

TeraVM

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# TeraVM Release Notes

TeraVM Release 12.0



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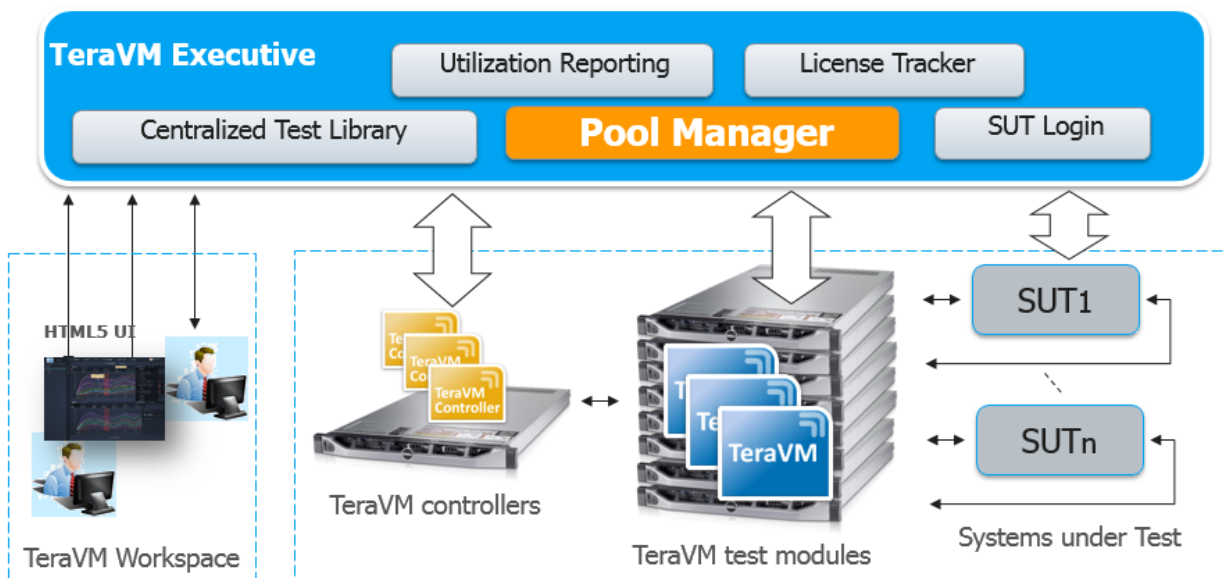
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## Chapter 1. What's New in this Release

Release 12.0 introduces significant advances to TeraVM, which will enable greater collaboration and productivity by delivering optimal test resources on demand. The advances include:

- A new intuitive **HTML5 User Interface (UI)** which together with a **Centralized Test Library**, enables users to quickly create, checkout, share and run tests.
- A new **TeraVM Executive**, which packages TeraVM administrative and management functions.
- The ability to build an **elastic test bed**, according to the resource requirements of a particular test. This is enabled with the new TeraVM **Pool Manager**, which optimizes compute resources by sharing TeraVM test modules among multiple testbeds (controllers).
- The TVM-vRAN, which provides user and control plane RAN emulation for testing 4G RAN, Core and peripheral interfaces.
- Significant **Licensing Updates**, including **Bandwidth Equivalent Licensing**.
- Many updates to security and other miscellaneous TeraVM applications.
- **Other new features**, including Active Directory support and support for Mellanox 40G NICs.

Figure 1-1. TeraVM 12.0 Release



### 1.1. HTML5 User Interface and Centralized Test Library

Release 12.0 introduces a new Cobham-branded, HTML5 user interface, and a Centralized Test Library, where many users (and TeraVM controllers) can share and run test-cases easily via an intuitive push-button user interface. The library offers a collaborative framework where users can avail of Cobham-supplied tests or create and share their own test scenarios via a central server.

The library includes:

- RFC 2544 style tests
- TeraVM vRAN tests for testing an EPC core, RAN and peripherals.

Test cases created in the new UI are cross-compatible with, and can be viewed/managed in the TeraVM Java Client.

**Note**

The Java Client continues to be available for running tests at a host/application level. For details, see the *TeraVM Java Client User Guide*.

