Project Name:

Lab Space and Desktop Allocation for Research Labs & Server Compute Usage Management

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Revision History

Revision Number	Date	Description
1.0	14-1-2025	Initial Draft

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(i) Problem Statement

Managing research lab resources efficiently is a challenge, particularly in ensuring proper allocation of seating spaces and desktops to students and faculty. Additionally, server compute resources are often overutilized without proper tracking, leading to performance degradation. This project addresses the need for a centralized system to manage lab space allocation and monitor server compute usage in real-time.

(ii) Objective

- Develop a website for:
  - Managing seating allocations using a scanned layout of research labs.
  - Allowing admins to allocate seating spaces to students and faculty efficiently.
- Implement a module for:
  - Monitoring server compute usage using commands like `acct` and `sa`.
  - Sending real-time alerts to users exceeding usage thresholds.
- Enable ease of management for research labs and server resources through:
  - Interactive interfaces.
  - Real-time notifications.
  - Reports for resource usage trends.

(iii) Preliminary Ideas

1. **Lab Layout Management**:
    - Upload scanned images of lab layouts.
    - Identify and mark seating positions using prescribed conventions.
    - Create a dashboard to manage allocations interactively.
2. **Server Usage Monitoring**:
    - Periodically fetch compute usage data via `acct` and `sa` commands.
    - Store usage metrics for analysis and visualization.
    - Notify users exceeding predefined thresholds via email or dashboard alerts.

(iv) More Ideas

1. **Advanced Features for Lab Management**:
    - Allow admins to block/unblock seating positions.
    - Maintain history logs for allocations and releases.
    - Introduce priority-based seating allocations for senior researchers.
2. **Enhanced Server Monitoring**:
    - Include metrics like disk I/O and network bandwidth usage.
    - Integrate predictive analytics to forecast potential resource overuse.
    - Provide suggestions for optimizing compute usage based on trends.
3. **User-friendly Interface Enhancements**:
    - Use SVG overlays for interactive seating management on lab layouts.
    - Create personalized dashboards for students and faculty to track their allocations and usage.
4. **Scalability Features**:
    - Add support for managing multiple labs across different departments.
    - Implement a role-based access control system for admins at various levels.