Software-driven networking solutions

Johnny Hermansen, Senior Systems Engineer
Extreme Networks

Extreme®
Connect Beyond the Network
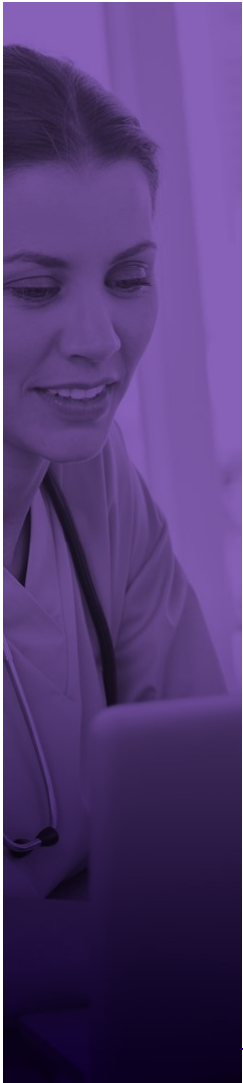
Software Defined Networks ?

Separates the network's **control** (brains) and forwarding (muscle) planes to make it easier to optimize each.

– SDN Central

The SDN Controller acts as the "brains" of the network. It allows SDN users to gain a central look at the entire network, and empowers network administrators to instruct switches and routers how the forwarding plane should direct network traffic.
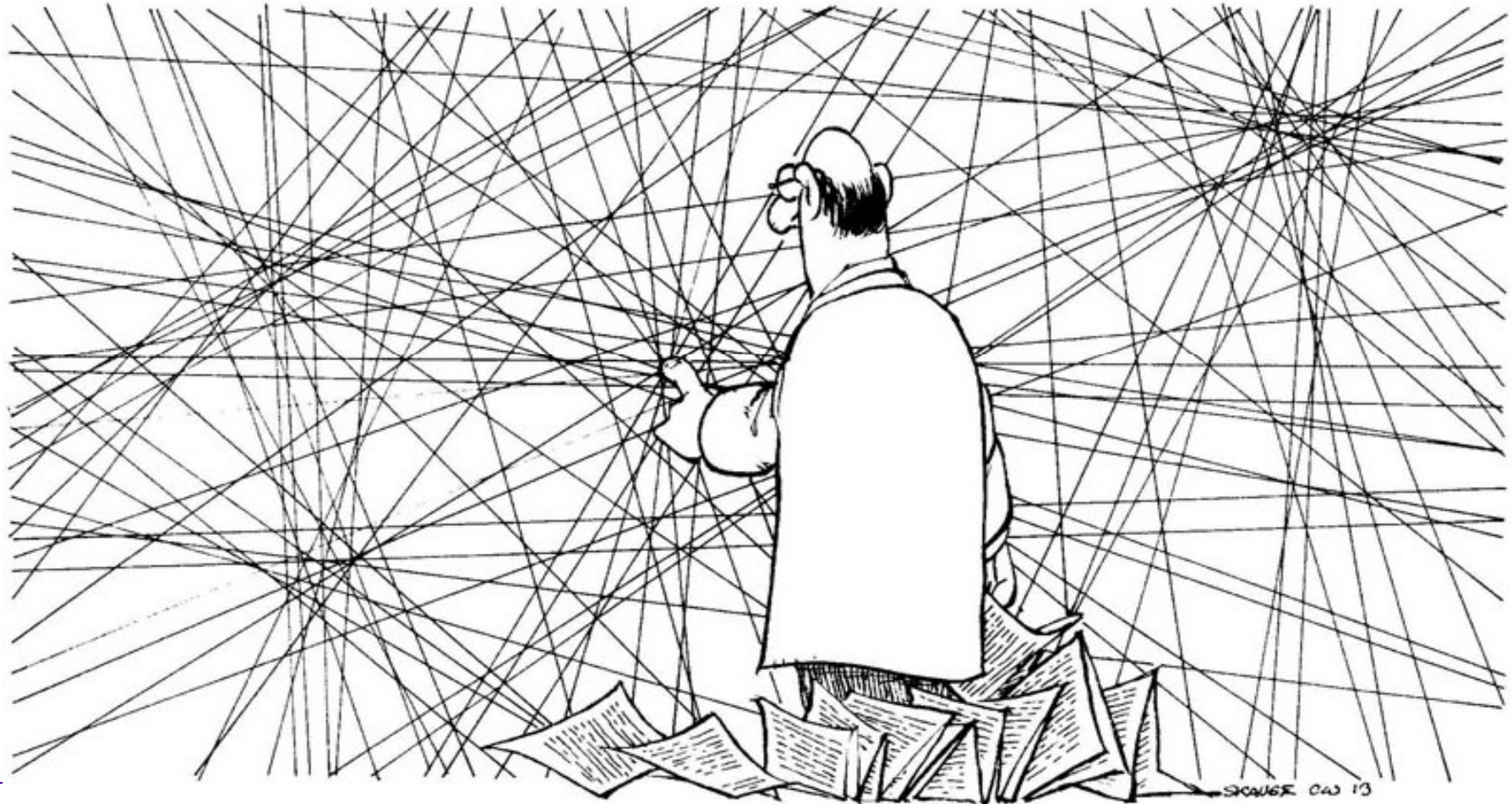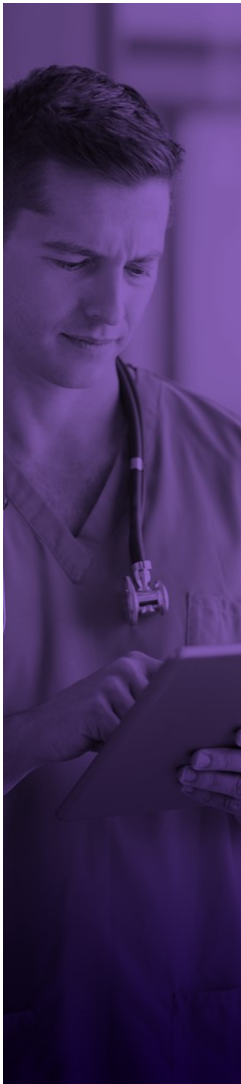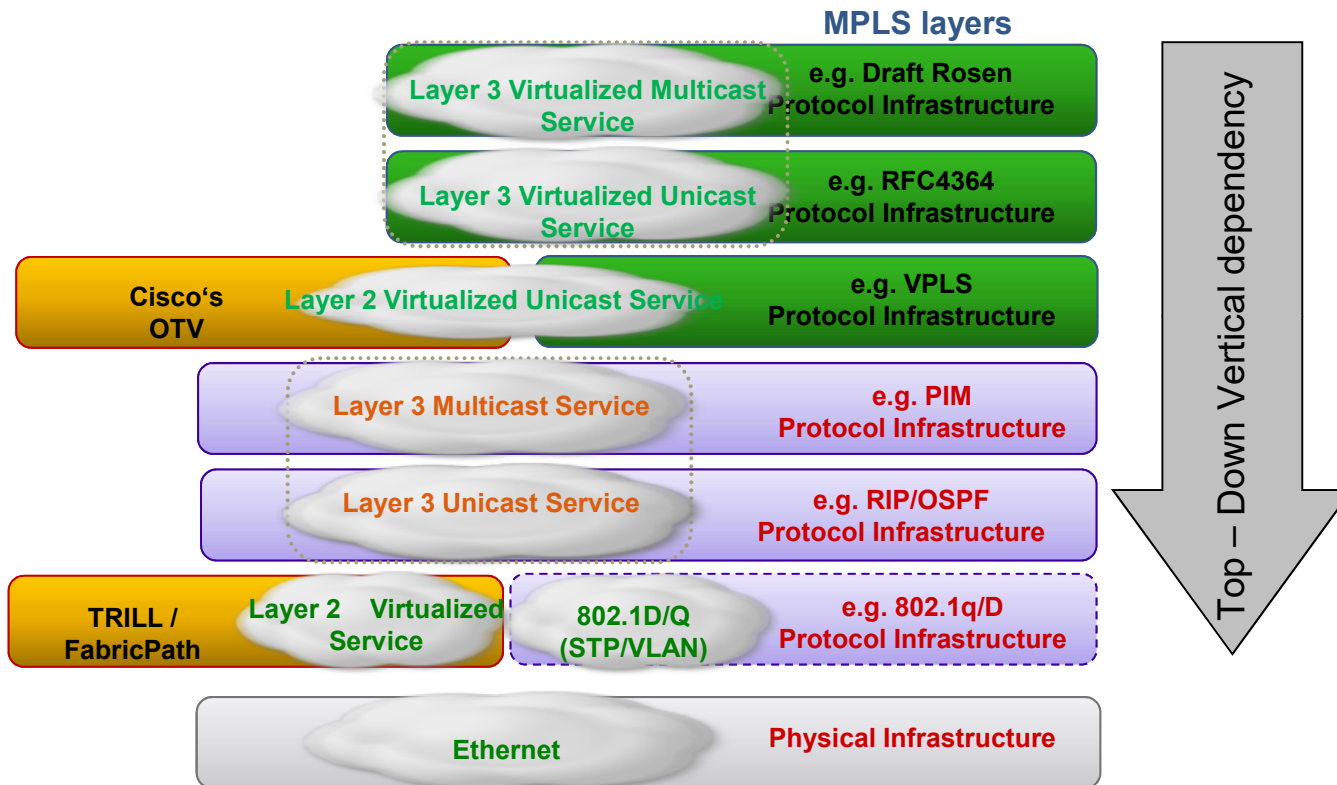
 - SDN Resources
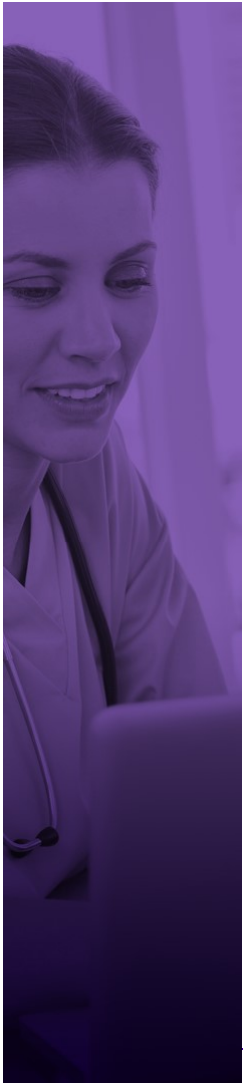
Some key challenges and concerns

