Real-time Collaboration in a Virtualized World

Leveraging Next-Generation Data Centers and Networking Fabric

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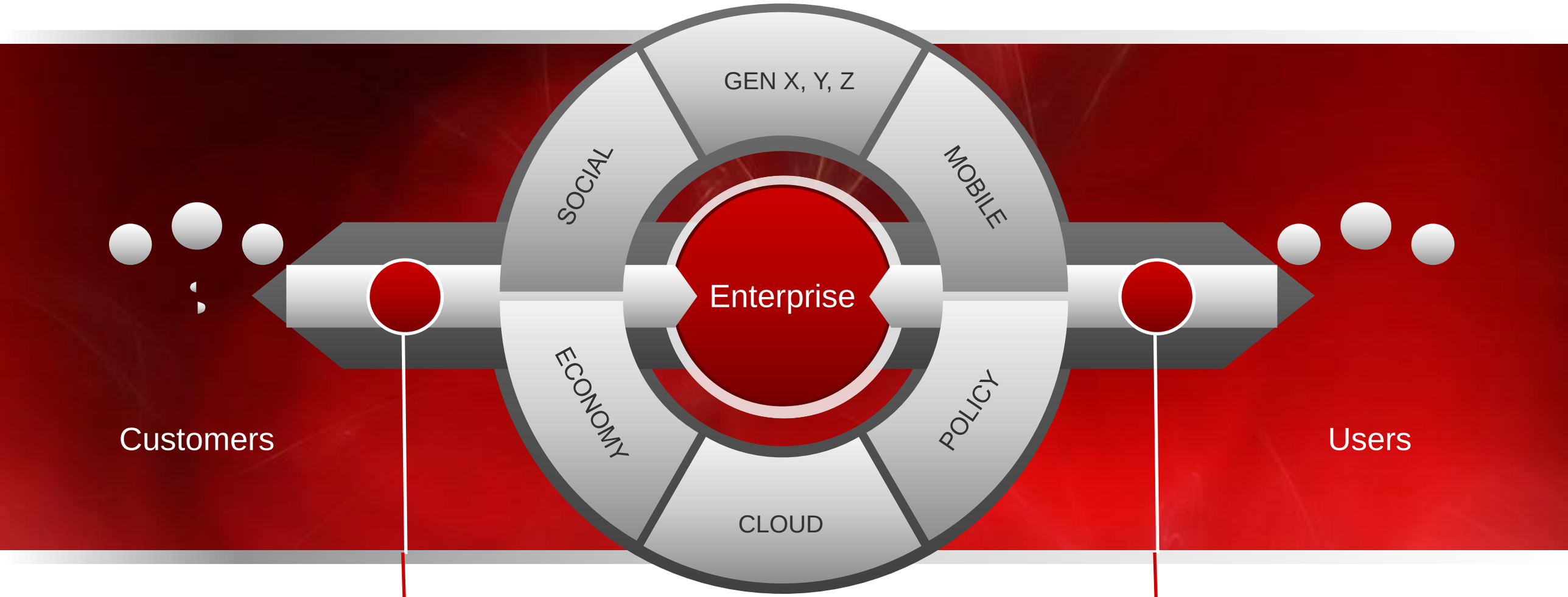
October 2012

Accelerating the Speed of Business

Accelerating **People**, **Processes**, and **Customer response**



Point of
Revenue

Point of
Productivity

Legacy View of the Enterprise

Enabling Business Agility

Avaya Collaborative Cloud™ approach

Delivering new innovative applications and services

Real-Time Applications

Contact Center

Networking

Unified Communications

Use it.

Access services through public & hybrid cloud

Build it.

Cloud grade network

Deliver it.

Deliver cloud services

Enhance it.

Integrate your business applications to enhance the cloud

Transforming the way people work together.

Enabling Enterprise-wide Collaboration Solutions

Faster collaboration, smarter decisions, better business

Use it.
Access the public & hybrid cloud

Apps *Collaboration*

Apps *Social Media*

Apps *Contact Center*

Standard Media

Web

Social Networks

Stores Branches

Avaya Aura®

Avaya Networking Fabric

Cloud Services

AvayaLive

Service Providers

Customers
Partners
Suppliers

Mobile Collaborators
Customer Facing Specialists

Visual Collaborators
High-Speed Teams

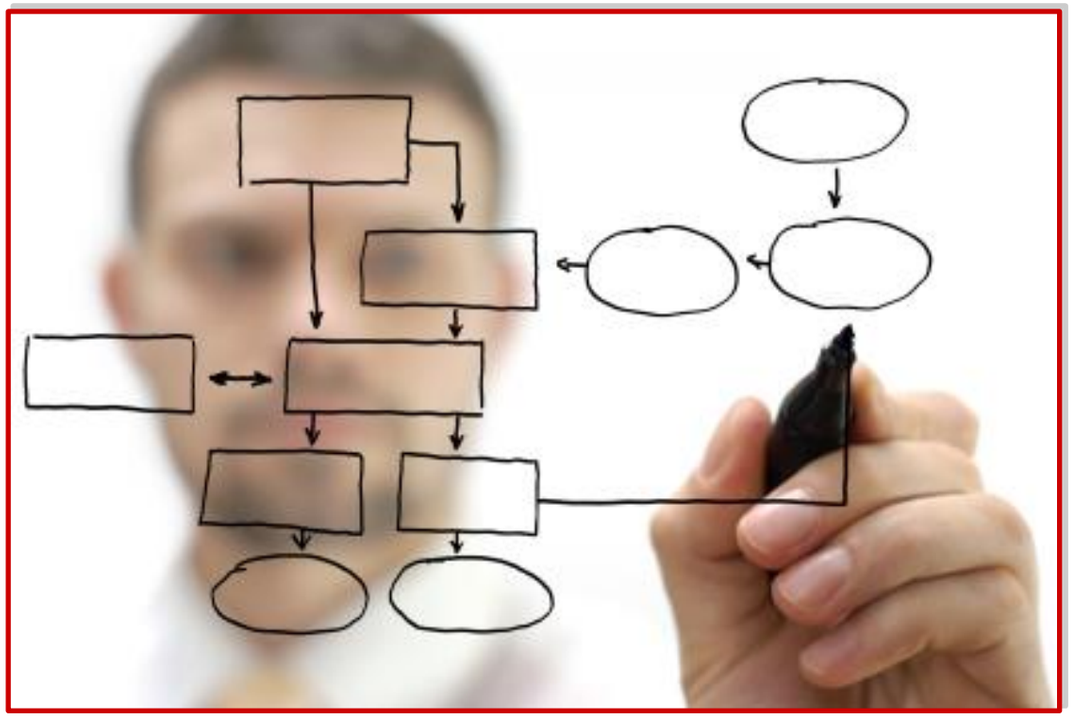
Knowledge Workers
Back Office, Experts

Service Agents

Today's Challenges in Application Deployment

Months to deploy applications

41% of companies take over one month to action a network change*



Coordination across silo'ed groups

Server, storage and networking teams have to work together to deploy applications

Inability to adopt new technologies

Due to lack of expertise and resources

*Avaya survey of IT professionals 2012

Goals of Fabric Technologies

- **Plug & play services** enabled by end-point provisioning
- **Operational simplicity (remember this)**
- Increased **network uptime**
- **Predictable** network behavior
- Optimal **bandwidth & resource utilization**
- Maximum network **design flexibility**
- Immune to **human-induced-errors**
- Must be optimized for **Ethernet, IP, & Multicast**

NOT ALL FABRICS ARE CREATED EQUAL…

Technologies to Understand

- Resiliency and Availability Protocols
  - STP – Spanning Tree Protocol
  - SMLT – Split Multi Link Trunking
  - RSMLT – Routed Split Multi Link Trunking
  - Horizontal Stacking

Resiliency & Availability

Active/Active Model - Defacto

- Avaya introduced the RIGHT resiliency model
  - Delivering SIMPLICITY
  - Reducing number of layers/devices
    - Delivering a LOWER TCO
  - Faster recovery during:
    - Network failures (link, module, power interruption..)
    - Uninterrupted services during maintenance

