B3 Week – New CO-LO Network Design

2024

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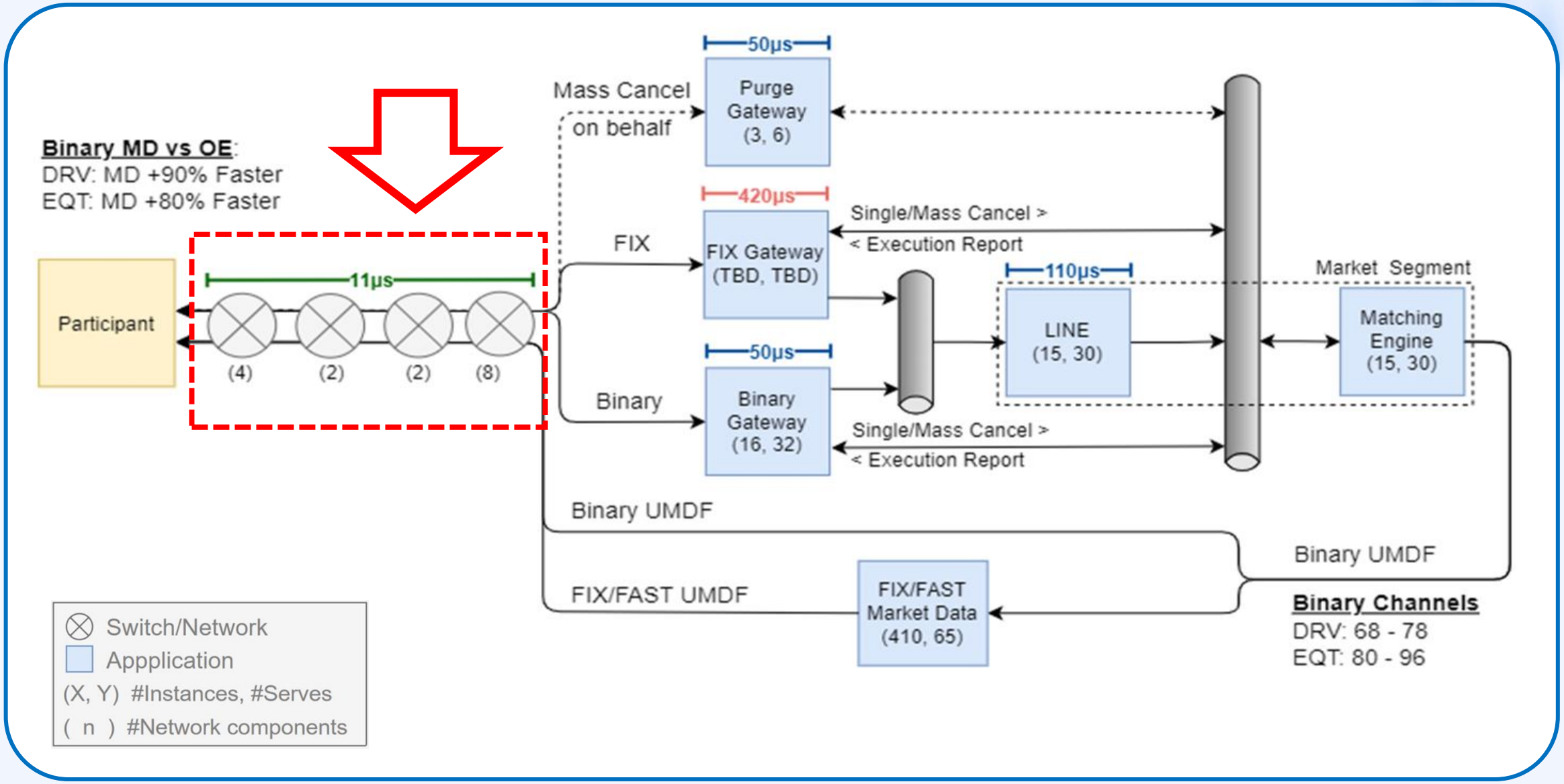
AGENDA

1. Scope of Network Modernization
2. Drivers for Changes
3. Project Timeline
4. Design Overview, Performance & Observability
5. DC Cabling
6. Simulation Phase
7. Networking Migration Overview – MD & OE

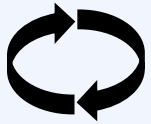
SCOPE OF NETWORK MODERNIZATION

Scope of Network Modernization



DRIVERS FOR CHANGES

Understanding the drivers for changes



Network device end-of-life cycle

- Good opportunity to rethink our COLO access network design

Architecture Update *(Requirements)*

- Improve determinism and fairness
- More network simplicity for management
- Increase network visibility
- Reduce multiplicity
- No interference between OE and MD flows

