

ONAP 5G USE CASE ENHANCEMENTS FOR PNF DEPLOYMENTS

- ONAP and 5G USE CASE Enhancements
- PNF (Radio Network) Deployments
- R3 CASABLANCA RELEASE

- 5G Use Case Team

ONAP PNF Plug and Play Enhancements

- ONAP and PNF Plug and Play Enhancements
- PNF (Radio Network) Deployments
- For R3 Casablanca (and onwards)

- 5G Use Case Team

PNF PNP ENHANCEMENTS OVERVIEW

PNF PLUG AND PLAY ENHANCEMENTS OVERVIEW FOR CASABLANCA

Plug and Play enhancements – PNF registration handler (PRH) improvements

Plug and Play enhancements – Security Enhancements

Plug and Play enhancements – SO Workflow enhancements

Plug and Play enhancements – Modeling enhancements

Plug and Play enhancements – PNF Onboarding / PNF Package

Plug and Play enhancements – Service Configuration Enhancements

PNF PnP: PNF REGISTRATION HANDLER ENHANCEMENTS

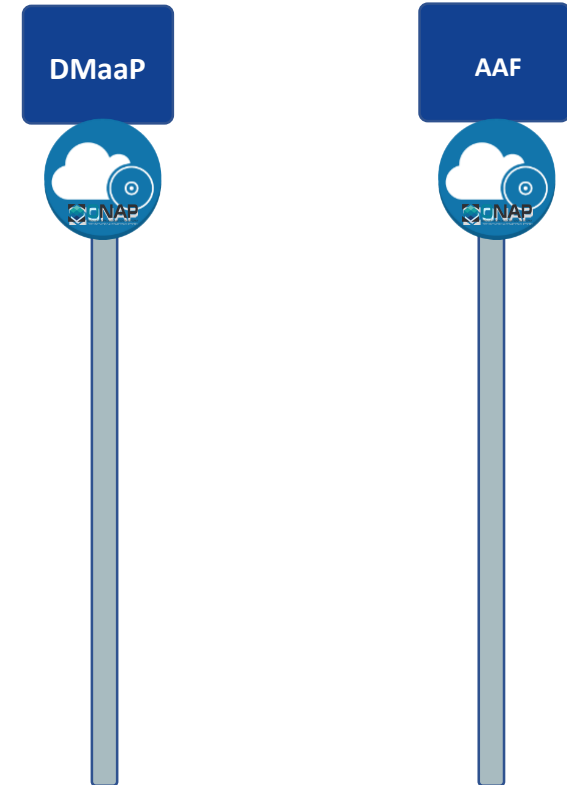
DESCRIPTION

PNF Registration Handler (PRH) Enhancements.

(1) Stand-alone own domain – New PRH domain. In Beijing used an adder (Beijing work around). For Casablanca, we propose using a dedicated domain. VES separation of events.

(2) VES CONTENT - As a result, VES collector content will change with additional fields. VES may also be extended Physical PNF location.'

OVERVIEW



PROJECTS

PNF Registration Handler, AAF

PNF PnP: SECURITY ENHANCEMENTS

DESCRIPTION

- (1) PNF AUTHENTICATION** – VES authentication framework integrated. DCAE needs to authenticate the PNF.
- (2) VENDOR CERTIFICATES** – Handling Vendor Certificates for TLS.
- (3) USER NAME & PASSWORDS** – Provisioning. DCAE & PNF management of User Name & Passwords.
- (4) SECURITY BETWEEN COMPONENTS** – DMaaP & PRH to authenticate w/ other ONAP components.

