Juniper Networks | Engineering Simplicity

NorthStar Planner Feature Guide

6.0.0

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Documentation and Release Notes

Documentation Conventions

Table 1: Notice Icons

Table 2: Text and Syntax Conventions

Bold text like this		configure configure
`Fixed-width text like this`		`user@host>` show chassis alarms `No alarms currently active`

Table 2: Text and Syntax Conventions (continued)

		set system domain-name
Text like this		stub [edit protocols ospf area area-id] CONSOLE
		stub <default-metric metric>;
		broadcast | multicast (string|string0|string1)
		rsvp { # Required for dynamic MPLS only
		community name members [community-ids

GUI Conventions

Table 2: Text and Syntax Conventions đ continued ọ

Bold text like this		All Interfaces Cancel
>		Protocols>Ospf

Documentation Feedback

Requesting Technical Support

Self-Help Online Tools and Resources

Creating a Service Request with JTAC

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Interior Gateway Protocols (IGP)

Equal Cost Multiple Paths (ECMP)

Static Routes

Policy Based Routes (PBR)

Border Gateway Protocol (BGP)

Virtual Private Networks (IP VPN)

Class of Service (CoS)

Multicast

VoIP

OSPF Area Design

Multi-Protocol Label Switching (MPLS) Tunnels for Traffic Engineering

Path Placement

Modification

Net Grooming

Configlet Generation

Path Diversity Design

Fast Reroute (FRR)

Inter-Area MPLS-TE

DiffServ TE Tunnels

Following Along with the Examples in this Manual

NOTE:

Figure 1: Typical Missing License Warning

```
> cd /u/wandl/sample/IP
> cp -r fish fish1
> cd fish1
> chmod 666 *
```

```
> cp -r fish /export/home/john/myexamples/fish
```

Spec File > Modify Spe

Yes

Yes

CHAPTER

Router Data Extraction

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Router Data Extraction Overview

NOTE:

Recommended Instructions

Graphical User Interface Mode

Text Mode (Alternative)

MPLS Tunnel Path Import

Getipconf - Router Configuration Extraction

Graphical User Interface

File > Create Network > From Collected Data Next

Figure 2: Import Network Wizard - Introduction Page

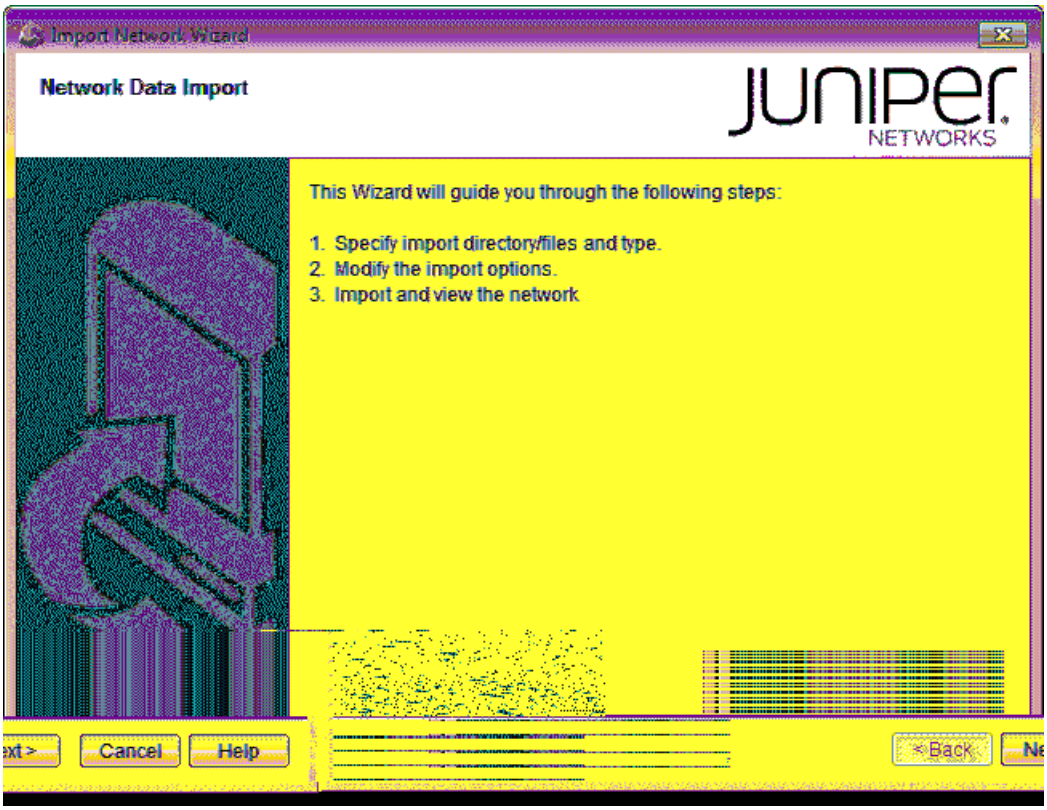
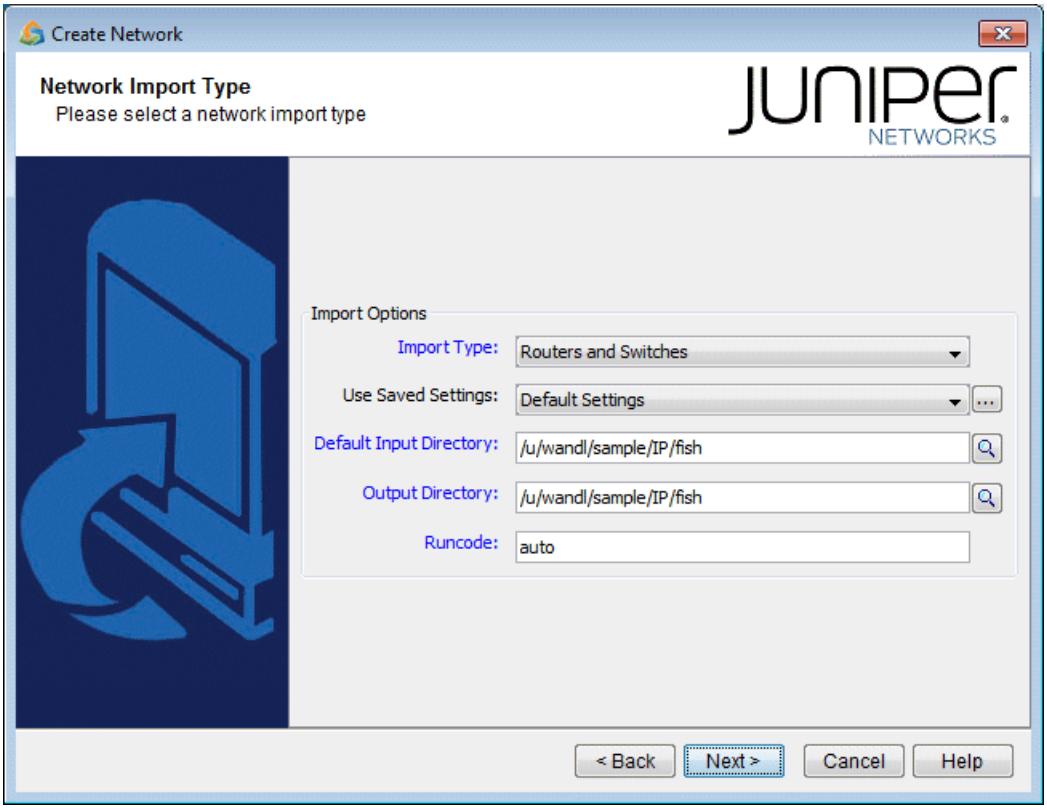


Figure 3: Selecting the Import Type (Options vary)



/u/wandl/data/collection/.LiveNetwork

Next

Default Inputs

Figure 4: Selecting the Output Directory and Runcode

	show configuration | display inheritance show running-config	
	# show configuration | match “host-name” # show interfaces | no-more # show configuration system host-name # show running | include <hostname> # show interfaces	

	show mpls lsp statistics ingress extensive show mpls traffic-eng tunnels	
	show rsvp session ingress detail show rsvp session transit detail show mpls traffic-eng tunnels backup	
	/u/wandl/db/command/<vendor>.cli	
	/u/wandl/data/collection/.LiveNetwork/equipment	

Figure 143: An inter-AS VPN being constructed, with three PEs from AS 65301 already added

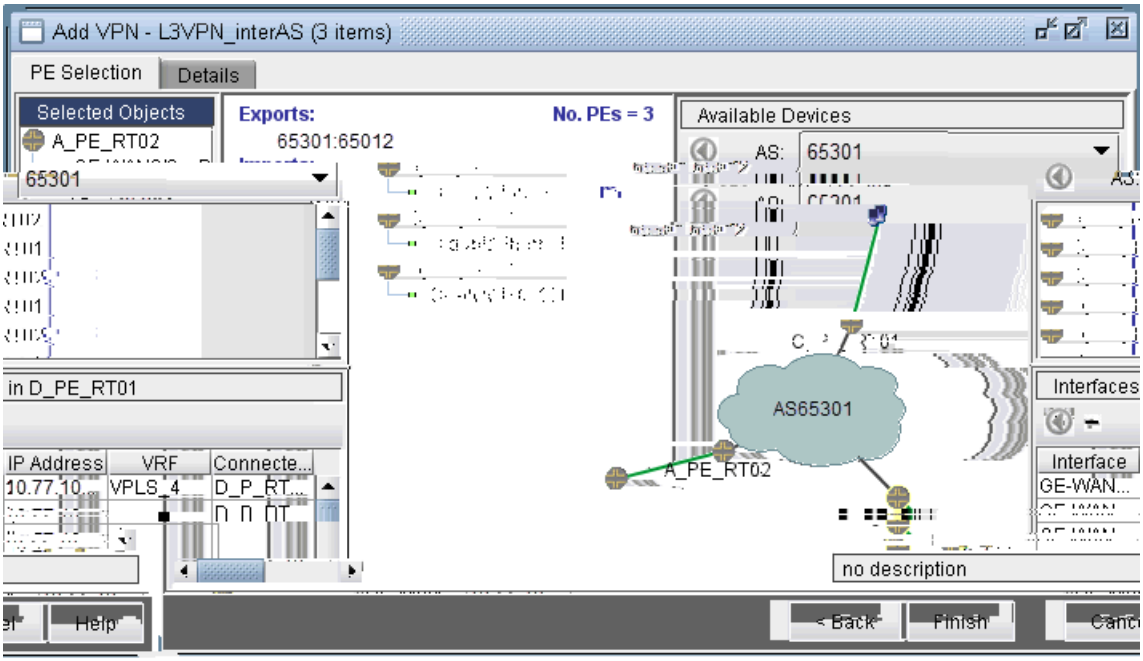


Figure 144: Adding two more PEs from another AS (65222)

Forming VPN Customer Groups

Figure 145: Forming a Customer Group

Figure 146: Supply a customer ID

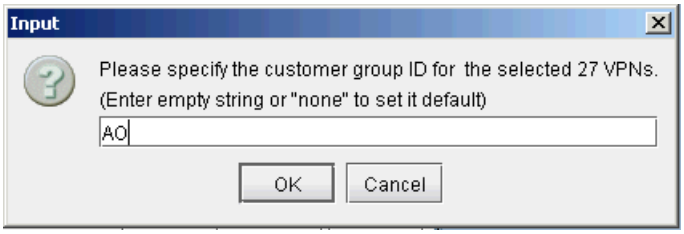
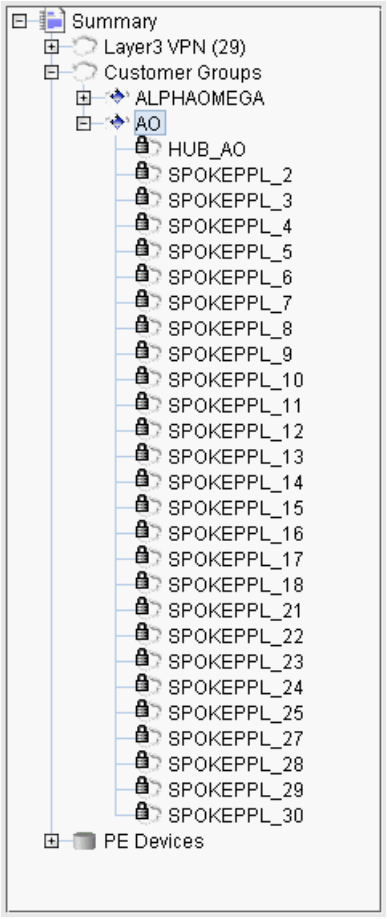


