Self Service Control Loop
Acumos-DCAE Integration
Frankfurt Release

Architecture Subcommittee Review

Ting Lu

October 1, 2019

Self Service Control Loop & Acumos-DCAE Integration

During May-September 2019, 2 projects have been developed in parallel:

- ONAP Frankfurt "**Self Service Control Loop**" feature – Propose enhancements to SDC to fix BP generator, onboard mS and policy models, and distribution CSAR to Policy and CLAMP for Control Loop Design.   This feature requires community contributions to SDC.

- "**Acumos-ONAP DCAE Integration**" project – Developed DCAE MOD (Microservice Onboarding & Design) to adapt Acumos ML models into DCAE Compliant mS, and to onboard, design, configure, and deploy the mS into a DCAE runtime environment. (AT&T & Ericsson collaboration)

- 4 PTLs (SDC, DCAE, Policy, CLAMP) synced up, reorganized, and agreed to submit the following 2 features to Frankfurt release:
  - Jira REQ-9 "**Self Serve Control Loop**": **DCAE MOD onboarding & Design** as the software components for the feature
  - Jira REQ-166 "**Acumos-DCAE Integration**": **DCAE MOD Acumos-DCAE Adaptor** as the software component for the feature

The new DCAE MOD, replacing the mS onboarding & DCAE-DS in SDC, provides functionalities to:
  - Support automated adaptation of ML model from Acumos to DCAE design & runtime environment.
