



Cisco Modeling Labs Release Notes

Cisco Modeling Labs

Version 1.2

Last Updated: July 8, 2016

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

All printed copies and duplicate soft copies are considered uncontrolled copies and the original on-line version should be referred to for latest version.

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco website at www.cisco.com/go/offices.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: www.cisco.com/go/trademarks. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)

© 2016 Cisco Systems, Inc. All rights reserved.



Contents

Platform Reference Model VMs	3
Images Supported	3
Virtual Machines Memory Requirement	3
New Features in 1.2	4
OpenStack Kilo.....	4
XRv 9000 Image support	4
CML Port Numbers	4
Static TCP Port Allocation Control.....	5
Packet Generator Ostinato Container	5
iPerf Image Container	6
Cisco Modeling Labs Client - Java Runtime Environment 'bundled'.....	7
Link Latency, Jitter and Packet-loss Controls	7
Cisco Modeling Labs Client Active Canvas.....	8
Packet Capture.....	11
VRF-Lite on Mgmt Networks.....	12
Live Visualization View	13
Infrastructure-only Configuration Generation	19
Simulation 'name' Support	20
CML Client - Import/Export to Directory	21
GNS3 Import / Export	22
Python Client Libraries.....	22
Changes	24
Platforms.....	24
CML Client File Menu.....	24
CML Client Edit Menu	25
CML Client Simulation Menu	25
Server Side - UWM	26
STD and UWM API documentation	28
Caveats	30
CML 1.1 Resolved Issues	35



Platform Reference Model VMs

Images Supported

Image	Bundled (Yes / No)
NEW IOSv - 15.6(2)T image	Yes
IOSvL2 - 15.2.4055 DSGS image	Yes
NEW IOSXRv - 6.0.1 CCO demo image	Yes
NEW IOSXRv 9000 - 6.0.1 demo image	No. Available on CML FileExchange
NEW CSR1000v - 3.17 XE-based demo image	No. Included in eDelivery and available on CML FileExchange
Ubuntu 14.04.2 Cloud-init	Yes
Unmanaged Switch	Yes
NEW ASAv 9.5.1	Yes

Virtual Machines Memory Requirement

Image	Memory Requirement (MB)
IOSv - 15.6(2)T image	512
IOSvL2 - 15.2.4055 DSGS image	768
IOSXRv - 6.0.1 CCO demo image	3072
IOS-XRv 9000 - 6.0.1 demo image	16384
CSR1000v - 3.17 XE-based demo image	3072
Ubuntu 14.04.2 Cloud-init	2048
ASAv 9.5.1	2048



New Features in 1.2

OpenStack Kilo

- CML contains a new OpenStack infrastructure, OpenStack Kilo.

XRv 9000 Image support

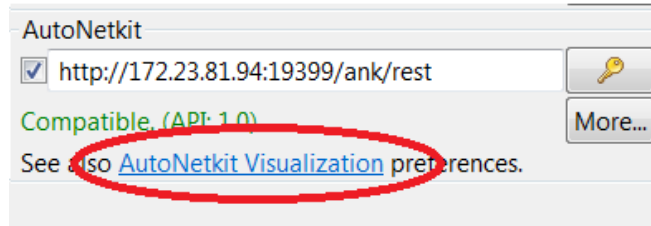
- CML 1.2 has support for the new XRv 9000 platform. The image is only available via the CML FileExchange. Because XRv9000 does not support SWIFT licensing and only supports SMART licensing, only the demo image is supported.

CML Port Numbers

- The following is the list of CML port numbers in use:

VIRL Apache server port	<input type="text" value="80"/>
First VM Serial Console TCP port	<input type="text" value="17000"/>
Last VM Serial Console TCP port	<input type="text" value="18000"/>
VIRL Web Services port	<input type="text" value="19399"/>
UWM port	<input type="text" value="19400"/>
AutoNetkit webservice port	<input type="text" value="19401"/>
Live Visualization webservice port	<input type="text" value="19402"/>
UWM web-ssh port	<input type="text" value="19403"/>
Nova websocket serial port	<input type="text" value="19406"/>
Nova websocket vnc port	<input type="text" value="19407"/>

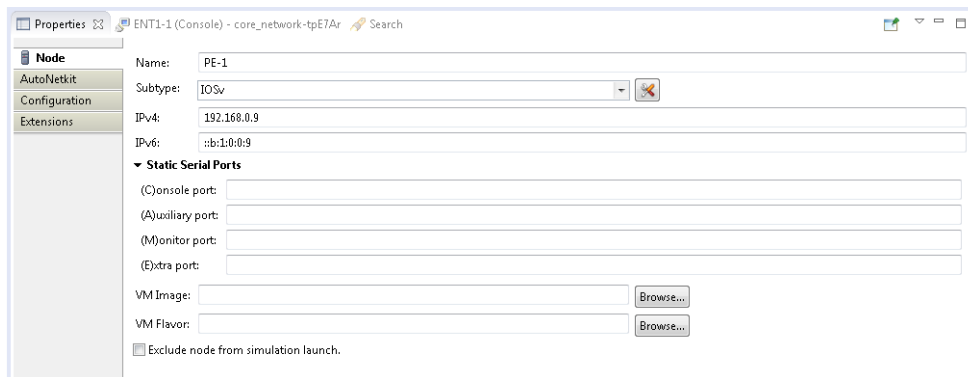
- The AutoNetKit Web and Live Visualization ports can be set via the CML client under “File>Preferences>Web Services>AutoNetkit Visualization”.



- They can also be set through the newly re-vamped UWM interface under CML Server->System ->Services.

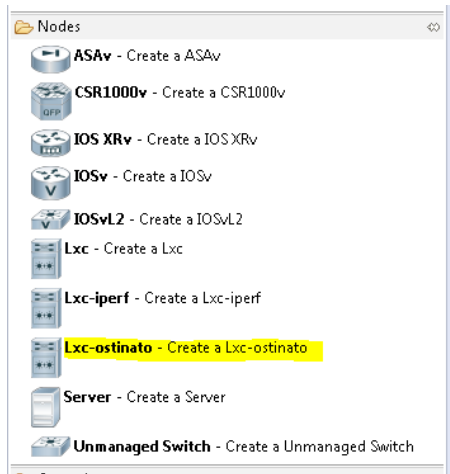
Static TCP Port Allocation Control

- Users are able to specify the TCP port number that they wish to use when connecting to the console, auxiliary or monitor ports of a particular node running in their simulation. The port numbers are optional and can be set via the CML client. The port number allocation is retained in the settings.ini file and will be applied each time the simulation is started. Functionality is provided so that TCP port numbers in use are easily adjusted.
- To set these port numbers in design mode, highlight a node and choose the Node configuration tab.



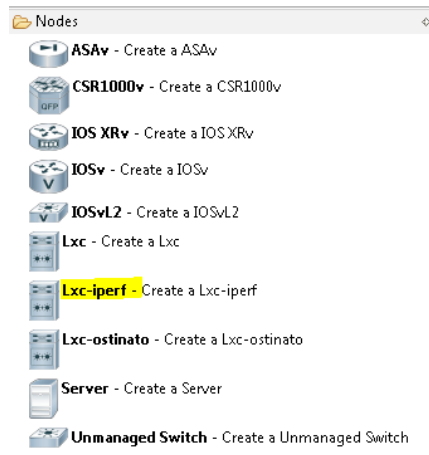
Packet Generator Ostinato Container

- A new LXC image is now available containing the Ostinato packet traffic generator application. This application provides data-plane traffic generation capabilities. The Ostinato 'drone' (generator) is used in combination with the Ostinato GUI. The GUI can be obtained from Downloads - Ostinato. When deployed, the LXC-ostinato node can be accessed using the 'ssh' connection method. Telnet will NOT work. The Ostinato 'drone' application will execute automatically when the LXC becomes active.



iPerf Image Container

- iPerf LXC container provides a stripped down lightweight Linux container which has been loaded with the iPerf application (<https://iperf.fr/>). The Lxc iPerf does not have Cloud-init support so it cannot be automatically configured with all of the necessary route entries at this point time.
- iPerf is a tool for active measurements of the maximum achievable bandwidth on IP networks. It supports tuning of various parameters related to timing, buffers and protocols (TCP, UDP, SCTP with IPv4 and IPv6). For each test it reports the bandwidth, loss, and other parameters.

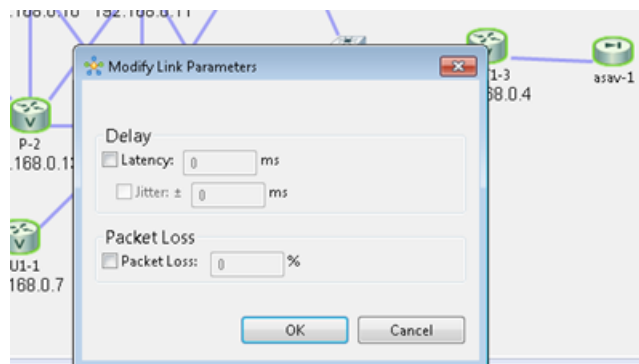
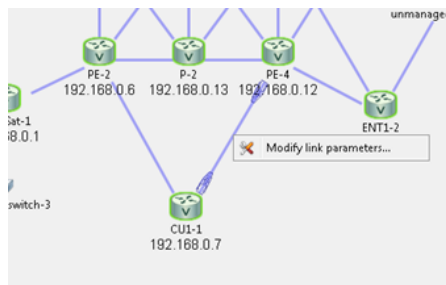


Cisco Modeling Labs Client – Java Runtime Environment 'bundled'

- The CML client no longer requires the user to have a Java Runtime Environment installed. It is now included within the CML client binary.

