IOT KERETRENDSZEREK ÉS IPARI ALKALMAZÁSAIK

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Service Oriented Architectures

Rendszertervezési megközelítés

- Egy IIoT rendszerben nem csak egy gyártó megoldásai lesznek.
  - Rendszerintegráció, mintsem komplex rendszerépítés
  - Interfészek, API-k, szolgáltatások növekvő szerepe
  - COTS és saját fejlesztésű komponensek keverése
- Fekete és fehér doboz tervezési absztrakciós szintek
- Szolgáltatásorientált Architektúra tervezés

System of systems

- „**System of systems** is a collection of task-oriented or dedicated systems that pool their resources and capabilities together to create a new, more complex system which offers more functionality and performance than simply the sum of the constituent systems.”
  - Operational Independence of Elements
  - Managerial Independence of Elements
  - Evolutionary Development
  - Emergent Behavior
  - Geographical Distribution of Elements
  - Interdisciplinary Study
  - Heterogeneity of Systems
  - Networks of Systems

Design Document Relations

Session 1

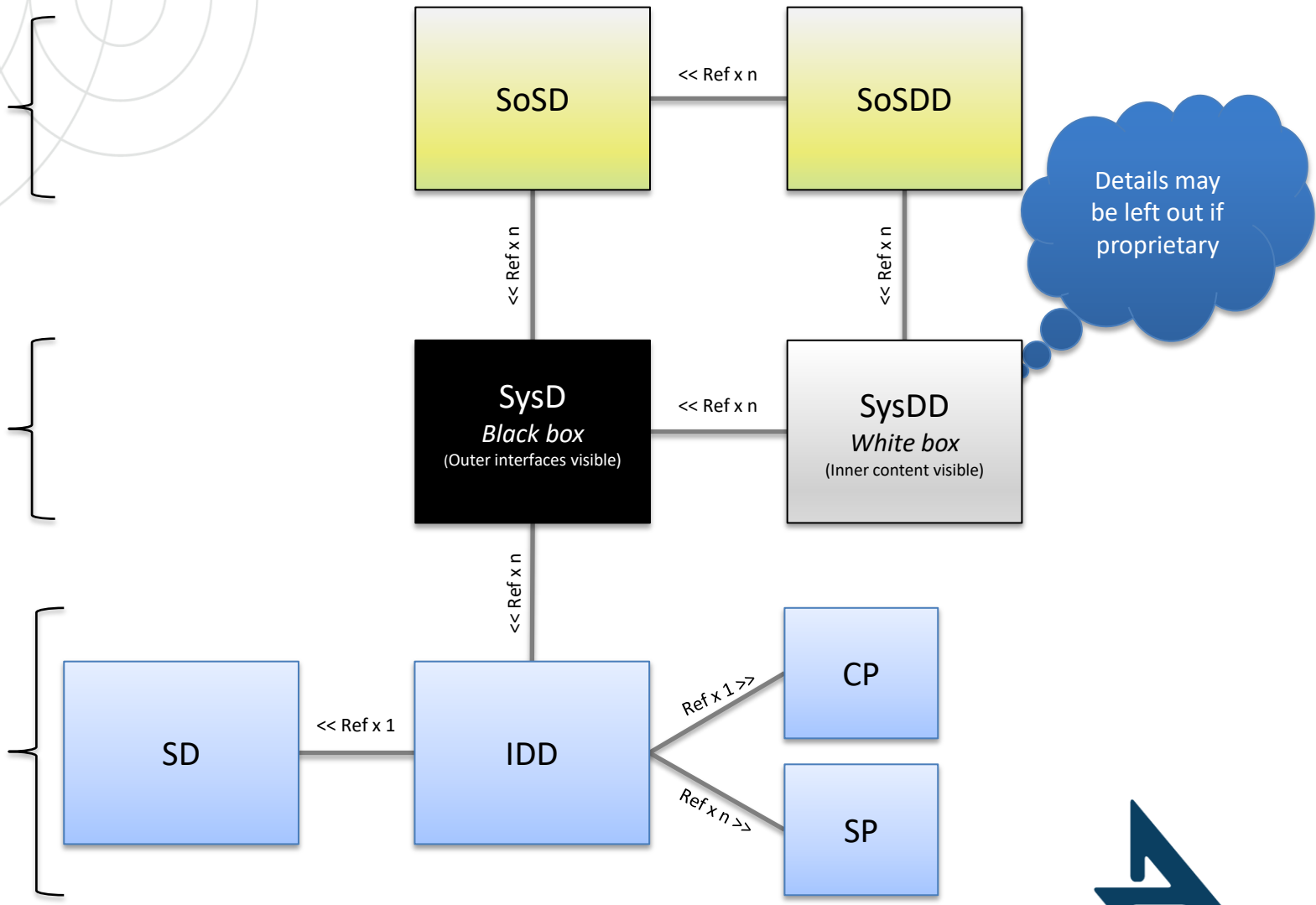
Session 3

Session 2

System of Systems

System

Service



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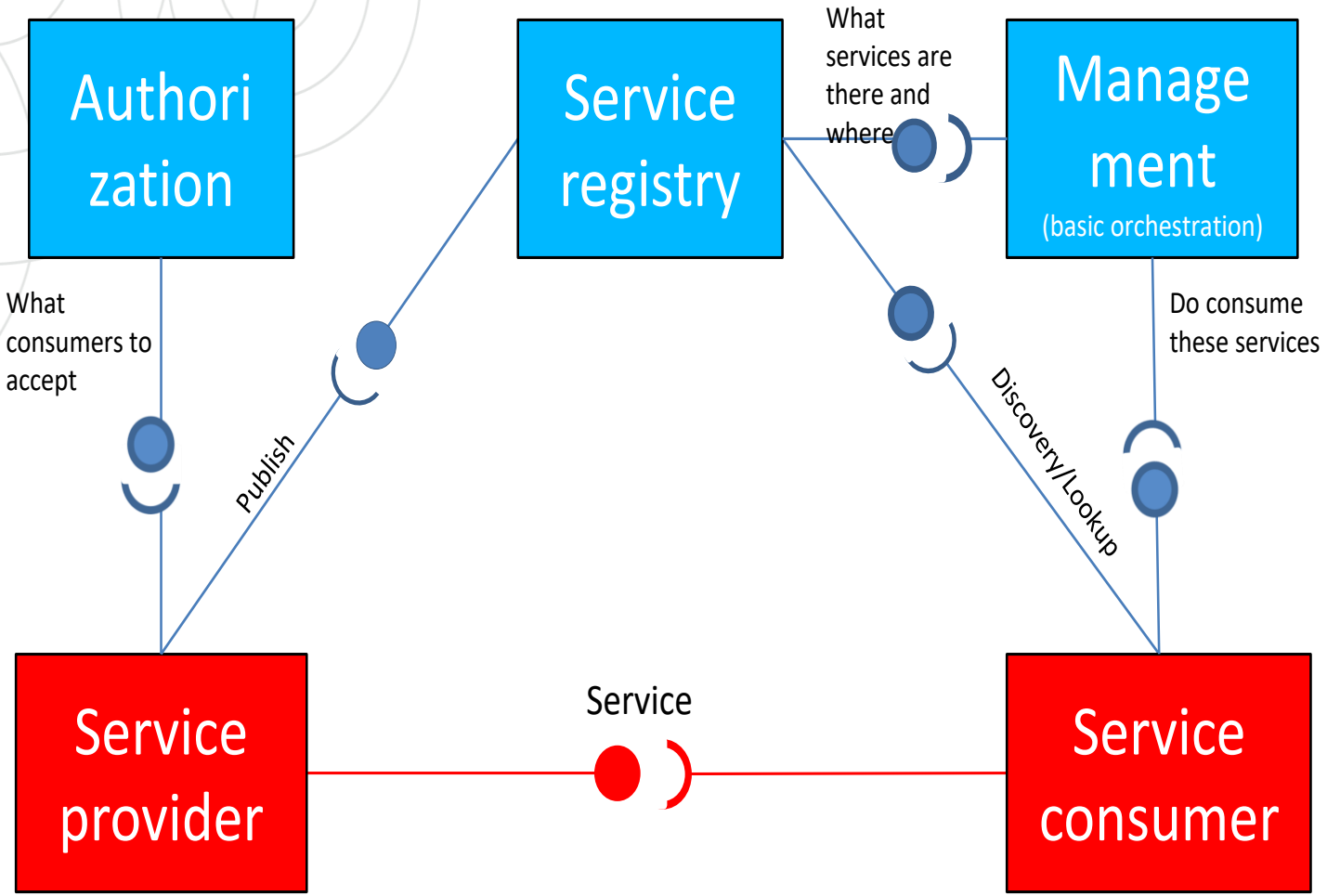
Arrowhead Generic Design Pattern

How should my system/component behave to operate properly in an Arrowhead network?

