Document title	Document type
AiCluster	**SysDD**
Date	Version
2025-10-20	**X.Y.Z**
Author	Status
Doument author	**RELEASE**
Contact	Page
xx@yy.xx	**1 (7)**

AiCluster
System Design Description

Abstract

This is the template for System Design Description (SysDD document) according to the Eclipse Arrowhead documentation structure.

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1 Overview

This document describes the [XX] system, which provides [brief description of the implementation of the [XX] SysD. functionality]. Preferable make use of SysML/UML use case diagram. This is the documentation describing the AiCluster system and it's sysD description will be implemented.

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2 Implementation

This implementation is based on the SysD document ...... **??**

2.1 Implementation language and tools

- Code language:Python 3.14

- Tools: TensorBoard (For traning visualization).

- IDE: Visual Studio code or other comparable python compatible IDE.

- Compiler: CPython.

- Libaries: Pytorch (For Ai training and dataset construction), Pandas (For reading data).

2.2 Functional properties implementation

- Hardware Specs:

  - CPU: AMD EPYC or equivalent high-core-count enterprise grade CPU.
  - GPU: Nvidia GPUs with a memory count of 12Gb or higher.
  - Nvme: Higher end Read- write-speed internal storage.

- Software specs:

  - OS: Ubuntu server or similar Linux based server solution.
  - Database:
    * Used database: MySQL
    * Database structure: Models(SafeTensors and hyperparameters).
    * Ontology: Arrowhead's internal ontology.
    * Data Models: Json.
  - Result provided as: Json.

2.3 Non functional properties implementation

2.3.1 Security

- Necessary Resources:

Uses the Arrowhead Authorization and Certificate Authority systems. With TLS certificates for secure communication of HTTP packages.

- Data Handling and storage:

Store registered system credentials and a log of autorized and denied requests in a lightweight SQLite internal DB.

2.3.2 Power management

The system will use a back up PSU for uninterrupted operation so no training or runtime will be lost in case of a power outage.

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2.3.3   Internal monitoring

- Necessary Resources:

Employ a internal monitoring module to keep a log on the hardware runtime and health status.

- Data Handling and storage:

The metrics from the monitoring is stored locally in a suitable Database format. Which can be accessed for evaluation at a later time.

2.3.4   Configuration

- Necessary Resources and Data handling:

Configurations of the system will be handled via a local JSON file. Backup copies will be maintained for rollbacks.

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3 Services

The implementation services is based on the follwoing SD and IDD documents:

- SD: Title aiClusterSD

- IDD: Title aiClusterIDD

Table 1: References to documentation for services produced and consumed.

Services produced	SysD ref	SD ref	IDD ref
aiCluster	SysD aiCluster	SD aiCluster	IDD aiCluster HTTP/TLS/JSON
Services consumed	**SysD ref**	**SD ref**	**IDD ref**
ServiceDiscovery	SysD ServiceRegistry	SD ServiceDiscovery	IDD ServiceDiscovery HTTP
ServiceOrchestration	SysD ServiceOrchestration	SD ServiceOrchestration	IDD ServiceOrchestration HTTP
AuthorisationManagement	SysD ConsumtionAuthorisation	SD AuthorisationManagement	IDD AuthorisationManagement HTTP
dataBaseService	SysD DataBase	SD dataBaseService	IDD dataBase HTTP/TLS/JSON

4 References

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5   Revision History

5.1   Amendments

Revision history and Quality assurance as per examples below

No.	Date	Version	Subject of Amendments	Author
1	2020-12-05	X.Y.Z		Tanyi Szvetlin
2	2021-07-14	X.Y.Z	Minor updates	Jerker Delsing
3	2022-01-12	X.Y.Z	Minor updates	Jerker Delsing

5.2   Quality Assurance

No.	Date	Version	Approved by
1	2022-01-10	X.Y.Z	