

# Cisco Webinar

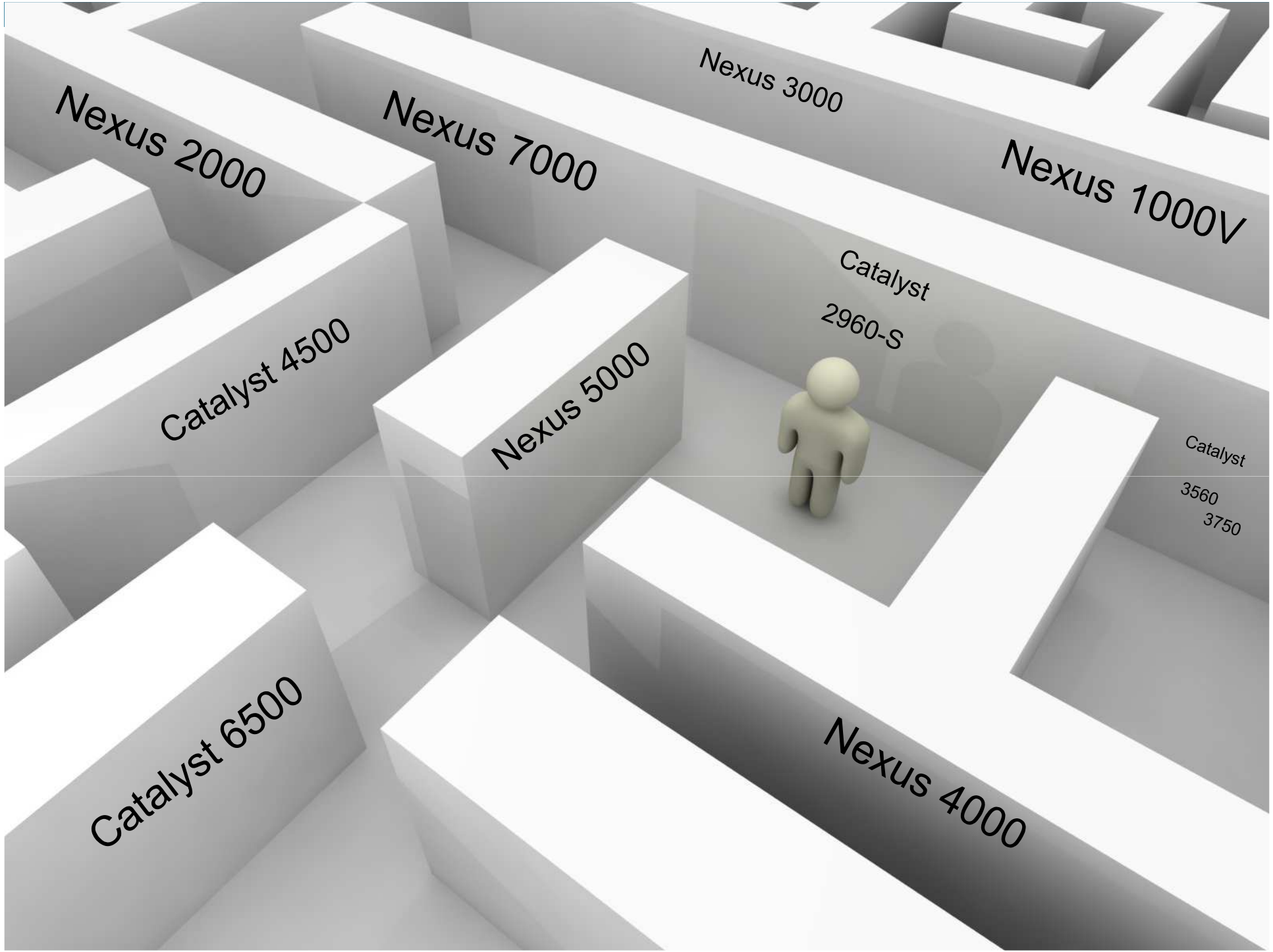
## Ethernet Switching – Powered by Cisco

