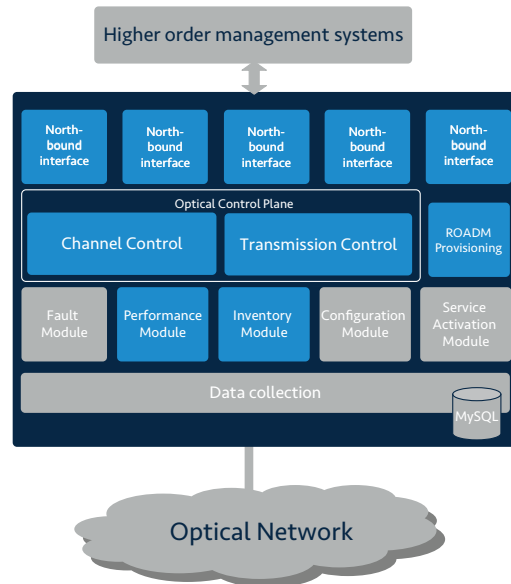


# ROADM Provisioning

*A TNM application providing fast end-to-end service provisioning in ROADM networks*

### Key benefits:

- Reduced time and operational costs associated with end-to-end provisioning of channels across ROADM-based networks
- Prevents configuration errors that may result in wavelength conflicts and hence traffic disturbances
- Point-and-click end-to-end provisioning
- Full integration with the TNM map and activation GUI
- Automated path-calculation
- Insertion of routing constraints and automatic configuration and activation of channels



The ROADM Provisioning application is an optional Transmode Network Manager (TNM) application that is fully integrated with the TNM map and features. It extends the Service Activation GUI to also include end-to-end provisioning of channels and sub-channels through ROADMs. The ROADM Provisioning application completely removes the need to manually configure each individual ROADM board in the Element Network Manager (ENM) when provisioning new connections and services. Power balancing and tuning in amplified optical networks

### Flexibility and automation using ROADMs

ROADMs introduce a great degree of flexibility and automation in optical networks. There is no need to predetermine where channels are dropped and channels can be provisioned and rerouted with a minimum of effort.

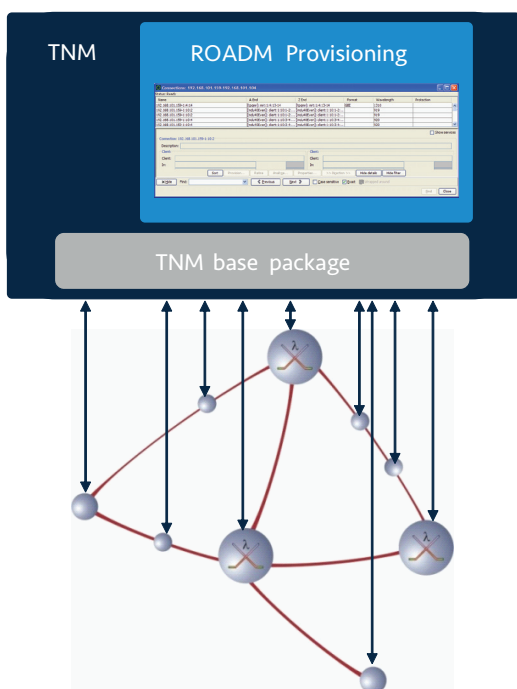


Fig 1. The ROADM Provisioning application automates path-computation and configuration of end-to-end services across ROADM networks.

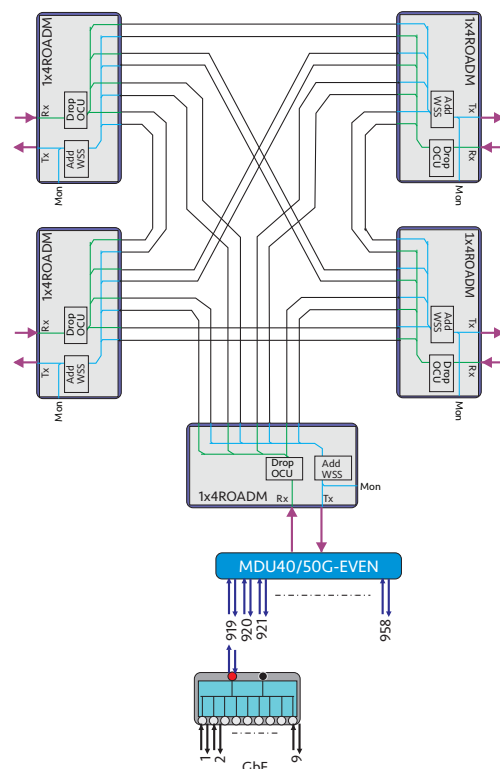


Fig 2. Four-dimensional directionless ROADM node. The figure shows complexity of manual ROADM configuration.

The new capabilities that ROADMs bring to the network also increase the operational complexity when provisioning services directly into the network layer. A multi-degree ROADM node consists of several ROADM boards that are commissioned to interconnect traffic between different line-fibers and/or local Add/Drop ports. To establish a complete end-to-end connection it is necessary to configure each ROADM board in all intermediate nodes. To do this manually is complex and time consuming.

