

SAF Stakeholders

SAF_Stakeholder_Definition

This section provides a list of the Stakeholder roles considered in the development of the architecture described by SAF. For each, the section lists the concerns that the Stakeholder has that can be addressed by the information in this SAF framework.

Each Stakeholder of a system - customer, user, project manager, coder, analyst, tester, and so on - is concerned with different characteristics of the system that are affected by its architecture.

For example, the user is concerned that the system is reliable and available when needed; the customer is concerned that the architecture can be implemented on schedule and to budget; the manager is worried (in addition to cost and schedule) that the architecture will allow teams to work largely independently, interacting in disciplined and controlled ways.

The system architect is worried about strategies to achieve all of those goals.

The security analyst is concerned that the system will meet its information assurance requirements, and the performance analyst is similarly concerned with it satisfying real-time deadlines.

The following subchapters describe the stakeholders and their concerns:

Acquirer

Definition - Acquirer: stakeholder that acquires or procures a product or service from a supplier, [ISO/IEC 15288:2015 - Systems engineering - System life-cycle processes]

The Acquirer is a Stakeholder that acquires or procures a product or service from a supplier. The Acquirer may be an organization or an individual acting on behalf of the customer or the user.

He is responsible for providing a feasible solution within a given budget. The Acquirer must plan and control the delivery of the system-of-interest as well as other systems together with necessary infrastructure, equipment or training. He must plan the integration of all the procured items to provide a complete solution ready for operation. For large enterprises standardization is an issue. Therefore, the acquirer is interested that standard items are considered in the system architecture.

Concern

- What are necessary inputs for operating the system expected to be provided by other external entities?
- How is the system being used or utilized and interacting with other external systems to satisfy user needs?
- What services are expected from external entities?
- Are defined standard items considered in the architecture?
- What is the cost for each required function?

- What is the priority of each function?
- What is the time schedule for delivering the functions?
- Which physical items the SOI is built of?
- What are necessary enabling systems?
- What is the System Boundary definition?
- What shall be validated to the customer at system level?
- What kind of information or what kind of items are exchanged between the system and external entities (incl. actors)?
- What are the normal and extreme environmental conditions for normal operation, for not operational, for storage and for transport?
- Which information is exchanged between the system and external entities?
- What is the necessary response time for an interface or a service?
- What are the scenarios a system function is utilized in?
- How does a system function interact with its environment?
- What are the external physical entities the system interacts with in the respective context?
- Who provides the inputs to a critical function?
- What are the planned architectural means for risk mitigation?
- What are the different contexts the system is embedded and utilized in?
- What are the Capabilities that are supported by the system?
- What is the lack / deficiency / gap in current Capability implementation that is addressed with the intended solution?
- Who are the Stakeholders involved in the intended solution?
- What are the geographical and physical locations of the intended / proposed elements of the solution?
- What Performers or Resources are necessary to operate the intended solution?
- What existing elements of the organization, enterprise, or operational entity need to be integrated in the intended solution?
- Which functions will the system provide?

Architecture Framework Stakeholder

Definition - Architecture Framework Stakeholder: The Architecture Framework Stakeholder is a generic Stakeholder class more specific Stakeholder(s). The derived Stakeholder(s) have concern(s) regarding the architecture framework description(s). Most of these concern(s) are addressed by SAF Viewpoint(s).

Note: Den Framework Stakeholder braucht SAF für die SAF Entwicklung, denn ein Architecture Framework Stakeholder ist dann ein solcher, wenn er, der Architecture Framework Stakeholder, Requirement(s) / Concern(s) hat, die zu VP führen bzw. durch VP befriedigt werden.

Concern

Customer

Definition - Customer (also Acquirer): organization or person that receives a product or service, [ISO/IEC 15288:2015 –Systems engineering - System life-cycle processes] The Customer is an organization or person that receives a product. Examples: Consumer, client, end user, retailer, beneficiary, and purchaser. A customer can be internal or external to the organization. Customer is a broader reference than Acquirer, operator, or user and includes those roles as well as others. However, the Customer provides the funding.

