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Enabling OCP GPON Optical Line Terminals (OLT) using DmOS

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Agenda

1. Open Networking: from datacenters to metropolitan areas

Open Hardware Platforms

Open Source Software Projects

2. xPON Access Devices

Introduction & Complexities

OCP Platforms with no available NOS

SEBA/VOLTHA current status – 2.x release

3. DmOS: disaggregated NOS for PON applications

Evolution and collaboration with ONF projects



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Disclaimer

ONF's team is doing a great job!

There is no criticism on its value proposition and roadmap, just the general feeling that there is a lot of ground to be covered until it achieves the necessary level of completeness and robustness for large scale field deployment.



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Open Networking meets MAN



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Open Networking was born in the Datacenter core, but it is naturally expanding to other areas in the networking space, notably Metropolitan-area Ethernet networks. MAN Networks are commonly split in the following domains:

- Access
- Aggregation/Distribution
- Transport
- Core



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Disaggregating the Metro Ethernet



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There is a number of Open Source projects working in the direction of disaggregating the infrastructure and building a hardware agnostic platform:

Broadband PON: ONF SEBA, VOLTHA

Radio Access Networks: O-RAN Alliance, TIP – OpenRAN

Transport Networks: TIP – OOPT, CANDI, ONF - ODTN



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Open HW Designs for Metro Ethernet



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Transport:



TELECOM INFRA
PROJECT



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Cassini – Open Packet Transponder

Voyager – Open Packet Optical Switch

Odyssey – Disaggregated Cell Site Gateways

Open Cell Site Router – Edgecore AS7316-26X

PON Access:



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Edgecore ASXvOLT16 (XGS-PON)

Edgecore ASGvOLT32/64 (GPON)

TiBIT MicroPlug OLT (XGS-PON)*

No viable NOS Available for those devices,
commercial or open source – just lab experiments



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* MicroPlug is not an open hardware design, but it is functionally an open platform

Metro environment is far more complex than datacenter

- Applications variability
- Uncontrolled environment
- Multiple domains
- Heterogeneous puzzle



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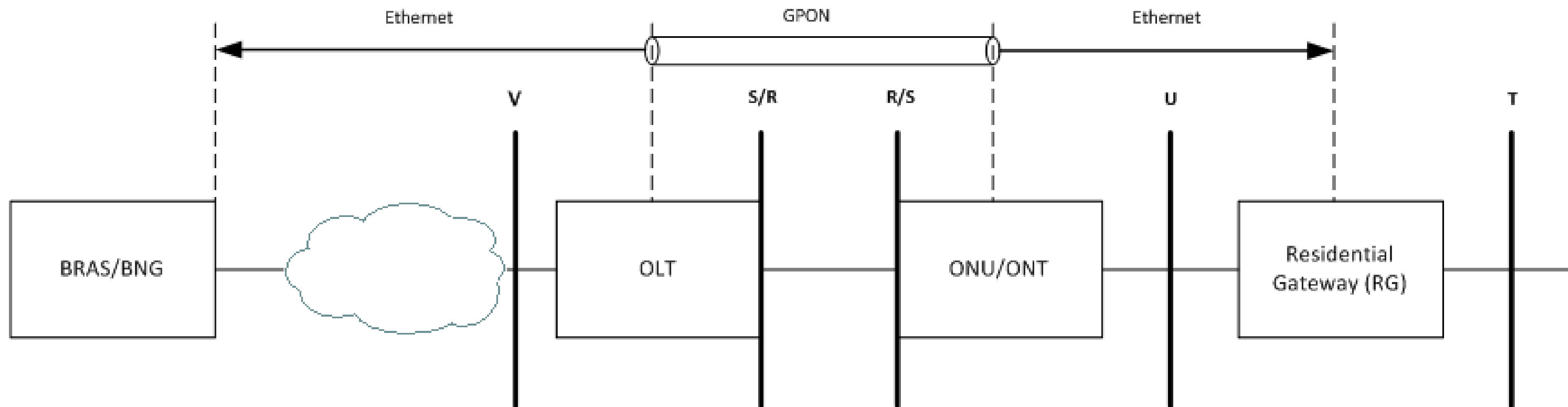


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Intro to PON Access Interfaces



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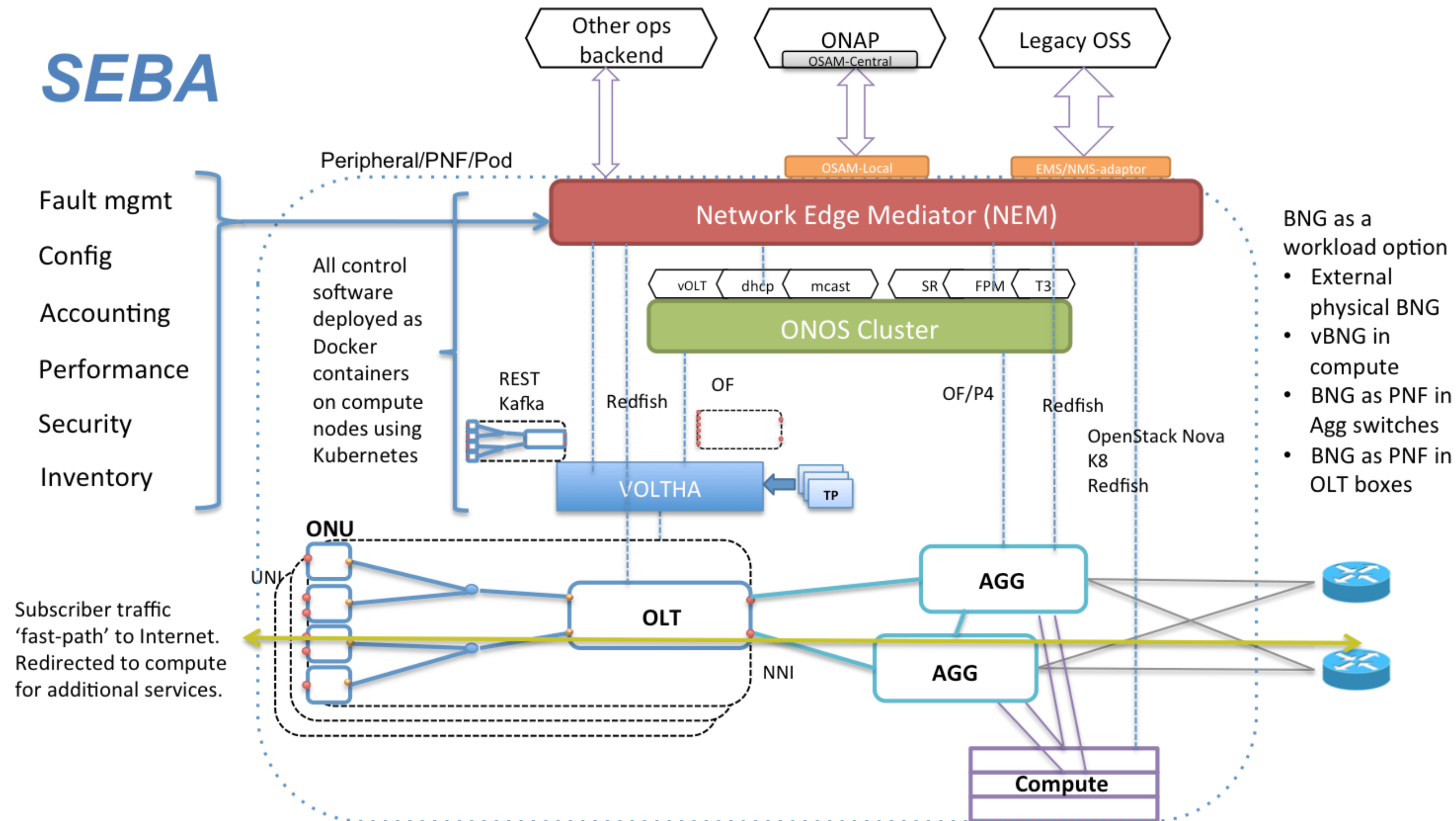


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SDN-Enabled Broadband Access



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<https://wiki.opencord.org/display/CORD/SEBA>



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Things still to be addressed - features



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- Focus on XGS-PON, but there is still a lot of demand for GPON
- Broadcom Abstraction Layer (BAL) API exposes a certain number of capabilities, imposing limitations for more complex use cases
- SDN-centric, still in the early adoption phase
- Complex architecture, multiple pieces with different deployment environments
- High cost, not taking advantage of the available CPU capacity in the different hardware components



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Maturity

- Scalability: current tests involve very few devices. A 64-port OLT can support up to 8K users
- Cross-compatibility: heterogeneous market with frequent compatibility issues between ONU and OLT



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From OCP Regional Summit 2018



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Audience: “When do you expect to see this actually deployed in reality for Deutsche Telekom?”

Paul Wagner (DT): “(...) . It makes not very much sense that we have carrier grade hardware but the software does not meet our expectations.”

<https://www.opencompute.org/events/past-summits>



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Steps to an open OLT solution

- Architectural disaggregation
- Standard Northbound Interfaces: OF/NETCONF
- Standard Southbound Interface - Hardware Abstraction Layer: OpenOLT agent



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DmOS approach to Disaggregation



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- Modularity allowing interchangeable modules combining closed and open source items
- Clear and well-defined abstraction layer, suitable for different running environments and platforms
- Standard Northbound Interfaces: NETCONF
- Hardware Abstraction Layer: OpenOLT Agent/gRPC Interface*

*Limited to BAL, not in the first release

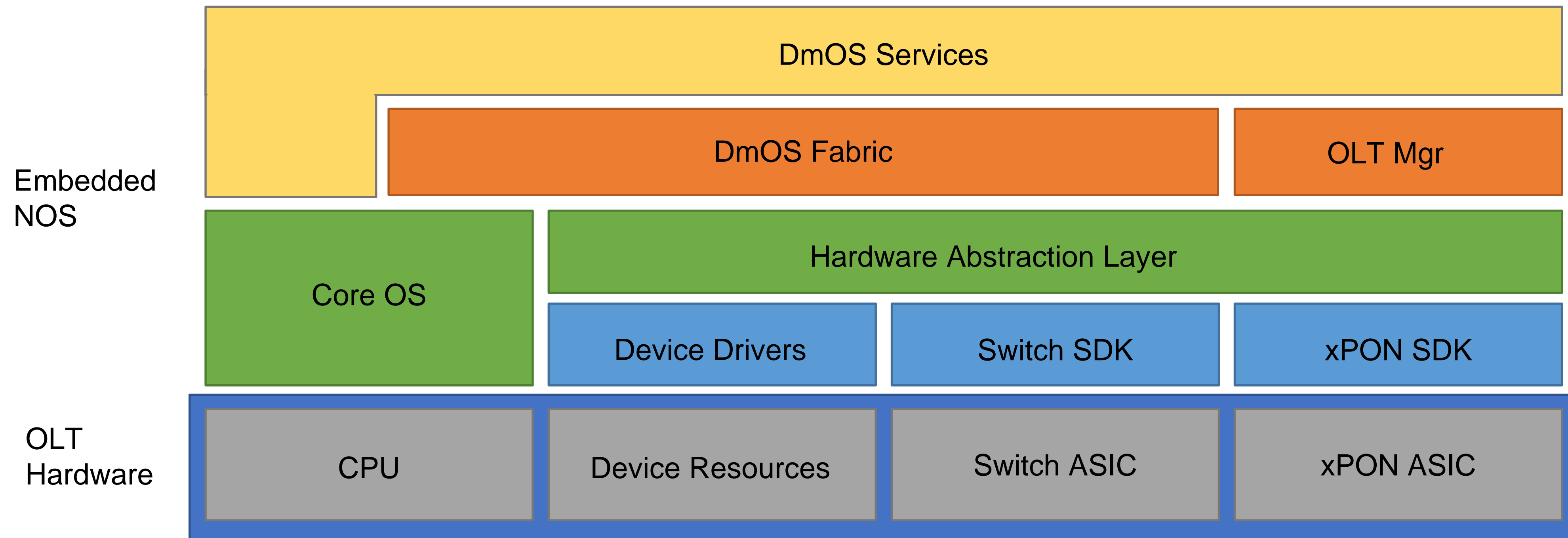


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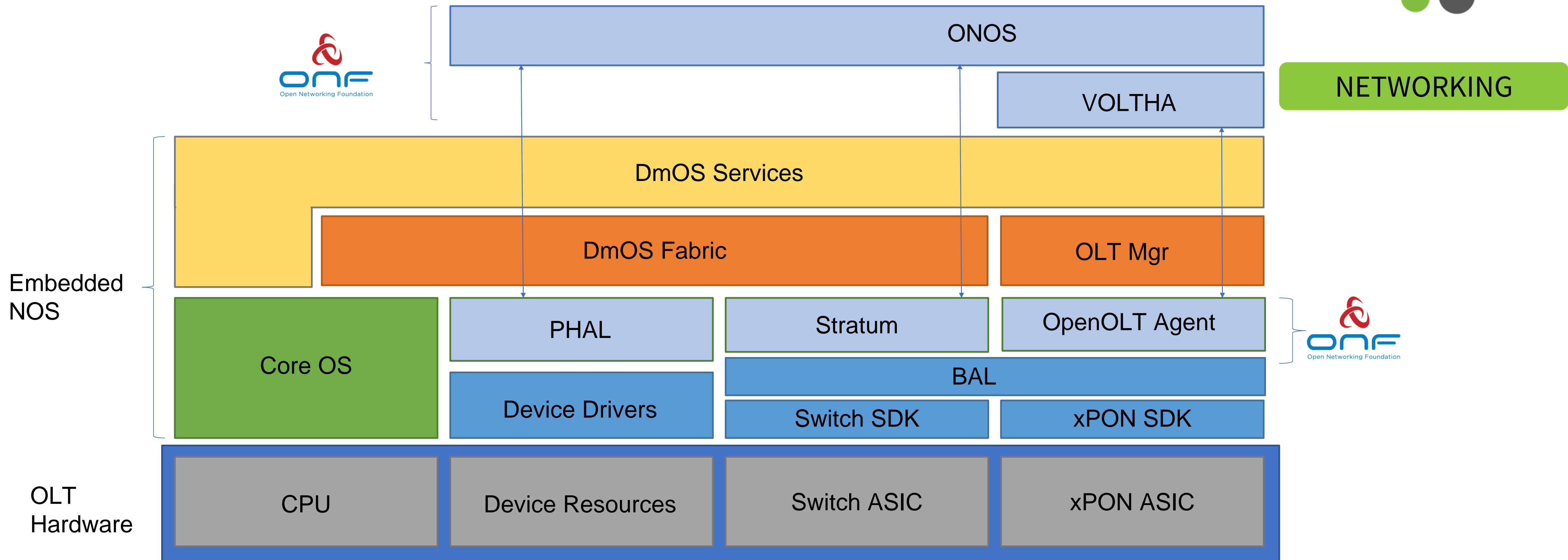
DmOS architecture



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DmOS architecture evolution



DmOS current status

- Preliminary release for Edge-core ASGvOLT64*
- Full release available for Datacom GPON OLT's
- Support for x86 and PPC-based platforms, Broadcom StrataXGS and DNX switch ASIC's and Maple Device
- Work in progress on Edge-core XGS-PON and TiBIT MicroPlug



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*Demo available at OCP Regional Summit



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Call to Action

- Protect your investment: OCP GPON OLTs are a reality
- Consider using a commercial NOS as a transition path to an open source solution
- Support and influence open source initiatives like SEBA/VOLTHA so the community can achieve a broad and mature solution sooner



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Thank you!

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