Figure 1-2. TeraVM HTML5 UI

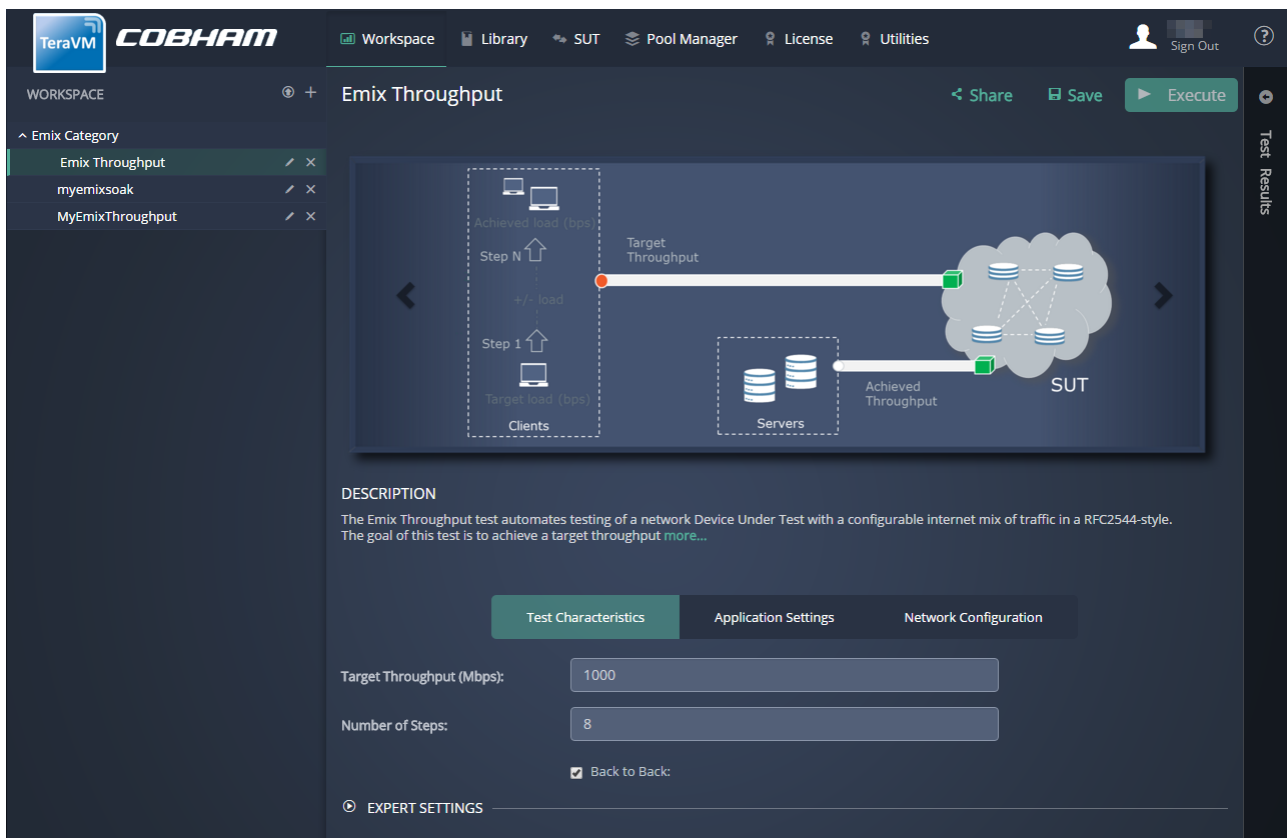
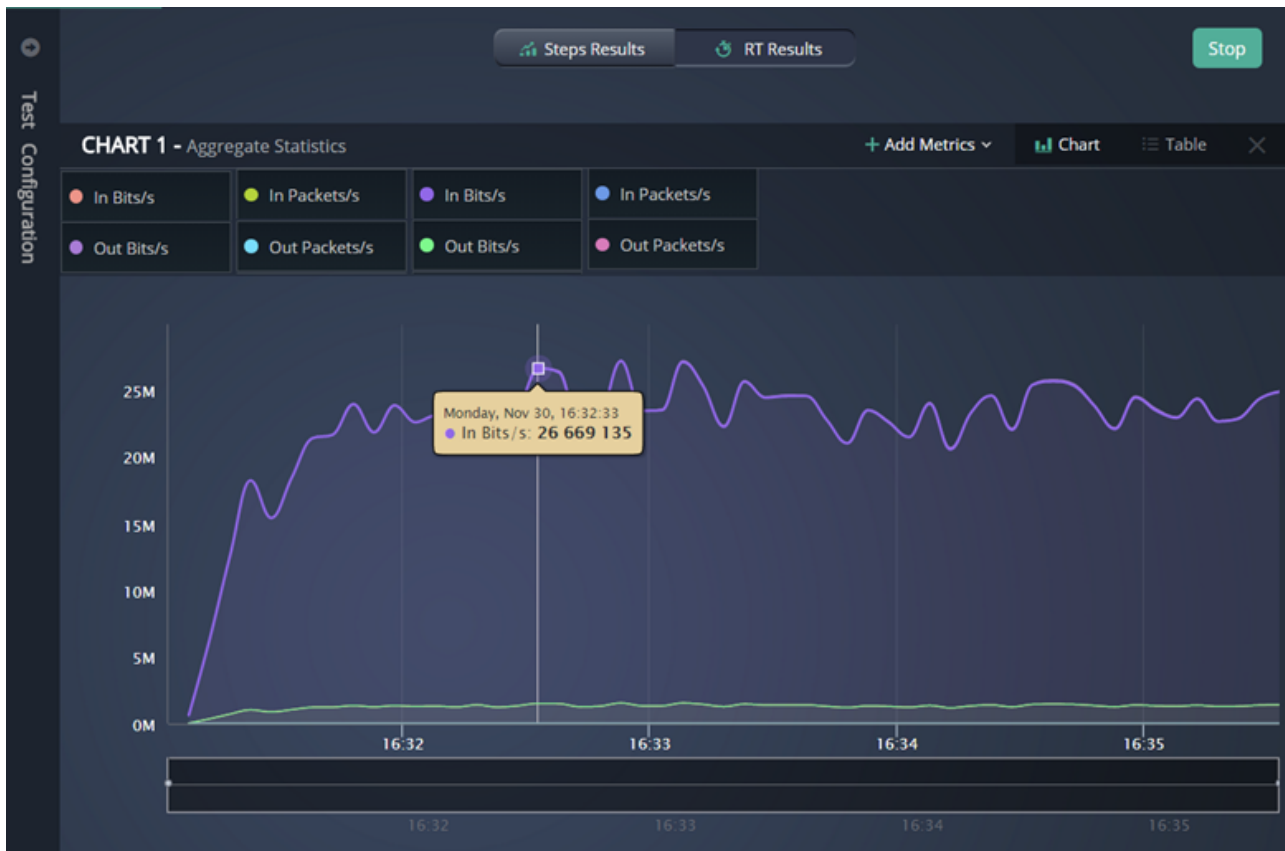


Figure 1-3. Test Results in the UI



The new UI enables up to ten real-time charts, each containing up to ten unique metrics. A significant enhancement is the ability to see event notifications based on threshold crossing events in each of the charts.

