LF NETWORKING

ONAP
OPEN NETWORK AUTOMATION PLATFORM

ONAP For Enterprise Business

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ONAP - Enabler For Innovation

Industry Collaboration

5G Footprint

Slicing Capabilities

Security

Cloud Native

Production Readiness

Network Automation

RAN Virtualization

Enterprise/Vertical Markets

5G Open Source Stack Initiative

Cross Communities Effort including E2E SDO/Alliance Integration

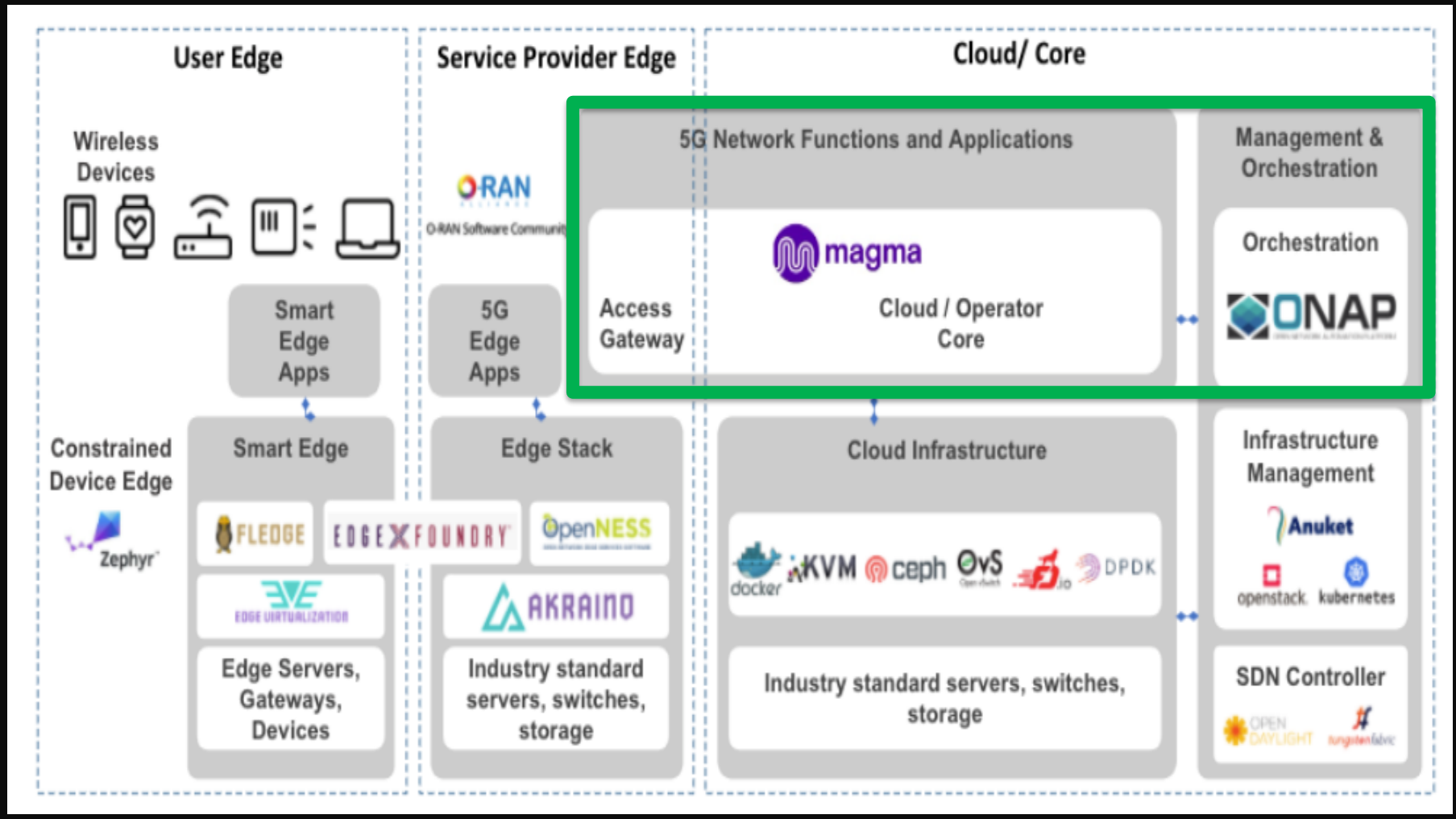
Target Audience:

- Enterprise Networking
- Service Providers
- End Users, Governments

ONAP Assets:

- Orchestration & Life Cycle Management
- Cloud Native Modularity
- 5G Network Slicing
- Support ORAN SC SMO
- Control Loop Automation
- Analytics

And More ...

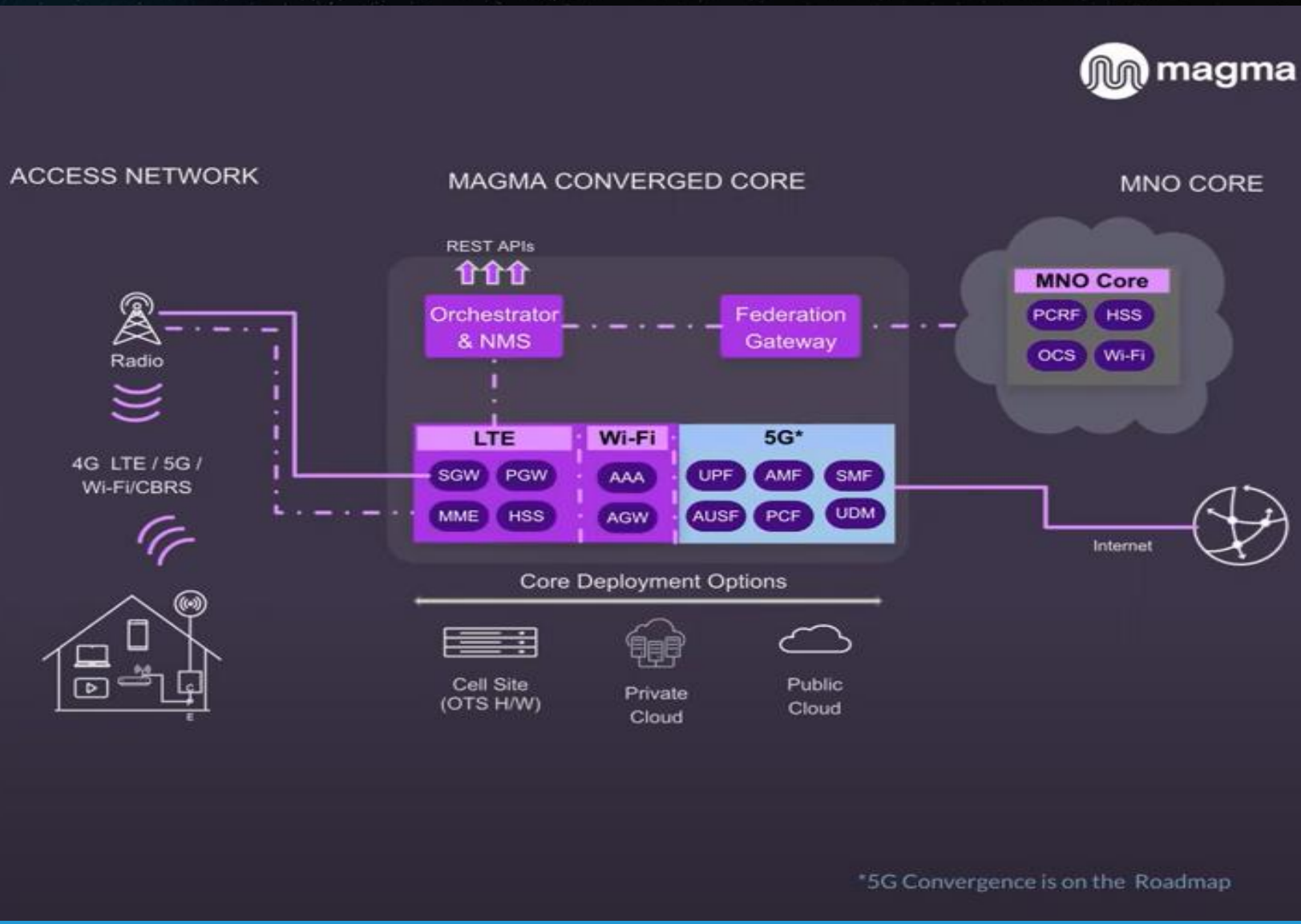


Learn more: 5G Super Blueprint - Networking (lfnetworking.org)

What is Magma?

Introducing Magma

- Hyper Scalable & Distributed Core
- Highly Available
- Open Source with Permissive Licensing
- Cloud Native, CUPS, Containerized
- Vendor / Transport Agnostic
- Local Break-out for Internet Traffic
- MNO Core Integration
- Remote Configuration & Lifecycle Management using REST APIs
- "All access" Convergence
  - LTE, Wi-Fi, P-LTE, 5G

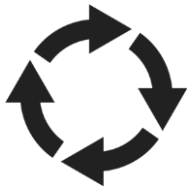


ONAP/Magma Integration Principles

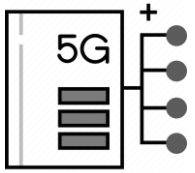
INITIAL SCOPE

Orchestration of Magma Controller and GWs

Magma Controller/GWs configuration



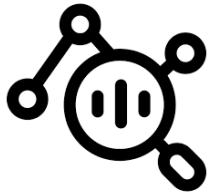
Magma Controller/GWs LCM (e.g. update)