Dipl.-Ing. Andreas la Quiante, TSA  
Jose Moreno, SE



CCIE 7817  
CCIE 16601  
CCDE 20100008  
VCP, EMCISA

*“Many of the products and features described herein remain in varying stages of development and will be offered on a when-and-if-available basis. This roadmap is subject to change at the sole discretion of Cisco, and Cisco will have no liability for delay in the delivery or failure to deliver any of the products or features set forth in this document.”*



Nexus 2000

Nexus 7000

Nexus 3000

Nexus 1000V

Catalyst 4500

Nexus 5000

Catalyst  
2960-S

Catalyst  
3560  
3750

Catalyst 6500

Nexus 4000

# Struktur & Agenda

Catalyst

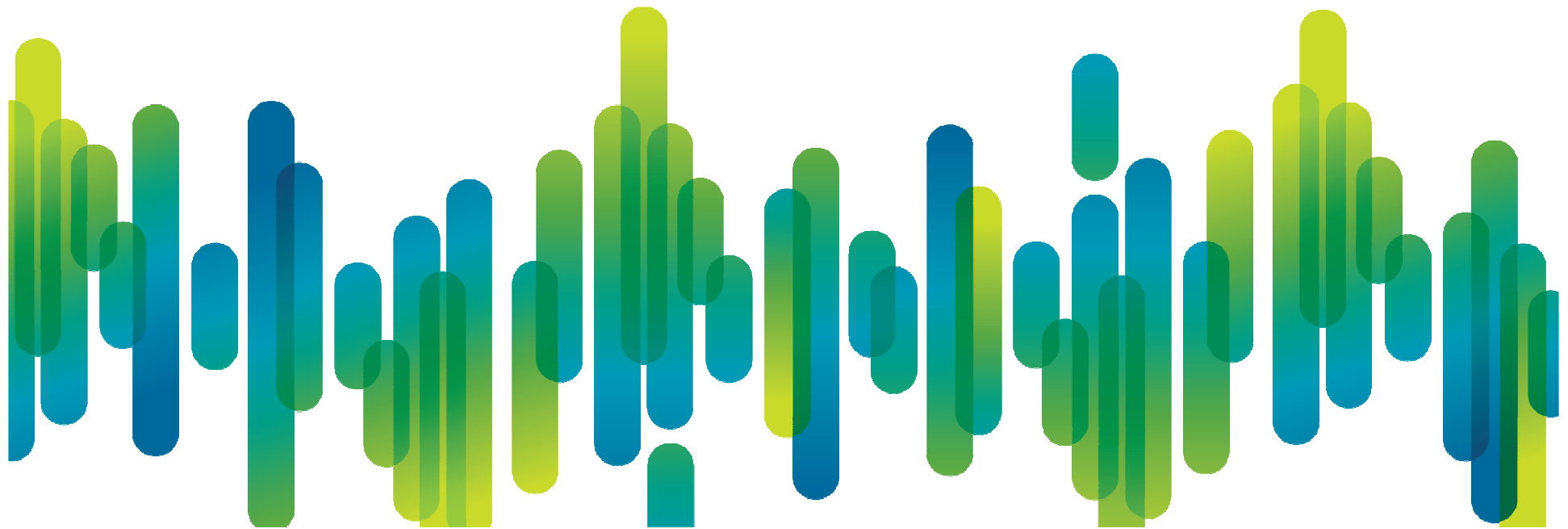
Nexus

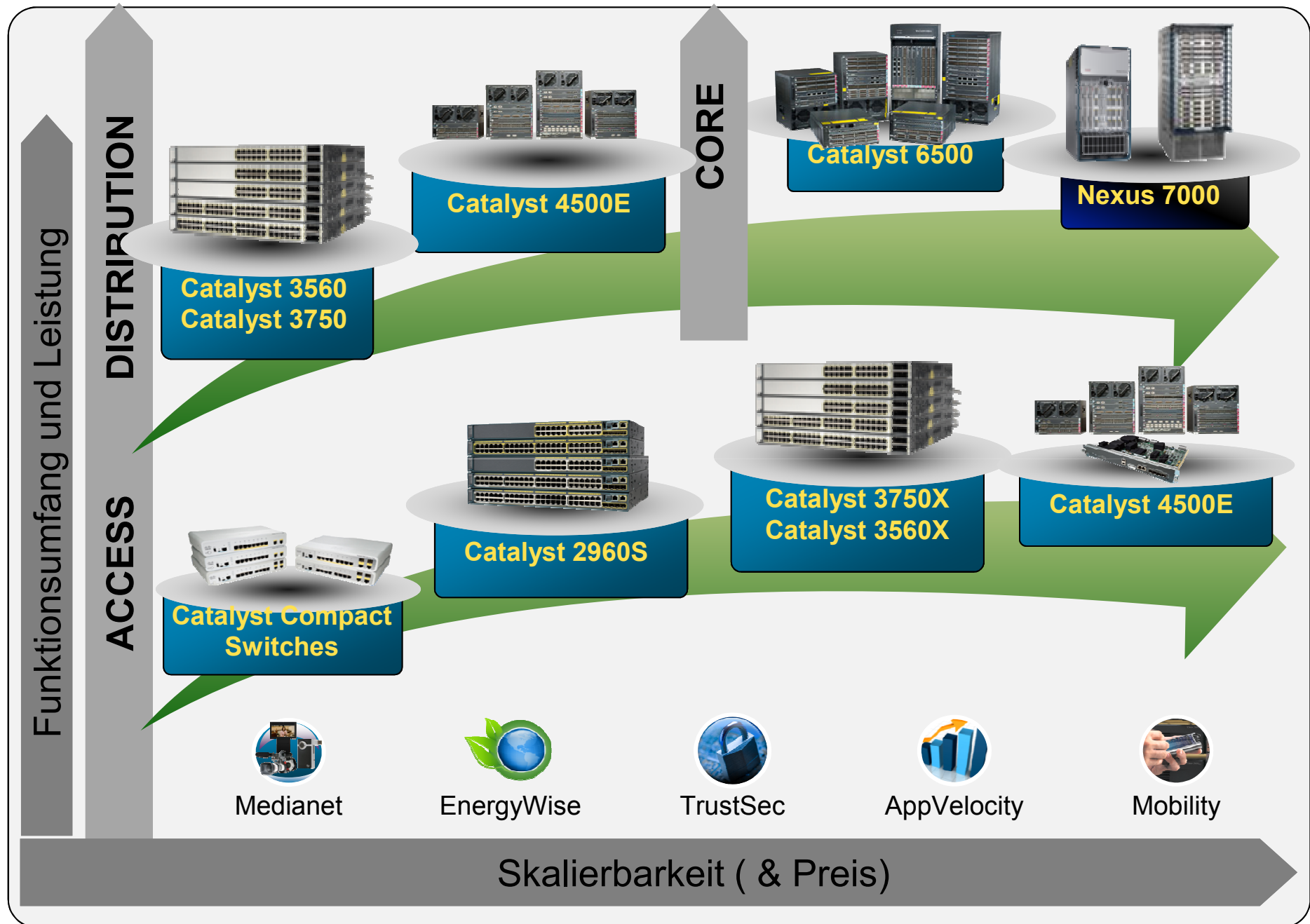
- Teil 1 Das Catalyst Portfolio
  - Catalyst 2k /3k
  - Catalyst 4k
  - Catalyst 6k
- Teil 2 Das Nexus Portfolio
  - Nexus 1kV
  - Nexus 2k
  - Nexus 3k
  - Nexus 5k
  - Nexus 7k
- Teil 3 Cisco Prime