- Security
- Availability
- Groving complexity
- The «human error factor»
- Cost of operation
- Flexibility
- Time to service

The current state of networks (?)
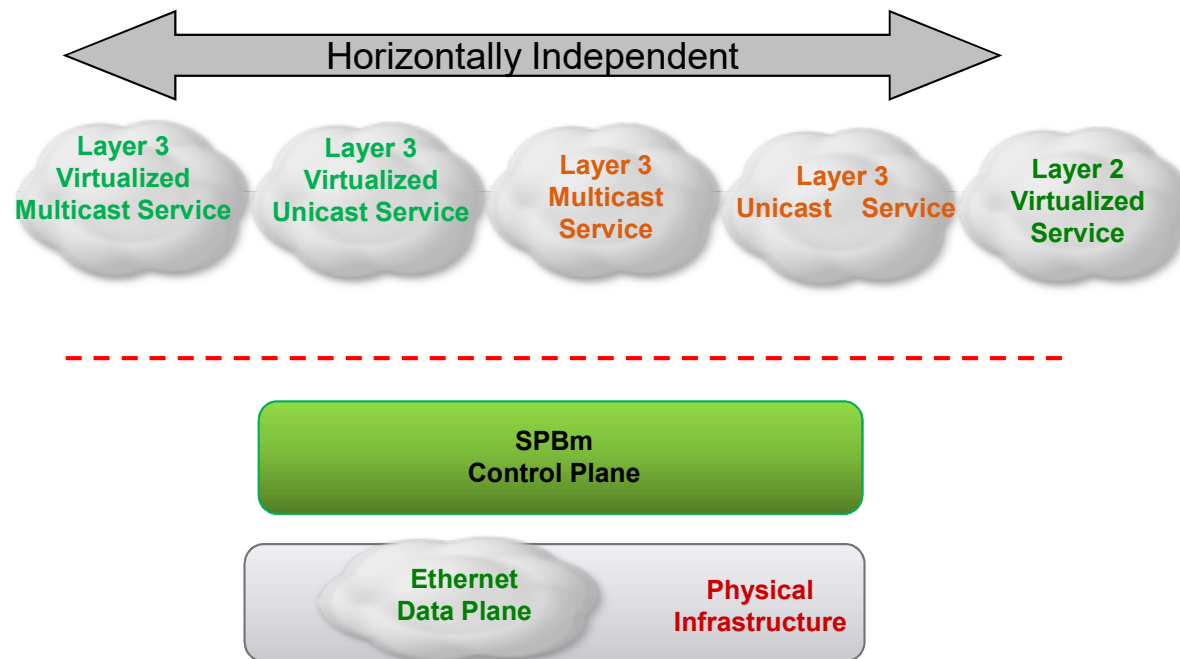
The complexity challenge – the stack of protocols

MPLS layers

Layer 3 Virtualized Multicast Service	e.g. Draft Rosen Protocol Infrastructure
Layer 3 Virtualized Unicast Service	e.g. RFC4364 Protocol Infrastructure

Cisco's OTV | Layer 2 Virtualized Unicast Service | e.g. VPLS Protocol Infrastructure

Layer 3 Multicast Service	e.g. PIM Protocol Infrastructure
Layer 3 Unicast Service	e.g. RIP/OSPF Protocol Infrastructure

TRILL / FabricPath | Layer 2 Virtualized Service | 802.1D/Q (STP/VLAN) | e.g. 802.1q/D Protocol Infrastructure

