Új Utak a Távközlésben

A szolgáltatói infrastruktúra fejlődése

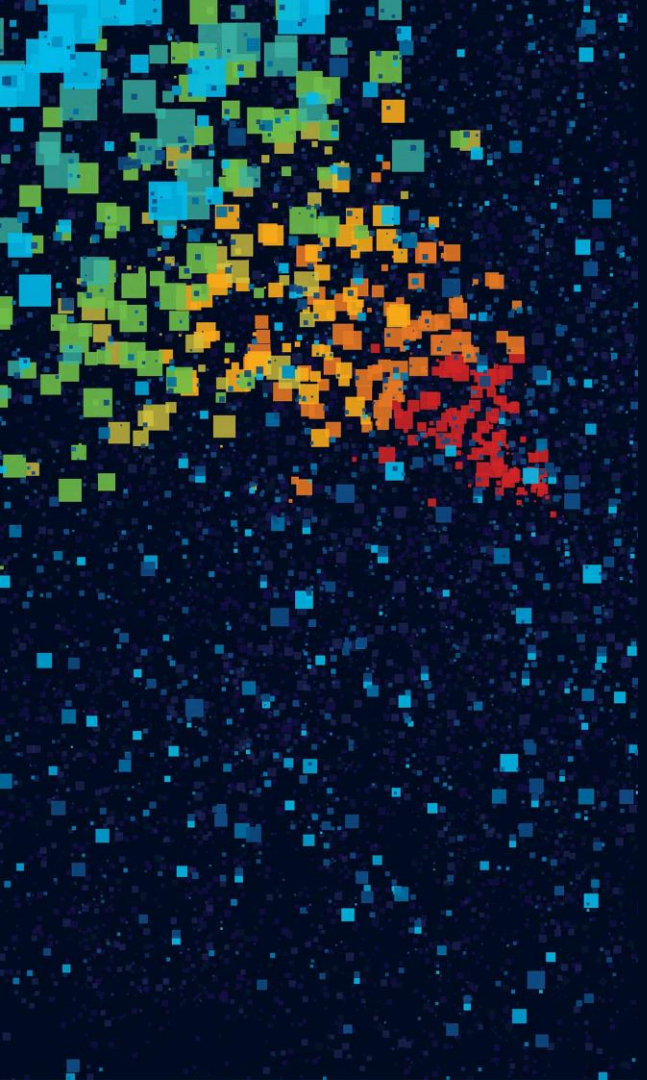
KÖSZÖNJÜK A TÁMOGATÁST!

ARANY SZPONZOR

EZÜST SZPONZOR

BRONZ SZPONZOR

EGYÜTTMŰKÖDŐ PARTNEREK



Agenda

- Business Drivers Driving Digital Transformation
- Industry Trends: The Backdrop
- The Path to Simplicity
- Next Generation Topologies and Technologies
- Conclusion