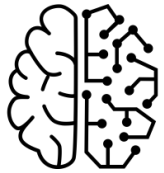
Magma Network Slicing

FUTURE CAPABILITIES

Magma Controller/GWs control loops

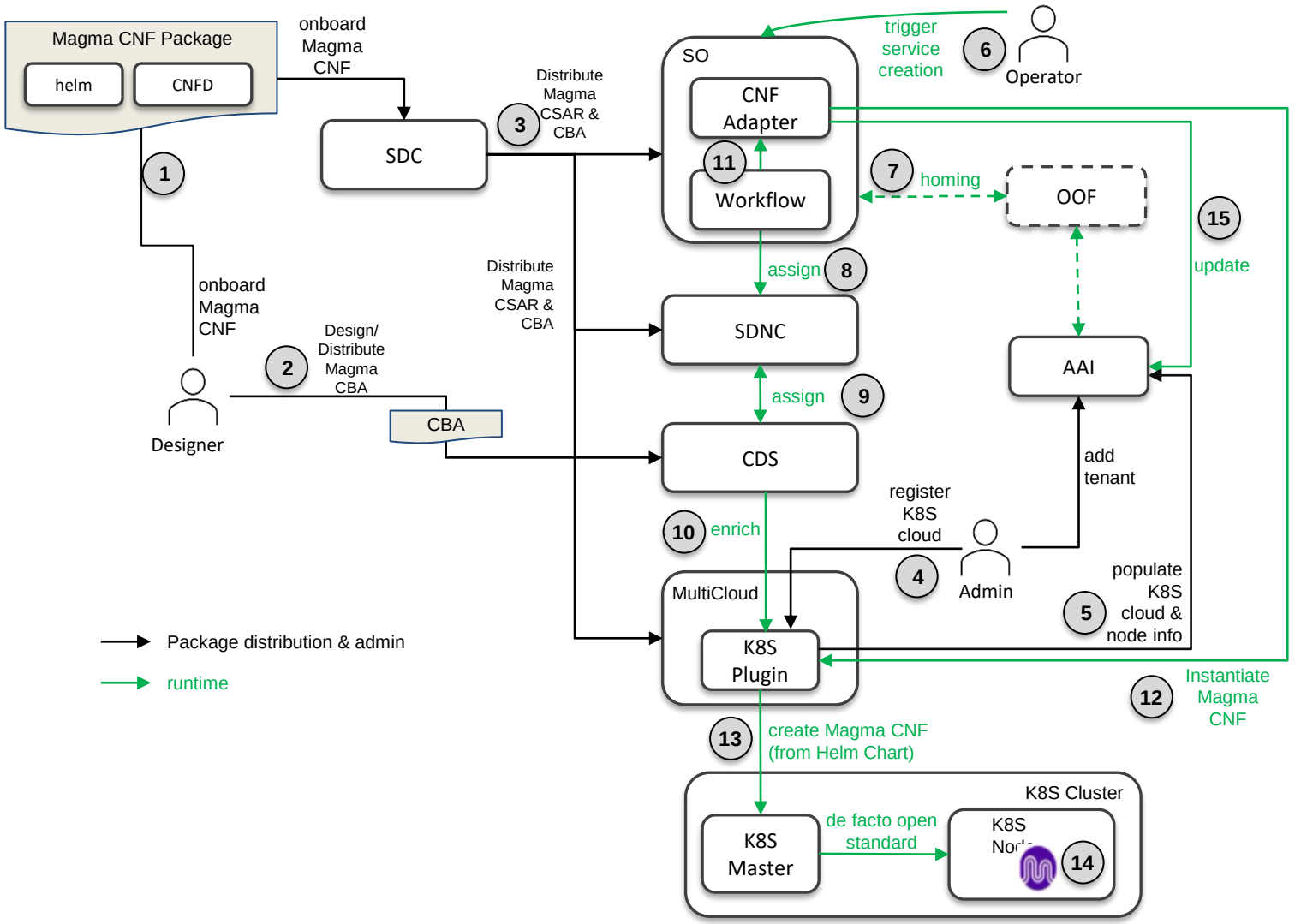


Analytics on Magma Controller data



AI/ML on Magma Controller data

ONAP/Magma Flows (Day 0/1)



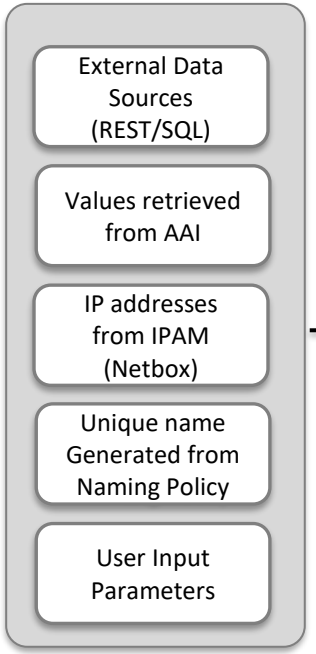
ONAP Magma Deployment Process Sequence (Magma is CNF):

