Overview

WAE Design is standalone software that can run on multiple platforms, or on standard laptops or desktops. It can be accessed in three ways: through a GUI, web browser (WAE Design Archive application only), and CLI. This guide describes how to use the WAE Design GUI.

Note This guide references $CARIDEN_HOME, which is the directory in which the WAE Design, WAE Live, and WAE Collector executables and binaries are installed. On Linux, the default is /opt/cariden/software/mate/current where /opt/cariden is the default installation directory.

Applications

WAE Design enables you to model, simulate, and analyze failures, design changes, and impact of traffic growth, as well as optimize your network for maximum efficiency. For instance, with WAE Design models and tools, you can answer a wide variety of questions about traffic management.

Planning

- Where is traffic going in the network?
- When and where will my network run out of capacity?
- How do I convert my growth forecasts into upgrade plans?

Engineering

- How can I better distribute traffic throughout the network?
- How can I design for differentiated quality of service?
- Where is my network most vulnerable to failure, and how can I mitigate it?
- How will a Layer 1 design affect the resilience of Layer 3?

Operations

- How can I visualize the current health of the network?
- What caused the outage experienced earlier today?
- How would a current failure affect the network at peak time tomorrow?
- Which VPN customers will be affected by a planned outage or by an unplanned failure?

WAE Design Fundamentals

Initially, network topology and routing information is captured by WAE Collector discovery tools and stored in plan files within a series of tables. These plan files are the basis of information displayed in and used by WAE Design. Following is a high-level overview of what they contain.

- Network configurations
- Visual layouts
- IP/MPLS routes, including multicast and LSPs
- Measured traffic
- Estimated end-to-end traffic matrix
- Operational state of network objects
- Results of analyses, such as worst-case failure analysis results

This information is displayed in the GUI through tables and a network plot where you can both visualize and manipulate it further. For example, you can change the visual layouts, simulated traffic, configurations, and operational states.

WAE Design Tools

WAE Design contains numerous tools with user-friendly features, such as easy navigation of object dependencies, bulk editing, and tight interaction between plots and tables. Following is an overview of the categories under which these tools fall.

- **Visualization**—Provides graphical layouts of the network, showing views of different regions and layers, as well as utilizations and routings.

  Related chapters: User Interface, Plan Objects, Plot Legend for Design Layouts

  Related guide: *WAE Network Visualization Guide*

- **Simulation**—Enables you to perform interactive what-if simulations by, for example, failing objects, modifying network topology, creating and changing the traffic demands (which simulate traffic flows), and modifying routing configurations.

  - Demand Deduction—Estimates an end-to-end traffic flow matrix based on available measured traffic, such as interface utilizations and LSP traffic statistics.

  - Failures and Simulation Analysis—Allows evaluation of the effect of failures of network objects, including circuits, nodes, and Layer 1 equipment. You can evaluate overall risk using worst-case analyses over these failures.

  - Forecasting—Enables you to create plans for future expected traffic levels.

  Related chapters: Traffic Demand Modeling, Simulation, Simulation Analysis, Forecasting Traffic, IGP Simulation, MPLS Simulation, RSVP-TE Simulation, Segment Routing Simulation, Quality of Service Simulation, BGP Simulation, Advanced Routing with External Endpoints, VPN Simulation, Multicast Simulation, Layer 1 Simulation

- **Offline Traffic Engineering**—Enables you to optimize the network's reliability and performance.

  - Metric Optimization—Suggests changes to the OSPF or IS-IS metrics that enable you to optimize the network, for example, by reducing congestion under circuit failures.

- LSP Optimization—The Explicit LSP Optimization, Tactical Explicit LSP Optimization, and RSVP-TE Optimization tools optimize the placement of primary and secondary paths for RSVP-TE LSPs. The LSP Loadshare Optimization tool optimizes LSP load balancing percentages between parallel LSPs. The Segment Routing (SR) TE Optimization tool creates or updates segment lists to minimize the sum total of user-specified metrics for selected SR LSPs using the fewest number of segment list hops as possible.

- Changeover—Recommends a step-by-step series of configuration changes to maneuver a network safely from one configuration state to another.

  Related chapters: Metric Optimization, RSVP-TE Optimization, LSP Optimization, LSP Loadshare Optimization, SR-TE Optimization, Changeover

- **Reporting**—Enables you to generate reports that compare IP/MPLS topology and configuration information, demand routings, demand groupings, and LSP routings. You can also generate reports that compare traffic, compare plan files, and estimate network infrastructure costs. Other reports, such as Simulation Analysis and Demand Deduction, are automatically generated.

  Related chapters: Reports, Cost Modeling

Extensible Tools

The plan file format is open and documented. Add-on capabilities are available for extending GUI functionality. Additionally, command-line tool equivalents of the GUI tools are provided for scripting and automation. Refer to the *WAE Design Integration and Development Guide* for information on CLI tools, creating add-ons and reports, details on how plan files, and other reference material.

Related Information

- *WAE Design Tutorials*

- *WAE Network Visualization Guide*

- *WAE Design Integration and Development Guide*

- *WAE Plan Table Schema and CLI Reference*

- Sample plan files—`$CARIDEN_HOME/samples`

- CLI tools—`$CARIDEN_HOME/bin`