

Performance Monitoring of Linux Servers on Cloud using Web Panel

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Abstract— Our developed module for – “Performance monitoring of Linux servers on Cloud “is to construct the large-scale, flexible, multi-pram monitoring, remotely collect data over SSH i.e. secure shell, no extra client to install with an alternate command execution panel for multi-tier virtualized network management and performance monitoring system that will be access by end user using Web panel as a Dashboard.

It is evident that information and communication technologies (ICT) have transformed our lives. Where cloud computing plays an important role in today’s IT sector, Performance monitoring is one of the most important aspects for the Cloud Servers that will indicate how well a system or Linux machine meets its requirements for timeliness. It will be sounds good if we will have a web panel to monitor the performance of Linux servers instead of going to Datacenter or Server room and monitor it via black and white console.

Performance Monitoring of Linux servers on Cloud using Web Panel will provide the performance or health monitoring of Servers as a part of cloud infrastructure. It will generate the alerts respective to system storage, CPU Utilization, Memory etc. Web-Panel for Linux can ensure maximum productivity in an effective and efficient manner through log or event of system that results in predictive analysis. There are many common monitoring systems for Linux Servers but our deployed module is to ensure Servers Performance and normal run, to ensure server management and maintenance by providing a web shell, and to lower the effect of human factors. Where Cloud Computing is a rising technology in IT sector, has great potential for future and used to access the resources (hardware, software) over the network via Internet wherever and whenever user need in an effective and efficient manner , Design of integrated monitoring system should think all monitoring systems as a whole through web Based panel. Where everyone are looking for the better visualization in terms of User Interface, this web panel will act like a dashboard for performance monitoring. It enables the cloud servers to more rapidly adjust resources to meet fluctuating and unpredictable monitoring demand and provides elasticity and flexibility in all computing manner.

This keynote will address the Performance Monitoring of Linux servers on cloud using Web Panel – what it is and how it can be explore in current cloud computing system to provide better performance monitoring on cloud to utilize the resources in future. It provides an impact of Cloud computing in noblest pursuit of all, performance where resource

allocation and sharing purpose will fulfill in an effective manner, outlines the role of virtualization in the establishment of cloud, several attractive benefits it can.

Keywords— *Performance Monitoring, Web Panel as a Dashboard, Cloud Computing, Integrated Monitoring Solution, Challenges in Monitoring Solution.*

I. Introduction

In context of Cloud Computing, virtualization refers to the basic concern where sharing of resources happens in terms of memory, CPU usage, storage, network and much more. Performance is one of the most important aspects concerned with cloud servers and provisioned VMs as a deployment model mainly in IaaS (Infrastructure as a Service). It indicates how well a system meets its requirements for timeliness. Performance Monitoring will provide the performance or health monitoring of VM/Server as a part of cloud infrastructure. It will monitor the performance respective to system storage, CPU Utilization, Memory etc. It keeps the application and process to run in an effective and efficient manner and help to monitor or measure the level of a product's performance.

The most common use of profiling information is to aid program optimization. Performance is extremely important for understanding program behavior. Computer architects need such tools to evaluate how well programs will perform on new architectures. Software writers need tools to analyze their programs and identify critical sections of load, CPU usage etc.

At present, necessity of performance respective to deliverable is now swelling at an extent that organizations are facing several challenges in server monitoring which can be overcome by using our developed module through Web Panel. The Challenges are;

- 1) **Cost:** Based on Pay-Per-Use policy as a part of Cloud.
- 2) **Resource utilization:** Effectively manageable.
- 3) **Security:** Ip-tables/Security Management through Web Panel.
- 4) **Data/Information Integration and Benchmarking**

II. Integrated Monitoring Solution

We have provide an integrated monitoring solution for our module that is mainly based on SSH. It will act like a central monitoring solution for all cloud servers. SSH is Generic tool which is available with all UNIX architecture based system and can communicate with other Linux machine in a secure way. Thus in our developed module for performance monitoring system, we used SSH, as a generic agent for remotely collecting the data from cloud servers. It did not create any major overhead to the servers and results in a secure data transfer. It is used for encrypted point to point terminals and data copying across the internet.