## 1.2. TeraVM Executive

The TeraVM Executive packages miscellaneous TeraVM collaboration functions. There is one TeraVM Executive per TeraVM system.

The Executive contains:

- The **Pool Manager**, which allocates TeraVM test module resources to a TeraVM Controller at test run-time.
- The **License Tracker**, which tracks TeraVM license usage and generates reports.
- **The Centralized Test Library**, accessible from the new UI.
- **User Authentication** via Microsoft Active Directory.
- SUT Login Agent.

## 1.2.1. Accessing the Controller and Executive

- Entering the IP address of the TeraVM Controller in a web browser now brings you to the new UI login screen for the Controller.

### Note

Access to the TeraVM Controller Administration interface is now from the **Utilities** button in the Controller UI.

- Entering the IP address of the TeraVM Executive in a web browser brings you to the new UI login screen for the Executive.

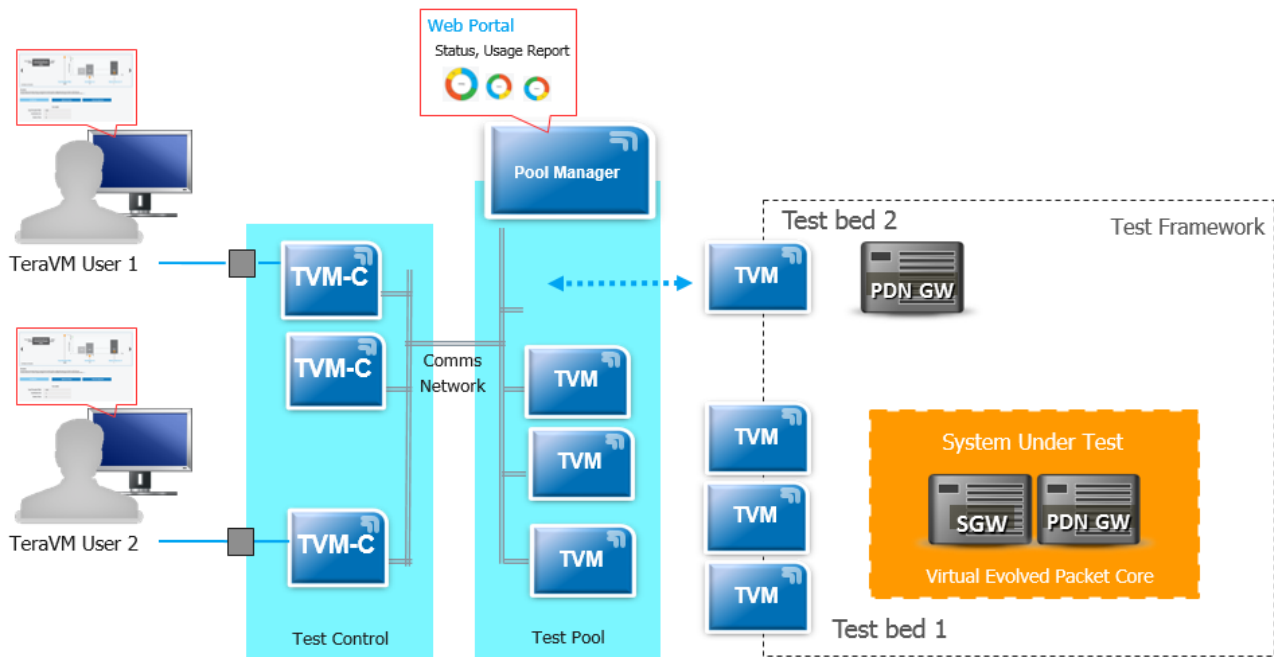
## 1.3. Pool Manager

With the TeraVM Pool Manager, you can create *elastic* test beds, where the size of the test bed, and hence resource usage, is determined by an individual test's run-time requirements. Multiple logical test beds (corresponding to Pool Manager *topologies*), each with a separate System Under Test (SUT), are possible from one physical network.

TeraVM test modules are managed by the Pool Manager, and allocated to the Controller at test run-time. This is a significant departure from 11.4 as it decouples the test modules from the controller.

Multiple controllers may use the same Pool Manager.

Figure 1-4. TeraVM Pool Manager



Each test module has one or more test interfaces for generating and receiving network traffic. When a TeraVM controller starts a test, it requests the Pool Manager for available test interfaces. The way the interfaces are assigned depends on which interface selection mode is in force:

- *Pool Manager Mode*: Interface selection is based on a user-defined set of *topologies* and *categories*. If test modules with those interface types are available, the Pool Manager assigns those test modules to the TeraVM controller at run-time.
- *Classic Mode*: This corresponds to pre-12.0 operation: in this mode, it is still possible to select interfaces directly, for example 3/1/3.

For details on setting up and using the Pool Manager, see the *TeraVM User Guide*.

### Note

There are changes to some CLI commands and parameters to support *Pool Manager Mode* - see [Appendix A](#).

