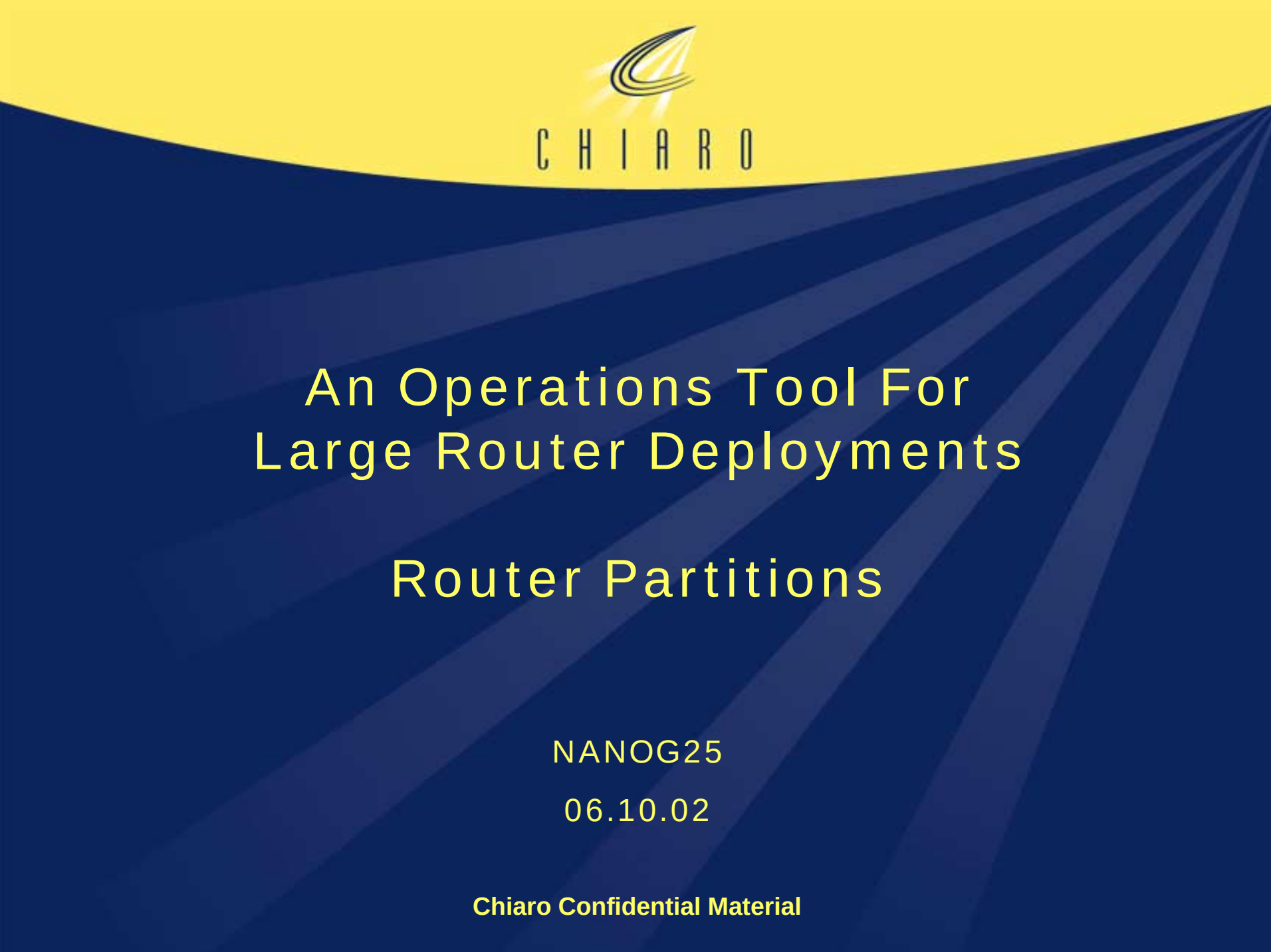

An Operations Tool For Large Router Deployments

Router Partitions

NANOG25

06.10.02

Core Networking Trends

- **Major Trends – driven by economic benefits**
  - Network consolidation - mergers
  - Service consolidation – single core backbone
  - Simplifying the PoP – collapse layers, reduce interconnection
- **Multi-service networking**
  - SLAs, high availability, protection/restoration, line-rate encapsulation and tunneling technologies
- **Internet traffic is still growing**
  - And these trends only add to the traffic growth
- **Large scale core routers driven by bandwidth and connectivity requirements**