PROJECTS

PNF Registration Handler, DCAE, AAF, ONAP Controller, DMaaP

OVERVIEW



PNF PnP: SO WORKFLOW ENHANCEMENTS

DESCRIPTION

- (1) SO WORKFLOW ENHANCEMENTS** –
Dedicated 5G BTS Workflow in SO.
- (2) 5G PNF WORKFLOW** – Extensions to Beijing
SO Workflow (part of VCPE workflow)

OVERVIEW

PROJECTS

PNF Registration Handler, DCAE

PNF PnP: MODELING ENHANCEMENTS

DESCRIPTION

(1) PNF MODELING – Modeling enhancements to support 5G PNF in ONAP. Inheritance, and PNF characteristics for sharing. Focusing on PNF connectivity. PNF-SDK (from vendors). Modeling the Physical “Box” (PNF).

PROJECTS

SDC, CDT

OVERVIEW

Notes:

- 1) **EXTERNALS** - Not trying to model the internals of PNFs. What is exposed by the box is what is modeled.
- 2) **INTERRELATIONS** - Focus on relations of PNFs/VNFs. Interworking between PNFs/VNFs.
- 3) **VISIBILITY** - CP/UP visibility
Not M-Plane (as this is 3GPP standardized)
- 4) **MODELING ANALYSIS** - Modeling activity to assess PNF, and check SDC model is sufficient to cover Casa use cases if additional parameters need to be added (e.g. relations between other NFs). Expanding the “Release 0 model” for Casa. PNF type vs PNF instance. Design-time vs Run-time model.

PNF PnP: PNF ONBOARDING / PNF PACKAGE

DESCRIPTION

PNF Onboarding and PNF Package

(1) PNF PACKAGE DEFINITION – Defining *PNF Onboarding Package*. Extending framework to work with PNFs. Defining Package framework.

- A. **PNF ARTIFACTS DEFINITION** – Vendor specific/provided artifacts to add to the (new PNF) package.
- B. **PNF ARTIFACTS DISTRIBUTION**

OVERVIEW

PROJECTS:

SDC, APP-C

PNF PnP: SERVICE CONFIGURATION ENHANCEMENTS

DESCRIPTION

(1) **Service configuration Enhancements** to ONAP Controller to PNF *service configuration* exchange with PNF. Better definition around the Protocols supported (and/or support more protocols).

What ONAP controller supports what PNF
And what protocols are supported.

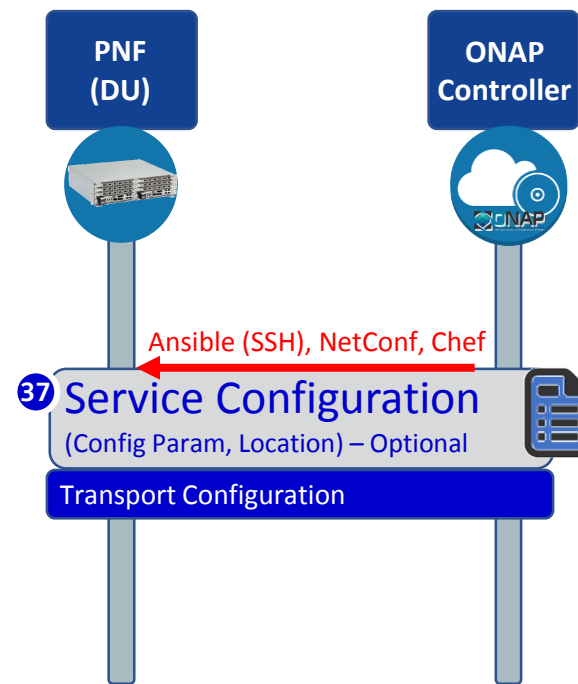
(2) **Configuration Extensions** – New parameters needed for Casablanca use cases. Vid script to pushing data, ID config, ID where data comes from. Generic configuration support.

(3) **PNF PnP Config** – Finishing PNF PnP by sending down config data.

