

Configuration & Persistency Service



- Release 8 (Honolulu) TSC Presentation
Oct 01, 2020 version 10

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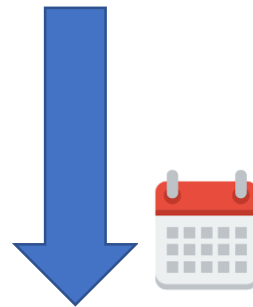
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R8 TSC Project Proposal Presentation

TIME	Oct 01, 2020 TSC Agenda
5 min	Context & Overview of C&PS & Agenda – Introduction to C&PS, Project Context.
5 min	Model Driven C&PS Proof of Concept (PoC) – Overview of the Model-Driven C&PS PoC for R7.
5 min	Project Proposal & Progress from last presentation – Project proposal (teaser), Project Roadmap, TSC Vote
5 min	Questions & Answers – Q&A



TIME	Q&A Session Post-Session
-	Follow-up questions – Follow-up meetings at C&PS Team Call (Fridays)

Overview of Configuration & Persistency Service



Context



Architecture S/C



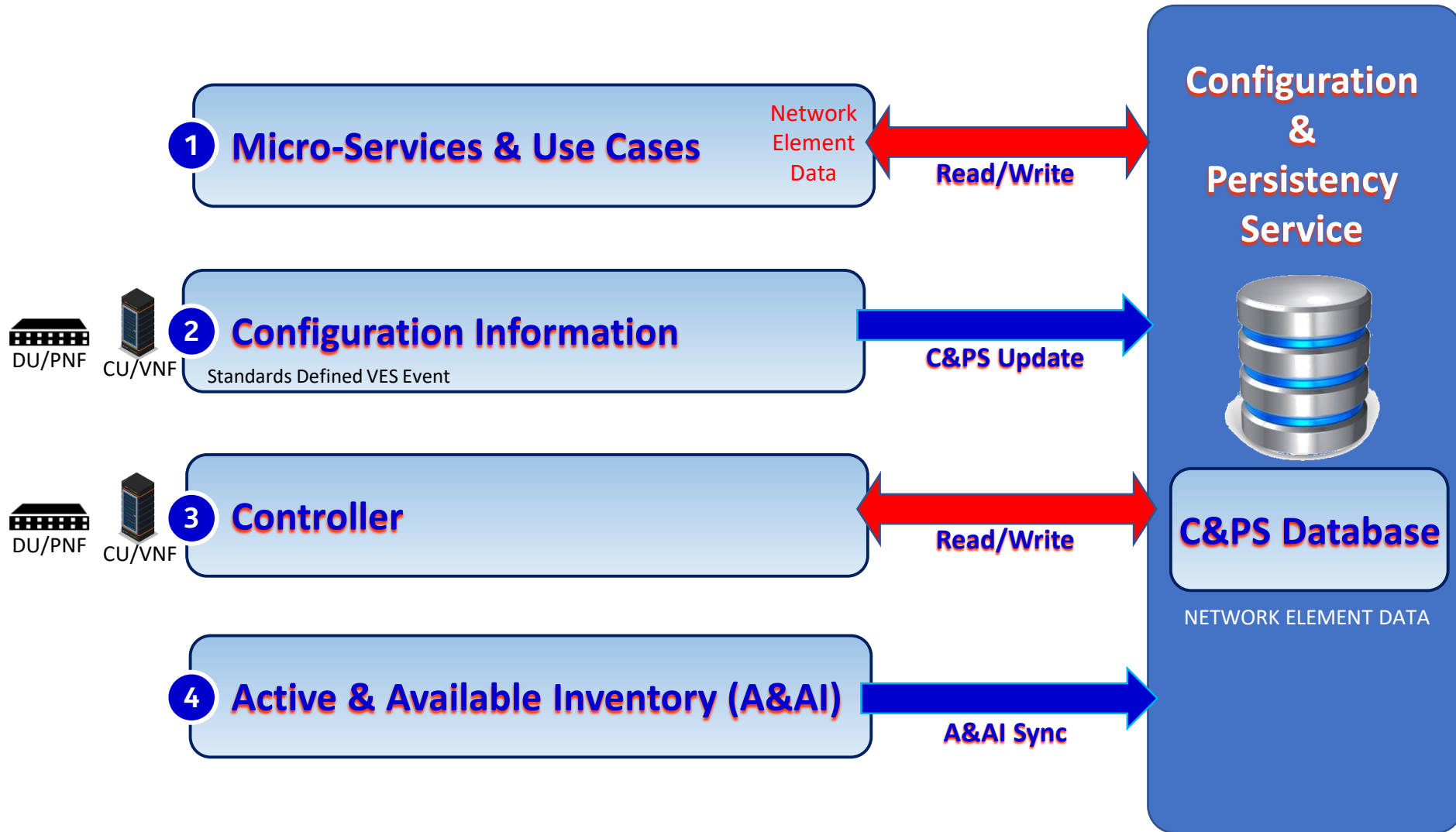
Overview

Context for C&PS

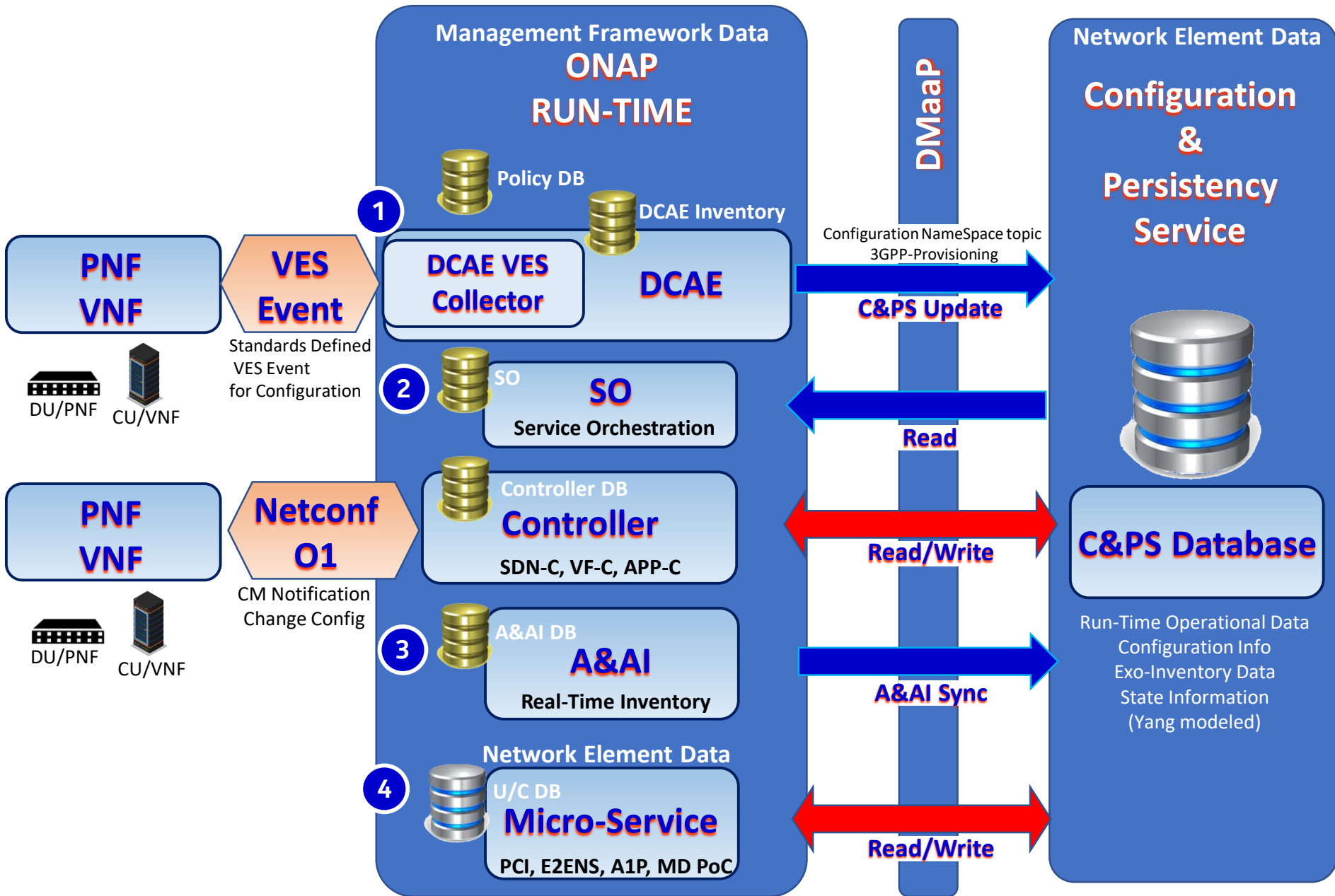


