

# Multi-Tenant LoadMaster

### **Feature Description**

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### 1 Introduction

Multi-Tenant LoadMaster is Kemp's multi-tenancy product. It is a product where multiple independent instances of the Kemp LoadMaster and GEO LoadMaster can operate. These instances can be referred to as tenants, clients and Virtual Network Functions (VNFs). Each LoadMaster instance within the Kemp Multi-Tenant LoadMaster can be deployed, stopped, started and updated at will.

### 1.1 Licensing

Licensing is done on the Multi-Tenant LoadMaster and is based on the maximum number of tenants that can be started. This means that the LoadMaster tenants do not need to be licensed individually. All of the LoadMaster tenants inherit a default license from the Multi-Tenant LoadMaster. 10 is number of tenants for the default Multi-Tenant LoadMaster license.

Apart from the differences listed in the above paragraph, licensing the Multi-Tenant LoadMaster is the same as licensing a regular LoadMaster. For more information, and steps on how to license, refer to the **Licensing, Feature Description**.

### 1.2 Document Purpose

The purpose of this document is to provide further information on the Multi-Tenant LoadMaster which is Kemp's multi-tenancy product. This document contains instructional steps on how to perform certain tasks in the Multi-Tenant LoadMaster product.

For a more high-level overview of the Multi-Tenant LoadMaster product and architecture, refer to the **Kemp Multi-Tenant LoadMaster, Product Overview**.

For a description of each of the Web User Interface (WUI) options, refer to the **Kemp Multi-Tenant** LoadMaster, Configuration Guide.

### 1.3 Intended Audience

This document is intended to be read by anyone who is interested in learning more about the Kemp Multi-Tenant LoadMaster product.



## 2 Features

Some of the Multi-Tenant LoadMaster features are described in the sections below.

#### Ability to Create Virtual LoadMaster (VLM) Instances from Packages

A VNF package is LoadMaster or GEO LoadMaster firmware that can be used to create a LoadMaster VNF. Multiple packages can be installed on the Multi-Tenant LoadMaster. The Multi-Tenant LoadMaster will come with a pre-installed package which contains the latest LoadMaster firmware at that time. Other packages can be downloaded from the Kemp website as needed. Each package can be a different version of the Kemp LoadMaster. From these packages, multiple instances can be created.

VNF packages which were for pre-MT\_7.1-30 firmware versions will not work on MT\_7.1-30 or above. The latest VNF package can be downloaded from the Kemp website (<u>https://support.kemptechnologies.com</u> - search for LoadMaster MT Release Notice).

When an instance is created from a VNF Package, the number of CPUs and amount of RAM can be configured.

#### Application Templates Managed in the Multi-Tenant LoadMaster

Application templates make the setting up of Virtual Services easier by automatically configuring the parameters for a Virtual Service. Before a template can be used to configure a Virtual Service, it must be imported and installed on the Multi-Tenant LoadMaster or a tenant LoadMaster.

When templates are added to the Kemp Multi-Tenant LoadMaster, you can assign templates to specific VNFs as needed. The templates will then be available for use in the tenant LoadMaster when creating a new Virtual Service.

#### LoadMaster Manipulation in the Multi-Tenant LoadMaster

LoadMaster instances can be created, deployed, ran, stopped and destroyed in the Multi-Tenant LoadMaster.

#### Upgrades

It is possible to upgrade the Multi-Tenant LoadMaster firmware version. There is no impact to the virtual instances that are running when the Multi-Tenant LoadMaster software is updated. It is also

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possible to install a new VLM package template. This means that any time there is a new VLM release from Kemp, the Multi-Tenant LoadMaster administrator can add a new VLM template. You can create a VNF instance from any of the installed VNF packages.

Existing tenants need to be upgraded in the usual manner, via the LoadMaster WUI.

#### Backups

It is possible to make backups of VNF instances at the Multi-Tenant LoadMaster-level. The VNF backup contains the LoadMaster settings. It is also possible to view the list of backups, download and delete backups that were previously taken.