Business Drivers Driving
Digital Transformation

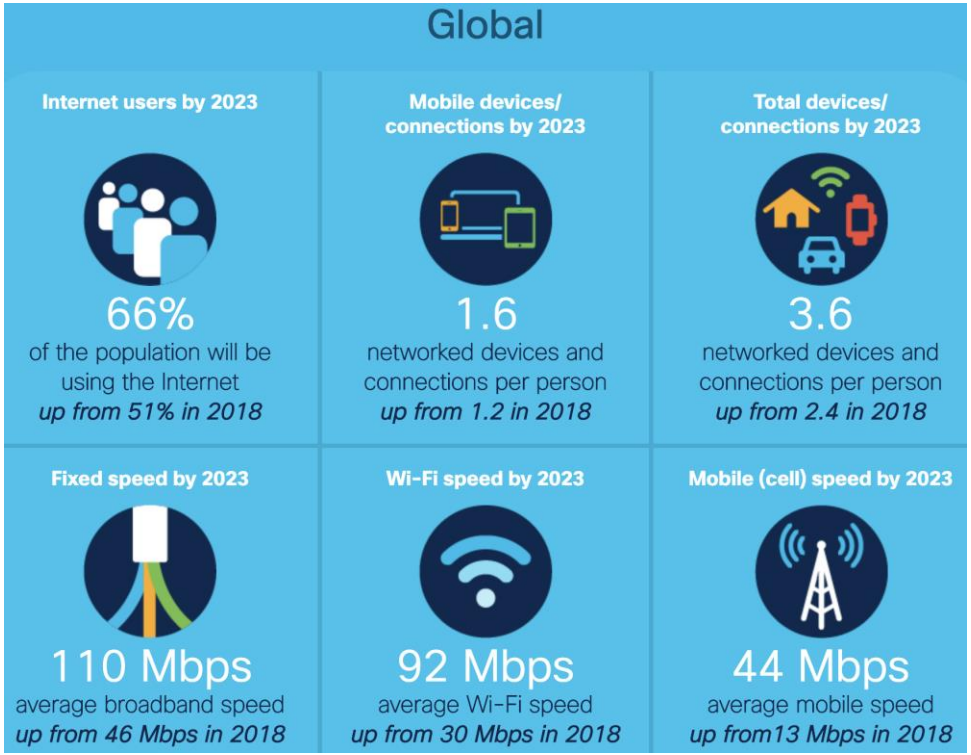
Bandwidth growing 50% year-over-year

The world has gone mobile

Massive IP traffic growth, driven by video

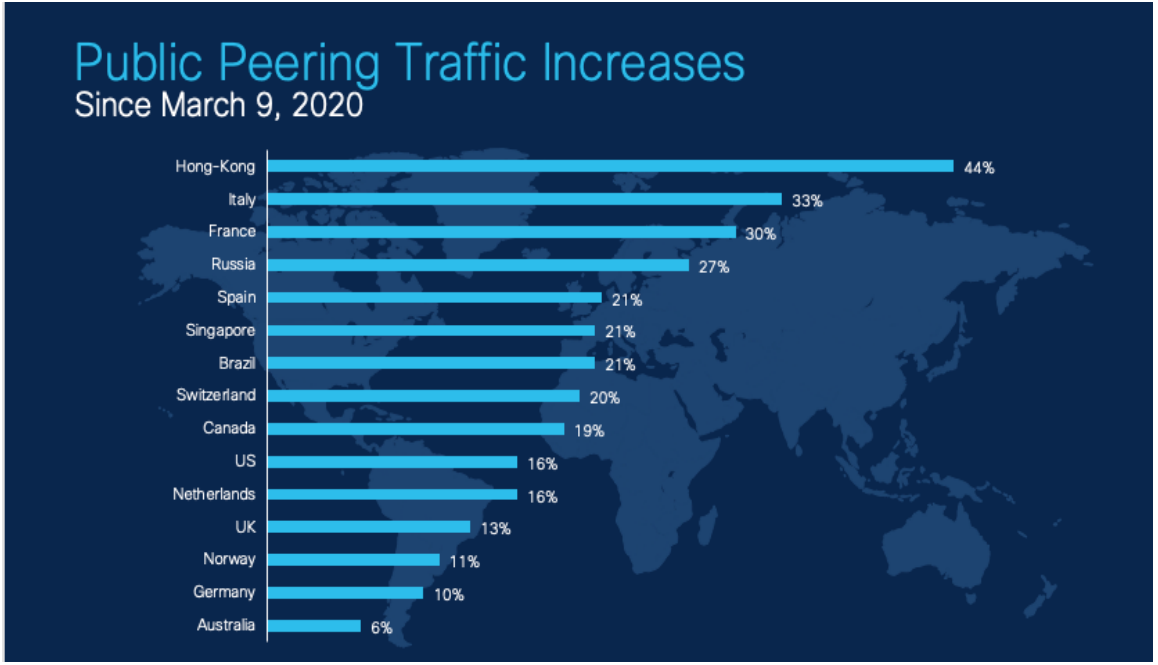
Cloud computing ubiquity

Digitization leading to IoT



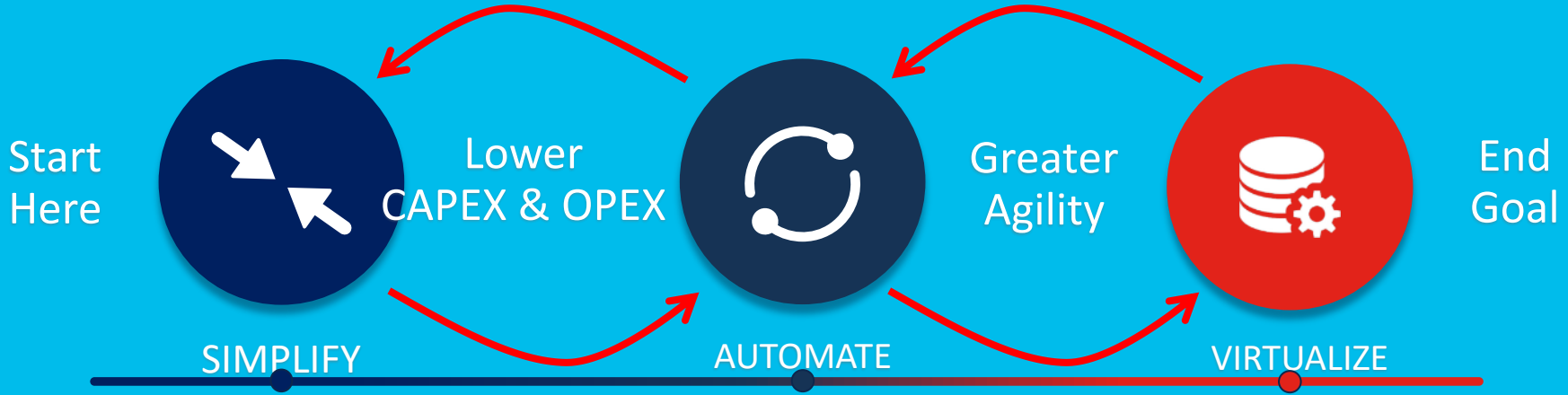
Cisco Annual Internet Report

Our new reality…



- "The Internet is Essential"
- Netflix Streaming effect
- Huge Spike in Webex use
- Sustained Busy Hours