- How to announce the presence of a service?
- How to discover services?
- How to control which service instances that shall exchange information?
- How to decide which consumer that is allowed to access information?


Authori zation
Service registry
What services are there and where
Manage ment
(basic orchestration)
What consumers to accept
Publish
Discovery/Lookup
Do consume these services
Service provider
Service
Service consumer

Arrowhead Core Functionality

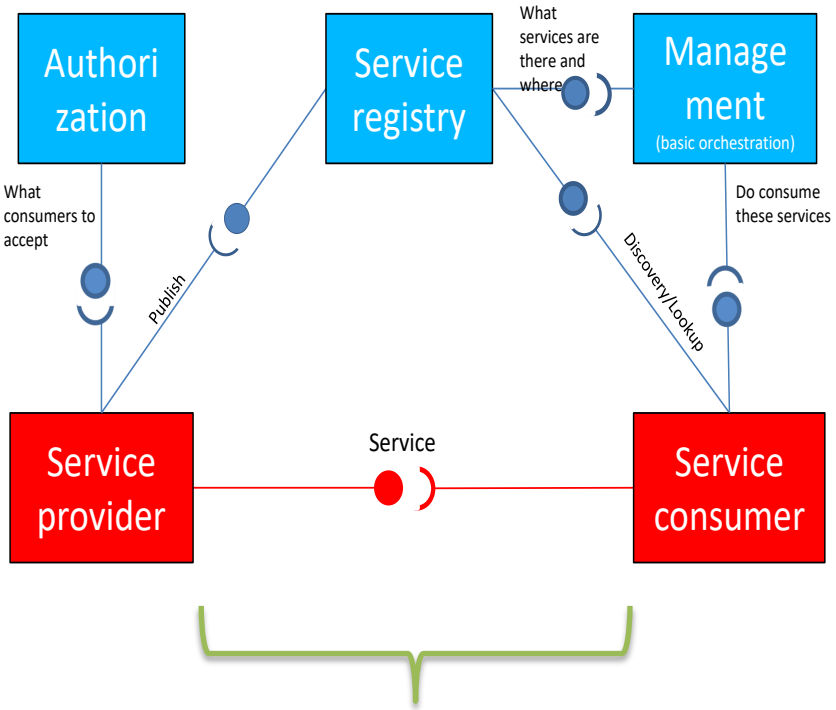
- Around 20 core services identified so far
- System/Component mandatory services
  - Service Discovery
    - Answers how to set presence and how to discover services
  - Orchestration
    - Answers how to control information exchange
  - Authorisation
    - Answers who is allowed to access information
  - Status
    - Vital for system/component monitoring

Generic Design Pattern

- Generic Design Documents
  - Cook book
  - SoSD
    - Enumeration of mandatory core systems/components
    - Expected interactions between an application system/component and core systems/components
  - SysD
    - Black box description of a generic Arrowhead system/component

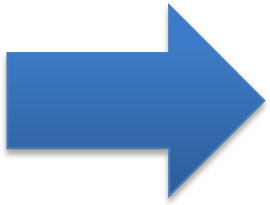
Service Concept

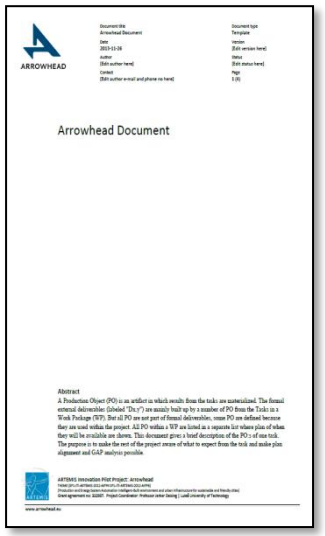
In Arrowhead a service is the information exchange between two technical systems.