Ethernet	Physical Infrastructure

Top – Down Vertical dependency

The power of simplicity

Shortest Path Bridging

Connectivity Services independent from Infrastructure

Horizontally Independent

Layer 3 Virtualized Multicast Service

Layer 3 Virtualized Unicast Service

Layer 3 Multicast Service

Layer 3 Unicast Service

Layer 2 Virtualized Service

SPBm Control Plane

Ethernet Data Plane

Physical Infrastructure
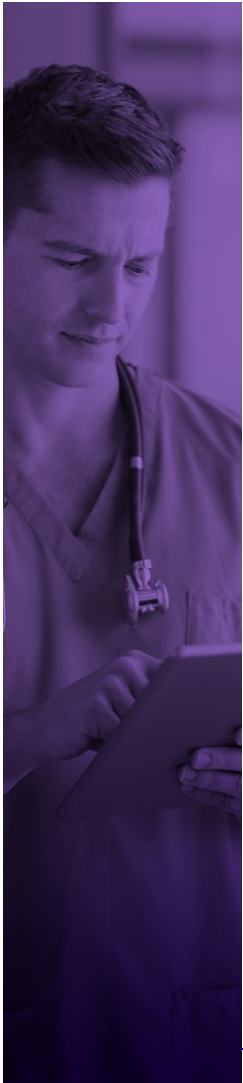
## Shortest Path Bridging The new generation Ethernet

- **It is very secure**
- **It greatly simplifies computer networks**
- **It is extremely flexible – support any physical topology**
- **It is built from ground up to support virtualization**
- **It is extremely scalable**
- **Support for multicast traffic is natively built in**
- **Shortest Path Bridging is an open industry standard**
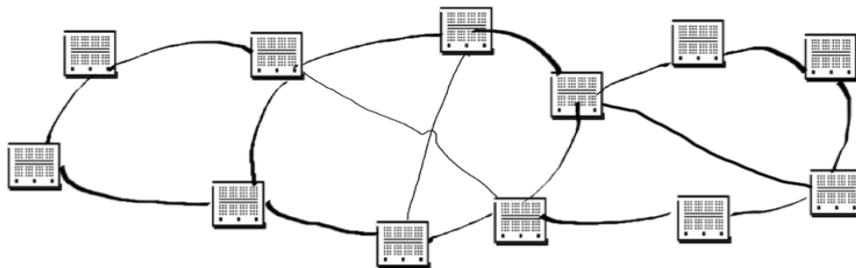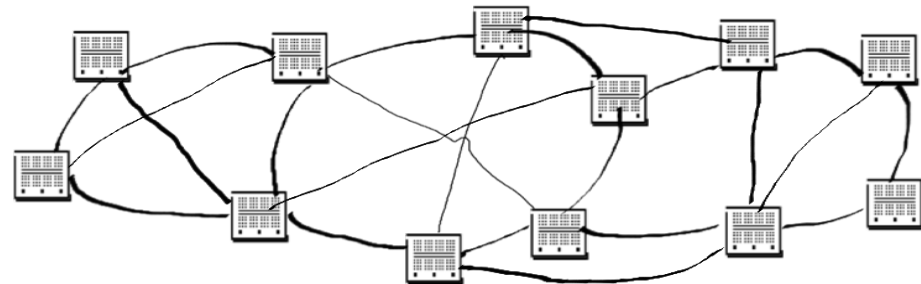
Ethernet with a brain

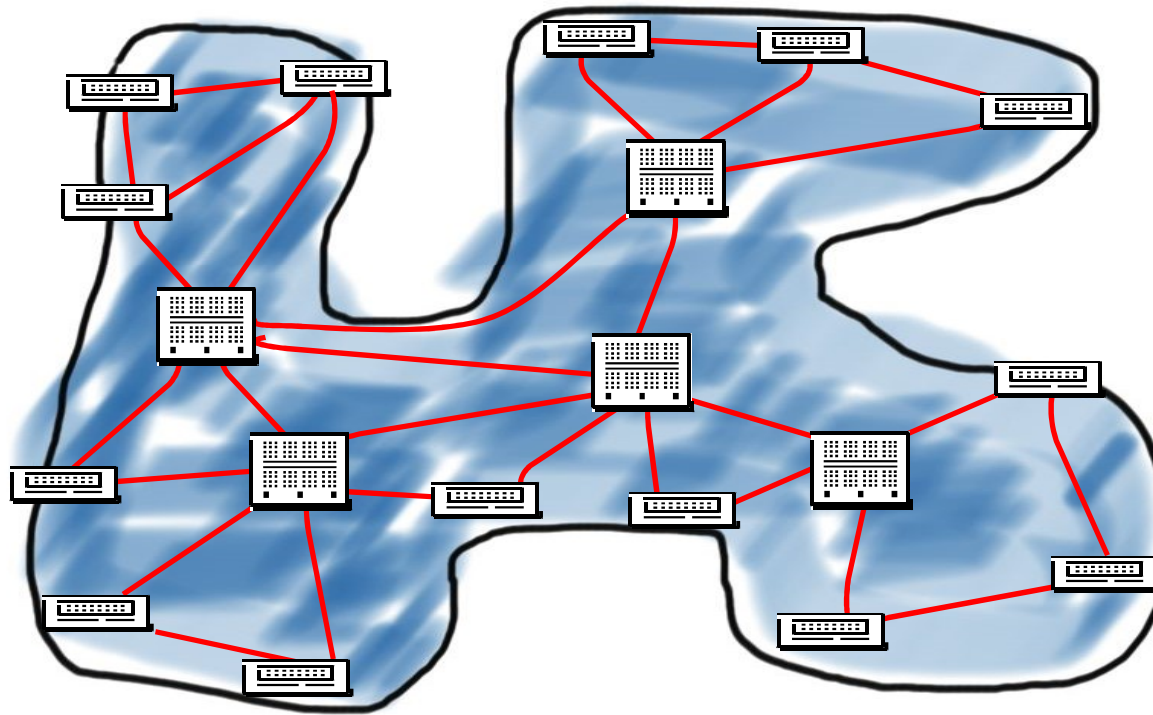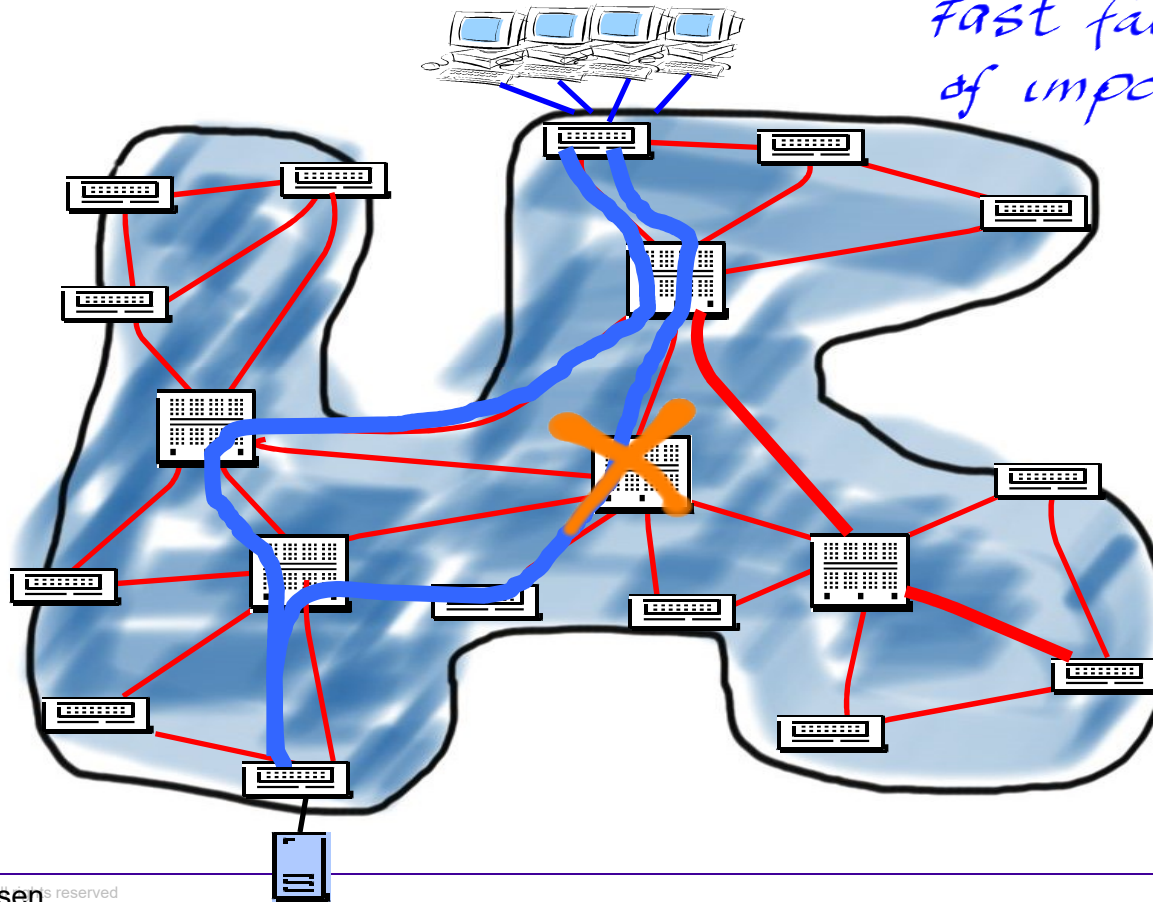# SPB SUPPORTS ANY TOPOLOGY
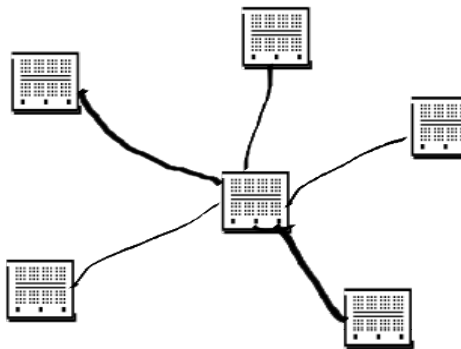
STAR
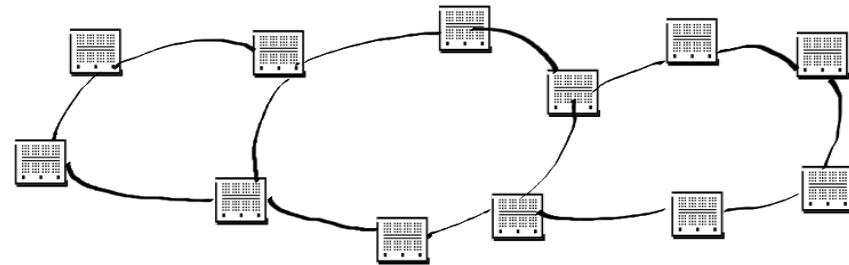
RINGS