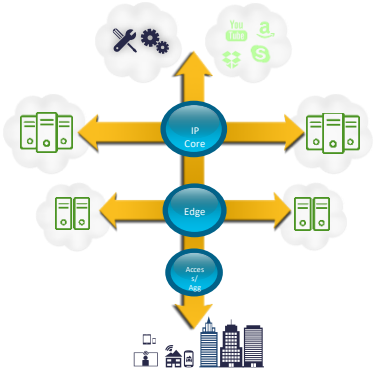
The Business Demands Transformation



Efficiency | Agility | Innovation

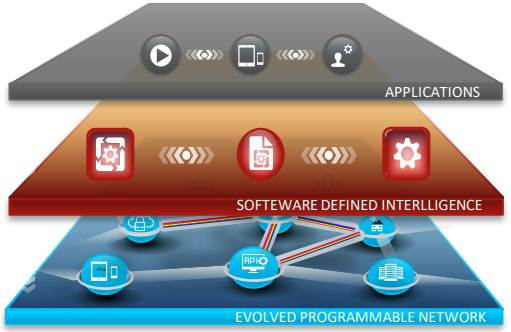

Industry Trends:
The Backdrop

A New Era in Network Architectures



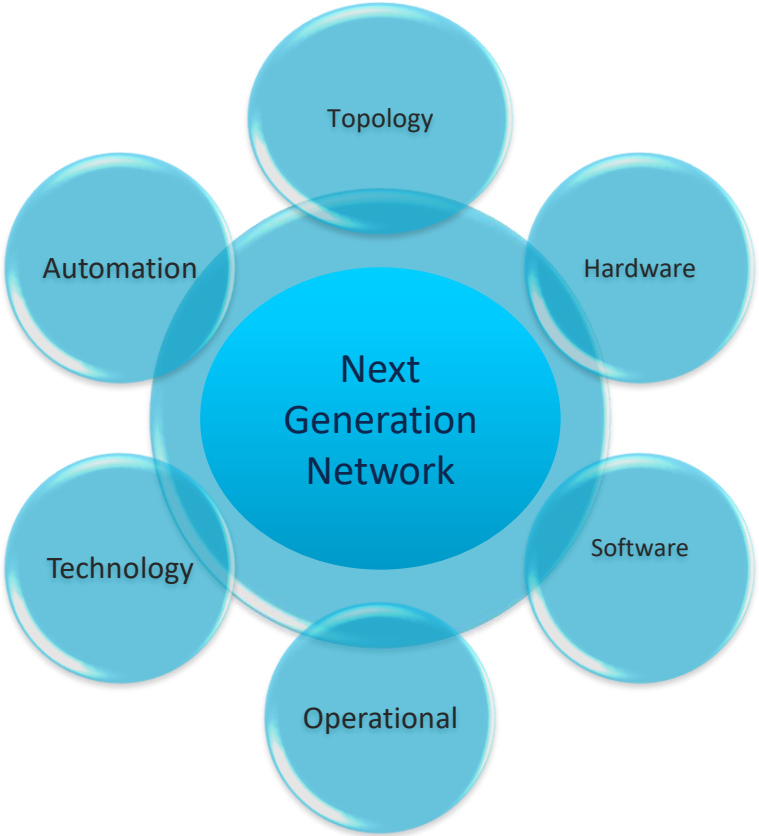
~2 to 5+ Year Transition

Happening today



IP NGN Era	Intent Driven Networks
Designed to support a set of services	Designed to support any kind of services
Static traffic patterns	Dynamic traffic patterns
Manual configuration (CLI)	Automation (APIs, Controllers, …)
Apps Independent of Network	App & Network Interaction

Next Generation Architectural Decisions

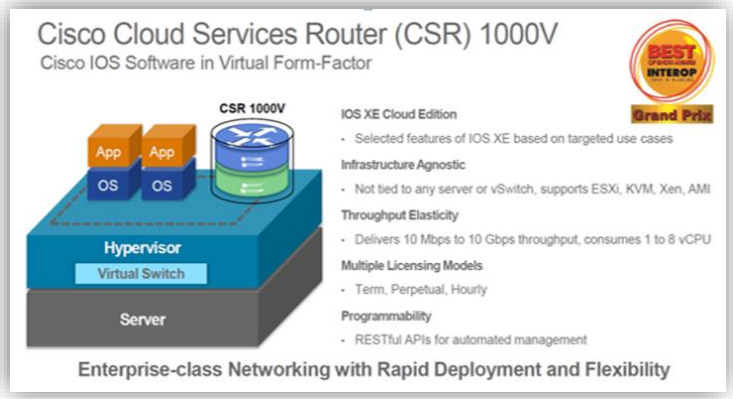


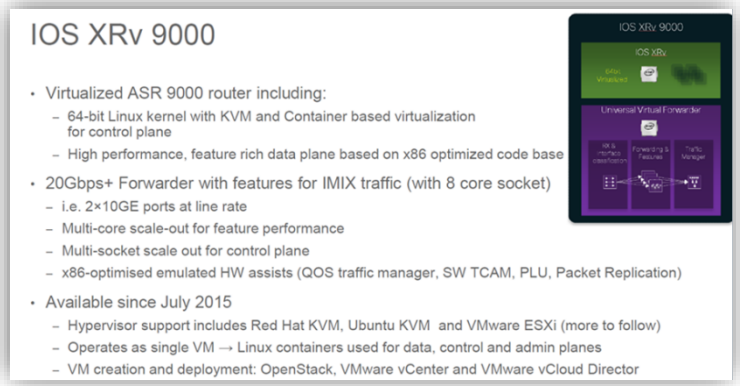
- High Capacity and Scale
- Software Defined & Controller Based
- Virtualized
- Automated
- A Combination of Hardware and Software Worlds