PROJECTS

PNF Registration Handler, ONAP Controller
VID

OVERVIEW



ONAP communicates to PNF in approved protocol (*Ansible, NetConf, Chef*)

Template defines Protocol

5G USE CASE: OPTIMIZATION

- ONAP and Event Collection
- PNF (Radio Network) Deployments

- 5G Use Case Team

EVENT COLLECTION OVERVIEW

VNF & PNF EVENT COLLECTION OVERVIEW FOR CASABLANCA

FAULT MANAGEMENT

PERFORMANCE MANAGEMENT

HIGH-VOLUME DATA COLLECTION

EVENT COLLECTION – PERFORMANCE MANAGEMENT

DESCRIPTION

Events Collection with ONAP. Development and evolution of event collection through VES collector.

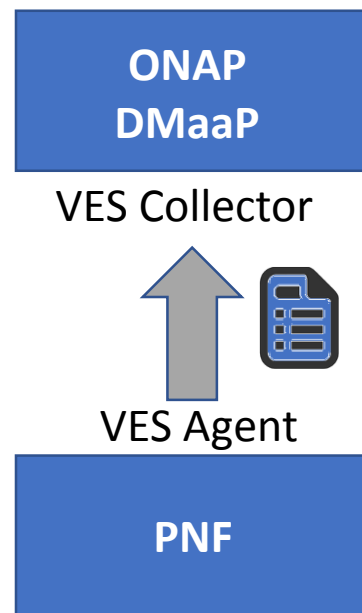
Forms basis of Performance Measurements collection through ONAP.

- (1) COLLECTION MECHANISM** – How will data be moved to ONAP in RAN domain.
- (2) VOLUMETRICS** – Volume of data.

PROJECTS

DCAE, DMaaP, VES

OVERVIEW



EVENT COLLECTION – HIGH VOLUME COLLECTION

DESCRIPTION

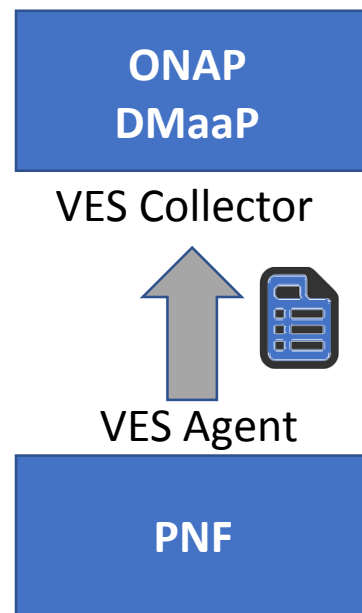
High Volume Data Event Collection

- (1) COLLECTION MECHANISM** – How will data be moved to ONAP in RAN domain vis-à-vis high volume events (for streaming)
- (2) STREAMING MANAGEMENT** – Topics related to high volume management. VES Streaming collector.
- (3) VOLUMETRICS** – Volume of data.

PROJECTS

DCAE, DMaaP, VES

OVERVIEW



RESP. Generic collector.
Sync/Async/Stream.
DMaaP/Kafka DDS or bus
Keep collectors agnostic from data distribution bus
Streaming collector in VES.

ONAP PNF Deployment & Management

- ONAP and PNF Deployment & Management
- PNF (Radio Network) Deployments

- 5G Use Case Team

ENHANCEMENTS OVERVIEW

CASABLANCA ENHANCEMENTS OVERVIEW FOR CASABLANCA

CDT Integration to SDC

PNF Software Version Checking

Application Level Configuration

Life-Cycle Management Support

Edge Cloud Support

Mobility Edge VNF CU Integration

PNF Configuration Management

INTEGRATED CDT

DESCRIPTION

Next Generation Configuration Design Tool (CDT) which provides a GUI to build artifacts to be used by APP-C (using Tosca models) to configure Templates. However, this duplicates (in principle) the function of SDC.