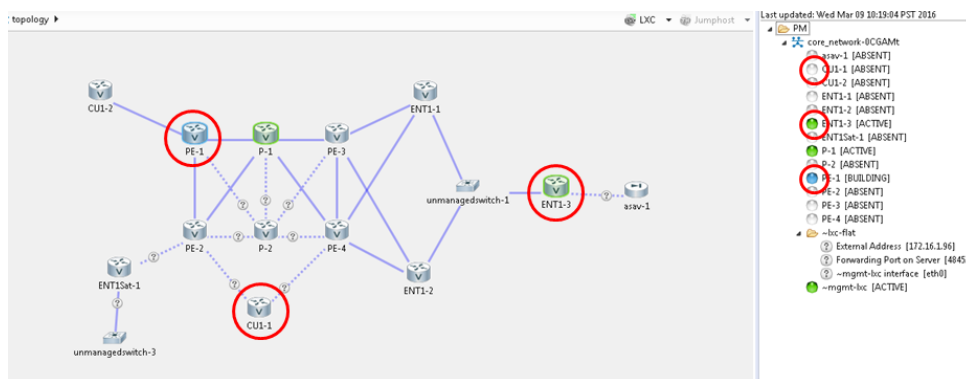
Link Latency, Jitter and Packet-loss Controls

- When a simulation is running, users are able to select links between nodes in a simulation and set latency, jitter and packet-loss values on that link. Simply right mouse click a link and click “Modify link parameters.” This launches another window that enables users to model real world physical link parameters such as Latency, Packet loss and Jitter. The link parameters can be applied on any link except for those connected to a FLAT or SNAT external connector. The values set by the user are applied bi-directionally, meaning that setting a latency value of 100msec will result in 100msec from node A to node B and 100msec from node B to node A for the return path (200msec total). The same is true for packet-loss. Ten packets sent from node A on a link with 10% packet-loss will result in 9 packets being received on node B. The packet loss will also be applied on the return path meaning that another packet may be lost between node B and node A.



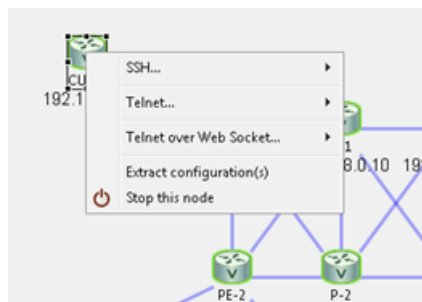
Cisco Modeling Labs Client Active Canvas

- CML client now provides an 'active canvas'. This feature brings interaction to the Simulation mode topology tab and allows users to, perform set, display and different functions. Some of these functions were strictly available from the UWM in previous versions of CML such as disabling an interface or Packet capturing, others are new functions such as setting link parameters, and others are functions that were only available from the Simulation perspective tree such as “telnet” to a node or “Extract Config.”
- When a simulation is started the user switches to the 'simulation perspective', a new window will be displayed showing the network diagram. If you have multiple Simulations running, you simply double click on the simulation name in the Simulation perspective and it will bring the topology diagram forward. As the virtual machines and LXCs boot, the diagram is updated to reflect the state of the simulation. Links will change from dotted links (with question marks) to solid lines.
- Nodes will also change color reflecting their operational state:
 - Grey: Node is yet to be started or stopped (Absent) – CU1-1
 - Blue: Node is in process of being built (Building) – PE-1
 - Green: Node is ready (Active) – ENT1-3



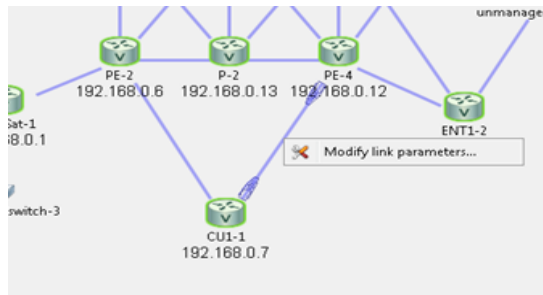
- Similarly for links, dotted lines are links that are being built and not ready, and solid blue ones are already build and ready for use.

- Node Active Functions:
 - Once a node is in the 'active' state, users can right-click the node to perform operations such as opening an SSH or Telnet connection, extract the configuration of the specific node and stop/start the node.

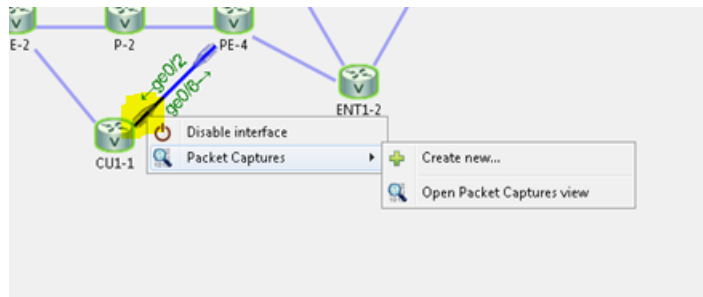


■ Link Active Functions:

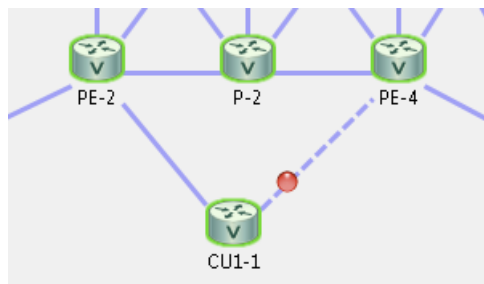
- User can right mouse click an active link and set/modify the following link parameters: Latency, Jitter, and Packet loss to simulate a real world physical link.



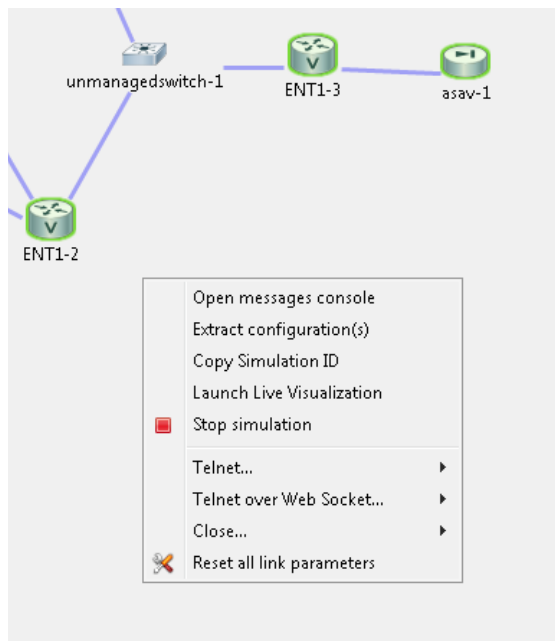
- Additionally, if you right mouse click at the end of link (arrow like end), which is the device interface; user can enable or disable the interface (interface up or down) and capture packets. This functionality was previously only available through the UWM interface.



- When an interface is disabled, the Link on that interface now shows as a “dotted” line rather than a solid line. Furthermore, a “Red” dot on the interface indicates that it is down.



- Simulation/Background Active Functions:
 - A right-mouse click on the background, without any node being selected, enables the user to perform simulation-wide operations such as configuration extraction, launch the live visualization view, and stop the simulation as well as resetting all link parameters (latency, jitter and packet-loss) that may be in operation. If the simulation view is closed, it can be re-opened by selecting the simulation from the simulations panel, right-clicking and selecting the 'View simulation' option or by double clicking on the Simulation name.



Packet Capture

- When a simulation is running on your CML server, you can now select an interface and capture packets sent and received by that interface. You can do this from the CML client active canvas (as mentioned previously) or from the UWM interface. In order to start a packet capture, using a web-browser, connect to 'http://<ip address of your CML server>' and log in to the User Workspace Management interface using the user credentials under which you started your simulation.
- In the Overview page, under the Simulations, select the active 'session' that you want, in the example below it is "CML12"

Simulations Request to stop all

Simulations of project *PM* Request to stop selected

Simulation	User	Project	Status	Started	Expires	Options
<input type="checkbox"/> CML12	PM	PM	● ACTIVE	2016-03-09 00:40:12	never	

- The page displayed lists the available interfaces. Select 'Create Traffic Capture' from the Options heading as shown:

Interfaces Filter:

Show entries

Node	Interface name	Interface up	Network subtype	Network name	IP Addresses	Options
asav-1	Management0/0	✓ True	PROJECT MGMT	PM	10.255.0.47 / 16	
asav-1	GigabitEthernet0/0	✓ True	SIMPLE	asav-1-to-iosv2-1	unassigned	Create Traffic Capture
asav-2	Management0/0	✓ True	PROJECT MGMT	PM	10.255.0.48 / 16	

- You are presented with the Create Capture page where you can set the parameters that you require for the packet capture. There are two types of Capture modes:
 - Offline Capture to file: In this option the captured traffic .pcap file is downloaded and can be viewed with applications such as Wireshark.
 - Live capture on TCP port: In this option live packet capture to a certain port where an attach packet analyzer like Wireshark can view the data as it's flowing through the interface/being captured.
- This page also allows you to specify/define other parameters such as the size of the packet captured based on time, packet count or the overall size.

