

Forecasting Traffic Growth and Impact with Cisco MATE Design

Forecasting Scenarios for Planners, Engineers, and Operations

What You Will Learn

The ability to predict the impact of traffic growth is critical for planning and designing stable and resilient networks. Network planners, design engineers, and operators need precise, reliable, and fast network modeling tools to help model traffic trends, visualize growth, and determine when optimization and upgrades are necessary. Cisco® MATE Design is an industry-leading solution for planning and designing IP/MPLS networks. It offers network planners, designers, and engineers the ability to:

- View the impact of adding customers and services to the network infrastructure
- Rapidly create models of future network-wide growth to plan the network infrastructure
- Determine when optimization and upgrades will be necessary based on trending traffic data from Cisco MATE Live

Planning for Additional Customers and Services

Knowing the impact of adding customers or services to the network helps maintain a high average return per user (ARPU) and assists in rightsizing the network over time.

A simple way to forecast growth on network infrastructure is to add traffic to and from a specific location. MATE Design helps enable you to simulate potential traffic in the network with demands. Each demand has a single source (node or external **Autonomous System (AS)**), and an egress destination (node, external **Autonomous System AS**, or multicast destination). All demands are treated the same by the network. Simulation in MATE Design constantly examines traffic demands, network topology, element configuration, and state, and instantly updates the property tables and the Simulated Traffic view in the network plot. You can select, filter, and organize demands in the demands table.

By adjusting the Simulated Traffic view (Figure 1) and modifying the information in the property tables, network planners can quickly see the impact of changes to any traffic demand, network topology, element configuration, or other object state. Upon modeling changes to the network, the simulated effects on the network infrastructure become immediately apparent.

Figure 1. Simulated Traffic View of a Service Provider Network



For example, a service provider is planning to add a customer in Boston. The estimated bandwidth requirements are 1 Gbps. Figure 2 compares the simulation results before and after all demands to and from the Boston site were increased by 1 Gbps.

Figure 2. Before and After Views of Increased Traffic from and to Boston



You can also assess the impact of a failure to the rest of the network. The MATE Design Simulation Analysis tool analyzes a large set of failure scenarios that include network objects and defined traffic levels. Two network traffic views are generated (Figure 3):

- **Worst Case** - Displays the maximum utilization level caused by failure elsewhere in the network. This view shows how much risk the rest of the network poses to a specific interface. Figure 3 shows a before and after view.
- **Failure Impact** - Displays the maximum utilization level caused by failure of an object in the network. This view shows how much risk a specific interface poses to the rest of the network.

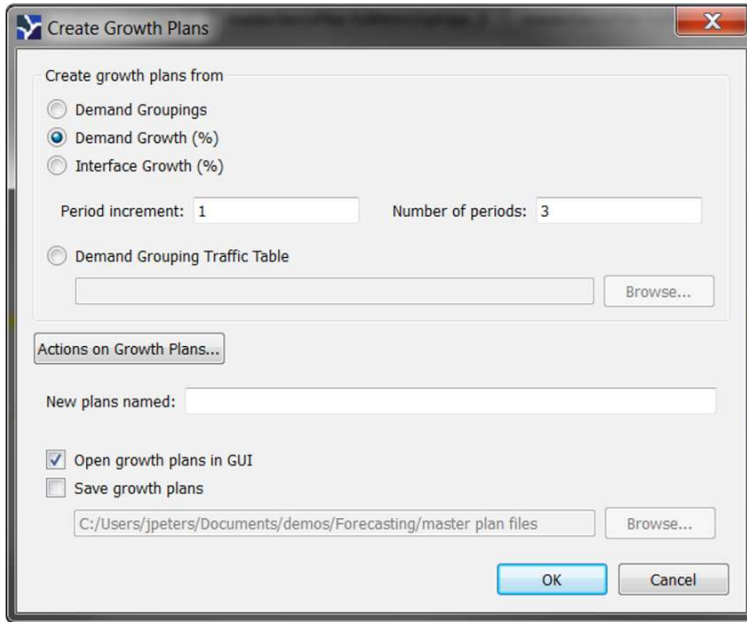
Figure 3. Before and After Worst-Case Simulation Analysis of Increased Traffic from Boston



Projecting Network Growth

Planners and engineers need to know what the network will look like over time to properly gauge the improvements and upgrades that are needed. MATE Design allows you to forecast future network growth. Using a simple dialog box, you can plot the growth rate for demands, interfaces, or groups of demands.