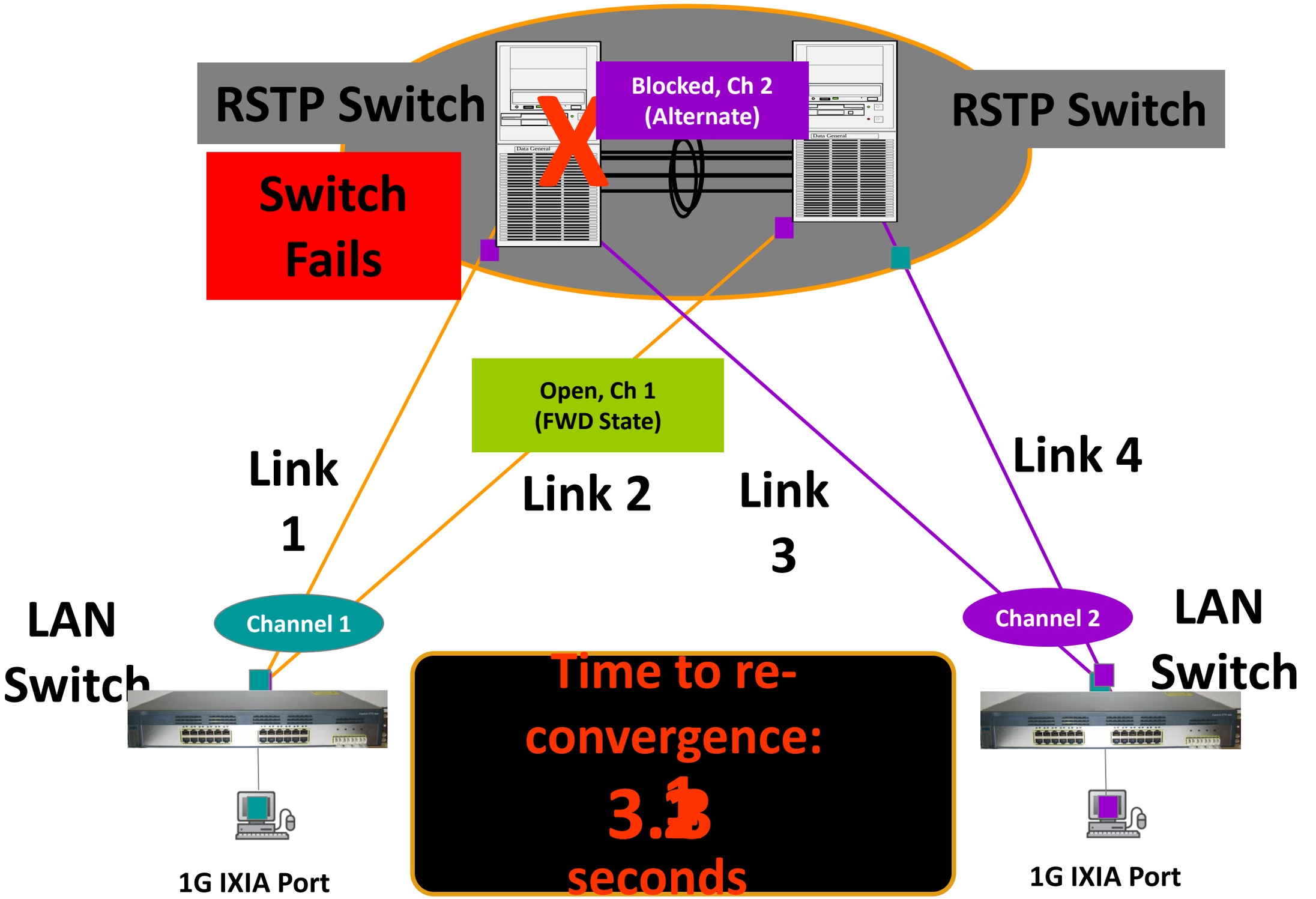
RESILIENCY:

“*Active/Active*”

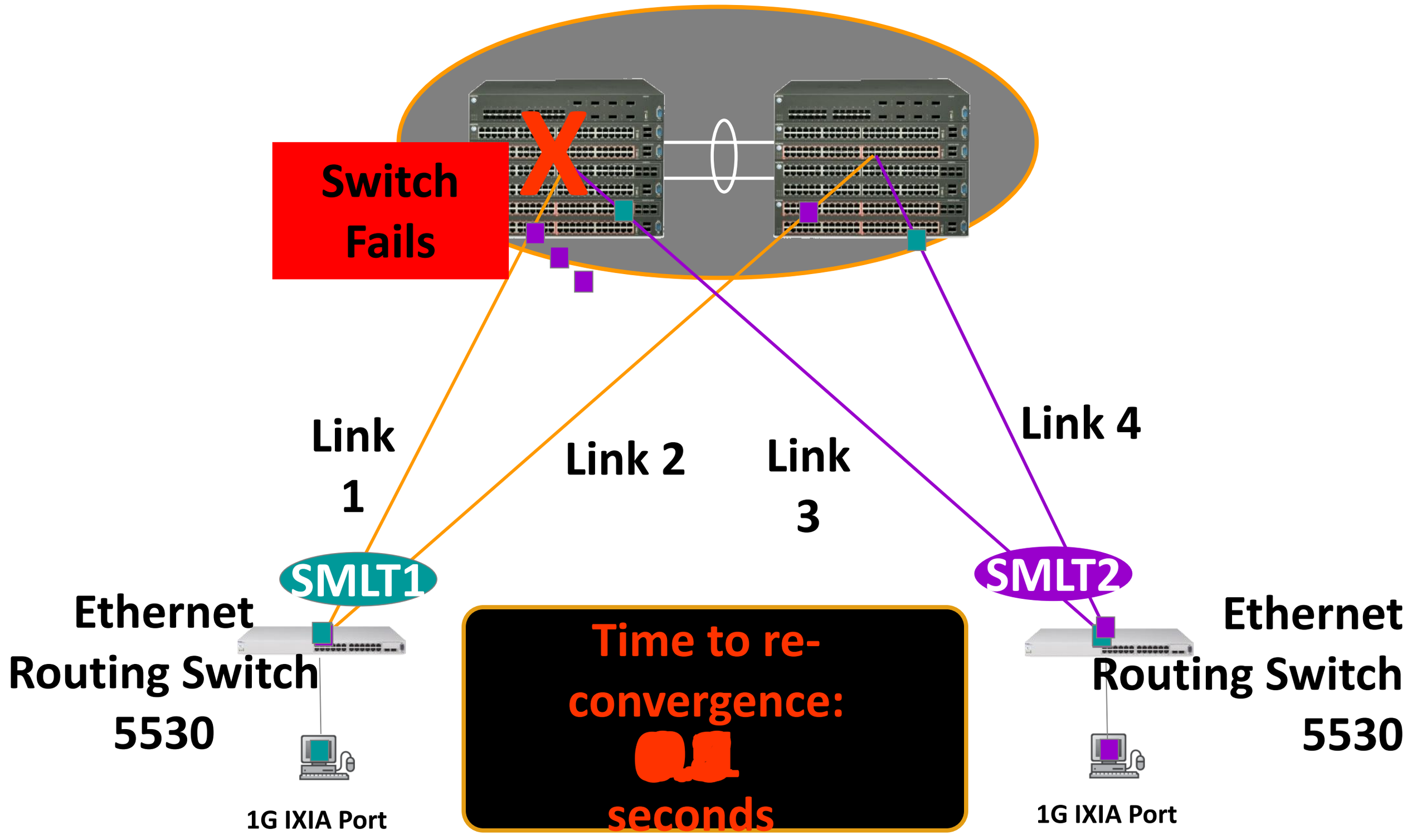
What aircraft would you rather be flying?