# **3 Initial VLM VNF Instantiation**

After the Multi-Tenant LoadMaster installation is complete, and the password has been set, a prompt will appear asking if you would like to instantiate the first VLM VNF.

Initial VLM VNF Instantiation				
Use DHCP for guest VNF(s) 🕑				
Would you like to instantiate VLM VNF now?	Yes 🔘	Not Right Now 🔘		

A check box will be displayed which specifies whether or not the MT guests should utilise DHCP for initial IP configuration. If this is enabled, the initial IP address and default gateway of the guest VNF will be automatically obtained via DHCP, and you will not be prompted to set them. If this option is disabled, text boxes will allow you to specify the initial IP address and default gateway.

There are also radio buttons which allow you to specify whether you would like to instantiate a VLM VNF now or not. If you select **Yes**, the **Create Instance** screen will appear and you will be prompted to configure the settings for the VNF. If you select **Not Right Now**, you will be brought to the Multi-Tenant LoadMaster home page.

If you select **Yes**, the steps to create the VLM instance are the same as the ones outlined in the **Create a VLM Instance** section from Step 4 onwards.



## 4 Create a VLM Instance

To create a VLM instance from a VNF template, follow the steps below:

- 1. In the main menu of the Multi-Tenant LoadMaster WUI, select Instance Management.
- 2. Select Package Management.

Currently Installed VNF Packages						
Package	Version	Operation				
LoadMaster-VLM	7.1-30a-10	Create Instance Delete				
Import VNF Package						
VNF Package File: Browse No file selected. Install VNF Package						

3. On the relevant package, click the **Create Instance** button.

Other VNF packages can be do website	ther VNF packages can be downloaded from the <u>Kemp</u> <u>ebsite</u>						
Create Instance							
VNF Name	LoadMaster-VLM						
Initial IP address	172.21.56.106/24						
Initial Default Gateway	172.21.0.1						
Number of NICS	1 🔻						
Number of CPUs	1 🔻						
Memory Requirement	512 Mbytes 🔻						
Cancel	Create VNF Now						

4. Enter a name for the VNF. If the **Enable DHCP for MT VNF(s)** option is enabled (**System Configuration > Miscellaneous Options > Network Options**), you can skip the next two steps because the initial IP address and default gateway will be obtained automatically via DHCP and the **Initial IP address** and **Initial Default Gateway** fields will not be displayed.

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- 5. Enter the **Initial IP address**.
- 6. Enter the Initial Default Gateway.
- 7. Specify the Number of NICS.
- 8. Specify the Number of CPUs.
- 9. Select the amount of RAM in the **Memory Requirement** drop-down list.

The maximum value that can be set here is half of the total system memory.

- 10. Click Create VNF Now.
- 11. Click **OK**.
- 12. Wait for the VNF to be created.
- 13. Click **OK**.

Instantiated VNFs						
I	d Name	Status	IP Address	Operation		
	vnf1 LoadMaster-VLM@	idle	172.16.129.49	Start No AutoStart Configure VNF Management Delete Update License		
	vnf2 LoadMaster-VLM@test1	idle	172.16.129.77	Start No AutoStart Configure VNF Management Delete Update License		

14. Click **Start** to start the VNF instance. The IP address will change to a link which can be clicked to access the LoadMaster tenant WUI.



# 5 Managing a VLM Instance

The installed VNFs can be administered from the **Instance Management** section.

### 5.1 VNF Status

This screen lists all the available VNFs and their status.

Currently committed Resources										
Co	ores	0 of 8								
м	emory	0 Mbytes of 7680 Mbyte	25							
	Allow Overcommitment of	Resources 🗌								
Ins	stantiated VNFs									
Id	Name	Statu	s IP Ado	dress	Operat	ion				
vr	nf1 LoadMaster-VLM@	idle	172.16.	129.49	Start	No AutoStart	Configure	VNF Management	Delete	Update License
vr	nf2 LoadMaster-VLM@test1	idle	172.16.	129.77	Start	No AutoStart	Configure	VNF Management	Delete	Update License

At the top of the screen the currently committed resources are displayed, i.e. how many cores are in use and how much memory is currently in use.