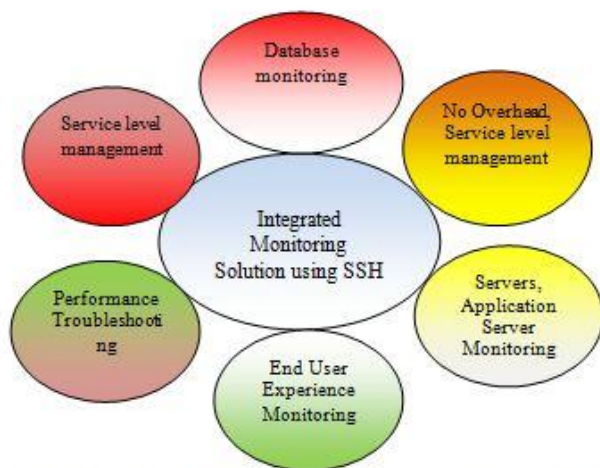


Fig.1. Benefits of Integrated Monitoring Solution on Cloud

A. Architecture

It has a central component based architecture have database as MySQL. It remotely collect the data over SSH and store it into database which results in administration with the data we need to quickly discover, isolate and solve problems that negatively impact Server/VM performance using database query and Linux commands. This is specific to a particular application or monitor multiple applications on the same network, collecting data about client CPU utilization, memory demands, data throughput and bandwidth.

At peak level of memory usage, server collects no data. For instance, if one process consumes 100 % usage, machine stops responding or get slower. For example, the space (memory) or time complexity of a program, the usage of particular instructions, or frequency and duration of function calls. The most common use of profiling information is to aid program optimization. We are monitoring alert thresholds on established baseline metric values that we have gathered from servers. This ensures that generated alerts are calibrated to system architecture. Properly calibrated alert thresholds are more likely to detect actual deviations from normal system behavior, and thus provide the cloud servers a measure of protection.

- It will support granular monitoring, alerting, reporting and analysis.
- It has the ability to extend for custom server, service or application metric collection.

The following diagram gives an overview of the developed architecture of our module including the database in the server. Here, as a multi-tier architecture of the network monitoring solution system, multiple servers will communicate to each other. The basic fundamental to achieve this is the message bus, RabbitMQ server which provide elastic services and protocols for monitoring solutions to communicate and transfer the data inside the queue. The middle tier of the cloud servers is deployed to run in one Java Virtual Machine (JVM) process. Web Panel UI is achieved using HTML5 and JQuery over the browser as a thin client.

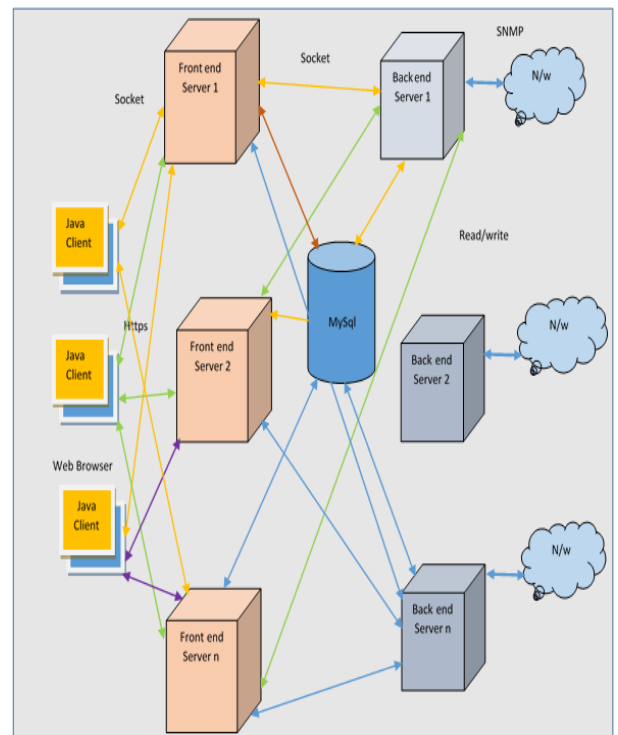


Fig.2. Multi-tier Architecture based on Java and MySQL

III. Implementation

We implemented our module for performance monitoring of Linux servers on cloud to construct the large-scale, flexible, multi-pram monitoring, no extra client to install with an alternate command execution panel for multi-tier virtualized network management and performance monitoring system that will be access by end user using Web panel as a Dashboard. It is divided into several modules that are as follows as:

- 1) **Super admin Module:** provide administration rights as supervising activities in progress to ensure they are on-course and on-schedule in meeting the objectives and performance targets. It helps to monitor the user activities and server activities log like addition/deletion,

activate/deactivate the server based on memory usage and cpu performance.