Discussions & Initiatives

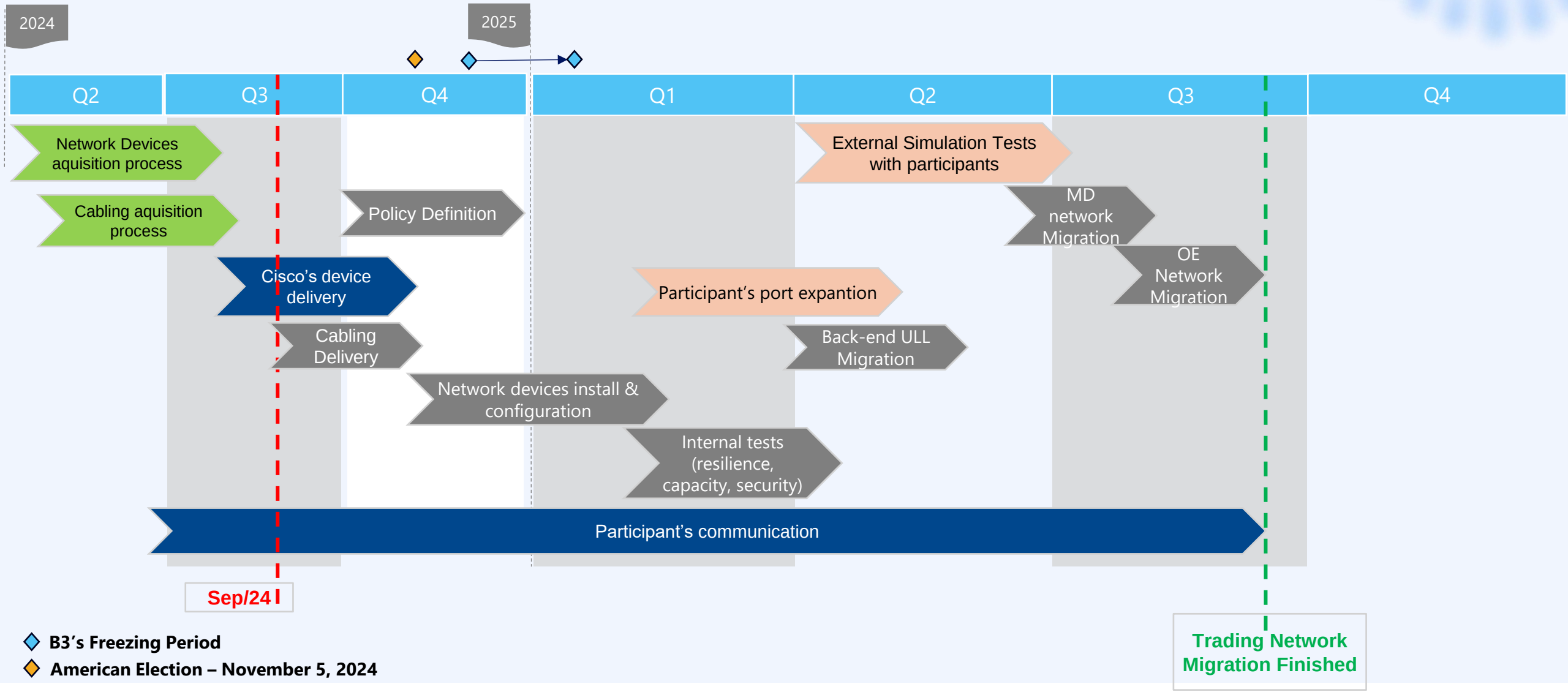
- Discussions with vendors and *some* market participants
  - Multicast and Unicast routing designs
  - Device models and behaviors
  - Forwarding modes and Overtaking Probability
  - Cable length normalization
- Extensive lab validation *(BR, US & UK)*

Trade-Offs & Final Decision

- MD Dedicated Network – All layers with Nexus 3550T
- OE Dedicated Network – Edge layer with Nexus 3548XL
  - *Only cut-through* is supported
  - *Other models* have *port preference*
  - *Other vendors* are off the table due to the lack specialized support and skilled professionals in Br
  - Network *policies* and *rules* are being studied and will be published on Q4/2024