TOPIC	PROBLEM	SOLUTION
Heterogeneous Data Sources	Reconciling Multiple domains, multiple vendors, multiple functions and multiple versions	Model Driven Persistence
Shared Data Access	Expensive IO operations that should be shared rather than duplicated	Share Data access through model ownership
Model Handling	Because of the heterogeneous data sources need streamlined approach to support models without having platform life cycle events.	Model Driven Persistence
A&AI Scope Creep	A&AI storing non-inventory information resulting in mismatch of A&AI access	Storing Network Element data in C&PS instead of A&AI

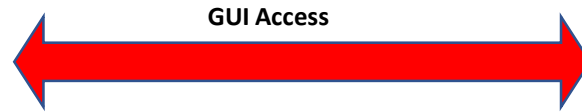
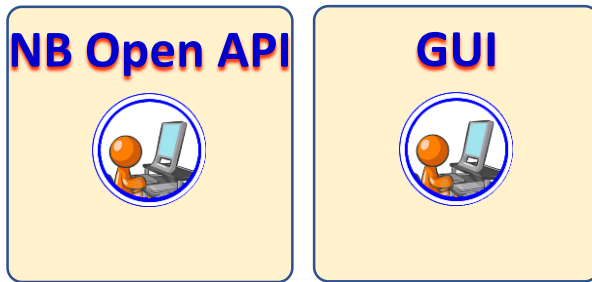
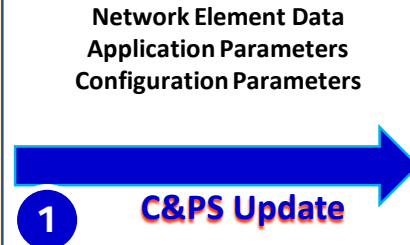
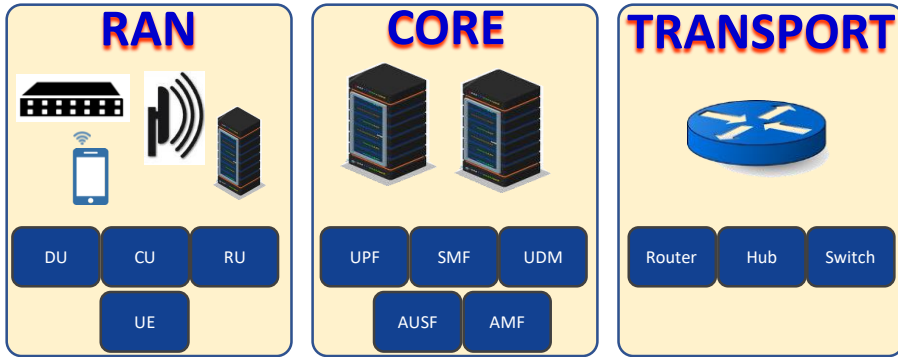
Configuration & Persistency Service (C&PS)



Configuration & Persistency Service (C&PS)



Configuration & Persistency Service (C&PS)