  - Provide simplified mS Onboarding, Service Assurance flow design, & mS configurations in DCAE.
  - Auto-generate blueprint at the end of the design process, not onboarded before the design process.
  - Support Policy onboarding & artifact distribution to Policy/CLAMP to support Self Service Control Loop.
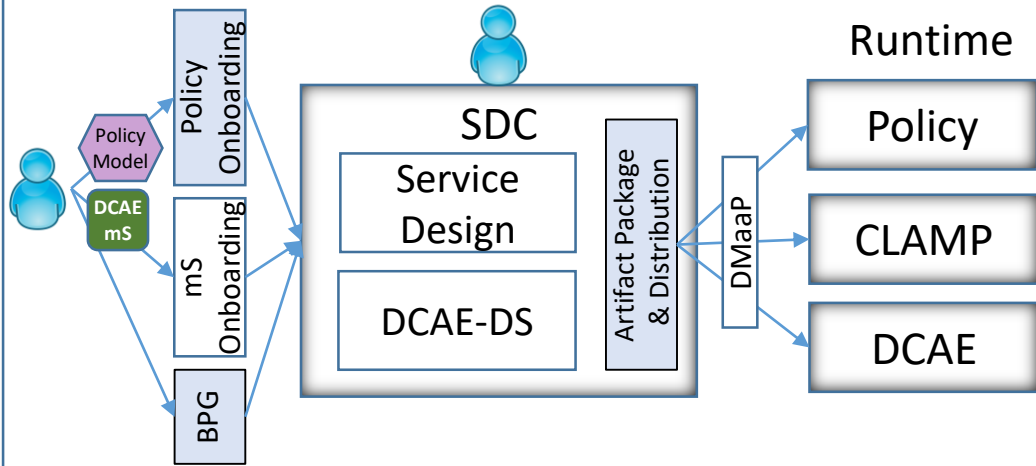 - Integrate with ONAP User Experience portals (initially ONAP portal, later SDC portal).
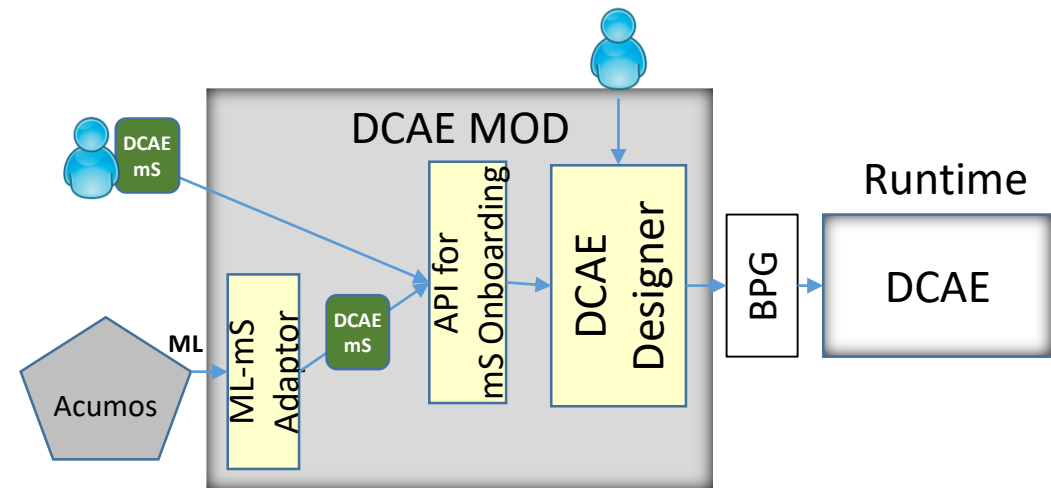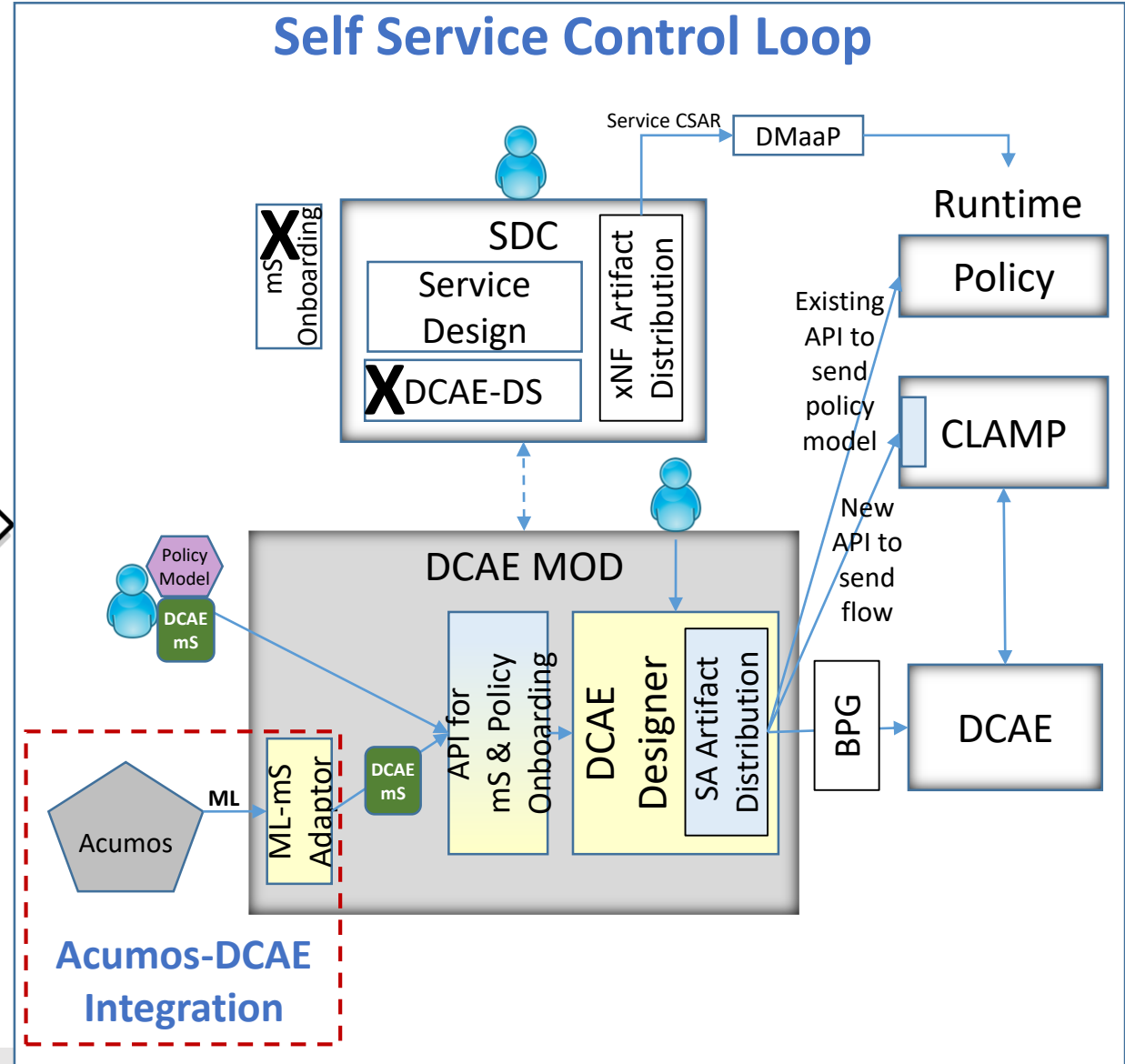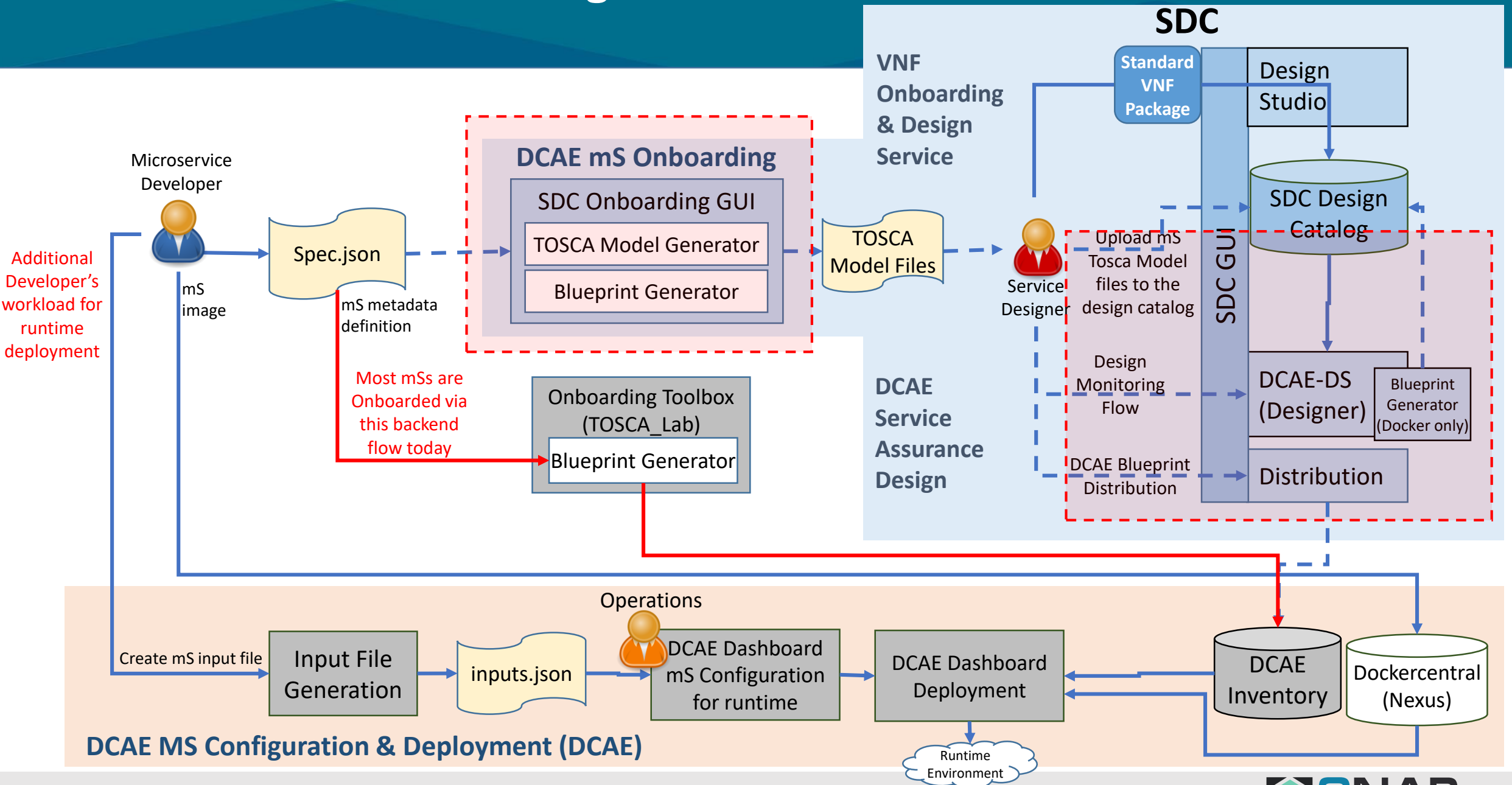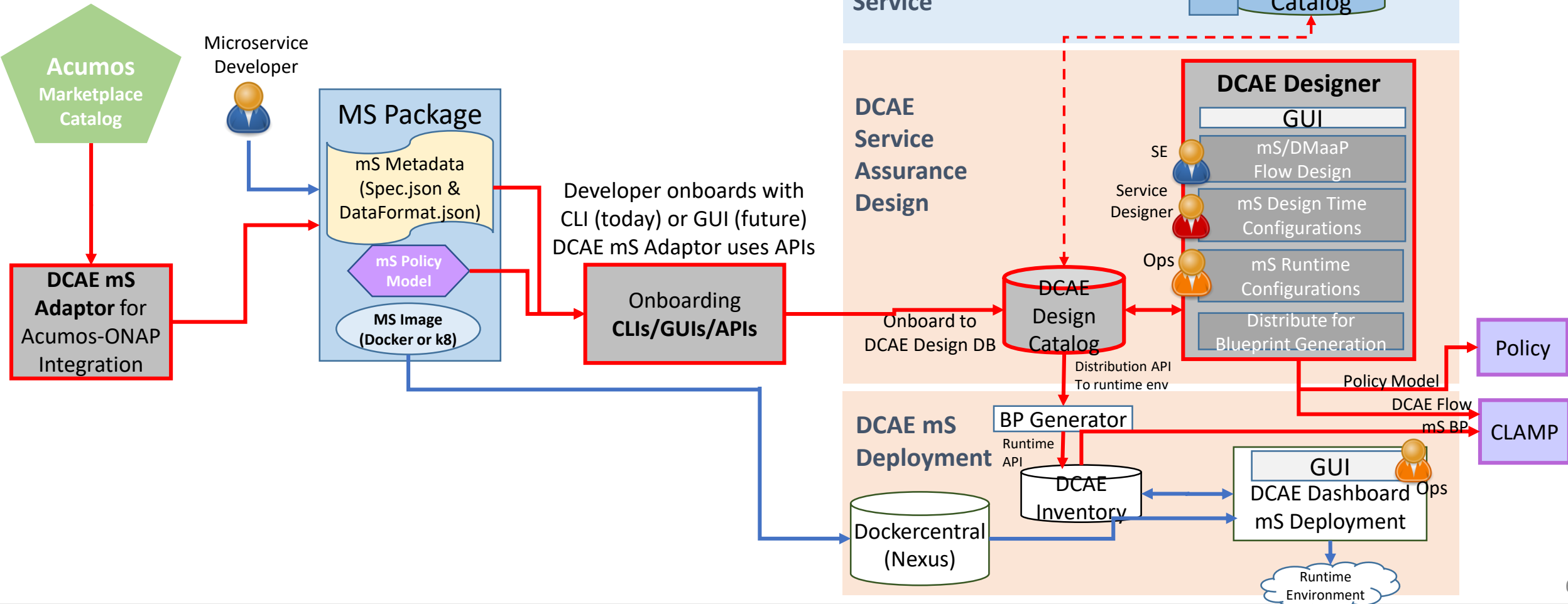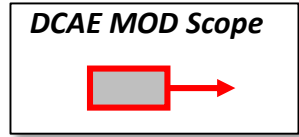
ONAP Frankfurt Release Proposal

