Deploy Monitoring Service On An Open Stack Cloud

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Abstract - The objective is to implement an efficient monitoring solution for an OpenStack cloud environment. The monitoring solution should provide administrators with real-time information about the cloud's status, incoming and outgoing data, and other relevant metrics. The chosen approach involves setting up a single-node environment using VirtualBox and configuring Vagrant to deploy Nagios, a monitoring tool, on the virtual machine. The goal is to streamline the monitoring process and enable administrators to effectively manage and maintain the OpenStack cloud infrastructure

Key words: OpenStack, MONAAS, XAAS (Anything-as-a-Service)

I INTRODUCTION

Throughout the years, corporate computing has undergone significant transformations, leading to the emergence of cloud computing. Here is a summary of the key developments:

1990s: Corporate computing revolved around servers housed in data centres. Organizations maintained their own hardware infrastructure and managed their computing resources on-site.

2000s: Virtualization became prominent in corporate computing. It involved abstracting physical hardware into virtual machines, enabling better resource utilization and flexibility in managing workloads.

2010s: Cloud computing gained traction as a solution to leverage corporate computing capabilities. Cloud computing encompasses a broad range of services and approaches, and it is interpreted differently by end-users and system administrators.

Infrastructure as a Service (IaaS): This approach provides virtualized infrastructure, such as virtual machines, storage, and networking resources, to users. Platform as a Service (PAAS): PAAS providers offer a complete development and deployment platform, including the underlying infrastructure, operating system, middleware, and runtime environment, to host applications. Software as a Service (SAAS): SAAS providers deliver applications over the internet, allowing users to access and use them without the need for local installation or management.

OpenStack primarily falls under the IaaS category of cloud computing. However, OpenStack is an evolving platform that continuously expands its scope. It occasionally extends beyond traditional IaaS functionalities to offer additional services.

In the context of OpenStack, there is a need for effective monitoring of the deployed services. This is where MONAAS (Monitoring-as-a-Service) comes into play. MONAAS, a part of the XAAS (Anything-as-a-Service) framework, provides a dedicated framework for deploying monitoring functionalities for various services and applications within a cloud environment. It helps administrators track and manage the performance, health, and status of their cloud resources effectively.

The aim of the project is to deploy and monitor an OpenStack cloud environment using Nagios as the monitoring tool. OpenStack, being built on open standards and supported by major cloud services players, provides an open API that attracts developers and simplifies their work.

The project scope includes the following tasks:

Installation of VirtualBox: Setting up the virtualization software on the machine.

Configuring a Vagrant: Creating a Vagrant configuration to manage the virtual machine environment.

Deploying Nagios: Installing and setting up Nagios as the monitoring service on the single-node architecture.

Port Forwarding: Configuring port forwarding to enable communication between the host machine and the virtual environment.

Monitoring the system: Utilizing Nagios to monitor the performance and status of the OpenStack cloud on the single node.

However, the project scope explicitly excludes the following:

Including any features in the monitoring tools that are not technically, economically, or operationally feasible.

Monitoring any paid services, focusing solely on the monitoring of the OpenStack cloud deployed on the single node architecture.

By adhering to the defined scope, the project aims to successfully deploy Nagios for monitoring an OpenStack cloud environment on a single node architecture while considering feasibility and excluding monitoring of paid services.

II LITERATURE SURVEY

Existing System: In the current scenario, Cloud Computing has become a widely adopted technology, with major players in the IT industry deploying their own cloud platforms. Once a cloud infrastructure is deployed, it requires ongoing maintenance, and administrators need to have real-time visibility into the cloud's performance, incoming and outgoing data, and overall status. Monitoring plays a crucial role in simplifying these tasks for administrators.

However, when it comes to monitoring an OpenStack cloud, there is no comprehensive solution that provides all the necessary facilities for monitoring and alerting.

The closest solution available for monitoring OpenStack is a tool called Ceilometer. Ceilometer is primarily designed to track and measure usage information collected from various OpenStack components, originally intended for billing purposes. While Ceilometer is useful for cloud operators and infrastructure metering, it falls short as a monitoring solution for tenants and their services/applications running in the cloud. It lacks support for service/application-level monitoring and does not provide detailed and precise metrics from guest systems.

In summary, the existing system relies on Ceilometer, which offers metering capabilities for OpenStack components but does not provide comprehensive monitoring features for tenants and their applications/services within the cloud.

The referenced papers highlight the importance of monitoring in cloud computing and discuss the limitations of existing monitoring solutions in OpenStack, such as Ceilometer. Here are the key points from the papers:

"Enhanced Monitoring-as-a-Service for Effective Cloud Management" (IEEE Transactions on computers, VOL.62, NO.9, September 2013):

Monitoring in the cloud involves executing checks, applying rules, alerting users, and maintaining a history of data within the cloud.

MONAAS (Monitoring-as-a-Service) is a cloud delivery model under XAAS (Anything-as-a-Service) that deploys monitoring functionalities for various services and applications in the cloud.