Figure 147: Customer Group AO



Deleting or Renaming VPNs

Rename

Delete

Figure 148: VPN Rename and Delete Actions

VPN Configlet Generation

Figure 149: A Configlet Generated for a L3VPN

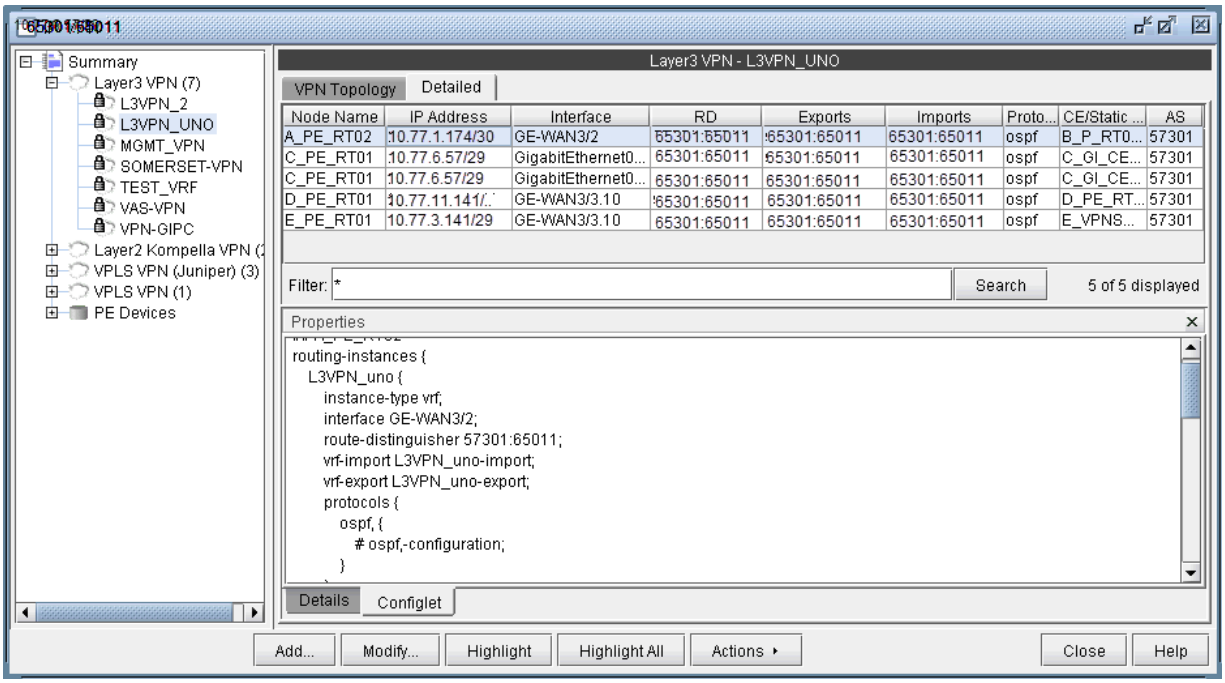


Figure 150: A Configlet Generated for a L2CCC VPN

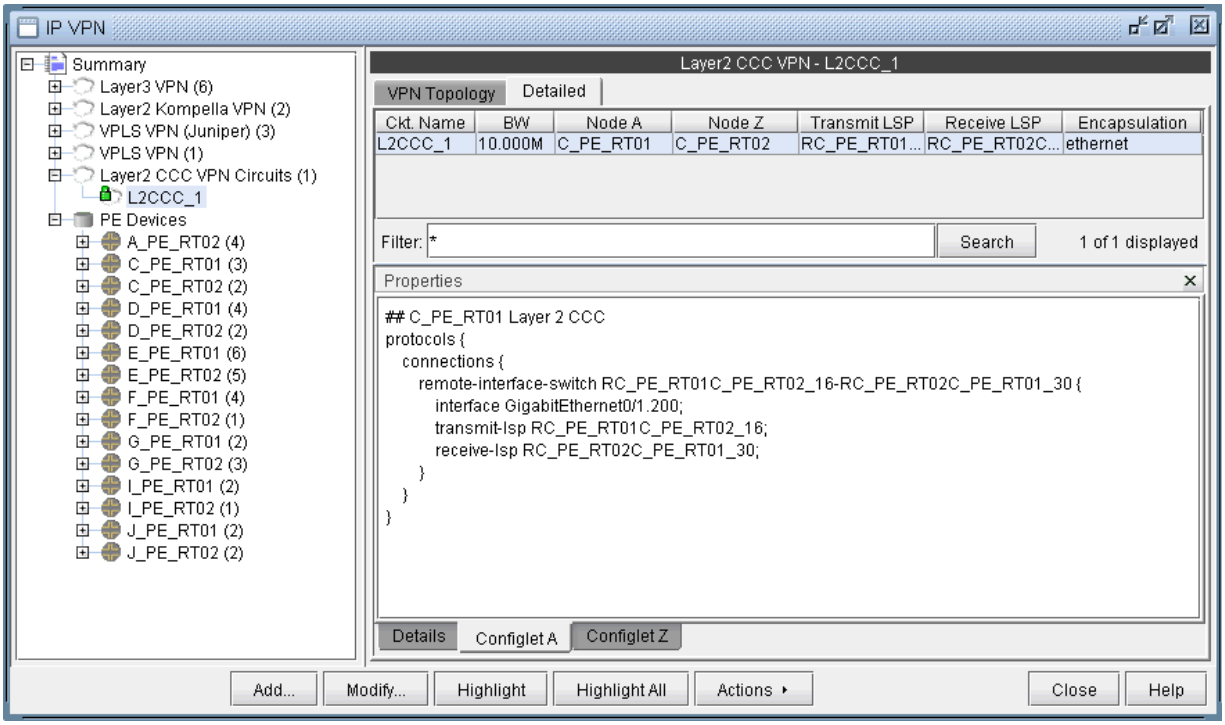


Figure 151: VPN Configlet Menu

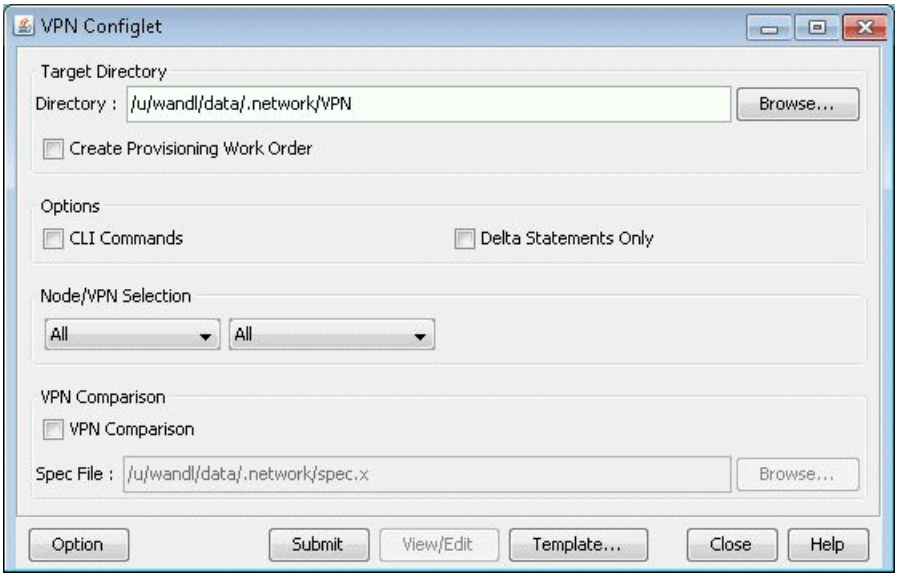


Figure 152: VPN Directory with the Generated VPN Configlets

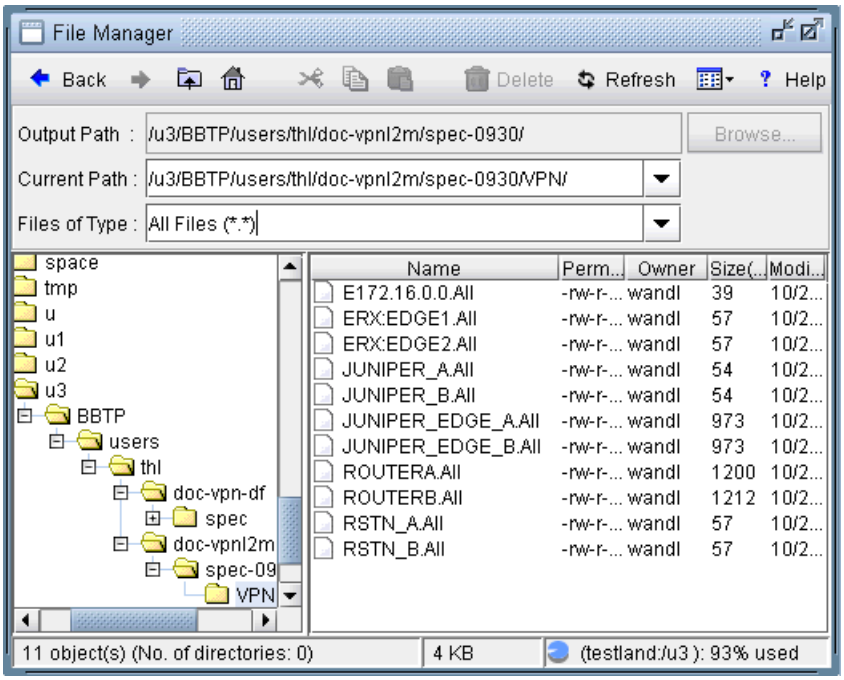


Figure 153: The Configlet Generated for JUNIPER_EDGE_A

Adding Traffic Demands in a VPN

Modify > Elements > Demands, Add > Multiple Demands

Add

Figure 154: Adding a Full-Mesh of Demands in the VPN Called INTER-AS VPNs

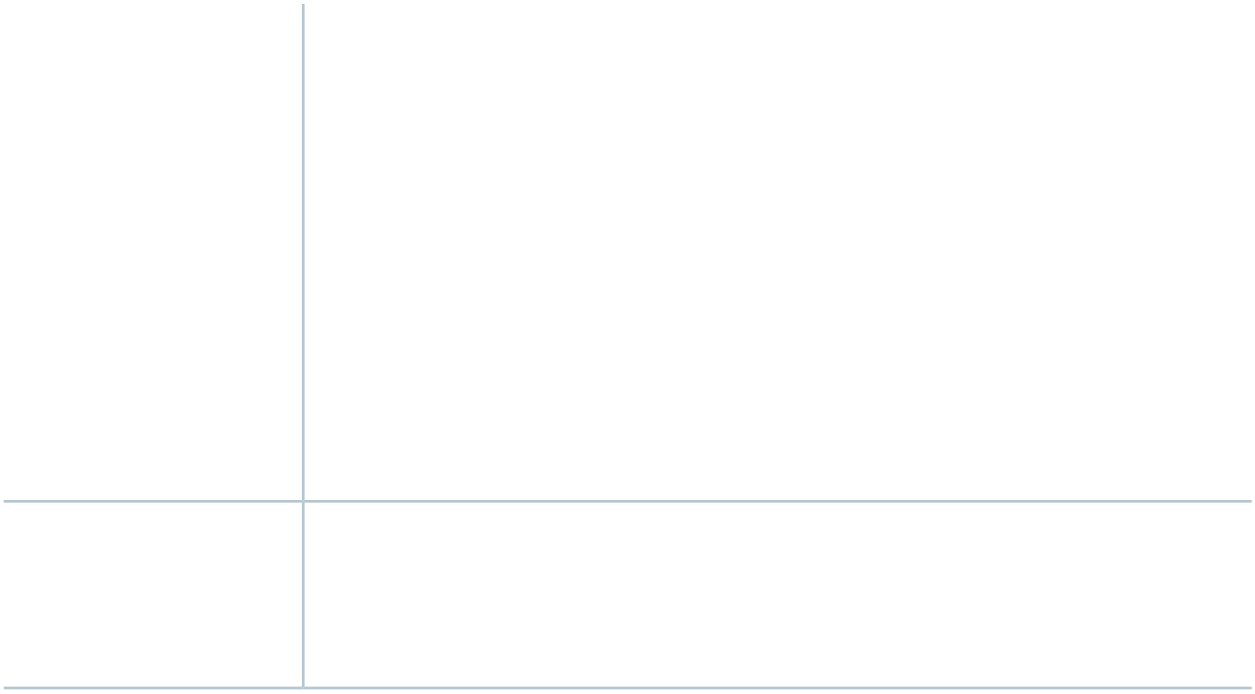
Figure 155: Adding a Single VPN Demand

VPN Traffic Generation

Tools

> VPN Traffic Generation

Figure 156: VPN Traffic Generation



VPN-Related Reports

Figure 157: L2 Martini VPN Report Generated in the VPN Section of the Report Manager

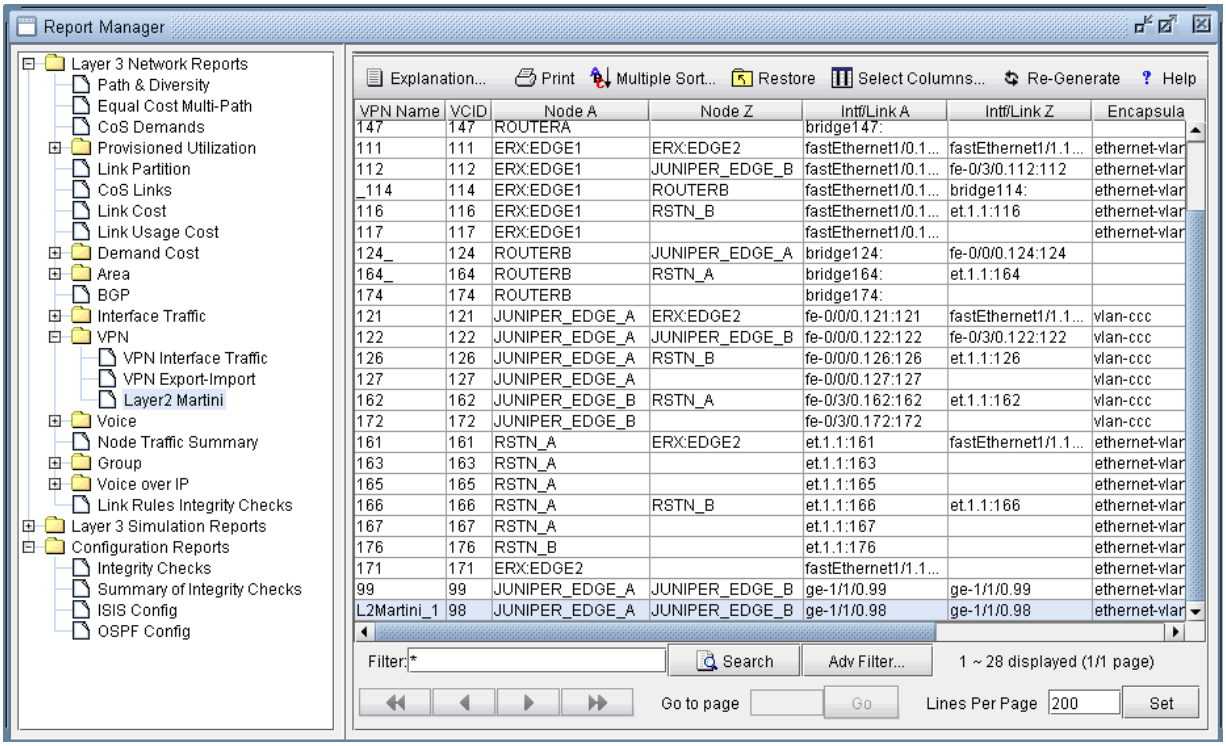


Figure 158: A L3 VPN Report Generated in the VPN Section of the Report Manager

NorthStar Planner Class of Service Overview

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NorthStar Planner Recommended CoS Instructions

The QoS Manager

File > Import Data

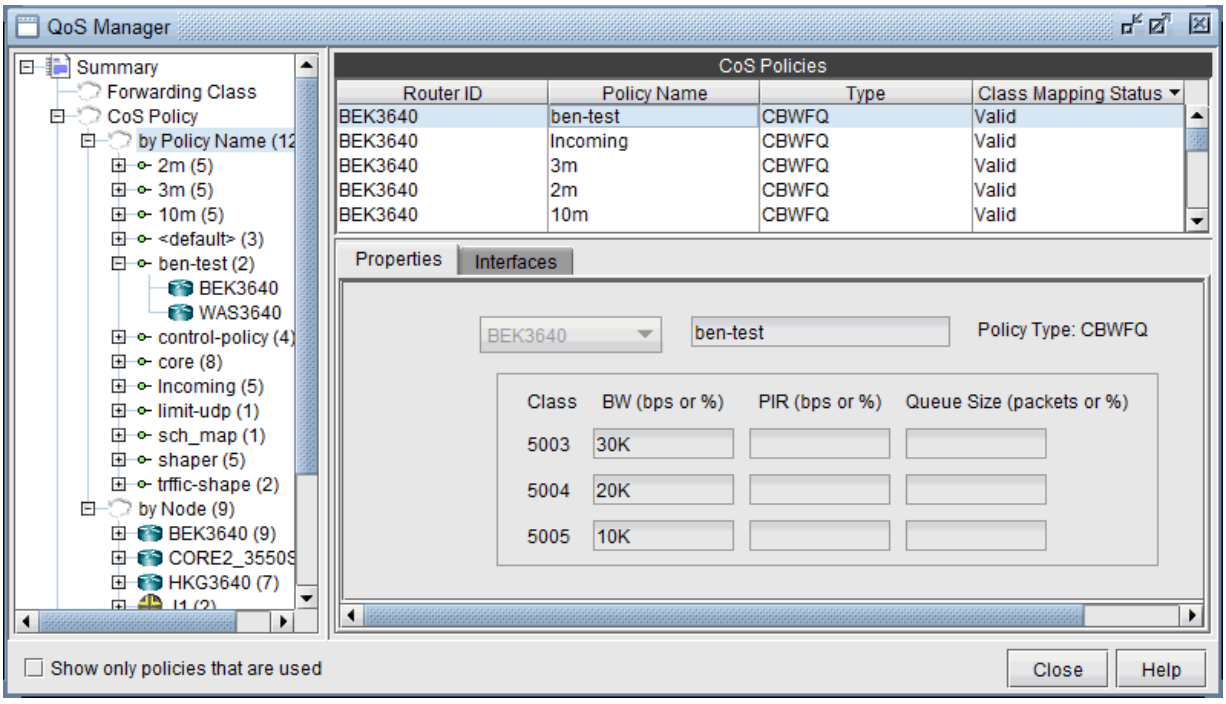
Network > QoS

Forwarding Class

Figure 185: QoS Manager

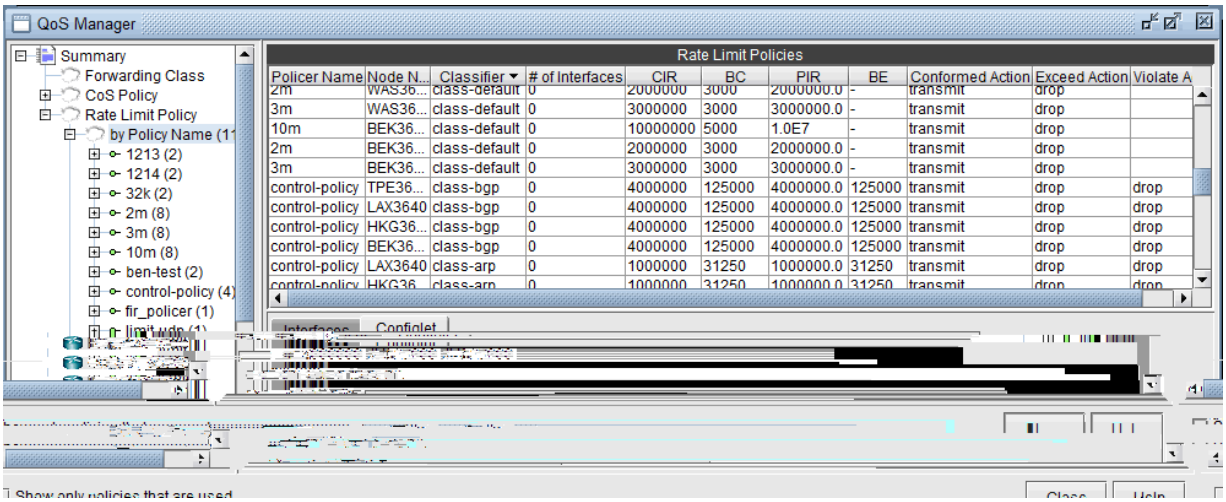
CoS Policy > by Policy Name

Figure 186: CoS Policy



Rate Limit Policy > by Policy Name

Figure 187: Rate Limit Policy



How to Input CoS Parameters

Define Class Maps

Modify > QoS

> CoS Classes

Figure 188: Names of CoS Classes

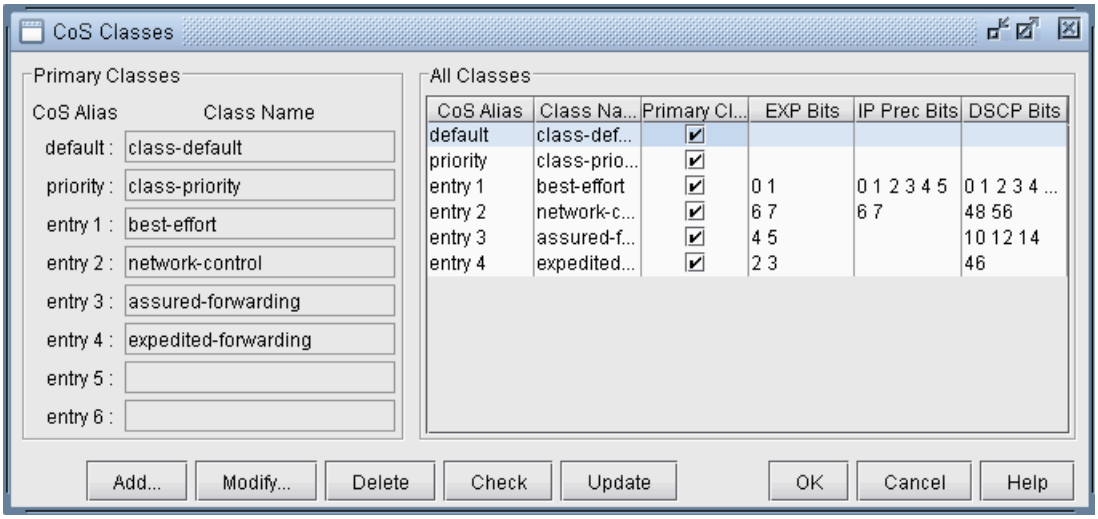
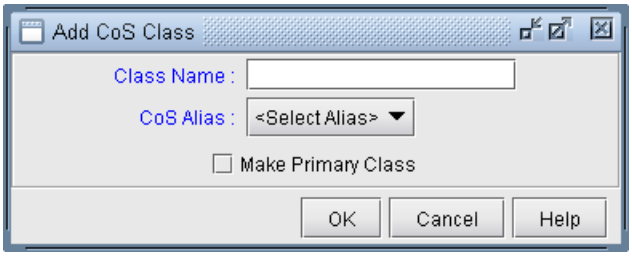


Figure 189: Add CoS Class



DEFAULT class

PRIORITY class

OK

Related Cisco Commands

```
Router(config) # class-map class-map-name
```

NOTE:

Create Policies for Classes

Modify > QoS > CoS Policies

Figure 190: CoS Policies Window

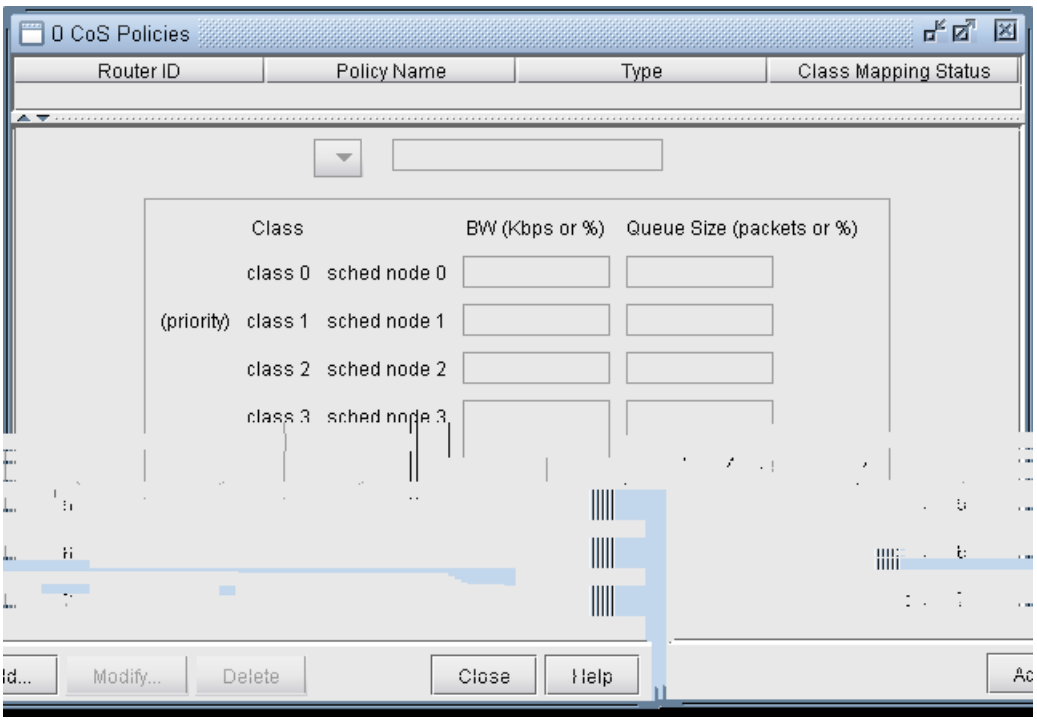
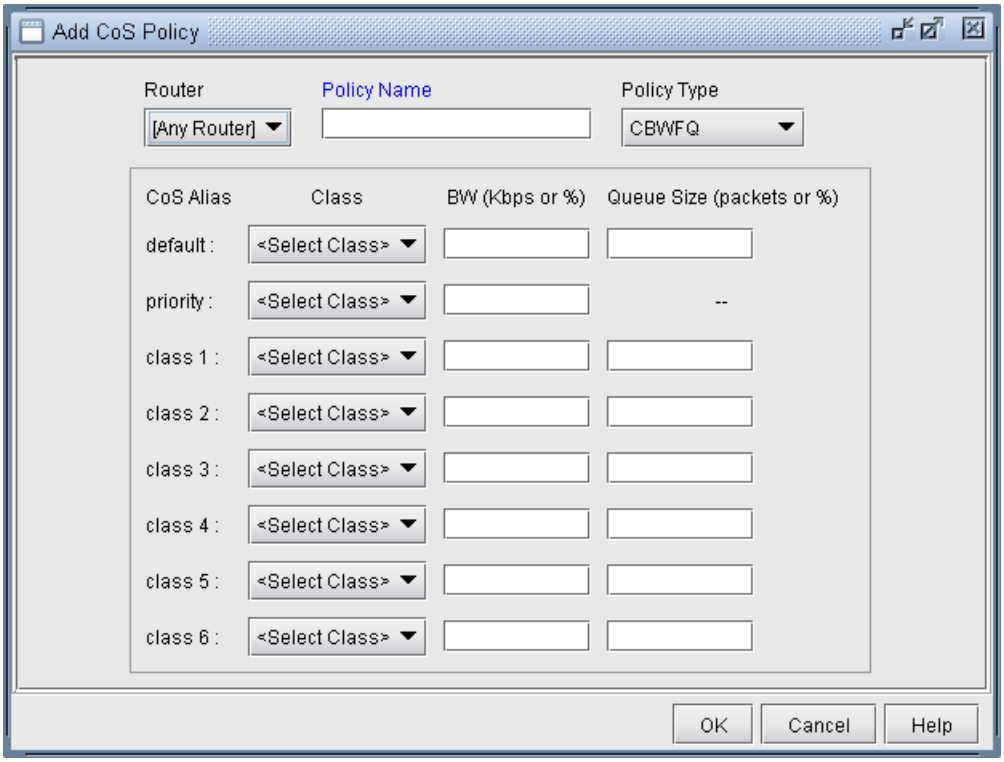


Figure 191: Add CoS Policy Window



	NOTE:
	NOTE: NOTE:

Related Cisco commands:

```
Router(config) # policy-map policy-map-name
```

```
Router(config-pmap) # class class-name
```

```
Router(config-pmap-c) # bandwidth bandwidth-kbps
Router(config-pmap-c) # bandwidth percent percentage
```

```
Router(config-pmap-c) # queue-limit number-of-packets
```

Example:

```
Router(config) # policy-map policy1
Router(config-pmap) # class class1
Router(config-pmap-c) # bandwidth 3000
Router(config-pmap-c) # queue-limit 30
Router(config-pmap) # class class2
Router(config-pmap-c) # bandwidth percent 10
```