Concern

- Who provides the inputs to a critical function?
- What is the rationale if requirements are not considered?
- What are the different contexts the system is embedded and utilized in?
- How is the system being used or utilized and interacting with other external systems to satisfy user needs?
- How does a system function interact with its environment?
- What are the scenarios a system function is utilized in?
- What is the System Boundary definition?
- What are necessary enabling systems?
- What shall be validated to the customer at system level?
- What are necessary inputs for operating the system expected to be provided by other external entities?
- What are the external physical entities the system interacts with in the respective context?
- What is the necessary response time for an interface or a service?
- Which information is exchanged between the system and external entities?
- What are the planned architectural means for risk mitigation?
- What services are expected from external entities?
- What kind of information or what kind of items are exchanged between the system and external entities (incl. actors)?
- What are the normal and extreme environmental conditions for normal operation, for not operational, for storage and for transport?
- Which functions will the system provide?

Customer (Representative)

Definition - Customer (Representative): (1) [SAF] The primary goal in a Customer (Representative) role is to represent the end-user, an individual, organization, or enterprise that benefits from the operation of the system. In this role the Customer (Representative) provides usage scenario(s), user need(s) and requirement(s). (2) [SAF] The secondary goal in a Customer (Representative) role is to represent the Acquirer, who buys or procures a product or service from a supplier. The Acquirer selected by the User to serve as their technical representative to:

1. Specify the system.
2. Select a System Developer or Services Provider.
3. Provide technical assistance.

4. Provide contractual oversight for the execution of the contract and delivery of a verified and validated system to the User. Note: All other Stakeholder(s) do not use the system for purpose, and they do not need or require the system to satisfy any need. Therefore, interests of the end-user and claims of the other stakeholders could be contradicting and the Customer (Representative) role therefore strives for a solution satisfying all the Stakeholder Requirement(s).

Concern

Hardware Developer

Definition - Developer: organization that performs development tasks (including requirements analysis, design, testing through acceptance) during a life cycle process. [ISO/IEC 12207:2008] The Developer is a group or an individual implementing the system parts according to defined requirements. On the lowest level of the system architecture there are the Hardware Developer responsible for implementing the hardware components.

Concern

- What is the necessary processing performance?
- What are the interface requirements regarding bandwidth, data throughput and latency?
- What is the allocated space?
- What is the allocated reliability for the complete item?
- Which interfaces are necessary?
- What is the scope of a delivery standard?
- Which variants of a HW item need to be provided?
- What are the provided power inputs?
- What is the necessary memory size for processing nodes and data storage?
- Which protection means need to be provided for an interface?
- What delivery standards need to be provided?
- What is the necessary accuracy and resolution for analog signal acquisition?
- Which functions need to be realized by HW?
- What is the allocated weight?
- What is the necessary accuracy and resolution for processing?
- What are the normal and extreme environmental conditions for normal operation, for not operational, for storage and for transport?
- What is the allocated power consumption?
- What is the allocated reliability for a single function?
- What is the necessary response time for an interface or a service?
- How does the system or a system element interact with the test environment?
- What are the encryption means used for an exchange?
- What additional information the system or a system element needs to generate to enable testing?
- How are error states handled?

- Which modes and states does the system have?
- Who provides the inputs to a critical function?
- What kind of information or what kind of items are exchanged between the system and external entities (incl. actors)?
- What is the sequence of interactions among the system and context elements

IV&V Engineer

Definition - IV&V Engineer Individuals or groups responsible for integration, verification and validation. [tbd]
 IV&V Engineers are individuals or groups responsible for integration, validation and verification during development of the system. Integration, Verification and Validation are activities that are performed simultaneously, and alternately i.e. virtual integration is used to validate requirements, verification of prototypes is performed to validate requirements and design decisions, verification of interfaces is performed during integration on various integration levels allowing to gather enough test coverage.

Concern

- How does the system or a system element interact with the test environment?
- What additional interfaces are necessary to expose internal properties, states and modes for testing?
- What kind of test equipment is necessary to test the system elements?
- What shall be validated to the customer at system level?
- What additional information the system or a system element needs to generate to enable testing?
- How does the elements of the test environment interact with each other?
- How are error states handled?
- What is the necessary response time for an interface or a service?
- Who provides the inputs to a critical function?
- What is the flow of critical information and data through the system?
- Are safety related design principles) followed e.g. segregation of monitors or independence or redundant elements?
- Which modes and states does the system have?
- What is the sequence of interactions among the system and context elements

Maintainer

Definition - Maintainer individual or organization that performs maintenance activities, [ISO/IEC 12207:2008]
 The Maintainer is an individual, group or organization responsible to maintain the system during its operational usage. The Maintainer assures the availability of the system over its foreseen lifetime. It involves obsolescence management, technology evolution, repair, update or replacement of parts of the system or even of the whole system. The Maintainer provides major non-functional requirements (e.g. reliability, availability, mean time to repair), but also functional requirements e.g. to ensure the compatibility with existing enabling systems.

