              | if:8 (Slot: 1 Port: 8): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 8                | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 189 days 20:26:23.25 |
| Int #9           | Favorite |              | if:9 (Slot: 1 Port: 9): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 9                | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 273 days 00:45:42.51 |
| Int #10          | Favorite |              | if:10 (Slot: 1 Port: 10): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 10             | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 197 days 05:14:48.50 |
| Int #11          | Favorite |              | if:11 (Slot: 1 Port: 11): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 11             | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 70 days 12:15:16.57  |
| Int #12          | Favorite |              | if:12 (Slot: 1 Port: 12): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 12             | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 273 days 00:45:42.51 |
| Int #13          | Favorite |              | if:13 (Slot: 1 Port: 13): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 13             | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 273 days 00:45:42.51 |
| Int #14          | Favorite |              | if:14 (Slot: 1 Port: 14): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 14             | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 196 days 03:25:23.51 |
| Int #15          | Favorite |              | if:15 (Slot: 1 Port: 15): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 15             | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 26 days 23:08:19.65  |
| Int #16          | Favorite |              | if:16 (Slot: 1 Port: 16): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 16             | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 273 days 00:45:42.51 |
| Int #17          | Favorite |              | if:17 (Slot: 1 Port: 17): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 17             | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 30 days 01:57:32.15  |
| Int #18          | Favorite |              | if:18 (Slot: 1 Port: 18): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 18             | Ignore     | • |            | 001bba19a400 | 1514 | ethernetCsmacd | 273 days 00:45:42.51 |

The Interface Number, IP Address, and Description columns will remain unchanged from the “General” tab.

The X column shows an indicator if this interface has a physical connector associated with the interface.

**Note:** If the device does not support RFC 2863 and the ifConnector Present OID, then this column will be empty.

The MAC Address column shows the MAC address that is associated with this interface.

**Note:** The MAC address displayed here is the physical interface’s own MAC address, not the MAC address of any devices connected to this interface.

The MTU column displays the MTU (Maximum Transmission Unit) of the interface. This is the largest frame that can be transmitted or received on this interface. Typically, this will show 1500 bytes as the maximum for normal frames, but may be above 9,000 bytes if the interface is configured for supporting Jumbo Frames.

The Type column presents the type of interface.

The Last Changed column shows the time the interface last changed status from up to down, or from down to up.

### Interface Summary Fields: Poll Tab

The interface summary table includes the following fields when the “Poll” sub-tab is chosen:

The screenshot shows the PathSolutions TotalView interface. At the top right, it displays system information: Poll frequency: 00:05:00, Last poll: 2/18/2015 3:36:37 PM, and Network health: DEGRADED (1.2%). The navigation bar includes tabs for Map, Path, Phones, Assessment, MOS, Devices, Favorites, Issues, Health, Top-10, WAN, Interfaces, and Tools. The 'Devices' tab is active, showing a 'Device Summary' table for a device named 'Malbec' with IP 10.100.36.75. Below this, the 'Interface Summary' table is displayed under the 'Poll' sub-tab. The table has columns for Interface Number, Favorite, IP Address, Description, Ignore Int, MIB-II, and DetailPoll. It lists 24 interfaces (Int #1 to Int #24) for a Nortel Ethernet Routing Switch 5520-24T-PWR Module. Each interface is associated with a specific slot and port number. The 'Ignore Int' column is set to 'Ignore' for all interfaces, and the 'MIB-II' column is set to 'V2POLL64'. The 'DetailPoll' column is set to 'FastEther' for all interfaces.

| Interface Number | Favorite | IP Address   | Description  | Ignore Int | Poll Type |            |
|------------------|----------|--------------|--|------------|-----------|------------|
|                  |          |              |  |            | MIB-II    | DetailPoll |
| Int #1           | Favorite |              | ifc1 (Slot: 1 Port: 1): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 1 (To Bardolino) | Ignore     | V2POLL64  | FastEther  |
| Int #2           | Favorite | 10.100.36.75 | ifc2 (Slot: 1 Port: 2): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 2 (To Pinot)     | Ignore     | V2POLL64  | FastEther  |
| Int #3           | Favorite |              | ifc3 (Slot: 1 Port: 3): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 3 (To Merlot)    | Ignore     | V2POLL64  | FastEther  |
| Int #4           | Favorite |              | ifc4 (Slot: 1 Port: 4): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 4                | Ignore     | V2POLL64  | FastEther  |
| Int #5           | Favorite |              | ifc5 (Slot: 1 Port: 5): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 5                | Ignore     | V2POLL64  | FastEther  |
| Int #6           | Favorite |              | ifc6 (Slot: 1 Port: 6): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 6                | Ignore     | V2POLL64  | FastEther  |
| Int #7           | Favorite |              | ifc7 (Slot: 1 Port: 7): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 7                | Ignore     | V2POLL64  | FastEther  |
| Int #8           | Favorite |              | ifc8 (Slot: 1 Port: 8): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 8                | Ignore     | V2POLL64  | FastEther  |
| Int #9           | Favorite |              | ifc9 (Slot: 1 Port: 9): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 9                | Ignore     | V2POLL64  | FastEther  |
| Int #10          | Favorite |              | ifc10 (Slot: 1 Port: 10): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 10             | Ignore     | V2POLL64  | FastEther  |
| Int #11          | Favorite |              | ifc11 (Slot: 1 Port: 11): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 11             | Ignore     | V2POLL64  | FastEther  |
| Int #12          | Favorite |              | ifc12 (Slot: 1 Port: 12): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 12             | Ignore     | V2POLL64  | FastEther  |
| Int #13          | Favorite |              | ifc13 (Slot: 1 Port: 13): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 13             | Ignore     | V2POLL64  | FastEther  |
| Int #14          | Favorite |              | ifc14 (Slot: 1 Port: 14): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 14             | Ignore     | V2POLL64  | FastEther  |
| Int #15          | Favorite |              | ifc15 (Slot: 1 Port: 15): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 15             | Ignore     | V2POLL64  | FastEther  |
| Int #16          | Favorite |              | ifc16 (Slot: 1 Port: 16): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 16             | Ignore     | V2POLL64  | FastEther  |
| Int #17          | Favorite |              | ifc17 (Slot: 1 Port: 17): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 17             | Ignore     | V2POLL64  | FastEther  |
| Int #18          | Favorite |              | ifc18 (Slot: 1 Port: 18): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 18             | Ignore     | V2POLL64  | FastEther  |
| Int #19          | Favorite |              | ifc19 (Slot: 1 Port: 19): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 19             | Ignore     | V2POLL64  | FastEther  |
| Int #20          | Favorite |              | ifc20 (Slot: 1 Port: 20): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 20             | Ignore     | V2POLL64  | FastEther  |
| Int #21          | Favorite |              | ifc21 (Slot: 1 Port: 21): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 21             | Ignore     | V2POLL64  | FastEther  |
| Int #22          | Favorite |              | ifc22 (Slot: 1 Port: 22): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 22             | Ignore     | V2POLL64  | FastEther  |
| Int #23          | Favorite |              | ifc23 (Slot: 1 Port: 23): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 23             | Ignore     | V2POLL64  | FastEther  |
| Int #24          | Favorite |              | ifc24 (Slot: 1 Port: 24): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 24             | Ignore     | V2POLL64  | FastEther  |

The Interface Number, IP Address, and Description columns will remain unchanged from the “General” tab.

The MIB-II column shows the MIB-II poll type that was used to collect information from the interface. This is useful for determining how efficient PathSolutions TotalView can be when collecting information from this interface.

The DetailPoll column identifies additional details that are polled from the interface.



## Interface Summary Fields: CDP/LLDP

Each interface is queried for CDP and LLDP information and displays exactly what device and OS version is connected to that switch/router interface. To view CDP/LLDP information on an interface, click on a switch. You will then see all of the interfaces. Click on the sub-tab named "CDP/LLDP".

If you see some information displayed, it means that the connected device is providing CDP/LLDP information and should display the remote device's interface that connects to the local switch interface, the remote device's IP address, platform, name, and method (CDP or LLDP).

The screenshot shows the PathSolutions TotalView interface. At the top, there are navigation tabs: Map, Path, Phones, Assessment, MOS, Devices, Favorites, Issues, Health, Top-10, WAN, Interfaces, Tools. The main content area is divided into two sections: Device Summary and Interface Summary.

**Device Summary Table:**

| Device Name | Device IP Address | Manage Device        | OSI Services |   |   |   |   |   |    | # of Int | Oper Up | Oper Down | Admin Down  | Location    | Contact |
|-------------|-------------------|----------------------|--------------|---|---|---|---|---|----|----------|---------|-----------|-------------|-------------|---------|
|             |                   |                      | 1            | 2 | 3 | 4 | 5 | 6 | 7  |          |         |           |             |             |         |
| Pinot       | 10.100.36.53      | Telnet SSH Web HTTPS | •            | • |   |   |   |   | 27 | 12       | 15      | 0         | Santa Clara | Sally Toner |         |

**Interface Summary Table:**

| Interface Number | Favorite | IP Address   | Description   | Ignore Int | Method | Remote Device   |                     |               |                 |  |
|------------------|----------|--------------|---|------------|--------|-----------------|---------------------|---------------|-----------------|--|
|                  |          |              |   |            |        | Name            | Platform            | IP Address    | Interface       |  |
| Int #1           | Favorite | 10.100.36.53 | V11: Vlan1  | Ignore     |        |                 |                     |               |                 |  |
| Int #10001       | Favorite |              | Fa0/1: FastEthernet0/1 (Trunk Port Connected to Merlot) | Ignore     |        |                 |                     |               |                 |  |
| Int #10002       | Favorite |              | Fa0/2: FastEthernet0/2 (Cube A-02)                      | Ignore     |        |                 |                     |               |                 |  |
| Int #10003       | Favorite |              | Fa0/3: FastEthernet0/3 (Cube A-03)                      | Ignore     |        |                 |                     |               |                 |  |
| Int #10004       | Favorite |              | Fa0/4: FastEthernet0/4 (Trunk Port Connected to Malbec) | Ignore     |        |                 |                     |               |                 |  |
| Int #10005       | Favorite |              | Fa0/5: FastEthernet0/5 (To Wireless Access Point)       | Ignore     |        |                 |                     |               |                 |  |
| Int #10006       | Favorite |              | Fa0/6: FastEthernet0/6 ((( )))                          | Ignore     |        |                 |                     |               |                 |  |
| Int #10007       | Favorite |              | Fa0/7: FastEthernet0/7 (Connection to Denver)           | Ignore     | CDP    | Denver          | cisco 2610          | 10.100.36.60  | Ethernet0/0     |  |
| Int #10008       | Favorite |              | Fa0/8: FastEthernet0/8 (Cube A-07)                      | Ignore     |        |                 |                     |               |                 |  |
| Int #10009       | Favorite |              | Fa0/9: FastEthernet0/9 (( ))                            | Ignore     |        |                 |                     |               |                 |  |
| Int #10010       | Favorite |              | Fa0/10: FastEthernet0/10 (To Hawaii)                    | Ignore     | CDP    | Honolulu        | Cisco 2811          | 10.100.36.5   | FastEthernet0/0 |  |
| Int #10011       | Favorite |              | Fa0/11: FastEthernet0/11 (2nd Floor Cube B-02)          | Ignore     |        |                 |                     |               |                 |  |
| Int #10012       | Favorite |              | Fa0/12: FastEthernet0/12 (Sauv-Zinf-Internet)           | Ignore     | CDP    | Internet        | cisco 2621          | 10.100.36.1   | FastEthernet0/1 |  |
| Int #10013       | Favorite |              | Fa0/13: FastEthernet0/13 (To Velma)                     | Ignore     |        |                 |                     |               |                 |  |
| Int #10014       | Favorite |              | Fa0/14: FastEthernet0/14 (Sally)                        | Ignore     |        |                 |                     |               |                 |  |
| Int #10015       | Favorite |              | Fa0/15: FastEthernet0/15 (Tim)                          | Ignore     |        |                 |                     |               |                 |  |
| Int #10016       | Favorite |              | Fa0/16: FastEthernet0/16 (2nd Floor Cube B-06)          | Ignore     |        |                 |                     |               |                 |  |
| Int #10017       | Favorite |              | Fa0/17: FastEthernet0/17 (2nd Floor Cube B-07)          | Ignore     | CDP    | SIP0002FD65907A | Cisco IP Phone 7960 | 10.100.36.164 | Port 1          |  |
| Int #10018       | Favorite |              | Fa0/18: FastEthernet0/18 (2nd Floor Cube B-08)          | Ignore     |        |                 |                     |               |                 |  |
| Int #10019       | Favorite |              | Fa0/19: FastEthernet0/19 (2nd Floor Cube B-09)          | Ignore     |        |                 |                     |               |                 |  |
| Int #10020       | Favorite |              | Fa0/20: FastEthernet0/20 (Visitor Bldg Cube B)          | Ignore     |        |                 |                     |               |                 |  |
| Int #10021       | Favorite |              | Fa0/21: FastEthernet0/21 (Visitor Bldg Cube C)          | Ignore     |        |                 |                     |               |                 |  |
| Int #10022       | Favorite |              | Fa0/22: FastEthernet0/22 (Visitor Bldg Cube D)          | Ignore     |        |                 |                     |               |                 |  |
| Int #10023       | Favorite |              | Fa0/23: FastEthernet0/23 (Visitor Bldg Cube E)          | Ignore     |        |                 |                     |               |                 |  |
| Int #10024       | Favorite |              | Fa0/24: FastEthernet0/24 (Visitor Bldg Cube F)          | Ignore     |        |                 |                     |               |                 |  |

**Note:** \*Cisco CDP only shows other Cisco CDP Devices

\*LLDP Devices (Including configured Cisco Device) may show other LLDP devices

\*Some Devices (Enterasys/Extreme, HP) show both CDP and LLDP

## Interface Summary Fields: Connected Tab

The interface summary table includes the following fields when the “Connected” sub-tab is chosen.

**Note:** The results for the Connected tab will show up differently depending if the device is a switch or not.

### Ethernet Switch Results

The screenshot shows the PathSolutions TotalView interface. At the top, there's a navigation bar with tabs like Map, Path, Phones, Assessment, MOS, Devices, Favorites, Issues, Health, Top-10, WAN, Interfaces, and Tools. The 'Interfaces' tab is selected. Below it, there's a 'Device Summary' section for 'Barbera' (10.100.37.5) with various status indicators. The main part of the screenshot is the 'Interface Summary' table, which is currently on the 'Connected' sub-tab. The table has columns for Interface Number, Favorite, IP Address, Description, Ignore Int, and a list of connected devices. The 'Update' button is visible above the connected devices list.

| Interface Number | Favorite | IP Address | Description  | Ignore Int | Devices connected to this switch port  |
|------------------|----------|------------|--|------------|--|
| Int #1           | Favorite |            | fe.1.1: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 1                                    | Ignore     | VLAN #1: 10-DD-B1-AA-F2-F2   |
| Int #2           | Favorite |            | fe.1.2: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 2 (Trunk Port Connected to Gamay)    | Ignore     | VLAN #1: 00-10-49-00-6F-60 → 10.100.37.100<br>VLAN #1: 00-A0-C8-1D-85-F4 → 10.100.37.2<br>VLAN #1: 00-A0-C8-1D-86-0C<br>VLAN #1: 84-1B-5E-81-27-FC → 10.100.37.3   |
| Int #3           | Favorite |            | fe.1.3: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 3 (Andy Bohart Phone)                | Ignore     | VLAN #1: 08-00-0F-41-82-79 → 10.100.37.6   |
| Int #4           | Favorite |            | fe.1.4: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 4                                    | Ignore     | VLAN #1: 00-A0-C8-1D-86-0B   |
| Int #5           | Favorite |            | fe.1.5: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 5 (Ray Kissner Phone)                | Ignore     | VLAN #1: 08-00-0F-41-82-83 → 10.100.37.8   |
| Int #6           | Favorite |            | fe.1.6: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 6                                    | Ignore     | VLAN #1: 00-04-F2-2F-60-6F → 10.100.37.13  |
| Int #7           | Favorite |            | fe.1.7: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 7 (Mary Ludloff Phone)               | Ignore     |  |
| Int #8           | Favorite |            | fe.1.8: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 8                                    | Ignore     |  |
| Int #9           | Favorite |            | fe.1.9: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 9 (Damon Tribble Phone)              | Ignore     | VLAN #1: 08-00-0F-41-83-3F → 10.100.37.7   |
| Int #10          | Favorite |            | fe.1.10: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 10                                  | Ignore     |  |
| Int #11          | Favorite |            | fe.1.11: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 11 (Polycom Phone in Conference Rm) | Ignore     |  |
| Int #12          | Favorite |            | fe.1.12: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 12                                  | Ignore     |  |
| Int #13          | Favorite |            | fe.1.13: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 13                                  | Ignore     |  |
| Int #14          | Favorite |            | fe.1.14: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 14                                  | Ignore     |  |
| Int #15          | Favorite |            | fe.1.15: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 15                                  | Ignore     |  |
| Int #16          | Favorite |            | fe.1.16: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 16                                  | Ignore     |  |
| Int #17          | Favorite |            | fe.1.17: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 17                                  | Ignore     |  |
| Int #18          | Favorite |            | fe.1.18: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 18                                  | Ignore     | VLAN #1: 00-10-49-02-47-13 → 10.100.37.10<br>VLAN #1: 00-10-49-03-E1-42 → 10.100.37.101<br>VLAN #1: 00-13-C4-C7-7A-60 → 10.100.37.1<br>VLAN #1: B4-99-BA-CD-C6-80 → 10.100.37.16<br>VLAN #1: B4-99-BA-CD-C6-B9 |
| Int #19          | Favorite |            | fe.1.19: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 19 (Aastra Phone in Guest Rm)       | Ignore     | VLAN #1: 00-08-5D-28-15-CD   |
| Int #20          | Favorite |            | fe.1.20: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 20                                  | Ignore     |  |
| Int #21          | Favorite |            | fe.1.21: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 21                                  | Ignore     | VLAN #1: 00-B0-64-61-E3-00 → 10.100.37.53<br>VLAN #1: 00-B0-64-61-E3-15  |
| Int #22          | Favorite |            | fe.1.22: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 22                                  | Ignore     | VLAN #1: 90-B1-1C-10-DD-5F → 10.100.37.18<br>VLAN #1: 90-B1-1C-10-DD-61  |
| Int #23          | Favorite |            | fe.1.23: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 23                                  | Ignore     | VLAN #1: 00-04-F2-95-3D-1D   |
| Int #24          | Favorite |            | fe.1.24: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 24                                  | Ignore     | VLAN #1: B4-99-BA-CD-C6-BB   |

The Interface Number, IP Address, and Description columns will remain unchanged from the “General” tab.

The last column will show the VLAN associated with the device connected, followed by the MAC address and IP address (if found in router/server ARP caches). MAC address manufacturers are identified by hovering over the MAC address.

Reverse-DNS lookups for switch ports can be identified by clicking on the IP address. The DNS name will then be shown.

**Note:** If the results are blank, or the information is not as expected, click on the “Update” button to collect the current bridge table, MAC addresses, and ARP cache information from network equipment.

## Router/Server Results

The screenshot shows the PathSolutions TotalView interface. At the top, there are navigation tabs: Map, Path, Phones, Assessment, MOS, Devices, Favorites, Issues, Health, Top-10, WAN, Interfaces, and Tools. The 'Devices' tab is selected. The main content area is divided into two sections: 'Device Summary' and 'Interface Summary'.

**Device Summary** (General tab):

| Device Name | Device IP Address | Manage Device        | OSI Services |   |   |   |   |   |   | # of Int | Oper Up | Oper Down | Admin Down  | Location           | Contact |
|-------------|-------------------|----------------------|--------------|---|---|---|---|---|---|----------|---------|-----------|-------------|--------------------|---------|
|             |                   |                      | 1            | 2 | 3 | 4 | 5 | 6 | 7 |          |         |           |             |                    |         |
| Atlanta     | 10.100.37.1       | Telnet SSH Web HTTPS | ●            | ● | ● | ● | ● | ● | 3 | 2        | 1       | 1         | Atlanta, GA | Sally Toner x 4005 |         |

**Interface Summary** (General tab):

| Interface Number | Favorite | IP Address    | Description            | Ignore Int | Switch interfaces showing this MAC address   |
|------------------|----------|---------------|------------------------|------------|--|
|                  |          |               |                        |            | Update   |
| Int #1           | Favorite | 10.100.37.1   | Fa0/0: FastEthernet0/0 | Ignore     | Barbera- Int #18 (5)<br>Gamay- Int #24 (13)<br>Grenache- Int #22 (12)<br>Shiraz- Int #1 (15) |
| Int #2           | Favorite | 192.168.202.2 | Fa0/1: FastEthernet0/1 | Ignore     | Bordeaux- Int #5 (3)<br>Cabernet- Int #4 (1)   |
| Int #3           | Favorite |               | Se0/0: Serial0/0       | Ignore     |  |

The Interface Number, IP Address, and Description columns will remain unchanged from the “General” tab.

The last column will show the Ethernet Switches and interfaces where this interface’s MAC address was discovered. Each entry will show the switch name, followed by the interface number, then the number of MAC addresses on that interface.

**Note:** If the number of MAC addresses on that interface show up with a number greater than 1, then the interface may be an Ethernet trunk port where two switches connect. If the number of MAC addresses show up as 1, then this is the switch interface where this interface is connected. If none of the devices show up with “(1)” Mac address then that device is not being monitored and should be added through the Configuration Tool.

**Note:** If the results are blank, or the information is not as expected, click on the “Update” button to collect the current bridge table, MAC addresses, and ARP cache information from network equipment.

## Device Overall Statistics

Below the Device Summary interface listing (shown in the previous two pages) is a view of the overall statistics for the device:



You can view the daily, weekly, monthly, or yearly information for the aggregate utilization for the device.

---

**Note:** On the Daily graphs, you will see a grey line which marks midnight. The Weekly graph shows a grey line on Saturday at midnight. The Monthly graph shows a grey line for the first of the month. And the Yearly graph shows a grey line for each month.

---

This is valuable for determining when the device is passing more or less traffic. This equates to a graph showing how much work was performed by the device over time, and is useful for determining when to schedule downtime for the device.

If the device is a Cisco router or switch, the CPU utilization and Free RAM is also displayed.

## Device Details

Below the Device Overall Statistics is information about the device:

**Device Details**

| Device Description       | MFG website                                      | Device Uptime        |
|--------------------------|--|----------------------|
| Cisco C2600-I-M - Denver | <a href="http://www.cisco.com">www.cisco.com</a> | 219 days 19:09:49.00 |

**Routing Table Entries (ipForward)**

| Interface | Route         | Mask          | Next Hop      | Policy | Metric1 | Status |
|-----------|---------------|---------------|---------------|--------|---------|--------|
| Int #0    | 0.0.0.0       | 0.0.0.0       | 10.100.36.1   | 0      | 0       | 1      |
| Int #2    | 10.0.0.0      | 255.0.0.0     | 192.168.201.2 | 0      | 2       | 1      |
| Int #1    | 10.0.0.0      | 255.255.240.0 | 10.100.36.1   | 0      | 1       | 1      |
| Int #1    | 10.100.36.0   | 255.255.255.0 | 10.100.36.60  | 0      | 0       | 1      |
| Int #1    | 10.100.38.0   | 255.255.255.0 | 10.100.36.5   | 0      | 1       | 1      |
| Int #2    | 192.168.201.0 | 255.255.255.0 | 192.168.201.1 | 0      | 0       | 1      |
| Int #2    | 192.168.202.0 | 255.255.255.0 | 192.168.201.2 | 0      | 1       | 1      |

**Device Parents**  
(none)

**Device Internal Description**

Cisco Internetwork Operating System Software IOS (tm) C2600 Software (C2600-I-M), Version 12.3(26), RELEASE SOFTWARE (fc2) Technical Support: http://www.cisco.com/techsupport Copyright (c) 1986-2008 by cisco Systems, Inc. Compiled Mon 17-Mar-08 15:23

**Cisco BootROM Version**

System Bootstrap, Version 11.3(2)XA4, RELEASE SOFTWARE (fc1) Copyright (c) 1999 by cisco Systems, Inc. TAC:Home:SW:IOS:Specials for info

**Cisco Chassis Information**

|                            |                          |
|----------------------------|--------------------------|
| Chassis Type               | c2610                    |
| Chassis Version            | 0x202                    |
| Chassis ID (Serial Number) | JAB0333026P (1953273289) |
| RAM                        | 62,914,560 bytes         |
| Non Volatile RAM Size      | 29,688 bytes             |
| Non Volatile RAM Used      | 3,230 bytes              |
| Config Register            | 8450                     |
| Next Boot Config Register  | 8450                     |
| Chassis Slots              | 2 slots                  |
| Community String Indexing  | TRUE                     |
| VLANs detected:            | 0                        |

**Device Overall Utilization - Traffic**

|                   | Packets     |             | Broadcasts |            | % Broadcasts |        |
|-------------------|-------------|-------------|------------|------------|--------------|--------|
|                   | Tx          | Rx          | Tx         | Rx         | Tx           | Rx     |
| <b>Historical</b> | 453,006,000 | 451,506,000 | 1,008,000  | 38,171,000 | 0.222%       | 7.795% |
| <b>Last Poll</b>  | 13,275      | 13,241      | 15         | 563        | 0.113%       | 4.079% |

**Device Notes** [Add Note](#)

| Date/Time | Username | Note |
|-----------|----------|------|
|           |          |      |

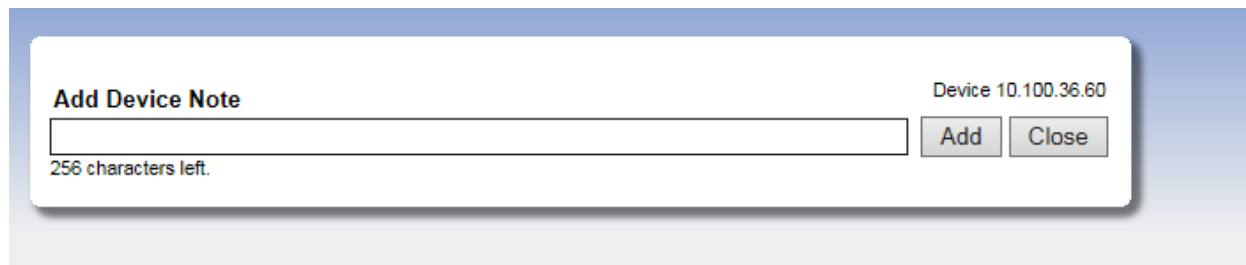
TotalView Release 6 (6436) Copyright ©2014 PathSolutions Perpetual License, licensed for 1000 interfaces [Feature Request](#)

From this section, you can track the device's uptime (as reported by the device), as well as internal information about the device.

**Note:** If the device is a Cisco switch or router, then additional internal device information is displayed.

## Device Notes

Notes can be added to a device so you can track when you performed work on a device:



The screenshot shows a dialog box titled "Add Device Note" for device "10.100.36.60". It features a text input field with a "256 characters left" indicator and "Add" and "Close" buttons.

---

**Note:** If you have authentication turned on, then the Username field will use the logged in user who entered the note.

**Note:** The notes are stored in comma separated values (CSV) format in the following directory:

For 32 Bit Operating Systems

C:\Program Files\PathSolutions\TotalView\Notes

For 64 Bit Operating Systems

C:\Program Files (x86)\PathSolutions\TotalView\Notes

You can edit the files with any text editor like Notepad or use Excel to open the file in CSV format.

The filename for device notes is the IP address of the device. For example, the notes for device 38.102.148.163 would be stored in filename 38.102.148.163.csv.

---

## Interface Details

If you click on an interface number, you will see details about that specific interface:

The errors graph in addition to the utilization graph will be displayed to correlate periods of high packet loss with high utilization.

From this page, you can view all information about an interface's performance.

TotalView

Poll frequency: 00:05:00  
 Last poll: 2/19/2015 2:39:48 PM  
 Network health: DEGRADED (1.7%)

Map
Path
Phones
Assessment
MOS
Devices
Favorites
Issues
Health
Top-10
WAN
Interfaces
Tools

Device Summary << ● Healthy ● Suppressed issue ● Issue ? Comm fail >>

General
Traffic
PoE
STP
Inventory
Description
Support
Financials
Uptime

| Device Name | Device IP Address | Protocol | Version | Priority | Topology    |         | Root Bridge | Root Cost | Root Port | Hold Time |
|-------------|-------------------|----------|---------|----------|-------------|---------|-------------|-----------|-----------|-----------|
|             |                   |          |         |          | Last change | Changes |             |           |           |           |
| ● SCWANRTR  | 38.102.148.163    | -        | -       | -        | -           | -       | -           | -         | -         | -         |

Interface Summary <<>>

General
Traffic
PoE
STP
Details
Poll
CDP/LLDP
Connected

| Interface Number | IP Address   | Description                     | Queue X Type | MAC Address  | MTU  | State          |                      |
|------------------|--------------|---------------------------------|--------------|--------------|------|----------------|----------------------|
|                  |              |                                 |              |              |      | Type           | Last Changed         |
| ● Int #2         | 38.104.225.2 | Fa0/1: FastEthernet0/1 (Cogent) | ● FIFO       | 001f6ce115b9 | 1500 | ethernetCsmacd | 203 days 06:07:28.12 |

Interface Performance

Current Utilization
Download Excel
View Advanced Stats

Daily
Weekly
Monthly
Yearly

Bits per second Percent Peak Percent

|        | Tx         | Rx          |
|--------|------------|-------------|
| Min    | 59 kbps    | 95 kbps     |
| Avg    | 1,193 kbps | 2,764 kbps  |
| Max    | 6,595 kbps | 10,288 kbps |
| 95th   | 4,376 kbps | 9,726 kbps  |
| 95th % | 4.376%     | 9.727%      |

Packet Loss (Errors per polling period)

Queuing Mechanism

First In First Out (FIFO)

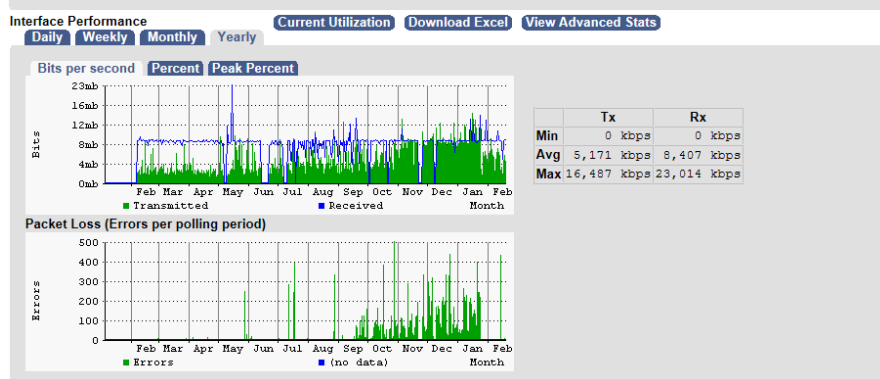
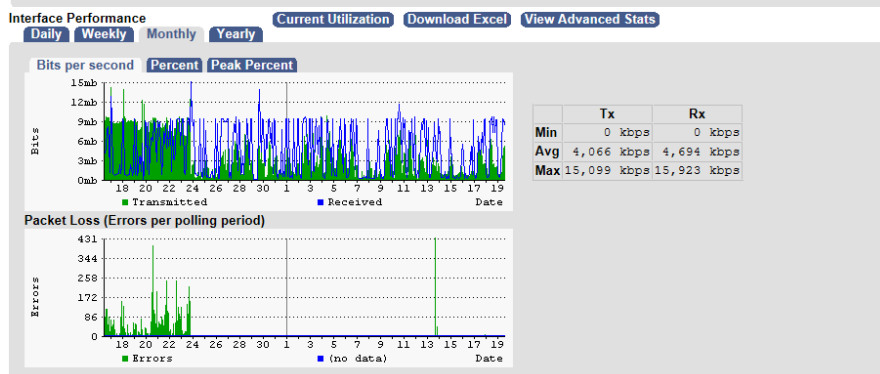
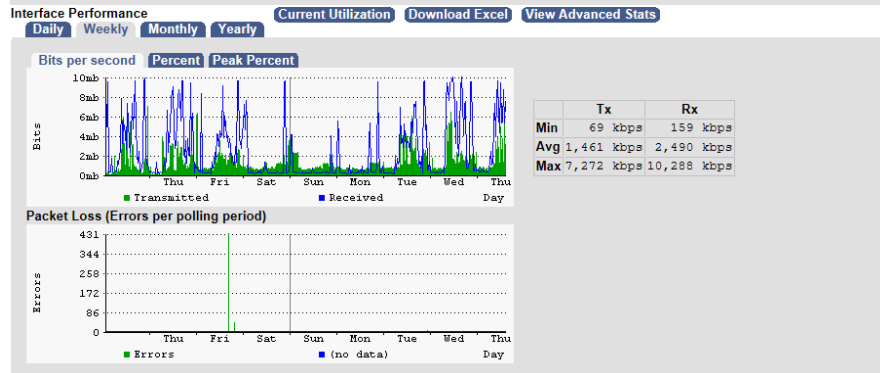
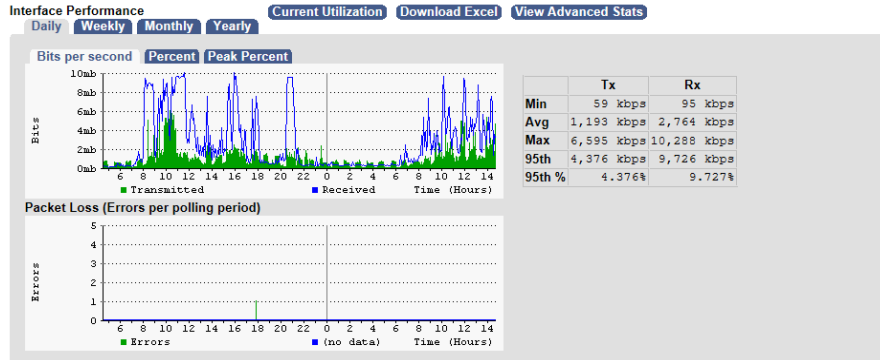
Network Prescription™

- Frame Too Long errors exist on this interface**  
 This interface has received frames that are too large for it to receive. Another interface on this segment may be configured to perform VLAN tagging, and this interface is not configured to respect VLAN tags. If the other interface transmits a 1500 byte long frame, the VLAN tag added to the frame making it 1518 bytes long. This interface may discard these frames and also not interpret the VLAN tag properly as a result. To fix this problem, either enable VLAN tagging on this interface, or disable VLAN tagging on all other interfaces on this segment.

## Utilization Graphs

The utilization graphs provide historical utilization of an interface in Daily, Weekly, Monthly, and Yearly views.

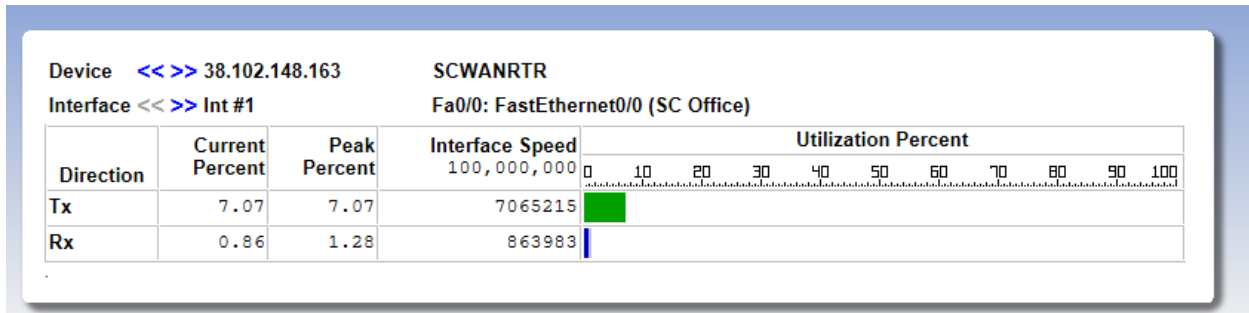
You can also view the information in bits per second, percent utilization, or peak percent utilization.





### Current Utilization Information

If you want to view the current utilization of this interface, click on the "Current Utilization" button. You'll get a window that will display the immediate current utilization on the interface:



You can open as many of these current utilization windows as you would like. This permits you to do detailed bandwidth studies of any monitored interface on the system.

A high-water mark is maintained so you can determine the highest utilization point that occurred since the window was opened.

The current utilization page is updated every 5 seconds.

### Exporting Utilization Graph Data for an Interface

The "Download Excel" button allows you to download all of the graph data into an .xls file for charting and graphing with a spreadsheet.

## Network Prescription

Below the graph is the Network Prescription for the interface. This is an analysis of any problems that exist on the interface, including errors and utilization.

pathSolutions

TotalView

Poll frequency: 00:05:00  
 Last poll: 2/19/2015 2:49:54 PM  
 Network health: DEGRADED (1.7%)

Map
Path
Phones
Assessment
MOS
Devices
Favorites
Issues
Health
Top-10
WAN
Interfaces
Tools

Device Summary << ● Healthy ● Suppressed issue ● Issue ? Comm fail >>

General
Traffic
PoE
STP
Inventory
Description
Support
Financials
Uptime

| Device Name | Device IP Address | Protocol  | Version | Priority | Topology           |         | Root Bridge | Root Cost | Root Port | Hold Time |
|-------------|-------------------|-----------|---------|----------|--------------------|---------|-------------|-----------|-----------|-----------|
|             |                   |           |         |          | Last change        | Changes |             |           |           |           |
| ● Malbec    | 10.100.36.75      | ieee8021d | -       | 32768    | 1 days 05:03:32.00 | 51519   | Merlot      | 10        | Int #3    | 100       |

Interface Summary <<>>

General
Traffic
PoE
STP
Details
Poll
CDP/LLDP
Connected

| Interface Number | IP Address | Description  | Peak Daily Error Rate | Peak Daily Utilization |        | Interface Speed | Duplex* | Port VLAN ID | Status |      |
|------------------|------------|--|-----------------------|------------------------|--------|-----------------|---------|--------------|--------|------|
|                  |            |  |                       | Tx                     | Rx     |                 |         |              | Admin  | Oper |
| ● Int #23        |            | ifc23 (Slot: 1 Port: 23): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 23 | 27.755%               | 0.000%                 | 0.000% | 1,000,000,000   | Full    | none         | up     | up   |

Interface Performance Current Utilization [Download Excel](#) [View Advanced Stats](#)

Daily
Weekly
Monthly
Yearly

Bits per second Percent Peak Percent

Packet Loss (Errors per polling period)

|        | Tx     | Rx     |
|--------|--------|--------|
| Min    | 0 kbps | 1 kbps |
| Avg    | 0 kbps | 1 kbps |
| Max    | 0 kbps | 4 kbps |
| 95th   | 0 kbps | 2 kbps |
| 95th % | 0.000% | 0.000% |

Network Prescription™

- Inbound Discards exist on this interface**  
Inbound packets had to be discarded because of a lack of available packet receive buffers. This can indicate that the device's internal CPU may be unable to process all of the inbound data that it is receiving.
- Outbound Discards exist on this interface**  
Packets were discarded because the transmitting machine may have run out of outbound packet buffers. This can occur if there is not enough outbound bandwidth available to transmit all requested data. It is suggested that you increase the bandwidth of this link, or increase the number of transmit buffers on this device.

Interface Notes [Add Note](#)

| Date/Time            | Username | Note                           |
|----------------------|----------|--------------------------------|
| 7/17/2014 3:05:06 PM | SYSTEM   | Interface changed status to UP |

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## Interface Notes

Notes can be added to an interface so you can track when you performed work on an interface:



The screenshot shows a dialog box titled "Add Interface Note" for "Device 10.100.36.75, Int #23". It features a text input field and two buttons labeled "Add" and "Close". Below the input field, it indicates "256 characters left."

---

**Note:** If you have authentication turned on, then the Username field will use the logged in user who entered the note.

**Note:** The notes are stored in comma separated values (CSV) format in the following directory:

**For 32 Bit Operating Systems**

C:\Program Files\PathSolutions\TotalView\Notes

**For 64 Bit Operating Systems**

C:\Program Files (x86)\PathSolutions\TotalView\Notes

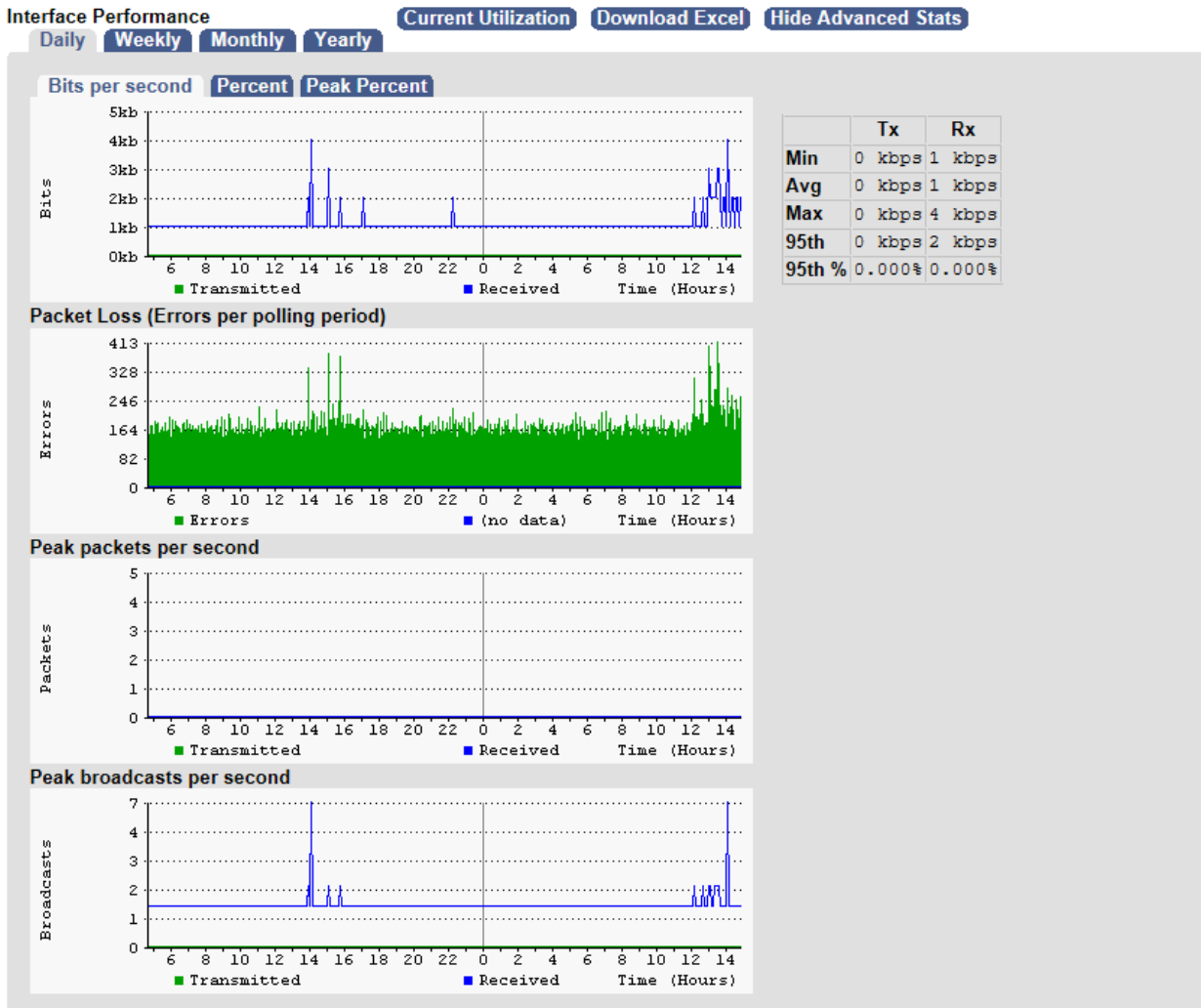
You can edit the files with any text editor like Notepad or use Excel to open the file in CSV format.

The filename for device notes is the IP address of the device. For example, the notes for device 38.102.148.163 interface #2 would be stored in filename 38.102.148.163-2.csv.

---

### Advanced Interface Statistics

If you click on the “View Advanced Stats” button, you will be presented with additional graphs showing bits per second, packets per second, broadcasts per second, and errors over time:



The information displayed is useful for determining timing of broadcast storms or unusual packet activity.

You can also determine when packet loss occurred on the interface to help correlate with network events. It is useful to determine if packet loss occurred along with high utilization levels or if the loss was independent from utilization events.

Additional interface information is displayed below the graphs:

#### Interface Traffic

|            | Packets    |            | Broadcasts  |             | % Broadcasts |         |
|------------|------------|------------|-------------|-------------|--------------|---------|
|            | Tx         | Rx         | Tx          | Rx          | Tx           | Rx      |
| Historical | 53,301,557 | 66,160,371 | 343,441,720 | 359,457,658 | 86.565%      | 84.455% |
| Last Poll  | 0          | 5          | 10          | 891         | 0.000%       | 99.442% |

#### Interface Errors

| Error Counter                | Tracked | Type      | Errors  |             | Errors per Packet |         |
|------------------------------|---------|-----------|---------|-------------|-------------------|---------|
|                              |         |           | Current | Total       | Current           | Average |
| Inbound Unknown Protocols    |         | Common    | 0       | 0           | -                 | -       |
| Inbound Discards             | ●       | Rare      | 260     | 9,819,730   | 28.698%           | 1.194%  |
| Inbound Errors               | ●       | Rare      | 0       | 0           | -                 | -       |
| Outbound Discards            | ●       | Rare      | 0       | 296,405,766 | -                 | 36.043% |
| Outbound Errors              | ●       | Common    | 0       | 0           | -                 | -       |
| Outbound Queue Length        |         | Reference | 0       | 0           | -                 | -       |
| Single Collision Frames      | ●       | Common    | 0       | 0           | -                 | -       |
| Multiple Collision Frames    | ●       | Rare      | 0       | 0           | -                 | -       |
| Deferred Transmissions       | ●       | Common    | 0       | 0           | -                 | -       |
| Carrier Sense Errors         | ●       | Rare      | 0       | 0           | -                 | -       |
| Excessive Collisions         |         | Rare      | 0       | 0           | -                 | -       |
| Alignment Errors             | ●       | Rare      | 0       | 0           | -                 | -       |
| FCS Errors                   | ●       | Rare      | 0       | 0           | -                 | -       |
| SQE Test Errors              | ●       | Rare      | 0       | 0           | -                 | -       |
| Late Collisions              | ●       | Rare      | 0       | 0           | -                 | -       |
| Internal MAC Transmit Errors | ●       | Rare      | 0       | 0           | -                 | -       |
| Frame Too Longs              | ●       | Rare      | 0       | 0           | -                 | -       |
| MAC Receive Errors           | ●       | Rare      | 0       | 0           | -                 | -       |
| <b>Error Totals</b>          |         |           | 260     | 306,225,259 | 28.698%           | 37.237% |

#### Network Prescription™

- Inbound Discards exist on this interface**  
Inbound packets had to be discarded because of a lack of available packet receive buffers. This can indicate that the device's internal CPU may be unable to process all of the inbound data that it is receiving.
- Outbound Discards exist on this interface**  
Packets were discarded because the transmitting machine may have run out of outbound packet buffers. This can occur if there is not enough outbound bandwidth available to transmit all requested data. It is suggested that you increase the bandwidth of this link, or increase the number of transmit buffers on this device.

#### Interface Notes

[Add Note](#)

| Date/Time            | Username | Note                           |
|----------------------|----------|--------------------------------|
| 7/17/2014 3:05:06 PM | SYSTEM   | Interface changed status to UP |

All error counters are displayed so you can determine the exact error type that occurred on the interface.

If you click on an Error Counter type, you will receive the official definition of the error as well as what should be done to resolve the error:

### **SingleCollisionFrames (Common event)**

*Official definition:* A count of successfully transmitted frames on a particular interface for which transmission is inhibited by exactly one collision. A frame that is counted by an instance of this object is also counted by the corresponding instance of either the `ifOutUcastPkts` or `ifOutNUcastPkts` object and is not counted by the corresponding instance of the `dot3StatsMultipleCollisionFrames` object.

*Basic definition:* If a network interface attempts to transmit a frame, and detects a collision, it will attempt to re-transmit the frame after the collision. If the retransmission was successful, then the event is logged as a single collision frame.

#### **What you should do to fix this problem:**

*Cause 1:* Single Collision Frames can be caused by multiple machines wanting to transmit at the same time. This is a normal occurrence on Ethernet.

*Cause 2:* If Single Collision Frames increases dramatically, this could indicate that the segment is becoming overloaded (too many machines on the segment, or too many heavy talkers on the segment). As the segment continues to become overloaded, Single Collision Frame count may decrease, as Multiple Collision Frames increases. Converting the segment to a switched environment may solve this problem. Another possible solution is to reduce the number of machines on this segment, or install a bridge to segregate the segment into two halves.

*Cause 3:* Single Collision frames can be caused by poor wiring or induced noise. Use a cable tester to insure that the physical cable is good.

*Cause 4:* Single Collision frames can be caused by a bad network interface card, or failing transceiver. Check to make sure the network cards and transceivers on the segment are functioning correctly.

## Ignoring Interfaces

There are three different ways of ignoring interfaces.

- 1) The IgnoreList.cfg allows you to ignore ranges of interfaces on devices.
- 2) The IgnoreType.cfg allows you to ignore interfaces via descriptions system-wide – like if you wanted to always ignore any interface with the description of “Loopback”.

The above files should be opened up in Notepad for editing. After you save the file, stop and restart the service to have this change take effect.

These files are located in one of the following directories:

For 64 bit – C:/Program Files (x86)/PathSolutions/TotalView/IgnoreList.cfg  
 For 32 bit – C:/Program Files/PathSolutions/TotalView/IgnoreList.cfg

- 3) If you only have a couple of ports you would like to ignore you can go to the “Device List” tab and click on a device and then click on the “ignore” link towards the right hand side of the table for each interface number you would like to ignore.

The screenshot shows the TotalView web interface. At the top, there's a navigation bar with tabs like Map, Path, Phones, Assessment, MOS, Devices, Favorites, Issues, Health, Top-10, WAN, Interfaces, and Tools. The 'Devices' tab is active. Below the navigation bar, there's a 'Device Summary' section with a legend for device health (Healthy, Suppressed issue, Issue, Comm fail, Lock Config). The main content area shows a table of devices. The first device is 'Merlot' with IP address 10.100.36.48. Below the device table, there's an 'Interface Summary' section with a table of interfaces. The table has columns for Interface Number, Favorite, IP Address, Description, and Ignore Int. A red arrow points to the 'Ignore Int' link for interface #1.

| Device Name | Device IP Address | Manage Device        | OSI Services  | # of Int | Oper Up | Oper Down | Admin Down | Location        | Contact               |
|-------------|-------------------|----------------------|---------------|----------|---------|-----------|------------|-----------------|-----------------------|
| Merlot      | 10.100.36.48      | Telnet SSH Web HTTPS | 1 2 3 4 5 6 7 | 31       | 7       | 24        | 0          | Santa Clara, CA | noc@pathsolutions.com |

| Interface Number | Favorite | IP Address | Description                             | Ignore Int |
|------------------|----------|------------|---|------------|
| Int #1           | Favorite |            | 1/1: Summit300-24-Port 1 (Visitor_Cube) | Ignore     |
| Int #2           | Favorite |            | 1/2: Summit300-24-Port 2 (Trunk-Muscat) | Ignore     |
| Int #3           | Favorite |            | 1/3: Summit300-24-Port 3                | Ignore     |
| Int #4           | Favorite |            | 1/4: Summit300-24-Port 4                | Ignore     |
| Int #5           | Favorite |            | 1/5: Summit300-24-Port 5                | Ignore     |

If your Web Config has been locked and you do not see then “ignore” link in the Device List tab, follow the instructions below to Unlock the Web Config.