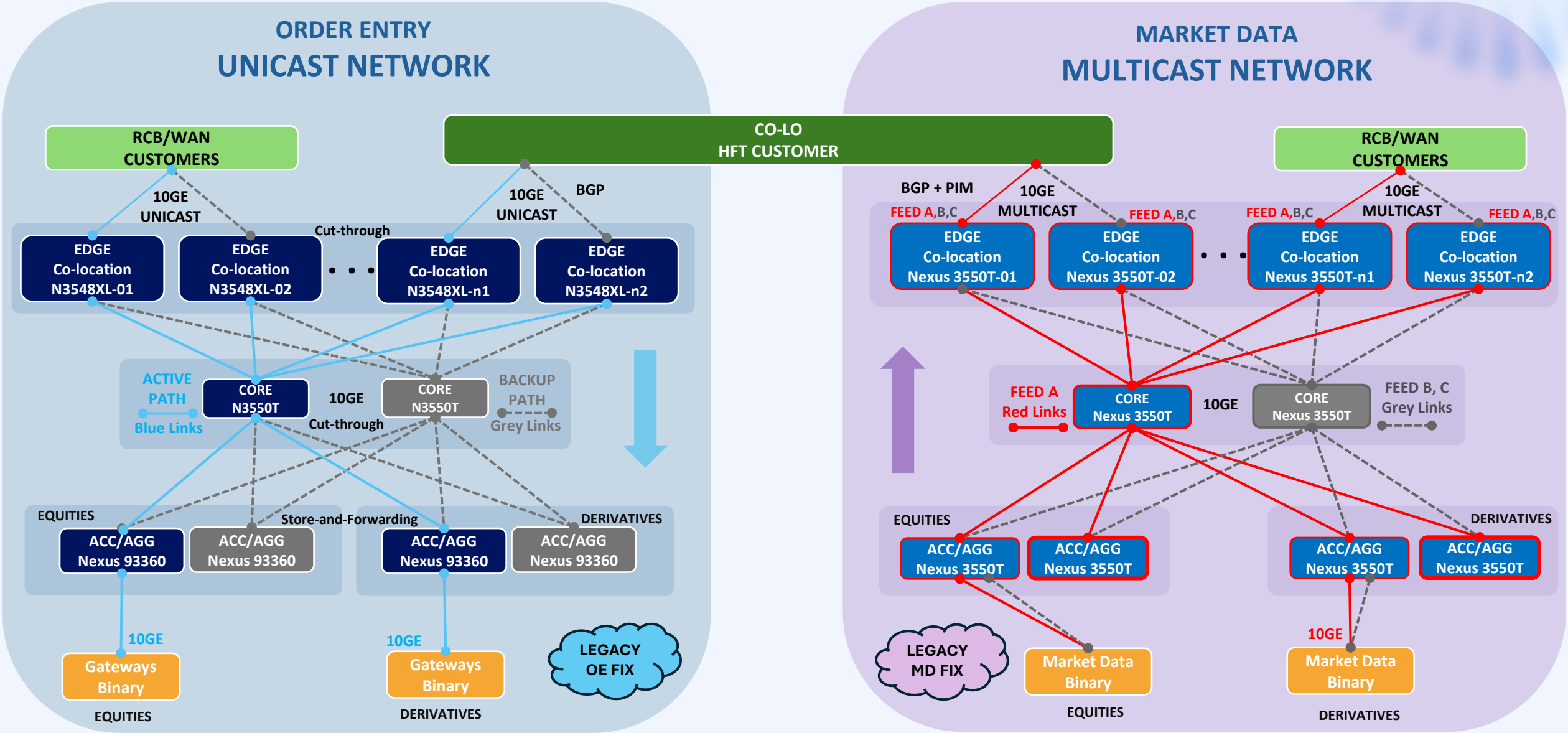
PROJECT TIMELINE

Project Macro Timeline



NETWORK DESIGN OVERVIEW
PERFORMANCE & OBSERVABILITY

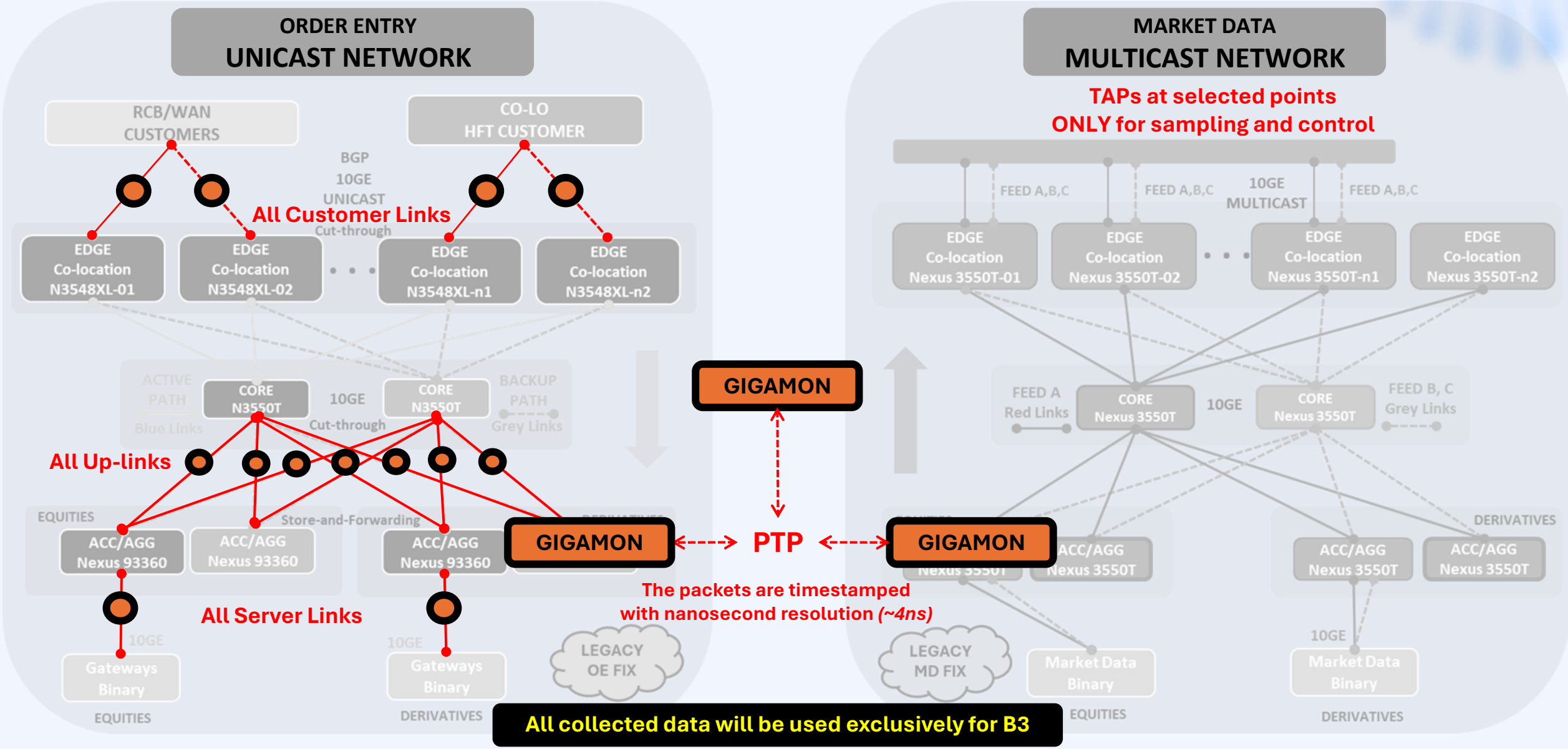
New Network Design



Network Performance Comparison

	MARKET DATA		ORDER ENTRY	
	CURRENT	NEW	CURRENT	NEW
Latency Path	~11us *One-Way*	~800ns *One-Way*	~22us *RTT*	~4us *RTT*
Port-2-Port Variance	Not Measured	~1ns	Not Applied	Not Applied
Overtaking Probability	Not Applied	Not Applied	Not Measured	Up to ~4ns *No more above*