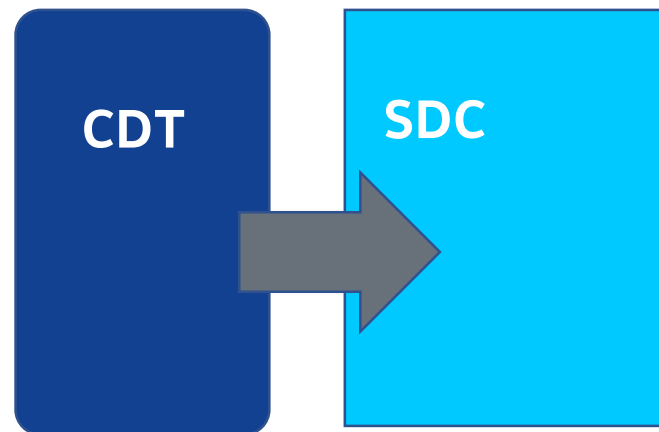
This effort would integrate CDT (used by APP-C today) into SDC [for General Development]. The result would be an Integrated design tool for configuration design for 5G NEs.

Extend to allow use with any controller persona

PROJECTS:

SDC, APP-C

OVERVIEW



PNF S/W VERSION CHECKING

DESCRIPTION

Check version of PNF S/W Version

Reporting S/W version transmittable across ONAP controller & A&AI.

Demonstrate the S/W version has been updated in A&AI.

OVERVIEW

PROJECTS

A&AI, SDC, APP-C/SDN-C/R, DCAE/DMaaP
VNF-SDK

APPLICATION LEVEL CONFIGURATION

DESCRIPTION

SDN-R adaptation of SDN-C for PNFs (RAN Controllers).

“*ONAP controller*” (SDN-R vs APP-C) [Unified generic controller for wireless mobility]

SDN-R and PNF. [Currently supports NetConf-Yang]

Support Ansible API to configure PNF

Support full application level configuration & Ansible, allow various mobile network elements to be controlled from same controller persona created from CC-SDK.

Persona to control/create 5G PNFs.

OVERVIEW

PROJECTS

SDN-R, SDN-C, APP-C, CC-SDK

LIFE CYCLE MANAGEMENT FUNCTIONS

DESCRIPTION

Add lifecycle management functions to controller persona

Plan, setup, Build, Test, Deploy, Monitor, Manage, Meter, Charge, Optimize Health Check, Software Upgrade

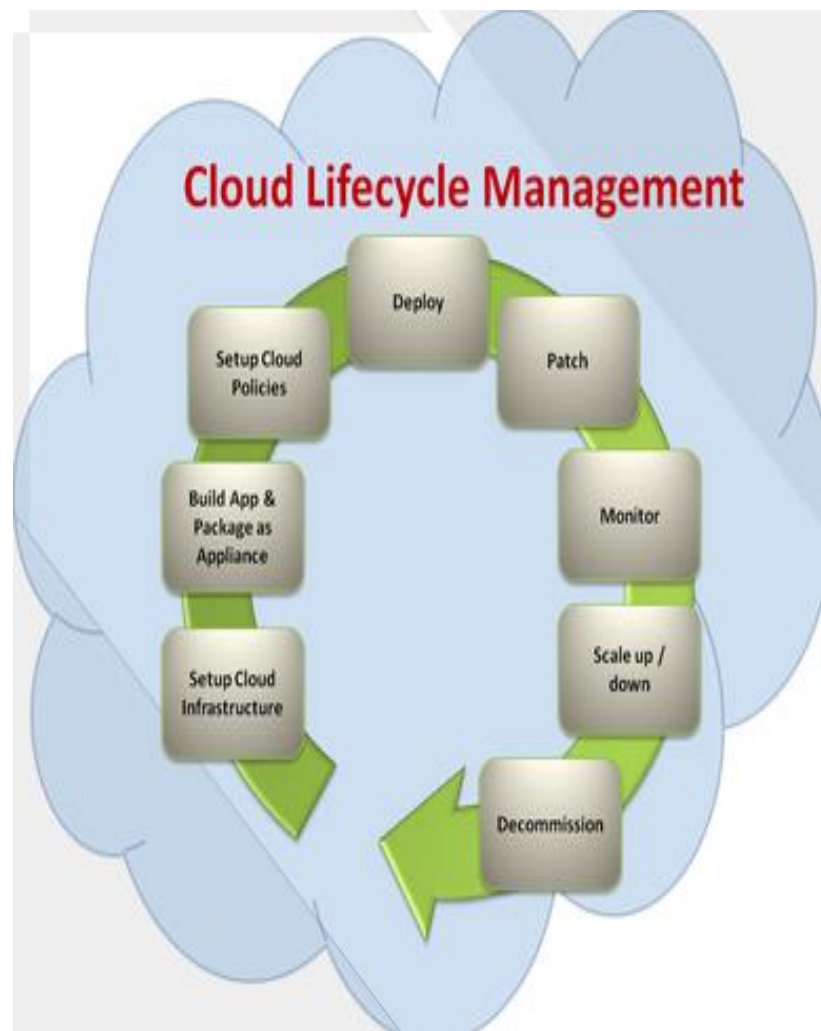
Setup, Build, Policies, Deploy, Patch, Monitor, Scaleup/Scale down