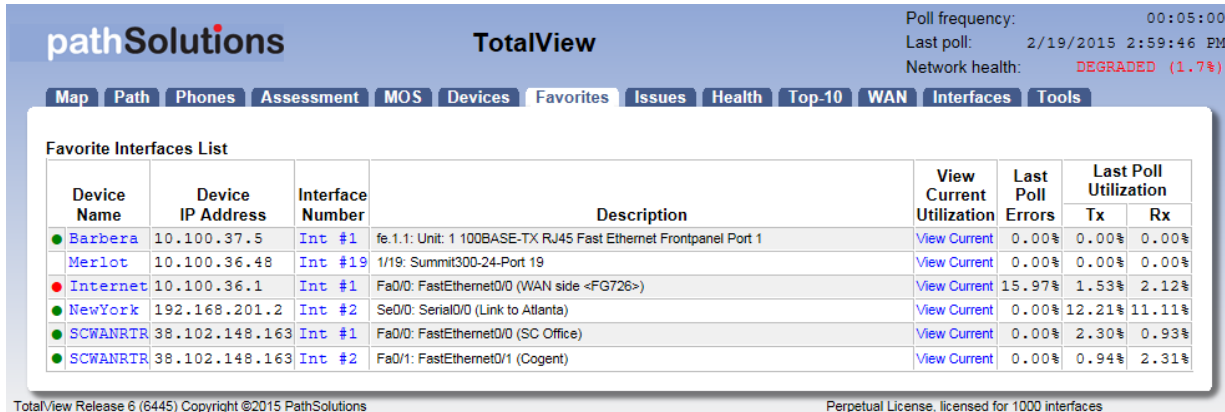
### Unlock the Web Configuration

If the web configuration is locked, and you want to unlock it, Use the Config Tool > Output tab and then check the box “Unlock Web Configuration”

Alternatively, if you want to Lock the Web Configuration to remove the “favorite” and “ignore” feature, click on the “Lock Config” link shown below.

## Favorites Page

If you have specific interfaces that you want to group together to view from one page, they can be added to the Favorite's page:



pathSolutions TotalView

Poll frequency: 00:05:00  
Last poll: 2/19/2015 2:59:46 PM  
Network health: DEGRADED (1.7%)

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

**Favorite Interfaces List**

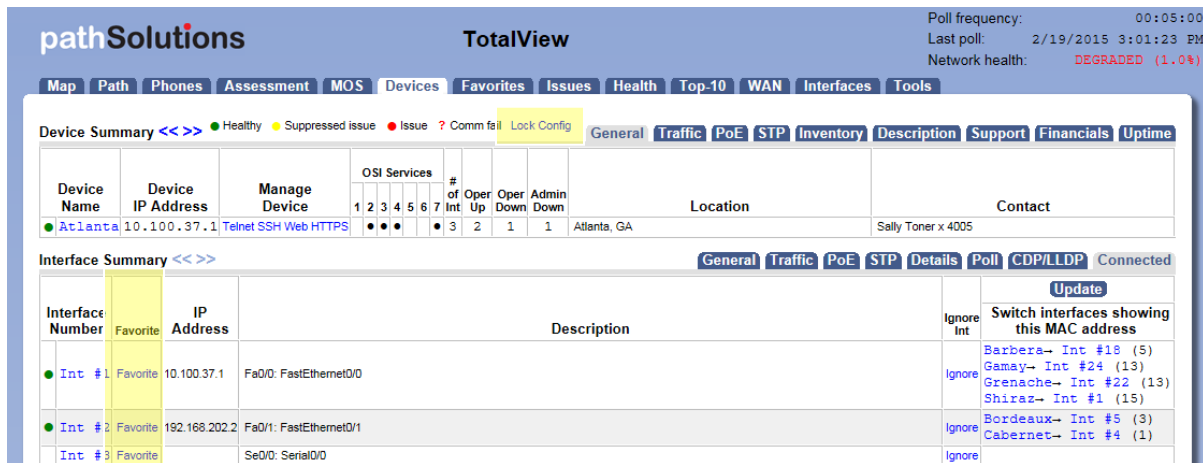
| Device Name | Device IP Address | Interface Number | Description   | View Current Utilization | Last Poll Errors | Last Poll Utilization |        |
|-------------|-------------------|------------------|---|--------------------------|------------------|-----------------------|--------|
|             |                   |                  |   |                          |                  | Tx                    | Rx     |
| Barbera     | 10.100.37.5       | Int #1           | fe.1.1: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 1 | View Current             | 0.00%            | 0.00%                 | 0.00%  |
| Merlot      | 10.100.36.48      | Int #19          | 1/19: Summit300-24-Port 19                                      | View Current             | 0.00%            | 0.00%                 | 0.00%  |
| Internet    | 10.100.36.1       | Int #1           | Fa0/0: FastEthernet0/0 (WAN side <FG726>)                       | View Current             | 15.97%           | 1.53%                 | 2.12%  |
| NewYork     | 192.168.201.2     | Int #2           | Se0/0: Serial0/0 (Link to Atlanta)                              | View Current             | 0.00%            | 12.21%                | 11.11% |
| SCWANRTR    | 38.102.148.163    | Int #1           | Fa0/0: FastEthernet0/0 (SC Office)                              | View Current             | 0.00%            | 2.30%                 | 0.93%  |
| SCWANRTR    | 38.102.148.163    | Int #2           | Fa0/1: FastEthernet0/1 (Cogent)                                 | View Current             | 0.00%            | 0.94%                 | 2.31%  |

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This page displays the most recent utilization that was seen during the last polling period of all favorite interfaces.

## Adding an Interface to the Favorites List

To add an interface to the favorites list, just click “Favorite” in the General sub-tab under the Device List tab.



pathSolutions TotalView

Poll frequency: 00:05:00  
Last poll: 2/19/2015 3:01:23 PM  
Network health: DEGRADED (1.0%)

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

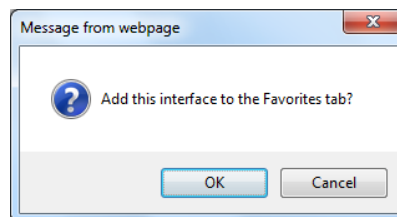
Device Summary <<>> ● Healthy ● Suppressed issue ● Issue ? Comm fail Lock Config

| Device Name | Device IP Address | Manage Device        | OSI Services |   |   |   |   |   |   | Location | Contact |   |   |             |                    |
|-------------|-------------------|----------------------|--------------|---|---|---|---|---|---|----------|---------|---|---|-------------|--------------------|
|             |                   |                      | 1            | 2 | 3 | 4 | 5 | 6 | 7 |          |         |   |   |             |                    |
| Atlanta     | 10.100.37.1       | Telnet SSH Web HTTPS | ●            | ● | ● | ● | ● | ● | ● | 3        | 2       | 1 | 1 | Atlanta, GA | Sally Toner x 4005 |

Interface Summary <<>>

| Interface Number | Favorite | IP Address    | Description            | Ignore Int | Update   |
|------------------|----------|---------------|------------------------|------------|--|
|                  |          |               |                        |            | Switch interfaces showing this MAC address   |
| Int #1           | Favorite | 10.100.37.1   | Fa0/0: FastEthernet0/0 | Ignore     | Barbera- Int #18 (5)<br>Gamay- Int #24 (13)<br>Grenache- Int #22 (13)<br>Shiraz- Int #1 (15) |
| Int #2           | Favorite | 192.168.202.2 | Fa0/1: FastEthernet0/1 | Ignore     | Bordeaux- Int #5 (3)<br>Cabernet- Int #4 (1)   |
| Int #3           | Favorite |               | Se0/0: Serial0/0       | Ignore     |  |

You will be presented with a dialog confirming your selection:



Click “OK” to add the interface to the favorites tab, or Cancel if you do not want to do so.

**Note:** The web interface must be in Configuration Mode to be able to add an interface to the Favorites List. To access the web configuration tool, use the Config Tool and choose the “Output Tab”. If the web configuration is locked, and you want to unlock it, check the box “Unlock Web Configuration. See page 132 to see more about the Configuration Mode.



## Removing an Interface from the Favorites List

To remove an interface from the Favorites List use the “Config Tool” and click on the Favorites Tab where you can delete an interface from the Favorites List. See Page 137 for details.

You can also edit the following file with a text editor and remove Favorite Interfaces:

**For 32 Bit Operating Systems**

C:\Program Files\PathSolutions\TotalView\Favorites.cfg

**For 64 Bit Operating Systems**

C:\Program Files (x86)\PathSolutions\TotalView\Favorites.cfg

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Locate the IP address and interface number in the file and then delete it and Save the file. The PathSolutions TotalView service must be stopped and re-started to have these changes take effect.

### Issues

Interfaces that have peak utilization rates or error rates that are over the threshold will be listed under the "Issues" tab:

pathSolutions TotalView

Poll frequency: 00:05:00  
 Last poll: 2/19/2015 3:06:32 PM  
 Network health: **DEGRADED (1.0%)**

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Interfaces with peak daily utilization rates greater than 90% or error rate greater than 5% sorted by Comm fail, Error rate, and Utilization Print

| Device Name | Device IP Address | Interface Number | Description  | Ignore Int | Interface Speed | Peak Daily Error Rate | Peak Daily Utilization |          |
|-------------|-------------------|------------------|--|------------|-----------------|-----------------------|------------------------|----------|
|             |                   |                  |  |            |                 |                       | Tx                     | Rx       |
| Sauvignon   | 10.100.36.20      | Int #17          | ifc17 (Slot: 1 Port: 17): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 17  | Ignore     | 100,000,000     | 80.313%               | 100.000%               | 100.000% |
| Malbec      | 10.100.36.75      | Int #23          | ifc23 (Slot: 1 Port: 23): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 23 | Ignore     | 1,000,000,000   | 31.025%               | 0.000%                 | 0.000%   |
| Palomino    | 10.100.38.2       | Int #2           | Fa0/2: FastEthernet0/2   | Ignore     | 100,000,000     | 25.641%               | 0.001%                 | 0.000%   |
| Internet    | 10.100.36.1       | Int #1           | Fa0/0: FastEthernet0/0 (WAN side <FG726>)  | Ignore     | 10,000,000      | 18.896%               | 16.633%                | 49.034%  |
| Muscat      | 10.100.36.51      | Int #11          | ifc11 (Slot: 1 Port: 11): Nortel Ethernet Switch 470-48T Module - Port 11              | Ignore     | 100,000,000     | 10.194%               | 0.033%                 | 0.003%   |
| CiscoASA    | 10.100.36.4       | Int #15          | inside: Adaptive Security Appliance 'inside' interface                                 | Ignore     | -Unknown-       | 9.772%                | 0.000%                 | 0.000%   |
| Internet    | 10.100.36.1       | Int #2           | Fa0/1: FastEthernet0/1   | Ignore     | 100,000,000     | 9.130%                | 4.905%                 | 1.669%   |
| Sauvignon   | 10.100.36.20      | Int #7           | ifc7 (Slot: 1 Port: 7): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 7     | Ignore     | 100,000,000     | 2.339%                | 100.000%               | 100.000% |

8 total interfaces listed Top of page

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The threshold levels are displayed at the top of this table for reference.

If the error rate or peak utilization rate is over the threshold, it will be displayed in red for easy determination of the interface problem.

You can click on the interface number to jump to the interface details page and view the utilization and error information.

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**Note:** Interfaces that have been over threshold sometime in the past 24 hours are listed. Interfaces will roll off of the issues list if it is under the error rate and utilization rate for a full 24 hours

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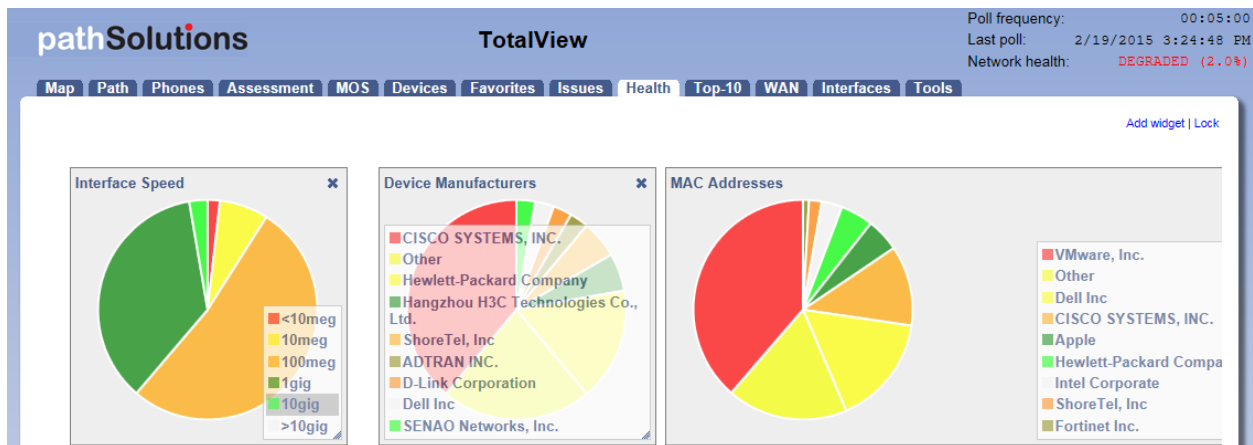
## Health

The Health tab provides user-changeable widgets that can be displayed inside or outside of this tab. You decide the type of widget and how you want information presented, and each widget auto-updates automatically.

When you first use the Health tab, it will display a blank screen with a little “Edit” link in the upper right hand side.



If you click that link, it changes to two links: “Add Widget” and “Lock”.



If you click “Lock”, it will just go back to “Edit”.

If you click “Add Widget”, it will open a dialog box and ask which widget you should add. The one you select will immediately be placed on the page. You can move the selected widget around and change the size by clicking on the sizing object in the lower right corner of the widget.

If you want, you can click “X” and close the selected widget.

When you are satisfied with its location and size, click “Lock” and the system will then lock it in and display it without risk of having it change size or location. The “X” in the upper right corner will change to an arrow that you can now click on. It will create a separate detached window for the widget that you can drag around your screen.

You can continue to add other widgets to the screen as you want.

## Top 10

The top 10 section provides you with overall network information for all monitored interfaces. This section is handy for determining what is occurring on the network regarding errors, utilization, and broadcast levels.

## Errors

The top 10 interfaces with the highest error rates are listed under the "Top-10" tab, in the "Errors" sub-tab.

This tab allows you to see what interfaces have errors that are approaching the error threshold.

Click on the interface number to jump to the interface details page and view the utilization and error information.

The screenshot shows the TotalView interface with the 'Errors' sub-tab selected. The main content area displays a table titled 'Top 10 Interfaces With Highest Daily Error Rates Sorted by Error Rate'. The table has columns for Device Name, Device IP Address, Interface Number, Description, Peak Daily Error Rate, and Peak Daily Utilization (Tx and Rx). The 'Scope' is set to 'Peak Daily' and 'Group' is set to 'All'. The top interface is Sauvignon with an error rate of 88.294%.

| Device Name | Device IP Address | Interface Number | Description  | Peak Daily Error Rate | Peak Daily Utilization Tx | Peak Daily Utilization Rx |
|-------------|-------------------|------------------|--|-----------------------|---------------------------|---------------------------|
| Sauvignon   | 10.100.36.20      | Int #17          | ifc17 (Slot: 1 Port: 17): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 17  | 88.294%               | 100.000%                  | 100.000%                  |
| Malbec      | 10.100.36.75      | Int #23          | ifc23 (Slot: 1 Port: 23): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 23 | 41.047%               | 0.000%                    | 0.001%                    |
| CiscoASA    | 10.100.36.4       | Int #15          | inside: Adaptive Security Appliance 'inside' interface                                 | 28.168%               | 0.000%                    | 0.000%                    |
| Palomino    | 10.100.38.2       | Int #2           | Fa0/2: FastEthernet0/2   | 25.641%               | 0.001%                    | 0.000%                    |
| Internet    | 10.100.36.1       | Int #1           | Fa0/0: FastEthernet0/0 (WAN side <FG726>)  | 18.702%               | 23.370%                   | 49.034%                   |
| Muscat      | 10.100.36.51      | Int #11          | ifc11 (Slot: 1 Port: 11): Nortel Ethernet Switch 470-48T Module - Port 11              | 4.881%                | 0.033%                    | 0.003%                    |
| Internet    | 10.100.36.1       | Int #2           | Fa0/1: FastEthernet0/1   | 4.705%                | 4.905%                    | 2.356%                    |
| VELMA       | 10.100.36.10      | Int #2           | Intel(R) PRO Adapter   | 3.079%                | 0.022%                    | 0.051%                    |
| NewYork     | 192.168.202.1     | Int #1           | Eto/0: Ethernet0/0   | 3.056%                | 0.472%                    | 0.519%                    |
| Bardolino   | 10.100.36.18      | Int #4           | port 4: Gigabit Copper: port 4: Gigabit Copper   | 3.025%                | 0.000%                    | 0.001%                    |

You can also modify the output to view your preferred "Scope" or device "Groups" by using the drop down menu on the right hand side. The "Scope" drop down menu will allow you to either see Peak Daily Highest Error Rate within the last 24 hours or the Last Poll Error Rate within the last 5 minutes.

If a problem is currently happening on the network it's valuable to know which interfaces are currently showing the highest utilization or error rates. The Last 5 Minute Poll allows you to target the right impingement points in the network and get the root-cause of the problem fixed rapidly.

The screenshot shows the TotalView interface with the 'Errors' sub-tab selected. The main content area displays a table titled 'Top 10 Interfaces With Highest Last Poll Error Rates Sorted by Error Rate'. The 'Scope' is set to 'Last Poll' and 'Group' is set to 'All'. The top interface is Palomino with an error rate of 23.077%.

| Device Name | Device IP Address | Interface Number | Description  | Peak Daily Error Rate | Peak Daily Utilization Tx | Peak Daily Utilization Rx |
|-------------|-------------------|------------------|--|-----------------------|---------------------------|---------------------------|
| Palomino    | 10.100.38.2       | Int #2           | Fa0/2: FastEthernet0/2   | 23.077%               | 0.000%                    | 0.000%                    |
| Malbec      | 10.100.36.75      | Int #23          | ifc23 (Slot: 1 Port: 23): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 23 | 21.229%               | 0.000%                    | 0.000%                    |
| CiscoASA    | 10.100.36.4       | Int #15          | inside: Adaptive Security Appliance 'inside' interface                                 | 7.156%                | 0.000%                    | 0.000%                    |
| Miami       | 10.100.38.3       | Int #1           | Gi0/0: GigabitEthernet0/0  | 2.252%                | 0.001%                    | 0.001%                    |
| NewYork     | 192.168.202.1     | Int #1           | Eto/0: Ethernet0/0   | 2.196%                | 0.331%                    | 0.355%                    |
| Atlanta     | 10.100.37.1       | Int #1           | Fa0/0: FastEthernet0/0   | 1.661%                | 0.182%                    | 0.203%                    |
| Internet    | 10.100.36.1       | Int #1           | Fa0/0: FastEthernet0/0 (WAN side <FG726>)  | 1.456%                | 0.219%                    | 0.392%                    |
| Bordeaux    | 192.168.202.4     | Int #46          | 46: Ethernet Interface   | 1.207%                | 0.387%                    | 0.358%                    |
| Honolulu    | 10.100.38.1       | Int #3           | Fa0/1: FastEthernet0/1   | 1.185%                | 0.002%                    | 0.003%                    |
| Honolulu    | 10.100.36.5       | Int #3           | Fa0/1: FastEthernet0/1   | 1.185%                | 0.002%                    | 0.003%                    |

## Transmitters

The top 10 interfaces with the Highest Daily Transmitted Rates sorted by Utilization are listed under the "Transmitters" sub-tab.

This tab allows you to see what interfaces physically transmit the most data regardless of interface speed.

You can click on the interface number to jump to the interface details page and view the utilization and error information.

| Device Name | Device IP Address | Interface Number | Description   | Peak Daily Error Rate | Peak Daily Utilization |          |
|-------------|-------------------|------------------|---|-----------------------|------------------------|----------|
|             |                   |                  |   |                       | Tx                     | Rx       |
| Sauvignon   | 10.100.36.20      | Int #7           | ifc7 (Slot: 1 Port: 7): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 7    | 2.301%                | 100.000%               | 100.000% |
| Sauvignon   | 10.100.36.20      | Int #17          | ifc17 (Slot: 1 Port: 17): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 17 | 88.294%               | 100.000%               | 100.000% |
| Internet    | 10.100.36.1       | Int #1           | Fa0/0: FastEthernet0/0 (WAN side <FG726>)   | 18.702%               | 23.370%                | 49.034%  |
| NewYork     | 192.168.202.1     | Int #2           | Se0/0: Serial0/0 (Link to Atlanta)  | 0.000%                | 19.458%                | 17.469%  |
| Denver      | 10.100.36.60      | Int #2           | Se0/0: Serial0/0  | 0.000%                | 17.490%                | 19.542%  |
| Sauvignon   | 10.100.36.20      | Int #3           | ifc3 (Slot: 1 Port: 3): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 3    | 2.301%                | 11.362%                | 11.430%  |
| Sauvignon   | 10.100.36.20      | Int #49          | ifc49 (Slot: 1 Port: 49): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 49 | 2.301%                | 11.362%                | 11.430%  |
| Sauvignon   | 10.100.36.20      | Int #1           | ifc1 (Slot: 1 Port: 1): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 1    | 2.301%                | 11.362%                | 11.430%  |
| Internet    | 10.100.36.1       | Int #2           | Fa0/1: FastEthernet0/1  | 4.705%                | 4.905%                 | 2.356%   |
| Pinot       | 10.100.36.53      | Int #10005       | Fa0/5: FastEthernet0/5 (To Wireless Access Point)                                     | 0.000%                | 4.354%                 | 0.961%   |

You can modify the output to view your preferred "Scope" or "Group" devices by using the drop down menu on the right hand side. Using the Scope, you can choose to see the Peak Daily Highest Error Rate within the last 24 hours or the Last Poll Error Rate within the last 5 minutes. You also have the option to view the 95<sup>th</sup> Percentile Highest Daily Transmitted Rates, Raw Data Highest Daily Transmitted Rates, or Broadcasts with The Highest Transmitted Broadcast Percentage.

| Device Name | Device IP Address | Interface Number | Description   | Peak Daily Error Rate | Peak Daily Utilization |          |
|-------------|-------------------|------------------|---|-----------------------|------------------------|----------|
|             |                   |                  |   |                       | Tx                     | Rx       |
| Sauvignon   | 10.100.36.20      | Int #7           | ifc7 (Slot: 1 Port: 7): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 7    | 2.301%                | 100.000%               | 100.000% |
| Sauvignon   | 10.100.36.20      | Int #17          | ifc17 (Slot: 1 Port: 17): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 17 | 88.294%               | 100.000%               | 100.000% |
| Internet    | 10.100.36.1       | Int #1           | Fa0/0: FastEthernet0/0 (WAN side <FG726>)   | 18.702%               | 23.370%                | 49.034%  |
| NewYork     | 192.168.202.1     | Int #2           | Se0/0: Serial0/0 (Link to Atlanta)  | 0.000%                | 19.458%                | 17.469%  |
| Denver      | 10.100.36.60      | Int #2           | Se0/0: Serial0/0  | 0.000%                | 17.490%                | 19.542%  |
| Sauvignon   | 10.100.36.20      | Int #3           | ifc3 (Slot: 1 Port: 3): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 3    | 2.301%                | 11.362%                | 11.430%  |
| Sauvignon   | 10.100.36.20      | Int #49          | ifc49 (Slot: 1 Port: 49): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 49 | 2.301%                | 11.362%                | 11.430%  |
| Sauvignon   | 10.100.36.20      | Int #1           | ifc1 (Slot: 1 Port: 1): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 1    | 2.301%                | 11.362%                | 11.430%  |
| Internet    | 10.100.36.1       | Int #2           | Fa0/1: FastEthernet0/1  | 4.705%                | 4.905%                 | 2.356%   |
| Pinot       | 10.100.36.53      | Int #10005       | Fa0/5: FastEthernet0/5 (To Wireless Access Point)                                     | 0.000%                | 4.354%                 | 0.961%   |

## Receivers

The top 10 interfaces with the highest daily received rates are listed under the “Receivers” sub-tab.

This tab allows you to see what interfaces physically receive the most data regardless of interface speed.

Click on the interface number to jump to the interface details page and view the utilization and error information.

The screenshot shows the TotalView interface with the 'Receivers' tab selected. The main content area displays a table titled 'Top 10 Interfaces With Highest Daily Received Rates Sorted by Utilization'. The table has columns for Device Name, Device IP Address, Interface Number, Description, Peak Daily Error Rate, and Peak Daily Utilization (Tx and Rx). The top two entries are from 'Sauvignon' devices with 100.000% utilization. The interface number 'Int #7' is highlighted in blue.

| Device Name | Device IP Address | Interface Number | Description   | Peak Daily Error Rate | Peak Daily Utilization |          |
|-------------|-------------------|------------------|---|-----------------------|------------------------|----------|
|             |                   |                  |   |                       | Tx                     | Rx       |
| Sauvignon   | 10.100.36.20      | Int #7           | ifc7 (Slot: 1 Port: 7): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 7    | 2.301%                | 100.000%               | 100.000% |
| Sauvignon   | 10.100.36.20      | Int #17          | ifc17 (Slot: 1 Port: 17): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 17 | 88.294%               | 100.000%               | 100.000% |
| Internet    | 10.100.36.1       | Int #1           | Fa0/0: FastEthernet0/0 (WAN side <FG726>)   | 18.702%               | 23.370%                | 49.034%  |
| Denver      | 10.100.36.60      | Int #2           | Se0/0: Serial0/0  | 0.000%                | 17.490%                | 19.542%  |
| NewYork     | 192.168.202.1     | Int #2           | Se0/0: Serial0/0 (Link to Atlanta)  | 0.000%                | 19.458%                | 17.469%  |
| Sauvignon   | 10.100.36.20      | Int #49          | ifc49 (Slot: 1 Port: 49): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 49 | 2.301%                | 11.362%                | 11.430%  |
| Sauvignon   | 10.100.36.20      | Int #1           | ifc1 (Slot: 1 Port: 1): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 1    | 2.301%                | 11.362%                | 11.430%  |
| Sauvignon   | 10.100.36.20      | Int #3           | ifc3 (Slot: 1 Port: 3): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 3    | 2.301%                | 11.362%                | 11.430%  |
| Pinot       | 10.100.36.53      | Int #10012       | Fa0/12: FastEthernet0/12 (Sauv-Zinf-Internet)   | 0.004%                | 2.495%                 | 4.632%   |
| Pinot       | 10.100.36.53      | Int #10015       | Fa0/15: FastEthernet0/15 (Tim)  | 0.248%                | 0.884%                 | 2.373%   |

You can modify the output to view your preferred “Scope” or “Group” devices by using the drop down menu on the right hand side. Using the Scope, you can choose to see the Peak Daily Highest Error Rate within the last 24 hours or the Last Poll Error Rate within the last 5 minutes. You also have the option to view the 95<sup>th</sup> Percentile Highest Daily Transmitted Rates, Raw Data Highest Daily Transmitted Rates, or Broadcasts with The Highest Transmitted Broadcast Percentage.

This screenshot is similar to the previous one but shows the 'Group' dropdown menu open. The menu options include 'All', 'VoIP Gateways', 'Distribution Network', 'Edge Network', 'Cisco ASA Firewall', and 'Servers'. The 'Group' is currently set to 'All'. The table content remains the same as in the previous screenshot.

**Note:** If you have an interface that is receiving a high level of broadcasts, investigate the device that is connected to it to determine why it is transmitting a lot of broadcasts.

## Latency

The top 10 devices with the highest daily latency are listed under the “Latency” sub-tab.

This tab allows you to see which devices have the highest latency sorted by latency.

You can click on the Device to jump to the Device Overall Statistics page and view the Latency, Jitter, and Packet Loss details.

pathSolutions TotalView

Poll frequency: 00:05:00  
Last poll: 2/20/2015 3:11:26 PM  
Network health: **DEGRADED (0.7%)**

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Errors Transmitters Receivers Latency Jitter Loss

Top 10 Devices With the Highest Daily Latency Sorted by Latency Group: All

| Device Name | Device IP Address | Location        | Peak Daily Latency | Peak Daily Jitter | Peak Daily Loss |
|-------------|-------------------|-----------------|--------------------|-------------------|-----------------|
| Zinfandel   | 10.100.36.27      | snmplocation    | 181 ms             | 14 ms             | 0%              |
| Zinfandel   | 10.100.36.25      | snmplocation    | 173 ms             | 14 ms             | 0%              |
| Shiraz      | 10.100.37.3       | Santa Clara     | 153 ms             | 2 ms              | 5%              |
| VELMA       | 10.100.36.10      | Santa Clara, CA | 114 ms             | 343 ms            | 0%              |
| Atlanta     | 10.100.37.1       | Atlanta, GA     | 78 ms              | 43 ms             | 18%             |
| Grenache    | 10.100.37.53      | Sunnyvale, CA   | 70 ms              | 1 ms              | 11%             |
| Gamay       | 10.100.37.2       | Santa Clara, CA | 44 ms              | 5 ms              | 30%             |
| Bordeaux    | 192.168.202.4     | Sunnyvale       | 40 ms              | 0 ms              | 3%              |
| Corvina     | 10.100.36.61      | Hangzhou China  | 39 ms              | 4 ms              | 0%              |
| Denver      | 10.100.36.60      | Denver, CO      | 36 ms              | 9 ms              | 0%              |

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You can also modify the output to view your preferred device “Groups” by using the drop down menu on the right hand side.

pathSolutions TotalView

Poll frequency: 00:05:00  
Last poll: 2/20/2015 3:11:26 PM  
Network health: **DEGRADED (0.7%)**

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Errors Transmitters Receivers Latency Jitter Loss

Top 10 Devices With the Highest Daily Latency Sorted by Latency Group: All

- All
- VoIP Gateways
- Distribution Network
- Edge Network
- Cisco ASA Firewall
- Servers

| Device Name | Device IP Address | Location        | Peak Daily Latency | Peak Daily Jitter | Peak Daily Loss |
|-------------|-------------------|-----------------|--------------------|-------------------|-----------------|
| Zinfandel   | 10.100.36.27      | snmplocation    | 173 ms             | 14 ms             | 0%              |
| Zinfandel   | 10.100.36.25      | snmplocation    | 153 ms             | 2 ms              | 5%              |
| Shiraz      | 10.100.37.3       | Santa Clara     | 114 ms             | 343 ms            | 0%              |
| VELMA       | 10.100.36.10      | Santa Clara, CA | 78 ms              | 43 ms             | 18%             |
| Atlanta     | 10.100.37.1       | Atlanta, GA     | 70 ms              | 1 ms              | 11%             |
| Grenache    | 10.100.37.53      | Sunnyvale, CA   | 44 ms              | 5 ms              | 30%             |
| Gamay       | 10.100.37.2       | Santa Clara, CA | 40 ms              | 0 ms              | 3%              |
| Bordeaux    | 192.168.202.4     | Sunnyvale       | 39 ms              | 4 ms              | 0%              |
| Corvina     | 10.100.36.61      | Hangzhou China  | 36 ms              | 9 ms              | 0%              |
| Denver      | 10.100.36.60      | Denver, CO      |                    |                   |                 |

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### Jitter

The top 10 devices with the highest daily Jitter are listed under the “Jitter” sub-tab.

This tab allows you to see which devices have the highest daily Jitter sorted by Jitter.

You can click on the device to jump to the Device Overall Statistics page and view the Latency, Jitter, and Packet Loss details.

pathSolutions TotalView

Poll frequency: 00:05:00  
Last poll: 2/20/2015 3:11:26 PM  
Network health: **DEGRADED (0.7%)**

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Errors Transmitters Receivers Latency Jitter Loss

Top 10 Devices With the Highest Daily Jitter Sorted by Jitter

Group: All

| Device Name      | Device IP Address | Location          | Peak Daily Latency | Peak Daily Jitter | Peak Daily Loss |
|------------------|-------------------|-------------------|--------------------|-------------------|-----------------|
| VELMA            | 10.100.36.10      | Santa Clara, CA   | 114 ms             | 343 ms            | 0%              |
| Atlanta          | 10.100.37.1       | Atlanta, GA       | 78 ms              | 43 ms             | 18%             |
| Honolulu         | 10.100.36.5       |                   | 8 ms               | 31 ms             | 0%              |
| Honolulu         | 10.100.38.1       |                   | 8 ms               | 31 ms             | 0%              |
| San Francisco GW | 10.100.37.100     | San Francisco     | 15 ms              | 31 ms             | 40%             |
| REDSONJA         | 10.100.36.12      | Santa Clara, CA   | 3 ms               | 16 ms             | 100%            |
| Internet         | 10.100.36.1       | San Francisco, CA | 20 ms              | 16 ms             | 0%              |
| Miami            | 10.100.38.3       |                   | 7 ms               | 16 ms             | 0%              |
| Santa Clara GW   | 10.100.36.100     | Headquarters      | 10 ms              | 15 ms             | 0%              |
| Zinfandel        | 10.100.36.25      | snmplocation      | 173 ms             | 14 ms             | 0%              |

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You can also modify the output to view your preferred device “Group” by using the drop down menu on the right hand side.

pathSolutions TotalView

Poll frequency: 00:05:00  
Last poll: 2/20/2015 3:11:26 PM  
Network health: **DEGRADED (0.7%)**

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Errors Transmitters Receivers Latency Jitter Loss

Top 10 Devices With the Highest Daily Jitter Sorted by Jitter

Group: VoIP Gateways

| Device Name      | Device IP Address | Location          | Peak Daily Latency | Peak Daily Jitter | Peak Daily Loss |
|------------------|-------------------|-------------------|--------------------|-------------------|-----------------|
| VELMA            | 10.100.36.10      | Santa Clara, CA   | 114 ms             | 343 ms            | 0%              |
| Atlanta          | 10.100.37.1       | Atlanta, GA       | 78 ms              | 43 ms             | 18%             |
| Honolulu         | 10.100.36.5       |                   | 8 ms               | 31 ms             | 0%              |
| Honolulu         | 10.100.38.1       |                   | 8 ms               | 31 ms             | 0%              |
| San Francisco GW | 10.100.37.100     | San Francisco     | 15 ms              | 31 ms             | 40%             |
| REDSONJA         | 10.100.36.12      | Santa Clara, CA   | 3 ms               | 16 ms             | 100%            |
| Internet         | 10.100.36.1       | San Francisco, CA | 20 ms              | 16 ms             | 0%              |
| Miami            | 10.100.38.3       |                   | 7 ms               | 16 ms             | 0%              |
| Santa Clara GW   | 10.100.36.100     | Headquarters      | 10 ms              | 15 ms             | 0%              |
| Zinfandel        | 10.100.36.25      | snmplocation      | 173 ms             | 14 ms             | 0%              |

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### Loss

The top 10 devices with the highest daily packet loss are listed under the “Loss” tab.

This tab allows you to see which devices have the highest packet loss sorted by packet loss.

You can click on the device to jump to the Device Overall Statistics page and view the Latency, Jitter, and Packet Loss details.

The screenshot shows the TotalView interface with the 'Loss' tab selected. The table displays the top 10 devices with the highest daily loss, sorted by loss. The table includes columns for Device Name, Device IP Address, Location, Peak Daily Latency, Peak Daily Jitter, and Peak Daily Loss.

| Device Name      | Device IP Address | Location        | Peak Daily Latency | Peak Daily Jitter | Peak Daily Loss |
|------------------|-------------------|-----------------|--------------------|-------------------|-----------------|
| REDSONJA         | 10.100.36.12      | Santa Clara, CA | 3 ms               | 16 ms             | 100%            |
| San Francisco GW | 10.100.37.100     | San Francisco   | 15 ms              | 31 ms             | 40%             |
| Gamay            | 10.100.37.2       | Santa Clara, CA | 44 ms              | 5 ms              | 30%             |
| Atlanta          | 10.100.37.1       | Atlanta, GA     | 78 ms              | 43 ms             | 18%             |
| Barbera          | 10.100.37.5       | Santa Clara     | 22 ms              | 4 ms              | 18%             |
| Grenache         | 10.100.37.53      | Sunnyvale, CA   | 70 ms              | 1 ms              | 11%             |
| Cabernet         | 192.168.202.3     |                 | 31 ms              | 0 ms              | 6%              |
| Shiraz           | 10.100.37.3       | Santa Clara     | 171 ms             | 2 ms              | 5%              |
| Bardolino        | 10.100.36.18      | San Francisco   | 9 ms               | 3 ms              | 5%              |
| Bordeaux         | 192.168.202.4     | Sunnyvale       | 40 ms              | 0 ms              | 3%              |

You can also modify the output to view your preferred device “Groups” by using the drop down menu on the right hand side.

The screenshot shows the TotalView interface with the 'Loss' tab selected. A dropdown menu is open on the right side of the table, showing various device groups. The table data is the same as in the previous screenshot.

| Device Name      | Device IP Address | Location        | Peak Daily Latency | Peak Daily Jitter | Peak Daily Loss |
|------------------|-------------------|-----------------|--------------------|-------------------|-----------------|
| REDSONJA         | 10.100.36.12      | Santa Clara, CA | 3 ms               | 16 ms             | 100%            |
| San Francisco GW | 10.100.37.100     | San Francisco   | 15 ms              | 31 ms             | 40%             |
| Gamay            | 10.100.37.2       | Santa Clara, CA | 44 ms              | 5 ms              | 30%             |
| Atlanta          | 10.100.37.1       | Atlanta, GA     | 78 ms              | 43 ms             | 18%             |
| Barbera          | 10.100.37.5       | Santa Clara     | 22 ms              | 4 ms              | 18%             |
| Grenache         | 10.100.37.53      | Sunnyvale, CA   | 70 ms              | 1 ms              | 11%             |
| Cabernet         | 192.168.202.3     |                 | 31 ms              | 0 ms              | 6%              |
| Shiraz           | 10.100.37.3       | Santa Clara     | 171 ms             | 2 ms              | 5%              |
| Bardolino        | 10.100.36.18      | San Francisco   | 9 ms               | 3 ms              | 5%              |
| Bordeaux         | 192.168.202.4     | Sunnyvale       | 40 ms              | 0 ms              | 3%              |

## WAN Tab

This section will automatically display WAN interfaces that are slower than 10meg, sorted by 95<sup>th</sup> percentile:

pathSolutions TotalView

Poll frequency: 00:05:00  
Last poll: 2/20/2015 3:13:10 PM  
Network health: **DEGRADED (1.8%)**

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

| WAN Interfaces |                  | Details   |  | Utilization Graph |  |
|----------------|------------------|---|--|-------------------|--|
| Device Name    | Interface Number |   |  |                   |  |
| Chardonnay     | Int #15          | 15: 15<br>DSCP Tagging for VoIP<br>Provider: AT&T<br>Support Phone: (877) 555-1212<br>Contract Expiration: 12/15/2015<br>Speed: 100,000,000<br>MTU: 1514<br>Tx Peak: 0.00%<br>Tx 95th Pct: 0.00%                    | Circuit ID: CBW34-58921-DS1<br>Monthly Cost: \$685<br>Cost per Gigabit: \$30.19301607<br>Type: ethernetCsmacd<br>Queuing: Undetermined<br>Rx Peak: 0.02%<br>Rx 95th Pct: 0.01%     |                   |  |
| SCWANRTR       | Int #1           | Fa0/0: FastEthernet0/0 (SC Office)<br>To Dallas<br>Provider: Verizon<br>Support Phone: (800) 555-1212<br>Contract Expiration: 6/1/2016<br>Speed: 100,000,000<br>MTU: 1500<br>Tx Peak: 9.93%<br>Tx 95th Pct: 7.83%   | Circuit ID: VZ45-K4801-3812<br>Monthly Cost: \$1452<br>Cost per Gigabit: \$0.08919365<br>Type: ethernetCsmacd<br>Queuing: FIFO<br>Rx Peak: 9.81%<br>Rx 95th Pct: 9.64%             |                   |  |
| NewYork        | Int #2           | Se0/0: Serial0/0 (Link to Atlanta)<br>To Atlanta<br>Provider: Cable One<br>Support Phone: (877) 555-1212<br>Contract Expiration: 7/12/2016<br>Speed: 256,000<br>MTU: 1500<br>Tx Peak: 41.77%<br>Tx 95th Pct: 12.97% | Circuit ID: CW481-B481-331130<br>Monthly Cost: \$892<br>Cost per Gigabit: \$4.12156883<br>Type: propPointToPointSerial<br>Queuing: WFQ<br>Rx Peak: 40.51%<br>Rx 95th Pct: 11.76%   |                   |  |
| Denver         | Int #2           | Se0/0: Serial0/0<br>To New York<br>Provider: Cable One<br>Support Phone: (877) 555-1212<br>Contract Expiration: 7/12/2016<br>Speed: 256,000<br>MTU: 1500<br>Tx Peak: 40.44%<br>Tx 95th Pct: 11.72%                  | Circuit ID: CW481-B378-381721<br>Monthly Cost: \$1105<br>Cost per Gigabit: \$5.11639698<br>Type: propPointToPointSerial<br>Queuing: FIFO<br>Rx Peak: 41.69%<br>Rx 95th Pct: 12.97% |                   |  |

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**Note:** The list of WAN interfaces on this list is automatically generated by the system. If you desire to include specific WAN interfaces that are not displayed in this list, this can be accomplished by using the “Config Tool” and selecting the WAN Tab. You can add, change, or delete any interfaces there as well as sort them in order by using the Shift Up or Shift Down keys. See Page 127 for details.

You can also editing the WAN.cfg file. This file is located in the following directory:

### For 32 Bit Operating Systems

C:\Program Files\PathSolutions\TotalView\WAN.cfg

### For 64 Bit Operating Systems

C:\Program Files (x86)\PathSolutions\TotalView\WAN.cfg

Edit this file with a text editor (like Notepad) and add the IP address and interface for each WAN interface that you want the program to list. The IP address and interface number should be separated by at least one <TAB> character. Save the file and then stop and re-start PathSolutions’ TotalView Service to have it take effect.

## Interfaces Tab

This section identifies interfaces with specific conditions.

### Half Duplex Interface Report

Interfaces that are configured for half-duplex or are showing collision counters are displayed on this report:

pathSolutions TotalView

Poll frequency: 00:05:00  
 Last poll: 2/20/2015 3:13:10 PM  
 Network health: DEGRADED (1.8%)

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Half Duplex Unknown Protocols Sub 10 meg 10 meg 100 meg 1 gig 10 gig Operationally Down Administratively Down

Half Duplex Interface List sorted by Peak Daily Error Rate

| Device Name | Device IP Address | Interface Number | Description   | Peak Daily Error Rate | Peak Daily Utilization |          | Duplex* |
|-------------|-------------------|------------------|---|-----------------------|------------------------|----------|---------|
|             |                   |                  |   |                       | Tx                     | Rx       |         |
| Sauvignon   | 10.100.36.20      | Int #17          | ifc17 (Slot: 1 Port: 17): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 17 | 30.149%               | 100.000%               | 100.000% | Half    |
| Internet    | 10.100.36.1       | Int #1           | Fa0/0: FastEthernet0/0 (WAN side <FG726>)   | 18.652%               | 25.316%                | 64.452%  | Half    |
| SC_User_SW2 | 10.0.12.7         | Int #24          | 24: 24 (Path Solutions)   | 14.609%               | 65.969%                | 25.415%  | Half    |
| Brunello    | 10.100.37.16      | Int #2           | 2: 2  | 6.894%                | 0.307%                 | 0.313%   | Half    |
| Internet    | 10.100.36.1       | Int #2           | Fa0/1: FastEthernet0/1  | 4.851%                | 6.447%                 | 2.549%   | Half    |
| Bordeaux    | 192.168.202.4     | Int #46          | 46: Ethernet Interface  | 1.711%                | 0.529%                 | 0.496%   | Half    |
| Pinot       | 10.100.36.53      | Int #10010       | Fa0/10: FastEthernet0/10 (To Hawaii)  | 0.165%                | 0.011%                 | 0.007%   | Half    |
| Honolulu    | 10.100.36.5       | Int #2           | Fa0/0: FastEthernet0/0  | 0.000%                | 0.007%                 | 0.008%   | Half    |

8 total half-duplex interfaces displayed [Top of page](#)

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With modern switched networks, no interfaces should be configured for half-duplex or creating collisions on the network. This report discloses all interfaces that are either configured for half-duplex operation or have collision error counters.

**Note:** If the Duplex value shows a red asterisk (\*) behind the label, it indicates that the duplex setting could not be read from the device because the device does not support RFC 2665. In this case, the duplex setting is estimated based on the presence or absence of collision error counters on the interface.

## Unknown Protocols

This report shows all interfaces that received a valid frame with unknown protocols. Knowing which interfaces have devices transmitting strange protocols (IPX, Appletalk, etc.) can be valuable for reducing unnecessary broadcasts on your network. This report will disclose the interfaces that are currently discarding packets.

The screenshot displays the 'Unknown Protocols' report in TotalView. At the top, it shows the network health as 'DEGRADED (1.8%)'. Below the navigation tabs, a filter bar shows 'Unknown Protocols' selected. The main content area is titled 'Interfaces Currently Showing Unknown Protocols sorted by Peak Daily Error Rate'. It contains a table with the following data:

| Device Name | Device IP Address | Interface Number | Description               | Peak Daily Error Rate | Peak Daily Utilization |        |
|-------------|-------------------|------------------|---------------------------|-----------------------|------------------------|--------|
|             |                   |                  |                           |                       | Tx                     | Rx     |
| Internet    | 10.100.36.1       | Int #2           | Fa0/1: FastEthernet0/1    | 4.851%                | 6.447%                 | 2.549% |
| Palomino    | 10.100.38.2       | Int #2           | Fa0/2: FastEthernet0/2    | 0.000%                | 0.001%                 | 0.000% |
| Denver      | 10.100.36.60      | Int #1           | Eto0: Ethernet0/0         | 0.000%                | 0.528%                 | 0.515% |
| Honolulu    | 10.100.36.5       | Int #2           | Fa0/0: FastEthernet0/0    | 0.000%                | 0.007%                 | 0.008% |
| Honolulu    | 10.100.36.5       | Int #3           | Fa0/1: FastEthernet0/1    | 0.000%                | 0.009%                 | 0.009% |
| Miami       | 10.100.38.3       | Int #1           | Gi0/0: GigabitEthernet0/0 | 0.000%                | 0.008%                 | 0.008% |

6 total unknown protocol interfaces displayed [Top of page](#)

For Example: If AppleTalk, IPX, or IPv6 is configured on two devices, these two devices will send broadcasts to each other. All other devices on the network will also receive the broadcast frames. These devices will not know what to do with the packets and will discard them.

### Sub 10 meg

This report shows all interfaces that are configured under 10meg Ethernet. These interfaces may be critical WAN interfaces that need to be tracked more closely.

pathSolutions TotalView

Poll frequency: 00:05:00  
 Last poll: 2/20/2015 3:18:05 PM  
 Network health: DEGRADED (1.8%)

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Half Duplex Unknown Protocols Sub 10 meg 10 meg 100 meg 1 gig 10 gig Operationally Down Administratively Down

10 Meg Interface List sorted by Peak Daily Utilization Rate

| Device Name | Device IP Address | Interface Number | Description                        | Peak Daily Error Rate | Peak Daily Utilization |          | Interface Speed |
|-------------|-------------------|------------------|------------------------------------|-----------------------|------------------------|----------|-----------------|
|             |                   |                  |                                    |                       | Tx                     | Rx       |                 |
| ● SCWANRTR  | 38.102.148.163    | Int #10          | Tu2: Tunnel2                       | 0.000%                | 100.000%               | 100.000% | 9,000           |
| ● SCWANRTR  | 38.102.148.163    | Int #9           | Tu1: Tunnel1                       | 0.000%                | 1.778%                 | 100.000% | 9,000           |
| ● NewYork   | 192.168.201.2     | Int #2           | Se0/0: Serial0/0 (Link to Atlanta) | 0.000%                | 41.771%                | 40.510%  | 256,000         |
| ● Denver    | 10.100.36.60      | Int #2           | Se0/0: Serial0/0                   | 0.000%                | 40.438%                | 41.688%  | 256,000         |

4 total sub 10 meg interfaces displayed [Top of page](#)

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Since virtually all network adapters that have been sold in the past 10 years are both 10meg and 100meg capable, this report discloses interfaces that are configured under 10megs. Network performance can be generally improved by changing these adapters to use 100meg.

**Note:** Even if a network link has low utilization, it can still benefit from upgrading to 100meg, as the latency to stream small chunks of data across a 10meg link can be reduced significantly by increasing the bandwidth ten-fold.

## 10Meg Interface Report

This report shows all interfaces that are configured for 10meg Ethernet:

pathSolutions TotalView

Poll frequency: 00:05:00  
Last poll: 2/20/2015 3:18:05 PM  
Network health: **DEGRADED (1.8%)**

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Half Duplex Unknown Protocols Sub 10 meg 10 meg 100 meg 1 gig 10 gig Operationally Down Administratively Down

10 Meg Interface List sorted by Peak Daily Utilization Rate

| Device Name   | Device IP Address | Interface Number | Description                                   | Peak Daily Error Rate | Peak Daily Utilization |         | Interface Speed |
|---------------|-------------------|------------------|---|-----------------------|------------------------|---------|-----------------|
|               |                   |                  |   |                       | Tx                     | Rx      |                 |
| ● SC_User_SW2 | 10.0.12.7         | Int #24          | 24: 24 (Path Solutions)                       | 14.751%               | 65.969%                | 25.415% | 10,000,000      |
| ● Internet    | 10.100.36.1       | Int #1           | Fa0/0: FastEthernet0/0 (WAN side <FG726>)     | 18.799%               | 25.316%                | 64.452% | 10,000,000      |
| ● EAP900H     | 10.100.36.7       | Int #2           | eth0: eth0                                    | 0.830%                | 9.590%                 | 61.219% | 10,000,000      |
| ● Pinot       | 10.100.36.53      | Int #10007       | Fa0/7: FastEthernet0/7 (Connection to Denver) | 0.000%                | 0.554%                 | 0.546%  | 10,000,000      |
| ● Bordeaux    | 192.168.202.4     | Int #46          | 46: Ethernet Interface                        | 1.711%                | 0.529%                 | 0.496%  | 10,000,000      |
| ● Denver      | 10.100.36.60      | Int #1           | Et0/0: Ethernet0/0                            | 0.000%                | 0.528%                 | 0.515%  | 10,000,000      |
| ● NewYork     | 192.168.201.2     | Int #1           | Et0/0: Ethernet0/0                            | 2.968%                | 0.483%                 | 0.523%  | 10,000,000      |
| ● Atlanta     | 192.168.202.2     | Int #1           | Fa0/0: FastEthernet0/0                        | 2.570%                | 0.319%                 | 0.302%  | 10,000,000      |
| ● Atlanta     | 10.100.37.1       | Int #1           | Fa0/0: FastEthernet0/0                        | 2.432%                | 0.319%                 | 0.302%  | 10,000,000      |
| ● Brunello    | 10.100.37.16      | Int #2           | 2: 2  | 6.894%                | 0.307%                 | 0.313%  | 10,000,000      |
| ● Pinot       | 10.100.36.53      | Int #10013       | Fa0/13: FastEthernet0/13 (To Velma)           | 0.000%                | 0.107%                 | 0.022%  | 10,000,000      |
| ● VELMA       | 10.100.36.10      | Int #2           | Intel(R) PRO Adapter                          | 0.000%                | 0.022%                 | 0.050%  | 10,000,000      |
| ● EAP900H     | 10.100.36.7       | Int #12          | br-lan: br-lan                                | 0.000%                | 0.000%                 | 0.000%  | 10,000,000      |

13 total 10 meg interfaces displayed [Top of page](#)

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Since virtually all network adapters that have been sold in the past 10 years are both 10meg and 100meg capable, this report discloses interfaces that are configured for 10meg. Network performance can be generally improved by changing these adapters to use 100meg speeds instead of 10meg.