The Evolving Hardware and Router Landscape

Some new Entrants to the mix

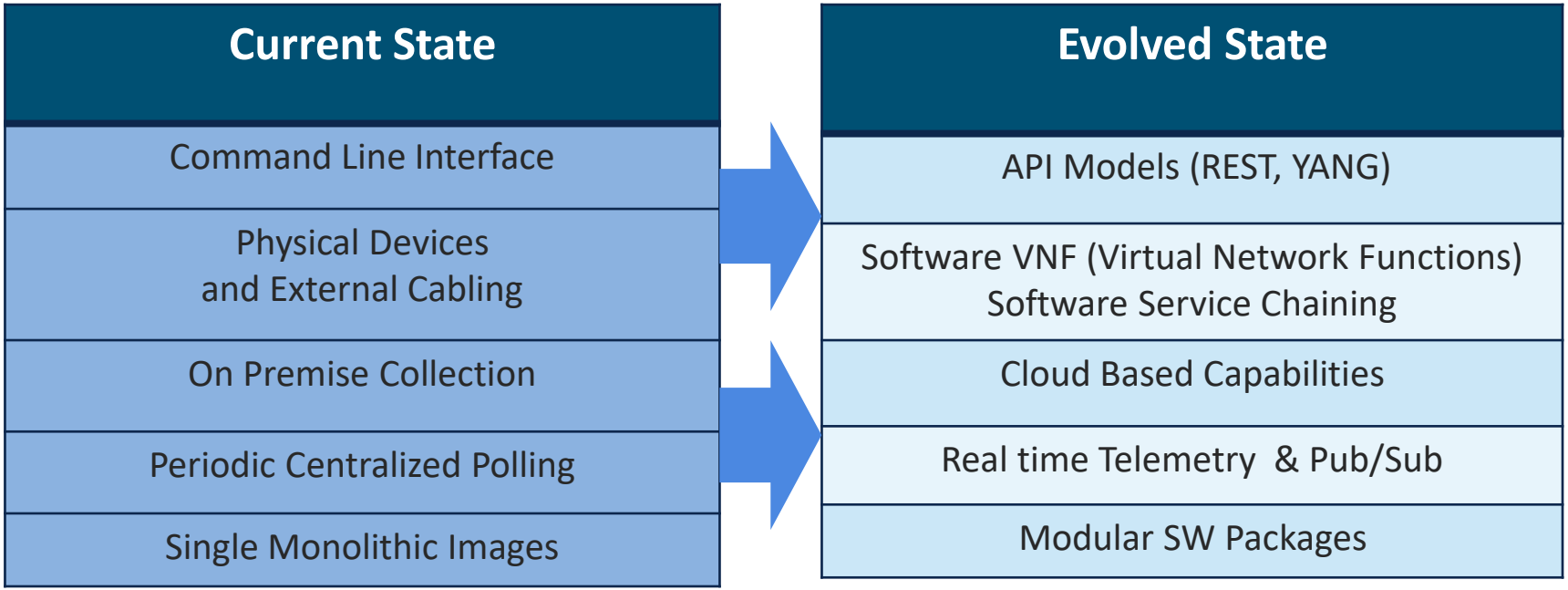
- Exponential Traffic Growth driving multi Terabit speeds and rich features on high-end platforms with Custom Silicon
- Commoditized Silicon for moderate and low end applications (Internet Peering, etc)
- Software based Routers for virtualized environments and Hyperscalers
- Many customers have End of Life or End of Support Gear that are incapable of more modern features like Segment Routing, FlowSpec, Model Driven API support, Telemetry, and many other features





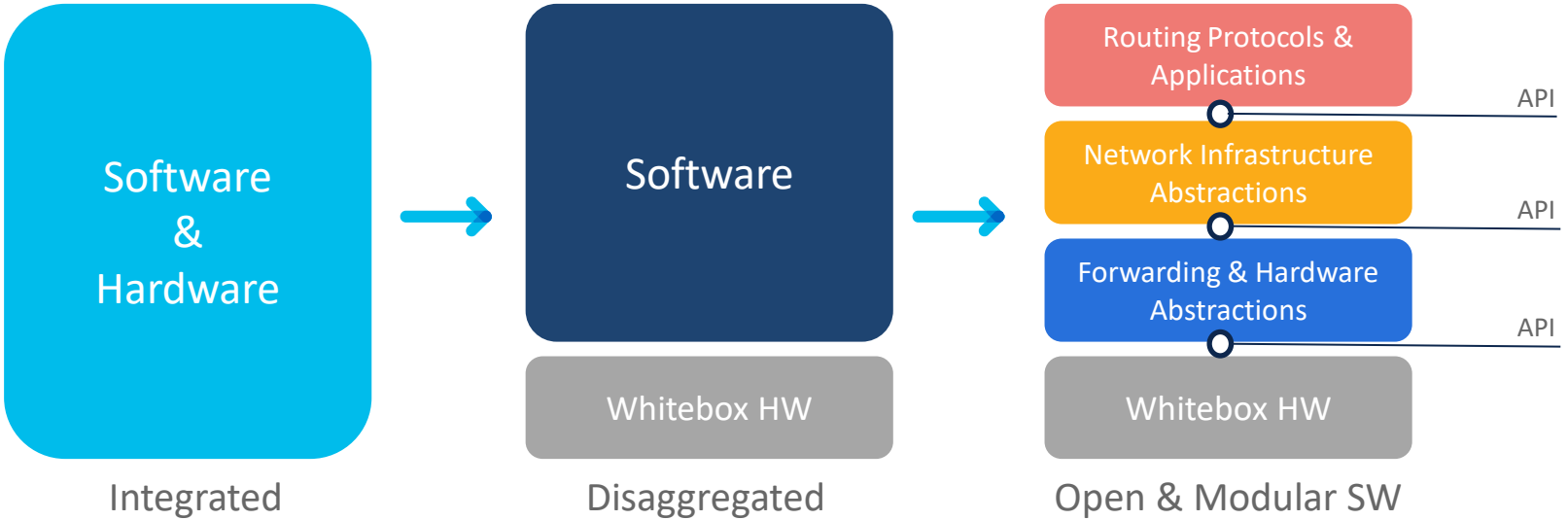
The Evolving Software Landscape

Hybrid state will persist for a while



Hardware and Software Disaggregation

We are still in “early innings”…



Rich Feature Set
Wide Range of HW Form Factors
Pre-integrated / pre-tested
Single Touchpoint Support

