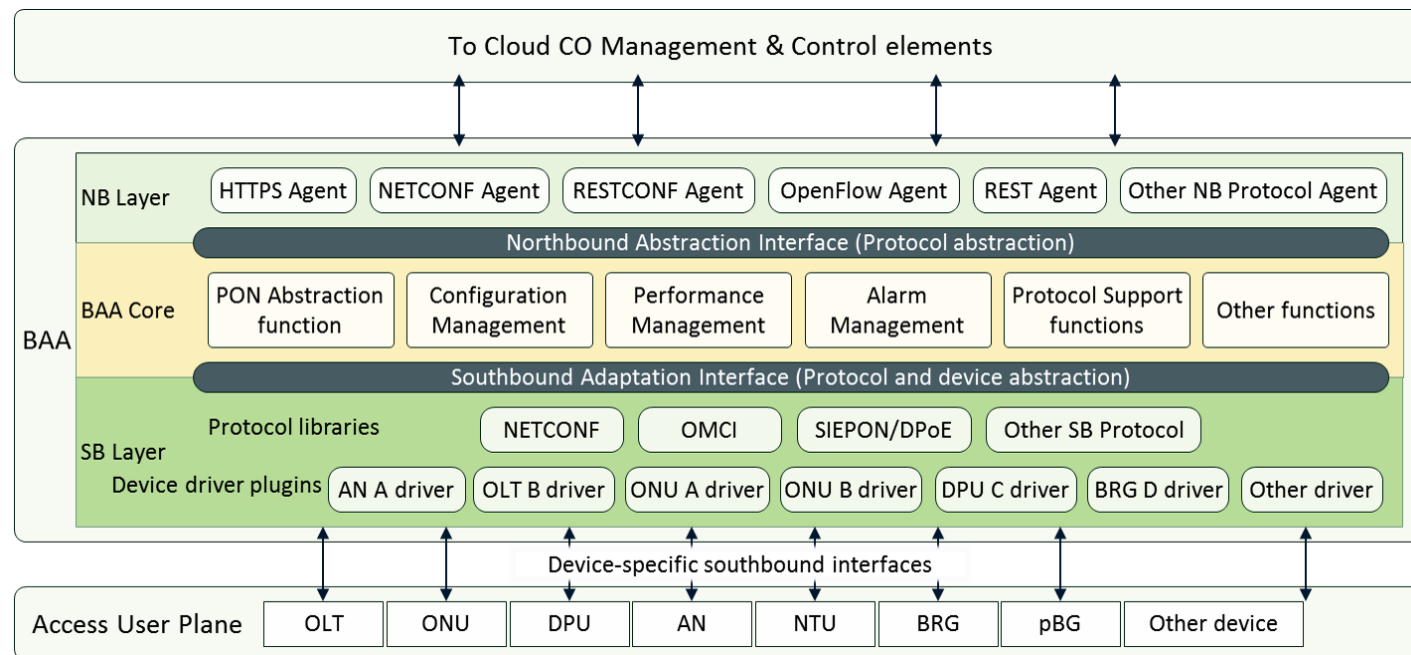# Open Broadband: Broadband Access Abstraction Overview
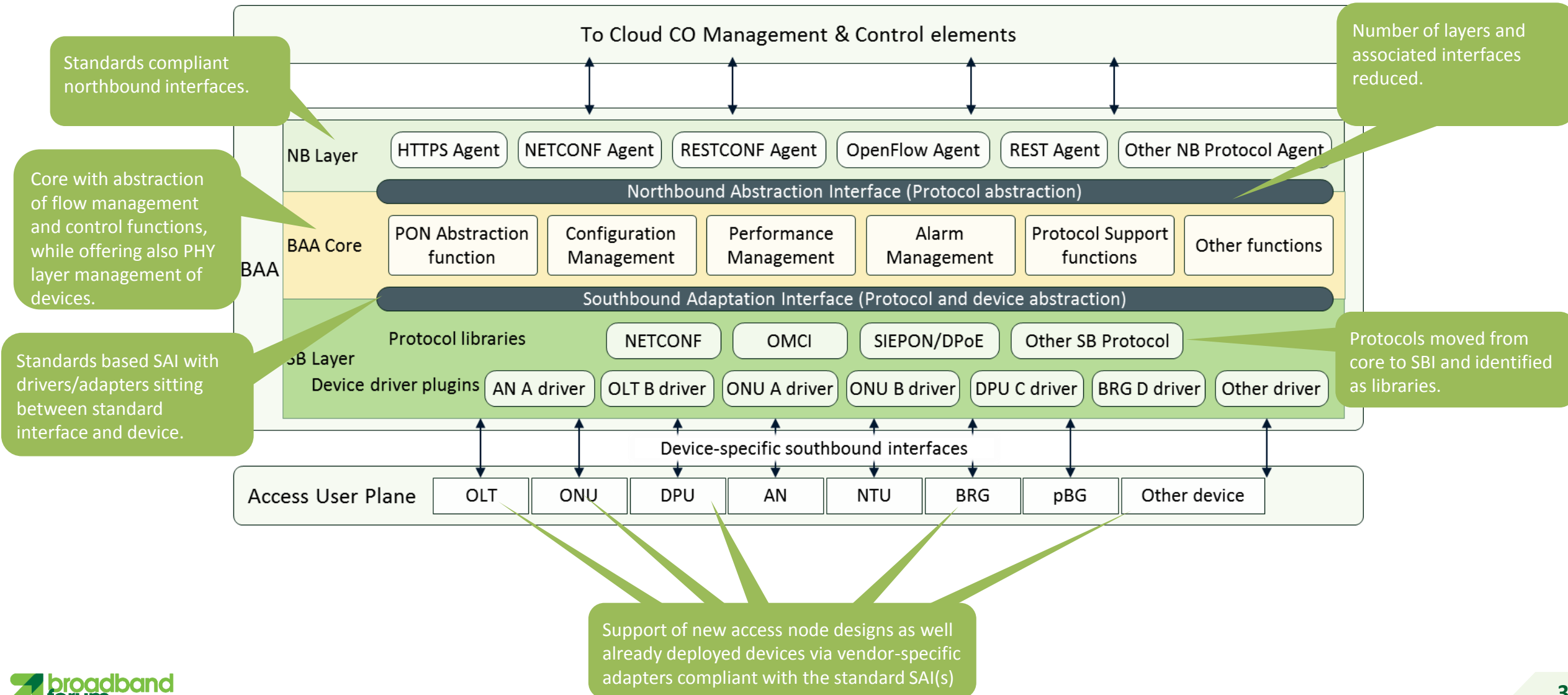
Tim Carey (Nokia), OB-BAA Project Chair
April 10, 2018