MONAAS reduces the cost of ownership by leveraging advanced monitoring tools and functionalities, making it easier to implement state monitoring at different levels of cloud services compared to developing ad hoc monitoring tools or dedicated hardware/software.

"OpenStack Monitoring (MONAAS)" by Alexandre Viau & Thibault Cohen:

OpenStack is a powerful tool for implementing cloud functionalities in an open-source environment, and it supports several monitoring tools like Nagios and Zenoss.

Ceilometer, an OpenStack component, collects measurements from various platform components but is primarily designed for billing purposes and lacks comprehensive monitoring capabilities for users and their applications.

Ceilometer does not allow monitoring at the application level.

The papers identify missing capabilities in existing monitoring solutions, such as polling, services availability, applicative data, and checking scenarios.

The proposed solution involves deploying a monitoring tool, like Nagios or Zenoss, on a virtual machine to monitor incoming and outgoing traffic on the base machine or any other machine.

The proposed project aims to address the limitations of existing monitoring solutions in OpenStack by deploying a dedicated monitoring tool on a virtual machine to monitor network traffic. This approach would provide more comprehensive monitoring capabilities, including application-level monitoring, which is lacking in Ceilometer and other existing solutions.

III WORKING ENVIORNMENT

a.**VirtualBox** is a cross-platform virtualization application that allows users to run multiple operating systems on their existing computers simultaneously. It can be installed on Intel or AMD-based computers running Windows, Mac, Linux, or Solaris operating systems. VirtualBox extends the capabilities of the host computer, enabling it to run multiple virtual machines concurrently.

The installation process for VirtualBox involves downloading and installing the specific version, such as Oracle VirtualBox 5.1.14 released on January 17th, 2017. This version is a maintenance release that focuses on improving stability and fixing any regression issues. The detailed changelog provides more information about the changes implemented in this release.

VirtualBox is known for its simplicity and flexibility, making it suitable for various use cases ranging from small embedded systems and desktop machines to datacentre deployments and cloud environments. It offers the convenience of running multiple operating systems on a single physical machine, allowing users to allocate resources like disk space and memory according to their requirements.

b.Vagrant is an open-source software tool designed to create and maintain portable virtual development environments. It addresses the challenges of managing complex development environments in large projects

with multiple technical stacks. The core idea behind Vagrant is to simplify environment maintenance, reduce setup time, and increase development productivity.

Vagrant is primarily written in the Ruby programming language, but it supports development in various other languages through its ecosystem. It acts as a wrapper on top of virtualization software, enabling developers to easily interact with different providers. Instead of directly using virtualization software, Vagrant automates the configuration of virtual environments using tools like Chef or Puppet.

To define the required machine and software configurations, developers utilize a file called the "Vagrantfile." This file specifies the necessary steps to create a development-ready virtual machine. A Vagrant environment is packaged into a format known as a "box," which is an extension (.box) that can be copied to other machines to replicate the same environment.

In summary, Vagrant simplifies the management of virtual development environments by automating configuration and providing a portable solution for replicating environments across different machines. It eliminates the need for manual setup and maintenance, allowing developers to focus on their work efficiently.

c. Proposed Methodology

Software requirements:

- Operating System : UBUNTU 14.04 LTS or higher.
- Languages used : Python.
- Softwares used : Openstack and it's various plug-ins.

Hardware requirements:

- Processor : Intel i3 processor 2.1 Ghz or higher.
- RAM : 8GB or higher.
- Hard disk : 20GB.

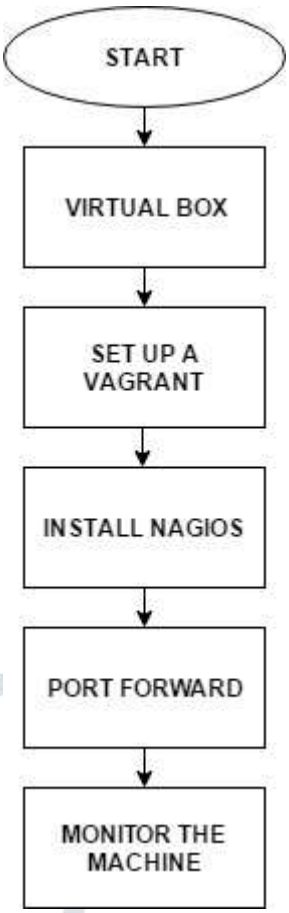

Figure 1: Steps to Monitor Cloud

This service is used to monitor the cloud and all its activities through the use of event logs. Event logs are the best way to record every single action that has been performed by the cloud.

IV CONCLUSION

we have researched existing monitoring schemes for the Openstack Cloud. We have worked with Openstack, Zenoss, Nagios. We have made a note of all the advantages and disadvantages each tool provides. Our aim to implement Nagios for a single node architecture was successful.

REFERNCES

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