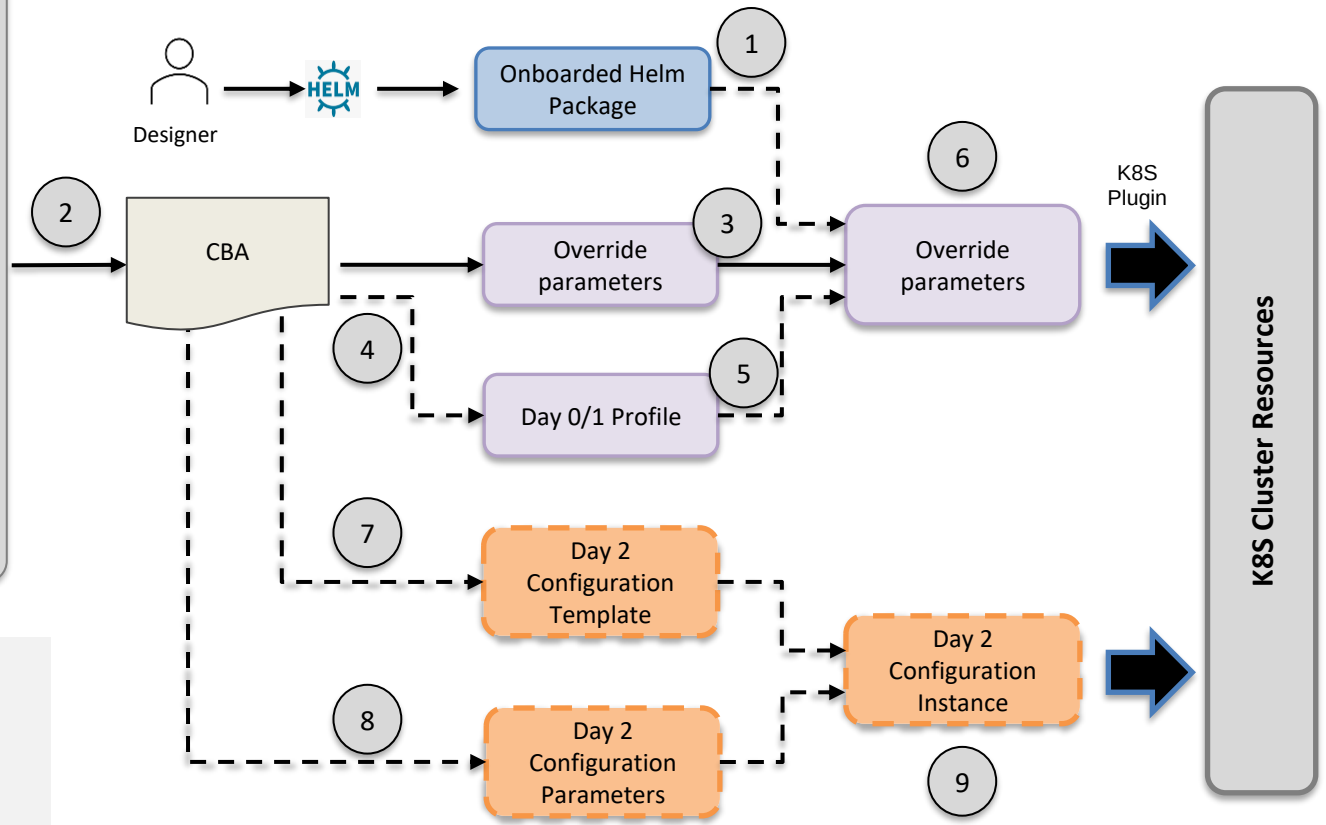
#	Actor	Action
1	designer	onboards Magma CNF package to SDC
2	designer	designs/distribute Magma CBA to CDS
3	SDC	distributes Magma CSAR to ONAP runtime components such as SO, SDNC, MultiCloud
4	admin	registers target K8S cloud to K8S plugin and adds tenant
5	K8S plugin	populates K8S cloud & node info to AAI
6	operator	starts Magma CNF service creation by calling SO
7	SO	askes OOF for homing for Magma CNF
8	SO	assigns Magma CNF to SDNC
9	SDNC	assigns Magma CNF / generates Magma CNF configuration from template to CDS
10	CDS	enriches Magma CNF configuration to K8S plugin
11	SO	calles CNF Adapter to instantiate CNF
12	cnf adapter	calls K8S plugin Instantiate API
13	K8S plugin	deploys Magma CNF from helm chart to the target K8S
14	K8S master	deploys Magma CNF to K8S node
15	cnf adapter	updates Magma CNF instance

ONAP Magma Helm Chart Mgmt (Day 0/1/2)