In addition, the high degree of flexibility makes it easy to make configuration mistakes. One important and time-consuming step in a manual configuration of ROADMs is to ensure that the selected channel is not already used somewhere across the network segment, resulting in a wavelength collision and consequently traffic disturbances.

This additional complexity can be removed by the use of the ROADM Provisioning application.

### The ROADM Provisioning application

The ROADM Provisioning application extends the Service Activation GUI to also include end-to-end provisioning of channels and sub-channels through ROADMs.

The TNM GUI allows the user to select terminal nodes from the map through point-and-click. The Service Activation GUI then displays all configured and available connections between the terminal nodes. If there are ROADMs in the network segment, the ROADM Provisioning application automatically performs path-computation that presents to the operator the possible end-to-end channels and sub-channels that can be activated via automatic ROADM provisioning.

The user can also enter routing constraints such as forcing the service to pass or not to pass specified nodes. When the user then activates a specific channel or sub-channel, the ROADM Provisioning application automatically configures the ROADM boards along the path. Before configuring the ROADMs, the application checks that the channel has not already been used somewhere else along the path.

The ROADM Provisioning application supports two-dimensional, three-dimensional, four-dimensional and four-dimensional directionless ROADM nodes. The ROADM Provisioning application supports linear, ring and mesh-topologies.

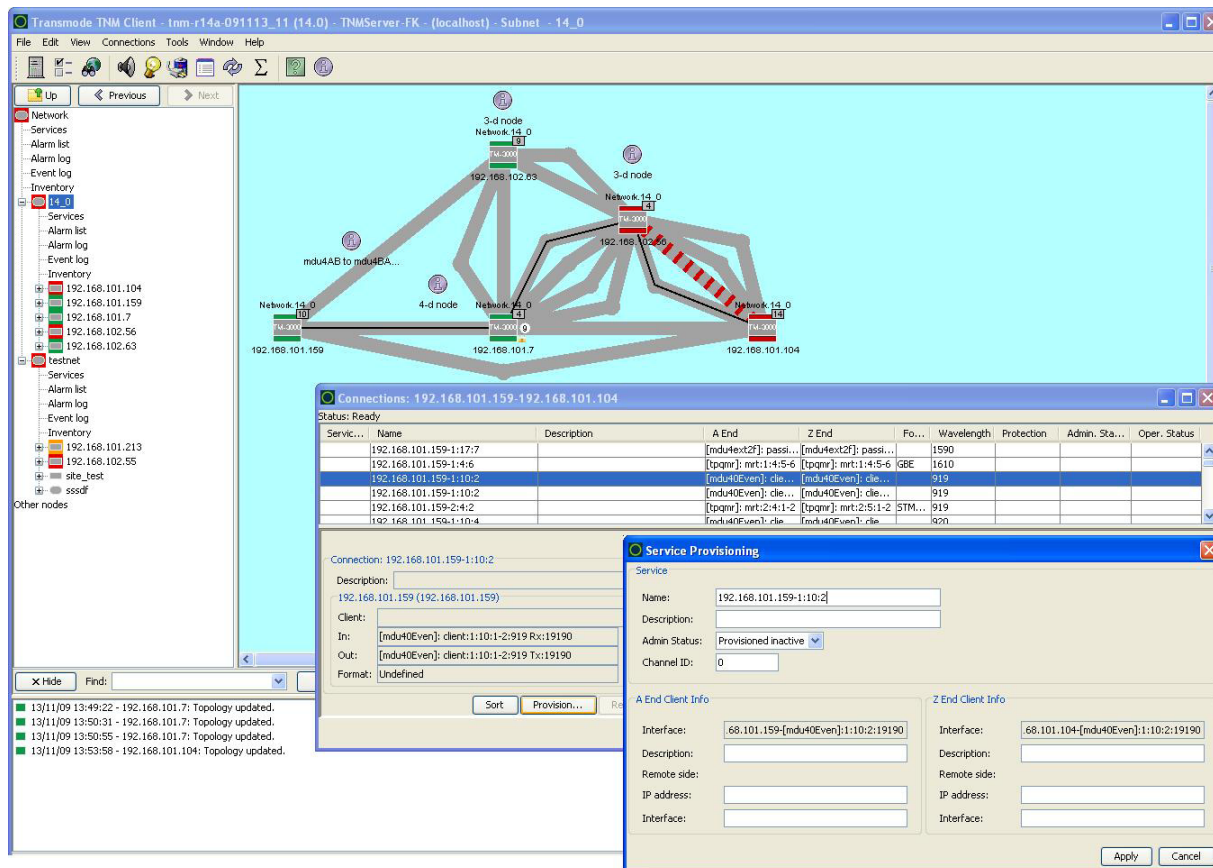


Fig 3. The TNM map, Service Activation GUI and ROADM Provisioning application are completely integrated to minimize the time to provision end-to-end services across ROADMs.

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