Network Element Data

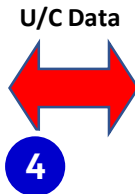
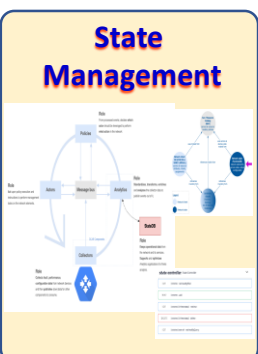
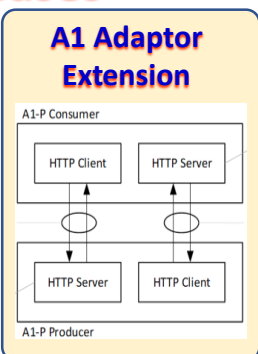
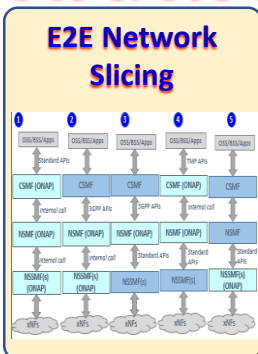
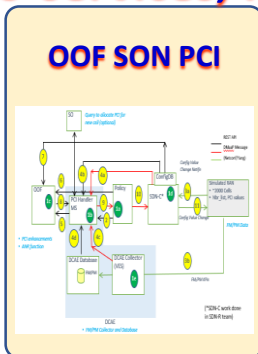
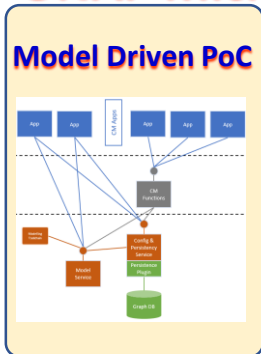
Configuration & Persistency Service



C&PS Database

Run-Time Operational Data
Configuration Info
Exo-Inventory Data
State Information

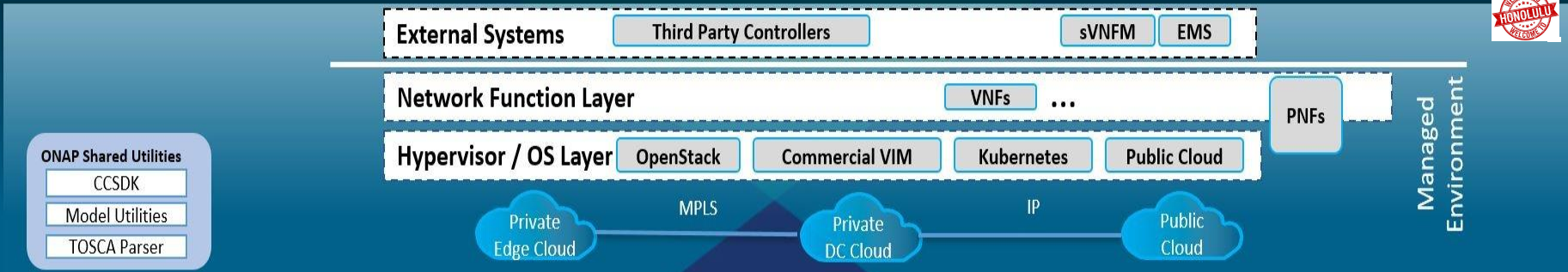
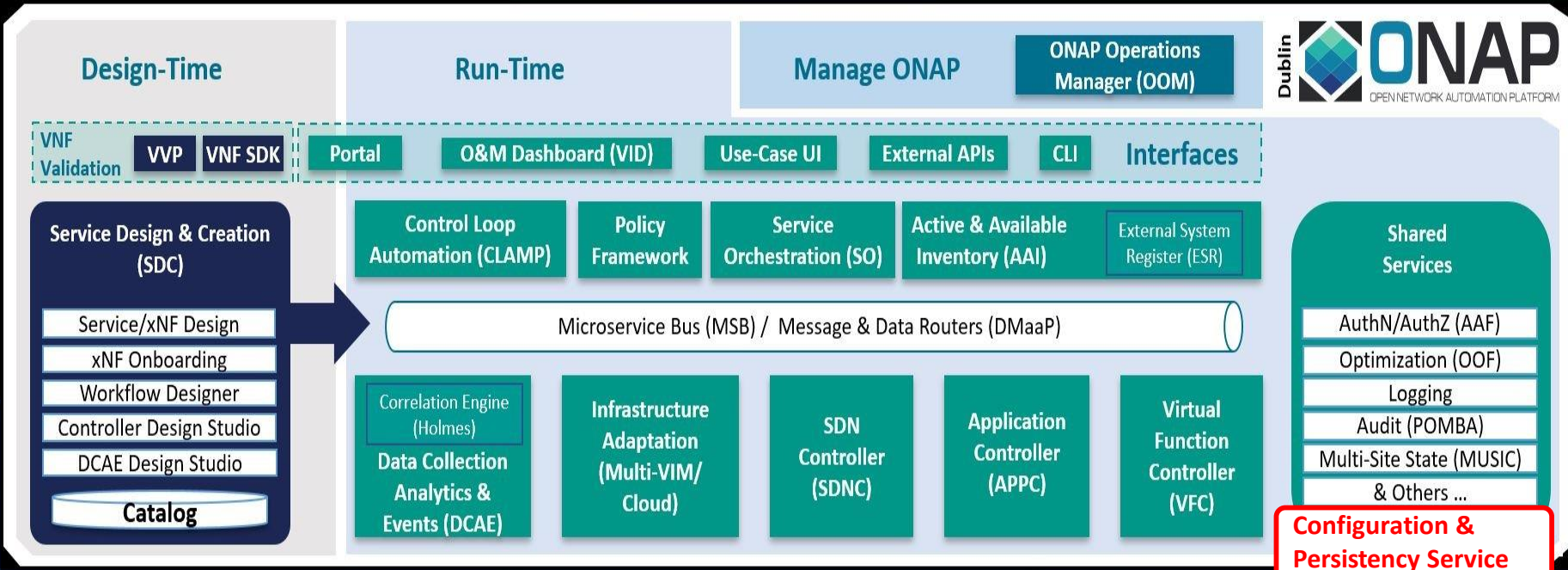
ONAP Micro-services, POCs & Use Cases