Steps of processing of Helm data with help of CDS

1. Onboarded Helm package
2. External input for CBA
3. Generated profile contents
4. Helm enrichment/Profile generation input
5. Generated Helm enrichment/Profile contents
6. Final Helm package for instantiation as a merge of override values and additional/modified Helm templates from Profile
7. Preparation of Configuration Template - Helm package with K8S resources for CNF configuration
8. Preparation of configuration overrides of Configuration template
9. Merge of configuration template and parameters and instantiation of configuration



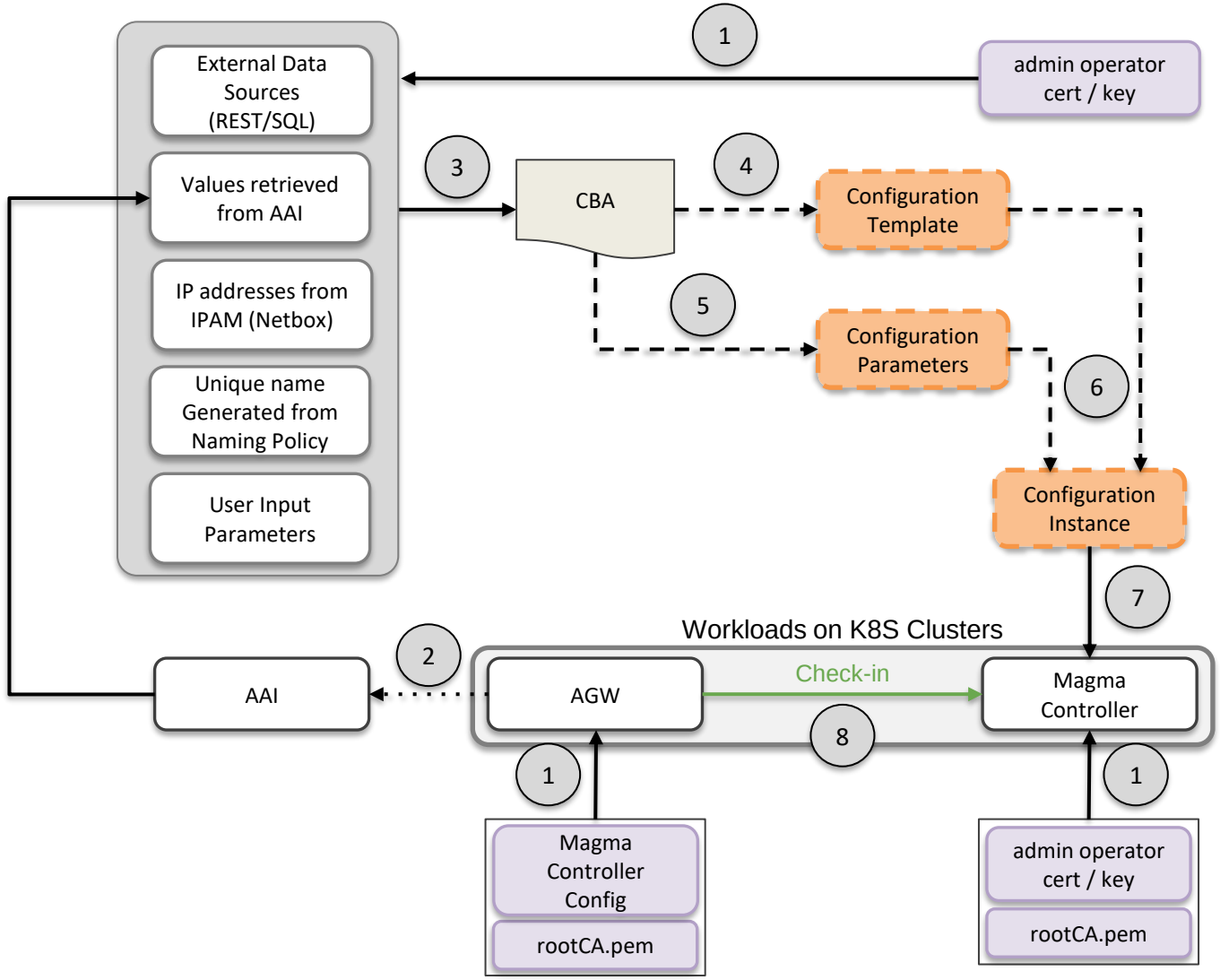


- CDS plays a crucial role in the process of Magma CNF instantiation
- During a helm package is instantiated, K8S Plugin combines override values from helm package, rb profile and from the instantiation request
- Magma Helm package and CBA can follow the same ONAP procedures as illustrated here for Day 0/1/2 operation

ONAP/Magma Registration Flows

1. Certificates, Keys and Config files made available as part of Day (0/1) configuration
2. AGW is added to the AAI with information on Hardware-ID and Challenge Key
3. CBA content
4. Config assign
5. Config deploy
6. Merge of config template and parameters forming AGW registration instance
7. Configure Magma Controller using the Rest Interface
8. Access Gateway Check-in into Magma Controller and initiates bootstrap process.

Connection between Magma Controller and AGW establishes



Magma Sample Configuration

Not secure | 192.168.102.88:9443/magma/v1/lte/network_1


```
{
  - cellular: {
      - epc: {
            default_rule_id: "default_rule_1",
            gx_gy_relay_enabled: false,
            hss_relay_enabled: false,
            lte_auth_amf: "gAA=",
            lte_auth_op: "EREREREREREREREREREQ==",