Describing a Service

- The ”What” and ”Why”
  - Purpose
  - Functionality
  - Information Model
- The ”How”
  - Implementation Details
  - Communication Protocol
  - Data Encoding
  - Security
  - Semantics





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Describing a Service in Arrowhead

Technology Independent

Technology Dependent

Service Description (SD)

Interface Design Description (IDD)

Semantics Profile (SP)

Communication Profile (CP)

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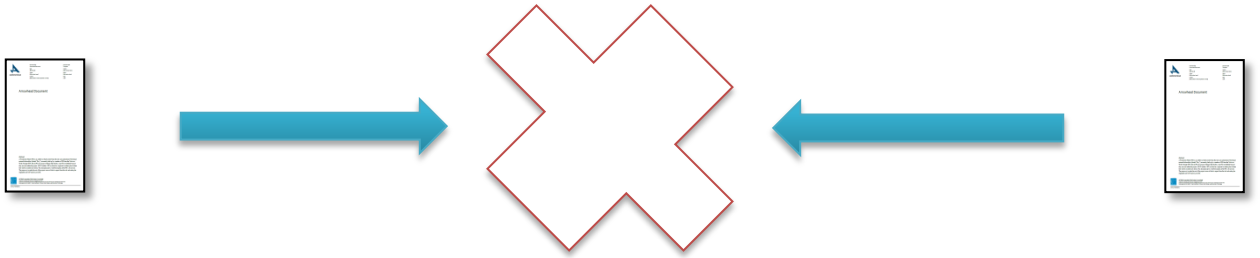
Example: One Document Strategy

