## **Checkpoint #1:**

Focuses on identifying and characterizing the quality attributes that have a strong influence on the architecture of the system. Your team collectively come into an agreement on the quality attributes characterized as scenarios and their prioritization.

*Worth 10% of the final grade*

Similar to tables 2 and 3 in lesson 2, your group will complete the following for the assigned project:

* list the important business goals (mission objectives).
* refine the mission objectives into engineering objectives.
* identify important quality attributes for the engineering objective.
* elaborate each quality attribute using a quality attribute scenario making sure each scenario has a stimulus, stimulus source, artifact, response, response measure and environment.
* prioritize the quality attribute scenarios based on their business value.

Submit Group Project Checkpoint #1.

## Rubric

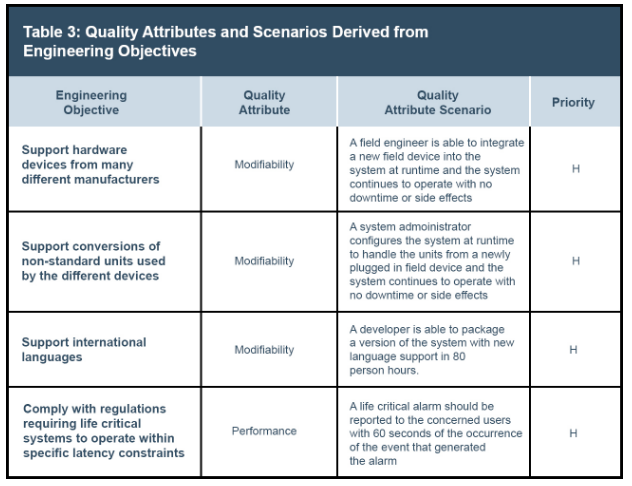
**Checkpoint 1 Rubric**

Checkpoint 1 Rubric (From Steve)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Criteria | Description | Full Marks | Partial Marks | Minimum Expectation | No Marks |
| Business Goals (Mission Objectives) | Business goals must be aligned with answering the questions:  “Why we need to build this system from a business perspective?  How is this aligned with the company’s strategy?”  For example, enabling efficient collaboration among geographically dispersed teams / individuals is one of the business needs. | Business goals are aligned. | Business goals are MOSTLY aligned. | Business goals are NOT aligned. | Business goals are missing from the submission. |
| Engineering Objectives | It is useful to think of engineering objectives in terms of the features / capabilities (a cohesive set of functionality) the system must possess in order to satisfy the business goals.  For instance, reliable and responsive real-time synchronous communication over multiple channels helps meet the business goal related to collaboration among geographically dispersed teams. | Engineering objectives are the right level of granularity (features / capabilities). | You have a mix of coarse grained and fine-grained items on your list of engineering objectives and need to be consistent in how think about them. | The engineering objectives that you have enumerated are too detailed (or solution specific; for instance, use of a particular technology or application). | Engineering objectives are missing from the submission. |
| Quality Attributes | When identifying quality attributes, think of what qualities within the system would help achieve one of more engineering objectives.  For instance, availability can be one of the desired qualities for achieving reliable synchronous communication. | Qualities desired to meet engineering objectives are correctly identified. | Qualities desired to meet engineering objectives are MOSTLY identified. | Qualities desired to meet engineering objectives are NOT correctly identified. | Quality attributes are missing from the submission. |
| Quality Attribute Scenarios | You must provide a well-formed scenario and parse each into scenario into six parts: stimulus, source of stimulus, artifact, environment, response and response measure.  Parsing would also help justify and make more clear why you mapped a particular quality to a given engineering objective. | Scenarios are well-formed and properly parsed. | Scenarios are MOSTLY well-formed and correctly parsed. | Scenarios are NOT well-formed and/or parsed. | Quality attribute scenarios are missing from the submission. |
| Quality Attribute Scenario Prioritization | The priorities must be based on how business critical a quality attribute requirement is. | Priorities of scenarios are aligned with how business critical they are. | Priorities of scenarios are MOSTLY aligned with how business critical they are. | Priorities of scenarios are NOT aligned with how business critical they are. | Priorities are missing from the submission. |