## 1.4. TVM-vRAN

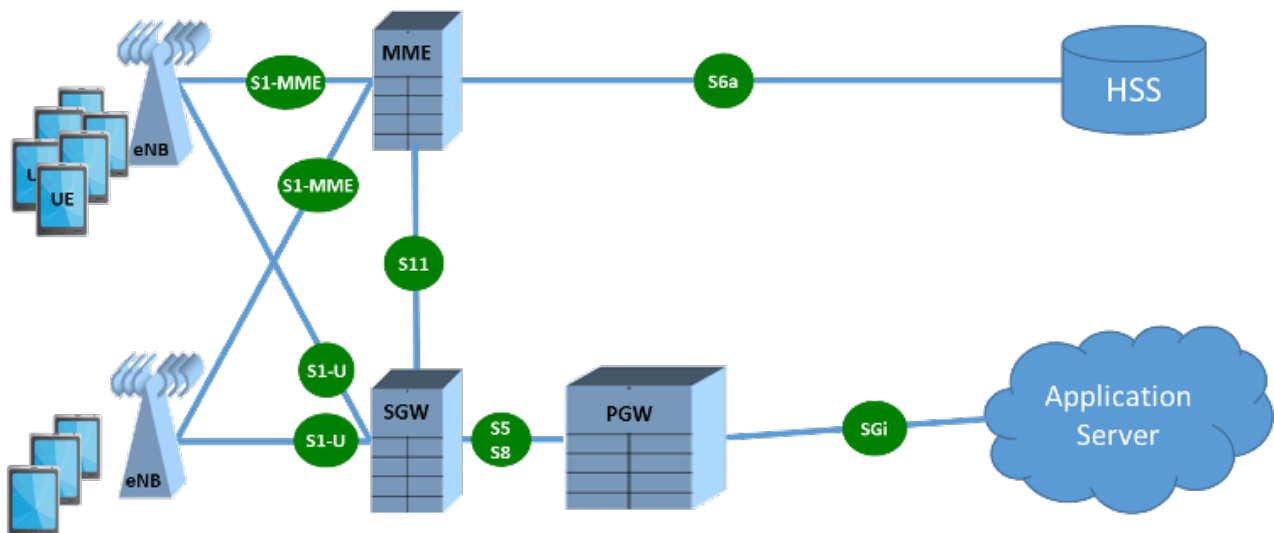
Cobham and NG4T's TeraVM vRAN (TVM-vRAN) solution provides emulation of 4G RAN and combined core emulating S1-U, S1-MME and SGi interfaces. The system simulates user and control plane traffic of an entire next generation mobile network.

The TeraVM vRAN is delivered as a modular architecture which supports a range of test use cases. It can be used to wrap around individual nodes and/or expose necessary interfaces to use for testing.

The figure below highlights the modules and interfaces that are available for test in TVM-vRAN.

For more information, see the *TeraVM vRAN User Guide*.

Figure 1-5. TVM-vRAN system



## 1.5. Licensing

Significant enhancements have been made to TeraVM licensing. For more information, see the *TeraVM Licensing Guide*.

New features include:



- **Bandwidth Equivalent Licensing** mode, based on the traffic bandwidth or packet rate usage in a running test. This is in addition to the traditional Core based licensing mode.
- **Failover License Server** mechanism.
- **License Tracker** This tracks license usage and generates web reports at pre-configured intervals.
- Password protected licenses.
- License server setup via CLI.
- Automatic, time-based check-in of licenses.

#### Note

New TeraVM Appliances will have Bandwidth Equivalent Licensing enabled. To update an existing license, please contact Cobham Sales.

## 1.6. Security and Miscellaneous Application Updates

The following TeraVM applications have additional functionality:

*Table 1-1. Application Updates*

Application Name	Enhancement
TCP and UDP Playback	It is now possible to configure the destination ports for TCP and UDP playback to use the destination port from the pcap being replayed**.
Cisco AnyConnect and IKE/IPsec	<b>VPN failover</b> handling support: It is now possible to configure IKEv2 applications to redirect to a secondary system in the event of the primary component becoming unavailable through either failure or scheduled down time.
All applications using TLS and DTLS	<b>FIPS2 compliance:</b> A global setting has been added to allow customers to test their FIPS compliancy by restricting all TeraVM SSL/TLS communications to FIPS approved algorithms.
HTTP	TeraVM now supports HTTP/2 client requests.  HTTP POST method header improvement: uses single Content-Type. Also, support for JSON and parsing of responses.
Generic IKE and Cisco AnyConnect	<b>IKEv2 Fragmentation:</b> TeraVM is now able to accept and generate fragmented IKEv2 packets in compliance with RFC 7383. The packets can be fragmented after a configurable number of bytes.
VoIP	<b>SIP Trunking:</b> Support RFC 4904 Trunking Parameters: It is now possible to simulate VoIP traffic over a SIP trunk using a group of VoIP UAs.
TeraFlow	<b>OOKLA Speedtest External Server Support:</b> Emulate OOKLA-like client/servers support to connect to third party OOKLA speedtest server.

\*\*If you installed an 11.4 patch with this functionality in Global Settings, please note these global settings were a temporary solution and are now gone - you must configure this in the Java Client.

## 1.7. Miscellaneous New Features

In addition to the features already mentioned, the 12.0 release also contains the following:

### Platform Updates

Mellanox ConnectX-4 network interface cards are now supported which allow traffic testing of up to 40Gbps per port, with MultiMac and Multicast Support. For further details see the *TeraVM on VMWare Set Up Guide*.

### Cybersecurity Database

Cobham provides regular Cybersecurity Database updates.

12.0 ships with the latest version of the Cybersecurity Database. The repository supports up to 10,500 Cybersecurity threats which are accessible from the TeraVM Java Client and perl library (cli).

### Other

Layer 1 In Bits/s and Layer 1 Out Bits/s statistics are now available on individual interfaces.

Aggregated interface statistics, including Layer 1 statistics, are now available in the default Aggregate Group.

