perfSONAR-MA-VM Installation Guide

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| Authors: | D. Stoykov |

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# Introduction

The perfSONAR-MA-VM is a preconfigured virtual appliance intended to simplify the deployment of a perfSONAR measurement archive (MA). It is based on the CentOS 6.4 operating system and contains the SQL Measurement Archive and the perfsonarUI, together with the required dependencies, preconfigured and ready for use.

The perfSONAR-MA-VM is delivered in two formats:

* Open Virtualization Format (OVF) package, which can be deployed on any hypervisor that supports the OVF standard.
* VMware virtual machine format (.*vmx* and .*vmdk* files). This allows for faster and more convenient deployment on VMware products, such as VMware ESX/ESXi, VMware Workstation and VMware Player.

# Installation

## System Requirements

### Supported platforms

The following platforms are supported by the VMware format version:

* VMware ESX/ESXi 4.0 or later
* VMware Workstation 6.5.0 or later
* VMware Player 3.0 or later
* VMware Server 2.0

The OVF version can be deployed on any virtualization platform that conforms to the standard.

### Hardware requirements

The perfSONAR-MA-VM is configured with the following resources:

* 1 virtual CPU (core)
* 2 GB RAM
* 16 GB system drive and 20 GB data drive (/var filesystem) thin provisioned
	+ ~ 3 GB will be initially occupied on systems that support thin provisioning

## VM installation

* For the VMware version, download the perfSONAR-ma-vm.vmx and perfsonar-ma-vm.vmdk files into a single directory.
	+ For desktop software (VMware Workstation, VMware Player) open the virtual machine by double-clicking on the perfsonar-ma-vm.vmx file. Make sure the network adapter is using a bridged network connection.
	+ For ESX/ESXi/vSphere:
		- use the VMware Converter to deploy the virtual machine and select ”VMware workstation or other VMware virtual machine” as source type. (*recommended*)

or

* + - upload both files to a directory on the datastore, then right-click on the .vmx file, choose “Add to Inventory” and follow the prompts.
* For the OVF version, refer to documentation of your preferred hypervisor for instruction on how to deploy a virtual machine from the OVF template.

Regardless of the platform, make sure the virtual network interface is bridged to the proper network segment in case there is more than one available.

# Guest OS setup

Login to the console with the following default credentials:

User: root

Password: perfsonar

## Initial (mandatory) steps

After performing these steps, the system will be able to collect and visualize measurement data. The perfsonarUI can be accessed at <http://$SERVER_NAME:8080/perfsonar-ui/>. In the services list, a special entry called LOCALHOST has been added, that can be used to access stored measurements on this machine.

### Set root password

Change the root password by issuing the *passwd* command.

~]# passwd

Changing password for user root.

New UNIX password:

Retype new UNIX password:

passwd: all authentication tokens updated successfully.

~]#

### Configure hostname and network settings

By default the system if configured with no IP address assigned to the network interface card. Use the *system-config-network* interactive tool to configure network settings (hostname, static IP address, network mask, default gateway, DNS servers).

Alternatively, direct editing of the network configuration files can be used.

* */etc/sysconfig/network*
* */etc/sysconfig/network-scripts/ifcfg-eth0*
* */etc/resolv.conf*

After configuration is finished, restart the network service:

~]# service network restart

### Configure SQL-MA admin password

The SQL MA is configured via a web interface available at:

http://$SERVER\_NAME:8080/geant2-java-sql-ma/

The default credentials are:

* Username: *perfsonaruser*
* Password: *perfsonarpass*

SQL MA is configured to work out of the box. However, as a minimum, the default password should be changed. This option is available at Service Settings -> Administration Configuration.

### Configure MySQL root password

While MySQL is not accessible over the network, it is recommended to set a password for the root user. To do so run the command:

~]# mysql\_secure\_installation

Accept the suggested defaults and set a root password.

## Optional setup

These steps are not essential, but are recommended for smoother operation and better results. Some of them are specific for the perfSONAR software, while others are general good practices for running Linux/Unix systems.

### Enable Lookup Service registration

Registration with the Lookup service is supported, but not enabled by default. To have the measurement archive register into the Lookup service, open the SQL MA web interface, navigate to Service Settings -> LS Configuration and fill in the required information.