DCAE MOD Features

New Capabilities	Requirement	Solution
	1. Enable ingestion of ML models from Acumos to ONAP as advanced Service Assurance analytic applications. (Acumos-ONAP DCAE Integration requirement).	**DCAE MOD**: Provide an "Adaptor" with capabilities to translate a Acumos ML model into a DCAE compliant microservice.
	2. Onboard Policy model to DCAE (SSCL requirement).	**DCAE MOD**: Enhance mS Onboarding APIs to support policy models.
	3. Distribution of Artifacts to Policy and CLAMP (SSCL requirement).	**DCAE MOD**: Add additional artifacts and interfaces in DCAE Designer for artifact distribution to Policy & CLAMP.
Issues Addressed	Issue	Solution
	1. Due to resource constraints, there are mismatched capabilities between SDC/DCAE-DS and DCAE mS deployment.	**DCAE MOD**: • Move DCAE mS onboarding & design system software development from SDC project to DCAE Project. • DCAE-MOD is developed by the DCAE team to ensure consistency across all DCAE implementation, with the long term objective to integrate with SDC as part of the Design Platform. • Provide a simplified mS onboarding & design process to support developers, service designers, and operations. • Support Service Assurance FLOW design and microservice design time & runtime configurations. • Catalog & data for microservice lifecycle tracking.
	2. Due to #1, mS developers upload handcrafted blueprint, and stay involved throughout the deployment process. This also ties mS development to specifically Cloudify implementation.	
	3. No Service Assurance flow design in SDC/DCAE-DS, therefore no reusable flow designs for the Service Designer.	
	4. Extensive reliance on developers' involvement in providing [Inputs.json] as runtime configurations for mS deployment.	
	5. No E2E tracking of microservice lifecycle.	