Network Observability *(TAPs & Timestamping)*



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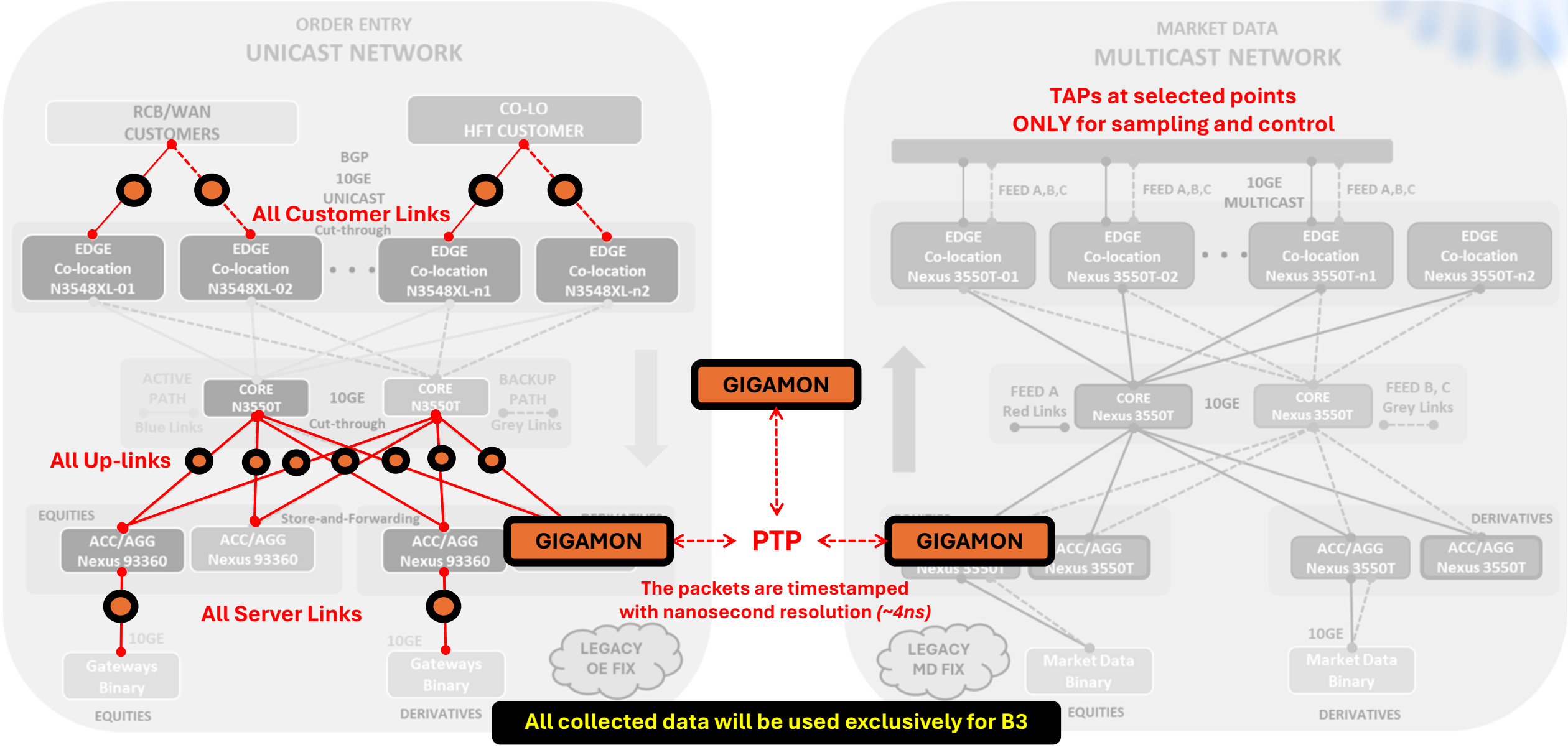
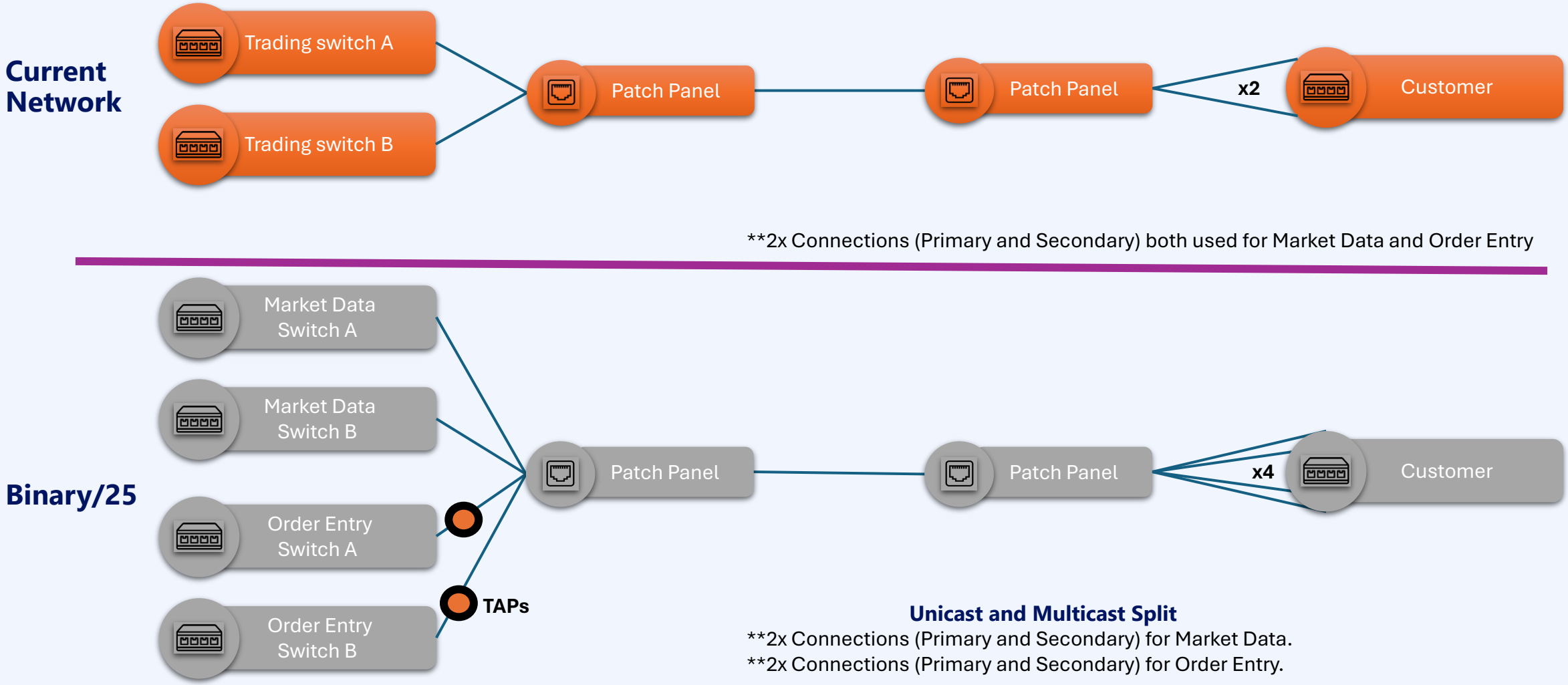


