Network Hardware Resource Management System

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Overview

Introduction

The Network Hardware Resource Management System is a web-based application designed to efficiently manage hardware resources within a network environment. It allows users to add new hardware resources, remove existing ones, monitor resource usage, and so on.

02

Requirements

Functional Requirements

List Hardware Resources

View Live Resource Usage

Add New Hardware Resources

Remove Existing Hardware Resources

View User/Group-Based Resources

Manage Docker Containers

Non-functional Requirements

Usability Requirements

- Responsive Design
- Minimal Steps
- Cross-Browser Compatibility

Performance Requirements

- Response Time
- Scalability

Security Requirements

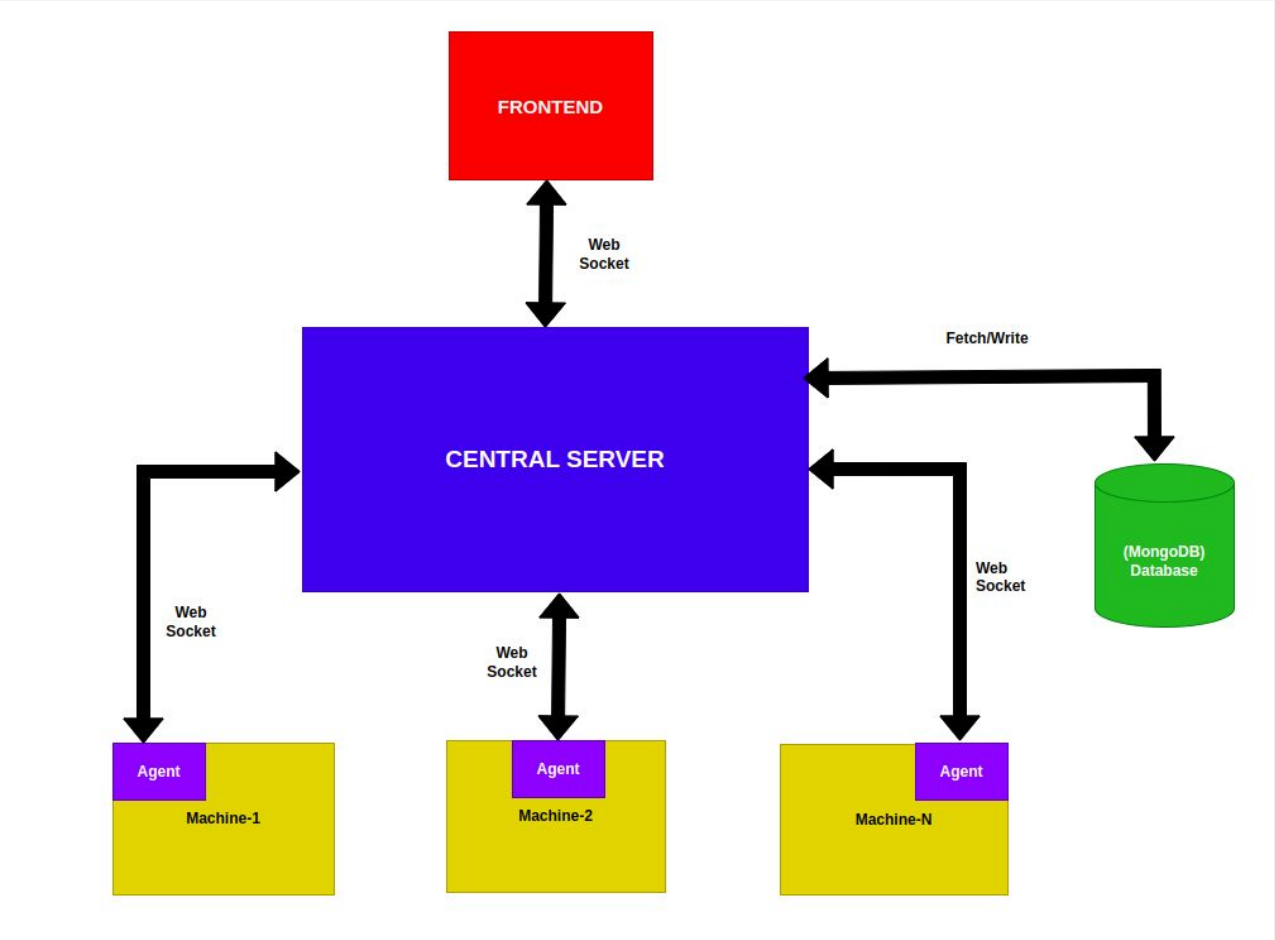
- Authentication
- Data Encryption

03

Design

04

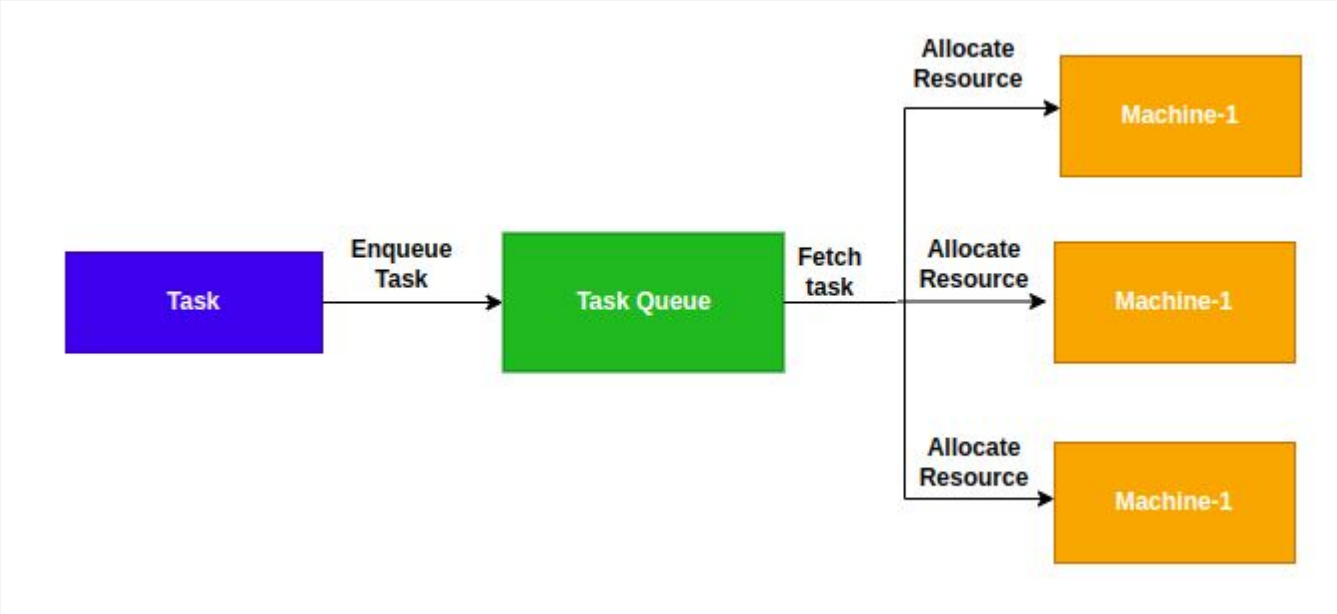
Architecture Overview


FRONTEND
Web
Socket
CENTRAL SERVER
Fetch/Write
(MongoDB)
Database
Web
Socket
Web
Socket
Web
Socket
Agent
Machine-1
Agent
Machine-2
Agent
Machine-N

- Utilized web sockets for bi-directional communication.
- Agent runs on each machine to establish the connection to the central server.
- Central server stores the agent information on a mongodb database hosted on cloud.
- Agent periodically sends system information to the server.

