BLEKINGE TEKNISKA HÖGSKOLA

Monitoring the Performance of Virtual Machines

TEAM: 'SHIELD'

HARSHINI NEKKANTI

HIMA BINDU NUTALAPATI

JYOTHI SPANDANA PENMETSA

NAVYA UPPALAPATI

PRIYASUBHA CHUNDRU

RAYWON TEJA KARI

SAIPHANI KRISHNA PRIYANKA KOLLURI

SASANK SAI SUJAN ADAPA

SRAVANI KANCHARLA

TULASI PRIYANKA SANABOYINA

VEERAVENKATA NAGA SOMESWARA MANITEJA DARISIPUDI

Document Type: **Installation Document**

Version 1.1

CONTENTS

1. Preface

This is the Installation document of the developed software product. It consists of all the necessary steps needed to install the required tools and software to use the software product, and its operations. The remainder of the document is organised as follwos. Glossary and abbreviations include the abbreviated terms involved in the product development document. The overview of the product gives a basic idea on how the product is developed and what it can do. The prerequisites, installation steps are included. And the steps to start the software are included.

Revised version v1.1 on 2015-05-29

- Changes in installation steps and configuration steps added. Refer section 5.

2. Glossary and Abbreviations

API: Application Program Interface

CN: Compute Node

GUI: Graphical User Interface

HTTP: Hyper Text Transfer Protocol

MOD: Module

RRD: Round Robin Database

SYS: System

USR: User

VM: Virtual Machine

3. General Information

3.1. Overview

The software product is used to monitor resource utilization metrics namely, CPU utilization, network I/O usage, memory usage, and disk usage of all the hosts and virtual machines in them. With the product, the user will be able to monitor the resource utilization in an http page. The user can add/remove hosts and virtual machines, view graphs and utilization statistics of the hosts and virtual machines, view alerts when any device exceeds threshold.

4. Prerequisites

- **Operating System:** The software product was developed on 64-bit Ubuntu 14.04 LTS operating system. Hence, the user is recommended to use the same operating system in order for the software to work properly.
    - The operating system can be downloaded and installed using the Ubuntu official website given below:
        - http://www.ubuntu.com/download/desktop
    - The user is expected to be familiar with the usage of the Ubuntu operating system such as accessing the terminal, internet etc.
- **Hypervisor:** The user needs to install a hypervisor on every system to create number of virtual machines at his will. User have the choice to install either a '*xen*' hypervisor or a '*kvm*' hypervisor.
    - ***Xen Hypervisor:***
        - To install a xen hypervisor, user needs to run the following command in the terminal:
            - **"sudo apt-get install xen-hypervisor-amd64"**
            - After the installation is done, reboot the system using the command: 'sudo reboot' in the terminal
            - To check whether xen is installed or not, use the following command in the terminal : 'sudo xl list'
    - ***Kvm Hypervisor:***
        - To install a kvm hypervisor, user needs to run the following command in the terminal:
            - **"sudo apt-get install qemu-kvm libvirt-bin Ubuntu-vm-builder bridge-utils"**
            - After the installation is done, reboot the system using the command: 'sudo reboot' in the terminal
            - To check whether kvm is installed or not, use the following command in the terminal : 'virsh -c qemu:///system list
    - Run ssh atleast once using the command ssh username@ipaddress and enter the respective host's password. This will register the device in the ssh known hosts.

5. Installation steps

- Several **tools and modules** are to be installed, which are described thoroughly in this section:

    a) Apache Web Server:

a. Apache web server is an open source license web server used in most of the UNIX based operating systems such as LINUX, Ubuntu etc.
b. Apache Web server is to be installed in the Ubuntu operating system. Best method is using the terminal.
c. Enter and run the command "*sudo apt-get install apache2*" to install the apache web server package.
d. To check whether the apache2 server is installed, open the web browser and enter the URL '*https://localhost/*'. It displays the default apache page.