Vendor A Temperature Service

Vendor B Temperature Service



Technology X

Technology Y

Technology Z

Technology Z

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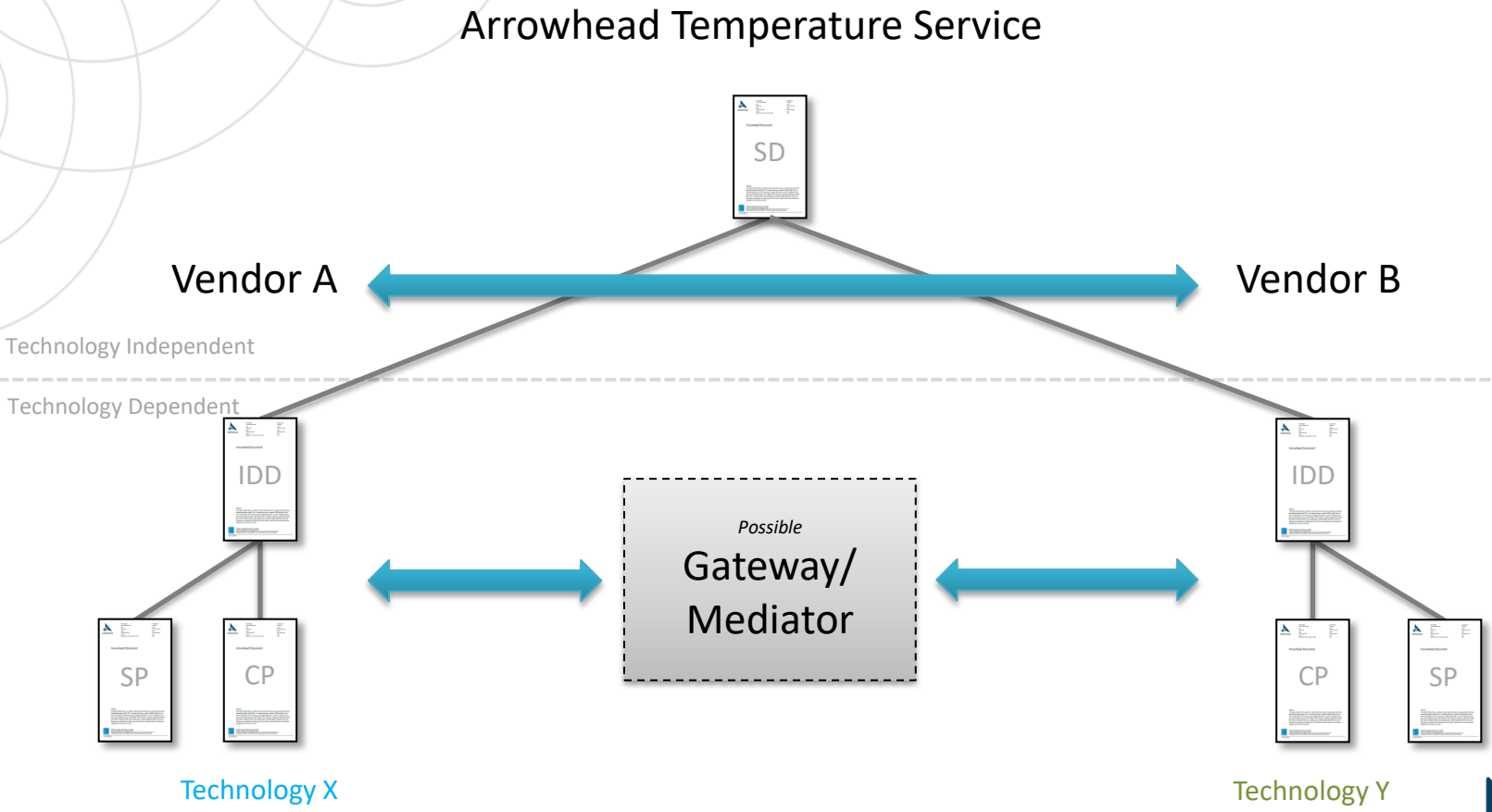
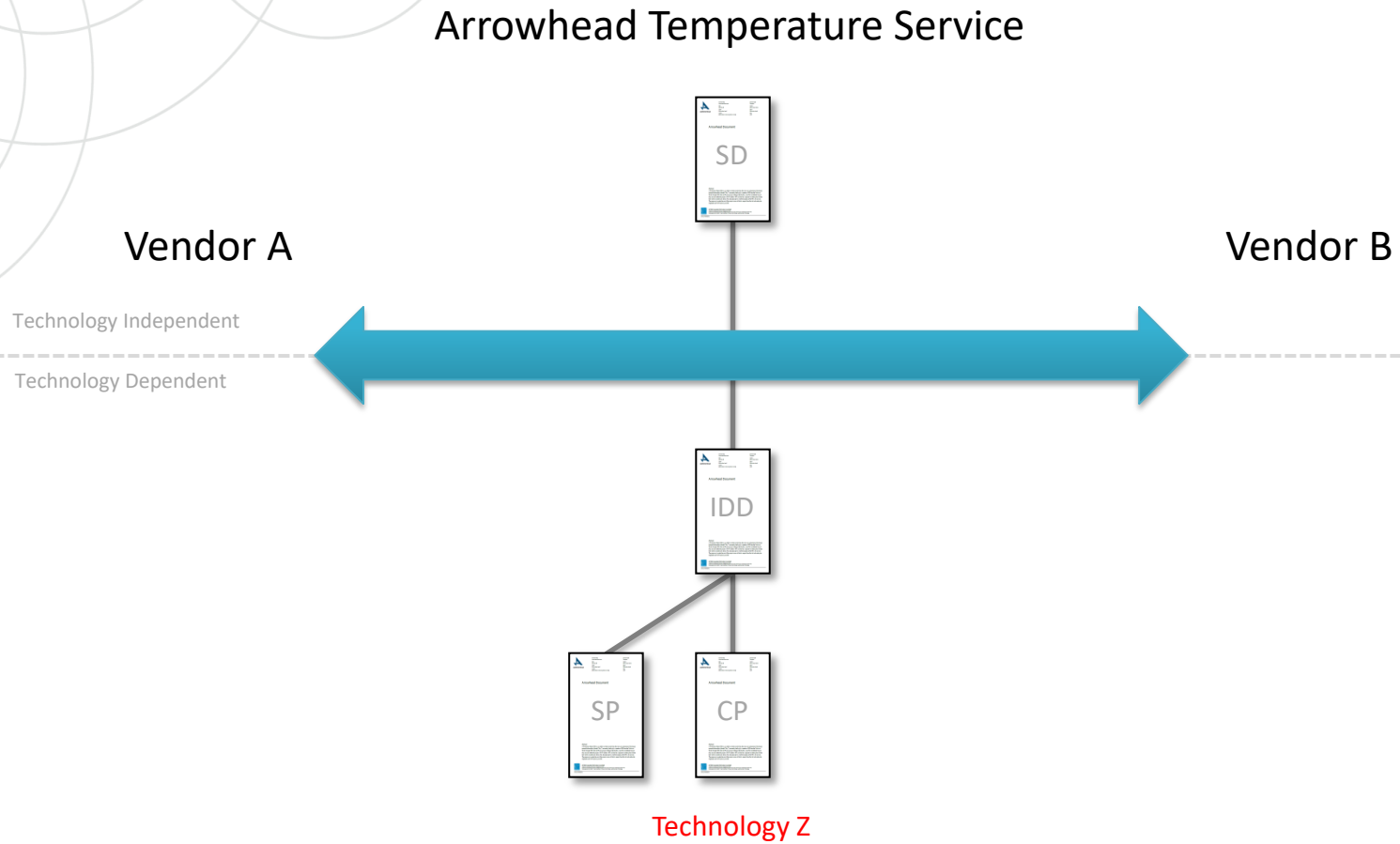