ONAP
OPEN NETWORK AUTOMATION PLATFORM
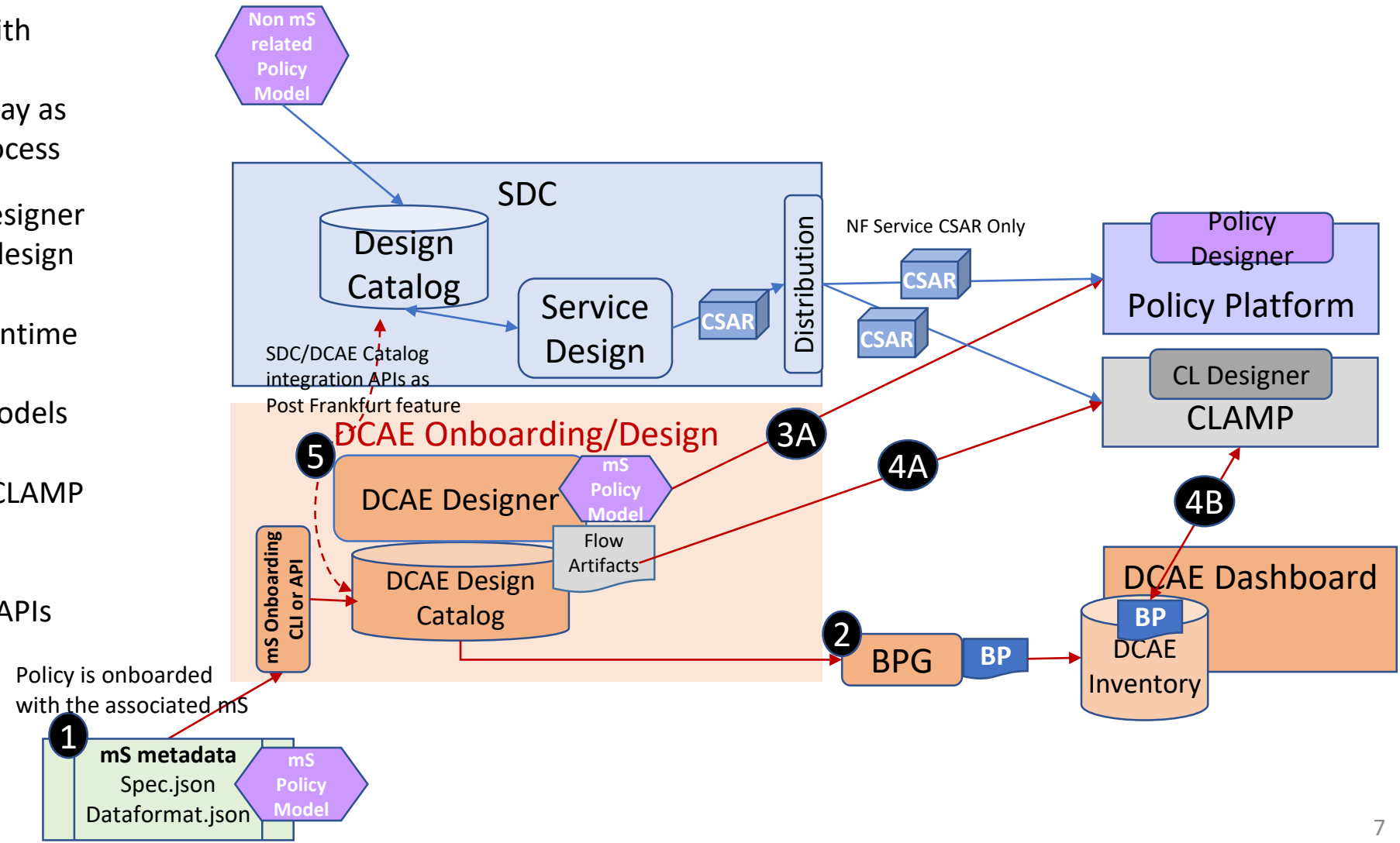
PMO - DCAE Onboard/Design Issues

FMO - A Simplified Onboarding/Design with DCAE MOD

Frankfurt – Self Serve Control Loops using DCAE MOD

1
- Change the mS onboarding process with just the metadata (no BP)
- Onboard mS policy model the same way as mS, via the new DCAE Onboarding process

2
- Replace DCAE-DS with a new DCAE Designer
- DCAE generates BP at the end of the design process
- Simplify the process from design to runtime

3
- DCAE uses Policy API to send policy models

4
- DCAE Designer sends flow artifact to CLAMP
- CLAMP retrieves BP from DCAE

5
- Establish GUI and Catalog integration APIs between DCAE-MOD and SDC (future)