What is OB-BAA?

- Stands for: **B**roadband **A**ccess **A**bstraction under BBF's **O**pen **B**roadband initiative.

- It is an **open source project** whose primary objective is to develop a **software reference implementation** of the BBF's CloudCO BAA layer.

- It provides the ability to pull **differing access device types**, **including legacy implementations**, together under an umbrella to be **exposed to management elements** such as the SDN Management and/or Control and Element Management Systems.

What makes the BAA layer different?

To Cloud CO Management & Control elements

Standards compliant northbound interfaces.

Number of layers and associated interfaces reduced.

BAA

NB Layer
- HTTPS Agent
- NETCONF Agent
- RESTCONF Agent
- OpenFlow Agent
- REST Agent
- Other NB Protocol Agent

Northbound Abstraction Interface (Protocol abstraction)

Core with abstraction of flow management and control functions, while offering also PHY layer management of devices.

BAA Core
- PON Abstraction function
- Configuration Management
- Performance Management
- Alarm Management
- Protocol Support functions
- Other functions

Southbound Adaptation Interface (Protocol and device abstraction)

SB Layer

Protocol libraries
- NETCONF
- OMCI
- SIEPON/DPoE
- Other SB Protocol

Protocols moved from core to SBI and identified as libraries.

Device driver plugins
- AN A driver
- OLT B driver
- ONU A driver
- ONU B driver
- DPU C driver
- BRG D driver
- Other driver

Standards based SAI with drivers/adapters sitting between standard interface and device.

Device-specific southbound interfaces

Access User Plane
- OLT
- ONU
- DPU
- AN
- NTU
- BRG
- pBG
- Other device

Support of new access node designs as well already deployed devices via vendor-specific adapters compliant with the standard SAI(s)

broadband forum

3

What are the Benefits of the BAA layer?

For the Service Providers:

- Standard compliant NBIs (e.g. WT-411, WT-413 for BAA) provide SPs with interface contract Southbound of their OSS that is vendor and environment agnostic.

- Standard compliant SBIs (e.g., TR-355) provide interoperable interfaces, nurturing the growth of the ecosystem of network elements and shortening validation and deployment cycles.

- Enables the migration of legacy access nodes into the new management and control architecture.

- The NB layer of BAA offers protocol adaptation to fit those of the SDN Management and/or Control Elements that interact with Access Nodes and to allow different architectures.
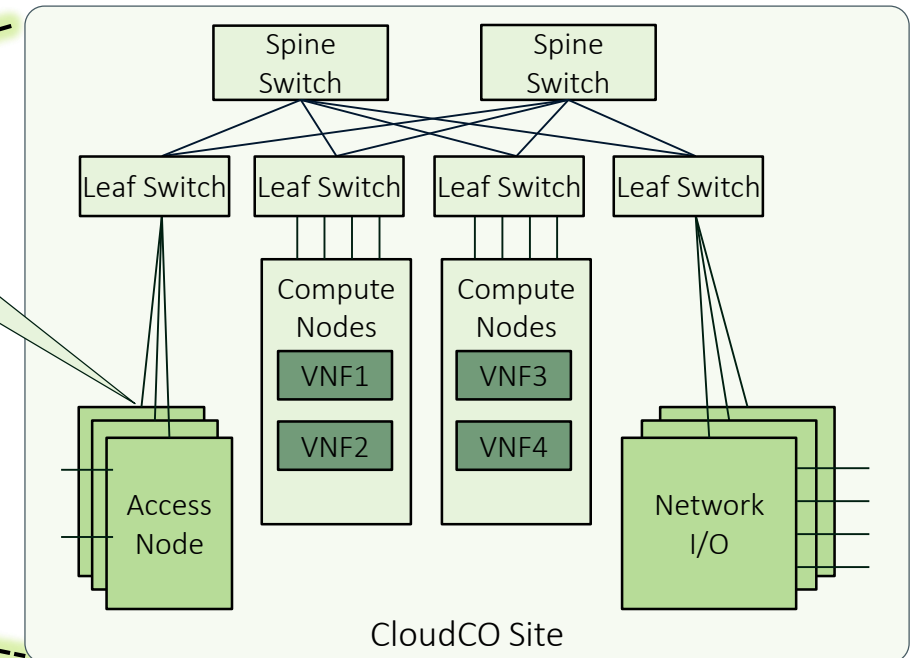
For the Vendors:

- Equipment vendors can develop against standard references, thus limiting the number of interfaces they have to support to integrate into a Service Provider network.

- The NB and SB layers of BAA provide isolation of Core functionalities from protocols and interfaces that change over time.

