



# ACCESS 4.0

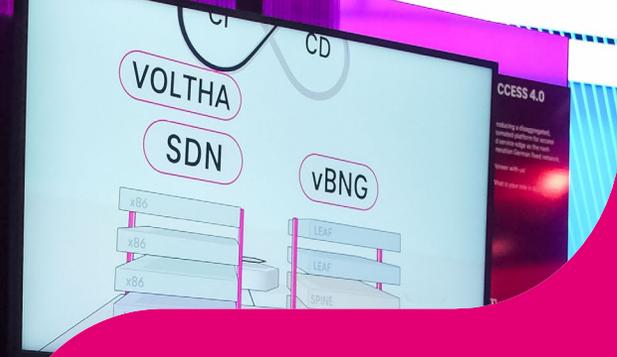
designed for change

## Access 4.0 & VOLTHA

**Network leadership by disaggregation -  
Leveraging Open-Source Software and Hardware Innovations**

Fabian Schneider, Manuel Paul et al. | May 2022





# Access 4.0 Update

Fabian Schneider,  
Head of Access 4.0 Development & Engineering

# Why: Key Challenges in Fixed Access



Monolithic solution with vendor lock



Feature introduction-time of years



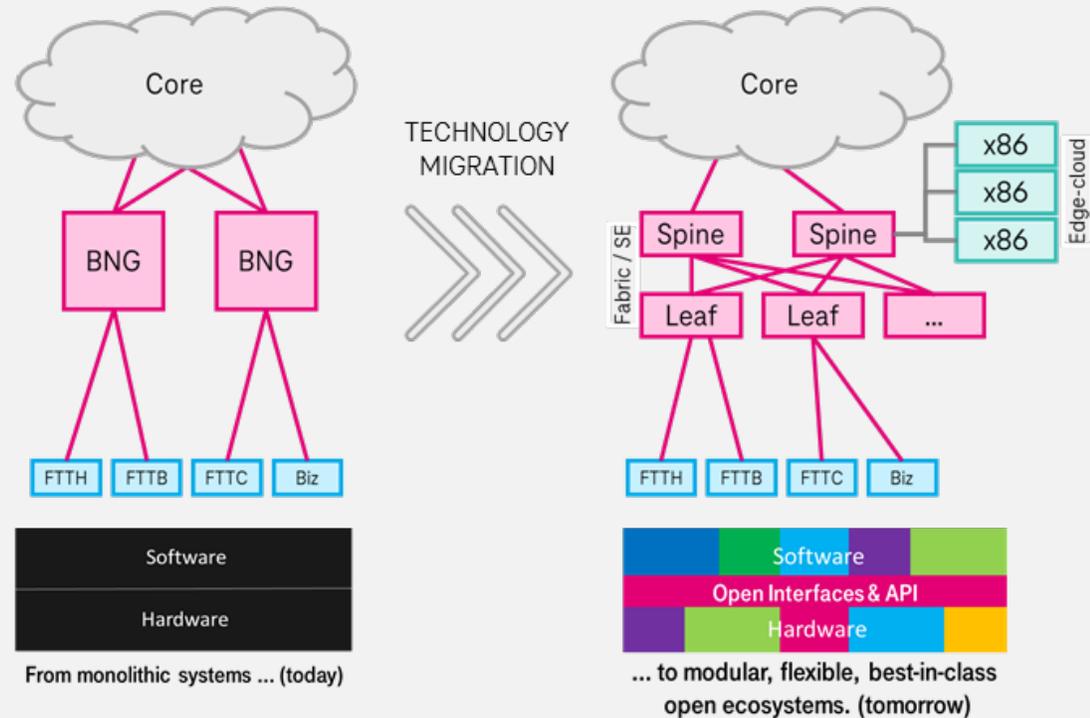
Fixed cost scale with further rollout



Intense mega lifecycles

# Access 4.0 in a nutshell

## What's it all about?



~25 mio customers – 900 locations – ~1 billion euros spent in 10 years

***“A4 aims to be the next generation of access, aggregation and service edge between customer and core in DT’s fixed network in Germany.”***