PARTIALLY MESHED

OR WHATEVER YOU MAY NEED

ABSOLUTE *Free Form Network*

Highly recilient

Fast failover
of impacted traffic

Need to add new services?

#vlan i-sid 15 1010

#vlan i-sid 30 1010

only touchpoints:
network edge ports

#vlan i-sid 15 1010

#vlan i-sid 15 1010

#vlan 100 i-sid 1010
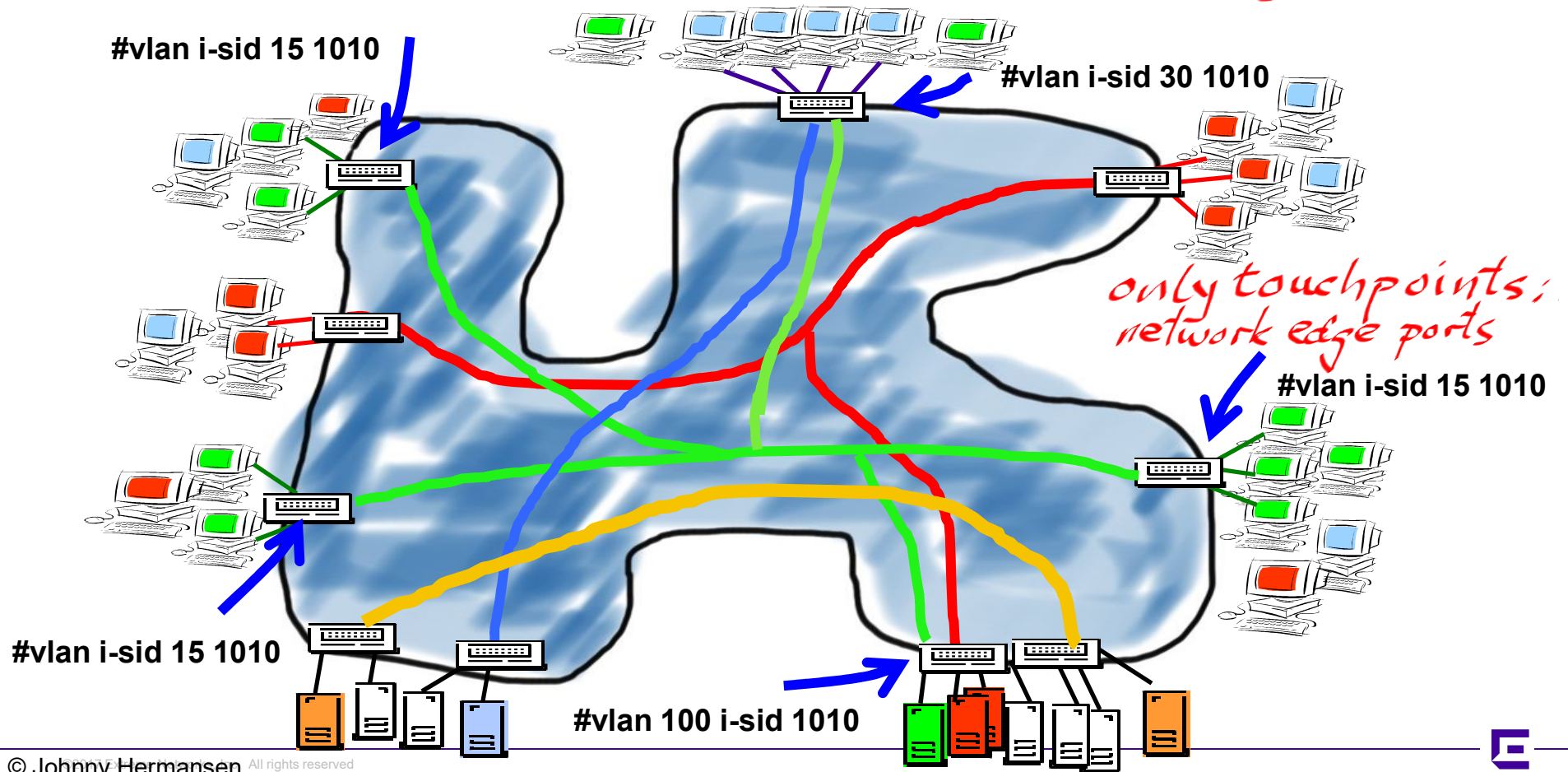
Enhanced Security with Hypersegmentation: **Prevents Lateral Movements Creating Dead Ends for Hackers**

Campus VLAN's and ACL's

VLAN Chaining

NETWORK

Micro-segmentation in the data center

Application Servers

Without Hyper-Segmentation
Isolation is fragmented and **limited in scale**

With Hyper-Segmentation
Zones **effortlessly** reach across **entire** network

END-TO-END CONTROL PLANE

NETWORK

Customer / Patient Records

Financial Systems

Application Servers

Enhanced Security with Stealth: **Keeps topology hidden.**
What you can't see you can't attack

Without Stealth Capability
All network nodes and devices can be viewed

With Stealth Capability
There is no reachability in or out of a segment.