Concern

- What is the order information for each identified system element or component?
- How to install / de-install components to / from the system?
- How to connect the system or a system element to a test equipment?
- How to ensure full Operational Capability of the system after maintenance activities with a system element or component?
- What are the replaceable system components?
- Which modes and states does the system have?
- What kind of information or what kind of items are exchanged between the system and external entities (incl. actors)?
- How are error states handled?

Mechanic Developer

Definition - Developer: organization that performs development tasks (including requirements analysis, design, testing through acceptance) during a life cycle process. [ISO/IEC 12207:2008] The Developer is a group or an individual implementing the system parts according to defined requirements. On the lowest level of the system architecture there are the Mechanic Developer responsible for implementing the mechanical components.

Concern

Operator

Definition - Operator: individual or organization that performs the operations of a system, [ISO/IEC 15288:2015 –Systems engineering - System life-cycle processes]

The Operator is an individual or organization that uses knowledge, skills and procedures to perform the functions of the system to provide the benefit, product or service.

An individual Operator combined with knowledge, skills, and procedures may be considered as an element of the system. The role of the operator and the role of the user can be delegated to a single individual or may be simultaneously instantiated in the same organization.

*For example: Air passengers are the user of the air transport system while a single flight is operated by an air carrier like the Lufthansa using aircrafts of various types to provide the transport service.

To provide the service to the passengers the carrier's organization must implement lots of services utilizing several other enabling systems.

The individual aircraft is operated by the pilot who uses the on-board systems to control the aircraft and to navigate during that flight.

The example illustrates, that the roles user and operator are depending heavily on the definition of the SOI Scope.*

Concern

- What are the scenarios a system function is utilized in?
- What is the necessary response time for an interface or a service?
- How is the system being used or utilized and interacting with other external systems to satisfy user needs?
- What are necessary inputs for operating the system expected to be provided by other external entities?
- How does a system function interact with its environment?

Project Manager

Definition - Project Manager: The responsibility of the Project Manager is to make the right resources with the right skills available in time to get the identified work done.

The Project Manager controls that the work packages are completed in time and agreed milestones are met.

A clear definition of the solution for the stated problem allows planning to be done properly.

Systems Engineering creates a clear and manageable system structure, which is the basis for project planning and task assignment.

Concern

- What are the HW components to be provided?
- What are the SW components to be provided?
- When do product functions or features become available?
- Which development effort is associated with each individual element?
- What is the functional scope of each system delivery standard?
- What are the system delivery standards?
- What is the risk involved with each development item?
- What is the rational if requirements are not considered?
- What services are expected from external entities?
- Who provides the inputs to a critical function?
- Which functions will the system provide?

Regulation Authority

Definition - Regulation Authority: Regulation Authorities can have impact by imposing Stakeholder requirements against the system and by their involvement in the development and acceptance phases (e.g. safety or IT security acceptance audits).

The term “authorities” also refers to current applicable regulations and laws.

The requirements stipulated on the system are diverse. They can be functional and non-functional requirements.

Systems Engineering must adhere to relevant standards and needs to demonstrate compliance with those standards and requirements.

Concern

- How are applicable requirements considered in the system architecture?
- What is the rationale if requirements are not considered?
- What additional information the system or a system element needs to generate to enable testing?
- Which modes and states does the system have?
- How are error states handled?

Safety Expert

Definition - Safety Specialist: Safety is one subject matter of specialty engineering but important enough to be treated separately. The safety experts evaluate a proposed system architecture and design for safety applying different analysis considering the criticality of the system functions. The result of the activity are safety requirements that need to be considered in the system design.

Concern

- How is a critical function decomposed and allocated?
- Who provides the inputs to a critical function?
- What are the planned architectural means for risk mitigation?
- How does criticality propagate down the system hierarchy?
- What are the hazards of a system function in an identified situation (context + scenario)?
- What are the inputs to a critical function?
- What are the scenarios a system function is utilized in?
- What is the possible harm in utilizing the system?
- Are safety related design principles followed e.g. segregation of monitors or independence or redundant elements?
- How does a system function interact with its environment?
- How are safety features verified?
- What are the contributors (SW and HW items contributing to a critical function) to a critical function?
- What are the failure modes of a system function?
- What is the flow of critical information and data through the system?
- What kind of information or what kind of items are exchanged between the system and external entities (incl. actors)?
- What is the necessary response time for an interface or a service?

