15 Viewing Network Information

This chapter describes the reports and results you can view in SP Guru Transport Planner. The following topics are discussed:

- SP Guru Transport Planner Reports Directory
- Topology Information
- OTS Connectivity Information
- Network Cost
- Viewing Node and Link Utilizations
- Wavelength Usage
- Bill of Materials
- Connection Resource Details Reports
- Connection Span Details Reports for OCH Connections
- Spreadsheet Reports
- Service Identifier Assignments Report
- Diversity Report

SP Guru Transport Planner Reports Directory

Your op_reports directory (<*wdm_guru_user_home*>/op_reports) contains a subdirectory for each project, containing the reports that have been generated for that project. Each project directory, contains a subdirectory for each of its scenarios. In each scenario directory there is a directory named "SP Guru Transport Planner Reports" to which all reports generated by SP Guru Transport Planner are written. You can access this folder at any time to view these reports. The "SP Guru Transport Planner Reports" directory contains ten subdirectories, which are listed in Table 15-1.

Each directory normally contains a separate subdirectory for each report and the time it was created. Unless otherwise noted, each subdirectory has the title <*date*>-<*time*>. To open an HTML report, open the *index.html* file in the corresponding subdirectory.

Note—SP Guru Transport Planner can send its HTML reports to Report Server. This allows you to share your reports among different users. If you have a Report Server installed, and you want to send all HTML reports to the Report Server, choose Info > Send Web Reports to Report Server (the menu item shows a check mark if this option is selected).

Table 15-1 SP Guru Transport Planner Reports Directory Structure

Subdirectory	Description
Bill-Of-Materials	Contains directories for HTML reports generated by the Bill of Materials operation. For more information, see Bill of Materials on page TrP-15-6.
Connection Resources	Contains directories for HTML reports generated by the Connection Resource Details operation. For more information, see Connection Resource Details Reports on page TrP-15-20.
Connection Spans	Contains directories for HTML reports generated by the Connection Span Details operation. For more information, see Connection Span Details Reports for OCH Connections on page TrP-15-21.
Failure Analysis	Contains directories for HTML reports generated by the Failure Analysis operation. For more information, see Chapter 14 Failure Evaluation on page TrP-14-1.
Hardware Configuration	Contains directories for HTML reports generated by the Hardware Report operation. For more information, see Hardware Web Report on page TrP-13-24.
Link Utilization	Contains directories for HTML reports generated by the Link Utilization operation. For more information, see Viewing Node and Link Utilizations on page TrP-15-5.
Spreadsheets	Contains directories for spreadsheet reports generated by the Export to Spreadsheet operation. For more information, see Spreadsheet Reports on page TrP-15-24. Each directory contains one .csv file for each type of spreadsheet report generated (Nodes, Links, Wavelength Usage, and so on).
Interim Reports	Contains interim reports that describe the algorithmic details of a network design run. The files are titled <*traffic_matrices*>-<*network_design_action*>-<*date*>-<*time*>.,txt To have SP Guru Transport Planner open these reports automatically after a design run, choose Info > View Details after Design Operations so that the check mark appears next to this menu item.
Service Identifier Assignments Report	This report visualizes the Service Identifiers that are assigned to connections. You can also use this report to verify whether DCL connections have been routed over OCH connections with matching Service Identifiers. For more information, see Service Identifier Assignments Report on page TrP-15-35.
Diversity Report	Provides information about how diversely one or more traffic matrices are routed. For more information, see Diversity Report on page TrP-15-36.
End of Table 15-1	

Topology Information

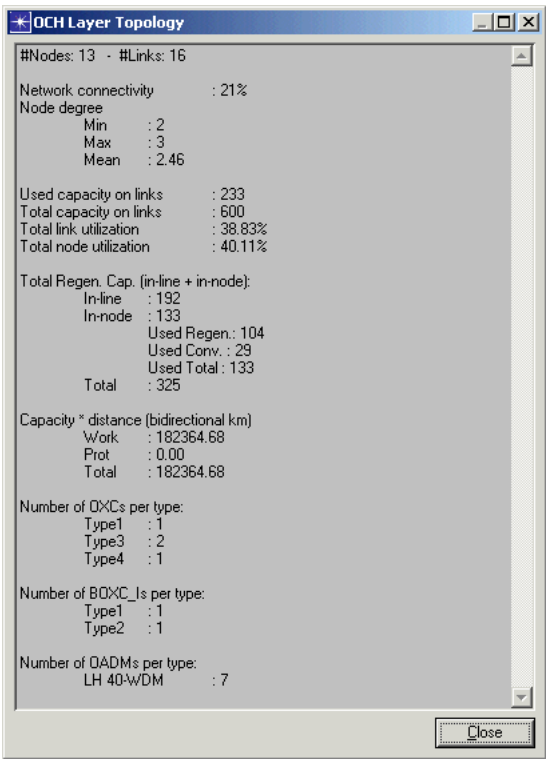
To view high-level information on your network topology at each layer, choose Info > Topology > <*network_layer*>. SP Guru Transport Planner displays the following information for all network layers:

- Number of nodes and links
- Network connectivity
- Minimum, maximum and mean node degree
- Used and total capacity on all links
- Total link utilization

SP Guru Transport Planner displays the following additional information for specific layers:

- DCL layer—DXC, IXC, and ADM types used in the DCL layer, the used and total node ports, the number of rings, and the total node utilization
- OCH layer—OXC, WP-OXC, IXC, and OADM node types used in the OCH layer, the capacity distance product of working and protecting channels, the in-line and in-node regeneration capacity, the used and total node ports, and the total node utilization
- OMS layer—the minimum, maximum, mean and total fiber length, and the number of fibers per line system type
- OTS layer—number of ECC, EOCC, and OCC nodes; the number of cable splitters, and the minimum, maximum, mean, and total cable length

Figure 15-1 Info Topology Window (OCH Layer)



OTS Connectivity Information

The Node Connectivity (OTS Layer) window shows the minimum, maximum, and mean node connectivity as well as a matrix with the node connectivity between every node pair. To open this window, choose Info > OTS Layer Connectivity > Node Connectivity.

The Link Connectivity (OTS Layer) window shows the minimum, maximum, and mean link connectivity as well as a matrix with the link connectivity between every node pair. To open this window, choose Info > OTS Layer Connectivity > Link Connectivity.

Network Cost

The Node Cost window (Info > Network Cost > Node Cost) shows

- Fixed and per-port costs of DXCs, ADMs, IXCs, OXCs, OADMs, and patch panels
- Long-reach transponders in transparent mode and short-reach transponders in opaque mode
- SDH terminal multiplexer cost

The Link Cost window (Info > Network Cost > Link Cost) displays

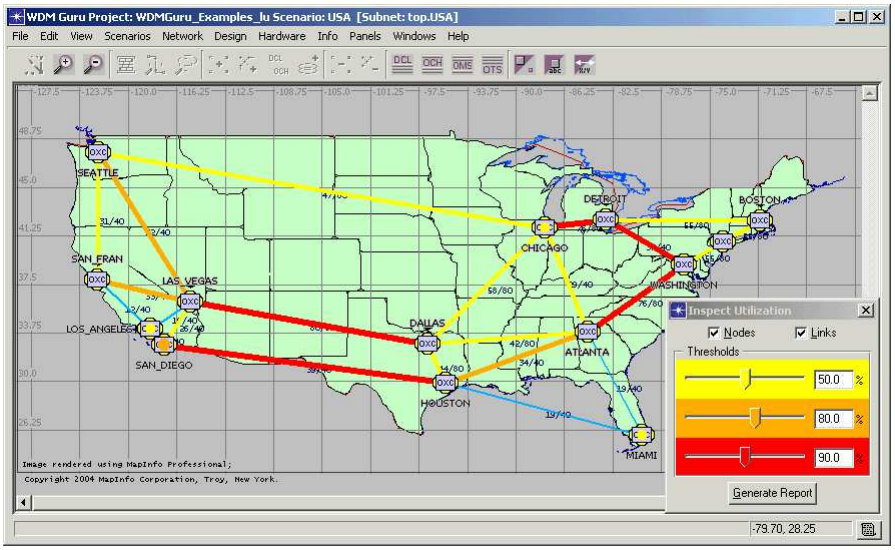
- Cable, fiber, and channel cost of links
- WDM terminal multiplexer cost, amplifier cost, and regenerator cost
- Long-reach transponder cost in opaque mode

The Network Cost window (Info > Network Cost > Network Cost) displays the total node, link, and network costs.