- Vendors can use and extend the software with additional features and interfaces allowing them to differentiate themselves.
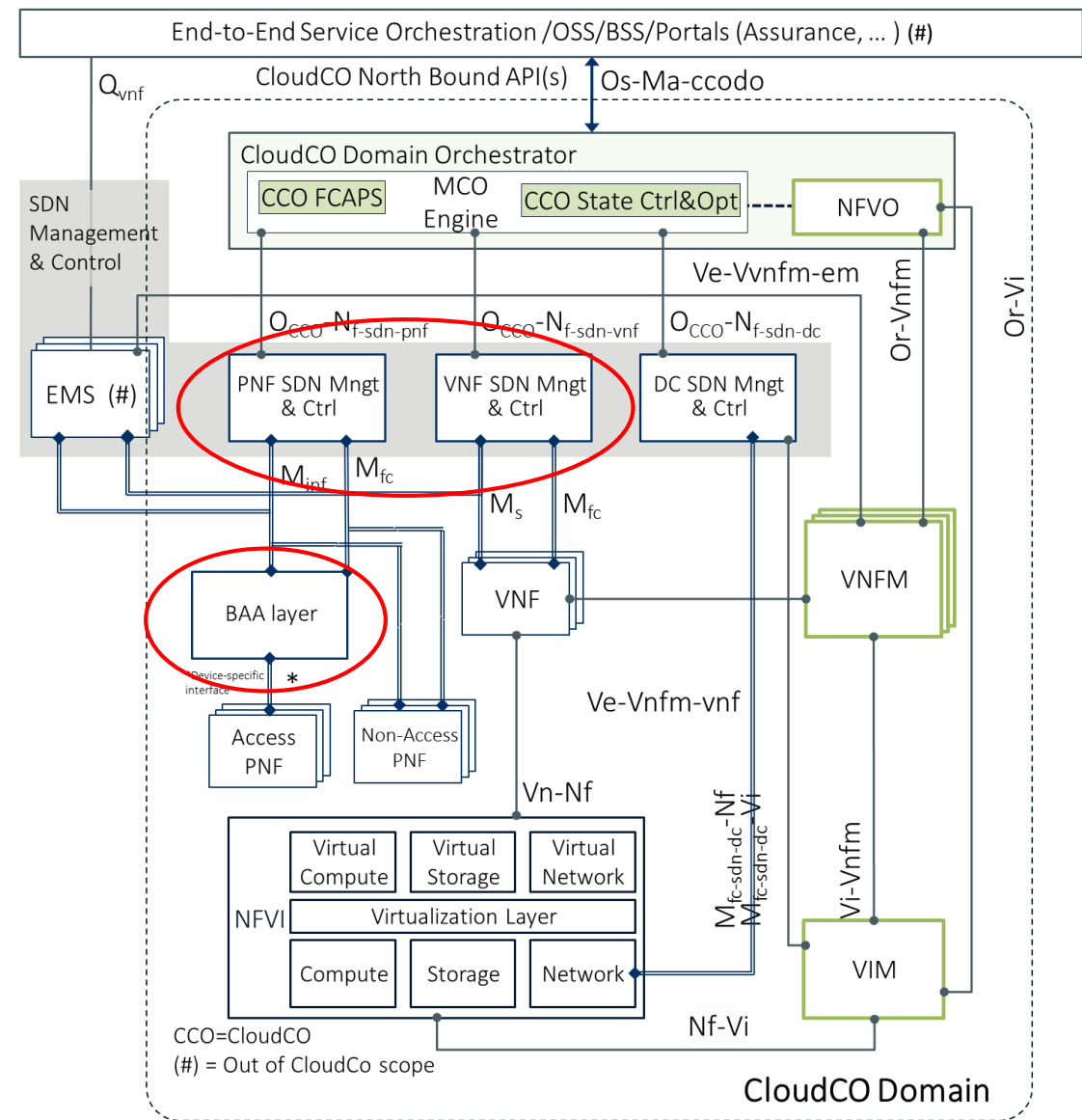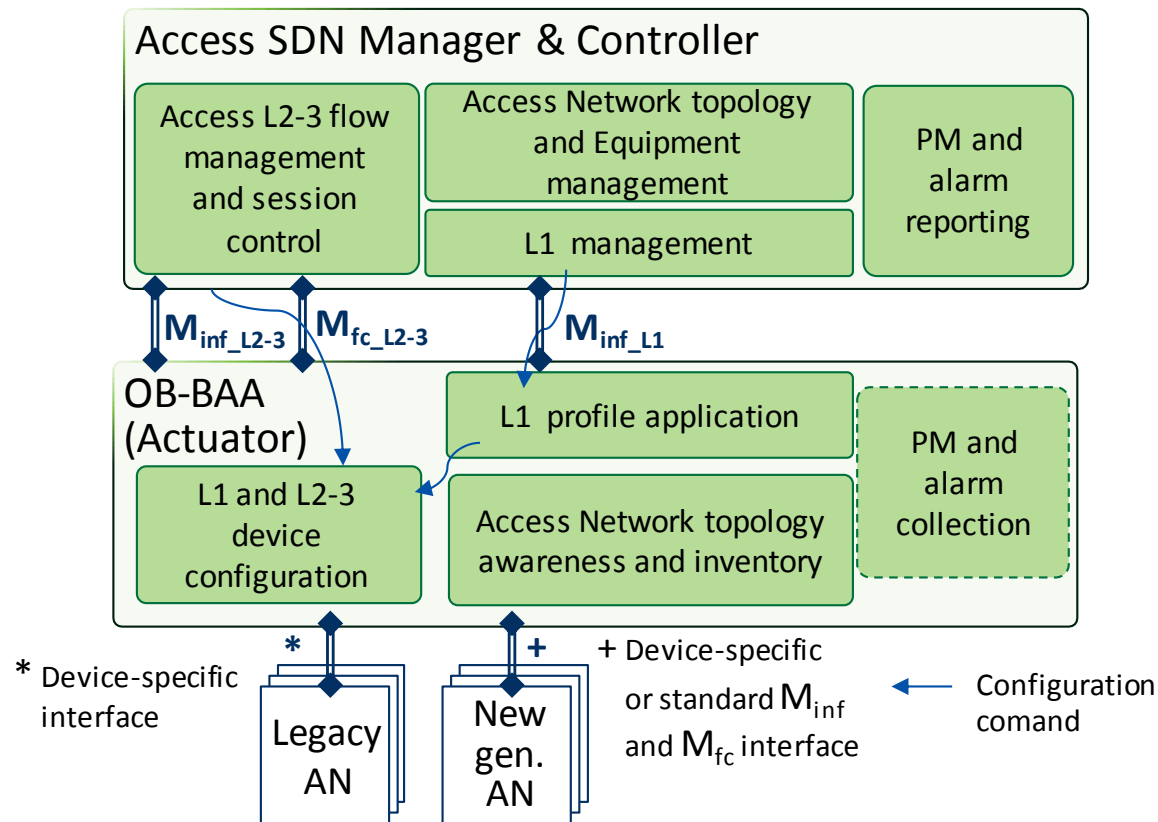
BAA layer realized in the BBF's CloudCO