HWRR Policies

Figure 192: CoS HWRR Policy Window - Scheduler Nodes

To Add a Scheduler Node

Scheduler Nodes

Figure 193: CoS HWRR Policy Window - Queues

To Add a Queue

Queues

OK

Attach Policies to Interfaces

Figure 194: Modify Links

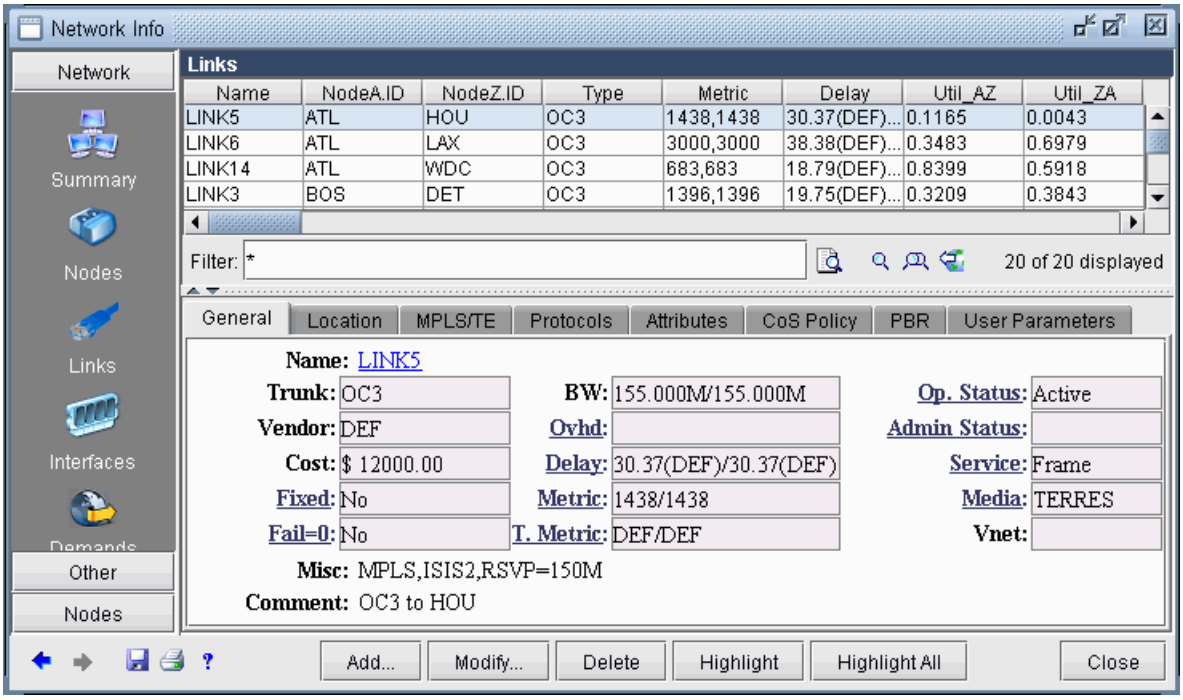
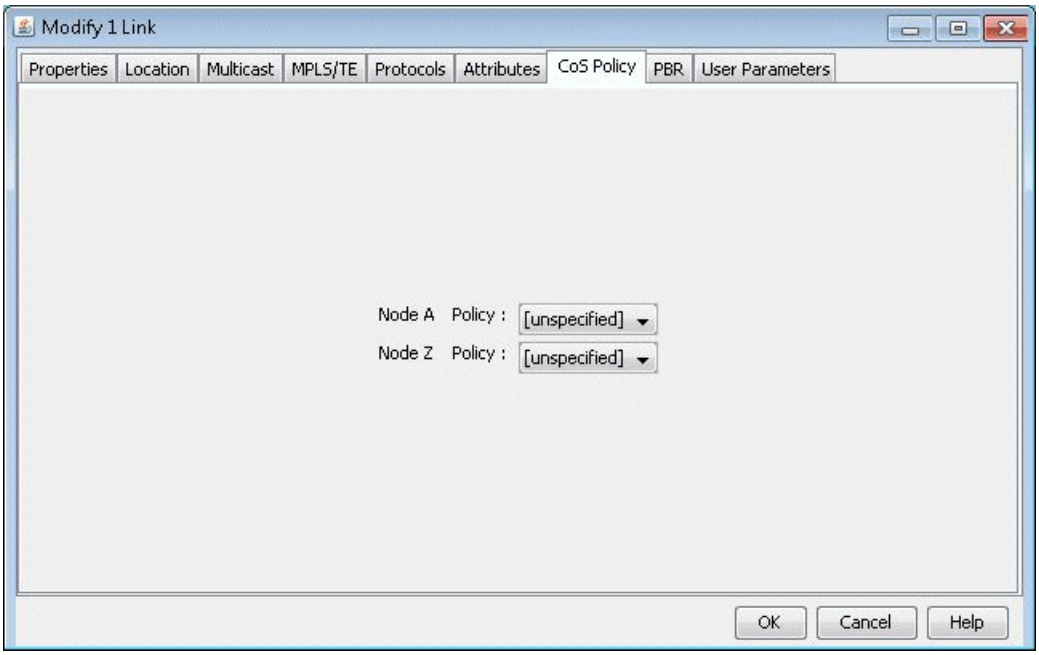


Figure 195: Modify Link Location

Figure 196: CoS Policy for Link Interfaces



```
Router(config-if) # service-policy {input| output} policy-map
```

```
Router(config) # interface e1/1
Router(config-if) # service-policy output policy1
```

Adding Traffic Inputs

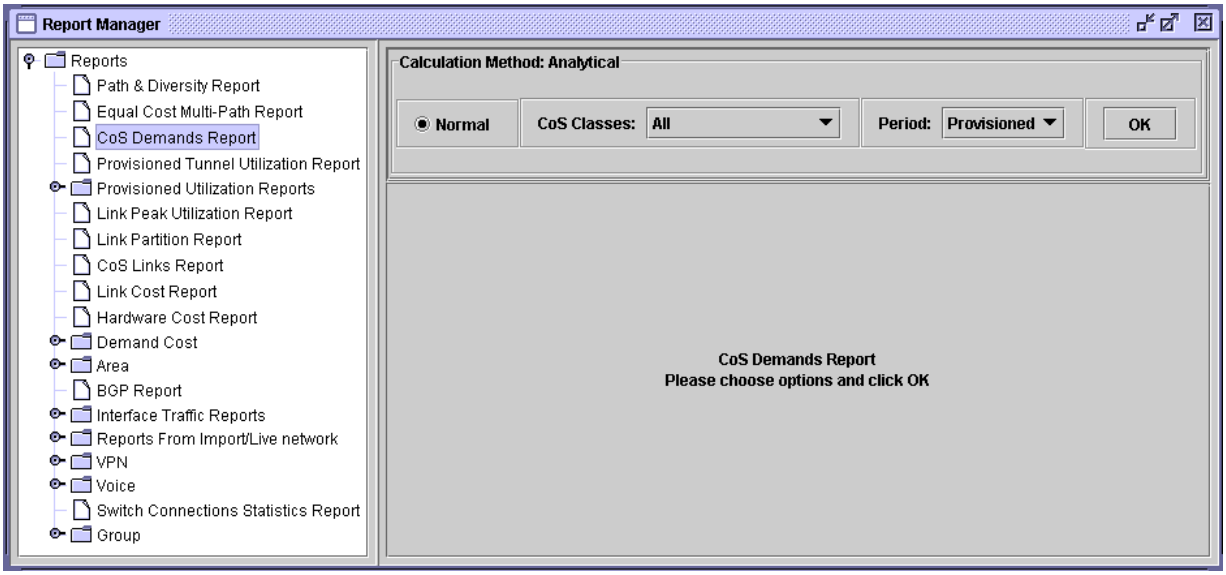
Figure 197: Demand Type Parameter Generation Window

Using the Text Editor

Reporting Module

NOTE:

Figure 198: Query Window



IP Flow Information

Figure 199: CoS Demands Report

Link information

Figure 200: Link CoS Report

Traffic Load Analysis

Animated Traffic Load Display

Figure 204: Routing Instance Window

Figure 205: Add Routing Instance Window

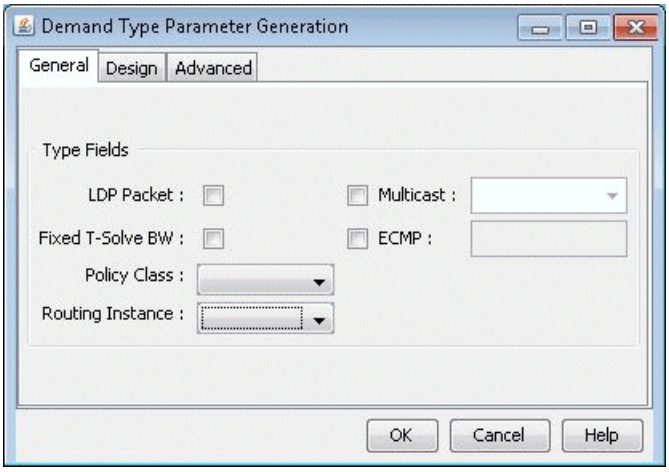
Figure 206: Modify Link Window

Subviews > Routing Instances

Figure 207: Topology Map - Routing Instance

Path Analysis

Figure 208: Demand Type Window



Reports

Asymmetric Route Instance Definition

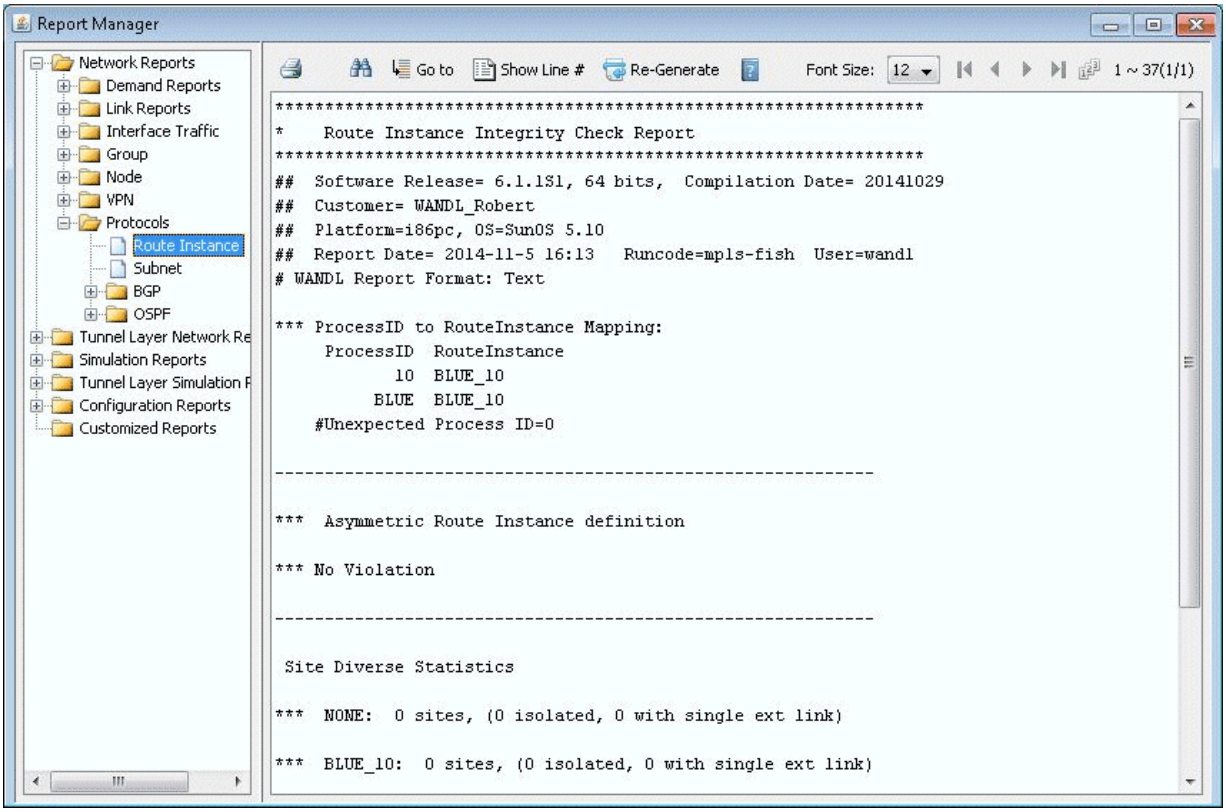
Unexpected OSPF process number

Site Diverse Statistics

BGP community definition errors

Isolated colored PoP

Figure 209: Routing Instance Integrity Check Report



File Format

```
#name assigned_color OSPF_PID route-instance-name community
```

```
blue_10 color=BLUE 10 BLUE community=1234:5678
red_20 color=RED 20 RED community=2345:6789|3456:7890
white_30 color=GREEN 30 NOID
```

NOTE:

CHAPTER

Traffic Matrix Solver

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Traffic Matrix Solver Overview

NOTE:

Traffic Matrix Solver Recommended Instructions

Input Interface Traffic

Interface Traffic File Format

```
#NodeID Interface Direction - Per1 Per2 Per3 ...
```

```
NODE3 ATM1/0.1 A2Z - 192320 204960 30263 ...
NODE4 Ethernet0 A2Z - 381 382 539 ...
```

```
#LinkName Direction - Per1 Per2 Per3 ...
```

```
LINK1 A2Z - 192320 204960 30263 ...
```

NOTE:

Example Interface Traffic File

```
#Starting Time : 6/28/07 9:50 PM

#Interval : 5 minutes
```

```
NODE11 GigabitEthernet3/0/1 A2Z 0 243836792 239290424 240655400 245699408
253939296 249574480 250319920 247234760 249261400 248431176 246328192 246079952
241803032 245348992 244634288 245710200 242983256 241388720 239512760 238729992
239829624 238082232 234324288 231259912
```

Traffic > Import Traffic

Figure 210: Load an Egress File

Input TrafficLoad File

```
#DemandID Direction AvgFrameSize Per1 Per2 Per3 etc...
```

```
Flow1 A2Z - 6852 2341 3456 3456 3568 3852
```

Traffic > Import Traffic

Input Seed Demands

Creating a Full Mesh of Demands

Modify > Elements > Demands, Add > Multiple Demands

Populate Destination IP

Modify > Selected

Note

Unplaced Test Demands

Running the Traffic Matrix Solver

Figure 211: T-Solve

Interface Egress File, Interface Ingress File, Known Demand Traffic Load File

NOTE:

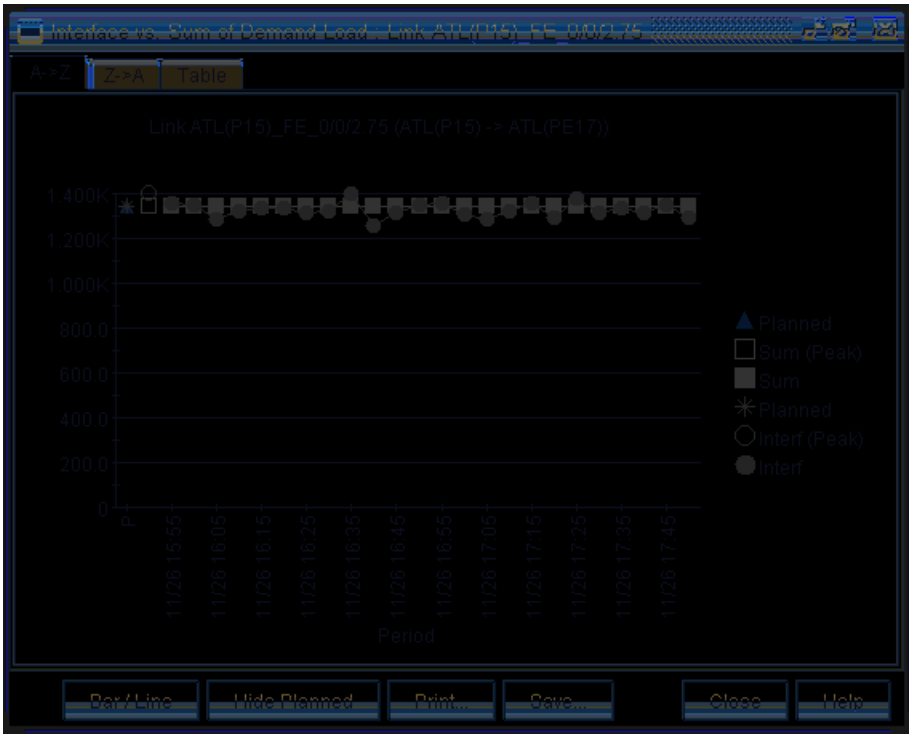
Minimum Seed Demand Bandwidth

Viewing the Results

Trafficload

Bar/Line

Figure 212: Trafficload Window



Console

#link_interface without traffic and demands=n

#link_interface without traffic=n

#link_interface without demands=n

Reports

TMLINK.runcode

TMShape.runcode

TMPATH.runcode

TMLOAD.runcode

Network > Elements > Demands

Summary Tab

overallFit

formula

ShapeError

WorstLinkDiff

Links Tab

Figure 213: Links Tab

Name

Direction

Node,Interface

Remote Node

Type

Known Model Traffic

Measured Traffic

Diff Traffic

Measured Util %

Model Util %

Diff Util %

Abs Diff Util %

Viewing Differences Graphically

Figure 214: Difference Between Measured and Model Traffic

Figure 215: Popup Window

Show Selected Color

Show All

Show None

“Show None” “Show Selected Color”

Traffic & demand missing

Traffic missing

0 traffic

Demand missing

Traffic Matrix Solver Troubleshooting

Additional Traffic Matrix Solver Information

Choosing a Period of Interface Traffic

“Interface”

“Fetch”

Traffic > Traffic Matrix > Save Interface Traffic

Resetting Demand Bandwidth According to Demand Trafficload File

“Show Results.”

Yes

Traffic Matrix Parameters

TM_linkdiff = <ratio>

TM_minimprovement = <number>

CHAPTER

LSP Tunnels

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NorthStar Planner LSP Tunnels Overview

NOTE:

$WANDL_HOME/sample/IP/fish directory

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| 295
| 299
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Viewing Tunnel Info

/u/wandl/sample/IP/fish/spec.mpls-fish network

“Yes”

Network > Elements > Tunnels

Figure 216: All Tunnels Window

NOTE:

Viewing Primary and Backup Paths

Show Path

Figure 217: Tunnel Paths on Map

“Show Paths”

“Hide Unrelated Nodes”

Figure 218: Show Primary and Backup Paths

Viewing Tunnel Utilization Information from the Topology Map

Figure 219: Planned Tunnel Utilization (Tunnel Layer View)

Tunnel BW / Link BW

Tunnel BW / RSVP BW

Viewing Tunnels Through a Link

View>Tunnels on/thru Link

Figure 220: Tunnels through Link Window

Viewing Demands Through a Tunnel

Show Demands Routed on Tunnel

Figure 221: Demands (or Flows) Routed Through a Particular Tunnel

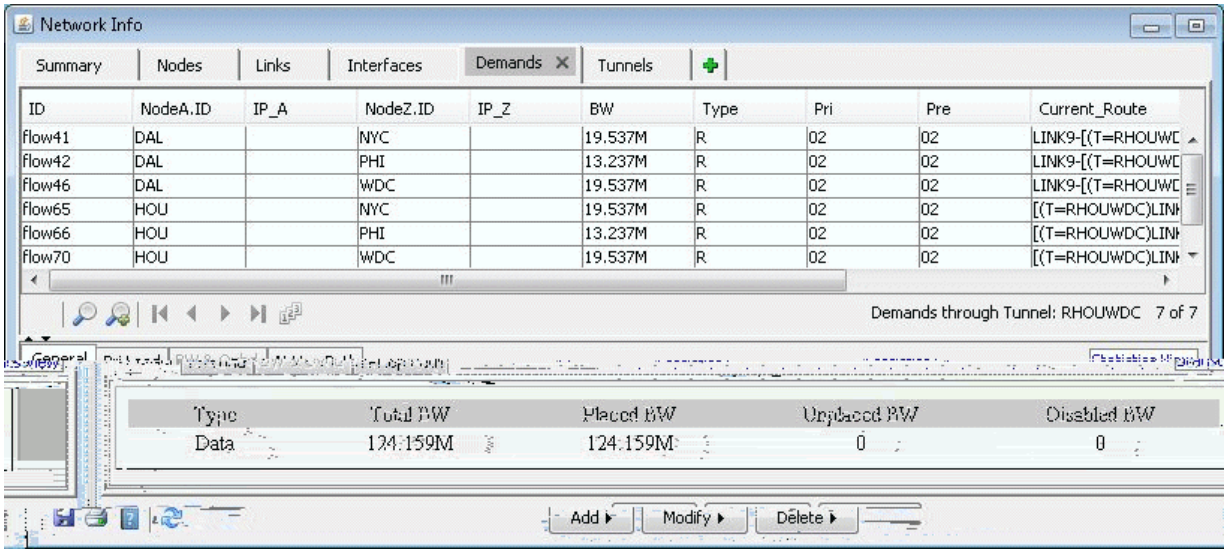
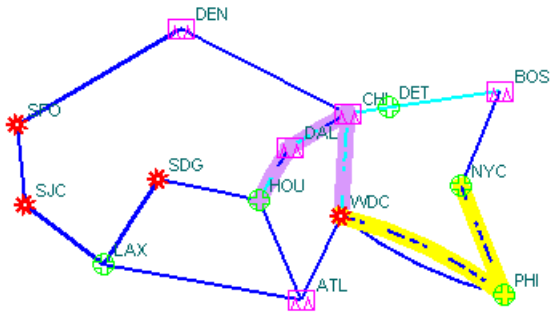
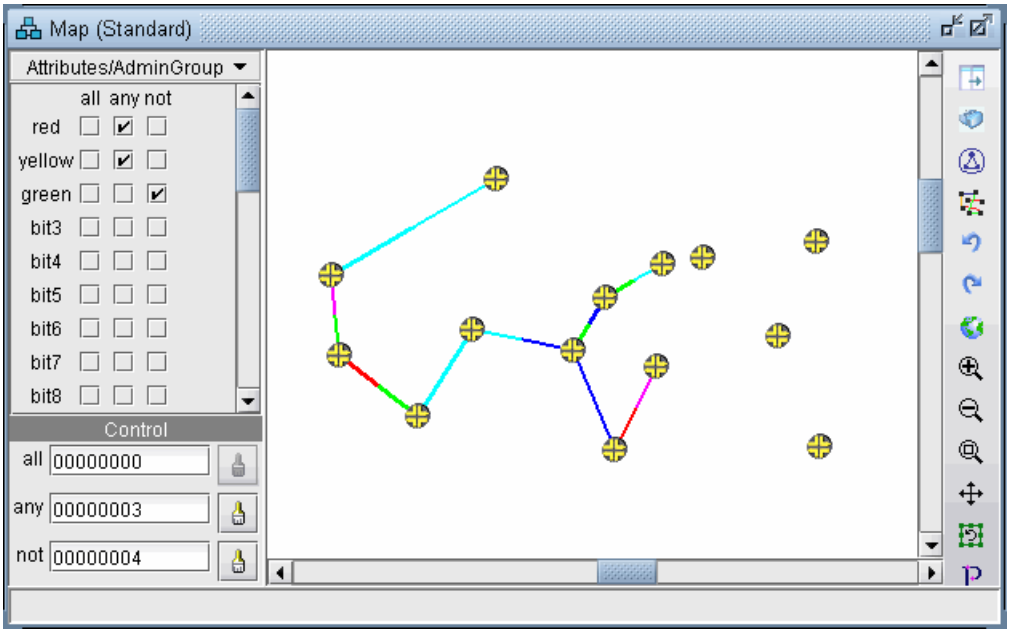