**Note:** Even if a network link has low utilization, it can still benefit from upgrading to 100meg, as the latency to stream small chunks of data across a 10meg link can be reduced significantly by increasing the bandwidth ten-fold.

# 100Meg Interface Report

This report shows all interfaces that are configured for 100meg Ethernet:

| pathSolutions  |                   | TotalView        |   | Poll frequency:       | 00:05:00               |          |                 |
|--|-------------------|------------------|---|-----------------------|------------------------|----------|-----------------|
|  |                   |                  |   | Last poll:            | 2/20/2015 3:18:05 PM   |          |                 |
|  |                   |                  |   | Network health:       | DEGRADED (1.8%)        |          |                 |
| <p>Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools</p> <p>Half Duplex Unknown Protocols Sub 10 meg 10 meg 100 meg 1 gig 10 gig Operationally Down Administratively Down</p> |                   |                  |   |                       |                        |          |                 |
| 100 Meg Interface List sorted by Peak Daily Utilization Rate   |                   |                  |   |                       |                        |          |                 |
| Device Name  | Device IP Address | Interface Number | Description   | Peak Daily Error Rate | Peak Daily Utilization |          | Interface Speed |
|  |                   |                  |   |                       | Tx                     | Rx       |                 |
| Sauvignon  | 10.100.36.20      | Int #17          | ifc17 (Slot: 1 Port: 17): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 17           | 30.149%               | 100.000%               | 100.000% | 100,000,000     |
| Sauvignon  | 10.100.36.20      | Int #7           | ifc7 (Slot: 1 Port: 7): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 7              | 2.398%                | 100.000%               | 100.000% | 100,000,000     |
| SC_User_SW1  | 10.0.12.6         | Int #35          | 35: 35 (23.1)   | 0.000%                | 30.360%                | 1.013%   | 100,000,000     |
| SC_Server  | 10.0.12.5         | Int #24          | 24: 24 (SCNetmon01)   | 0.020%                | 13.418%                | 0.353%   | 100,000,000     |
| GatewaySwitch  | 38.102.148.186    | Int #7           | Fa0/6: FastEthernet0/6 (SCFG-pr1_SC_Block)  | 0.000%                | 9.785%                 | 10.254%  | 100,000,000     |
| SCWANRTR   | 38.102.148.163    | Int #2           | Fa0/1: FastEthernet0/1 (Cogent)   | 0.101%                | 10.182%                | 9.934%   | 100,000,000     |
| GatewaySwitch  | 38.102.148.186    | Int #2           | Fa0/1: FastEthernet0/1 (SCWANRTR)   | 0.006%                | 9.830%                 | 9.938%   | 100,000,000     |
| SCWANRTR   | 38.102.148.163    | Int #1           | Fa0/0: FastEthernet0/0 (SC Office)  | 0.001%                | 9.929%                 | 9.810%   | 100,000,000     |
| SC_Server  | 10.0.12.5         | Int #1           | 1: 1 (SCFG1 10.0.1.252)   | 0.000%                | 9.873%                 | 9.552%   | 100,000,000     |
| Pinot  | 10.100.36.53      | Int #10012       | Fa0/12: FastEthernet0/12 (Sauv-Zinf-Internet)   | 0.004%                | 2.581%                 | 6.465%   | 100,000,000     |
| Internet   | 10.100.36.1       | Int #2           | Fa0/1: FastEthernet0/1  | 4.851%                | 6.447%                 | 2.549%   | 100,000,000     |
| GatewaySwitch  | 38.102.148.186    | Int #14          | Fa0/13: FastEthernet0/13  | 1.619%                | 6.351%                 | 0.670%   | 100,000,000     |
| Pinot  | 10.100.36.53      | Int #10005       | Fa0/5: FastEthernet0/5 (To Wireless Access Point)   | 0.000%                | 6.136%                 | 0.958%   | 100,000,000     |
| SC_Server  | 10.0.12.5         | Int #4           | 4: 4 (Fortimanager)   | 0.000%                | 2.451%                 | 0.406%   | 100,000,000     |
| Pinot  | 10.100.36.53      | Int #10015       | Fa0/15: FastEthernet0/15 (Tim)  | 0.243%                | 0.881%                 | 2.451%   | 100,000,000     |
| Pinot  | 10.100.36.53      | Int #10004       | Fa0/4: FastEthernet0/4 (Trunk Port Connected to Malbec)   | 0.000%                | 1.944%                 | 0.253%   | 100,000,000     |
| Malbec   | 10.100.36.75      | Int #2           | ifc2 (Slot: 1 Port: 2): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 2 (To Pinot)  | 0.337%                | 0.250%                 | 1.940%   | 100,000,000     |
| Pinot  | 10.100.36.53      | Int #10014       | Fa0/14: FastEthernet0/14 (Sally)  | 0.000%                | 0.300%                 | 1.909%   | 100,000,000     |
| SC_Server  | 10.0.12.5         | Int #7           | 7: 7 (Lifesize)   | 0.000%                | 0.846%                 | 0.812%   | 100,000,000     |
| Malbec   | 10.100.36.75      | Int #3           | ifc3 (Slot: 1 Port: 3): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 3 (To Merlot) | 0.100%                | 0.833%                 | 0.115%   | 100,000,000     |
| Merlot   | 10.100.36.48      | Int #23          | 1/23: Summit300-24-Port 23 (WiFiAccessPoint)  | 0.000%                | 0.115%                 | 0.833%   | 100,000,000     |
| Merlot   | 10.100.36.48      | Int #5           | 1/5: Summit300-24-Port 5  | 0.000%                | 0.826%                 | 0.104%   | 100,000,000     |
| Muscat   | 10.100.36.51      | Int #2           | ifc2 (Slot: 1 Port: 2): Nortel Ethernet Switch 470-48T Module - Port 2 (SC-Fort)                | 0.000%                | 0.104%                 | 0.826%   | 100,000,000     |
| SC_User_SW1  | 10.0.12.6         | Int #14          | 14: 14 (19.1)   | 0.000%                | 0.156%                 | 0.758%   | 100,000,000     |
| SC_Server  | 10.0.12.5         | Int #43          | 43: 43 (VL6 4tg8 Pri)   | 0.000%                | 0.533%                 | 0.236%   | 100,000,000     |
| SC_Server  | 10.0.12.5         | Int #42          | 42: 42 (VL6 ProdRouter)   | 0.000%                | 0.237%                 | 0.533%   | 100,000,000     |
| Muscat   | 10.100.36.51      | Int #13          | ifc13 (Slot: 1 Port: 13): Nortel Ethernet Switch 470-48T Module - Port 13                       | 0.000%                | 0.095%                 | 0.095%   | 100,000,000     |
| SC_Server  | 10.0.12.5         | Int #15          | 15: 15 (SCFG1-EXT)  | 0.000%                | 0.081%                 | 0.062%   | 100,000,000     |
| SC_User_SW2  | 10.0.12.7         | Int #46          | 46: 46 (BD Staging)   | 0.000%                | 0.048%                 | 0.064%   | 100,000,000     |

The highest utilized of these interfaces should be considered for upgrading to Gigabit Ethernet.

**Note:** Even if a network link has low utilization, it can still benefit from upgrading to Gigabit Ethernet, as the latency to stream small chunks of data across a 100meg link can be reduced significantly by increasing the bandwidth ten-fold.

**Note:** Another consideration is that an interface that shows 20% peak utilization (during a 5 minute poll period) may actually have been 100% utilized for 1 minute of that 5 minute poll period, and 0% utilization for the remaining 4 minutes. Review the interface usage graph and/or reduce your poll frequency to see more granular historical utilization of interfaces.

# 1Gig Interface Report

This report shows all interfaces that are configured for 1gig Ethernet:

| pathSolutions   |                   | TotalView        |  | Poll frequency: 00:05:00               |                        |         |                 |
|---|-------------------|------------------|--|--|------------------------|---------|-----------------|
|   |                   |                  |  | Last poll: 2/20/2015 3:18:05 PM        |                        |         |                 |
|   |                   |                  |  | Network health: <b>DEGRADED (1.8%)</b> |                        |         |                 |
| Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools                    |                   |                  |  |  |                        |         |                 |
| Half Duplex Unknown Protocols Sub 10 meg 10 meg 100 meg 1 gig 10 gig Operationally Down Administratively Down |                   |                  |  |  |                        |         |                 |
| 1 Gigabit Interface List sorted by Peak Daily Utilization Rate  |                   |                  |  |  |                        |         |                 |
| Device Name   | Device IP Address | Interface Number | Description  | Peak Daily Error Rate                  | Peak Daily Utilization |         | Interface Speed |
|   |                   |                  |  |  | Tx                     | Rx      |                 |
| SC_Server   | 10.0.12.5         | Int #40          | 40: 40 (UPS4)  | 0.000%                                 | 12.401%                | 12.190% | 1,000,000,000   |
| SC_Server   | 10.0.12.5         | Int #26          | 26: 26 (Avocent)   | 0.000%                                 | 12.205%                | 12.126% | 1,000,000,000   |
| Sauvignon   | 10.100.36.20      | Int #49          | Ifc49 (Slot: 1 Port: 49): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 49  | 2.398%                                 | 11.389%                | 11.426% | 1,000,000,000   |
| Sauvignon   | 10.100.36.20      | Int #1           | Ifc1 (Slot: 1 Port: 1): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 1     | 2.398%                                 | 11.389%                | 11.407% | 1,000,000,000   |
| Sauvignon   | 10.100.36.20      | Int #3           | Ifc3 (Slot: 1 Port: 3): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 3     | 2.398%                                 | 11.389%                | 11.407% | 1,000,000,000   |
| SC_Server   | 10.0.12.5         | Int #38          | 38: 38 (UPS2)  | 0.000%                                 | 7.685%                 | 9.465%  | 1,000,000,000   |
| SC_Server   | 10.0.12.5         | Int #10          | 10: 10 (SC-ESX04 10.0.1.84)  | 0.000%                                 | 7.602%                 | 7.069%  | 1,000,000,000   |
| SC_Server   | 10.0.12.5         | Int #37          | 37: 37 (UPS1)  | 0.000%                                 | 4.772%                 | 7.222%  | 1,000,000,000   |
| SC_Server   | 10.0.12.5         | Int #21          | 21: 21   | 0.000%                                 | 5.797%                 | 6.752%  | 1,000,000,000   |
| SC_User_SW1   | 10.0.12.6         | Int #1           | 1: 1 (1.1)   | 0.000%                                 | 6.460%                 | 0.907%  | 1,000,000,000   |
| SC_Server   | 10.0.12.5         | Int #23          | 23: 23 (SCSAND1)   | 0.000%                                 | 3.418%                 | 2.603%  | 1,000,000,000   |
| SC_Server   | 10.0.12.5         | Int #28          | 28: 28 (Apollo)  | 0.000%                                 | 1.695%                 | 3.025%  | 1,000,000,000   |
| SC_User_SW1   | 10.0.12.6         | Int #11          | 11: 11 (17.2)  | 0.000%                                 | 1.705%                 | 0.046%  | 1,000,000,000   |
| SC_User_SW1   | 10.0.12.6         | Int #20          | 20: 20 (28.2)  | 0.000%                                 | 1.695%                 | 0.040%  | 1,000,000,000   |
| SC_Server   | 10.0.12.5         | Int #22          | 22: 22 (SCDC01)  | 0.000%                                 | 1.643%                 | 0.199%  | 1,000,000,000   |
| SC_Server   | 10.0.12.5         | Int #34          | 34: 34 (SC-ESX02 10.0.1.82)  | 0.000%                                 | 0.516%                 | 0.849%  | 1,000,000,000   |
| SC_Server   | 10.0.12.5         | Int #12          | 12: 12   | 0.000%                                 | 0.737%                 | 0.486%  | 1,000,000,000   |
| SC_Server   | 10.0.12.5         | Int #41          | 41: 41   | 0.000%                                 | 0.064%                 | 0.610%  | 1,000,000,000   |
| SC_User_SW2   | 10.0.12.7         | Int #32          | 32: 32 (62.3)  | 0.000%                                 | 0.439%                 | 0.096%  | 1,000,000,000   |
| SC_User_SW2   | 10.0.12.7         | Int #11          | 11: 11 (52.3)  | 0.000%                                 | 0.356%                 | 0.248%  | 1,000,000,000   |
| SC_User_SW2   | 10.0.12.7         | Int #12          | 12: 12 (SoupCup)   | 0.000%                                 | 0.092%                 | 0.338%  | 1,000,000,000   |
| SC_Server   | 10.0.12.5         | Int #29          | 29: 29 (SCVH01)  | 0.000%                                 | 0.036%                 | 0.331%  | 1,000,000,000   |
| SC_Server   | 10.0.12.5         | Int #31          | 31: 31 (Kittyhawk p1 10.0.1.56)  | 0.000%                                 | 0.302%                 | 0.091%  | 1,000,000,000   |
| SC_User_SW1   | 10.0.12.6         | Int #9           | 9: 9 (12.1)  | 0.000%                                 | 0.239%                 | 0.180%  | 1,000,000,000   |
| SC_User_SW1   | 10.0.12.6         | Int #15          | 15: 15 (20.1)  | 0.000%                                 | 0.199%                 | 0.014%  | 1,000,000,000   |
| SC_User_SW2   | 10.0.12.7         | Int #43          | 43: 43 (40.2)  | 0.000%                                 | 0.199%                 | 0.087%  | 1,000,000,000   |
| SC_User_SW1   | 10.0.12.6         | Int #5           | 5: 5 (4.2 Outside Olympus)   | 0.000%                                 | 0.196%                 | 0.110%  | 1,000,000,000   |
| Malbec  | 10.100.36.75      | Int #11          | Ifc11 (Slot: 1 Port: 11): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 11 | 0.111%                                 | 0.192%                 | 0.017%  | 1,000,000,000   |

The highest utilized of these interfaces should be considered for upgrading to 10Gigabit Ethernet.

**Note:** Even if a network link has low utilization, it can still benefit from upgrading to 10Gigabit Ethernet, as the latency to stream small chunks of data across a Gigabit link can be reduced significantly by increasing the bandwidth ten-fold.



# 10Gig Interface Report

This report shows all interfaces that are configured for 10gig Ethernet:

TotalView

Poll frequency: 00:05:00  
 Last poll: 2/20/2015 3:23:16 PM  
 Network health: DEGRADED (1.8%)

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Half Duplex Unknown Protocols Sub 10 meg 10 meg 100 meg 1 gig 10 gig Operationally Down Administratively Down

**10 Gigabit Interface List sorted by Peak Daily Utilization Rate**

| Device Name                 | Device IP Address | Interface Number        | Description          | Peak Daily Error Rate | Peak Daily Utilization |        | Interface Speed |
|-----------------------------|-------------------|-------------------------|----------------------|-----------------------|------------------------|--------|-----------------|
|                             |                   |                         |                      |                       | Tx                     | Rx     |                 |
| <a href="#">SC_Server</a>   | 10.0.12.5         | <a href="#">Int #49</a> | A1: A1 (To_SC_User1) | 0.000%                | 0.707%                 | 0.099% | 10,000,000,000  |
| <a href="#">SC_User_SW1</a> | 10.0.12.6         | <a href="#">Int #49</a> | A1: A1               | 0.000%                | 0.099%                 | 0.707% | 10,000,000,000  |
| <a href="#">SC_User_SW1</a> | 10.0.12.6         | <a href="#">Int #50</a> | A2: A2               | 0.000%                | 0.079%                 | 0.036% | 10,000,000,000  |
| <a href="#">SC_User_SW2</a> | 10.0.12.7         | <a href="#">Int #49</a> | A1: A1               | 0.000%                | 0.036%                 | 0.079% | 10,000,000,000  |
| <a href="#">SC_User_SW2</a> | 10.0.12.7         | <a href="#">Int #50</a> | A2: A2               | 0.000%                | 0.007%                 | 0.032% | 10,000,000,000  |

5 total 10 gigabit interfaces displayed [Top of page](#)

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## Operationally Down Interface Report

Operationally down interfaces are listed under the "Operationally Shut Down" tab. When the number of operationally down ports gets too low, additional switch ports should be acquired.

The screenshot shows the PathSolutions TotalView interface. At the top right, it displays 'Poll frequency: 00:05:00', 'Last poll: 2/20/2015 3:23:16 PM', and 'Network health: DEGRADED (1.8%)'. The navigation bar includes tabs for Map, Path, Phones, Assessment, MOS, Devices, Favorites, Issues, Health, Top-10, WAN, Interfaces, and Tools. Under the 'Interfaces' tab, there are sub-tabs for Half Duplex, Unknown Protocols, Sub 10 meg, 10 meg, 100 meg, 1 gig, 10 gig, Operationally Down, and Administratively Down. The 'Operationally Down' sub-tab is selected, showing a table titled 'Operationally Down Interface List sorted by Last Used'.

| Device Name | Device IP Address | Interface Number | Description   | Type           | Last Used           |
|-------------|-------------------|------------------|---|----------------|---------------------|
| SC_User_SW1 | 10.0.12.6         | Int #3           | 3:3 (2.2)   | ethernetCsmacd | 0 days 00:15:13.70  |
| Muscat      | 10.100.36.51      | Int #35          | ifc35 (Slot: 1 Port: 35): Nortel Ethernet Switch 470-48T Module - Port 35           | ethernetCsmacd | 0 days 21:56:57.23  |
| SC_User_SW1 | 10.0.12.6         | Int #41          | 41: 41 (13.1)   | ethernetCsmacd | 0 days 22:03:24.49  |
| SC_User_SW2 | 10.0.12.7         | Int #2           | 2:2 (36.3 McCarthy)   | ethernetCsmacd | 1 days 06:04:46.86  |
| SC_User_SW2 | 10.0.12.7         | Int #4           | 4: 4 (41.2)   | ethernetCsmacd | 1 days 21:53:08.97  |
| SC_Server   | 10.0.12.5         | Int #5           | 5: 5 (Rob's old cube)   | ethernetCsmacd | 6 days 04:50:50.99  |
| SC_User_SW1 | 10.0.12.6         | Int #39          | 39: 39 (16.1)   | ethernetCsmacd | 6 days 22:25:41.77  |
| SC_User_SW2 | 10.0.12.7         | Int #44          | 44: 44 (40.1)   | ethernetCsmacd | 7 days 00:11:30.58  |
| SC_User_SW1 | 10.0.12.6         | Int #6           | 6: 6 (9.1)  | ethernetCsmacd | 7 days 01:06:03.30  |
| SC_Server   | 10.0.12.5         | Int #11          | 11: 11 (SCAir01)  | ethernetCsmacd | 7 days 21:38:19.15  |
| SC_Server   | 10.0.12.5         | Int #32          | 32: 32 (SCVIVC01 10.0.1.12)   | ethernetCsmacd | 7 days 21:42:58.42  |
| SC_Server   | 10.0.12.5         | Int #19          | 19: 19  | ethernetCsmacd | 7 days 21:47:13.83  |
| SC_Server   | 10.0.12.5         | Int #25          | 25: 25  | ethernetCsmacd | 8 days 05:38:10.95  |
| SC_User_SW1 | 10.0.12.6         | Int #7           | 7: 7 (11.1)   | ethernetCsmacd | 8 days 05:53:28.96  |
| SC_Server   | 10.0.12.5         | Int #13          | 13: 13 (SCFG1-DMZ)  | ethernetCsmacd | 9 days 18:35:47.74  |
| SC_Server   | 10.0.12.5         | Int #273         | VLAN100: VLAN100 (DMZ)  | propVirtual    | 9 days 18:35:47.74  |
| SC_User_SW2 | 10.0.12.7         | Int #36          | 36: 36 (55.2)   | ethernetCsmacd | 14 days 23:20:23.11 |
| SC_User_SW1 | 10.0.12.6         | Int #38          | 38: 38 (21.1)   | ethernetCsmacd | 15 days 04:12:43.11 |
| SC_User_SW2 | 10.0.12.7         | Int #34          | 34: 34 (56.3)   | ethernetCsmacd | 16 days 23:50:32.14 |
| Malbec      | 10.100.36.75      | Int #5           | ifc5 (Slot: 1 Port: 5): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 5 | ethernetCsmacd | 20 days 18:06:08.63 |
| SC_User_SW1 | 10.0.12.6         | Int #24          | 24: 24 (35.2)   | ethernetCsmacd | 20 days 22:35:58.66 |
| SC_User_SW1 | 10.0.12.6         | Int #4           | 4: 4 (3.1)  | ethernetCsmacd | 20 days 22:50:14.39 |
| Bordeaux    | 192.168.202.4     | Int #49          | 49: Ethernet Interface  | ethernetCsmacd | 21 days 23:51:42.61 |
| Bordeaux    | 192.168.202.4     | Int #50          | 50: Ethernet Interface  | ethernetCsmacd | 21 days 23:51:42.61 |
| Bordeaux    | 192.168.202.4     | Int #47          | 47: Ethernet Interface  | ethernetCsmacd | 21 days 23:51:42.81 |
| Bordeaux    | 192.168.202.4     | Int #48          | 48: Ethernet Interface  | ethernetCsmacd | 21 days 23:51:42.81 |
| Bordeaux    | 192.168.202.4     | Int #42          | 42: Ethernet Interface  | ethernetCsmacd | 21 days 23:51:42.83 |
| Bordeaux    | 192.168.202.4     | Int #45          | 45: Ethernet Interface  | ethernetCsmacd | 21 days 23:51:42.83 |
| Bordeaux    | 192.168.202.4     | Int #44          | 44: Ethernet Interface  | ethernetCsmacd | 21 days 23:51:42.83 |
| Bordeaux    | 192.168.202.4     | Int #43          | 43: Ethernet Interface  | ethernetCsmacd | 21 days 23:51:42.83 |
| Bordeaux    | 192.168.202.4     | Int #41          | 41: Ethernet Interface  | ethernetCsmacd | 21 days 23:51:43.03 |
| Bordeaux    | 192.168.202.4     | Int #40          | 40: Ethernet Interface  | ethernetCsmacd | 21 days 23:51:43.03 |
| Bordeaux    | 192.168.202.4     | Int #39          | 39: Ethernet Interface  | ethernetCsmacd | 21 days 23:51:43.03 |
| Bordeaux    | 192.168.202.4     | Int #38          | 38: Ethernet Interface  | ethernetCsmacd | 21 days 23:51:43.03 |

This list displays all available (operationally shut down) interfaces on your network, including:

- Device name
- Device IP Address
- Interface Number
- Interface Description
- Interface Type
- Interface Time Last Used

# Administratively Shut Down Interface Report

Administratively shut down interfaces are listed under the "Administratively Shut Down" tab:

TotalView

Poll frequency: 00:05:00  
 Last poll: 2/20/2015 3:23:16 PM  
 Network health: DEGRADED (1.8%)

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Half Duplex Unknown Protocols Sub 10 meg 10 meg 100 meg 1 gig 10 gig Operationally Down **Administratively Down**

**Administratively Down Interface List sorted by Last Used**

| Device Name    | Device IP Address | Interface Number | Description  | Type                   | Last Used            |
|----------------|-------------------|------------------|--|------------------------|----------------------|
| Honolulu       | 10.100.36.5       | Int #1           | Se0/0/0: Serial0/0/0   | propPointToPointSerial | 87 days 22:19:03.58  |
| Atlanta        | 10.100.37.1       | Int #3           | Se0/0: Serial0/0   | propPointToPointSerial | 92 days 00:40:59.05  |
| Atlanta        | 192.168.202.2     | Int #3           | Se0/0: Serial0/0   | propPointToPointSerial | 92 days 00:40:59.41  |
| SFO-OOB-HP5500 | 63.147.175.6      | Int #28          | GigabitEthernet1/0/28: GigabitEthernet1/0/28 (GigabitEthernet1/0/28 Interface) | ethernetCsmacd         | 164 days 04:37:31.81 |
| SFO-OOB-HP5500 | 63.147.175.6      | Int #26          | GigabitEthernet1/0/26: GigabitEthernet1/0/26 (GigabitEthernet1/0/26 Interface) | ethernetCsmacd         | 164 days 04:37:31.90 |
| SFO-OOB-HP5500 | 63.147.175.6      | Int #25          | GigabitEthernet1/0/25: GigabitEthernet1/0/25 (GigabitEthernet1/0/25 Interface) | ethernetCsmacd         | 164 days 04:37:31.94 |
| SFO-OOB-HP5500 | 63.147.175.6      | Int #21          | GigabitEthernet1/0/21: GigabitEthernet1/0/21 (GigabitEthernet1/0/21 Interface) | ethernetCsmacd         | 164 days 04:37:32.36 |
| Corvina        | 10.100.36.61      | Int #4227841     | GigabitEthernet1/0/28: GigabitEthernet1/0/28                                   | gigabitEthernet        | 192 days 20:28:40.59 |
| Corvina        | 10.100.36.61      | Int #4227833     | GigabitEthernet1/0/27: GigabitEthernet1/0/27                                   | gigabitEthernet        | 192 days 20:28:40.61 |
| Corvina        | 10.100.36.61      | Int #4227825     | GigabitEthernet1/0/26: GigabitEthernet1/0/26                                   | gigabitEthernet        | 192 days 20:28:40.74 |
| Corvina        | 10.100.36.61      | Int #4227817     | GigabitEthernet1/0/25: GigabitEthernet1/0/25                                   | gigabitEthernet        | 192 days 20:28:40.76 |
| SC_Server      | 10.0.12.5         | Int #4273        | lo5: HP ProCurve Switch software loopback interface (lo5)                      | softwareLoopback       | 204 days 06:58:31.68 |
| SC_Server      | 10.0.12.5         | Int #4269        | lo1: HP ProCurve Switch software loopback interface (lo1)                      | softwareLoopback       | 204 days 06:58:31.68 |
| SC_Server      | 10.0.12.5         | Int #4270        | lo2: HP ProCurve Switch software loopback interface (lo2)                      | softwareLoopback       | 204 days 06:58:31.68 |
| SC_Server      | 10.0.12.5         | Int #4271        | lo3: HP ProCurve Switch software loopback interface (lo3)                      | softwareLoopback       | 204 days 06:58:31.68 |
| SC_Server      | 10.0.12.5         | Int #4272        | lo4: HP ProCurve Switch software loopback interface (lo4)                      | softwareLoopback       | 204 days 06:58:31.68 |
| SC_Server      | 10.0.12.5         | Int #4275        | lo7: HP ProCurve Switch software loopback interface (lo7)                      | softwareLoopback       | 204 days 06:58:31.68 |
| SC_Server      | 10.0.12.5         | Int #4274        | lo6: HP ProCurve Switch software loopback interface (lo6)                      | softwareLoopback       | 204 days 06:58:31.68 |
| SC_User_SW1    | 10.0.12.6         | Int #4272        | lo4: HP ProCurve Switch software loopback interface (lo4)                      | softwareLoopback       | 204 days 06:58:33.22 |
| SC_User_SW1    | 10.0.12.6         | Int #4275        | lo7: HP ProCurve Switch software loopback interface (lo7)                      | softwareLoopback       | 204 days 06:58:33.22 |
| SC_User_SW1    | 10.0.12.6         | Int #4269        | lo1: HP ProCurve Switch software loopback interface (lo1)                      | softwareLoopback       | 204 days 06:58:33.22 |
| SC_User_SW1    | 10.0.12.6         | Int #4270        | lo2: HP ProCurve Switch software loopback interface (lo2)                      | softwareLoopback       | 204 days 06:58:33.22 |
| SC_User_SW1    | 10.0.12.6         | Int #4271        | lo3: HP ProCurve Switch software loopback interface (lo3)                      | softwareLoopback       | 204 days 06:58:33.22 |
| SC_User_SW1    | 10.0.12.6         | Int #4273        | lo5: HP ProCurve Switch software loopback interface (lo5)                      | softwareLoopback       | 204 days 06:58:33.22 |
| SC_User_SW1    | 10.0.12.6         | Int #4274        | lo6: HP ProCurve Switch software loopback interface (lo6)                      | softwareLoopback       | 204 days 06:58:33.22 |
| SC_User_SW2    | 10.0.12.7         | Int #4270        | lo2: HP ProCurve Switch software loopback interface (lo2)                      | softwareLoopback       | 204 days 06:58:41.38 |
| SC_User_SW2    | 10.0.12.7         | Int #4269        | lo1: HP ProCurve Switch software loopback interface (lo1)                      | softwareLoopback       | 204 days 06:58:41.38 |
| SC_User_SW2    | 10.0.12.7         | Int #4274        | lo6: HP ProCurve Switch software loopback interface (lo6)                      | softwareLoopback       | 204 days 06:58:41.38 |
| SC_User_SW2    | 10.0.12.7         | Int #4271        | lo3: HP ProCurve Switch software loopback interface (lo3)                      | softwareLoopback       | 204 days 06:58:41.38 |
| SC_User_SW2    | 10.0.12.7         | Int #4272        | lo4: HP ProCurve Switch software loopback interface (lo4)                      | softwareLoopback       | 204 days 06:58:41.38 |
| SC_User_SW2    | 10.0.12.7         | Int #4273        | lo5: HP ProCurve Switch software loopback interface (lo5)                      | softwareLoopback       | 204 days 06:58:41.38 |
| SC_User_SW2    | 10.0.12.7         | Int #4275        | lo7: HP ProCurve Switch software loopback interface (lo7)                      | softwareLoopback       | 204 days 06:58:41.38 |
| NewYork        | 192.168.201.2     | Int #3           | Se0/1: Serial0/1 (Link to Sunnyvale)   | propPointToPointSerial | 220 days 19:46:40.36 |
| Denver         | 10.100.36.60      | Int #3           | Se0/1: Serial0/1   | propPointToPointSerial | 220 days 19:53:33.92 |

34 total administratively shut down interfaces displayed
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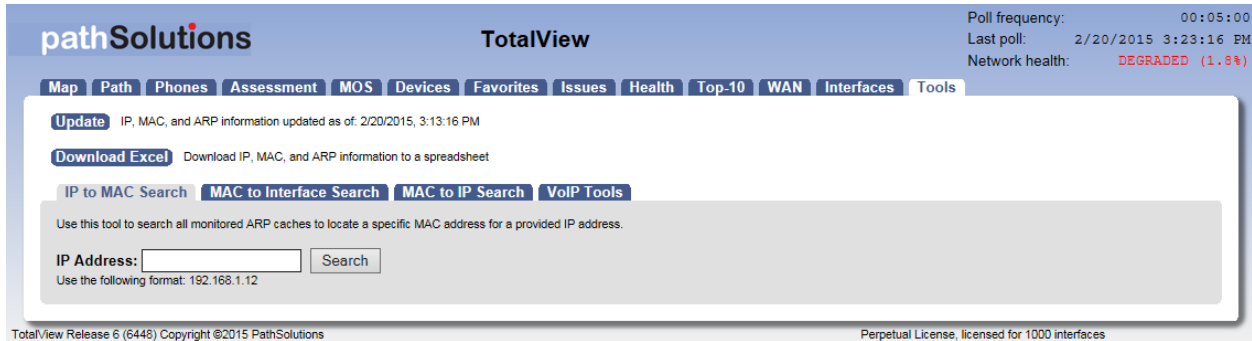
Perpetual License, licensed for 1000 interfaces

This list displays interfaces that have been administratively shut down and will not function unless the interface is enabled and brought online by the administrator.

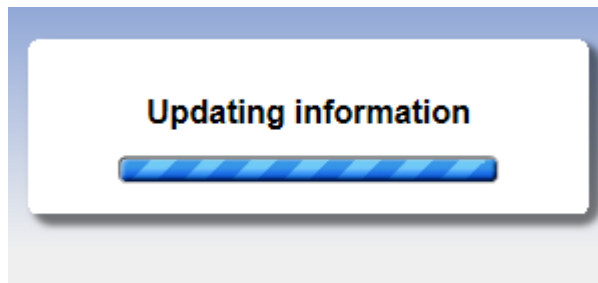
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## Tools

Tools are provided to help locate IP addresses and MAC addresses on your network.



Before using any of the tools, you should click on the “Update” button to collect the Bridge table and ARP cache information from your network.

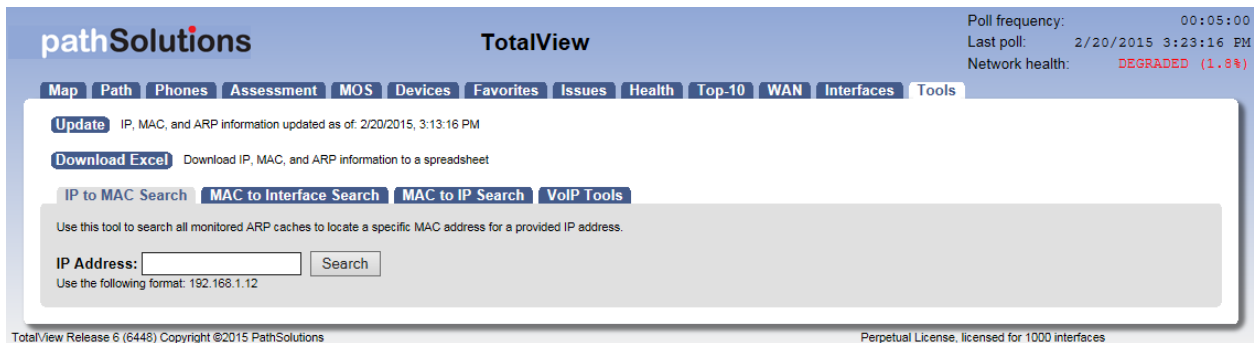


This process may take more than 10 minutes depending on the size of your network and the number of monitored devices.

After the update is complete, you can choose to download the information to an Excel spreadsheet, or perform queries against the information.

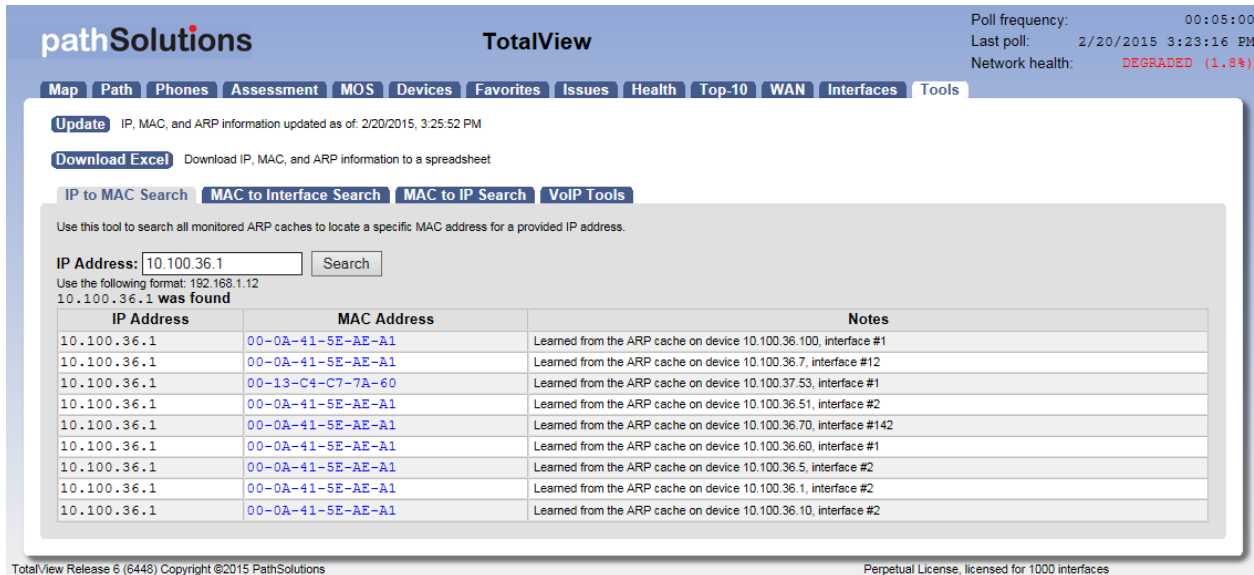
## Finding a MAC address for an IP address

Determining what MAC address goes with an IP address is easy if your computer is on the same subnet as the device, but can prove to be difficult if you have many subnets.



From the IP to MAC search screen, enter the IP address that you want to find and click “Search”.

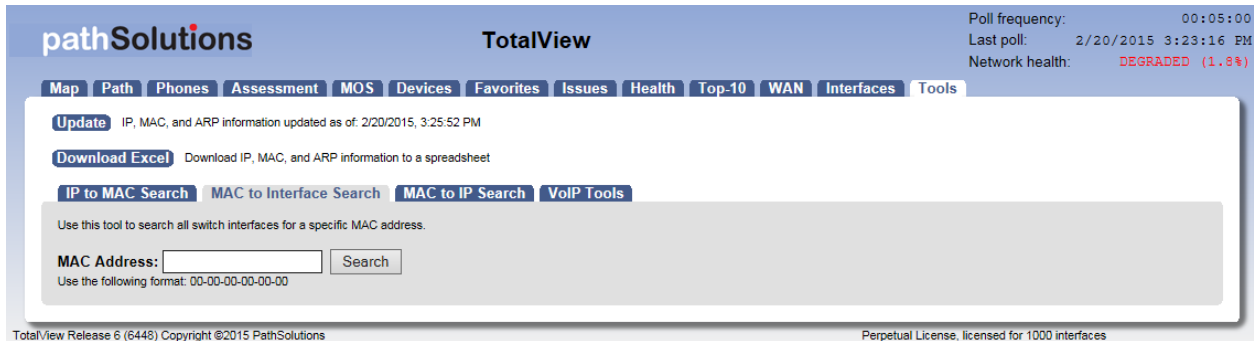
If the IP address was discovered in any monitored device’s ARP cache, it will be displayed along with the device where it was discovered:



The MAC address will be displayed along with the device and interface where the MAC address was found in the device’s ARP cache.

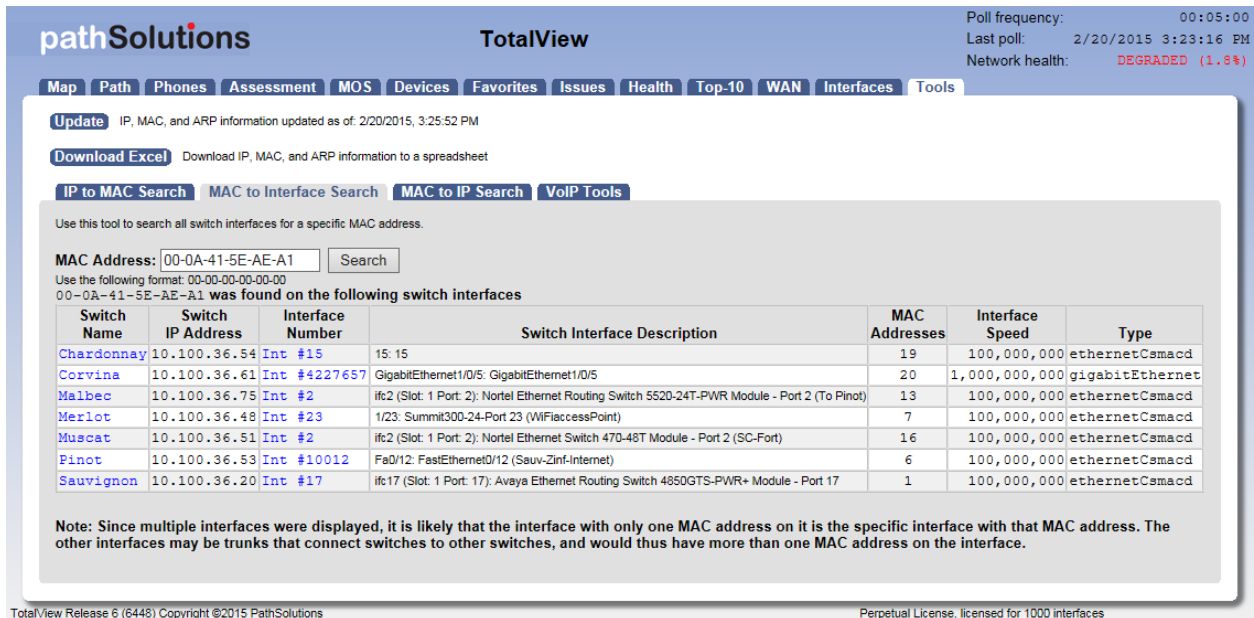
## Finding a MAC address on a Switch Interface

Locating where a MAC address exists on a switch port can be difficult if you have a lot of switches to query. This can easily be done on the MAC to Interface Search screen:



Enter the MAC address that you want to search for and click “Search”. The MAC search will look for device MAC addresses (PCs, servers, phones, etc.) that are connected to switches.

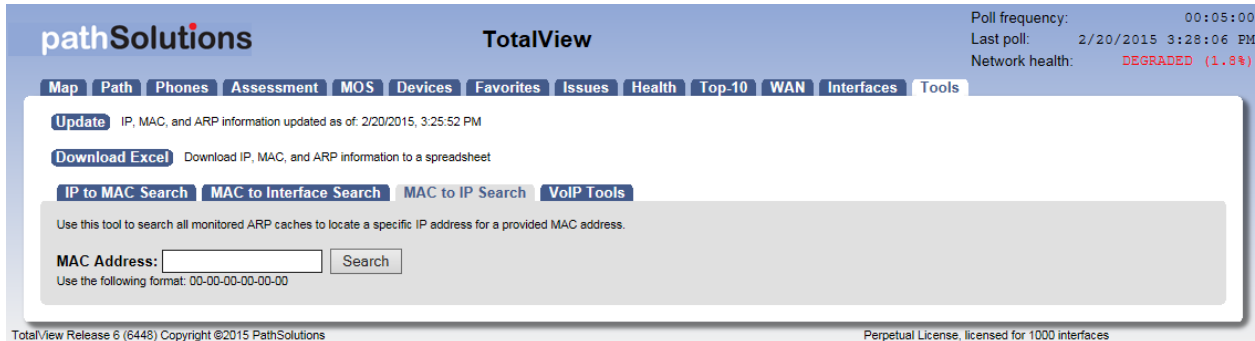
If the MAC address is found on a switch, you should see the following:



Notice that the MAC address was discovered on more than one interface. The “MAC Addresses” column will help you to determine how many MAC addresses exist on an interface. This is useful for determining if an interface is a switch to a switch trunk. If so, then more than one MAC address would exist on the link. If it is the interface where the device is physically connected to then there will only be one MAC address connected.

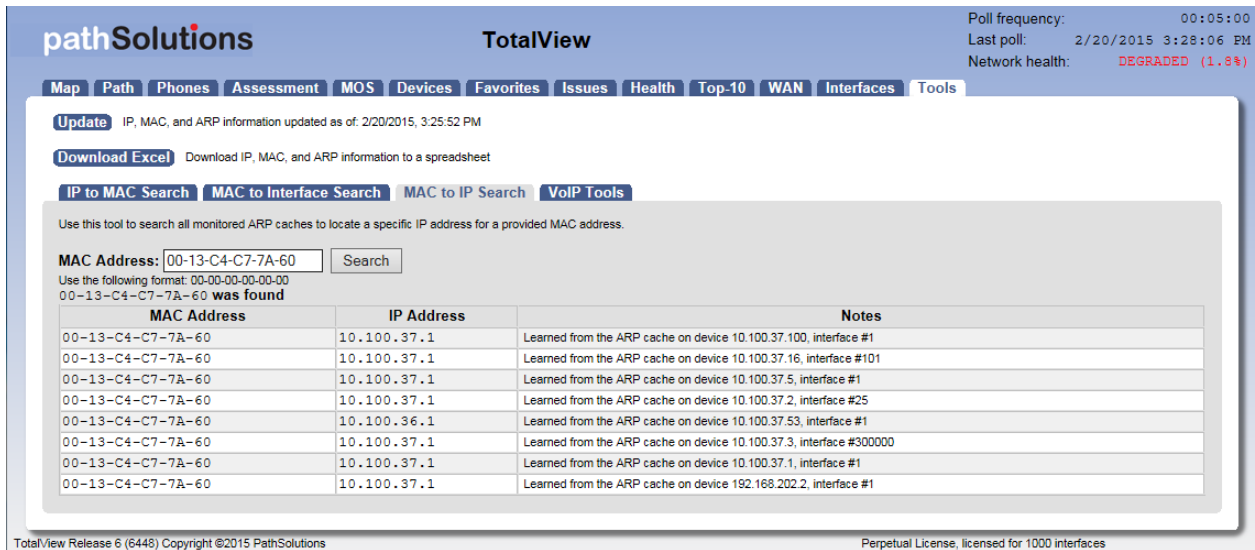
## Converting a MAC address to an IP address

If you have a MAC address and want to know what IP address it is associated with, use this tool:



Enter the MAC address and click “Search”.

You should see the resulting IP address for the MAC address if it was found in any of the monitored devices’ ARP caches:



The IP address will be displayed along with the device and interface where the IP address was found in the device’s ARP cache.

## PathSolutions' VoIP Module Features

In the Tools tab, the VoIP Tools sub-tab which includes the VoIP Call Simulation Client and the Check Address Translation tool is also available.

The screenshot displays the PathSolutions TotalView web interface. At the top left is the 'pathSolutions' logo, and at the top center is 'TotalView'. On the right side, system information is shown: 'Poll frequency: 00:05:00', 'Last poll: 2/20/2015 3:28:06 PM', and 'Network health: DEGRADED (1.8%)'. A navigation menu below the header includes 'Map', 'Path', 'Phones', 'Assessment', 'MOS', 'Devices', 'Favorites', 'Issues', 'Health', 'Top-10', 'WAN', 'Interfaces', and 'Tools'. The 'Tools' tab is active, showing a sub-tab 'VoIP Tools'. Under this sub-tab, there are three main sections: 1) An 'Update' button with the text 'IP, MAC, and ARP information updated as of: 2/20/2015, 3:25:52 PM'. 2) A 'Download Excel' button with the text 'Download IP, MAC, and ARP information to a spreadsheet'. 3) A section titled 'Use these tools to validate and troubleshoot VoIP Networks.' containing two buttons: 'VoIP Call Simulation Client' with the text 'Download Call Simulation client (email link)' and 'Check Address Translation' with the text 'Check for address translation from a web client to this server (email link)'. At the bottom left of the interface, it says 'TotalView Release 6 (6448) Copyright ©2015 PathSolutions', and at the bottom right, it says 'Perpetual License, licensed for 1000 interfaces'.



## Phones Tab

The Phones tab lists the location of all VoIP phones in your network. This is detected by looking for the MAC address prefixes that VoIP phones use.

To learn the current location of phones, click the "Update" button to collect the bridge tables and ARP cache information.

In a few moments, you should see the phones in your environment along with the switch ports where they are connected:

pathSolutions TotalView

Poll frequency: 00:05:00  
Last poll: 2/20/2015 3:28:06 PM  
Network health: DEGRADED (1.8%)

Map Path **Phones** Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

[Update](#) Information updated as of: 2/20/2015, 3:25:52 PM [Download Excel](#)

VoIP devices discovered on the network [First](#) [Previous](#) [1](#) [2](#) [Next](#) [Last](#)

| VoIP Device IP Address | VoIP Device MFG | VLAN | PoE     | Switch and interface where VoIP device is Connected |            |  | MAC Addresses | Peak Daily Utilization |        |        |
|------------------------|-----------------|------|---------|---|------------|--|---------------|------------------------|--------|--------|
|                        |                 |      |         | Switch  | Interface  | Interface Description  |               | Error Rate             | Tx     | Rx     |
| 10.100.37.10           | ShoreTel        | 1    | 6.49 W  | Brunello  | Int #9     | 9: 9   | 1             | 0.000%                 | 0.002% | 0.000% |
| 10.100.37.101          | ShoreTel        | 1    | 6.49 W  | Brunello  | Int #4     | 4: 4   | 1             | 0.000%                 | 0.002% | 0.000% |
|                        | Polycorn        | 1    | 6.49 W  | Barbera   | Int #23    | fe.1.23: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 23                            | 1             | 0.000%                 | 0.002% | 0.000% |
|                        | Aastra          | 1    | 6.49 W  | Barbera   | Int #19    | fe.1.19: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 19 (Aastra Phone in Guest Rm) | 1             | 0.000%                 | 0.002% | 0.000% |
| 10.100.37.6            | Mitel           | 1    | 6.49 W  | Barbera   | Int #3     | fe.1.3: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 3 (Andy Bohart Phone)          | 1             | 0.000%                 | 0.002% | 0.000% |
| 10.100.37.8            | Mitel           | 1    | 6.49 W  | Barbera   | Int #5     | fe.1.5: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 5 (Ray Kisser Phone)           | 1             | 0.000%                 | 0.002% | 0.000% |
| 10.100.37.7            | Mitel           | 1    | 6.49 W  | Barbera   | Int #9     | fe.1.9: Unit: 1 100BASE-TX RJ45 Fast Ethernet Frontpanel Port 9 (Damon Tribble Phone)        | 1             | 0.000%                 | 0.002% | 0.000% |
| 10.100.36.100          | ShoreTel        | 1    | 12.94 W | Malbec  | Int #20    | ifc20 (Slot: 1 Port: 20): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 20       | 1             | 0.000%                 | 0.016% | 0.002% |
| 10.100.36.101          | ShoreTel        | 1    | 12.94 W | Palomino  | Int #2     | Fa0/2: FastEthernet0/2   | 1             | 0.000%                 | 0.001% | 0.000% |
| 10.100.36.164          | Cisco           | 1    | 12.94 W | Pinot   | Int #10017 | Fa0/17: FastEthernet0/17 (2nd Floor Cube B-07)   | 1             | 0.000%                 | 0.009% | 0.000% |

Records 1-10 of 11 displayed (10 per page)

[First](#) [Previous](#) [1](#) [2](#) [Next](#) [Last](#)

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If you notice that there is more than one MAC address on the interface, it would indicate that a PC is hooked up to the phone.

The error and utilization rates are shown for each switch interface to inform you of the health of these connections.

**Note:** If you have VoIP phones that are not showing up in the list, you can add device manufacturer OUIs (Organizationally Unique Identifier) to the OUIFilter.cfg file. Look in Appendix H for additional information on this.

## Path Tab

The Path tab permits you to view the health of all links between two IP addresses.

The screenshot displays the PathSolutions TotalView interface. At the top left is the 'pathSolutions' logo, and at the top center is 'TotalView'. On the right, system status is shown: 'Poll frequency: 00:05:00', 'Last poll: 2/20/2015 3:28:06 PM', and 'Network health: DEGRADED (1.8%)'. A navigation bar contains tabs for 'Map', 'Path', 'Phones', 'Assessment', 'MOS', 'Devices', 'Favorites', 'Issues', 'Health', 'Top-10', 'WAN', 'Interfaces', and 'Tools'. The 'Path' tab is active, showing an 'Update' button and the text 'IP, MAC, and ARP information updated as of: 2/20/2015, 3:25:52 PM'. Below this is the heading 'Current mapping from one IP address to another IP address'. There are two input fields: 'Source IP Address:' and 'Destination IP Address:'. A 'Map' button is positioned to the right of the 'Destination IP Address' field. A note states: 'Note: The mapping will display the path that packets currently take. If the network configuration or state was different at a previous point in time, the mapping may not reflect the previous conditions.' At the bottom of the interface, it says 'TotalView Release 6 (6448) Copyright ©2015 PathSolutions' and 'Perpetual License, licensed for 1000 interfaces'.

Before mapping a call, click on the “Update” button to make sure that the bridge tables and ARP cache information is current.

---

**Note:** The mapping will display the current path that packets take. If the network configuration or state was different at a previous point in time, this mapping may not reflect the previous conditions.

---

Enter the Source IP address where you want the mapping to start and the Destination IP address where the packets would be destined. Click the "Map" button to initiate the mapping.

pathSolutions

TotalView

Poll frequency: 00:05:00  
 Last poll: 2/20/2015 3:33:06 PM  
 Network health: DEGRADED (1.8%)

Map
Path
Phones
Assessment
MOS
Devices
Favorites
Issues
Health
Top-10
WAN
Interfaces
Tools

Update IP, MAC, and ARP information updated as of: 2/20/2015, 3:25:52 PM

**Current mapping from one IP address to another IP address**

Source IP Address:

Destination IP Address:  Map

Note: The mapping will display the path that packets currently take. If the network configuration or state was different at a previous point in time, the mapping may not reflect the previous conditions.