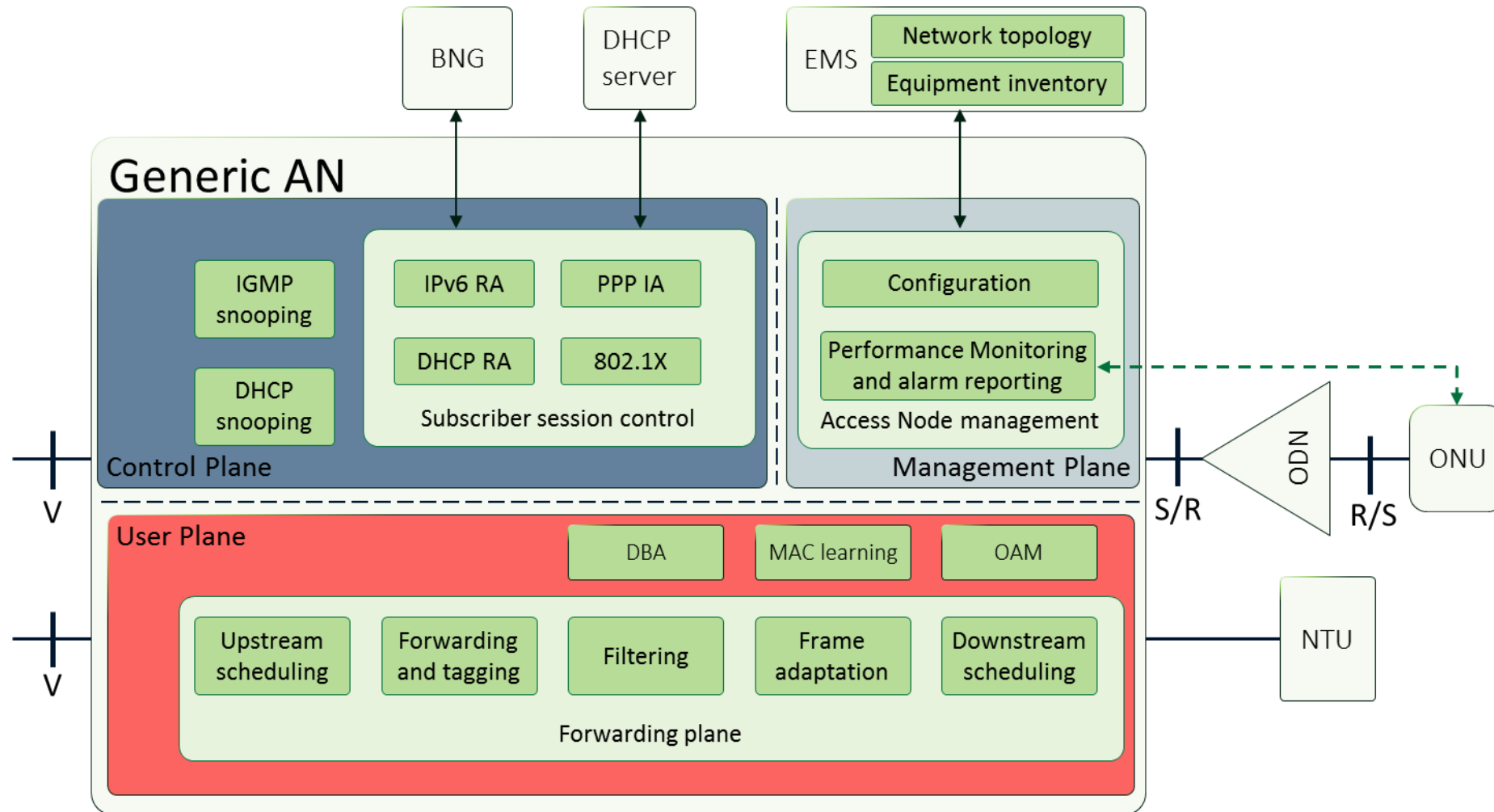What controls the interaction to the Access Nodes?
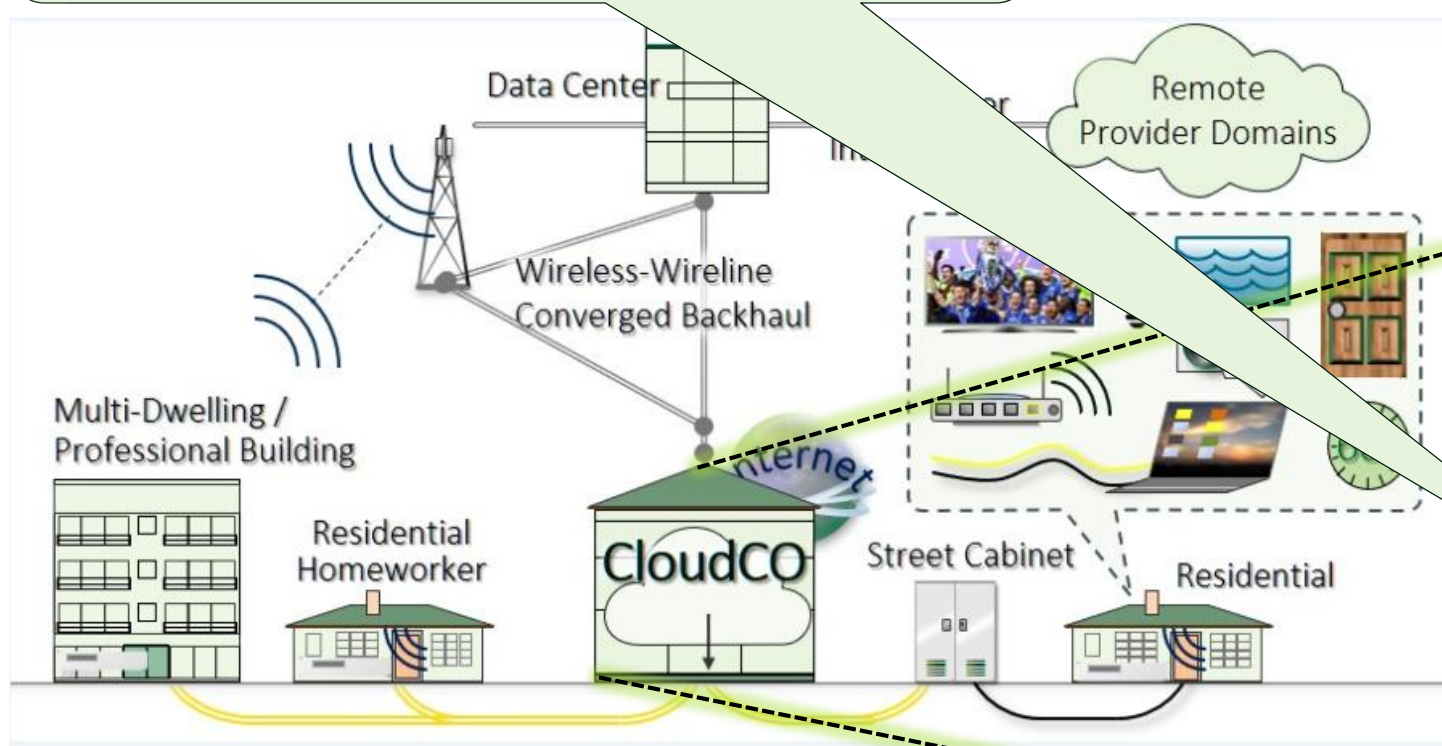
Virtual network functions (VNFs) deployed on generic computing infrastructure, interconnected