MULTI-RELEASE EFFORT

PROJECTS

SDC

OVERVIEW



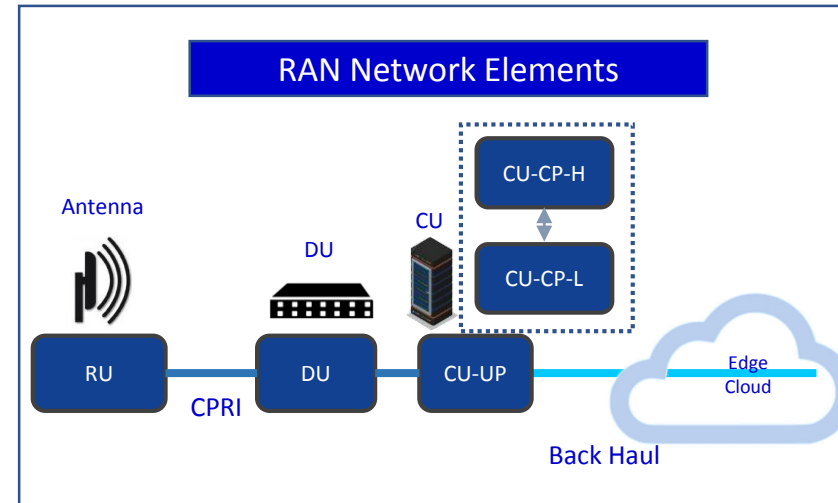
EDGE CLOUD SUPPORT

DESCRIPTION

Support for deploying mobility virtual network element (e.g. CU) at the Edge Locations

MULTI-RELEASE EFFORT

OVERVIEW



PROJECTS

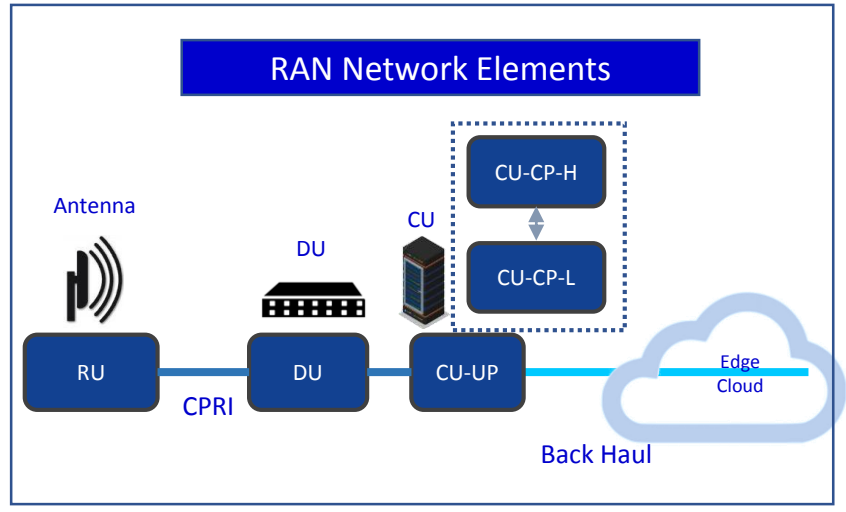
MOBILITY EDGE VNF (CU) INTEGRATION

DESCRIPTION

Support for deploying mobility virtual network element (e.g. CU) at the Edge Locations