Create Capture

Simulations / CML12 (of user PM) / Create traffic capture

Overview

User: PM

Simulation: CML12

Node: asav-1

Interface: Management0/0

General Settings

Capture mode: Offline capture to file
 Live capture on TCP port

Live port: automatic

Filter packets on the interface, e.g. "icmp or arp", "host 1.2.3.4", "tcp port 123". See [syntax reference](#).

PCAP filter: unfiltered

Capture Limits

Packets (count): max

Size (MB): max

Time (seconds): max

- Once an offline capture has been completed, you can download the resulting PCAP file from the 'Traffic Captures' table, under the 'Options' heading: "Fetch Captured Data" which will allow you to save or open the capture file

Traffic captures

Show 10 entries

Mode	Running	Node	Interface name	PCAP filter	Created	Options
Offline	True	asav-1	Management0/0	unfiltered	2016-03-09 01:01:07	

Showing 1 to 1 of 1 entries

Previous 1 Next

VRF-Lite on Mgmt Networks

- When using the 'Build initial configurations' (AutoNetkit) function, the out-of-band management interface is now placed into a "Mgmt-intf" VRF by default. By placing the interface into a VRF, it ensures that there is no route-leaking by the routing protocols and CDP will not report the OOB interface. The following configuration snippet shows an example of the OOB interface configuration from an IOSv node:

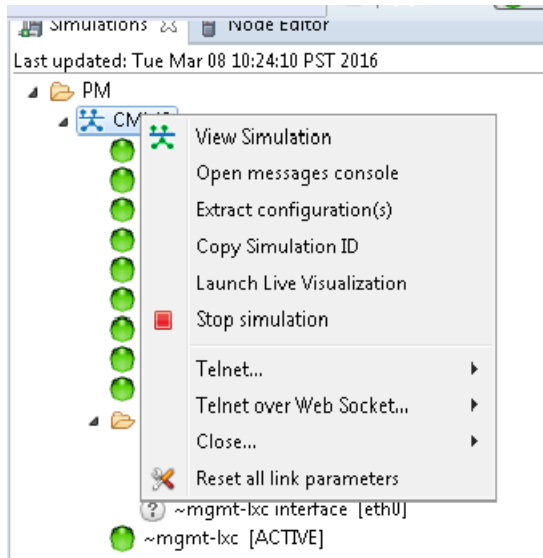
```

CU1-1(Console) - core_network-tpE7Ar
CU1-1#sho config
Using 10335 out of 262144 bytes
!
! Last configuration change at 18:35:40 UTC Fri Mar 11 2016
!
version 15.6
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname CU1-1
!
boot-start-marker
boot-end-marker
!
!
vrf definition Mgmt-intf
!
 address-family ipv4
  exit-address-family
!
 address-family ipv6
  exit-address-family
!

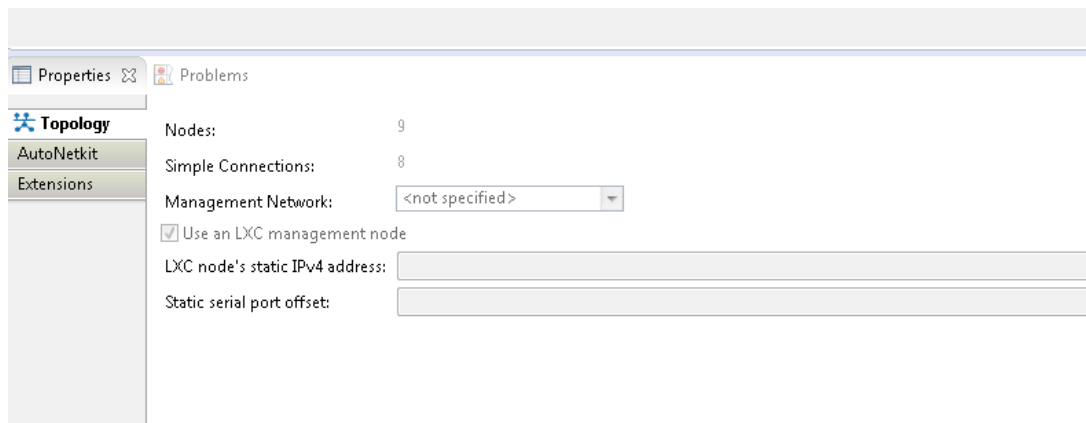
```

Live Visualization View

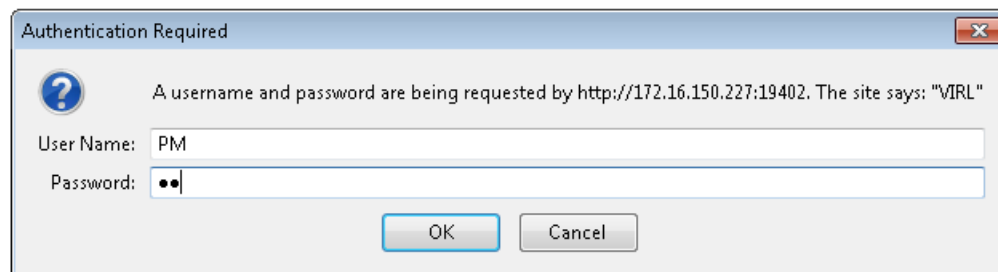
- CML now has a new Live Visualization feature that draws visual protocol maps of the running simulation. In past releases, visualization was limited to the topologies built with ANK and user could visualize the running Simulation protocols. With CML 1.2 you can now run Live Visualization on any topology file (ANK created or not). Furthermore, Live Visualization will update the map if changes are made to the running simulation.
- When a simulation is running, a new Launch Live Visualization option is available from the simulation menu.



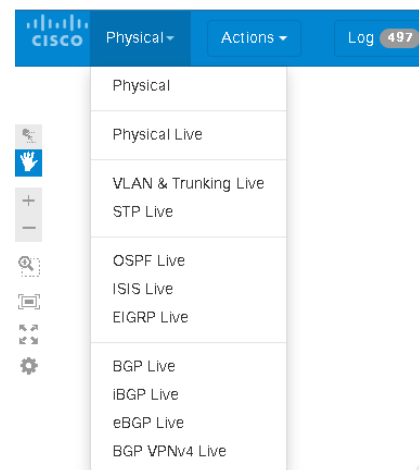
- The Live Visualization view is only operational when the Linux container (LXC) is active.

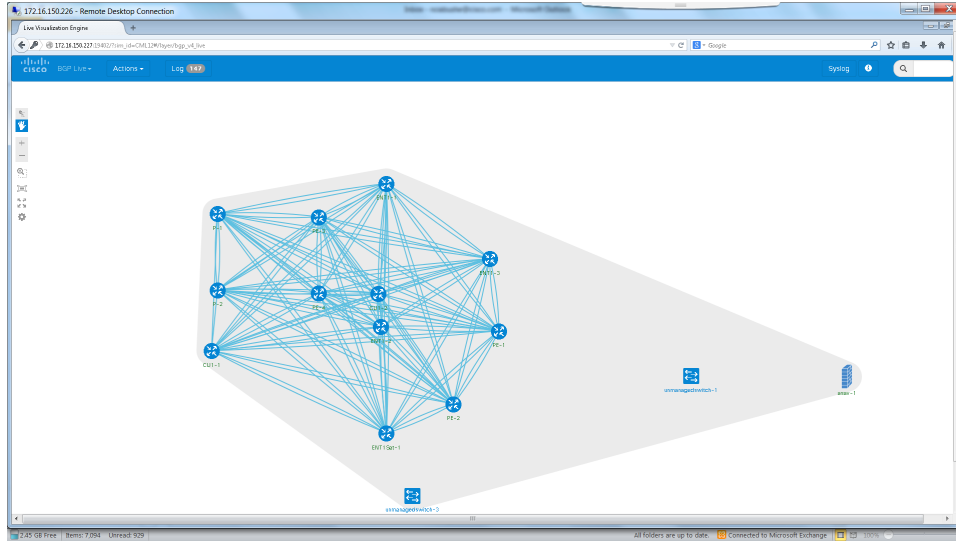


- When Launch Live Visualization is selected, an Authentication dialog is displayed asking you to enter your user name and password, these are the credentials used to login to the UWM.