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Routing Partitions Preserve Operational Boundaries

- **Logical separate routers on the same physical system**
  - Key applications in Core are network migrations and Network/SP consolidations
  - Small number of partitions
  - Dedicated memory, separate processes, multiple versions, multiple protocols.
- **Cut-through routing**
  - Routing exchanges between partitions
  - Resolutions for single lookup, avoids looping interfaces, single lookup
- **Single or multi-partition interfaces for integrating backbone links**

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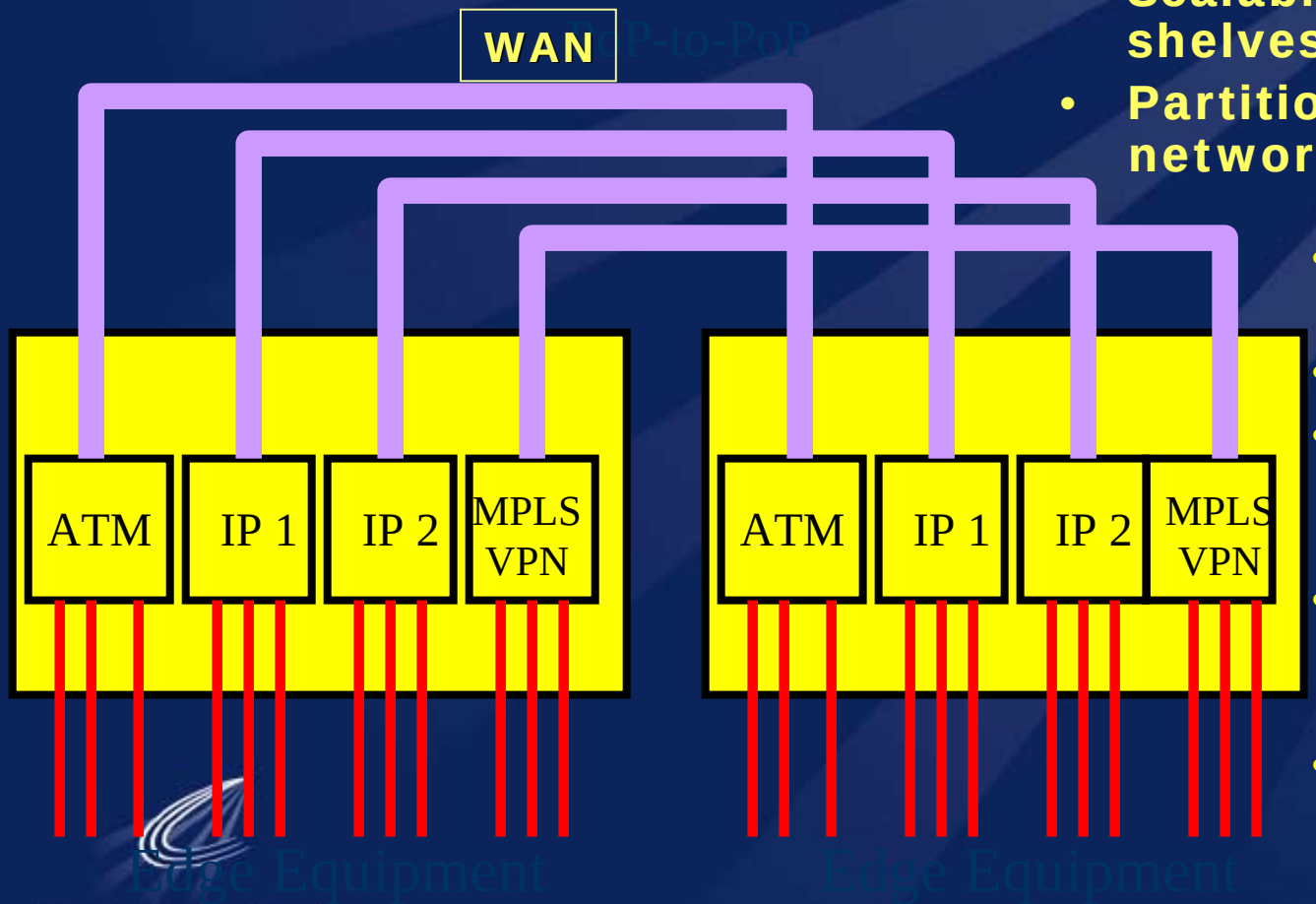
Network/Service Partitioning