MULTI-RELEASE EFFORT

OVERVIEW



PROJECTS

CHANGE AND CONFIGURATION MANAGEMENT

DESCRIPTION

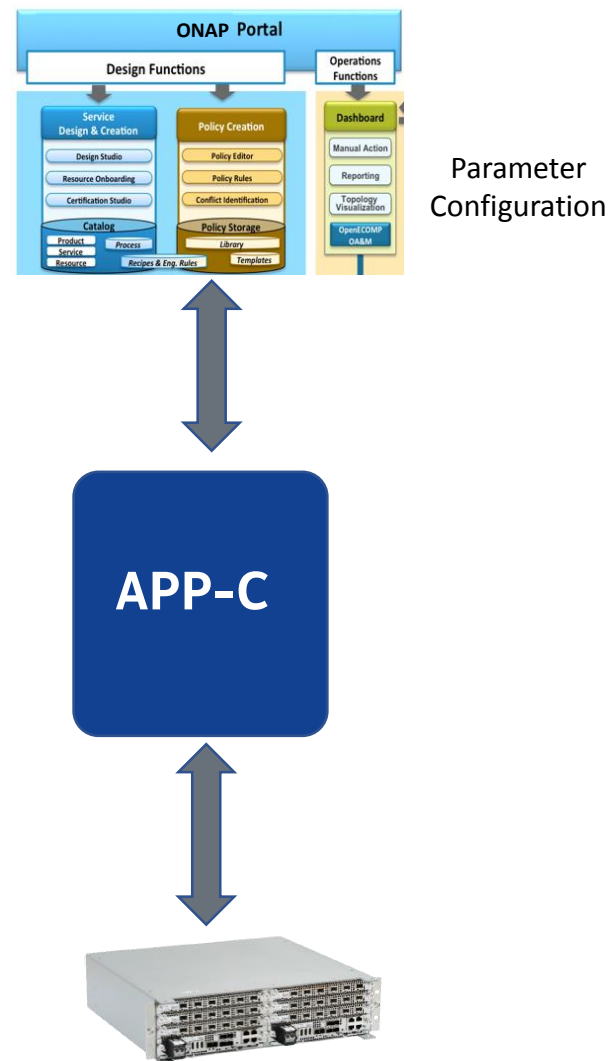
Pre-provisioning with VID. Bulk Provision a 1000 PNFs. O&M IP@, model, configuration, radio parameters. Modeling for PNFs.