b) php5

a. Php is a server side scripting language used for web development. It is a general purpose programming language.
b. Php5 is to be installed using the command "sudo apt-get install php5"
c. Enter the following command in the terminal after the installation is completed "sudo apt-get install libapache2-mod-auth-mysql php5-mysql phpmyadmin"
d. While installing these packages, the terminal will prompt for a password, user needs to enter any desired password, this password will be the password to the user's database.
e. After the installation is complete, enter the following command to restart the apache server "sudo service apache2 restart"
f. To check whether the phpmyadmin is installed, open the web browser and enter the URL '*https://localhost/phpmyadmin*'
g. User must link the apache2 directory with the phpmyadmin directory, using the following command: '*sudo ln -s /usr/share/phpmyadmin /var/www/phpmyadmin*'
h. If the webpage displays the '*404 Error*', user needs to change the permissions of the apache2. To change the permissions, user must run the command '*sudo chmod -R 775 /etc/phpmyadmin*'

c) MySQL

a. MySQL is the widely used relational database management system (RDBMS) and is used as a database.
b. MySQL is installed using the command "sudo apt-get install mysql-server"

c. While installing these packages, the terminal will prompt for a password, user needs to enter any desired password, this password will be the password to the user's database.
d. Once the installation is complete, restart the MySQL using the following command "sudo service mysql restart"
e. While installing the mysql package, the terminal will prompt to enter a password for creating the mysql, user can enter his desired password to access the database.

d) Virt-Top

a. The virt-top command is used to know the VM utilization statistics.
b. The virt-top package is to be installed using the terminal and command used is '***sudo apt-get install virt-top***'

e) **Netstat, IOstat**

a. Netstat and Iostat are the tools used to find the network statistics and disk usage statistics of hosts
b. The above tools are to be installed using terminal and the commands are : '***sudo apt-get install netstat***' and '***sudo apt-get install sysstat***'

f) Open SSH

a. Open SSH provides secure connection between two hosts
b. User must install openssh client and server in the device using the commands '***sudo apt-get install openssh-client***' and '***sudo apt-get install openssh-server***'
c. After the installation is completed, open the sshd_config from the /etc/ssh/ directory and edit the PermitRootLogin to yes and save the changes.
d. Now run the command '***sudo passwd***' and enter the desired password, and after the process is completed, restart the ssh service by using the command '***sudo service ssh restart***' and '***sudo service ssh reload***'

g) CPAN

a. CPAN is an archive of software modules, which are nearly 130,000 in number. CPAN is used by perl scripting.
b. CPAN is installed in Ubuntu using the command "**sudo apt-get install CPANMINUS**"
c. As soon as the install is completed, enter and run the commands "**sudo apt-get update**" and "**sudo apt-get upgrade**" to update and upgrade the system

h) Perl Modules

a. Several perl modules are to be installed.
b. To install the perl modules of CPAN, cpan shell is to be used.
c. Cpan shell is accessed by using the following command, which is entered in the terminal "sudo perl –MCPAN –e shell"
d. Shell opens up and enter the following commands to install respective modules
   i. Net::OpenSSH module
      Install Net::OpenSSH
   ii. IPC::System::Simple (qw)
      Install IPC::System::Simple (qw)
   iii. DBI Module
      Install DBI module
   iv. DBD::MySql module
      Install DBD::MySql
   v. Data::Dumper module
      Install Data::Dumper
   vi. RRD::Simple module
      Install RRD::Simple
   vii. Mail::Sender module
      Install Mail::Sender

- The product is submitted as a tar.gz file
- Move the folder SHIELD in the tar.gz file to /var/www/html
- Grant permission to all the files in the directory for successful execution using the command '***chmod –R 777 /var/www/html***'

Note: User is recommended to create virtual machines using virt-manager and the command used to install the virt-manager is '***sudo apt-get install virt-manager***'. Care should be taken that the names of the VMs are unique.

- For creating vms using virt-manager, user needs to do the following:
  - Download Ubuntu desktop ISO file from the official Ubuntu website i.e., https://www.ubuntu.com/download/desktop
  - Add connection in the virt-manager and select the respective hypervisor installed on the system, and follow the procedure as shown in the dialog box.

6. Steps to start the software

- Open the terminal in Ubuntu by pressing CTRL+ALT+t

- Change the directory to /var/www/html/SHIELD by using the command '***cd /var/www/html/SHIELD/'***
- Run the backend script 'backend.pl' using the command '***sudo perl backend.pl'*** to start the software.