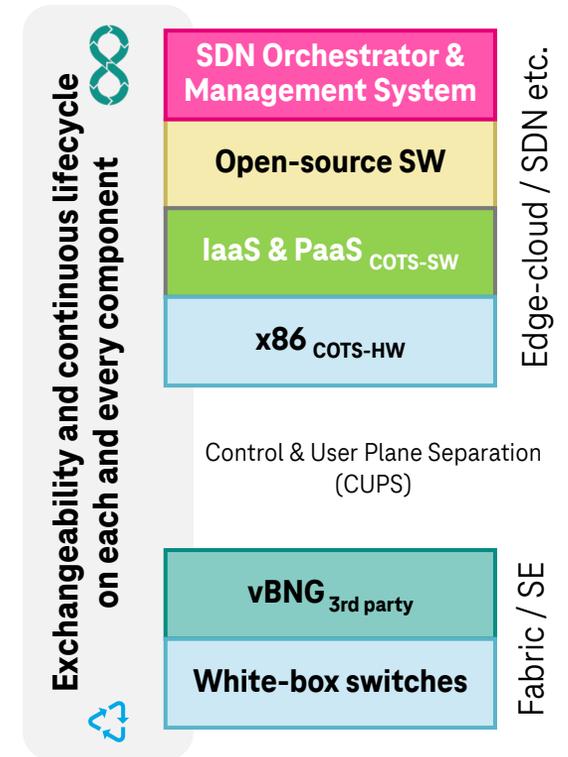
# A4 || designed for change

disaggregation principles in DT

- 1. Separation of Control & User Plane**  
Management and control plane are separated from the user plane.
- 2. Separation of hardware and software**  
Hardware is separated from the software and even cut in pieces.
- 3. Cloud-native microservices**  
Management and control plane software is microservice-based.