| Design Concerns | You may undertake architecture design for various purposes and the effort expended in designing the architecture will be commensurate with that purpose. | Design purpose IS clear | Design purpose is MOSTLY clear. | Design purpose is NOT clear. | Design purpose is MISSING from the submission. |
| Quality Attribute Requirememnts | Quality attributes are measurable and testable properties of a system used to indicate how well the system satisfies the needs of its stakeholders. Among the drivers, these are the most significant forces that shape the architecture of a system and are expressed using quality attribute scenarios | Quality attribute scenarios are well-formed and properly parsed. | Quality attribute scenarios are MOSTLY well-formed and correctly parsed. | Quality attribute scenarios are NOT well-formed and/or correctly parsed. | Quality attribute scenarios are missing from the submission. |
| Primary Functionality | While functionality is orthogonal to architecture design, there is a subset that is critical to achieving the business goals that motivated the development of the system. As a rule of thumb, this subset is typically 10 percent of the total use cases or user stories for a system and is referred to as primary functionality. | Primary functionality IS correctly identified. | Primary functionality is MOSTLY correctly identified. | Primary functionality is NOT correctly identified. | Primary functional use cases / user stories are missing from the submission. |
| Architectural concerns | Some concerns that not spelled out explicitly as requirements but are part of architecture design for most systems and must be addressed | Architectural concerns ARE correctly identified. | Architectural concerns are MOSTLY correctly identified. | Architectural concerns are NOT correctly identified. | Architectural concerns are missing from the submission. |
| Constraints | Constraints are decisions over which an architect has little or no control, and architectures that satisfy the business goals need to be designed around them. | Constraints ARE correctly identified. | Constraints are MOSTLY correctly identified. | Constraints are NOT correctly identified. | Constraints are missing from the submission. |
| How design concepts are used to address the design concerns of the architecture drivers. | The ADD process works by looking at each architectural driver and making a decision on which design concept to use on which part of the system to address the concerns related to that driver. This results in adding new components and architectural capabilities. | How design concepts are used to address the design concerns of the architecture drivers IS clear. | How design concepts are used to address the design concerns of the architecture drivers is MOSTLY clear. | How design concepts are used to address the design concerns of the architecture drivers is NOT clear. | How design concepts are used to address the design concerns of the architecture drivers is missing from this submission. |
| How functionality is allocated to the components created as a part of the recursive decomposition process | It should be clear applying which design concepts gives rise to which module /component, and what architectural and functional responsibilities does that module handle. In particular, show the element interaction design for primary use cases. | How functionality is allocated to the components created as a part of the recursive decomposition process IS clear. | How functionality is allocated to the components created as a part of the recursive decomposition process is MOSTLY clear. | How functionality is allocated to the components created as a part of the recursive decomposition process is NOT clear. | How functionality is allocated to the components created as a part of the recursive decomposition process is missing from this submission. |