## Chapter 2. Platforms

### 2.1. Hardware

The matrix below shows which hardware TeraVM has been certified on.

Figure 2-1. Hardware Platforms

Cisco UCS		DELL	
Model	NIC	Model	NIC
C240	Cisco VIC 1285 PCIe Ethernet NIC (40Gig)	R630	Intel 82599EB 10-Gigabit SFP
	Cisco Systems Inc VIC 1225 PCIe Ethernet NIC (10Gig)		Intel 10-Gigabit X540-AT2
C220	Cisco Systems Inc VIC 1225 PCIe Ethernet NIC (10Gig)		Mellanox ConnectX4 (40Gig)
C200	Cisco Systems Inc VIC 1225 PCIe Ethernet NIC (10Gig)	R620	Intel 82599EB 10-Gigabit SFP
B200	Cisco Systems Inc VIC 1225 PCIe Ethernet NIC (10Gig)		Broadcom (1G)

### 2.2. Hypervisors

This release supports the ESXi hypervisor, with the following versions

Hypervisor	Hypervisor Version	TVM Version	TVM Types	vSwitch Type	Virtual NIC
ESXi	5.5.0	3.0.10	TVM-1-5, TVM-7, TVM-8, TVM-16	VMXNET3	VMware VMXNET3 virtual interface

#### Note

- TVM-7 is supported for VPN applications only.
- TVM-8 and TVM-16 are for use with Mellanox Cards. They require ESXi 5.5.0 and above. Unlike the other TVM types which have only one core for interrupt processing, TVM-8 and TVM-16 use half of their cores for control.
- ESXi also supports Direct Path/DPIO as well as virtual switch configurations.

### 2.3. Operating Systems

Figure 2-2 shows the operating systems that TeraVM Java Client has been tested with.

*Figure 2-2. Operating Systems*

<b>Operating Systems</b>	
Windows	8.10
MAC OS X	10.10.4
Ubuntu	14.04.1

## 2.4. Web Browsers

TeraVM is developed to work with modern web browsers.

Figure 2-3 shows the web browsers that TeraVM has been tested with. Cobham will make every reasonable effort to support older versions.

*Figure 2-3. Web Browsers*

<b>Web Browsers</b>	
Mozilla Firefox	39
Internet Explorer	11.0.9600.17842
Safari (in Mac OS)	5.1.8
Google Chrome	44.0.2403.157 m