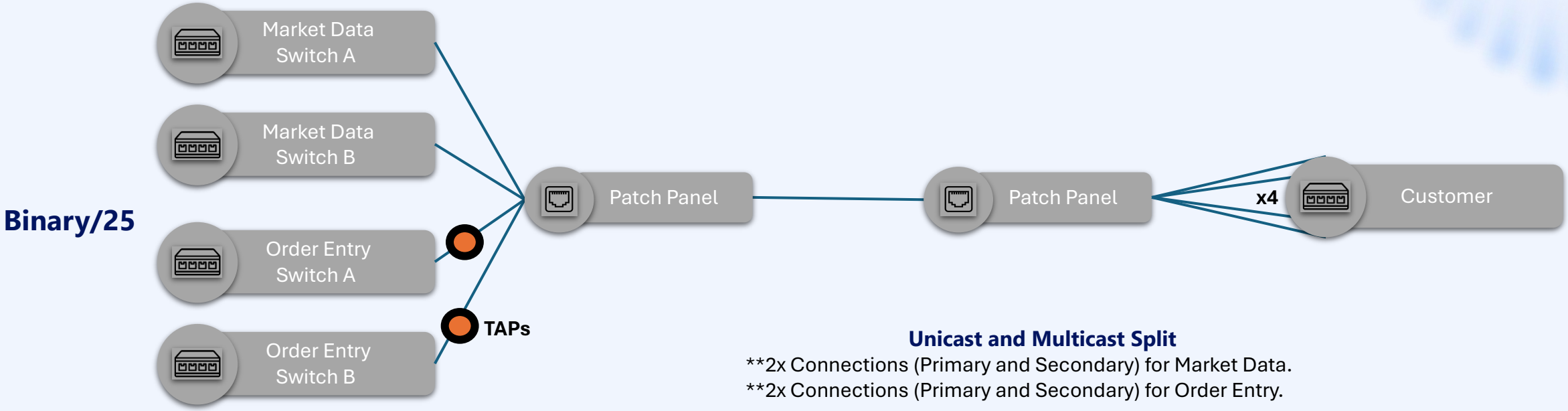
NETWORKING INFRA

DC CABLING

Cabling Infrastructure *(per half rack)*



Simulation Environment *(per half rack)*

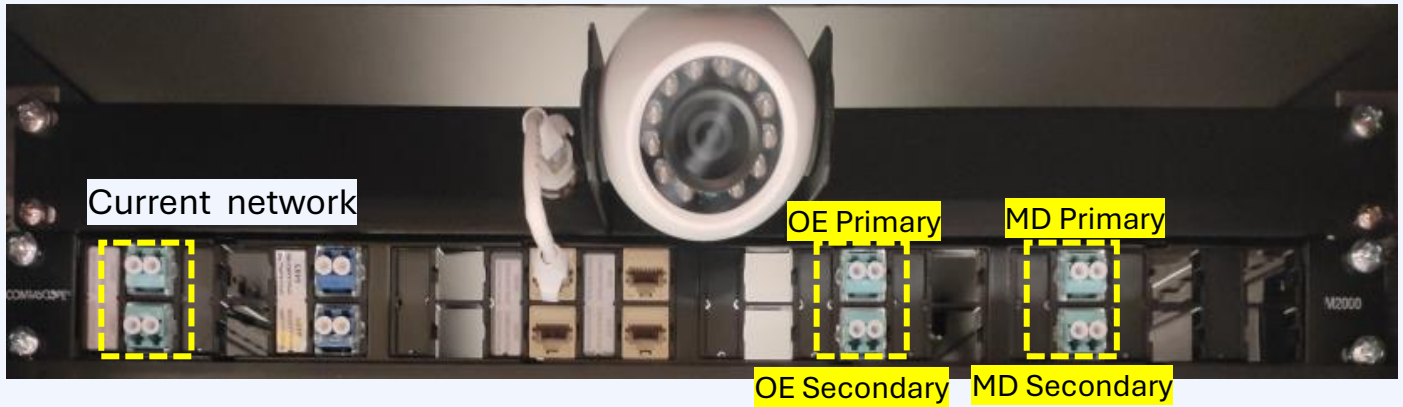


Unicast and Multicast Split

**2x Connections (Primary and Secondary) for Market Data.

**2x Connections (Primary and Secondary) for Order Entry.

Customer rack's patchpanel

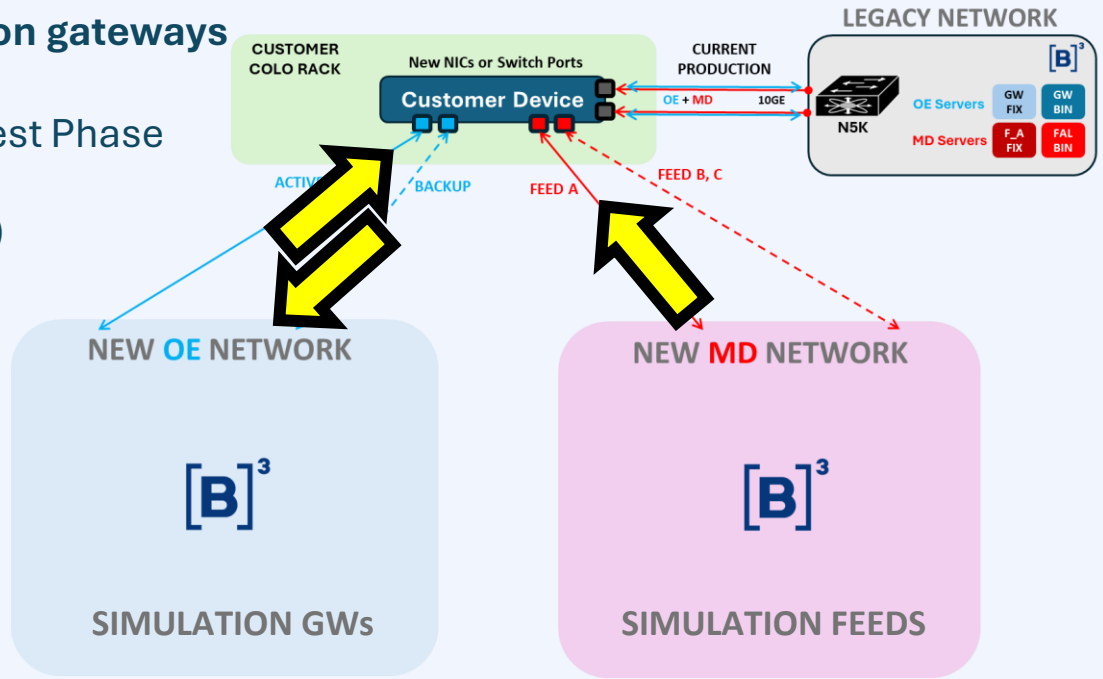


After migration phase *the current network* will be deactivated

NETWORKING TESTS
SIMULATION PHASE

Simulation Environment Overview

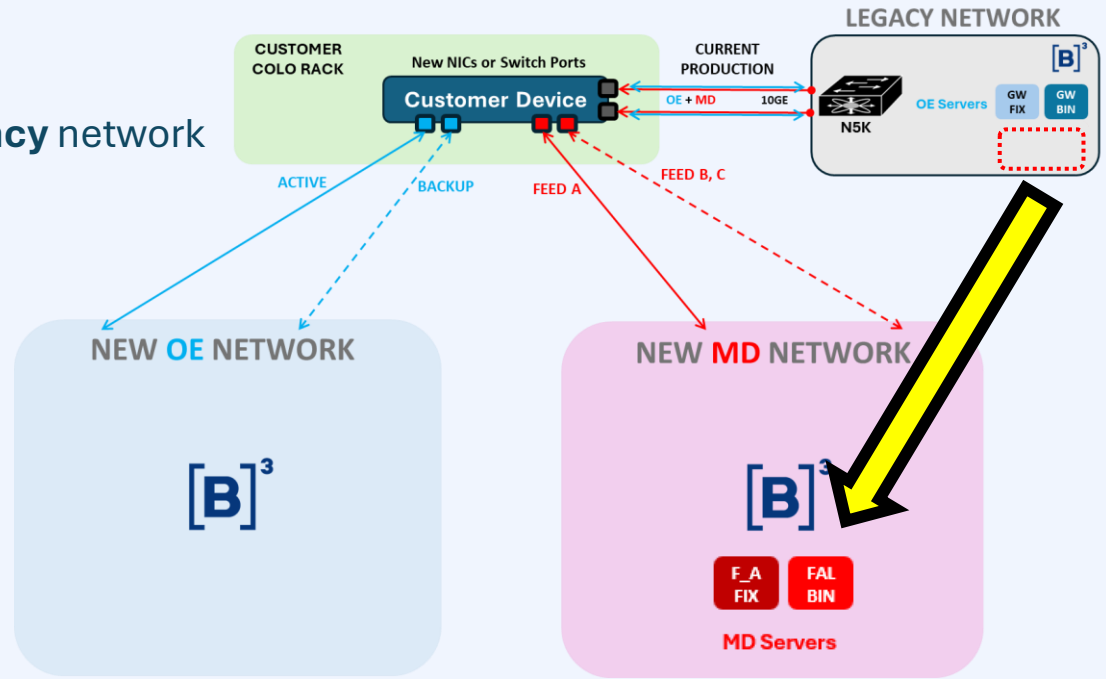
- ✓ **Expansion of participant's** switch and/or port **required for Q2/2025**
- ✓ The **Simulation Test Phase** will last for **about 3 months**
- ✓ **New and exclusive IP addressing**, and multicast groups will be used to **avoid interference** with the current production
- ✓ All **simulation tests** will **not interfere** with the **real production** environment
- ✓ New links will **receive FEEDS** *(with delay)* and connectivity to **simulation gateways**
- ✓ **All service IP addresses** will be **deactivated** after the Simulation Test Phase
- ✓ **Only links** and their **IPs** will be **reused** for the next phase *(Migration)*