14:00 Uhr bis 15:00 Uhr

# Teil 1 Das Catalyst Portfolio





# Catalyst im „Access“

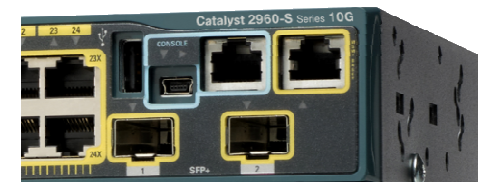
- Catalyst 2k
- Catalyst 3k
- Compact Switches



Innovative Absicherung  
der Systemversorgung



Modulare Uplinks



SFP/SFP+

# Catalyst 2k / 3k

- Grundanforderung: FastEthernet

- Anforderung:

Gerät:

Softwareoptionen:

# Catalyst 3K Fiber

- Zur Schließung von Lücken wurde das Portfolio kürzlich um die folgenden Geräte für „Fiber Anbindungen“ erweitert:
- Für die Anbidung von FastEthernet über 100FX steht ein 24 Port Gerät mit 2 GE Uplinks zur Verfügung. Dieses Gerät gehört zur 3750 V2 Serie und unterstützt StackWise.



- Ebenfalls von Kunden gewünscht:

Geräte für die Zusammenfassung von 1G Uplinks in Fiber innerhalb eines Stacks. Hier besteht nun die Wahl zwischen einem 12-Port und einem 24-Port SFP basierten Switch der Serie 3750-X.

# Catalyst 2k / 3k

- Grundanforderung: GigabitEthernet

- Anforderung:

Gerät:

Softwareoptionen:

# Catalyst Compact

- Klein
- Leise
- aber groß im Funktionsumfang



Compact, quiet design  
Size (in): 1.75 x 10.6 x 6.8 to 9.4



8 10/100 ports, 2 PoE  
2 GE PoE+ input ports

**2960-C  
PD/PSE**



8 10/100/1000 ports, 4 PoE+  
2 GE uplink ports

**3560-C  
GE PoE**



8 10/100 ports  
2 GE PoE+ input ports

**2960-C  
PD**



8 10/100/1000 ports  
2 GE uplink ports

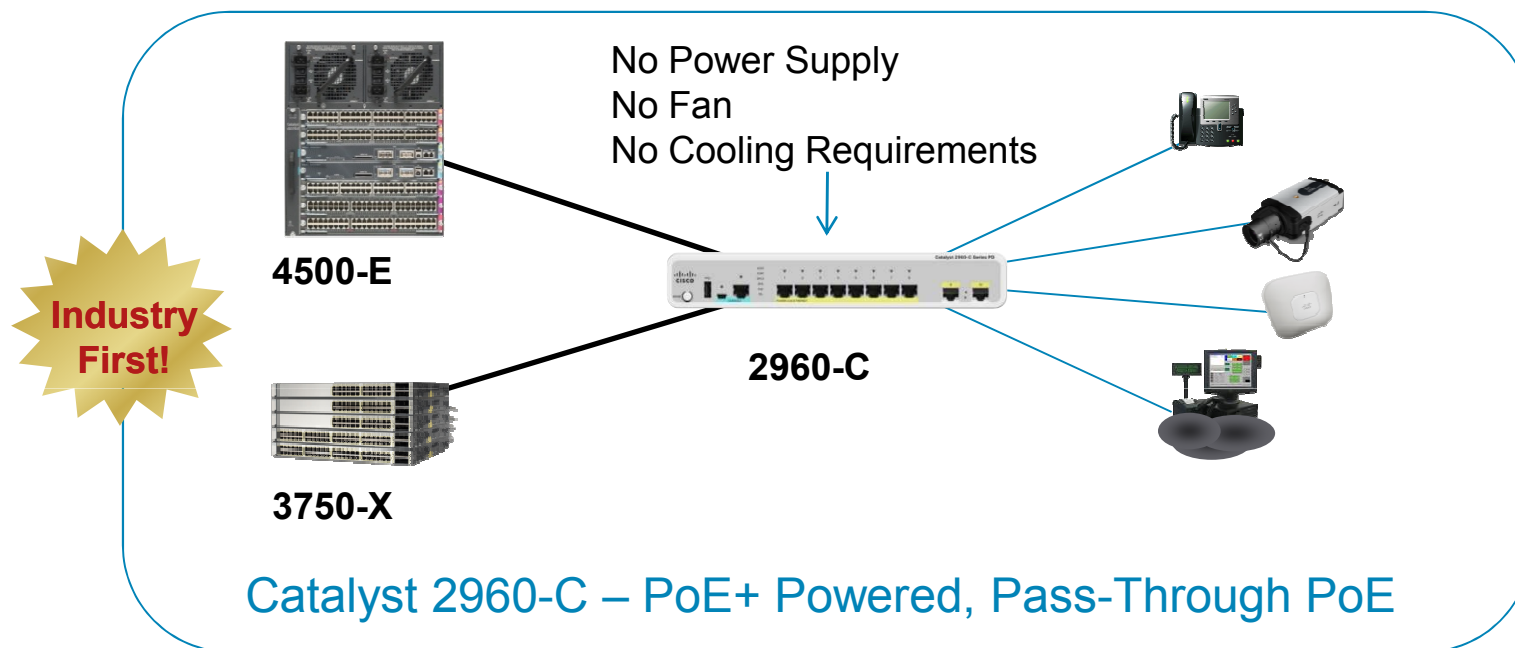
**3560-C  
GE**



8 10/100/1000 ports  
2 GE uplink ports

**2960-C  
GE**

# Catalyst Compact



- PoE/PoE+ (output and input) diminish power infrastructure
- Quiet, cool, compact design ideal for co-location
- Cisco EnergyWise further cuts energy consumption and costs

# Access Switching „Threat Protection“

- Sicherheit IPv4 und IPv6  