MULTI-RELEASE EFFORT

PROJECTS

A&AI, SDC, APP-C/SDN-C/R, DCAE/DMaaP, VID

OVERVIEW



ONAP PNF Deployment PROJECT IMPACTS

- ONAP and PNF Deployment Requirements for 5G RAN
- For Casablanca (R3) Release

- 5G Use Case Team

PNF DEPLOYMENT – A&AI IMPACTS

PNF DEPLOYMENT – DCAE IMPACTS

PNF DEPLOYMENT – SO (Service Orchestrator) IMPACTS

PNF DEPLOYMENT – SDC IMPACTS

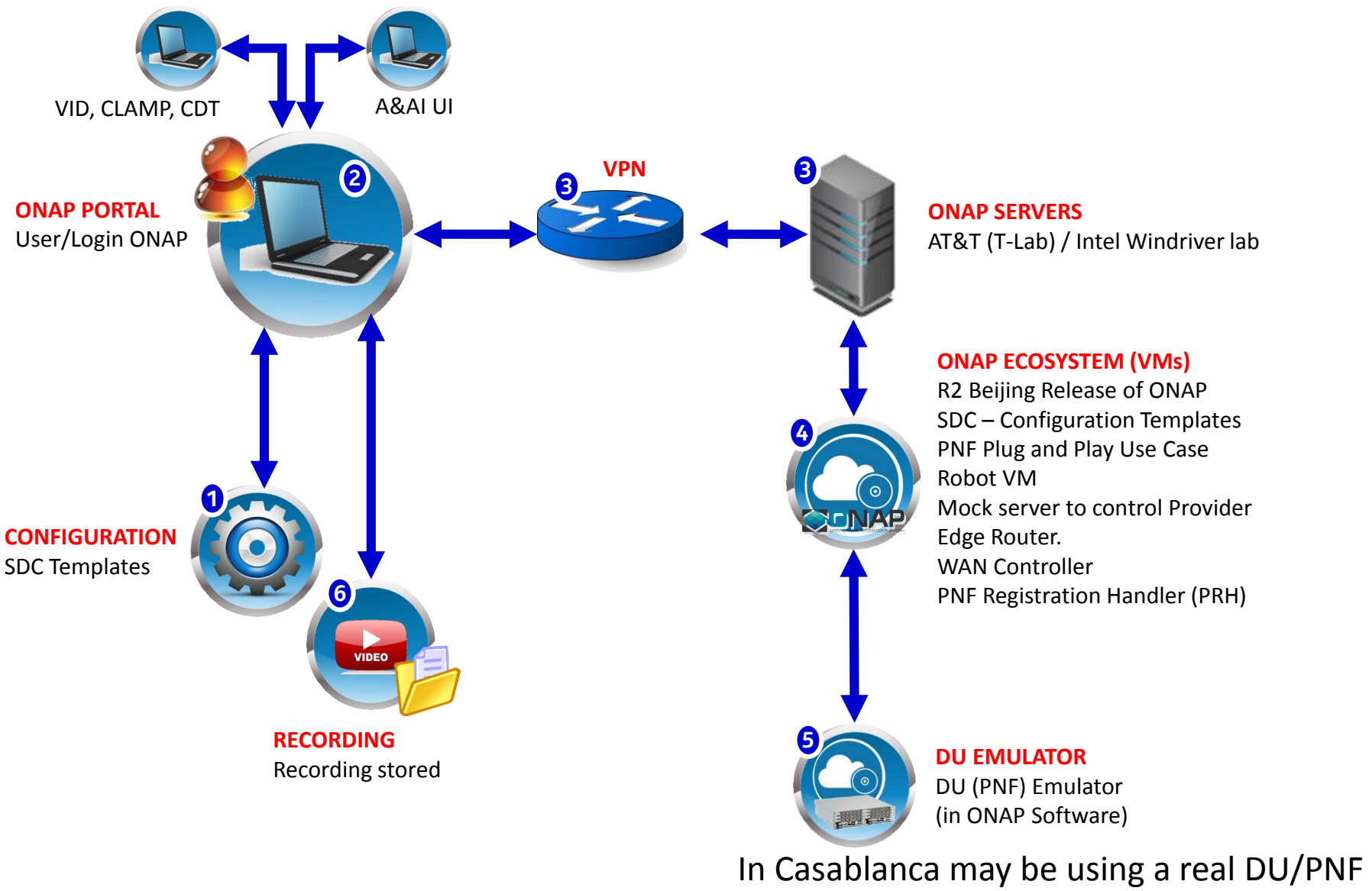
PNF DEPLOYMENT – VID IMPACTS

ONAP PNF Deployment INTEGRATION AND SHOWCASING

- ONAP and PNF Deployment Requirements for 5G RAN
- For Casablanca (R3) Release

- 5G Use Case Team

PNF DEPLOYMENT – INTEGRATION & SHOWCASING



PNF DEPLOYMENT – INTEGRATION & SHOWCASING

STEP	DESCRIPTION
1	CONFIGURATION – SDC Design templates need to be configured in preparation of the Demo & Showcasing. The appropriate PNF and VNF designs are designed, validated and exported to the other components of ONAP.
2	PORTAL & GUI – The ONAP Portal is used to access the appropriate GUIs and interfaces necessary to operate and configure ONAP. The VID and CLMAP GUI are used to configure the appropriate information for the showcase. The A&AI GUI are used to show the created entries in A&AI for the PNF.
3	VPN – The appropriate security gateways and/or VPN networks are configured. The appropriate security setups are authenticated against. Passwords and IP addresses that are needed to connect to the ONAP servers go through this VPN or security gateway (as appropriate) ONAP SERVERS – The ONAP Servers that host the ONAP ecosystem are connected to
4	ONAP ECOSYSTEM (VM) – The ONAP ecosystem has all of the appropriate Virtual Machines necessary to operate. This has the R2 Beijing Release of ONAP. All of the PNF Plug and Play Use Case updated software is available in the ONAP Ecosystem. The Robot VM, Mock server to control Provider Edge Router, and WAN Controller are established. The PNF Registration Handler a new DCAE plug-in are available in this ONAP ecosystem which is used to register the PNF into ONAP.
5	DU EMULATOR – The DU Emulator is used to emulate the responses and connection to ONAP. The DU emulator establishes a VES HTTPS connection with the PRH during the registration process and receives a APP-C response back via ansible.
6	RECORDING – A recording is made of the showcase and demo for later upload/download and playback for demonstration purposes.

ONAP PNF Deployment APPENDIX

- ONAP and PNF Deployment Requirements for 5G RAN