Figure 222: Path of Demand Through a Tunnel



Viewing Link Attributes/Admin-Group

Figure 223: Attributes/Admin Group Legend

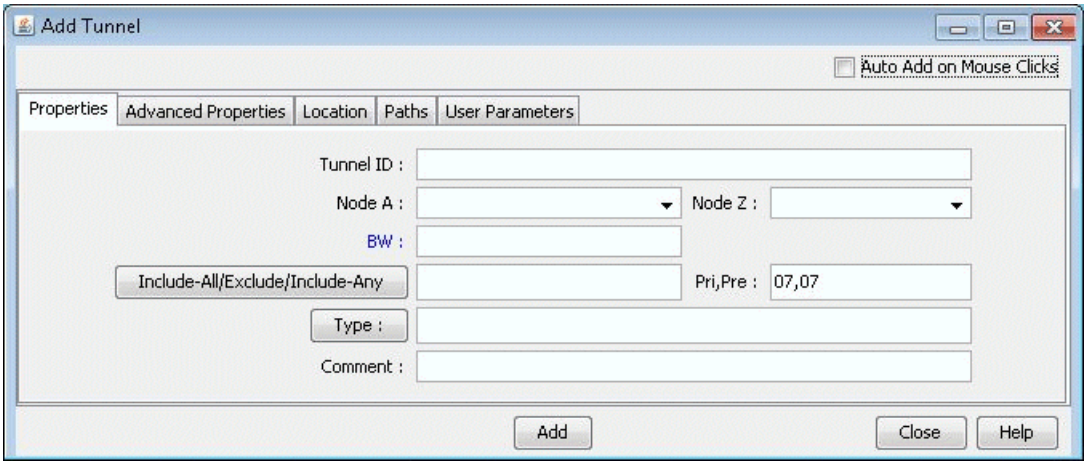


Viewing Tunnel-Related Reports

Adding Primary Tunnels

Modify > Elements > Tunnels Add
One Tunnel

Figure 224: Add Tunnel Window



paths field

Figure 225: Different Methods of Choosing Paths

“Add”

Adding Multiple Tunnels

Modify > Elements > Tunnels, Add > Multiple Tunnels
Add>Multiple Tunnels

Figure 226: Add Multiple Tunnel Window

Mark MPLS-Enabled on Links Along Path

Modify > Elements > Tunnels
Mark MPLS-enabled on links along path

Modifying Tunnels

Modify > Elements > Tunnels
“Modify”

“Modify” “Modify”
“All Entries”

Path Configuration

Figure 227: Configuring the Tunnel Path (Options may vary)

NOTE:

Edit Route

Specifying a Dynamic Path

Configuring a Dynamic Route Between Source and Destination

NOTE:

Configuring a Loose Route

Configuring an Explicit Route Based On Current Route

“Add” “Config”

Excluding Network Elements from a Path (for Cisco Routers)

Click links/nodes

Use Map Sel’n as Excluded

Show Route

Figure 228: Marked Elements to Avoid in Route

Specifying Alternate Routes, Secondary and Backup Tunnels

Specifying Alternate Routes (for Cisco Routers)

Add Row

NOTE:

Specifying Secondary and Standby Tunnels (for Juniper Routers)

Secondary Standby

"OK"

Figure 229: Tunnel Type Parameter Generation Window for Juniper Routers (Options May Vary)

NOTE:

Edit Route, Edit Type, Edit Affinity

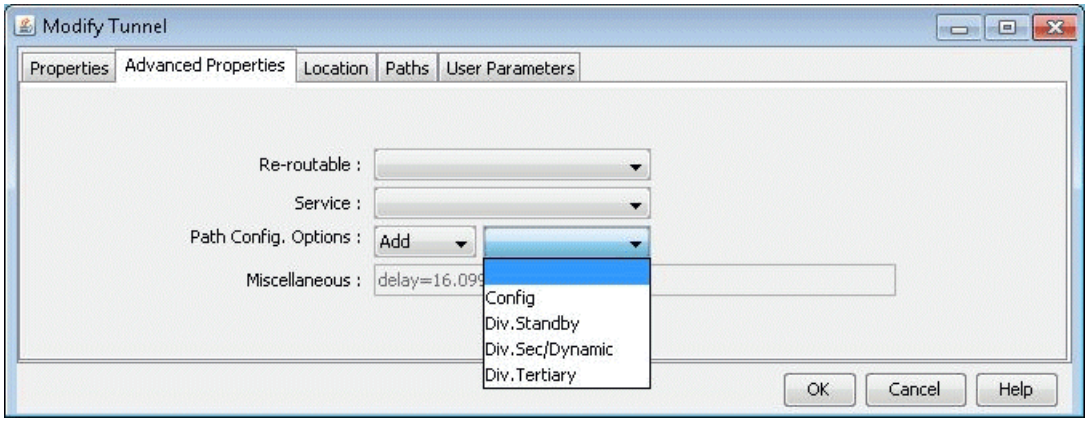
Div.Stdby Div.Sec/Dynamic
OK

Selected Entries “Add”

NOTE:

Path Config Options

Figure 230: Path Configuration Options



Adding and Assigning Tunnel ID Groups

Tunnel#

Figure 231: Adding a Tunnel ID Group User Parameter

Modify > Elements > Tunnel ID Groups

Figure 232: Creating Tunnel ID Groups

Figure 233: Adding a Tunnel ID Group

OK

Figure 234: Assigning a Tunnel ID Group to an LSP Tunnel

Figure 235: Option for Updating Tunnel Names

```
!! BOS
interface Tunnel0123
description from BOS to WDC
ip unnumbered Loopback0
tunnel destination 10.10.10.8
tunnel mode mpls traffic-eng
tunnel mpls traffic-eng autoroute announce
tunnel mpls traffic-eng priority 2 2
tunnel mpls traffic-eng bandwidth 10000
tunnel mpls traffic-eng path-option 10 explicit name Tunnel0.p0
```

Making Specifications for Fast Reroute

NOTE:

Figure 240: Tunnel Affinity/Mask Properties

“Clear”

Including and Excluding Admin-Groups (Juniper)

Figure 241: Directly Entering in Include/Exclude Constraints

Figure 242: Tunnel Include/Exclude Constraints

Adding One-Hop Tunnels

```
mpls traffic-eng auto-tunnel primary onehop
mpls traffic-eng auto-tunnel primary tunnel-num [min num] [max num]
mpls traffic-eng auto-tunnel primary config unnumbered-interface interface
```

NOTE:

Modify > Elements > User Parameters Add...

Figure 243: Adding a User Parameter for TunnelGroupID.

Modify > Elements > Tunnel ID Groups
Add

Figure 244: Adding a Tunnel ID Group

OK

Figure 245: Enabling OSPF or ISIS on the Links

Modify > Elements >Tunnels, Add > One Hop Tunnels

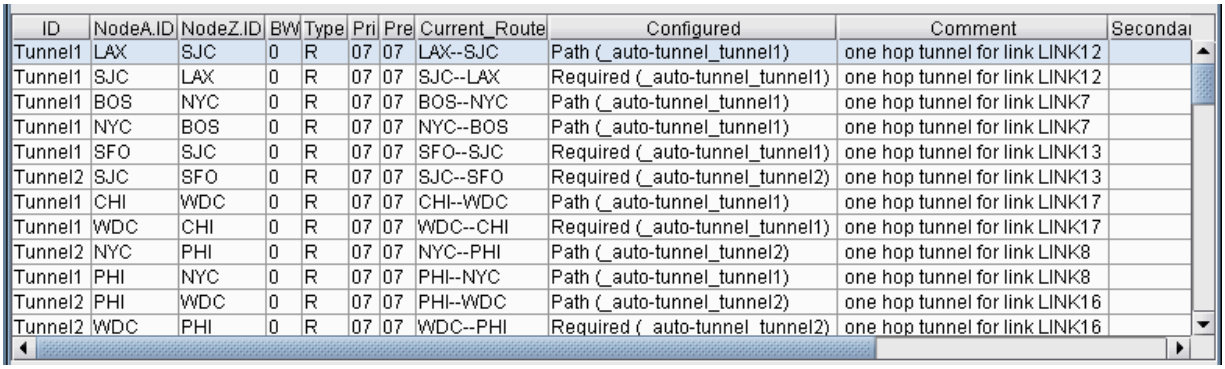
Filter from Map

“OK”

Figure 246: Add One Hop Tunnels

Modify > Elements > Tunnels

Figure 247: Results of One Hop Tunnel Additions



ID	NodeA.ID	NodeZ.ID	BW	Type	Pri	Pre	Current_Route	Configured	Comment	Secondar
Tunnel1	LAX	SJC	0	R	07	07	LAX--SJC	Path (_auto-tunnel_tunnel1)	one hop tunnel for link LINK12	
Tunnel1	SJC	LAX	0	R	07	07	SJC--LAX	Required (_auto-tunnel_tunnel1)	one hop tunnel for link LINK12	
Tunnel1	BOS	NYC	0	R	07	07	BOS--NYC	Path (_auto-tunnel_tunnel1)	one hop tunnel for link LINK7	
Tunnel1	NYC	BOS	0	R	07	07	NYC--BOS	Path (_auto-tunnel_tunnel1)	one hop tunnel for link LINK7	
Tunnel1	SFO	SJC	0	R	07	07	SFO--SJC	Required (_auto-tunnel_tunnel1)	one hop tunnel for link LINK13	
Tunnel2	SJC	SFO	0	R	07	07	SJC--SFO	Required (_auto-tunnel_tunnel2)	one hop tunnel for link LINK13	
Tunnel1	CHI	WDC	0	R	07	07	CHI--WDC	Path (_auto-tunnel_tunnel1)	one hop tunnel for link LINK17	
Tunnel1	WDC	CHI	0	R	07	07	WDC--CHI	Required (_auto-tunnel_tunnel1)	one hop tunnel for link LINK17	
Tunnel2	NYC	PHI	0	R	07	07	NYC--PHI	Path (_auto-tunnel_tunnel2)	one hop tunnel for link LINK8	
Tunnel1	PHI	NYC	0	R	07	07	PHI--NYC	Path (_auto-tunnel_tunnel1)	one hop tunnel for link LINK8	
Tunnel2	PHI	WDC	0	R	07	07	PHI--WDC	Path (_auto-tunnel_tunnel2)	one hop tunnel for link LINK16	
Tunnel2	WDC	PHI	0	R	07	07	WDC--PHI	Required (_auto-tunnel_tunnel2)	one hop tunnel for link LINK16	

Design > Configlets/Delta > LSP Configlet “Submit”

Tunnel Layer and Layer 3 Routing Interaction

Additional Information

Table 3: Commands Modeled Using Affinity and Mask Feature

Table 3: Commands Modeled Using Affinity and Mask Feature đ continued ọ

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Optimizing Tunnel Paths

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Optimizing Tunnel Paths Overview

$WANDL_HOME/sample/IP/fish directory

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Procedures for Optimizing Tunnel Paths

Figure 270

Figure 248: Switching to Design Mode, and Tunnel Layer

Design > Route Paths > Interactive Mode

Update Preferred Path Setting

Preferred Path Modification Menu:

1. # Tunnel with Preferred Path setting= 0 primary, 0 secondary

2. # Tunnel with Required Path setting= 5 primary, 0 secondary

3. Use current routes as preferred/required paths

Select:

Apply Changes to 1: Primary only, 2. Secondary/Standby only, 3. All

3

Required Paths Modification Menu:

1. Change to Preferred, 2. Remove All Required Paths, 3. No Change

Select:

<Enter>

NOTE:

Network Grooming

Figure 249: Network Grooming Window for Tunnel Paths

OK

Figure 250: Net Groom - Potential Admin Weight (AW) Gain for Tunnel Path

Multiple tunnels

CHAPTER

Tunnel Sizing and Demand Sizing

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Tunnel Sizing and Demand Sizing Overview

Sizing Tunnels and Demands

NOTE:

Design > Tunnel Sizing

Sizing Tunnels

NOTE:

Figure 251: Tunnel Layer Button

T_trafficload = T_trafficload.runcode

DEN:tunDenDet A2Z - 3.0M 4.0M 9.1K

Report > Report Manager

Figure 252: Demand Traffic on Tunnel Report (formerly Planned Tunnel Util)

Design > TE Tunnels > Tunnel Sizing

Figure 253: Find Tunnels for Tunnel Sizing

NOTE:

“OK”

“No”

Figure 254: Tunnel Sizing Parameters

“OK”

Figure 255: Tunnel Sizing Window

“Confirm All”

“OK”

Figure 256: Options Window To Recalculate Selected Tunnels

“Customize Current View”

Figure 257: Right-click Pop-up Menu

Figure 258: Select Sort Options Window

“Replace New BW Values”

Calculation of the New Tunnel Bandwidth

CHAPTER

Tunnel Path Design

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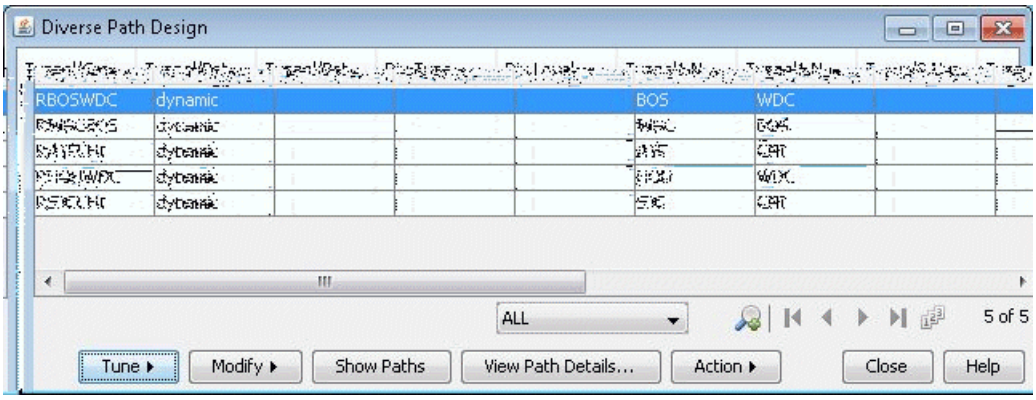
Tunnel Path Design Overview

Tunnel Path Design Instructions

Designing Tunnel Paths Overview

Design > TE Tunnels > Path Design

Figure 259: Diverse Paths Table



Tune > Selected Paths Tune > All Paths

Figure 260: Tuning Options

Backup Path Configuration Options

Add if not existing

Dynamic Primary Path

Primary Path

Backup Path #1 and Backup Path #2

NOTE:

Explicit Primary Path with Dynamic Secondary Path

Primary Path

Backup Path #1

Backup Path #2

NOTE:

Explicit Primary and Explicit Standby Path

Primary Path

Backup Path #1

Backup Path #2

NOTE:

Explicit Primary and Explicit Standby Path with Dynamic Tertiary Path

Primary Path

Backup Path #1

Backup Path #2

Default Diversity Level

Evaluate/Tune Options

Advanced Options

Figure 261: Advanced Options

OK

Viewing Design Results

Figure 262: Path Window After Design for Diverse Standby + Dynamic Tertiary

Show Paths

Hide Unrelated Nodes

Figure 263: Paths After Design for Tertiary diverse path (3DIV)

NOTE:

Action... > Report

Tunnel Modifications

Modify > Selected Paths or Modify > All Path

Figure 264: Tunnel Modification Options

General Path Options

Modify > Selected Paths

Replace Explicit with Dynamic

Diversity Group Configuration Groups

Modify > Selected Paths

Exporting and Importing Diverse Group Definitions

```
#
# Tunnel Diverse Group Definition
#
## Software Release= 5.5.1, 32 bits
## Platform=i86pc, OS=SunOS 5.10
## Report Date= 7/12/2010 04:55 Runcode=autosave User=telus
#NodeName TunnelName DivGroupName

BOS,RBOSWDC,test
WDC,RWDCBOS,test
```

```
ATL,RATLCHI,test
HOU,RHOUWDC,test
```

Action > Import DivPath Definition File

Advanced Path Modification

Figure 265: Designing Three Paths

Action > LSP Delta Wizard

CHAPTER

Inter-Area MPLS-TE

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NorthStar Planner Inter-Area MPLS-TE Overview

NOTE:

Inter-Area MPLS-TE Instructions

Viewing OSPF Areas

Figure 266: Initial Network with Area Legend

Figure 267: View of Areas from Modify > OSPF Areas

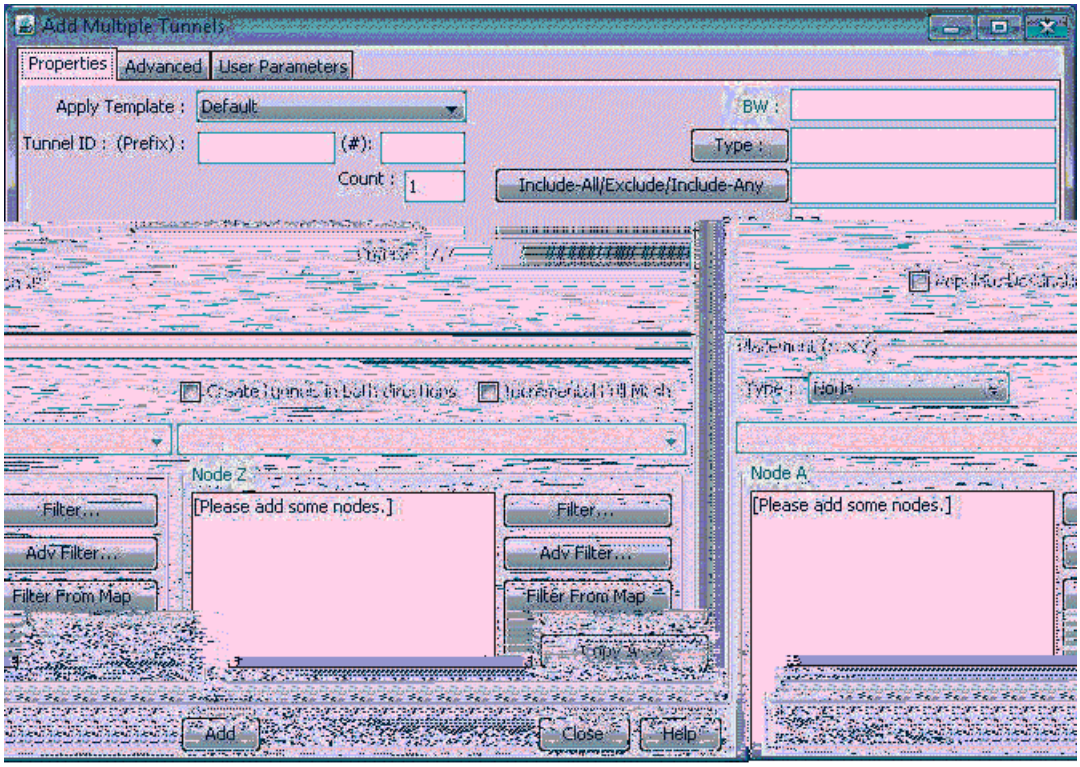
Grouping > AutoGroup
Done

Figure 268: Grouped by OSPF Area

Adding Multiple Tunnels Between Areas

Modify > Elements > Tunnels, Add > Multiple Tunnels

Figure 269: Adding Multiple LSP Tunnels between Groups



Tunnel Type Configuration Options Related to Areas

NOTE:

Figure 270: Tunnel Type Window (Options May Vary)

Cancel Add

NOTE:

Viewing Inter-Area Tunnels

Modify > Elements > Tunnels

Figure 271: Current Route of Newly Created Tunnels

Show Path

Table Options

Figure 272: Path of an Inter-Area LSP Tunnel between B2 and R2

Configuring a Loose Route

All

Entries

Figure 273: Configured Loose Routes

NOTE:

Figure 274: Configuring a Route for a Specific LSP Tunnel

Figure 275: Example of an LSP Configlet

CHAPTER

Point-to-Multipoint (P2MP) Traffic Engineering

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NorthStar Planner P2MP Traffic Engineering Overview

