ITE365 Final Project

Software Quality Management Case Study and Quality System Design: Zoom

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Part A – Company & System Research

1.1 Company / System Selection

Zoom Video Communications, Inc. is the organization selected for this case study. Zoom is a global technology company that provides cloud-based video conferencing and online collaboration services. The Zoom platform is widely used for virtual meetings, online classes, webinars, and remote work communication. This company was chosen because it operates a large-scale, real-time communication system where software quality attributes such as reliability, performance efficiency, usability, and security are essential. The platform supports millions of users simultaneously, making software quality management a critical factor for service continuity and user satisfaction.

1.2 Background Study

- **Company Overview:** Zoom Video Communications, Inc. was established in 2011 and specializes in cloud-based communication services. The company aims to provide simple, reliable, and high-quality video and audio communication tools. Zoom has gained global recognition as a key platform supporting remote work, online learning, and virtual collaboration.
- **Type of Software System**: The Zoom platform is designed as a cloud-centered software system that supports multiple client applications. Users can access Zoom through web browsers, desktop software, or mobile applications. The backend infrastructure is responsible for managing real-time data transmission, user authentication, meeting coordination, and security controls.
- **Target users and stakeholders**: Zoom serves a wide range of users including students, educators, professionals, and corporate teams who depend on the platform for communication. Additional stakeholders include system administrators, development teams, service operators, company executives, and regulatory authorities concerned with data protection and privacy compliance.
- **Business or social impact of the system**: Zoom plays an important role in enabling flexible working environments and remote education. It allows organizations to continue operations without physical meetings and supports collaboration across

different geographical locations. While Zoom improves accessibility and productivity, it also introduces challenges related to privacy, system dependability, and large-scale service availability.

1.3 Quality Challenges

- Critical quality attributes: Key software quality attributes for Zoom include system reliability, performance efficiency, ease of use, data security, and service availability. Because Zoom is used for real-time communication, even short system disruptions can significantly affect users.
- Known issues or failures: Some commonly reported issues related to Zoom include connection instability during high user demand, delays in audio or video transmission, occasional application crashes, and previous concerns related to meeting security. These challenges demonstrate the need for continuous quality improvement.
- Consequences of poor quality: If software quality is not properly managed, Zoom may experience service interruptions, reduced user confidence, exposure to security threats, and possible legal or regulatory issues. Ensuring consistent quality is essential for maintaining user trust and system reliability.

Part B – Software Quality Model & Objectives

2.1 Quality Attributes (ISO 25010)

- Functional suitability: refers to the system's ability to correctly deliver its intended features. In Zoom, this includes meeting scheduling, participant control, screen sharing, and recording functions.
- Performance efficiency: evaluates how well the system uses resources while maintaining fast response times. Zoom must support a high number of simultaneous users without significant lag or degradation in service quality.
- Reliability: describes the system's capability to operate consistently over time. Zoom requires a high level of reliability to ensure meetings are not interrupted unexpectedly.
- Usability: focuses on how easily users can interact with the system. Zoom must provide a clear and intuitive interface that allows users with limited technical knowledge to use the platform effectively.

- Security: ensures that user information, meeting content, and payment data are protected. Strong security measures are necessary to prevent unauthorized access and protect sensitive data.

Part C – Defect Analysis & Quality Control

3.1 Defect Identification

Several defects and quality issues were identified in the Zoom video conferencing system. These include meeting disconnections during high participant load, audio and video delay, screen sharing interruptions, application crashes on low-performance devices, login and authentication errors, high CPU and memory usage during large meetings, unclear system error messages, and insufficient documentation for advanced security settings.

3.2 Defect Classification

- Severity: Defects affecting meeting access and security are considered critical, performance-related defects are major, while user interface issues are minor.
- Priority: Issues related to system stability and security are treated as high priority, performance issues as medium priority, and cosmetic problems as low priority.
- Root cause: Possible causes include insufficient testing, infrastructure limitations, complex system integration, and unclear functional requirements.

3.3 Defect Tracking

Defects are tracked using GitHub Issues, where each issue is categorized using labels such as bug, performance, security, and documentation. Milestones are used to monitor progress from defect identification to resolution, ensuring that quality issues are managed in a structured and transparent manner.

Part D – CMMI Process Maturity Analysis

4.1 CMMI Overview

The Capability Maturity Model Integration (CMMI) is a framework used to assess and improve software development and quality management processes. It helps organizations evaluate how well their processes are defined, managed, and optimized, with higher maturity levels indicating greater process control and consistency.

4.2 Current Maturity Assessment

Zoom is assessed at CMMI Level 2 (Managed). At this level, the organization demonstrates basic planning, monitoring, and control of software development activities. Zoom applies structured defect tracking, performance monitoring, and risk management practices; however, some processes may still vary across teams and projects.

4.3 Process Improvement Plan

To advance toward CMMI Level 3 (Defined), Zoom should further standardize development and testing processes across the organization. Additional improvements include implementing formal quality reviews and increasing the use of metrics to evaluate performance, reliability, and defect trends.

Part E – Risk Management

5.1 Risk Identification

The key risks associated with the Zoom system include service downtime, security breaches, performance degradation during peak usage periods, failures introduced during software updates, and limited testing coverage for new features.

5.2 Risk Analysis

Service downtime presents a high impact with a medium likelihood due to Zoom's reliance on cloud infrastructure. Security breaches have a high impact but a lower likelihood due to existing security controls. Performance overload during peak usage has both high impact and medium likelihood. Update-related failures and testing gaps are assessed as medium impact and medium likelihood risks.

5.3 Risk Mitigation Plan

Risk mitigation strategies include continuous system monitoring, regular security audits, extensive load testing, controlled deployment of updates, and expanded automated testing. All identified risks are recorded and tracked using GitHub Issues to ensure accountability and timely mitigation.

Part F – Quality Management Implementation Using GitHub

GitHub is used as the primary platform for managing software quality activities in this case study. The repository README provides an overview of the system and defines quality objectives. Defects, risks, and improvement tasks are documented using GitHub Issues, while a GitHub Project Board is used to manage workflow stages from planning to completion, ensuring traceability and effective quality control.

References

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