Standard Grade Resiliency in the Core

Rapid Spanning Tree: RSTP Restoration Time

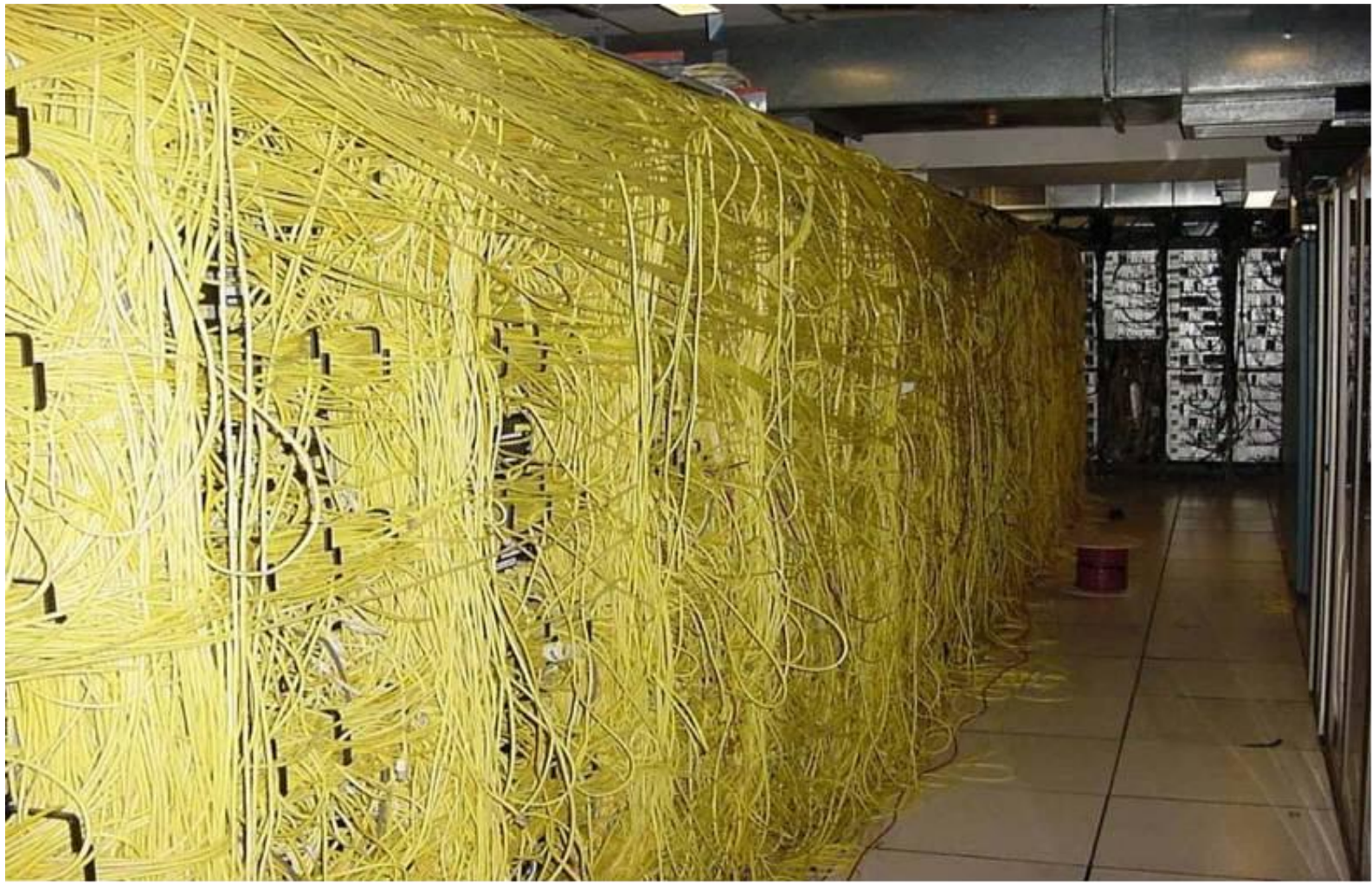


Avaya SMLT Restoration Time



Horizontal Stacking

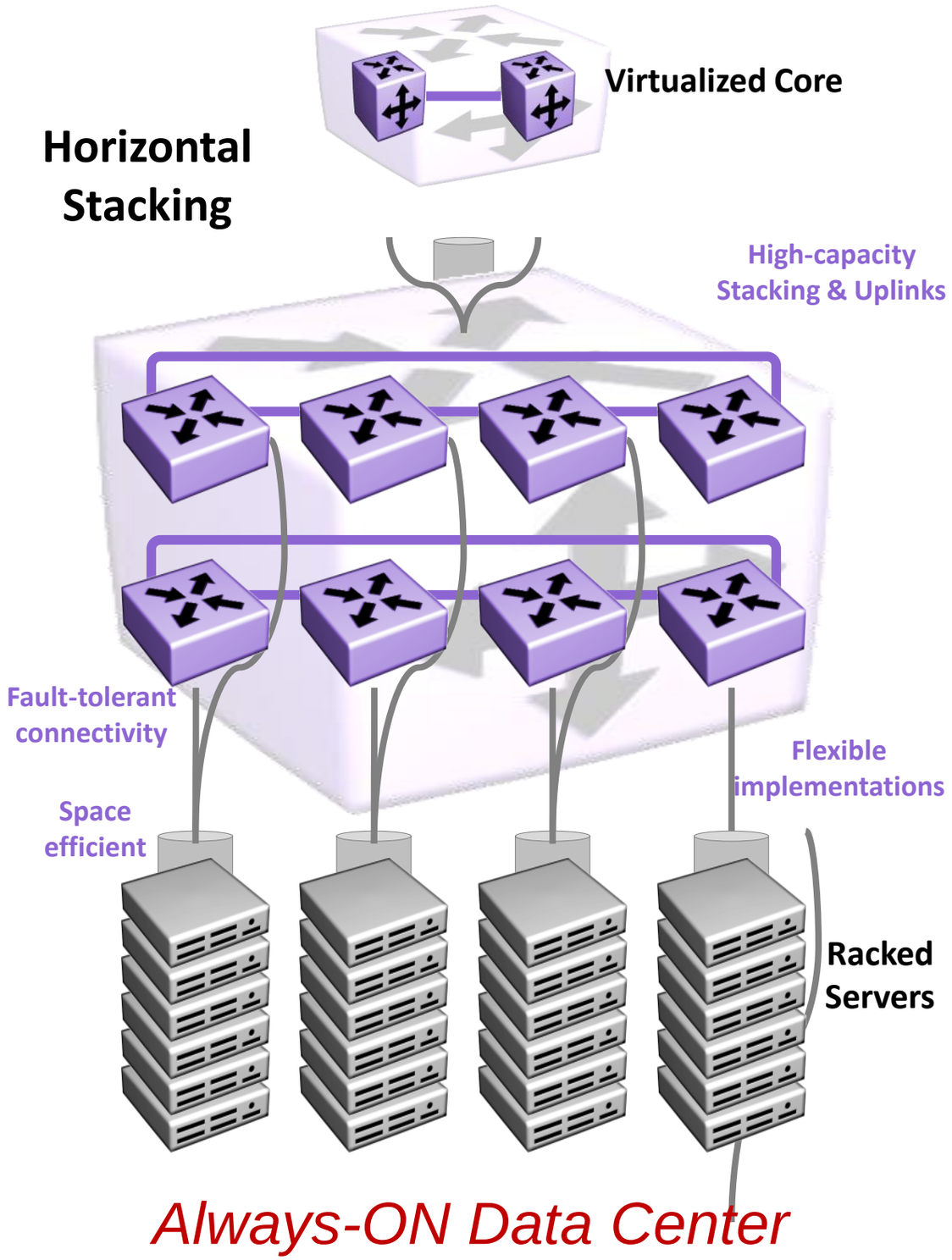
- Most cost-effective solution to provide server connectivity–adaptable to ToR or EoR
- Leverage best in class Active/Active switch clustering for in-service maintenance
- Ability to eliminate ALL single point of failures when required by business
- Green IT data center, lowest power and heat dissipation
- Offload the core from server-to-server communications leveraging resilient Terabit Stacking architecture
- Distributed forwarding to maximize performance
- Interoperable with all storage solutions and virtualized computing (VMware, Microsoft Hyper-V, and Xen Hypervisor)



Resilient and Cost-Effective Data Center

Horizontal Stacking Delivers Dependability

- High bandwidth and low latency
  - Optimizes server-to-server communication
- Reduces the number of ports required on the core
  - Reduces costs and complexity
- Simplifies cabling between server and switch
  - Reduces complexity and maintains rack cooling integrity
- Easily scale capacity (switches and uplinks)
  - Zero network downtime for maintenance or failure