OSS / BSS / Other

Legend **Design** Orchestration & Management Operations



- ONAP Shared Utilities**
- CCSDK
 - Model Utilities
 - TOSCA Parser



R7 – Model Driven Configuration & Persistency Service Proof of Concept

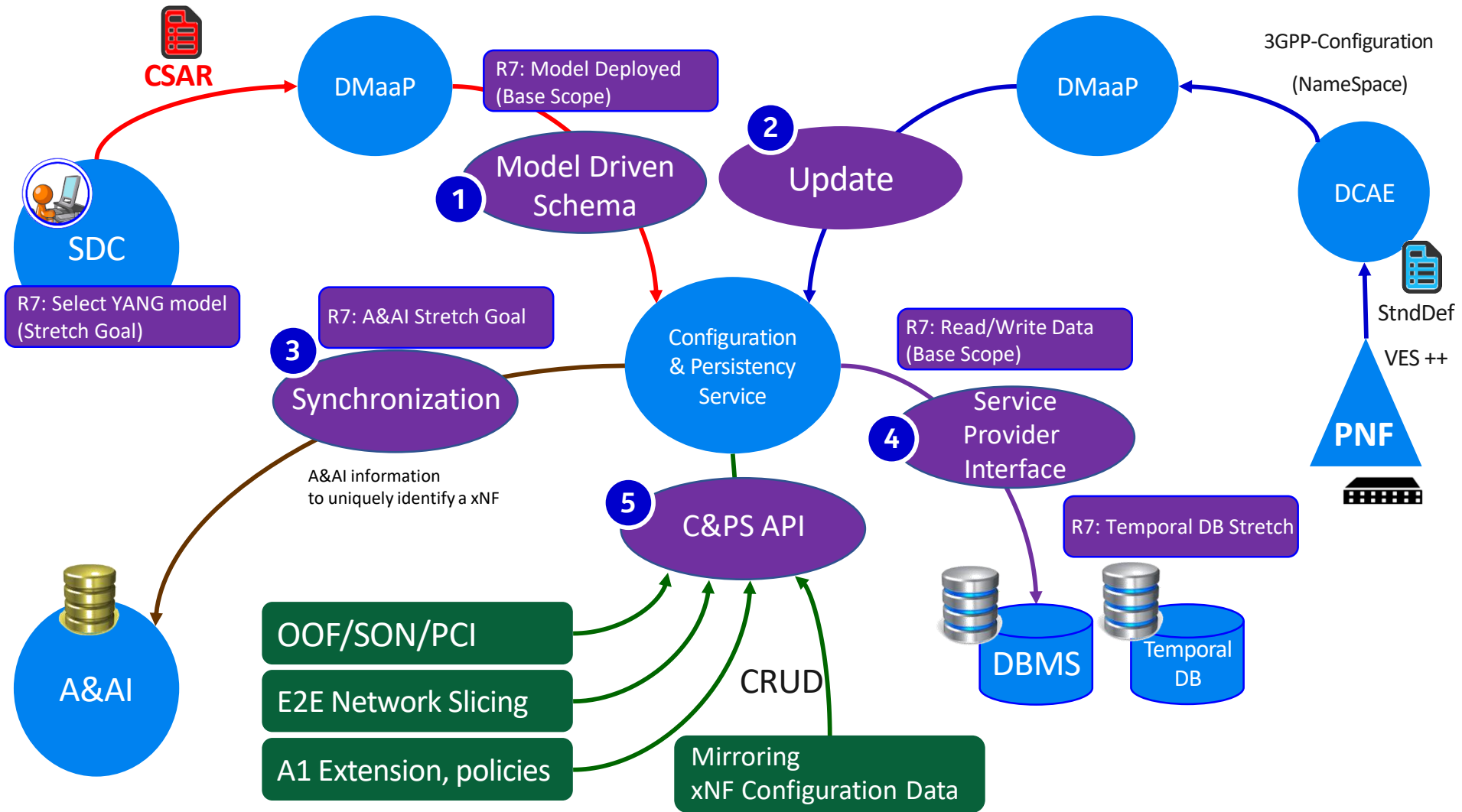


Proof of Concept

R7 Model Driven C&PS PoC



Use case	Component	Work required
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R7 Model Driven C&PS PoC Lessons Learned



TOPIC	PoC RESULTS
SEED CODE	Seed Code to serve as a basis for C&PS has been developed
PROOF POINTS	<ol style="list-style-type: none">1. Create/read CRUD operations using YANG fragments using a simple schema or schema-less repository2. Deploy & upgrade YANG model fragments at run-time3. Validate based on YANG Constraints4. Provide architecture vision and roadmap for a target architecture.
ARCHITECTURE AGREEMENTS	Resolve key architectural Issues necessary for C&PS as a stand-alone project
C&PS CORE FUNCTIONALITY	Can soon demonstrate some key C&PS operations
PERFORMANCE LIMITS	Ascertain a sense of Performance and Capacity boundaries

R7 Model Driven C&PS PoC Lessons Learned



- Base : N/A (new code)
Main dependency : ODL Yang Tools 5.x (probably)
<https://javadoc.io/doc/org.opendaylight.yangtools>

- Design and Architecture discussions ongoing
<https://wiki.onap.org/display/DW/Issues+decisions+and+assumptions>

8	1	MEDIUM	Existing Yang Parser	Is there an existing Yang Parser in ONAP an/or OpenDayLight that can be used for C&PS	No	
9	N/A	AGREED	Location of PoC Code	Dan Timony suggested to use an existing CCSDK repo, he mentioned ccsdk/features. As long as the PoC remains completely independent and doesn't affect delivery of existing artifacts in the same repo.	--	ccsdk/features, see https://gerrit.onap.org/r/c/ccsdk/features/+110385 (awaiting approval)
10	N/A	AGREED	Common information model, Data lake and Access control	How will the CPS help with managing coupling between ONAP components that make use of data lake and common information model	--	We will start with Architectural Approach A in the PoC with the aim of fully supporting Architectural Approach C. I.e. access to the data lake will be conditional on permission granted by the data owner. In the PoC we will not implement the permission granting mechanism
11	4,5	MEDIUM	Transactional behavior	It needs to be clear to users the level of atomic operations supported by the CPS	Yes	

C&PS Roadmap



Roadmap





C&PS Roadmap & R6-R8 Plan

Configuration & Persistency Service (CPS) Roadmap –

R6 Frankfurt

R7 Guilin



R8 Honolulu



C&PS 1.0

R6 C&PS

- CC-SDK/SDN-C solution
- Evolution of “ConfigDB”