Viewing Node and Link Utilizations

You can visualize node and link utilizations using the Utilization Viewer (Info > Inspect Utilization). You can specify three levels of utilization. The links and nodes are colored according to the specified levels. Yellow, Orange, and Red are used to indicate links and nodes reaching saturation level 1, 2, or 3. Click the DCL/ OCH/ OMS/ OTS toolbar buttons to switch to the layer you want to view.

Figure 15-2 Viewing Link and Node Utilizations



When you click Generate Report, an HTML report appears and shows the link utilizations at the different layers. This report includes the following:

- An overview page that shows the number of links for the selected utilization levels
- A more detailed page that shows the individual links for the selected utilization levels at each layer

Wavelength Usage

The Wavelength Usage window (Info > Wavelength Usage) provides an overview of the available resources in the optical layer. This window shows

- The number of times this wavelength is used
- The total number of times this wavelength is available on all line systems in the network.

Note—If your network uses multiple WDM systems, SP Guru Transport Planner might report a wavelength as being available multiple times. For example, suppose your network has one 8-wavelength system and one 16-wavelength system. In this case, wavelengths 1 through 8 are present twice in the network, while the wavelengths 9 to 16 are present only once.

Bill of Materials

You can generate a Bill of Materials at any time as a web report (Info > Export to Web Report > Bill of Materials) or a .csv file (Info > Export to Spreadsheet).

The Bill of Materials shows detailed information about your network, such as the amount of node and link equipment required, the costs of the equipment, and the total cost of the network.

SP Guru Transport Planner assumes that all network equipment (such as fibers, optical amplifiers, transponders, ports on the switches) is bidirectional. Where appropriate, SP Guru Transport Planner displays equipment inventory per bit rate: regeneration card per bit rate, tributary and trunk usage per bit rate, and transponders per bit rate.

Contents of the BOM

Table 15-2 lists the major sections in the Bill of Materials.

Table 15-2 Bill of Materials: Contents

Item	Description	Reference
Overview Total Cost	Gives an overview of the different parts of the total network cost	Overview Cost Parameters on page TrP-15-7
Overview Node Cost	Shows the equipment required to switch the traffic in each node of the network (such as the tributary and trunk ports per bit rate)	Overview Node Cost on page TrP-15-8

Table 15-2 Bill of Materials: Contents (Continued)

Item	Description	Reference
Overview Link Cost	Shows the equipment required to carry the traffic on each link of the network (such as the number of fibers, regenerators, amplifiers, etc.)	Overview Link Cost on page TrP-15-16
Overview Cost Parameters	Contains the user-specified cost parameters that are used to calculate the cost of the equipment	Overview Total Cost on page TrP-15-19
Topology	Shows the OTS, OMS, OCH, and DCL network topologies	—
End of Table 15-2		

Overview Cost Parameters

Table 15-3 describes the overviews shown in the Overview Cost Parameters section of the Bill of Materials.

Table 15-3 Bill of Materials: Overview Cost Parameters

Overview	Description
Node Fixed Cost	This table shows the following fields: • Fixed cost and number of ports per node type for DXCs, OXCs, WP-OXCs, and IXCs • Fixed cost per line system type for OADMs and integrated OADMs
Node Port Cost	This table shows the following fields: • Cost per bit rate of the tributary and trunk ports of ADMs, DXCs, OXCs, WP-OXCs, and IXCs • SDH terminal multiplexer cost per output bit rate • Short-reach transponder cost per bit rate • Fixed cost per ring type and per bit rate for ADMs
Link Fixed Cost	This table shows the following fields: • Cable—Fixed cost, cost per length unit, cost per OA site and per regenerator site • Fiber—Fixed cost and cost per length unit • Channel—Fixed cost and cost per length unit
Link Fiber Cost	This table shows the following fields: • WDM terminal multiplexer cost, optical amplifier cost and regenerator (common equipment) cost per line system type
Link Channel Cost	This table shows the following fields: • WDM channel card cost per line system type • Regenerator card cost and long-reach transponder cost per OCH bit rate and per line system type
Link SDH Equipment Cost	This table shows the following fields: • SDH amplifier cost and SDH regenerator cost per OCH bit rate
End of Table 15-3	

Overview Node Cost

The Overview Node Cost section shows an overview table that contains equipment costs for each node equipment category. Table 15-4 lists the node equipment categories shown in the Node Equipment section of the Bill of Materials. You can follow links for each equipment category to see more detailed information about the installed node equipment and its cost.

Table 15-4 Bill of Materials: Overview Node Cost Section

Section	Reference
DXC (or DXC + TM)	DXC on page TrP-15-8
ADM	ADM on page TrP-15-10
OXC	OXC on page TrP-15-11
OADM	OADM on page TrP-15-12
IXC	IXC on page TrP-15-13
Patch Panel	Patch Panel on page TrP-15-15
Transponders	Transponders on page TrP-15-15
End of Table 15-4	

Note—A BOM might not include all of these sections. The sections appear according to the node equipment in the network. For example, if there are no IXC nodes in the network, the BOM does not have an IXC section.

DXC

Table 15-5 describes the overviews shown in the DXC section of the Overview Node Cost section.

Table 15-5 Bill of Materials: DXC Section (Part 1 of 2)

Overview	Description
Overview Aggregators	A node must contain aggregators if the network contains local DCL traffic with a lower bit rate than the minimum aggregation bit rate of the DXC (this bit rate is specific per DXC type). This table shows: • Name—Name of the node • <*dcl_bit_rate*>—Amount of local DCL traffic per DCL bit rate that must be aggregated • Aggr <*minimum_bit_rate*>—Number of aggregators. The bit rate of the aggregators is the minimum bit rate of the DXC. • Cost—Total cost of the aggregators in the node

Table 15-5 Bill of Materials: DXC Section (Part 2 of 2)

Overview	Description
Overview DXC Ports	This overview lists nodes that have a DXC installed to switch SONET/SDH demands. This table shows: • Name—Name of the node • Trib <*dcl_bit_rate*>—DXC tributary ports (per DCL bit rate) • #Trib Ports—Total number of DXC tributary ports • Trunk <*och_bit_rate*> —DXC trunk ports (per OCH bit rate) • # Trunk Ports—Total number of DXC trunk ports • Total Ports—Total number of ports in the DXC (equals the sum of tributary and trunk ports) • Type—Type of the DXC • Cost—Total DXC cost. This cost consists of the fixed cost of the used DXC type in the node and the cost of the required DXC tributary and trunk ports.
Overview Mid-Stage Multiplexers	Mid-stage multiplexers are needed if OCH traffic terminates in the DXC with a higher bit rate than the maximum bit rate of the ports in the DXC. The table shows:· • Name—Name of the node • Maximum bit rate—Traffic at the maximum bit rate of the DXC • Mid-Stage Mux <*bit_rate*>—Number of mid-stage multiplexers needed to aggregate the traffic (per OCH bit rate) • Cost—Total cost of the mid-stage multiplexers in the node. The cost of a mid-stage multiplexer is set at the same cost as a SDH terminal multiplexer and depends on the OCH bit rate.
Overview Terminal Multiplexers (Non-Grooming Nodes)	This overview lists non-grooming nodes. In these nodes, SDH terminal multiplexers replace the DXC. This table shows: • Name—Name of the node • <*dcl_bit_rate*>—Amount of local DCL traffic (per DCL bit rate) • TM <*och_bit_rate*>—Number of SDH terminal multiplexers (per OCH bit rate) • #TMs —Total number of SDH terminal multiplexers in the node • Cost —Total cost of the SDH terminal multiplexers in the node
End of Table 15-5	

ADM

Table 15-6 describes the overviews shown in the ADM section of the Overview Node Cost section.

