



## Overview

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WAE Design is a standalone application that you can run on multiple platforms, or on standard laptops or desktops.



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

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This section contains the following topics:

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- [WAE Design Tools, on page 3](#)

## Use Cases

WAE Design lets you model, simulate, and analyze failures, design changes, and impact of traffic growth, as well as optimize your network for maximum efficiency. For example, 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?

## Plan Files

A *plan file* (Figure 1: Opened Plan File, on page 2) is comprised of a series of tables that store information about a network, including topology, configuration information, traffic, failure state, and visual layout. Additionally, WAE Design uses plan file information to perform simulations.

**Figure 1: Opened Plan File**

**Plan File Opened in Excel**

<Nodes>			
Name	Site	Function	Protected
cr1.ams	AMS	core	F
cr1.fra	FRA	core	F
cr1.lon	LON	core	F
cr1.par	PAR	core	F
er1.ams	AMS	edge	T

← **Table Name**  
← **Column Names**  
← **Values**

**Plan File Opened in the GUI**

Nodes			
Name	Site	Function	Protected
cr1.ams	AMS	core	F
cr1.fra	FRA	core	F
cr1.lon	LON	core	F
cr1.par	PAR	core	F
er1.ams	AMS	edge	T

<Sites>			
Name	LocationCode	Longitude	Latitude
AMS	AMS	4.78	52.32
BRU	BRU - Brussels (Belgium)	4.48	50.90
FRA	FRA	8.57	50.03
LON	LON	-0.45	51.47
PAR	PAR	2.55	49.02

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Initially, network topology and routing information is captured by WAE discovery tools and stored in plan files. These plan files are the basis of information displayed in and used by WAE Design. Plan files 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

Plan files have two formats, both of which are editable by SQL commands:

- The .pln format is compact and can be quickly loaded to and saved in the WAE Design GUI.

- The .txt format contains tab-delimited columns. You can create and edit these directly in a text editor or spreadsheet, such as Excel, and quickly apply bulk edits. In these plan files, each table is labeled with angle brackets, such as <Nodes> and <Sites>.

## Patch Files

A *patch file* is a compact way to represent differences between plan files. These differences or “patches” can be applied to other plan files or deployed to the network. Patch files have a .plp format.

For information on creating and sending patches, see [Patch Files](#).

## 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. Tools fall under these categories:

- Visualization—Provides graphical layouts of the network, showing views of different regions and layers, as well as utilizations and routings.
- Simulation—Lets you 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.
  - 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—Lets you create plans for future expected traffic levels.
- Offline traffic engineering—Lets you optimize the network’s reliability and performance.
  - Optimization—Suggests changes that let you optimize the network, for example, by reducing congestion under circuit failures.
  - Changeover—Recommends a step-by-step series of configuration changes to maneuver a network safely from one configuration state to another.
- Other tools:
  - Reporting—Lets you 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.
  - Importing, exporting, and getting plans—Multiple tools are available for importing traffic and objects, exporting routes, tables, explicit LSP settings, and spectrum utilization, and for getting data from sources such as config files and IGP databases.

## 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. For information, see the *Cisco WAE Design Integration and Development Guide* .