



Installation Runbook for Solace Systems Virtual Message Router

Application Version	Solace Virtual Message Router (VMR) OpenStack (Cloud Edition) Version 7.1.1.327
MOS Version	7.0
OpenStack Version	Kilo
Application Type	Message Broker

Content

Document History 1 Introduction 1.1 Target Audience 2 Application overview 3 Joint reference architecture 4 Physical & Logical Network topology 5 Installation & Configuration 5.1 Overview of MOS installation steps 5.2 MOS installation in details 5.2.1 Creation of OpenStack environment 5.2.2 MOS Deployment 5.2.3 Health Check Results 5.3 Solace VMR installation steps 5.4 Testing 5.4.1 Target use case(s) 5.4.2 Test cases 5.4.2 Test Tools 5.4.3 Test Results

Document History

Version	Revision Date	Description
0.1	31-08-2015	Initial Version
0.2	24-09-2015	Feedback from Mirantis
0.3	17-02-2016	Updated for VMR Cloud Edition and MOS 7.0

1 Introduction

This document is to serve as a detailed Deployment Guide for the Virtual Message Router (VMR). Solace Systems offers the VMR (message broker solution) as an application level infrastructure to support VNF-to-VNF communications in a Network Function Virtualization (NFV) environment, VNF to OSS/BSS integration, as well as traditional enterprise messaging queueing, data ingestion-as-aservice for Big Data, and Web, Mobile, or IoT communications over the public Internet. This document describes the reference architecture, installation steps for certified MOS+VMR, limitations and testing procedures.

1.1 Target Audience

The audience that would use Solace VMR would include application developers familiar with coding directly to APIs for Publish/Subscribe (Pub/Sub), Request/Reply (REST), Message Queueing (MQ), Remote Procedure Calls (RPC), or Inter-Process Communications (IPC) middleware.

Another set of potential users of Solace VMR would be infrastructure operations managers that are deploying and configuring platform services for higher level applications and middleware to use as transport. This could include deploying Solace VMR as the underlying transport for an ESB, CEP Engine, Change Data Capture system, Database Replication, In-Memory Data Grid, Big Data Repository, Streaming Analytics Engine, IoT Device Server, M2M/SCADA Gateway, etc.

Although there is considerable overlap between the functionality of the Solace VMR and AMQP brokers such as RabbitMQ and Qpid, this runbook does <u>not</u> attempt to document the use of Solace VMR as a replacement for AMQP as used for RPC by Fuel, Nova, or any other component of the Mirantis OpenStack distribution. This runbook is strictly designed to enable application level execution of the Solace VMR for Application to Application or Device to Datacenter messaging.

2 Application overview

The Solace VMR is a completely self contained and turnkey carrier-class message broker that comes bundled with it's own SolOS Operating System (SolOS being a special hardened flavor of Linux with messaging functionality built-in). The VMR can run in either a stand alone or clustered environment. Clustering of VMR instances can be achieved using Solace Multi-Node Routing (MNR) or Solace Message VPN Bridging, but neither of these mechanisms requires any special setup within OpenStack and is configured entirely via the Solace Element Management Protocol (SEMP), CLI, or SolAdmin GUI.

3 Joint Reference Architecture

Solace VMR can run as a stand-alone message broker (hub and spoke) or as a networked cluster of of to 64 VMR instances in a single domain. Further scalability some from linking multiple domains using Solace Remote VPN bridge capability. Application and/or VNFs running as tenant applications within Nova can connect to the Solace VMR over a number of supported interfaces and protocols including REST, JMS, MQTT, WebSocket, HTTP, and the Solace Messaging Format (SMF). All connections are via TCP socket connections over Neutron provisioned virtual IP interfaces (both public and private). The Solace VMR will translate between all these supported transport protocols so for example, a publisher can send a REST message (HTTP POST) and a subscriber might listen to a JMS topic to receive the data.



Solace VMR instances can also link with one or more VMRs running in another datacenter or outside the OpenStack environment. The VMR can also connect with Solace hardware appliances (such as the highest performance 3560) to form and seamless multi-node messaging fabric.



4 Physical & Logical Network Topology

The Solace VMR can run in a number of network topologies depending on the use case. For IOT, Web Streaming, or any other internet facing client connections, it important to have the VMR connected to a publically accessible external subnet. If HTTP or TLS termination is done by another VNF or proxy in front of the Solace VMR then it might not be required to have a public interface and security rules that allow external client connections.

