Aggregating Heterogeneous Computing Resources

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Introduction & Background

- What computing resources does openlab have?
    - Openlab has over 100 machines all with different configurations
    - Types of machines include cloud-based quantum computing and AI infrastructure, on-site servers, and personal devices.

- How are openlab's resources managed?
    - There are two ways resources are configured and managed, either with a deployment tool like Puppet or Ansible or manually by administrators.

Efficient Resource Management

- Puppet and Ansible for Resource Management
  - Automate the management and configuration of machines using a hierarchy structure and statically typed language.
  - Ideal for larger systems with similar needs

- Manual Management
  - Direct intervention by administrators.
  - Suitable for small-scale setups or customization.
 - Prone to inconsistencies, time-consuming in larger environments.
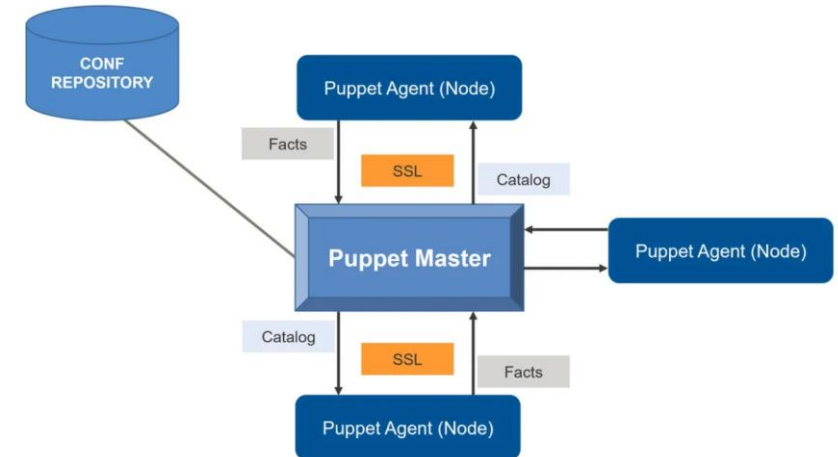
Why Manage and Update Resources?

- Diverse Project Requirements
  - Different projects demand specific resources based on scale and nature.
  - Flexibility to adapt resources to changing project demands.
- Optimizing Resource Utilization
  - System Administrators maximize available resources.
  - Allocate right resources to projects, prevent wastage.
- Monitoring Hardware Performance
  - Track performance of equipment to inform collaborating companies
  - Improve resource allocation and future decision making
- Enhancing System Reliability
  - Regular updates include security patches, fixes.
  - Managed, up-to-date resources ensure stability.

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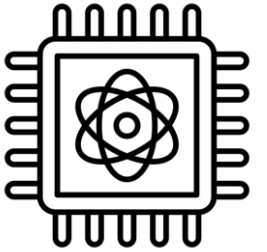
How Does the Portal Help?

- Automated Tasks (scheduled jobs)
  - Hardware information taken from Puppet and Ansible
  - Data scraped using scripts
  - Generating reports and mailing users

- Manual Tasks
  - Addition / deletion of machines
  - updating information
  - addition/deletion of users and expiration
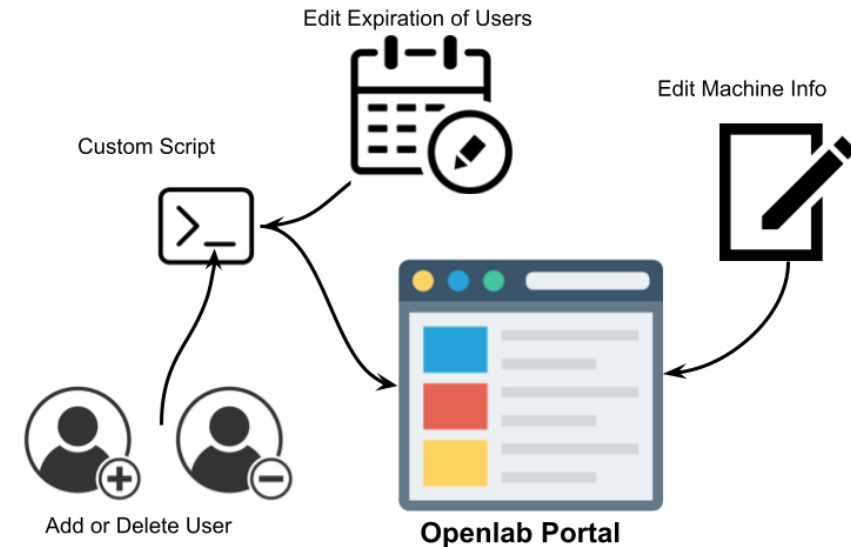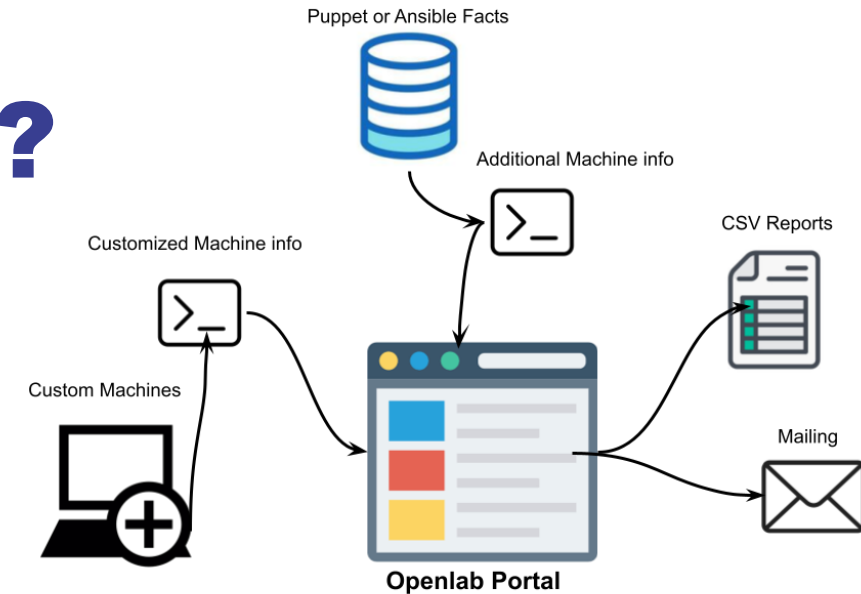
New Features

- New Front End Visuals
- Additional Info (Load, current users)
- Add Nodes without Puppet/Ansible
- Add/Delete machines
- Add/Delete/Edit users
- Automate Expiration reports for added machines
- Edit Machine info
- Specify Public vs. Private Nodes and generate cumulative CSV and JSON files

Future Work

- Increasing efficiency with revised code
- Handling nodes with limitations
  - password required
  - no sudo/root access
  - remote resources with multiple gateways
- Making the portal available to multiple users
  - Users can utilize the portal while viewing only their machine information

Thank You!

Questions?

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