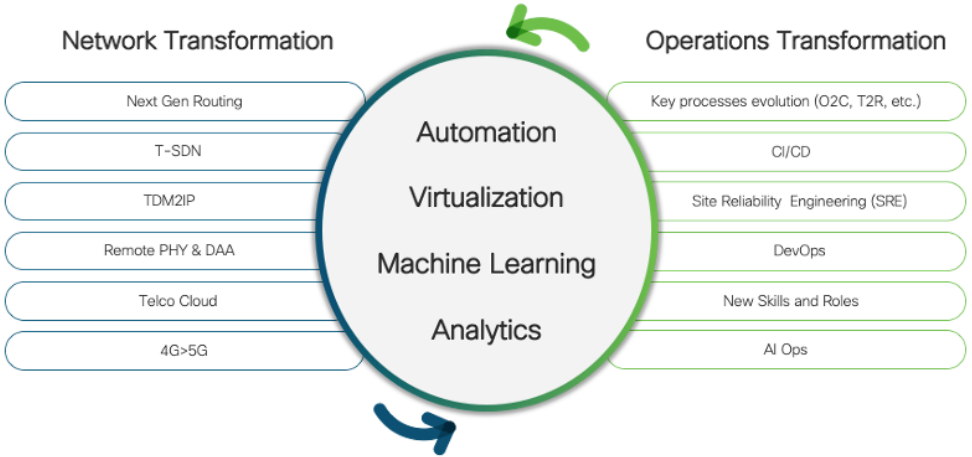
Value
Proposition

SW Feature Development Speed
HW Platform Independence
Cost efficiency
New Operating Paradigms

The Evolving Operational Landscape

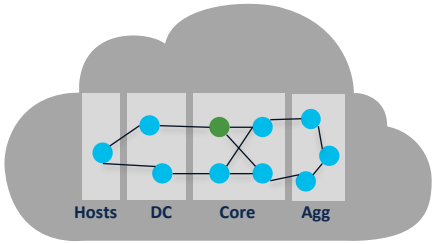
Network & Operations Transformation must work Hand in Hand

- Analytics Platforms, Capacity Planning and Traffic modeling have matured
- Telemetry is key focus area
- Automation, network programming and collectic standards are here (NETCONF/YANG)
- Predictive Analytics, Data Correlation are happening and accelerating
- Closed Loop Automation and Analytics are here

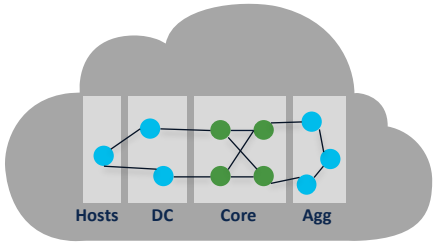


Lot of Data Sources!

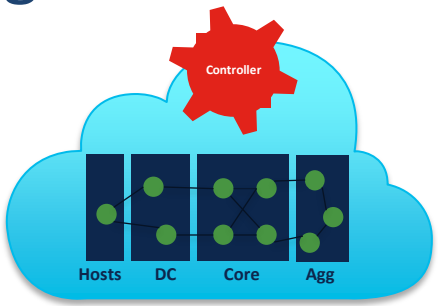
Evolution from “CCIE Hacks” to Modern Elegance



One device, single domain



Many devices, single domain



Many devices, across domains

IP NGN Era

Policy-Based Routing

MPLS RSVP - TE

Effective solutions with some caveats:

- Little or no application / network interaction
- Scalability
- Configuration & troubleshooting complexity
- States to be maintained in each network node

Controller

Evolution required to address the new paradigm

Intent Driven Networks

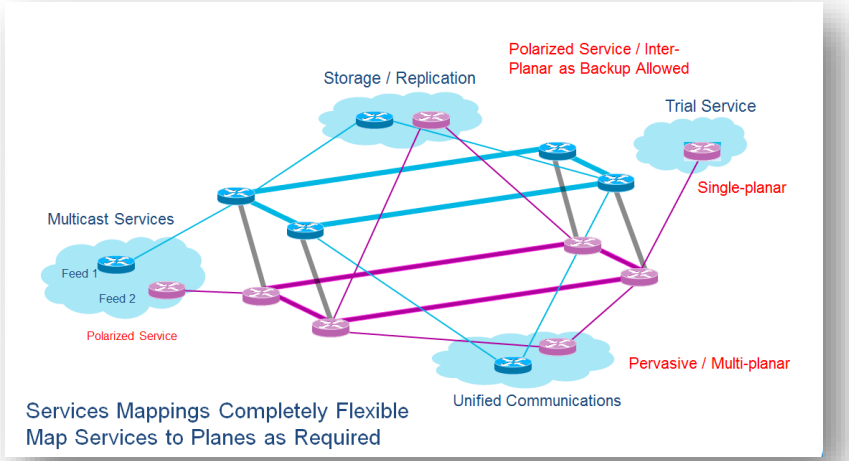
Software Defined Networking

- Scalable
- Stateless
- Programmable
- Ease of configuration & troubleshooting , Simplicity
- New Technologies (Segment Routing , EVPN, Telemetry)


The Path To Simplicity

Architecture, Topology and Capacity Trends
Adjusting to new service and application needs