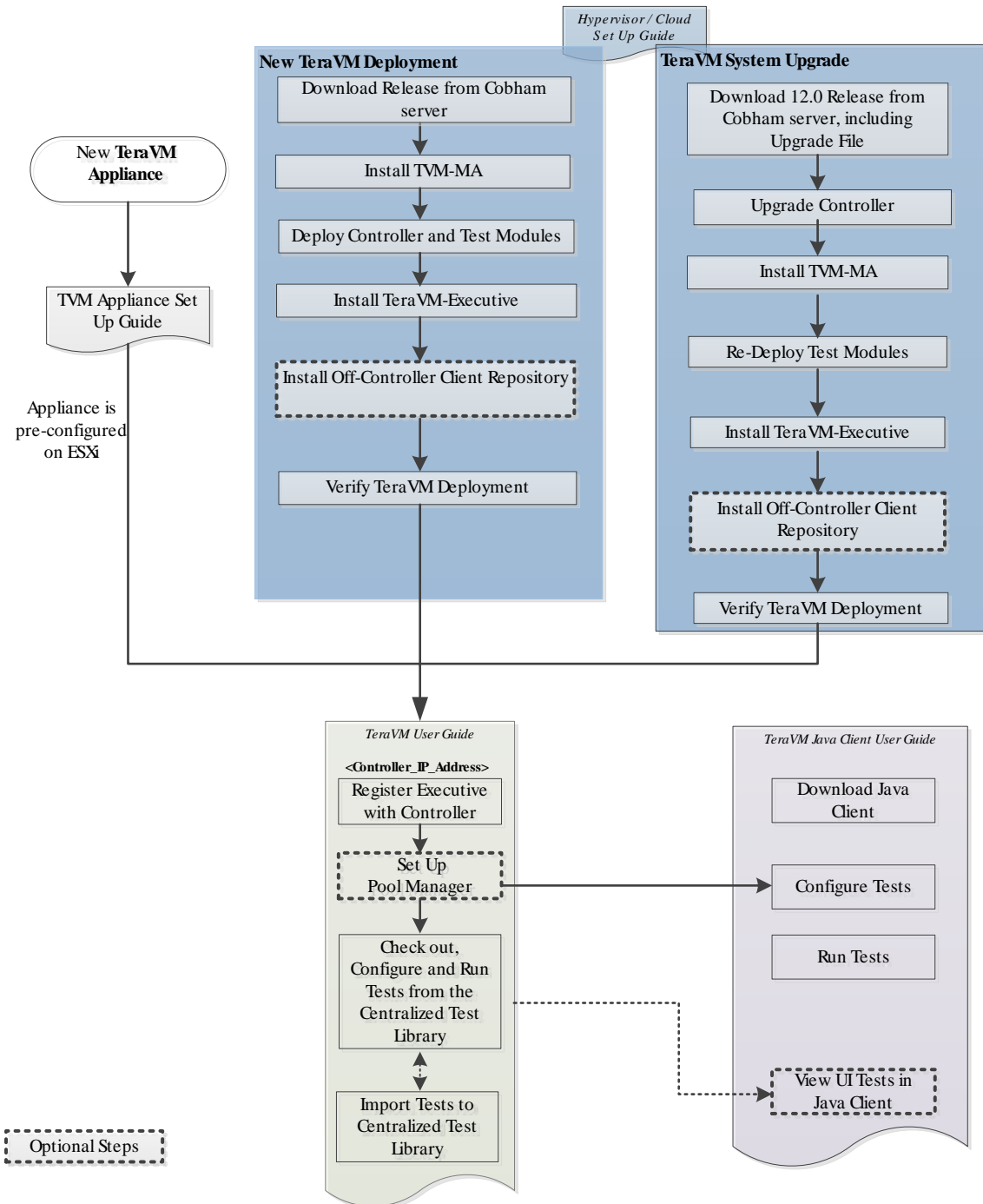
## Chapter 3. Upgrading to this Release

### **Important**

Because TeraVM 12.0 is a major release, with many new features, you **must** deploy the TeraVM Test Modules and the TeraVM Executive to get access to 12.0 features.

The diagram shows the steps to install TeraVM for both new and existing TeraVM installations. The Controller upgrade step is covered in the next section. To deploy the Test Modules and TeraVM Executive, continue to the *TeraVM on VMWare Set up Guide*. To set up the Pool Manager, see the *TeraVM User Guide*.

Figure 3-1. Upgrading to Release 12.0



## 3.1. Upgrade Controller

### 3.1.1. Check Your Current Version against Installer

The Upgrade installer upgrades the TeraVM Controller. It can be used in conjunction with the versions listed below. If the release you are currently using is not listed, please contact Cobham support.

#### Attention

If you are upgrading from a release prior to 11.0, please contact Cobham support as you may need to run an additional step.

Release versions use the following convention:

“Major.Minor-BuildNumber” or “X.Y-Build”

where X represents the major version, Y the minor version.

*Table 3-1. Releases Supported by Installer*

11.0-257	11.0.1-259	11.1-300
11.2-334	11.2.1-339	11.3-379
11.3.1-401	11.3.2-420	11.4-613

### 3.1.2. Download and Install Upgrade

#### Procedure

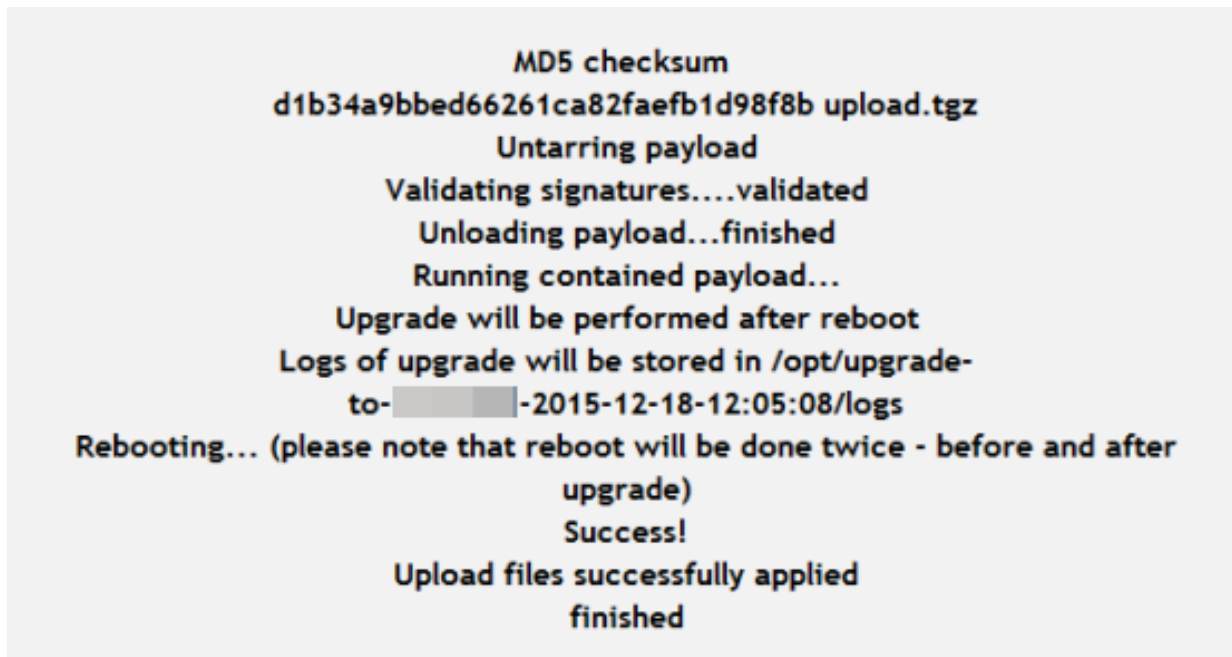
1. Download the upgrade file from the link provided by Cobham support. Close any open TeraVM user interfaces and stop any tests.
2. In your web browser, go to the Administration Interface of your current TeraVM Controller: `<http://<Controller IP Address>`.
3. On the Home tab, click **Upgrade System**. Enter: Username: **diverAdmin**; Password: **diversifEye**.
4. Click **Choose File** and find the file you downloaded from the Cobham support site. Click **Upload**.
5. When the upload is complete, click **Upgrade**.

#### Note

The controller reboots twice during the upgrade procedure.

If the system updates successfully, a message similar to the following appears:

*Figure 3-2. Upgrade Step Complete*



Otherwise, a message will appear with instructions about how to ftp the upgrade file to the system. Follow these instructions to complete the upgrade step.

**Note**

Older hardware may require ftp. Contact Cobham support if you run into issues.