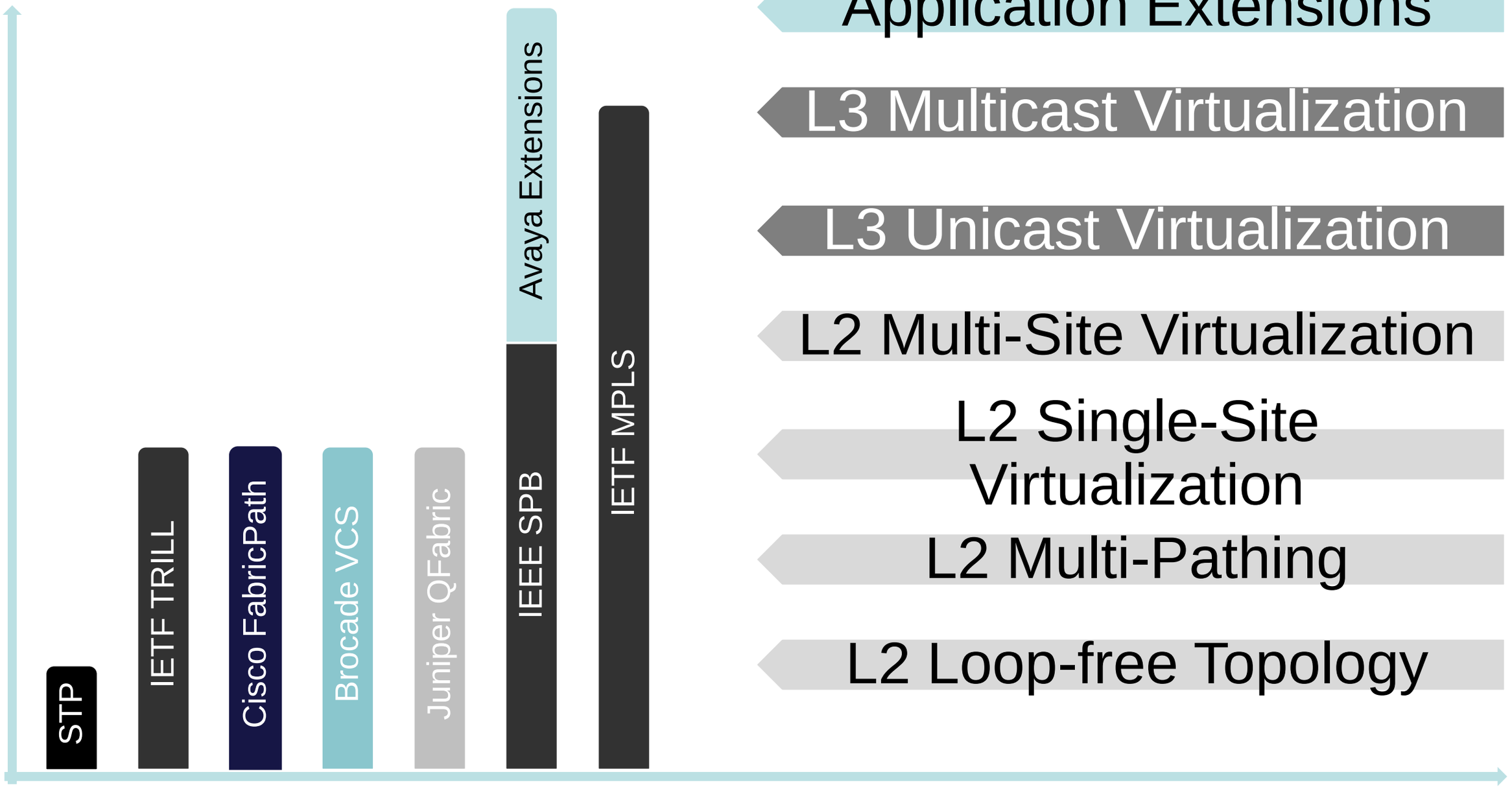


Technologies to Understand

- Network Virtualization Protocols
  - MPLS – Multi Protocol Label Switching
  - ***SPBm – Shortest Path Bridging*** ***(mac-in-mac)***

Which Fabric Technology is the Answer..?

That all depends on how you qualify the question…



Avaya VENA reduces complexity, increases Time to Service

competition still struggles with reducing complexity

Avaya VENA simplification (SPB)

– At Avaya, creating a Layer 2 service in the network is easy:

To create an L2 VSN with SPB VENA...

- *Config vlan 7 i-sid 700*

Competitive complexity (MPLS)

– At our competition, creating a Layer 2 service in the network can be a challenge:

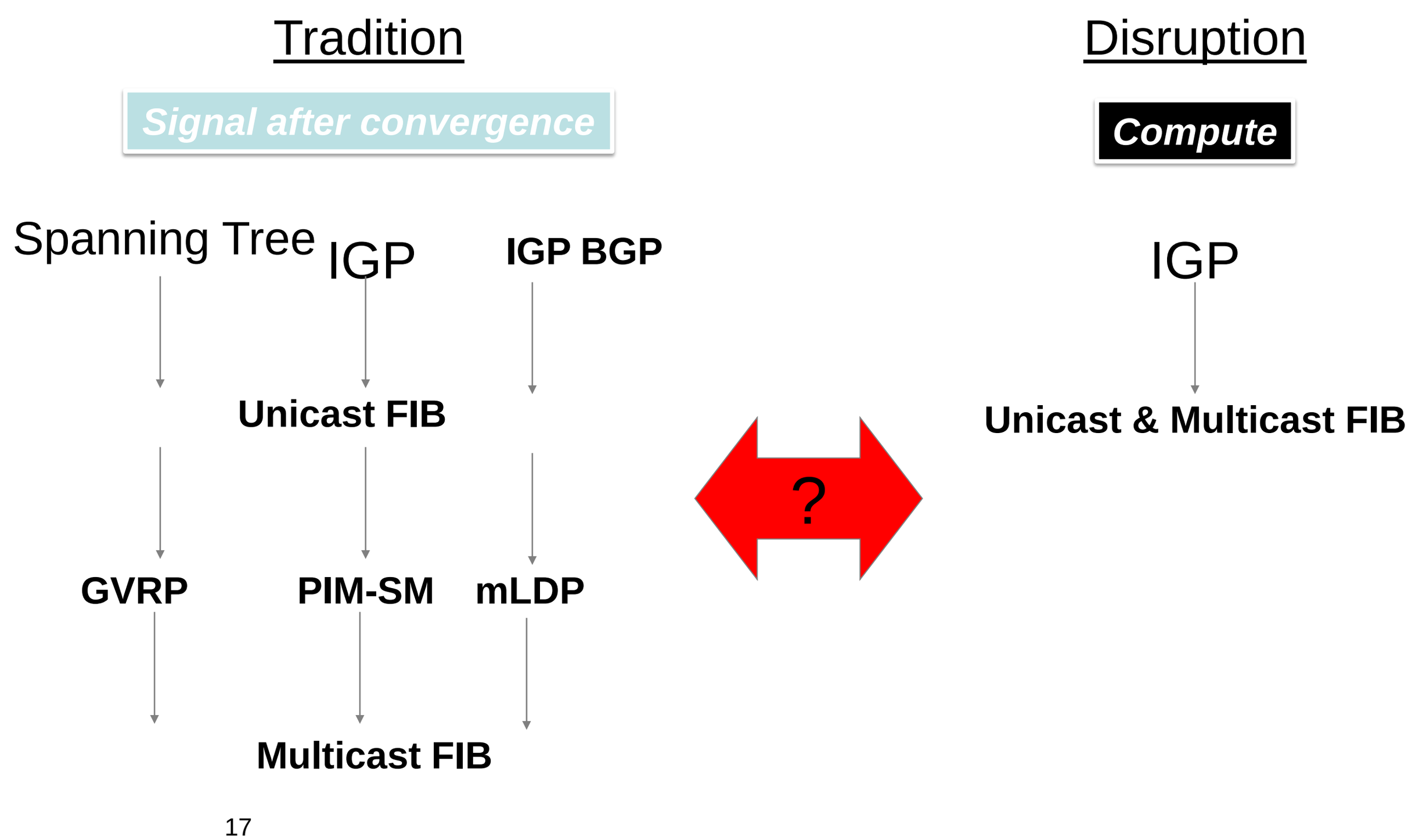
VPLS with MPLS the commands are:

set routing-instances RI-IPN-L2L01 instance-type l2vpn
set routing-instances RI-IPN-L2L01 interface ge-0/0/8.700
set routing-instances RI-IPN-L2L01 interface xe-0/2/0.700
set routing-instances RI-IPN-L2L01 route-distinguisher 13.13.13.1:1013
set routing-instances RI-IPN-L2L01 vrf-target target:64999:1013
set routing-instances RI-IPN-L2L01 protocols l2vpn encapsulation-type ethernet-vlan
set routing-instances RI-IPN-L2L01 protocols l2vpn site H15-H15-IPN-L2L01 site-identifier 1
set routing-instances RI-IPN-L2L01 protocols l2vpn site H15-H15-IPN-L2L01 interface xe-0/2/0.700 remote-site-id 11
set routing-instances RI-IPN-L2L01 protocols l2vpn site RH15-H15-IPN-L2L01 site-identifier 11
set routing-instances RI-IPN-L2L01 protocols l2vpn site RH15-H15-IPN-L2L01 interface ge-0/0/8.700 remote-site-id 1
--
set interfaces ge-0/0/8 unit 700 description L2-IPN-L2L01
set interfaces ge-0/0/8 unit 700 encapsulation vlan-ccc
set interfaces ge-0/0/8 unit 700 vlan-id 613

Good Luck!