In order to make the Solace VMR work easily in the POC setup, both an external and private interface was created as show in the following Network Topology diagram from the Horizon UI.

Network Topology



5 Installation & Configuration

5.1 Overview of MOS installation steps

Solace VMR requires only a minimum of 1 compute node to run a stand-alone VMR instance, and 1 storage node in which to store the VMR image(s) in a format compatible with the available hypervisor(s).

The high-level description of MOS installation steps are as follows:

- Download Mirantis 7.0 ISO from Mirantis website.
- Follow the installation instructions as specified in Mirantis OpenStack User Guide.
- Download the Solace Virtual Message Router
- Create a volume from the SolOS/VMR image
- Configure a Security Group which will allow external clients to connect into SolOS/VMR using the desired messaging wire protocols
- Launch a SolOS/VMR instance

- Connect into the running VMR using SSH, or SolAdmin GUI to continue setup as specified in the Solace Feature Provisioning Guide.
- Test that the Solace VMR is running by publishing and subscribing to a test topic using cURL, or any Open Source MQTT client tools such those provided by the Eclipse Paho Project (http://www.eclipse.org/paho/) or using the Solace-provided sdkperf benchmarking tools and sample client applications.
- (optional) start multiple instances of the Solace VMR and configure Solace Multi-Node-Routing or Remote VPN Bridging between the available VMR nodes to form a Solace messaging cluster/network.

5.2 MOS installation in details

5.2.1 Creation of OpenStack environment

Solace VMR runs in the default environment which can be created as documented in the Mirantis OpenStack documentation (<u>Create a new OpenStack environment</u> section).

5.2.2 MOS Deployment

VMR requires only at least a single Controller node and two Compute nodes with enough CPU and Memory to run a standard m1.small flavor instance. For best performance Solace recommends 4 CPUs and 4GB of RAM for each instance of the VMR. 2 CPUs and 4 GB RAM is the minimum required to run.

Nodes	Networks	Ö Settings	Logs	Health Check	Actions		n Deploy Chang
Group By		Filter By					
Roles	\$	Node name/n	nac			Configure Disks Configure	Add Nodes
							Select All
Control	ller (1)						Select All
	Slave CONTR	1 OLLER		D	✓ READY	CPU: 1 (1) HDD	192.0 GB RAM: 1.5 GB 🔯
Compu	ute, Storage	e - Cinder (2)					Select All
	Slave COMPU	2 ITE - CINDER		D	✓ READY	CPU: 1 (1) HDD	192.0 GB RAM: 1.5 GB 🚺
-	Slave	3		D	✓ READY	CPU: 1 (1) HDD	192.0 GB RAM: 1.5 GB 🔯

05	Mada		Network	Storage
OS Mode Ubuntu <mark>CentOS</mark> HAHA	ΠV	VLAN	Ceph	
<u>Ubuntu<mark>CentOS</mark></u>	<u>HA</u> HA	<u>Any</u> Any	<u>Any</u> Any	optionaloptional
Ubuntu	HA	Any	Any	optional

5.2.3 Health Check Results

No additional health checks are required beyond the basic network verification tests in Fuel.

5.3 Solace VMR installation steps

System Requirements

• 22 GB of disk space, 4 GB of RAM, and two CPUs minimum (4 CPUs recommended)

Download the Solace VMR and associated tools

- On the **Downloads** page of dev.solacesystems.com, in the Products SolAdmin section, click SolAdmin, then click the SolAdmin distribution for your administrative workstation's OS environment. This is optional, and only required if you want to use the thick client SolAdmin GUI in place of the command line interface (CLI). SolAdmin can run on any workstation or laptop and does not need to run in the OpenStack environment.
- On the **Downloads** page of dev.solacesystems.com, in the Tools section, click SDKperf, then click the SDKperf distribution for your client application OS environment. Use of SDKperf is optional and only required for benchmarking or otherwise generating pub/sub traffic without programming. SDKperf is a command line tool and does require a GUI environment to run. SDKperf can run on any workstation or laptop and does not need to run in the OpenStack environment.
- On the Downloads_page of dev.solacesystems.com, in the Products Cloud Images section, click Virtual Message Router, then click the Compressed QCOW2 Cloud Package for your environment.

Comment [1]: MOS 7.0 has not Centos OS for slaves, please remove it

- After you read and agree to the licence agreement, a compressed QCOW2 file called soltr-<version>-vmr-cloud-<type>.qcow2.tar.gz will be downloaded.
- Once you have the compressed QCOW2 package, you need to extract it so that you are left with the desired QCOW2 image. The compressed QCOW2 can be extracted using the tar command.



use going forward with OpenStack.