Table 15-6 Bill of Materials: ADM Section

Overview	Description
ADM	This overview lists nodes that have ADMs installed. This table shows: • Name—Name of the node • ADM <*ring_type*> <och_bit_rate>—Number of ADMs (per ring type and per OCH bit rate • #ADMs—Total number of ADMs in the node • Trib <*dcl_bit_rate*>—ADM tributary ports (per DCL bit rate) • #Trib Ports—Total number of ADM tributary ports • Cost—Total ADM cost. This cost consists of the fixed cost of the ADMs in the node and the cost of the required ADM tributary ports.
End of Table 15-6	

OXC

Table 15-7 describes the overviews shown in the OXC section of the Overview Node Cost section.

Table 15-7 Bill of Materials: OXC Section

Overview	Description
Overview OXC Ports	This overview lists nodes that have an OXC installed to switch optical demands. This table shows: • Name—Name of the node • Mode—Opaque, Selective or Transparent (in transparent OCH layer mode only) • Trib <*bit_rate*>—OXC tributary ports (per OCH bit rate) • #Trib Ports—Total number of OXC tributary ports • Trunk <*bit_rate*>—OXC trunk ports (per OCH bit rate)- • #Trunk Ports—Total number of OXC trunk ports • #Trunk Ports For Transit—Number of OXC trunk ports needed for transit traffic • #In-node Regen. Units—Total number of in-node regeneration units in the OXC (in transparent OCH layer mode only) • #In-node WC. Units—Total number of in-node wavelength conversion units in the OXC (in transparent OCH layer mode only) • Total Ports—Total number of ports in the OXC (equals the sum of tributary and trunk ports) • Type—Type of the OXC • Cost—Total OXC cost. This cost consists of the fixed cost of the used OXC type in the node and the cost of the required OXC tributary and trunk ports.
Overview Integrated BOXC Ports	This overview lists the nodes that have an integrated WP-OXC installed. The table shows: • Name—Name of the node • Mode—Opaque, Selective or Transparent • #Trib Ports—Total number of WP-OXC tributary fiber ports • #Trunk Ports—Total number of WP-OXC trunk fiber ports • #Flex Ports—Total number of WP-OXC flex fiber ports • #In-node Regen. Units—Total number of in-node regeneration units in the WP-OXC • #In-node WC. Units—Total number of in-node wavelength conversion units in the WP-OXC • Type—Type of the WP-OXC • Port Usage—Used and total WP-OXC fiber ports • Cost—Total WP-OXC cost. This cost equals the fixed cost of the used WP-OXC type in the node.

Table 15-7 Bill of Materials: OXC Section (Continued)

Overview	Description
WDM Terminal Equipment (Integrated Nodes)	This overview lists the nodes that have an integrated WP-OXC installed. The table shows: • Name—Name of the node • #WDM Term <*line_system_type*>—Number of WDM terminal multiplexer per line system type • #Bidir Channel Cards—Total number of WDM channel cards • Trib <*bit_rate*>—WP-OXC tributary wavelength ports (per OCH bit rate) • Total Trib—Total number of WP-OXC tributary wavelength ports • Cost—This cost consists of the WDM terminal multiplexer cost and the WDM channel card cost in the node.
End of Table 15-7	

OADM

Table 15-8 describes the overviews shown in the OADM section of the Overview Node Cost section.

Table 15-8 Bill of Materials: OADM Section

Overview	Description
Overview OADM Ports	This overview lists the nodes that have at least one OADM installed. The table shows: • Name—Name of the node • Mode—Opaque, Selective or Transparent (in transparent OCH layer mode only) • Trib <bit_rate>—OADM tributary ports (per OCH bit rate) • #Trib Ports—Total number of OADM tributary ports • Trunk <bit_rate>—OADM trunk ports (per OCH bit rate) • #Trunk Ports—Total number of OADM trunk ports • #Trunk Ports For Transit—Number of OADM trunk ports needed for transit traffic • #In-node Regen. Units—Total number of in-node regeneration units in the OADMs (in transparent OCH layer mode only) • #In-node WC. Units—Total number of in-node wavelength conversion units in the OADMs (in transparent OCH layer mode only) • Total Ports—Total number of ports in the OADMs (equals the sum of tributary and trunk ports) • Type—Node type • Cost—Total OADM cost. This cost equals the fixed cost of the OADMs in the node.

Table 15-8 Bill of Materials: OADM Section (Continued)

Overview	Description
OADM Details	This overview lists the nodes that have at least one OADM installed. The table shows per OADM: • Name—Name of the node • Orientation—Orientation of the OADM • Type—Line system type of the OADM • Trib <*bit_rate*>—OADM tributary ports (per OCH bit rate) • Total Trib—Total number of OADM tributary ports • Trunk1 <*bit_rate*>—Number of trunk ports (per OCH bit rate) on the first fiber attached to the OADM • Total Trunk1—Total number of trunk ports on the first fiber attached to the OADM • Trunk2 <*bit_rate*>—Number of trunk ports (per OCH bit rate) on the second fiber attached to the OADM • Total Trunk2—Total number of trunk ports on the second fiber attached to the OADM • Total—Total number of ports in the OADM (equals the sum of tributary and trunk ports) • Cost—Fixed cost of the OADM
End of Table 15-8	

IXC

Table 15-9 gives an overview of the IXC ports. It lists grooming nodes only, which use an integrated DXC/OXC to switch the optical and the digital traffic.

Table 15-9 Bill of Materials: IXC Section

Overview	Description
Aggregators Mid-Stage Multiplexers	If the bit rate of the local traffic is lower than the minimum aggregation bit rate of the IXC type used in the node, this section includes two extra tables that show information about the required aggregators and mid-stage multiplexers (similar to the DXC section, as described in DXC on page TrP-15-8).

Table 15-9 Bill of Materials: IXC Section (Continued)

Overview	Description
Overview IXC Ports	This overview lists nodes that have an IXC installed in the node. This table shows • Name—Name of the node • Trib Electrical <*dcl_bit_rate*>—IXC tributary ports per DCL bit rate. These are needed for the local DCL traffic in the node • Trib Optical <*och_bit_rate*>—IXC tributary ports per OCH bit rate. These are needed for the local native OCH traffic in the node. • #Trib Ports—Total number of IXC tributary ports • Trunk <*och_bit_rate*>—IXC trunk ports (per OCH bit rate) • #Trunk Ports—Total number of IXC trunk ports • Total Ports—Total number of ports in the IXC (equals the sum of tributary and trunk ports) • Total Ports (STS-1/STM-1 equivalents)—Total number of ports in equivalent STS-1 or STM-1 units, which is equivalent to the IXC throughput • Type—Type of the IXC • Cost—Total IXC cost. This cost consists of the fixed cost of the used IXC type in the node and the cost of the required IXC tributary and trunk ports.
End of Table 15-9	

Patch Panel

This section gives an overview of the patch panel ports, and lists nodes that contain a patch panel, or a patch panel and another switching device (OXC, IXC or OADM).

Table 15-10 Bill of Materials: Patch Panel Section

Section	Description
Overview Patch Panel Ports	• This overview lists nodes that have a patch panel installed. This table shows: • Name—Name of the node • Node Type—Type of the node • Mode—Opaque, Selective or Transparent (in transparent OCH layer mode only) • Trib <*bit_rate*>—Patch panel tributary ports (per OCH bit rate) • #Trib Ports—Total number of patch panel tributary ports • Trunk <*bit_rate*>—Patch panel trunk ports (per OCH bit rate) • #Trunk Ports—Total number of patch panel trunk ports • #Trunk Ports For Transit—Number of patch panel trunk ports needed for transit traffic • #In-node Regen. Units—Total number of in-node regeneration units in the patch panel (in transparent OCH layer mode only) • #In-node WC. Units—Total number of in-node wavelength conversion units in the patch panel (in transparent OCH layer mode only) • Total Ports—Total number of ports in the patch panel (equals the sum of tributary and trunk ports) • Cost—Total patch panel cost. This cost consists of the fixed patch panel cost and the cost of the required patch panel tributary and trunk ports.
End of Table 15-10	

Transponders

The Transponders section gives an overview of the in-node transponders. If you are in opaque network mode, this section lists only the short-reach transponders; the long-reach transponders appear in the link equipment section (see Overview Link Cost on page TrP-15-16).