Supporting R6 Use Cases

- SON/OOF/PCI U/C

June 5, 2020

C&PS 1.1

R6 C&PS Extensions

- Evolution of CC-SDK/SDN-C solution REQ322

Supporting R7 Use Cases

- SON/OOF/PCI U/C
- 5G E2E Network Slicing

Model-Driven PoC

- Seed implementation
- Write NE Data
- Read NE Data
- Access Control
- Info-Modeling design

State Management PoC

- State Management PoC (BellCA) self-contained

December 2020

C&PS 2.0

R8 C&PS stand-alone project proposal

- Deprecate C&PS 1.0 & 1.1
- Project proposals TSC/Architecture S/C
- Setup Project Repo
- Full Info-Model

CPS FUNCTIONALITY:

- Data Recovery
- Model Adaption (Dynamic Schema)

June 2021

Legend:

RED text is CC-SDK/SDN-C solution

BLUE text is the PoC & stand-alone project

C&PS Roadmap & R8-R10 Plan



Configuration & Persistency Service (CPS) Roadmap –

R8 Honolulu



R9 Istanbul



R10 Kyoto



C&PS 2.0

R8 C&PS stand-alone project proposal

- Deprecate C&PS 1.0 & 1.1
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CPS FUNCTIONALITY:

- Data Recovery
- Model Adaption (Dynamic Schema)

Legend:

RED text is CC-SDK/SDN-C solution

BLUE text is the PoC & stand-alone project

June 2021

Rx (future) development

CPS FUNCTIONALITY:

- Data Auditing Model driven
- Topology Traversal
- Data Syncing

December, 2020

Rx (future) development

CPS FUNCTIONALITY:

- Data Auditing Rules Driven
- Data History
- Roll-Back
- Database Backup
- Performance Optimization (Scaling)

June 2021

Questions



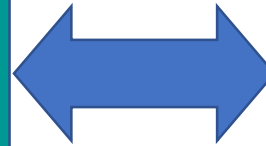
APPENDIX



Dependencies vs Scope

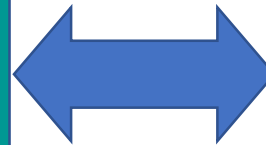
DEPENDENCIES – need to operate

SDC Yang Model (to load schema)
ability to process & translate yang models into schemas
AAF (intra-ONAP security)
Database implementation for Data Persistency
(for example MariaDB)



DEPENDENCIES – value added

DMaaP (some use cases to work / indirect dependency)



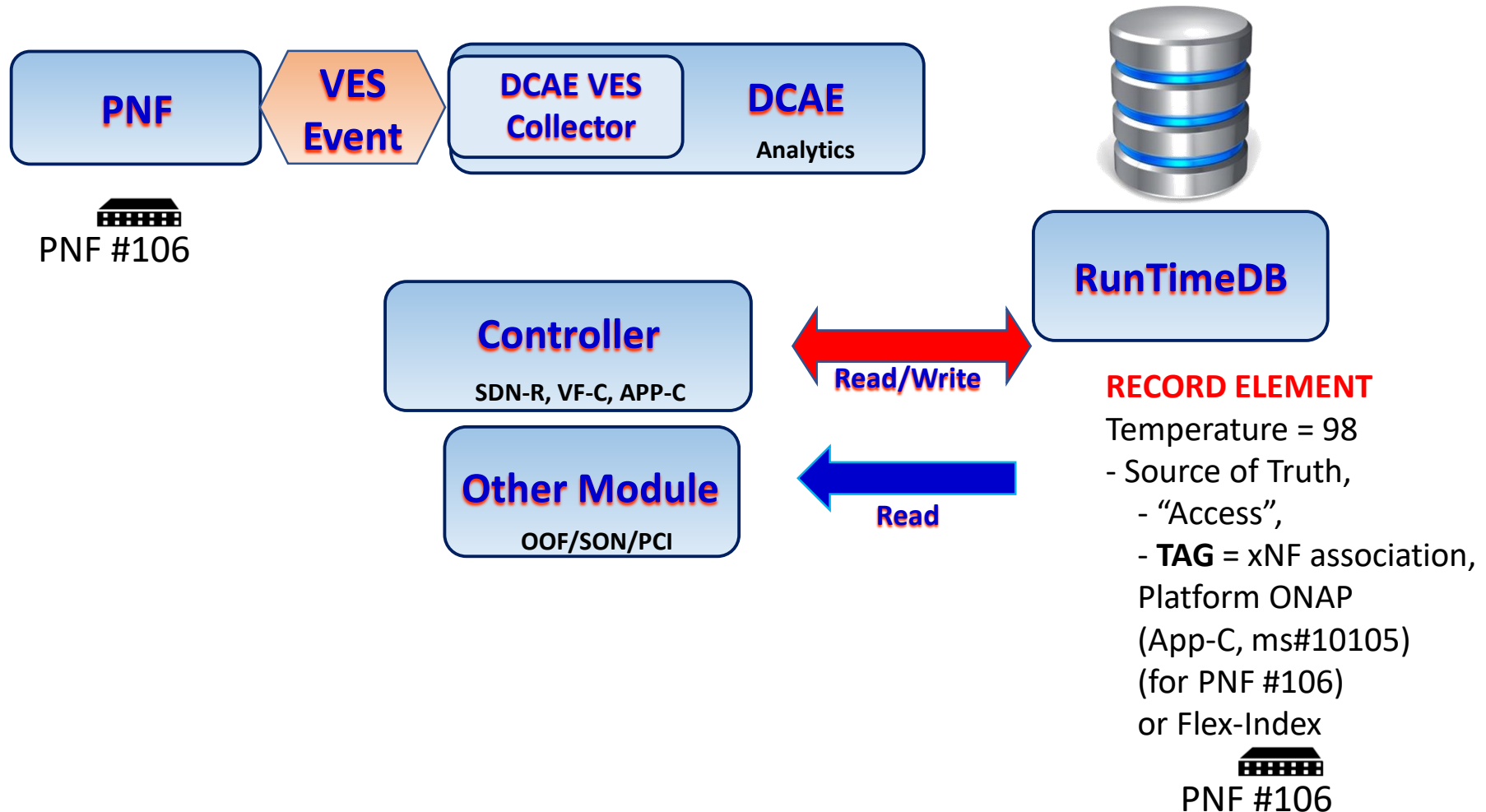
SCOPE




**C&PS
Database**









RECEIVE INFORMATION
WRITE INFORMATION
PUBLISH CHANGES
REFERENTIAL INTEGRITY
INGEST PACKAGES
LOGICAL OBJECTS
ASSOCIATIONS
CARDINALITY RULES
LINKING RESTRICTIONS
SYNCHRONIZATION
DATA INTEGRITY & RECOVERY