- How are error states handled?
- How do internal system elements interact with each other to provide the system function or service?
- What shall be validated to the customer at system level?
- Which information is exchanged between the system and external entities?
- What additional information the system or a system element needs to generate to enable testing?
- Which modes and states does the system have?
- What are the encryption means used for an exchange?
- What are the external physical entities the system interacts with in the respective context?
- What is the rationale if requirements are not considered?
- Which functions will the system provide?
- What is the sequence of interactions among the system and context elements

Security Expert

Definition - Security Specialist: Security is one subject matter of specialty engineering but important enough to be treated separately. The IT-Security experts evaluate a proposed system architecture and design for IT-Security. One outcome of the activity are technical security requirements that need to be considered in the system design. Other outcomes affect the organization or the infrastructure of the user or define procedures that need to be implemented.

Concern

- What are the requirements for security relevant IT-equipment?
- Which information is exchanged between the system and external entities?
- What are the protocols used for exchanging information?
- What are the interfaces between different domains?
- How is the interface between different domains protected?
- What kind of information is exchanged and processed within the system?
- What are the domains of similar security levels in the system or the system participates in?
- What are the encryption means used for an exchange?
- What are the confidentiality, integrity and availability levels for processed or exchanged information?
- What physical items are used building up the system?
- What is the necessary response time for an interface or a service?
- How do internal system elements interact with each other to provide the system function or service?
- What kind of information or what kind of items are exchanged between the system and external entities (incl. actors)?
- Which modes and states does the system have?
- How are error states handled?
- What additional information the system or a system element needs to generate to enable testing?
- What are the scenarios a system function is utilized in?
- What shall be validated to the customer at system level?

- What is the rationale if requirements are not considered?
- What are necessary inputs for operating the system expected to be provided by other external entities?
- Which functions will the system provide?
- What is the sequence of interactions among the system and context elements

Software Developer

Definition - Developer: organization that performs development tasks (including requirements analysis, design, testing through acceptance) during a life cycle process. [ISO/IEC 12207:2008] The Developer is a group or an individual implementing the system parts according to defined requirements. On the lowest level of the system architecture there are the Software Developer responsible for implementing the software components.

Concern

- What are data / information items exchanged?
- What are the algorithms to be implemented?
- Which functions and services need to be implemented in SW?
- What are the protocols for exchanging items on an interface?
- What are precision and accuracy requirements for presentation of data items on an interface?
- What is the necessary performance for processing?
- What are precision and accuracy requirements for processing of data items?
- What are the non-functional requirements applying to SW (e.g. with regard to SW quality, modularization, changeability or reuse)?
- What is the necessary response time for an interface or a service?
- Which SW interfaces are necessary?
- What are the interface requirements regarding bandwidth, data throughput and latency?
- What are the formats of the exchanged items?
- What are the encryption means used for an exchange?
- What kind of information or what kind of items are exchanged between the system and external entities (incl. actors)?
- What additional information the system or a system element needs to generate to enable testing?
- How are error states handled?
- Who provides the inputs to a critical function?
- What is the necessary accuracy and resolution for processing?
- How does the system or a system element interact with the test environment?
- Which modes and states does the system have?
- What is the sequence of interactions among the system and context elements

Supplier

Definition - Supplier: organization or an individual that enters into an agreement with the Acquirer for the supply of a product or service, [ISO/IEC 15288:2015 –Systems engineering - System life-cycle processes]
The Supplier is the organization or individual that enters into an agreement with the Acquirer to supply a product or service. Usually, the system architect and the developers for make-items are part of the supplier's organization. Other terms commonly used for Supplier are contractor, producer, seller or vendor.

Concern

- What are the scenarios a system function is utilized in?
- What are the external physical entities the system interacts with in the respective context?
- What are necessary inputs for operating the system expected to be provided by other external entities?
- What are necessary enabling systems?
- What services are expected from external entities?
- What is the System Boundary definition?
- What are the normal and extreme environmental conditions for normal operation, for not operational, for storage and for transport?
- What are the Capabilities that are supported by the system?
- What is the lack / deficiency / gap in current Capability implementation that is addressed with the intended solution?
- Who are the Stakeholders involved in the intended solution?
- What are the geographical and physical locations of the intended / proposed elements of the solution?