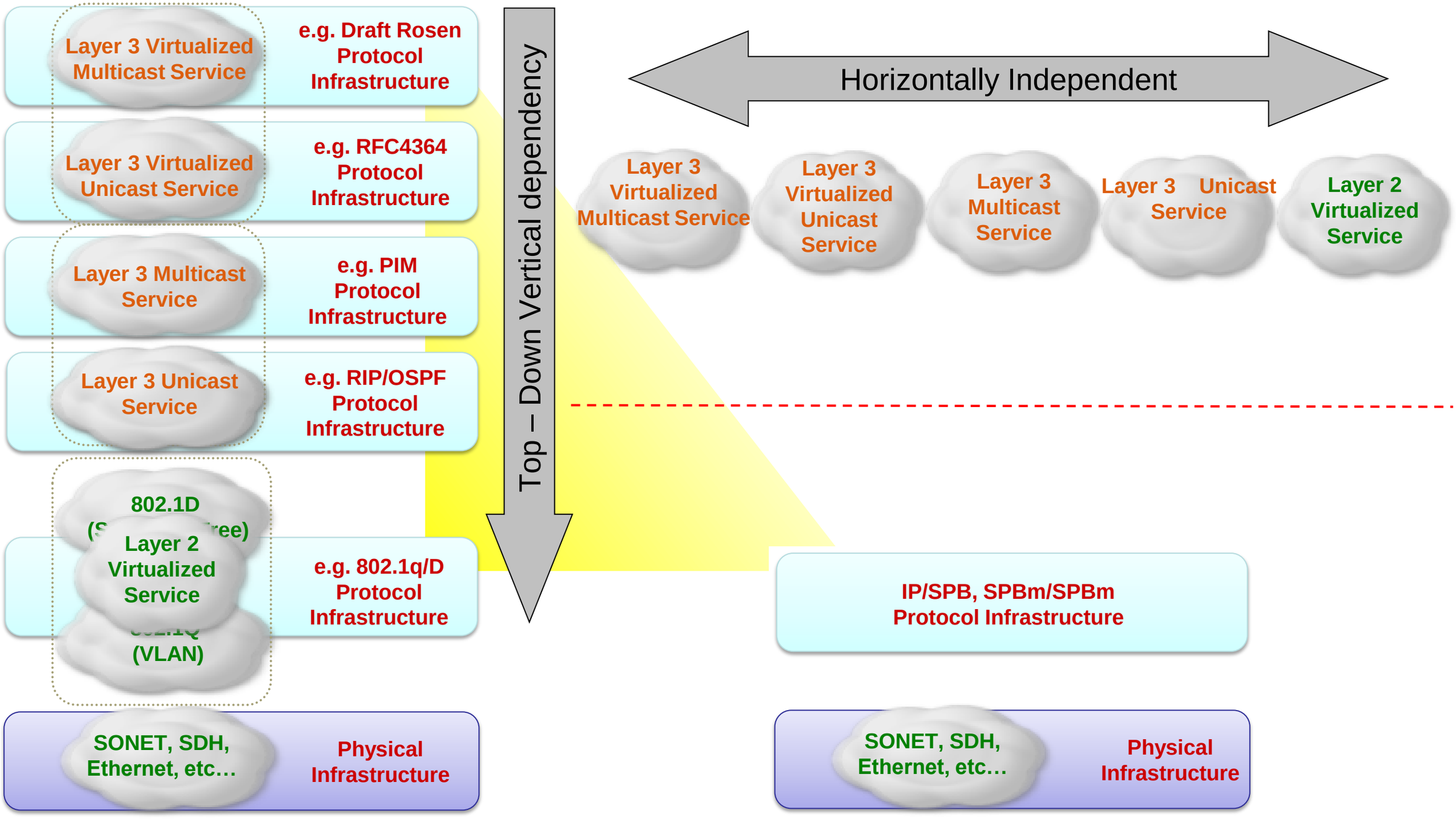
Which would you rather do?

Less state machines mean better performance and lower processing requirements!



Virtualization Technology Comparison

MPLS versus VENA



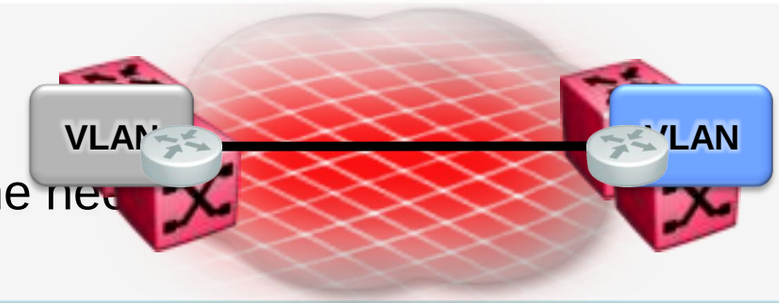
Flexible Network Services

Layer 2 Virtual Service Network

Mapping of a Layer 2 VLAN into a Virtual Service Network delivering seamless Layer 2 extensions

IP Shortcuts

Native IP routing across the Virtual Service Fabric without the nee
Virtual Service Networks or any additional IGP



Layer 3 Virtual Service Network

Mapping of a Layer 3 VRF into a Virtual Service Network delivering seamless Layer 3 extensions

Inter-VSN Routing

Enhancing 802.1aq by offering a policy-based Layer 3 internetworkin
capability of multiple Virtual Service Networks

Use Cases and Opportunities for VENA

- Strategic Topics
  - Multi-tenancy and/or Virtualization
  - ***Multicast***
  - IPv6 Implementations
    - Cloud Strategies – Private/Public/Hybrid
    - Company Expansion/Construction
- Tactical Topics
  - Top of Rack – Fabric Interconnect or Mesh
  - NAC

SPB Deployment Scenarios

Solution 1	Solution 2	Solution 3	Solution 4	Solution 5

Multitenant
• Airports
• Government
• Healthcare
• Uni/Edu
• Tier2/Tier3 SP
 	
• Functionality
  • L2 VSNs
  • L3 VSNs
  • Internet
  • (Multicast)
	Cloud Services
	• Service Provider hosted Services
	
	• Functionality
	  • L2 VSNs
	  • L3 VSNs
		Ethernet/E-service based Wan/Metro-Edge (CE)
		• Stock Exchange
		
		• Functionality
		  • (L2 VSNs)
		  • L3 VSNs
		  • Internet
		  • (Multicast)
			IP-TV/ Surveillance
			• Hotels/Casinos
			• Transportation
			
			• Functionality
			  • Internet
			  • (L3 VSNs)
			  • Multicast
				Virtualized Campus
				• Any Enterprise
				
				• Functionality
				  • L2 VSNs
				  • L3 VSNs
				  • Internet
				  • Multicast

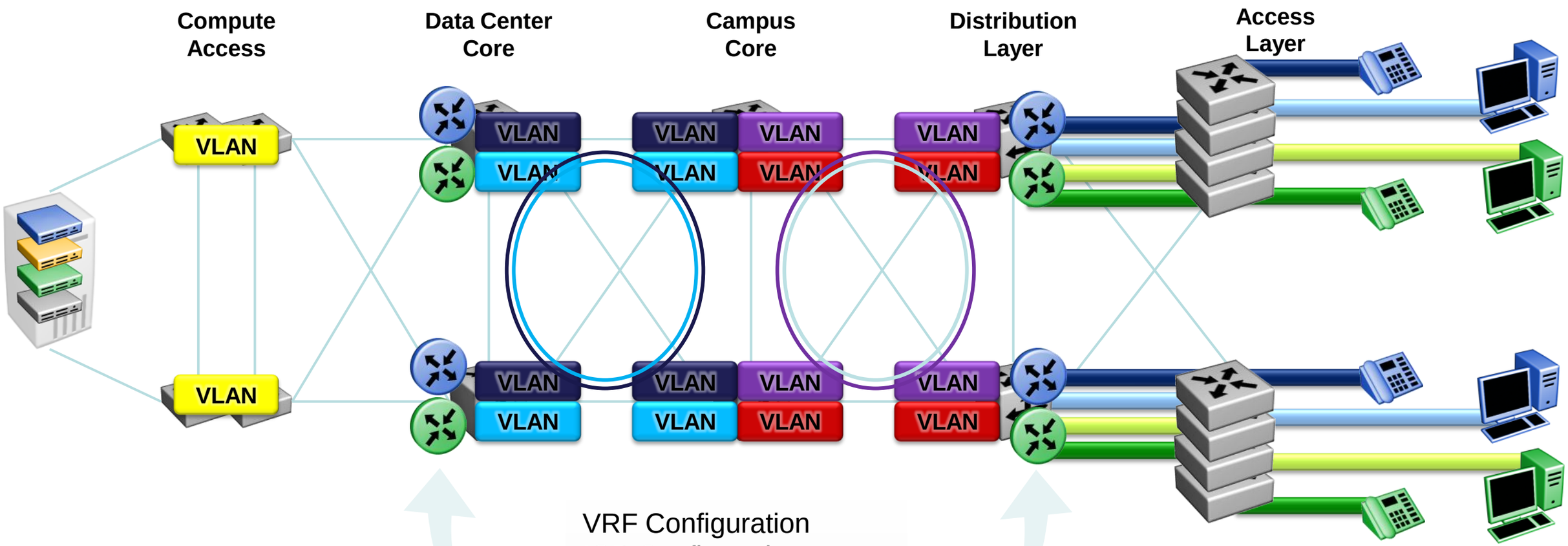
Example: Multi-tenant Networks

The complexities we have to deal with today...