- For Casablanca (R3) Release

- 5G Use Case Team

A: 5G Radio Network Deployment Requirements

Description

Disaggregated 5G RAN may include PNFs and VNFs, in which case cloud infrastructure deployment at the edge is required. Beijing implemented the first phase of PNF discovery and instantiation. Our goal for Casablanca is expand on that work, include VNF deployment at the edge, and fully integrated lifecycle management. Key enhancements needed are:

- Support full Application level Configuration (+Ansible), allow various mobile network elements to be controlled from same controller persona created from CC-SDK
- Add Lifecycle management functions to controller persona
- Support an integrated configuration design tool in SDC that can be used with any controller persona (next gen CDT)
- Add support for PNF Software Management and Change management
- Edge Cloud Support
- Add needed support for deploying Mobility Virtual Network Elements (e.g. CU) at the Edge locations
- Further automation of PnP Discovery for PNF

Rationale

Support for deploying and managing 5G mobility network is critically important for most ONAP members.

Impacted ONAP components

SDC, SO, CC-SDK (SDN-C, APP-C), AAI, DCAE, (V/P)NF-SDK

Participating Companies

AT&T Amdocs China Mobile Ciena Cisco Ericsson Huawei Intel Nokia VMWare Others

For details regarding the requirements, please see <https://wiki.onap.org/display/DW/Missing+Platform+capabilities>

Apr 5, 2018

QUESTION – PNF Heart-beating (after PnP/Registration). Monitoring.

Updates to A&AI if PNF goes off-line.

VNF-SDK (package from vendors) wanted PNF-SDK a package that describes what can be done, what ONAP should do w/ the PNF.

Generic vs Vendor added PNF onboarding Package. Onboard a Generic PNF w/ a “generic PNF onboarding package.

Topic: Licensing PNF S/W. (Post Casablanca – Future)

Topic: Fault Management/Alarms, State-Stateful events.

POST CASABLANCA

- ONAP and PNF Deployment Requirements for 5G RAN
- For Casablanca (R3) Release

- 5G Use Case Team

SOFTWARE MANAGEMENT

DESCRIPTION

ONAP Integrated PNF software management and change management could be a long-term goal. In R3 Casablanca release, as a simple first step the software load for one PNF could be managed within a repository, but not actually downloaded to a PNF.

MULTI-RELEASE EFFORT

Version checking
S/W upgrade

PROJECTS

A&AI, SDC, APP-C/SDN-C/R, DCAE/DMaaP
VNF-SDK

OVERVIEW