Video Surveillance Cameras

NETWORK

Customer / Patient Records

Financial Systems

Video Surveillance Servers

Video Surveillance Cameras

NETWORK

Video Surveillance Servers

Enhanced Security with Elasticity: **Eliminates Back Door Entry Points**

IoT's in Video Surveillance Zone

IoT is removed -- zone is automatically contracted

IoT moved -- zone automatically expands appropriately

END-TO-END CONTROL PLANE
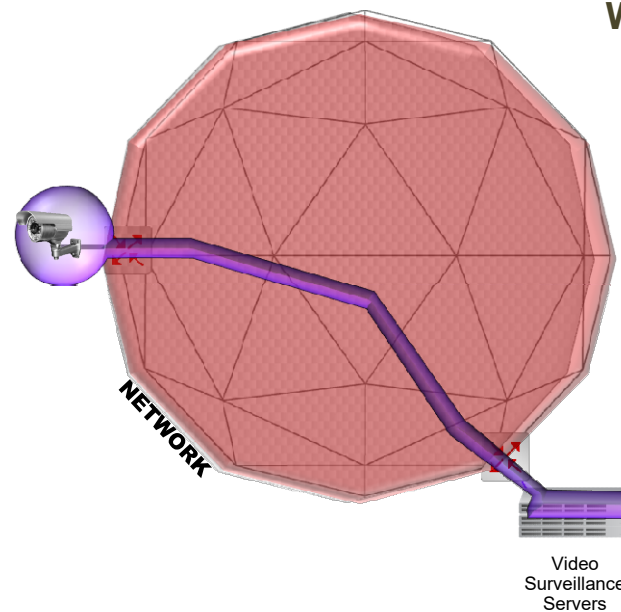
NETWORK

Video Surveillance Servers
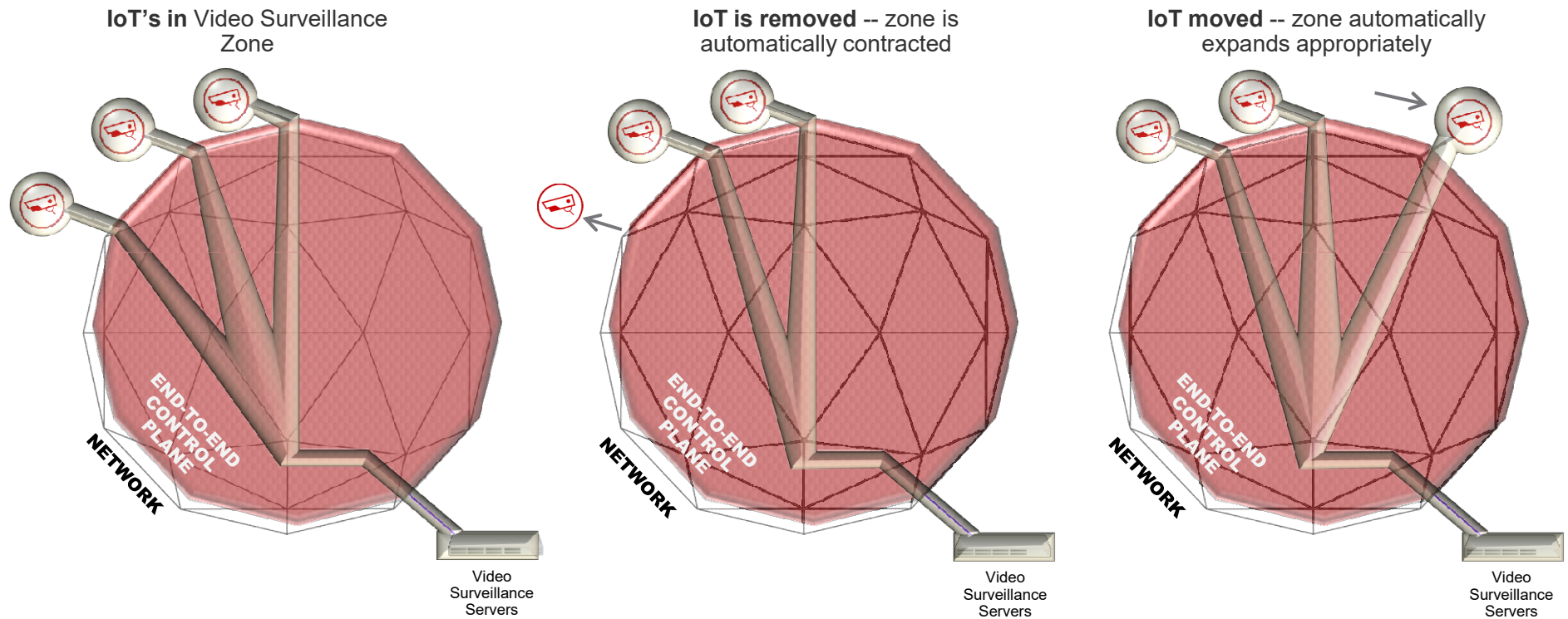
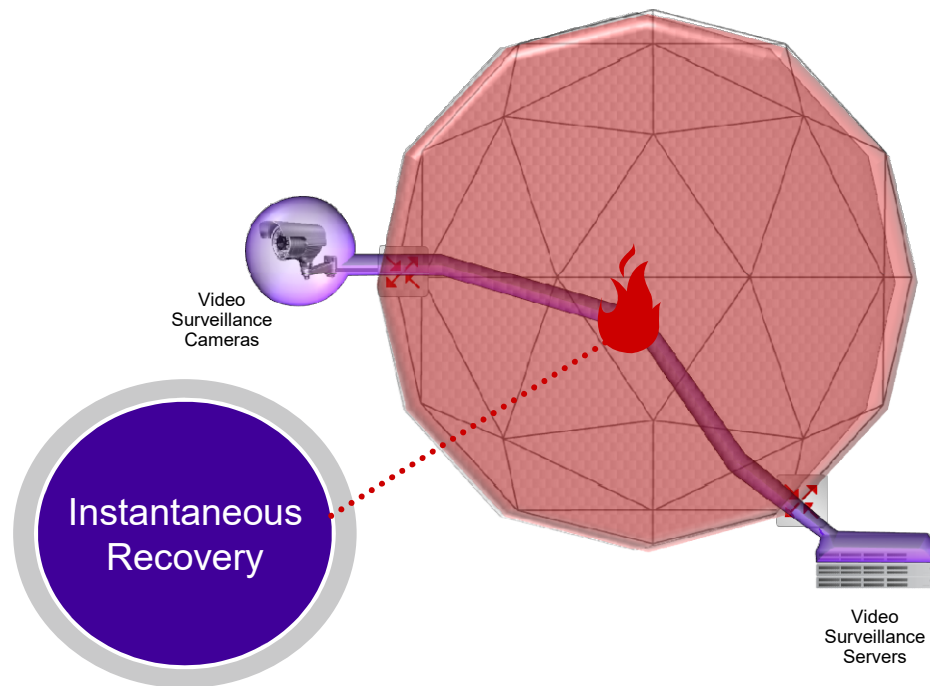# 11x Faster time to Service with Simple Edge Provisioning
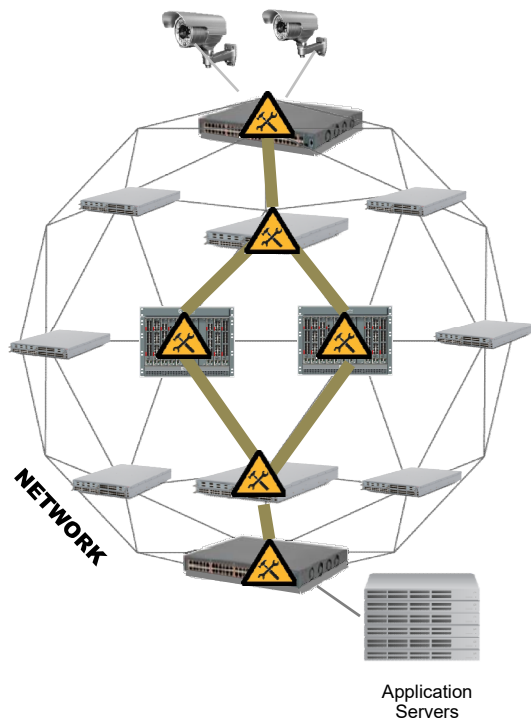
Status Quo