There are two kinds of short-reach transponders: the *regular* short-reach transponder and the short-reach *protection* transponder. A protection transponder is used to accommodate an OCH demand with 1+1 protection but without client protection (for OXC, OADM and patch panel only). A protection transponder is never used in an IXC (the IXC does 1+1 protection switching of OCH traffic). The IXC uses only the regular short-reach transponder for OCH demands.

A transparent node contains no short-reach transponders, and only the following long-reach transponders:

- One long-reach transponder on the tributary side for add/drop traffic

- One long-reach transponder on the tributary side for 1+1 protected traffic without client protection
- Two regular long-reach transponders for 1+1 protected traffic with client protection
- Two regular long-reach transponders for wavelength-converted or wavelength-regenerated pass-through traffic

Table 15-11 Bill of Materials: Transponder Section

Section	Description
(opaque mode)	This table includes the following fields: • SR Transp - Trib—The number of regular short-range transponders (per bit rate, total, and cost) • SR Prot Transp - Trib OXC/OADM/PP—The number of short-range protection transponders (per bit rate, total, and cost)
(transparent mode)	This table includes the following fields: • SR Transponder - Trib Opaque Nodes —The number of regular short-range transponders (per bit rate, total and cost • SR Protection Transponder - Trib Opaque OXC/OADM/PP (for opaque nodes only)—The number of short-range protection transponders (per bit rate, total and cost) • LR Transponder - Trib Transparent + Trunk Opaque (for transparent nodes at the tributary ports, for opaque nodes at the trunk ports)—The number of regular long-range transponders (per bit rate, total and cost) • LR Protection Transponder - Trib OXC/OADM/PP (for transparent nodes only)—The number of long-range protection transponders (per bit rate, total and cost)
End of Table 15-11	

Overview Link Cost

The Overview Link Cost section displays an overview table containing the cost per link equipment category. Table 15-12 lists the link equipment categories. You can follow links for each equipment category to see details about the installed link equipment and associated costs.

Table 15-12 Bill of Materials: Link Equipment Section

Section	Reference
WDM Terminal Equipment	WDM Terminal Equipment on page TrP-15-17
In-line Regeneration/Amplification	In-line Regeneration/Amplification on page TrP-15-18
SDH Equipment	SDH Equipment on page TrP-15-19
End of Table 15-12	

WDM Terminal Equipment

This section lists all OTS links that have WDM equipment. If a link connects to WP-OXCs or OADMs with terminal multiplexers, no WDM terminal multiplexers are used on the link.

Table 15-13 Bill of Materials: WDM Terminal Equipment Section

Section	Description
WDM Terminal Equipment	This overview lists all OTS links that have WDM equipment installed. This table shows: • Name—Name of the OTS link • Fiber <*line_system_type*>—Number of fiber pairs equipped on the link (per line system type) • #Fiber Pairs—Total number of fiber pairs equipped on the link • #Regen Stations—Number of regeneration stations on the link • WDM Term <*line_system_type*>—Number of WDM terminal multiplexers on the link (per line system type) • #WDM Term—Total number of terminal multiplexers on the link • #Bidir Channels Available—Number of optical channels available on the link • #Bidir Channels Used—Number of optical channels in use on the link • #Bidir Channel Cards—Total number of WDM channel cards on the link • #LR Transp (for opaque OCH layer mode only)—Total number of long-reach transponders installed on the link • Cards <*line_system_type*>—Number of WDM channel cards (per line system type) • LR Transp <*line_system_type*> <*bit_rate*> (for opaque OCH layer mode only)—Number of long-reach transponders (per line system type and per OCH bit rate) • Cost—This cost consists of the cost of the WDM terminal multiplexers and the WDM channel cards installed on the link. In case of opaque OCH layer mode also the cost for the long-reach transponders installed on the link is included in this cost.
End of Table 15-13	

In-line Regeneration/Amplification

This section lists all OTS links that have WDM equipment.

Table 15-14 Bill of Materials: In-Line Regeneration/Amplification

Section	Description
In-Line Regeneration/Amplification (WDM Links)	This overview lists all OTS links that have WDM equipment installed. This table shows: • Name—Name of the OTS link • Fiber <*line_system_type*>—Number of fiber pairs equipped on the link (per line system type) • #Fiber Pairs—Total number of fiber pairs equipped on the link • #Regen Stations—Number of regeneration stations on the link • #OA Stations—Number of optical amplifier stations on the link • Regen Com. Eq. <*line_system_type*>—Number of regenerators (common equipment, per line system type) • #Regen Com. Eq.—Total number of regenerators (common equipment) installed on the link • OA <*line_system_type*>—Number of optical amplifiers (per line system type) • #Bidir OAs—Total number of optical amplifiers installed on the link • #Bidir Channels Used—Number of optical channels in use on the link • #Bidir Regen Cards—Total number of in-line regenerator cards installed on the link • Regen Cards <*line_system_type*> <*bi_rate*>—Number of regenerator cards (per line system type and per OCH bit rate) • Cost—This cost consists of the cost of the optical amplifier equipment and the regenerator equipment installed on the link.
End of Table 15-14	

SDH Equipment

This section lists the DCL links (links with an ECC as end node) that contain non-WDM line systems—that is, line systems with only one wavelength per fiber. These links are equipped with SDH/SONET equipment.

Note—A SONET/SDH link can be equipped with non-WDM line systems (one wavelength per fiber) or with WDM line systems (multiple wavelengths per fiber). If the link is equipped with WDM equipment, it will be listed in other sections of the BOM.

Table 15-15 Bill of Materials: SDH Equipment (SDH Links)

Section	Description
SDH Equipment	This overview lists all OTS links that have non-WDM equipment installed. This table shows: • Name—Name of the OTS link • Fiber <line_system_type>—Number of fiber pairs equipped on the link (per line system type) • #Fiber Pairs—Total number of fiber pairs equipped on the link • #Regen Stations—Number of regeneration stations on the link • #Amplif Stations—Number of amplifier stations on the link • SDH Regen <*bit_rate*>—Number of SDH regenerators (per OCH bit rate) • #SDH Regen—Total number of SDH regenerators installed on the link • SDH Amp <*bit_rate*>—Number of SDH amplifiers (per OCH bit rate) • #SDH Amp—Total number of SDH amplifiers installed on the link • Cost—This cost consists of the cost of the SDH amplifiers and the SDH regenerators installed on the link.
End of Table 15-15	

Overview Total Cost

This section gives an overview of the installed node and link equipment in the network.