| How tradeoffs are handled in the design | Usually when we select some tactics to implement quality A; we may be hurting quality B due to this selection. Then we need to add more tactics for quality B to reduce the negative impact. Your tradeoff analysis should identify such conflicts and describe how they are resolved. | Discussion on how tradeoffs are handled in the design IS clear. | Discussion on how tradeoffs are handled in the design is MOSTLY clear. | Discussion on how tradeoffs are handled in the design is NOT clear. | Discussion on how tradeoffs are handled in the design is missing from this submission. |
| Tactics supported or not supported | For the chosen high priority quality attribute scenario, which tactics are supported or not supported in your architecture. | Analysis of tactics supported or not supported IS clear. | Analysis of tactics supported or not supported is MOSTLY clear. | Analysis of tactics supported or not supported is NOT clear. | Analysis of tactics supported or not supported is missing from the submission. |
| Design Decisions | For the tactics that are supported, describe the specific design decisions made to support the tactic and enumerate where these decisions are, or will be, manifested (located) in the architecture. | Where design decisions are manifested in the architecture IS clear. | Where design decisions are manifested in the architecture is MOSTLY clear. | Where design decisions are manifested in the architecture is NOT clear. | Where design decisions are manifested in the architecture is missing from this submission. |
| Risk The risk of implementing tactics using a (H = High, M = Medium, L = Low) scale. | For the chosen high priority quality attribute scenario, which tactics are supported or not supported in your architecture. | Risk of implementing tactics IS clear. | Risk of implementing tactics is MOSTLY clear. | Risk of implementing tactics is NOT clear. | Risk of implementing tactics is missing from this submission. |
| Rationale | The rationale for the design decisions made (including a decision to not use this tactic) and its implications | Rationale for the design decisions made IS clear. | Rationale for the design decisions made is MOSTLY clear. | Rationale for the design decisions made is NOT clear. | Rationale for the design decisions made is missing from this submission. |
| Description of the Architecture Documentation | Describes what the views are, their intended purpose and where they can be found in the document. | No Issues | Minor issues | Major Issues | No submission of Description of the Architecture Documentation. |
| How Stakeholders Can Use the Documentation | Provides guidance on how different stakeholders might want to view the various sections | No Issues | Minor issues | Major Issues | No submission of guidance on how different stakeholders might want to view the various sections |
| System Overview | Short description of a system’s business goals and context | No Issues | Minor issues | Major Issues | No submission of a short description of a system’s business goals and context |
| Architectural Drivers | From the design purpose, primary functionality, quality attribute requirements, constraints and architectural concerns, distill a list of significant architectural drivers. | No Issues | Minor issues | Major Issues | No submission of a list of significant architectural drivers. |
| Architecture Views | A view’s primary function is to show the structure that it represents. Create 3 or more architectural views of the system. | No Issues | Minor issues | Major Issues | No submission of 3 or more architectural views of the system. |
| Mapping between views | Relationship among views showing how the architecture works as a unified conceptual whole | No Issues | Minor issues | Major Issues | No submission of views. |
| Rationale | Explains how the overall architecture is a solution to its requirements, why it was chosen, and the implications in changing it | No Issues | Minor issues | Major Issues | No submission Rationale. |