05

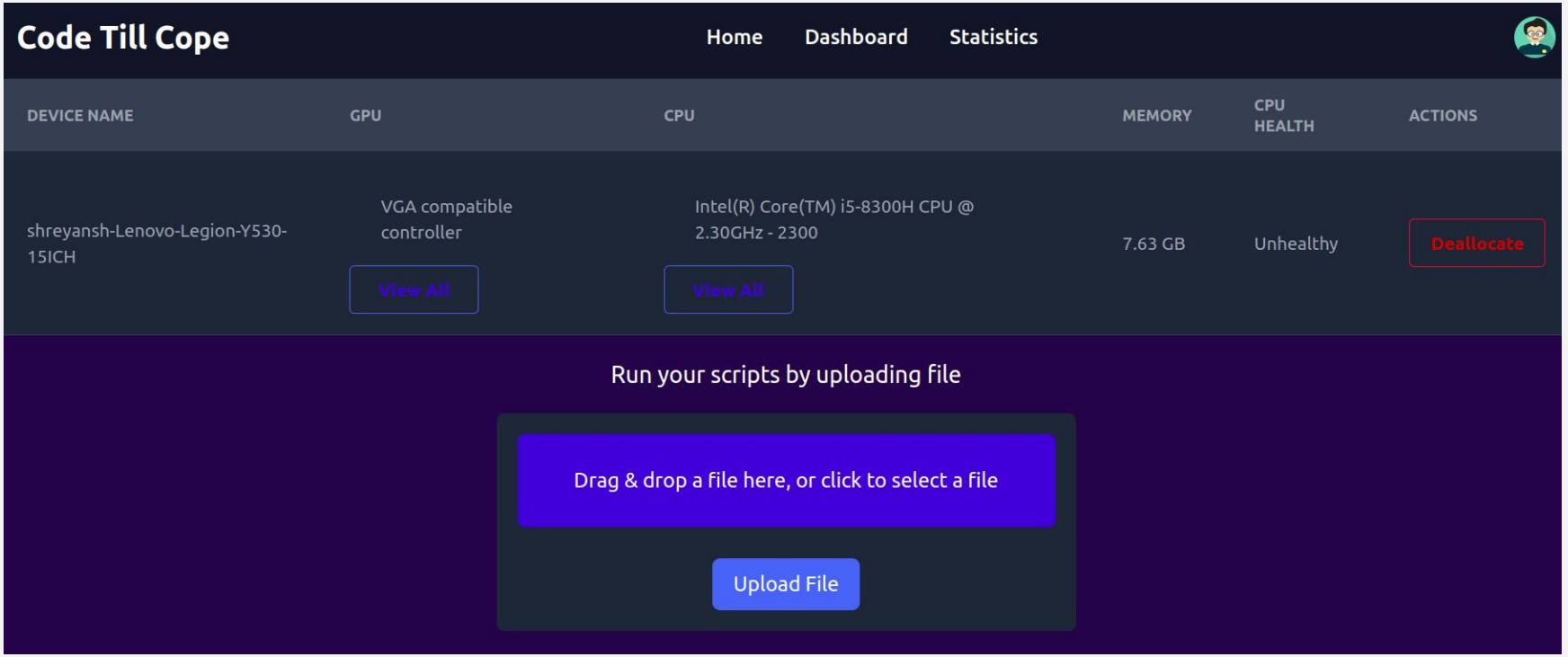
Internal Working

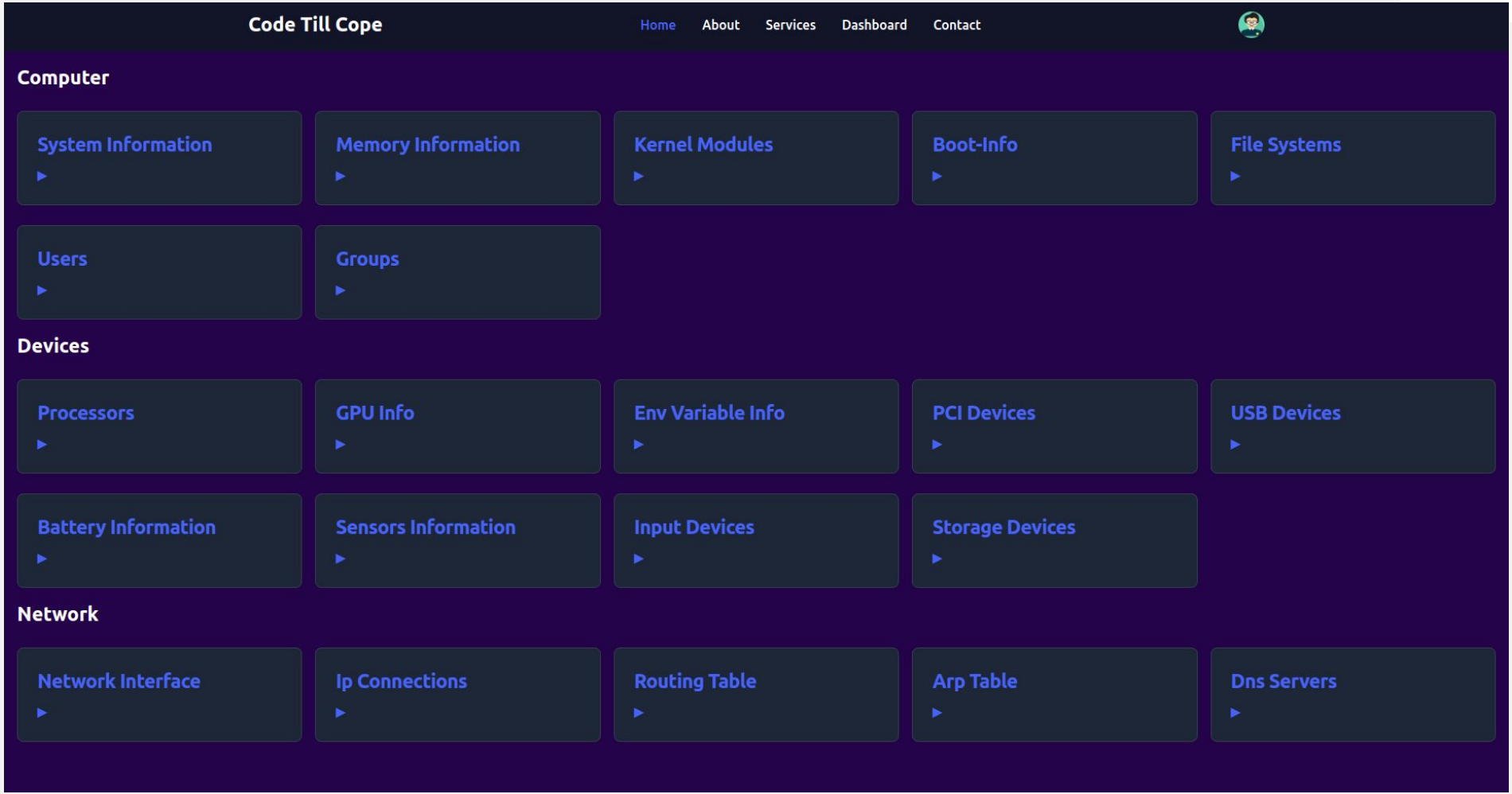

Task
Enqueue Task
Task Queue
Fetch task
Allocate Resource
Machine-1
Allocate Resource
Machine-1
Allocate Resource
Machine-1

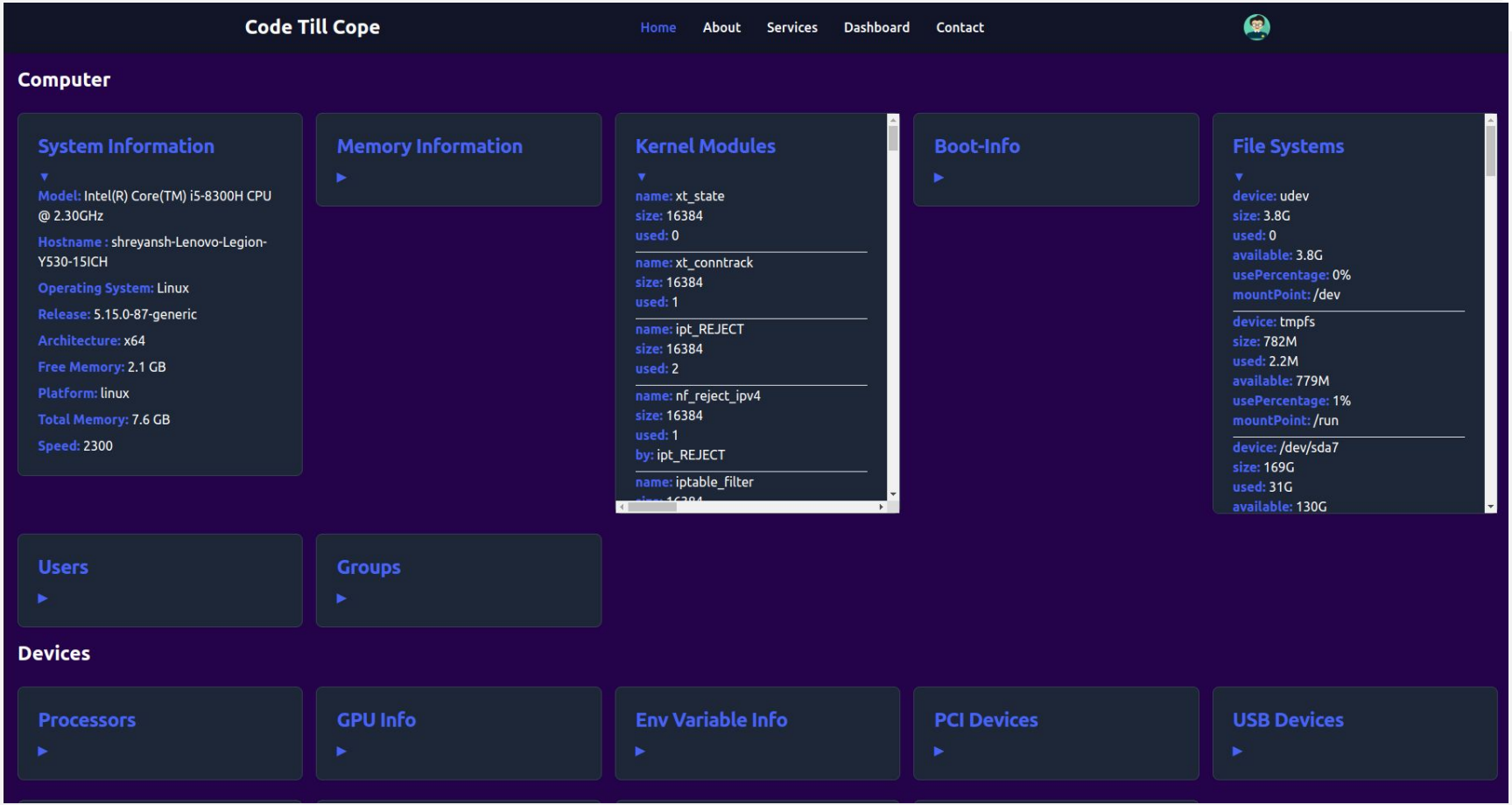
- In memory queue is maintained to handle incoming jobs.
- When a CPU gets added the jobs are fetched from queue.
- The job is allocated to the machine.
- A good method is to use RabbitMq to ensure durability. (Requires hosting it and a private network).