Non mS related Policy Model

SDC
Design Catalog
Service Design
CSAR
Distribution

SDC/DCAE Catalog integration APIs as Post Frankfurt feature

NF Service CSAR Only
CSAR
CSAR

Policy Designer
Policy Platform

CL Designer
CLAMP

DCAE Onboarding/Design
5
DCAE Designer
mS Policy Model
Flow Artifacts

mS Onboarding CLI or API

DCAE Design Catalog

3A
4A
4B

DCAE Dashboard
BP
DCAE Inventory

2
BPG
BP

Policy is onboarded with the associated mS

1
mS metadata
Spec.json
Dataformat.json
mS Policy Model

DCAE MOD Contribution Description

Impacted Project(s): DCAE

- *Frankfurt* – **Self Serve Control Loops** feature, and **Acumos-ONAP DCAE Integration** feature

DCAE MOD Descriptions:

- **Acumos-DCAE Adaptor**: Enable ML model federation from Acumos to ONAP, translate and onboard ingested ML models to DCAE compliant microservices in ONAP design time and runtime.

- **Microservice/Policy Onboarding APIs**: provide APIs for automated microservice & its associated policy model onboarding.

- **DCAE Designer**

  - **Flow Design**: GUI and Catalog support for service assurance flow design with microservices and DMaaP topics.

  - **Microservice Design Time & Runtime Environmental Configurations**

  - **Version Control, Reporting, & Tracking**

  - **Submit for BP generation** (in conjunction with Input Parameter Generator (IPG))

  - **Distribute for BP generation to DCAE Inventory** (can be retrieve by CLAMP, & DCAE Dashboard for deployment)

  - **Distribute Policy model to Policy Platform** (via Policy APIs)

  - **Distribute SA Flow artifact to CLAMP** (format TBD)

Self Service Control Loop Impact Analysis

Work Item	SDC	DCAE (with DCAE MOD)	CLAMP	Policy
Policy Model Onboarding	Original SSCL scope (Policy model is created as a Resource TOSCA) *(Not Needed)*	Use the new DCAE mS Onboarding to concurrently onboard the associated mS Policy model	No Impact	No Impact
mS Onboarding	**Retire** existing SDC mS Onboarding	Use the new DCAE mS Onboarding CLI/GUIAPI	No Impact	No Impact
DCAE Flow Design & mS Configuration	**Retire** existing DCAE-DS	Use the new DCAE Designer	No Impact	No Impact
mS BP Generation	**Retire** BPG used by SDC before the design process	Use automated DCAE BPG at the end of the design process	No Impact	No Impact
Distribute Policy model association with a mS	Original SSCL scope is to ask SDC Service Design to create a Service TOSCA topology template that includes Resources (mS & Policy) *(Not Needed)*	Use DCAE Designer to simplify the artifacts distribution to CLAMP/Policy	Query Policy for µS policy-model (this is a minor addition given that we needed to do it for Operational and guard Policy anyway)	No Impact DCAE will use Policy API to send policy models
SDC packages mS BP into CSAR	Original SSCL scope *(Not Needed)*	No Impact	No Impact	No Impact
SDC & DCAE MOD Catalog Integration	Provide catalog APIs to send NFs and Collector models to DCAE Designer/Catalog *(Later Release)*	Provide catalog APIs to send DCAE Design Artifacts to SDC, if needed *(Later Release)*	No Impact	No Impact
DCAE MOD User Experience integration		With ONAP portal (Frankfurt) With SDC Portal *(later release)*		

Self Service Control Loop Impact Analysis (Cont'd)

Work Item	SDC	DCAE (with DCAE MOD)	CLAMP	Policy
CL workflow Distribution		DCAE Designer send flow design artifacts to CLAMP	• Support new interface from DCAE to receive **Control Loop flow** description (format of the flow still needs to be agreed upon) • Support interface from DCAE to query DCAE inventory for BP	
CLAMP Control Loop workflow management & execution			• Ability to support the old **clamp workflow** (policy model, blueprint inside csar) **together** with the **new clamp workflow** (receive flow artifact from DCAE, query DCAE inventory, trigger instantiation of individual µS BP, …). This is for backward compatibility reason. • Orchestration of the **Control Loop flow** to individually trigger instantiation of µS BP which are part of the flow	