Forward Historical
Reverse Historical
Forward Current
Reverse Current

**Mapping from 10.100.36.1 to 10.100.36.10**

Source IP: 10.100.36.1

|   |  |
|---|--|
| <p><b>Outbound</b></p> <p><b>Int #2</b> Fa0/1: FastEthernet0/1</p> <p>IP Address: 10.70.151.1</p> <p>Duplex: Half</p> <p>Speed: 100,000,000 bps</p> <p>Peak Error Rate: <span style="color: red;">4.851%</span></p> <p>Peak Utilization Rate: 6.447% Tx</p> <p>Queuing: FIFO</p>  |  |
| <p><b>Inbound</b></p> <p><b>Int #17</b> ifc17 (Slot: 1 Port: 17): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 17</p> <p>Duplex: Half</p> <p>Speed: 100,000,000 bps</p> <p>Peak Error Rate: <span style="color: red;">30.149%</span></p> <p>Peak Utilization Rate: <span style="color: red;">100.000% Rx</span></p> |  |

Sauvignon Switch (10.100.36.20) Device Telet Web

|   |  |
|---|--|
| <p><b>Outbound</b></p> <p><b>Int #7</b> ifc7 (Slot: 1 Port: 7): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 7</p> <p>Duplex: Full</p> <p>Speed: 100,000,000 bps</p> <p>Peak Error Rate: <span style="color: red;">2.398%</span></p> <p>Peak Utilization Rate: <span style="color: red;">100.000% Tx</span></p> |  |
| <p><b>Inbound</b></p> <p><b>Int #10012</b> Fa0/12: FastEthernet0/12 (Sauv-Zinf-Internet)</p> <p>Duplex: Full</p> <p>Speed: 100,000,000 bps</p> <p>Peak Error Rate: 0.004%</p> <p>Peak Utilization Rate: 6.465% Rx</p>   |  |

Pinot Switch (10.100.36.53) (Peak CPU utilization: 7%) Device Telet Web

|   |  |
|---|--|
| <p><b>Outbound</b></p> <p><b>Int #10013</b> Fa0/13: FastEthernet0/13 (To Velma)</p> <p>Duplex: Full</p> <p>Speed: 10,000,000 bps</p> <p>Peak Error Rate: 0.000%</p> <p>Peak Utilization Rate: 0.107% Tx</p> <p>Queuing:</p> |  |
| <p><b>Inbound</b></p> <p><b>Int #2</b> Intel(R) PRO Adapter</p> <p>IP Address: 10.100.36.10</p> <p>Duplex: Full</p> <p>Speed: 10,000,000 bps</p> <p>Peak Error Rate: 0.000%</p> <p>Peak Utilization Rate: 0.050% Rx</p>     |  |

Destination IP: 10.100.36.10

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This will perform a one-way path mapping from the starting IP address to the ending IP address. It is a one-way view of how packets would flow from the starting IP to the ending IP. To view how packets

would return, you should click on “Reverse Historical”, as the reverse path may be different than the outbound path if asymmetric routing is occurring.

Each interface will display the historical percent utilization (received for inbound interfaces and transmit for outbound interfaces) along with the error rate.

You can also view the duplex setting of each interface to make sure that each outbound interface matches the duplex setting on the inbound interface.

On outbound Cisco router interfaces, the Queuing configuration of the interface is also shown to aid in determining if QoS is configured properly on the interface.

---

**Note:** If the mapping is unable to complete, it may be due to the fact that all switches and routers along the path may not be monitored. Add these devices to monitoring for complete visibility of the entire path.

**Note:** If a switch or router is unable to be monitored (For example: A WAN service provider does not allow SNMP access to the device), then a static route mapping can be made through the device to the far end. Refer to Appendix K on how to add a static route to the configuration.

---

You can view current utilization for all of these links by clicking "Forward Current".

pathSolutions

TotalView

Poll frequency: 00:05:00  
 Last poll: 3/3/2015 5:06:08 PM  
 Network health: DEGRADED (1.14)

Map
Path
Phones
Assessment
MOS
Devices
Favorites
Issues
Health
Top-10
WAN
Interfaces
Tools

Update IP, MAC, and ARP information updated as of: 3/3/2015, 2:05:39 PM

**Current mapping from one IP address to another IP address**

Source IP Address:  Note: The mapping will display the path that packets currently take. If the network configuration or state was different at a previous point in time, the mapping may not reflect the previous conditions.

Destination IP Address:

Forward Historical
Reverse Historical
Forward Current
Reverse Current

Mapping from 10.100.36.1 to 10.100.36.10

Source IP: 10.100.36.1

|   |  |
|---|--|
| <p><b>Outbound</b></p> <p><b>Int #2</b> Fa0/1: FastEthernet0/1</p> <p>IP Address: 10.70.151.1</p> <p>Duplex: Half</p> <p>Speed: 100,000,000 bps</p> <p>Peak Error Rate: 6.009%</p> <p>Peak Utilization Rate: 2.811% Tx</p> <p>Queuing: FIFO</p> | <div style="border: 1px solid #ccc; padding: 5px; text-align: center;"> <p style="margin: 0;">Utilization Percent</p> </div> |
|---|--|

Inbound

**Int #17** ifc17 (Slot: 1 Port: 17): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 17

Duplex: Half

Speed: 100,000,000 bps

Peak Error Rate: 21.042%

Peak Utilization Rate: 100.000% Rx

Sauvignon Switch (10.100.36.20) Device Telnet Web

|   |  |
|---|--|
| <p><b>Outbound</b></p> <p><b>Int #7</b> ifc7 (Slot: 1 Port: 7): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 7</p> <p>Duplex: Full</p> <p>Speed: 100,000,000 bps</p> <p>Peak Error Rate: 1.585%</p> <p>Peak Utilization Rate: 100.000% Tx</p> | <div style="border: 1px solid #ccc; padding: 5px; text-align: center;"> <p style="margin: 0;">Utilization Percent</p> </div> |
|---|--|

Inbound

**Int #10012** Fa0/12: FastEthernet0/12 (Sauv-Zinf-Internet)

Duplex: Full

Speed: 100,000,000 bps

Peak Error Rate: 0.000%

Peak Utilization Rate: 2.893% Rx

Pinot Switch (10.100.36.53) (Current CPU utilization: 6%) Device Telnet Web

|   |  |
|---|--|
| <p><b>Outbound</b></p> <p><b>Int #10013</b> Fa0/13: FastEthernet0/13 (To Velma)</p> <p>Duplex: Full</p> <p>Speed: 10,000,000 bps</p> <p>Peak Error Rate: 0.000%</p> <p>Peak Utilization Rate: 0.053% Tx</p> <p>Queuing:</p> | <div style="border: 1px solid #ccc; padding: 5px; text-align: center;"> <p style="margin: 0;">Utilization Percent</p> </div> |
|---|--|

Inbound

**Int #2** Intel(R) PRO Adapter

IP Address: 10.100.36.10

Duplex: Full\*

Speed: 10,000,000 bps

Peak Error Rate: 2.865%

Peak Utilization Rate: 0.037% Rx

Destination IP: 10.100.36.10

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Feature Request

The current utilization will update every 10 seconds.

## Assessment Tab

The Assessment tab displays bandwidth constrained interfaces and recommendations for QoS configurations:

The screenshot shows the PathSolutions TotalView interface. At the top right, it displays system information: Poll frequency: 00:05:00, Last poll: 2/20/2015 3:33:06 PM, and Network health: DEGRADED (1.8%). The main navigation bar includes tabs for Map, Path, Phones, Assessment (selected), MOS, Devices, Favorites, Issues, Health, Top-10, WAN, Interfaces, and Tools. The 'Assessment' tab is active, showing a 'Bandwidth constrained interfaces' table and a 'Recommendations' box.

**Bandwidth constrained interfaces**

| Name     | Interface Number | IP Address     | Description                          | Interface Speed | Queueing Configuration      | Maximum Simultaneous Calls | Status | Admin | Oper |
|----------|------------------|----------------|--------------------------------------|-----------------|-----------------------------|----------------------------|--------|-------|------|
| Atlanta  | Int #3           |                | Se0/0: Serial0/0                     | 1,536,000       | Weighted Fair Queuing (WFQ) | 23                         | down   | down  |      |
| Atlanta  | Int #3           |                | Se0/0: Serial0/0                     | 1,536,000       | Weighted Fair Queuing (WFQ) | 23                         | down   | down  |      |
| Denver   | Int #2           | 192.168.201.1  | Se0/0: Serial0/0                     | 256,000         | First In First Out (FIFO)   | 3                          | up     | up    |      |
| Denver   | Int #3           |                | Se0/1: Serial0/1                     | 1,544,000       | Weighted Fair Queuing (WFQ) | 23                         | down   | down  |      |
| Honolulu | Int #1           |                | Se0/0: Serial0/0                     | 1,544,000       | Weighted Fair Queuing (WFQ) | 23                         | down   | down  |      |
| NewYork  | Int #2           | 192.168.201.2  | Se0/0: Serial0/0 (Link to Atlanta)   | 256,000         | Weighted Fair Queuing (WFQ) | 3                          | up     | up    |      |
| NewYork  | Int #3           |                | Se0/1: Serial0/1 (Link to Sunnyvale) | 1,544,000       | Weighted Fair Queuing (WFQ) | 23                         | down   | down  |      |
| SCWANRTR | Int #5           |                | T1 0/0/0: T1 0/0/0                   | 1,544,000       | Undetermined                | 23                         | up     | down  |      |
| SCWANRTR | Int #6           |                | T1 0/0/1: T1 0/0/1                   | 1,544,000       | Undetermined                | 23                         | up     | down  |      |
| SCWANRTR | Int #7           | 38.104.140.182 | Se0/0/0:0: Serial0/0/0/0             | 1,536,000       | Weighted Fair Queuing (WFQ) | 23                         | up     | down  |      |
| SCWANRTR | Int #8           | 38.112.59.94   | Se0/0/1:0: Serial0/0/1/0             | 1,536,000       | Weighted Fair Queuing (WFQ) | 23                         | up     | down  |      |
| SCWANRTR | Int #9           | 169.254.249.30 | Tu1: Tunnel1                         | 9,000           | First In First Out (FIFO)   | 0                          | up     | up    |      |
| SCWANRTR | Int #10          | 169.254.249.26 | Tu2: Tunnel2                         | 9,000           | First In First Out (FIFO)   | 0                          | up     | up    |      |

**Recommendations**

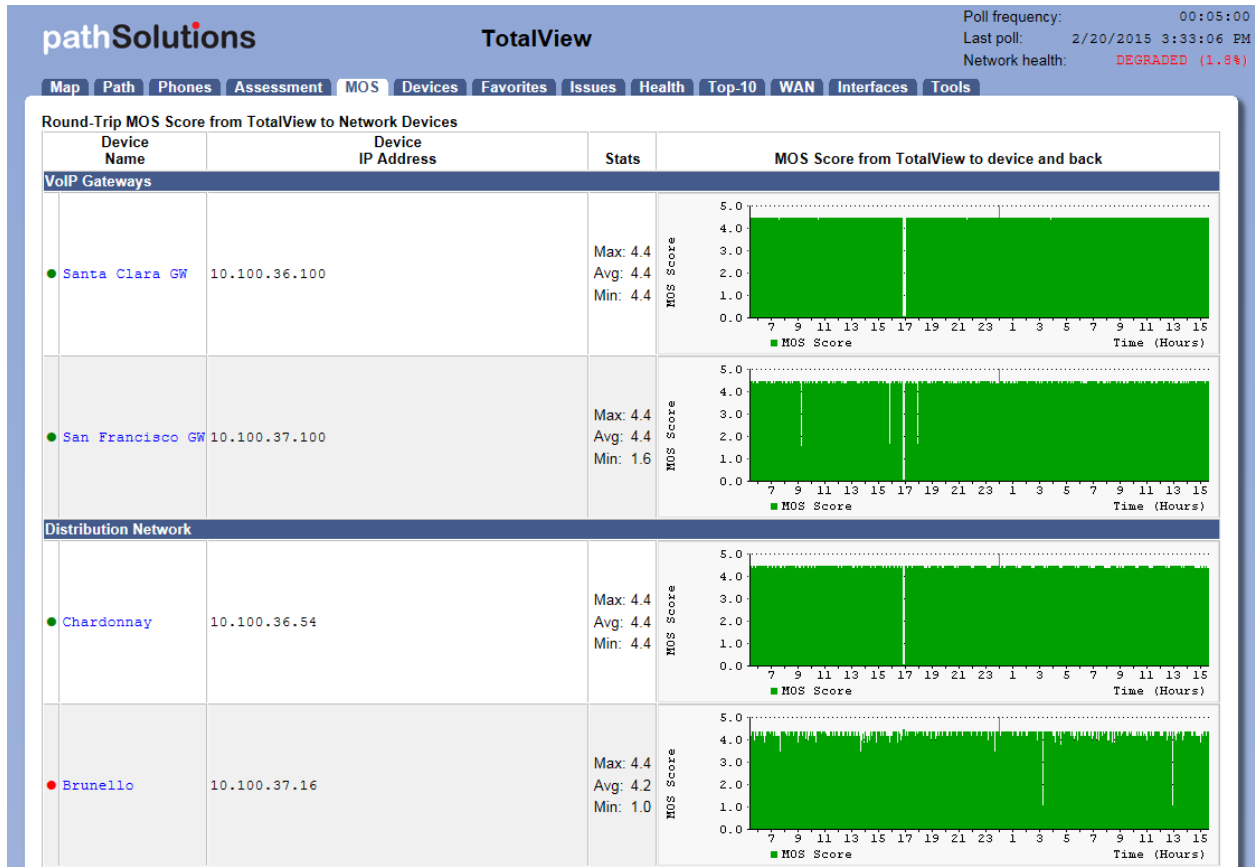
- Weighted Fair Queuing (WFQ) is employed**  
Weighted Fair Queuing should not be utilized on links slower than 10megs in a VoIP environment, as it does not provide adequate prioritization for VoIP packets. Custom queuing or Modular Qos CL should be enabled to ensure bandwidth protection for VoIP packets.
- First In First Out (FIFO) Queuing is employed**  
FIFO Queuing should not be utilized on links slower than 10megs in a VoIP environment, as it does not provide any prioritization for VoIP packets. Custom queuing or Modular Qos CL should be enabled to ensure bandwidth protection for VoIP packets.

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In the upper right corner is the Comprehensive Assessment Report. This is a single downloadable report that includes information from many different parts of the system. This can be used as a complete VoIP assessment of network conditions and errors.

## MOS Tab

The MOS tab displays the MOS graphs for each monitored device on the network:

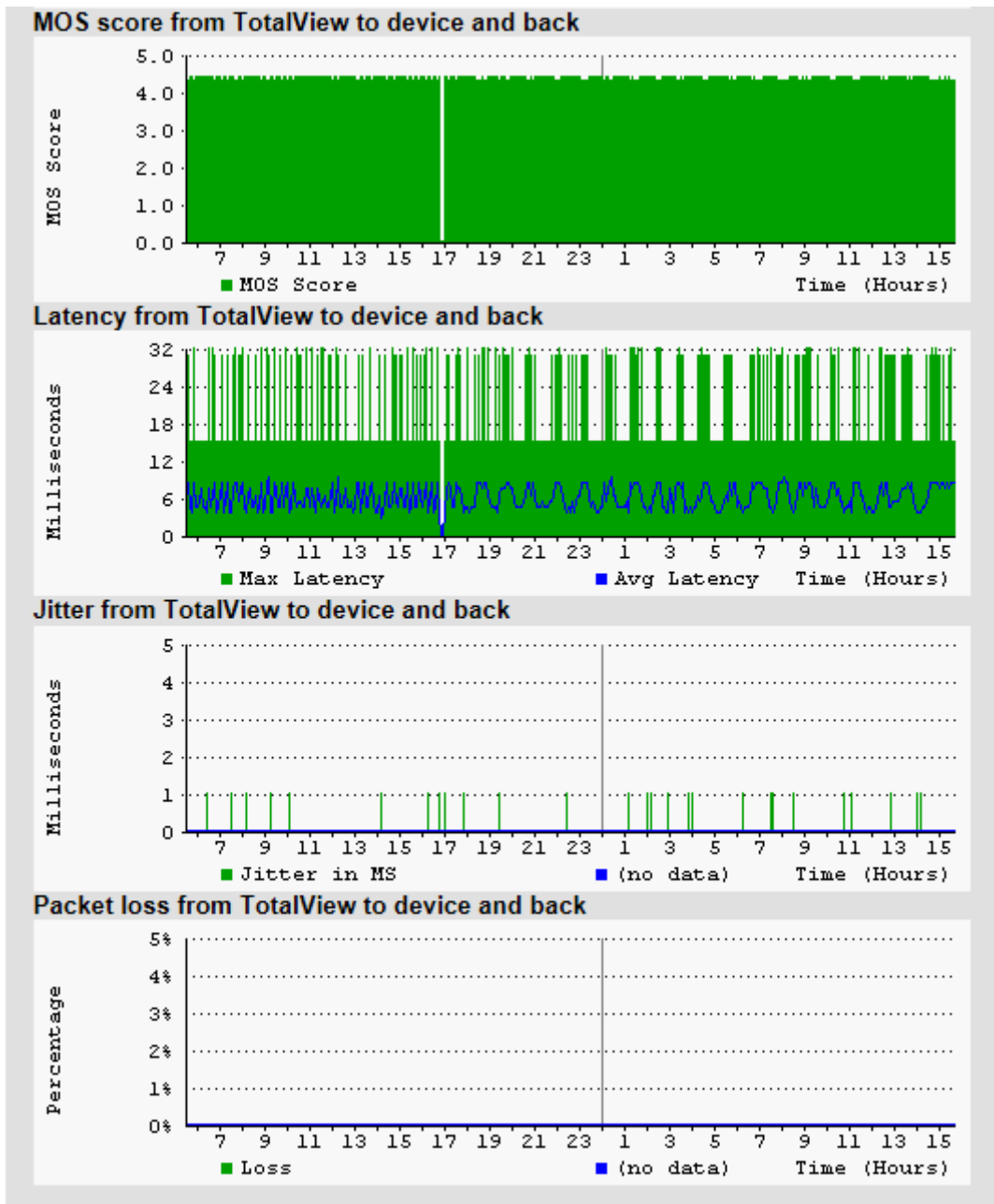


### Device MOS Score, Latency, Jitter, and Packet Loss

During its communications with each monitored device, PathSolutions' TotalView tracks the peak and average latency, as well as the jitter, packet loss and MOS score.

This creates the ability to monitor devices across a WAN or the Internet and know how stable the connection is.

This information is available below the Aggregate Peak utilization (and CPU and memory graphs if it is a Cisco device) on the device page:





## VoIP Tools

On the Tools tab, the VoIP Tool is available.



The screenshot shows the PathSolutions TotalView interface. At the top, the PathSolutions logo and TotalView title are visible. The right side shows system information: Poll frequency: 00:05:00, Last poll: 2/23/2015 2:01:26 PM, and Network health: DEGRADED (1.4%). A navigation bar includes tabs for Map, Path, Phones, Assessment, MOS, Devices, Favorites, Issues, Health, Top-10, WAN, Interfaces, and Tools. The Tools tab is active, displaying a panel with the following options:

- Update**: IP, MAC, and ARP information updated as of: 2/23/2015, 1:56:29 PM
- Download Excel**: Download IP, MAC, and ARP information to a spreadsheet
- IP to MAC Search**, **MAC to Interface Search**, **MAC to IP Search**, and **VoIP Tools** (highlighted)

Below these options, a message states: "Use these tools to validate and troubleshoot VoIP Networks." Underneath, there are two more options:

- VoIP Call Simulation Client**: Download Call Simulation client ([email link](#))
- Check Address Translation**: Check for address translation from a web client to this server ([email link](#))

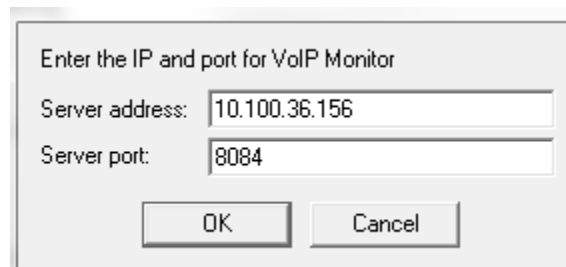
At the bottom of the interface, the text reads: "TotalView Release 6 (6448) Copyright ©2015 PathSolutions" and "Perpetual License, licensed for 1000 interfaces".

## VoIP Call Simulation Client

### Call Simulator

The Call Simulator is a program that is run on a computer where you would like to test a VoIP call. It will send VoIP formatted ICMP ping packets to any IP address endpoint. This permits you to simulate a VoIP phone call to any LAN or remote IP address without having to set up software on the remote IP endpoint.

When the Call Simulator is initially run on a computer it will ask for the IP address and port number for the PathSolutions' TotalView Server. This is done for licensing as well as to seed the program with the server and port for performing call path mappings:



The screenshot shows a dialog box titled "Enter the IP and port for VoIP Monitor". It contains two input fields: "Server address:" with the value "10.100.36.156" and "Server port:" with the value "8084". At the bottom of the dialog are "OK" and "Cancel" buttons.

Once the validation check is complete, you should see the program ready to start:

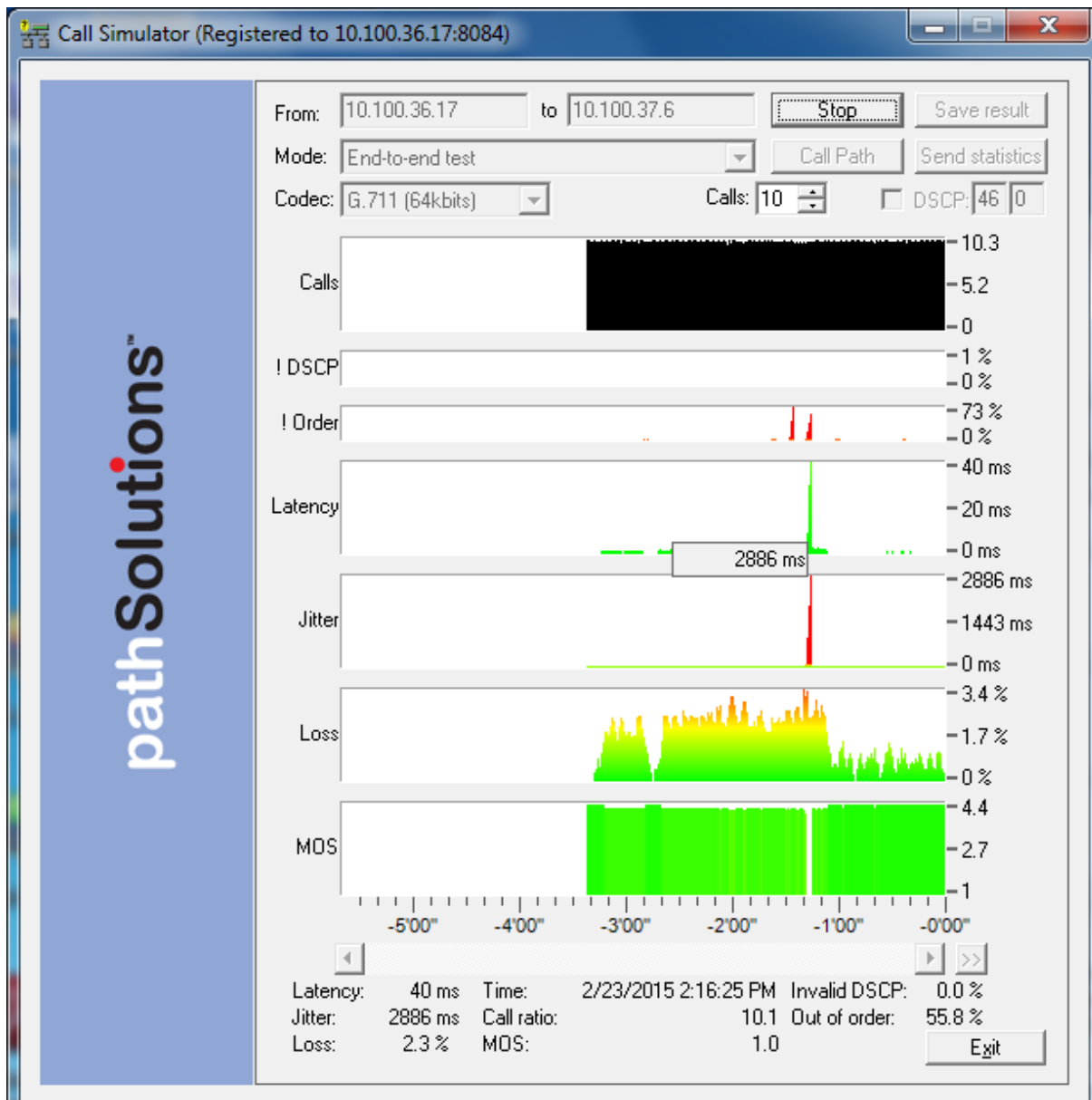
## End-to-End Testing

You should be able to enter the IP address of the remote device or location that you desire to test to and choose the codec to simulate. Click "Start" to start the simulation. This will perform an end-to-end test to the remote location.

**Note:** If you choose an IP phone as the destination, you should simulate only one call at a time to that location. IP phones tend to have very small CPUs and cannot handle more than 2 calls worth of traffic before they start to discard packets.

Any remote location that responds to a PING (ICMP ECHO) can be used as a destination for testing.

You can choose to optionally tag the packets with a DSCP setting.

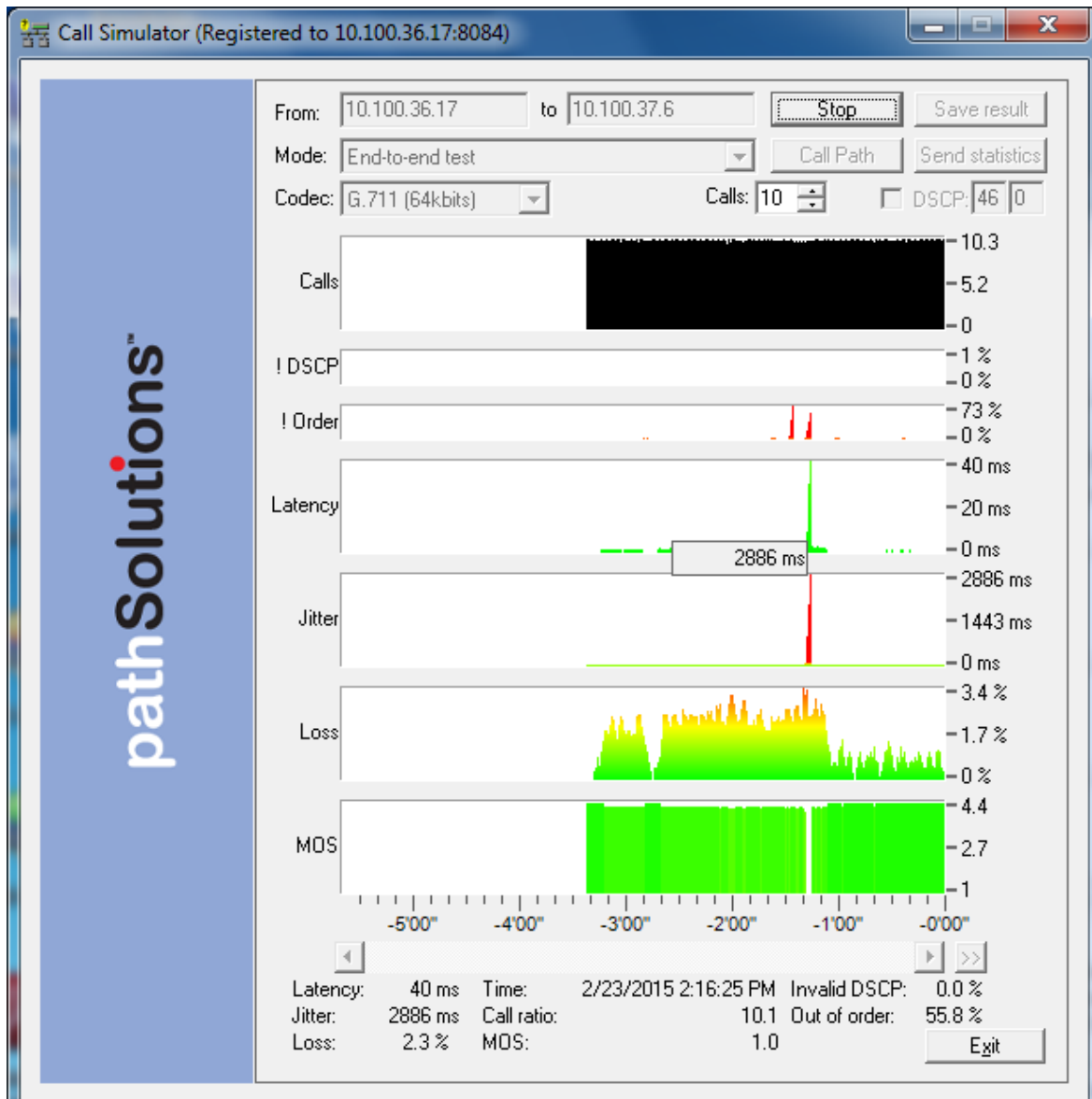


**Note:** Your network configuration may strip this DSCP tagging and apply a different tag to the packets. You may choose to deploy a packet analyzer to validate that the network configuration is not stripping the DSCP tagging.

**Note:** If you intend to load a network to saturation to test for WAN stability, it is advised to use the IP address of a router, switch, or server as the destination. Those devices tend to have enough spare CPU cycles to handle processing large loads of traffic.

**Note:** Some devices will strip the DSCP tagging on their responses. Cisco routers have been validated to preserve the DSCP tagging on their responses. Other devices may have to be checked to see if they preserve or strip the tagging to insure that the DSCP is preserved bi-directionally.

During a call test, the number of calls can be ramped up to load the network and determine how many calls can reliably be handled to a destination.



Additional details about any point in time can be seen by hovering over the graph element with the mouse.

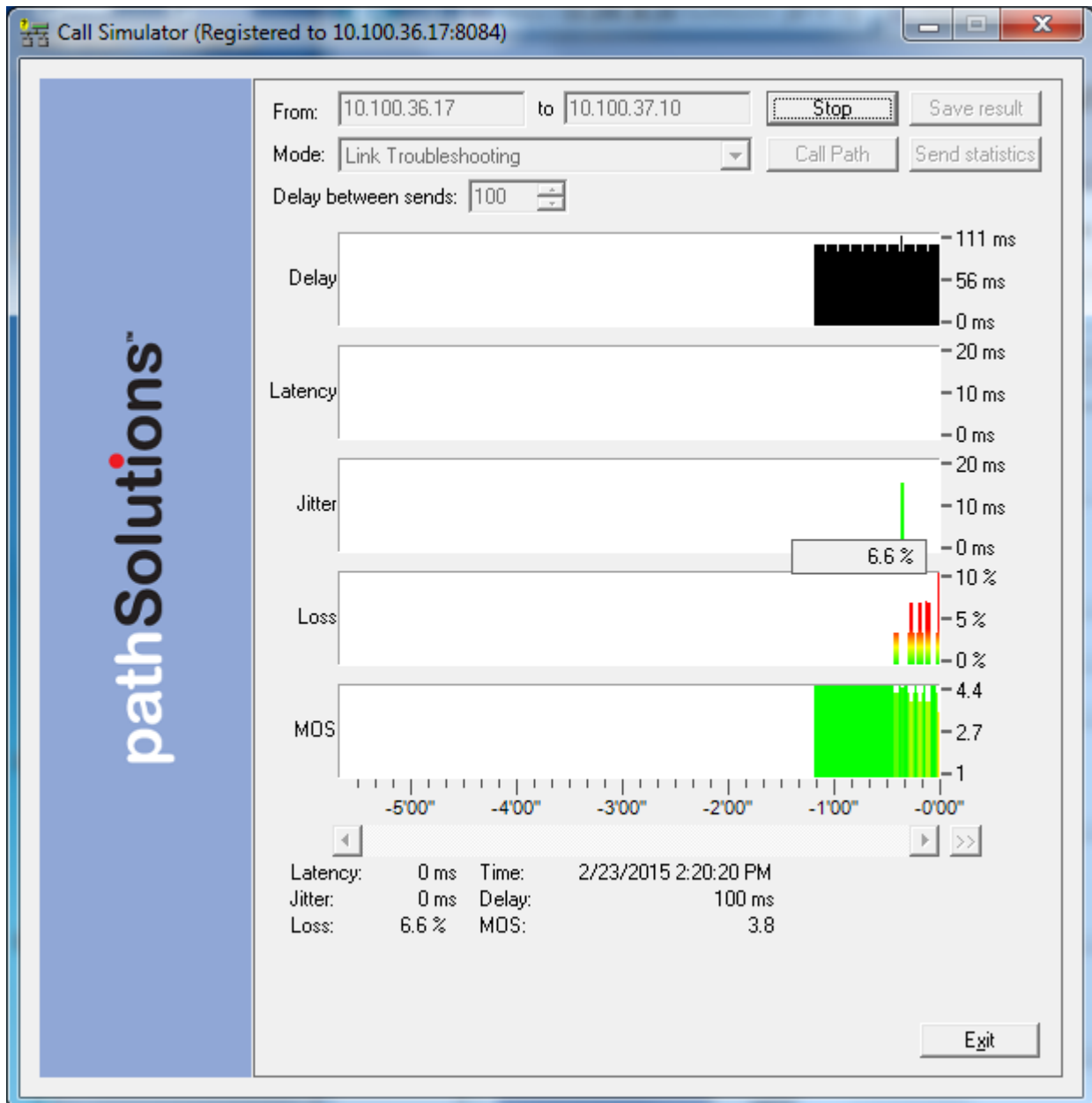
- **DSCP loss historical tracking:** If DSCP is lost during a test, TotalView displays when it was lost so it can be correlated with network events to determine the cause.
- **Out of order reception historical tracking:** If packets arrive out of order, TotalView tracks when it occurred.

## Link Troubleshooting

The Link Troubleshooting mode can be used to test packet stability over a number of router hops and is typically used to test stability outside of a VPN tunnel to determine where packets are being lost or delayed.

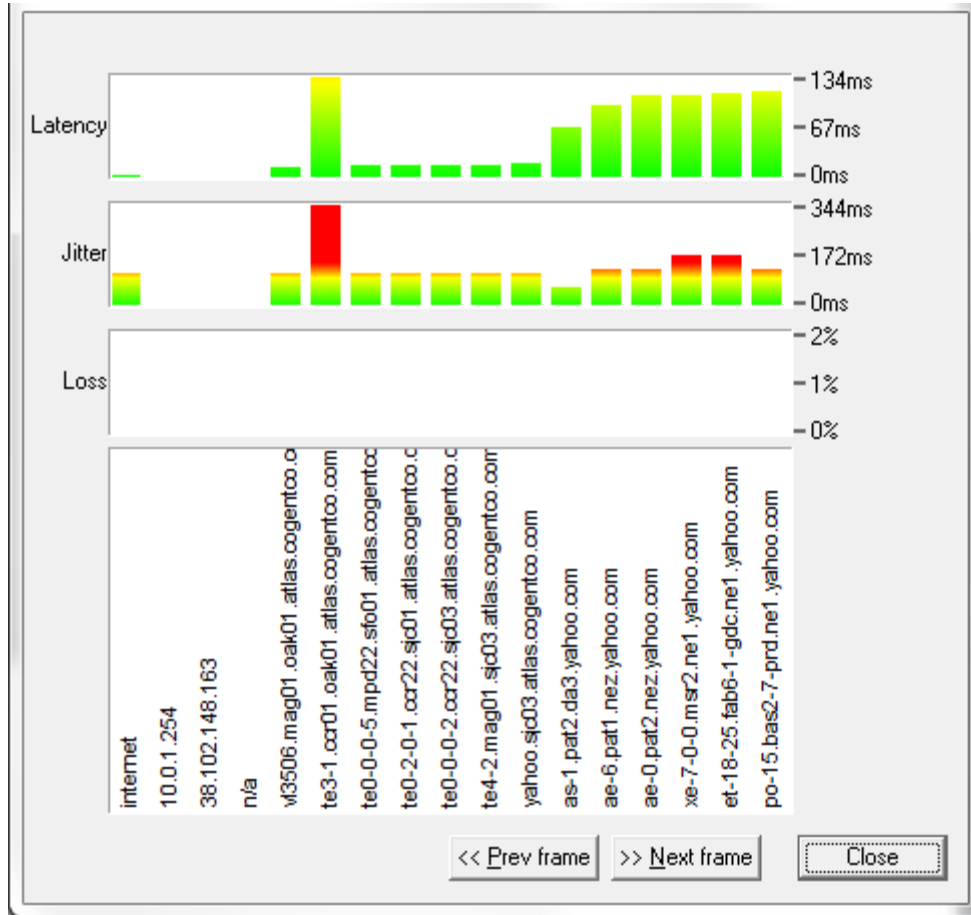
Enter the IP address of the destination to test and click "Start". The program will trace the route to the destination and then start testing:

**Note:** If the graphs do not show up you will need to check your Firewall. You may need to turn off your Firewall for Link Troubleshooting.



If at any point there is a spike in latency, jitter, or loss, the graph point can be clicked on to view additional information of inter-link information between all involved devices along the path.

As shown below, you can determine who owns or manages routers along the Internet.



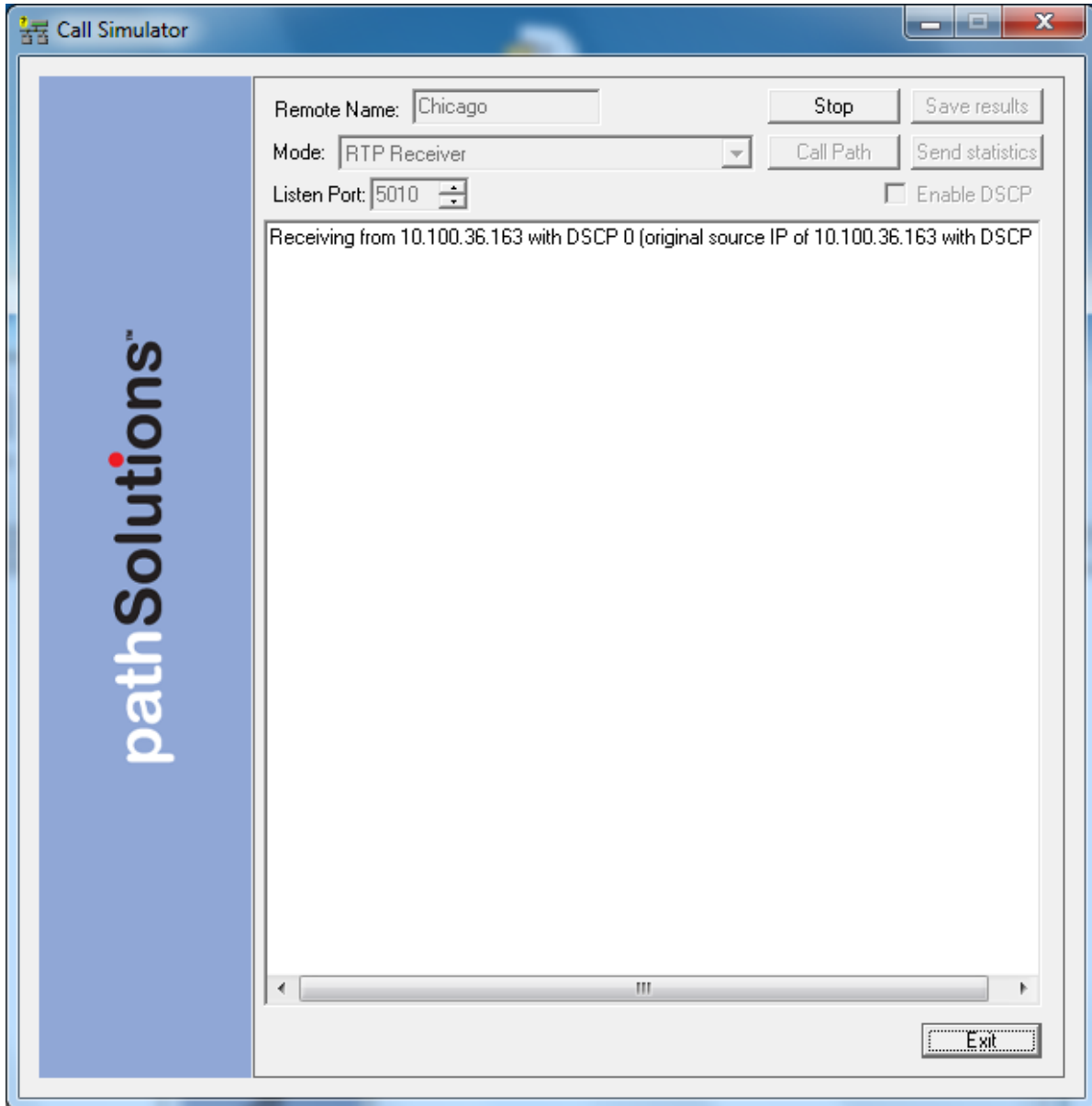
Latency, Jitter, and Loss are displayed to each hop along the way. As a result, it can be easily determined which device is adding Latency, Jitter, or Loss along the way.

### RTP Receiver/Transmitter

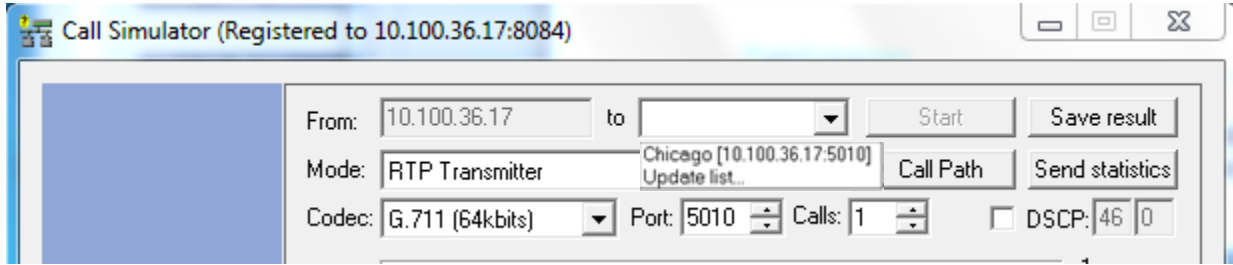
The RTP Receiver/Transmitter mode uses UDP packets and is useful when remote devices block PING (ICMP ECHO) packets.

To use the RTP Receiver/Transmitter Mode, email the link to the remote user and have the remote user also run a copy of the Call Simulator on the network.

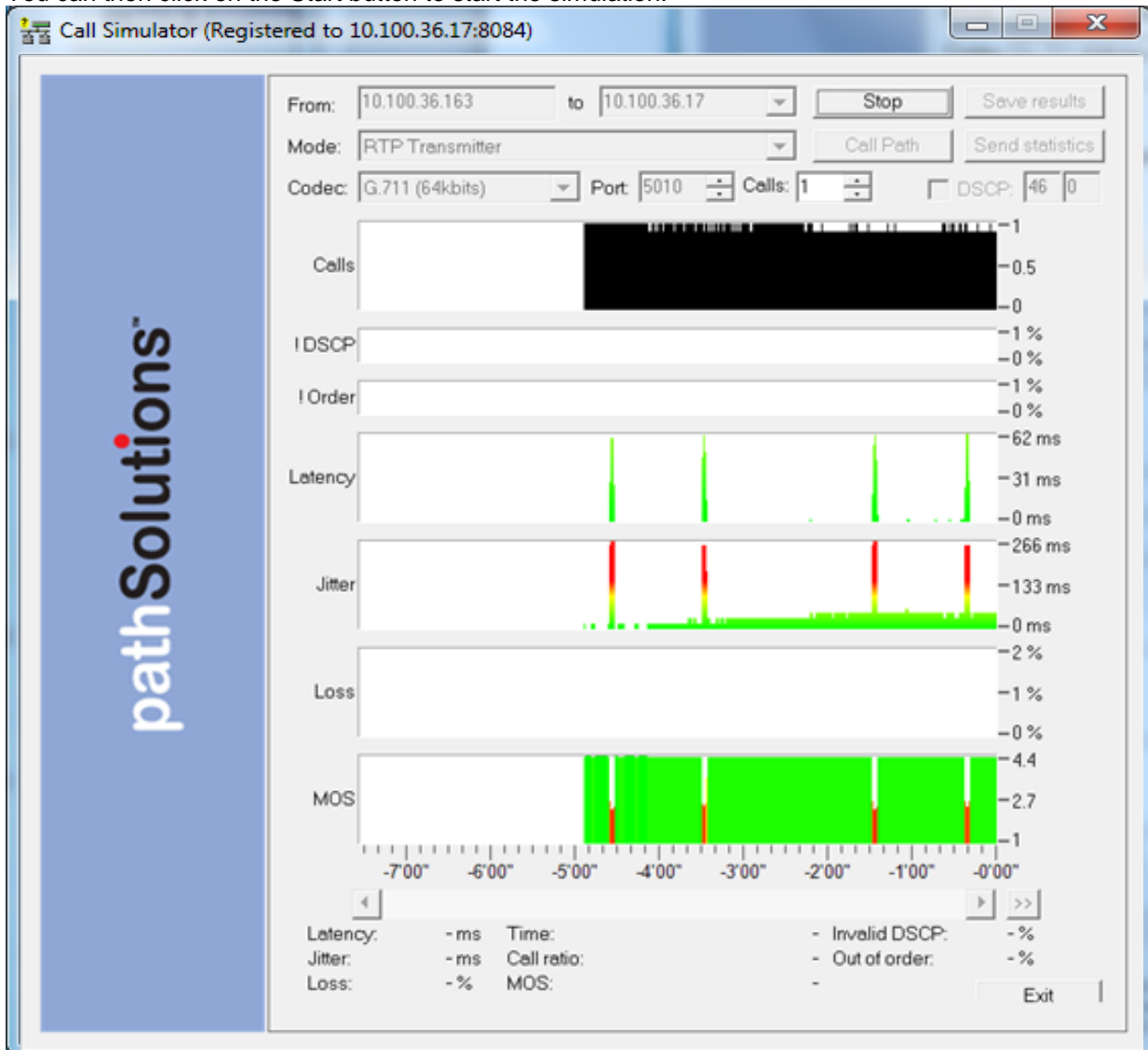
Enter a "name" in the Remote Name field such as "Chicago". Then set your Call Simulator as RTP Receiver in the Mode field and click on Start.



On the remote Call Simulator, select the RTP Transmitter mode in the Mode drop down box. You will then see a drop-down box in the "To" field where you can select the "Name" of your machine. Select the name of the machine to test.



You can then click on the Start button to start the simulation.



The !DSCP Graph will show when packets lose DSCP marking during a test.

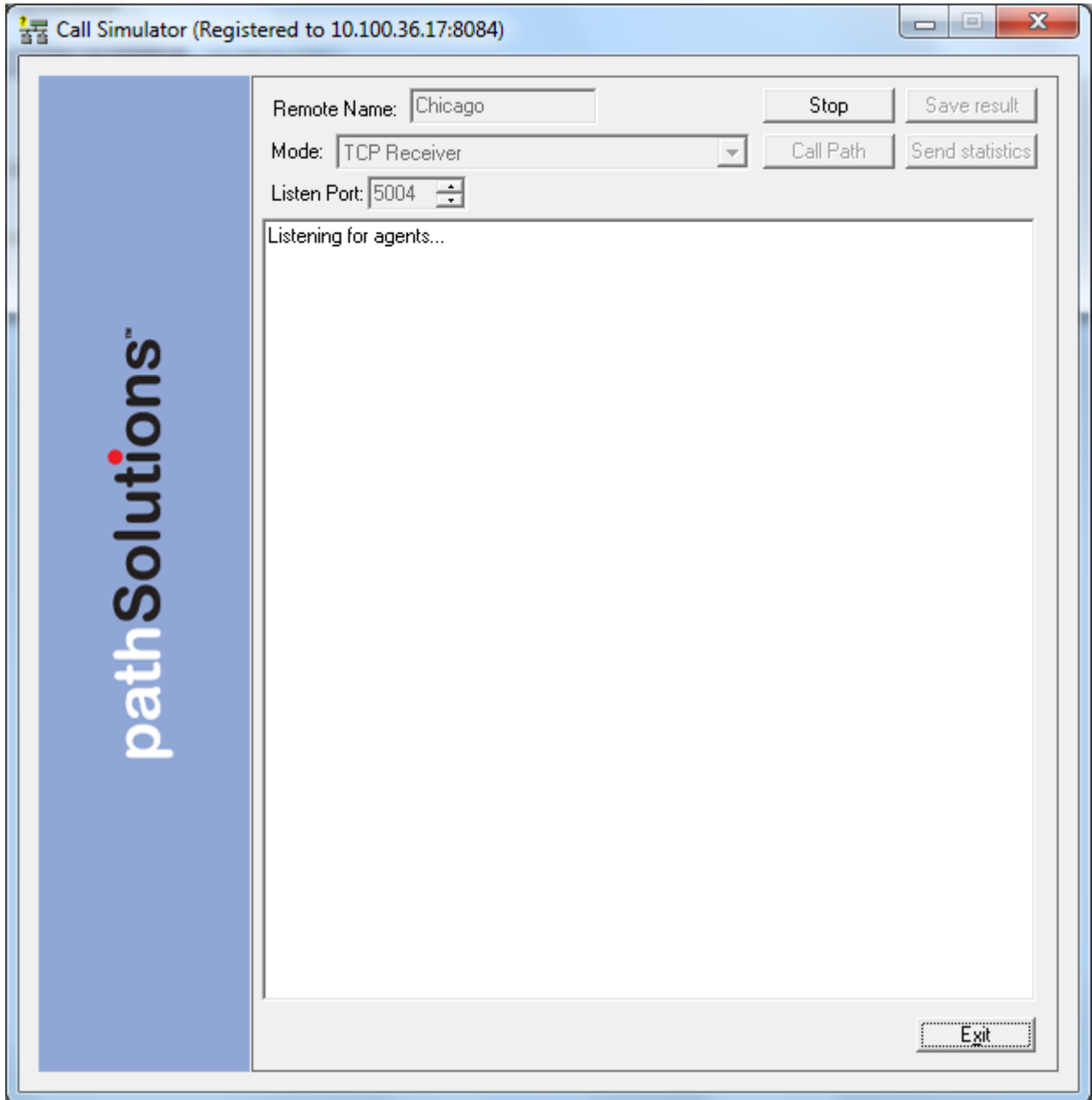
The !Order Graph will show when packets arrive out of order

### TCP Receiver

Using the TCP Transmitter/Receiver mode will validate how much bandwidth is available between two computers.

For example, If you have a 10meg WAN circuit between your remote offices but you think it is always slow, you can confirm that the current utilization is zero percent, but you may want to test it.

