System-of-Systems Design Description (SoSDD) Template

**Abstract**

This document defines the System-of-Systems Design Description template for Arrowhead compliant Systems-of-Systems.

This document should contain an abstract high level view, describing how its main functionalities have been technologically implemented, i.e. which technologies have been used, how it is physically implemented.

All Arrowhead System-of-Systems Design Descriptions should be specified using this template and stored on a common repository (available on the SVN server), in order to document and formalize the pilot demonstrators and the common Arrowhead framework.

1. System-of-Systems Design Description Overview - SoSDD 3
2. Systems 3
3. Use-cases refinement 4
4. SoS architecture and implmentation 4
   1. Structure and Behaviours 5
   2. Data Flow Diagram 5
5. Cyber Physical description 5
6. Security implementation 5
   1. Technical security realisation 5
   2. Threats and Vulnerabilities 5
7. Non-functional requirements implementation 5
8. Domain contextualisation 6
9. References 6
10. Revision history 7
    1. Amendments 7
    2. Quality Assurance 7

## System-of-Systems Design Description Overview - SoSDD

This document should describe how a “System-of-Systems Design Description” document is instantiated into an existing System-of-Systems describing the technologies being used. Therefore, this document should point out all necessary Black Box System Description (SysD) and White Box System Design Description (SysDD) documents, which describe the systems used in this realization.

This section should contain a high level overview of the system, complementing the abstract design contained in “System-of-Systems Description (SoSD)” with implementation details.

The formal picture, presented on the “System-of-Systems Description” document, shows the relations between the different components should be complemented with the technologies being used (COAP, XMPP, XML, ZigBee, etc). A pointer to the SoSD document must also be placed here.

**Table 1 Pointers to SoSD documents**

|  |  |
| --- | --- |
| **Pointer to SoSD doc:** | Path the document on the repository |

Since it is a deployment description, the entire setup of the system must be explained. It must describe the pilots in detail, in order to be deployed.

An example of how this template can be used can be found at ….

## Systems

This section MUST contain pointers to SysD and SysDD documents, which implements the systems.

**Table 2 Pointers to SysD documents**

|  |  |
| --- | --- |
| **System name** | **Path** |
| System1 | Path the document on the repository |
| System2 | Path the document on the repository |

**Table 3 Pointers to SysDD documents**

|  |  |
| --- | --- |
| **System Design name** | **Path** |
| SystemDesign1 | Path the document on the repository |
| SystemDesign2 | Path the document on the repository |

## Use-cases refinement

Refinement compared to above referenced SoSD document

UML use-case diagrams are suggested to graphically represent the use-cases. If needed a UML sequence diagram can also be added. To include more detail on the use-case section, use the table format, depicted in Table 4.

**Table 4 Use-case description table**

|  |
| --- |
| **Name of the Use-case** |
| **ID**: Unique ID |
| **Brief description**:  Give a brief description of the use-case. |
| **Primary actors**:  Present the primary actor, e.g.,Prosumer |
| **Secondary actors**:  Present the secondary actors, e.g., Virtual Market of Energy |
| **Preconditions**:  If there are any |
| **Main flow**:  Present in a sequence of steps the interactions among the actors  1-  2-  3-  ……… |
| **Postconditions**:  If there are any |
| **Alternative flows**:  Any possible alternative flows to the sequence presented in the Main flow section. |

## SoS architecture and implmentation

In this section a detailed description of the System-of-Systems is required. This may partly be covered by chapter 4. The description needs to cover the following points:

* Architecture of the System-of-Systems (diagrams, explanations, technologies used)
* Technical description of interface implementation (interfaces between Systems)
* Description of implementation of access control mechanisms
* Programming languages used

## Structure and Behaviours

UML/SysML diagrams in this section shall show two different views:

* Structure
* Behavior

For the structure, the UML Component diagram or the SysML Block Definition diagram defines the SoS in terms of the Systems listed in Section 2.

For the behaviour, usage of an SysML/UML sequence diagrams is recommended.

## Data Flow Diagram

Provide a Data Flow diagram of the SoS.

## Cyber Physical description

This section should describe cyber-physical details.

This section should provide details regarding what is related to the physical implementation, location of devices, constraints, etc.

## Security implementation

This chapter describes how security is implemented into the System-of-Systems.

## Technical security realisation

In this section the technical realisation of the security requirements, specified in the SoSD document.

## Threats and Vulnerabilities

This chapter contains any known threats and vulnerabilities to the SoS.

## Non-functional requirements implementation

This section describes requirements regarding QoS, response time, resources, reliability, etc. Note that some of these requirements can be optional.

The following table should specify which non-functional requirements are implemented.

**Table 5 Non-functional requirements**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Description** | **Type** | **Value** | **Use**-**case** |
|  |  |  |  |  |

The above table reports the non-functional requirements, by providing the following information:

* **Name:** The name of the non-functional requirement.
* **Description:** Description of the non-functional requirement.
* **Type:** The type of the non-functional requirement (e.g., hardware, software, performance).
* **Value:** Any constrains it imposes to the use-case(s) (e.g., serve 1000 houses per aggregator, perform 100000 transactions per minute, have a delay of less that 1ms on a message).
* **Use-case:** Provide the ID of the use-case(s) it refers to.

## Domain contextualisation

This section contextualises the implementation into an Arrowhead Area, e.g. DNS structure.

## References

Any references must be put here

## Revision history

## Amendments

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Date | Version | Subject of Amendments | Author |
| 1 | 2013-11-06 | 0.0 | Creation | Luis Lino Ferreira |
| 2 | 2013-11-25 | 0.1 | Revisions, nomenclature changes | Christos Chrysoulas, Luis Lino Ferreira |
| 3 | 2013-12-03 | 0.2 | Revisions | Christos Chrysoulas |
| 4 | 2013-12-18 | 0.3 | Text Revisions | Christos Chrysoulas |
| 5 | 2014-01-11 | 0.4 | Quickparts and format to dotx | Ove Jansson |
| 6 | 2015-02-20 | 1.0 | Revision of text | Michele Albano / Luis Ferreira |
| 7 | 2015-09-30 | 1.1 | Refinement of the structure | Michele Albano / Luis Ferreira |
| 8 | 2015-09-30 | 1.1 | Revision | Iker Martínez de Soria |
| 9 | 2020-06-05 | 2.0 | Major update | Jerker Delsing |
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## Quality Assurance

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Date | Version | Approved by |
| 1 | YYYY-MM-DD | 1.0 | Nnnnn Nnnnnnn |
| 2 |  |  |  |