- Single shared core router
- Separate backbones
- Scalable: add shelves / ports as needed
- Partition separate networks

- Routing protocol separation
- Failures isolated
- Different software versions
- Internet separated from VPN
- No BGP necessary in ATM / MPLS VPN

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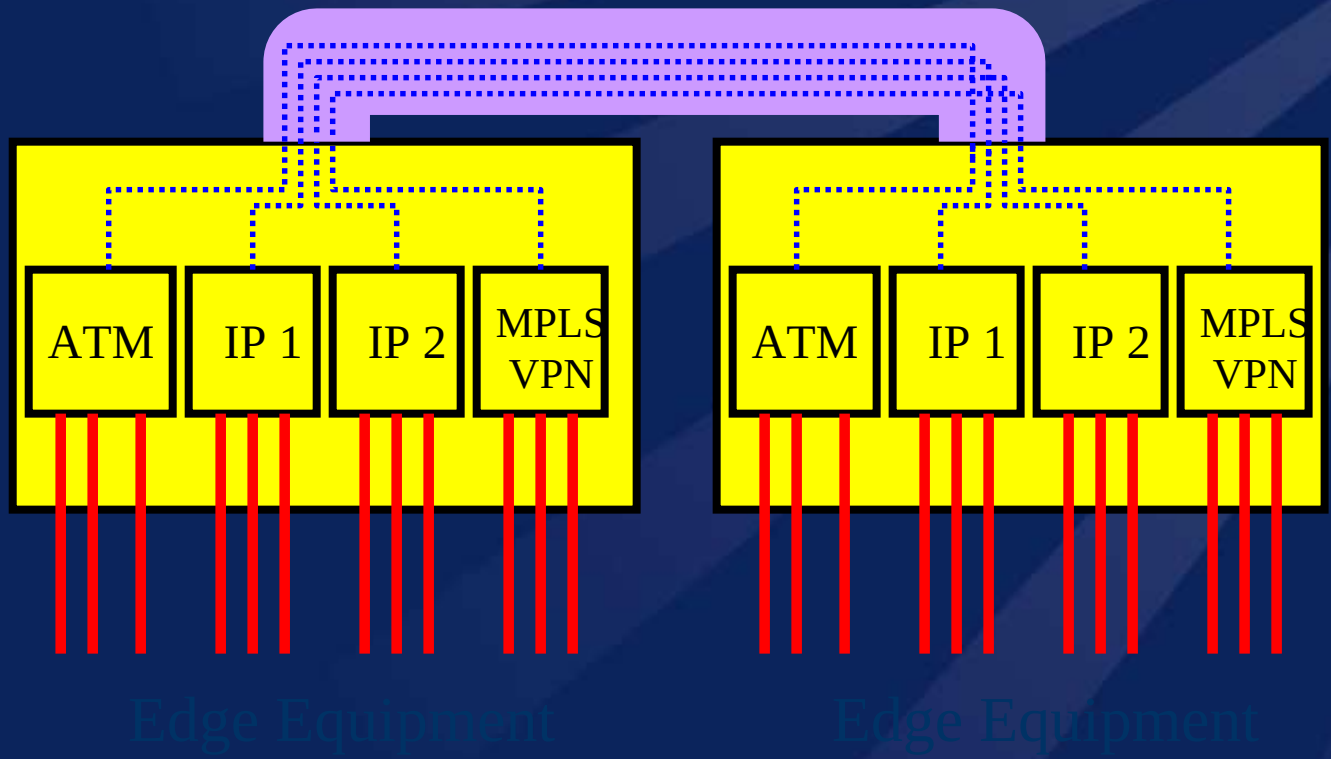
Network/Service Partitioning



- Separate services but integrates over common facilities
- Mux and demux based on encapsulation / tunnels
- Software sandbox
- Graceful introduction of new features
- Useful tool for migrations

