3 Creating a Multi-Layered Network Model

In the context of SWIM, a multi-layered network model consists of the following components:

- A Layer-2/3 network scenario modelled in SP Guru Network Planner
- A transport-layer network scenario modelled in SP Guru Transport Planner
- A SWIM file that defines the relationships between links and nodes in the two scenarios

After you create a multi-layered network, you can design and analyze each layer using any of the standard operations in SP Guru Network Planner and SP Guru Transport Planner. You can also run integrated multi-layered operations available in SWIM; these operations are described in Menu Reference on page TC-A-1.

Workflow Description

The following steps outline the workflow for creating an multi-layered network model:

1) Create the Layer-2/3 network in SP Guru Network Planner
2) Create the transport-layer network in SP Guru Transport Planner
3) Map Layer-2/3 nodes (such as IP routers) to the transport nodes (such as OXCs and DXCs)
4) Map Layer-2/3 links to the transport connections that support those links

After you map the two layers, SWIM keeps the two model states consistent with each other. For example, SP Guru Network Planner fails any link as failed if it depends on a connection that has not yet been set up in SP Guru Transport Planner. SP Guru Network Planner also sets link delays based on delays experienced by the underlying Transport connections. SWIM ensures this inter-layer consistency automatically, even if one of the network models changes.

Creating a Network Model in SP Guru Network Planner

To create a Layer-2/3 network model, you can use any of the standard methods available in SP Guru Network Planner. At the very least, your network scenario should include the following:

- Topology information (nodes and links)
- Traffic information (traffic flows, connections, and/or discrete traffic)

Creating a Transport Network Model

After you create the Layer-2/3 network, SP Guru Transport Planner can create the Transport network that supports it. The simplest method is to generate the network directly from SP Guru Network Planner: in the Project Editor, choose SWIM > Create Corresponding SP Guru Transport Planner Project. After you do this, you can create the nodes and links using one of the following methods:

- Manually, using the object palette
- Import the network model from another SP Guru Transport Planner scenario
- Import the topology from a comma-separate-value (CSV) file
- Import a complete SP Guru Transport Planner project

Mapping Layer-2/3 Nodes to Transport Nodes

SWIM includes a Node Mapping dialog box that you can use to identify the Layer-2/3 nodes that are connected to, or collocated with, Transport nodes. Node mappings can be many-to-one—that is, multiple Layer-2/3 nodes can be collocated with, or connected to, one Transport node. You can use the Map Nodes dialog box to specify the node mapping between the two layers. You can also use this dialog box to create new Transport nodes and map them to Layer-2/3 nodes in one step.

Mapping Layer-2/3 Links to Transport Connections

SWIM also includes a Map Links dialog box that you can use to identify the Layer-2/3 links that need to be supported by Transport connections. Link mappings are always one-to-one: each link is supported by exactly one transport connection. SWIM groups mapped connections with the same bit rate and protection strategy into a unified traffic matrix, which you can use to perform design operations such as routing and dimensioning. These types of matrices are denoted as “External” and cannot be edited in the Traffic Matrix Editor in SP Guru Transport Planner.

References

Table 3-1 Creating a SWIM Scenario: References

Topic	Reference
Creating a Layer-2/3 network scenario in SP Guru Network Planner	See the following sections in the SP Guru Network Planner documentation: • "Building Network Topologies" paper (*Methodologies and Case Studies*) • "Creating a Unified View of the Network" paper (*Methodologies and Case Studies*) • "Importing Network Topologies" chapter (*User Guide*)
Creating a Transport network	Creating a Baseline Scenario on page TrP-3-1
Mapping Layer-2/3 nodes to Transport nodes	Mapping Layer-2/3 Nodes to Transport Nodes on page TC-4-1
Mapping Layer-2/3 links to Transport connections	Mapping Layer-2/3 Links to Transport Connections on page TC-5-1
End of Table 3-1	