            mcc: "001",
            mnc: "01",
          - network_services: [
                "policy_enforcement"
            ],
            tac: 1
        },
      - ran: {
            bandwidth_mhz: 20,
          - tdd_config: {
                earfcndl: 44590,
                special_subframe_pattern: 7,
                subframe_assignment: 2
            }
        }
    },
    description: "sample desc",
  - dns: {
        enable_caching: false,
        local_ttl: 60
    },
    id: "network_1",
    name: "sample"
}
```


Not secure | 192.168.102.88:9443/magma/v1/lte/network_1/gateways/gw2

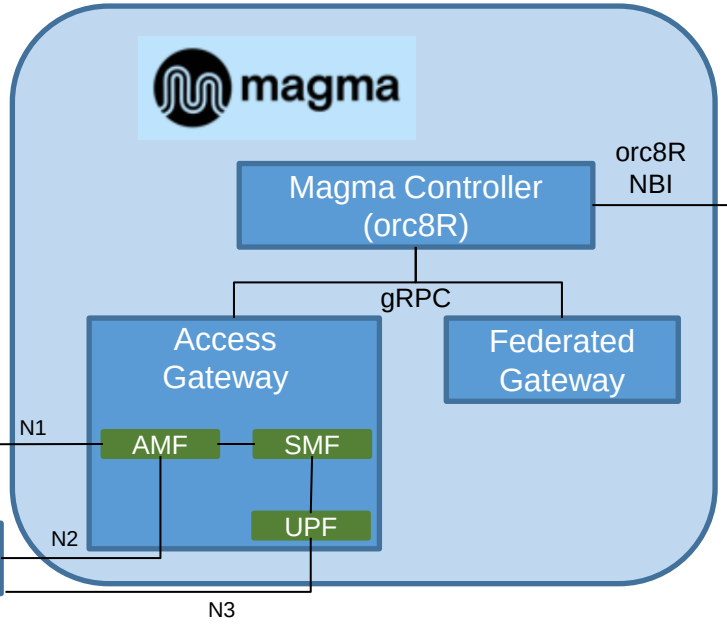

```
{
  - cellular: {
      - dns: {
            dhcp_server_enabled: false,
            enable_caching: false,
            local_ttl: 0
        },
      - epc: {
            ip_block: "192.168.128.0/24",
            nat_enabled: true
        },
      - ran: {
            pci: 260,
            transmit_enabled: true
        }
    },
    connected_enodeb_serials: [ ],
    description: "agw vm",
  - device: {
        hardware_id: "c9701040-ee72-432b-8465-60f6b2da2d4d",
      - key: {
            key: "MHYwEAYHKoZIzj0CAQYFK4EEACIDYgAEpp1+V7gM6uo8BJQriui7Rf6ICWNZEmV9/M+TuMC4eC9paFFz9JaLpYAGg6y4hs8n+anrL6xcre
            key_type: "SOFTWARE_ECDSA_SHA256"
        }
    },
    id: "gw2",
  - magmad: {
        autoupgrade_enabled: true,
        autoupgrade_poll_interval: 60,
        checkin_interval: 60,
        checkin_timeout: 30,
      - dynamic_services: [
            "eventd",
            "td-agent-bit"
        ],
      - logging: {
          - aggregation: {
              - target_files_by_tag: {
                    mme: "var/log/mme.log"
                }
            },
            log_level: "DEBUG"
        }
    },
    name: "gw2",
    tier: "default"
}
```