By default the Multi-Tenant LoadMaster will only start running instances which do not exceed the total amount of available hardware resources. Selecting the **Allow Overcommitment of Resources** check box allows resources to be overcommitted. This can have an impact on performance.

A number of Actions can be performed on each VNF:

- Start/Stop: Start/stop this VNF.
- AutoStart/No AutoStart: Specify whether the system should auto-start this VNF upon Multi-Tenant LoadMaster reboot or not.
- **Configure:** Modify the settings for this VNF, such as those relating to the memory, CPUs and IP addresses.
- VNF Management: Administer this VNF including deploying application templates.



- **Delete:** Delete this VNF. A VNF cannot be deleted if it is running. To delete a VNF, first stop the VNF (if it is running), then click **Delete**.
- **Update License:** When the multi-tenant host license is updated, you can update the VNF license by clicking the **Update License** button. If the VNF is running, you must restart it to apply the new license.

#### 5.1.1 Configure a VNF

The Multi-Tenant LoadMaster creates one Open vSwitch (OVS) per physical/VLAN interface. This is the Virtual Switch software in the Multi-Tenant LoadMaster which allows multiple VLMs to share a common switch fabric. In addition, 10 host local networks are created. The tenant's vNICs connect either to one of these switches or to one of the host local networks. Each tenant can have up to 10 vNICs named **ETH0...9**.

	Name LoadMaster-VLM		_
	Memory 512 Mbytes •		
	CPUs 1		_
	MAC Addross	Physical Port	
VNF Interface	MAC Address	Physical Port	
VNF Interface	MAC Address 52:55:44:f5:9a:20	Physical Port <ul> <li>Physical Interface eth0 •</li> <li>Virtual Network Virt0 •</li> </ul>	Add Interfa

To modify a VNF, click the **Configure** button in the **VNF Status** screen. Various options can be set on the VNF settings screen.

The VNF has to be stopped in order to make changes on this screen. If the VNF has not been stopped, the fields on this screen will be greyed out. VNFs can be stopped on the **VNF Status** screen. Refer to the **VNF Status** section for further information on the stop option.

Name: The name of the VNF.

Memory: The amount of memory that the VNF uses.

**CPUs:** The number of CPUs that the VNF uses.

There is a limit to the VNF size of the maximum number of cores of a single CPU on a multi-core platform. For example, on

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5 Managing a VLM Instance



a dual CPU system with six cores per CPU, the maximum size that can be configured for a single VNF is six cores.

The second half of this screen lists the interfaces for this VNF along with related operations.

VNF Interface: Enter the interface number.

MAC Address: The Media Access Control (MAC) address of the VNF.

**Physical Interface/Virtual Network:** Select either a physical interface or virtual network and select the relevant interface.

Add Interface: Add the interface.

**Delete Interface:** Delete the interface.

The interfaces can only be configured when the VNF is not running.

Reset: Reset all values.

**Apply:** Apply the changes to the VNFs.

#### 5.1.2 Manage a VNF

Backup		
Perform a Backup of the VNF	Backup VNF	
Template Management		
Templates	Available Templates Exchange 2013 IMAP Exchange 2013 IMAPS Exchange 2013 IMAPS Offloaded Exchange 2013 IMAP with STARTTLS	Installed Templates None Installed Install Templates

To access the screen to manage a VNF, click the **VNF Management** button on the **VNF Status** screen. Administrative functions can be performed to VNFs on this screen.

#### Backup VNF

Take a backup of the VNF.

The backup name includes a date and timestamp, in the format **YYYY\_MM\_DD.HH\_mm**. This has a granularity of one minute. If



more than one backup is created in the same minute, the original backup (with the same name) will be overwritten. If there is more than one minute between backup attempts, a separate file will be created.