Point-to-Multipoint Traffic Engineering Instructions

Import a Network That Already has Configured P2MP LSP Tunnels

Examine the P2MP LSP Tunnels

Figure 276: P2MP LSP tunnels

Figure 277: Tree for the P2MP LSP Named C_BLACK

P2MP Tunnels

Figure 278: P2MP Tunnels from the Right-Click Menu

Figure 279: Sub-LSPs Associated With a Particular P2MP LSP Tunnel Instance

Create P2MP LSP Tunnels and Generate Corresponding LSP Configlets

Modify > Elements > Tunnels

Figure 280: Selecting the P2MP Tunnels Option in the Tunnels Window

Figure 281: Adding a P2MP LSP tunnel

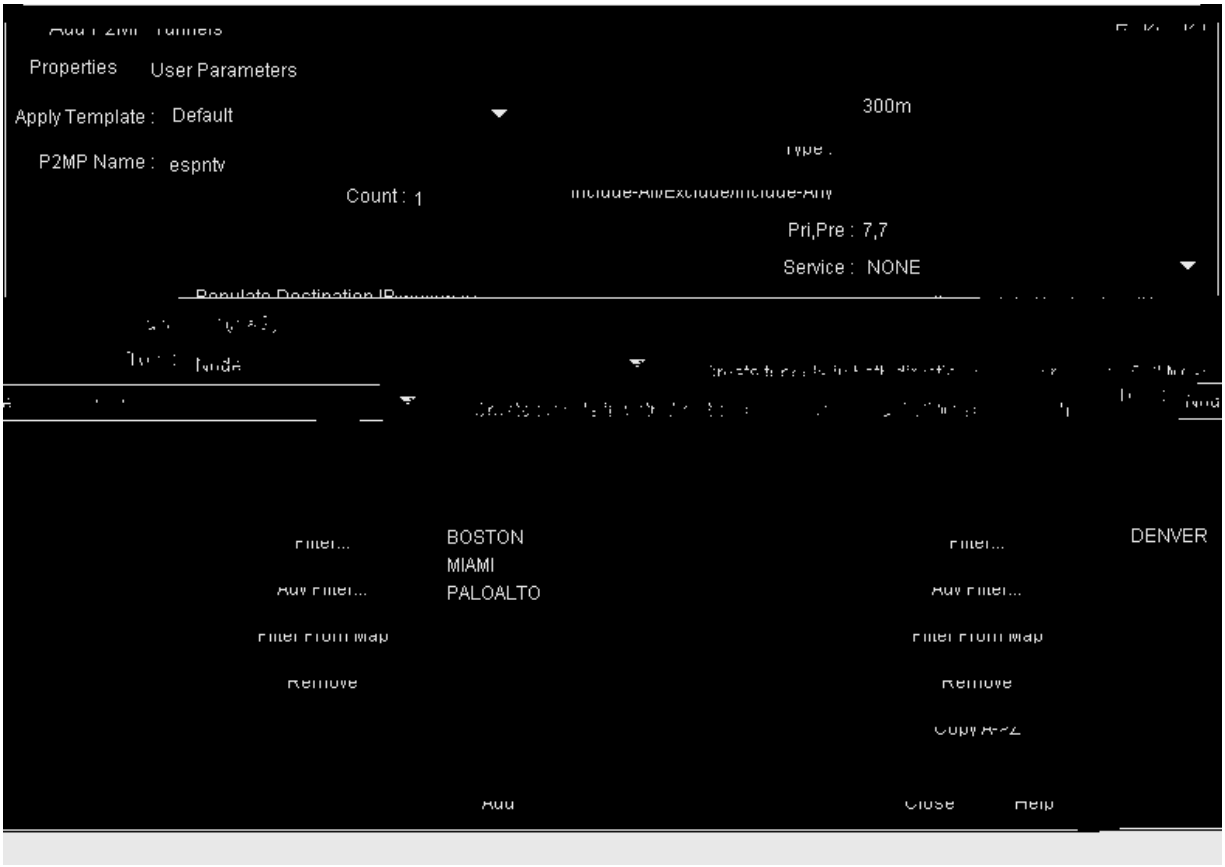


Figure 282: Newly-Added P2MP LSP Called espntv

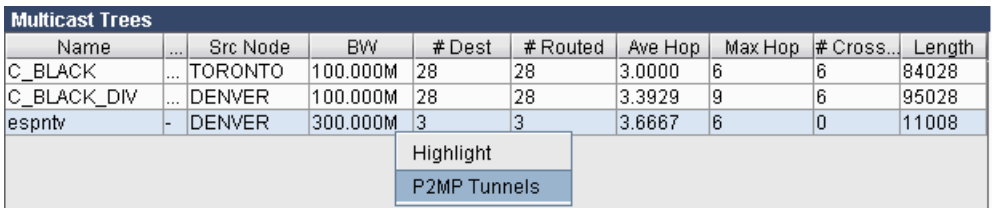


Figure 283: The Sub-LSPs for the P2MP LSP espntv

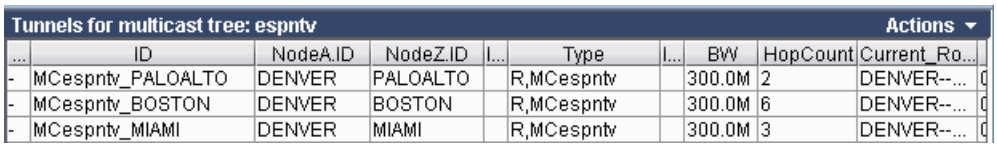
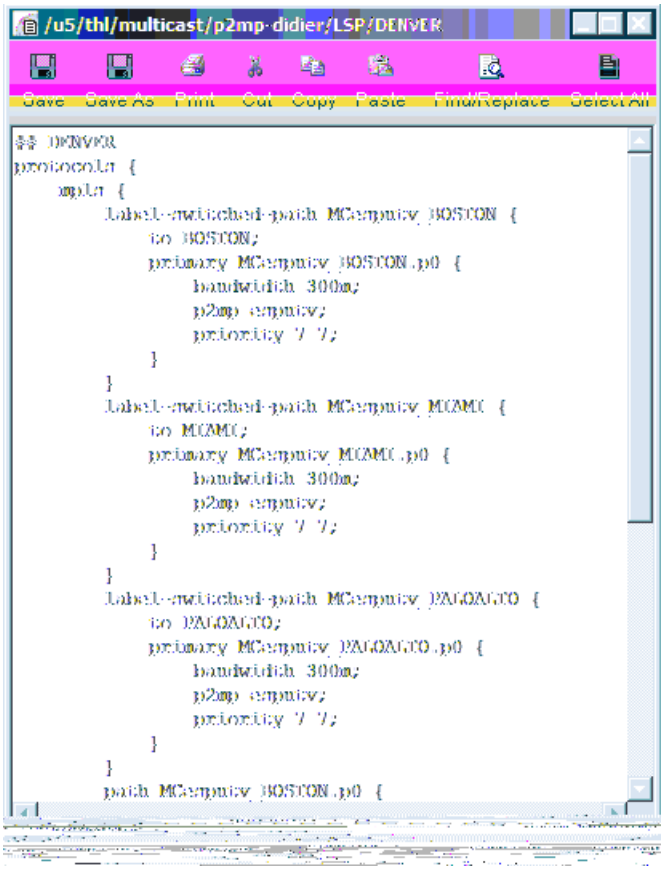


Figure 284: LSP Configlet Generation Window

Figure 285: Configlet Generated for the P2MP LSP espntv.



Examine P2MP LSP Tunnel Link Utilization

Figure 286: Link Utilization Based on Tunnel Placement

Perform Failure Simulation and Assess the Impact

Figure 287: Placement of Sub-LSPs Prior to Link Failure

Figure 288: Changes in Placement of Sub-LSPs After Link Failure

CHAPTER

Diverse Multicast Tree Design

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Diverse Multicast Tree Design Overview

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Diverse Multicast Tree Instructions

Open a Network That Already Has a Multicast Tree

Figure 289: Two P2MP Trees Shown in Main Topology Map's P2MP Subview

Set the Two P2MP Trees of Interest to be in the Same Diversity Group

Figure 290: Specify Diversity Group for Each Sub-LSP for the Two P2MP Trees

Figure 291: Type Field Containing DC_BLACK.

Using the Multicast Tree Design Feature to Design Diverse Multicast Trees

Design > Multicast Tree Design

Figure 292: Multicast Tree Design Window Before Tuning Tree

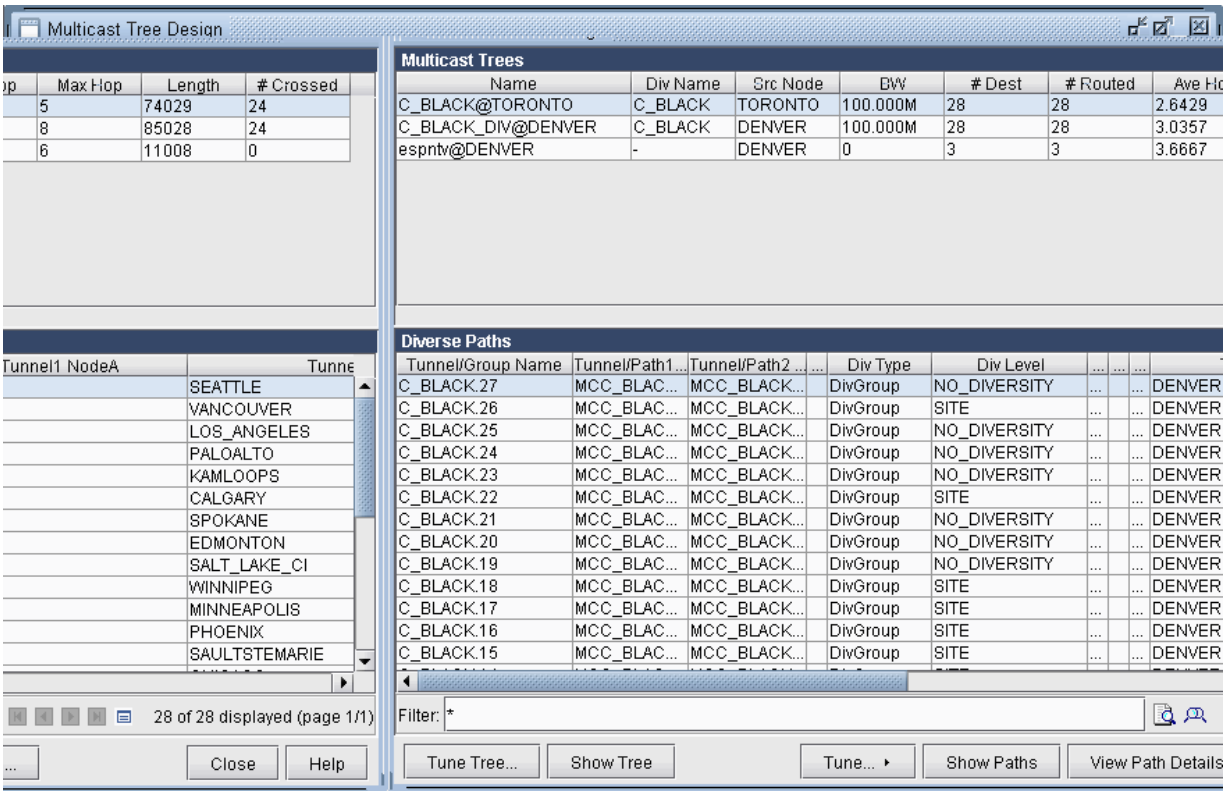


Figure 293: Example of Site Diverse Sub-LSPs.

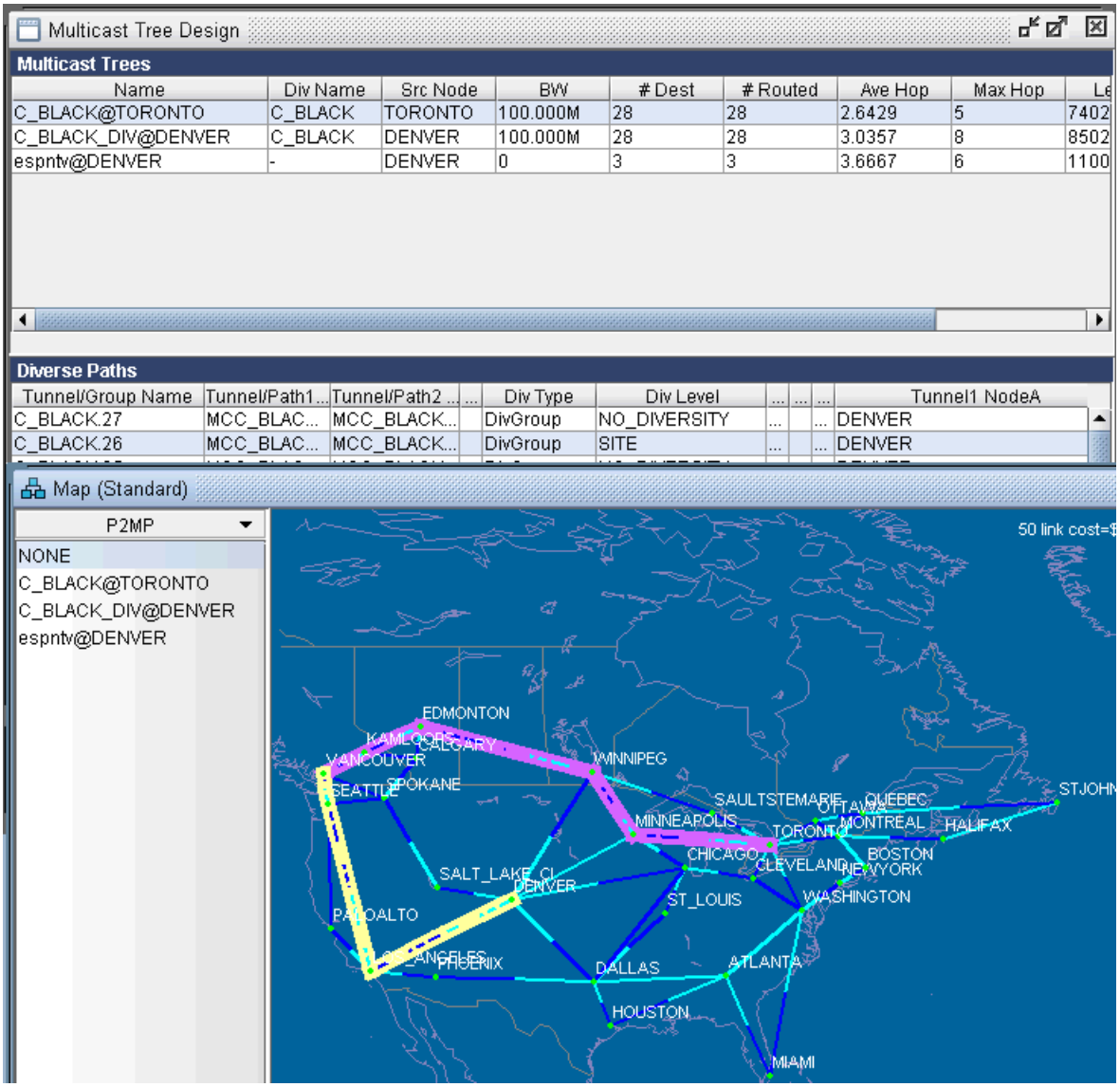
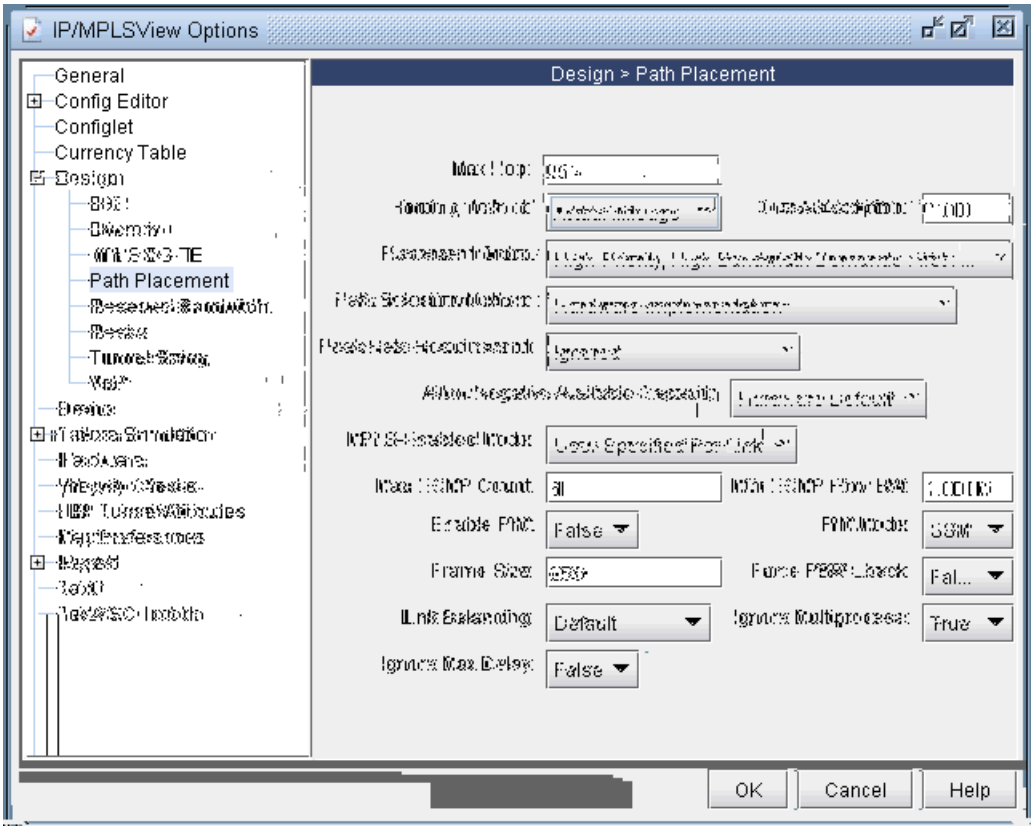


Figure 294: Max Iterations.

Figure 295: Diversity Level Satisfied.

Figure 296: Setting Routing Method to use Actual Mileage



Using the Multicast Tree Design Feature

Figure 297: Tuning a single P2MP diverse multicast tree

CHAPTER

DiffServ Traffic Engineering Tunnels

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DiffServ Traffic Engineering Tunnels Overview

Bandwidth Model

Differentiated Services

DSCP

DS-TE LSP

E-LS

L-LSP

Planned Bandwidth

QoS

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Using DS-TE LSP

Hardware Support for DS-TE LSP

Class Type

EXP Bits

Forwarding Class

Scheduler Map

Bandwidth Model

Operation

NorthStar Planner Support for DS-TE LSP

Class Types

EXP Bits

CoS Classes

Cos Policies

Bandwidth Model

Configuring the Bandwidth Model and Default Bandwidth Partitions

Figure 298: Configuring Bandwidth Model and Default Link Bandwidth Partition

Forwarding Class to Class Type Mapping

```
cos2ctmap=M-RT:CT3|1R,MC:CT2|2R,ME:CT1|4R,BE:CT0|6R
```

cosname:CTn

cosname:CTn|m

cosname:CTn|mR

Link Bandwidth Reservation

Figure 299: Defining Scheduler Maps or CoS Policies

Figure 300: Assigning a Scheduler Map or CoS Policy to a Link

Figure 301: Link Capacity Reflecting the Assigned Scheduler Map or CoS Policy

Creating a New Multi-Class or Single-Class LSP

Figure 302: Selecting the Type of DiffServ-Aware LSP

Configuring a DiffServ-Aware LSP

Figure 303: Assigning Class Type to a Single-cCass LSP

Figure 304: Assigning Bandwidth per Class to a Multi-Class LSP

Tunnel Routing

Link Utilization Analysis

Figure 305: Link Capacity Window Showing Tunnel Traffic

CHAPTER

Fast Reroute

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NorthStar Planner Fast Reroute Overview

Graphical Display

What-If Studies and Path Design

Fast Reroute Supported Vendors

Juniper

Cisco

Import Config and Tunnel Path

Viewing the FRR Configuration

Network > Elements > Tunnels

Cisco

Juniper

Figure 306: LSP Tunnel Requesting FRR Protection

Viewing FRR Backup Tunnels

OK

OK

Show Path

Show FRR Backup Tunnels

Show FRR Backup Tunnels

FRR Detour

Table Options NodeA.Hardware

Figure 307: Primary Tunnel (Yellow) and One of Three Bypass Tunnels (Green)

Figure 308: Tunnel Paths Window

Viewing Primary Tunnels Protected by a Bypass Tunnel

Design > TE Tunnels > FRR

Design

Show Paths

Figure 309: Protected Tunnels

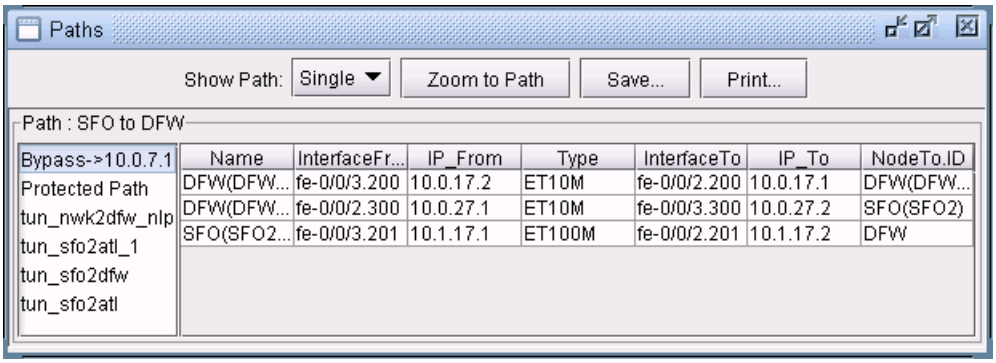


Figure 310: Filtering for all FRR-LK Backup Tunnels

Modifying Tunnels to Request FRR Protection

Selected

Entries

Figure 311: LSP Tunnel Requesting FRR Protection

OK

OK

Modifying Links to Configure Multiple Bypasses (Juniper only)