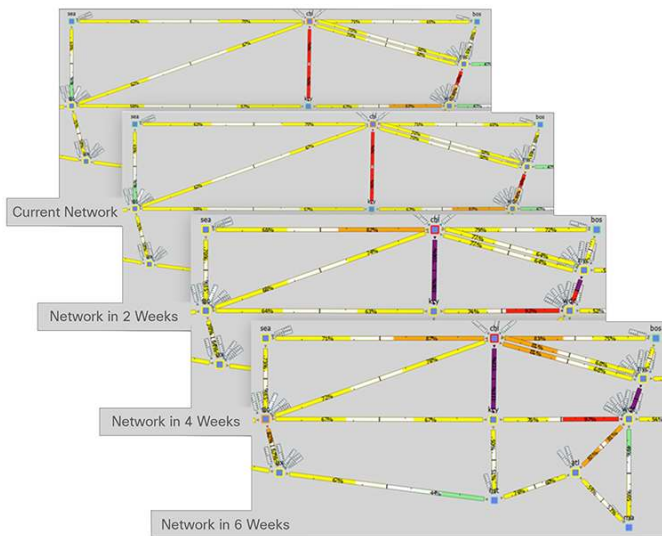
Figure 4. Create Growth Plans Tool



Network-Wide Forecasting

Let's take a look at a network operator who has determined that traffic is increasing by five percent every two weeks. For all demands, growth rates have been set to five percent. Using the Create Growth Plans tool, multiple plan files illustrating what the network will look like two, four, and six weeks from now are generated. To rapidly identify objects most at risk, the operator can use the Simulation Analysis tool and view the worst-case scenarios (Figure 5). With this information, the network operator can create a plan to modify the network to handle the increasing traffic.

Figure 5. Worst-Case Traffic View of Network Growth Plans



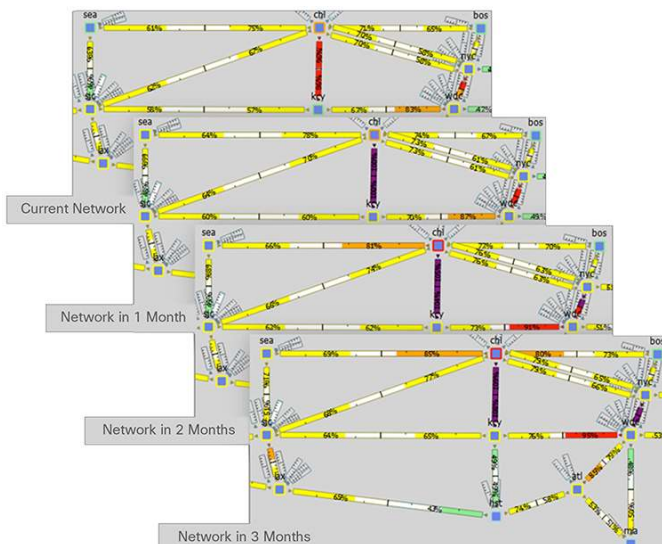
Regional Forecasting

If traffic in your network is increasing in different regions by different rates, you can use MATE Design to forecast different regions by doing the following:

- Assign site tags. You can select different sites in the network plot and apply user-defined tags to identify and classify each site.
- Create demand groupings based on the site tags.
- Establish growth rates for each demand grouping.
- Create growth plans based on the demand grouping growth rates.