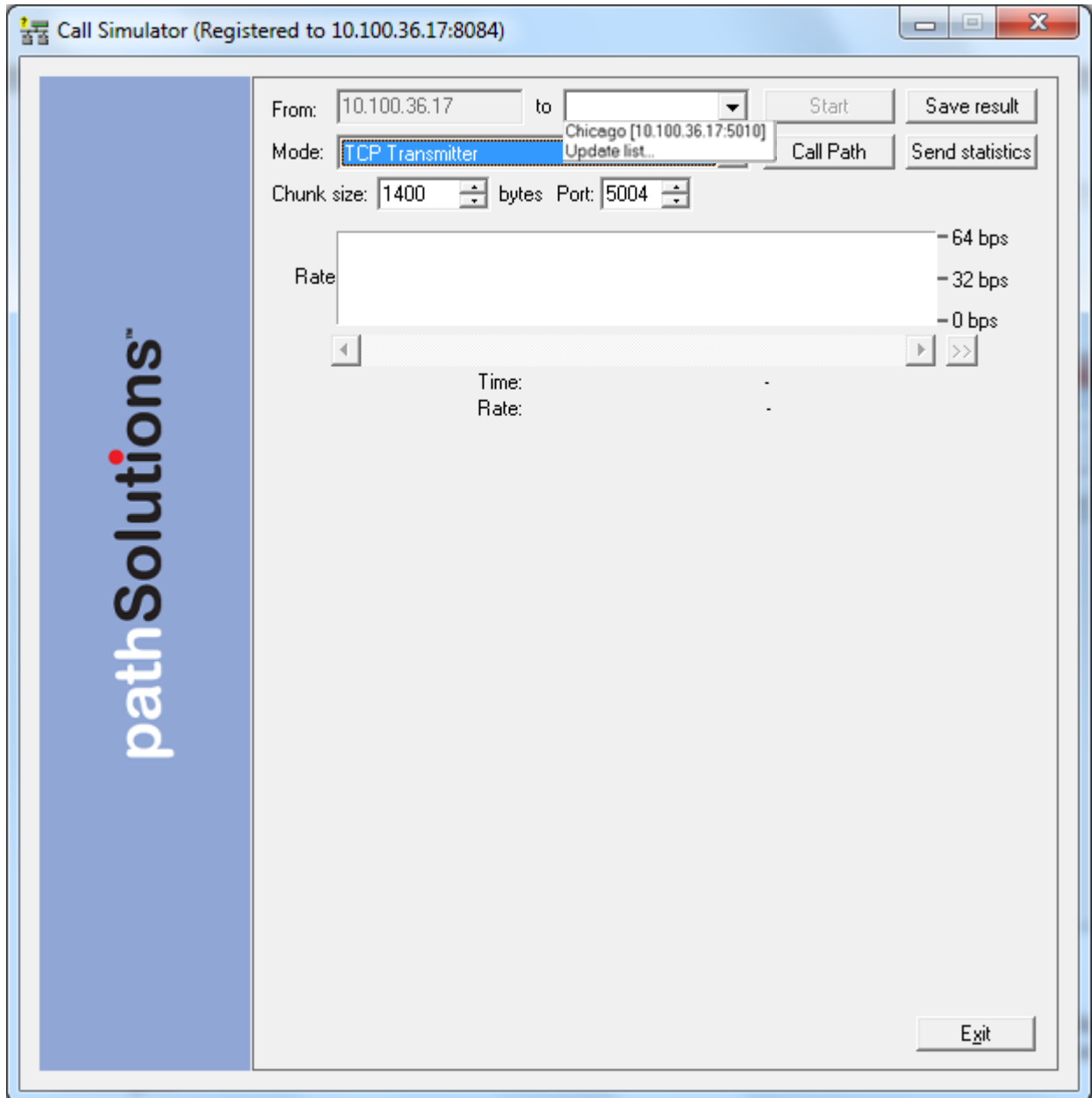
Set up a computer in the remote office with TCP Receiver and provide a Remote Name.





On the local machine, run the TCP Transmitter and enter the remote computer's name from the Drop Down box.

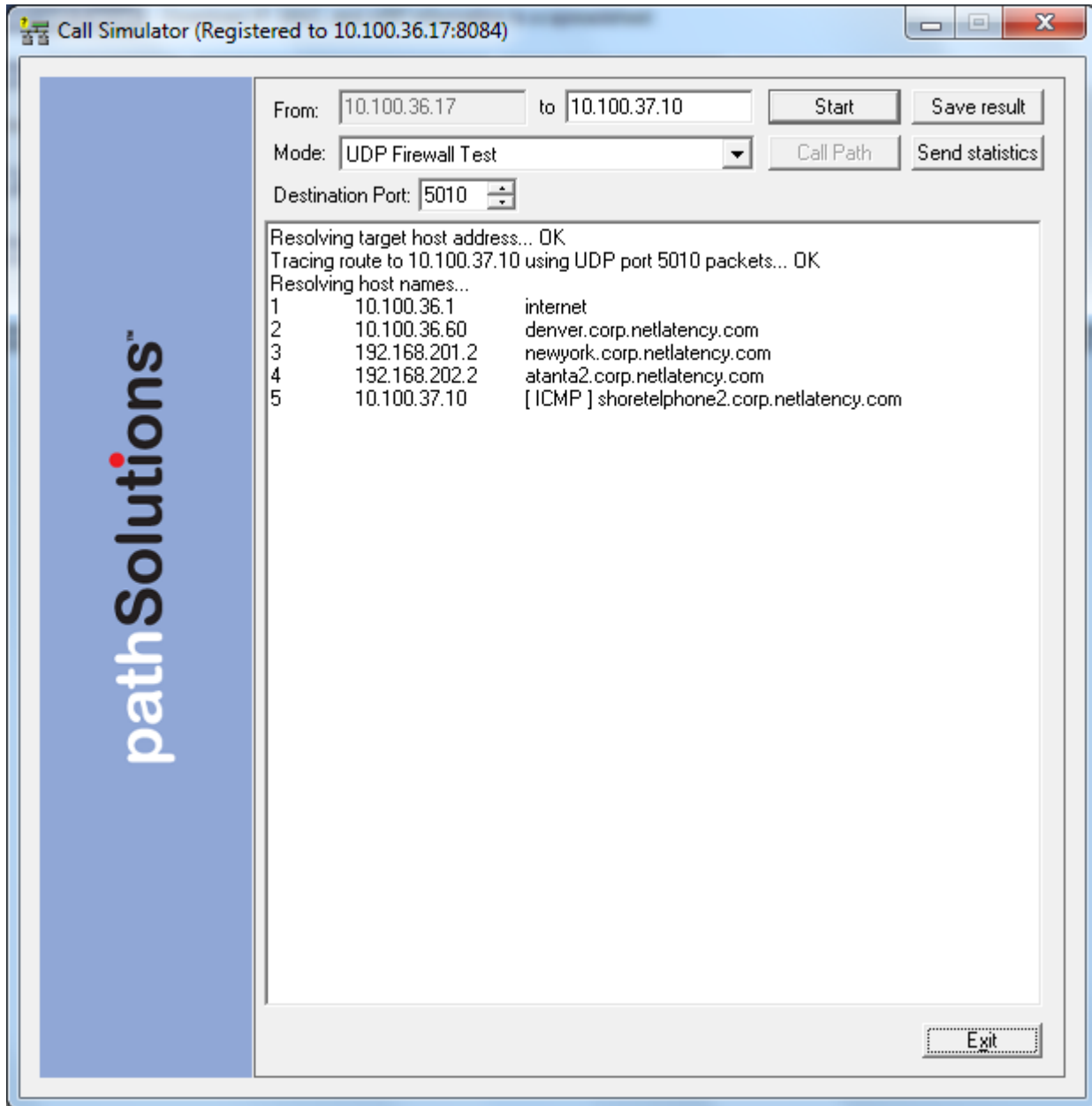
Simulated traffic will then run between the two systems.



Traffic between the two computers will start loading up and show how much bandwidth is being utilized. If it shows that you are only getting 5mbps of throughput, you should call your WAN provider to discuss and investigate.

### UDP Firewall Test

To test if the port can fully reach the destination you can use the UDP Firewall Test. Choose the “UDP Firewall Test” option from the Mode drop down box.



## Check for NAT

Network Address Translation can cause one-way audio problems in a VoIP network. Being able to quickly ascertain if NAT is being performed is an important capability.

Simply click on the “Check Address Translation” link to determine if NAT is occurring between your computer and PathSolutions’ TotalView.

You should see:

**IP Address**

**On workstation:** 192.168.1.15  
**As seen by server:** 10.100.36.156

**NAT is occurring somewhere**

[Email Results](#)

If no NAT is running you should see:

**IP Address**

**On workstation:** 10.100.36.156  
**As seen by server:** 10.100.36.156

**No NAT detected**

[Email Results](#)

---

**Note:** This tool runs a small Java applet. The browser where this is executed must be able to run a Java v1.1 applet.

---

This tool is intended to be run by users on remote computers. It is recommended to use the “email link” button on the VoIP Tools tab to send a link to the end user who should run this check. The end user can then click on “Email Results” to send the results back to you for evaluation.

The screenshot shows the PathSolutions TotalView interface. At the top, there are navigation tabs: Map, Path, Phones, Assessment, MOS, Devices, Favorites, Issues, Health, Top-10, WAN, Interfaces, and Tools. The Tools tab is selected. Below the navigation, there is a section for VoIP Tools. It includes an 'Update' button with the text 'IP, MAC, and ARP information updated as of: 2/23/2015, 1:56:29 PM'. There is a 'Download Excel' button with the text 'Download IP, MAC, and ARP information to a spreadsheet'. Below these are three search buttons: 'IP to MAC Search', 'MAC to Interface Search', and 'MAC to IP Search'. The 'VoIP Tools' button is highlighted. Underneath, there is a message: 'Use these tools to validate and troubleshoot VoIP Networks.' Below this message are two buttons: 'VoIP Call Simulation Client' with the text 'Download Call Simulation client (email link)' and 'Check Address Translation' with the text 'Check for address translation from a web client to this server (email link)'. The 'Check Address Translation' button is highlighted. At the bottom of the interface, there is a footer with the text 'TotalView Release 6 (6448) Copyright ©2015 PathSolutions' and 'Perpetual License, licensed for 1000 interfaces'. In the top right corner, there is a status bar showing 'Poll frequency: 00:05:00', 'Last poll: 2/23/2015 2:01:26 PM', and 'Network health: DEGRADED (1.4%)'.

# Fixing Problems on your Network

## Improving Network Health

Network health can be improved by working on the issues listed in the “Issues” list:

pathSolutions TotalView

Poll frequency: 00:05:00  
Last poll: 2/23/2015 2:31:28 PM  
Network health: **DEGRADED (1.6%)**

Map Path Phones Assessment MOS Devices Favorites Issues Health Top-10 WAN Interfaces Tools

Interfaces with peak daily utilization rates greater than 80% or error rate greater than 3% sorted by Comm fail, Error rate, and Utilization [Print](#)

| Device Name    | Device IP Address | Interface Number | Description  | Interface Speed | Peak Daily Error Rate | Peak Daily Utilization |          |
|----------------|-------------------|------------------|--|-----------------|-----------------------|------------------------|----------|
|                |                   |                  |  |                 |                       | Tx                     | Rx       |
| SC_User_SW2    | 10.0.12.7         | Int #1           | 1: 1 (36.1)  | 1,000,000,000   | 99.999%               | 0.447%                 | 0.013%   |
| Sauvignon      | 10.100.36.20      | Int #17          | ifc17 (Slot: 1 Port: 17): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 17  | 100,000,000     | 30.949%               | 100.000%               | 92.197%  |
| Malbec         | 10.100.36.75      | Int #23          | ifc23 (Slot: 1 Port: 23): Nortel Ethernet Routing Switch 5520-24T-PWR Module - Port 23 | 1,000,000,000   | 28.648%               | 0.000%                 | 0.000%   |
| Internet       | 10.100.36.1       | Int #1           | Fa0/0: FastEthernet0/0 (WAN side <FG726>)  | 10,000,000      | 16.020%               | 38.600%                | 1.721%   |
| CiscoASA       | 10.100.36.4       | Int #15          | inside: Adaptive Security Appliance 'inside' interface                                 | -Unknown-       | 13.485%               | 0.000%                 | 0.000%   |
| SFO-OOB-HP5500 | 63.147.175.6      | Int #17          | GigabitEthernet1/0/17: GigabitEthernet1/0/17 (GigabitEthernet1/0/17 Interface)         | 1,000,000,000   | 11.785%               | 0.000%                 | 0.000%   |
| Muscat         | 10.100.36.51      | Int #11          | ifc11 (Slot: 1 Port: 11): Nortel Ethernet Switch 470-48T Module - Port 11              | 100,000,000     | 10.401%               | 0.004%                 | 0.004%   |
| Internet       | 10.100.36.1       | Int #2           | Fa0/1: FastEthernet0/1   | 100,000,000     | 6.659%                | 0.166%                 | 3.872%   |
| Brunello       | 10.100.37.16      | Int #2           | 2: 2   | 10,000,000      | 6.506%                | 7.945%                 | 8.114%   |
| SC_User_SW2    | 10.0.12.7         | Int #24          | 24: 24 (Path Solutions)  | 10,000,000      | 5.341%                | 1.893%                 | 39.397%  |
| NewYork        | 192.168.201.2     | Int #1           | Et0/0: Ethernet0/0   | 10,000,000      | 3.049%                | 7.137%                 | 6.818%   |
| Sauvignon      | 10.100.36.20      | Int #7           | ifc7 (Slot: 1 Port: 7): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 7     | 100,000,000     | 2.344%                | 100.000%               | 92.197%  |
| Denver         | 10.100.36.60      | Int #2           | Se0/0: Serial0/0   | 256,000         | 0.000%                | 100.000%               | 100.000% |
| SCWANRTR       | 38.102.148.163    | Int #10          | Tu2: Tunnel2   | 9,000           | 0.000%                | 100.000%               | 100.000% |
| SCWANRTR       | 38.102.148.163    | Int #9           | Tu1: Tunnel1   | 9,000           | 0.000%                | 0.889%                 | 100.000% |
| NewYork        | 192.168.201.2     | Int #2           | Se0/0: Serial0/0 (Link to Atlanta)   | 256,000         | 0.000%                | 100.000%               | 100.000% |

16 total interfaces listed [Top of page](#)

TotalView Release 6 (6448) Copyright ©2015 PathSolutions Perpetual License, licensed for 1000 interfaces

Click on the interface number to get details on the source of the problem.

If you have a bandwidth problem, you may want to upgrade the interface to a faster speed (upgrade 10mbps to 100mbps, or 100mbps to gigabit), and/or configure the link for full duplex. You may have errors associated with a bandwidth problem (like collisions), so it is recommended to solve bandwidth problems first.

After resolving bandwidth problems, you will want to focus on reducing the error rate on the interface (if this is a problem). Use the error analysis section for suggestions of a course of action. It may recommend replacing cables or network cards, depending on the types of errors that occur.

Additional troubleshooting information exists for each specific error. You can receive the online help by clicking on the specific error name.

Once you have implemented a fix, you should have a gradual reduction of the error rate on this interface. You may choose to immediately reset the counters on the interface so the program will start calculating error rates with a clean slate. Refer to your switch's documentation for information on how to clear interface statistics.

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**Note:** Some switch manufacturers only allow clearing statistics for the entire switch, not a specific interface.

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**Note:** If a switch manufacturer does not offer a method of clearing statistics, you will have to reboot the switch (or perhaps just the management module) to clear out old statistics. The telnet link can be used to quickly connect to the switch and check duplex and switch configuration.

---

## Running a Collision-Free Network

Click on the “Interfaces” tab and review the interfaces that are configured for half-duplex:

The screenshot shows the TotalView interface with the 'Interfaces' tab selected. The sub-tab 'Half Duplex' is active, displaying a table of interfaces sorted by Peak Daily Error Rate. The table includes columns for Device Name, Device IP Address, Interface Number, Description, Peak Daily Error Rate, Peak Daily Utilization (Tx and Rx), and Duplex mode. The network health is shown as 'DEGRADED (1.5%)'.

| Device Name | Device IP Address | Interface Number | Description   | Peak Daily Error Rate | Peak Daily Utilization |         | Duplex* |
|-------------|-------------------|------------------|---|-----------------------|------------------------|---------|---------|
|             |                   |                  |   |                       | Tx                     | Rx      |         |
| Sauvignon   | 10.100.36.20      | Int #17          | ifb17 (Slot: 1 Port: 17): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 17 | 30.949%               | 100.000%               | 92.197% | Half    |
| Internet    | 10.100.36.1       | Int #1           | Fa0/0: FastEthernet0/0 (WAN side <FG726>)   | 16.020%               | 38.600%                | 1.721%  | Half    |
| Internet    | 10.100.36.1       | Int #2           | Fa0/1: FastEthernet0/1  | 6.659%                | 0.166%                 | 3.872%  | Half    |
| Brunello    | 10.100.37.16      | Int #2           | 2:2   | 6.506%                | 7.945%                 | 8.114%  | Half    |
| SC_User_SW2 | 10.0.12.7         | Int #24          | 24:24 (Path Solutions)  | 5.341%                | 1.893%                 | 39.397% | Half    |
| Bordeaux    | 192.168.202.4     | Int #46          | 46: Ethernet Interface  | 1.742%                | 7.855%                 | 8.156%  | Half    |
| Pinot       | 10.100.36.53      | Int #10010       | Fa0/10: FastEthernet0/10 (To Hawaii)  | 0.165%                | 0.007%                 | 0.005%  | Half    |
| Honolulu    | 10.100.36.5       | Int #2           | Fa0/0: FastEthernet0/0  | 0.000%                | 0.006%                 | 0.006%  | Half    |

8 total half-duplex interfaces displayed [Top of page](#)

These interfaces should be converted to run in full-duplex mode to eliminate packet loss due to collisions.

## Eliminating Bottlenecks

Click on the “10meg”, “100meg”, and 1gig sub-tabs to investigate interfaces that should be upgraded to a faster speed:

The screenshot shows the TotalView interface with the 'Interfaces' tab selected. The sub-tab '10 meg' is active, displaying a table of interfaces sorted by Peak Daily Utilization Rate. The table includes columns for Device Name, Device IP Address, Interface Number, Description, Peak Daily Error Rate, Peak Daily Utilization (Tx and Rx), and Interface Speed. The network health is shown as 'DEGRADED (1.6%)'.

| Device Name | Device IP Address | Interface Number | Description                                   | Peak Daily Error Rate | Peak Daily Utilization |         | Interface Speed |
|-------------|-------------------|------------------|---|-----------------------|------------------------|---------|-----------------|
|             |                   |                  |   |                       | Tx                     | Rx      |                 |
| SC_User_SW2 | 10.0.12.7         | Int #24          | 24:24 (Path Solutions)                        | 5.341%                | 1.893%                 | 39.397% | 10,000,000      |
| EAP900H     | 10.100.36.7       | Int #2           | eth0: eth0                                    | 0.818%                | 39.182%                | 1.566%  | 10,000,000      |
| Internet    | 10.100.36.1       | Int #1           | Fa0/0: FastEthernet0/0 (WAN side <FG726>)     | 16.020%               | 38.600%                | 1.721%  | 10,000,000      |
| Bordeaux    | 192.168.202.4     | Int #46          | 46: Ethernet Interface                        | 1.742%                | 7.855%                 | 8.156%  | 10,000,000      |
| Brunello    | 10.100.37.16      | Int #2           | 2:2   | 6.506%                | 7.945%                 | 8.114%  | 10,000,000      |
| Pinot       | 10.100.36.53      | Int #10007       | Fa0/7: FastEthernet0/7 (Connection to Denver) | 0.000%                | 7.275%                 | 6.921%  | 10,000,000      |
| Denver      | 10.100.36.60      | Int #1           | E10/0: Ethernet0/0                            | 0.000%                | 6.809%                 | 7.140%  | 10,000,000      |
| NewYork     | 192.168.201.2     | Int #1           | E10/0: Ethernet0/0                            | 3.049%                | 7.137%                 | 6.818%  | 10,000,000      |
| Atlanta     | 10.100.37.1       | Int #1           | Fa0/0: FastEthernet0/0                        | 2.987%                | 7.065%                 | 6.817%  | 10,000,000      |
| Atlanta     | 192.168.202.2     | Int #1           | Fa0/0: FastEthernet0/0                        | 2.676%                | 6.999%                 | 6.763%  | 10,000,000      |
| Pinot       | 10.100.36.53      | Int #10013       | Fa0/13: FastEthernet0/13 (To Velma)           | 0.000%                | 0.048%                 | 0.019%  | 10,000,000      |
| VELMA       | 10.100.36.10      | Int #2           | Intel(R) PRO Adapter                          | 0.000%                | 0.019%                 | 0.035%  | 10,000,000      |
| EAP900H     | 10.100.36.7       | Int #12          | br-lan: br-lan                                | 0.000%                | 0.000%                 | 0.000%  | 10,000,000      |

13 total 10 meg interfaces displayed [Top of page](#)

Click on the interface number to get details on the interface’s utilization.

## Determining What's Connected to an Interface

If you click on the interface and then click on the "Connected" tab, it will show you what devices are connected to the interface, along with the VLAN, MAC address, and IP address (if available in other device's ARP caches). If you hover over the MAC address it will show you the Manufacturer of that device. Reverse-DNS lookups for switch ports can also be identified by clicking on the IP address.

The screenshot displays the PathSolutions TotalView interface. At the top, there's a navigation bar with tabs like Map, Path, Phones, Assessment, MOS, Devices, Favorites, Issues, Health, Top-10, WAN, Interfaces, and Tools. The main content area is divided into two sections: Device Summary and Interface Summary.

**Device Summary** (Healthy):

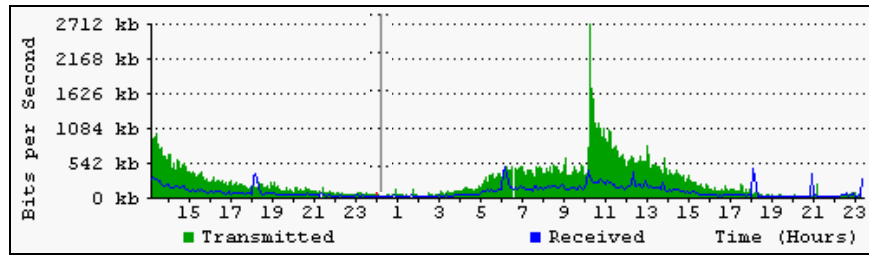
| Device Name | Device IP Address | Manage Device               | OSI Services |   |   |   |   |   |    | # of Int | Oper Up | Oper Down | Admin Down  | Location    | Contact |
|-------------|-------------------|-----------------------------|--------------|---|---|---|---|---|----|----------|---------|-----------|-------------|-------------|---------|
|             |                   |                             | 1            | 2 | 3 | 4 | 5 | 6 | 7  |          |         |           |             |             |         |
| Pinct       | 10.100.36.53      | Telnet SSH Web HTTPS Syslog | ●            | ● |   |   |   |   | 27 | 12       | 15      | 0         | Santa Clara | Sally Toner |         |

**Interface Summary** (Update):

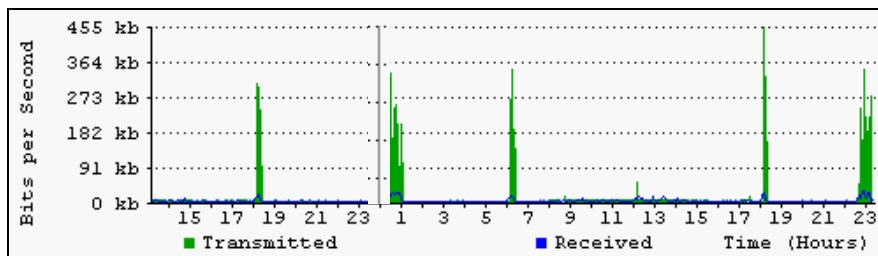
| Interface Number | IP Address   | Description   | Devices connected to this switch port  |
|------------------|--------------|---|--|
| Int #1           | 10.100.36.53 | Vl1: Vlan1  |  |
| Int #10001       |              | Fa0/1: FastEthernet0/1 (Trunk Port Connected to Merlot) |  |
| Int #10002       |              | Fa0/2: FastEthernet0/2 (Cube A-02)                      | VLAN #1: F8-66-F2-23-4B-16 → 10.100.36.4   |
| Int #10003       |              | Fa0/3: FastEthernet0/3 (Cube A-03)                      |  |
| Int #10004       |              | Fa0/4: FastEthernet0/4 (Trunk Port Connected to Malbec) | VLAN #1: 00-00-AA-8F-E5-DA → 10.100.36.158<br>VLAN #1: 00-00-CD-28-05-DF<br>VLAN #1: 00-04-96-1F-93-AC → 10.100.36.48 → merlot.corp.netlatency.com<br>VLAN #1: 00-09-97-18-D6-80<br>VLAN #1: 00-0F-E2-C2-7C-05 → 10.100.36.61<br>VLAN #1: 00-10-49-00-4A-68 → 10.100.36.100<br>VLAN #1: 00-18-FE-D9-BF-80<br>VLAN #1: 00-1B-BA-19-A4-00<br>VLAN #1: 00-1B-BA-19-A4-01<br>VLAN #1: 00-26-B9-F0-40-A7 → 10.100.36.167<br><a href="#">More...</a> |
| Int #10005       |              | Fa0/5: FastEthernet0/5 (To Wireless Access Point)       | VLAN #1: 6C-71-D9-BD-42-55 → 10.100.36.166<br>VLAN #1: 88-DC-96-1F-48-11 → 10.100.36.7<br>VLAN #1: 8C-2D-AA-5E-D7-73 → 10.100.36.152<br>VLAN #1: B8-E8-56-B8-B2-31 → 10.100.36.163   |
| Int #10006       |              | Fa0/6: FastEthernet0/6 ((( )))                          |  |
| Int #10007       |              | Fa0/7: FastEthernet0/7 (Connection to Denver)           | VLAN #1: 00-30-80-11-C2-C0 → 10.100.36.60  |
| Int #10008       |              | Fa0/8: FastEthernet0/8 (Cube A-07)                      |  |
| Int #10009       |              | Fa0/9: FastEthernet0/9 (( ))                            |  |
| Int #10010       |              | Fa0/10: FastEthernet0/10 (To Hawaii)                    | VLAN #1: 00-19-56-D9-60-40 → 10.100.36.5   |
| Int #10011       |              | Fa0/11: FastEthernet0/11 (2nd Floor Cube B-02)          |  |
| Int #10012       |              | Fa0/12: FastEthernet0/12 (Sauv-Zinf-Internet)           | VLAN #1: 00-0A-41-5E-AE-A1 → 10.100.36.1<br>VLAN #1: 00-0D-EC-FB-CC-C0<br>VLAN #1: 00-0D-EC-FB-CC-D1<br>VLAN #1: 00-0D-EC-FB-CC-FC<br>VLAN #1: D4-EA-0E-C9-B8-00<br>VLAN #1: D4-EA-0E-C9-B8-01   |
| Int #10013       |              | Fa0/13: FastEthernet0/13 (To Velma)                     | VLAN #1: 00-90-27-6D-35-AA → 10.100.36.10  |
| Int #10014       |              | Fa0/14: FastEthernet0/14 (Sally)                        | VLAN #1: 78-2B-CB-B6-D7-D6 → 10.100.36.17  |
| Int #10015       |              | Fa0/15: FastEthernet0/15 (Tim)                          | VLAN #1: 78-2B-CB-B6-D7-CB → 10.100.36.16  |
| Int #10016       |              | Fa0/16: FastEthernet0/16 (2nd Floor Cube B-06)          |  |
| Int #10017       |              | Fa0/17: FastEthernet0/17 (2nd Floor Cube B-07)          | VLAN #1: 00-02-FD-65-90-7A → 10.100.36.164   |

## Finding Anomalous Traffic

If you notice strange traffic on one interface, you can use TotalView to locate the source of the traffic. Consider the following graph:



At approximately 18:15 (6:15pm) yesterday, roughly 300k of data was received. The same amount of traffic was received at 06:15 (6:15am, and 18:15 this evening. With this traffic pattern in mind, we can quickly click on the interface arrows to find the interface that transmitted that quantity of traffic during those times:



Once you have found the interface, you can determine what is connected to the interface and look into the purpose of the traffic.

The benefit of this feature is that you do not have to be in front of a packet analyzer at the time the traffic is transmitted to determine the source of the traffic.

Click on the **left and right interface arrows** to view the other interfaces on the switch. Look for a similar traffic pattern at the same timeframe.

Interface Summary <<>

| Interface Number | IP Address | Description  | Devices connected to this switch port   |
|------------------|------------|--|---|
| Int #1           |            | g1: Ethernet Interface (Trunk Port Connected to Gamay) | VLAN #1: 00-04-F2-95-3D-1D<br>VLAN #1: 00-08-5D-28-15-CD<br>VLAN #1: 00-10-49-02-47-13 → 10.100.37.10<br>VLAN #1: 00-10-49-03-E1-42 → 10.100.37.101<br>VLAN #1: 00-11-88-C9-0C-4A<br>VLAN #1: 00-14-7C-51-14-20 → 10.100.37.4<br>VLAN #1: 00-14-7C-51-14-21<br>VLAN #1: 00-A0-C8-1D-85-F4 → 10.100.37.2<br>VLAN #1: 00-D0-58-A3-58-D0 → 10.100.37.1<br>VLAN #1: 90-B1-1C-10-DD-5F → 10.100.37.18<br><a href="#">More...</a> |

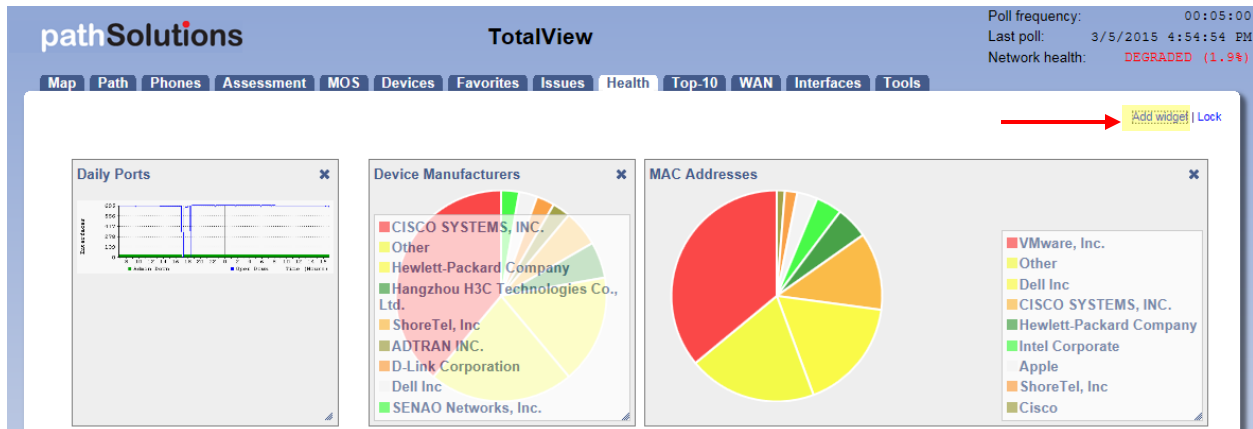
Interface Utilization: Daily Weekly Monthly Yearly Current Utilization Download Excel View Advanced Stats

|        | Tx     | Rx     |
|--------|--------|--------|
| Min    | 0 kbps | 0 kbps |
| Avg    | 3 kbps | 3 kbps |
| Max    | 8 kbps | 8 kbps |
| 95th   | 5 kbps | 5 kbps |
| 95th % | 0.005% | 0.005% |

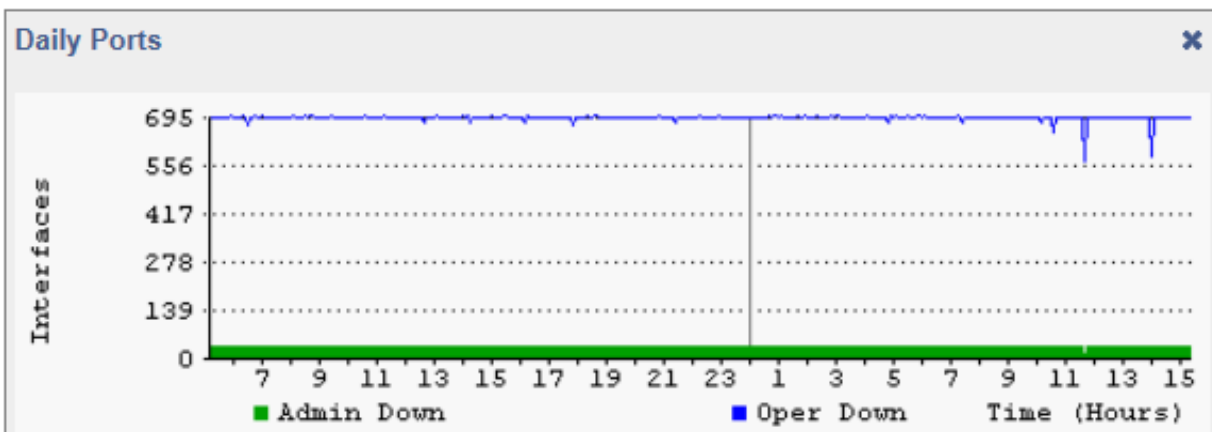
If determining the source and destination of the traffic is not enough to narrow down the cause, the next step would be to connect a network analyzer to that interface to try to determine the purpose of the traffic.

## Determining Laptop Usage

Laptops add and drop from the network on a regular basis. To track their usage patterns, select the Health tab. Then select “Add Widget” on the right hand side.



Select the “Daily Ports” – to see the Down Interfaces:



Notice that the number of "Operationally Down" interfaces decreases as users connect to the network and increases as users disconnect.

## Planning for Network Growth

Making sure that you always have free network ports available for growth is important. Use the Health tab, select Add Widget, and add the “Daily Ports” to view the Down Interfaces to determine overall port availability.

When the number of operationally shut down ports gets too low, additional switch ports should be acquired.

## Scheduling Server Outages

Determining the timeframe to schedule server outages can be tricky without TotalView. Choose the interface that connects to the server and view the daily, weekly, and monthly graphs to determine when network utilization for this server is lowest. The user community should be comfortable with the decision, as there is no documented usage during that period.

## Scheduling Switch & Router Outages

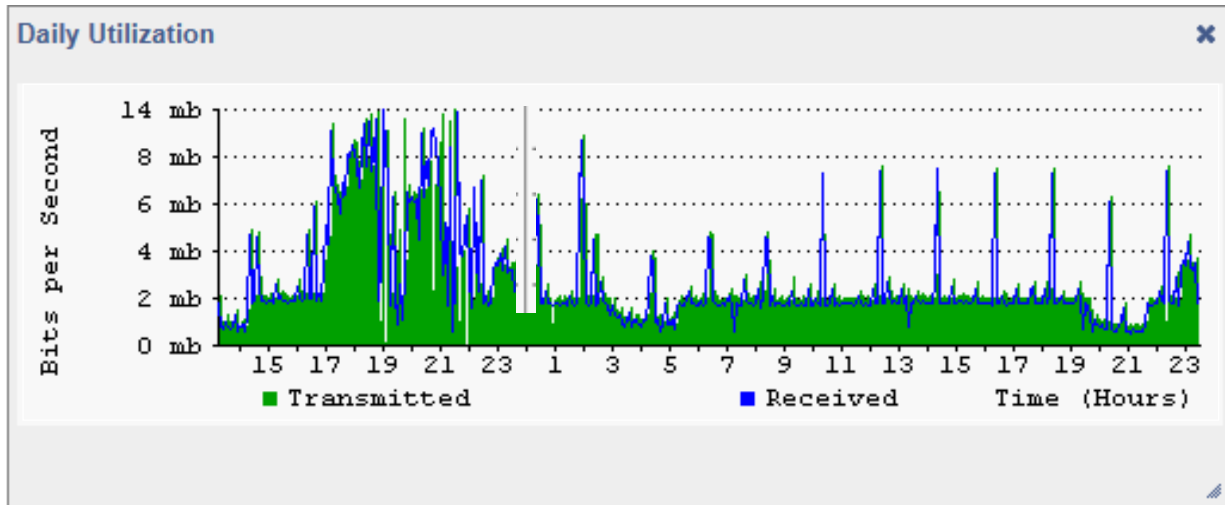
Scheduling switch outages are easy as well. Choose the switch details and view the daily, weekly, and monthly graphs to determine when overall switch utilization is lowest.



## Daily Utilization Tracking

View the daily utilization using a Widget in the Health tab to determine if the utilization meets with your expectation of usage.

Consider the following “Daily Utilization” graph:

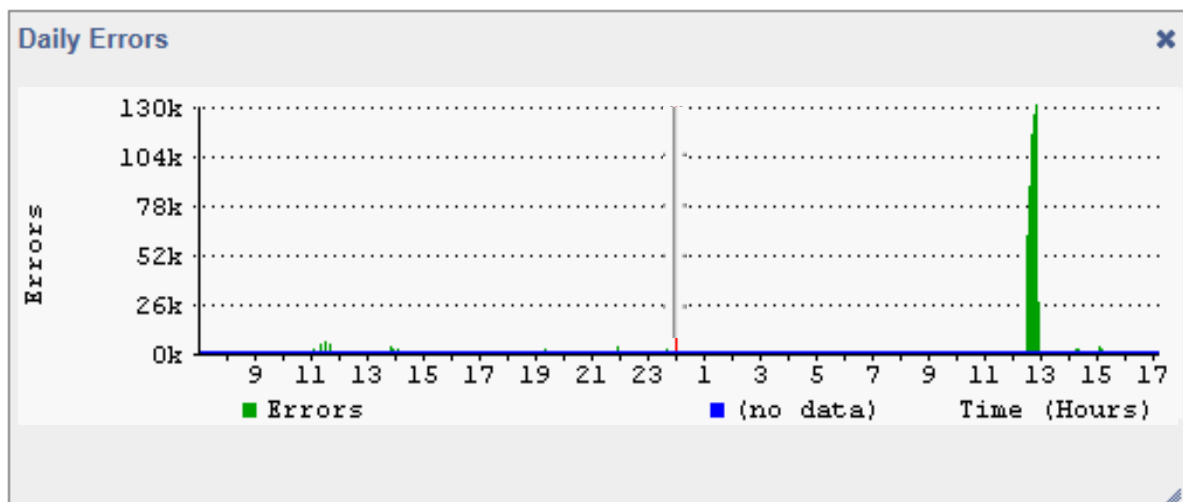


This graph shows a lot of data being transmitted on the previous day starting at 17:00 hours (5:00pm). This timeframe may correspond with backup jobs that are set to execute during that timeframe. The graph also shows spikes roughly every two hours throughout the day. This may also correspond with scheduled activities on the network.

## Daily Errors Tracking

View the daily overall errors to determine if the level of errors meets with your expectation of error distribution.

Consider the following “Daily Errors” graph:



This graph shows that there were a lot of errors around 13:00 hours (1:00pm). If you are aware of a process that runs at that time, you may choose to investigate the interface of the machine that executes the process.

## Performing Proactive Analysis

You can be proactive by using the "Top-10" (errors) tab to locate interfaces that have error rates that are increasing. Reducing these error rates will help prevent them from becoming issues.

The "Top Transmitters" and "Top Receivers" tabs can be used to watch which interfaces may become bandwidth bottlenecks.

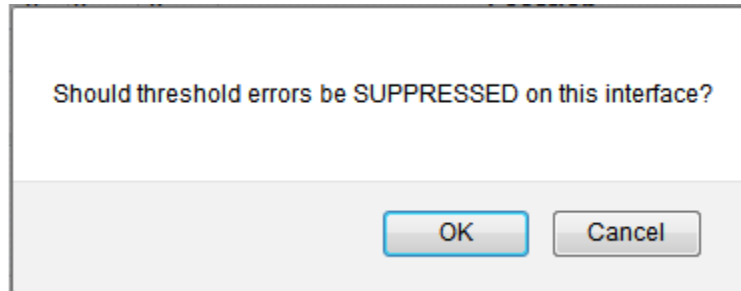
## Error Resolution

Some device manufacturers may improperly report error information, making it impossible to clear certain errors. The device manufacturer should be able to provide a new version of their device software to report errors correctly.

You can tell PathSolutions' TotalView to suppress errors on interfaces by clicking on the status indicator (the colored dot in the Status Column)

| Interface Number | Favorite | IP Address | Description                               | Ignore Int | Switch interfaces showing this MAC address |
|------------------|----------|------------|---|------------|--|
| ● Int #1         | Favorite | 10.0.1.1   | Fa0/0: FastEthernet0/0 (WAN side <FG726>) | Ignore     |  |

The following dialog should then be presented:



You can Un-Suppress errors on an interface by clicking on its status indicator again.

# Using the Network Weather Report

The network Weather Report is emailed by the service every night at midnight. An example of a weather report with interfaces that are degraded is as follows:

The default report includes information regarding the health of the network, a section on issues and errors, a section on performance, a section on the top 10 interfaces with the highest daily receive percentage and administrative information.

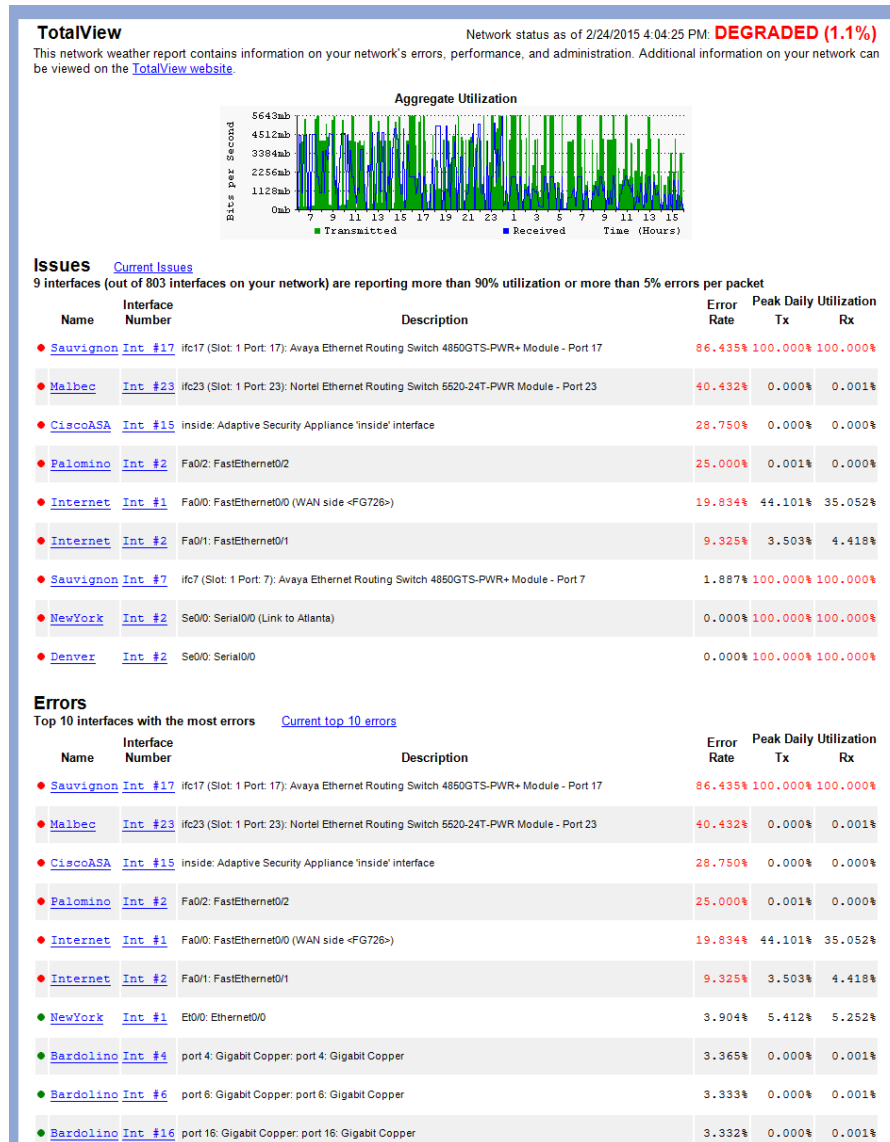
All links on the report will link to the product website so you can rapidly check information and work on resolving problems on a daily basis.

It is recommended that you archive these reports in an email folder for future reference.

The network's overall status is displayed in color (red for "Degraded", green for "Good") at the top of the report.

If the overall network status is degraded, then a table listing the interfaces with "Issues" will be displayed.

The "Errors" section will list the top 10 interfaces with the most errors.



The "Performance" section will list the top 10 talkers and top 10 listeners.

The "Administration" section will include the number of interfaces that are operationally shut down and administratively shut down.

Network Weather Reports can be customized to include your company logo, or other text. Refer to page 125 (Configuring Email) for information on configuring the report.

**Note:** The Network Weather Report has an attached text file that can be used to display the same data, except without HTML formatting.

### Performance

Top 10 interfaces with the highest daily transmission percentage [Current top 10 talkers](#)

| Name                      | Interface Number           | Description   | Error Rate | Peak Daily Utilization Tx | Peak Daily Utilization Rx |
|---------------------------|----------------------------|---|------------|---------------------------|---------------------------|
| <a href="#">Sauvignon</a> | <a href="#">Int #7</a>     | Ifc7 (Slot: 1 Port: 7): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 7    | 1.887%     | 100.000%                  | 100.000%                  |
| <a href="#">Sauvignon</a> | <a href="#">Int #17</a>    | Ifc17 (Slot: 1 Port: 17): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 17 | 86.435%    | 100.000%                  | 100.000%                  |
| <a href="#">NewYork</a>   | <a href="#">Int #2</a>     | Se0/0: Serial0/0 (Link to Atlanta)  | 0.000%     | 100.000%                  | 100.000%                  |
| <a href="#">Denver</a>    | <a href="#">Int #2</a>     | Se0/0: Serial0/0  | 0.000%     | 100.000%                  | 100.000%                  |
| <a href="#">Internet</a>  | <a href="#">Int #1</a>     | Fa0/0: FastEthernet0/0 (WAN side <FG726>)   | 19.834%    | 44.101%                   | 35.052%                   |
| <a href="#">Sauvignon</a> | <a href="#">Int #1</a>     | Ifc1 (Slot: 1 Port: 1): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 1    | 1.887%     | 11.284%                   | 11.112%                   |
| <a href="#">Sauvignon</a> | <a href="#">Int #3</a>     | Ifc3 (Slot: 1 Port: 3): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 3    | 1.887%     | 11.284%                   | 11.112%                   |
| <a href="#">Sauvignon</a> | <a href="#">Int #49</a>    | Ifc49 (Slot: 1 Port: 49): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 49 | 1.863%     | 11.284%                   | 11.112%                   |
| <a href="#">Bordeaux</a>  | <a href="#">Int #46</a>    | 46: Ethernet Interface  | 2.537%     | 6.203%                    | 6.521%                    |
| <a href="#">Pinot</a>     | <a href="#">Int #10007</a> | Fa0/7: FastEthernet0/7 (Connection to Denver)   | 0.000%     | 5.629%                    | 5.438%                    |

Top 10 interfaces with the highest daily receive percentage [Current top 10 listeners](#)

| Name                      | Interface Number        | Description   | Error Rate | Peak Daily Utilization Tx | Peak Daily Utilization Rx |
|---------------------------|-------------------------|---|------------|---------------------------|---------------------------|
| <a href="#">Denver</a>    | <a href="#">Int #2</a>  | Se0/0: Serial0/0  | 0.000%     | 100.000%                  | 100.000%                  |
| <a href="#">Sauvignon</a> | <a href="#">Int #7</a>  | Ifc7 (Slot: 1 Port: 7): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 7    | 1.887%     | 100.000%                  | 100.000%                  |
| <a href="#">NewYork</a>   | <a href="#">Int #2</a>  | Se0/0: Serial0/0 (Link to Atlanta)  | 0.000%     | 100.000%                  | 100.000%                  |
| <a href="#">Sauvignon</a> | <a href="#">Int #17</a> | Ifc17 (Slot: 1 Port: 17): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 17 | 86.435%    | 100.000%                  | 100.000%                  |
| <a href="#">Internet</a>  | <a href="#">Int #1</a>  | Fa0/0: FastEthernet0/0 (WAN side <FG726>)   | 19.834%    | 44.101%                   | 35.052%                   |
| <a href="#">Sauvignon</a> | <a href="#">Int #3</a>  | Ifc3 (Slot: 1 Port: 3): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 3    | 1.887%     | 11.284%                   | 11.112%                   |
| <a href="#">Sauvignon</a> | <a href="#">Int #1</a>  | Ifc1 (Slot: 1 Port: 1): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 1    | 1.887%     | 11.284%                   | 11.112%                   |
| <a href="#">Sauvignon</a> | <a href="#">Int #49</a> | Ifc49 (Slot: 1 Port: 49): Avaya Ethernet Routing Switch 4850GTS-PWR+ Module - Port 49 | 1.863%     | 11.284%                   | 11.112%                   |
| <a href="#">Bordeaux</a>  | <a href="#">Int #46</a> | 46: Ethernet Interface  | 2.537%     | 6.203%                    | 6.521%                    |
| <a href="#">Denver</a>    | <a href="#">Int #1</a>  | Et0/0: Ethernet0/0  | 0.226%     | 5.320%                    | 5.492%                    |

### Administration

Your network has 637 interfaces that are operationally shut down. These interfaces are available for additional nodes. When this number drops too low, you should consider purchasing additional switch interfaces to make sure you can continue to add to your network. View current [Operationally down interfaces](#).

Your network has 9 interfaces that are administratively shut down. These interfaces have been disabled by the network administrator, and will not function if a node is connected. View current [Administratively shut down interfaces](#).

If you have questions related to PathSolutions's sales, please contact [Sales@PathSolutions.com](mailto:Sales@PathSolutions.com).  
 If you have technical support issues relating to any of PathSolutions's products, please contact [Support@PathSolutions.com](mailto:Support@PathSolutions.com).

TotalView 6.0 (6436) Copyright ©2009 PathSolutions, Inc.

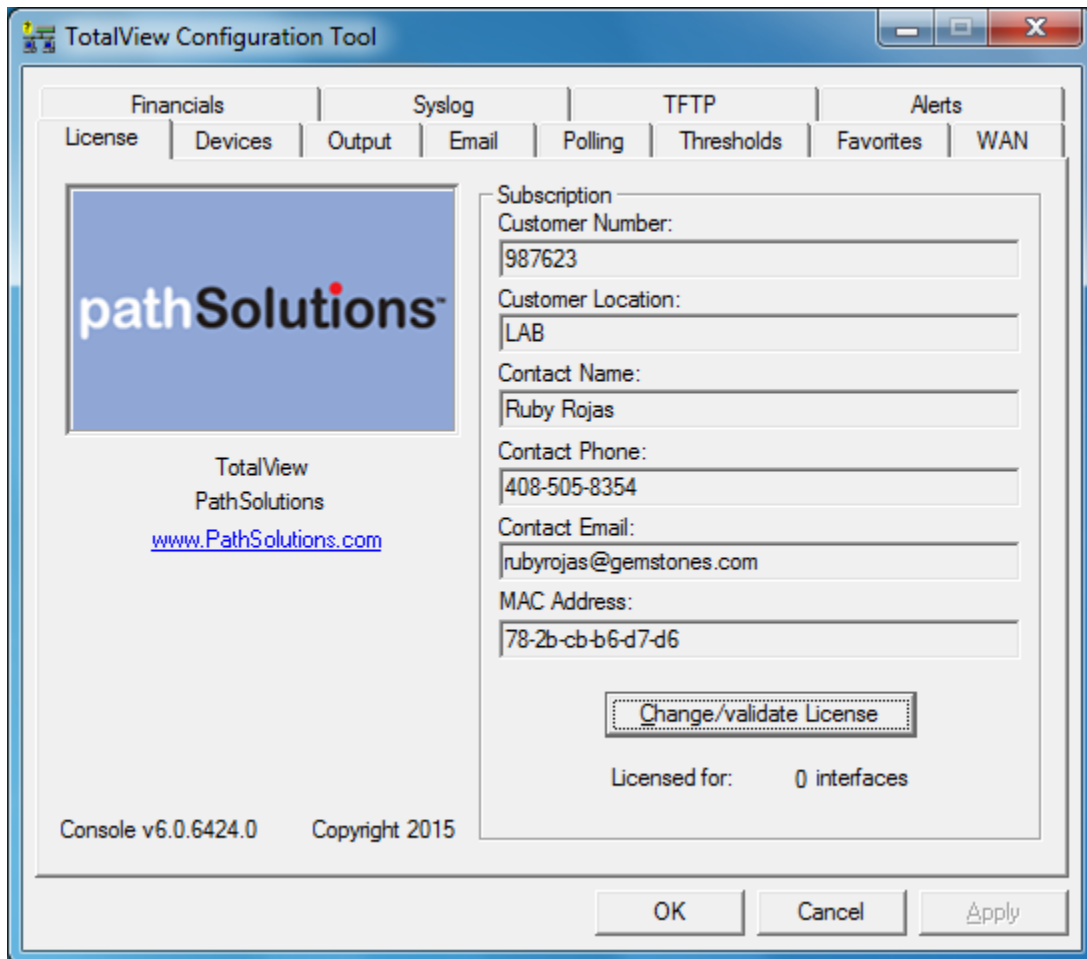
## Using the Configuration Tool

The Configuration Tool is used to change the general configuration options of the product as well as add or remove devices from monitoring.