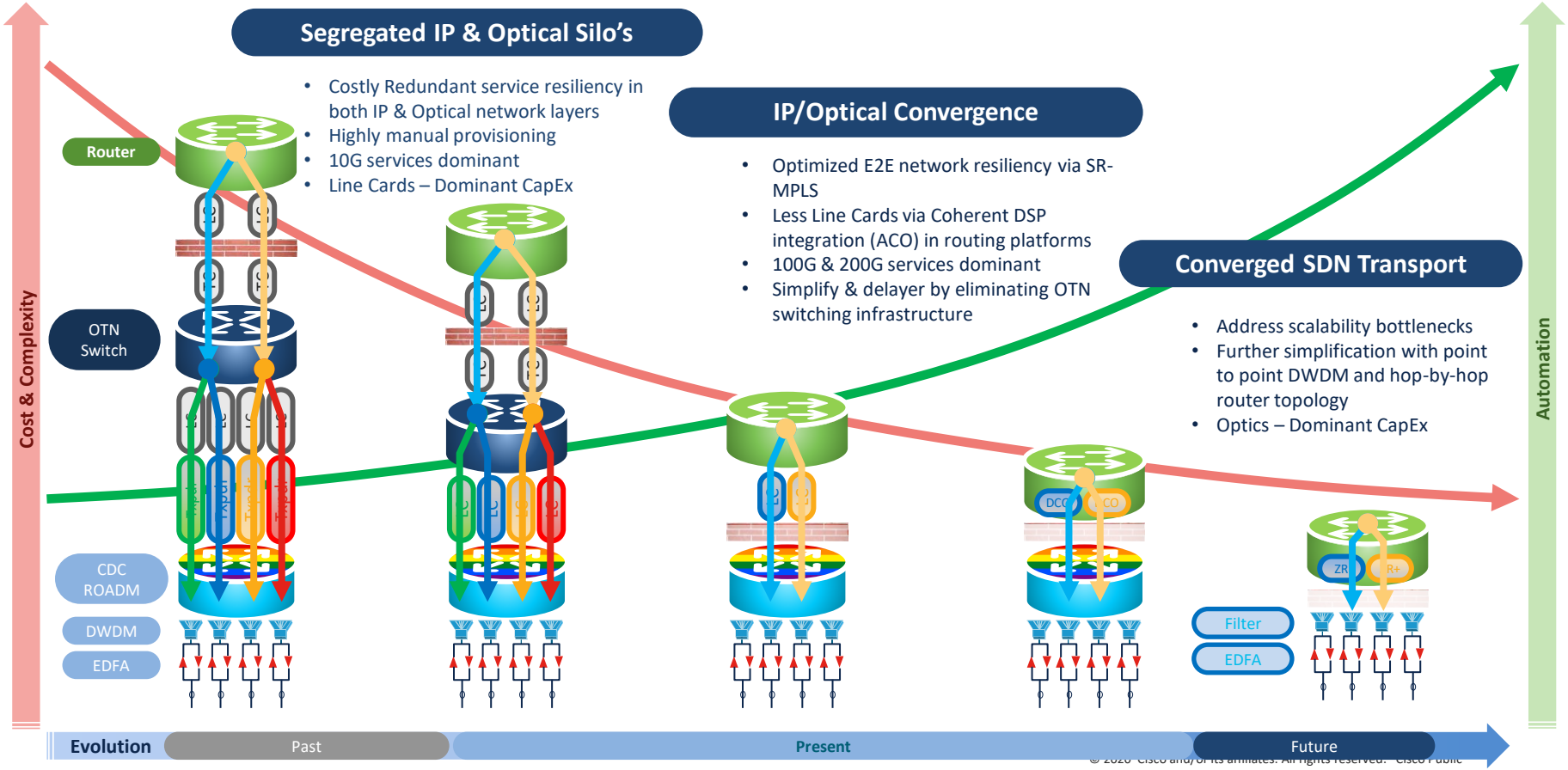
- Reduce/remove protocol state where you can!
  - simplifies troubleshooting, design, testing cycles
- Simplified Topology - Lean / Hollow Core
  - Core as a “Fabric” -- Any to Any becomes more feasible, CLoS Fabrics
- Service Segmentation
  - Simplified Traffic Steering for low latency or high bandwidth
  - Multi Planar Cores
- IP and Optical Convergence