- Hop by hop provisioning

- Moves, adds and changes require core reconfiguration

- Vulnerable to human error during change

- Services coupled to physical topology

NETWORK

Application Servers

With Extreme

- Edge Provisioning only

- Core is hands off

- Moves, adds and changes on the fly (no more maintenance windows)

- Services abstracted from topology

NETWORK

Video Surveillance Servers

Fabric Connect is Resilient: **Delivering 2500X Faster Network Recovery (from mins to milliseconds)**

Video Surveillance Cameras

Instantaneous Recovery

Video Surveillance Servers

- Load balanced, active / active network
- Full network recovery in milliseconds (L2/3, even multicast)
- Eliminates the domino effect of protocol overlays
- Recovers so quick that upper layer communications protocols are unaffected.

Customer Example: US Hospital

The Challenge

- Completely paperless
- Needed a secure network environment for HIPAA compliance
- High bandwidth, resilient connectivity between 3 data centers, and 100 different locations
- Imaging (CT and MRI devices at rural locations)
- High availability paramount

The Value Provided

- **40% reduction in operating costs.**
- **Ability for IT to increase efficiency**
- **A secure, decentralized, self-healing network** that the Hospital and its affiliates require to serve their patients effectively in a complex, paperless environment.

"We consider the network in the same critical category as electricity, oxygen, and water. It needs to be available 24x365. That's where we make a lot of our technology investments."

# Customer Example: The Power of Fabric Connect

"**We have already created 14 virtual networks** using Fabric Connect. We can create and configure a virtual network from one side of the company to another **in one hour, with zero configuration mistakes. Before the implementation this would take up the whole day, and errors were easy to make.**

Thanks to Fabric Connect, ŠKODA is no longer dependent on a fixed physical topology **and we have reduced provisioning by 50%"**
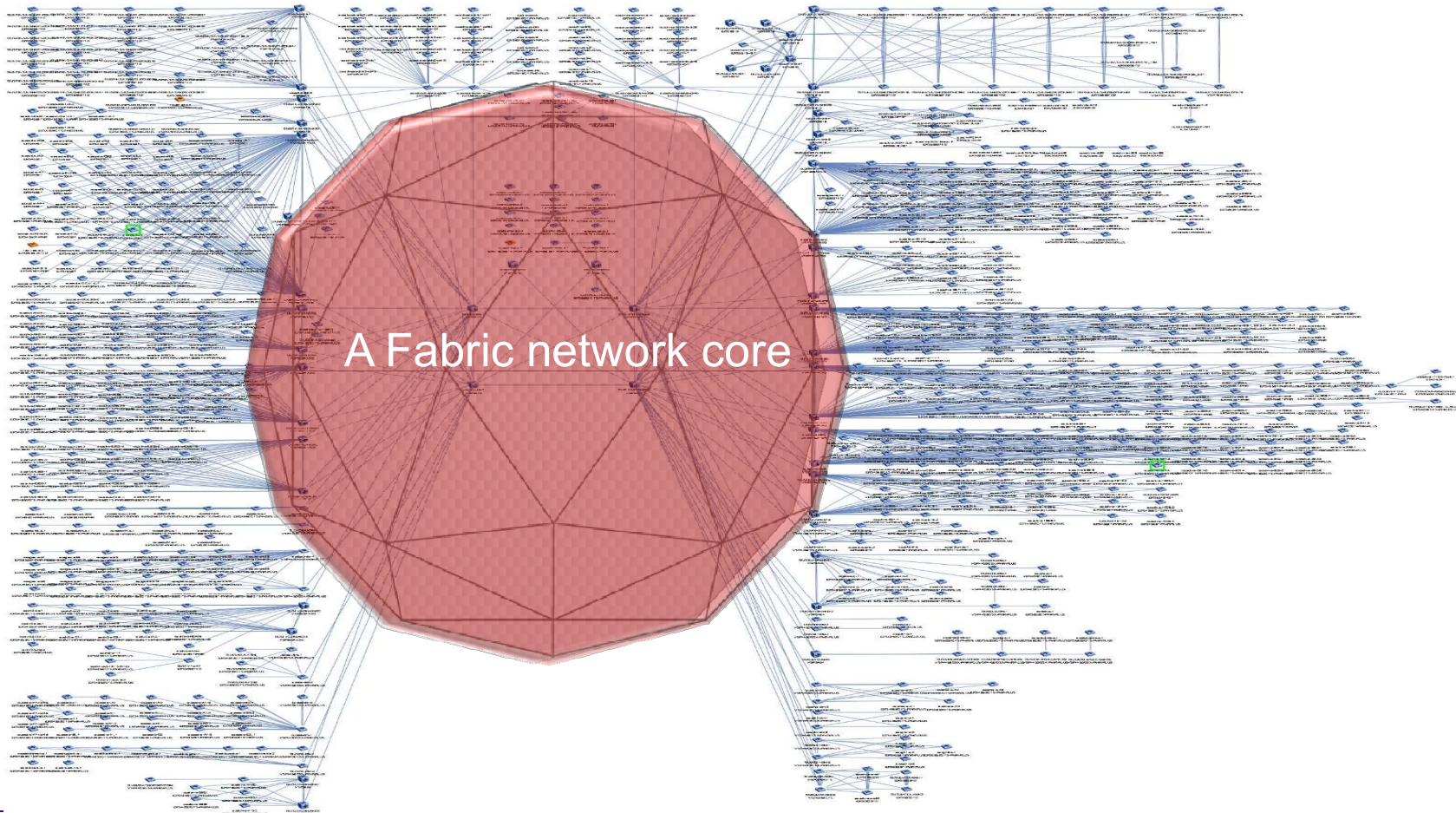
– Martin Polak, Coordinator, Network Planning, **ŠKODA AUTO**

