PROGRAM ACCESS 4.0

Thomas Haag (Lead Architect)

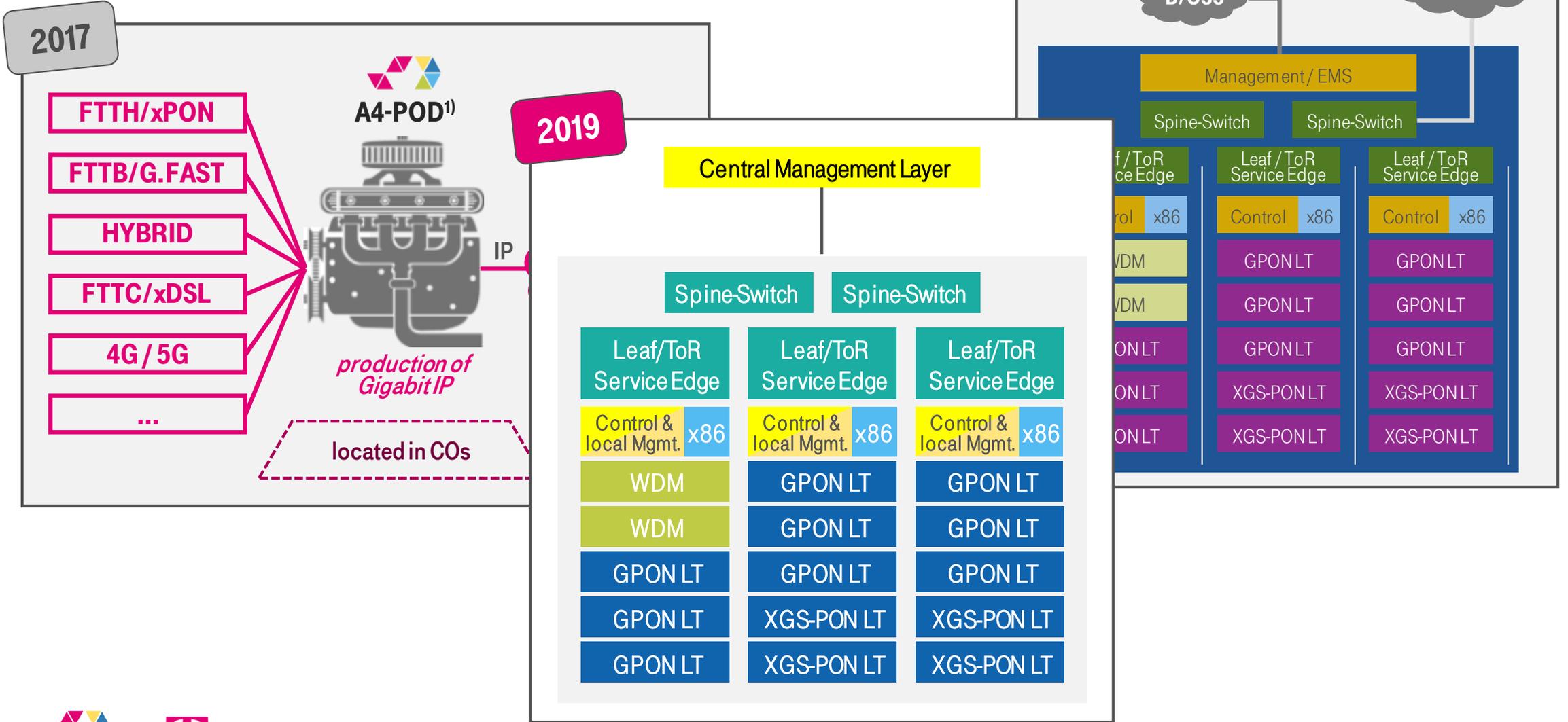Hans-Jörg Kolbe (Head of SSQ Access4.0)

Robert Soukup (Head of Program)

LIFE IS FOR SHARING.

RECAP – WHAT IS ACCESS4.0?

2017

- FTTH/xPON
- FTTB/G.FAST
- HYBRID
- FTTC/xDSL
- 4G / 5G
- ...

A4-POD[1)]

IP

production of Gigabit IP

located in COs

2019

Central Management Layer

Spine-Switch	Spine-Switch

Leaf/ToR Service Edge	Leaf/ToR Service Edge	Leaf/ToR Service Edge
Control & local Mgmt. x86	Control & local Mgmt. x86	Control & local Mgmt. x86
WDM	GPON LT	GPON LT
WDM	GPON LT	GPON LT
GPON LT	GPON LT	GPON LT
GPON LT	XGS-PON LT	XGS-PON LT
GPON LT	XGS-PON LT	XGS-PON LT

2018

B/OSS   BACKBONE

Management / EMS

Spine-Switch	Spine-Switch

Leaf / ToR Service Edge	Leaf / ToR Service Edge	Leaf / ToR Service Edge
Control x86	Control x86	Control x86
WDM	GPON LT	GPON LT
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PON LT	XGS-PON LT	XGS-PON LT

RECAP – WHAT DO WE WANT TO ACHIEVE?

> **WE DEVELOP A COST-EFFICIENT, LEAN-TO-OPERATE AND SCALABLE ACCESS PLATFORM TO DELIVER GIGABIT PRODUCTS.**

WIN WITH (THE RIGHT) PARTNERS

- **Business logic** remains with DT
- **Independence** of single supplier's specifics
- True **DevOps** processes

REDUCE TIME-TO-MARKET

- **One change per day** (CI/CD)
- **Open source / ecosystem** to foster innovation

INCREASE AUTOMATION

- **Decouple** network scale and necessary effort
- **Increased quality** by improved testing (scope, scale)

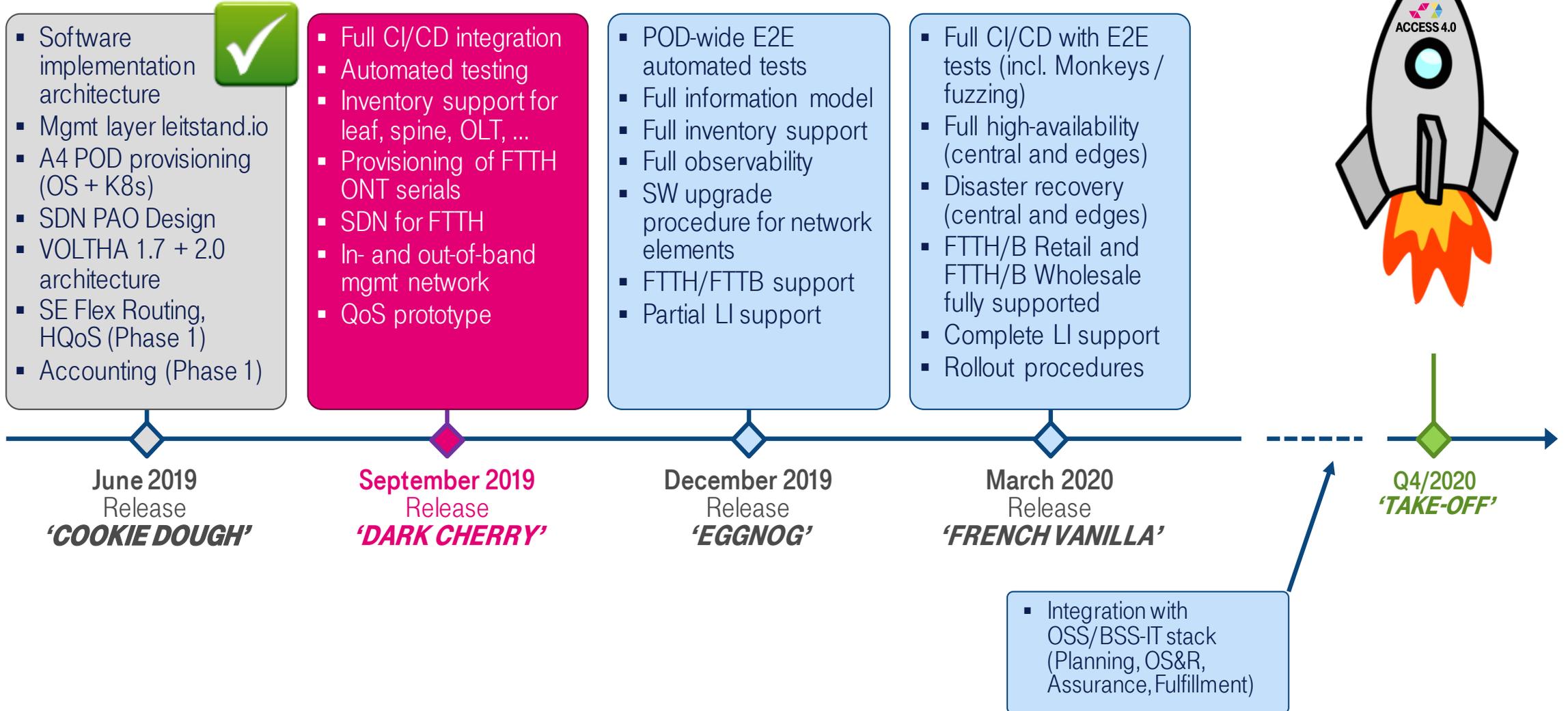## ENSURE BOTTOM-UP PRICING / ALLOW FOR D2C

- Enable **design-to-cost**
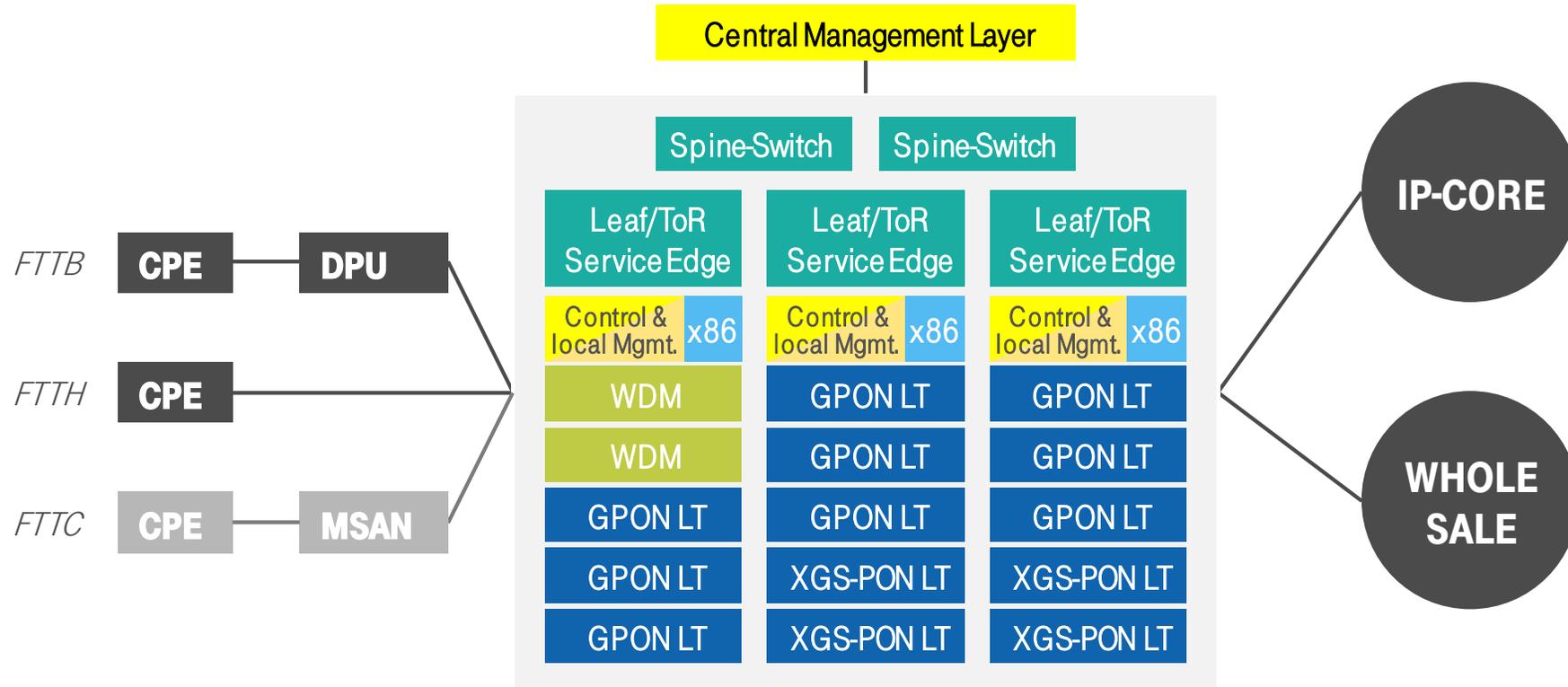- **Open source** as benchmark

ALL POWERED BY EDGE CLOUD AND READINESS FOR 5G

- **CUPs enabled** to cope with data scale
- **Edge service** at lowest possible costs

ACCESS4.0 – CURRENT SCHEDULE

- Software implementation architecture
- Mgmt layer leitstand.io
- A4 POD provisioning (OS + K8s)
- SDN PAO Design
- VOLTHA 1.7 + 2.0 architecture
- SE Flex Routing, HQoS (Phase 1)
- Accounting (Phase 1)

- Full CI/CD integration
- Automated testing
- Inventory support for leaf, spine, OLT, ...
- Provisioning of FTTH ONT serials
- SDN for FTTH
- In- and out-of-band mgmt network
- QoS prototype

- POD-wide E2E automated tests
- Full information model
- Full inventory support
- Full observability
- SW upgrade procedure for network elements
- FTTH/FTTB support
- Partial LI support

- Full CI/CD with E2E tests (incl. Monkeys / fuzzing)
- Full high-availability (central and edges)
- Disaster recovery (central and edges)
- FTTH/B Retail and FTTH/B Wholesale fully supported
- Complete LI support
- Rollout procedures

June 2019
Release
'COOKIE DOUGH'

September 2019
Release
'DARK CHERRY'

December 2019
Release
'EGGNOG'

March 2020
Release
'FRENCH VANILLA'

Q4/2020
'TAKE-OFF'

- Integration with OSS/BSS-IT stack (Planning, OS&R, Assurance, Fulfillment)

ACCESS 4.0

LIFE IS FOR SHARING.

ACCESS4.0 IS A MINI DATA CENTER AT THE NETWORK EDGE
(AKA DT'S SEBA INCARNATION)

FTTB — **CPE** — **DPU**

FTTH — **CPE**

FTTC — **CPE** — **MSAN**

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GPON LT	XGS-PON LT	XGS-PON LT

IP-CORE

WHOLE SALE
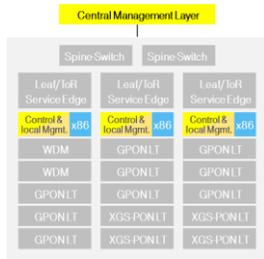
✓ **MERCHANT SILICON BARE METAL**

✓ **HW / SW SPLIT (CUPS, …)**

✓ **COMMUNITY & OPEN SOURCE**

✓ **HORIZONTALLY & VERTICALLY SCALABLE**

... BUT WHAT'S INSIDE? **CENTRALIZED MANAGEMENT**

| DT OSS/BSS | Other Systems (future) | Staff (Ops, Plan) |

NEMO

| OSS/IT Adapter | NEMO GUI / CLI |

EMS (Leitstand.io) API

EMS (Leitstand.io) back-end

A4 EMS

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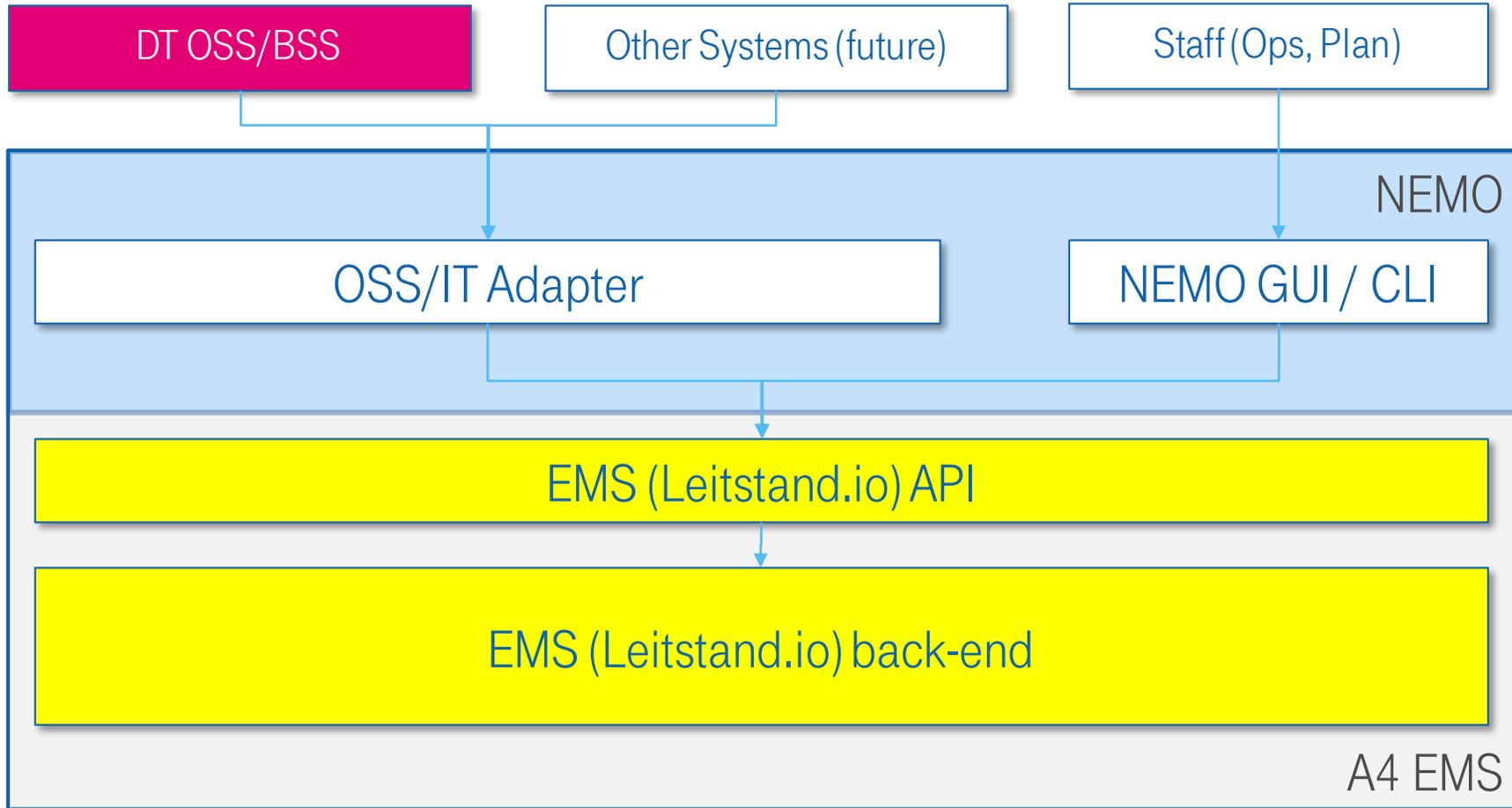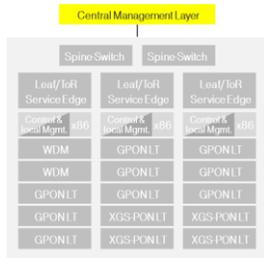
... BUT WHAT'S INSIDE? **COMPONENTS & INTERFACES**

A4 EMS – Central Instance

LCM API

Kong Ingress

A4 POD API

Logging sidecar

Metrics sidecar

A4 POD actor

A4 POD actors (many)

A4 POD message broker

Logging sidecar

Metrics sidecar

Service Control

LI BOX

FABRIC

Service Edge

A10NSP

SDN Control

SDN control containers (PAO)

PFS proxy

LI Proxy

Fabric proxy

Service Edge proxy

A10NSP proxy

Metrics sidecar

Logging sidecar

VOLTHA

VOLTHA containers

VOLTHA Access Proxy

Logging sidecar

Metrics sidecar

OLT

Start with VOLTHA but designed highly modular for any access (e.g. WTTH)

Logging collector, processor, and forwarder (Fluent Bit)

LIFE IS FOR SHARING.

ACCESS4.0 IS TECHNOLOGY BUT ALSO ABOUT CHANGE – SOME LESSONS FROM AN INCUMBENT NETWORK PROVIDER ☺

1 Working agile (e.g. according to Scrum) is pretty rigid (meeting cycle, roles, ...). 2-week sprints are tough – especially for those, who are in touch with non-agile units → **it's all worth the effort; we get real results quickly.**

2 Software Implementation Architecture, code guidelines, requirements documentation etc. are project guidelines → **be bold & strict!**

3 Code developed varies in quality → **have empowered code maintainers in-house**

6 Transformation requires the right partners → **be strictly picky about the right one; rather postpone milestones**

4 You can teach a network person IT, but becoming a software engineer is a different thing → **establish a nucleus of true IT people**

5 Scrum, SAFe, Nexus, ... require new roles, processes etc. → **Benefit from coaches to help you to communicate and practice over and over ...**

ACCESS 4.0

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A4 PARTNER ECOSYSTEM FOR THE MVP FTTH/B
JUST THE BEGINNING
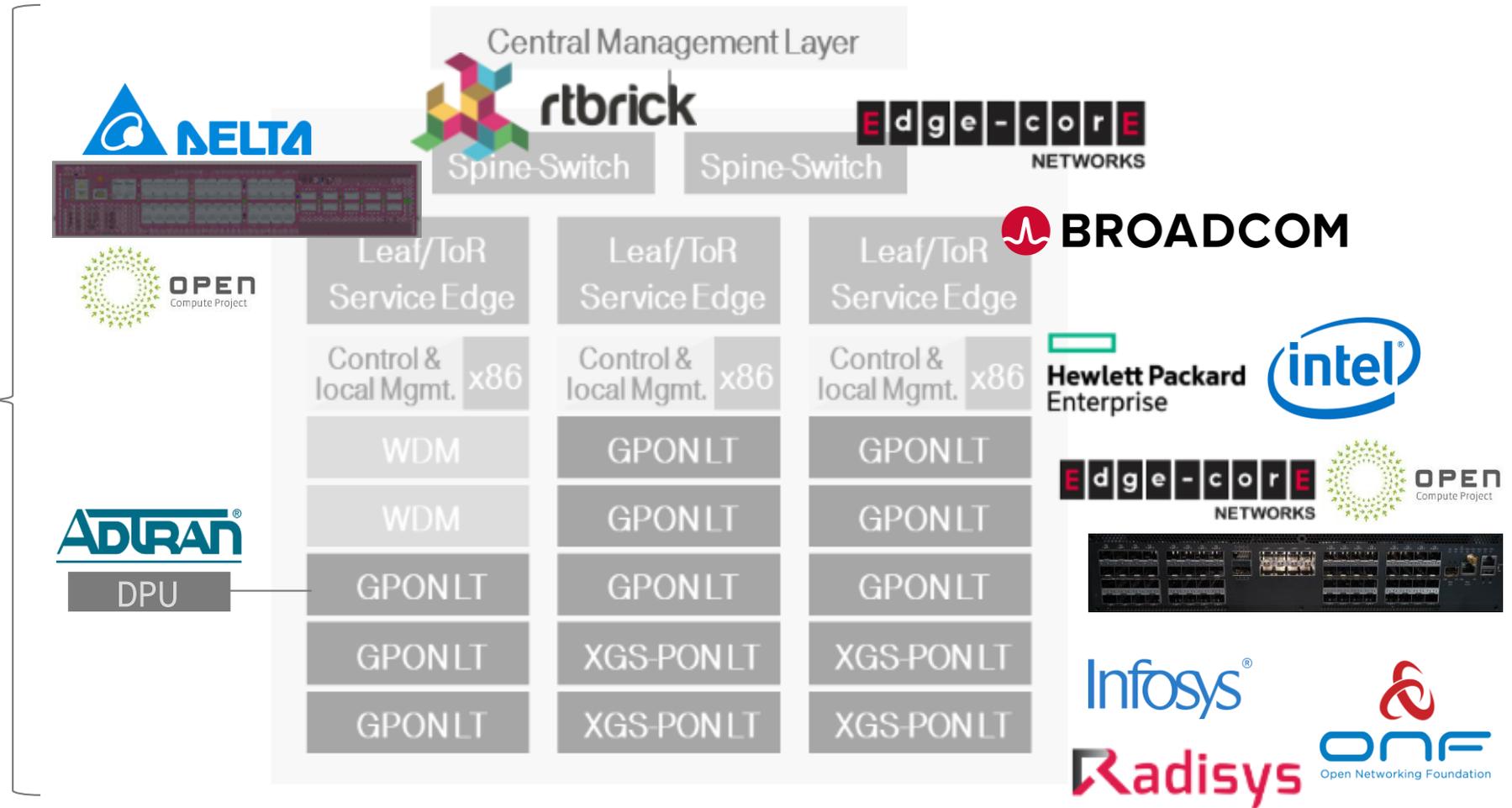
DEUTSCHE TELEKOM @ ONF CONNECT 2019
DEEP DIVES ON ACCESS4.0 AND MUCH MORE

FRI — Jochen Appel, **10:00AM**
KEYNOTE: ACCESS NETWORK TRANSFORMATION

WED — Dr. Hans-Joerg Kolbe, **11:00AM**
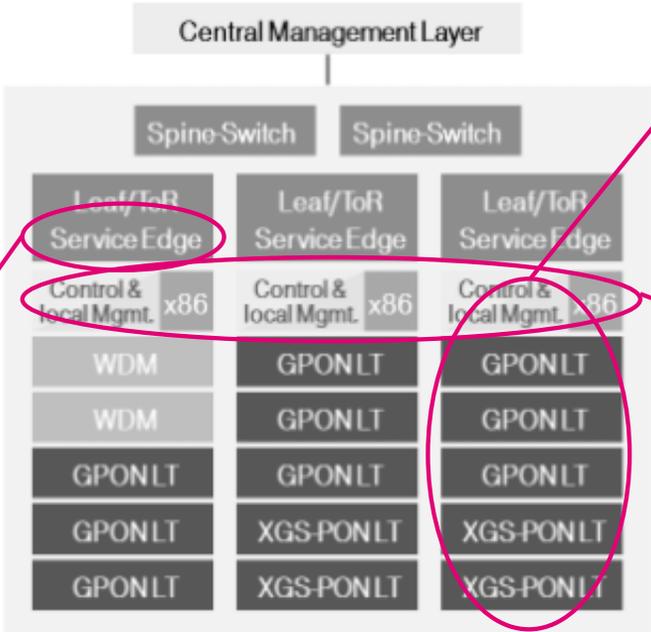**INSIDE VIEW INTO OPERATOR BUSINESS CASES**

Whitepaper

WED — Manuel Paul, **4:30PM**
COMAC AND OMEC AT DT

WED — Bjoern Nagel, **2:15PM**
VOLTHA ROADMAP

THU — Dr. Hans-Joerg Kolbe, **2:30PM**
IMPLEMENTING THE PROGRAMMABLE SERVICE EDGE

THU — Dr. Fabian Schneider, **5:30PM**
SEBA REALITY CHECK! HOW TO TAKE THE DESIGN TO THE NEXT LEVEL?

THU — Robert Soukup, **4:30PM**
ACCESS4.0 PROGRAM UPDATE

FRI — Manuel Paul, **11:55AM**
PANEL: TECHNICAL LEADERSHIP TEAM (TLT)

WED — Michal Sewera, **5:30PM**
OPEN SOURCE EPC

WED — Michal Sewera, **11:45AM**
5G AND OPEN SOURCE

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GPON LT   XGS-PON LT   XGS-PON LT

ERLEBEN, WAS VERBINDET.

10

BACKUP

ACCESS 4.0

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