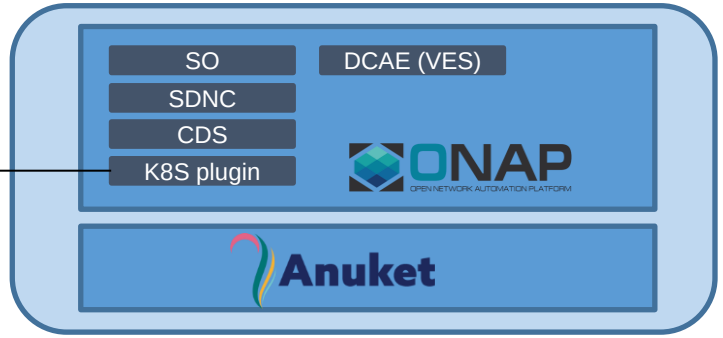
ONAP/Magma Integration

Magma Controller (orc8R) NBI swagger:
https://app.swaggerhub.com/apis/karthiksubraveti/magma/1.0.0#/Gateways/post_networks__network_id__gateways

Supported API Operation	Supported API Operation
Alerts	Tenants
Call Tracing	Upgrades
Carrier Wifi gateways	Wifi Gateways
Carrier Wifi Networks	Wifi Meshes
EnodeBs	Wifi Networks
Federated LTE Networks	baremetal
Federation Gateways	e2e
Federation Networks	Events
Gateways	Defaults
LTE Gateways	APNs
LTE Networks	Subscribers
Metrics	Network Probes
Policies	Commands
Rating Groups	Logs
SMS	Models

- ONAP sees Magma as EMS/Controller that manages wireless network (5G, 4G)
- When Magma Controller is used, thru K8S plugin, SDNC/CDS delegate its operations to the Magma Controller
- Magma CNF model/package e2e distribution will be done thru ONAP. Currently Magma self-contains all the necessary models / packages
- Magma metrics will be collected by DCAE





Magma has three major components

- Orchestrator
  - Provides configurations and monitoring of wireless network
  - Its web UI provides analytics and traffic flows
- Access Gateway
  - Provides network services and policy enforcement
  - Implements CNFs/VNFs/PNFs
- Federation Gateway
  - Integrates MNO core network by 3GPP interfaces
  - Acts as a proxy between AGW and operator's network (authentication, data plans, policy enforcement, charging)

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OPEN NETWORK AUTOMATION PLATFORM

Q&A

Interested to join us?
Bi-Weekly Meeting - Wednesday @7.30am PST/10.30 am EST/4.30pm CET
ONAP Wiki: *TSC Task Force: ONAP for Enterprise Business*
Mailing List: *onap-enterprise@lists.onap.org*