REQ-479:ONAP DCAE Transformation Proposal
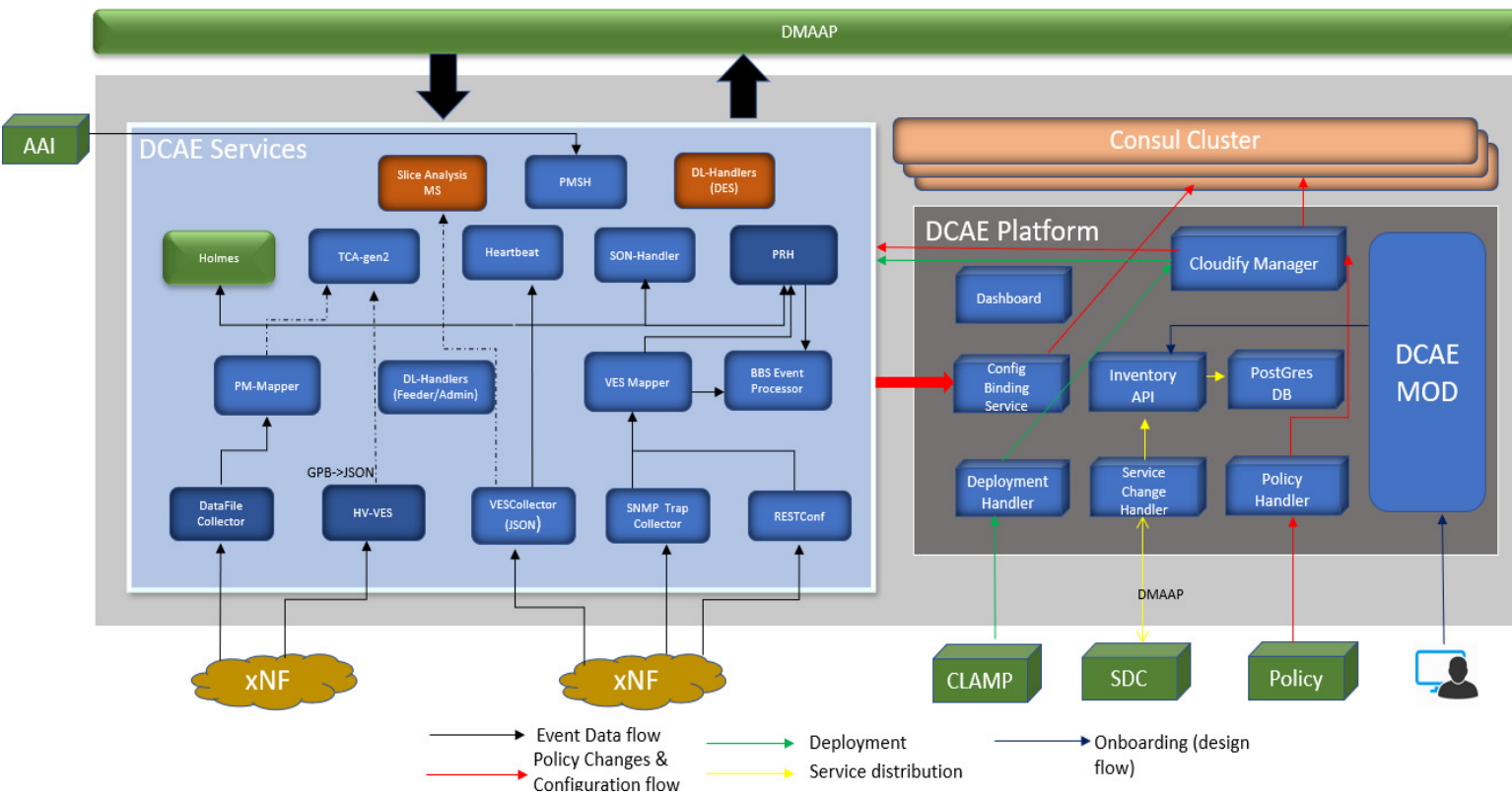
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Vijay Venkatesh Kumar
(vv770d@att.com)