System Architect

Definition - System Architect: The System Architect as an individual or group performing the systems engineering for the SOI (Sol). The system architect creates the system architecture i.e. the views as defined by the SAF.

Concern

- What kind of information or what kind of items are exchanged between the system and external entities (incl. actors)?
- What is the configuration or version of each configuration item?
- Which system functions are dependent on a systems mode or state?
- Which Stakeholder are relevant to the system and might impose requirements?
- What are the configuration items in the physical architecture?
- What are the external physical entities the system interacts with in the respective context?
- What are the physical components?
- What system elements are make-items, reuse items or COTS?
- What is the breakdown of functions into sub-functions?
- What is the allocation of functions to the physical architecture?
- What are the consequences, if the Stakeholder's concerns are not considered?

- What is the physical breakdown of the system?
- What are the system delivery standards?
- How do internal system elements interact with each other to provide the system function or service?
- What are the different contexts the system is embedded and utilized in?
- What is the System Boundary definition?
- What are the encryption means used for an exchange?
- How does criticality propagate down the system hierarchy?
- Which modes and states does the system have?
- How are error states handled?
- How are applicable requirements considered in the system architecture?
- What are necessary enabling systems?
- What is the necessary response time for an interface or a service?
- How does a system function interact with its environment?
- Which information is exchanged between the system and external entities?
- What is the flow of critical information and data through the system?
- What are the normal and extreme environmental conditions for normal operation, for not operational, for storage and for transport?
- How does the system or a system element interact with the test environment?
- How is a critical function decomposed and allocated?
- What are the planned architectural means for risk mitigation?
- What is the functional scope of each system delivery standard?
- Have the logical decomposition guidelines been followed?
- What shall be validated to the customer at system level?
- How does the elements of the test environment interact with each other?
- Who provides the inputs to a critical function?
- How is the system being used or utilized and interacting with other external systems to satisfy user needs?
- What are necessary inputs for operating the system expected to be provided by other external entities?
- What are the scenarios a system function is utilized in?
- Are safety related design principles) followed e.g. segregation of monitors or independence or redundant elements?
- What is the necessary accuracy and resolution for processing?
- What additional information the system or a system element needs to generate to enable testing?
- Which system function is addressed by system requirement?
- What services are expected from external entities?
- What is the rational if requirements are not considered?
- What are the Capabilities that are supported by the system?
- What is the lack / deficiency / gap in current Capability implementation that is addressed with the intended solution?
- Who are the Stakeholders involved in the intended solution?
- What are the geographical and physical locations of the intended / proposed elements of the solution?

- What Performers or Resources are necessary to operate the intended solution?
- What existing elements of the organization, enterprise, or operational entity need to be integrated in the intended solution?
- What is the context of the organization, enterprise, or operational entity?
- What is the task executed by an organization, enterprise, or operational entity in the Operational Context?
- Which functions will the system provide?
- What is the sequence of interactions among the system and context elements

System of Interest Stakeholder

Definition - System of Interest Stakeholder: [SAF] the SOI Stakeholder is a generic Stakeholder. Imposes Stakeholder Requirement(s) on the system. The derived Stakeholder(s) have concern(s). Note: Der SOI Stakeholder könnte SAF für SAF Entwicklung egal sein, denn SOI Stakeholder haben Requirement(s) / Concern(s) bezüglich eines mit dem SAF Framework zu entwickelnden Systems.

Concern

User

Definition - User: individual or group that interacts with a system or benefits from a system during its utilization, [ISO/IEC 15288:2015 - Systems engineering - System life-cycle processes] The User is the individual, organization or group that benefits from the operation of the system. The User provides the usage scenarios, the User needs and finally the user requirements representing most of the functional requirements but also non-functional requirements. The role of User and the role of operator are sometimes allocated, simultaneously or sequentially, to the same individual or organization. All the other stakeholders do not use the system for any purpose, and they do not need or require the system to satisfy any need. Therefore, interests of the User and claims of the Stakeholder could be contradicting.

Concern

- What are the scenarios a system function is utilized in?
- What is the necessary response time for an interface or a service?
- How is the system being used or utilized and interacting with other external systems to satisfy user needs?
- How does a system function interact with its environment?
- What are necessary inputs for operating the system expected to be provided by other external entities?