06

Web App


Code Till Cope
Home
Dashboard
Statistics
DEVICE NAME
GPU
CPU
MEMORY
CPU HEALTH
ACTIONS
shreyansh-Lenovo-Legion-Y530-15ICH
VGA compatible controller
View All
Intel(R) Core(TM) i5-8300H CPU @ 2.30GHz - 2300
View All
7.63 GB
Unhealthy
Deallocate
Run your scripts by uploading file
Drag & drop a file here, or click to select a file
Upload File


Code Till Cope
Home
About
Services
Dashboard
Contact
Computer
System Information
Memory Information
Kernel Modules
Boot-Info
File Systems
Users
Groups
Devices
Processors
GPU Info
Env Variable Info
PCI Devices
USB Devices
Battery Information
Sensors Information
Input Devices
Storage Devices
Network
Network Interface
Ip Connections
Routing Table
Arp Table
Dns Servers


Code Till Cope
Home
About
Services
Dashboard
Contact
Computer
System Information
Model: Intel(R) Core(TM) i5-8300H CPU @ 2.30GHz
Hostname : shreyansh-Lenovo-Legion-Y530-15ICH
Operating System: Linux
Release: 5.15.0-87-generic
Architecture: x64
Free Memory: 2.1 GB
Platform: linux
Total Memory: 7.6 GB
Speed: 2300
Memory Information
Kernel Modules
name: xt_state
size: 16384
used: 0
name: xt_conntrack
size: 16384
used: 1
name: ipt_REJECT
size: 16384
used: 2
name: nf_reject_ipv4
size: 16384
used: 1
by: ipt_REJECT
name: iptable_filter
Boot-Info
File Systems
device: udev
size: 3.8G
used: 0
available: 3.8G
usePercentage: 0%
mountPoint: /dev
device: tmpfs
size: 782M
used: 2.2M
available: 779M
usePercentage: 1%
mountPoint: /run
device: /dev/sda7
size: 169G
used: 31G
available: 130G
Users
Groups
Devices
Processors
GPU Info
Env Variable Info
PCI Devices
USB Devices

- React based front-end
- Dynamic update
- Inutitive UI

07

Plan & Progress

Project Progress

01	**Phase-1**	Web Interface Listing Down All hardware Resources	✓
02	**Phase-2**	Functionality that will enable the admin to monitor the usage of different resources. This will enable us to figure out which of the resources are being overused or underused	✓
03	**Phase-3**	Creation of API to allocate/deallocate resources	✓

Thank You