Transformation Objective

Simplify DCAE architecture by offloading platform functions into generic k8s/cloud native function to be controlled based on Microservice deployment via helm

ONAP DCAE Architecture (Guilin)

DMAAP

AAI

DCAE Services

Slice Analysis MS | PMSH | DL-Handlers (DES)

Holmes | TCA-gen2 | Heartbeat | SON-Handler | PRH

PM-Mapper | DL-Handlers (Feeder/Admin) | VES Mapper | BBS Event Processor

GPB->JSON

DataFile Collector | HV-VES | VESCollector (JSON) | SNMP Trap Collector | RESTConf

Consul Cluster

DCAE Platform

Dashboard

Cloudify Manager

Config Binding Service | Inventory API | PostGres DB

DCAE MOD

Deployment Handler | Service Change Handler | Policy Handler

DMAAP

xNF | xNF

CLAMP | SDC | Policy

→ Event Data flow
→ Policy Changes & Configuration flow
→ Deployment
→ Service distribution
→ Onboarding (design flow)

Cloudify Manager
Primary orchestrator within in DCAE through which all DCAE MS are deployed. Cloudify, through its arsenal of plugins, is capable of relationship-based orchestration in many levels and cross different technologies.

Deployment Handler
Provides API for deploying DCAE MS into DCAE. Used by CLAMP and Dashboard

InventoryAPI
Provides API for storing and retrieving Service blueprints into Postgres

Service Change Handler
Retrieves DCAE specific blueprint composition distributed by SDC/DCAE-DS

Policy Handler
Retrieves configuration for DCAE components from Policy Engine. Listens on updates from Policy, identifies target mS and pushes update into mS (or Consul)

Dashboard
An UI for operation team to manage, deploy and track services component in DCAE

Config Binding Service (CBS)
Standard API layer for DCAE components to retrieve configuration (from Consul or other sources)

Consul
Provides KV store for DCAE MS configuration. Service registration is used for selected components

DCAE MOD (NiFI)
Design platform for onboarding and service composition creation

Benefits through Cloudify architecture not fully utilized in ONAP

- Infrastructure management support
- Support Hierarchical and distributed deployment (with central and regional/Edge site)
- Model driven approach enabling design flow integration
- Support containerized and VM based workload deployment on heterogenous cloud environment
- Supports service composition design (flow based) and instantiation of multiple related mS
- Dynamic DMAAP MR/DR provisioning capabilities part of orchestration.

Challenges
- Added complexity on DCAE Platform maintenance due to cross component dependency
- Tight coupling with Cloudify orchestration introduced onboarding challenge (maintaining k8s plugin <-> blueprint-gen compatibility)
- Community adoptions not diverse
- Security patches, ONAP compliance, S3P goals dependent Cloudify support
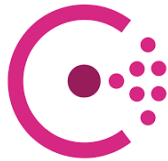- Kubernetes and Cloudify state consistency

ONAP Community Request

- Helm adoption for alignment with rest of ONAP deployments

- Remove second-level orchestration for DCAE Service components to remove underlying complexity

- Reduce 3rd party vendor software dependency

Transformation Goals

Decentralization of platform function

Remove centralized external Config Store

Remove Cloudify centric

Adopt industry standard and tools

Easier onboarding and deployment of DCAE mS

CI/CD based workflow automation

Pros
- Simplified & Open architecture
- Connectivity on distributed deployment
- Address latency and throughput concerns
- Cloud native solution enabling broader community support

