

Ericsson Software Technology

OSC NONRTRIC rApp/R1 Prototyping Release E Outline Implementation Proposal – OSC RSAC

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Focus/Themes for OSC NONRTRIC Release E

- ONAP Control Loop -> O-RAN rApp : "The *rApp-ification* of ONAP Control Loops"
 - Adopt ONAP CL work as a starting point, continue to identify gaps, then extend
 - Identify & motivate where an rApp is different from a CL
 - Types of rApps:
 - Microservice-based rApps
 - Non-Microservice-based rApps
- NONRTRIC Service Exposure/Gateway -> O-RAN R1 : "The R1-ification of Service Exposure"
 - Service-independent aspects
 - Types of exposure support in R1:
 - Microservice-based rApps & Service
 - Non-Microservice-based rApps & Service
- Use cases of rApps & Exposing specific Services via R1
 - Requirements drivers & demonstrators
 - O-RU FH recovery (multiple), Slice Assurance, Existing Function Tests, various other use cases in ONAP
- Continued Evolution & Support for A1 functions

CL -> rApp : "The *rApp-ification* of ONAP control loops!

Gaps:

• Extend CLAMP CL manager

- (Note CLAMP has been re-imagined in ONAP I)
- Register rApp CLs
- Ensure rApp CL LCM functions are via R1 Gateway
- Coordinate setting up the different mechanisms needed to enable CL element interactions through R1 Gateway
- Support rApp registration to Service registry & Gateway
- Service Gateway / Service Exposure
 - Implement using KONG gateway
- Microservice-based rApp CLs
 - K8s Namespace & Network Policies to enforce isolation (network/access level)
 - ISTIO to help support microservice authentication
 - ISTIO to help redirect traffic to R1 Gateway

• Non-Microservice-based rApp CLs

- Studies continue
- (Trusted) CL Participant is best placed to set up traffic redirection to R1 Gateway & enforce sandboxing of CL Elements
 - Likely need different strategies for different participants / CL Element Types

Service Exposure/Gateway -> R1 : "The *R1-ification* of Service Exposure"

Gaps:

- rApp Management part of R1 (Onboarding, Install, registration, discovery, LCM, monitoring, update/upgrade, deleted, reconfigure)
 - Extend CLAMP CL manager to coordinate rApp-specific extensions & expose direct to Service Gateway
- NONRTRIC Service & SMO Service (& rApp Service) exposure to rApps
 - Service-independent/Generic gateway no service-specific implementation
 - Service Registration, Discovery, Configuration interfaces
 - No LCM for SMO Services (Automation Platform) exposure only
 - rApps CL Elements restricted to only access SMO services & other rApps through R1 gateway
 - Retain direct access to SMO services for non-rApp CLs & service-service interactions
- Data exposure to rApps
 - Via NONRTRIC Information Job Coordinator Service (*previously A1 El Coordinator*)
 - ONAP DMaaP -> Information Job Producer
- Integration point for Access Control Enforcement

OSC NONRTRIC Func. Architecture (*Release D – Jul '21*)



OSC NONRTRIC: <u>https://wiki.o-ran-sc.org/display/RICNR</u>

O-RAN: Non-RealTime RIC Architecture



Figure 4-1: Non-RT RIC Reference Architecture

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O-RAN: rApps & Exposing SMO & Non-RT RIC functions to rApps



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ONAP Control Loop Architecture



ONAP Control Loops: <u>https://wiki.onap.org/display/DW/TOSCA+Defined+Control+Loops%3A+Architecture+and+Design</u>

Control Loop **ONAP** Control Loop Architecture Package (tbc) CLAMP GUI Public REST API Public REST API Control Control Loop Design Loop (In SDC or Standalone) Control Loop Runtime (CLAMP) Defintions CL Composition CL Participant Execution Control Design Analytic Metadata Time Artifcats Design Commissioning Catalogue Comissioned Models Policies Supervision Commissioned CL Inventory Controller Policy Distribution Directives SDC AR' Instantiation Execution Monitoring Policy Distribution Existing Core System Monitorina Instance LCM (Unchanged) Metadata Data CSAR Instantiated CL Inventory CL Decoder CL Forwarder Instantiation 🔶 Monitoring DMaaP Instantiation Monitoring Instantiated **CL Element** ation Existing Kubernetes Policy Controller System - dicinar Participant Participant Participant Existing CL Data CL Controller System Model Policies metadata metadata CPS DCAE Policy Controller Microservice Existing System Microservice Framework Configuration Persistence DCAE Kubernetes Ecosystem Policy

ONAP Control Loops: https://wiki.onap.org/display/DW/TOSCA+Defined+Control+Loops%3A+Architecture+and+Design

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