Conestoga College

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PROG8630 – Design and Testing Specifications

Amazon

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### Introduction

Amazon's IT department is the backbone of its technical operations, ensuring smooth functioning of the e-commerce giant’s infrastructure. To help the IT department manage performance, this design document outlines the creation of a dashboard that tracks key performance indicators (KPIs) relevant to maintaining system uptime, resolving technical incidents, and monitoring infrastructure utilization. This dashboard will provide real-time insights to improve decision-making, optimize system performance, and ensure minimal downtime.

### Company

Amazon’s IT department oversees a vast array of systems, ranging from internal infrastructure to Amazon Web Services (AWS), supporting both internal teams and external customers. Given the high demand for continuous system availability, the IT department requires tools to track and analyze performance metrics. This dashboard will answer two critical business questions:

1. **How quickly are IT issues being resolved?** – To monitor and improve incident response times, reduce downtime, and enhance service levels.
2. **What is the current utilization of infrastructure?** – To assess whether system resources are being fully utilized or if there’s a need for scaling to handle increased traffic.

### KPI 1: Mean Time to Resolution (MTTR)

MTTR measures the average time it takes to resolve an IT issue from the time it is first reported until it is resolved. This KPI is crucial for assessing the efficiency of your IT department in handling incidents.

* **Total Resolution Time**: The sum of time taken to resolve all incidents.
* **Number of Incidents Resolved**: The total number of incidents resolved within the time frame.

### KPI 2: System Uptime Percentage

This KPI tracks the percentage of time a system is available and operational. Uptime is critical for ensuring smooth operations in any IT infrastructure, especially in cloud-based services.

* **Total Uptime**: The total time the system was up and running.
* **Total Available Time**: The total time the system was supposed to be available (e.g., 24 hours a day).

### KPI 3: Incident Volume

Incident volume tracks the total number of IT incidents (e.g., system failures, downtimes, or performance issues) reported over a specific period. This KPI helps in identifying trends in IT issues and understanding how frequently problems occur.

### KPI 4: Infrastructure Utilization

Infrastructure utilization measures how efficiently IT resources (such as CPU, memory, storage) are being used. It helps to determine if the infrastructure is over- or under-utilized and whether scaling is necessary.

### Dashboard Mock-up

A screenshot of a diagram

Description automatically generated

### Test Specifications

1. **Real-time Data Updates**: The dashboard must display up-to-date metrics from live sources (e.g., AWS CloudWatch and ServiceNow). Data should refresh at regular intervals (e.g., every 5 minutes).
2. **Customizable Filters**: Users should be able to adjust time ranges and filter by incident type or system ID across all dashboard sections.
3. **Responsive Design**: The dashboard must be accessible and functional on various devices, including desktops, tablets, and mobile phones.
4. **Alert System**: When system uptime drops below 99% or incident volume spikes beyond a preset threshold, the dashboard should trigger visual or email alerts.
5. **Data Accuracy**: Ensure that data calculations (MTTR, uptime percentages, infrastructure utilization) are accurate and align with pre-defined formulas.

### Data Source and Data Model

The data for the Amazon IT Department dashboard will be derived from both actual and simulated sources. Simulated data will be used initially to prototype the dashboard and test the functionality before connecting to live data sources. Below is a breakdown of the simulated data that will be used:

1. **Simulated Incident Data (ServiceNow)** (Olaoye, 2023)**:**  
   A dataset containing a list of IT incidents over a 6-month period. Each entry includes:
   * **Incident ID** (e.g., INC001, INC002)
   * **Time Logged** (e.g., 2024-01-15 14:30:00)
   * **Time Resolved** (e.g., 2024-01-15 16:00:00)
   * **Incident Type** (e.g., Server Failure, Network Downtime)
   * **Priority** (e.g., High, Medium, Low)
   * **Resolved By** (e.g., Support Engineer ID)
   * **MTTR (Mean Time to Resolution)** calculated from time logged and time resolved for each incident.
2. **Simulated System Uptime Data (AWS CloudWatch)** (SheWrites, 2023)**:**  
   A dataset simulating the availability of Amazon’s internal systems over a 30-day period. Data fields include:
   * **Date** (e.g., 2024-02-01)
   * **System ID** (e.g., SYS001, SYS002)
   * **Uptime Percentage** (e.g., 99.95%, 99.99%)
   * **Downtime in Minutes** (e.g., 5 minutes)
   * **Number of Downtime Events** (e.g., 2 incidents).
3. **Simulated Infrastructure Utilization Data (AWS CloudWatch):**  
   This dataset will contain information about resource usage across Amazon’s IT infrastructure over a 1-month period. Data fields include:
   * **Server ID** (e.g., SERVER001, SERVER002)
   * **CPU Utilization (%)** (e.g., 75%, 85%)
   * **Memory Utilization (%)** (e.g., 60%, 70%)
   * **Storage Utilization (GB)** (e.g., 500 GB out of 1 TB capacity)
   * **Network Throughput (Mbps)** (e.g., 150 Mbps).
4. **Simulated Customer Satisfaction (CSAT) for IT Services:**  
   A dataset simulating feedback from internal customers using IT services. Each record will contain (Plancque, 2023):
   * **Date** (e.g., 2024-03-05)
   * **Service Used** (e.g., Email Service, Database Access)
   * **Satisfaction Score** (e.g., 4/5, 5/5)
   * **Comments** (e.g., "Quick resolution," "System downtime too frequent").

### Data Model:

For this dashboard, Tableau was chosen as the development tool due to its ease of use, powerful visualization capabilities, and integration with data sources like AWS and ServiceNow.

* **Positives**: Quick to develop, excellent for interactive data visualizations, and supports multiple data sources.
* **Negatives**: Requires a license, and advanced features may require more technical expertise.

### Tool Selection

At this stage you should have selected your tool for the dashboard development. Please refer to the lecture and discussions about tools. The tool you select for your dashboard needs to be at least a ‘mid-tier’ tool (e.g., Microsoft Excel, Power BI, Tableau, etc.). Make sure you give some rationale for your decision, listing both positive and negative sides of the selected tool.

### Target Audience

1. IT Support Specialist:

* Focuses on resolving IT issues quickly and needs a dashboard to monitor open tickets, view MTTR, and spot recurring issues.

1. Systems Analyst:

* Analyzes system performance data to identify trends and improve uptime. Requires detailed visualizations of system uptime and incident patterns.

1. Network Engineer:

* Monitors infrastructure utilization and network performance, using the dashboard to ensure system stability and optimize resource use.

# Bibliography

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