NETWORK MIGRATION OVERVIEW – MD & OE

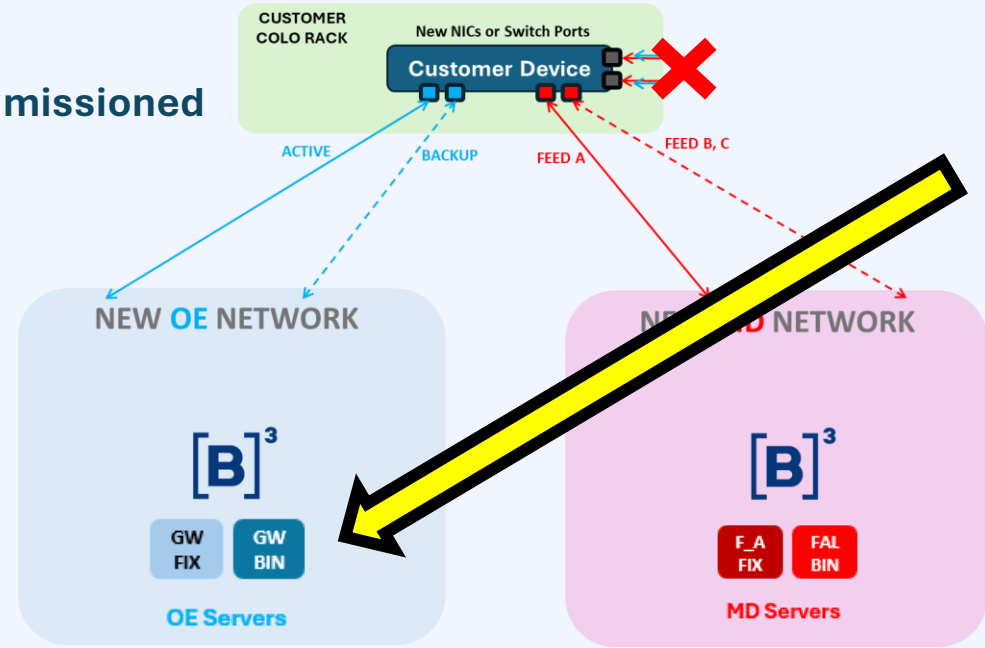
Market Data Migration

- ✓ **All links** will be the **same** as simulation phase
- ✓ **MD** will be the **first migrated** service
- ✓ Will be **migrated in tranches**, in Q3/2025;
- ✓ Same **IP addressing**, and multicast groups as current production
- ✓ **All MD services** *(Bin / Fix)* will be **available** on the new MD network
- ✓ With **MD** already **migrated**, **OE** will continue to **operate via** the **legacy** network



Order Entry Migration

- ✓ **All links** will be the **same** as simulation phase
- ✓ **OE** will be the **last migrated** service
- ✓ Will be **migrated in tranches**, in Q3/2025;
- ✓ Same **IP addressing** as in the current production environment
- ✓ **All OE services** *(Bin / Fix)* will be **available** on the new OE network
- ✓ With **all migration completed**, the **LEGACY** network will be **decommissioned**
- ✓ Full **services running** on the **new infrastructure**



Wrap-up & Takeaways

- ✓ **Network architecture change:** Market Data and OE flows will be segregated over dedicated network
  - Cut-throught as forwarding mode at the edge for OE Switches;
- ✓ **Participant's switch and/or port expansion required for Q2/2025** for the Simulation test phase;
- ✓ **3 months** of duration for the **Simulation Test Phase**;
- ✓ **MD and OE** will be **migrated in tranches**, in Q3/2025;
- ✓ **New network observability** will be available **Only for B3 internal use**;
- ✓ **New network policy and rules of engagement** is under construction and will be available in Q4 / 2024;
- ✓ **Technical deep-dive workshop** scheduled for **next week**;
- ✓ **B3 Tecnical team available for bi-lateral meetings.**

THANK YOU!