



Project Phase II

Topic:

Square

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Date:

20-10-2023

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SQUARE

SQUARE, or System Quality Requirements Engineering, is a smart method created by experts at Carnegie Mellon University. It helps make sure that computer systems and apps are really safe right from the start. It has nine clear steps that guide developers in setting up strong security measures. This way, systems can be trusted to work safely and securely. SQUARE is like a trusted friend that makes sure everything is safe and sound in the digital world!

Metrics

SQUARE (System Quality Requirements Engineering) methodology employs several metrics to evaluate requirements effectively. These metrics help assess the quality and relevance of security requirements for information technology systems. Here are some key metrics used in SQUARE:

1. **Compliance with Security Definitions:** Measures how well the requirements align with the established security definitions agreed upon by stakeholders.
2. **Alignment with Safety and Security Goals:** Assesses the extent to which the requirements contribute to achieving the high-level safety and security goals set for the system.
3. **Effectiveness of Elicitation Techniques:** Evaluates the success of the chosen techniques in extracting pertinent security requirements from stakeholders.
4. **Completeness of Artifacts:** Determines if the developed artifacts (e.g., scenarios, misuse cases, models) sufficiently capture important functional information related to security.
5. **Coverage of Safety and Security Requirements:** Measures the thoroughness of elicited safety and security requirements in addressing potential risks and vulnerabilities.
6. **Risk Assessment Results:** Assesses the quality and accuracy of the risk assessment, including the identification and evaluation of potential threats and their impacts.
7. **Priority and Importance of Requirements:** Evaluates the prioritization of requirements based on their significance in meeting security goals and mitigating risks.
8. **Inspection Results:** Assesses the quality of the requirements inspection process, including the identification and resolution of defects or issues.
9. **Adherence to Organizational Standards:** Checks if the elicited requirements conform to established organizational standards, procedures, and policies.
10. **Traceability of Requirements:** Measures the ability to trace each requirement back to its source, whether it be a stakeholder input, artifact, or other source.
11. **Cost-Benefit Analysis of Requirements:** Assesses the value and feasibility of implementing each requirement in terms of cost and benefit to the organization.
12. **Impact on Business Goals:** Evaluates how well the requirements support the broader business objectives of the organization.

These metrics help ensure that the security requirements identified through SQUARE are comprehensive, relevant, and aligned with the organization's goals and standards. They provide a structured way to assess the effectiveness of the SQUARE methodology in eliciting and prioritizing security requirements.

Learnova Requirement usings SQUARE

Functional Requirements using SQUARE:

1. User Authentication and Authorization (SQUARE Metric: Alignment with Security Definitions and Goals):

- Users must complete a secure authentication process to access the system.
- Teachers, as authorized users, should have the capability to create and manage classes securely.
- Students must be able to securely join classes and access learning materials.

2. Personalized Learning Paths (SQUARE Metric: Alignment with Safety and Security Goals):

- The system shall facilitate teachers in creating personalized learning paths for individual students based on their specific needs and abilities.
- Students should have secure access to view their personalized learning paths and track their progress.

3. Real-time Feedback (SQUARE Metric: Effectiveness of Elicitation Techniques):

- Teachers must be able to provide real-time feedback on assignments and assessments through a secure platform.
- Students should receive timely notifications and feedback on their performance.

4. Collaboration Tools (SQUARE Metric: Completeness of Artifacts):

- The system shall provide secure collaborative features including discussion boards and group project tools.
- Users should be able to securely interact with each other and with teachers via messaging and chat functionalities.

5. Content Accessibility (SQUARE Metric: Compliance with Security Definitions):

- Learning materials (documents, videos, assignments) should be securely accessible from any location with an internet connection.
- Content organization and search functionalities should be intuitive and secure.

6. Assessment and Grading (SQUARE Metric: Completeness of Artifacts):

- The system must support teachers in creating secure quizzes and assessments.
- Students should securely receive automated grades and performance reports.

Non-Functional Requirements using SQUARE

1. Performance (SQUARE Metric: Compliance with Security Definitions and Goals):

- The system must respond to user interactions within 2 seconds to ensure a seamless learning experience.
- It should securely support a concurrent user load of at least 1000 users to accommodate high traffic.

2. Security (SQUARE Metric: Alignment with Safety and Security Goals):

- User data and learning materials must be securely stored and transmitted to protect confidentiality.
- The system should be resilient to common security threats such as SQL injection and cross-site scripting for enhanced security.

3. Scalability (SQUARE Metric: Alignment with Safety and Security Goals):

- The system must be designed to scale and handle future growth securely.
- It should securely accommodate an increasing number of users and courses without compromising performance.

4. Reliability (SQUARE Metric: Alignment with Safety and Security Goals):

- The system should maintain a minimum uptime of 99.9% to ensure consistent accessibility.
- Regular secure backups and disaster recovery procedures must be in place to safeguard against data loss.

Quality Requirements using SQUARE:

1. Usability (SQUARE Metric: Alignment with Safety and Security Goals):

- The user interface must be intuitive and user-friendly to enhance ease of use.
- User training for both teachers and students should be completed within 30 minutes, ensuring efficient onboarding.

2. Compatibility (SQUARE Metric: Compliance with Security Definitions):

- Learnova should be compatible with modern, secure web browsers (Chrome, Firefox, Safari, and Edge).
- It should securely operate on various devices, including desktops, tablets, and smartphones.

3. Maintainability (SQUARE Metric: Alignment with Safety and Security Goals):

- The system should be designed for easy maintenance and updates without causing disruptions to secure operations.
- All code and database changes must be securely documented to facilitate future maintenance.

4. Compliance (SQUARE Metric: Compliance with Security Definitions):

- The system should comply with relevant education and data protection regulations, including FERPA and GDPR, to ensure secure handling of sensitive information.
- Accessibility standards (e.g., WCAG) must be followed to promote inclusive and secure learning experiences.

These requirements provide a structured and comprehensive framework for the development and evaluation of the Learnova learning management system, ensuring it meets security, performance, and quality expectations.

Conclusion

The SQUARE methodology has meticulously defined requirements for Learnova, ensuring a secure, high-performance, and user-friendly learning platform. Functional, non-functional, and quality aspects have been rigorously evaluated. This systematic approach guarantees a cutting-edge system ready to meet current and future educational demands.