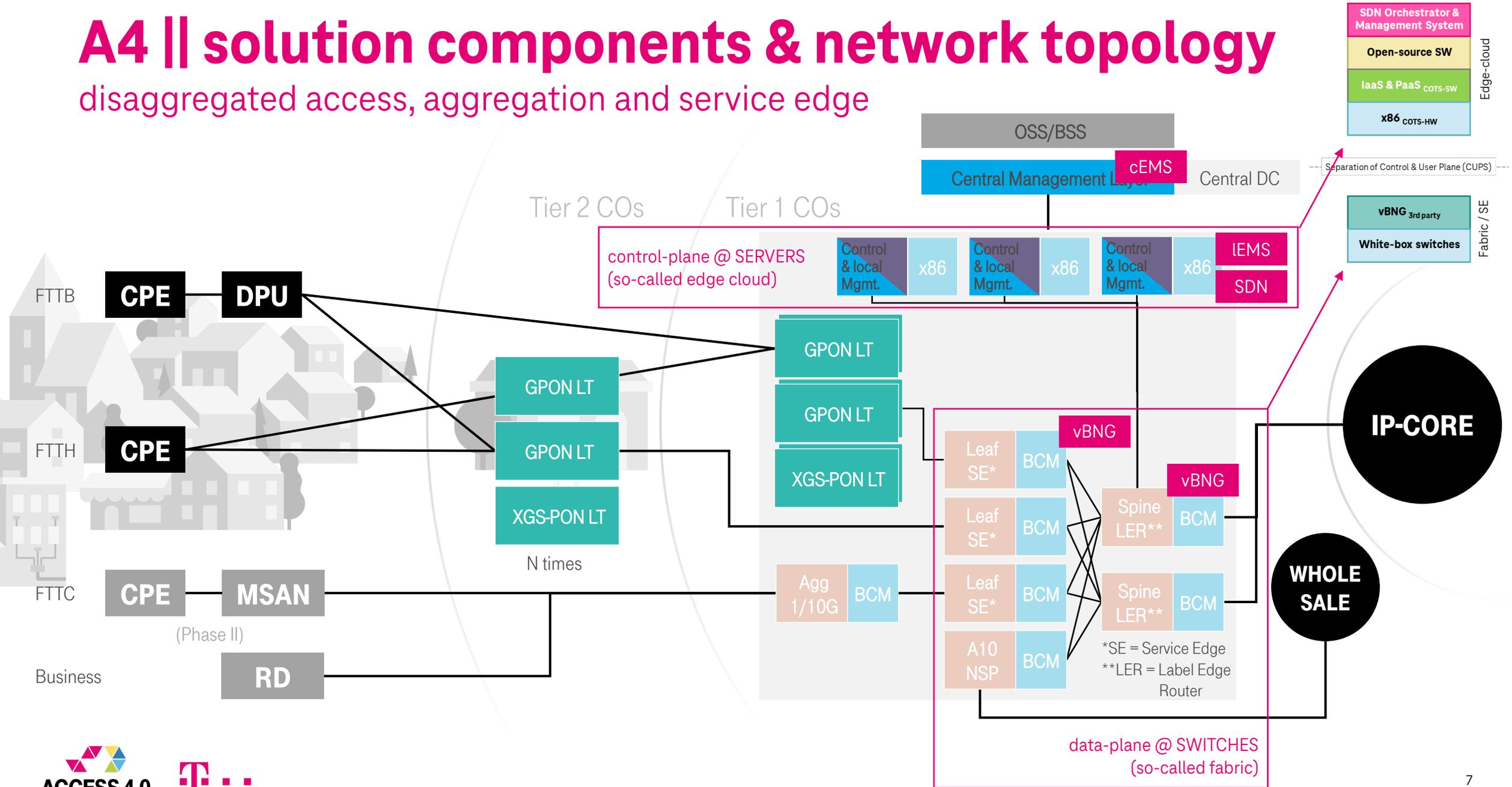


*This results into highest transparency and flexibility ...  
... as well as allows for agile DevOps.*