by a generic switching fabric with Access and Edge Network Elements.
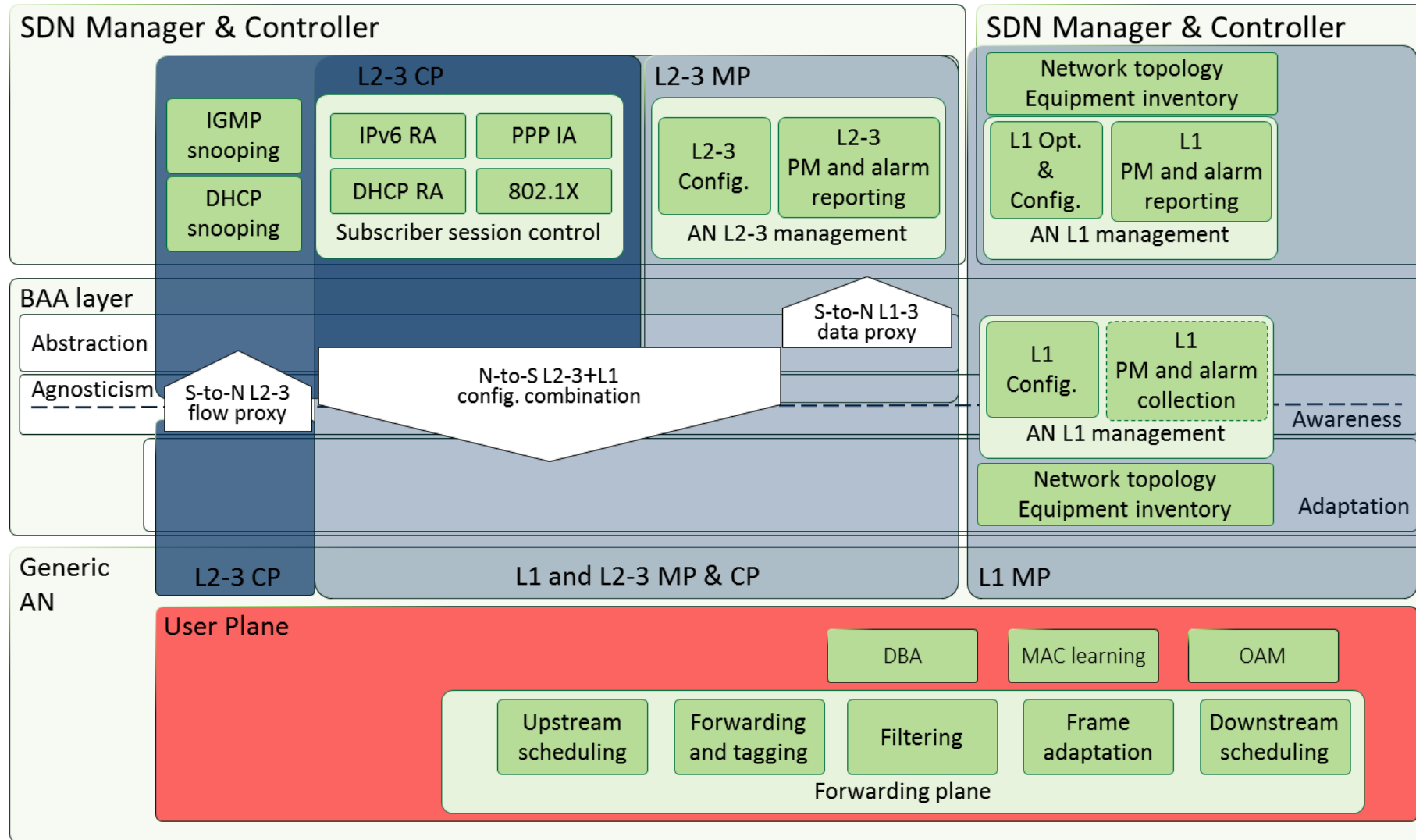
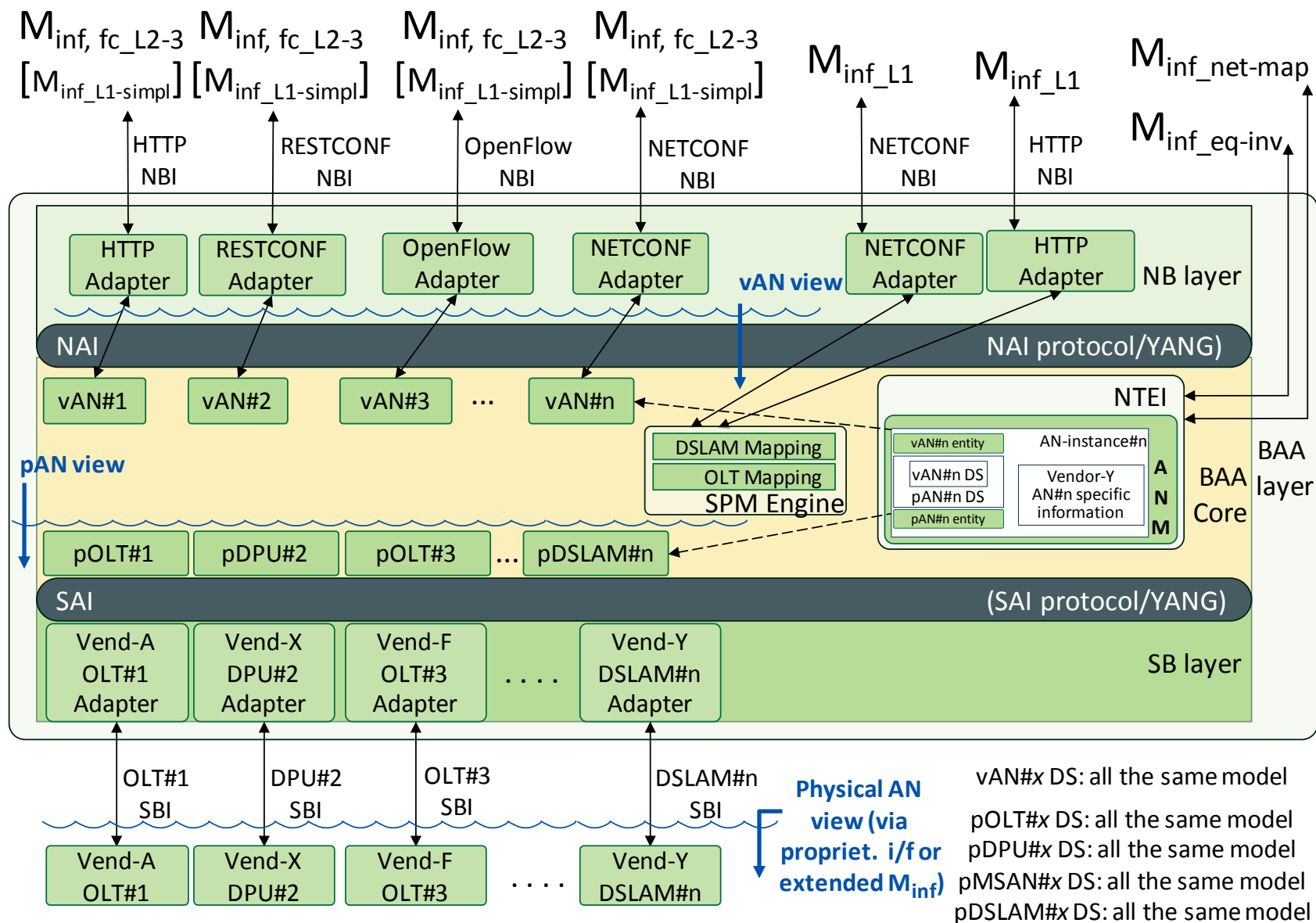# It's the combination of Access SDN Manager & Controller and BAA layer….