Backup				
Perform a Backup of the VNF	Backup VNF			
Available Backups				
LMBackups_2015_10_14.14_49		Restore Download	Delete	
Template Management				
	Available Templates	Inst	alled Templates	5
	Exchange 2013 IMAP	A Nor	ne Installed *	
Templates	Exchange 2013 IMAPS			Install Templates
	Exchange 2013 IMAPS Off	oaded		
	Exchange 2013 IMAP with	STARTTLS 🗸	-	

#### Available Backups

Show a list of previous backups for this VNF.

**Restore:** Restore the backup to the VNF.

Download: Downloads the backup to the local machine.

**Delete:** Deletes the backup.

#### Templates

A list of **Available Templates** which exist on the Multi-Tenant LoadMaster is displayed on the left. Templates can be uploaded to the Multi-Tenant LoadMaster in the **Manage Templates** screen. For more information on uploading templates to the Multi-Tenant LoadMaster, refer to the **Manage Templates** section.

Templates can be moved to the **Installed Templates** list on the right by selecting them and clicking the right arrow. To remove templates, use the left arrow. Click **Install Templates** to apply the changes to the VNF. All **Installed Templates** will be available for use in the relevant tenant VLM.

#### 5.1.3 Package Management

To access the Package Management screen, click **Package Management** in the main menu of the LoadMaster WUI.

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5 Managing a VLM Instance



#### Import VNF Package

Currently Installed VNF Packages					
Package	Version	Operation			
LoadMaster-VLM	7.1-30a-10	Create Instance	Delete		
Import VNF Package					
VNF Package File: Browse	Io file selected.	Install VNF Package			

Import a new VNF package.

Package: The name of the VNF package.

Version: The VNF package version.

#### Action:

- Create Instance: Create an instance of this VNF package.
- **Delete:** Delete this package.

#### 5.1.4 Manage Templates

Application templates make the setting up of Virtual Services easier by automatically configuring the parameters for a Virtual Service. Before a template can be used to configure a Virtual Service, it must be imported and installed on the Multi-Tenant LoadMaster or on a tenant VLM.

Templates can be downloaded from <a href="http://kemptechnologies.com/documentation">http://kemptechnologies.com/documentation</a>.

To import a template, follow the steps below in the Multi-Tenant LoadMaster WUI:

1. In the main menu, select **Instance Management > Manage Templates**.

Import Templates			
Template file: Choose File No file chosen	Add New Template		

2. Click the **Choose File** button, select the template you wish to install and click the **Add New Template** button to install the selected template.





3. Click **OK**.

4. Then, to assign a template to a VNF, in the main menu select **Instance Management > VNF Status**.

5. Click the VNF Management button for the relevant VNF.

Template Management		
Templates	Available Templates Exchange 2013 HTTPS Reencrypted	Installed Templates Exchange 2013 HTTPS Exchange 2013 HTTPS Offloaded Exchange 2013 SMTP

- 6. Select the relevant template(s) in the **Available Templates** box.
- 7. Click the right arrow to move the templates to the **Installed Templates** box.
- 8. Click the Install Templates button.

The template(s) will be available for use in the relevant tenant LoadMaster when adding a new Virtual Service.

Templates can be deleted in the Manage Templates screen by clicking the Delete button.

For details on how to use a template to create and configure a new Virtual Service and where to obtain templates, please refer to the **Virtual Services and Templates, Feature Description** document.