Table 15-16 Bill of Materials: Overview Total Cost

Section	Description
Link Cost	This table gives an overview of the total cost of the link equipment in the network: • Cable—Total cost of the cable equipment • Fiber—Total cost of the fiber equipment • Channel—Total cost of the channel equipment • SDH equipment—Total cost of the SDH equipment
Node Cost	This table gives an overview of the total cost of the node equipment in the network: • Electrical—Total cost of the electrical node equipment (ADMs, DXCs, IXCs, SDH terminal multiplexers, aggregators, mid-stage multiplexers) • Optical—Total cost of the optical node equipment (OXCs, OADMs, patch panels, transponders)

Table 15-16 Bill of Materials: Overview Total Cost (Continued)

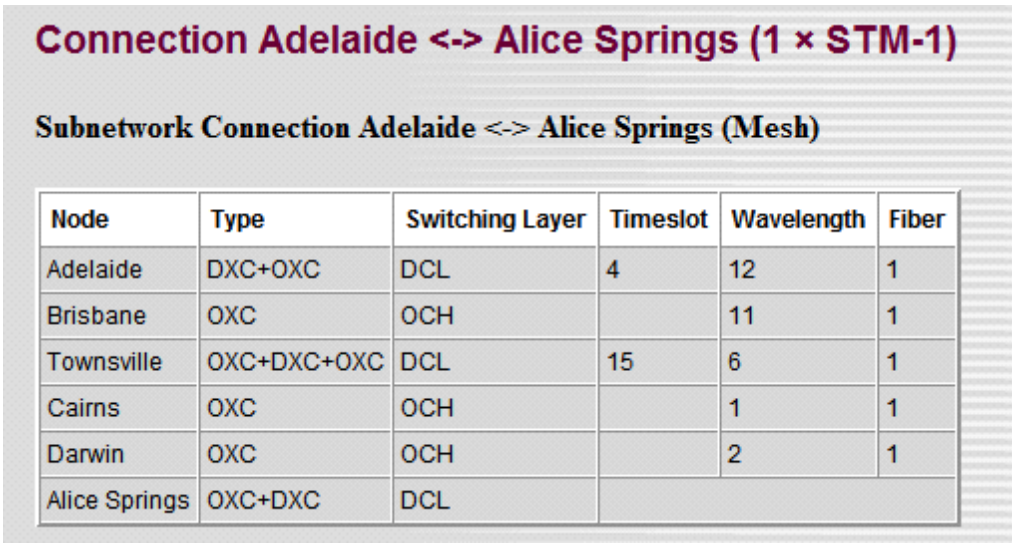
Section	Description
Total Network Cost	Total cost of the install equipment on the network
End of Table 15-16	

Connection Resource Details Reports

The report gives a detailed overview of the route taken and resources used for each connection, as well as for the SONET/SDH rings, as illustrated in Figure 15-3. There are two ways to generate the report.

- Info > Export to Web Report > Connection Resource Details > By Resource Index—This generates a report based on the index of the resources used, such as fiber index, wavelength index and time slot index. This is illustrated in Figure 15-3.
- Info > Export to Web Report > Connection Resource Details > By Resource Designation—This generates a report based on the designations of the resources used.

Figure 15-3 Connection Resource Details (By Index) Table in Web Report: Example



Connection Adelaide <-> Alice Springs (1 × STM-1)

Subnetwork Connection Adelaide <-> Alice Springs (Mesh)

Node	Type	Switching Layer	Timeslot	Wavelength	Fiber
Adelaide	DXC+OXC	DCL	4	12	1
Brisbane	OXC	OCH		11	1
Townsville	OXC+DXC+OXC	DCL	15	6	1
Cairns	OXC	OCH		1	1
Darwin	OXC	OCH		2	1
Alice Springs	OXC+DXC	DCL			

This report includes a table for every connection accommodated in the network. If a connection is routed over different rings, or partly over rings and mesh resources, the reports includes a table for each of these subnetwork connections. Each table shows the switching points in the different layers and the resources used between these switching points.

The first row of the table indicates the connection end points and number, the connection capacity, and connection bit rate (first, second, and third columns respectively).

Subsequent rows list the nodes along the path. Each row for the “By Resource Index” table includes the following fields:

- Type—The equipment used in that node
- Switching Layer—The layer at which traffic is switched in that node
- Timeslot (DCL layer) on which the traffic is routed
- Wavelength (OCH layer) on which the traffic is routed
- Fiber (OMS/OTS layer) on which the traffic is routed

Each row for the “By Resource Designation” table includes the following fields:

- Type—The equipment used in that node
- Switching Layer—The layer at which traffic is switched in that node
- DCL—Designation of the DCL link and subdesignation(s) of the timeslot(s) on which the traffic is routed
- OCH—Designation of the OCH link and subdesignation(s) of the wavelength(s) on which the traffic is routed
- OTS—Designation of the OTS link and subdesignation of the fiber on which the traffic is routed

Connection Span Details Reports for OCH Connections

The report provides an overview of the transparent sections of all connections routed in the optical (OCH) layer. In this context, the transparent section of a connection is the section between two regeneration points. Depending on the length of a transparent section, a different type of transponder might be used. You can use this report to assess the cost savings of deploying mixed transponders in a transparent network that uses ultra-long-haul (ULH) systems.

The report compares the currently deployed ULH transponders with the long-haul (LH) transponders of the line system that is specified in the Connection Span Details dialog box.

Note—The report is available in transparent OCH layer mode only.

To generate this report, choose Info > Export to Web Report > Connection Span Details. This opens the Connection Span Details dialog box (Figure 15-4 and Table 15-17). This dialog box shows the number of ULH transponders that can be replaced by LH transponders. You can generate a web report that shows the type of transponder used for each transparent section of every OCH connection accommodated in the network.

Figure 15-4 Connection Span Details Dialog Box

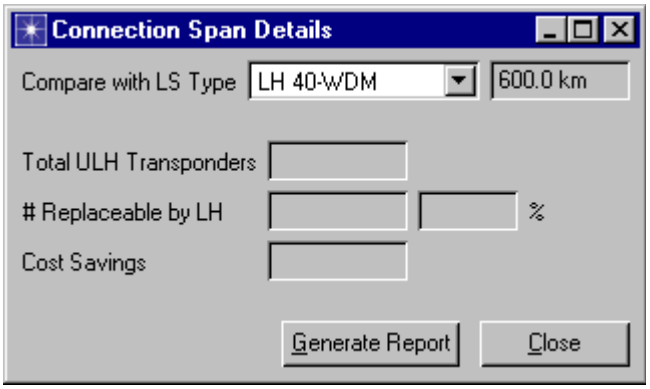


Table 15-17 Connection Span Details Dialog Box

Overview	Description
Compare with LS Type	SP Guru Transport Planner compares the ULH transponders currently deployed in the network with the transponders of the LH line system selected in this menu. **Note—**The transparent reach of the selected LS Type (LH) must be smaller than the transparent reach of the LS type (ULH) currently deployed in the network.
Total ULH Transponders	Total number of ULH transponders
# Replaceable by LH	Number of ULH transponders that can be replaced by LH transponders
Cost Savings	SP Guru Transport Planner calculates this value based on the cost difference between the LH and the ULH transponders.
End of Table 15-17	

Consider the example from the web report shown in Figure 15-5, which was generated with the following assumptions:

- An ultra-long-haul system (ULH) has a transparent reach of 2500 km and a long-haul system (LH) has a reach of 600 km.
- A connection between node_00 and node_03 with three transparent sections.

SP Guru Transport Planner designs the network for one type of transponder—in this case the ULH transponder, thus requiring six ULH transponders (two for each transparent section). The report shows that

- The first and second transparent sections (1500 and 2200 km long, respectively) require an ULH transponder
- The third transparent section (500 km long) can be implemented using a LH transponder.

This means that one third (1/3) of the ULH transponders can be replaced by lower-cost LH transponders.

Figure 15-5 Connection Span Details: Example

node_00=node_03		
Working Path: 3 transparent sections	4200	6 ULH transponders
node_00-node_01	1500	ULH
node_01-node_02	2200	ULH
node_02-node_03	500	LH
Replacement by LH	2	33.33%

Spreadsheet Reports

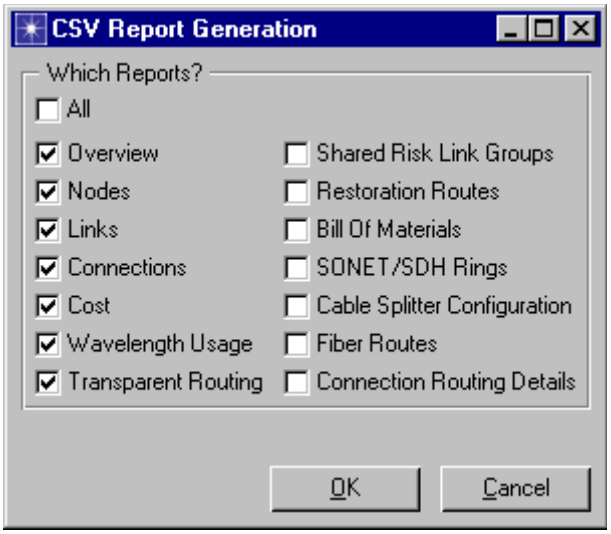
In addition to the Bill of Materials, you can also generate reports in .csv (comma-separated-value) files that you can view using a spreadsheet program like Excel. The remaining sections in this chapter describe the different types of reports you can generate and the information contained in each report.