Multi-Planar Core Example

Many Real Deployments,
99.999+ Uptime

IP/Photonics Convergence – More Simplification Ahead



Control Plane Evolution: Reducing Protocols and State –

A real customer example

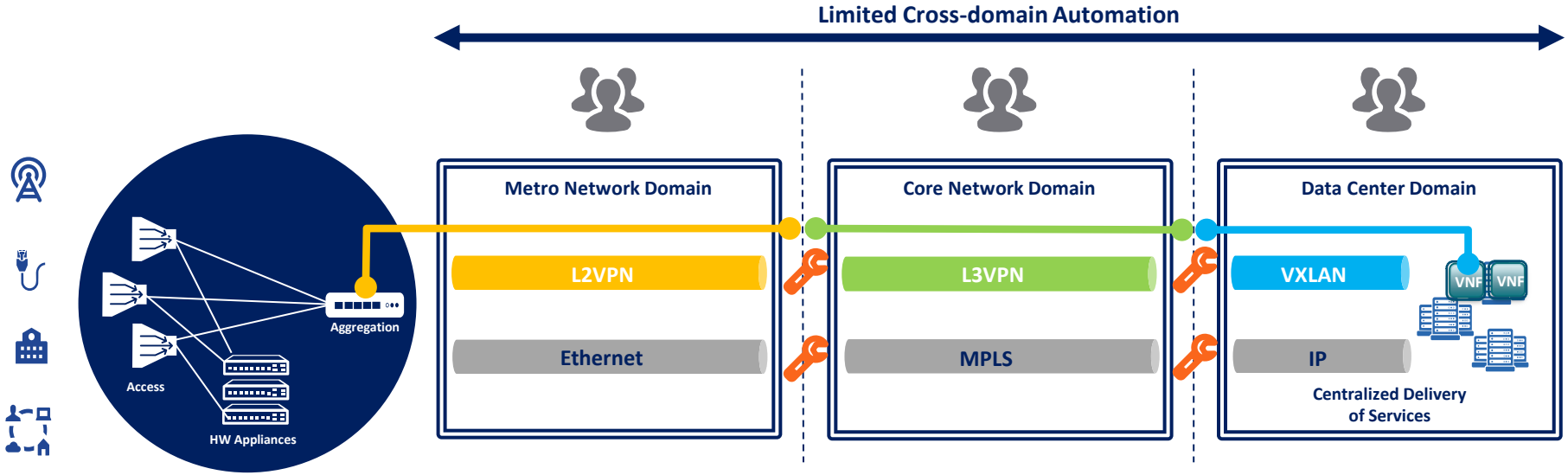
Current State (Today)
ISIS
RSVP-TE
LDP
PIM
Directed LDP
BGP (VPNv4, VPNv6, Label Unicast, etc.)

Evolved State (Future)
ISIS with Segment Routing
BGP (EVPN, VPNv4, VPNv6, Label Unicast, etc)

5-6 (IGP, BGP, Specialized protocols)

2 -3 Protocols (IGP and BGP)
Simplicity!

Understanding Today's Service Creation
Too much Complexity!



E2E service provisioning is lengthy and complex:

- ✓ Multiple network domains under different management teams
- ✓ Manual operations
- ✓ Heterogeneous Underlay and Overlay networks


Next Generation
Technologies

Next Generation Requirements

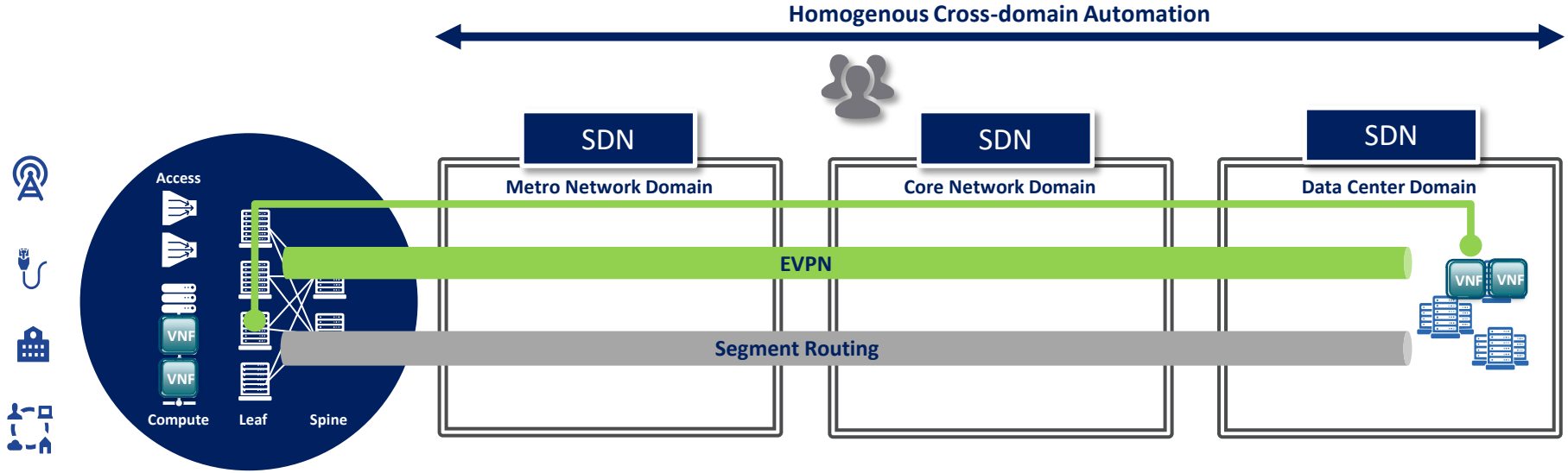
- High availability (5 9s+)
- Fast converging (subsecond)
- Low latency (<50ms) and low jitter for real time communication services
- Ultra-High Scalability (thousands to 100,000+ nodes, global scale)
- Traffic Engineering and Steering as needed
- Fault-domain isolation and service segmentation
- Greater Efficiency (higher average utilization)
- Secure and Programmable Infrastructure

Segment Routing 101

- Source Routing
  - The source chooses a path and encodes it in the packet header as an ordered list of segments
  - The rest of the network executes the encoded instructions
- Segment: an identifier for any type of instruction
  - Forwarding or Service
- Forwarding Plane Options:
  - MPLS: an ordered list of segments is represented as a stack of labels
  - IPv6: an ordered list of instructions is encoded in IPv6 header
- Standards Driven, Multi-Vendor Solution