Application VLAN with IGP configured for routing capabilities

Dual Core IGP VLANs and RSMLT for best resiliency and fast failover/recovery

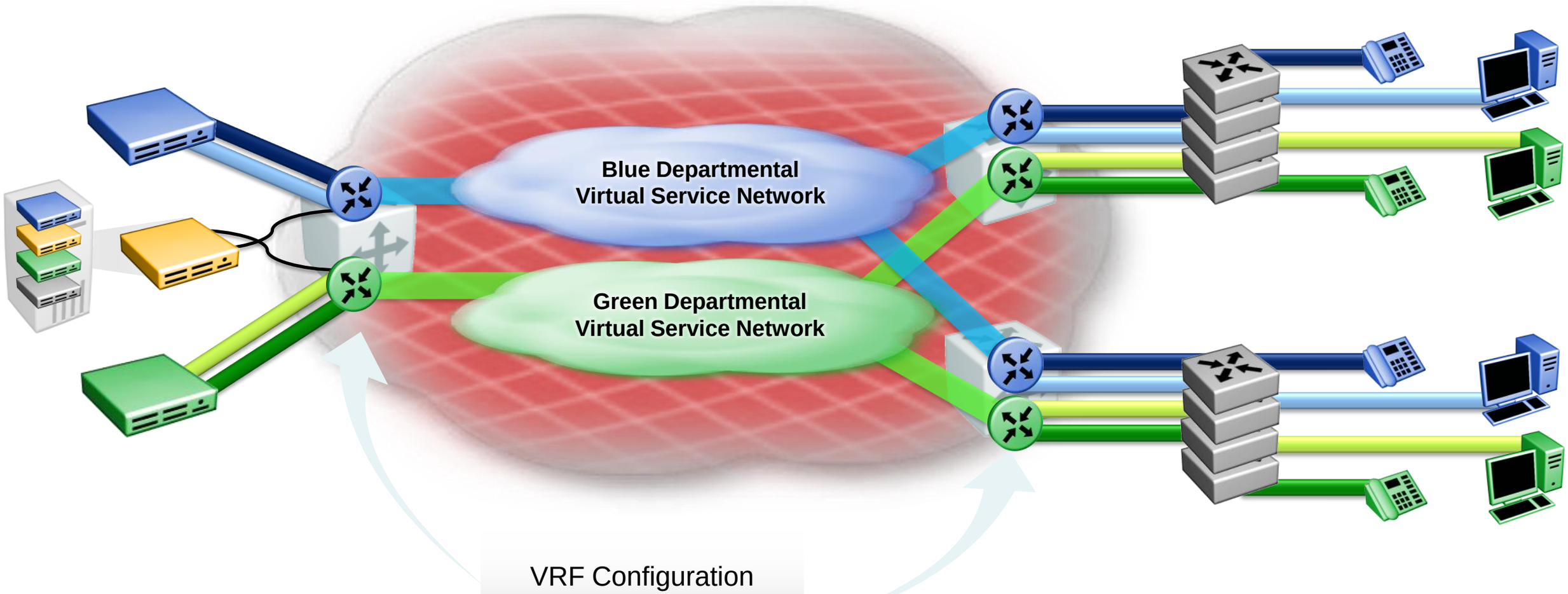
User VLANs with IGP configured for routing capabilities



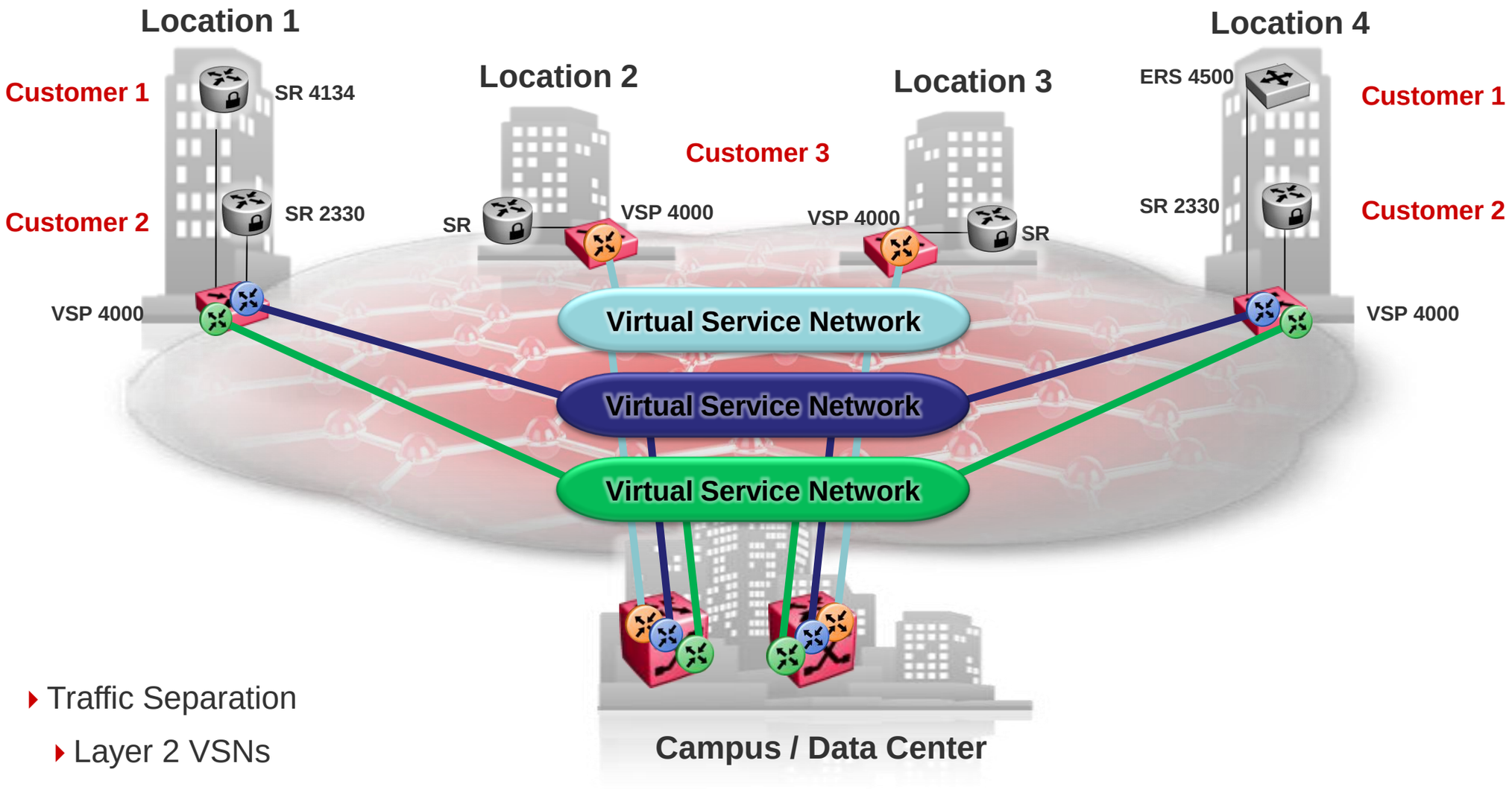
VRF Configuration
IGP Configuration
iBGP Peering
MPBGP
Route Targets
Route Distinguishers

Example: Multi-tenant Networks

- VRFs create traffic separation which is maintained through VSN
- Layer 3 VRF extension across the Virtual Services Fabric
- Use of shared services becomes simple and efficient