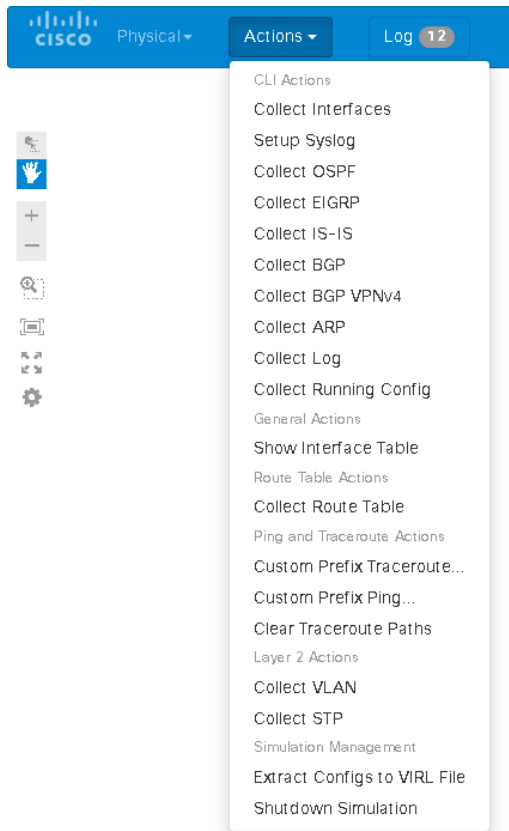


- Please note that both the user name and password are case sensitive.
- For Live Visualization, there are four drop down menus: Physical, Actions, Log and SysLog (on the far right)
- The drop menu under Physical has many protocol options. When you select one of these options, CML will collect the live data from the topology devices and draw the protocol map. The following example shows a BGP map:





- Users are able to select action from the Actions tool which results in commands being executed on each active virtual machine. For example, if you select “BGP Live” from the first drop-down menu (under Physical), it will draw the BGP Protocol map as shown in the figure above. If a user changes a link status or any parameters on any device, you can now go to the Actions drop-down list and select “Collect BGP” to refresh that map.



- The Actions menu also has other action functions such as “Shutdown Simulation,” “Show Interface Table,” “Clear Traceroute Paths” and more.)
- The Log menu shows the Logs that have been collected from all of the Collect Operations run under the Actions drop-down. Please note that Log menu will also show the result of the PING operation performed from the Live Visualization (when clicking on a node and choosing the “Ping From” and “To” options.)

The screenshot shows the Cisco BGP Live interface with the 'Log' menu selected. The log contains several entries:

- Node P-2 is REACHABLE
- Node PE-1 is ACTIVE
- Node PE-4 is ACTIVE
- CU1-2 Tue Mar 08 2016 17:58:11 show ip ospf neighbor

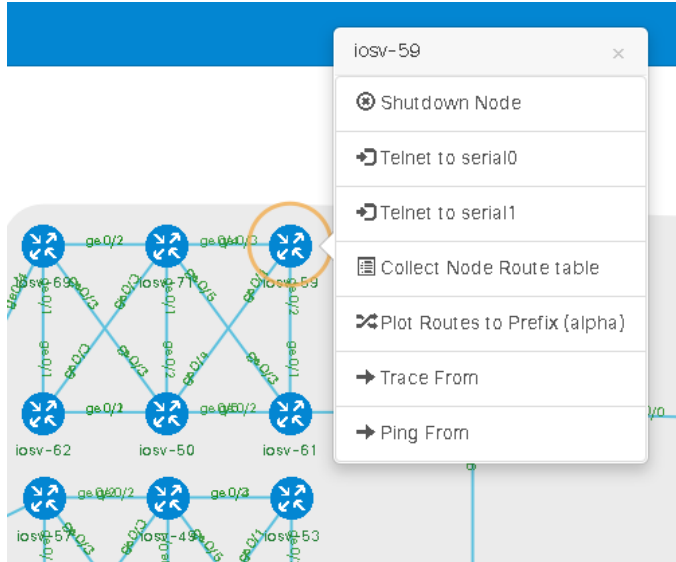
Neighbor ID	Pri	State	Dead Time	Address	Interface
192.168.0.9	1	FULL/BDR	00:00:35	10.0.0.33	GigabitEthernet0/1
- CU1-2 Tue Mar 08 2016 17:58:11 show ip ospf int brief

Interface	PID	Area	IP Address/Mask	Cost	State	Nbrs	F/C
Lo0	1	10	192.168.0.8/32	1	LOOP	0/0	
Gi0/1	1	10	10.0.0.34/30	1	DR	1/1	
- ENT1-3 Tue Mar 08 2016 17:58:13 show ip ospf neighbor

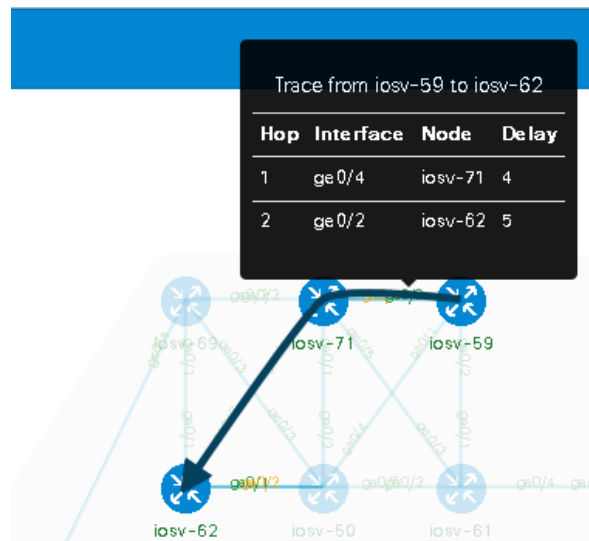
Neighbor ID	Pri	State	Dead Time	Address	Interface
192.168.0.3	1	FULL/DROTHER	00:00:34	10.0.128.2	GigabitEthernet0/1
192.168.0.15	1	FULL/DR	00:00:37	10.0.128.1	GigabitEthernet0/1
- ENT1-3 Tue Mar 08 2016 17:58:13 show ip ospf int brief

Interface	PID	Area	IP Address/Mask	Cost	State	Nbrs	F/C
Lo0	1	20	192.168.0.4/32	1	LOOP	0/0	
Gi0/2	1	20	10.0.0.38/30	1	DR	0/0	
Gi0/1	1	20	10.0.128.3/29	1	BDR	2/2	
- ENT1-2 Tue Mar 08 2016 17:58:16 show ip ospf neighbor

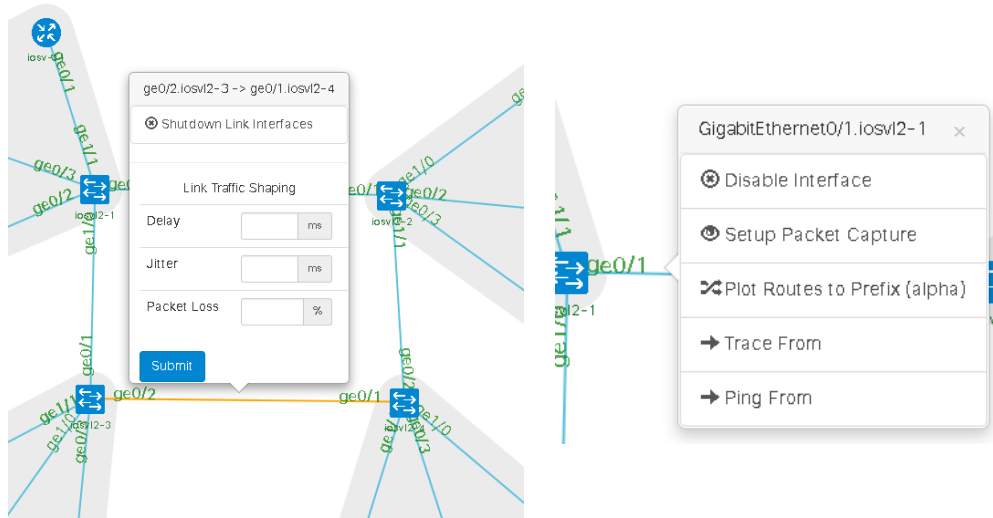
- The Live Visualization view/map is also an interactive map where you can perform operations on Nodes simply by clicking on the node itself. When a node is clicked on, the following menu is displayed allowing a user to Shutdown / Enable node, start a Traceroute to and from the node, collect node route tables (which will be displayed in the Log), start a ping to and from the node and launch a telnet session.