Procedure 15-1 Creating a Spreadsheet Report

1 Choose Info > Export to Spreadsheet.

➥ The CSV Report Generation dialog box appears.

Figure 15-6 CSV Report Generation Dialog Box



2 Select the spreadsheet reports you want to generate and click OK.

End of Procedure 15-1

Report Descriptions

Table 15-18 lists the types of spreadsheet reports that SP Guru Transport Planner can generate.

Table 15-18 Spreadsheet Reports: Report Types (Part 1 of 2)

Item	Description	Reference
Connection Report (“connections.csv”)	Information about the traffic demands accommodated in the network	Connection Report on page TrP-15-26
Cost Report (“cost.csv”)	Information about the different parts of the total network cost	Cost Report on page TrP-15-26
Links Report (“links.csv”)	Information about the links in the different layers in the network	Link Report on page TrP-15-27

Table 15-18 Spreadsheet Reports: Report Types (Part 2 of 2)

Item	Description	Reference
Nodes Report (“nodes.csv”)	Information about the traffic in the nodes	Node Report on page TrP-15-28
Wavelength Usage Report (“wavelength_usage.csv”)	Information about the wavelengths that carry the optical traffic demands	Wavelength Usage Report on page TrP-15-30
Overview Report (“overview.csv”)	General information about the network	Overview Report on page TrP-15-30
Transparent Routing Report (“transparent_routing.csv”)	Routing details corresponding to the transparent network mode. This report shows the regeneration capacity per node, routes taken by the OCH connections, actual regeneration points, etc. This report is available in transparent OCH layer mode only	Transparent Routing Report on page TrP-15-32
Shared Risk Link Groups Report (“srlg.csv”)	This report provides an overview of the DCL links and their relationship with respect to the Shared Risk Link Group (SRLG) concept. Two DCL links are SRLGs if the links are supported by a common link in one of the lower layers. In addition, for all DCL connections using 1+1 protection, the SRLG relationships are computed and supporting links common to working and protection paths are reported.	Shared Risk Link Group Report on page TrP-15-33
Restoration Routes Report (“restoration.csv”)	Provides an overview of the connections restored and the restoration routes taken per link failure	Restoration Routes Report on page TrP-15-33
Bill of Materials Report (“bom.csv”)	Exports the Bill of Materials to a .csv file	Bill of Materials on page TrP-15-6
SONET/SDH Rings Report (suffix “_Rings”)	Provides an overview of the SONET/SDH rings in the network and their utilization.	Rings Report on page TrP-15-34
Cable Splitter Configuration Report (“cable_splitter.csv”)	Overview of all cable splitters in the network	Cable Splitter Report on page TrP-15-34
Fiber Routes Report (“fiber_routes.csv”)	Overview of all fiber routes in the network	Fiber Routes Report on page TrP-15-34
Connection Routing Details Report (“connection_routing_details.csv”)	Overview of all connections accommodated in the network, the paths taken and the electrical and optical processing points in the network. The report shows digital equipment (referred to as DXC_<*name_node*>), optical equipment (referred to as OXC_<*name_node*>) and wavelengths along the path of a DCL or OCH connection.	—
End of Table 15-18		

Connection Report

The Connection Report gives an overview of the connections accommodated in the OCH and DCL layers. The connections are sorted by traffic matrix.

Table 15-19 Spreadsheet Report: Connections

Object Type	Properties
Connection	This report shows the following properties for each connection: • From—Source node of the connection • To—Destination node of the connection • Traffic Matrix—Name of the traffic matrix • Bit Rate—Bit rate of the connection • Capacity—Capacity units
Paths	This report lists the following information about the path or the different sub-paths of the connection: • From—Source node of the sub-path • To—Destination node of the sub-path • Carrier—"Mesh" if the sub-path is carried on mesh links; the name of the ring if the sub-path is carried on a ring • Length Work/Prot—Length (in km or miles) of the working and protection sub-paths • Regens. Work/Prot—Number of regenerators on the working and protection sub-paths (shown for OCH connections only) • OAs. Work/Prot—Number of optical amplifiers on the working and protection sub-paths (shown for OCH connections only) • Hopes Work/Prot—Number of hops in the working and protection sub-paths • Route Work/Prot—The route (expressed by the nodes traversed) of the working and protection sub-paths
End of Table 15-19	

Cost Report

This report shows a summary of the installed equipment in the network and its cost. The total network cost is divided into the node costs and the link costs. You might find it useful to generate a Bill of Materials to see more detailed information about the installed equipment and its cost.

Link Report

This report lists information about the links in each layer. The links are listed alphabetically.

Table 15-20 Spreadsheet Report: Links (Part 1 of 2)

Link Type	Properties
OTS Links	This report shows the following properties for each OTS link: • End nodes • Length (in km or miles) • Number of regenerator and amplifier stations on the link • Total fiber pairs • User-specified link cost
OMS Links	This report shows the following properties for each OMS link: • End nodes • Length (in km or miles) • Equipped fiber pairs per line system type • Total number of equipped fiber pairs • Number of regenerators (common equipment) • Number of amplifiers • Dark fiber pairs • Total fiber pairs
OCH Links	This report shows the following properties for each OCH link: • End nodes • Length (in km or miles • Number of in-line regeneration cards • Used channel pairs for working traffic • Used channel pairs for 1+1 protection traffic • Used channel pairs for shared protection traffic • Used channel pairs for (link and path) restoration capacity • Used channel pairs (per OCH bit rate) • Total number of used channel pairs • Equipped channel pairs • Total channel pairs

Table 15-20 Spreadsheet Report: Links (Part 2 of 2)

Link Type	Properties
DCL Mesh Links	This report shows the following properties for each DCL mesh link: • End nodes • Length (in km or miles) • Used trunk capacity for working traffic (in STM-1/STS-1 equivalents) • Used trunk capacity for 1+1 protection (in STM-1/STS-1 equivalents) • Used trunk capacity per DCL bit rate (in STM-1/STS-1 equivalents) • Total used trunk capacity (in STM-1/STS-1 equivalents) • Total trunk capacity (in STM-1/STS-1 equivalents)
DCL Ring Links	This report shows the following properties for each DCL ring link: • End nodes • Length (in km or miles) • Type of the ring • OCH bit rate of the ring • Name of the ring • Used trunk capacity per DCL bit rate (in STM-1/ STS-1 equivalents) • Total used trunk capacity (in STM-1/ STS-1 equivalents) • Total trunk capacity (in STM-1/ STS-1 equivalents)
End of Table 15-20	

Node Report

This report gives an overview of the traffic accommodated in the nodes (in the OCH and the DCL layer).

Table 15-21 Spreadsheet Report: Nodes (Part 1 of 2)

Node Type	Properties
OXC Patch Panel OADM Nodes	This report shows the following properties for an OXC / patch panel or OADM node: • Node type—OXC or WP-OXC type, OADM or patch panel • Local traffic per OCH bit rate—(optical) traffic dropped in the node • Total local traffic • Transit traffic per OCH bit rate • Total transit traffic • Transit / local traffic percentage

Table 15-21 Spreadsheet Report: Nodes (Part 2 of 2)

Node Type	Properties
IXC Nodes (DCL traffic)	This report shows the following properties for an IXC node: • Node type—IXC type • Local traffic per DCL bit rate—(digital) traffic dropped in the node • Total local digital traffic • Transit traffic per DCL bit rate—(digital) transit traffic in the node • Total transit digital traffic • Transit / local digital traffic percentage
IXC Nodes (OCH traffic)	This report shows the following properties for an IXC node: • Node type—IXC type • Local traffic per OCH bit rate—Native (optical) traffic dropped in the node • Total local native optical traffic • Transit traffic per OCH bit rate—(optical) transit traffic in the node • Total transit optical traffic • Transit / local traffic percentage
DXC / TM Nodes	This report shows the following properties for a DXC or terminal multiplexer node: • Node type: DXC type or Terminal Multiplexer • Local traffic per DCL bit rate: (digital) traffic dropped in the node • Total local traffic • Transit traffic per DCL bit rate • Total transit traffic • Transit / local traffic percentage
ADM Nodes	This report shows the following properties for each ADM: • Node type—ADM type • Local traffic per DCL bit rate—(digital) traffic dropped in the ADM • Total local traffic • Transit traffic per DCL bit rate • Total transit traffic • Transit / local traffic percentage
End of Table 15-21	

Wavelength Usage Report

This report gives an overview of the wavelength usage in the network.