6. If you are a TeraVM Cybersecurity user, and have not already updated to the latest Cybersecurity Database, note that this is an extra step in the upgrade process. For further details, contact Cobham Support.
7. Next, continue to the relevant platform set up guide, for example, VMWare EXSi, to deploy the TeraVM Test Modules and Executive, as shown in [Chapter 3](#).



## Chapter 4. Bugs Fixed and Known Issues

### 4.1. Bugs Fixed

*Table 4-1. Bugs Fixed in This Release*

<b>Bug Number</b>	<b>Description</b>
20404	SRRD not flushing temp data.
20463	AnyConnect IKEv2 connections should send BASE_MTU configuration attribute.
21462	Pdf generation no longer working in 11.4 on Windows 7.
20652	When trying to start a 'detached' App Replay test has 'Contact Support' Message.
21446	Default repo not accessible in 11.4 - 403 Forbidden.
21784	VPN Failover seems to be taking time to reach steady state (many reconnects).
21939	Clientless VPN - Citrix emulation not working.
21447	Not possible to create multiple "Single host per row".
21484	Incorrect entity status on SIPUAC in callee configuration.
21853	HTTP Adaptive Bit Rate Client HLS 206 Partial Content Server Response stops stream.
19917	AWS Guide: Access to TeraVM AMI on Amazon Web Services.
21394	IKE-Rekey Anyconnect Mean ms Statistic appears incorrect.
21793	Cisco Clientless VPN Pre-Mangled URLs broken in GUI error message of pcap resource.
21818	Multiple VoIP UA selected Properties Dialogue Window does not work.
20683	System needs to be rebooted after every VoLTE Test to run another test group.
19906	IKE redirect and SPI.
21940	RDA appliance: MLIPS Crash on RDA when passive analysis enabled on VoIP UA.
21852	IMS Server sends BYE to Callee and results in 480 updateCallDetails failed to Caller.
21222	Server disconnecting from JVM, under moderate load running RTSP applications against external server.

### 4.2. Known Issues

These are the known issues in this release. For further details, please contact Cobham support.

*Table 4-2. Known Issues in this Release*

<b>Bug Number</b>	<b>Description</b>
-------------------	--------------------

22575	On a d500/d1000, if the controller is rebooted while a test is running, the Test Agent remains "in use" in the Pool Manager, and cannot be used. Always finish or stop a test before rebooting.
22574	Java Client: Editing Interface Properties after updating (adding) classic mode interfaces on hosts corrupts the test database. Do not use <i>Interfaces Properties</i> in left panel to change properties.
21499	Rebooting a d500/d1000 after uninstalling the RPM results in the system losing their IPs.
21517	GUI cannot remove stream profile configuration from VoIP application set to Initiate calls disabled.
21518	SSL Anyconnect Aggregate Authentication registers IPv4 address on Dynamic IPv6 Host.
21519	Cannot run test on SR-IOV enabled NetXtreme II NICs when 1TA is using more than 1 VF on the same PF.
21520	Jumbo frame transaction fails to complete.
21522	HTTPS application is not using imported externally generated signing certificates (ca.crt).
21525	Threshold events disappear from GUI if TE tab is opened or loaded too late.
21526	DiversifEyeAPI fails to throw an exception when importing truncated xml file.
21606	TCP App: the TCP App Server is showing Established and Failed connections with the same value.
21742	Scaled HTTP Server cannot allocate as block or determinate distribution in HTTP test.
21958	User should not be allowed to put localhost value in License Server and Failover License Server IP Address.
21679	Cisco AnyConnect VPN Test with scale factor 1000 failing at 99%.
22080	cli command prompt never comes back if issue command during Test Group start.
21493	TT-2015-06053 - SSLT testing with 2544 cli test script - high latency.
22358	IKE Ipsec Applications in RA mode don't send Config Payload.

## Appendix A. CLI Changes for Pool Manager Mode

In order to support the *Pool Manager Mode* of interface selection, the behaviour of some CLI and perl features has changed in a way that may require you to change your existing perl scripts or test configurations. For more details on the Pool Manager, see the *TeraVM User Guide*. There are also some new commands.

### Note

Interfaces in Pool Manager Mode are called *interface representatives* below as they refer to topologies and categories and not actual interfaces, which are chosen at test run-time.

#### 1. New CLI Commands:

- `listTestGroupInterfaces`: lists interface representative names and associated real interface names for the current or last-run test group.
- `listTestGroupAgents`: lists the names of test agents (cards) in use in the current or last-run test group.
- `configureTvmExecutiveInfo`: allow user to update TeraVM Executive 'Comms IP Address' from the cli.

#### 2. `listInterfaces` command:

- When listing interfaces, the MAC Address is no longer output.
- The original option **Category** has been replaced by a new option **Class**. If `Class=server`, the output is *server* interfaces. If `Class=client`, the output is *client* interfaces.

#### 3. `listTestAgents` and `listFlowProcessors`:

- These commands are no longer supported.

#### 4. `saveStats` command:

- When considering entities of type Interface, `saveStats` matches the *EntityName* argument against the name of the interface representative instead of the name of the real interface. The name of the real interface is saved in the Description column in the zipfile metadata.
- When considering entities of type test agent (card), `saveStats` matches the *EntityName* argument against the name of the interface representatives in the test group, and saves stats for the test agents (cards) assigned at runtime to the matching interface representatives.

#### 5. `thrEvents` command:

- When considering entities of type Interface for event output, `thrEvents` matches the *EntityName* argument against the name of an interface representative instead of the name of the real interface.
- When considering entities of type test agent (card) for event output, `thrEvents` matches the *EntityName* argument against the name of the interface representatives in the test group, and outputs events arising from the test agents assigned at runtime to the matching interfaces.