Figure 6 shows the results of modeling regional growth and projected worst-case traffic scenarios.

Figure 6. Worst-Case Traffic View of Network Growth by Region

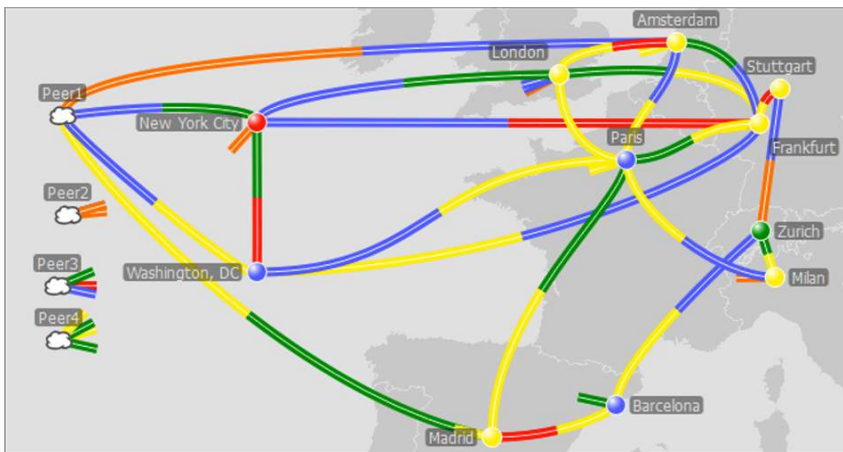


Projecting Network-Wide Growth with Trending Traffic Data

The Cisco MATE Portfolio consists of tightly integrated tools that, when used together, help you model and accurately forecast network traffic. Forecasting with traffic trending data involves three steps:

- **Measure** - Collect data quickly and correctly using Cisco MATE Collector to create frequent and accurate network snapshots.
- **Analyze** - Use Cisco MATE Live to explore current usage, analyze current and historical information, and generate traffic reports of near-real-time and historical data.
- **Forecast** - Export network and traffic trending information from Cisco MATE Live directly into Cisco MATE Design to simulate traffic and model demand groupings. You can then create growth plans to forecast future network growth.

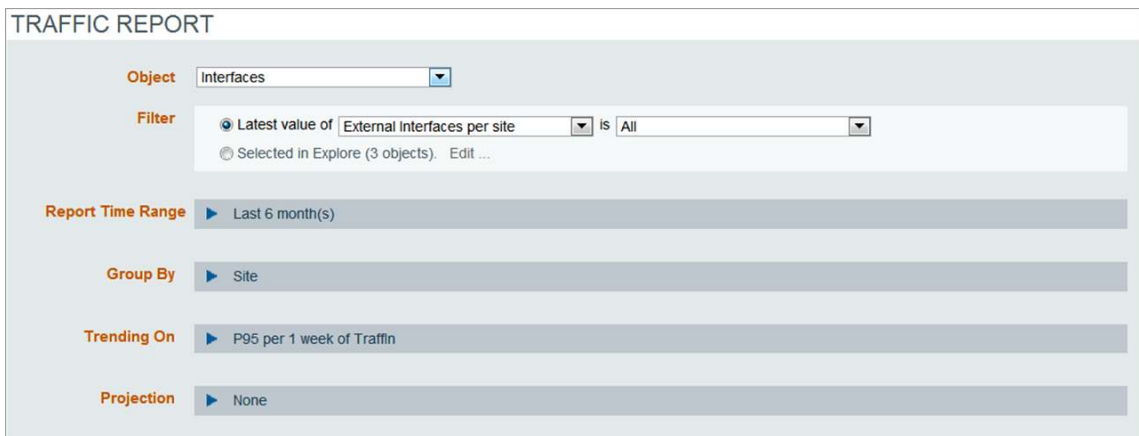
Figure 7. Simulated Traffic View in MATE Design from MATE Live Reporting



Creating a Trending Report

MATE Live can generate on-demand traffic reports, network health reports, and special reports.