Modify > Elements > Links

Modify

Figure 312: Auto Bypass Parameters

yes

Max Num Bypasses

Bandwidth

Subscription

Node Protection

Modifying Links to Trigger FRR Backup Tunnel Creation (Cisco)

Modify > Elements > Links

Modify

yes

Example

Figure 313: Source-Destination Pairs for Possible FRR-LP tunnels (left) and FRR-NP Tunnels (right)

FRR Design

NOTE:

Design > TE Tunnels > FRR Design

Figure 314: Tune FRR Backup Tunnels Window

Tune FRR Backup Tunnels Fields

Node A, Node Z

Link Name

Primary Tunnels

Primary Tunnel BW

Backup Tunnel

Backup BW

Protected Pool

Prot Prim Tun

Type

Protected Node

Prot Prim Tun BW

RSVP BW

Design BW

Div Level

Path Violation

Backup Route

Options

Evaluate

Tune>Selected

Delete>Selected

Auto Design

Show Paths

Show All

View Path Details

View Protected Tunnels

Report

NOTE:

Auto Design Parameters

Figure 315: FRR Design - Basic Options Tab

Diversity Level Link, Site, or Facility

Protection Type

Design Bandwidth (for Design/Placement)

NOTE:

Set RSVP Bandwidth to

Multiple FRR Tunnel Settings

Maximum bandwidth per tunnel

Number of tunnels per interface

Figure 316: FRR Design - Advanced Options Tab

Advanced Options for Cisco

Protect traffic of type

Allocate Backup Bandwidth using

Tunnel can protect unlimited amount of Backup Bandwidth

NOTE:

Advanced Options for Juniper

Other Options

Open in Report Viewer

FRR Auto Design

NOTE:

Auto Bypass

NOTE:

```
Diversity Level= SITE
Tunnel       Site+Link-Diversity      Link-Diversity     No-Diversity    Notplaced
  Deactivated
FRRBackup      10                                0                   0
            0            0
```

FRR Design Report

NOTE:

Figure 317: FRR Design Report Generated from Auto Design

FRR Design Report Fields

FailureType

Element

nBKuptunnel

BKUPTunnelBW

nFail

TotalFailBW

Fail%

View Created FRR Backup Tunnels

Figure 318: View of LSP Tunnels after FRR-LP Design

FRR Tuning

NOTE:

Figure 319: Additional Options for Tuning (Basic Tab)

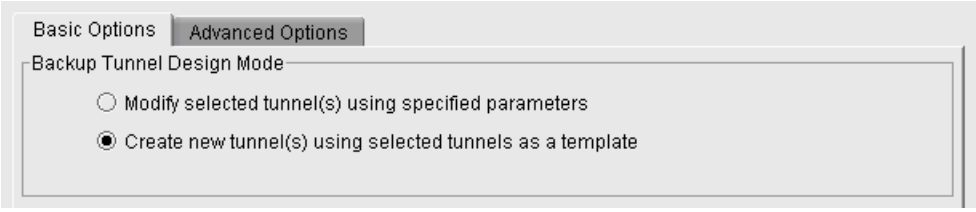
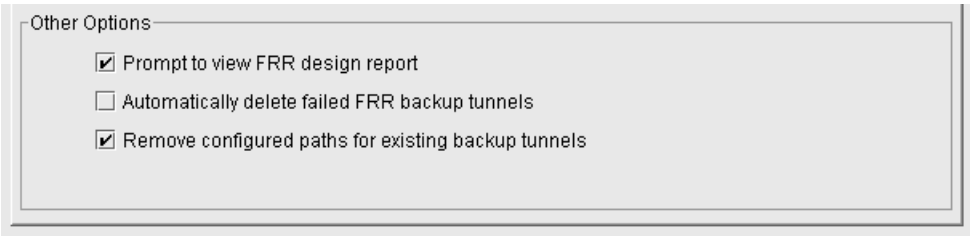


Figure 320: Additional Options for Tuning (Advanced Tab)



OK

NOTE:

Figure 321: FRR Paths After Tuning is Complete

NOTE:

```
Diversity Level= SITE
          Tunnel          Site-Div     Link-Div      No-Div   Unplaced   Deactivated

           FRRBackup      2               0               0             0
       0
```

Filtering in the FRR Tuning Window

Figure 322: Filter for a More Specific Set of Tuning Entries

Node A, Node Z

FRR Backup Tunnel endpoints must match (either/both) NodeA and NodeZ

either

both

Primary FRR-enabled Tunnel Exists

FRR Backup Tunnel Exists

Link is FRR Enabled

FRR Protection Type

Backup Tunnel Diversity Level

Protected Node

Protected Interface

Facilities

Viewing Created Backup Tunnels

Figure 323: Paths Window

Show Path “Highlight All”

Generating LSP Configlets for FRR Backup Tunnels

Failure Simulation—Testing the FRR Backup Tunnels

Simulating Local Protection

Fail Selected Links

Figure 324: Simulation Toolbar with Run, Step, and Stop buttons

Figure 325: FRR Local Protection

```
tunnel181     N9     N6    100M R,LP 07,00    N9--N2--N1--N6 #!delay=3ms
DISCONNECTED
        tunnel181     N9     N6    100M R,LP 07,00    N9--N2--N7--N6 #!delay=3ms
   #DETOURED
```

Simulating Head-end Reroute or Use of Backup Route

```
tunnel181     N9     N6    100M R,LP 07,00    N9--N2--N7--N6 #!delay=3ms    DETOURED

       tunnel181     N9     N6    100M R,LP 07,00    N9--N8--N1--N6 #!delay=3ms
 REROUTED
```

Using the Run Button

Simulation > Reset Simulation

Tools > Options > Report

Yes

Resulting Link Utilizations

FRR Only

Figure 326: FRR Mode

Simulation > Reset Simulation

Exhaustive Failure

Figure 327: FRR Failure Simulation Options

Normal

FRR + Normal

NOTE:

FRR only

FRR

Reroute Information

Peak Utilization Report

Run

Link, Site and Facility Diverse Paths

Link Diversity

Figure 328: Link Diverse Route for Protecting a Link (left) and Protecting a Node (right)

Site Diversity

Figure 329: Site Diverse Route for Protecting a Node

```
Diversity Level= Link or SITE
Tunnel                      Site-Diversity      Link-Diversity      No-Diversity
   Unplaced
FRRBackup                              34                        0
    54                 0
```

NOTE:

Facility Diversity (SRLG)

NOTE:

Figure 330: Facility-Diverse Route for Protecting a Link (left) and Protecting a Node (right)

```
Diversity Level= FACILITY
Tunnel                      Site-Diversity      FAC-Diversity      No-Diversity
  Unplaced
FRRBackup                             37                         0
    51                 0
```

NOTE:

CHAPTER

Cisco Auto-Tunnels

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Cisco Auto-Tunnels Overview

Configuration Import

Auto-tunnels Creation

Tunnel Path Data Collection and Import

Verification

Design (optional)

Importing Cisco Auto-Tunnel Information from Router Configuration Files

File>Import Data

mesh group auto-tunnel statements
tunnel destination access-list num

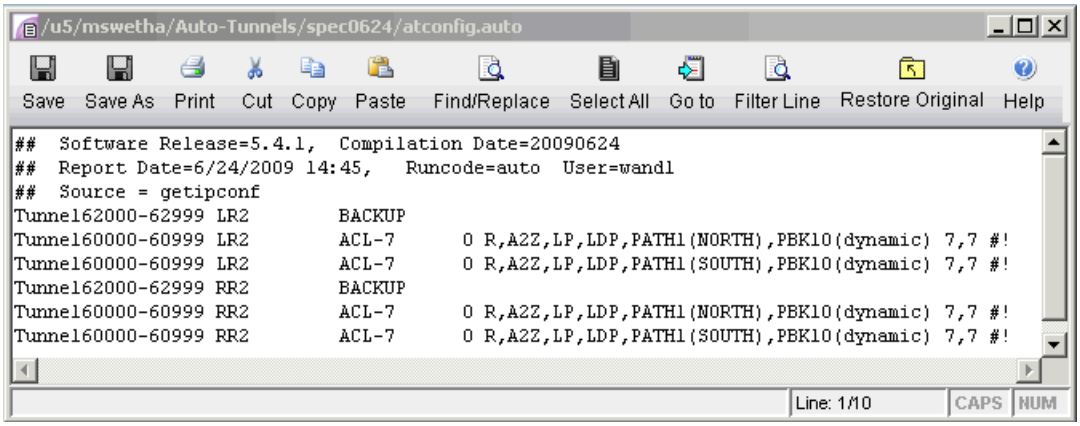
Table 4: Cisco auto-tunnel statements parsed during configuration import

Table 4: Cisco auto-tunnel statements parsed during configuration import đ continued ọ

Next>

Figure 331: Configuration Import

Figure 332: Atconfig File Containing Both Mesh Group and Backup Auto-Tunnels



Tunnel62000-62999 LR2 BACKUP

Tunnel60000-60999 LR2 ACL-7 0 R,A2Z,LP,LDP,PATH1(NORTH),PBK10(dynamic) 7,7 #!

Auto-Tunnel Creation

No

Figure 333: Auto Tunnel Design Menu

Yes

Figure 334: Auto-Tunnels Tagged With “AT” in the Type fField

Match Substring

Figure 335: Filtering for Auto-Tunnels

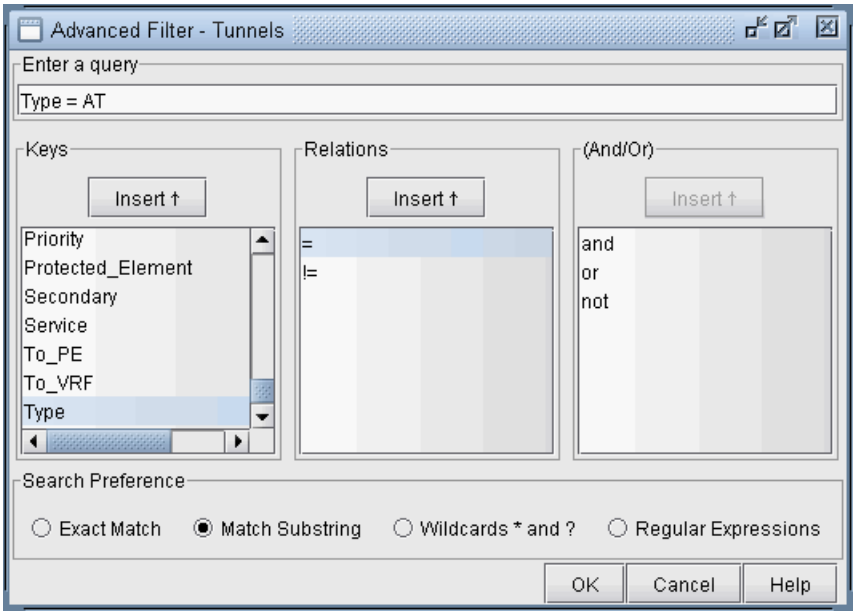


Figure 336: Tunnels Window Showing Only Auto-Tunnels

Figure 337: Click Yes to Save Auto-Tunnels

Figure 338: Auto-Tunnels Saved

Tunnel Path Data Collection and Import for Auto-tunnels

Tunnel Path Import Type

Figure 339: Tunnel Path Import

Figure 340: Directory of Show Command Output Files

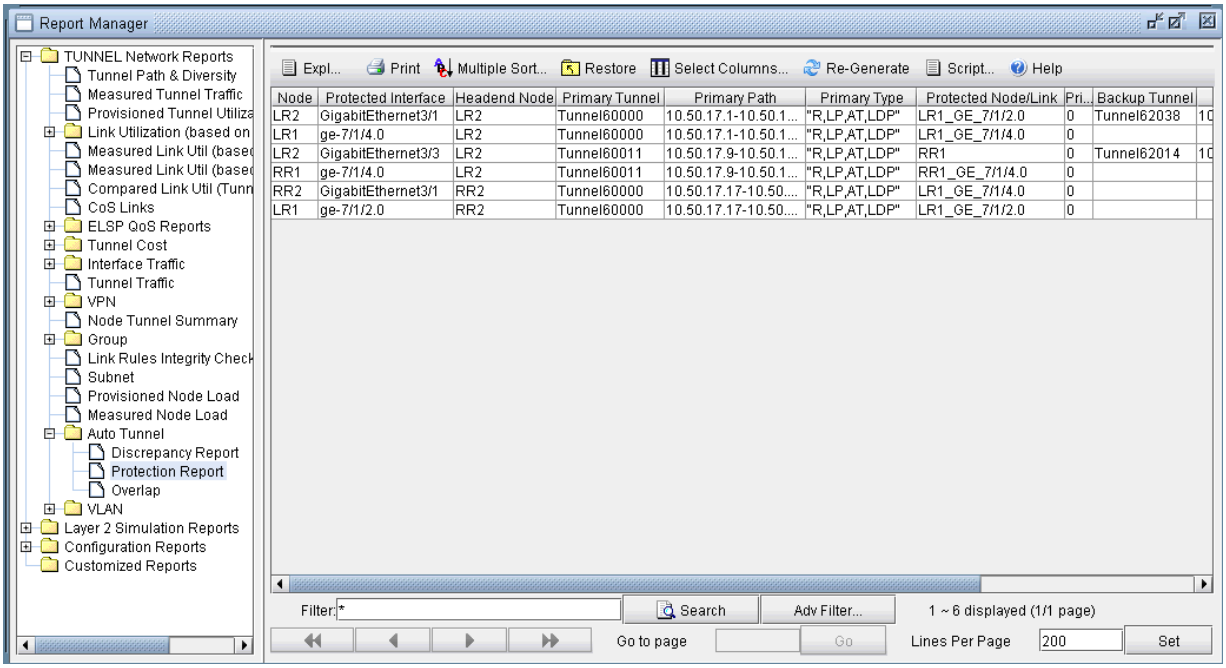
Next

Figure 341: Tunnels after Tunnel Path Import

Auto-Tunnels Reporting for Verification

Figure 342: Discrepancy Report Showing Modeled Auto-Tunnels Not Generated by Routers

Figure 343: Protection Report Showing Protected Interfaces in the Network



CHAPTER

Integrity Check Report

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Integrity Check Report Overview

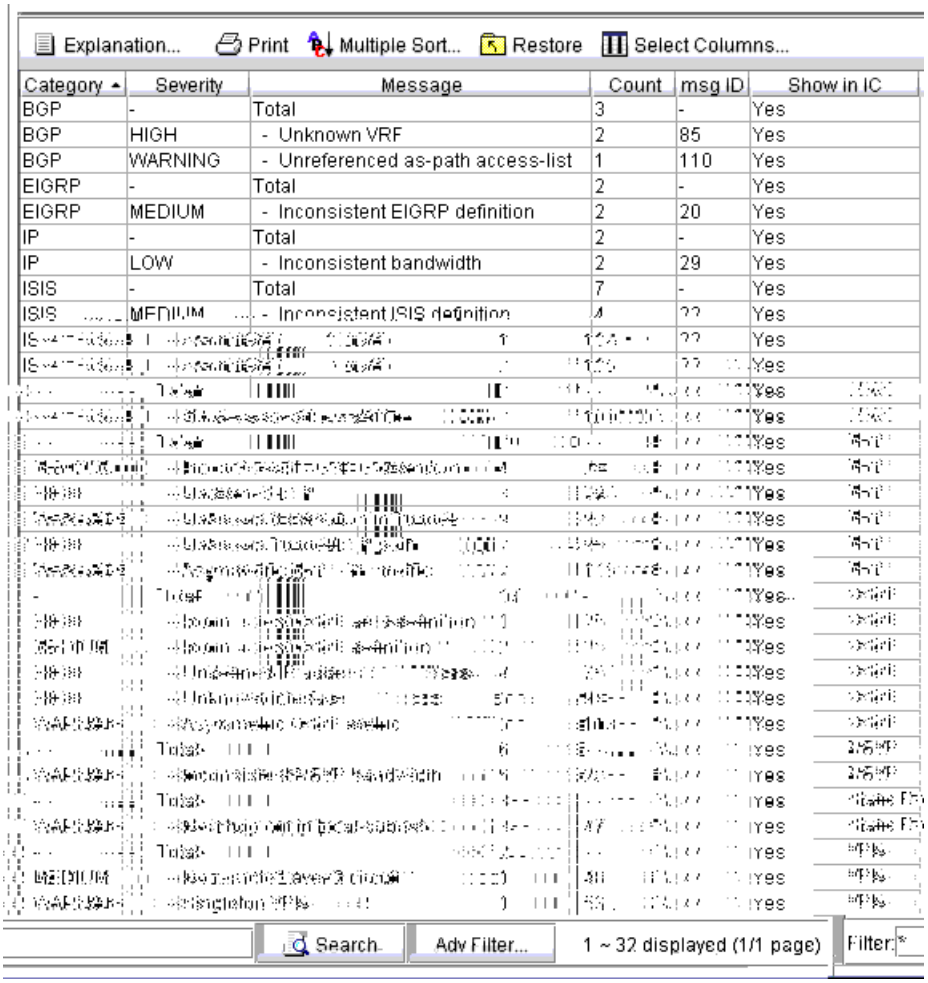
Viewing the Integrity Check Report

Report > Report Manager

Figure 344: Config Import Reports

Figure 345: Integrity Checks Report

Figure 346: Summary of Integrity Checks Report



Using the Report Viewer

Open in Report Viewer

Figure 347: Right-Click Menu

Error Source

Customizing the Severity Level

Tools > Options > Integrity Checks

Figure 348: Integrity Checks Profile Table

OK

Scheduling Integrity Checking in Task Manager

Integrity Check Task

Admin > Task Manager

Next

Next

Finish

Report Options

Figure 349: Report Options

Integrity Check Options Tab

Network OptionsNetwork Options

Use live network

Use specification file

Filter by Category

Filter by Message

Filter by Router

Filter by Group

Filter by Severity

Integrity Check Options Tab

Additional Report Options

Integrity Check Descriptions

Access List and Prefix List Integrity Checks

["Non-utilized access-list rule (Cisco)", msgID=106, High]

["Unknown access-list (Cisco)", msgID=86, High]

["Unreferenced access-list (Cisco)", msgID=100, Warning]

["Unknown prefix-list (Cisco)", msgID=107, High]

["Unreferenced prefix-list (Cisco)", msgID=108, Warning]

BGP Integrity Checks

["Disabled BGP protocol (Juniper)", msgID=5, Warning]

["Ignored 'community-list' statement due to unexpected 'permit'/'deny' location (Riverstone)", msgID=18, Warning]

["BGP neighbor shutdown", msgID=51, Warning]

["Unknown as-path access-list", msgID=109, High]

["Unreferenced as-path access-list (Cisco)", msgID=110, Warning]

["Unknown community-list", msgID=124, High]

["Unreferenced community-list (Cisco)", msgID=125, Warning]

["Unknown route-map action (Riverstone)", msgID=97, High]

EIGRP/IGRP Integrity Checks

["Inconsistent EIGRP definition", msgID=20, Medium]

["Inconsistent IGRP definition", msgID=21, Medium]

["Invalid EIGRP inverse (wildcard) mask", msgID=61, High]

["Invalid IGRP inverse (wildcard) mask", msgID=62, High]

["Invalid EIGRP network address", msgID=65, High]

["Unexpected IGRP network address", msgID=66, High]

IP Integrity Checks

["Duplicate IP address (public)", msgID=9, High]

["Duplicate IP address (private)", msgID=111, Warning]

["Duplicate host name", msgID=10, High]

["Error in address definition (Riverstone)", msgID=12, High]

["Inconsistent media interfaces with same subnet address", msgID=19, Warning]

["Inconsistent bandwidth", msgID=29, Low]

["Missing host name", msgID=38, High]

["Multiple hostnames defined", msgID=45, High]

["Non-primary address matched", msgID=49, Warning]

["Overlapped subnet addresses", msgID=50, High]

["Unexpected IP address", msgID=63, High]

["Unexpected IP mask (Riverstone, Juniper)", msgID=64, High]

ISIS Integrity Checks

["Inconsistent ISIS definition", msgID=22, Medium]

["Asymmetric ISIS1 metric", msgID=114, Warning]

["Asymmetric ISIS2 metric", msgID=115, Warning]

["Overlapped network statements", msgID=164 Warning]

RIP Integrity Checks

["Inconsistent RIP definition", msgID=112, Medium]

["Invalid OSPF/IGRP/EIGRP network address", msgID=69, High]

["Duplicate area IDs defined (Riverstone)", msgID=6, High]

["Inconsistent OSPF area definition", msgID=25, High]

["Inconsistent OSPF definition", msgID=26, Medium]

["Multiple defined backbone areas (Riverstone)", msgID=44, High]

["Invalid OSPF network address", msgID=67, High]

["Unexpected OSPF inverse (wildcard) mask", msgID=68, High]

["Unexpected area IP (Riverstone)", msgID=60, High]

["Unknown OSPF area (Riverstone)", msgID=81, High]

["Asymmetric OSPF metric", msgID=113, Warning]

["ABR not in Area 0", msgID=119, Warning]

["Unbalanced OSPF virtual-link", msgID=126, High]

["OSPF virtual-links not in the same transit area", msgID=127, High]