#### 6. CLI `getStat` command: the interface reference depends on the Interface Selection mode.

- Pool Manager mode (`EntityType=Interface`). Example:  

```
cli getStat "SUT-client-3" "CPU Usage %" Fine Card
```

- Classic mode (EntityType=Card). Example:  
`cli getStat "3/1/3" "CPU Usage %" Fine Card`

#### 7. Perl Provisioning API:

- **Class `diversifEye::HeadEndMonitor`** has been removed.
- **Class `diversifEye::PsIfl`** (interface list property scaler) has been updated to work with interface representative names instead of real interface names.
- **Class `diversifEye::Threshold`** has been updated to replace property "physical\_interface" with "interface" taking as a value an interface representative name instead of a real interface name. The "physical\_interface" property will continue to be supported for backward compatibility, but must be set to an interface representative name.

When applying thresholds to test agents, the name of an interface representative must be specified rather than a test agent (card) name. The threshold is applied to the test agent(s) assigned at run time to the matching or identified interfaces.

- **Class `diversifEye::CardLevelConfig`** no longer has a 'name' property, and only instance will be supported per TestGroup and the single instance will apply to all test agents assigned to the TestGroup at runtime.
- **Class `diversifEye::PortLevelConfig`** instances will be identified by an interface representative name rather than a real interface name.
- **Class `diversifEye::EthernetInterfaceConfig`** will no longer have any effect, but will be retained for backward compatibility and will issue a warning when an instance is constructed.
- **Class `diversifEye::RawPortPlayback`** instances will be identified by an interface representative name instead of a real interface name.

## Appendix B. IP Addresses/Access, Usernames and Passwords

The usernames and passwords you will need in TeraVM are shown below. Where a blank column is given, it is recommended you fill this in before you start.

*Table B-1. TeraVM Entry Points, Usernames and Passwords in TeraVM*

Description	Function/Access	IP Address/URL	Username	Password
<b>TeraVM Controller Administration Interface</b>	Access TeraVM Controller with web browser, and click on <b>Utilities</b> .	Controller IP Address	diverAdmin	diversifEye
<b>TeraVM Controller on HTML5 UI</b>	Access TeraVM Controller on UI from web browser	Controller IP Address	username (Microsoft Active Directory may be enabled).	password
<b>TeraVM Executive</b>	Access TeraVM Executive on UI from web browser	Executive IP Address		
<b>TeraVM Java Client</b>	TeraVM Java Client Application. Username and password shown needed for: <ul style="list-style-type: none"> <li>1. Admin Tab</li> <li>2. Shutdown/Restart from GUI</li> </ul> For normal login, use username.	Java Client	username	N/A
<b>TeraVM CLI Interface</b>	Required to: <ul style="list-style-type: none"> <li>1. Configure Controller with a static IP address.</li> <li>2. Run cli commands and automation scripts.</li> </ul>	Controller IP Address	cli	diversifEye
<b>License Server</b>				
<b>License Server</b>	License set up	User defined	User defined	
<b>Hypervisor</b>				
<b>ESXi Management Assistant (TVM-MA)</b>	Configure and run ESXi orchestration from the command line.	TVM-MA IP Address	vi-admin	TeraVM

## Appendix C. TeraVM Documentation Set

All TeraVM Guides are available for download at the TeraVM documentation portal:

<http://ats.aeroflex.com/login-account>

When you have logged into the portal, click **Support/Technical Support/Product Support Documents/TeraVM Portal/TeraVM User Guides**

The complete TeraVM documentation set is listed below.

*Table C-1. TeraVM User Guides*

User Guides	Description
Release Notes	New features / Changes in the latest release. (Includes upgrade instructions and supported versions).
TeraVM User Guide	TeraVM overview including setting up and running tests in the HTML5 UI, Centralized Test Library.
TeraVM Java Client User Guide	How to create and run tests in the Java Client: Details of applications and hosts supported.
TeraVM CLI User Guide	Using the Automation Interface (CLI, Perl commands and RFC scripts) for testing. Also man pages are available for commands and scripts in the Documentation sub-directory <i>cli</i> .
TeraVM Appliance Set Up Guide	TeraVM Hardware Appliance Set Up (Appliance Customers only).
TeraVM vRAN User Guide	Combined NG4T / Cobham solution for RAN, Core and Peripheral IP Emulation for 4G.
TeraVM Licensing Guide	How to set up and configure licensing features, e.g. set up license servers and license reporting.
TeraVM Application Library Test Configuration Guide, Application Library Repository Users Guide	Traffic generation test solution for creating application flows. Includes repository setup information.
TeraVM 3G and 4G Encapsulation Session Support Guide	Tests for 3G and 4G.

*Table C-2. Hypervisor/Cloud Specific TeraVM Set Up Guides*

Hypervisor/Cloud Environment	Document Name
ESXi	TeraVM on VMWare Set Up Guide
KVM	TeraVM on KVM Set Up Guide
OpenStack on KVM	TeraVM on OpenStack Set Up Guide
Citrix XenServer	TeraVM on Citrix Xen Set Up Guide
Hyper-V	TeraVM on Hyper-V Set Up Guide

Amazon AWS	TeraVM on Amazon AWS Set Up Guide
Microsoft Azure	TeraVM on Microsoft Azure Set Up Guide

*Table C-3. TeraVM Reference Guides*

<b>Reference Guides</b>	<b>Description</b>
TeraVM Metrics Guide	Statistics/Metrics available with TeraVM
CLI Reference Guides (under <i>Documentation/cli</i> ).	Man pages are available for commands and scripts in the Documentation sub-directory

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