802.1X, WebAuth, MAC Auth  
Dynamic ARP Inspection  
DHCP Snooping  
IP Source Guard  
Port Security  
Root Guard  
PVLAN  
CTS (TrustSec/MacSec)

- Installations- und  
Betriebsvereinfachung

Smart-Install

Auto-SmartPorts

CNA

EEM

AutoQoS Voice & Video

<http://www.cisco.com/en/US/docs/solutions/Enterprise/Video/tpqoscampus.html>

# Sicherheit



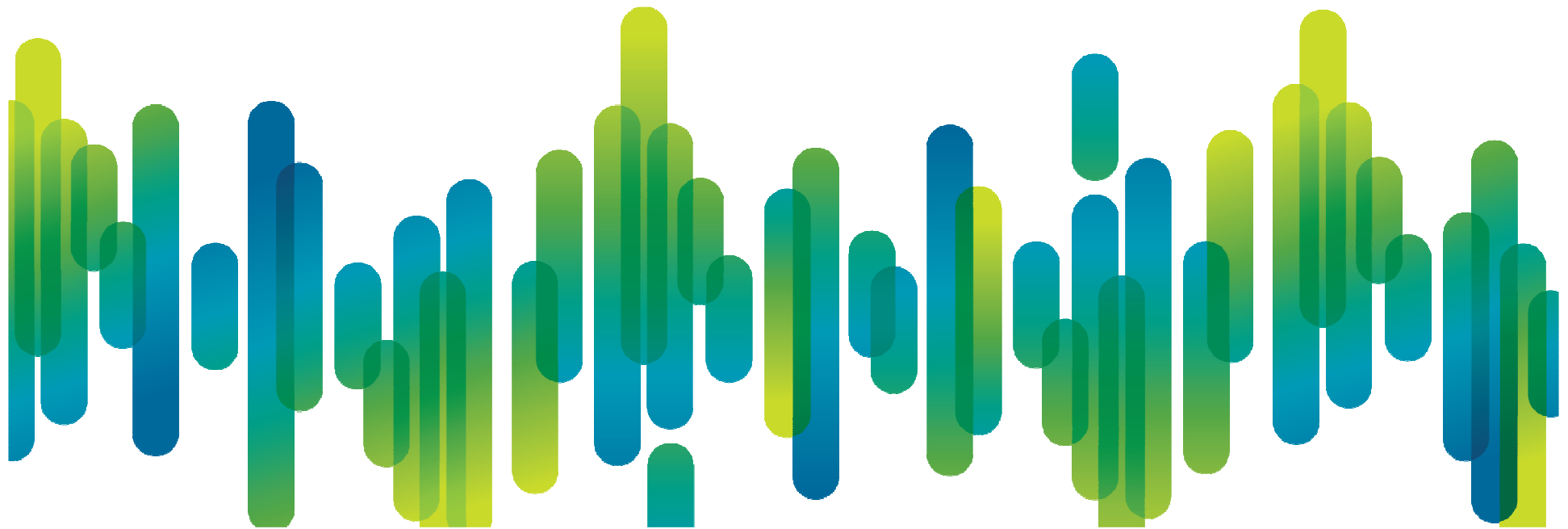
- TrustSec provides Layer 2 hop-by-hop encryption and integrity, based on IEEE 802.1AE standard
- 128bit AES-GCM (Galois/Counter Mode) – NIST Approved \*
- Line rate Encryption / Decryption for both 10GbE/1GbE interface
- Replay Protection of each and every frame
- 802.1AE encryption to protect CMD field (SGT value)