### Running the System Monitor Configuration Tool

To run PathSolutions' TotalView Configuration Tool, select "Start", choose "Programs", point to "PathSolutions", then choose "TotalView", and then select "Config Tool".

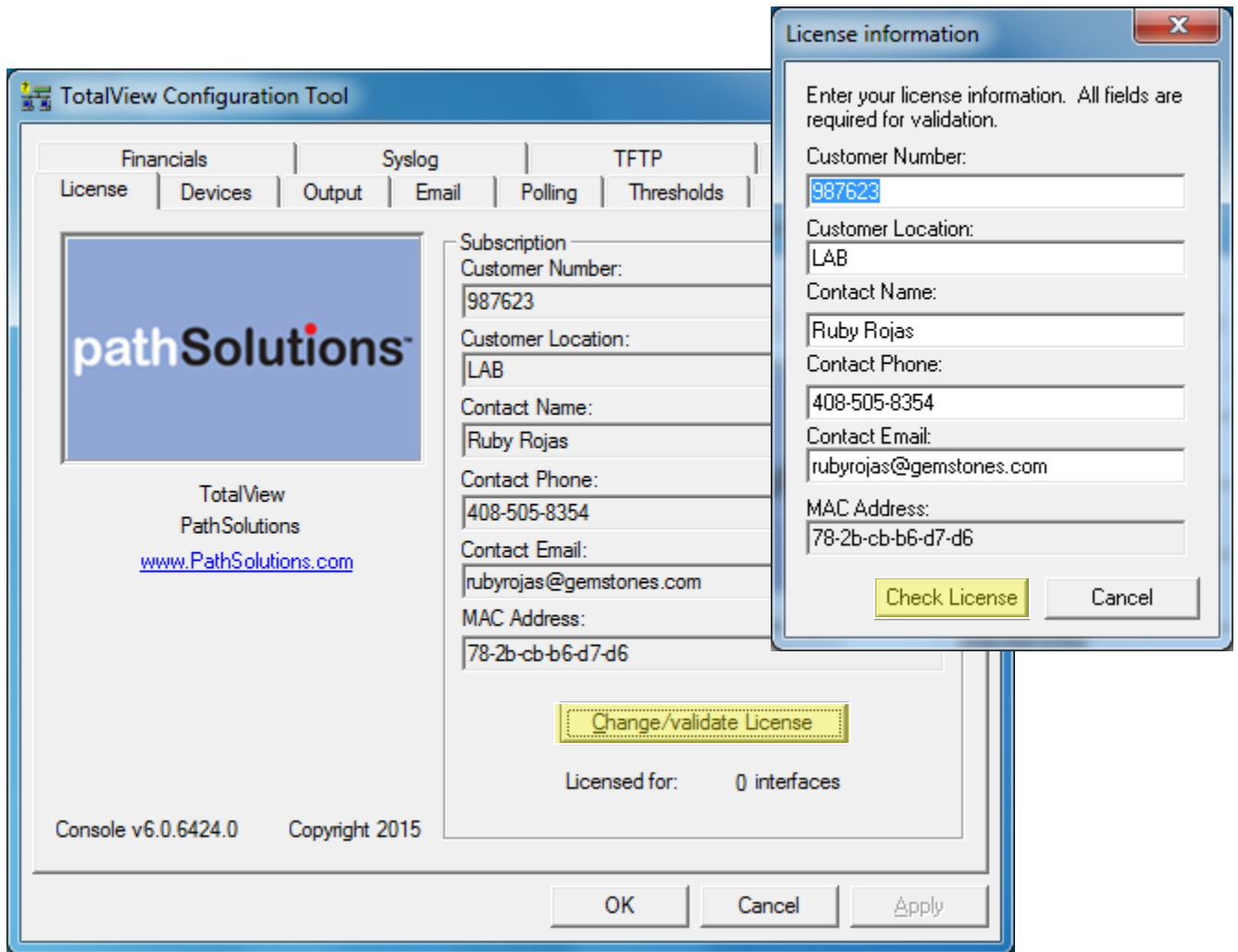
If you have not yet entered your subscription information, you may be presented with the following dialog upon starting the program:



The screenshot shows the 'TotalView Configuration Tool' window. It has a menu bar with 'Financials', 'Syslog', 'TFTP', and 'Alerts'. Below the menu bar are tabs for 'License', 'Devices', 'Output', 'Email', 'Polling', 'Thresholds', 'Favorites', and 'WAN'. The 'License' tab is selected. On the left side, there is a blue box with the 'pathSolutions' logo and the text 'TotalView PathSolutions' and 'www.PathSolutions.com'. On the right side, there is a form for 'Subscription' information with the following fields: 'Customer Number' (987623), 'Customer Location' (LAB), 'Contact Name' (Ruby Rojas), 'Contact Phone' (408-505-8354), 'Contact Email' (rubyrojas@gemstones.com), and 'MAC Address' (78-2b-cb-b6-d7-d6). Below the form is a 'Change/validate License' button. At the bottom of the form, it says 'Licensed for: 0 interfaces'. At the bottom of the window are 'OK', 'Cancel', and 'Apply' buttons. In the bottom left corner, it says 'Console v6.0.6424.0 Copyright 2015'.

Enter your subscription information and then click “Change/Validate License” to validate the license and continue.

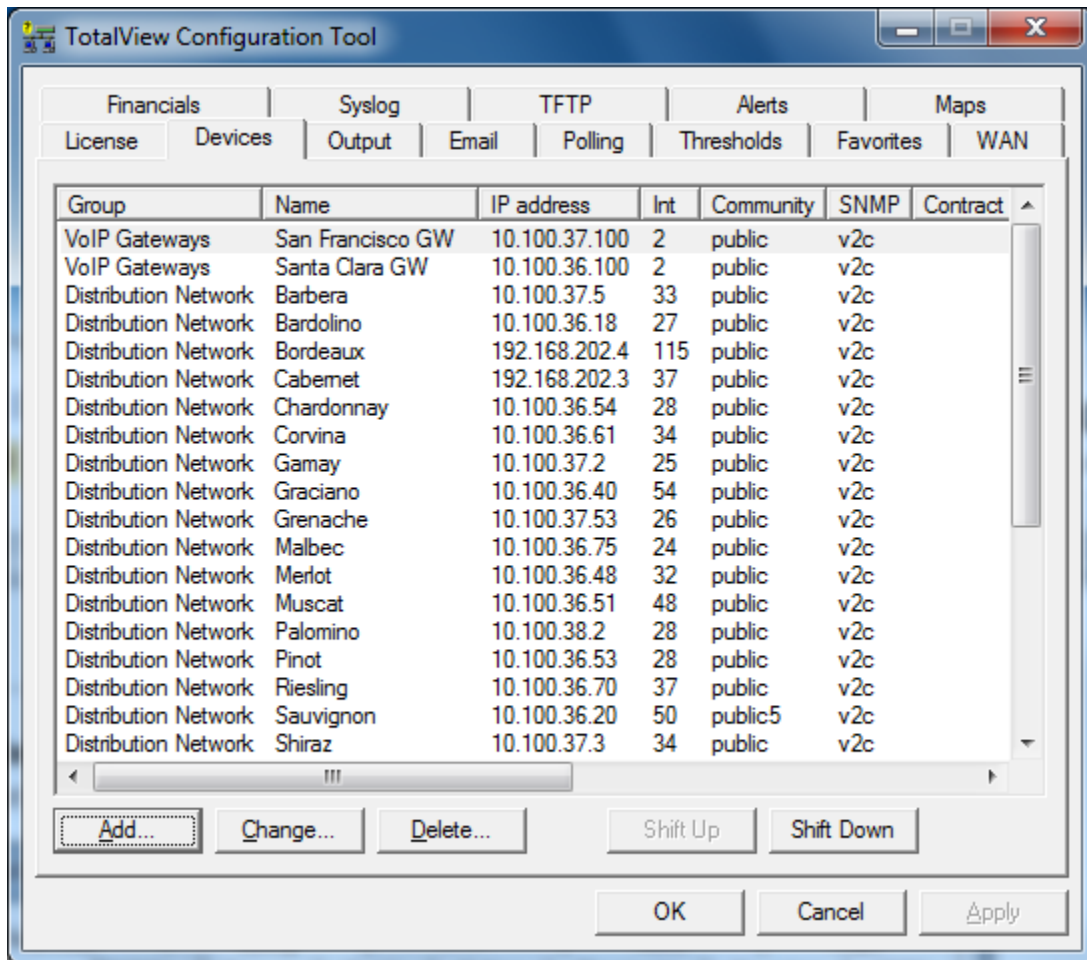
You should see the PathSolutions’ TotalView Configuration Tool license window:



Use this page to validate and/or change your subscription information on your License.

## Adding or Removing Devices

When you select the “Devices” tab, you will see the list of currently monitored devices:

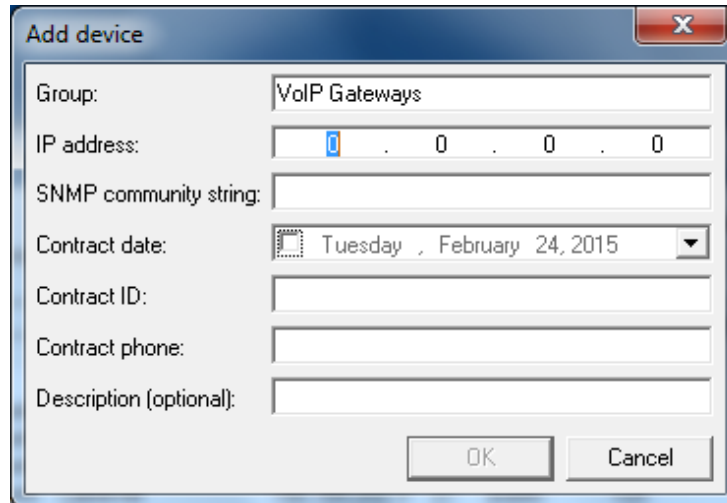


You can sort the list (and thus sort the order that the devices are displayed on the web pages) by clicking on a column header.

To move switches up or down in the listing click on the switch and then click " Shift Up" or " Shift Down".

## Adding Devices

To add a device, click "Add". You will see the "Add device" dialog:



Enter the IP address and SNMP read-only community string for the device. If desired, you can also add a description and support contract information for the device.

Click "OK" to add the device, and the system will present you with a blank dialog box so you can enter another device.

Click "Cancel" on a blank dialog box to close the dialog and stop adding devices.

---

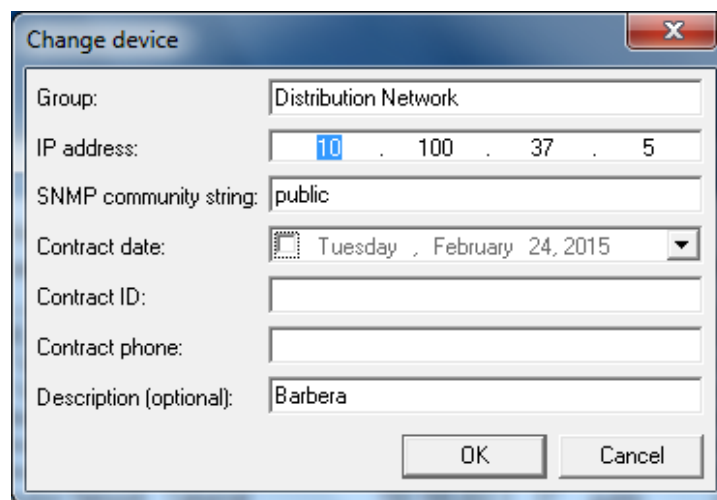
**Note:** All interfaces for each switch are monitored by default. You can ignore individual interfaces from being monitored on the web interface.

---

## Changing Device Information

To modify a device, double-click on an existing device IP address, or select the device's IP address and then click on "Change".

You will be presented with the Change Device dialog:

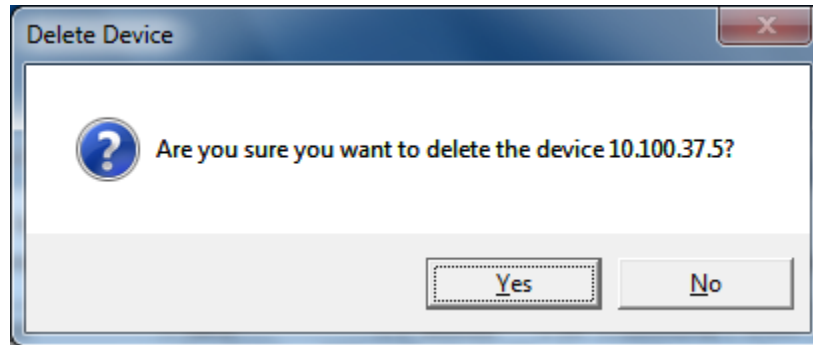


The only required fields for a device are the Group, IP address, and SNMP community string fields. All other fields are optional.

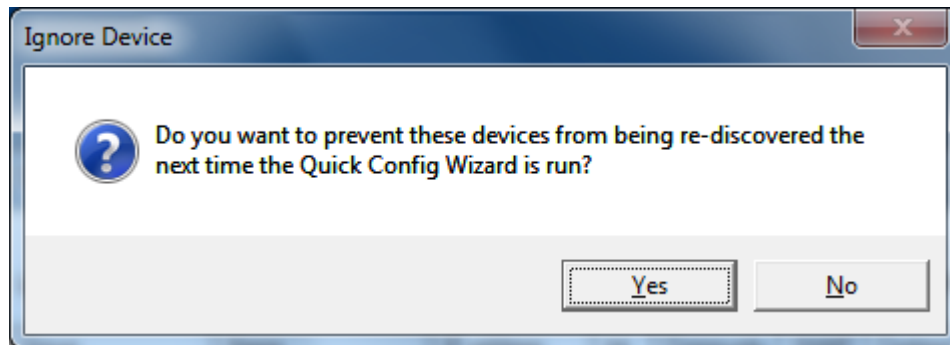


## Deleting Devices

To delete a device, click on the device and then click "Delete". You will see the "Delete device" dialog:



After deleting a device, you will be asked if you would like to prevent that device from being discovered Again if you re-run the Quick Config Wizard.



---

**Note:** Deleting a device from monitoring will not delete the previously collected graph data. You can add the device back to monitoring and it will continue to use the same data file for graph data storage.

---

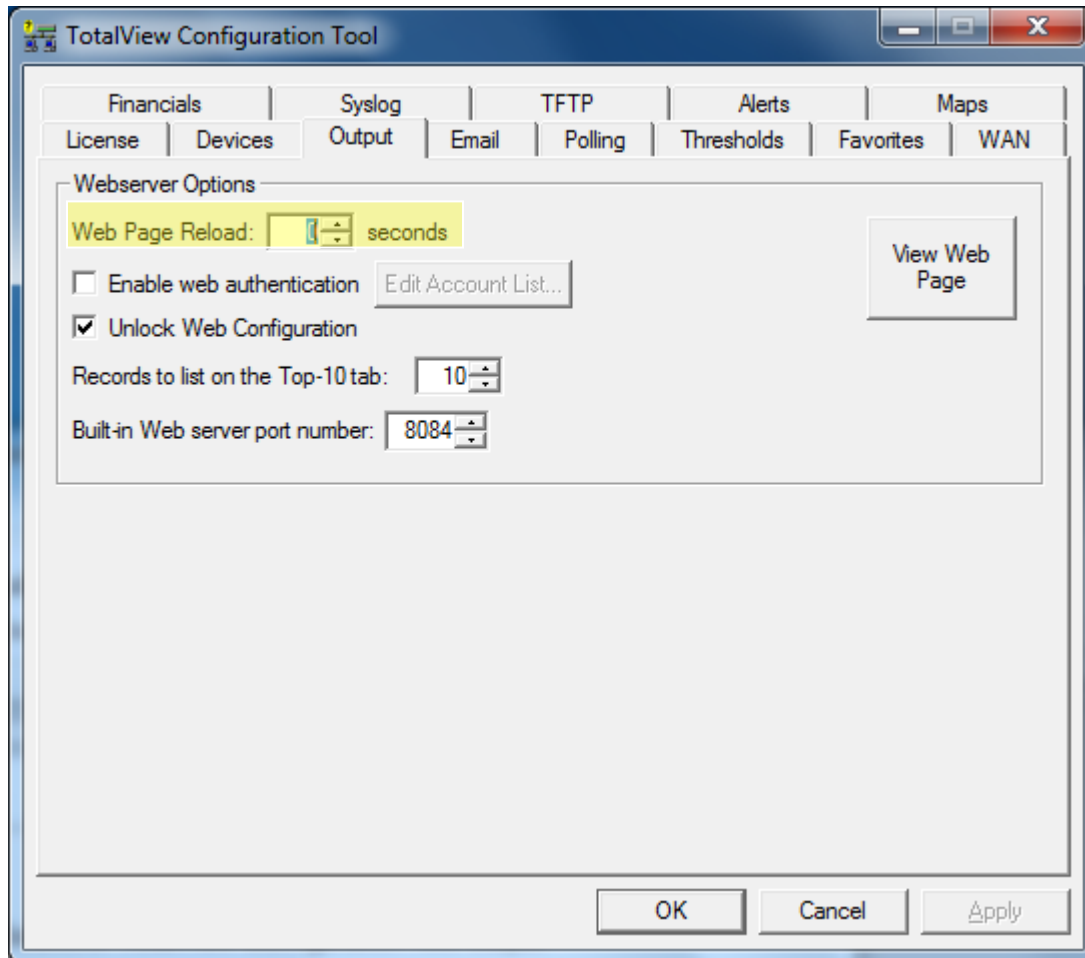
---

**Note:** Any Device prevented from being re-discovered when the Quick Config Wizard runs can be added back again by removing the device from being ignored in the SwMonIgnore.cfg file or by adding the device to be monitored again in the SwitchMonitor.cfg file. These files can be found in C:\Program Files (x86)\PathSolutions\TotalView. Save the file after any modification.

---

## Configuring Output

Select the "Output" tab. You should see the PathSolutions' TotalView Configuration Tool output configuration window:



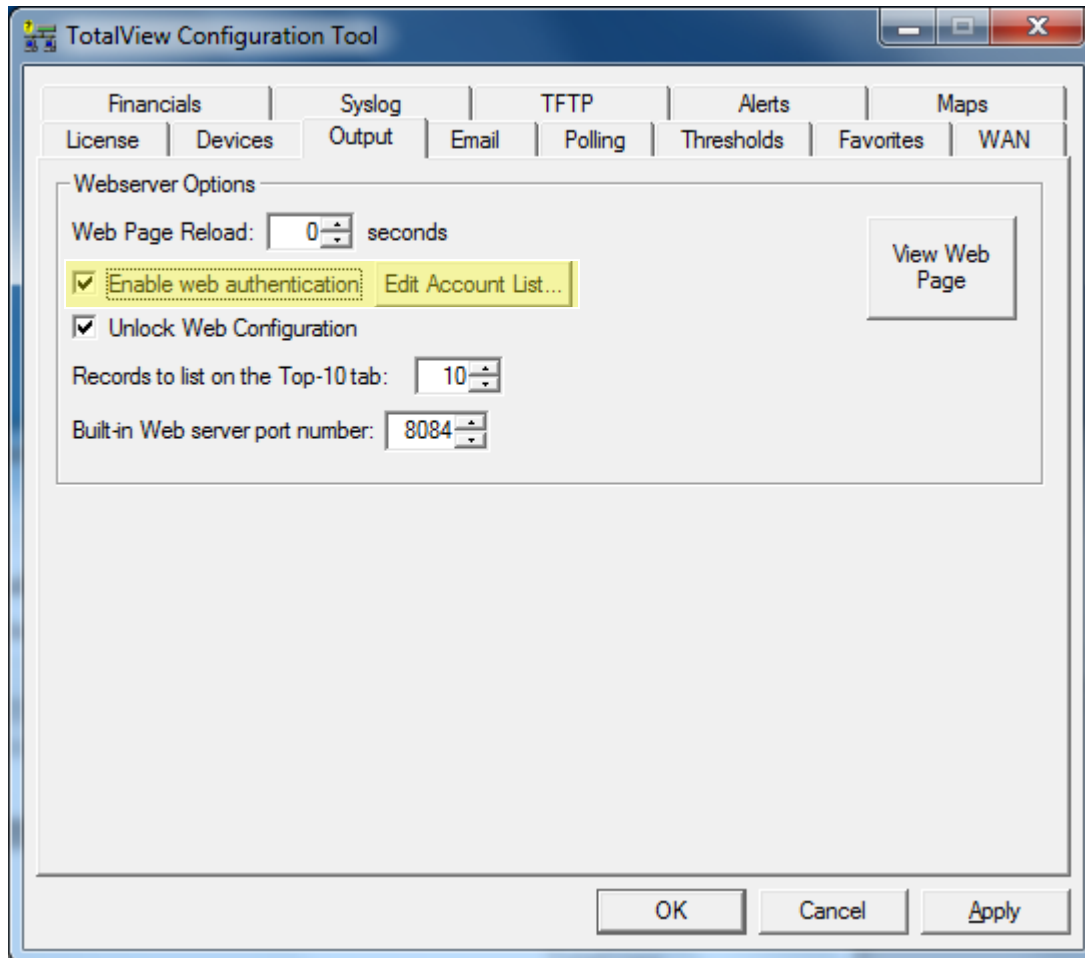
### Webserver Options

The web browser should automatically refresh the web page and reload. It is advised to use the default of 0 (zero) in the Web Page Reload field. If you do not want the web pages to reload automatically, use a number like 300 seconds (5 minutes) or adjust as needed.

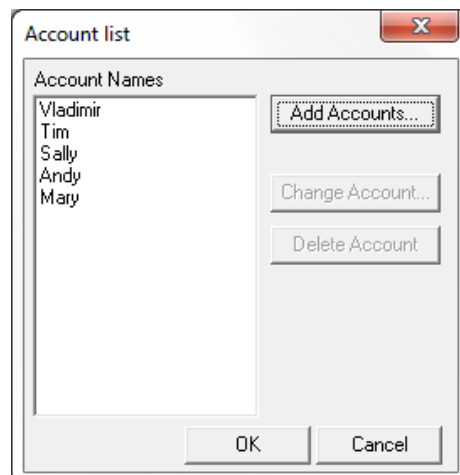
You can quickly view the web page by clicking on "View Web Page".

## Creating Accounts with Password Security

If you want to employ account security so passwords are required to view the web pages, check the box "Enable web authentication" and click on the button "Edit Account List" to create accounts. You should see the "Account List" dialog:

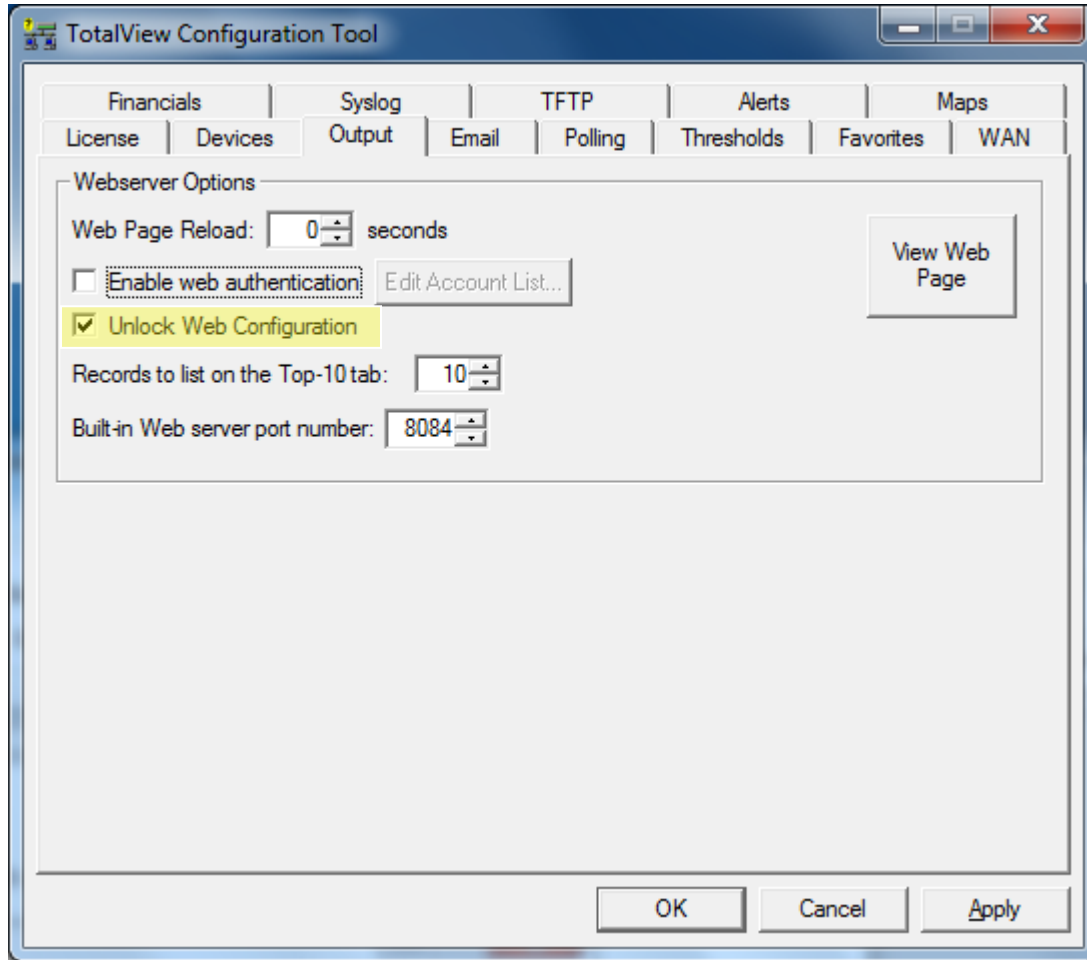


From this dialog, you can add accounts by clicking on the "Add Accounts" button, change account names and passwords, or delete accounts.

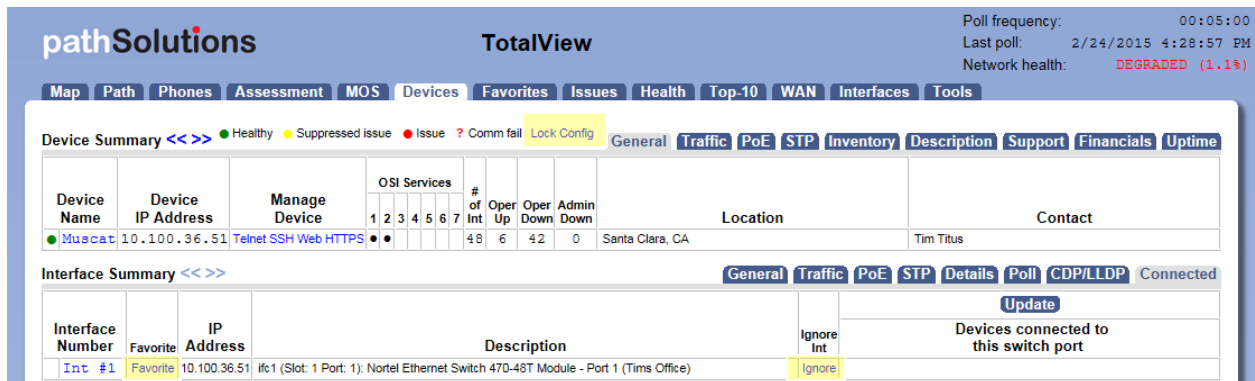


## Web Configuration

If the web configuration is locked, and you want to unlock it, check the box “Unlock Web Configuration”.



Alternatively, if you want to “Lock” the Web Configuration to remove the “favorite” and “ignore” feature shown in your TotalView pages, click on the “Lock Config” link shown below.



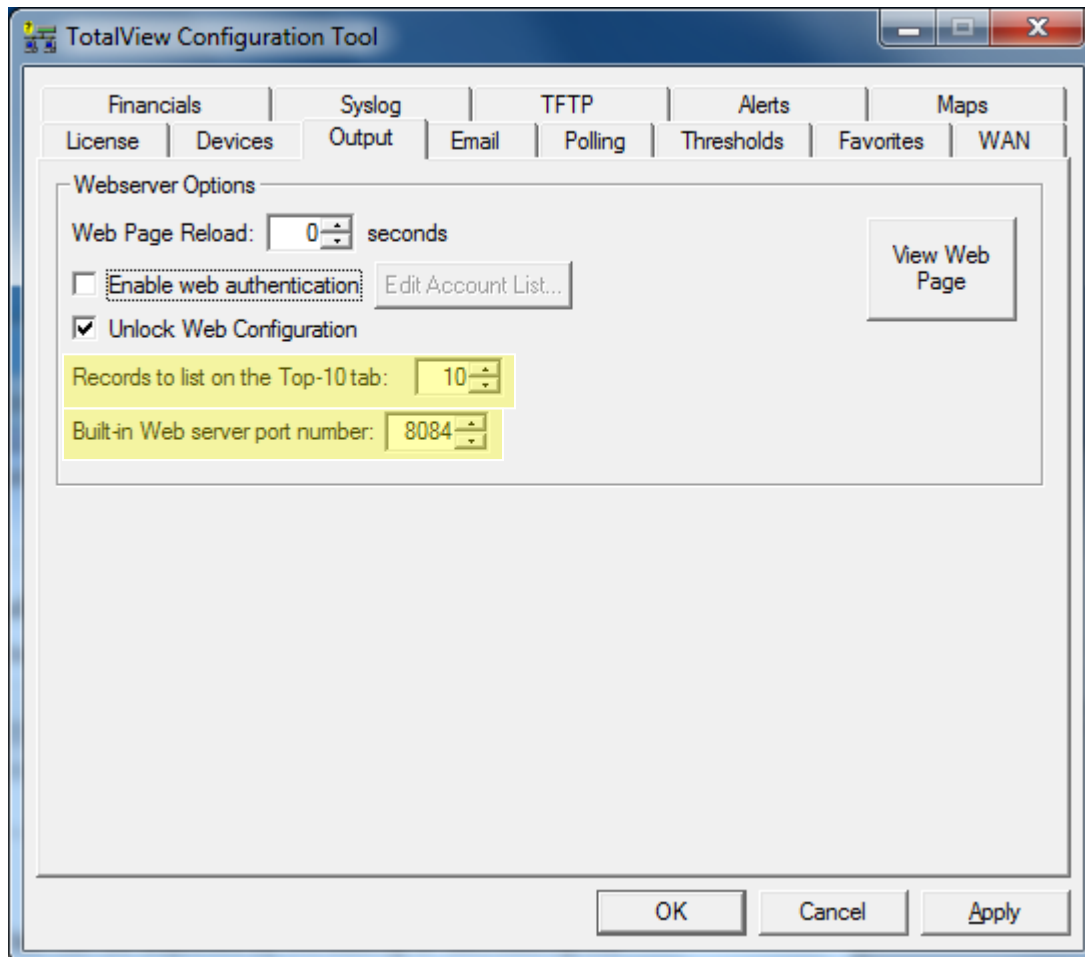
## Records to list on the Top-10 tab

The number of interfaces displayed on the Top-10 tab can be adjusted by increasing or decreasing the Top-10 Value.

## Built-in Web/WAP Server Port Number

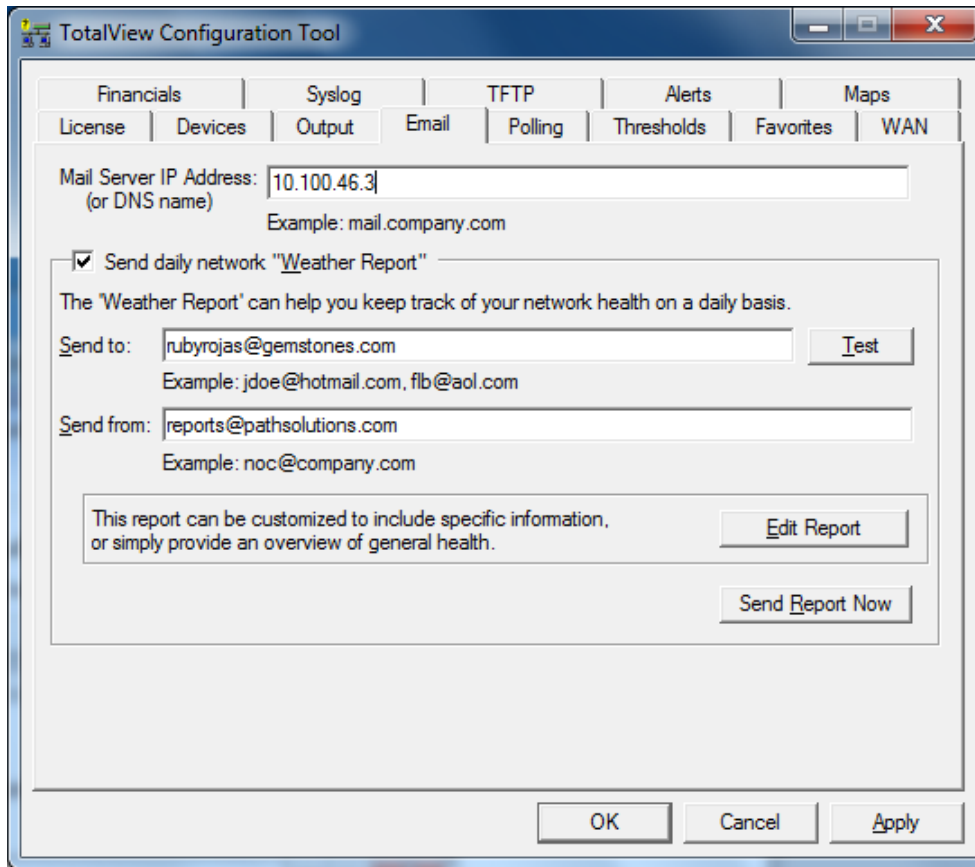
If you are using the integrated Web server to serve pages, you can specify the port that the program should use. You should choose a port that is unused on your system or the service may not be able to use that port.

If you select a port and then apply the changes by clicking on "Apply" or "OK", and the server does not respond on that port, check the application event log to determine if there may be a port conflict.



## Configuring Email

Select the "Email" tab. You should see the Configuration Tool email configuration window:



This dialog allows you to change information relating to the network "Weather Report".

If you want to receive a daily network Weather Report, check the Send daily Network Weather Report box.

You must enter an Internet SMTP email address that the report should be sent from and an Internet SMTP email address that the report should be sent to.

If you want reports to be sent to multiple users on the network, enter the user names here separated by a semicolon, comma, or space.

You must also enter your SMTP relay server IP address. This address can be your SMTP mail Internet gateway server's IP address (depending on your mail server configuration). If you are uncertain, check with your email server administrator. Appendix C contains additional information on SMTP relay server configuration.

Click "Test" to send a test email to all users listed.

If you want to modify the network Weather Report, click "Edit Report". You will be able to modify the default report to include your company logo, custom information, or shrink the email to display only the information you are interested in.

---

**Note:** The report uses MIME encoding to allow email readers to respect the content as HTML formatted content. If you need assistance with modifying this report, and do not understand MIME encoding, refer to the IETF's RFC1521 ([www.ietf.org](http://www.ietf.org)) or contact PathSolutions technical support for assistance.

---

The following objects can be included in the report:

|                       |  |
|-----------------------|--|
| %%                    | This will output a single "%" sign   |
| %DATE%                | Current date   |
| %TIME%                | Current time   |
| %URL-HOME%            | URL to the System Monitor home page  |
| %URL-GRAPHICS%        | URL pointer to the graphics directory (this can be re-directed to an Internet location)                    |
| %ISSUES%              | Text table showing the interfaces that are currently over the utilization rate or over the error rate      |
| %ISSUES*%             | HTML table showing the interfaces that are currently over the utilization rate or over the error rate      |
| %STATUS-ERR%          | Error rate threshold   |
| %STATUS-UTIL%         | Utilization rate threshold   |
| %STATUS-RESULT%       | Current status: Good or Degraded   |
| %STATUS-COLOR%        | HTML color green if the status is Good, or the HTML color red if the status is degraded                    |
| %IFSTATUS-GOOD%       | If the current status is 'Good', then the text following will be parsed and displayed up until %ENDIF%     |
| %IFSTATUS-DEGRADED%   | If the current status is 'Degraded', then the text following will be parsed and displayed up until %ENDIF% |
| %TOPCOUNT%            | Number of interfaces that are configured to be displayed in the 'Top X' lists (Top 10 Errors, etc.)        |
| %TOPERRORS%           | Text table showing the interfaces that have the highest error rates  |
| %TOPERRORS*%          | HTML table showing the interfaces that have the highest error rates  |
| %URL-TOPERRORS%       | URL pointer to the current top errors web page   |
| %TOPTRANSMITTERS%     | Text table showing the top 10 interfaces with the most data transmitted by utilization percentage          |
| %TOPTRANSMITTERS*%    | HTML TABLE showing the top 10 interfaces with the most data transmitted by utilization percentage          |
| %URL-TOPTRANSMITTERS% | URL pointer to the current top transmitters web page   |
| %TOPRECEIVERS%        | Top 10 Interfaces with Highest Daily Received Rates Sorted by Utilization                                  |
| %TOPRECEIVERS*%       | HTML table showing Top 10 Interfaces with Highest Daily Received Rates Sorted by Utilization               |
| %URL-TOPRECEIVERS%    | URL pointer to the current top receivers web page  |
| %TOPLATENCY%          | Top 10 Devices with the Highest Daily Latency Sorted by Latency  |
| %TOPLATENCY*%         | HTML table showing Top 10 Devices with the Highest Daily Latency Sorted by Latency                         |
| %URL-TOPLATENCY%      | URL pointer to the current top 10 Devices with the Highest Daily Latency                                   |
| %TOPJITTER%           | Top 10 Devices with the Highest Daily Jitter Sorted by Jitter  |
| %TOPJITTER*%          | HTML table showing Top 10 Devices with the Highest Daily Jitter Sorted by Jitter                           |
| %URL-TOPJITTER%       | URL pointer to the current top 10 Devices with the Highest Daily Jitter                                    |
| %TOPLOSS%             | Top 10 Devices with the Highest Daily Loss Sorted by Loss  |
| %TOPLOSS*%            | HTML table showing Top 10 Devices with the Highest Daily Loss Sorted by Loss                               |
| %URL-TOPLOSS%         | URL pointer to the current top 10 Devices with the Highest Daily Loss                                      |
| %TOPTALKERS%          | Text table showing the interfaces that have the highest transmission rates by kilobit                      |
| %TOPTALKERS*%         | HTML table showing the interfaces that have the highest transmission rates by kilobits                     |
| %URL-TOPTALKERS%      | URL pointer to the current top talkers web page  |

---

|                    |   |
|--------------------|---|
| %TOPLISTENERS%     | Text table showing the interfaces that have the highest reception rates         |
| %TOPLISTENERS*%    | HTML table showing the interfaces that have the highest reception rates         |
| %URL-TOPLISTENERS% | URL pointer to the current top listeners web page                               |
| %ADMINDOWN%        | Text table showing the interfaces that are currently administratively shut down |
| %ADMINDOWN*%       | HTML table showing the interfaces that are currently administratively shut down |
| %ADMINDOWN#%       | Total number of administratively shut down interfaces                           |
| %URL-ADMINDOWN%    | URL pointer to the current admin down web page                                  |
| %OPERDOWN%         | Text table showing the interfaces that are currently operationally shut down    |
| %OPERDOWN*%        | HTML table showing the interfaces that are currently operationally shut down    |
| %OPERDOWN#%        | Total number of operationally shut down interfaces                              |
| %URL-OPERDOWN%     | URL pointer to the current oper down web page                                   |

---

**Note:** Do NOT put a period "." on its own line anywhere in this file.

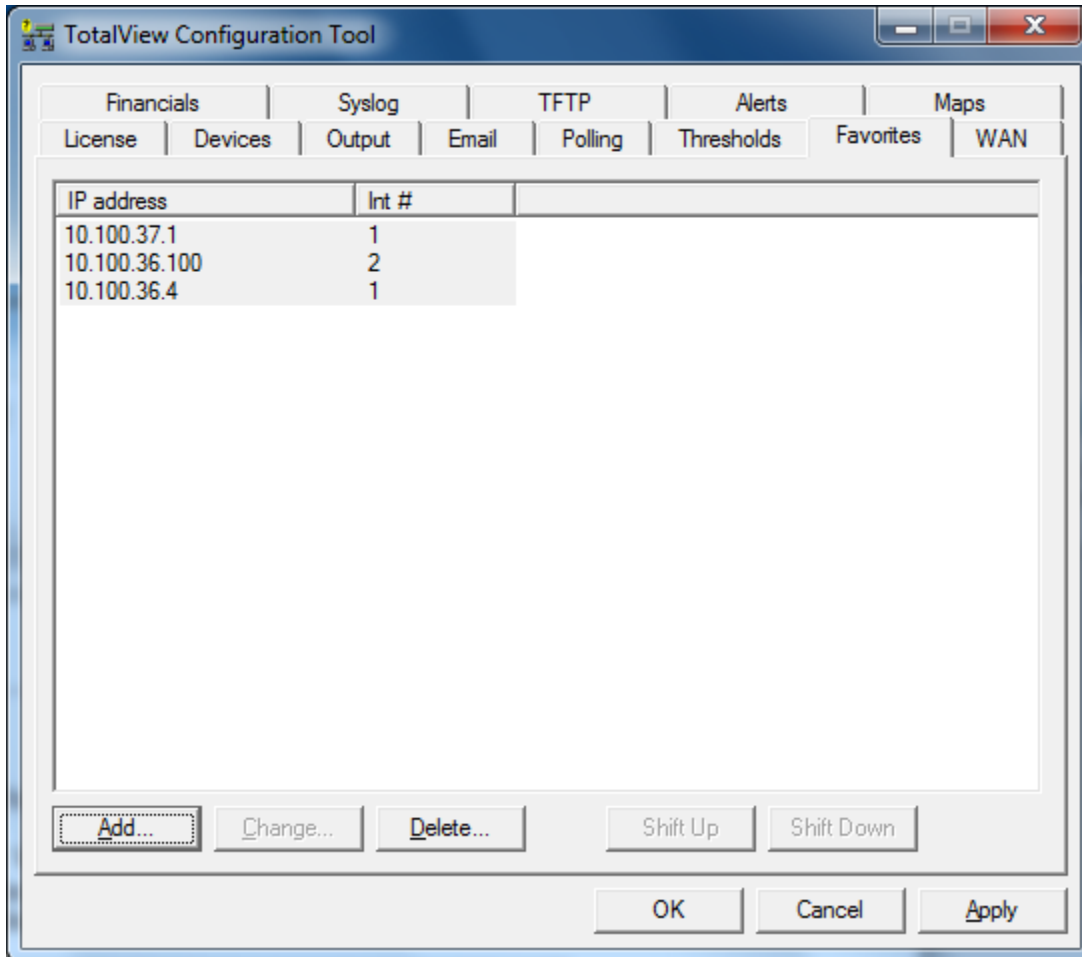
---



## Favorites

Specific interfaces can be grouped together for viewing in the Favorites tab in TotalView.

Use the Favorites tab below and click on the “Add” button to add the IP Address and Interface Number. You can also “Change” or “Delete” any interface in this list as needed. Use the Shift or Shift Down Button to sort the list in the order you would like to view them.

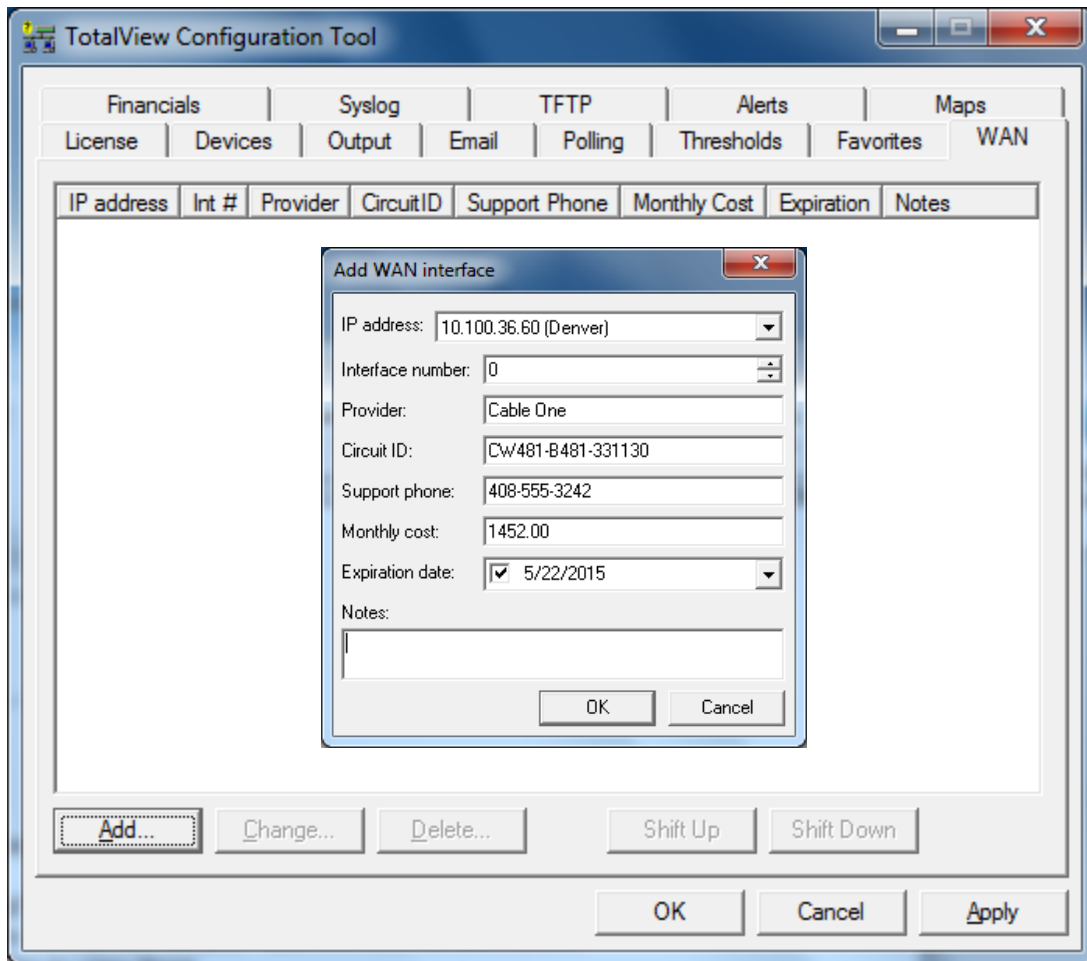


## WAN

The WAN tab can include any interface desired.

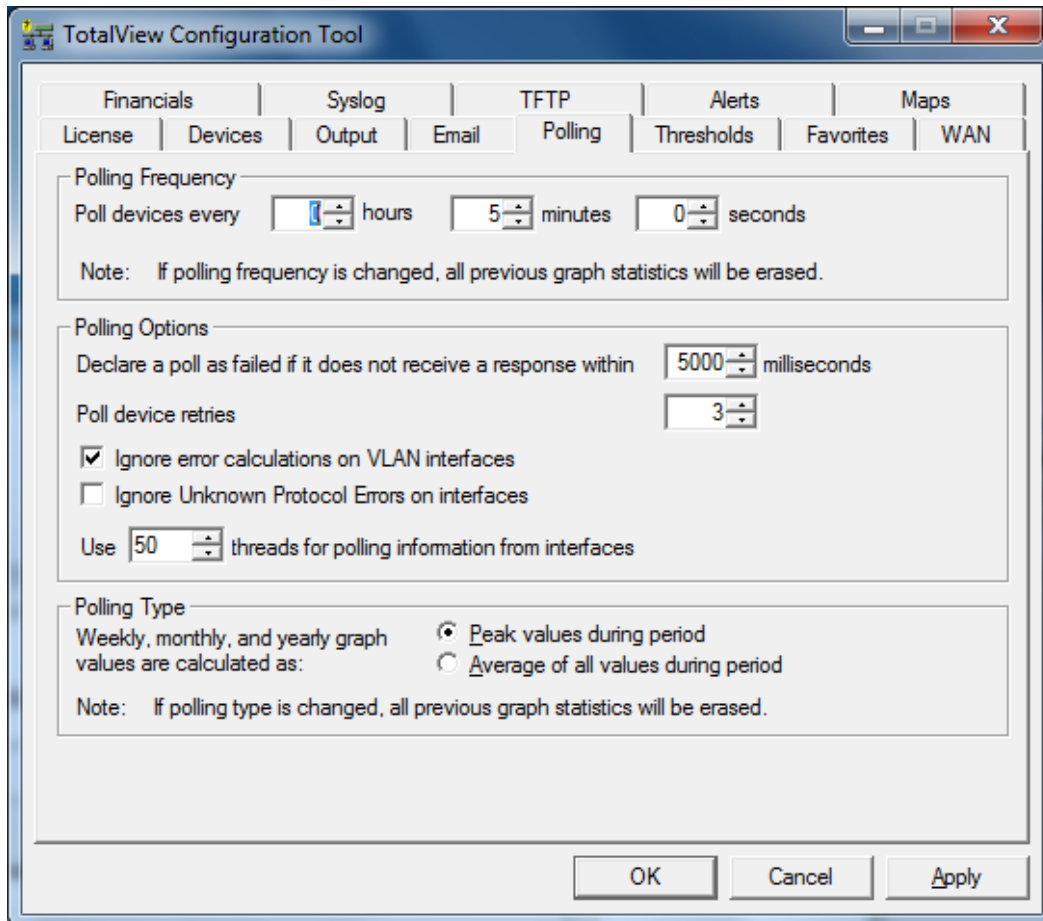
Use the WAN tab below and click on the “Add” button to add the IP Address and Interface Number. You can also include the Provider, Circuit ID, Support Phone, Monthly Cost, Expiration Date any Notes about a device to display on your WAN page.

Any interface on this page can be “Changed” or “Deleted” as needed. Use the Shift or Shift Down Button to sort the list in the order you would like to view them.



## Configuring Polling Behavior

Use the Configuration Tool and Select the "Polling" tab. You should see the polling configuration window:



PathSolutions' TotalView is very 'network friendly', and makes every attempt to prevent flooding the network with requests. One minimum sized SNMP packet is sent per interface.

### Configuring the Polling Frequency

You will want to select how often the program should poll each interface.

The default is 5 minutes. Less frequent polls will decrease the traffic on your network; however it will not provide you with as granular information on utilization and error rates.

---

**Note:** If you change the polling frequency, all historical utilization information (daily, weekly, monthly, and yearly graphs) will be erased when you click "OK", or "Apply".

---

**Note:** It is very important to make sure you do not poll your devices too often, as this can add to network overhead. In general, you should poll your interfaces every 5 minutes.

---

### Polling Options

PathSolutions' TotalView will need to know how long to wait for a response before declaring an individual poll as failed. The default is 3000ms (3 seconds). If you have a network that has extremely high latencies you may choose to increase this number. If you want PathSolutions' TotalView to declare a device as failed if it does not respond within a smaller response window you can adjust this number down.

## VLAN Interfaces

For some switch manufacturers, VLAN interfaces report anomalous errors. If you do not want the error rate of VLAN interfaces calculated, check the “Ignore error calculations on VLAN interfaces” box. The VLAN interface will still be listed, but it will not become an “issue” listed under the “Issues” tab.

