Parshvanath Charitable Trust's
A. P. SHAH INSTITUTE OF TECHNOLOGY
(Approved by AICTE New Delhi & Govt. of Maharashtra, Affiliated to University of Mumbai)
(Religious Jain Minority)

Autonetics and Administration for IT Laboratories

Group No. 17

Uddhabendra Maity 16104062
Karthikeyan 16104050
Atharv Shetty 16104061

Guide: Dr. Sameer Nanivadekar
Co-Guide: Prof. Vishal Badgujar

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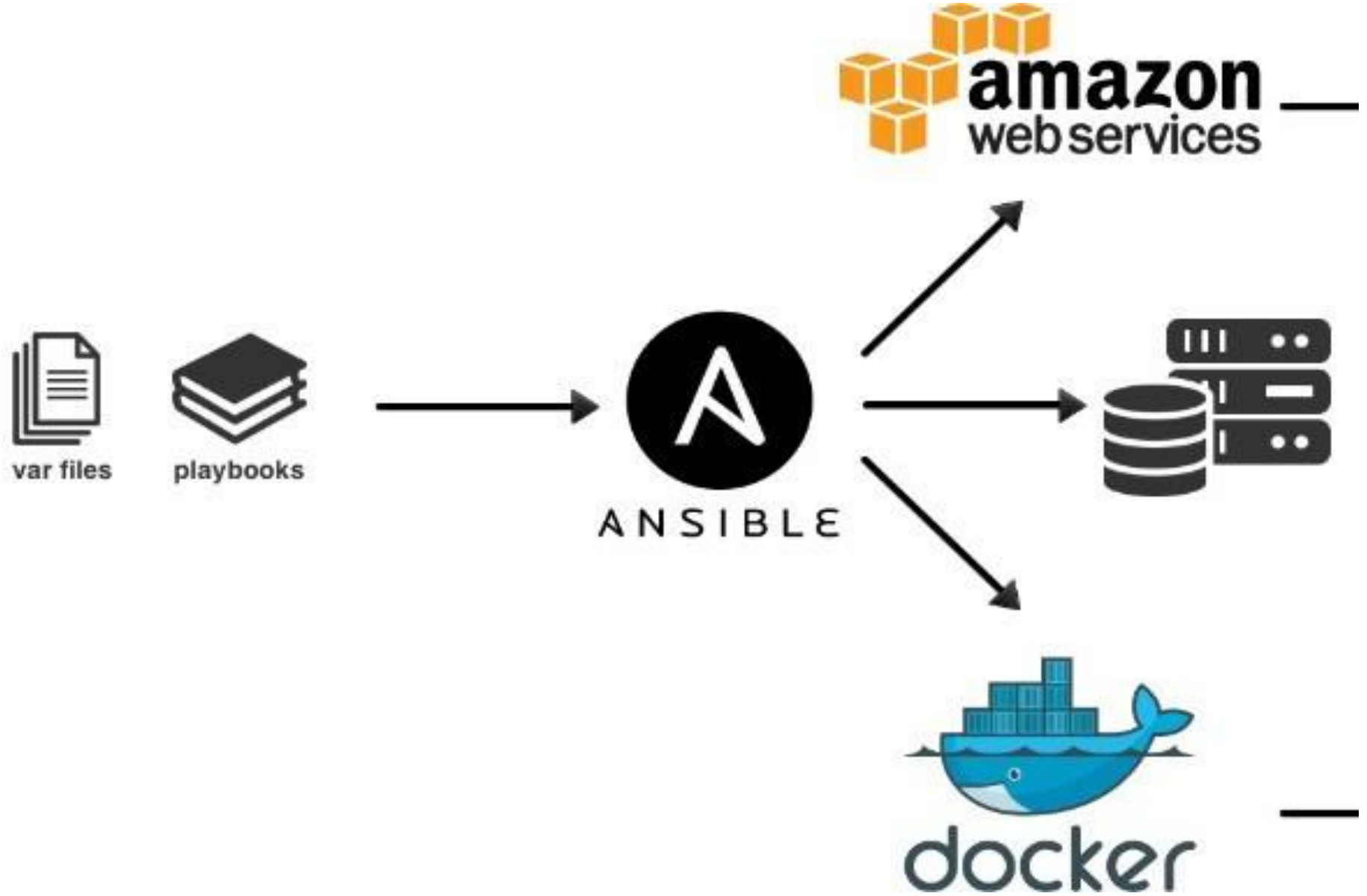
Abstract