Note: Some OpenStack implementations claim to support direct qcow2.tar.gz file imports. However, Solace strongly recommends importing a decompressed image.

Import the QCOW2 into OpenStack

Note: Your OpenStack GUI may be slightly different than shown below. The following procedure may need to be adjusted to work in your OpenStack environment.

In the OpenStack GUI under Images, click Create Image.

Create An Image	×
Name: *	Description:
vmrcloud	Specify an image to upload to the Image Service.
Description:	Currently only images available via an HTTP URL are supported. The image location must be accessible to the Image Service. Compressed image binaries are
.4	supported (.zip and .tar.gz.)
Image Location:	Please note: The Image Location field MUST be a valid and direct URL to the image binary. URLs that redirect or serve error pages will result in unusable
http://example.com/image.iso	images.
Format: *	
QCOW2 - QEMU Emulator	
Architecture:	
Minimum Disk (GB):	
22	
Minimum Ram (MB):	
4096	
Protected:	
	Cancel Create Image

2. Enter details for your VMR Image, then click **Create Image**. The creation of the image may take several minutes to complete.

Starting the VMR Instance in OpenStack

- 1. Once the image is available for use, go to Images, and click Launch Instance.
- On the Details tab, specify an Instance Name and Flavor; under Instance Boot Source, select Boot from Image; and under Image Name, select the VMR image that was created in the previous section.

Note: The VMR will inherit the Instance Name as its hostname.

Launch Instance		ж
Details * Access & Security * Networking *	Post-Creation Ad	vanced Options
Availability Zone:	Specify the details for la	unching an instance
nova	The chart below shows the	he resources used by this project
Instance Name: *	in relation to the project's	a quotas.
VMR1	Flavor Details	
	Name	81.2
Flavor: *	VCPUs	2
B1.2	Root Disk	40 GB
Instance Boot Source: *	Ephemeral Disk	0 GB
Boot from image	Total Disk	40 GB
Image Name:	RAM	8,192 MB
soltr- (845.1 MB)	Project Limits Number of Instances	9 of 10 Used
	Number of VCPUs	18 of 1,000 Used
	Total RAM	73,728 of 10,485,760 MB Used
		Cancel Launch

3. On the Access & Security tab, select or create a Key Pair, and assign a security group.

Details *	Access & Security *	Networking *	Post-Creation	Advanced Options	
Key Pair:			Control access to	vour instance via kav pairs, secur	itur
Select a key	pair	+	groups, and other	mechanisms.	ny
dmin Pass:					
Confirm Admi	in Pass:				
Security Grou	ips: *				
📝 default					
SolaceOn	lySecurityGroup				

4. On the **Networking** tab, assign one and only one network interface to the VMR.

Launch Instance > Details * Access & Security * Networking * Post-Creation Advanced Options Selected Networks Imperiphration of drag and drop, you may be but to nor drag and drop, you may be accessed of the works by push but ton or drag and drop as well. Imperiphration of the second selected selected selected selected be by drag and drop as well. Imperiphration of the selected selected selected selected selected selected be by drag and drop as well. Imperiphration of the selected select		
Details * Access & Security *	Networking *	Post-Creation Advanced Options
Selected Networks	itis-	Choose network from Available networks to Selected Networks by push button or drag and drop, you may change nic order by drag and drop as well.
	515-	
		Cancel

5. Click the Launch button. The VMR will launch and the OpenStack dashboard will display the running instance. Here you can find the IP address of the instance.

Ins	tances				Filter		Q Filer			Soft	Rebool Instances
	Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Uptime	Actions
۵	VMR1	soltr-		B1.2 8GB RAM 2 VCPU 40.0GB Disk	-	Active		None	Running	3 minutes	Create Snapshot More +

6. To log into SolOS CLI, enter the following command:

ssh -i <auth_key> admin@<external_ip_address>

Notes: - <auth_key> is the key pair you registered when launching the image - <ip_address> will need to be a floating ip if you are connecting from a shell hosted outside of openstack

Managing the VMR Configuration

Unlike a Solace messaging appliance, a VMR starts with a basic configuration that enables most common services. This basic configuration can be modified as required. For more information, refer to <u>VMR Configuration Defaults</u>.