Access SDN Manager & Controller

- Access L2-3 flow management and session control
- Access Network topology and Equipment management
- L1 management
- PM and alarm reporting

M_{inf_L2-3} M_{fc_L2-3} M_{inf_L1}

OB-BAA (Actuator)

- L1 and L2-3 device configuration
- L1 profile application
- Access Network topology awareness and inventory
- PM and alarm collection

* Device-specific interface

\+ Device-specific or standard M_{inf} and M_{fc} interface

→ Configuration comand

Legacy AN

New gen. AN

End-to-End Service Orchestration /OSS/BSS/Portals (Assurance, …) (#)

Q_{vnf}

CloudCO North Bound API(s) Os-Ma-ccodo

CloudCO Domain Orchestrator

SDN Management & Control

CCO FCAPS   MCO Engine   CCO State Ctrl&Opt   NFVO

Ve-Vvnfm-em   Or-Vnfm   Or-Vi

EMS (#)

O_{CCO}-$N_{f-sdn-pnf}$ O_{CCO}-$N_{f-sdn-vnf}$ O_{CCO}-$N_{f-sdn-dc}$

PNF SDN Mngt & Ctrl   VNF SDN Mngt & Ctrl   DC SDN Mngt & Ctrl

M_{inf} M_{fc} M_s M_{fc}

BAA layer

VNF   VNFM

Device-specific interface *

Ve-Vnfm-vnf

Access PNF   Non-Access PNF

Vn-Nf

$M_{fc-sdn-dc}$-Nf $M_{fc-sdn-dc}$-Vi

Vi-Vnfm

NFVI

Virtual Compute	Virtual Storage	Virtual Network
Virtualization Layer		
Compute	Storage	Network

VIM

CCO=CloudCO
(#) = Out of CloudCo scope

Nf-Vi

CloudCO Domain

↔ Cloud CO Northbound API   •—• Orchestration – Management & Control Plane Interface   ◆—◆ Data – Management & Control Plane Interface