Customer Example: Oslo University Hospital - the challenge

Complex
Rigid
Very hard to support
medical techical units
Strong need to segment
Security
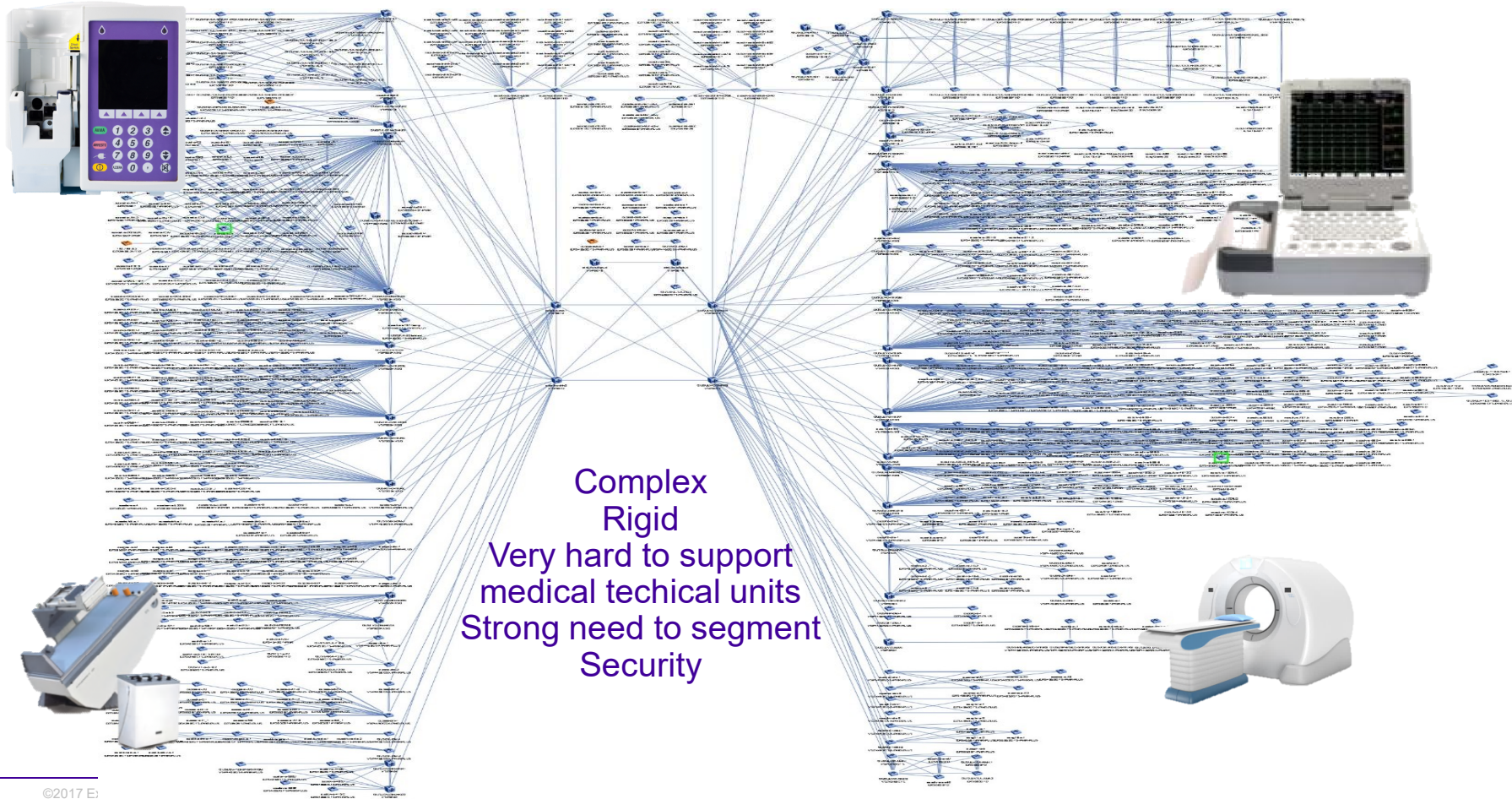
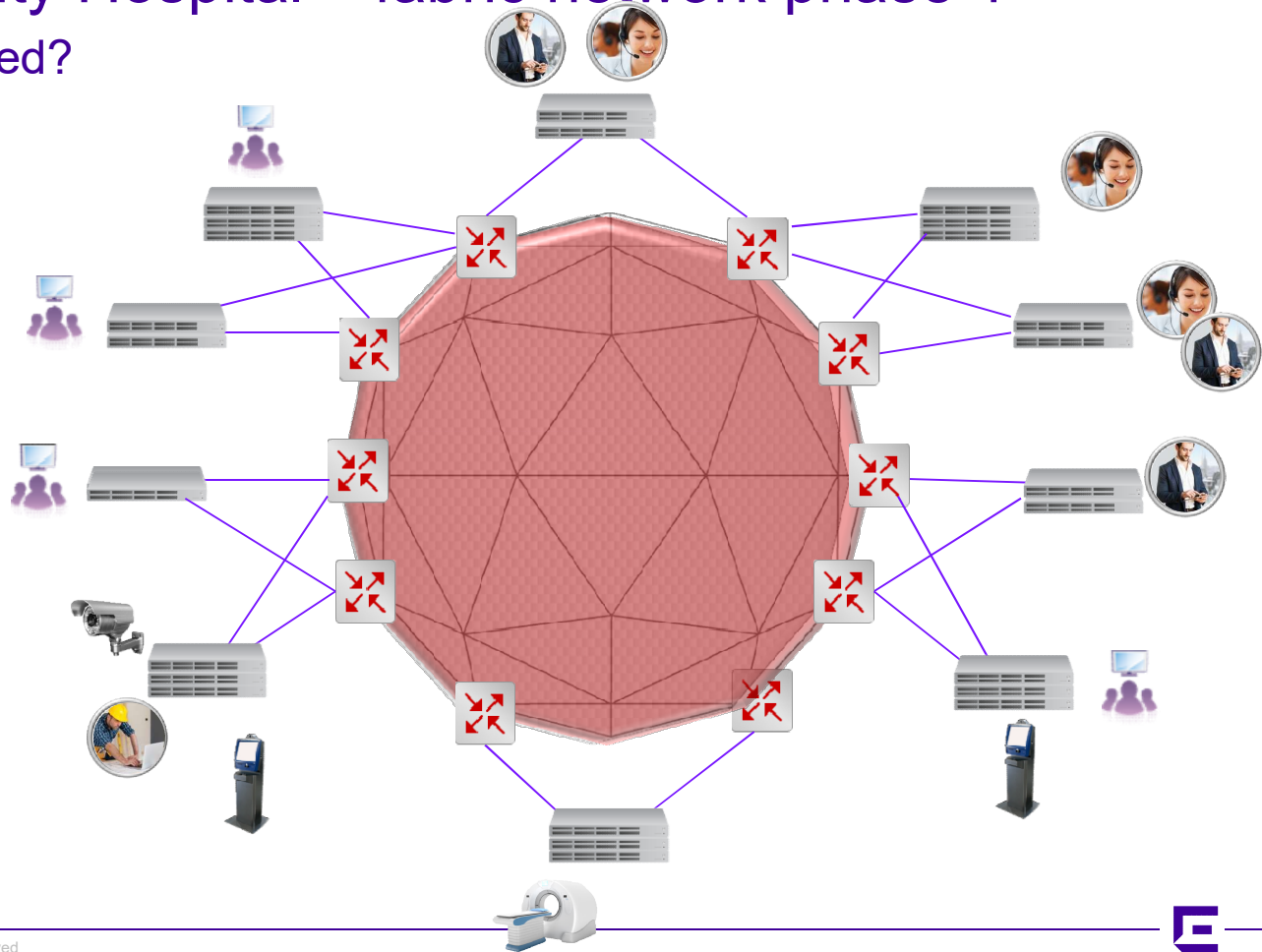# Oslo University Hospital – fabric network phase 1