Table 15-22 Spreadsheet Report: Wavelength Usage

Object Type	Properties
Wavelength Usage Network Wide	This table displays the wavelength usage network-wide. It shows the following properties for each wavelength: • Wavelength—Number of the wavelength • Used Capacity—Capacity used on the wavelength in the network • Total Capacity—Total capacity available on the wavelength in the network
Wavelength Usage Per Link	This table displays the wavelength usage per link. It shows the following properties for each OCH link: • End nodes of the link • #Equipped Fiber Pairs—Number of equipped fiber pairs on the link • #Used Wavelengths—Number of used channels on the link • # Wavelengths—Number of available channels on the link • Highest Wavelength Used—Highest wavelength used on the link
End of Table 15-22	

Overview Report

This report contains general information about the network.

Table 15-23 Spreadsheet Report: Overview (Part 1 of 2)

Attribute	Properties
Name	Scenario and project name
Date	Date and time the report was created
Mode	OCH layer mode (opaque or transparent)

Table 15-23 Spreadsheet Report: Overview (Part 2 of 2)

Attribute	Properties
Overview Traffic Matrices (OCH layer)	This table shows the following properties for each OCH traffic matrix: • Name—Name of the OCH traffic matrix • Bit Rate—OCH bit rate of the traffic matrix • Native—Yes or No • Patch Panel—Yes or No • Client Protected—Yes or No (only valid for 1+1 protected traffic matrix) • Protection—No Protection, 1+1 Protection, Shared Path Protection, Link Restoration or Path Restoration • Routed Cap.—Capacity of the traffic matrix that is accommodated in the network-Requested Cap. - Total capacity of the traffic matrix • % Routed—Percentage of the capacity of the traffic matrix that is accommodated in the network • Hops Working—Total link capacity taken by the working paths of the demands of the traffic matrix • Hops Protecting—Total link capacity taken by the protecting paths of the demands of the traffic matrix
Overview Traffic Matrices (DCL layer)	This table shows the following properties for each DCL traffic matrix: Name—Name of the DCL traffic matrix Bit Rate—DCL bit rate of the traffic matrix Client Protected—Yes or No (only valid for 1+1 protected traffic matrix) Protection—No Protection or 1+1 Protection Routed Cap.—Capacity of the traffic matrix that is accommodated in the network Requested Cap.—Total capacity of the traffic matrix %Routed—Percentage of the capacity of the traffic matrix that is accommodated in the network Hops Working—Total link capacity taken by the working paths of the demands of the traffic matrix Hops Protecting—Total link capacity taken by the protecting paths of the demands of the traffic matrix
Overview Shared Protection / Restoration Capacity	This table shows the following properties per link for each traffic matrix with shared protection, with link restoration or with path restoration: • End nodes of the link • Spare Capacity—Spare capacity reserved on the link to protect the traffic matrix against network failures In case of transparent OCH layer mode, this table shows the following properties per OCH node for each traffic matrix with shared protection, link restoration or path restoration: • Node—Name of the node • Spare Regen Capacity—Spare regenerator capacity reserved in the node to protect the traffic matrix against network failures • Spare WC Capacity—Spare wavelength converter capacity in the node to protect the traffic matrix against network failures
End of Table 15-23	

Transparent Routing Report

In a transparent network, an individual report shows more details about the wavelength usage and regeneration/conversion locations.

Table 15-24 Spreadsheet Report: Transparent Routing

Object Type	Properties
Transparent Reach	Length of a transparent section in km/miles or OA spans
Link	This report lists the following properties for each OCH link: • End nodes of the link • Length—Length (in km or miles) of the link • #Inline Regenerators—Number of regenerator stations on the link • Locations—Locations (in km or miles from the start node) of the regenerator stations • Inline Reg. Card Usage—Number of bi-directional optical channels regenerated per station • Wavelength Usage—Shows how many times each wavelength on the link is used/available
Node	This report lists the following information for each OCH node: • Node—Name of the node • Type—Opaque or Transparent • Reg. Usage—Used/available regeneration capacity in the node • Reg. + Conv.—Capacity used for regeneration + wavelength conversion • # Ports—Number of used wavelength ports in the node
Traffic Matrix	This report lists the following information for the routed connections of a traffic matrix: • From—Source node of the connection • To—Destination node of the connection • Bit Rate—OCH Bit rate of the connection • Protection Type—No Protection, 1+1 Protection, Shared Path Protection, Link or Path Restoration • Capacity—Capacity of the connection • Path Length—Length (in km or miles) of the working or protecting path • #Inline Reg.—Number of in-line regenerators on the path • #In-node Reg.+WC—Number of in-node regenerators and wavelength converters on the path • Path—The path, which is listed as a chain of nodes traversed and wavelengths used between the nodes. The nodes are shown between [] brackets. The report uses number signs (#node name#) to indicate that regeneration occurs in a node. The report uses “at” signs (@node_name@) to indicate that wavelength conversion occurs in a node. The wavelengths used between nodes are shown between < > brackets. The first number between these brackets refers to the wavelength, the second number refers to the fiber.
End of Table 15-24	

Shared Risk Link Group Report

The Shared Risk Link Group (SRLG) report shows links that share a common part of underlying infrastructure (and thus share the risk of being affected simultaneously) for each DCL link and connection.

- The first part of the report shows for every DCL link its shared risk links groups
- The second part of the reports shows for each DCL connection, its route, and its shared risk link groups

Restoration Routes Report

If a traffic matrix is accommodated in the network using the link or path restoration option, the back-up path taken in case of a failure depends on the specific failure. The dimensioning algorithms ensure that enough restoration capacity is present so that the network can survive every possible single-link failure and still support all traffic in the matrix. The restoration report gives an overview of the restoration routes for all single link failures.

Table 15-25 Spreadsheet Report: Restoration Routes

Object Type	Properties
Link-restorable traffic	For link-restorable traffic, the restoration report shows the following information: • Line—The failed link • Restorable—The restorable capacity on that link • Restoration routes—The capacity and list of nodes per restoration route between the end nodes of the failed link
Path-restorable traffic	For path-restorable traffic, the restoration report shows the following information: • Line—The failed link • Restorable—The restorable capacity on that link • Affected connection—The list of affected connections on the failed link • Capacity—The capacity of the affected connection • Restoration routes—The restoration routes (list of nodes) between the end nodes of the failed connection
End of Table 15-25	

Rings Report

The rings report gives an overview of all the SONET/SDH rings present in the network and their utilization.

Table 15-26 Spreadsheet Report: Rings

Object Type	Properties
DCL Rings	The report shows the following information for each DCL ring: • Name of the ring • Type—Type of the ring • Bit Rate—OCH bit rate of the ring • Used capacity per link of the ring (in STM-1/STS-1 equivalents) • Total utilization—Used / available capacity on all links of the ring
End of Table 15-26	

Cable Splitter Report

The cable splitter report gives an overview of all the cable splitters in the network. This report shows the configuration matrix for each cable splitter. This matrix specifies the number of configured fiber pairs between the nodes adjacent to the cable splitter.

Fiber Routes Report

The fiber routes report gives an overview of all the fiber routes installed in the network.