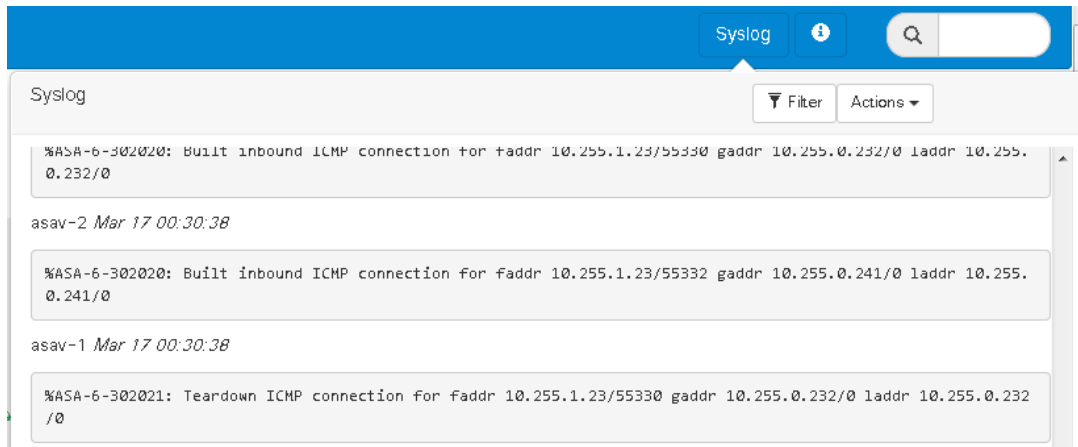
- If you hover the mouse over the Route rendered, it will display the route information:



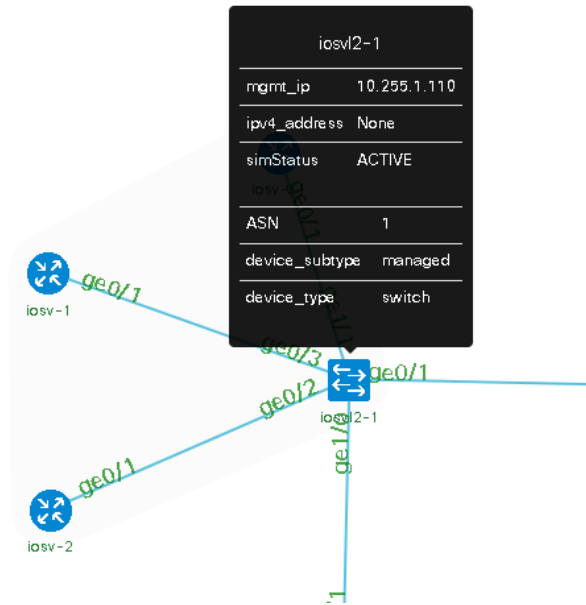
- Similarly if you click on the link or interface a menu will appear giving you options to perform functions as seen in the following two figures:



- Syslog:
 - The Live Visualization has the ability to configure all Cisco nodes to send syslog messages to a syslog process. Syslog messages generated by the configured nodes can be displayed by pressing the Syslog button (top right-hand corner).

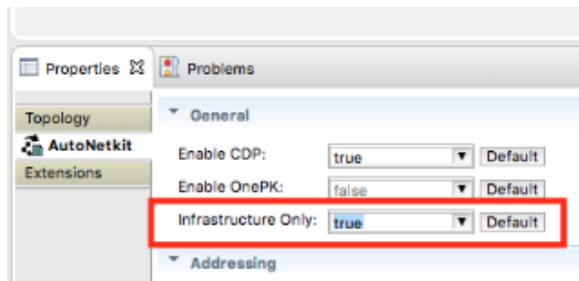


- If you hover the mouse over the node it will display some node information such as IP address, ASN #, and device type and so on.



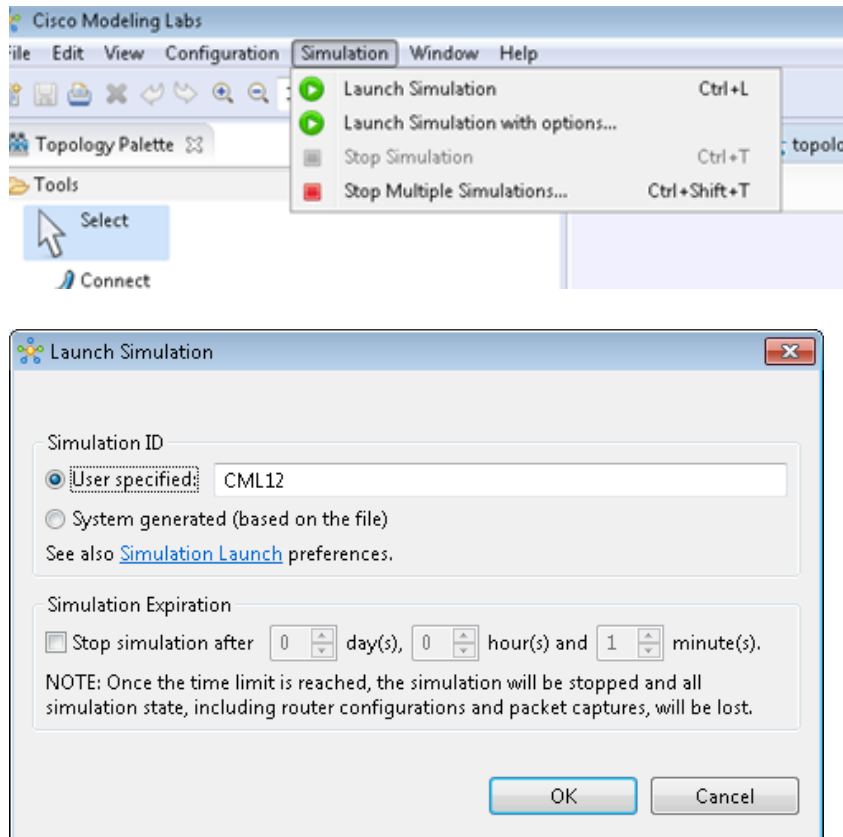
Infrastructure-only Configuration Generation

- AutoNetkit now offers the ability to generate a stripped-back configuration that provides the basic infrastructure configuration required to support configuration extraction and Live Visualization. With this function enabled, no IP addressing or routing protocol configuration will be created, leaving the node in a state where it is ready for manual configuration. This is ideal when using a simulation for study practice or when wanting to go through the process of building up an environment by hand.
- The feature is enabled by selecting the 'infrastructure only' option at the topology level under the 'AutoNetkit' tab in CML client:

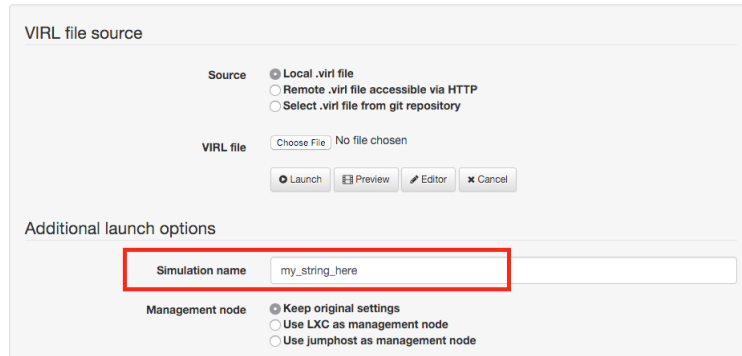


Simulation 'name' Support

- When a simulation is started in CML, a unique simulation ID is created. If using VIRL simulation in conjunction with CLI or REST API calls, it is helpful to have a predictable name or 'label' that you can define and assign to the simulation. This means that the simulation name can remain the same, making scripting and programming easier. The simulation name can be set via CML client from the tool bar menu by going to Simulations and choosing Simulation with Options. Alternatively by clicking on the Simulation Icon in the toolbar using the 'Simulation launch with options' function:

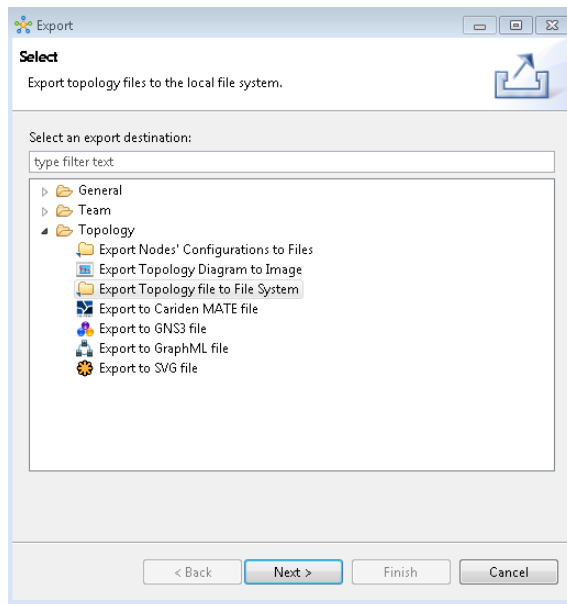


- It can also be set via the UWM interface when starting a simulation. From the UWM main page, select 'my simulations' and press the button to 'Launch new simulation' and setting the 'simulation name' field:



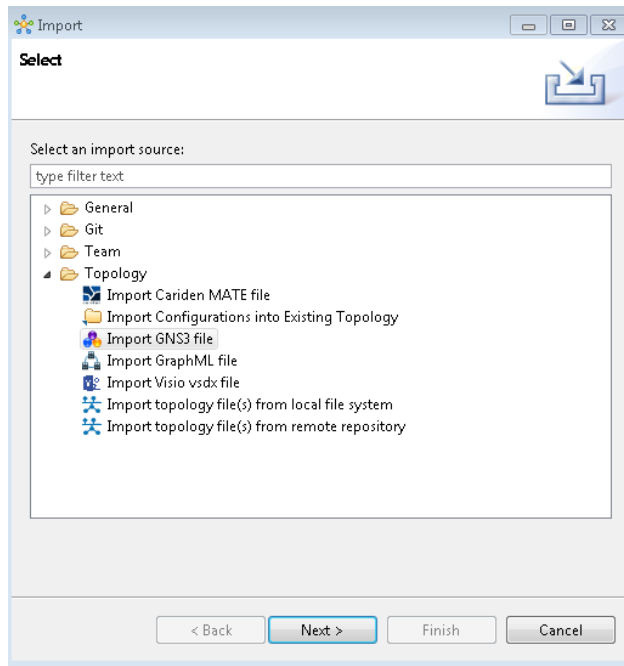
CML Client – Import/Export to Directory

- A new import/export function is available from the 'File Import' and 'File Export' menu. This functionality enables you to take the per-node configurations from within your .VIRT file and export them out to a directory location of your choice as individual text files (.cfg suffix). With the configuration files in the directory, you can then make changes as you wish and then, using the 'import' function, bring the content of the individual configuration files back into the .VIRT file.
- The filename of each of the configuration files matches to the node name in your simulation. If you have altered the filename, the import system will highlight that the expected file is missing. Similarly, if there are files that do not have an equivalent node present in the topology, the system will flag that.
- Note: when performing an 'import' operation, the file to which you wish to import the configuration MUST be open in the CML client. Note - if you wish to overwrite the node configuration, simply remove the content of the file but do not delete the file.