ONAP Design Time Architecture Evolution

User Experience Layer

SDC Design Time User Experience Workflow & GUI

SDC Provided User Experience APIs for application plugins

Application layer

Service Assurance Design Tools
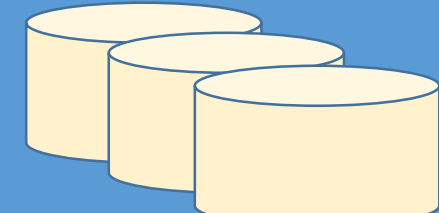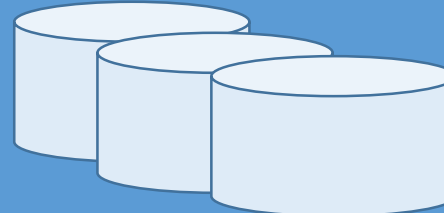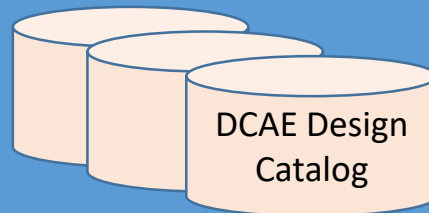- DCAE-MOD Evolution to integrate with Policy Design and CLAMP Design

xNF Onboarding & Service Design Tools (SDC)

Service Configuration Design Tools
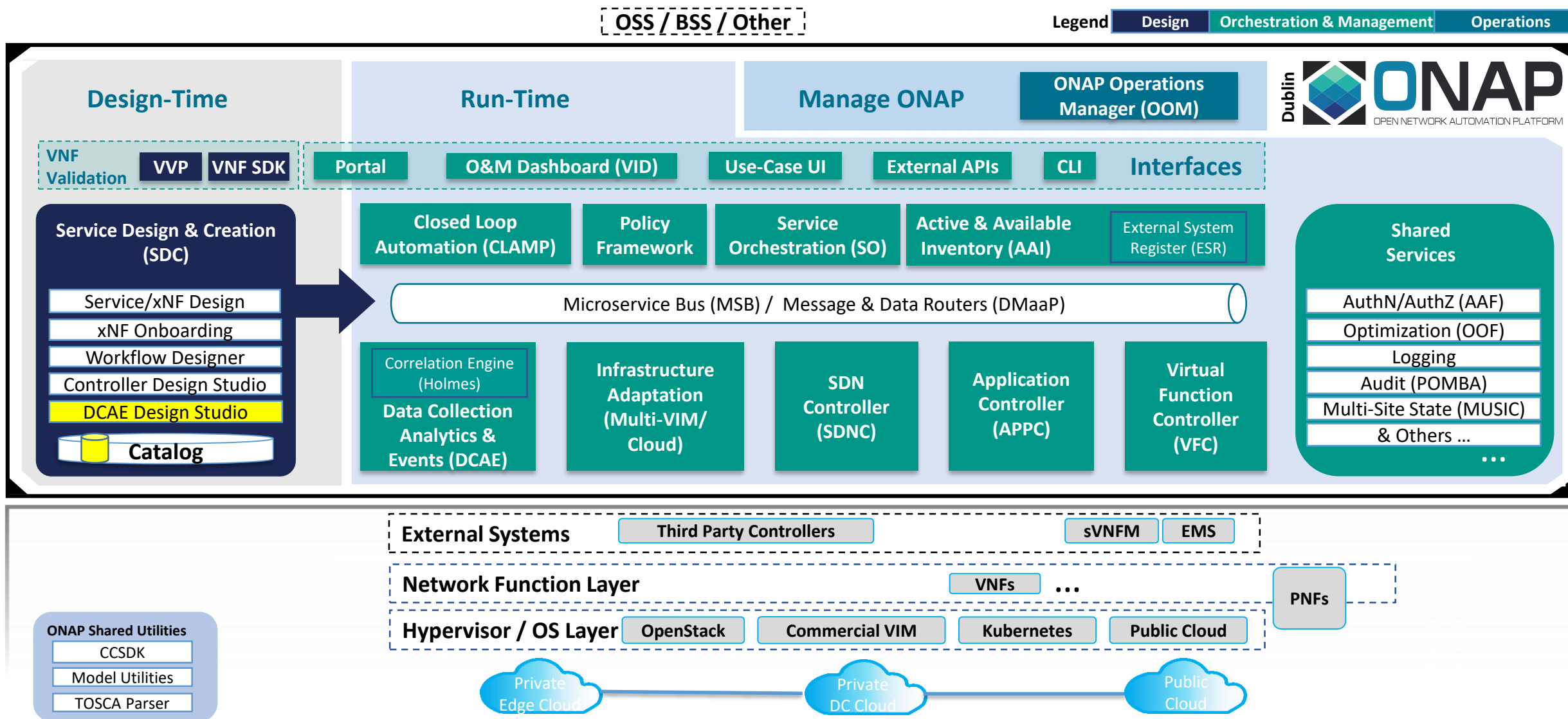- Workflow Design (e.g., Change Management)
- Controller Design Studio (CDS)