Configuring Users

After initially booting a cloud instance of a VMR, only key-based login for the admin account is allowed. For more information on login and user configuration, refer to <u>Configuring Users in the Cloud</u>.

Configuring Security Groups

Open up the default "Security Groups" or create a new "Solace" Security Group to allow TCP connections on SSH (22), HTTP/WebSockets (80), MQTT (1883), SEMP (8080), REST (9000), and JMS (55555) as shown in the screen image below.

- Comment [2]: From where? Comment [SR3]: Reply to Unknown Author (02/25/2016, 16:13): "..." I mean: Please provide more info. Please specify, that if user want to connect to an instance not from openstack nodes, a floating ip should be used Formatted: Indent: Left: 0" Formatted: List Paragraph, Outline numbered + Level: 1 + Numbering Style: Bullet + Aligned at: 0.75" + Indent at: 0.5"
 - Formatted: Indent: Left: 0"

oject	Ma	anage Sec	urity Group	Rules: Solace	2		
Compute	Se	curity Grou	p Rules				+ Add Rule X Delete R
Overview	0	Direction	Ether Type	IP Protocol	Port Range	Remote	Actions
Instances	.0	Egress	IPv6	Any	-	::/0 (CIDR)	Delete Rule
Volumes	0	Egress	IPv4	Any	2	0.0.0.0/0 (CIDR)	Delete Rule
Images	0	Ingress	IPv4	TCP	22 (SSH)	0.0.0.0/0 (CIDR)	Dalete Rule
Access & Security	0	Ingress	IPv4	TCP	80 (HTTP)	0.0.0.0/0 (CIDR)	Delete Fluie
Network		Ingress	IPv4	TCP	1883	0.0.0.0/0 (CIDR)	Delete Rule
Object Store		Ingress	IPv4	TCP	8090	0.0.0.0/0 (CIDR)	Delete Rule
Orchestration	1	Incress	IPv4	TCP	9000	0.0.0.0/0 (CIDR)	Delete Bule
imin	·					analara (anari)	

5.4 Testing

5.4.1 Target use case(s)

OpenStack provides the environment in which to easily deploy and horizontally scale instances of the Solace VMR for carrier-class pub/sub and message queueing. Whether it be scaling of IOT device connections or guaranteed JMS message delivery, Mirantis Openstack plus Solace VMR can provide the solution within an easy to operate environment that takes full advantage of any NFV specific performance enhancement (if required) such as CPU pinning, Hypervisor bypass, service chaining, etc.

5.4.2 Test cases

Test cases include:

- Being able to SSH to the administrative CLI
- Being able to start SolAdmin GUI and connect to the SEMP management port
- Publishing using REST
- Publishing and subscribing using MQTT
- Publishing and subscribing using SMF (or JMS)

5.4.2 Test Tools

Recommended testing tools include:

- ssh
- curl

- SolAdmin (download from Solace, see section 5.3 "Solace VMR installation steps")
- •___SDKperf (download from Solace, see section 5.3 "Solace VMR installation steps")
- (download from Solace)
- Mosquitto (or any other open source MQTT client from https://eclipse.org/paho/)

5.4.3 Test Results

5.4.3.1 SSH Port (22)

Test that you can SSH into the VMR administrative CLI from an external host and execute a "show version" command.

\$ ssh -i <auth_key> admin@<floatingexternal_ip>

Try a few show commands like "show version" or "show service".

Complete CLI help is online with the "help" command.

The full tree of commands can be listed with "tree"

Privileged mode (enables configuration commands) can be enabled with the "enable" command and is indicated with the "#" prompt in place of the ">" prompt.

See the Solace Feature Provisioning Guide for specific example command to enable the key features of the Solace VMR.

Comment [SR4]: Do you mean floating IP (in the openstack terminology)? If yes, please clarify that.