GNS3 Import / Export

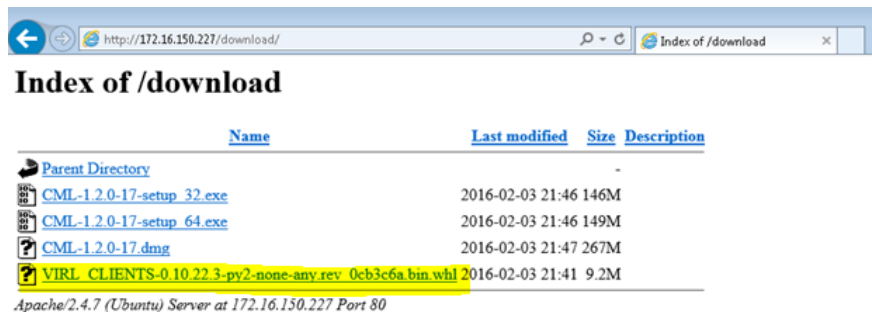
- This provides the ability to import and export GNS3 JSON-based topology files (.gns3).
- The import function will read the incoming .gns3 file and attempt to map the node types to the appropriate types within CML. For example, a GNS3 router node with fast-ethernet interfaces will be mapped to a Cisco IOSv instance with gigabitethernet interfaces. Note - if the GNS3 node has 'slots' configured with 'NM-16ESW', the import routine will consider the device to be a managed switch and will therefore map to the IOSvL2 node type. The user will need to review the imported topology to ensure that the node types are correctly mapped.
- Important: The import function is designed to import the topology and will NOT attempt to interpret the accompanying node .cfg files. The content will be read in verbatim and placed in the .VIRL file. It is up to the user to edit the configuration according to their need or you can use the 'Build Initial Configurations' (AutoNetkit) function to create new per-node configurations based on the imported topology.



Python Client Libraries

- Python client libraries for STD and UWM services are now available. These are available as .whl files that can be downloaded from <http://<your VIRL server IP address>/download/> with installation information at <http://<your VIRL server IP address>/doc/clients.html>. The package can be installed using the command 'sudo pip install <filename>.whl'. This provides the VIRL STD, UWM and Openstack CLIs and client modules which can be 'imported' into your Python projects.

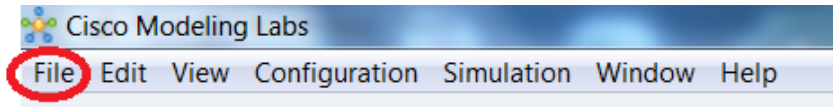
- The 'pydoc' function is available for these modules and can be accessed by issuing the commands 'pydoc virl_client.std', 'pydoc virl_client.uwm' and 'pydoc virl_client.openstack'. Help can be obtained by issuing the commands 'virld_client --help', 'virld_uwm_client --help' and 'virld_openstack_client --help'.
- The .whl file does not need to be installed on the CML server as it is already installed. The modules should be installed on your local Linux workstation. This .whl is specifically for Linux only.



Changes

Platforms

- ASAv 9.5.1
 - CML now has the ASAv demo image bundled and does NOT need to be downloaded.
- CSR1000v 3.17

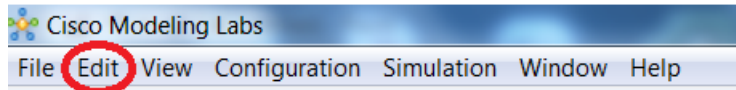


- Because of size consideration the CSR1000v demo is no longer bundled with CML. It will be included in the eDelivery email and on the CML FileExchange

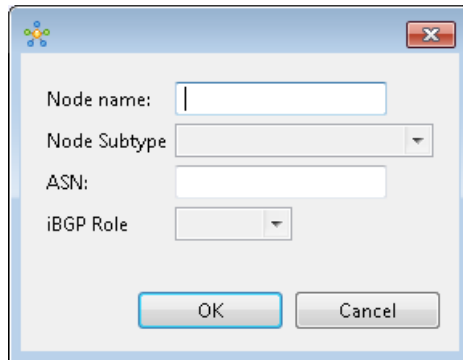
CML Client File Menu

- Preferences
 - Preferences under the File menu have a few changes as follows:
 - Install Update: Deleted
 - Simulation Launch & Packet Capture - added
 - Under General
 - Globalization was added
 - Start and Shutdown were deleted
- Import/Export
 - Now has an option to import a GNS3 JSON-based topology files (.gns3). (See previous section)

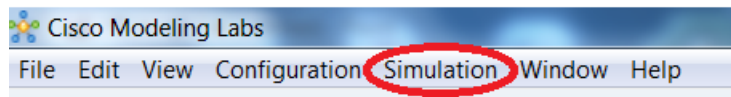
CML Client Edit Menu



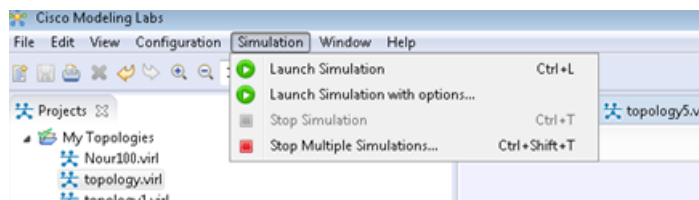
- Select Nodes: This option was added to enable users to search for a certain type of Node or nodes with specific functionality or parameters. This is useful when you are trying to identify a node or nodes in a large topology. This function only works in the Design perspective.



CML Client Simulation Menu



- There are now 2 additional options under simulations:
 1. Launch Simulation with Options: Allows user to set a name for the new simulation rather than taking the system-generated name
 2. Stop Multiple Simulations: Allows user to stop more than one simulation at a time.



Server Side - UWM

- User Workspace Management Interface Revamp:** The UWM interface has undergone a complete overhaul. All of the previous functionality has been retained with some reordering of the menus. One of the things to note is that the Overview page of UWM provides all the components' versions. Also many functions that were previously only available via CML Client are now available through the UWM interface.

The screenshot shows the UWM Overview page. On the left is a navigation sidebar with options like Overview, My simulations, Project simulations, Projects, Users, CML Server, Connectivity, VM Control, Licenses, Node resources, Repositories, and Documentation. The main content area is titled 'Overview' and contains several sections:

- Component Versions:** A table showing versions for VRL-CORE (0.10.21.15), AutoNetKit (0.21.4), AutoNetKit-Cisco (0.21.6), Topology Visualization Engine (0.15.4), and Live Network Collection Engine (0.8.10).
- System status:** A section for 'cml' showing resource usage: CPU (4.36%), RAM (6.24%), and Disk usage (15.12%).
- Resource usage of simulations:** A section with a 'Resource usage by project' link and three horizontal bar charts:
 - Instances / recommended capacity: 100.33% (13 / 12)
 - VCPUs / recommended capacity: 100.33% (13 / 12)
 - VRAM (MB) / recommended capacity: 1.62% (8192 / 505454)
- Simulations:** A table listing simulations for project 'PM'. One simulation 'core_network-OCGAMT' is shown as ACTIVE, started on 2016-03-10 01:29:34, and expires never.

At the bottom, it shows 'UWM 0.10.21.15', '© 2016 Cisco Systems, Inc.', and 'Generated at: 2016-03-10 16:44:40'.

- My Simulations:** Under My Simulations, user can double click on any active simulations and perform many functions that were before only available through the CML client. These functions include: Start/Stop nodes, Extract configurations, Start/Stop Simulations, Create snapshots and connect to devices.

