Understanding ONF's Curated Portfolio of Projects

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ONF's Far Reaching Mission

ONF Operators have tasked our community with a massive undertaking

Transformation of Technology

- Disaggregation
- SDN
- Virtualization
- Cloudification

Creation of Platforms

- White box
- Open source

Transformation of Ecosystem

- New supply chain ready to deliver on this mission

Can Open Source Pursue Such An Agenda?

- Over 7 years, we have learned
  - Incumbents have trouble pursuing such a disruptive agenda
  - Miscellany of open source pieces are too hard for operators to assemble and consume on their own
    - Incumbents (to date) only package them into proprietary solutions
  - Disruptive agenda requires committed focus

We Need a Special Model

A New Open Source Model

Consensus Model

1. Build broad community first
2. Find consensus
3. Build common pieces that different participants can all use
   - Incumbents have expertise, hence …
   - Incumbents play a majority role
4. Lends itself to infrastructure plays
   - NFVI

NEW
Operator Led Curated Open Source

1. Identify disruptive end-goal
   - Backed by multiple operators
2. Partners fund seed creation of technology
   - Requires dedicated engineering team of experts
3. Attract a small handful of supplier partners
4. Ultimately - Critical mass will attract broad community

… ONF is executing this 4 step plan

Step 1
Operators Come Together with Common Disruptive End Goal

March 2018, Operators Expanded ONF Direction

Eight Tier-1 Operator Committed to:

AT&T

China unicom中国联通

COMCAST

Google

Deutsche Telekom

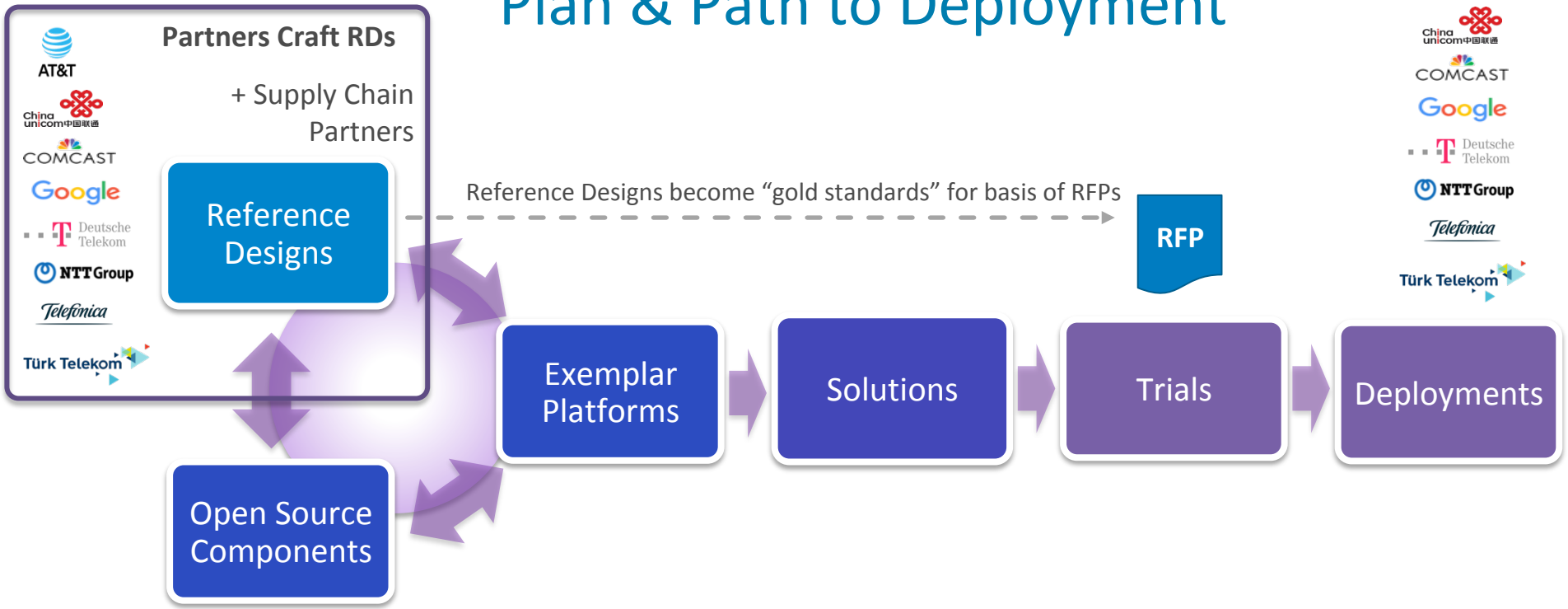
NTT Group

Telefónica

Türk Telekom

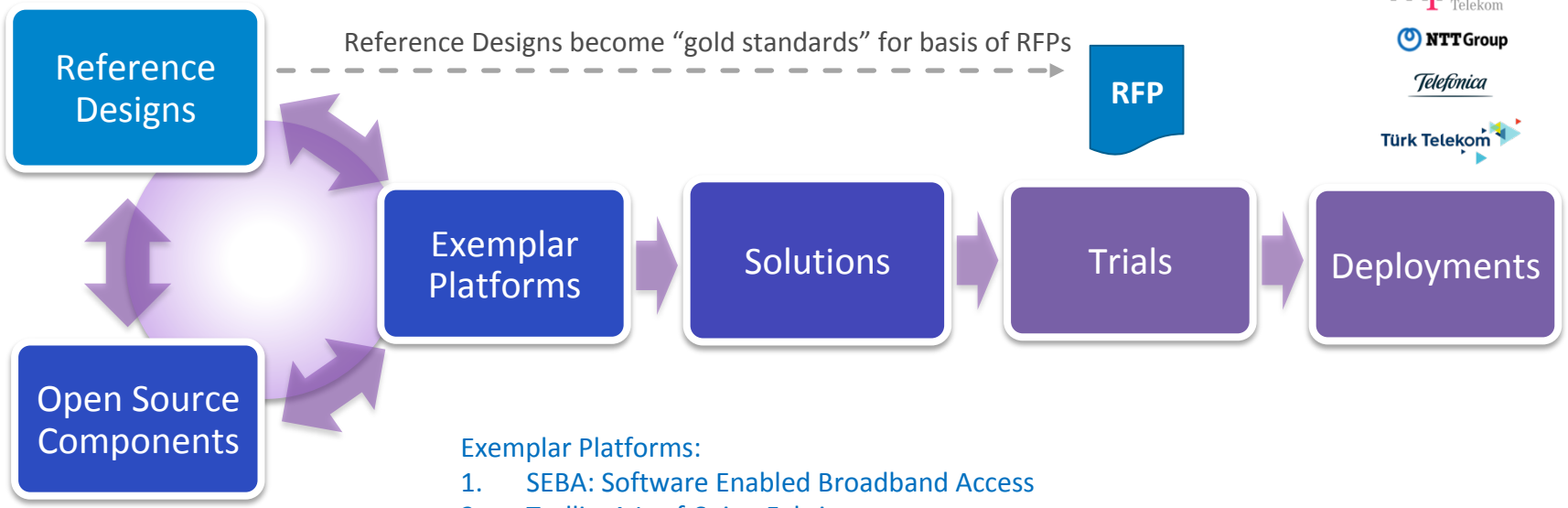
- Create “Curated Open Source” Model
  - Operator build consensus on ‘ exemplar platforms” using selected components
- Operators to jointly create common Reference Designs for access/edge
  - “Gold Standards” for what’s to be deployed in production networks
  - Operators committing resources from Architecture, Design & Ops teams
  - Operators to craft RFPs based on these designs
- Form Keiretsu ecosystem of operators and aligned supply chain partners
  - Operators committed to reconstitute a new supply chain
  - Aligned with leveraging open source & white box for production deployments

Plan & Path to Deployment



Components to Reference Designs & Exemplar Platforms

Reference Designs:
- SEBA-RD
- Trellis-RD
- UPAN-RD
- ODTN-RD



Components:
- XOS
- ONOS
- Stratum
- VOLTHA

Exemplar Platforms:
1. SEBA: Software Enabled Broadband Access
2. Trellis: A Leaf-Spine Fabric
3. UPAN: Unified Programmable Autonomous Network
4. ODTN: Open Disaggregated Transport Network

AT&T
China unicom中国联通
COMCAST
Google
Deutsche Telekom
NTT Group
Telefónica
Türk Telekom

Reference Designs Drive Procurement via Phased Development

Partners Create RDs

Operators join together by mutual commitment to deploy a Common RD

+

Aligned supplier partners participate in RD creation

AT&T
China unicom中国联通
COMCAST
Google
Deutsche Telekom
NTT Group
Türk Telekom

Reference Design Creation

ONF Member Participation

General ONF Membership asked to review and comment on RDs

Membership shares in RAND-Z licensing

Draft Reference Design

Operator Procurement

RDs become public.

Operators refer to and procure based on Reference Designs

Final Reference Design

AT&T
China unicom中国联通
COMCAST
Google
Deutsche Telekom
NTT Group
Telefónica
Türk Telekom

Plus additional operators

Reference Designs

Active Operators*

AT&T
Deutsche Telekom
Türk Telekom
Telefónica
Google
COMCAST
Google
NTT Communications
COMCAST

Reference Designs

SEBA
SDN Enabled Broadband Access

Trellis NFV Fabric
SDN Spine Leaf Fabric

UPAN
Unified Programmable Automated Network

ODTN
Open Disaggregated Transport Network

Trailblazing Projects & Emerging Reference Designs

M-CORD
vRAN & 5G Mobile

China unicom中国联通
AT&T
Sprint
Deutsche Telekom
Türk Telekom

CORD
Access & Edge Cloud

China unicom中国联通
Sprint
AT&T
Deutsche Telekom
Türk Telekom
Google
COMCAST
Telefónica

* These are the operators truly investing. Broader sets of operators are modestly investing & publicly support the work

Step 2
Create Common Components & Platforms

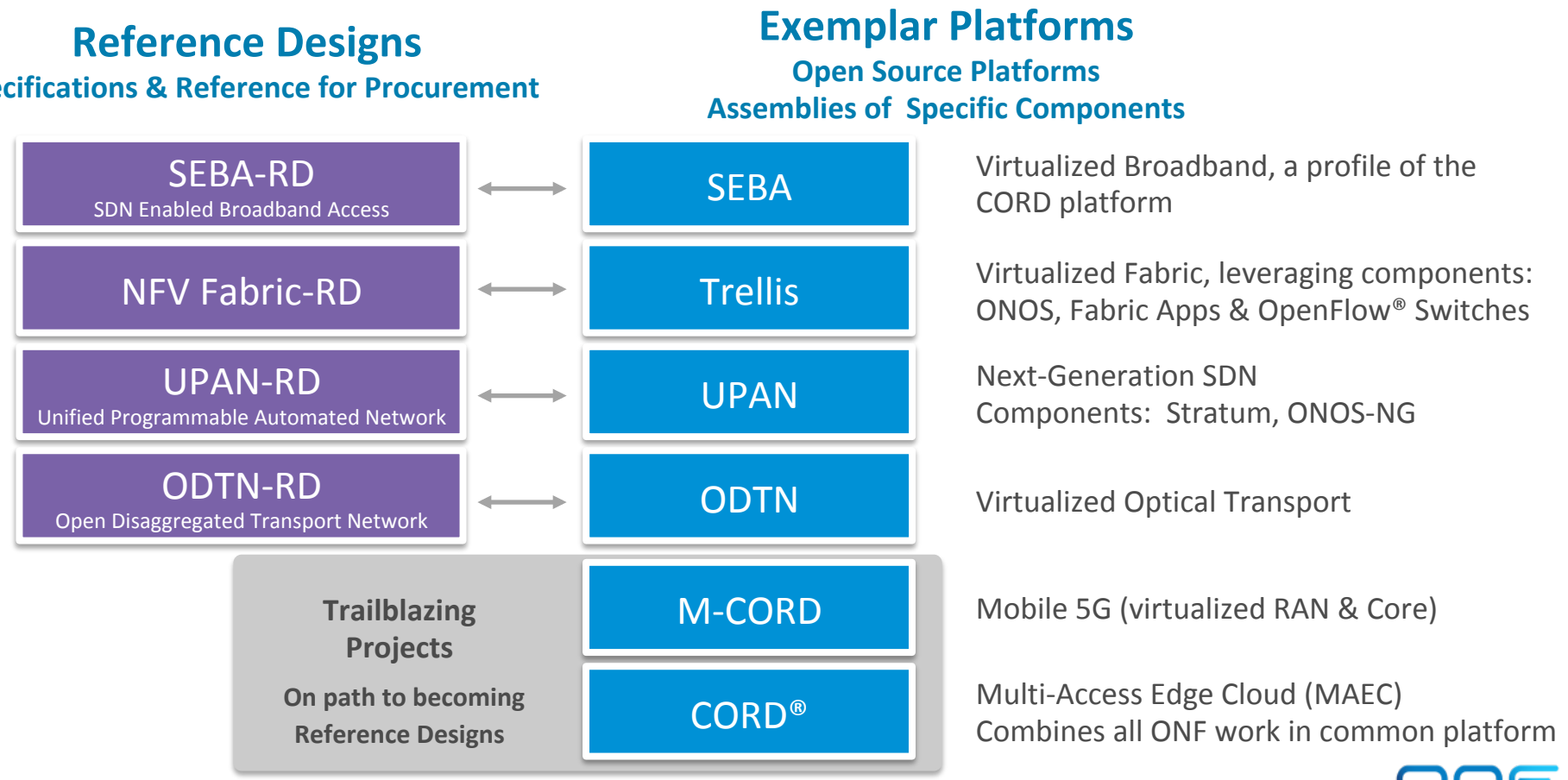
Reference Designs' Relation to Exemplar Platforms

Exemplar Platforms

Open Source Platforms
Assemblies of Specific Components

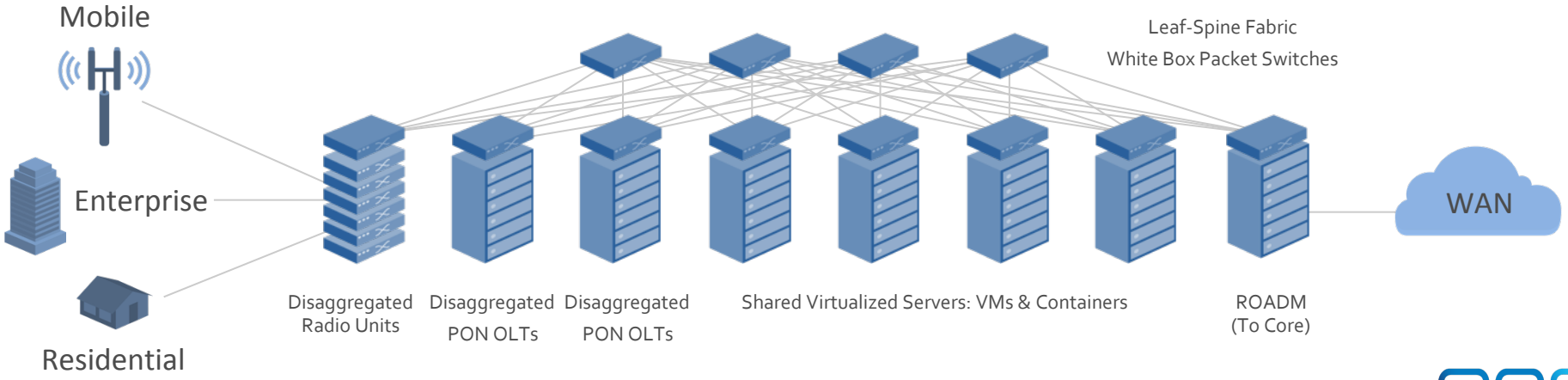
SEBA	Virtualized Broadband, a profile of the CORD platform
Trellis	Virtualized Fabric, leveraging components: ONOS, Fabric Apps & OpenFlow® Switches
UPAN	Next-Generation SDN Components: Stratum, ONOS-NG
ODTN	Virtualized Optical Transport
M-CORD	Mobile 5G (virtualized RAN & Core)
CORD®	Multi-Access Edge Cloud (MAEC) Combines all ONF work in common platform

Reference Designs' Relation to Exemplar Platforms

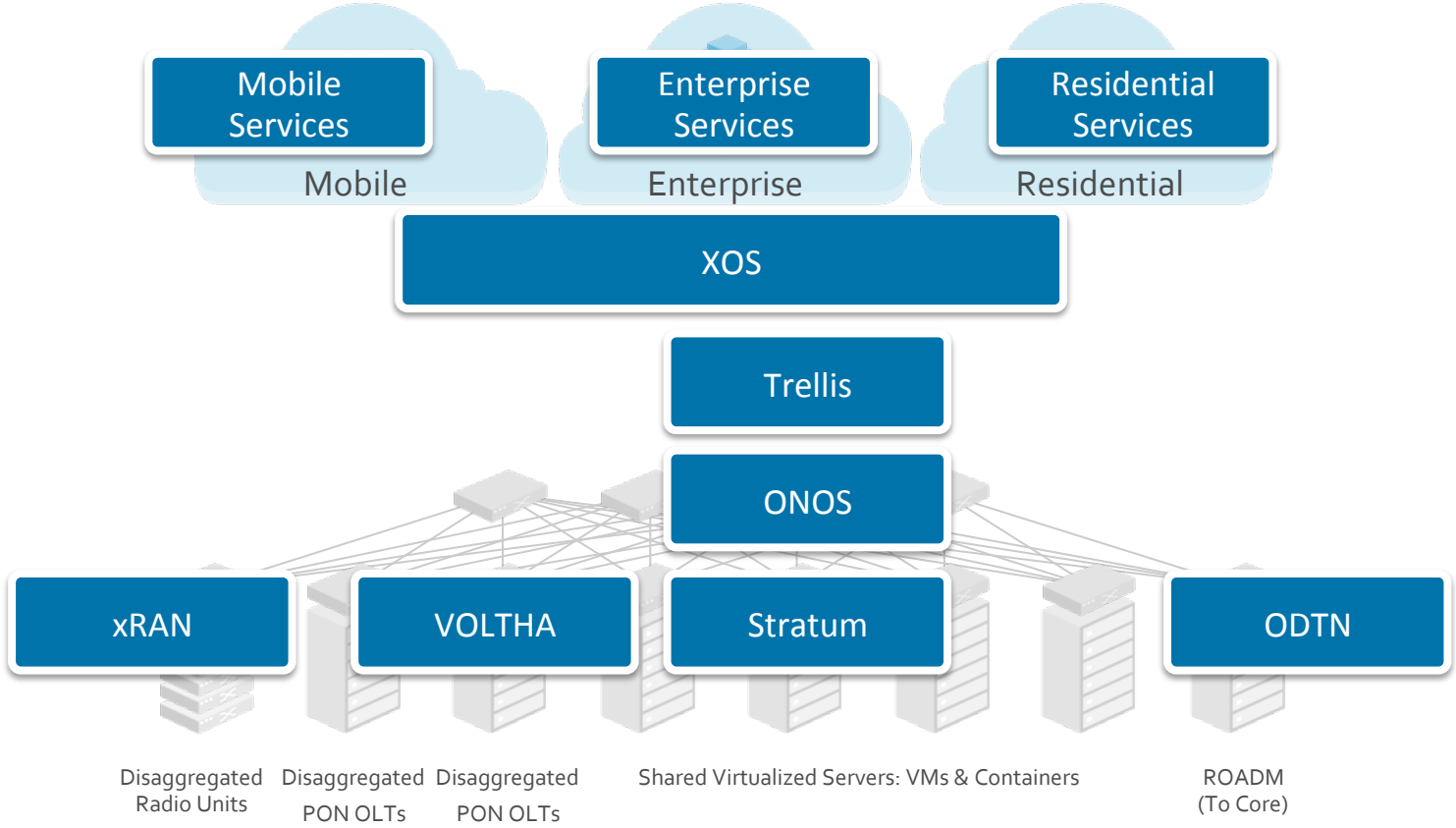


ONF Open Source Software Stack for Access and Edge

Open Source Software Stack

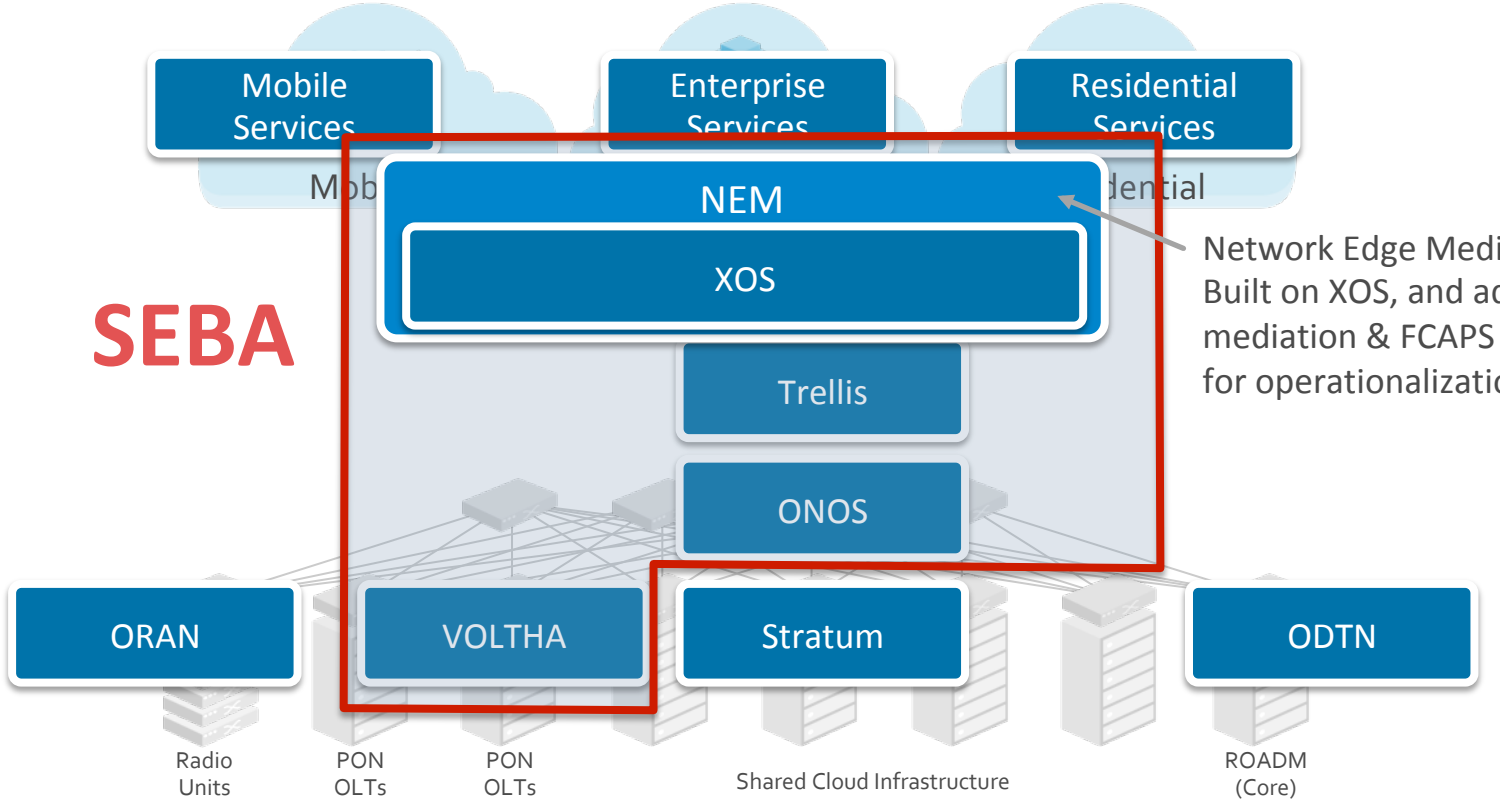


ONF Open Source Software Stack for Access and Edge

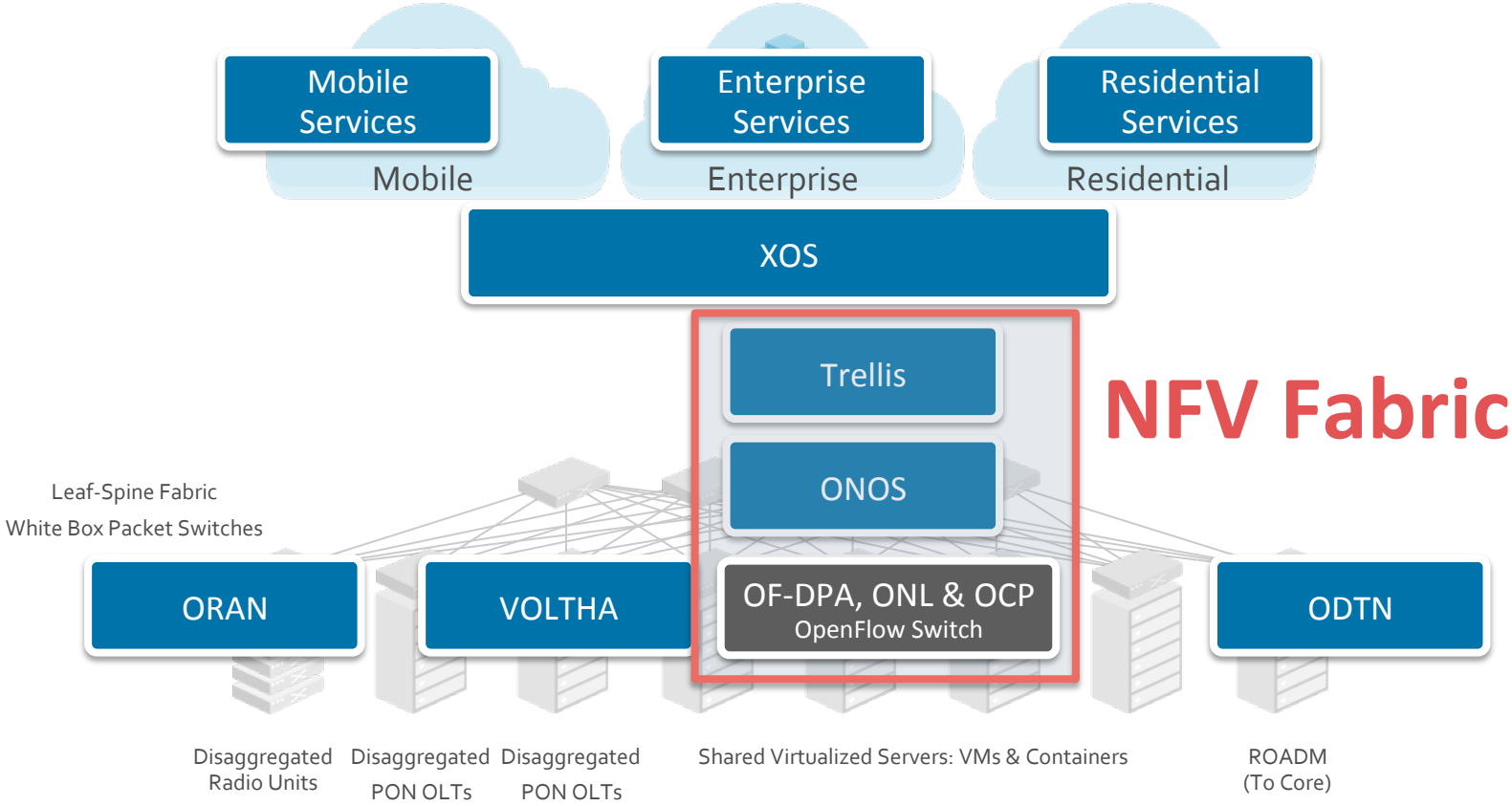


Each Platform
is a Profile built by pulling specific components
from the common CORD project

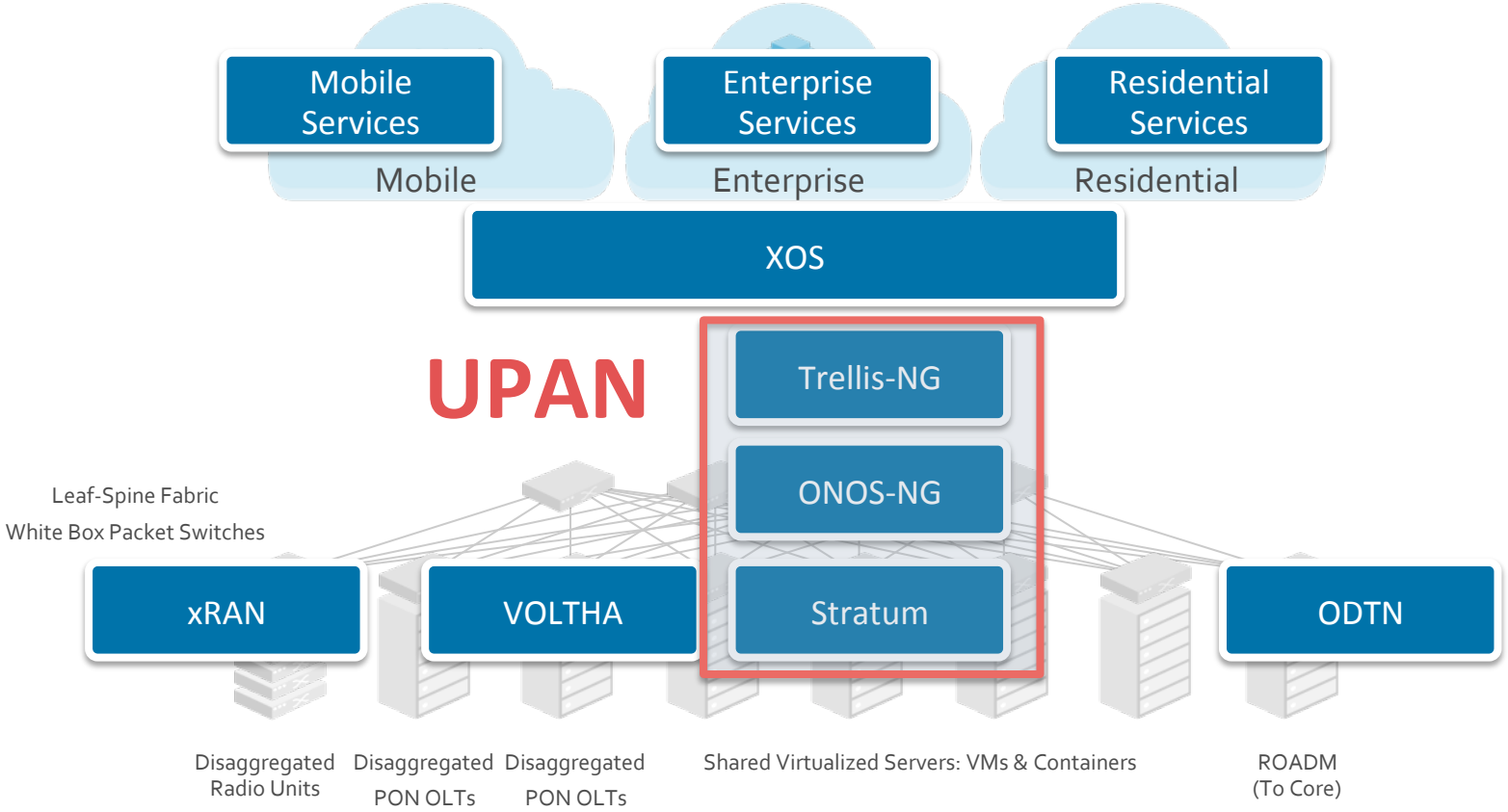
Virtualized Broadband Access - SEBA Exemplar Platform



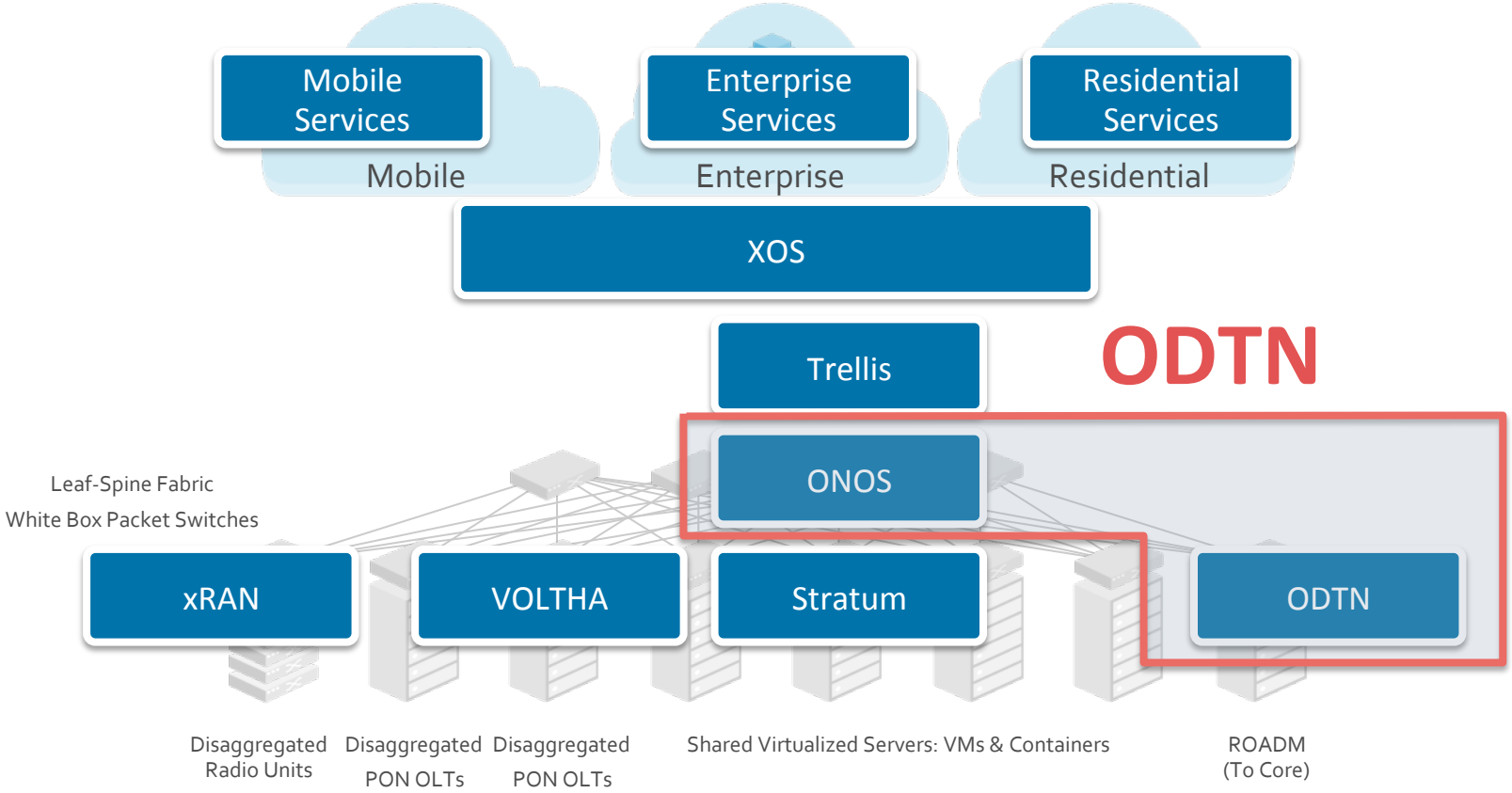
Trellis: A Leaf-Spine Fabric for NFV



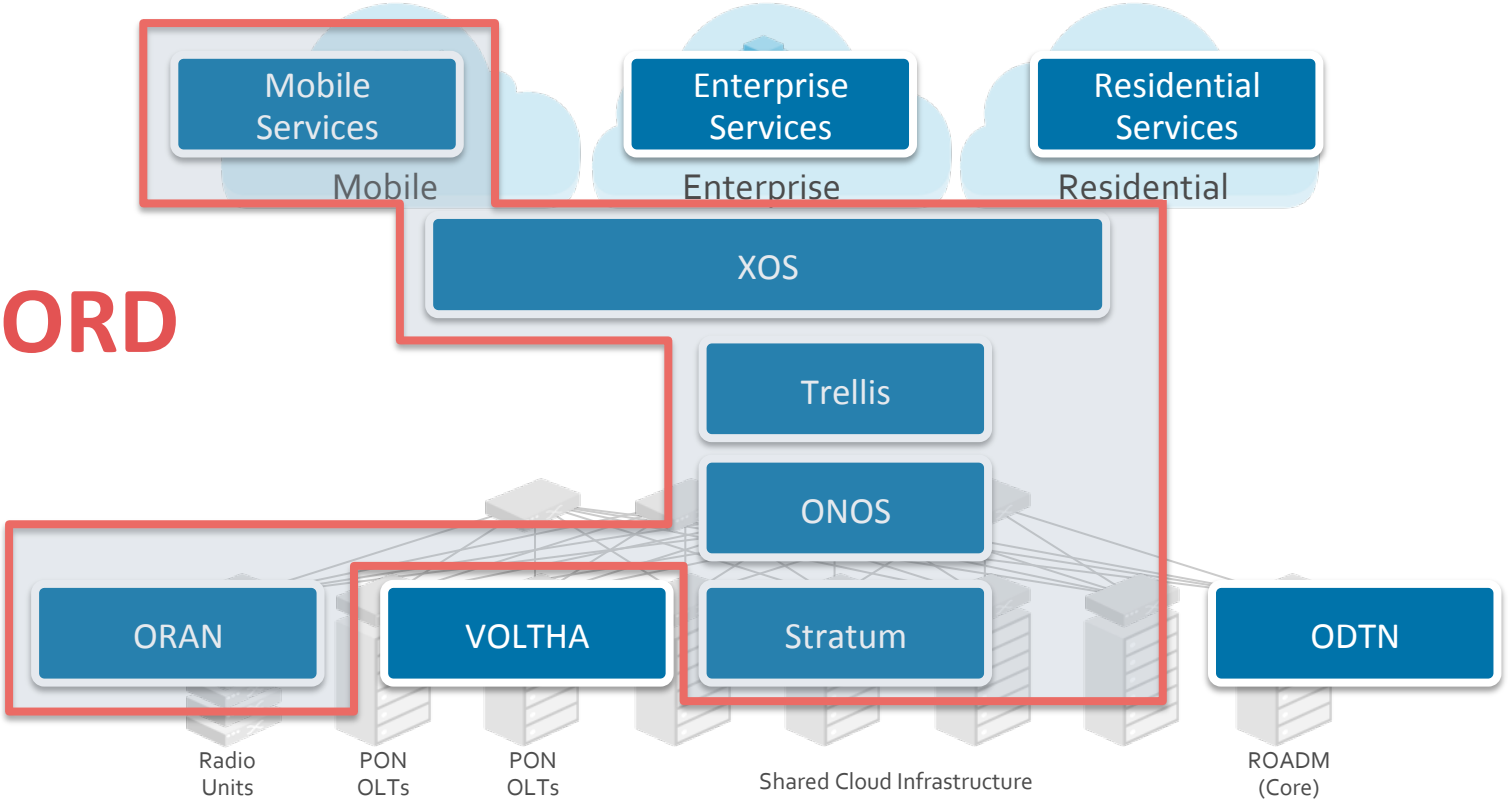
Next-Gen SDN: Unified Programmable Autonomous Network (UPAN)



ODTN: Open Disaggregated Transport Network

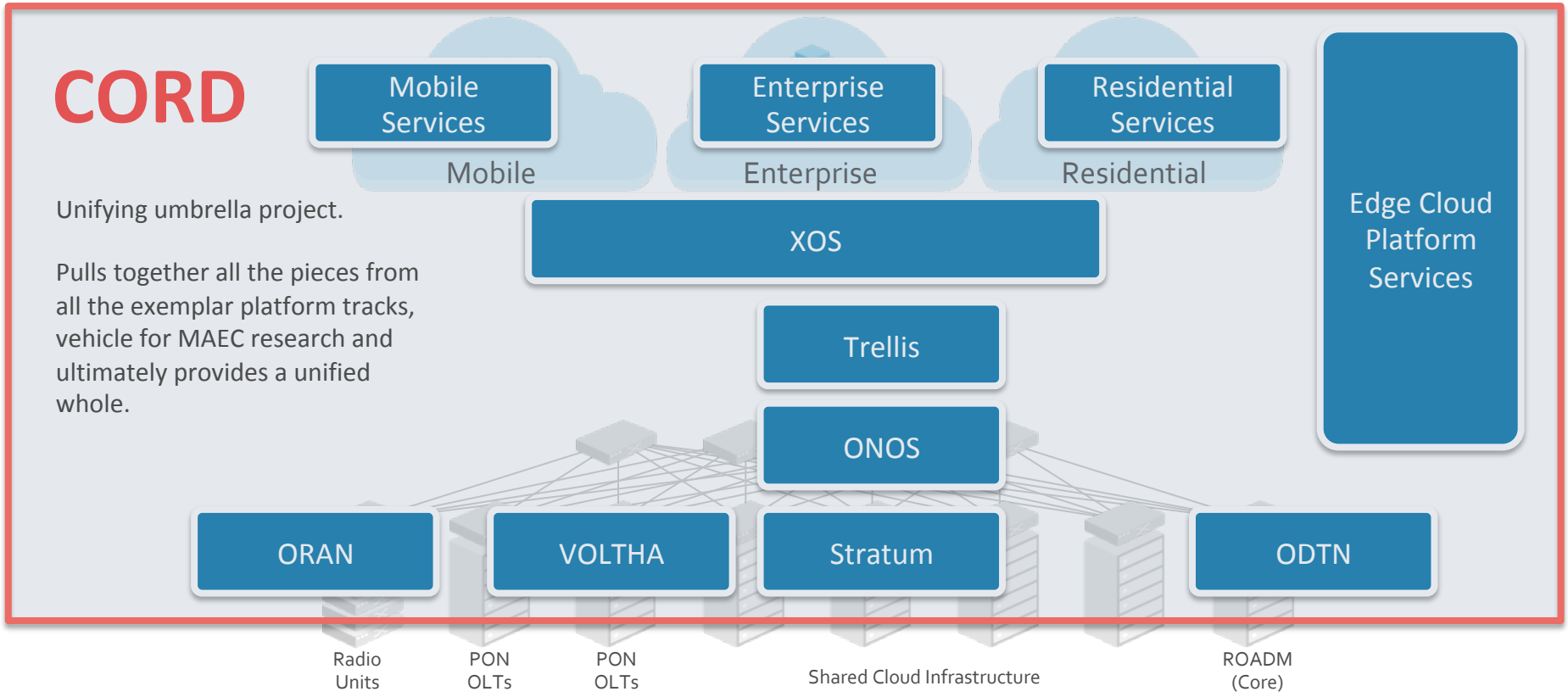


M-CORD Platform



M-CORD

CORD® as Multi-Access Edge Cloud Platform



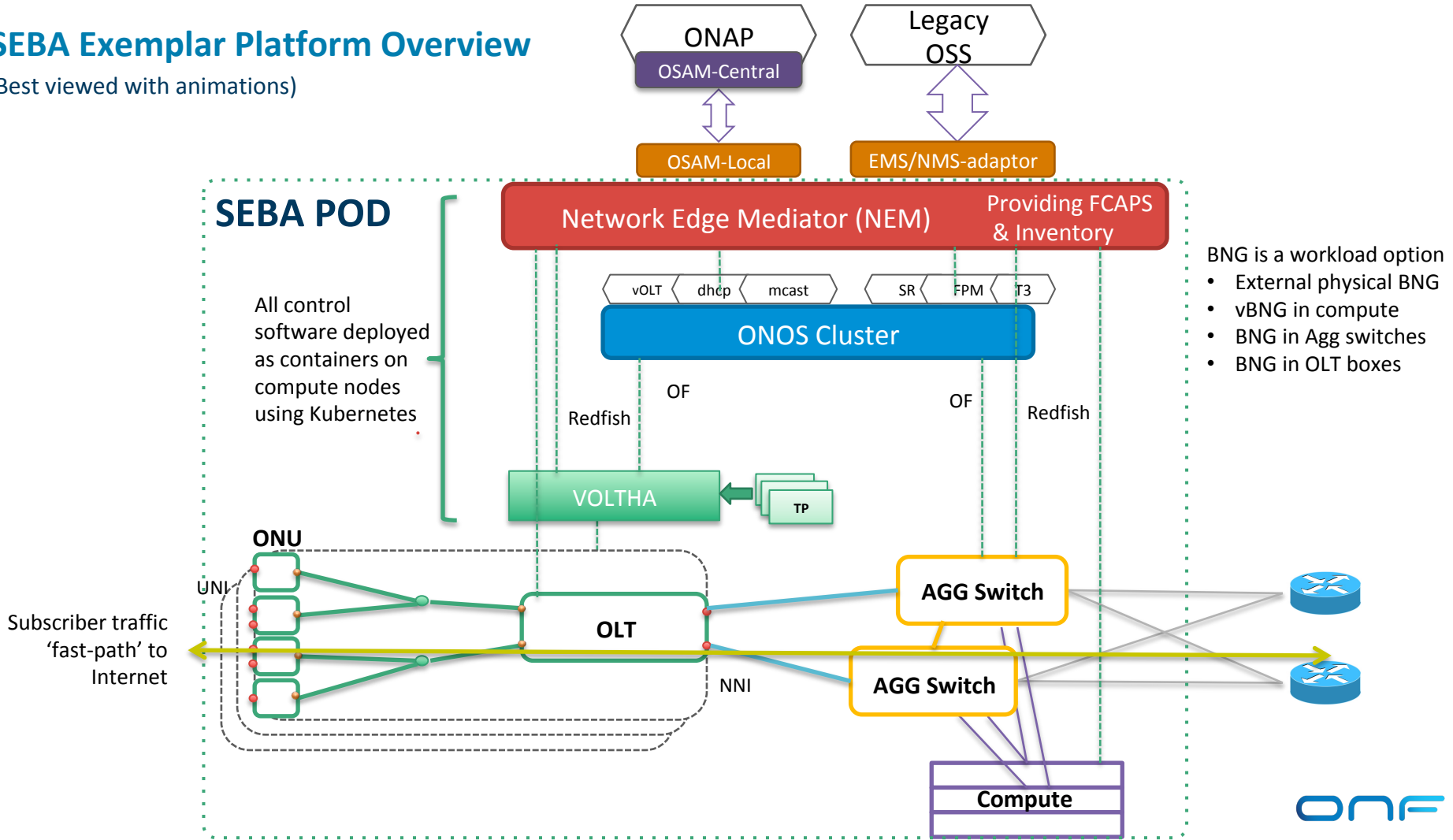
SEBA (and its relation to R-CORD)

Lightweight platform supporting a multitude of virtualized access technologies at the edge of the carrier network, including XGS-PON and G.Fast, and eventually DOCSIS and more.

- SEBA is a follow-on to R-CORD
  - Addresses both residential and backhaul use cases
- Lightweight - Optimized for minimal footprint
  - Kubernetes based
  - OpenStack is optional and only needed to support VM-based VNFs
- High Speed
  - Default data path does not touch an x86
- Operationalized
  - FCAPS and OSS integration

SEBA Exemplar Platform Overview

(Best viewed with animations)

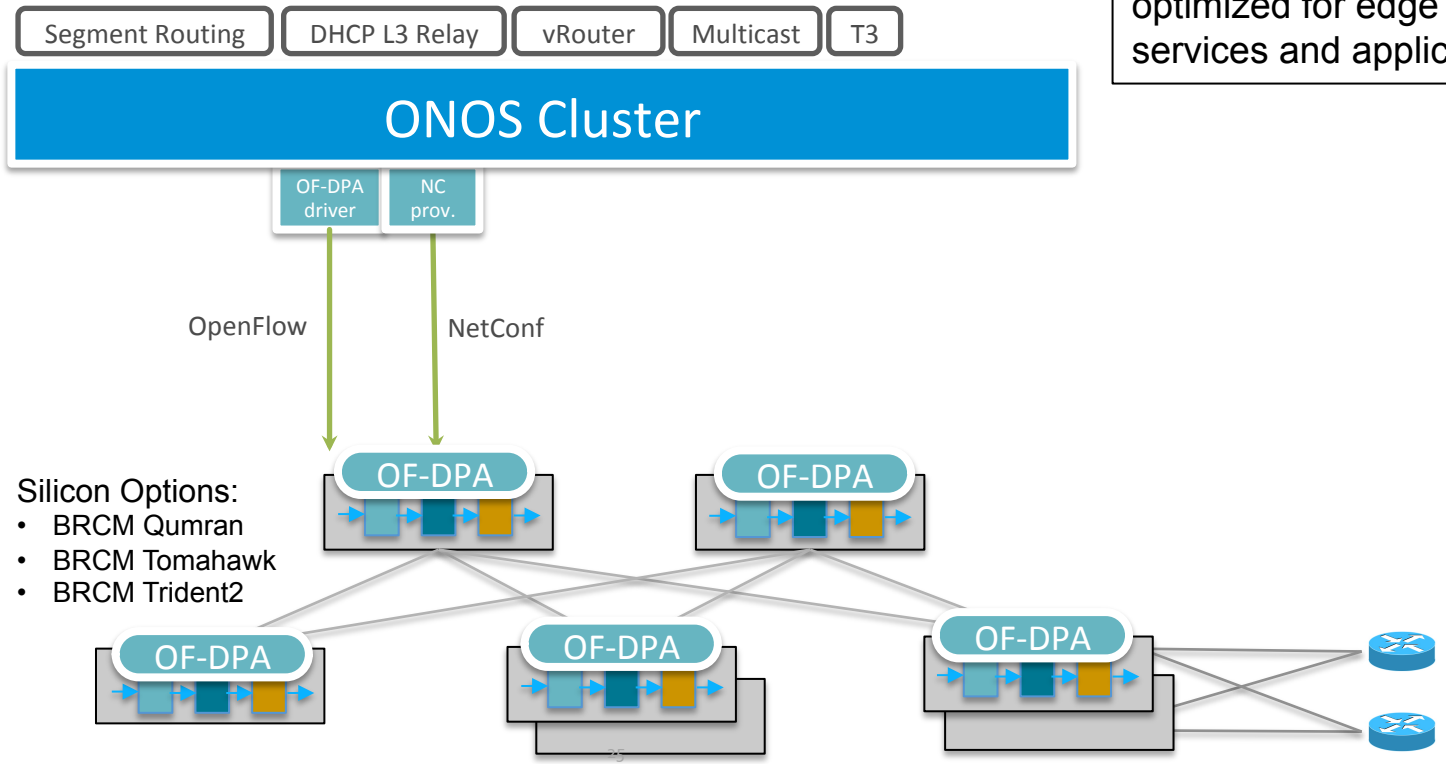


BNG is a workload option

- External physical BNG
- vBNG in compute
- BNG in Agg switches
- BNG in OLT boxes

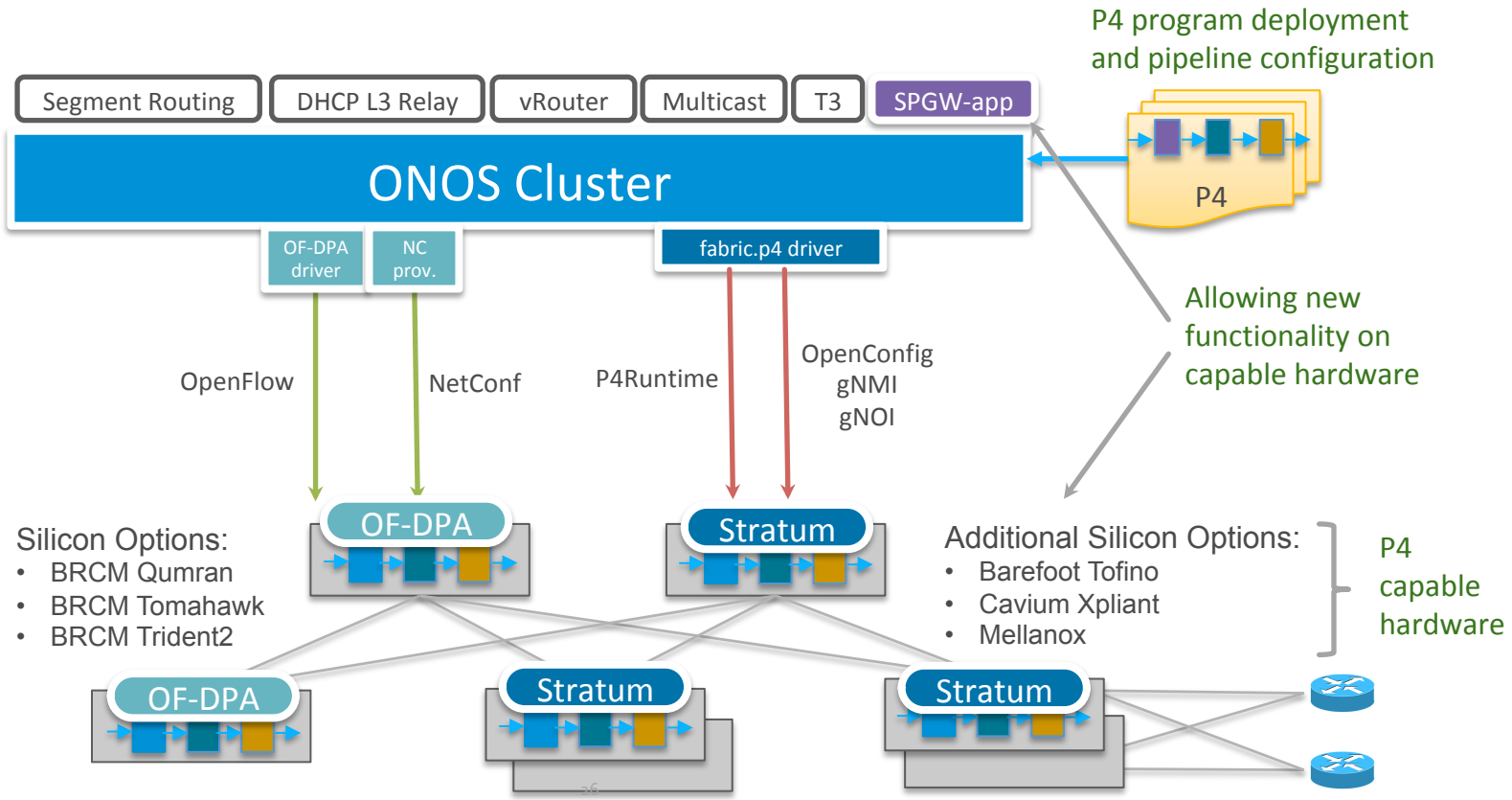
NFV Fabric Exemplar: Trellis

SDN-native spine-leaf data center fabric optimized for edge services and applications



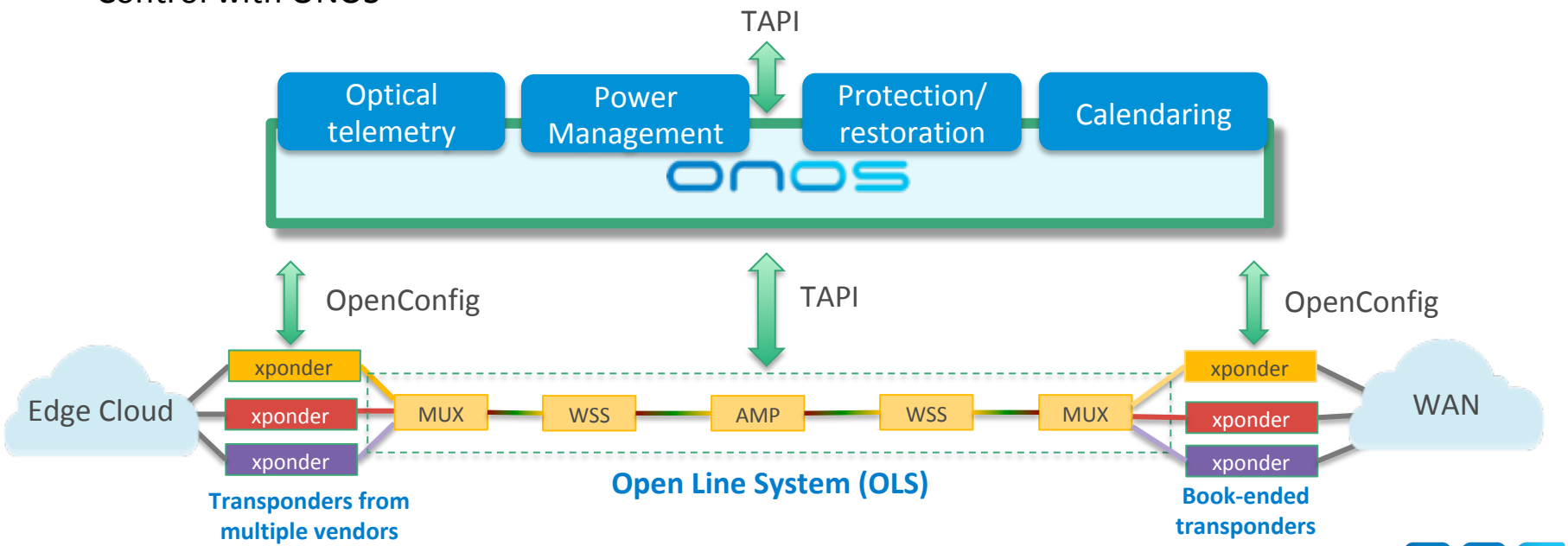
Next-Gen SDN: UPAN Exemplar (Trellis + Stratum + P4)

Next generation SDN reference design, leveraging P4 to enable flexible data plane programmability and network embedded VNF acceleration.

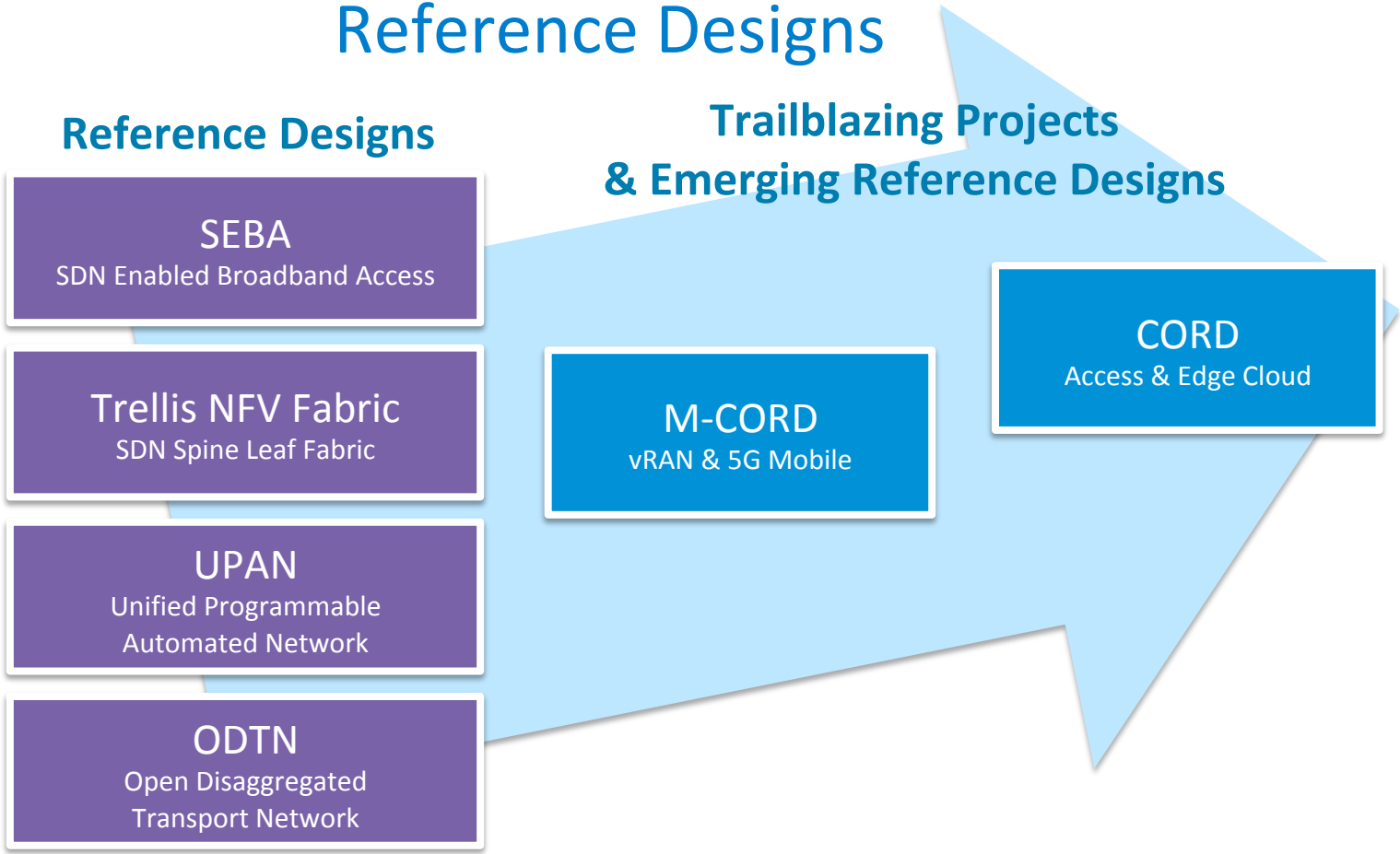


ODTN Exemplar Platform

- Open multi-vendor optical networks disaggregating transponders and OLS
  - Phase 1: point-to-point
  - Phase 2: expanding to multi-point ROADM networks
- Control with ONOS



Reference Designs



Announcing Today

All Four of initial Reference Designs have been released to ONF Membership for review and comment

Step 3
Build Ecosystem Starting with Small Keiretsu Team of Supply Chain Partners

Operator Groups & Supply Chain Partners

Virtualized Broadband SEBA	Operator Group	AT&T, Deutsche Telekom, NTT, Turk Telekom
	Supply Chain Partners	ADTRAN, Ciena, Dell, Edgecore, Radisys
NFV Fabric	Operator Group	Comcast
	Supply Chain Partners	Dell, Edgecore, Radisys
Next-Gen SDN UPAN	Operator Group	China Unicom, Deutsche Telekom, Google, NTT, Turk Telekom
	Supply Chain Partners	Ciena, Dell, Edgecore, Juniper Networks
Virtualized Optical Transport ODTN	Operator Group	China Unicom, Comcast, NTT
	Supply Chain Partners	Ciena, Edgecore, Juniper Networks

Supply-Chain Partner Participation in RDs

	Supply Chain Partners contributing to each Reference Design				
	SEBA	**Trellis**	UPAN	ODTN	M-CORD & CORD
System Integrators	Ciena, ADTRAN, Radisys	Radisys			Radisys
Software (VNFs & Platform)	ADTRAN, Ciena, Radisys	N/A		Juniper	Intel
IaaS Equipment (Whitebox ODM++)	Dell, Edgecore	Dell, Edgecore	Dell, Edgecore, Juniper	Edgecore	Dell
Access Equipment (PON, Radio, DWDM)	ADTRAN, Edgecore	N/A	N/A	Ciena Juniper	
Silicon	Intel	Intel	Intel	Intel	Intel

Step 4
Critical Mass Attracting a Broader Community

“Build it and They Will Come”

- This Year, as Direct Result of this Plan, ONF has added
  - 4 New Partners
  - 23 New Innovator Members

- Today – Announcing Newest Partner …

Thank You

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