I used Table 3 from the Lesson as reference. Feel Free to add/edit! -Brian

Nick: Thanks Brian – these look really good! I think it would be beneficial to separate out the Business Goals to its own table so we can show the goal refinement process – see the table below this one

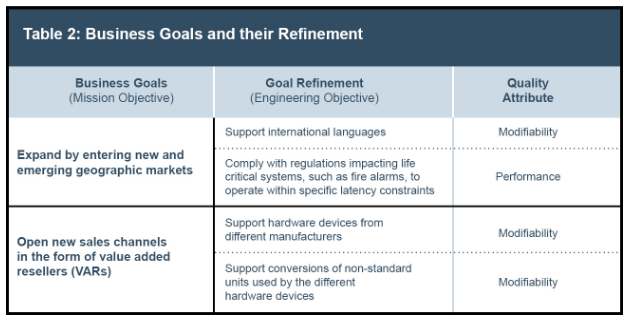


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| --- | --- | --- | --- | --- |
| **Business Goal** | **Engineering Objective** | **Quality Attribute** | **Quality Attribute Scenario** | **Priority** |
| Enable multiple methods of virtual Communication | Support operations such as speech communication, video conferencing, shared whiteboard, as well as email and file sharing | Usability | A user will be able to run the system and use video communication. Concurrently, the system can upload and send data without delay, corruption, or errors (hopefully). Data rate transfer speeds??? (Need help here)  **Source**: Collaborator  **Environment**: Runtime  **Response**: Upload and send data, no downtime  **Response Measure**: Data rate | H |
| Responsiveness | Performance | The host sends communication link under normal operation. The system processes the communication with latency.  **Source**: Collaborator  **Stimulus**: Communication request  **Environment**: Normal  **Artifact**:  **Response**: Process event  **Response Measure**: Latency | H |
| Functionality with third-party devices | Device Variety | Modifiability | Host is able to add a new input device into the system at runtime without error or compatibility issues.  **Source**: Collaborator  **Stimulus**: Runtime  **Environment**:  **Artifact**:  **Response**: Add functionality  **Response Measure**: No side effects | M |
| Send output to display devices | Modifiability | Host sends output from system to display station at runtime.  **Source**: Collaborator  **Stimulus**: Modify functionality  **Environment:** Runtime  **Artifact**:  **Response**: Modifications made  **Response measure**: No side-effects | M |
| Ensure Reliability Operation | Minimize system crashes and failures | Usability | The systems should minimize unexpected crashes and failures, providing a stable and reliable environment for collaboration.  **Source**:  **Environment**: Runtime  **Response**: Error Messages  **Response Measure**: Error rate | M |
| Optimize resource utilization | Performance | The system efficiently utilizes hardware and network resources to maintain stability.  **Source**:  **Stimulus**:  **Environment**: Normal  **Artifact**:  **Response**: Process event  **Response Measure**: Resources usages | M |
|  |  |  |  |
| Ensure System Scalability | Accommodate Growing User Base and Data Load | Scalability | The system can handle an increasing number of users and data load without performance degradation, ensuring optimal performance and responsiveness.  **Source**: Collaborator  **Stimulus**: Runtime  **Environment**:  **Artifact**:  **Response**:  **Response Measure**: No side effects | M |
|  |  |  |  |

Table 2 – Nick: I took what Brian started with (thank you!) and started a Goal Refinement table to satisfy the first two bullet points (*list the important business goals (mission objectives)* and *refine the mission objectives into engineering objectives.*)

|  |  |  |
| --- | --- | --- |
| **Business Goal (Mission Objective)** | **Goal Refinement (Engineering Objective)** | **Quality Attribute** |
| Enable multiple methods of virtual communication and collaboration | Support shared file/ data storage and transfer. | Usability |
| Support synchronous whiteboard editing and viewing | Usability |
| Support real-time communication with instant messaging, video, and audio communication | Usability |
| Increase collaboration efficiency by reducing time it takes to share information with multiple people | When multiple users are modifying the same whiteboard, the updates are visible instantly | Performance |
| Collaborative features can support up to 10 concurrent users without any loss in performance | Performance |
| Maintain a 99% uptime of service per month so users can collaborate at any time | Availability |
| Seamlessly integrate with different types of device hardware profiles | Input devices can be connected to the system during runtime without any loss of service to the other users | Modifiability |
| The output of the system can be changed to different devices or monitors without any loss of service | Modifiability |
| The system will keep data safe and maintain user traceability | Users will have to be authenticated each time a session is started and will only stay authenticated for 12 hours | Security |
| Users will have to have enroll in 2 Factor Authentication and will log users logging location, time and device id. | Security |

Sample:



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Business Goal** | **Engineering Objective** | **Quality Attribute** | **Quality Attribute Scenario** | **Priority** |
| **Increase efficiency of collaboration between geographically dispersed employees** | Ensure data privacy of user when connecting from unsecure networks during usage of the teleconferencing services |  |  |  |
|  | Ensure users have a nominal experience when using the teleconferencing services from any location |  |  |  |
|  | Optimize networking for teleconferencing services |  |  |  |
|  | Support the addition of a user to an existing session of the teleconferencing services |  |  |  |
|  | Support Desktop and mobile operating systems in the teleconferencing services |  |  |  |
|  | Implement an easy to use and intuitive interface for teleconferencing services |  |  |  |
|  | Ensure data privacy of user when connecting from unsecure networks during usage of the video conferencing services |  |  |  |
|  | Ensure users have a nominal experience when using the video conferencing services from any location |  |  |  |
|  | Optimize networking for conferencing services |  |  |  |
|  | Support the addition of a user to an existing session of the video conferencing services |  |  |  |
|  | Support Desktop and mobile operating systems in the video conferencing services |  |  |  |
|  | Implement an easy to use and intuitive interface for video conferencing services |  |  |  |
|  | Ensure data privacy of user when connecting from unsecure networks during usage of the chat services |  |  |  |
|  | Ensure users have a nominal experience when using the chat services from any location |  |  |  |
|  | Optimize networking for chat services |  |  |  |
|  | Support the addition of a user to an existing session of the chat services |  |  |  |
|  | Support Desktop and mobile operating systems in the chat services |  |  |  |
|  | Implement an easy to use and intuitive interface for chat services |  |  |  |
|  | Ensure data privacy of user when connecting from unsecure networks during usage of the file sharing services |  |  |  |
|  | Ensure users have a nominal experience when using the file sharing services from any location |  |  |  |
|  | Optimize networking for file sharing services |  |  |  |
|  | Support the addition of a user to an existing session of the file sharing services |  |  |  |
|  | Support Desktop and mobile operating systems in the file sharing services |  |  |  |
|  | Implement an easy to use and intuitive interface for file sharing services |  |  |  |
|  | Ensure data privacy of user when connecting from unsecure networks during usage of the shared whiteboard services |  |  |  |
|  | Ensure users have a nominal experience when using the shared whiteboard services from any location |  |  |  |
|  | Optimize networking for shared whiteboard services |  |  |  |
|  | Support the addition of a user to an existing session of the shared whiteboard services |  |  |  |
|  | Support Desktop and mobile operating systems in the shared whiteboard services |  |  |  |
|  | Implement an easy to use and intuitive interface for shared whiteboard services |  |  |  |
| Reduce employee productivity downtime or time spent on menial tasks  Reduce the operating costs of our business systems | Reduce man hours spent waiting for teleconferencing services to become available |  |  |  |
| Implement an in proved process for integrating changes to the teleconferencing services |  |  |  |
| Reduce the operating costs of our business systems | Reduce the time spent troubleshooting distruptions on the teleconferencing service |  |  |  |
|  | Increase efficiency when releasing changes for the teleconferencing services |  |  |  |
|  | Reduce man hours spent waiting for video conferencing services to become available |  |  |  |
|  | Implement an in proved process for integrating changes to the video conferencing services |  |  |  |
|  | Reduce the time spent troubleshooting distruptions on the video conferencing services |  |  |  |
|  | Increase efficiency when releasing changes for the video conferencing services |  |  |  |
|  | Reduce man hours spent waiting for chat services to become available |  |  |  |
|  | Implement an in proved process for integrating changes to the chat services |  |  |  |
|  | Reduce the time spent troubleshooting distruptions on the chat services |  |  |  |
|  | Increase efficiency when releasing changes for the chat services |  |  |  |
|  | Reduce man hours spent waiting for file sharing services to become available |  |  |  |
|  | Implement an in proved process for integrating changes to the file sharing services |  |  |  |
|  | Reduce the time spent troubleshooting distruptions on the file sharing services |  |  |  |
|  | Increase efficiency when releasing changes for the file sharing services |  |  |  |
|  | Reduce man hours spent waiting for shared whiteboard services to become available |  |  |  |
|  | Implement an in proved process for integrating changes to the shared whiteboard services |  |  |  |
|  | Reduce the time spent troubleshooting distruptions on the whiteboard services |  |  |  |
|  | Increase efficiency when releasing changes for the shared whiteboard services |  |  |  |

**Business Goals**