Cisco Modeling Labs 2.0

Overview of CML 2.0

Cisco Modeling Labs 2.0 is a major update of the entire Cisco Modeling Labs (CML) network simulation platform. While the platform still uses KVM as the hypervisor to run the same network OS virtual machine (VM) images, we have completely rewritten the rest of the platform. For example, we replaced the desktop GUI application with a new HTML5 browser-based user interface (UI). The software that orchestrates and runs the simulation is brand new and has a much smaller memory footprint. We greatly simplified the installation and initial simulation creation to improve the user experience. The virtual machines in the network simulations are connected via a custom-designed fabric. These changes provide for a more secure, easier-to-use network simulation platform and enable new core concepts in the product.

Starting with CML 2.0, you can think of each of your network topologies as a *lab*. You create and modify your labs on the CML server. With some limitations, you can modify the topology while the lab simulation is running. For example, you can change the connections between nodes, and you can add new nodes and connect them to the topology without stopping the simulation. Labs are also persistent by default now, unlike in the 1.x versions of the product. That is, when you stop a simulation, the disk images for the VMs in the lab are not discarded. This persistence preserves the state of each node, including crypto keys, license keys, and newly-installed packages.

CML 2.0 is built on top of REST-based web service APIs designed with both security and automation in mind. You can use these APIs to create labs and drive the entire simulation lifecycle programmatically. The new release was designed "API first" to ensure that fine-grained operations are exposed via the APIs in a consistent way. The product uses these APIs in its own user-facing interfaces:

- the HTML5 UI

- companion utilities, such as the Breakout Tool

- the Python client library

CML enables you to create and run virtual networks. You can use these labs for personal study for certification, for teaching networking classes, and for testing out new protocols or configuration changes. With the changes in the 2.0 release, CML also becomes part of a larger NetDevOps ecosystem, enabling you to test and validate network changes in an automated workflow. CML 2.0 is a complete rewrite of the product and introduces

fundamental changes. If you use CML 1.x or Cisco VIRL Personal Edition 1.x, then we recommend that you read the entire CML 2.0 release notes before you get started.

Summary of CML 2.0 Changes

Feature	Description	Details
New User Interface	The new HTML5 web application provides an intuitive and feature-rich user interface.	See *Using and Configuring Cisco Modeling Labs 2.0* for instructions on using the HTML5 UI.
New Simulation Engine	This component orchestrates and controls the network simulations. The new simulation engine enables new functionality, such as more intelligent simulation launch sequencing and the ability to modify a running lab.	See *Administering Cisco Modeling Labs 2.0* for more details on the new engine.
Improved Local Resource Management	An idle CML server now consumes less memory, providing approximately 4 GB more RAM for simulations to use.	See *Administering Cisco Modeling Labs 2.0* for more details.
Console Multiplexing	Connections to the consoles of simulated nodes pass through a multiplexer, permitting multiple simultaneous connections to the same console. The first interface of each node is no longer reserved for management access.	See *Administering Cisco Modeling Labs 2.0* for more details.
External Connector	Leveraging a single virtual interface, external connectivity is now managed via a single node type, configurable to use either NAT or Bridge mode.	See *Using and Configuring Cisco Modeling Labs 2.0* for instructions on configuring the external connector.
Breakout Tool	You can run the Breakout Tool on your local machine to expose the consoles of your lab's nodes as local ports. The Breakout Tool lets you use your favorite terminal emulator application to connect to the nodes over an authenticated, encrypted connection.	See *Using and Configuring Cisco Modeling Labs 2.0* for information on installing and setting up the Breakout Tool.
SCP-enabled	SCP is now enabled out-of-the-box, enabling a simplified custom image upload process. After you upload an image via `scp`, it will appear on the **Node and Image definitions** page of the UI.	See *Using and Configuring Cisco Modeling Labs 2.0* for instructions on installing custom images.
APIs and Programmability	CML 2.0 is ready for integration into your NetDevOps automated tests with a redesigned set of REST-based web service APIs. This release also includes a Python client library that simplifies automating CML.	The API documentation is included with the product itself. For more information about the client library, visit the client library's PyPi page.

Feature	Description	Details
Dedicated System Administration	This release introduces the System Administration Cockpit, a dedicated web console for administering the CML server itself.	See *Administering Cisco Modeling Labs 2.0* for more information on performing specific changes using the System Administration Cockpit.
Smart Licensing	CML-Enterprise edition no longer uses PAK licenses. CML-Personal edition no longer uses the Cisco Salt servers for licensing. If you have an active license for 1.x, you may convert it to a smart license for the 2.0 release.	See *Administering Cisco Modeling Labs 2.0* for instructions on applying your license.