["Asymmetric OSPF reference bandwidth", msgID=162, Low]

QoS Integrity Checks

["Bandwidth and priority commands cannot be used in the same class within the same policy map (Cisco)", msgID=3, severity=Medium]

["Duplicate policy-Map", msgID=11, Low]

["Duplicate Class-Map", msgID=7, Low]

["Duplicate CoS-Queue-Group", msgID=8, Low]

["Invalid IP precedence values", msgID=30, High]

["Invalid MPLS EXP bit value", msgID=31, High]

["Undefined class", msgID=55, Medium]

["Unknown class name in scheduler-map", msgID=90, Low]

["Unknown scheduler name in scheduler-map", msgID=98, Low]

["Reference to an unknown policy-map", msgID=135, Medium]

LINK Integrity Checks

["Inconsistent PIM mode", msgID=27, High]

["Undefined filter (Juniper)", msgID=56, High]

["Unreferenced firewall filter", msgID=101, Warning]

["Unknown ISIS area-tag (Cisco)", msgID=89, High]

["ip unnumbered command references an unknown interface (Cisco)", msgID=95, Medium]

MISCELLANEOUS Integrity Checks

["Invalid config file", msgID=33, Warning]

["non-text file", msgID=34, Warning]

["Undefined interface", msgID=77, High]

["Undefined IP address (Riverstone)", msgID=76, High]

["Undefined interface IP address", msgID=78, High]

["Undefined LSP", msgID=79, Low]

["Unknown interface", msgID=93, Low]

["vlan-id defined without configuration in vlan-tagging section(Juniper)", msgID=104, Medium]

["Inconsistent ATM bandwidth and PVC mean value", msgID=105, Warning]

["Reference to an unknown card (Alcatel)", msgID=139, High]

["Reference to an unknown port (Alcatel)", msgID=140, High]

["Reference to an unknown SDP (Alcatel)", msgID=141, High]

["Reference to an unknown route-map (Cisco)", msgID=130, High]

["Tunnel is configured as both autoroute announced and forwarding-adjacency", msgID=131, High]

["No IGP on forwarding-adjacency tunnel", msgID=132, Medium]

["bandwidth may exceed physical interface capacity", msgID=128, Low]

["Unreferenced route-map", msgID=152, Warning]

["Unreferenced policy-map", msgID=153, Warning]

["Empty route-map(route-policy) statement", msgID=163, Warning]

["Hostname not configured", msgID=165, Warning]

MPLS Integrity Checks

["Multiple group-names assigned to the same group-value (Juniper)", msgID=4, severity=High]

["Inconsistent LDP/TDP definition", msgID=23, Medium]

["Inconsistent MPLS-TE definition", msgID=24, Medium]

["Invalid tunnelbit (Juniper)", msgID=32, High]

["Undefined admin-group", msgID=70, High]

["Invalid tunnel destination IP address format", msgID=72, High]

["Invalid hop number", msgID=73, High]

["Invalid tunnel source IP address format", msgID=75, High]

["Unknown admin-group (Juniper, Alcatel)", msgID=87, High]

["Unknown Tunnel/LSP path", msgID=96, High]

["RSVP not defined on MPLS enabled interface", msgID=118, Warning]

["MPLS-TE tunnel is not enabled on the device", msgID=142, High]

["Asymmetric MPLS-TE metric", msgID=116, Warning]

RSVP Integrity Checks

["Inconsistent RSVP bandwidth", msgID=28, Warning]

["Inconsistent RSVP definition", msgID=147, Medium]

Static Routes Integrity Checks

["Shutdown interface in static route", msgID=52, Medium]

["Unknown tunnel in static route", msgID=82, High]

["Unknown interface in static route", msgID=94, High]

["Next hop is local address", msgID=146, High]

Tunnel Integrity Checks

["Undefined Tunnel (Cisco)", msgID=80, Low]

["Unknown destination address in Tunnel", msgID=92, Warning]

["Asymmetric GRE tunnel", msgID=143, High]

["Inconsistent GRE tunnels protocol", msgID=144, High]

["autotunnel mesh groups not enabled", msgID=137, High]

["autotunnel backup not enabled", msgID=138, High]

VPN Integrity Checks

["No remote Layer 2 circuit", msgID=48, Medium]

["Singleton VPN", msgID=53, Warning]

["VRFs with same meshed route targets", msgID=133, Warning]

["VRF without import and export route targets", msgID=134, Low]

["Missing route distinguisher", msgID=120, High]

["Missing export route-target", msgID=121, High]

["Missing import route-target" msgID=122, High]

["No interface in VRF", msgID=123, Warning]

["No interface/circuit using bridge-instance (Tellabs)", msgID=136, Warning]

["Unknown policy-name", msgID=129, High]

["VRFs with same route targets and route distinguisher", msgID=117, Warning]

["Unknown VRF", msgID=85, High]

["Duplicated RDs in different VRFs", msgID=151, Medium]

VLAN Integrity Checks

["Undefined vlan (Riverstone)", msgID=59, High]

["Unknown smarttrunk", msgID=99, High]

CHAPTER

Compliance Assessment Tool

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Compliance Assessment Tool Overview

Using The Compliance Assessment Tool

Tools > Compliance Assessment

Figure 350: Compliance Assessment Choose screen

Figure 351: Compliance Assessment Scan screen

Figure 352: Compliance Assessment Result screen

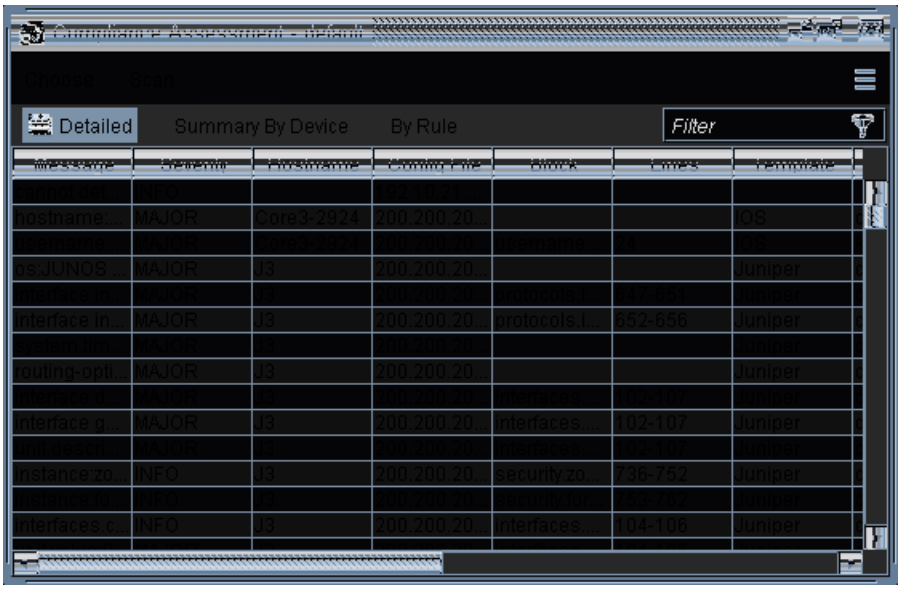


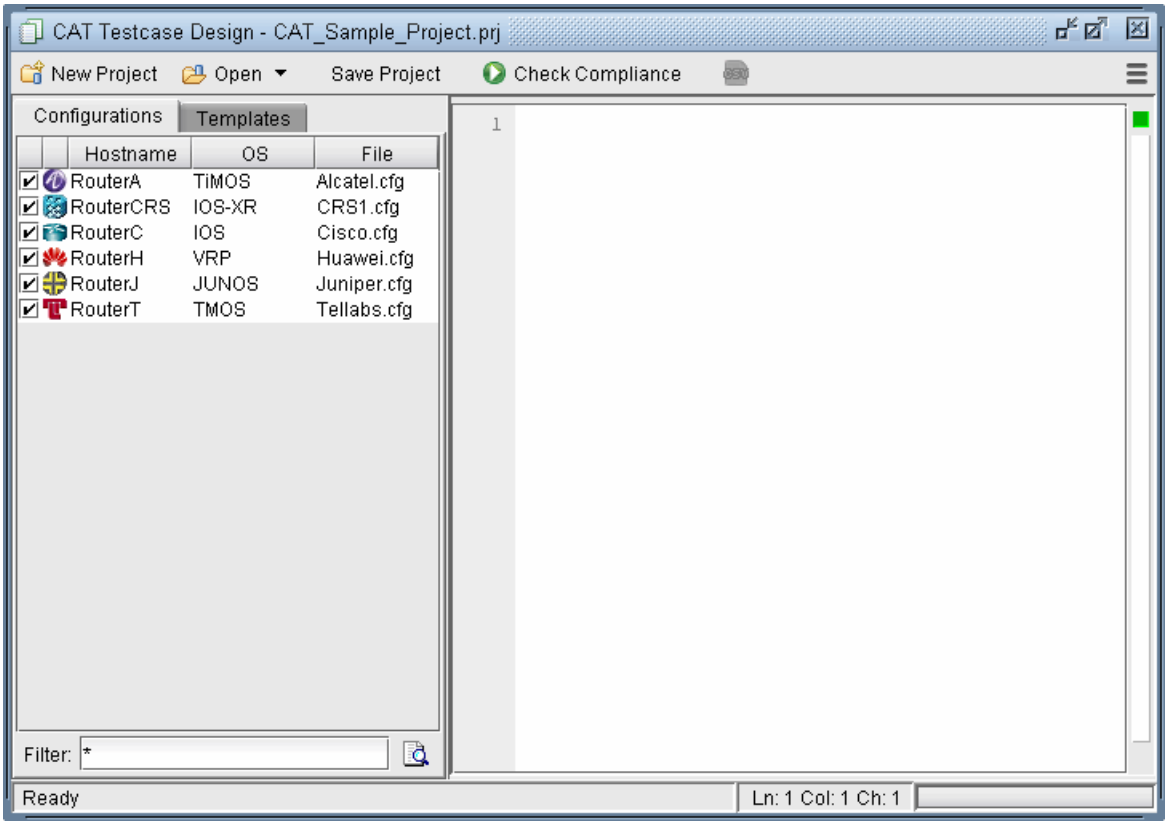
Figure 353: Compliance Assessment Actions options

CAT Testcase Design

Tools > CAT Testcase Design

templates test cases projects

Figure 354: CAT Testcase Design window



Creating a New Project

Figure 355: CAT Testcase Design creating new project

Loading the Configuration Files

Figure 356: Configurations tab right-click options

Load Current Network Configurations

Add

Figure 357: Selecting Configuration Files to add to the Configurations Tab

Select

Figure 358: Configuration File Loaded

Save Project

Creating Conformance Templates

New Template

Figure 359: Creating a New Template

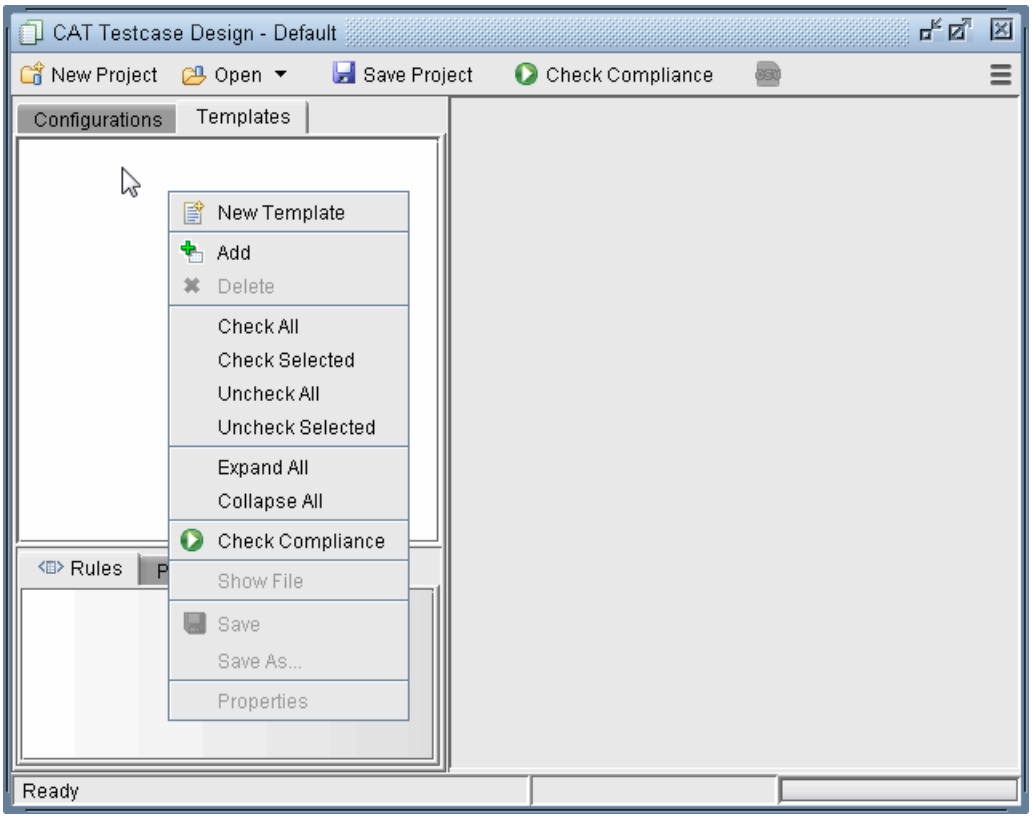


Figure 360: New Conformance Template window

Category, Name, and Location

Category

Name

Location

File Name

Types

Vendor/OS

Hardware

OS Version

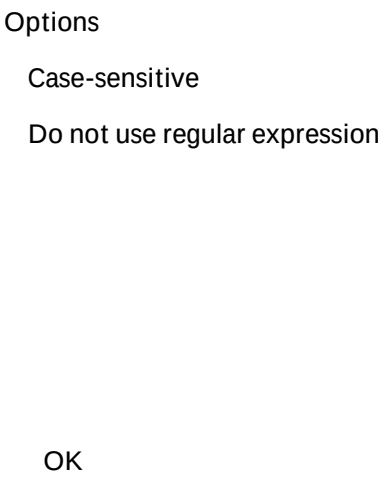


Figure 361: Initial Template

Reviewing and Saving the Template

Figure 362: Template with green box indicates no errors

Figure 363: Template with red box indicates errors

Saving and Loading Projects

Save Project As

Figure 364: Action menu

Open

Run Compliance Assessment Check

<Enter>

Figure 365: Configurations Filter field

Check Compliance

Figure 366: Check Compliance Results

<Enter>

Compliance Assessment Results

Table 5: Detailed Tab

Table 6: Summary By Device Tab

Table 7: By Rule Tab

Table 7: By Rule Tab đ continued ǫ

Publishing Templates

Publish Templates

Figure 367: Publishing Templates

Figure 368: Choosing Network

Running External Compliance Assessment Scripts

```
Message,Severity,Hostname,Config File,Block,Lines,Template,Rule,Template
Lines,Template Line,Template Line #,Category,Vendor,OS,Version
```

```
#conform type cisco ios
```

```
@define external isis_metric_check output=append
./external/edit_check_isis_metric.pl ./spec/spec.auto
```

```
print "$msg,$severity,$node,$source,,,external,$rule_name,,,\n".
```

Scheduling Configuration Checking in Task Manager

“Next”

Figure 369: Configuration Check Report Task

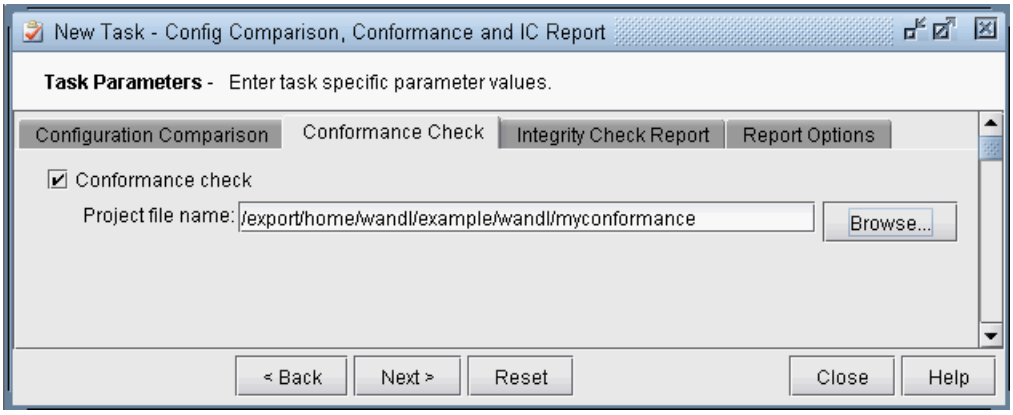
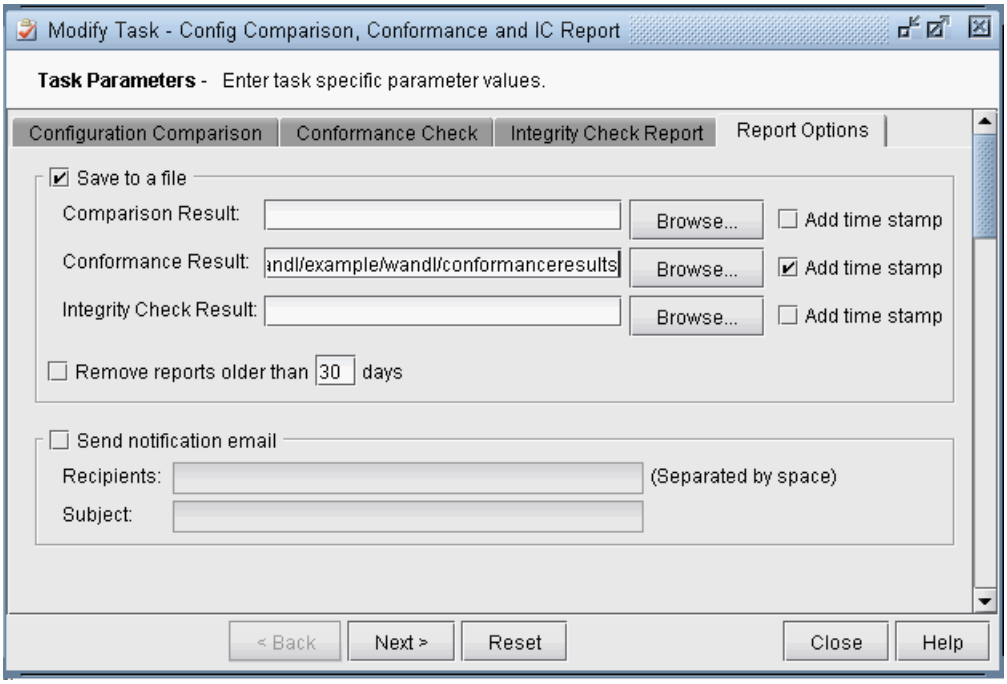


Figure 370: Compliance Assessment Report Options



"Next"

"Finish"

Building Templates

Cisco IOS Example

```
#conform name ciscotemplate
#conform type cisco ios
```

```
@define hasip
ip address $(myip) *
@define shutdown
shutdown
@define rule Shutdown_or_noip
foreach interface do
if (!hasip || shutdown) then raise warning "$(interface.name) has no ip
address or shutdown"
else print "$(interface.name) has an ip $(myip)"
end
end
```

NOTE:

Juniper JUNOS Example

```
#conform name junipertemplate
#conform type juniper junos
#conform use regular-expression
```

```
@define rule junosversion
if $(version) ~= "7.*" then raise critical "version $(version)"
elseif $(version) ~= "8.*" then raise major "version $(version)"
elseif $(version) ~= "9.[1-3].*" then raise minor "version $(version)"
else print "version $(version)"
end
```

```
#conform type junos
```

```
@define rsvptraceoptions
traceoptions {
file rsvp.log size 10m;
flag error;
flag resv;
flag route;
flag resvtear;
flag all;
}
@define rule check_rsvp
foreach protocols.rsvp do
if rsvptraceoptions then raise info "matched rsvp trace options"
else raise major "no match for rsvp trace options in $(hostname)"
end
end
```

NOTE:

```
chassis (
fpc 0 {
pic 0 {
}
}
}
```

```
@define hasdescription
description $(intfdesc)
@define rule maindescription
foreach interfaces.child do
if (hasdescription) then print "$(instance) has description $(intfdesc)"
end
end
```

Match Ordered, Unordered, or Exact

```
a
b
c
d
e
```

```
@define block
a
b
d
@define block2
a
c
b
@define rule exactmatch
match exact block # not matched due to additional lines c and e
@define rule orderedmatch
match ordered block2 # not matched due to out of order lines (lines c and b)
@define rule exactmach2
match exact block2 # not matched by the same reason above (an exact match must
also be ordered)
@define rule match
match block2 # matched
```

Match and Severity

Match Block with Variables

```
@define policy_statement_a
policy-statement a {
term term_a {
from {
protocol bgp;
community [ to-$(country) to-$(location) ];
}
then reject;
}
then accept;
}
@define rule rule_a
set $(location) right(hostname,2)
set $(country) left(hostname,2)
foreach policy-options do
match policy_statement_a
end
```

Table 8: Template Syntax

	Exit Example
	Example /tmp/ls.csv /usr/bin/ls -l /export/home/wandl/myscript.sh

Table 8: Template Syntax đ continued ọ

	Example

Table 9: Flow Control Syntax

Table 9: Flow Control Syntax ð continued ǫ

Next

Break

```
foreach $(your_array) do
print $(element)
done
```

```
$(array_name.array_index)
or
$(array_name.array_index_variable)
```

```
@define hasbandwidth
bandwidth $(bandwidth);
@define rule junosrule1 category=Interface
foreach interfaces.child.unit do
if hasbandwidth then print “$(interfaces.child)
has bw $(bandwidth)”
end
end
```