Multi-Tenant Network Architecture

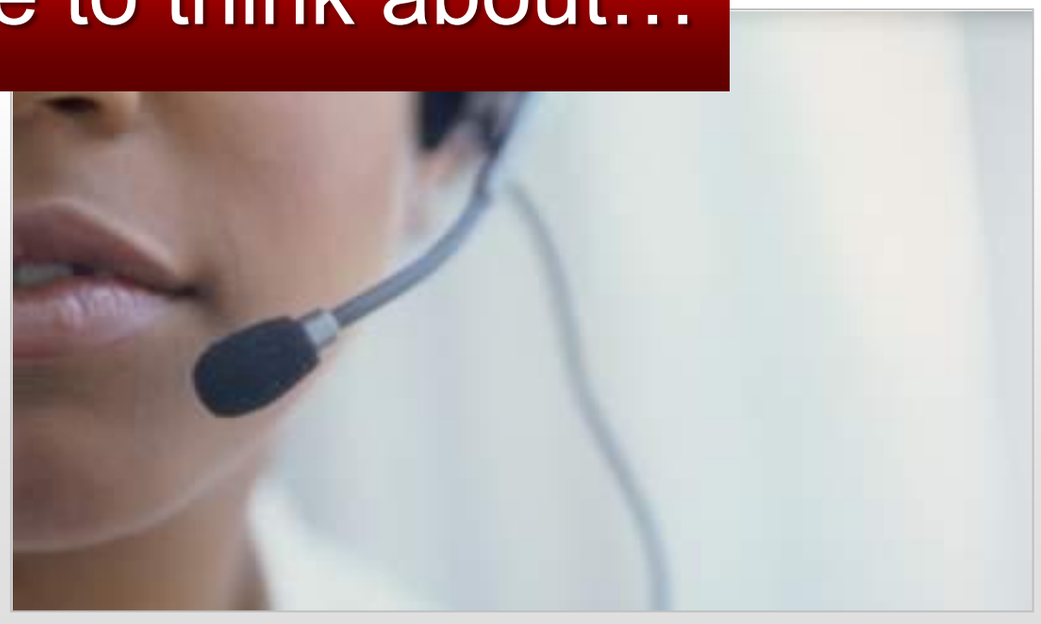


- Traffic Separation
- Layer 2 VSNs
- Layer 3 VRF Extensions
- IP Shortcuts
- SR provides integrated Voice services and SIP survivability

- Government
- Education
- Airports
- Hospitality

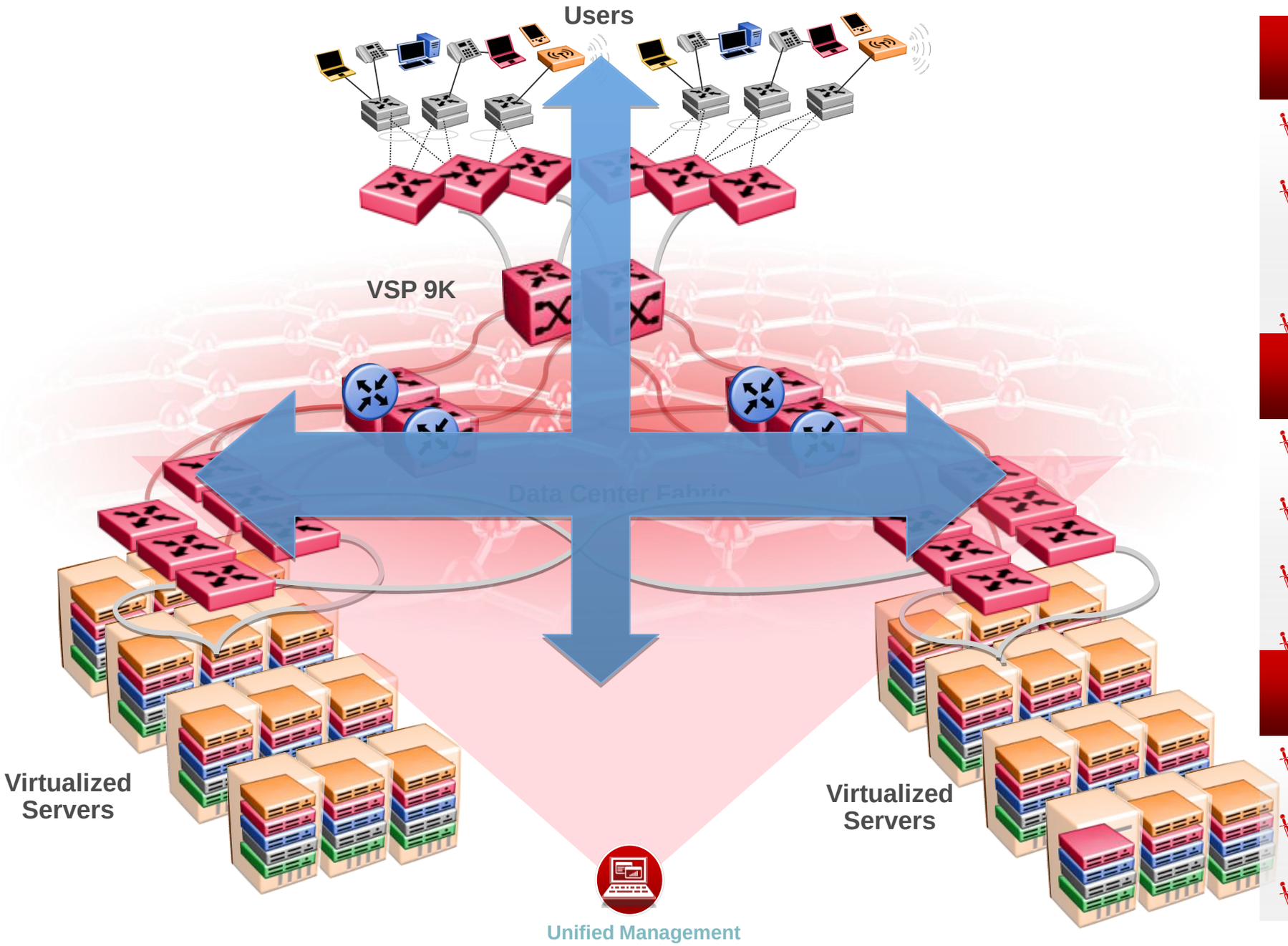
Definition of a successful network..?

It’s the one you don’t have to think about…



Evolution to Fabric Connect

Build it.
Cloud grade network



Efficiency

- Using All Paths and Bandwidth
- **Requirement to optimize East/West traffic with ToR solutions**
- **Average web page accesses 12**

Flexibility

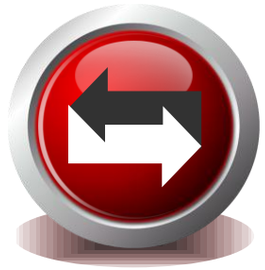
- Physical Topology Independent
- Service Virtualization L2/L3
- Any service Anywhere, Anytime
- Network Virtualization with Scale

VM Mobility

- Transparent Network Services
- Removing Boundaries
- Simplified Powerful Infrastructure