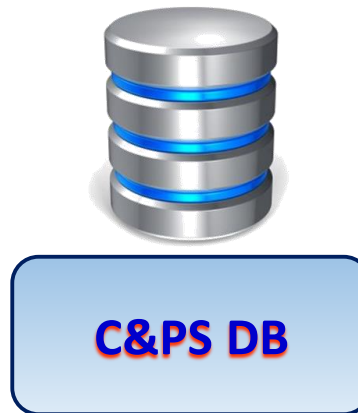
Config & Persist Service (Run-Time View)



-  PNF #101
-  PNF #102
-  PNF #103
-  PNF #104



-  PNF #101 
-  PNF #102 
-  PNF #103 
-  PNF #104 



-  PNF #101 
-  PNF #102 
-  PNF #103 
-  PNF #104 

A&I correlated/Index to RunTimeDB
Publish changes in A&I, notification on DMaaP

Indices into Config & Persist Service may also use Flex-Index (such as CellID)

C&PS Database (Run-Time View)



PNF #106



Cell #1 – Logical Object



Cell #2



Cell #3

RECORD ELEMENT

INDEX = PNF #106

Parameter #1
Parameter #2
Parameter #3
State Info X.733

Associations

{ Logical Object #111 Cell #2 }

Cardinality Rules

Linking Restrictions

RECORD ELEMENT

INDEX = Logical Object #111

Parameter #1
Parameter #2
Parameter #3
State Info

Associations

{ PNF #106 }