NOTE:

```
foreach interfaces.child do
for each unit do
if hasbandwidth then print “$(interfaces.child)
has bw $(bandwidth)”
end
```

Table 9: Flow Control Syntax ð continued ǫ

	end end
	Example

Table 10: Built-In Functions For Use Within a Rule

	Example
	Example
	Example

Table 10: Built-In Functions For Use Within a Rule ð continued ọ

	Example 1 Example 2
	Example NOTE: /tmp/interface-list.txt
	Example

Table 10: Built-In Functions For Use Within a Rule (continued)

	Example
	Example
	Example J1,ge-0/0/0,management interface for J1 J1,ge-0/0/1,to 3550S2 FastEthernet0/23 J1,ge-0/0/2,to_EX1_ge-0/0/12 J1,ge-0/0/3,to_BRS_2600 J1,lo0,loop - provision by WANDL J1,ae39,des J1,ae40,des

Table 10: Built-In Functions For Use Within a Rule đ continued ọ

	Example Example
	Example
	Example

Table 10: Built-In Functions For Use Within a Rule ð continued ọ

	Example
	Example
	Example

Special Built-In Functions

Wildmask Conversion for Cisco

Convert ISIS system ID to IPv4

Match string value

Get physical interface from sub interface

Arithmetic Function

String Extraction Function

Array Extraction Function

Data Structure Objects

NorthStar Planner Keywords For Use Within a Rule

		NOTE:

		NOTE:

		NOTE:

Table 11: Header Syntax - Conform Statements

Table 11: Header Syntax - Conform Statements đ continued ǫ

More on Regular Expressions

NOTE:

IP Manipulation

Subnet match checking

Interface IP handling for Cisco

CHAPTER

Virtual Local Area Networks

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NorthStar Planner Virtual Local Area Networks Overview

NOTE:

Importing Cisco VLAN and Spanning Tree Information

File>Import Data

Next

/u/wandl/data/collection/.LiveNetwork/bridge/intermediates

Next>

Finish

Viewing VLAN Details

Accessing Layer2 Information

Figure 371: VLAN View Summary Window

Accessing VLAN Information

Figure 372: VLAN View Window's Properties Pane

Accessing VLAN Report

Figure 373: VLAN Report

Figure 374: Detailed View of a Selected Node=

Accessing Devices Information

Figure 375: VLAN Device's Details for a Selected Device

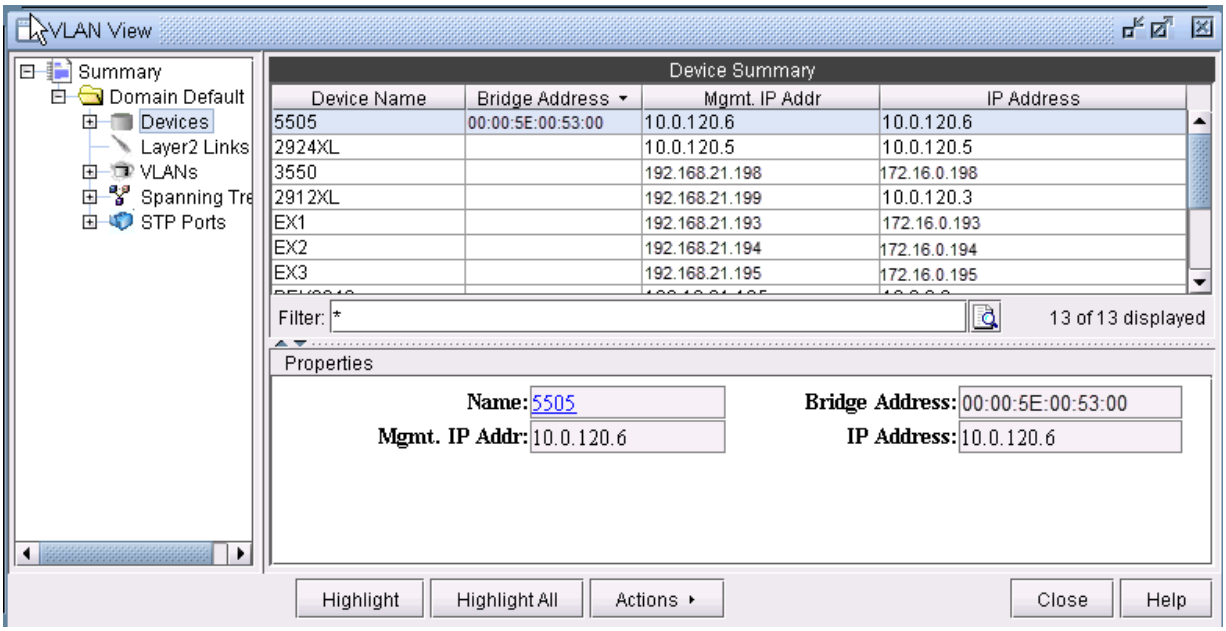


Figure 376: Detailed View of a Selected VLAN

Accessing Layer2 Links Information

“Show Related Interfaces”

Figure 377: Layer2 Links Details

Accessing STP Information

Figure 378: Selected Spanning Tree

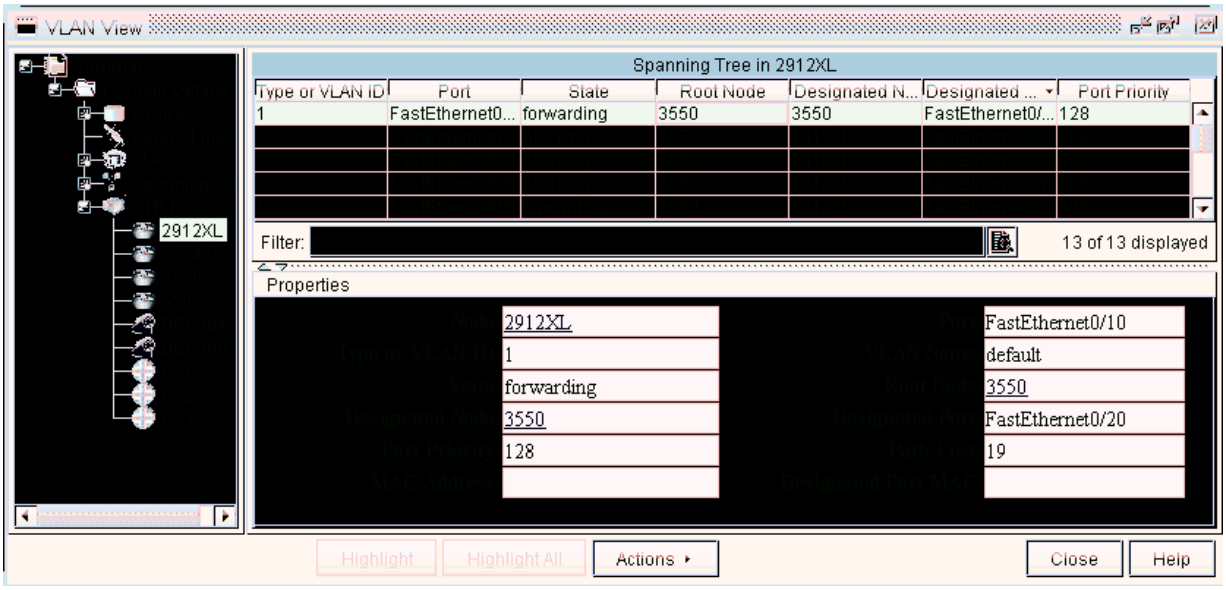
Figure 379: Detailed View of a Selected Node

Accessing STP Ports Information

Figure 380: Spanning Tree Port Details of a Selected Port

Accessing STP Ports Information for a Particular Node

Figure 381: Spanning Tree Port Details of a Selected Node



Viewing VLAN Topology

VLAN Topology View

Figure 382: VLAN Topology View

Figure 383: Right-Click menu Showing Topology and Label Functions

Spanning Tree Topology View

Figure 384: Topology View of a Spanning Tree

Figure 385: Right-Click Menu to Re-Layout the Spanning Tree Topology

Figure 386: Topology View of a Spanning Tree

Pink Colored Node

Blue Colored Node

Green Colored Node

Green Colored Link

Red Colored Link

VLAN Modification and Design

Defining an Access Domain

Modify > Services > Access Domains

Figure 387: Adding an Access Domain

Figure 388: Access Domains and Nodes details

Modifying an Access Domain

Modify

Deleting an Access Domain

Close

Close

Assigning Nodes to Access Domain

Modify > Elements > Nodes

L2SW

Figure 389: Assigning Access Domain to Nodes

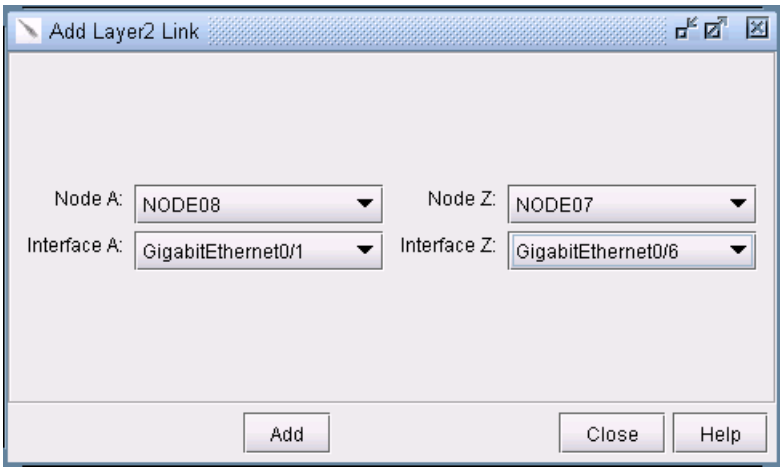
Figure 390: VLAN View Window after Defining Access Domains

Adding Layer2 Links

Modify > Services > VLAN

two switches

Figure 391: Adding a Layer 2 Link Between YGY_101 and BDN_001



Adding VLAN Design and Modeling using VLAN Wizard

Modify > Services > VLAN

Figure 392: VLAN Wizard Window

‹ 7 ; = - † |t _ 7( ) b Œ - u 7 | v _ ; - 1 1 ; v 7 v o l - b m o | _ ; o m ‹ o † v ; t ; 1 | ; 7 m _ ; ((b ; ‰ b m 7 o ‰ : + o † l - ‹ 1 _ o o v 7 b = = ; u 7 ; o m - | b = m u o | _ ; 1 1 ; v v o l - b m 7 u o r J 7 o l ‰ m † - m 7 _ ; m m | ; | u _ ; (7 ; | - b t m _ ; u ; v r ; 1 | b = ; ; t 7 v o u 7 m | u o - 1 1 o l l o 7 - | = ; o l u † t | b ^ ; m 7 m o u m J l - m -] ; l (; m | v 7 ( ) b Œ - u 7 r r o u | w - 0 o ^ ; :

$ _ ; ; ^ b 1 ; r v - m ; t t b v | - v ‹ ; u " ‰ b | 1 _ ; v 0 ; t o m | o | _ ; v ; t ; 1 | ; 7 1 1 ; v 7 v o l - b m $ _ ; u b ; v 7 u o r J 7 o ‰ m l ; m † † m 7 ; u ^ b 1 ; R v 7 o ‰ u m u o 0 ‰ v b 7 ; - v ‹ ; u " ‰ b | 1 _ = ; u v Q ‰ _ b ‹ 1 o _ † 1 - m v ; t ; 1 | _ ; 7 ; ^ b 1 ; ‹ r ; v ‹ o † ‰ - m | o ^ b ; ‰ m 7 _ ; m - 7 7 | o ; ^ b 1 ; o v m (v : _ o o v | ; _ ; 7 ; ^ b 1 ; ‹ r ; = u o | _ ; 7 u o r J 7 o - ‰ m 7 † v ; 7 7 0 † | | o | m - 7 7 | _ ; v ; t ; 1 | ; 7 7 ; ^ b 1 b ; v m ; ^ b 1 ; | v o ; ^ b 1 ; o v m (v r - m ; (: ‰ b Œ - 7 u 7 7 | v _ ; (| o | _ ; 7 ; ^ b 1 b ; v m ; ^ b 1 ; o v m (v :

Figure 393: Adding Devices to the VLAN

Figure 394: Assigning More Devices and Device Interfaces to the VLAN

Figure 395: How to Assign Interfaces to VLAN Devices

Figure 396: Assigning Interfaces to the VLAN devices

Next

Figure 397: Assigning Port Modes and In/Out Policies to Interfaces

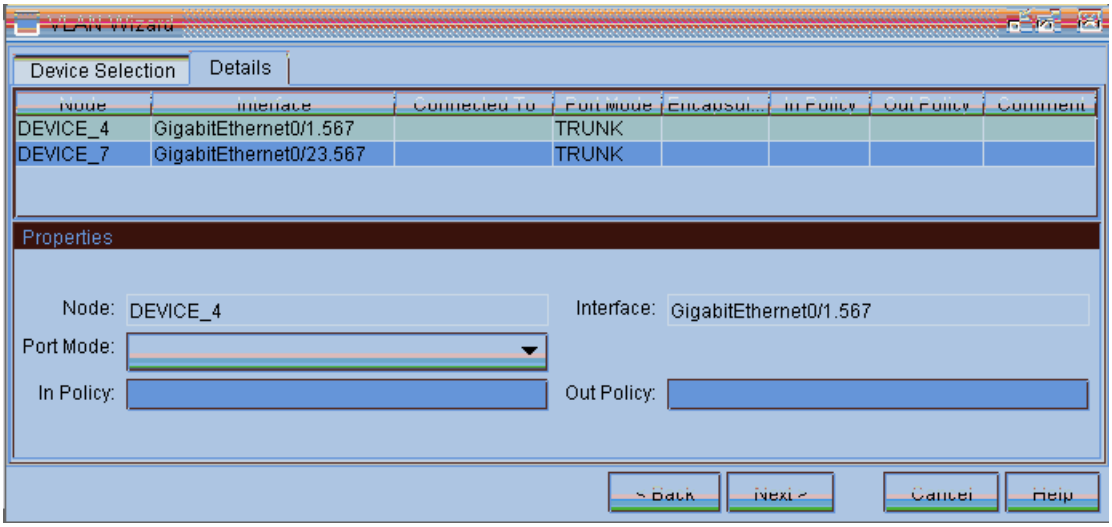
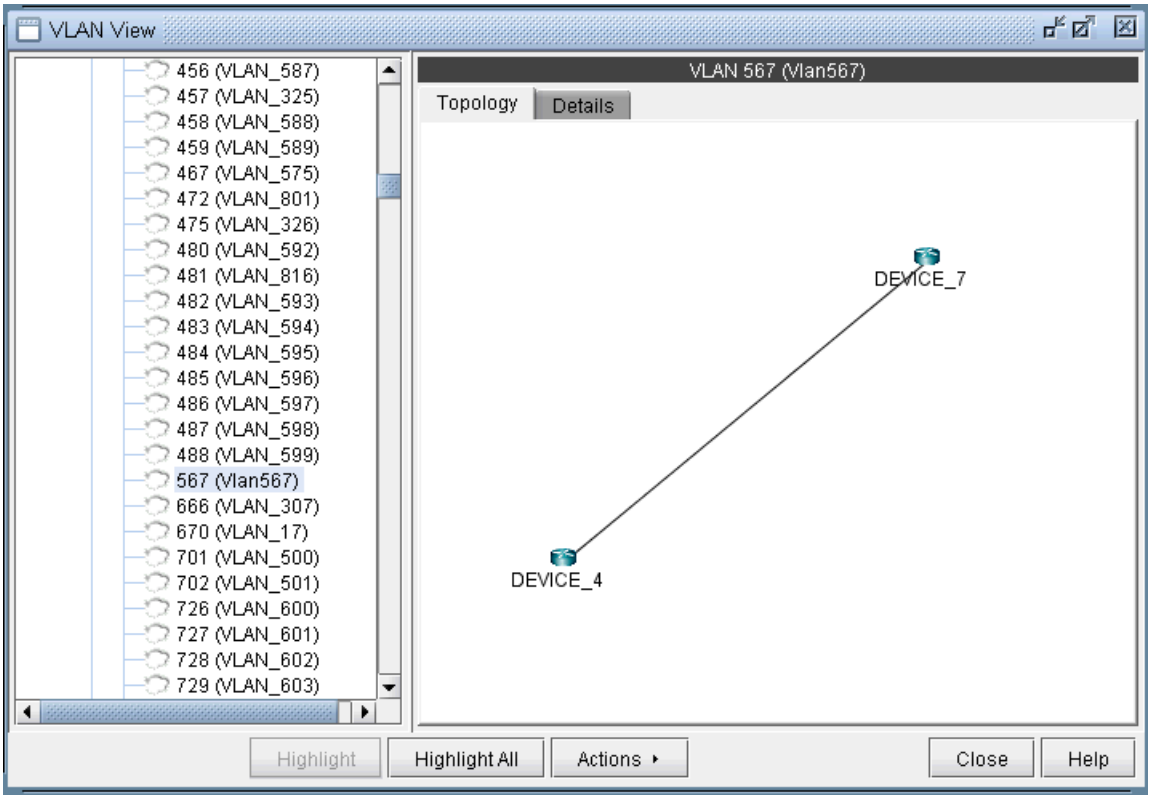


Figure 398: Select Layer3 Interface for Inter-VLAN Routing

Figure 399: Newly Added VLAN's Topology View



File Format

keepl2stptree=1

addroot2treename=1

accdomain=filename

CHAPTER

Overhead Calculation

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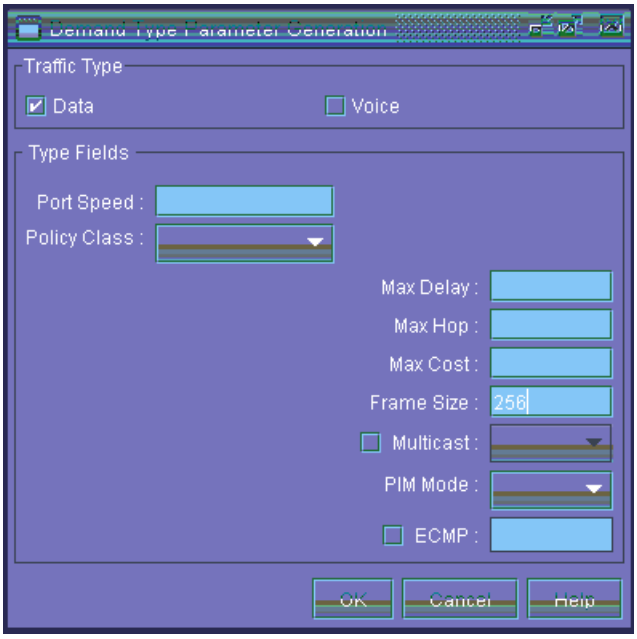
Overhead Calculation Background

NOTE:

Specifying the Overhead Calculation Frame Size

Figure 400: Demand Type Parameters Window



OK

RLDN2600NWK_1 LDN2600 NWK 5000000 R,A2Z,PATH10(Dynamic),BF256 02,02 LDN2600_ETHERNET0/0

BF256 indicates that the average frame size is 256 bytes.

CHAPTER

Router Reference

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Application Options

Config Editor

Design Options > BGP

Design Options > MPLS DS-TE

Table 12: Design Options > Path Placement

Design Options > Tunnel Sizing

Failure Simulation > FRR

Integrity Checks

LSP Tunnel Attributes

Tools > Options > General, LSP Tunnel Attributes

Node Window Parameters

Table 13: Properties Tab

Table 14: Design Properties Tab

Table 15: Modify Nodes, BGP Tab / View Nodes, Protocols Tab

Table 16: Modify Nodes, IP Tab / View Nodes, Protocols Tab

Link Window Fields

Table 17: Modify Link, Properties Tab / View Link, General Tab

Table 18: Location Tab

Modify Link, Multicast Tab / View Link, Protocols Tab

SM

DM

SDM

Table 19: MPLS/TE Tab

Table 19: MPLS/TE Tab đ continued ọ

Protocols Tab

IGRP_param1= TOS:0,K1:1,K2:0,K3:1,K4:0,K5:0

Attributes Tab

CoS Policy Tab

PBR (Policy Based Routing) Tab

Modify Link, VoIP Tab / View Link, Protocols Tab

cRTP Compression: None, 2 Bytes, or 4 Bytes

Interface Window Fields

Table 20: General Tab

Table 20: General Tab ð continued ǫ

Table 21: Advanced Tab - Layer 3

Table 21: Advanced Tab - Layer 3 ð continued ǫ

Interface window

“OK”

Advanced Tab - Layer 2

Demand Window Fields

Table 22: Demand Type Parameter Generation

Tunnel Window Fields

Table 23: Tunnel Window Fields

Table 23: Tunnel Window Fields ð continued ǫ

Path Table

Show Route

Show All Paths

Table 24: Tunnel Type Parameter Generation

	Absolute Relative Don’t Care	

Table 24: Tunnel Type Parameter Generation đ continued ọ

Table 24: Tunnel Type Parameter Generation đ continued ǫ

	$WANDL_HOME/data/templates /u/wandl/data/templates	

Table 25: Virtual Trunk Tab

Table 26: Diversity Tab