Cons

All existing DCAE Service component impacted with migration

Transformation Impact for DCAE Services

| Application Configuration Management	Deployment	Policy Interaction	DMaap Topic/feed provisioning	MOD (Design Platform)
• Switch Microservice employing Configbinding-Service API's (for configuration fetch from Consul) to retrieve config through K8S Configmap • Alternate option via K8S operator to replicate current platform functions	• Build Helm chart for existing services (with configuration defined as resource definition under helm). Generic template being explored • Common helm registry (ONAP CI integration) • OOM/Service (API support) for dynamic helm chart deployment post ONAP installation • ONAP deployed helm registry (for hosting dynamically onboarded component through MOD)	• Build SDK or sidecar container to periodically fetch and retrieve active policy configuration into application container (MS impact to retrieve policy configuration outside of CBS api)	• K8s operator for components require secure dynamic AAF based topic • Facilitate Native/Kafka integration for required DCAE MS (Note: Impact of Istio/Service mesh to be assessed)	• Onboarding, Deployment & Catalog Management for helm based component • Generation of helm chart based on meta-data/spec onboarded • Integration with ONAP native Helm registry to push generated charts (which will be used for ONAP CI/CD or OOM/Service)

ONAP DCAE Architecture (FMO)
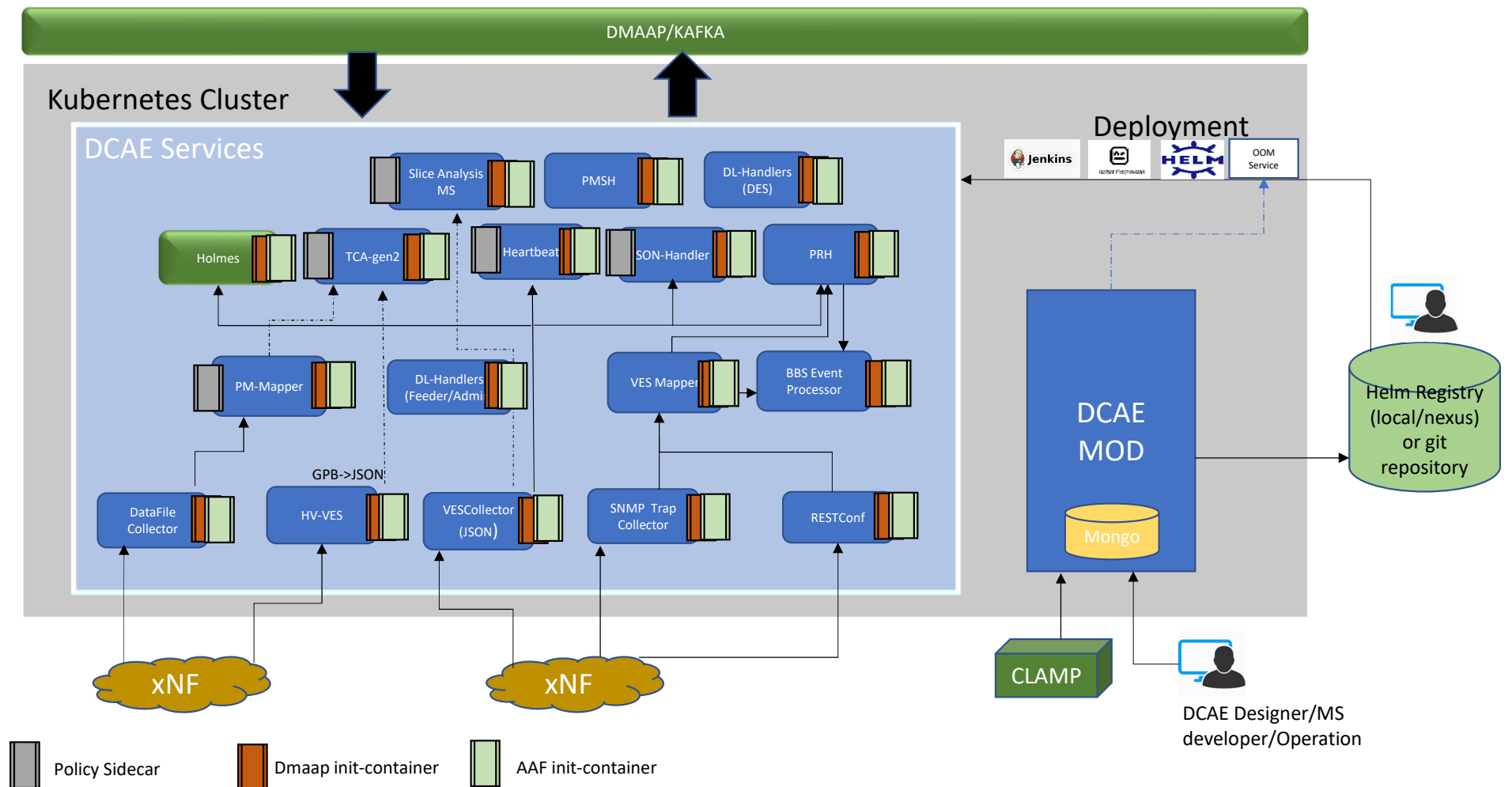
ONAP Phasing Plan (Proposal)