2) **Performance Monitor:** provides a platform where end user can also deploy there application. It focuses on making sure that server are performing as they are to be expected. Some types of processes may cause a dramatic increase in execution time. This may limit the application of performance to execution contexts and list the performance data on cloud server including:

- load_avg
- cpu_avg
- mem_avg
- disk_avg

3) **System Performance Graph:** It generate the graph based on System performance, it first looks for the server report generation i.e. consists the listing of cloud server details, number of active servers etc. It helps to know what kind of load it is handling. This information is particularly useful when we start finding the website or application to be running slower than usual. We can run a check on the performance of the system and compare it with prior results to see the increase in load. Then we can take the necessary action to fix the problem. To gather the performance data of server we need to use this module on the server and let it gather information which will give an idea of the performance of the server. It detects CPU Bottlenecks, runaway processes, I/O bottlenecks, improper I/O load balancing, slow disk devices, memory bottlenecks and leaks, inefficient system buffer cache sizing, improper system table sizes, inefficient PATH variables, and other problems with the way Linux and UNIX kernel parameters are set. The resource analysis and recommendations sections will analyze the data and make recommendations for gradual changes to VMs. The capacity planning component will approximate the amount of capacity left on system and determine which resource is likely to become exhausted first. There is no need of installation and buying the licensed version software. It makes the users free from the maintenance and support.

4) **CPU Performance Graph:** It allows accessing virtualized servers to quickly turn computing capacity up and down according to the requirement. It is characterized by the amount of useful work accomplished by a computer system or computer network compared to the time and resources used.

Depending on the context, high computer performance may involve one or more of the following:

- Short response time for a given piece of work
- High throughput (rate of processing work)
- Low utilization of computing resource(s)

Instead of bandwidth, CPU utilization is more effective for performance. From a single percentage of CPU utilization in GNOME System Monitor, to the more in-depth statistics reported by sar, it is possible to accurately determine how much CPU power is being consumed and by what [4].

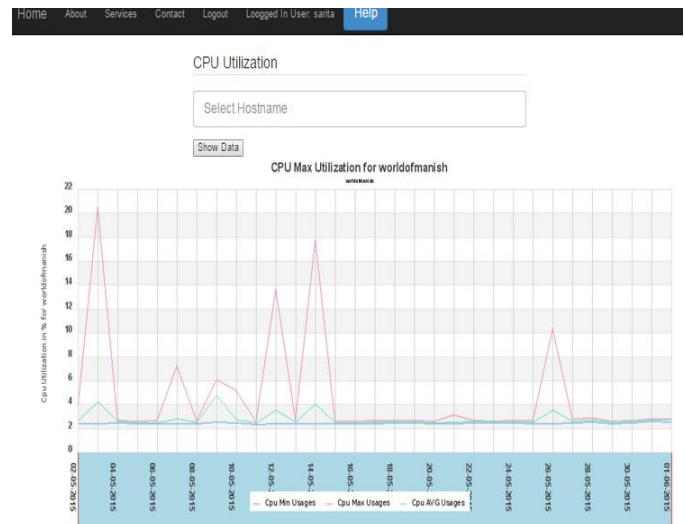


Fig.3. CPU Performance Graph of developed module to analyze the performance monitoring.

5) **Web Shell:** It is used by the end user for any cloud server from anywhere. It a type of shell through which system admin/user can maintain the activities and functionalities on time. It supports the cloud computing “access from anywhere feature at any time”. We can say that it is a shell over the browser which we can access anytime anywhere as a part of cloud infrastructure.

6) **Web Panel:** It acts like a dashboard that offers transparency and control over the data associated with the server easily or we can say it is a management Board of server monitoring and alerts automation. It is "an easy to read, often single page, real-time user interface, showing a graphical presentation of the current status of server info inside cloud infrastructure.

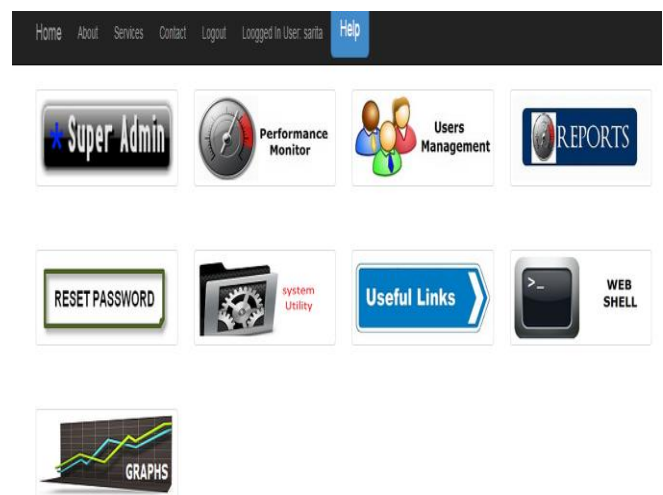


Fig.4. Web panel for Performance Monitoring for Linux servers on Cloud.

IV. CONCLUSION

Our developed module having web based panel as a dashboard – has a flexible, extensible architecture for the creation of monitoring automated module to benchmark the Linux servers on cloud. It allows the super admin to monitor the server task and user management, remote data collection over SSH, system performance graphs, performance monitor and web shell for maintenance. In this way, we can easily monitor the performance on Linux servers on cloud using Web based panel in a reliable manner.

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