Often it is observed that many of the PC's are remained switched on even when the labs are not in use resulting in an inefficient use of power and resources. Also the PCs have to be manually switched off by the lab assistants after the end of lab sessions if the students haven't shut it down themselves.A powerful,systematical and efficient Lab management system is required which will resolve all these basic and generic problems with less human labor.In our case, the **Ansible** tool which was developed to simplify complex orchestration and configuration management tasks has been chosen.

Introduction

- In the faculty's premises, a large number of computer classrooms is used for the teaching and research.
- However, some settings and applications are common to all of these cases. We developed a scenario that would unify the administration of such classrooms and save considerable amount of time spent on the maintenance of these classrooms.
- An Online Registry for each lab would be maintained in the proper GUI software which will carry the details of each and every student who have logged in to the individual PCs instead of passing the regular Lab Registers from place to place and updating the register manually for each session.

Ansible integration with other services



Objectives

- To Automate the **Software installation process**.
- To Automate the **PC shutdowns**
- To regulate the user identity of every PC along with time in a **digital format**
- To **alert** the users about the remaining time of the current lab session
- A proper GUI will be created which will display the **important announcements**
- To unleash the full potential of **Ansible** for IT automation
- To **remotely control** the electrical appliances of the whole Lab.

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Literature Review

Paper title: Automated Delivery in Pro NuGet

Authors: M. Balliauw and X. Decoster

Findings: In this paper, they have tried automating the labs using network interfacing

Advantages: Effective Package Management

Disadvantages: High Bandwidth Consumption,Client-Server node Failure leads to catastrophic issues.

Literature Review

Paper title: Topology and orchestration specification for cloud applications (TOSCA)

Authors: D. Palma and T. Spatzier

Findings: In this paper, they had implemented automating the labs by Management using Cloud Computing With cloud based applications.

Advantages: Does not mandate the use of any specific security mechanism or technology

Disadvantages: Expensive Infrastructure and maintenance for small Areas.

Literature Review

Paper title: Unleashing Full Potential of Ansible Framework: University Labs Administration

Authors: Pavel MasekMartin ŠtůsekJan Krejčí

Findings: In this paper, the developers have tried to create an ansible based environment for lab administration using various playbooks.

Advantages: Performs better than the previous generation technologies and is flexible and scalable to large extent

Disadvantages: Limited to the capabilites of the Ansible framework. They have developed the project completely depending on the ansible framework.