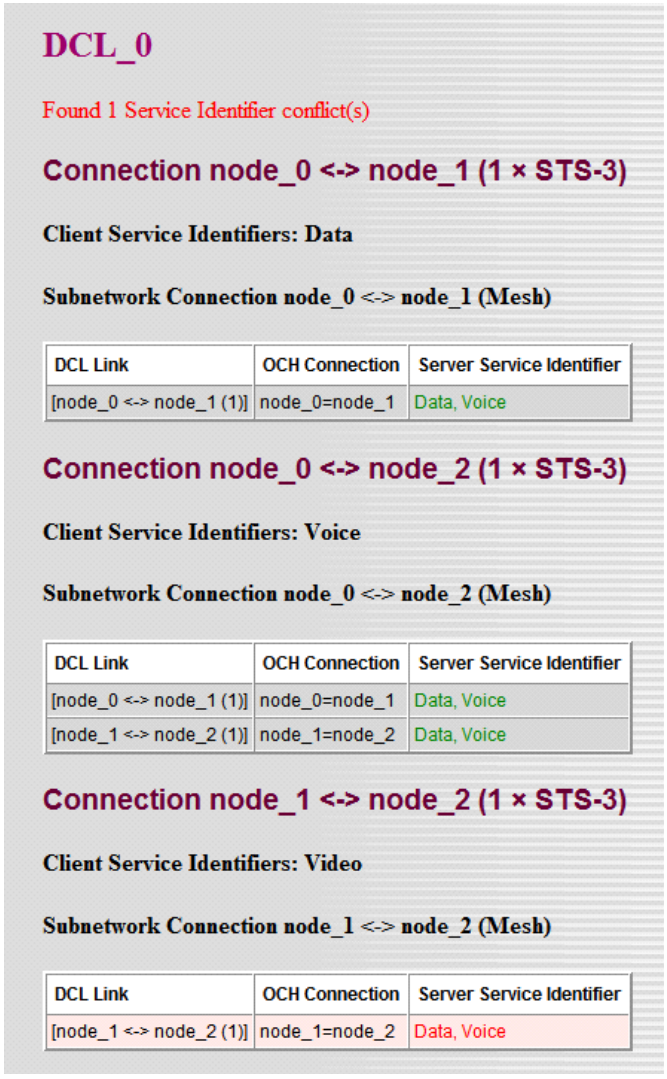
Table 15-27 Spreadsheet Report: Fiber Routes

Object Type	Properties
Fiber route	This table shows the following properties for each fiber route present in the network: • From—Source node • To—Destination node • Hops—Number of hops • Fiber Route—Path of the fiber route expressed by the nodes traversed
End of Table 15-27	

Service Identifier Assignments Report

To generate this report go to Info > Export to Web Report > Service Identifier Assignments Report. Next, set the option for matching Client Service Identifiers to Server Service Identifiers as explained in Applying Service Identifiers to Connections on page TrP-6-34. A report is generated based on the option specified. An example is shown in Figure 15-7. The reports list, per traffic matrix, the DCL connections and wavelengths (OCH Connections) they are assigned to. If the assignment to a wavelength is valid, the Server Service Identifier is printed in green text, if it is invalid it is printed in red text. Below the name of the traffic matrix, the number of assignment conflicts is shown.

Figure 15-7 Example Service Identifier Assignments Report



DCL_0

Found 1 Service Identifier conflict(s)

Connection node_0 <-> node_1 (1 × STS-3)

Client Service Identifiers: Data

Subnetwork Connection node_0 <-> node_1 (Mesh)

DCL Link	OCH Connection	Server Service Identifier
[node_0 <-> node_1 (1)]	node_0=node_1	Data, Voice

Connection node_0 <-> node_2 (1 × STS-3)

Client Service Identifiers: Voice

Subnetwork Connection node_0 <-> node_2 (Mesh)

DCL Link	OCH Connection	Server Service Identifier
[node_0 <-> node_1 (1)]	node_0=node_1	Data, Voice
[node_1 <-> node_2 (1)]	node_1=node_2	Data, Voice

Connection node_1 <-> node_2 (1 × STS-3)

Client Service Identifiers: Video

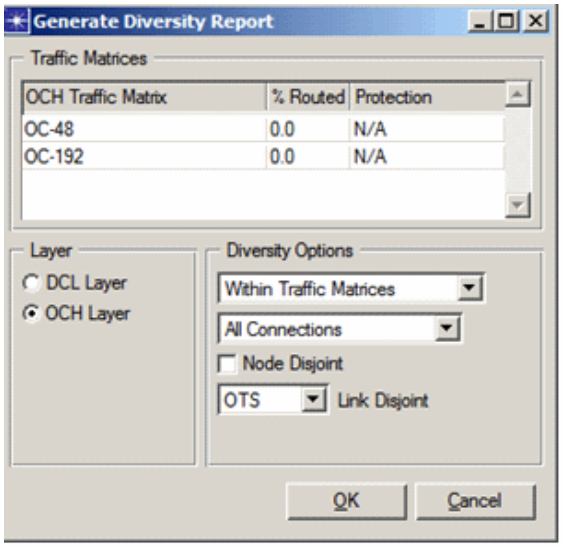
Subnetwork Connection node_1 <-> node_2 (Mesh)

DCL Link	OCH Connection	Server Service Identifier
[node_1 <-> node_2 (1)]	node_1=node_2	Data, Voice

Diversity Report

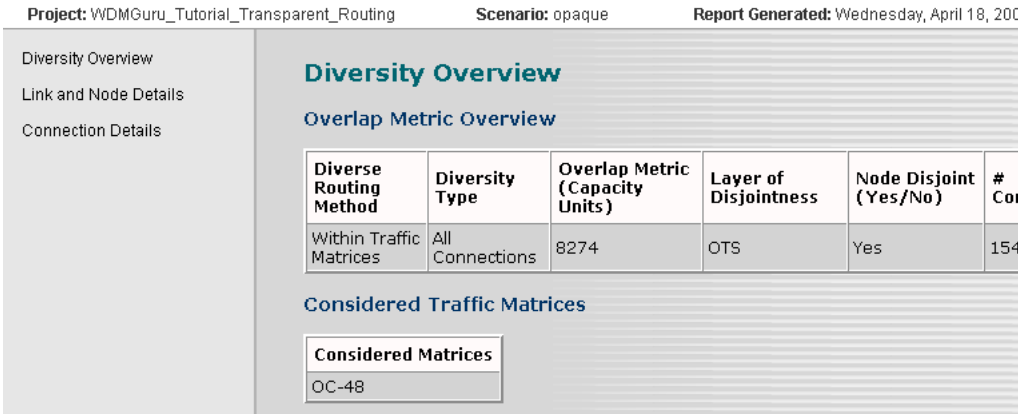
To generate this report, choose Info > Export to Web Report > Diversity Report. Next, set the options for calculating the diversity in the resulting dialog, shown in Figure 15-8.

Figure 15-8 Generate Diversity Report Options



Select the layer to consider (DCL or OCH), the traffic matrices on that layer, and the diversity options, as explained in Diverse Routing Algorithm on page TrP-6-10 in the *Routing* chapter. The report gives an overview of the overlap between different connections based on the specified diversity options. The "Overlap Metric" in the report expresses the units of capacity that are overlapping on a particular element (on a link, a node, or the entire network). An example is shown in Figure 15-9.

Figure 15-9 Diversity Report—Diversity Overview



The report contains three pages from which you can select:

- Diversity Overview—Gives an overview of the total amount of overlap in the network based on the specified diversity options. The diversity options are also shown in the overview page.

- Link and Node Details—Gives an overview of the total amount of overlap on each individual node and link, as well detailed information on the connections that are overlapping per node and link based on the specified diversity options.
- Connection Details—Gives an overview of the amount of overlap on each connection of the selected traffic matrices, as well as detailed information on the connections are overlapping with a particular connections, based on the specified diversity options. Also, the diverse connections are reported. These are the connections that do not have any overlap with any other connections, based on the specified diversity options.

Note—The traffic matrices that you select for which to create the diversity report do not necessarily need to be routed with the diverse routing algorithm. You can also calculate the overlap for traffic that has been routed without optimizing the diversity.