						1. ssh
iMac:~ hans\$ ss	h admin@172.16.0.133	3				
Solace Systems	- Virtual Message Ro	outer (VM	MR)			
By logging in to Solace VMR end is also availab	o the Solace Systems user license agreeme le by logging in as	s VMR you ent provi 'support	u are ided t t' or	agreeing o you wi 'root' a	to th th the nd typ	e terms of the WMR. The license Jing 'license'.
admin@172.16.0. Last login: Sun	133's password: Aug 30 21:32:05 201	L5 from 1	172.16	.0.254		
System Software	SolOS-TR Version 7	7.1vm.1.3	394			
Copyright 2004-3	2015 Solace Systems,	Inc. Al	ll rig	hts rese	rved.	
solace-vmr> sho Process	w version Release	Build	date			
CLI DataplaneMgr Controlplane Managementplane Current load is Backout load doo Loads available System uptime: f solace-vmr>	7.1vm.1.394 7.1vm.1.394 7.1vm.1.394 7.1vm.1.394 : soltr_7.1vm.1.394 es not exist on the appliance: 0d 6h 48m 36s	Jun 2 Jun 2 Jun 2 Jun 2	2 2015 2 2015 2 2015 2 2015 2 2015	17:14:1 17:14:1 17:14:1 17:14:1 17:14:1	7 UTC 7 UTC 7 UTC 7 UTC 7 UTC	

5.4.3.2 SEMP Port (8080)

Test that you can connect to the SEMP admin port on 8080 by installing and connecting using the SolAdmin GUI (download from Solace, see section 5.3 "Solace VMR installation steps")

Comment [SR5]: Where can we get this software?

			SolAd	min : 7.1.1.	58 - /Users/hans/SolAdmin/sol	a0191.608		
Properties	s Utilities Help							
pliance R	lesource Managemer	nt		🖥 File Transf	er 🐁 Connection Configuration	Coport Appliance Information Dy Appliance	Backup 🔏 Object Finder 📓 Statistics Chart 🍺 A	pplianc
by Manage	1 # @ I B Pieres	fransfer 😜	solace-vmr [1	72.16.0.13	3:8080] Message VPN Context			
Manaped	4 Applances ace-vmr [172:16:0:133:8080] - ac Fabric: 1	mm (Global Access Level Admin)	Current User		Clients Endpoints	Statistics User Management Network	Configuration Message VPNs, ACLs & Bridges	•
		Manage Appliance		Basic Applia	nce Properties Ö		aug-31-2015 18:01 16 /	тот
O Management IP Address	Management IP Address	172.16.0.133		voperties nt IP Addres	s/Host 172.36.0.133 N	anagement Port: 8080		1
	Management Port:	soad		perties			Backup Appliance Immediately 🗘 🎧	L
	User Name	admin			saltr_7.1vm,1.394 UTC	System Up Time: Router Time:	0d 4h 27m 59s Aug-31-2015 18:01:15 PDT	L
	Password:	[ME	solace-vmr solace-vmr	Deferred Host Name: Deferred Router Name:	solace-vmr	L
-	Use Secure Session			t Name: 951	Yes O	Deferred Mirror Host Nam Backup Schedule:	e. Yes never	L
ighbor I Tr	nust Store File		۹.	uto Backup: Rus:	N/A Changed since previous backup	Previous Backup:	N/A	
Te	rust Store Password			ties			Configure Service Admin State 🗘 🧕	
Cr	onfigure Advanced Properties			min States kbone:	Enabled			
ти	meout for Initial Connection 5	o Appliance (ms) 15000		Transport:	Enabled			
75	meout for Reading Reply from	Appliance (ms) 180000		Komino	Enabled			

5.4.3.3 REST Port (9000)

Test that you can connect to the Solace REST API port using cURL. In the following command, replace 172.16.0.137 with the floating ip address of the VMR instance you wish to test.

```
$ curl -v -X POST -d "hello REST"
http://<u>172.16.0.137</u>:<mark>172.16.0.137</mark>:9000/TOPIC/mytopic
*
    Trying 172.16.0.137...
* Connected to 172.16.0.137 (172.16.0.137) port 9000 (#0)
> POST /TOPIC/mytopic HTTP/1.1
> Host: 172.16.0.137:9000
> User-Agent: curl/7.43.0
> Accept: */*
> Content-Length: 10
> Content-Type: application/x-www-form-urlencoded
>
* upload completely sent off: 10 out of 10 bytes
< HTTP/1.1 200 OK
< Cache-Control: no-cache
< Content-Length: 0
< Server: Solace_Simulation/7.1vm.1.394
< Set-Cookie: TSID=00000002c100012; Path=/
```

Formatted: Font: Arial Formatted: Font: (Default) Arial, 11 pt, Font color: Black

Comment [SR6]: Please notify that this is the instance's floating ip in the current case and it may be differ.

```
< Solace-Client-Name: #rest/client/172.16.0.254/52229/000000002c100012
< *
* Connection #0 to host 172.16.0.137 left intact
$
```

5.4.3.4 MQTT Port (1883)

Test that you can connect to the Solace MQTT API port using the command line tools from http://mosquitto.org/download/ or any other MQTT client application. In the following command, replace 172.16.0.137 with the floating ip address of the VMR instance you wish to test.