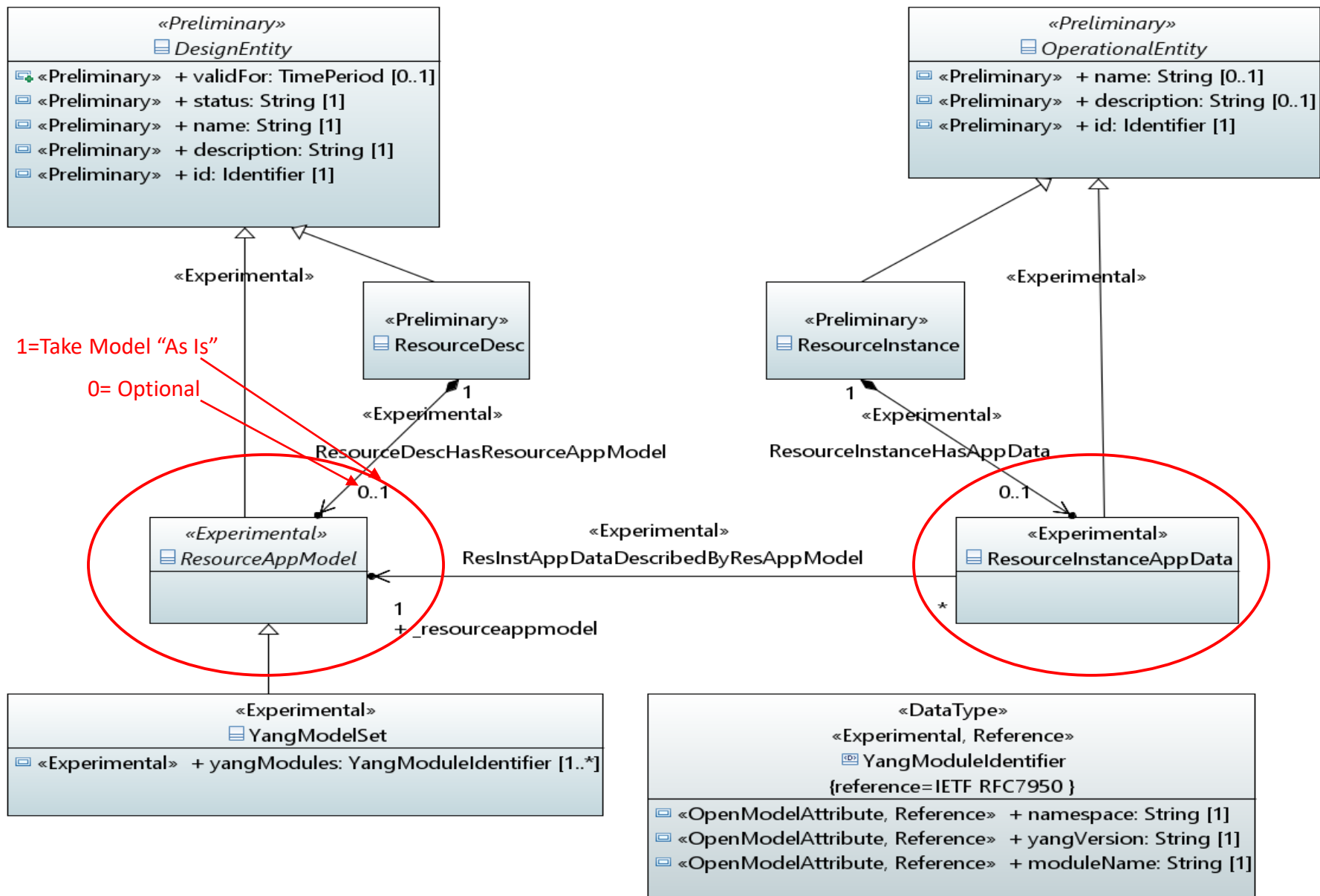
Cardinality Rules

Linking Restrictions

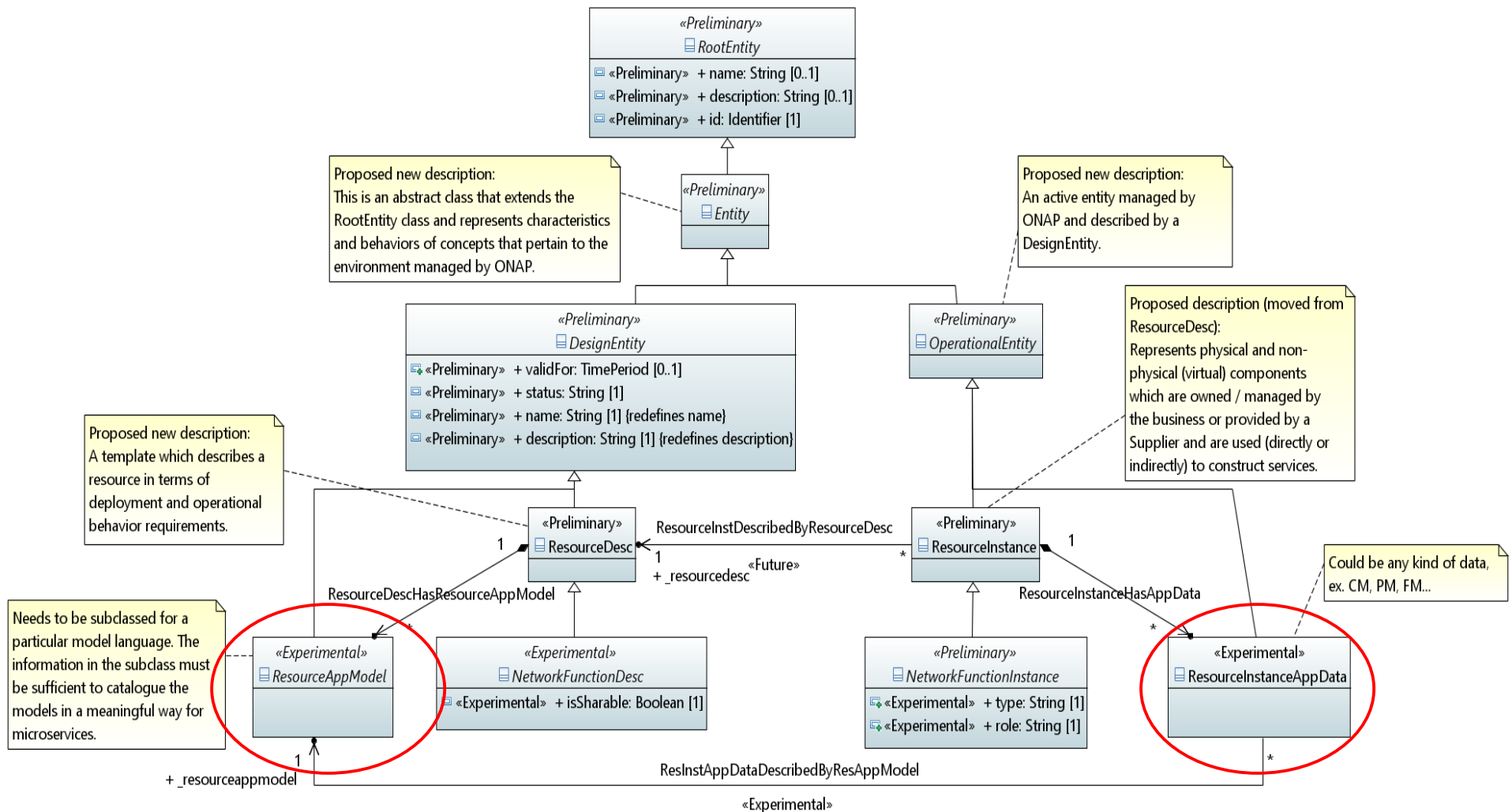
RECORD ELEMENT INDEX = PNF #106

Parameter #1
Parameter #2
Parameter #3
Logical object, Cell #1
Cell Parameter #1
Cell Parameter #2
Cell Parameter #3

C&PS Information Model Design R7



C&PS Information Model Design R8



C&PS Time Series Management

Streaming Database

Analyze large volumes of continually arriving data, keep little state.

E.g., count the number of packets transmitted over an interface, by 1 minute intervals

Storm, Flink

Time Series Database

Store KPIs : periodic measurements of an entity, emphasis on analytics

E.g. find peak transmission periods of an interface.

InfluxDB, TSDB

Temporal Database

Store current and past conditions of an entity.