Data Layer

SDC and Application Design Catalog Integration via APIs

DCAE Design Catalog

Backup

DCAE MOD Technical Solutions
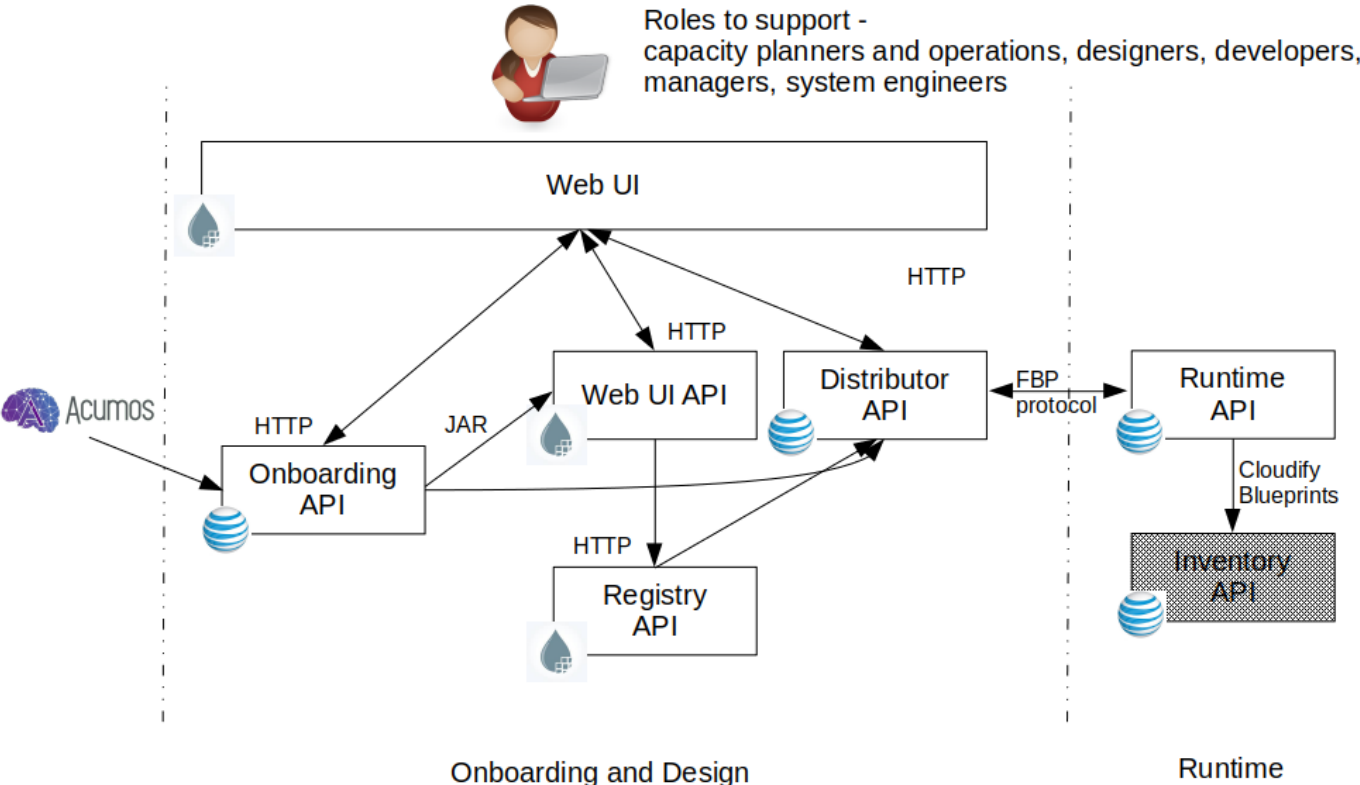
DCAE MOD Technical solutions – cont'd

- Main technical concept is flow based programming. DCAE MOD fits that paradigm.
- Nifi and flowbased org are notable players in FBP. We ended up combining things from both groups: Nifi (ui, web-api, registry) and FBP protocol from flowbased group.
- The FBP protocol is used to create a nice loose coupling between design and runtime which means the runtime can be extended to support runtimes that have different orchestration methods/technology like helm charts.
- Support of multiple environments and version control to support multiple releases.
- Focus on ECOMP concerns w.r.t environment variables in configuration, reports and tracking of the microservices.