# 6 Bonding/Teaming (802.3ad/Active-Backup)

There are a few key points to keep in mind when creating bonds/teams:

- Interface bonding on the LoadMaster is supported in Azure, but bonding on the Azure switches is not
- You can only bond interfaces higher than the parent. For example, if you start with port 10 you can only add ports 11 and greater.
- When using a Virtual LoadMaster (VLM), all NICs must be added prior to configuring bonding or adding VLANs. If a new NIC is needed you must remove the bond and/or remove the VLANs.
- If VLAN tagging is required, bond the links first and then add VLANs after the bond has been configured
- Bonding interfaces 0 and 1 is not permitted
- You should never bond all interfaces
- In order to add a link to a bonded interface, any IP addressing must first be removed from the link to be added. The NIC to be added to the initial interface must not have an IP address.
- Enabling the Active-Backup mode generally does not require switch intervention
- The **802.3ad** mode is an active-active setup
- Ensure that all bonded interfaces are configured for the same link speed, both on the switch and the LoadMaster
- If you want to bond port 0, you should strongly consider moving the web administrative interface and/or the remote SSH access to a different port temporarily until that bonding has been completely configured

### 6.1 Creating a Bond/Team

To create a bond/team, follow the steps below:

1. In the main menu of the WUI, navigate to **System Configuration > Network Setup >** Interfaces.



6 Bonding/Teaming (802.3ad/Active-Backup)

2. Click the link for the relevant interface.

Network Interface 1	
Interface Address (address[/prefix]) Link Status	Set Address       No Link Detected     Automatic     Force Link
Additional addresses (address[/prefix])	MTU: 1500 Set MTU Add Address
VLAN Configuration VXLAN Configuration	figuration Interface Bonding

3. Click Interface Bonding.

	Convert eth0 to a bonded device	Create a bonded interface 0
<-Back		

- 4. Click Create a bonded interface.
- 5. Click OK.
- 6. Click **OK** again.



7. Click Continue.

8. In the main menu, select **System Configuration > Network Setup > Interfaces** and click the bnd link.

6 Bonding/Teaming (802.3ad/Active-Backup)



Network Interface 0	
Bonded Interface (eth0)	
Interface Address (address[/prefix]) 10.154.11.70/16	Set Address
Additional addresses (address[/prefix])	dd Address
VLAN Configuration VXLAN Configuration Bonded Devices	

9. Click Bonded Devices.

<-Back Bonding Management	
Bonding mode	802.3ad •
Unbond this interface	Unbond
Add Link	No ports available  Add Link
Port eth0	
Unbind Port	Unbind Port
Link Status	Speed: 10000Mb/s, Full Duplex Automatic   Force Link

10. Select the relevant interface and click Add Link.

### 6.2 Removing a Bond/Team

To remove a bond/team, follow the steps below:

1. In the main menu of the LoadMaster WUI, go to **System Configuration > Network Setup > Interfaces**.

2. Select the bond to be removed.

6 Bonding/Teaming (802.3ad/Active-Backup)



<-Back Bonding Management	
Bonding mode	802.3ad •
Unbond this interface	Unbond
Add Link	No ports available  Add Link
Port eth0	
Unbind Port	Unbind Port
Link Status	Speed: 10000Mb/s, Full Duplex Automatic   Force Link

#### 3. Click Bonded Devices.

4. Un-bind each port by clicking the **Unbind Port** button. Repeat this until all ports are removed from the bond.

5. Once all of the child ports have been un-bonded, the parent port can be unbonded by clicking **Unbond**.

Interface Unbound
Deleted bonding support from Interface
Continue

6. Click Continue.



# 7 Troubleshooting

If it is not possible to start a VNF instance, please ensure that virtualization technologies are enabled in the BIOS, for example:

- 1. Power on the Multi-Tenant LoadMaster hardware box.
- 2. Access the bios options (may need to press Delete, F1 or F2 key).
- 3. Select Advanced Bios Features.
- 4. Select CPU Feature.
- 5. Go to Virtualization Technology (or technologies).
- 6. Enable this option.
- 7. Save the settings.
- 8. Boot the Multi-Tenant LoadMaster.



## 8 References

Unless otherwise specified, the following documents can be found at <a href="http://kemptechnologies.com/documentation">http://kemptechnologies.com/documentation</a>.

Licensing, Feature Description

Virtual Services and Templates, Feature Description

Kemp Multi-Tenant LoadMaster, Product Overview

Kemp Multi-Tenant LoadMaster, Configuration Guide

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# Last Updated Date

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