Phase 1 (H release candidate)
- Build standalone features for Helm integration
- Introduce framework & CI pipeline for supporting target architecture
- Design for transformation feature/work as POC

Phase 2 (I release candidate)
- Pilot few DCAE service components to leverage new feature
- Harden DCAE-MODv2 for helm support and CI for dynamic deployment
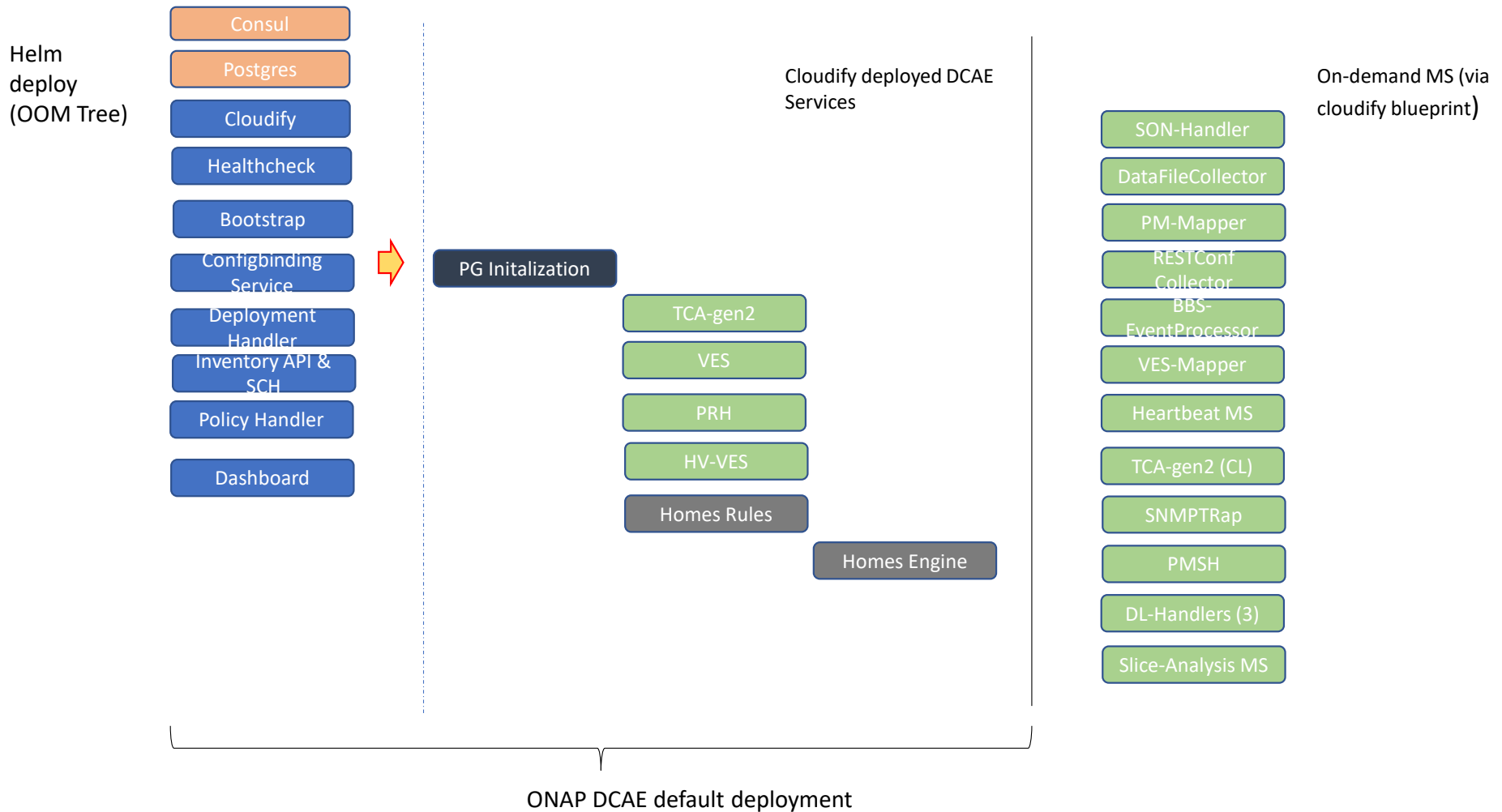
Phase 3 (J release)
- Migrate all existing/active DCAE services to helm
- Deprecate Cloudify/associated platform components
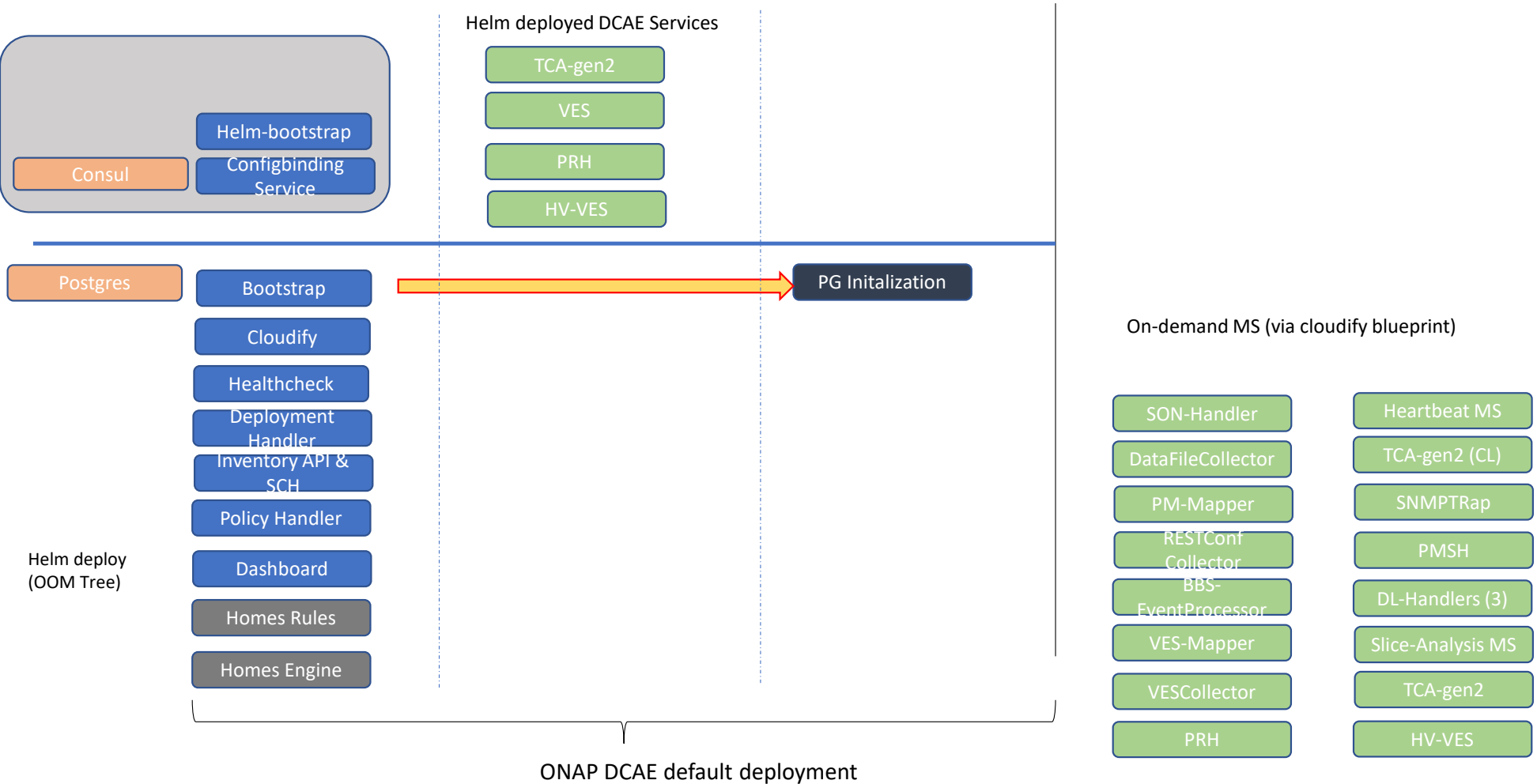
DCAE Honolulu release Plan