E.g., Keep track of an interface state

Postgres, MariaDB



Use Cases & Proof of Concepts



Use Cases

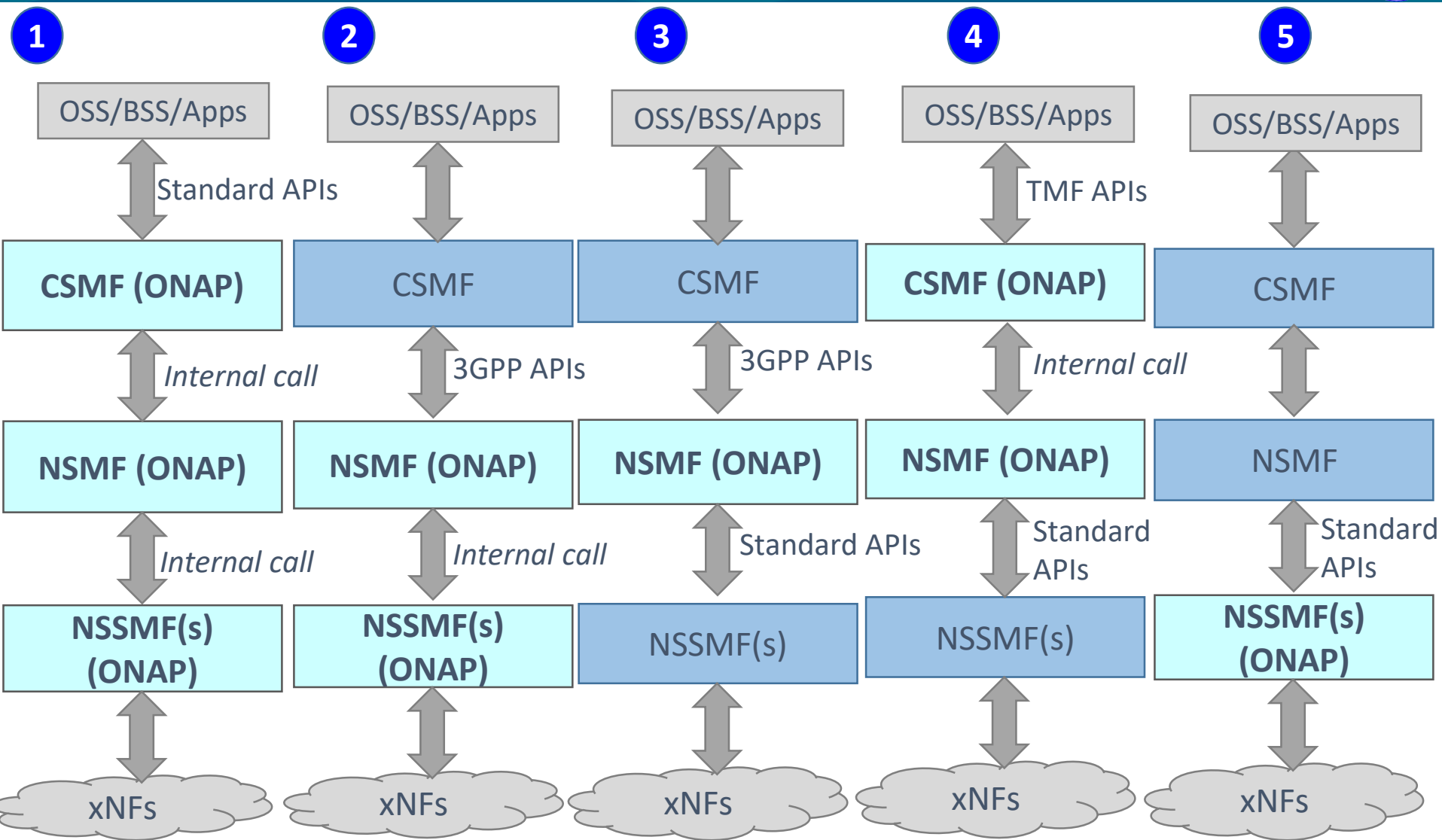


Proof of Concept

C&PS Use Cases and Proof of Concepts in R8

5G USE CASE	DESCRIPTION
OOF - SON (5G)	Optimization and SON functions for 5G RAN. Self-optimization, Self-Healing, Self-configuration.
NETWORK SLICING (5G Use Case)	Network Slicing defines Slices for 5G RAN systems. Network Slicing is a long-lead (multi-release) development. (will be presented in its own lecture at the Virtual Face to Face)
MOBILITY STANDARDS HARMONIZATION/ A1 adapter	A1 adapter: Enhancing the A1 adapter/interface capabilities in ONAP to manage A1 Policies, support multiple A1 targets in the RAN and multi-version A1 interface for different A1 targets, introduce secure TLS communication.
STATE MANAGEMENT POC	Bell Canada led PoC for State tracking and State management using C&PS Integration with C&PS (as a platform). Have the State management S/W now work with C&PS using available swaggers/APIs

End to End Network Slicing Use Case

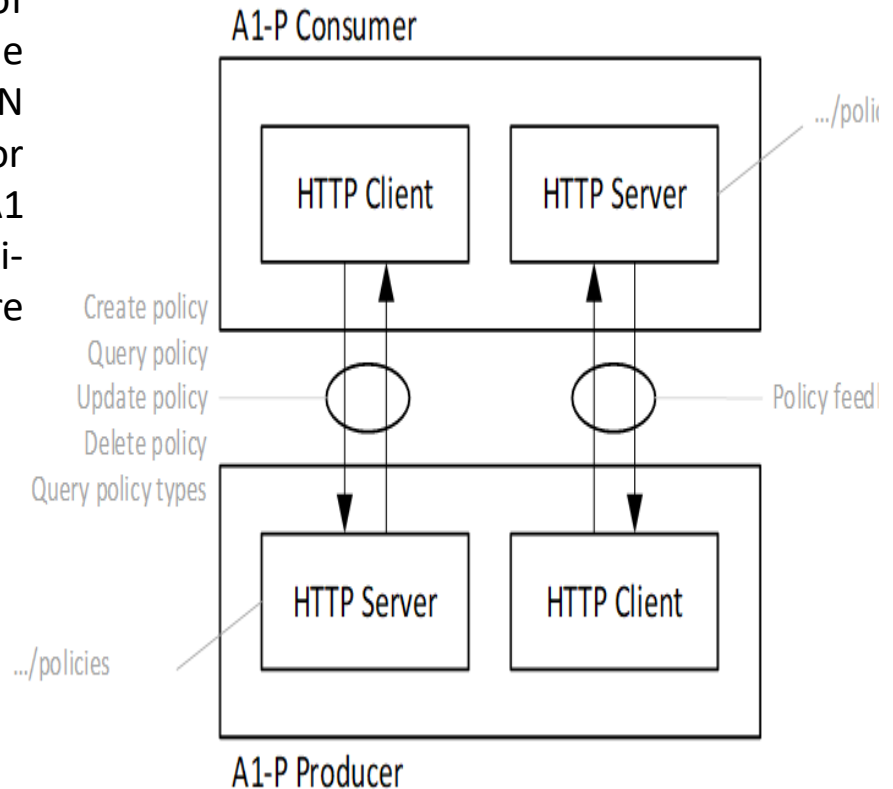


3rd party component

A1 Policy Extension ORAN-ONAP Harmonize



Executive Summary - This requirement enhances the A1 adapter/interface capabilities provided in Rel 6 as part of 5G/ORAN & 3GPP Standards Harmonization requirement (REQ-38). O-RAN has defined A1 interface specification in the context of the management of 5G RAN elements to provide intent based policies for optimization of the RAN network performance. Planned enhancements for Rel 7 include additional support for managing A1 Policies, multiple A1 targets in the RAN, multi-version support for different A1 targets, and secure TLS communication.



State Management PoC (Bell Canada)