Solving the Data Center VM Mobility needs

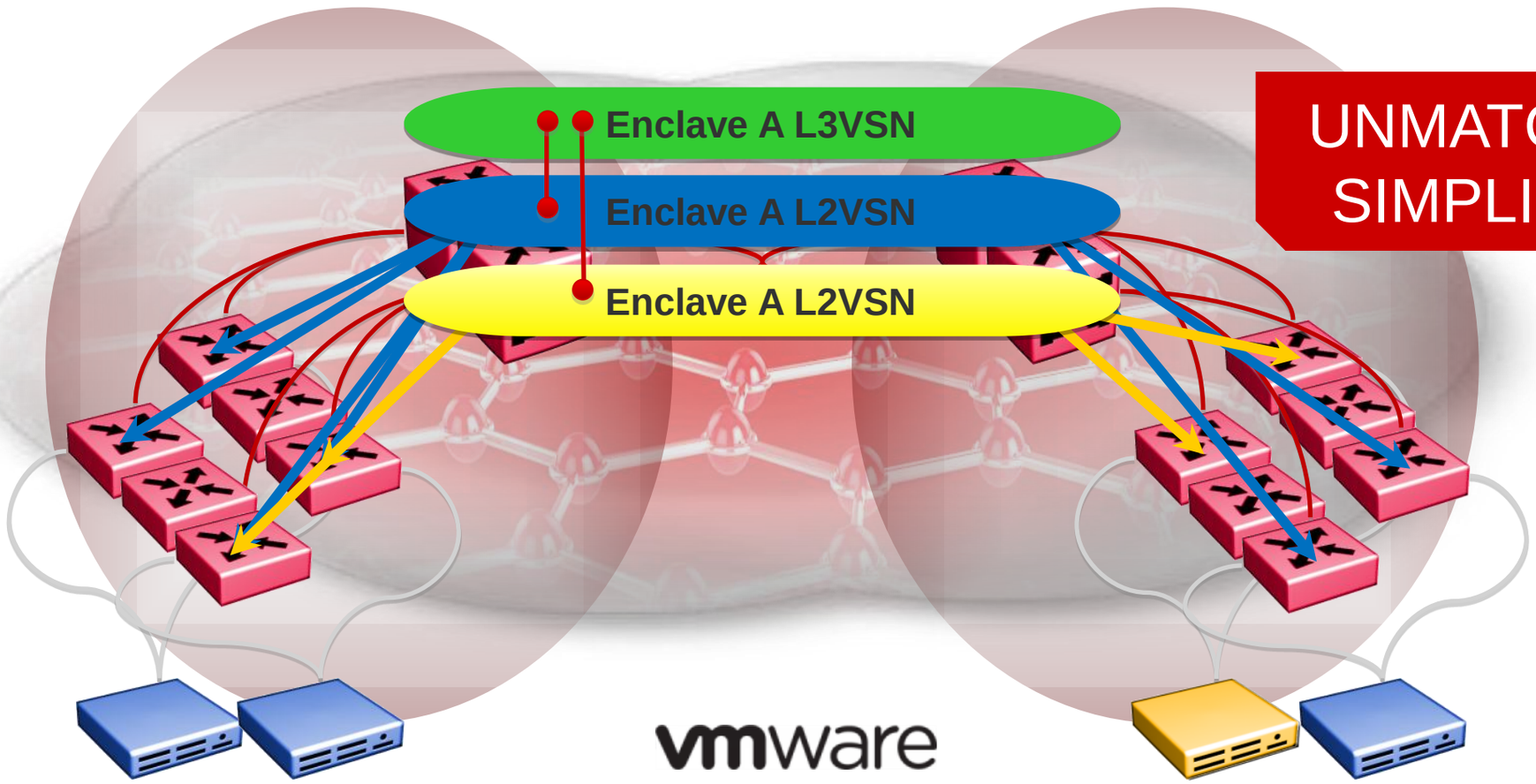
Delivering Services



Deliver it.

Deliver cloud services

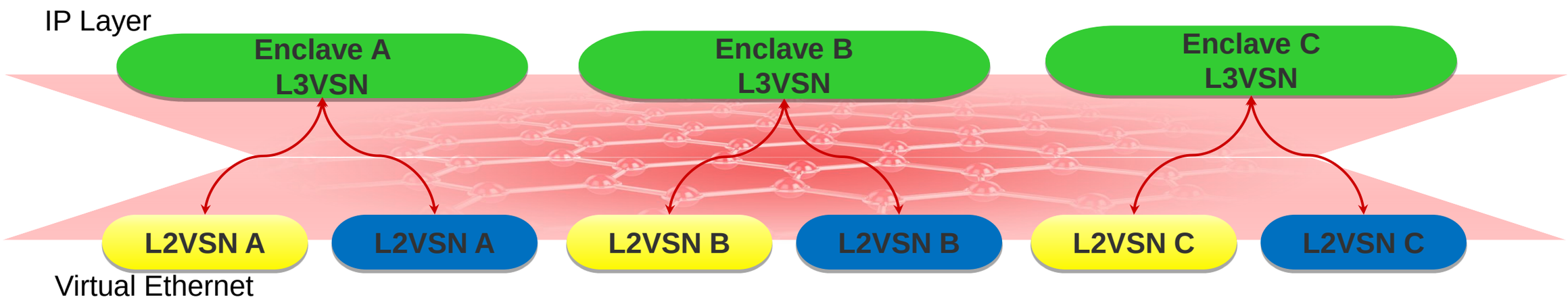
- **Mapping Applications & Services to Virtual Networks**
  - Provides granular traffic separation & enhanced control
- **VLAN and VXLAN extension across Fabric Connect**
  - Provides any-to-any connectivity
  - One-touch provisioning at the Fabric edge – no need to touch the Core
  - Create a virtual network in seconds – substantially improving time-to-service



Empowering Virtual Service Networks

Deliver it.

Deliver cloud services



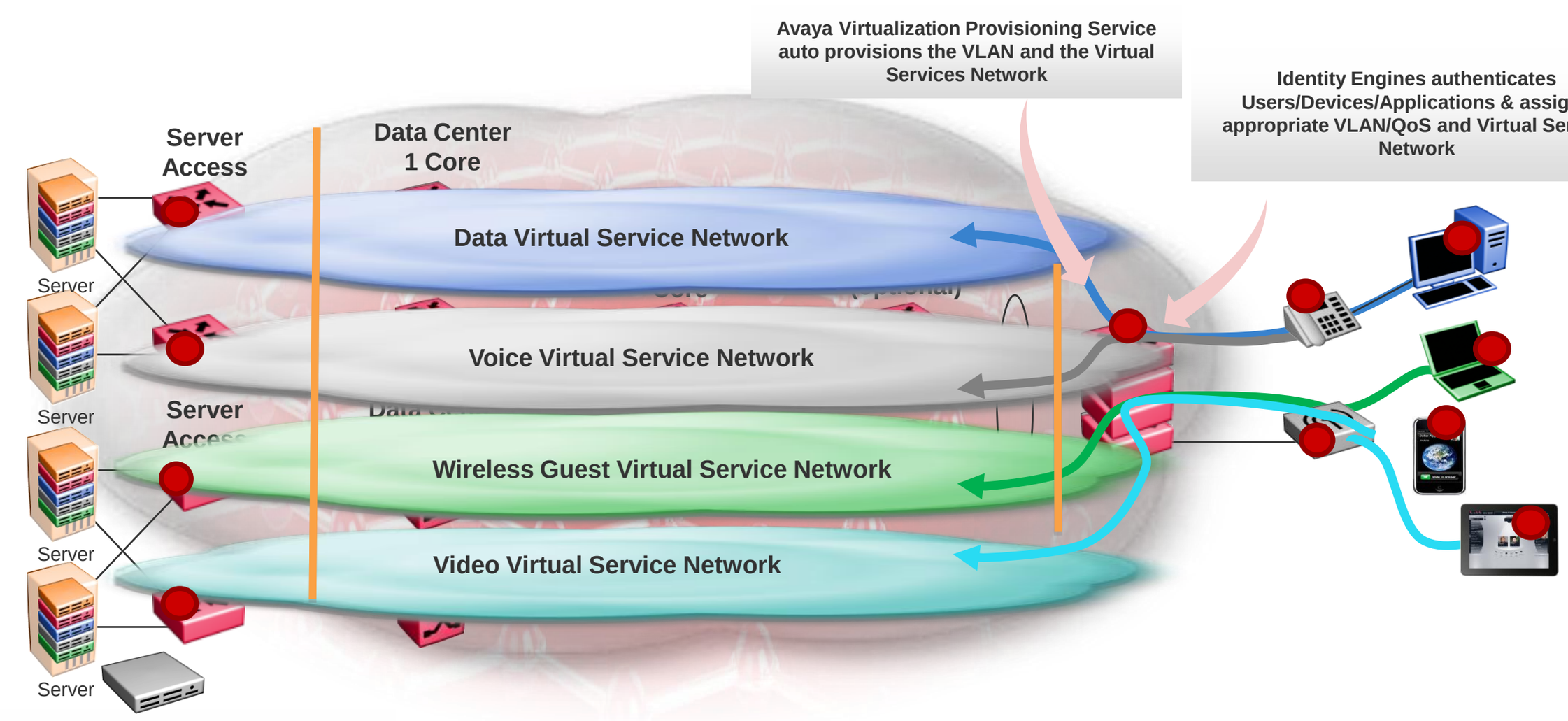
- One Fabric supporting any service, anywhere, for any tenant
  - Provides granular separation of L2 and L3 services between tenants
  - Tenants can be applications, services, or actual end hosted customers

Application-Driven Networking

- Policy-based; dynamic assignment of VSNs upon user authentication
- Ensure application performance
  - Isn't VDI just a real-time App with a new personality..?

Enhance it.

Integrate your business applications to enhance the cloud



Introducing Avaya Collaboration Pods

From silos to integrated

Enhance it.

Integrate your business applications to enhance the cloud

EMC²	vmware	AVAYA
• Industry leading storage vendor • Delivering storage arrays for Avaya VAR	• Industry leading virtualization vendor • Delivering virtualization and VDI software	• Industry leading communications vendor • Delivering networking, applications, management & integration

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What you would build yourself with enough time and budget

AVAYA

AVAYA

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