# A4 || solution components & network topology

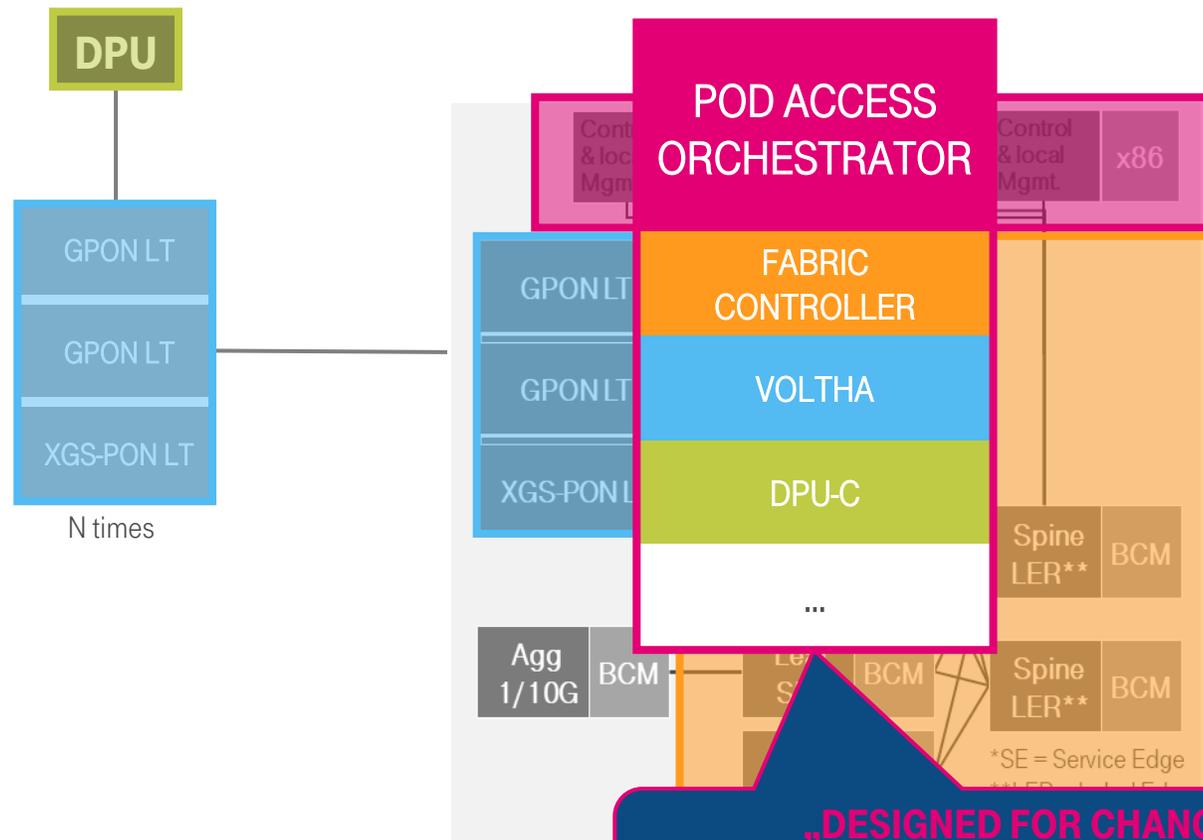
disaggregated access, aggregation and service edge



# A4 || POD access orchestrator (PAO)

serves as control plane centerpiece which controls all network components

- POD is **self-contained**; all control components physically run on the local PODs
- Technology-knowledge taken out of OSS-IT and "down" to POD  
→ i.e. we pull them in the network domain (=complete OSS-IT/NT process abstraction)
- "Ability to easily change / extend" is a design paradigm; additional components are integrated always with a dedicated POD-local control component



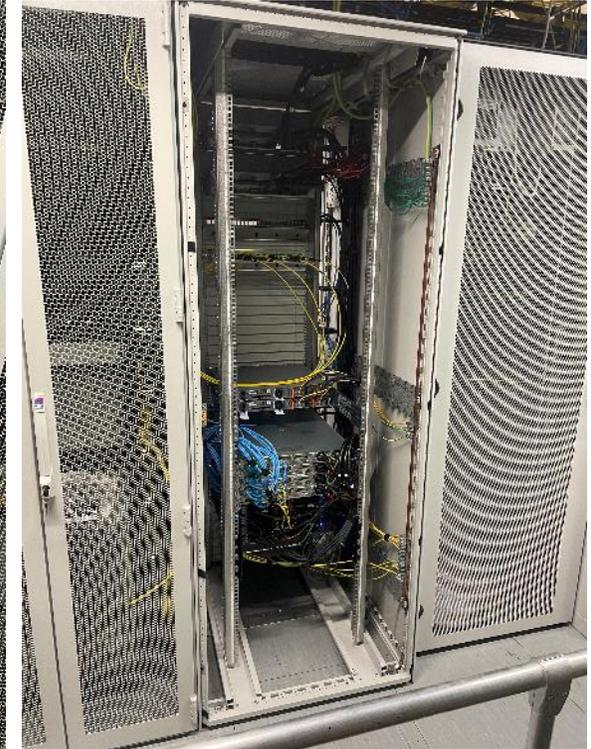
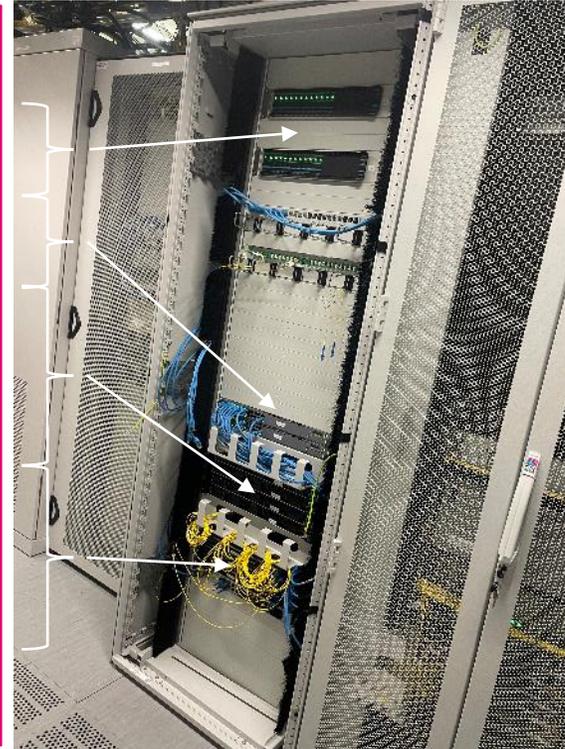
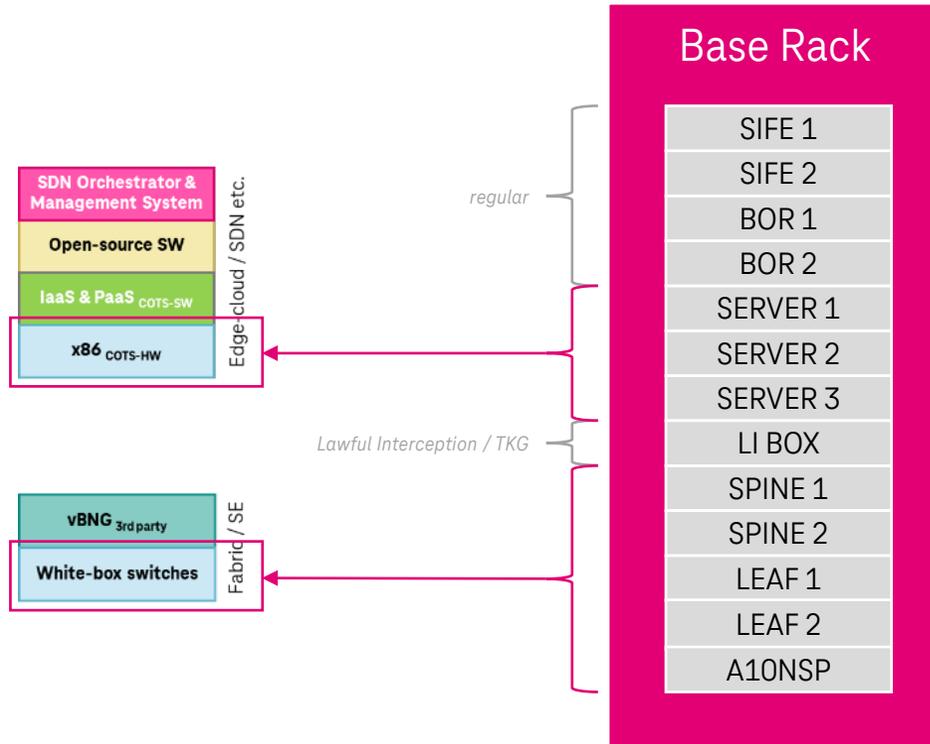
# A4 || virtual POD site visit in Bonn

base configuration in one rack – scaling of access devices results in further racks

“Wirkbetriebsvalidierung” in Bonn

front

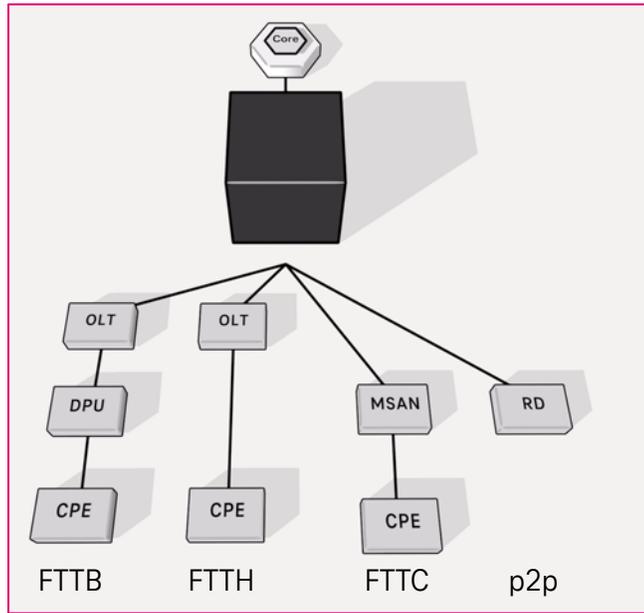
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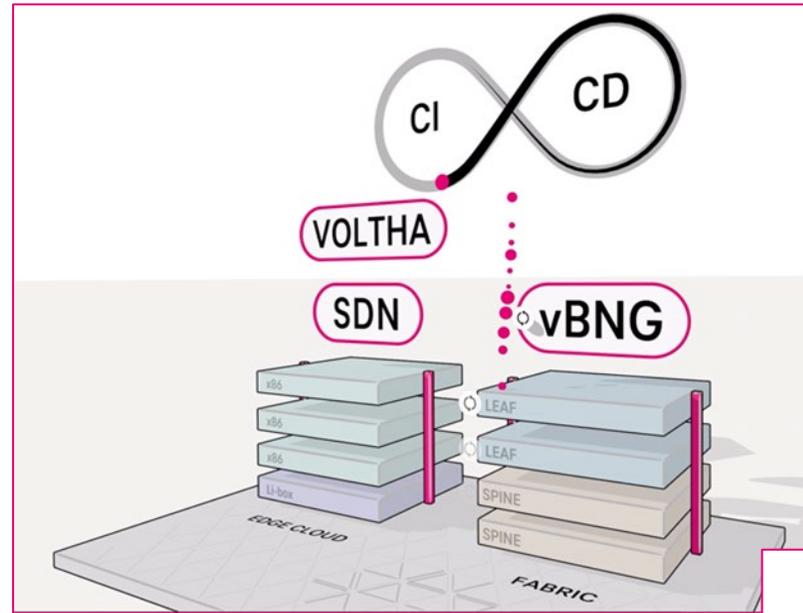
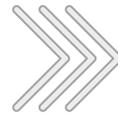
# A4 update || Summary

## TODAY

2.200 and increasing black boxes at 900 locations



TECHNOLOGY MIGRATION  
Replacing the monolithic box



## TOMORROW

900 PODs at 900 locations (1 each)

A4 has a scalable architecture for both hardware and software and full redundancy on each level.

### CONTROL-PLANE

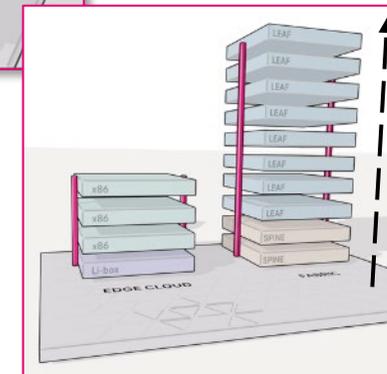
It comes with a software-defined network running on a local edge cloud with standard x86 hardware.

### USER-PLANE

The virtual BNG resides on a spine-leaf fabric which is made of white-box switches.

And even the OLT will be softwarized.

All software is developed in an agile framework under hyper-collaboration with relevant partners.



[MWC animation video](#)



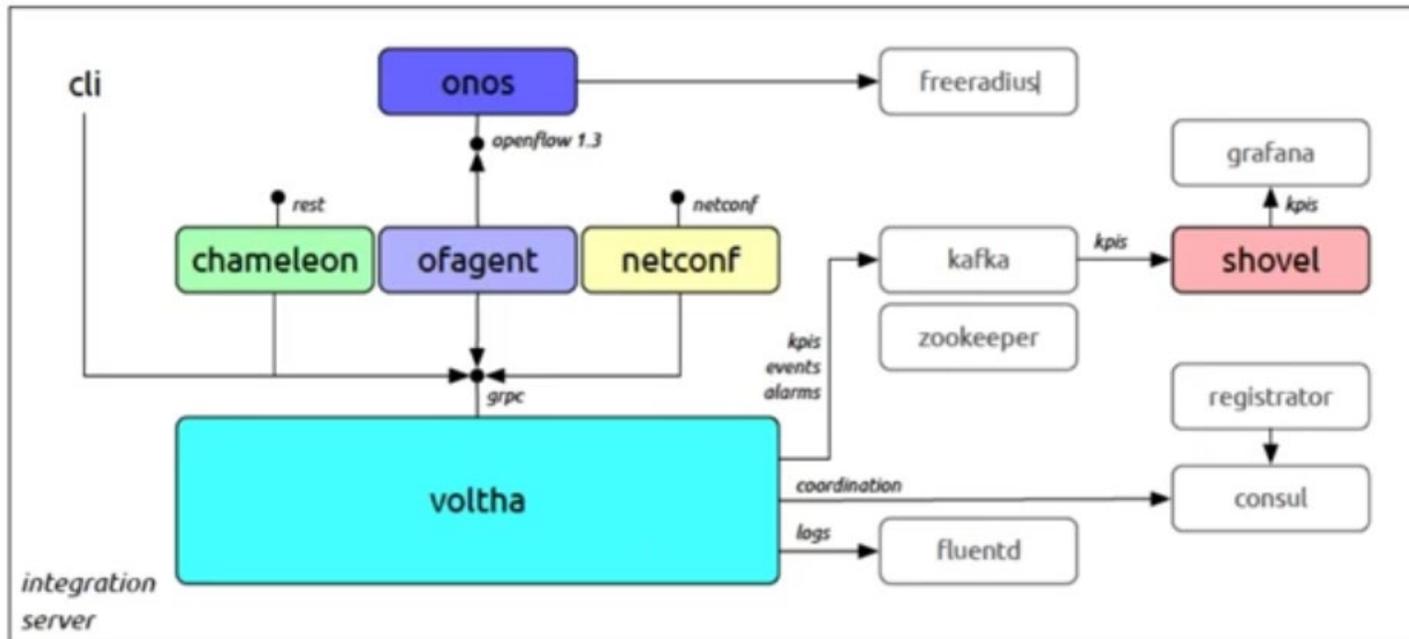
[MWC fact sheet](#)



# The A4 VOLTHA PON Controller

Manuel Paul  
Access4.0 VOLTHA Team Product Owner

# VOLTHA's Roots: Operators' Quest for Open, Disaggregated, Cloud-ready Telco Implementations



- Modern Micro-Service Architecture and APIs
- SDN Abstraction & Programmability
- Built leveraging Open Source tools and components
- Scalable
- Extensible

➤ **Cloud Software || Telco Functions**

# DT Access4.0's „Access Workflow“ and Requirements

## - Contributed and Openly Implemented



### Contributed to ONF

implemented in SEBA2.0 / VOLTHA2.2  
continuously extended in VOL2.x



### Contributed to BBF

”SDN-based FTTx Access  
with Full Automation”

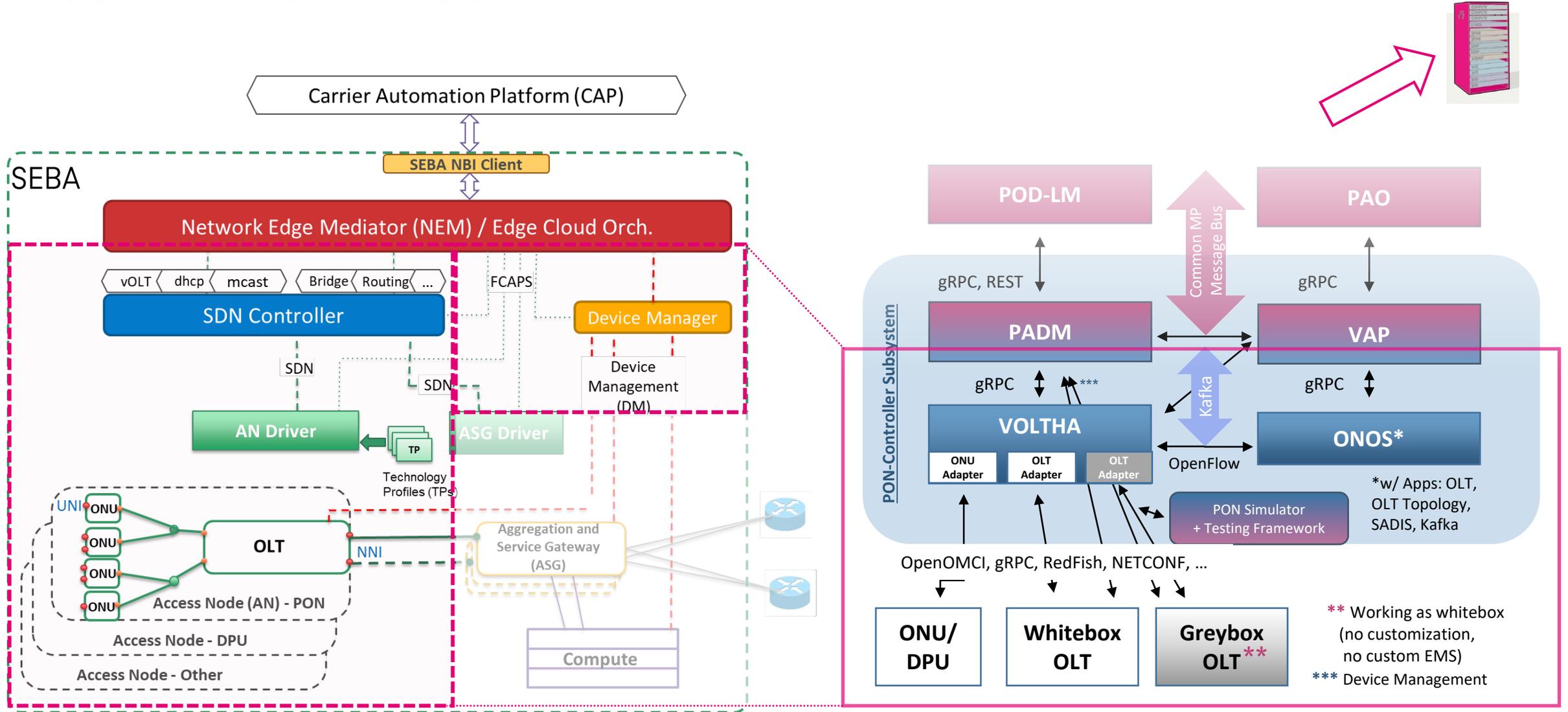


### **Goal: An Open Multi-Vendor Access Network**

- OpenOLT - not just some virtualized OLT functions, but a comprehensive common hardware resource abstraction
- OpenONU - true multi-vendor PON system interoperability (including ONUs) via OpenOMCI
- ✓ Addressed by BBF Specifications and ONF SEBA Reference Design Blueprint
- ✓ **Implemented with VOLTHA in Open Source - continuously extended, improved and tested upstream**

# ACCESS4.0'S PON-CONTROLLER

ACCESS 4.0



Note: DT's Access4.0 POD Architecture comprises more components (e.g. ASG/BNG) – this slide scopes on PON system components

# A4 PON-C & VOLTHA

**VOLTHA resulted from operators' need for an open software implementation supporting disaggregation and programmability**

**Key Success Factor: an Operator-driven Open-Source Framework**

- Suppliers can easily and rapidly integrate upstream and validate
- Allows to take, plug-in and run any compliant hardware

**This has been perfect fit for DT Access4.0's PON-Controller**

**THANK YOU**