Existing Architecture of Ansible Remote Interface

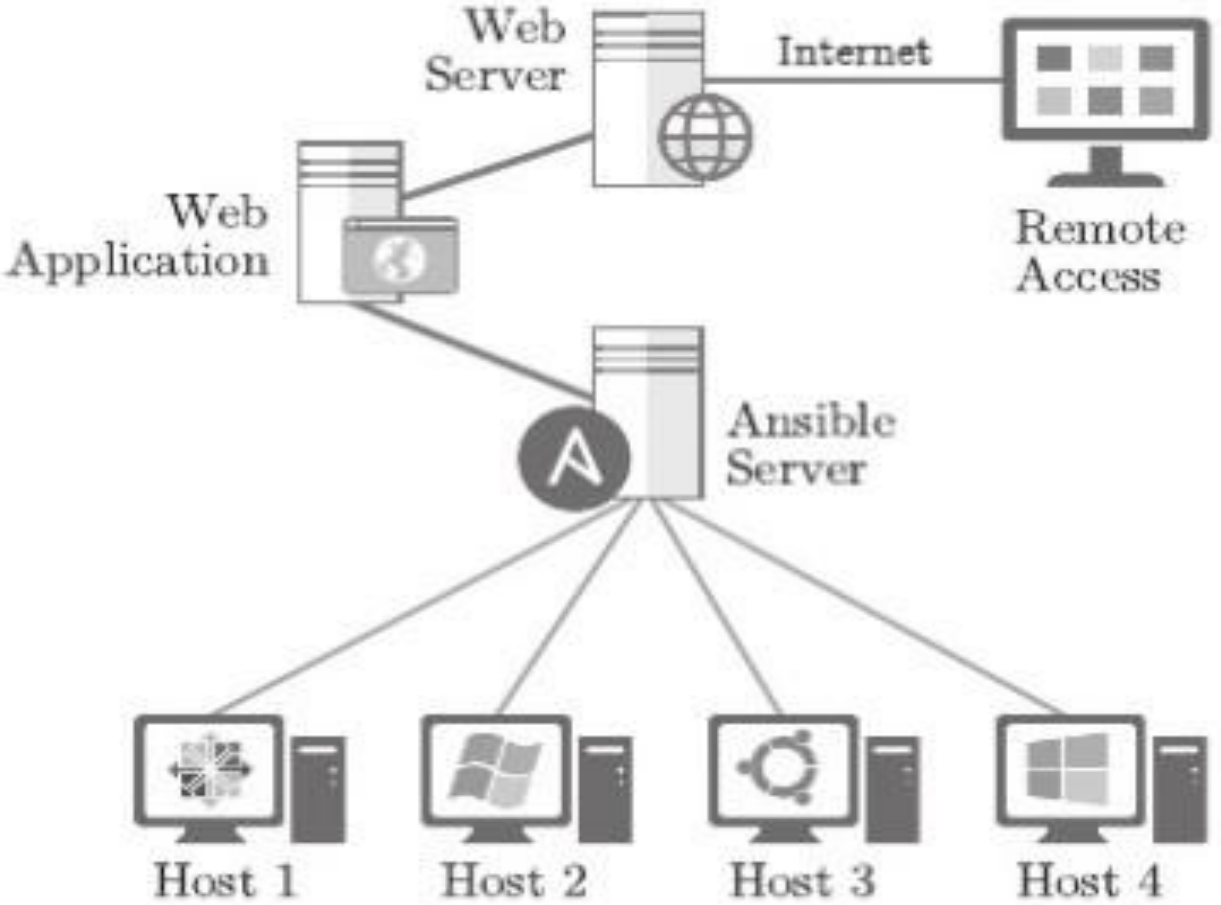
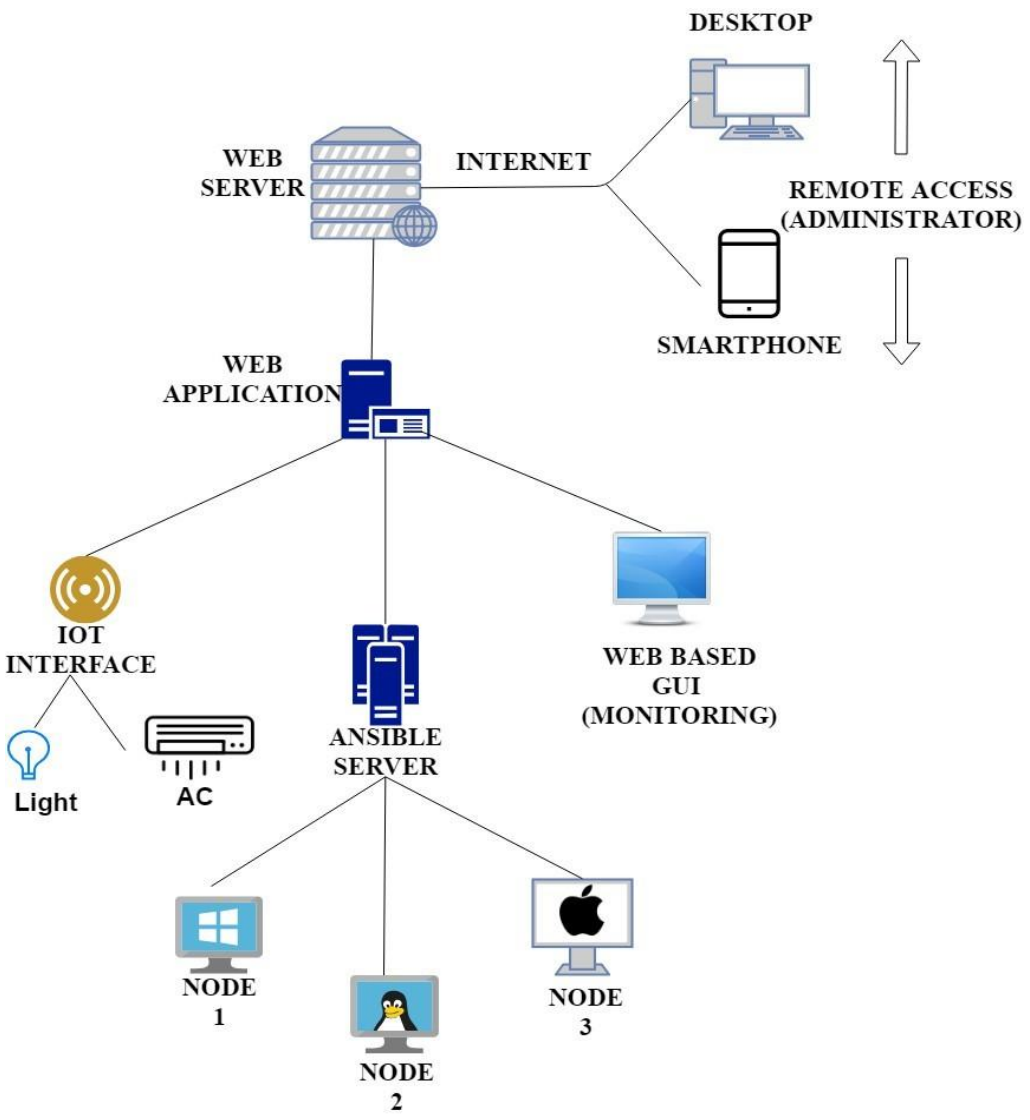