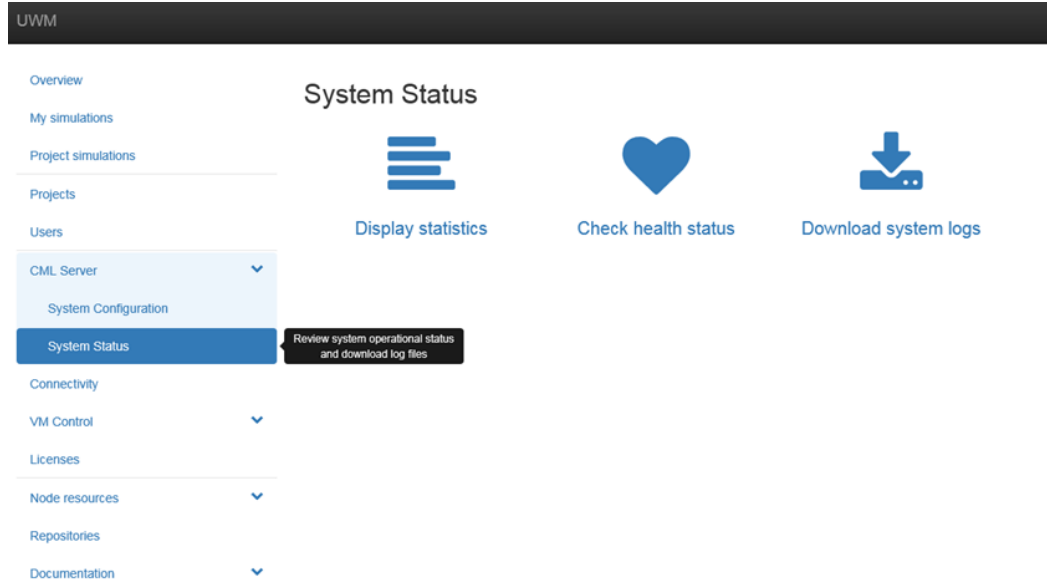
The screenshot shows the UWM Nodes page. The left sidebar is the same as in the Overview page. The main content area is titled 'Nodes' and includes a 'Refresh' button, 'Live Visualization' toggle, 'Stop simulation' button, 'Set expiration' button, and 'Download original net file' button. Below this is a table with columns for User, Project, Status, Started, and Expires. The table shows one active simulation for project 'PM'.

Below the simulation table is a 'Nodes' section with a 'Show 10 entries' dropdown and a 'Filter' input. It contains a table with columns for Node, Subtype, State, Management IPs, External Connections, and Options. All nodes are in an 'ACTIVE' state.

Node	Subtype	State	Management IPs	External Connections	Options
CU1-1	IOSv	ACTIVE	172.16.1.108	inetnet://172.16.150.227-17032 inetnet://172.16.150.227-17033	Start Stop Connect
CU1-2	IOSv	ACTIVE	172.16.1.97	inetnet://172.16.150.227-17000 inetnet://172.16.150.227-17001	Start Stop Connect
ENT1-1	IOSv	ACTIVE	172.16.1.98	inetnet://172.16.150.227-17002 inetnet://172.16.150.227-17003	Start Stop Connect
ENT1-2	IOSv	ACTIVE	172.16.1.101	inetnet://172.16.150.227-17029 inetnet://172.16.150.227-17030	Start Stop Connect
ENT1-3	IOSv	ACTIVE	172.16.1.94	inetnet://172.16.150.227-17027 inetnet://172.16.150.227-17028	Start Stop Connect
ENT1Sat-1	IOSv	ACTIVE	172.16.1.105	inetnet://172.16.150.227-17014 inetnet://172.16.150.227-17015	Start Stop Connect
P-1	IOSv	ACTIVE	172.16.1.99	inetnet://172.16.150.227-17004 inetnet://172.16.150.227-17005	Start Stop Connect
P-2	IOSv	ACTIVE	172.16.1.107	inetnet://172.16.150.227-17017 inetnet://172.16.150.227-17031	Start Stop Connect
PE-1	IOSv	ACTIVE	172.16.1.104	inetnet://172.16.150.227-17012 inetnet://172.16.150.227-17013	Start Stop Connect
PE-2	IOSv	ACTIVE	172.16.1.102	inetnet://172.16.150.227-17008 inetnet://172.16.150.227-17009	Start Stop Connect

At the bottom, it says 'SSH native handler configuration for Windows' and 'Showing 1 to 10 of 14 entries'.

- CML Server Health Status and Settings: New UWM has a Tab called CML Server with two sub-menus: System Configuration and System Status.
- System Status: Allows users to review the CML server system operation status, display statics and download the logs.



- System Configuration: You can set the initial CML server configuration here. In previous releases of CML this was done through editing the settings.ini file when logged into an x-term on the CML server. This gives the administrator the convenience to set up the server from the web interface and apply the settings. If any of the applied settings require a server reboot, the administrator will be prompted to reboot.
- System: Set up the system hostname and IP addressing
- Networks: Set up the Flat, Flat1 and SNAT IP addressing assignments
- VIRT Services: Set up all the TCP ports for the VIRT services
- Infrastructure: Enable Guest accounts and set up the OpenStack and MySQL passwords

UWM

Overview

My simulations

Project simulations

Projects

Users

CML Server

System Configuration

System Status

Connectivity

VM Control

Licenses

Node resources

Repositories

Documentation

System Configuration Controls

System Networks VIRT Services Infrastructure Resources **Apply Changes**

Hostname: cml

Domain Name: cml.info

NTP Server: pool.ntp.org

Ramdisk enabled:

VNC enabled:

VNC password: letmein

Primary Ethernet port: eth0

Use DHCP on primary Ethernet port?:

Static IP address: 172.16.150.227

Primary port network: 172.16.150.0

Primary port netmask: 255.255.255.0

Primary port gateway: 172.16.150.254

Primary DNS server IP address: 8.8.8.8

Secondary DNS server IP address: 8.8.4.4

Is your system behind a proxy?:

HTTP/HTTPS Proxy: http://ymbk.example.com:80/

- Node Resources: Provides the ability to view, add, delete, modify, import and export the Flavors, Images, Sub-types and containers as appropriate to each menu.

STD and UWM API documentation

- The STD and UWM API documentation is now integrated in a new 'API explorer' interface, enabling users to browse the available REST calls and see examples of the call structures. The documentation can be found in UWM, under the 'Documentation' link.

UWM

- Overview
- My simulations
- Project simulations
- Projects
- Users
- CML Server ▼
- Connectivity
- VM Control ▼
- Licenses
- Node resources ▼
- Repositories
- Documentation ▼
- STD API
- UWM API

Other documentation on topologies and features of the VIRL backend systems can be found at <http://172.16.150.227/doc>

VIRL STD API

admin Show/Hide | List Operations | Expand Operations

GET	/simengine/rest/systemlogs	Get a zip-file of all current logs
PUT	/simengine/rest/admin-stop/{user}/{simulation}	Stop a particular simulation or set of simulations
GET	/simengine/rest/admin-list/{user}	Get a list of all currently launched simulations
PUT	/simengine/rest/admin-update/{simulation}/expiry	Update simulation expiration
POST	/openstack/rest/create-port	Create a port on an OpenStack network

autonetkit Show/Hide | List Operations | Expand Operations

GET	/ank/rest/test	Verify the user is authenticated and return autonetkit API version. Also displays installed AutoNetkit version
POST	/ank/rest/process	Process a VIRL XML Topology

catalog Show/Hide | List Operations | Expand Operations

links Show/Hide | List Operations | Expand Operations

GET	/simengine/rest/link/{simulation_id}	Get link identifiers for selected simulation
GET	/simengine/rest/link/{simulation_id}/{link_id}	Get info about a given link

openstack Show/Hide | List Operations | Expand Operations

roster Show/Hide | List Operations | Expand Operations

simengine Show/Hide | List Operations | Expand Operations

traffic control Show/Hide | List Operations | Expand Operations

[BASE URL: / , API VERSION: 0.10]

Cisco Systems, Inc. www.cisco.com

29



Caveats

1. **Symptom:** IOSv 15.6(2)T - On boot-up the following message may be observed:%SYS-3-CPUHOG: Task is running for (1997)msecs, more than (2000)msecs (0/0),process = TTY Background.-Traceback= 114ECF8z 130425z 15E20Ez 15DF30z 15DD3Dz 157D75z 158A2Bz 1589BFz 159B67z 153672z 3C9740Az 3C868CEz 3C89BEFz 5125F91z 491D86Cz 492E540z - Process "Crypto CA", CPU hog, PC 0x00157D2C

Synopsis: This is cosmetic and can be ignored.

Solution: None. It can be ignored.

2. **Symptom:** IOSvL2 15.2(4055) DSGS - CSCuv77089 - CVAC: day0 configuration only partially saved.

Synopsis: when booting an IOSv or IOSvL2 instance within VIRL, it will insert the bootstrap configuration into running-config and report the following message:

Aug 10 15:06:08.555: %CVAC-4-CONFIG_DONE: Configuration generated from file flash3:/ios_config.txt was applied and saved to NVRAM. See 'show running-config' or 'show startup-config' for more details.

Synopsis: The running-config is fully applied. However, the startup configuration only contains partial content.

Solution: as a workaround: issuing the command 'copy run start' after the device has fully booted, will copy the running-configuration content to the startup-configuration as expected.Note: VIRL's configuration extraction function performs a 'copy run start' operation as part of its execution.

3. **Symptom:** Cannot connect (telnet/SSH) to nodes when launching a simulation.

Synopsis: When attempting to connect to a node console, the connection times out. This is due to nodes not having completed the boot cycle so the system is not ready.

Solution: Wait for a couple of minutes after all nodes turn Green in the Simulations view and then log in.

4. **Symptom:** After launching Live Visualization, the dropdown menu to switch to different overlays (under Physical) does not appear. Other dropdown menu works. (VIRLDEV-3710)

Synopsis: In some instances, users reported this issue. When reported, it worked fine but when issue show up, then it persists randomly when running the same simulation.