## Ignoring Unknown Protocol Errors

Devices will increment the “Inbound Unknown Protocols” error counters on interfaces if strange protocols are received. This is typically when network adapters receive IPX, AppleTalk, or Cisco Discovery Protocol (CDP) broadcasts from devices. These packets can be perceived as errors since they may be unwanted protocols on the network, or the network administrator may view these as valid packets that were successfully delivered although are of no use to the recipient device. Check this box if you do not want to regard Inbound Unknown Protocols as errors.

## Polling Threads

PathSolutions’ TotalView uses 20 threads for polling devices for SNMP information. If you have a faster computer, you may choose to increase this number. If you have a slower computer, and PathSolutions’ TotalView is utilizing 100% of the system’s CPU during a polling cycle, you may get better performance by reducing this number. This will cause less thread overhead in the system.

## Polling Type

The daily polling information is summarized to the weekly graph, the weekly graph is summarized to the monthly graph, and the yearly graph is summarized to the yearly graph.

The mechanism used for summarization can be configured to maintain the average utilization during the period or the peak values during the period.

Typically, knowing how often an interface reached peak utilization is more valuable than averaging, as the average utilization information loses its granularity through the averaging process.

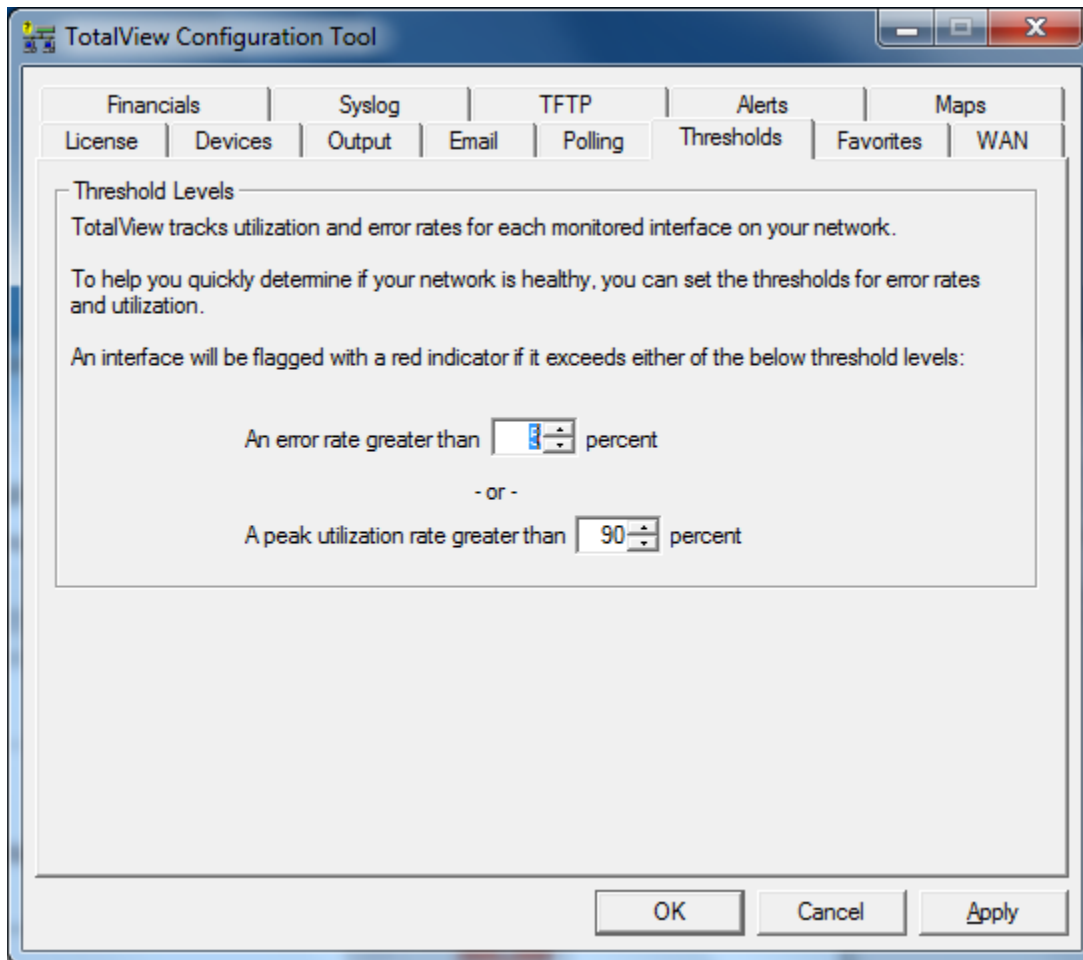
---

**Note:** If you change the polling frequency, all historical utilization information (daily, weekly, monthly, and yearly graphs) will be erased when you click “OK”, or “Apply”.

---

## Configuring Thresholds

Select the "Thresholds" tab. You should see the TotalView Configuration Tool thresholds configuration window:



If an interface has an error rate higher than 5%, network status will be changed to 'Degraded'.

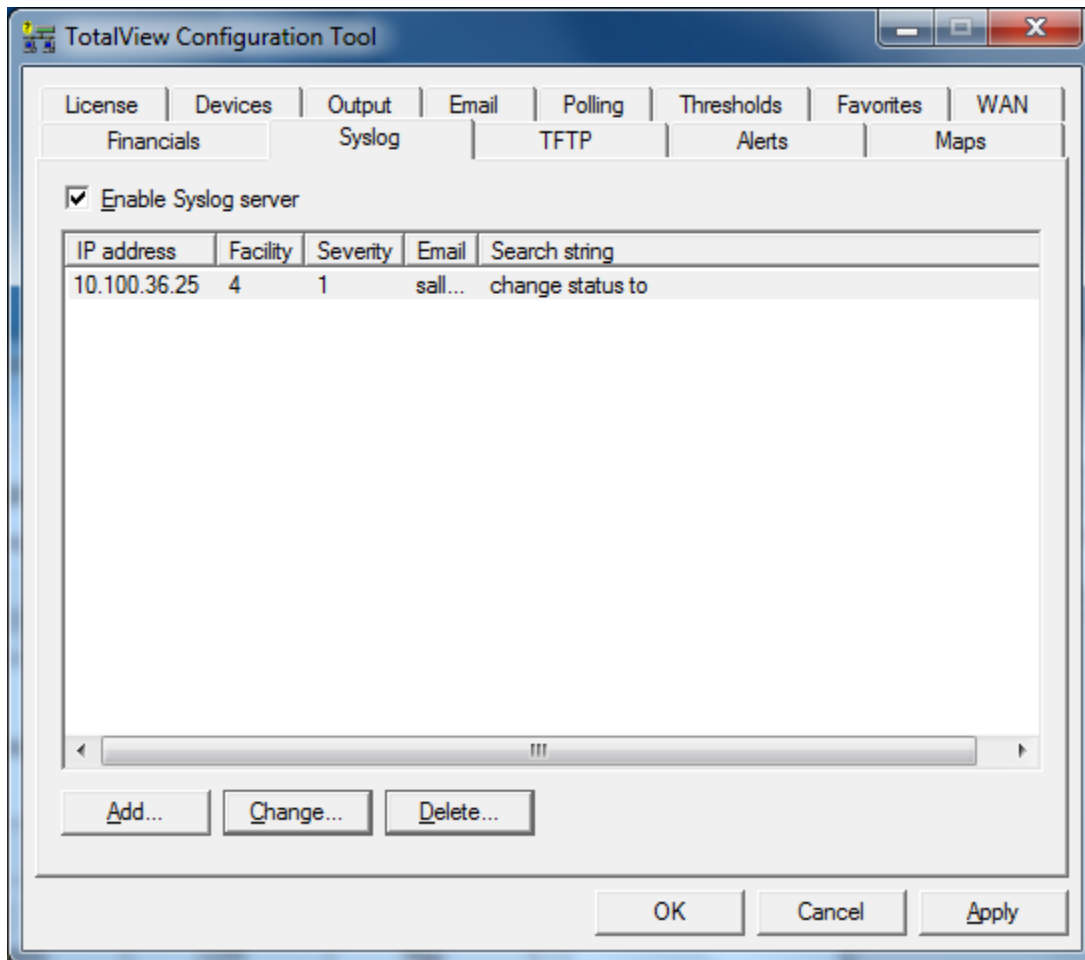
If an interface has a peak utilization rate (transmitted or received) over 90%, network status will be changed to 'Degraded'.

These numbers can be adjusted to suit your specific network environment, and your tolerance for errors.

When you are finished making changes, click "OK" to apply changes and exit the configuration tool.

## Enabling the Syslog Server

The system has a built in syslog server to receive and organize syslog messages received from network devices:



To enable the syslog server, check the box “Enable Syslog Server”.

Syslog messages will be captured and be visible from the web pages. Click on the “Syslog” link to the right of “Telnet” and “Web” to view the received syslog messages from each device.

---

**Note:** You will have to configure each of your network devices to send their syslog messages to the PathSolutions’ TotalView server.

---

You can add alerting for syslog messages by clicking on the “Add” button. You should see the following dialog:

If you enter the search string with a regular expression, you can then enter a test string and see if it matches.

Enter the email address that should receive the alert, the IP address where the syslog message should come from, and the facility number (or “Any” if it could be any facility number).

The Syslog matching capability is ECMAScript compatible.

## ECMAScript regular expressions pattern syntax

The following syntax is used to construct regex objects (or assign) that have selected ECMAScript as its grammar.

*A regular expression pattern* is formed by a sequence of characters.

Regular expression operations look sequentially for matches between the characters of the pattern and the characters in the target sequence: In principle, each character in the pattern is matched against the corresponding character in the target sequence, one by one. But the regex syntax allows for special characters and expressions in the pattern.

## Special pattern characters

Special pattern characters are characters (or sequences of characters) that have a special meaning when they appear in a regular expression pattern, either to represent a character that is difficult to express in a string, or to represent a category of characters. Each of these special pattern characters is matched in the target sequence against a single character (unless a quantifier specifies otherwise).

| characters | description       | matches  |
|------------|-------------------|--|
| .          | not newline       | any character except <i>line terminators</i> (LF, CR, LS, PS). |
| \t         | tab (HT)          | a horizontal tab character (same as \u0009).                   |
| \n         | newline (LF)      | a newline (line feed) character (same as \u000A).              |
| \v         | vertical tab (VT) | a vertical tab character (same as \u000B).                     |
| \f         | form feed (FF)    | a form feed character (same as \u000C).                        |
| \r         | carriage return   | a carriage return character (same as \u000D).                  |

|                         |                         |   |
|-------------------------|-------------------------|---|
|                         | (CR)                    |   |
| <code>\cletter</code>   | control code            | a control code character whose <i>code unit value</i> is the same as the remainder of dividing the <i>code unit value</i> of <i>letter</i> by 32.<br>For example: <code>\ca</code> is the same as <code>\u0001</code> , <code>\cb</code> the same as <code>\u0002</code> , and so on... |
| <code>\xhh</code>       | ASCII character         | a character whose <i>code unit value</i> has an hex value equivalent to the two hex digits <i>hh</i> .<br>For example: <code>\x4c</code> is the same as <code>␣</code> , or <code>\x23</code> the same as <code>#</code> .  |
| <code>\uhhhh</code>     | unicode character       | a character whose <i>code unit value</i> has an hex value equivalent to the four hex digits <i>hhhh</i> .   |
| <code>\0</code>         | null                    | a null character (same as <code>\u0000</code> ).  |
| <code>\int</code>       | backreference           | the result of the submatch whose opening parenthesis is the <i>int</i> -th ( <i>int</i> shall begin by a digit other than 0). See <a href="#">groups</a> below for more info.   |
| <code>\d</code>         | digit                   | a decimal digit character (same as <code>[[:digit:]]</code> ).  |
| <code>\D</code>         | not digit               | any character that is not a decimal digit character (same as <code>[^[:digit:]]</code> ).   |
| <code>\s</code>         | whitespace              | a whitespace character (same as <code>[[:space:]]</code> ).   |
| <code>\S</code>         | not whitespace          | any character that is not a whitespace character (same as <code>[^[:space:]]</code> ).  |
| <code>\w</code>         | word                    | an alphanumeric or underscore character (same as <code>[_[:alnum:]]</code> ).   |
| <code>\W</code>         | not word                | any character that is not an alphanumeric or underscore character (same as <code>[^_[:alnum:]]</code> ).  |
| <code>\character</code> | character               | the character <i>character</i> as it is, without interpreting its special meaning within a regex expression.<br>Any <i>character</i> can be escaped except those which form any of the special character sequences above.<br>Needed for: <code>^ \$ \ . * + ? ( ) [ ] { }  </code>      |
| <code>[class]</code>    | character class         | the target character is part of the class (see <a href="#">character classes</a> below)   |
| <code>[^class]</code>   | negated character class | the target character is not part of the class (see <a href="#">character classes</a> below)   |

Notice that, in C++, character and string literals also escape characters using the backslash character (`\`), and this affects the syntax for constructing regular expressions from such types. For example:

```
1 std::regex e1 ("\\d"); // regular expression: \d -> matches a digit
  character
  std::regex e2 ("\\\\"); // regular expression: \\ -> matches a single
2 backslash (\) character
```

## Quantifiers

Quantifiers follow a character or a special pattern character. They can modify the amount of times that character is repeated in the match:

| characters           | times              | effects  |
|----------------------|--------------------|--|
| <code>*</code>       | 0 or more          | The preceding atom is matched 0 or more times.                   |
| <code>+</code>       | 1 or more          | The preceding atom is matched 1 or more times.                   |
| <code>?</code>       | 0 or 1             | The preceding atom is optional (matched either 0 times or once). |
| <code>{int}</code>   | <i>int</i>         | The preceding atom is matched exactly <i>int</i> times.          |
| <code>{int, }</code> | <i>int</i> or more | The preceding atom is matched <i>int</i> or more times.          |



|                        |                                   |   |
|------------------------|-----------------------------------|---|
| <code>{min,max}</code> | between <i>min</i> and <i>max</i> | The preceding atom is matched at least <i>min</i> times, but not more than <i>max</i> . |
|------------------------|-----------------------------------|---|

By default, all these quantifiers are greedy (i.e., they take as many characters that meet the condition as possible). This behavior can be overridden to ungreedy (i.e., take as few characters that meet the condition as possible) by adding a question mark (?) after the quantifier.

For example:

Matching "(a+).\*" against "aardvark" succeeds and yields aa as the first sub match.

While matching "(a+?).\*" against "aardvark" also succeeds, but yields a as the first sub match.

## Groups

Groups allow applying quantifiers to a sequence of characters (instead of a single character). There are two kinds of groups:

| characters                  | description   | effects                          |
|-----------------------------|---------------|----------------------------------|
| <code>(subpattern)</code>   | Group         | Creates a backreference.         |
| <code>(?:subpattern)</code> | Passive group | Does not create a backreference. |

When a group creates a backreference, the characters that represent the subpattern in the target sequence are stored as a submatch. Each submatch is numbered after the order of appearance of their opening parenthesis (the first submatch is number 1; the second is number 2, and so on...).

These submatches can be used in the regular expression itself to specify that the entire subpattern should appear again somewhere else (see `\1` in the [special characters](#) list). They can also be used in the [replacement string](#) or retrieved in the [match results](#) object filled by some [regex](#) operations.

## Assertions

Assertions are conditions that do not consume characters in the target sequence: they do not describe a character, but a condition that must be fulfilled before or after a character.

| characters                  | description         | condition for match  |
|-----------------------------|---------------------|--|
| <code>^</code>              | Beginning of line   | Either it is the beginning of the target sequence, or follows a <i>line terminator</i> .   |
| <code>\$</code>             | End of line         | Either it is the end of the target sequence, or precedes a <i>line terminator</i> .  |
| <code>\b</code>             | Word boundary       | The previous character is a <i>word character</i> and the next is a <i>non-word character</i> (or vice-versa).<br>Note: The beginning and the end of the target sequence are considered here as <i>non-word characters</i> . |
| <code>\B</code>             | Not a word boundary | The previous and next characters are both <i>word characters</i> or both are <i>non-word characters</i> .<br>Note: The beginning and the end of the target sequence are considered here as <i>non-word characters</i> .      |
| <code>(?=subpattern)</code> | Positive lookahead  | The characters following the assertion must match <i>subpattern</i> , but no characters are consumed.  |
| <code>(?!subpattern)</code> | Negative lookahead  | The characters following the assertion must not match <i>subpattern</i> , but no characters are consumed.  |

## Alternatives

A pattern can include different alternatives:

| character | description | effects  |
|-----------|-------------|--|
|           | Separator   | Separates two alternative patterns or subpatterns. |

A regular expression can contain multiple alternative patterns simply by separating them with the *separator operator* (`|`): The regular expression will match if any of the alternatives match, and as soon as one does.

Subpatterns (in groups or assertions) can also use the *separator operator* to separate different alternatives.

## Character classes

A character class defines a category of characters. It is introduced by enclosing its descriptors in square brackets (`[` and `]`).

The regex object attempts to match the entire character class against a single character in the target sequence (unless a quantifier specifies otherwise).

The character class can contain any combination of:

- Individual characters:** Any character specified is considered part of the class (except `\`, `[`, `]` and `-`, which have a special meaning under some circumstances, and may need to be escaped to be part of the class).  
 For example:  
`[abc]` matches a, b or c.  
`[^xyz]` matches any character except x, y and z.
- Ranges:** They can be specified by using the hyphen character (`-`) between two valid characters.  
 For example:  
`[a-z]` matches any lowercase letter (a, b, c ... until z).  
`[abc1-5]` matches either a, b or c, or a digit between 1 and 5.
- POSIX-like classes:** A whole set of predefined classes can be added to a custom character class. There are three kinds:

| class                        | description           | notes  |
|------------------------------|-----------------------|--|
| <code>[ :classname: ]</code> | character class       | Uses the <i>regex traits'</i> <a href="#">isctype</a> member with the appropriate type gotten from applying <a href="#">lookup_classname</a> member on <i>classname</i> for the match. |
| <code>[ .classname. ]</code> | collating sequence    | Uses the <i>regex traits'</i> <a href="#">lookup_collatename</a> to interpret <i>classname</i> .   |
| <code>[ =classname= ]</code> | character equivalents | Uses the <i>regex traits'</i> <a href="#">transform_primary</a> of the result of <a href="#">regex_traits::lookup_collatename</a> for <i>classname</i> to check for matches.           |

- The choice of available classes depends on the [regex traits](#) type and on its selected locale. But at least the following character classes shall be recognized by any [regex traits](#) type and locale:

| class                    | description               | equivalent (with <a href="#">regex traits</a> , default locale) |
|--------------------------|---------------------------|---|
| <code>[ :alnum: ]</code> | alpha-numerical character | <a href="#">isalnum</a>   |
| <code>[ :alpha: ]</code> | alphabetic character      | <a href="#">isalpha</a>   |
| <code>[ :blank: ]</code> | blank character           | <a href="#">isblank</a>   |

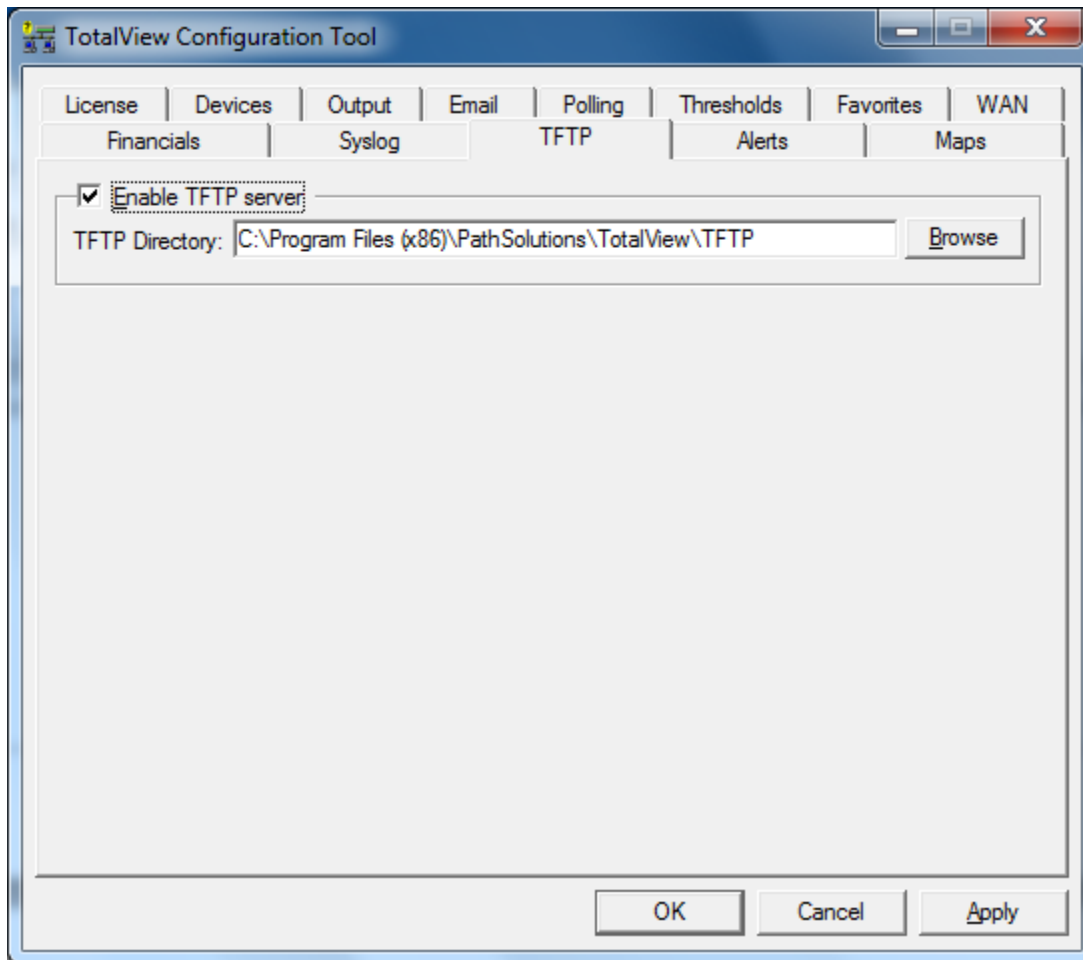
|                         |   |                          |
|-------------------------|---|--------------------------|
| <code>[:cntrl:]</code>  | control character                       | <a href="#">iscntrl</a>  |
| <code>[:digit:]</code>  | decimal digit character                 | <a href="#">isdigit</a>  |
| <code>[:graph:]</code>  | character with graphical representation | <a href="#">isgraph</a>  |
| <code>[:lower:]</code>  | lowercase letter                        | <a href="#">islower</a>  |
| <code>[:print:]</code>  | printable character                     | <a href="#">isprint</a>  |
| <code>[:punct:]</code>  | punctuation mark character              | <a href="#">ispunct</a>  |
| <code>[:space:]</code>  | whitespace character                    | <a href="#">isspace</a>  |
| <code>[:upper:]</code>  | uppercase letter                        | <a href="#">isupper</a>  |
| <code>[:xdigit:]</code> | hexadecimal digit character             | <a href="#">isxdigit</a> |
| <code>[:d:]</code>      | decimal digit character                 | <a href="#">isdigit</a>  |
| <code>[:w:]</code>      | word character                          | <a href="#">isalnum</a>  |
| <code>[:s:]</code>      | whitespace character                    | <a href="#">isspace</a>  |

- Please note that the brackets in the class names are additional to those opening and closing the class definition.  
For example:  
`[:alpha:]` is a character class that matches any alphanumeric character.  
`[abc[:digit:]]` is a character class that matches a, b, c, or a digit.  
`[^[:space:]]` is a character class that matches any character except a whitespace.
- **Escape characters:** All escape characters described above can also be used within a character class specification. The only change is with `\b`, that here is interpreted as a backspace character (`\u0008`) instead of a word boundary.  
Notice that within a class definition, those characters that have a special meaning in the regular expression (such as `*`, `.`, `$`) don't have such a meaning and are interpreted as normal characters (so they do not need to be escaped). Instead, within a class definition, the hyphen (`-`) and the brackets (`[` and `]`) do have a special meaning under some circumstances, in which case they should be escaped with a backslash (`\`) to be interpreted as normal characters.

Character classes' support depends heavily on the [regex traits](#) used by the [regex](#) object: the [regex](#) object calls its [traits](#)'s [isctype](#) member function with the appropriate arguments. For the standard [regex traits](#) object using the default locale, see [cctype](#) for a classification of characters.

## Enabling the TFTP Server

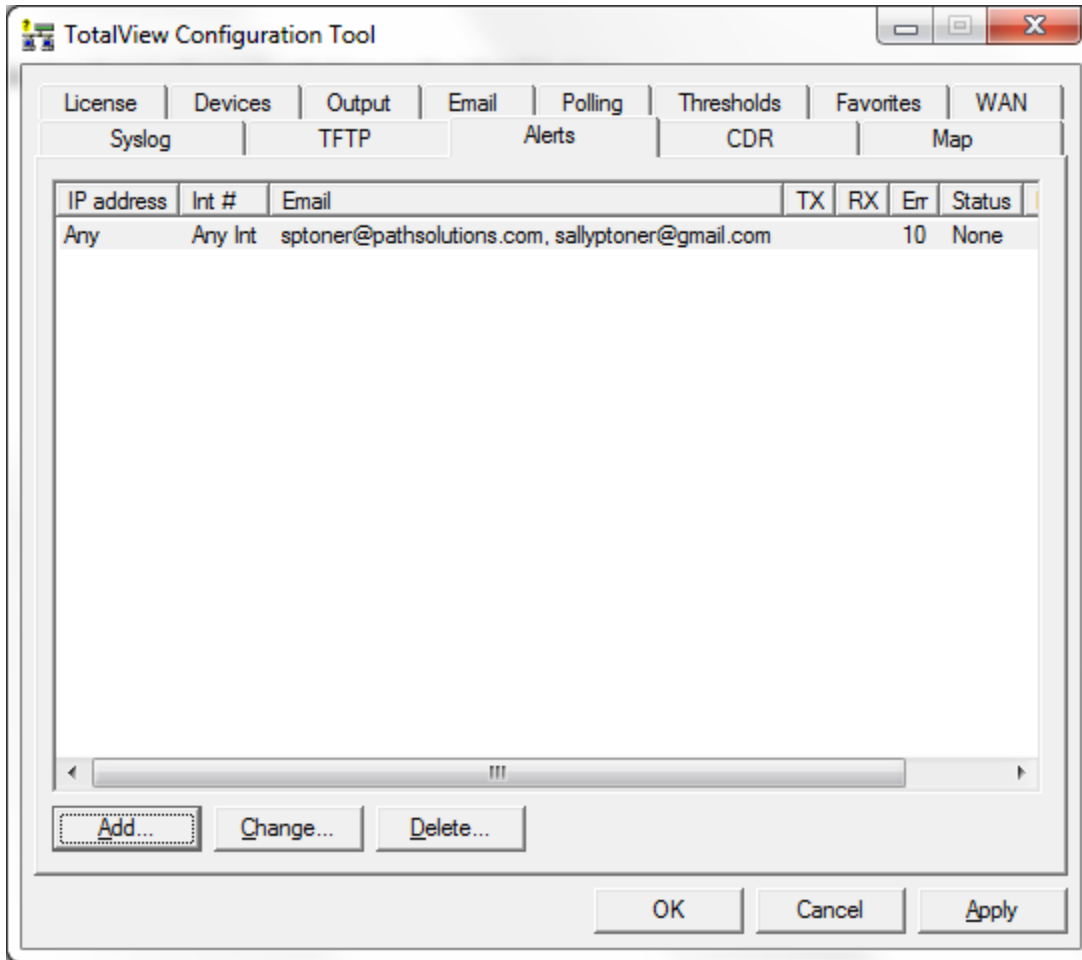
The system can receive TFTP files from network devices via the built-in TFTP server:



You can enter a different directory where the TFTP files are saved/retrieved from if desired.

## Enabling Alerting

The system can generate alerts if interfaces change status or exceed set levels of utilization or errors:



You can add alerting for interfaces by clicking on the “Add” button.

You should see the following dialog:

**Add alert**

Email address:

Description:

IP address:

Alert Type:

Device Communications Failure

Cisco CPU Utilization  %

Cisco free RAM  bytes

MOS score

Any Interface

Interface Number

Interface Type

Tx Utilization:  percent utilized

Rx Utilization:  percent utilized

Error percentage:  percent packet loss

Status Change:

OK Cancel

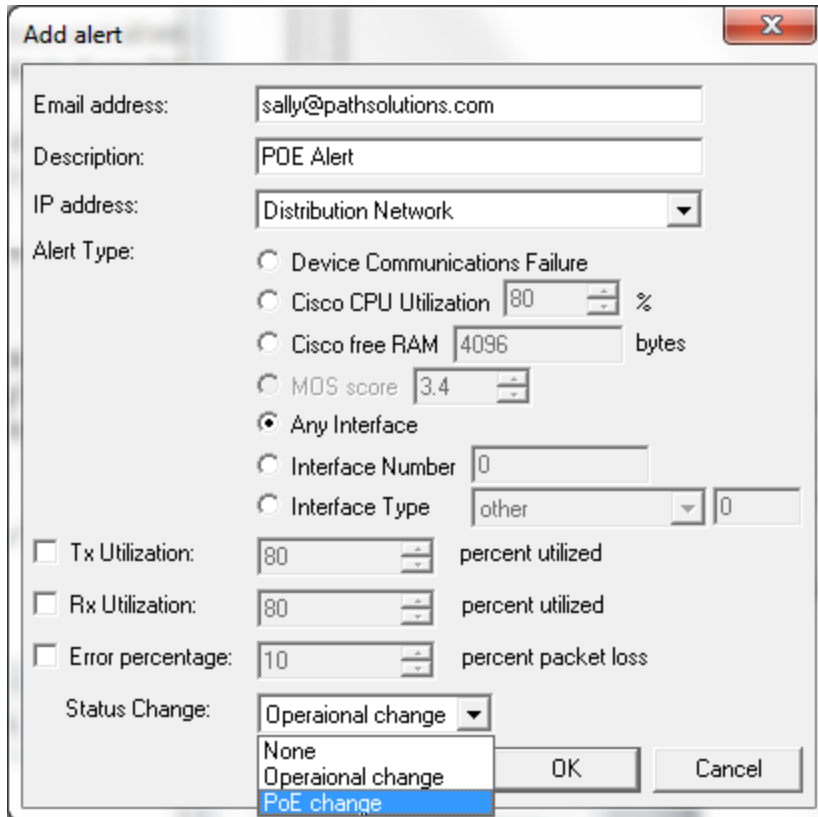
Enter the email address that should receive the alert, the IP address of the device and the interface number. Alternately, you can select Interface Type and choose the interface type from the drop-down or select "other" to enter additional interface types.

Enter Comm Fail if you want to receive an alert if the device cannot be communicated with or "Any if you want to receive the alert if any interface on the device exceeds the threshold.

You should check the box for Utilization, Error percentage, or Status change if you want these variables to trigger an alert or not.

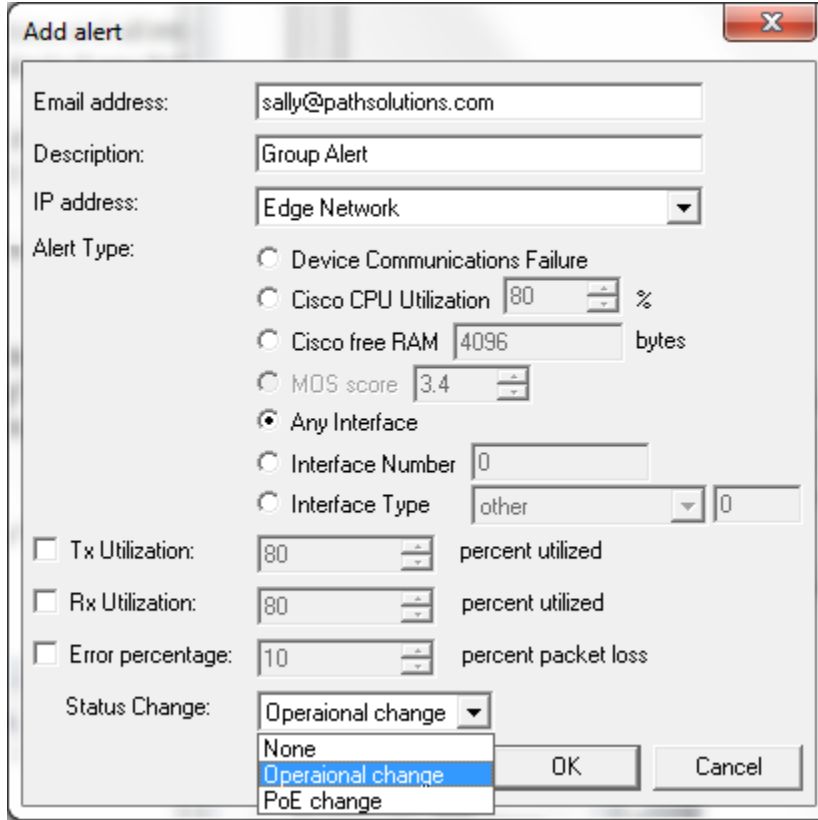
### POE Alerting

If you want to know if any PoE enabled device is connected or disconnected from your network select the "Status Change" PoE change option from the drop down box. You can track when and where VoIP phones are moved, rogue access points are connected to the network, or when VoIP phones are disconnected from the network to help track phone theft.



### Group Alerting

The new group alerting allows you to set up an alert for devices in a group. For example, if you want to know when any devices in the “Edge Network” group have an interface with high utilization. Just choose the group in the drop-down box.

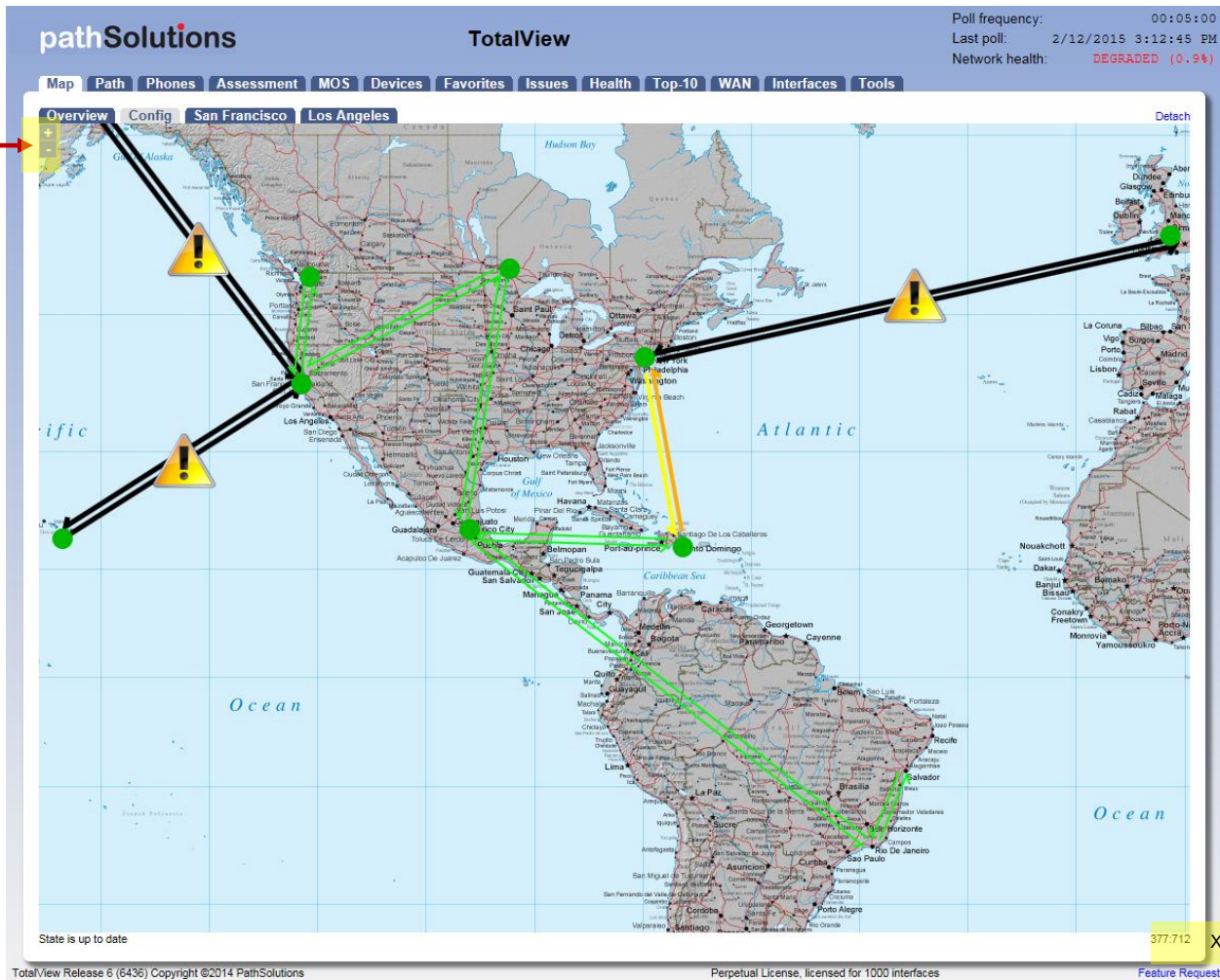




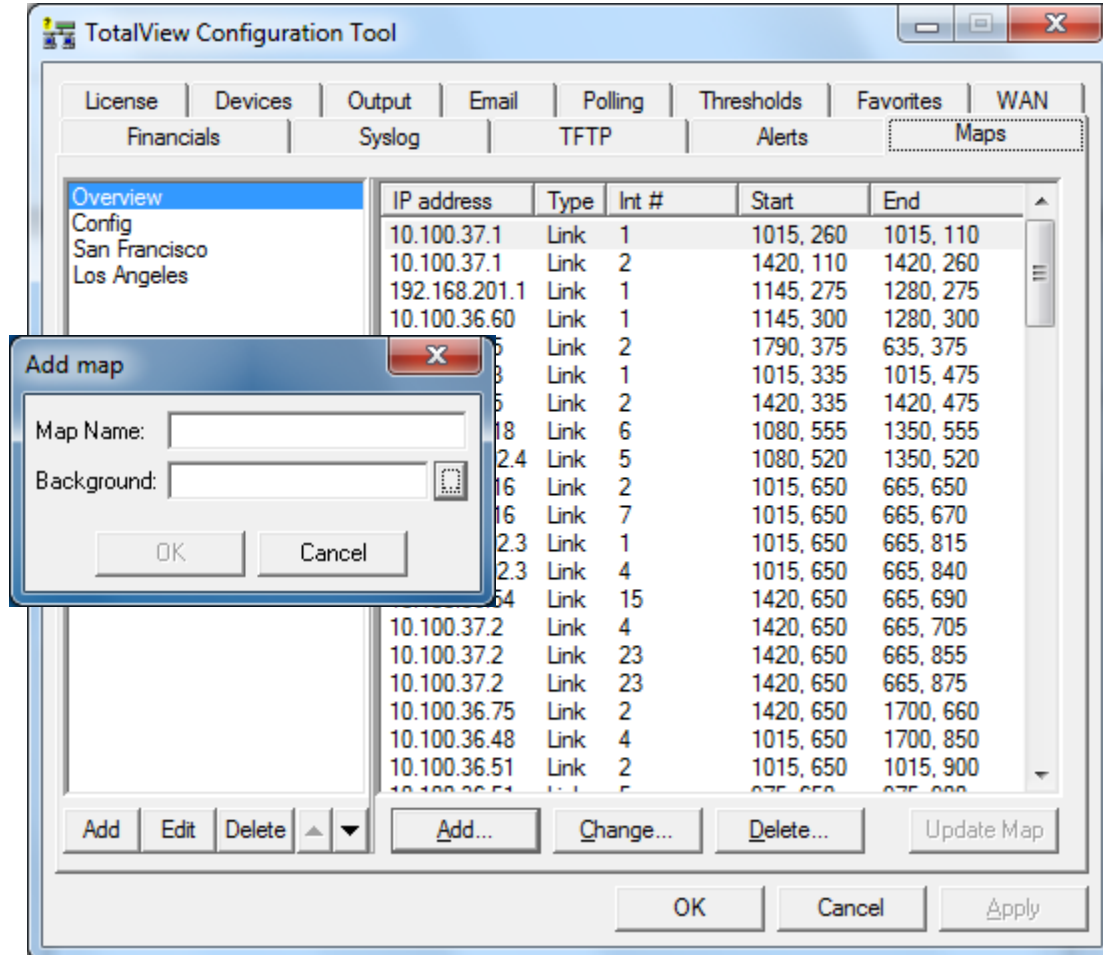
### Configuring the Network Map

To create interfaces that display on the network map, use the **coordinates displayed in the lower right** corner of the map and enter them in the Configuration Tool to determine the end points for your network links. To zoom in and out on the map, use the **+ and -** features at the top left of the screen. To pan, use your cursor in the center of the screen to move around.

Audible alerts play when links or devices go down so you can know what's happening immediately and start to remedy the problem.

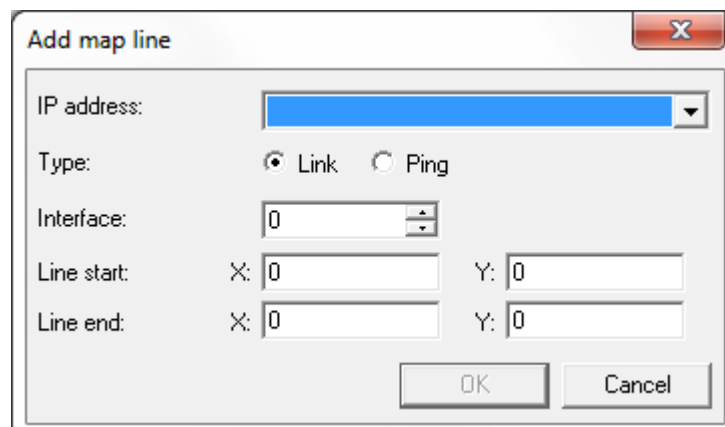


Open the Configuration Tool and add a Map on the left hand side. Click on Add, create a Map Name and then select a Background pic from your TotalView Graphics folder. Multiple Maps can be created. Then use the right hand side to enter the interfaces and include the XY coordinates to monitor.



To add an object click "Add". You should get the add map line dialog:

For a link connection between coordinates, choose "Link" and then the IP address of the device and then enter the interface number that should be updated. Then enter the Line Start X and Y coordinate and the Line End X and Y coordinate.



For a Ping point, choose “Ping” and then enter the Line Start X and Y coordinates. This represents that the Device can be pinged and will display as a green dot (can ping), a red dot (cannot ping), or a black dot (device is down).

When finished adding Links and Ping Points click on the “Update Map” button to view your results.

| Overview      | IP address    | Type | Int # | Start     | End       |
|---------------|---------------|------|-------|-----------|-----------|
| Config        | 10.100.37.1   | Link | 1     | 1015, 260 | 1015, 110 |
| San Francisco | 10.100.37.1   | Link | 2     | 1420, 110 | 1420, 260 |
| Los Angeles   | 192.168.201.1 | Link | 1     | 1145, 275 | 1280, 275 |
|               | 10.100.36.60  | Link | 1     | 1145, 300 | 1280, 300 |
|               | 10.100.37.5   | Link | 2     | 1790, 375 | 635, 375  |
|               | 10.100.38.3   | Link | 1     | 1015, 335 | 1015, 475 |
|               | 10.100.36.5   | Link | 2     | 1420, 335 | 1420, 475 |
|               | 10.100.36.18  | Link | 6     | 1080, 555 | 1350, 555 |
|               | 192.168.202.4 | Link | 5     | 1080, 520 | 1350, 520 |
|               | 10.100.37.16  | Link | 2     | 1015, 650 | 665, 650  |
|               | 10.100.37.16  | Link | 7     | 1015, 650 | 665, 670  |
|               | 192.168.202.3 | Link | 1     | 1015, 650 | 665, 815  |
|               | 192.168.202.3 | Link | 4     | 1015, 650 | 665, 840  |
|               | 10.100.36.54  | Link | 15    | 1420, 650 | 665, 690  |
|               | 10.100.37.2   | Link | 4     | 1420, 650 | 665, 705  |
|               | 10.100.37.2   | Link | 23    | 1420, 650 | 665, 855  |
|               | 10.100.37.2   | Link | 23    | 1420, 650 | 665, 875  |
|               | 10.100.36.75  | Link | 2     | 1420, 650 | 1700, 660 |
|               | 10.100.36.48  | Link | 4     | 1015, 650 | 1700, 850 |
|               | 10.100.36.51  | Link | 2     | 1015, 650 | 1015, 900 |
|               | 10.100.36.51  | Link | 5     | 875, 650  | 875, 880  |

## Sending Emailed Reports

Reports can be emailed to users whenever desired or on regular schedules.

To set up a report to be sent, create a text file with a text editor such as Notepad. This file should contain four fields, separated by at least one <TAB> character:

```
;Email Address      Template File      Device      Interface
;-----
jdoe@company.com   IntMailDetailDaily.txt  192.168.1.1  1
jdoe@company.com   IntMailSummaryDaily.txt 192.168.6.12 14
jdoe@company.com   SystemMailDaily.txt    /            /
```

The first field is the Email address where the report should be sent.

The second field is the email template file to use to send the report. Templates can be found in the "MailTemplates" subdirectory.

The third field references a monitored device. This field may or may not be required depending on the template used. If a system-wide report is used it does not need a specific device to be referenced and a slash '/' should be used instead.

The fourth field references a specific interface on the specified device. If the report is a system-wide report or a device report no interface needs to be specified and a slash '/' can be used instead.

Save this file with any filename that ends in ".cfg" in the "ReportSend" subdirectory and the report(s) will be sent during the next polling period and the file deleted.

---

**Note:** It's valuable to save this file in an alternate directory first and then copy it to the "ReportSend" directory when you want it to be sent.

**Note:** This process can be automated via the Windows Task manager to schedule reports to be sent on a regular basis.

**Note:** All files in the "ReportSend" directory with the extension .cfg will be processed and deleted every poll period.

---

## Creating Email Report Templates

Existing email report templates are located in the “MailTemplates” directory.

They can be edited with a text editor and copied to create new templates. The format of the templates includes standard MIME encapsulation headers and definitions for multipart messages (HTML and embedded graphics).

PathSolutions’ TotalView will pre-process the template and add data elements using the %ELEMENT% replacement strings.