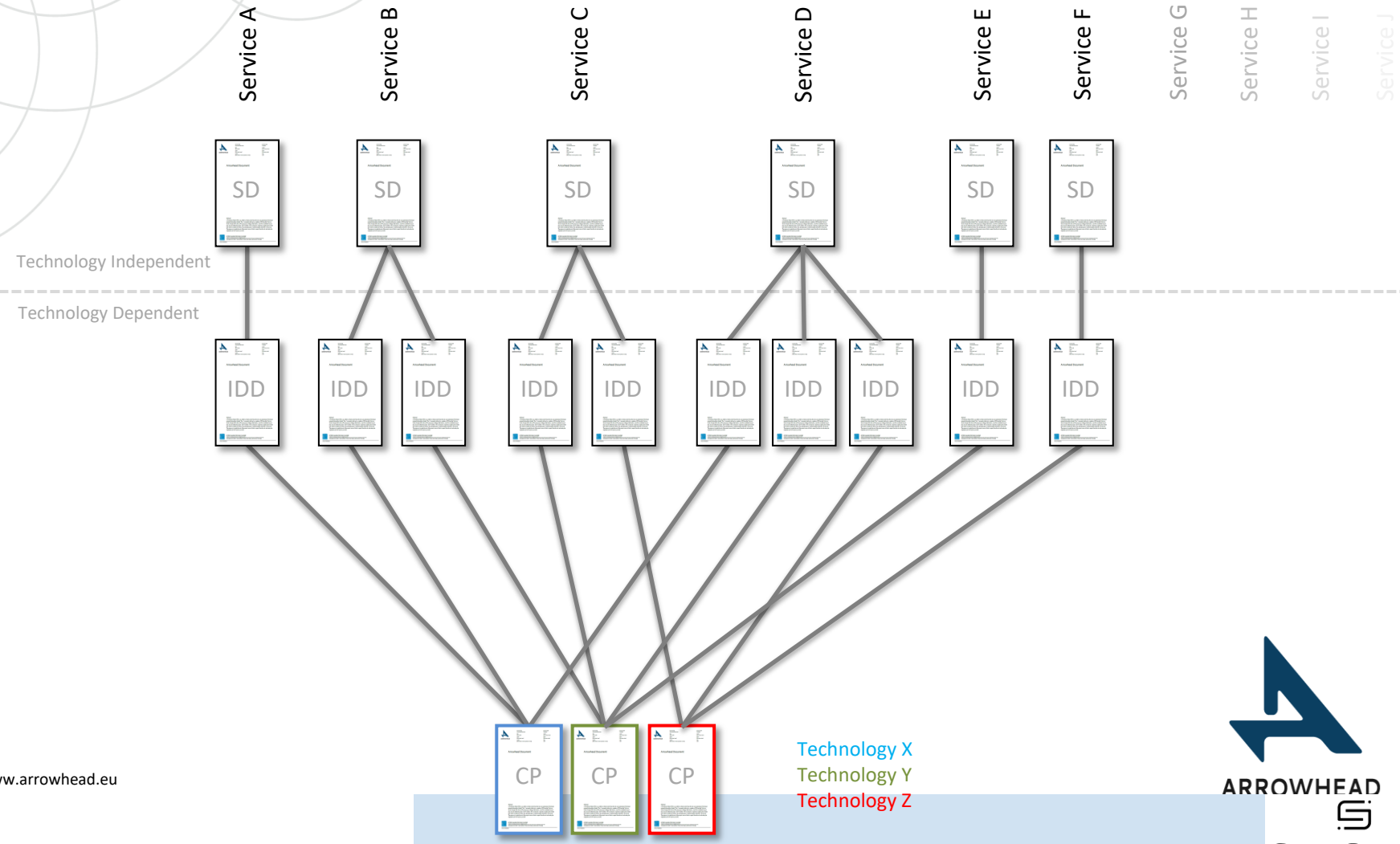
Example: Arrowhead Strategy



Example: Arrowhead Strategy



Vision



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Design Document Examples

- SD+IDD+CP
  - Application Service (Temperature, fictional)
  - Core Service (Orchestration)