In some instances after the issue occurs, the overlay not dropping persists on all simulations (new/existing) on that same server

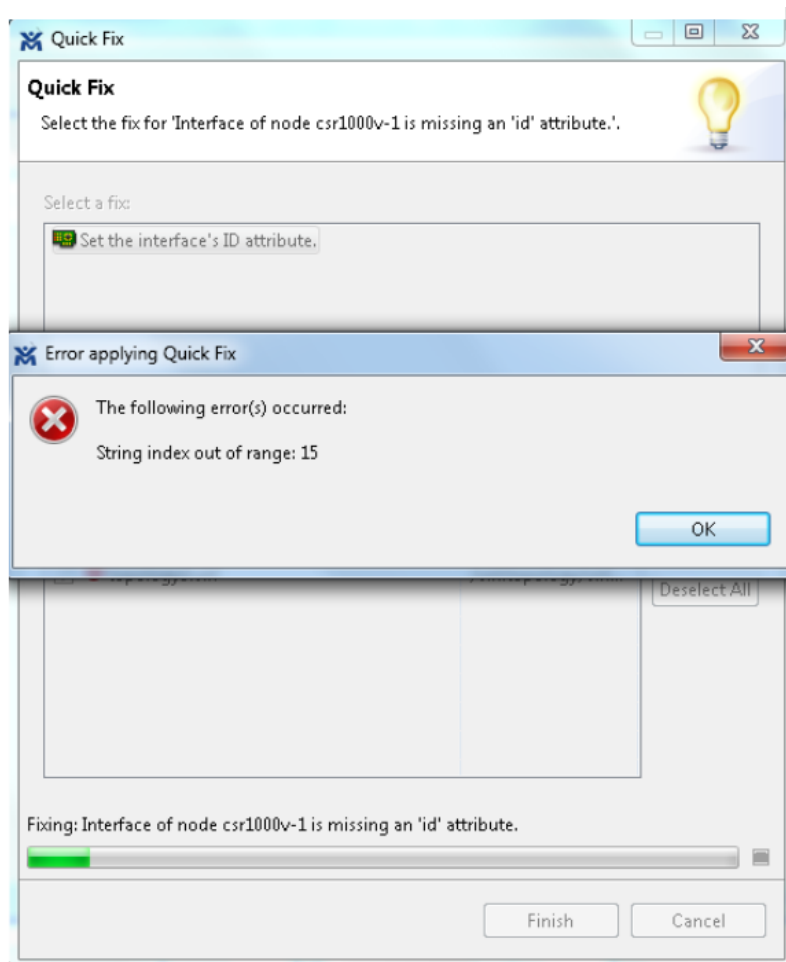
Solution: Restart the Live visualization service. From X-term on the cml server run the following command “sudo service virl-vis-processor restart”

5. **Symptom:** Telnet/Ping from/to IOSvL2 Mgmt port fails (VIRLDEV-3644)

Synopsis: In some instances, in an active simulation containing IOSvL2 and with a configuration created using ANK, ping/telnet to mgmt port fails.

Solution: None currently.

6. **Symptom:** Uppercase and special characters are not supported for use in the settings.ini file when updating the hostname and uwmadmin/OpenStack/MySQL passwords.



Synopsis: When uppercase and special characters are used in the settings.ini file for updating the hostname and uwmadmin/OpenStack/MySQL passwords, a connection error occurs.

Solution: None currently. Do not use upper case or special characters.

7. **Symptom:** Quick Fix failing with a String index out of range: error. (VIRLDEV-958)

Synopsis: For a node interface with a missing ID attribute <not specified>, selecting Quick Fix in the Problems tab to fix the problem returns a String index out of range: error.

Solution: None currently. As a workaround, go back and specify the interface name for the node.

8. **Symptom:** ISO install Keeps giving black screen while selecting 2nd option(install viri directly)

Synopsis: When doing ISO install on the UCS B-series, choosing the 2nd option (install viri directly) gives a black screen that persists and you cannot move forward with the install.

Solution: None currently. As a workaround chose 1st Option

9. **Symptom:** Must reboot CML Server once VIRL Web Services port and UWM port are updated (VIRLDEV-3797)

Synopsis: In UWM, admin can change the Web services ports and other entries but it does not prompt user to reboot.

Solution: Reboot CML server after changing settings in UWM.

10. **Symptom:** Launching a simulation with a time limit dialog ignores the second digit if the maximum limit is exceeded. (VIRLDEV-2259)

Synopsis: When the Launch simulation (with time limit) option is selected and a double digit time limit is provided that exceeds the maximum time limit, the second digit disappears and the time limit get updated to a single digit in the dialog.

Solution: None currently.

11. **Symptom:** In Live Visualization, Traceroute from Server to other nodes is not rendering a path.(VIRLDEV-3623)

Synopsis: When in Live Visualization, doing a trace route from a “Server” node to any other node does not show the path on the simulation map. The operation is actually completes and you can see the result in the log file, but the path is not rendered. If you do the traceroute from any node to the server, then that works fine and path is rendered.

Solution: None Currently

12. **Symptom:** ASAv: Attach to its VNC is not returning the prompt. (VIRLDEV-3616)

Synopsis: When in a simulation and after ASAv is in active state, if you try to attach to its VNC port, no prompt is returned and simply hangs there.

Solution: None Currently. Use telnet as a way to connect to a device.

13. **Symptom:** Launching Live vis in internal browser throws NPE exception in UI logs and Live Vis view remains blank. (VIRLDEV-3787)

Synopsis: If the Internal browser is used, (In CML Client: File ->preferences->General->Web Browser -> use internal web browser) and you run Live visualization, The live visualization view renders a blank page. This is the same if you are run the ANK visualization in the design phase.

Solution: Use external browsers. (In CML Client: File ->preferences->General->Web Browser -> use external web browser)

The following browsers are supported:

- Chrome 51.0. or later
- Firefox 47.0 or later
- Safari 9.0.2 or later

14. **Symptom:** Live Visualization - serial console - double carriage returns being sent for internal web browser. (VIRLDEV-2953)

Synopsis: If you try to access router serial console port from Live Visualization while the Internal browser is used, (In CML Client: File ->preferences->General->Web Browser -> use internal web browser), double carriage returns are being sent to the router.

Solution: Use external browsers. (In CML Client: File ->preferences->General->Web Browser -> use external web browser)

The following browsers are supported:

- Chrome 51.0. or later
- Firefox 47.0 or later
- Safari 9.0.2 or later

15. **Symptom:** UWM: Check health status throws error (VIRLDEV-3953)

Synopsis: When in UWM and you navigate to CML Server → system Status and you click on “Check health Status” system gives error “ Failed to get Health Status. NO Option ‘cluster mode in section orchestration”.

Solution: None Currently.

16. **Symptom:** In nested topology active simulation, opening “all console” ports fails (VIRLDEV-3959)

Synopsis: When a simulation is active and the Cisco Terminal option is selected in Terminal Preferences, when trying to Telnet using the “Telnet to all ports “ option, operation fails.

Solution: None Currently. As a work around, telnet to one port at the time.

17. **Symptom:** Traceroute from the node is not working after stop/start of node (VIRLDEV-4441)

Synopsis: In Live Visualization, when a node is shutdown and then re-enabled, Traceroute does not render a path.

Solution: Wait till the node is in enabled state (name is in black not red) and refresh the browser then do the Traceroute. Same result would be achieved if Live Visualization is launched.

18. **Symptom:** Live Visualization: changing UWM port (UWM -> CML Server -> System Configurations -> Viri Services) breaks functions in Live Visualization (VIRLDEV-4223)

Synopsis: If the UWM port is changed from the default 19400, In Live Visualization, many functions (like start/stop node, disable interface, setup packet capture) fails

Solution: Do not change UWM port. None Currently.

19. **Symptom:** In the Cisco Modeling Labs Online Help, the section 'Working with Simulations' contains a number of out-of-date images.

Synopsis: When using the Online Help, the section 'Working with Simulations' contains a number of out of date images. The information provided is correct; the images are just out-of-sync with the latest version of the Cisco Modeling Labs GUI.

Solution: See the 'Simulate the Topology' chapter in the Cisco Modeling Labs Corporate edition User, Release 1.2 for the most up-to-date images.



CML 1.1 Resolved Issues

The following list of CML 1.1 defects are resolved in this version of CML1.2:

- **Symptom:** (OperationalError) database is locked None None: error is returned. (VIRLDEV-2212)
- **Symptom:** SIGKILL error returned when trying to stop a simulation. (VIRLDEV-1961)
- **Symptom:** AutoNetkit: Custom configuration lines are not applied to IOSvL2 instances. (VIRLDEV-2214)
- **Symptom:** Title in the tab shows " null" while attaching a server to its VNC. (VIRLDEV-2258)
- **Symptom:** CSR1000v: Error %Error opening tftp://255.255.255.255/csr1000v-1-config (Timed out) thrown during boot up. (VIRLDEV-2264) - Resolved in CSR1000v 3.17
- **Symptom:** No valid host nova error returned. (VIRLDEV-2273)
- **Symptom:** Loss of Cisco IOSvL2 packets when using PAgP protocol. (VIRLDEV-1578)