Available replacement strings are as follows:

|                       |   |
|-----------------------|---|
| %%                    | Prints percent sign   |
| %DATE%                | Prints current date   |
| %TIME%                | Prints current time   |
| %COMMENT-START%       | Starts a comment area that won't be sent in the email                                     |
| %COMMENT-END%         | Ends a comment area   |
| %CUSTOMERNUMBER%      | Prints the licensed customer number   |
| %CUSTOMERLOCATION%    | Prints the licensed customer location   |
| %LICENSEDINTERFACES%  | Prints the licensed interface count   |
| %LICENSEEXPIRATION%   | Prints the license expiration   |
| %RESELLERNUMBER%      | Prints the reseller number  |
| %INTERFACES%          | Prints the number of monitored interfaces   |
| %VERSION%             | Prints the version of the program   |
| %REVISION%            | Prints the revision of the program  |
| %PRODNUMBER%          | Prints the product license number   |
| %PRODNAME%            | Prints the product name   |
| %COMPANYNAME%         | Prints the company name   |
| %EMAILADDRESS%        | Prints the email address(es) that this email will be sent to                              |
| %LICENSEDAYSLEFT%     | Prints the number of licensed days remaining  |
| %URL-HOME%            | Prints the full URL to the home page  |
| %URL-HEALTH%          | Prints the full URL to the health page  |
| %URL-GRAPHICS%        | Prints the full URL to the graphics directory   |
| %URL-FAVORITES%       | Prints the full URL to the favorites page   |
| %FAVORITES%           | Prints a text table of favorite interfaces  |
| %FAVORITES*%          | Prints an HTML table of favorite interfaces   |
| %ISSUES%              | Prints a text table of current issues   |
| %ISSUES*%             | Prints an HTML table of current issues  |
| %ISSUES#%             | Prints the current number of issues   |
| %URL-ISSUES%          | Prints the full URL to the issues page  |
| %STATUS-PERCENT%      | Prints the current health percentage  |
| %STATUS-ERR%          | Prints the configured error threshold level   |
| %STATUS-UTIL%         | Prints the configured utilization threshold level   |
| %STATUS-RESULT%       | Prints “Good” or “Degraded” depending if there are any issues                             |
| %STATUS-COLOR%        | Prints “#008000” or “#FF0000” depending if there are any issues                           |
| %IFSTATUS-GOOD%       | Prints the following if there are no issues   |
| %IFSTATUS-DEGRADED%   | Prints the following if there are issues  |
| %ENDIF%               | Ends a conditional IFSTATUS section   |
| %IFDEVICE-CISCO%      | Prints the following if it is a Cisco device  |
| %ENDIF-CISCO%         | Ends conditional for Cisco device   |
| %IFLICENSE-VOIP%      | Prints the following if the system is licensed for VoIP                                   |
| %ENDIF-VOIP%          | Ends conditional for VoIP License   |
| %TOPCOUNT%            | Prints the number of interfaces configured for the Top list                               |
| %TOPERRORS%           | Prints a text table of top interfaces with errors   |
| %TOPERRORS*%          | Prints an HTML table of top interfaces with errors  |
| %URL-TOPERRORS%       | Prints the full URL to the top errors page  |
| %TOPTRANSMITTERS%     | Prints a text table of the top interfaces with the most data transmitted by utilization   |
| %TOPTRANSMITTERS*%    | Prints an HTML table showing the top interfaces with the most data                        |
| %URL-TOPTRANSMITTERS% | Prints the full URL to the current top transmitters web page                              |
| %TOPRECEIVERS%        | Prints a text table of the top Interfaces with highest daily received rates               |
| %TOPRECEIVERS*%       | Prints an HTML table showing the top Interfaces with highest daily received               |
| %URL-TOPRECEIVERS%    | Prints the full URL to the current top receivers web page                                 |
| %TOPLATENCY%          | Prints a text table of the top devices with the highest daily latency sorted by latency   |
| %TOPLATENCY*%         | Prints an HTML table showing top devices with the highest daily latency sorted by latency |
| %URL-TOPLATENCY%      | Prints the full URL to the current top devices with the highest daily latency             |
| %TOPJITTER%           | Prints a text table of the top devices with the highest daily jitter sorted by jitter     |
| %TOPJITTER*%          | Prints an HTML table showing top devices with the highest daily jitter sorted by jitter   |
| %URL-TOPJITTER%       | Prints the full URL to the current top devices with the highest daily jitter              |

|                             |  |
|-----------------------------|--|
| %TOPLOSS%                   | Prints a text table to the top devices with the highest daily loss sorted by loss                          |
| %TOPLOSS*%                  | Prints an HTML table showing top devices with the highest daily loss sorted by loss                        |
| %URL-TOPLOSS%               | Prints the full URL to the current top devices with the highest daily loss                                 |
| %TOPTALKERS%                | Prints a text table of top talkers   |
| %TOPTALKERS*%               | Prints an HTML table of top talkers  |
| %URL-TOPTALKERS%            | Prints the full URL to the top talkers page  |
| %TOPLISTENERS%              | Prints a text table of top listeners   |
| %TOPLISTENERS*%             | Prints an HTML table of top listeners  |
| %URL-TOPLISTENERS%          | Prints the full URL to the top listeners page  |
| %ADMINDOWN%                 | Prints a text table of admin down interfaces   |
| %ADMINDOWN*%                | Prints an HTML table of admin down interfaces  |
| %ADMINDOWN#%                | Prints the number of admin down interfaces   |
| %URL-ADMINDOWN%             | Prints the full URL to the admin down page   |
| %OPERDOWN%                  | Prints a text table of oper down interfaces  |
| %OPERDOWN*%                 | Prints an HTML table of oper down interfaces   |
| %OPERDOWN#%                 | Prints the number of oper down interfaces  |
| %URL-OPERDOWN%              | Prints the full URL to the oper down page  |
| %POLLDELAY%                 | Prints the current configured poll delay   |
| %SAVESTATSTICKCOUNT%        | Prints the number of ticks (ms) required during the last poll to save statistics to disk                   |
| %SAVESTATSTICKCOUNTAVG%     | Prints the average number of ticks (ms) required to save statistics to disk                                |
| %POLLTICKCOUNT%             | Prints the number of ticks (ms) required during the last poll to collect SNMP information from all devices |
| %POLLTICKCOUNTAVG%          | Prints the average number of ticks (ms) required to collect SNMP information from all devices              |
| %ANALYZETICKCOUNT%          | Prints the number of ticks (ms) required during the last poll to analyze all data                          |
| %ANALYZETICKCOUNTAVG%       | Prints the average number of ticks (ms) required to analyze all data                                       |
| %OUTPUTTICKCOUNT%           | Prints the number of ticks (ms) required during the last poll to write output information                  |
| %OUTPUTTICKCOUNTAVG%        | Prints the average number of ticks (ms) required to write output information                               |
| %POLLHOURS%                 | Prints the configured poll delay hours   |
| %POLLMINUTES%               | Prints the configured poll delay minutes   |
| %POLLSECONDS%               | Prints the configured poll delay seconds   |
| %POLLFAILSECONDS%           | Prints the number of seconds that the last poll failed by  |
| %POLLFAILTABLE%             | Prints the text version of the poll fail table   |
| %POLLFAILTABLE*%            | Prints the HTML version of the poll fail table   |
| %SYSTEM-DAILY-UTIL%         | Prints base64 encoding of the daily aggregate utilization graph  |
| %SYSTEM-DAILY-ERRORS%       | Prints base64 encoding of the daily overall errors graph   |
| %SYSTEM-DAILY-ISSUES%       | Prints base64 encoding of the daily overall issues graph   |
| %SYSTEM-DAILY-INTERFACES%   | Prints base64 encoding of the daily interfaces graph   |
| %SYSTEM-WEEKLY-UTIL%        | Prints base64 encoding of the weekly aggregate utilization graph   |
| %SYSTEM-WEEKLY-UTIL%        | Prints base64 encoding of the weekly overall errors graph  |
| %SYSTEM-WEEKLY-ISSUES%      | Prints base64 encoding of the weekly overall issues graph  |
| %SYSTEM-WEEKLY-INTERFACES%  | Prints base64 encoding of the weekly interfaces graph  |
| %SYSTEM-MONTHLY-UTIL%       | Prints base64 encoding of the monthly aggregate utilization graph  |
| %SYSTEM-MONTHLY-ERRORS%     | Prints base64 encoding of the monthly overall errors graph   |
| %SYSTEM-MONTHLY-ISSUES%     | Prints base64 encoding of the monthly overall issues graph   |
| %SYSTEM-MONTHLY-INTERFACES% | Prints base64 encoding of the monthly interfaces graph   |
| %SYSTEM-YEARLY-UTIL%        | Prints base64 encoding of the yearly aggregate utilization graph   |
| %SYSTEM-YEARLY-ERRORS%      | Prints base64 encoding of the yearly overall errors graph  |
| %SYSTEM-YEARLY-ISSUES%      | Prints base64 encoding of the yearly overall issues graph  |
| %SYSTEM-YEARLY-INTERFACES%  | Prints base64 encoding of the yearly interfaces graph  |
| %URL-DEVICE%                | Prints the full URL to the specified device page   |
| %DEVICE-NUMBER%             | Prints the device number   |
| %DEVICE-AGENT%              | Prints the device agent (IP address)   |
| %DEVICE-GROUP%              | Prints the configured group for the device   |
| %DEVICE-CONTRACT-DATE%      | Prints the configured device service contract date   |
| %DEVICE-CONTRACT-ID%        | Prints the configured device ID number associated with the service contract                                |
| %DEVICE-CONTRACT-PHONE%     | Prints the configured device service contract phone number   |
| %DEVICE-DESCRIPTION%        | Prints the configured device description   |
| %DEVICE-INTERFACES%         | Prints the number of interfaces for the device   |
| %DEVICE-ADMINDOWN%          | Prints the number of admin down interfaces on the device   |
| %DEVICE-OPERDOWN%           | Prints the number of oper down interfaces on the device  |
| %DEVICE-INT-DESCRIPTION%    | Prints the device internal description (sysDescr)  |
| %DEVICE-LOCATION%           | Prints the device configured location (sysLocation)  |
| %DEVICE-CONTACT%            | Prints the device configured contact (sysContact)  |
| %DEVICE-NAME%               | Prints the device configured name (sysName)  |
| %DEVICE-SERIALNO%           | Prints the device serial number (Cisco IOS only)   |
| %DEVICE-CPU%                | Prints the device current CPU utilization graph (Cisco IOS only)   |
| %DEVICE-RAM%                | Prints the device current RAM utilization graph (Cisco IOS only)   |
| %DEVICE-DAILY-UTIL%         | Prints base64 encoding of the daily device overall utilization graph                                       |
| %DEVICE-DAILY-CPU%          | Prints base64 encoding of the daily CPU utilization graph (Cisco IOS only)                                 |
| %DEVICE-DAILY-RAM%          | Prints base64 encoding of the daily RAM utilization graph (Cisco IOS only)                                 |
| %DEVICE-DAILY-LATENCY%      | Prints base64 encoding of the daily latency graph (VoIP only)  |
| %DEVICE-DAILY-JITTER%       | Prints base64 encoding of the daily jitter graph (VoIP only)   |

|                           |  |
|---------------------------|--|
| %DEVICE-DAILY-LOSS%       | Prints base64 encoding of the daily loss graph (VoIP only)                   |
| %DEVICE-DAILY-MOS%        | Prints base64 encoding of the daily MOS graph (VoIP only)                    |
| %DEVICE-WEEKLY-UTIL%      | Prints base64 encoding of the weekly device overall utilization graph        |
| %DEVICE-WEEKLY-CPU%       | Prints base64 encoding of the weekly CPU utilization graph (Cisco IOS only)  |
| %DEVICE-WEEKLY-RAM%       | Prints base64 encoding of the weekly RAM utilization graph (Cisco IOS only)  |
| %DEVICE-WEEKLY-LATENCY%   | Prints base64 encoding of the weekly latency graph (VoIP only)               |
| %DEVICE-WEEKLY-JITTER%    | Prints base64 encoding of the weekly jitter graph (VoIP only)                |
| %DEVICE-WEEKLY-LOSS%      | Prints base64 encoding of the weekly loss graph (VoIP only)                  |
| %DEVICE-WEEKLY-MOS%       | Prints base64 encoding of the weekly MOS graph (VoIP only)                   |
| %DEVICE-MONTHLY-UTIL%     | Prints base64 encoding of the monthly device overall utilization graph       |
| %DEVICE-MONTHLY-CPU%      | Prints base64 encoding of the monthly CPU utilization graph (Cisco IOS only) |
| %DEVICE-MONTHLY-RAM%      | Prints base64 encoding of the monthly RAM utilization graph (Cisco IOS only) |
| %DEVICE-MONTHLY-LATENCY%  | Prints base64 encoding of the monthly latency graph (VoIP only)              |
| %DEVICE-MONTHLY-JITTER%   | Prints base64 encoding of the monthly jitter graph (VoIP only)               |
| %DEVICE-MONTHLY-LOSS%     | Prints base64 encoding of the monthly loss graph (VoIP only)                 |
| %DEVICE-MONTHLY-MOS%      | Prints base64 encoding of the monthly MOS graph (VoIP only)                  |
| %DEVICE-YEARLY-UTIL%      | Prints base64 encoding of the yearly device overall utilization graph        |
| %DEVICE-YEARLY-CPU%       | Prints base64 encoding of the yearly CPU utilization graph (Cisco IOS only)  |
| %DEVICE-YEARLY-RAM%       | Prints base64 encoding of the yearly RAM utilization graph (Cisco IOS only)  |
| %DEVICE-YEARLY-LATENCY%   | Prints base64 encoding of the yearly latency graph (VoIP only)               |
| %DEVICE-YEARLY-JITTER%    | Prints base64 encoding of the yearly jitter graph (VoIP only)                |
| %DEVICE-YEARLY-LOSS%      | Prints base64 encoding of the yearly loss graph (VoIP only)                  |
| %DEVICE-YEARLY-MOS%       | Prints base64 encoding of the yearly MOS graph (VoIP only)                   |
| %URL-INT%                 | Prints the full URL to the specified interface page                          |
| %INT-NUMBER%              | Prints the interface number  |
| %INT-DESCRIPTION%         | Prints the interface description   |
| %INT-ALIAS%               | Prints the interface alias   |
| %INT-NAME%                | Prints the interface name  |
| %INT-DAILYERRORRATE%      | Prints the daily peak error rate   |
| %INT-DAILYERRORRATECOLOR% | Prints the daily peak error rate color                                       |
| %INT-DAILYTXRATE%         | Prints the peak daily transmit rate  |
| %INT-DAILYTXRATECOLOR%    | Prints the peak daily transmit rate color                                    |
| %INT-DAILYRXRATE%         | Prints the peak daily receive rate   |
| %INT-DAILYRXRATECOLOR%    | Prints the peak daily receive rate color                                     |
| %INT-SPEED%               | Prints the interface speed of the interface                                  |
| %INT-DUPLEX%              | Prints the interface duplex of the interface                                 |
| %INT-ADMINSTATUS%         | Prints the current admin status of the interface                             |
| %INT-OPERSTATUS%          | Prints the current oper status of the interface                              |
| %INT-TXBROADCAST%         | Prints the transmit broadcast rate of the interface                          |
| %INT-RXBROADCAST%         | Prints the receive broadcast rate of the interface                           |
| %INT-ADMINSTATUSLAST%     | Prints the last admin status of the interface                                |
| %INT-OPERSTATUSLAST%      | Prints the last oper status of the interface                                 |
| %INT-CURRTXUTIL%          | Prints the current (last poll) transmit rate of the interface                |
| %INT-CURRRXUTIL%          | Prints the current (last poll) receive rate of the interface                 |
| %INT-CURRERRPCT%          | Prints the current (last poll) error rate of the interface                   |
| %INT-DAILY-BPS%           | Prints base64 encoding of the daily bits per second graph                    |
| %INT-DAILY-PCT%           | Prints base64 encoding of the daily percentage graph                         |
| %INT-DAILY-PPCT%          | Prints base64 encoding of the daily peak percentage graph                    |
| %INT-DAILY-PKTS%          | Prints base64 encoding of the daily packets graph                            |
| %INT-DAILY-BCSTS%         | Prints base64 encoding of the daily broadcasts graph                         |
| %INT-DAILY-ERRORS%        | Prints base64 encoding of the daily errors graph                             |
| %INT-WEEKLY-BPS%          | Prints base64 encoding of the weekly bits per second graph                   |
| %INT-WEEKLY-PCT%          | Prints base64 encoding of the weekly percentage graph                        |
| %INT-WEEKLY-PPCT%         | Prints base64 encoding of the weekly peak percentage graph                   |
| %INT-WEEKLY-PKTS%         | Prints base64 encoding of the weekly packets graph                           |
| %INT-WEEKLY-BCSTS%        | Prints base64 encoding of the weekly broadcasts graph                        |
| %INT-WEEKLY-ERRORS%       | Prints base64 encoding of the weekly errors graph                            |
| %INT-MONTHLY-BPS%         | Prints base64 encoding of the monthly bits per second graph                  |
| %INT-MONTHLY-PCT%         | Prints base64 encoding of the monthly percentage graph                       |
| %INT-MONTHLY-PPCT%        | Prints base64 encoding of the monthly peak percentage graph                  |
| %INT-MONTHLY-PKTS%        | Prints base64 encoding of the monthly packets graph                          |
| %INT-MONTHLY-BCSTS%       | Prints base64 encoding of the monthly broadcasts graph                       |
| %INT-MONTHLY-ERRORS%      | Prints base64 encoding of the monthly errors graph                           |
| %INT-YEARLY-BPS%          | Prints base64 encoding of the yearly bits per second graph                   |
| %INT-YEARLY-PCT%          | Prints base64 encoding of the yearly percentage graph                        |
| %INT-YEARLY-PPCT%         | Prints base64 encoding of the yearly peak percentage graph                   |
| %INT-YEARLY-PKTS%         | Prints base64 encoding of the yearly packets graph                           |
| %INT-YEARLY-BCSTS%        | Prints base64 encoding of the yearly broadcasts graph                        |
| %INT-YEARLY-ERRORS%       | Prints base64 encoding of the yearly errors graph                            |
| %INT-POESTATE%            | Current PoE state  |
| %INT-POESTATELAST%        | Last PoE state   |
| %INT-POEMAXDRAW%          | Maximum power draw of an interface   |

## Establishing Device Parent-Child Relationships

Parent-child relationships can be established so alerts for subordinate devices are not received when the parent device is unresponsive.

This can reduce and/or eliminate the large number of device outage alerts that are received when one device goes down, permitting you to focus your energies on responding to the one device that did fail.

Relationships are established via the ParentList.cfg file. Edit this file with a text editor like Notepad and enter your devices. Each "Child Device" should have one or more "Parent Device" defined.

```
;CHILD DEVICE      PARENT DEVICE
;-----
192.168.1.56       192.168.1.12
192.168.1.12       192.168.1.1
192.168.1.12       192.168.1.2
```

In the above example, if 192.168.1.12 goes down, the child device 192.168.1.56 will not generate an alert if it is unreachable.

In the above example, if 192.168.1.1 goes down, the child device 192.168.1.12 will still generate an alert because another parent is defined as a means of reaching it. If both 192.168.1.1 and 192.168.1.2 are down, then no alert will be generated for 192.168.1.12.

After saving this file, the service should be stopped and re-started to have it take effect.



## Troubleshooting

*There are no devices listed on the web page*

The Quick Config Wizard will attempt to locate any devices that are configured to respond to SNMP. You should check to make sure that SNMP is enabled on your network devices and that the device will respond to SNMP queries from the PathSolutions' TotalView computer.

You can use the PollDevice program to test SNMP communications to/from a network device to validate that it is responding to queries with your community string.

*Nothing happens when the service starts or the service fails to start*

Check the Windows Event Application log to see what the problem is. Detailed error descriptions have been created to help you determine what the program needs to be able to operate correctly.

*PathSolutions' TotalView does not check all of my interfaces*

If you have more interfaces on your network than you possess license keys, then PathSolutions' Totalview adds a notice at the bottom of all web pages informing you that there are not enough licenses to monitor all of your interfaces.

## Frequently Asked Questions

*I want to customize the Network Weather Report emails that are sent. How do I do this?*

If you want to modify the Network Weather Report emails that are sent, modify the "WeatherMail.txt" file in the directory where you installed the program.

*How do you clear out the utilization statistics?*

PathSolutions' TotalView saves statistics in files in the "Data" directory where you installed the program. Each filename corresponds to a device on your network. You should stop the PathSolutions' TotalView Service before deleting files.

*How many interfaces can I monitor with PathSolutions' TotalView?*

The collection engine at the core of PathSolutions' TotalView has been tested to be able to monitor networks with 50,000 interfaces within a 5-minute polling period. Make sure you have adequate RAM for the service if you plan on monitoring a lot of interfaces.

*Is PathSolutions' TotalView safe to use on the Internet?*

PathSolutions' TotalView has been tested for buffer overflow errors from browsers to make sure that it is safe to use on Intranets, Extranets, and the Internet. If you intend to use the product over the Internet, care should be taken to limit access to only IP addresses that should be able to access the PathSolutions' TotalView machine, and not permit general access. You should enable authentication and require passwords to be used to access the system.

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**Note:** The PathSolutions' TotalView Passwords are sent in Base64 encoding. This provides simple encryption of passwords and accounts, and should only be used to deter casual hackers. In general, a VPN should be employed to provide security between a computer on the Internet and the TotalView Server. The PathSolutions' TotalView Accounts should be used as a method of preventing internal users from accessing network information.

---

*Why are the transmitted and received information reversed?*

When you view statistics, they should be viewed from the switch interface's perspective. If your backup server is receiving lots of information at 2:00am, the switch interface that connects to the backup server would be transmitting a lot of information to the backup server.

*How do I assign descriptive names to interfaces?*

If your switch does not allow you to assign names to each interface, PathSolutions' TotalView can allow you to assign names to each interface. Edit the IntDescription.cfg file in the directory where you installed the program.

## Appendix A: Error Descriptions

### Alignment Errors

*Rare event*

*Official definition:* A count of frames received on a particular interface that are not an integral number of octets in length and do not pass the FCS check. The count represented by an instance of this object is incremented when the alignmentError status is returned by the MAC service to the LLC (or other MAC user). Received frames for which multiple error conditions are obtained, according to the conventions of IEEE 802.3 Layer Management, are counted exclusively according to the error status presented to the LLC.

*Basic definition:* All frames on the segment should contain a number of bits that are divisible by eight (to create bytes). If a frame arrives on an interface that includes some spare bits left over, the interface does not know what to do with the spare bits. Example: If a received frame has 1605 bits, the receiving interface will count 200 bytes and will have 5 bits left over. The Ethernet interface does not know what to do with the remaining bits. It will discard the bits and increment the Alignment Error count. Because of these remaining bits, it is more likely that the CRC check will fail (causing FCS Errors to increment) as well.

#### **What you should do to fix this problem:**

*Cause 1:* If you have a switch port configured for full-duplex, and the workstation is configured for half-duplex, (or vice-versa) the network connection will still pass traffic, but the full-duplex side of the network will report Alignment Errors (it cannot report any collisions because it cannot detect collisions on a full-duplex link). The half-duplex side of the network will report collisions correctly, and will not detect any abnormalities. Check to see if there is a duplex mismatch on this interface.

*Cause 2:* Occasionally, a collision can create an alignment error. If you have a segment with lots of collisions, and you see occasional alignment errors, you should solve the collision problem and then note if the alignment error problem also goes away. Implement full-duplex to solve the collision and the alignment problem.

*Cause 3:* Sometimes alignment errors will increment when there is induced noise on the physical cable. Perform a cable test. Check the environment for electrical changes (industrial electrical motor turning on, EMI radiation, etc.). Make sure your physical wiring is safe from electro-magnetic interference.

*Cause 4:* If you have alignment errors that occur without collisions, it usually means that you have a bad or corrupted software driver on a machine on that segment. Check to see what new machines have been added to that segment, or new network cards and/or drivers.

### Carrier Sense Errors

*Rare event*

*Official definition:* The number of times that the carrier sense condition was lost or never asserted when attempting to transmit a frame on a particular interface. The count represented by an instance of this object is incremented at most once per transmission attempt, even if the carrier sense condition fluctuates during a transmission attempt.

*Basic definition:* Carrier Sense Errors occur when an interface attempts to transmit a frame, but no carrier is detected, and the frame cannot be transmitted.

**What you should do to fix this problem:**

*Cause 1:* Carrier Sense Errors can occur when there is an intermittent network cabling problem. Check for cable breaks that may cause occasional outages. Use a cable tester to insure that the physical cabling is good.

*Cause 2:* Carrier Sense Errors can occur when the device connected to the interface has a failing network interface card (NIC). The network card connected to this interface should be replaced.

**Deferred Transmissions***Common event*

*Official definition:* A count of frames for which the first transmission attempt on a particular interface is delayed because the medium is busy. The count represented by an instance of this object does not include frames involved in collisions.

*Basic definition:* If an interface needs to transmit a frame, but the network is busy, it increments Deferred Transmissions. Transmissions that are deferred are buffered up and sent at a later time when the network is available again.

**What you should do to fix this problem:**

*Cause 1:* Deferred Transmissions can be deferred because of non-collision media access problems. For example: If the network is constantly busy (and a network card cannot get a word in edgewise), there is a media access problem (the NIC cannot get control of the network). This kind of deferred transmission is usually associated with Single or Multiple Collision Frames. Implementing a full-duplex connection can solve this problem.

*Cause 2:* Deferred Transmissions can be created on a switch or bridge that is forwarding packets to a destination machine that is currently using its network segment to transmit. This can usually be solved by implementing a full-duplex connection (if possible) on the segment.

**Excessive Collisions***Rare event*

*Official definition:* A count of frames for which transmission on a particular interface fails due to excessive collisions.

*Basic definition:* If there are too many collisions (beyond Multiple Collision Frames), the transmission will fail.

**What you should do to fix this problem:**

*Cause 1:* A faulty NIC can cause Excessive Collisions. Check the network cards on the segment to insure that they are functioning correctly.

*Cause 2:* A failed transceiver can cause Excessive Collisions. Check the transceivers on the segment to insure that they are functioning correctly.

*Cause 3:* Improper network wiring (wrong pairs, split pairs, crossed pairs) can cause Excessive Collisions. Use a cable tester to insure that wiring is good.

*Cause 4:* A network segment with extremely high utilization and high collision rates can cause Excessive Collisions. If utilization is high, attempt to implement full-duplex to solve this problem.

## FCS Errors

*Rare event*

*Official definition:* A count of frames received on a particular interface that are an integral number of octets in length but do not pass the FCS (Frame Check Sequence) check. The count represented by an instance of this object is incremented when the FrameCheckError status is returned by the MAC service to the LLC (or other MAC user). Received frames for which multiple error conditions are obtained, according to the conventions of IEEE 802.3 Layer Management, are counted exclusively according to the error status presented to the LLC.

*Basic definition:* An FCS error is a legal sized frame with a bad frame check sequence (CRC error). An FCS error can be caused by a duplex mismatch, faulty NIC or driver, cabling, hub, or induced noise.

### What you should do to fix this problem:

*Cause 1:* FCS errors can be caused by a duplex mismatch on a link. Check to make sure that both interfaces on this link have the same duplex setting.

*Cause 2:* Sometimes FCS errors will increment when there is induced noise on the physical cable. Perform a cable test. Check the environment for electrical changes (industrial electrical motor turning on, EMI radiation, etc.). Make sure your physical wiring is safe from electro-magnetic interference.

*Cause 3:* If you notice that FCS Errors increases, and Alignment Errors increase, attempt to solve the alignment error problem first. Alignment errors can cause FCS errors.

*Cause 4:* If you see FCS errors increase, check the network cards and transceivers on that segment. A failing network card or transceiver may transmit a proper frame, but garble the data inside, causing a FCS error to be detected by listening machines.

*Cause 5:* Check network driver software on that segment. If a network driver is bad or corrupt, it may calculate the CRC incorrectly, and cause listening machines to detect an FCS Error.

*Cause 6:* If you have an Ethernet cable that is too short (less than 0.5meters), FCS errors can be generated.

*Cause 7:* If you have an Ethernet cable that is too long (more than 100meters), FCS errors can be generated.

*Cause 8:* If you are using 10Base-2, and have poor termination, or poor grounding, FCS errors can be generated.

## Frame Too Longs

*Rare event*

*Official definition:* If a frame is detected on an interface that is too long (as defined by ifMTU), this counter will increment.

*Basic definition:* Frame Too Longs occur when an interface has received a frame that is longer (in bytes) than the maximum transmission unit (MTU) of the interface.

### What you should do to fix this problem:

*Cause 1:* Switches that use VLAN (Virtual LAN) tagging of frames can cause FrameTooLongs. To solve this specific problem, upgrade the device reporting the FrameTooLong error to support VLANs, or turn off VLAN tagging on neighboring switches.

*Cause 2:* Faulty NIC cards can cause FrameTooLongs. Check NIC cards on the segment to insure that they are running correctly.

*Cause 3:* Cabling or grounding problems can cause FrameTooLongs. Use a network cable tester to insure that the cabling is not too long, or out of specification for the technology you are using.

*Cause 4:* Software drivers that do not respect the correct MTU (Maximum Transmission Unit) of the medium can cause FrameTooLongs. Check network drivers to make sure they are functioning properly.

## Inbound Discards

*Rare event*

*Official definition:* The number of inbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. One possible reason for discarding such a packet could be to free up buffer space.

*Basic definition:* If too many packets are received, and the protocol stack does not have enough resources to properly handle the packet, it may be discarded.

### What you should do to fix this problem:

*Cause 1:* Insufficient memory allocated for inbound packet buffers. Research how to increase the inbound packet buffers on the interface. This may be modified in the device's configuration.

*Cause 2:* The CPU on the device may not be fast enough to process all of the inbound packets. Employing a faster CPU may remedy this problem.

## Inbound Errors

*Rare event*

*Official definition:* The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.

*Basic definition:* These packets contained one or more various data-link layer errors, and were thus discarded before being passed to the network layer. The root cause of these errors are undefined. In order to more accurately research these types of errors, you should deploy a packet analyzer in front of this interface to track the specific errors that occur, as the device is not capable of tracking any additional information relating to these errors. If this interface provides Ethernet specific errors, these errors may be detailed in that section.

### What you should do to fix this problem:

*Cause 1:* There are various sources of this type of error. The interface does not possess enough information as to the exact cause of this error. Deploy a packet analyzer in front of this interface to inspect the exact type of error that is occurring.

## Inbound Unknown Protocols

### *Common event*

*Official definition:* The number of packets received via the interfaces which were discarded because of an unknown or unsupported protocol.

*Basic definition:* If the physical and data-link layer do their job successfully and deliver a frame to the correct MAC address, it is assumed that the requested protocol will be available on the machine. If the protocol is not available, the frame is discarded. If your machine receives an AppleTalk packet, but your machine is not running AppleTalk, it will discard the packet and increment this counter.

### **What you should do to fix this problem:**

*Cause 1:* Broadcasts can cause inbound unknown protocol errors. If you have a Novell server on the segment, it will send out periodic IPX broadcasts that some devices will not understand (because they do not have the IPX protocol loaded in their network stack). This is a normal event. To attempt to reduce this, work on reducing the number of different protocols that exist on your network, or install additional protocols on your machines to be able to communicate with additional clients.

*Cause 2:* Inbound unknown protocols can be caused by mis-configurations of other machines. Check the configurations of other machines on the network to try to determine why this machine is receiving an unknown protocol. If inbound unknown protocols error is incrementing rapidly, attach a network analyzer and look at the protocols that are being sent to this machine, and their source.

## Outbound Discards

### *Rare event*

*Official definition:* The number of outbound packets which were chosen to be discarded even though no errors had been detected to prevent their being transmitted. One possible reason for discarding such a packet could be to free up buffer space.

*Basic definition:* If too many packets are queued to be transmitted, and the network interface is not fast enough to transmit all of the packets, it may be discarded.

### **What you should do to fix this problem:**

*Cause 1:* Insufficient memory allocated for outbound packet buffers. This may be modified in the device's configuration.

*Cause 2:* The network interface may not be fast enough to process all of the outbound packets. Employing a faster speed interface may remedy this problem.

## Outbound Errors

*Rare event*

*Official definition:* The number of outbound packets that could not be transmitted because of errors.

*Basic definition:* These packets could not be transmitted due to one or more various data-link layer errors. The root causes of these errors are undefined. In order to more accurately research these types of errors, you should deploy a packet analyzer in front of this interface to track the specific errors that occur, as the device is not capable of tracking any additional information relating to these errors. If this interface provides Ethernet specific errors, these errors may be detailed in that section.

### What you should do to fix this problem:

*Cause 1:* There are various sources of this type of error. The interface does not possess enough information as to the exact cause of this error. Deploy a packet analyzer in front of this interface to inspect the exact type of error that is occurring.

## Outbound Queue Length

*Common event*

The length of the output packet queue (in packets) number should return to zero in a short amount of time. If it ends up being any non-zero value for any length of time, you should consider upgrading the interface to a faster technology, or full duplex (if not already enabled).

## Internal Mac Transmit Errors

*Rare event*

*Official definition:* A count of frames for which transmission on a particular interface fails due to an internal MAC sub layer transmit error. A frame is only counted by an instance of this object if it is not counted by the corresponding instance of the dot3StatsLateCollisions object, the dot3StatsExcessiveCollisions object, or the dot3StatsCarrierSenseErrors object. The precise meaning of the count represented by an instance of this object is implementation-specific. In particular, an instance of this object may represent a count of transmission errors on a particular interface that are not otherwise counted.

*Basic definition:* If a transmission error occurs, but is not a late collision, excessive collision, or carrier sense error, it is counted as an error here. NIC vendors may identify these kinds of errors specifically. Check with the device's manufacturer to determine their interpretation of InternalMacTransmitErrors.

### What you should do to fix this problem:

*Cause 1:* A faulty network transmitter can cause InternalMACTransmitErrors. Check the device to insure that it is functioning correctly.

*Cause 2:* Check with the device's manufacturer to determine what their interpretation is of InternalMACTransmitErrors.

## Late Collisions

*Rare event*

*Official definition:* The number of times that a collision is detected on a particular interface later than 512 bit-times (64 bytes) into the transmission of a packet. Five hundred and twelve bit-times corresponds to 51.2 microseconds on a 10-megabit per second system. A (late) collision included in a count represented by an instance of this object is also considered as a (generic) collision for purposes of other collision-related statistics.



*Basic definition:* Collisions should be detected within the first 64 bytes of a transmission. If an interface transmits a frame and detects a collision before sending out the first 64 bytes, it declares it to be a "normal collision" and increments Single Collision Frames (or Multiple Collision Frames if more collisions follow). If an interface transmits a frame and detects a collision after sending out the first 64 bytes, it declares it to be a Late Collision. If a machine detects a Late Collision, it will treat the collision like any other collision (send a jam signal, and wait a random amount of time before attempting to retransmit). The other sending machine may or may NOT have detected the collision because it was so late in the transmission. The other sending machine may detect the collision AFTER it is done sending its frame, and will believe that its frame was sent out successfully.

**What you should do to fix this problem:**

*Cause 1:* A duplex mismatch can cause Late Collisions. Check to make sure that the duplex settings on both interfaces are set to use the same duplex.

*Cause 2:* A faulty NIC card on the segment can cause Late Collisions.

*Cause 3:* Late Collisions can be caused by a network that is physically too long. A network is physically too long if the end-to-end signal propagation time is greater than the time it takes to transmit a legal sized frame (about 57.6 microseconds). Check to make sure you do not have more than five hubs connected end-to-end on a segment, counting transceivers and media-converters as a two-port hub. Also check individual NIC cards for transmission problems.

*Cause 4:* If you have a switch on the network that is configured for "low-latency" forwarding (anything except "store and forward"), it may be causing the Late Collisions. Low latency forwarding ends up having the switch act like a very slow hub. It reduces traffic like a switch, but does not insure that frames reach the destination successfully. The frame "worms" its way through multiple switches, slowing down at each switch. If there is a collision on the end segment, the frame gets dropped by the switch, and the transmitting workstation does not detect that the frame was dropped. To fix this, do not use "low-latency" forwarding features on switches that are hooked up to other switches with "low-latency" forwarding features. Configure the switches to use "store and forward" forwarding methodology.

## MAC Receive Errors

*Rare event*

*Official definition:* A count of frames for which transmission on a particular interface fails due to an internal MAC sub layer transmit error. A frame is only counted by an instance of this object if it is not counted by the corresponding instance of the dot3StatsLateCollisions object, the dot3StatsExcessiveCollisions object, or the dot3StatsCarrierSenseErrors object. The precise meaning of the count represented by an instance of this object is implementation-specific. In particular, an instance of this object may represent a count of transmission errors on a particular interface that are not otherwise counted.

*Basic definition:* This is the number of frames that could not be transmitted due to an unknown problem. This unknown problem is not related to collisions or carrier sense errors. The device manufacturer's documentation may provide additional information on locating the source of these errors.

**What you should do to fix this problem:**

*Cause 1:* There are various sources of this type of error. The interface does not possess enough information as to the exact cause of this error. Contact the device manufacturer to determine how they define the MacReceiveError and how to fix this problem.

## Multiple Collision Frames

*Rare event*

*Official definition:* A count of successfully transmitted frames on a particular interface for which transmission is inhibited by more than one collision. A frame that is counted by an instance of this object is also counted by the corresponding instance of either the ifOutUcastPkts or ifOutNUcastPkts object and is not counted by the corresponding instance of the dot3StatsSingleCollisionFrames object.

*Basic definition:* If a network interface attempts to transmit a frame, and detects a collision, it will attempt to re-transmit the frame after the collision. If the retransmission also causes a collision, then Multiple Collision Frames is incremented.

### What you should do to fix this problem:

*Cause 1:* A faulty NIC or transceiver can cause Multiple Collision Frames. Check the network cards and transceivers on the segment for failures.

*Cause 2:* An extremely overloaded network can cause Multiple Collision Frames (average utilization should be less than 40%).

*Cause 3:* If you are using 10Base-2, and have poor termination, or poor grounding, Multiple Collision Frames can be generated.

*Cause 4:* If you have a bad hardware configuration (like creating an Ethernet ring), Multiple Collision Frames can be generated.

## Single Collision Frames

*Common event*

*Official definition:* A count of successfully transmitted frames on a particular interface for which transmission is inhibited by exactly one collision. A frame that is counted by an instance of this object is also counted by the corresponding instance of either the ifOutUcastPkts or ifOutNUcastPkts object and is not counted by the corresponding instance of the dot3StatsMultipleCollisionFrames object.

*Basic definition:* If a network interface attempts to transmit a frame, and detects a collision, it will attempt to re-transmit the frame after the collision. If the retransmission was successful, then the event is logged as a single collision frame.

### What you should do to fix this problem:

*Cause 1:* Single Collision Frames can be caused by multiple machines wanting to transmit at the same time. This is a normal occurrence on Ethernet.

*Cause 2:* If Single Collision Frames increases dramatically, this could indicate that the segment is becoming overloaded (too many machines on the segment or too many heavy talkers on the segment). As the segment continues to become overloaded, Single Collision Frame count may decrease, as Multiple Collision Frames increases. Converting the segment to a switched environment may solve this problem. Another possible solution is to reduce the number of machines on this segment, or install a bridge to segregate the segment into two halves.

*Cause 3:* Single Collision Frames can be caused by poor wiring or induced noise. Use a cable tester to insure that the physical cable is good.

*Cause 4:* Single Collision Frames can be caused by a bad network interface card, or failing transceiver. Check to make sure the network cards and transceivers on the segment are functioning correctly.

## SQE Test Errors

*Rare event*

*Official definition:* A count of times that the SQE TEST ERROR message is generated by the PLS sub layer for a particular interface. The SQE TEST ERROR message is defined in section 7.2.2.2.4 of ANSI/IEEE 802.3-1985 and its generation is described in section 7.2.4.6 of the same document.

*Basic definition:* SQE stands for "Signal Quality Error", and may also be referred to as the Ethernet "heartbeat". With early Ethernet cards that required transceivers, the transceiver would send a "Signal Quality Error" back to the Ethernet card after each frame was transmitted to insure that the collision detection circuitry was working. With modern network cards, this SQE test can cause network cards to believe that an actual collision occurred, and a collision is sent out on the network when a SQE test is detected. This can seriously degrade network performance, as each frame successfully transmitted on the network is followed by a collision caused by the SQE test.

### **What you should do to fix this problem:**

*Cause 1:* SQE Test Errors can be caused by a transceiver that have the "SQE test" dip switch turned on (it should be turned off). Check the switch settings on all transceivers on the segment.

*Cause 2:* SQE Test errors can be caused by broken transceivers. Check for failed transceivers on the segment.

## Appendix B: Saving PoE Usage to a Database

The system tracks current PoE status via the web reports. Historical power usage can be tracked over time with a few modifications.

- 1) Run RegEdit
- 2) Navigate to HKEY\_LOCAL\_MACHINE/Software/NetLatency/SwitchMonitor
- 3) Create a new DWORD key "PollSQLitePoEFlag" and set it to 1

Note: The PathSolutions service does not need to be restarted to have this entry take effect.

The system will now create a file in the Data directory called PoEConsumption.dat. This data file is a SQLite database that will track the consumption of all PSUs on all monitored switches.

The table structure is as follows:

| <b>Field</b> | <b>Type</b>  | <b>Description</b>                         |
|--------------|--------------|--|
| PollID       | Integer (PK) | Primary key                                |
| Node         | Text         | Server unique identifier                   |
| PollNumber   | Integer      | Unique poll number for each poll performed |
| PollTime     | Text         | Time of poll                               |
| Agent        | Text         | IP address of switch                       |
| Device       | Text         | Hostname of switch                         |
| PSU          | Integer      | Power Supply Unit number reporting         |
| Status       | Integer      | Status (1=On, 2=Off, 3=Faulty)             |
| Rating       | Integer      | Total watts permitted for the PSU          |
| Consumption  | Integer      | Current powers draw in watts               |

The index PollIndex can be used to speed up queries on large databases. It is indexed on PollID, PollTime, and Agent.

The database can be queried using the command-line sqlite3.exe program located in the Data directory:

```
sqlite3 -csv -header PoEConsumption.dat "select * from PoEPoll;"
```

This information can be sent to a file with the command-line redirect for further processing:

```
sqlite3 -csv -header PoEConsumption.dat "select * from PoEPoll;"
>PoEStats.csv
```

## Appendix C: SMTP E-mail Forwarding

Most companies use SMTP gateways to allow email from the Internet to reach internal users.

This gateway is typically set up to receive emails that are destined for mailboxes on the company's system.

If you configure PathSolutions' TotalView to use your company's SMTP mail gateway, the gateway should accept SMTP messages destined for internal users, but should not accept SMTP messages destined for outside addresses.

For example:

If you configured PathSolutions' TotalView to use "mail.company.com " as the SMTP mail gateway, and set the "Globally send to" field to `jdoe@company.com`, the mail gateway would accept emails sent to this address because it exists on the same domain. If the "Globally send to" field was set to `jdoe@outside.com`, then the gateway would refuse this request because most mail systems do not allow relaying of messages from one to another.

This is done by mail administrators to prevent abuse by spammers. Email spammers will search the Internet for anonymous SMTP mail forwarders that they can use to send their emails out.

This allows them to send untraceable emails.

To allow PathSolutions' TotalView to send emails to different domains, there are a number of solutions:

- Ask your ISP if they have an SMTP relay server that can be used by your machines. They may have a server set up that will relay only your messages. In this case, you would configure PathSolutions' TotalView to use their SMTP relay server.
- Ask your email administrator to configure the SMTP gateway to allow relaying from the server that PathSolutions' TotalView is installed on.

Create a mail alias on your email system (for example: `jdoe@company.com`) that forwards to an outside address (`jdoe@outside.com`).

A free SMTP mail relay agent (SMTP forwarder) is included with many Windows server's IIS implementation.

## Appendix D: Configuring SNMP on Devices

A variety of device configuration instructions are available on the PathSolutions website:

<http://www.PathSolutions.com/SwitchConfig.html>

Other device manufacturer instructions should be available through the device manufacturer's website.

## Appendix E: Changing Interface Names and Speed

Many device manufacturers do not allow interface names to be changed to a descriptive name to help document the network. In this case, PathSolutions' TotalView can be configured to ignore the interface description in the device and use information from a Config file.

Use a text editor such as Notepad to open the IntDescription.cfg file in the directory where PathSolutions' TotalView is installed.

You should see a document with a description of how to enter the switch interfaces and descriptions.

The file is composed of a number of columns or fields; each separated by one or more <TAB> characters.

---

**Note:** The fields in the configuration file need to be separated by at least one <TAB> character, not spaces.

---

Here is an example of a configuration file:

```
;This line is commented out
;
;IPAddress          Interface      Speed          Description
;-----
192.168.1.10        1              /              Internet connection
calvin.company.com  156            1544000        FE0/6
192.168.2.2         3              /              Connection to New York
```

Semicolons can be used anywhere in the file to indicate that the rest of the line is a comment.

### IP Addresses

The IP address of the switch must be entered to identify the device. If the Config file has a DNS name, then that identical name should be used here to identify the same device.

### Interface #

The interface number (as listed in the web reports) should be entered here. If you are unsure of the exact number to use, reference your device manufacturer's documentation to map the SNMP interface numbers to the physical addresses on the device. Then use your network documentation to determine what device is physically connected to the interface on the device.

### Speed

If you desire to override the reported interface speed, you can enter the speed in bits per second here. For example: You may want to change the reported interface speed of a router interface connected to the internet from 100 Mbps to the actual capacity of the link it is connected to (1.544 Mbps for a T1 connection). This will help to determine when the link utilization is exceeded. If you do not want to override this information, enter a slash "/" to skip this field.

### Description

Enter the description here. The description field should not contain a semicolon character.

---

**Note:** The service must be stopped and re-started after this file is modified in order to have the descriptions take effect.

---

## Appendix F: Configuring Multiple Locations

If you have multiple PathSolutions' TotalView implementations, PathSolutions' TotalView can be configured to make it easy to navigate between the sites.

Each web page will display tabs across the top of the web page indicating the site that you are viewing:



To configure multiple sites, use a text editor like Notepad to open the MultiSite.cfg file in the directory where you installed the program:

### For 32 Bit Operating Systems

C:\Program Files\PathSolutions\TotalView\MultiSite.cfg

### For 64 Bit Operating Systems

C:\Program Files (x86)\PathSolutions\TotalView\MultiSite.cfg

You should see a document with a description of how to enter the site names and URLs.

The file is composed of a number of columns or fields; each separated by one or more <TAB> characters.

---

**Note:** The fields in the configuration file need to be separated by at least one <TAB> character, not spaces.

---

Here is an example of a configuration file:

```
;Example for the San Francisco server:
;
;Current  Site Name      URL
;-----  -
YES      San Francisco  http://sfserver.company.com:8084
NO       New York    http://nyserver.company.com:8084
NO       Chicago     http://chicago.company.com:8084

;Example for the New York server:
;
;Current  Site Name      URL
;-----  -
NO       San Francisco  http://sfserver.company.com:8084
YES      New York    http://nyserver.company.com:8084
NO       Chicago     http://chicago.company.com:8084
```

Semicolons can be used anywhere in the file to indicate that the rest of the line is a comment.

### Current

This field identifies which site should be highlighted. Only one site should be highlighted per Config file. The Config file on the New York server should have "Yes" for the New York entry.

### Site Name

This is the name that is displayed in the tab.



**URL**

Enter the server's full URL and port here. This will allow linking from the other PathSolutions' TotalView Servers.

---

**Note:** The service must be stopped and re-started after this file is modified in order to have the links work.

---

The order of the listed sites should be similar for each deployed site so the tabs will display correctly for each site.

## Appendix G: Entering Custom OIDs to be Monitored

PathSolutions' TotalView can monitor custom OIDs such as CPU utilization, memory usage, and temperature if the device provides this information via SNMP.

The configuration file `OIDEntry.cfg` is used to configure custom OID monitoring. This file is found in the directory where the program was installed.

Edit this file with a text editor like Notepad.

You will need to enter the following information to be able to set up monitoring of a custom OID:

- IP address of the device ("10.0.1.16")
- Interface to be associated with or "/" if you want to associate it with the device instead of an interface ("23")
- Unique filename for storing the data collected for this OID ("FRAMERELAY")
- Description of this graph ("Frame Relay FECN & BECN")
- Y Axis description ("Packets")
- OID #1 Description ("FECN")
- OID #1 ("GAUGE:1.3.6.1.2.1.2.2.1.17.1")
- OID #2 Description ("BECN")
- OID #2 ("GAUGE:1.3.6.1.2.2.1.18.1")

---

**Note:** When entering the OID value, put the prefix "GAUGE:", "COUNTER:", or "COUNTER:8" in front of the OID to identify how the OID should be tracked.

---

---

**Note:** After saving this file, you will have to stop and restart the PathSolutions' TotalView service for the changes to take effect.

---

## Appendix H: Configuring Additional OUIs for Phones Tab

A number of OUIs (Organizationally Unique Identifiers) for various VoIP equipment manufacturers have already been added to the OUIFilter.cfg file. This file can be edited with a text editor (like Notepad) to add additional OUIs.

An OUI is the first three bytes of an Ethernet MAC address. The first three bytes are called the OUI because they are unique to the equipment manufacturer. Thus, any MAC addresses that share the first three bytes all come from a common manufacturer.

The OUIFilter.cfg file will require you to enter the OUI (each byte separated by a period "."), then a tab, then the name of the manufacturer.

---

**Note:** After saving this file, you will have to stop and restart the PathSolutions TotalView service for the changes to take effect.

---

## Appendix I: Changing the Map File

The map file can be changed to any custom JPG file desired.

PathSolutions' TotalView uses the map file:

For 32 Bit Operating Systems

C:\Program Files\PathSolutions\TotalView\Graphics\map.jpg

For 64 Bit Operating Systems

C:\Program Files (x86)\PathSolutions\TotalView\Graphics\map.jpg

---

**Note:** It's advised to rename the existing map file instead of overwriting this file so it can be used in the future if desired. Otherwise you will need to uninstall and reinstall to recover the map file.

---

The map can be centered on the screen by modifying the following registry entries:

HKEY\_LOCAL\_MACHINE\Software\Netlatency\NetworkMonitor\DestWebMapStartX

HKEY\_LOCAL\_MACHINE\Software\Netlatency\NetworkMonitor\DestWebMapStartY

This will set the starting X and Y coordinates for the upper left corner of the map file. If you want the map to initially display in the upper left corner, set both of these coordinates to 0 (zero).

After the map file has been replaced and the starting coordinates modified, stop and restart PathSolutions' TotalView Service to have the changes take effect.

## Appendix J: Changing the WAN Tab

The WAN tab can include any interface desired. This involves changing the WAN.cfg file with a text editor (like Notepad):

```
For 32 Bit Operating Systems
C:\Program Files\PathSolutions\TotalView\wan.cfg
```

```
For 64 Bit Operating Systems
C:\Program Files (x86)\PathSolutions\TotalView\wan.cfg
```

This file requires entering two fields, each separated by one or more <TAB> characters.

```
;This is a list of WAN interfaces to display on the
;"WAN" tab.
;
;Interface numbers are entered in the following format:
;
;IP Address<TAB>Interface number
;
;For example:
;
;IPAddress          Interface #
;-----          -
;192.168.12.15      43
;
;Enter your IP addresses and interface numbers below.
;IPAddress          Interface #
;-----          -
```

After the WAN.cfg file has been modified and saved, stop and restart the PathSolutions' TotalView service to have the changes take effect.

## Appendix K: Adding a Static Route to the Call Path

If there is an unmanaged device (or set of devices) in the network, a static route can be added that will allow the Call Path mapping to ignore these devices and show a continuous map through the network.

Many times, this may be required if a network provider does not permit SNMP access to their routers.

Adding a static route involves changing the StaticRoute.cfg file with a text editor (like Notepad):

### For 32 Bit Operating Systems

C:\Program Files\PathSolutions\TotalView\StaticRoute.cfg

### For 64 Bit Operating Systems

C:\Program Files (x86)\PathSolutions\TotalView\StaticRoute.cfg

This file requires entering five fields, each separated by one or more <TAB> characters.

| Router Address | Router Subnet | Route       | Mask            | NextHop        |
|----------------|---------------|-------------|-----------------|----------------|
| 10.0.1.254     | 255.255.255.0 | 44.44.44.44 | 255.255.255.255 | 38.102.148.163 |
| 10.100.36.60   | 255.255.255.0 | 10.100.37.1 | 255.255.255.0   | 10.100.37.1    |
| 10.100.37.1    | 255.255.255.0 | 10.100.36.1 | 255.255.255.0   | 10.100.36.60   |

The first and second fields reference the router's IP address and subnet that should be used for the static route. This is typically the unmanaged router's IP address where packets are sent.

The third and fourth fields reference the route and subnet mask for that route.

---

**Note:** You can enter a default route by using the route of 0.0.0.0 and mask of 0.0.0.0.

**Note:** Static routes take priority over any actual routes that exist on the network.

---

The fifth field references where the call path mapping should continue. This is typically the far-end router's LAN IP address.

Once the file is saved, the static route takes effect immediately. No need to stop and restart the service or collect re-collect information from switches & routers. This will help speed up troubleshooting and debugging of static routes in the environment.

---

**Note:** More likely, two static routes will need to be created. One static route will need to be created for the outbound traffic and one for the return traffic.

---

## Appendix L: Automatic Update Scheduling

Updating the bridge table, ARP cache, and routing table information can be automated to occur on a regular frequency. The following registry entry can be used to do this:

```
UpdateAutoFrequency=0
```

By default, this entry is 0 (zero). This means that the information is not collected on any schedule.

The variable can be changed to any of the following recommended intervals:

300000 (decimal) = 5 minutes

600000 (decimal) = 10 minutes

1800000 (decimal) = 30 minutes

3600000 (decimal) = 1 hour

86400000 (decimal) = 1 day

Other intervals can be used, as the number is the number of milliseconds to wait between automatic updates.

Note: The service must be stopped and restarted for this variable to take effect.

## Appendix M: Changing the Map Fetch Variables to Improve Map Stability

You may be seeing white lines going from white to green to white or red dots going from red to green to red. White lines means we did not get any SNMP response from the device. The red dots mean that we did not get a response from the ping. There may be a problem with packet loss to/from the device or the device may have a small CPU that causes the 2 pings to fail.

We have 5 seconds to respond to the web browser's request for information. If a device is up, we would send a ping and receive a response within 5 seconds so it's easy to show that it's green.

If we send a ping, we have to wait to see if we get a response. If we wait 2 seconds for the response and don't get one, we can send a second ping and then wait 2 seconds to get a response again. If we don't get a response from the second ping, then we should assume it is down.

Total View's default does 1 ping and then waits 2500ms (2.5 seconds) for a response. If it does not see a response, then it assumes it is down.

TotalView's default now does 2 pings and then waits 1500 (1.5 seconds) for a response. If it does not see a response, then it assumes it is down.

**This can be adjusted in the registry with the following variables to help improve the stability of the map:**

### Example of Variable Entry change in Bold below

Computer > HKEY\_LOCAL\_MACHINE > SOFTWARE > Wow6432Mode > Netlatency > SwitchMonitor

DestWebMapPingRetries = 1  
DestWebMapPingDelay = 2500

In this case, you can set the following:

**DestWebMapPingRetries = 2**  
**DestWebMapPingDelay = 1500**

It should improve the reliability/stability of the pings on the network.

For fetching the SNMP information, the following registry variables apply:

DestWebMapSNMPRetries = 1  
DestWebMapSNMPTimeout = 1000

In this case, you can set the following:

**DestWebMapSNMPRetries = 2**  
**DestWebMapSNMPTimeout = 1000**



## Glossary

*IETF* - This acronym stands for the Internet Engineering Task Force, and is the governing body for all standards that relate to Internet and associated communications technologies. Website: [www.ietf.org](http://www.ietf.org)

*MAC* – Media Access Control: This is a unique address that is used by Ethernet adapters to transmit and receive frames on the network. They are only used for conveying layer 2 frames between nodes on a LAN.

*MIME* - Multi-Purpose Internet Mail Extensions: This is an email standard that defines how different content is handled inside email messages. This allows graphics, audio, HTML text, formatted text, and video to be displayed correctly inside email messages. MIME is defined by the IETF's RFC1521 document, and is available on the IETF's website: <http://www.ietf.org/rfc/rfc1521.txt?number=1521>

*Network Weather Report* - System Monitor can email network reports to you on a daily basis. The network Weather Report helps to keep you informed of the overall health of your network.

*OSI* - Open Systems Interconnect: This is a standard description or "reference model" for how services are provided on a network.

*OUI* – Organizationally Unique Identifier: This is the identification of the first three bytes of an Ethernet MAC address. The first three bytes are called the OUI because they are unique to the equipment manufacturer. Thus, any MAC addresses that share the first three bytes all come from a common manufacturer.

*SNMP read-only community string* - This is an SNMP password with the rights to be able to read statistical information from a device.

*SNMP - Simple Network Management Protocol*. This protocol allows network management software (like System Monitor) to communicate with network devices to read statistical information.

*SMTP email address* -- This is a standard Internet email address. For example: [jdoe@company.com](mailto:jdoe@company.com).

*SMTP*-- Simple Mail Transport Protocol. This protocol allows email clients and servers to communicate over the Internet.