### Enable SSH access

By default SSH access is restricted, but can be allowed for specific remote hosts or networks that will be used to manage the server. To do so edit the */etc/hosts.allow* file and add a line similar to this:

sshd: 172.16.0.5 172.16.0.1 172.16.2.0/24

To allow SSH access from everywhere, use the ALL keyword.

sshd: ALL

### Configure time zone

The system is configured to automatically synchronize time via the NTP protocol, which uses Coordinated Universal Time (UTC) and does not rely on time zone and DST settings. However, in order to have local time displayed correctly in log files, etc., it is recommended to configure the local time zone. In order to do that, edit the */etc/sysconfig/clock* file and replace *Europe/Sofia* with the proper string for your location. A list of available time zones can be obtained by checking the contents of the */usr/share/zoneinfo* directory. Running processes will adopt the new setting after the next restart.

### Configure time servers

The NTP daemon is enabled by default, but is set up to sync with public servers from the *pool.ntp.org* project. In order to get more precise results, it is recommended to replace them with ones closer to your location. Ideally that would be stratum 1 time servers within your institution or NREN.

1. In the file */etc/ntp.conf*, comment the existing server definition lines and add new ones in accordance with the recommendations above.

#server 0.centos.pool.ntp.org

#server 1.centos.pool.ntp.org

#server 2.centos.pool.ntp.org

server ntp.example.org

server ntp2.example.org

1. Restart the NTP daemon.

~]# service ntpd restart

1. Verify time synchronization is working correctly by checking logging output:

~]# tail -f /var/log/messages

After some time you should see a line similar to this:

Aug 26 07:02:34 mx1 ntpd[2118]: synchronized to 91.210.88.73, stratum 1

### Configure an e-mail alias for the root account

By default the root account receives mail from the system with regularly generated reports or upon certain unexpected critical events. Therefore it is recommended to redirect all e-mail destined to the root account to another address, that will be regularly checked by the person or team responsible for the server.

To do so edit the file */etc/aliases* and add a line similar to this:

root: support@example.com

Then update the aliases database by running:

~]# newaliases

### Configure SMTP relay servers

While a networked host may be able to deliver outgoing mail by itself, it is recommended and often required to configure a mail relay server (smart host). To do so edit the file */etc/postfix/main.cf* and add a line similar to this:

relayhost = [smtp.example.com]

Then reload the postfix mail transfer agent (MTA) configuration:

~]# service postfix reload

# Expanding the data storage partition

The /var directory, where the measurement archive database is located, is placed on a ext4 filesystem on a separate 20GB virtual drive, managed by the Logical Volume Manager (LVM). This allows for online expansion of the filesystem partition without reverting to unsupported methods or third-party tools. Depending on the capabilities of the hypervisor, this can be achieved by extending the existing virtual disk or by adding another virtual disk.

## Expanding by extending the existing virtual disk

1. Force a SCSI bus rescan in order to have the expanded disk detected without a reboot:

~]# echo 1 > /sys/block/sdb/device/rescan

1. Create a new partition of type 8E (Linux LVM) on the newly added. A reboot may be required afterwards before the new partition is visible to the.

~]# cfdisk /dev/sdb

1. Initialize a new physical volume:

~]# pvcreate /dev/sdb2

1. Extend the volume group on the new physical volume:

~]# vgextend vg\_perfsonarmavm /dev/sdb2

1. Extend the logical volume with the newly added space:

~]# lvextend -L+10G /dev/vg\_perfsonarmavm/LogVol00\_var

1. Expand the underlying filesystem:

~]# resize2fs /dev/vg\_perfsonarmavm/LogVol00\_var

## Expanding by adding an additional virtual disk

Assuming the new virtual disk is discovered as /dev/sdc, the measurement archive partition can be expanded by performing the following steps:

1. Initialize a new physical volume:

~]# pvcreate /dev/sdc

1. Extend the volume group on the new physical volume:

~]# vgextend vg\_perfsonarmavm /dev/sdc

1. Extend the logical volume with the newly added space:

~]# lvextend -L+10G /dev/vg\_perfsonarmavm/LogVol00\_var

1. Expand the underlying filesystem:

~]# resize2fs /dev/vg\_perfsonarmavm/LogVol00\_var

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