Unified ‘Network as a Fabric’ for Service Creation

- Converged SDN Transport

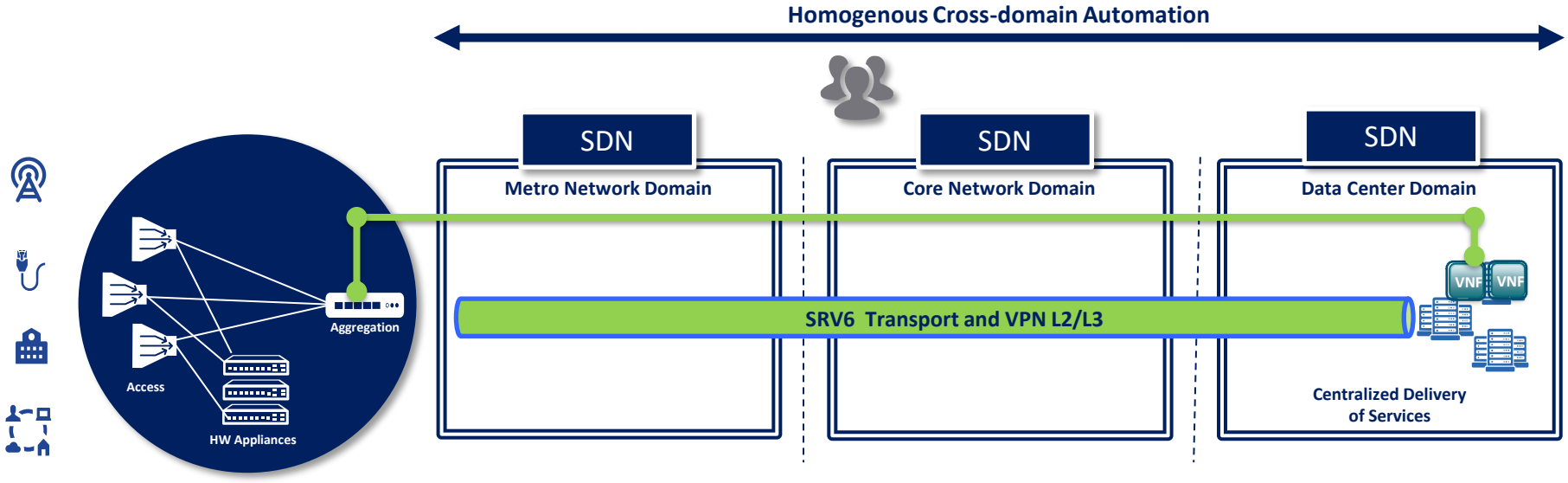


Simplify — Unified underlay and overlay networks with segment routing and EVPN

Automate — E2E Cross-domain automation with model-driven programmability and streaming telemetry

Virtualize — Enable distributed service delivery and speed up service creation

Consolidate Service and Transport using SRv6 Future State …



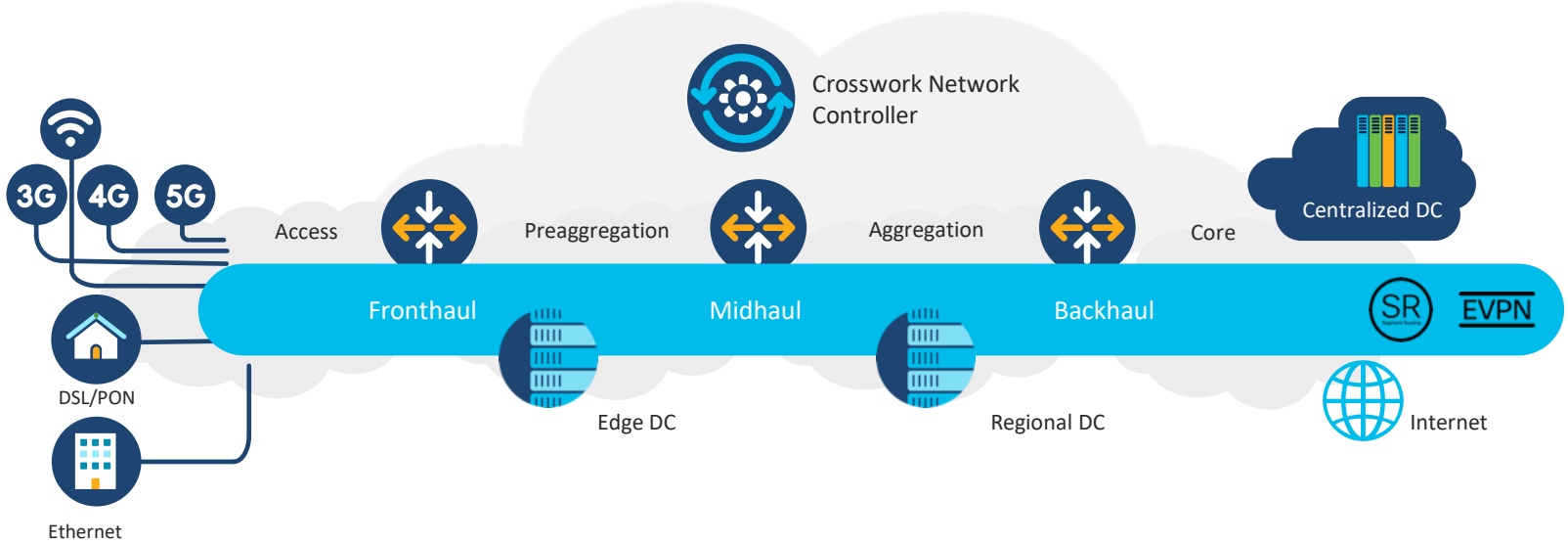
Simplify Further by Combining Service and Transport

- ✓ **SRv6 – Transport and Services both built into the IPv6 header**
- ✓ **Unified Transport and Services**
- ✓ **Multiple network domains under same management teams**
- ✓ **Automated Operations**

Conclusion

Converged SDN Transport

Mitigate Risk
Grow Revenue
Reduce Cost



Architectural Transformation

Programmable Infrastructure

Automated Infrastructure

Operations Transformation

Thank you