\$ mosquitto_sub -h 172.16.0.137 -t mytopic Then in a separate window start an MQTT publisher \$ mosquitto_pub -h 172.16.0.137 -t mytopic -l hello MQTT hello again MQTT ^C

5.4.3.5 SMF/JMS Port (55555)

Test that you can connect to the Solace Messaging Format (SMF) port using either the native Solace API or an open API such as JMS. Solace provides sample applications with each language supported as well as separate JMS examples for use in stand alone or POJO JMS apps or inside J2EE App Servers such as JBoss, WebLogic, and WebSphere using JCA and Message Driven Beans.

Example sdkperf command to start an SMF subscriber <u>(download from Solace, see section 5.3</u> <u>"Solace VMR installation steps"</u>). In the following commands, replace 172.16.0.137 with the floating ip address of the VMR instance you wish to test.

\$ sdkperf_java.sh -cip 172.16.0.137 -stl mytopic

Example command line to publish 1000 messages of 32 bytes in size, at a rate of 100 messages per second, with the "direct" non-persistent message transport.

Comment [SR7]: Where can user get this utility?

\$ sdkperf_java.sh -cip 172.16.0.137 -ptl mytopic -mt direct -mn 1000 -mr 100
-msa 32

T

			troubleshooting section.
5.4.3 Known Issues and	<u>d Workarounds</u>		Formatted: Outline numbered + Level: 3 + Numbering Style: 1, 2, 3, + Start at: 2 + Alignment: Left + Aligned at: 0" + Indent at: 0.5"
provides workarounds for correcting them, where available.			Formatted: List Paragraph, Indent: Left: 0.39"
Reference Number	Description		Formatted: Font: (Default) Arial, 11 pt, Font color: Black
			Formatted: Line spacing: At least 17 pt
53435	CSPFNeighbor stats will always show zero.		Formatted: Font: (Default) Arial, 11 pt, Not Bold, Font color: Black
<u>53726</u>	The VMR cannot participate in a network of Solace appliance	es, if that	Formatted: Font: (Default) Arial, 11 pt, Font color: Black
			Formatted: Font: (Default) Arial, 11 pt, Not Bold, Font color: Black
<u>54308</u>	When logging in as root or support user, the following messa on the terminal: "Error sending status request (Operation not	ge will ar permitte	Formatted: Font: (Default) Arial, 11 pt, Font color: Black
		. ///	Formatted Table
	Configuration changes made between executing backup 'for-	upgrade	Formatted: Font: (Default) Arial, 11 pt, Font color: Black
55637	a non- upgrade vmrc restart will be lost.		Formatted: Font: (Default) Arial, 11 pt, Font color: Black
<u></u>	Workaround: Do not make any configuration changes until you completed the upgrade. If configuration changes have been	ou have made in t	Formatted: Font: (Default) Arial, 11 pt, Font color: Black
	window, re- apply them to the VMR after the restart has com	pleted.	Formatted: Font: (Default) Arial, 11 pt, Font color: Black
	The power- down command will not stop the VM instance wh	en runnir	Formatted: Font: (Default) Arial, 11 pt, Not Bold, Font color: Black
55000	the cloud. The VMR will restart automatically after issuing the command	e power-	Formatted: Font: (Default) Arial, 11 pt, Font color: Black
<u>55863</u>	Workaround: Use cloud management tools to stop the VMR	instance	Formatted: Font: (Default) Arial, 11 pt, Font color: Black
	instead.		Formatted: Font: (Default) Arial, 11 pt, Not Bold, Font color: Black
	The 'backup for- upgrade' command may fail due to lack of d	isk space	Formatted: Font: (Default) Arial, 11 pt, Font color: Black
<u>55915</u>	when using the default message spool partition.		Formatted: Font: (Default) Arial, 11 pt, Font color: Black
	Workaround: Migrate the message spool to a larger external	block de	Formatted: Font: (Default) Arial, 11 pt, Not Bold Font color: Black
	following the procedure in the VMR Setup Guide, and then re	etry the	Bora, I oli colol. Black

backup for- upgrade' command.	Formatted: Font: (Default) Arial, 11 pt, Font color: Black
L	Formatted: Space After: 12 pt, Line spacing: At least 17 pt, No widow/orphan control, Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers