

T.U.R.B.O,
The All-optical Target Network in Cloud Era

New Changes in Cloud Era, New Opportunities in Optical Network

Gigabit Everywhere



- Naked-eye 3D: Up to 10Gbps
- End User Access: 100M->1000M->10G

Bandwidth: 30% CAGR ↑

Digital Transformation



- User-DC: More enterprises, minute-level TTM
- DC-DC: More clouds, xTb-level E to W traffic

Flow Topology: S/N -> S/N + E/W

Guaranteed Experience



- PL 0.1% → training efficiency 50% ↓
- DC dual-active, >99.99%, RTT < 1ms

Low latency: Min to 1ms ↓

Value of All-optical Network

$$\text{All-optical Value} = \sum_{n=1}^N \left[\left(\text{Capacity} + \text{Connection} \right) - \left(\text{Construction} + \text{O\&M} \right) / \text{bit} \right]$$

TCO
Optimal

Experience
Guaranteed

Architecture
Simplified

OTN/WDM to the
Metro Edge is
the Trend

100%

Core

95%

AGG

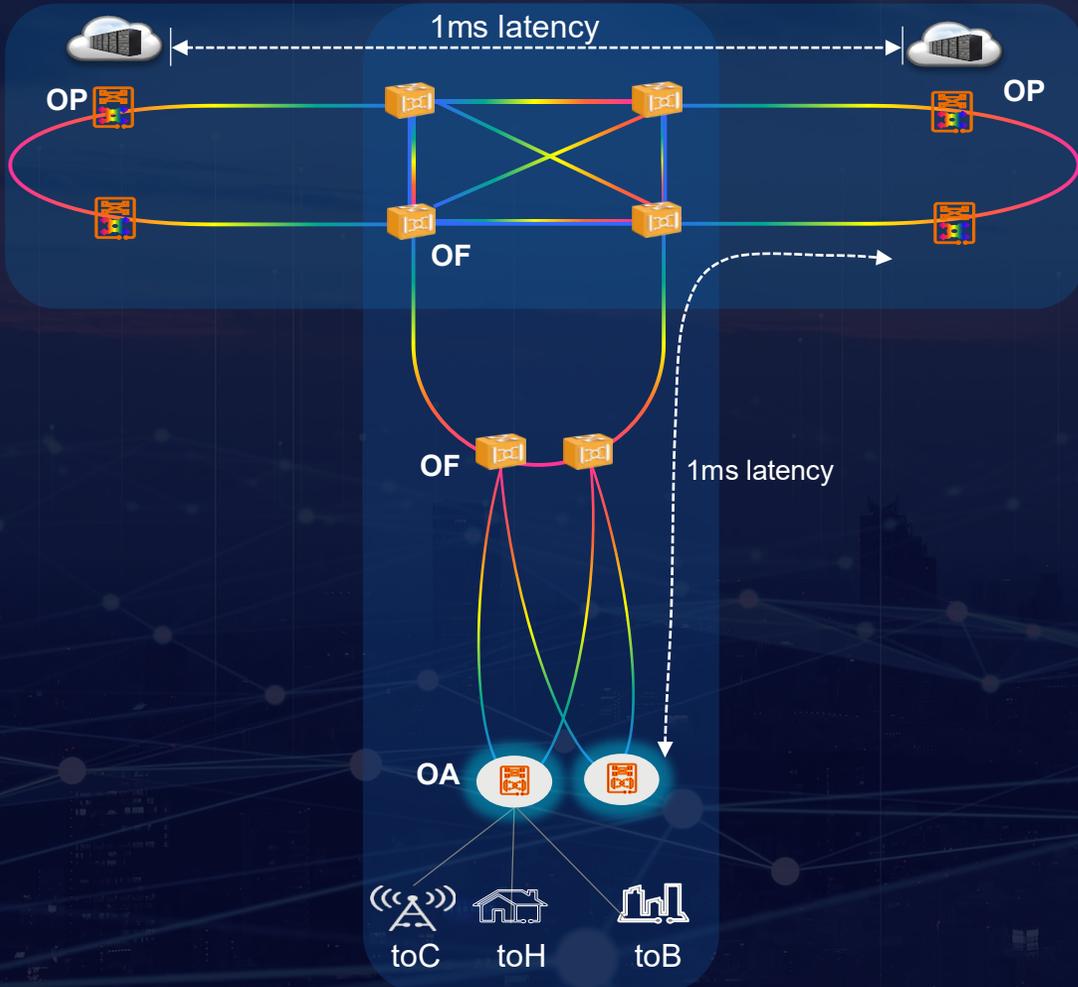
65%

Access

10%

Site

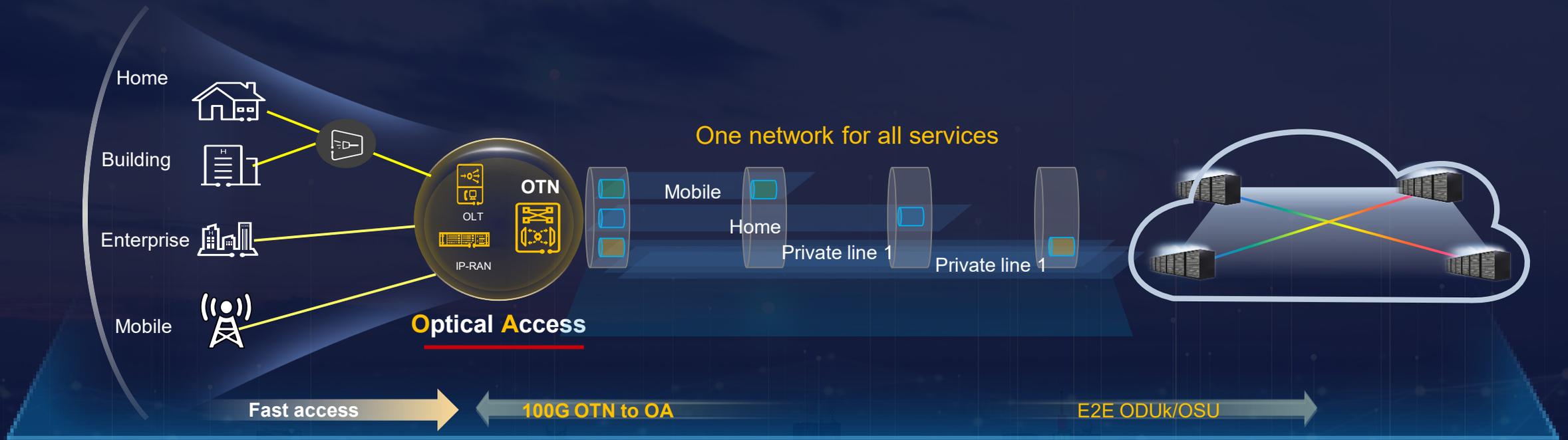
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T.U.R.B.O



Unified Access: Simplified & Optimal TCO FMEC Network



Simplified Network, 3→1

- All services in 1, FMEC
- Multiple networks → one network for all

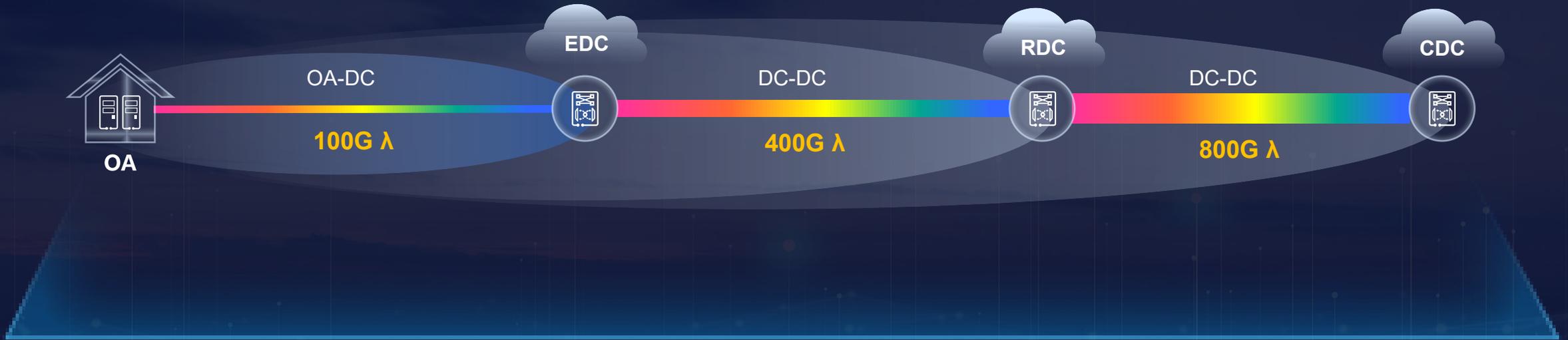
Capacity Upgrade, 10G→100G

- 100G coherent to OA: capacity 10X
- Long-term evolution with 400G to OA

Fast TTM, Weeks → Days

- OA close to User (OLT/CSG/ASG)
- OA close to Enterprises

Resilient Connection, Guaranteed Experience for NaaS



Connection on-Demand

- Lambda: 100G~800G, second-level auto-commissioning
- OSU: 10M~100G, 10K/100G connections

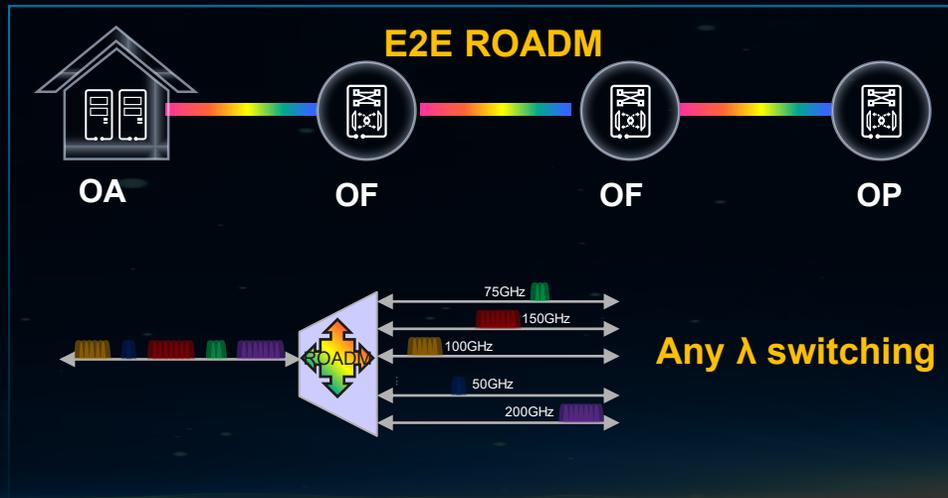


Quality on-Demand

- Availability 99% ~ 99.999%
- Latency 1ms ~ 1s

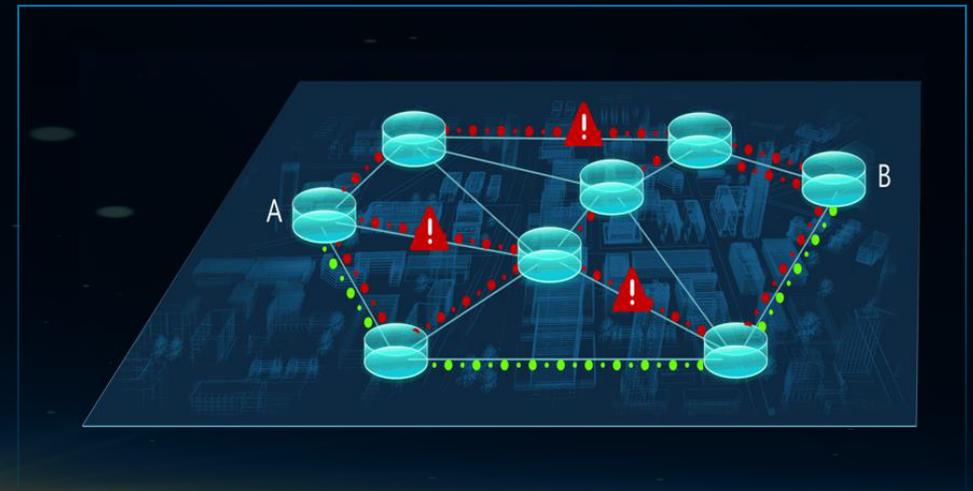
All Optical Switching, Building an Efficient and Reliable Foundation

All Flexgrid-ROADM



- Any λ to any site, 0 Blocking
- 100G/200G \rightarrow 400G/800G/1.2T+

Automatic Optical Rerouting



- Restoration Time: Seconds \rightarrow ms level
- Restoration SLA: Best Effort \rightarrow Deterministic

Autonomous Network **B**rain: Full Automation & Agile Monetization



E2E provisioning

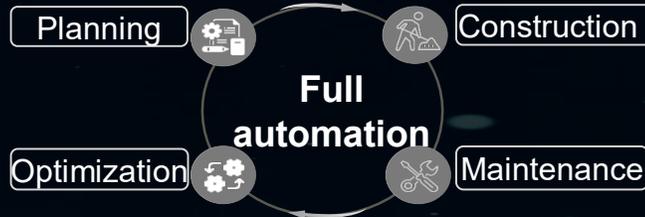


SLA monetarization



GIS fault location

Single-source data →
Digital twins
modeling and simulation



IETF ACTN APIs:
Scenario-based NBI



Brain



Towards "T.U.R.B.O" All-optical Target Network

Tco
Optimal

Experience
Guaranteed

Architecture
Simplified



T Shape
Architecture

Unified
Access

Resilient
Connectivity

AN
Brain

All **O**ptical
Switching



T.U.R.B.O All-optical Target Network

OTN to EverySite

Building a Fully Connected,
Intelligent World