Cloudify remains primary orchestration for dynamic deployments (MOD/CLAMP flows)

- Migrate bootstrap service components to Helm (continue Consul/CBS)
  - Build generic common helm template (to be used by VESCollector, TCAgen2, HV-VES, PRH, Holmes*)
  - Create separate DCAE/Helm Repo or current OOM tree (under discussion with OOM Team). Separate repo under DCAE requires
    - ONAP/Jenkins integration for helm chart build and push into ONAP/nexus
    - Dependency on oom/common to be available under ONAP/nexus

- Design configuration management for service component outside of Consul/CBS (Design)

- Building current DCAE platform function as sidecar/init container functionality
  - Dynamic Topic/feed (DMAAP) provisioning through helm & K8s operator (stretch-goal)
  - Policy Handling

- DCAE MODv2 Enhancement for Helm support *(Design)*

ONAP DCAE Deployment (Guilin Release)

Helm deploy (OOM Tree)

- Consul
- Postgres
- Cloudify
- Healthcheck
- Bootstrap
- Configbinding Service
- Deployment Handler
- Inventory API & SCH
- Policy Handler
- Dashboard

PG Initalization

Cloudify deployed DCAE Services

- TCA-gen2
- VES
- PRH
- HV-VES
- Homes Rules
- Homes Engine

On-demand MS (via cloudify blueprint)

- SON-Handler
- DataFileCollector
- PM-Mapper
- RESTConf Collector
- BBS-EventProcessor
- VES-Mapper
- Heartbeat MS
- TCA-gen2 (CL)
- SNMPTRap
- PMSH
- DL-Handlers (3)
- Slice-Analysis MS

ONAP DCAE default deployment

ONAP DCAE Honolulu Deployment View

Helm deployed DCAE Services

TCA-gen2
VES
PRH
HV-VES

Helm-bootstrap

Consul

Configbinding Service

Postgres

Bootstrap → PG Initalization

Helm deploy (OOM Tree)

- Cloudify
- Healthcheck
- Deployment Handler
- Inventory API & SCH
- Policy Handler
- Dashboard
- Homes Rules
- Homes Engine

ONAP DCAE default deployment

On-demand MS (via cloudify blueprint)

SON-Handler	Heartbeat MS
DataFileCollector	TCA-gen2 (CL)
PM-Mapper	SNMPTRap
RESTConf Collector	PMSH
BBS-EventProcessor	DL-Handlers (3)
VES-Mapper	Slice-Analysis MS
VESCollector	TCA-gen2
PRH	HV-VES

ONAP Cross project impact

- OOM
  - LF nexus integration for hosting Helm chart & Versioning (if separate repo is adopted)
  - OOM service for supporting on-demand deployment from external registry (after main ONAP)
  - ONAP deployed helm registry (for pushing dynamically onboarded component through MOD)

- Holmes
  - Helm chart under OOM repo

- CLAMP/Policy
  - Design integration through MOD for Helm deployed component
  - Deployment integration through MOD (for Helm flow)
  - Helm override support in CLAMP GUI

- DMAAP
  - Support of K8s operator for DMaap topic/feed provisioning
  - Support for Native/Kafka integration
  - Topic/feed provisioning in ONAP independent of AAF
    - Unauthenticated topic supported; feeds require access control for subscribers.

Questions ?