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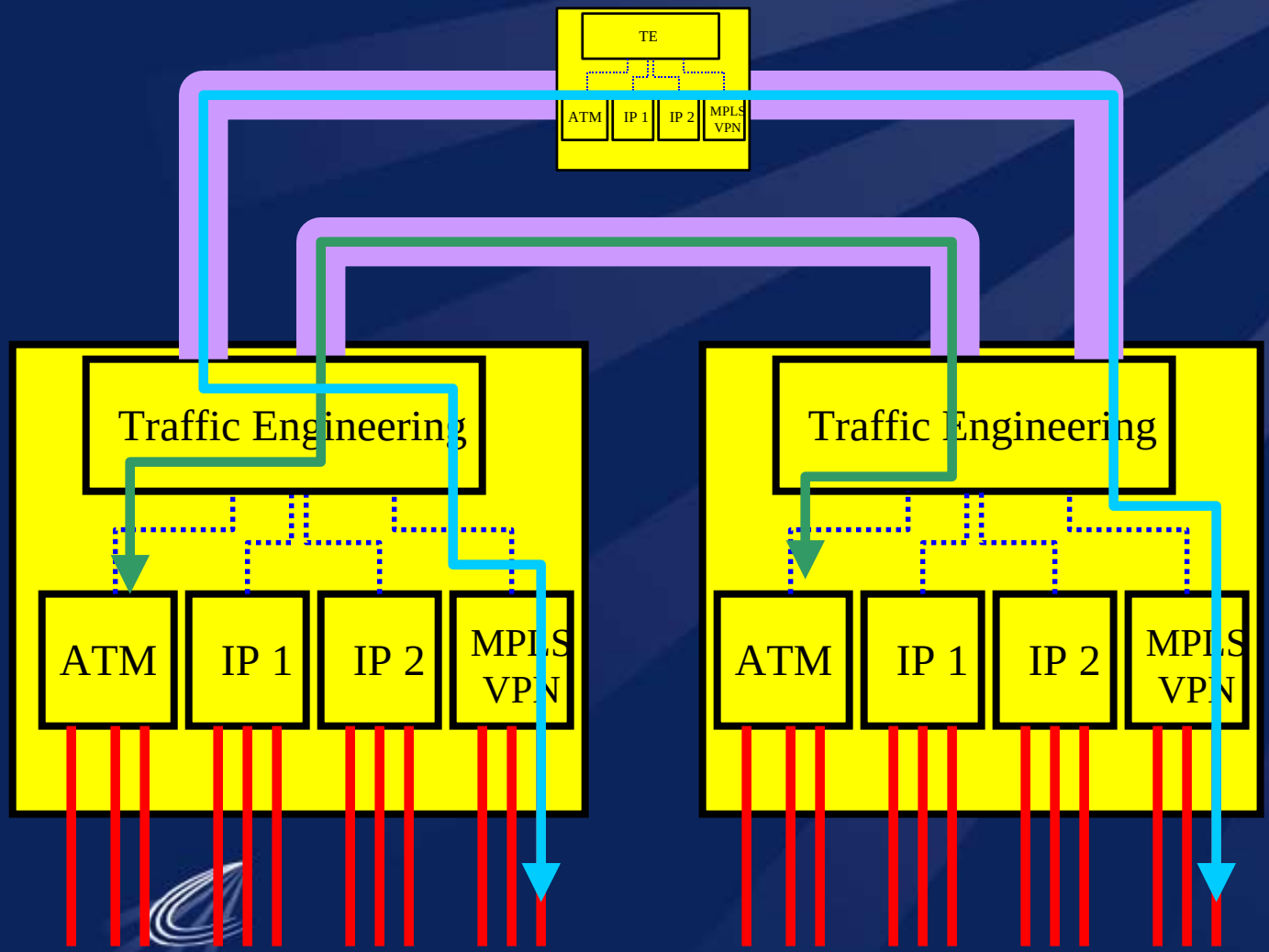
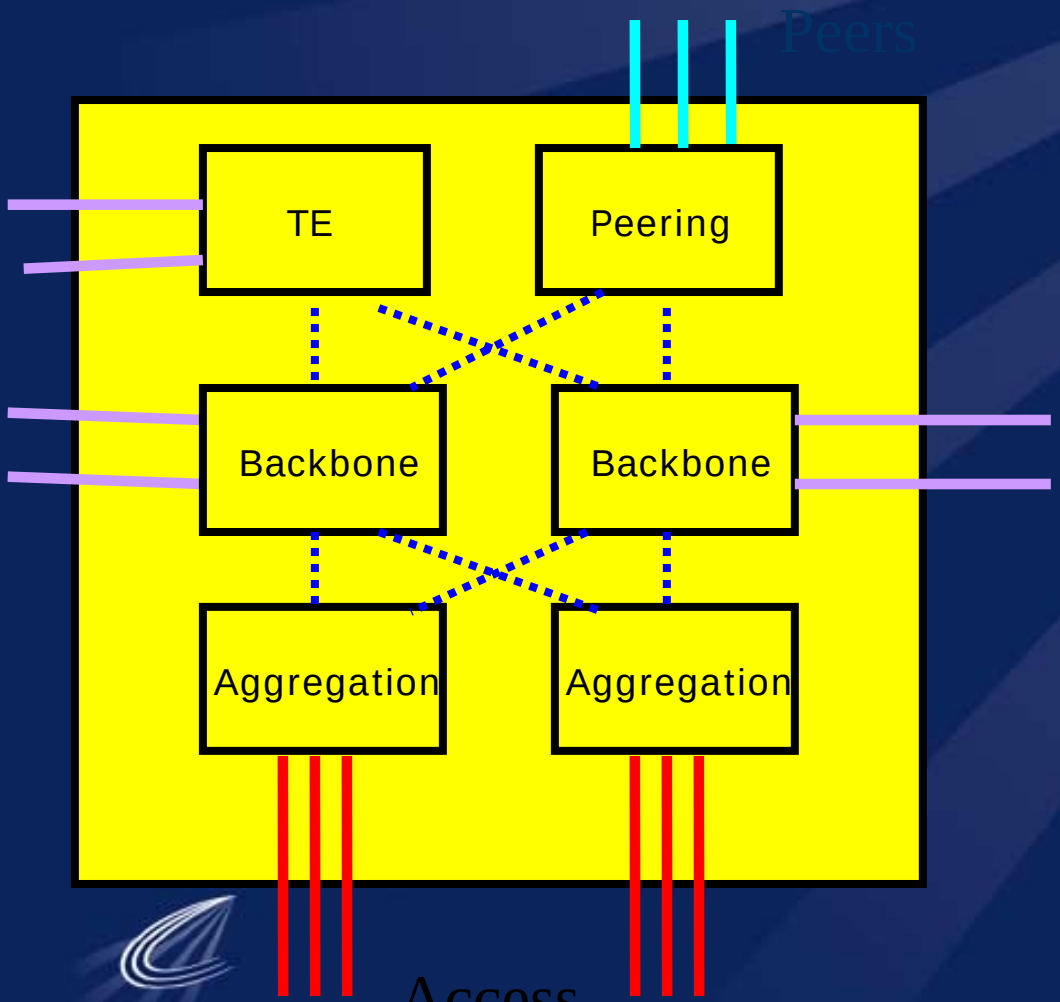
Network/Service Partitioning



- **Coordinated TE**
- **Single IGP Adj across WAN**
- **No BGP in ATM / TE parts**

Functionality Partitioning



- **Reduction of number of managed equipment**
- **Reduce wasted interconnection**
- **Routing protocol redundancy**
- **Maintain operational boundaries**
- **Separates network functions**
  - Peering
  - Core
  - TE
  - Aggregation

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New Level of High Availability Required

- **Larger router, more traffic, multi-service, collapsed layers**
  - Need highly availability design
- **Equipment protection**
  - Hitless failover for port cards, switch fabric cards, interconnection, etc. (1+1, 1:N)
  - No single point of failure
- **In service upgrades**
  - Standby activation should not generate route flaps and minimize non-stop forwarding time (<30sec)
  - Interoperable
  - Identify actual failures resulting in forwarding Loss
- **Simple switch architectures**

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Summary

- **Larger core routers needed but connectivity alone is not sufficient**
  - Partitions are a tool to migrate from current architecture
- **Router partitions maintain operational and service boundaries**
  - Integrated services
  - PoP NE consolidation
  - Graceful network migrations
  - New service introduction
- **High availability requirement increases as router systems scale**
  - Localized fault containment is goal
  - True stateful solution simplifies operator environment

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