Project Proposal

Course: Unix (420-321-VA) - Fall 2024

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Unix Section: 00002

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Project Description

The goal of this project is to set up a system which will be able to connect multiple machines together, so that we can monitor their system processes. For instance, CPU, GPU and memory usage. This tackles the real word issue of system admins having a way to monitor the health of the Linux machines connected to the server. This is useful since system admins may need to check on servers which have abnormally high resource usage.

Platform of choice

We will implement the monitoring system on virtual machines running GNU/LINUX. The main server will be the central point which will communicate with other VMs through a simulated network. The VMs will simulate a production environment, where we can test the monitoring capabilities of our setup.

Demonstration Plan

We plan to demonstrate the project on a laptop, with sufficient resources to run multiple Virtual Machines using VMware or VirtualBox. We will implement a virtualized network to simulate a local network setup. This will allow the monitoring server to gather data from the other VMs.

Requirements

The requirements are listed below:

1) Setup a basic system and security:
    a) We will create different accounts that will have different permissions.
    b) Authentication (using secure SSH keys for remote access to the VMs)
    c) File Permissions (using CHMOD to restrict access to logs and configuration files for monitoring)
2) Process or service management/scheduling
    a) Use Systemd services to manage the monitoring tools (e.g., starting, stopping, restarting monitoring agents)
    b) We will implement Cron jobs for periodic tasks such as data collection, backups, and reporting

3) Automating tasks using script language.
    a) Implement shell scripts automate the monitoring tasks (checking disk usage, checking process statuses)
    b) We will automatically update the display of the system so that the user can see in real time the performance of the system.

Major technical solutions compared

We will set up and compare multiple system monitoring software to find the pros and cons of each one. We will then choose singular monitoring software that we will explore. We will be testing out these monitoring systems: Prometheus with Grafana and CheckMk. We are going to compare the complexities of the installation process, the visual interface, the ease of use and the different features that it provides. Once we're done with the comparing, we will pick the best one and we will implement it in our project.

Timeline

This will be the timeline we will follow:

1) The First Week:
    a) Each team member will explore and evaluate different system monitoring tools.
    b) Research the installation and configuration process for different monitoring systems (Zabbix, Prometheus with Grafana, CheckMk).
2) The Second Week:
    a) We will pick one of the monitoring systems after debating on which one to use.
    b) Setup the connections to the VMs and make the monitor system display them.
3) The Third Week:
    a) Create automated tasks.
    b) Create the scheduled tasks.
    c) Finalize the project for the presentation.

Team Composition

The members of the team are Alexandru Cirlan, Mathew Veroutis, Himnish Patel.

Link for Github