Fig. 4: Architecture of Ansible remote interface management.

Proposed Architecture



Proposed System Architecture

Problem Definition

- In current labs of university most of the administrative work is done manually which consumes lot of time and efforts.
- With the help of Ansible framework and a proper supporting GUI which can unleash and maxmise the full potential of the servers,many of the current lab administrative problems can be resolved.

Technological Stack

Hosting : Ansible Web Server

Nodes: Linux Ubuntu,Windows

Front End : Python,Java , Android Studio, HTML5 , Axure RP

Database : MariaDB

Scope

1)The expected system will ease the whole autonetical process in labs and make the administration more easier.

2)This is completely an open source project and thus the total outcome expenditure is very low. Due to this, even the universities in the rural areas can claim benefit out of this.

3)The GUI will have a tutorial at the beginning for the lab handlers.

4) The proposed system will be the future of lab automation for university labs.

Limitations

- **Primary Focus- Lab administration:** Automation of Electrical appliances as per the seating arrangement in the lab can be implemented in future
- **No involvement of Cloud infrastructure :** Since the cloud infrastructure is entirely owned, managed and monitored by the service provider, it transfers minimal control over to the customer.
- **Totally depends on the inter-connectivity of PCs with the host PC:** Thus any loose connection or wire mismanagement may affect the functioning of the nodes.

Conclusion

- By going through the previous surveys and IEEE papers we,ve listed all the current problems in the university labs and found out the solutions to minimize the workload for the lab assistants and faculty members to the maximum.
- Using Ansible network along with other supporting tools and a proper GUI interface as a single unit would benefit the whole lab and the labs can be converted into current gen modern labs which will work up to the industry standards.

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References

1 Pavel MasekMartin ŠtůsekJan Krejčí, “Unleashing Full Potential of Ansible Framework: University Labs Administration” May 2018

2 Nishant Kumar Singh ,Amity University,”Automated Provisioning of Application” June 2017

3 J. O. Benson, J. J. Prevost, and P. Rad, “Survey of automated software deployment for computational and engineering research,” in System Conference (SysCon), 2016 Annual IEEE, pp. 1–6, IEEE, 2016.

THANK YOU