Course Name: Computing with IT Management

Year/Group: 4th Year ITM

Semester: 8

Module Title: IT Management Finals Project

Lecturer Name: Enda Lee, David White, Fernando Perez Tellez

GAME PERFORMANCE & IT MONITORING DASHBOARD

Student Name: Ricardo Danganan Jnr

Student Email: x00191395@mytudublin

Submission Date: 23/02/2025

Due Date: 24/02/2025

Table of Contents

Introduction

The **Game Performance** & **IT Monitoring Dashboard** is my final year IT Management project, developed as part of my 4th-year finals project. This real-time monitoring and optimization tool is designed to enhance gaming performance by providing comprehensive system insights. It tracks CPU and GPU usage, temperatures, RAM consumption, disk activity, and network performance, ensuring gamers have a clear view of their system's health. Equipped with threshold-based alerts, historical performance tracking, and Steam API integration, it helps optimize system resources, detect installed games, and provide tailored recommendations. Additionally, I am implementing an in-game overlay feature, allowing players to monitor system performance without exiting their game. Future enhancements include cloud-based monitoring, AI-driven game optimization, and multi-system performance tracking across LAN environments.

Features

Real-time performance tracking – Monitor CPU, GPU, RAM, disk usage, and network performance dynamically.
System alerts for overheating & resource overuse – Receive notifications when resource consumption exceeds safe limits.
Steam API integration – Automatically detect installed games based on the user's Steam library.
Optimized system recommendations – Suggest best performance settings based on game requirements and hardware specifications.
Historical performance tracking – Store real-time monitoring data in a local JSON file for future analysis.
Cloud synchronization (Future Enhancement) – Allow users to sync performance logs across multiple devices via cloud storage.

Multi-system monitoring across LAN (Planned) – Track performance data from multiple systems within a local network.
In-game overlay (Planned) – Display real-time system stats while gaming without exiting the application.
AI-driven game optimization (Planned) – Use machine learning to recommend system tweaks for better performance.

Usage

View system performance metrics in real-time

- **CPU, CPU, Disk, Ram Usage and Temperature, Latency**: Graphical representation via Chart.js.
- **RAM & Disk Usage**: Track memory and storage performance.
- **Network Monitoring**: Display ping and latency.

Receive alerts when system thresholds are exceeded

- **Automatic notifications** will appear when CPU, GPU, or RAM usage reaches critical levels.
- **Audio alerts** will trigger for immediate attention.

Use the game optimization module *(Upcoming Feature)*

- **Detect installed games** via Steam API.
- **Compare system hardware** to recommended settings.
- **Receive optimization suggestions** based on detected hardware and software.

Access in-game overlay *(Planned Feature)*

- **Live stats inside your game** without minimizing it.
- **Toggle visibility via a hotkey** to enable/disable the overlay.

Dependencies

Frontend:

- **React.js** – For UI components
- **Chart.js** – For real-time graphical data visualization
- **React Toastify** – For system alerts & notifications

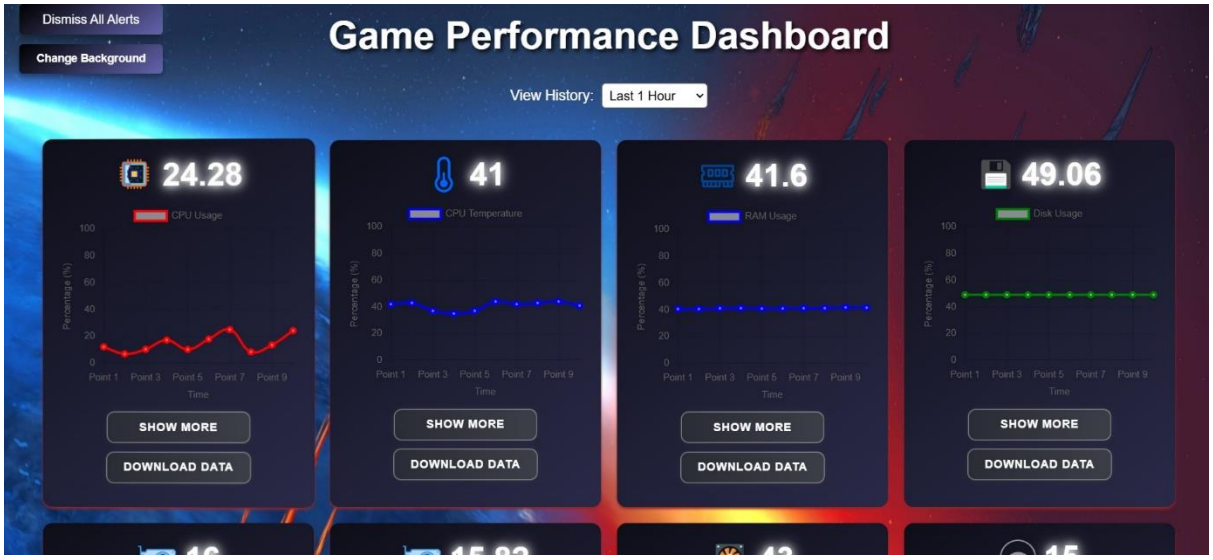
Backend:

- **Node.js** – For API handling
- **Express.js** – For managing requests
- **WebSockets** – For real-time updates
- **PowerShell Scripts** – For retrieving system performance data

APIs & Tools:

- **Steam API** – For detecting installed games
- **NVIDIA API (Planned)** – For AI-driven optimizations
- **(Electron.js, Overwolf SDK, NVDIA Overlay API)** - 3 Possible tools/API for an In-game overlay feature

Core Features of Iteration 1 Successfully Implemented



Live CPU, RAM, Disk, GPU Monitoring

- Tracks real-time **CPU usage, CPU temperature, RAM usage, Disk activity, GPU usage, GPU temperature, VRAM usage, and Network Latency** using PowerShell scripts.

Real-Time Graphs (Chart.js)

- Uses **Chart.js** to display performance metrics as **smooth, interactive line graphs**, updating automatically every few seconds.

System Alerts & Sound Notifications

- Implements **toast alerts and warning sounds** when critical performance limits (high CPU/GPU usage, overheating, network latency) are exceeded.

Historical Data Storage (SQLite)

- Stores real-time performance data in an **SQLite database** (performance_data.db), allowing users to track historical trends over **1hr, 12hr, and 24hr periods**.

Export Data (CSV & JSON)

- Provides an option to **download historical performance logs** in **CSV or JSON format** for further analysis.

Historical Data View

- Allows users to switch between **1hr, 12hr, and 24hr views**, dynamically fetching past performance data from the database.

Planned Features for Iteration 2

Steam API Integration - Game Detection

- Uses the **Steam API** to fetch a list of installed games, allowing for system performance tracking based on the user's active game library.

Game Optimization Feature

- Compares detected games with system hardware specifications and **recommends performance optimizations** such as adjusting resolution, background processes, and power settings.

In-Game Overlay for Real-Time Monitoring

- Implements a lightweight **in-game overlay** displaying key system metrics **(FPS, CPU/GPU usage, temperatures, latency)** without switching out of the game.

Further UI Improvements

- Enhances **visual effects, animation smoothness, and responsiveness** for a **sleek, modern dashboard experience**.

Customizable Performance Alerts and UI theme

- Future updates will allow users to **adjust threshold levels** for CPU, GPU, RAM, and network alerts, and toggle button for UI theme for the Dashboard.

GitHub Project URL

https://github.com/ricardodanganan/GamePerformanceMonitoring-Dashboard

Video Screencast URL for the Iteration 1 Demo

https://tudublin-my.sharepoint.com/personal/x00191395_mytudublin_ie/_layouts/15/stream.aspx?id=%2Fpersonal%2Fx00191395%5Fmytudublin%5Fie%2FDocuments%2FIT%20Management%202024%2D2025%20Files%2F%5B2nd%2DSem%5D%2DProject%2DIterations%2DReports%2FIteration%2D1%2F%28Revised%29%2DX00191395%2DProject%2DIteration%2D1%2DReport%2Emp4&referrer=StreamWebApp%2EWeb&referrerScenario=AddressBarCopied%2Eview%2E422affb6%2D605c%2D45fe%2D9d5b%2Db2da35cd86ed