Functions Provided by Generic AN

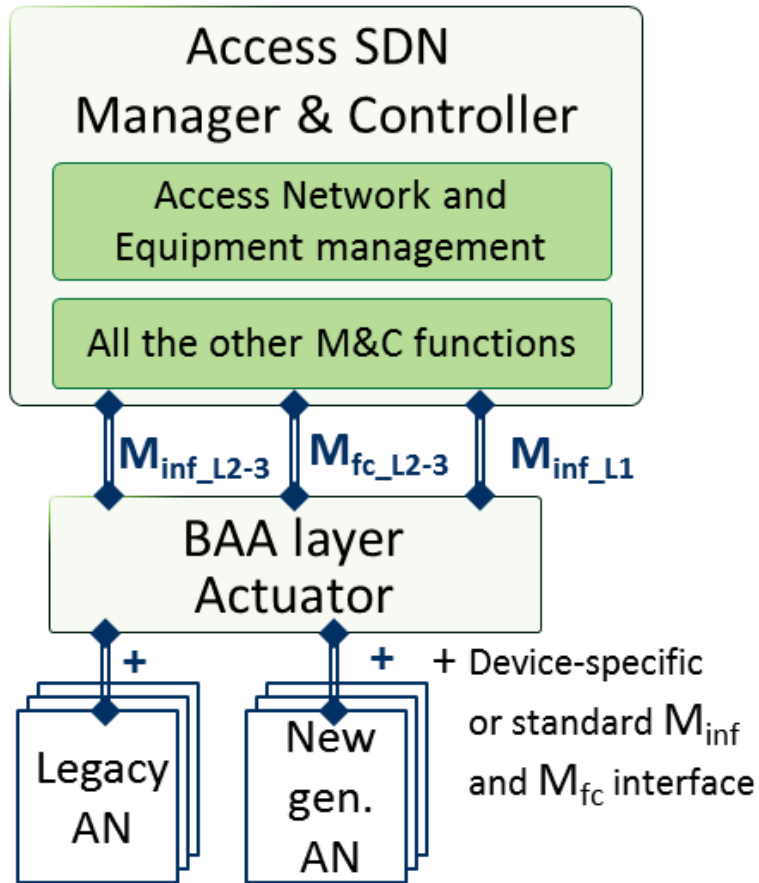# Functions Provided by the BAA layer

BAA layer Entities and Interfaces
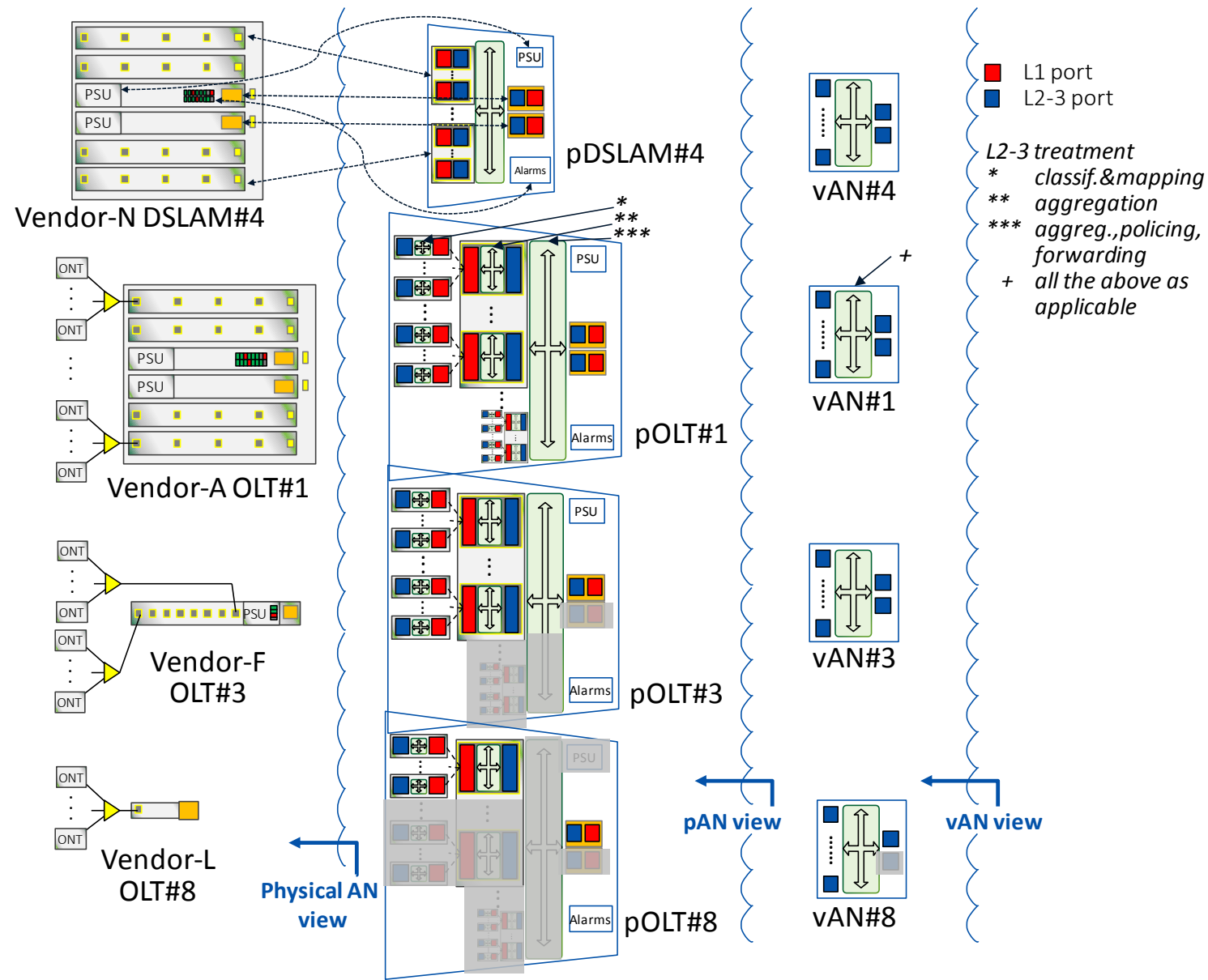
BAA layer Deployment Options
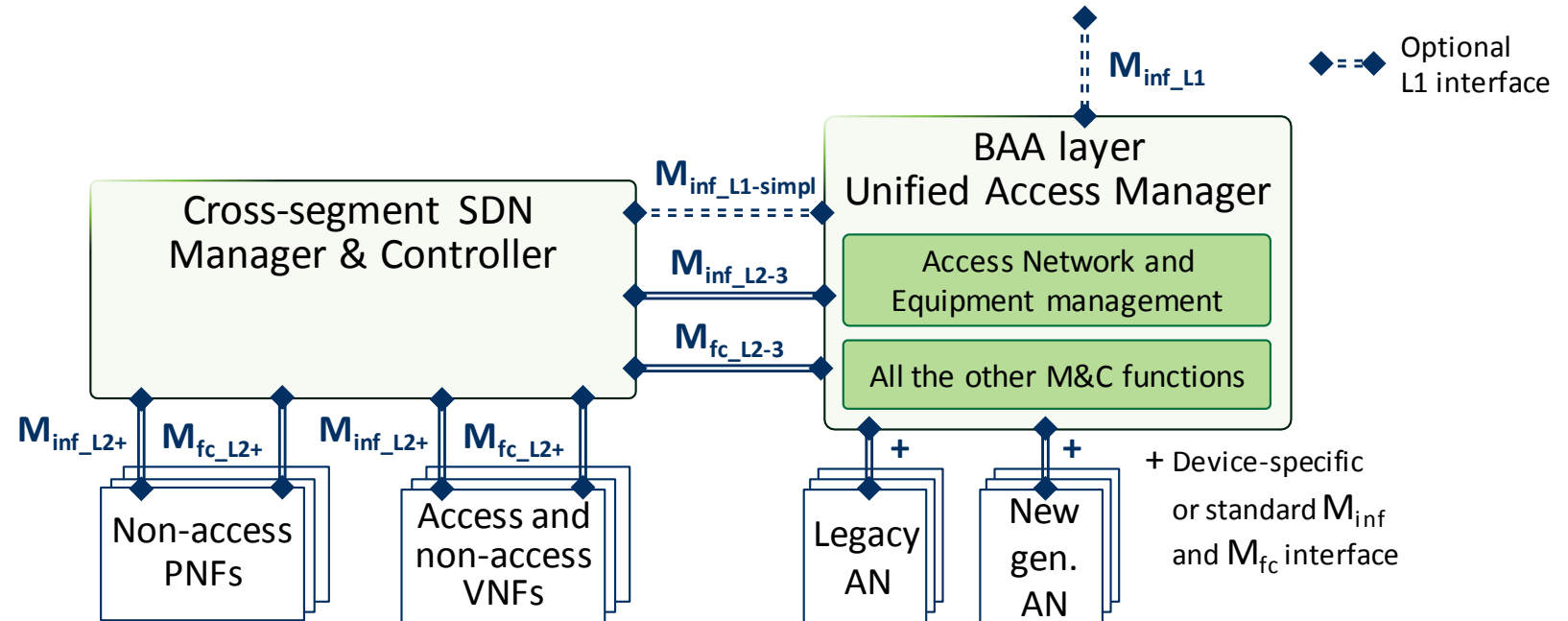
Developments in OB-BAA Project

- December 2017, the BAA project's CLA was agreed:
  - Uses the Apache 2.0 license for software (RANDZ)
  - Uses the BBF IPR for non-software artifacts (RAND)
- January 2018, the formal kick-off was held:
  - Nine (9) companies (3 Service Providers, 5 Vendors, 1 Test Lab) have joined the project as participants.
- March 2018, completed the system description and software architecture
  - Determined 1st release scope – July 2018
  - Generated stories for development
  - Started work on the 1st of 3 sprints toward that release

OB-BAA Release 1.0 Features

- **Core Framework**

- **Functionality**

  - pAN Actuator with PMA
  - Control plane relay
    - Subscriber management
    - PNF Addressing
  - Alarm relay

- **Plugins and Profiles**

  - NETCONF SBI/NBI (pDPU)

- **CI/CD**

  - Device simulator (pDPU)
  - Docker-based BAA Core and Plugins

Thank You!