A Fabric network core
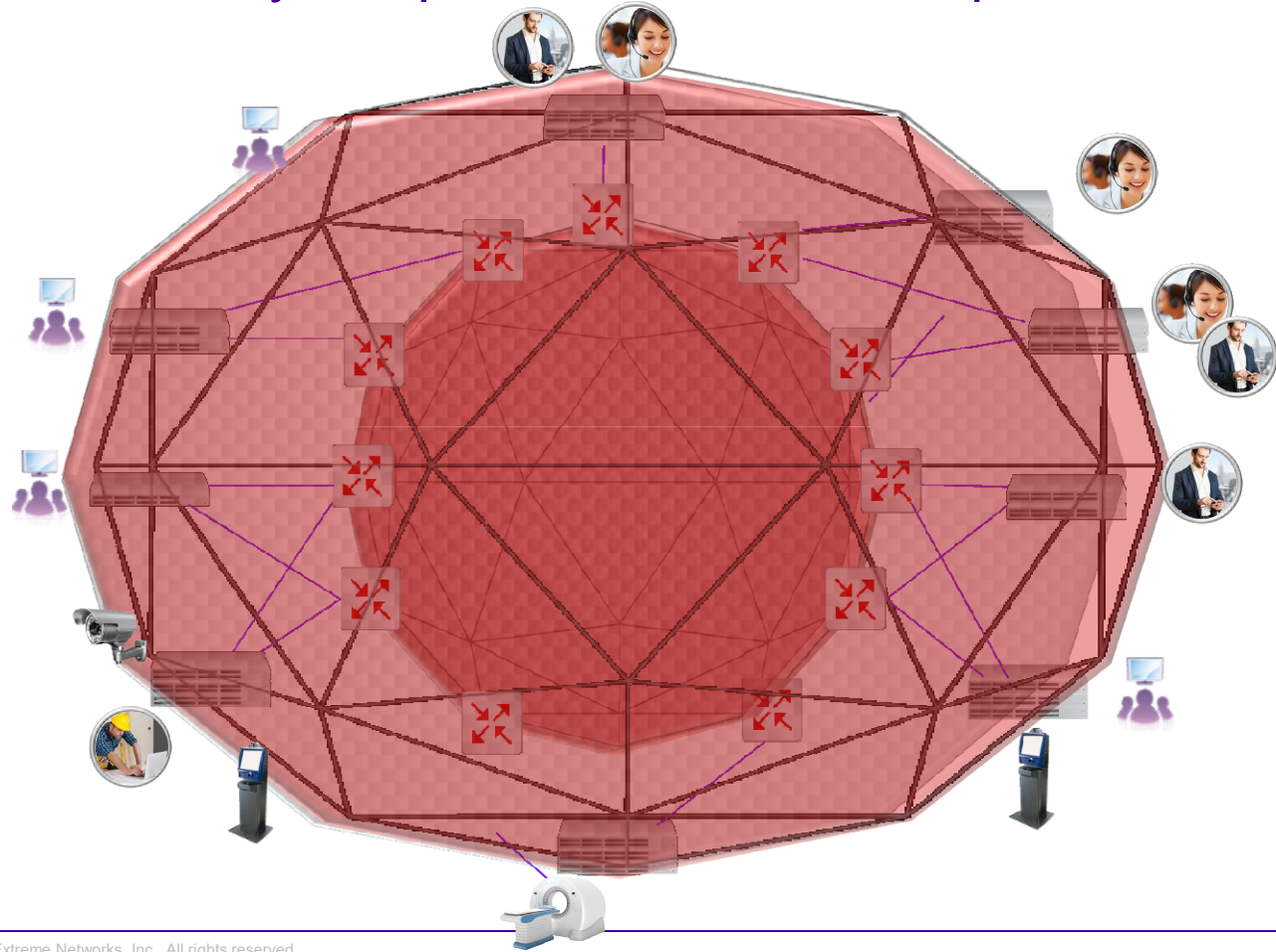
Oslo University Hospital – fabric network phase 1

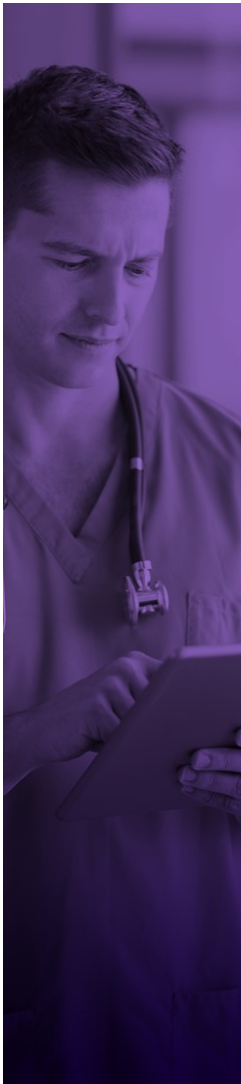## What was achieved?

- Highly secure
- Service oriented network
- Fast time to service
- Services as and when and where needed
- Reduced cost of operation

Oslo University Hospital – fabric network phase 2 – in progress

The goal: A fully automated, zero touch network with top security

END-TO-END CONTROL PLANE

NETWORK

Customer / Patient Records

Financial Systems

Application Servers

The Extreme Fabric Delivers Proven Results

DYNAMIC MARKETS

Fabric Connect
Customer
Experience
Research

Independent Market Research
Commissioned by

AVAYA

January 2015

	Before	After
Implementation Time	14 days	1.3 days
Configuration Time	4.6 days	.7 days
Troubleshooting Time	39 hrs	6 hrs
Failover Time	14 min	320 msec
Human-Caused Outages	3 annually	0 annually
Days Waiting to Deploy a Service or Application*	31 days	1 day

With Extreme Fabric Networking…

11x FASTER
Implementation Time

7x FASTER
Configuration Time

7x FASTER
Troubleshooting Time

2,553x FASTER
Failover Time

100% IMPROVEMENT
Outages Due to Human Error