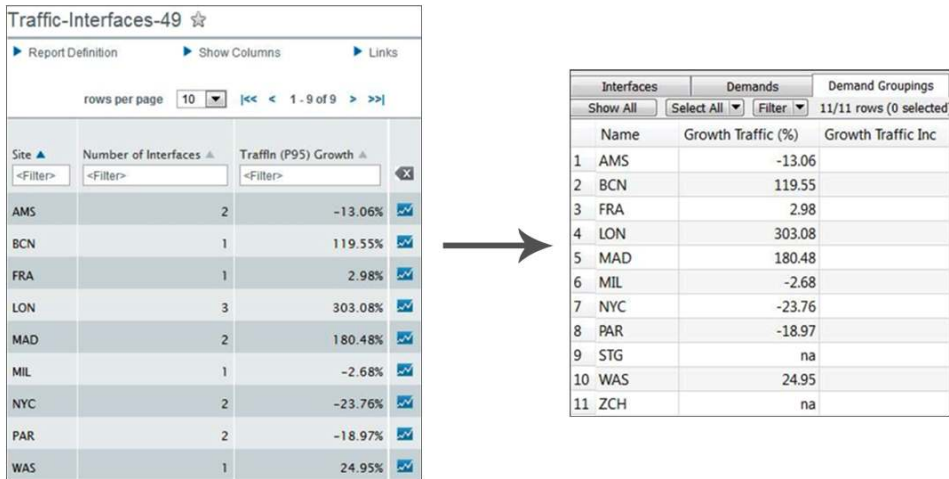
Figure 8. Traffic Trending Report on Interfaces Grouped by External Interfaces Per Site



Importing Trending Data

After you have established demand groupings, you can create the demand grouping growth rate based on the MATE Live traffic report. In Figure 9, the MATE Design Demand Groupings table on the right now matches the MATE Live report on the left, and these growth rates can be used for forecasting in MATE Design.

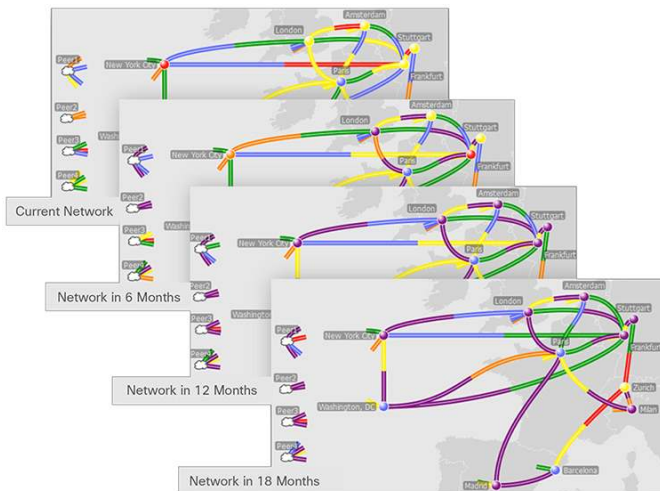
Figure 9. MATE Design Demand Grouping Growth Rates from a MATE Live Report



Forecasting with Trending Data

Using the Create Growth Plans tool, you can generate multiple plan files to illustrate what the network will look like six, 12, and 18 months from now.

Figure 10. Simulated Traffic View of Network Growth with Trending Data



Conclusion

Forecasting is simple with the Cisco MATE Portfolio tools. Rapidly analyze multiple “what-if” scenarios and plan for future growth with Cisco MATE Design. Use MATE Live Analytics to enhance the advanced planning capabilities of Cisco MATE Design. Create a traffic-trending report in MATE Live. Export the report to Cisco MATE Design. Create growth plans in Cisco MATE Design to visualize when and where optimization and upgrades to your network will be necessary.




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