## Customer Benefits

- Protects against man-in-the-middle attacks (snooping, tampering, replay)
- Standards based frame format and algorithm (AES-GCM)
- 802.1X-REV/MKA addition supports per-device security associations in shared media environments (e.g. PC vs. IP Phone) to provide secured communication
- Network service amenable hop-by-hop approach compared to end-to-end approach (e.g. Microsoft Domain Isolation/IPsec)

▪ \* NIST Special Publication 800-38D (<http://csrc.nist.gov/publications/nistpubs/800-38D/SP-800-38D.pdf>)

# Catalyst 4500 & 4900



# Catalyst 4500 & 4900



**4503-E**

**4507R+E**

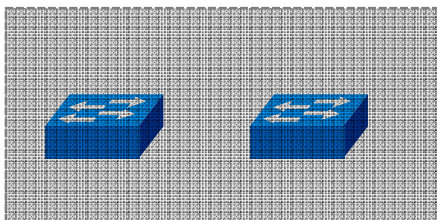
**4510R+E**

**4506-E**

- Catalyst 4500 Access für Endgeräte
- Catalyst 4900 Access für Server im Rechenzentrum
- Catalyst 4500 als Aggregation und Distributionsystem im Campus

# Catalyst 4500 und 4900

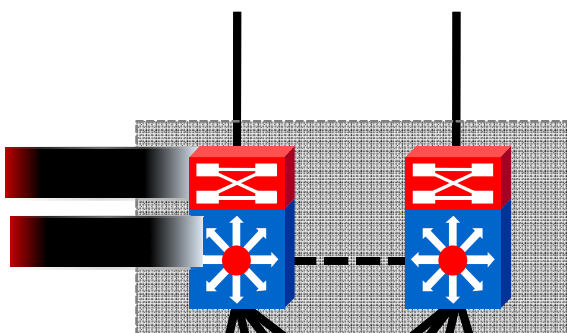
ACCESS DC



49xx  
4900-M

1 und 2 RU

DISTRIBUTION



Next Gen  
Cat4k/Sup7-E  
Sup6-E, 6L-E

Rapid Network Convergence  
Sub-sec HSRP, fast UDLD, Link state tracking, BFD\*

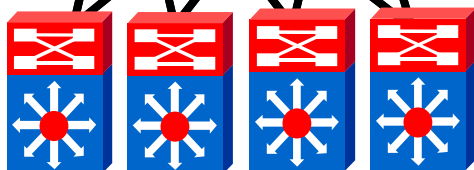
Optimized Routing Protocols

EIGRP, OSPF fast convergence, OSPFV3\*, NSF etc

sub-sec inter-chassis SSO, ISSU

Proactive Diagnostics  
EEM, GOLD, Smart Callhome

ACCESS



Next Gen  
Cat4k/ Sup7-E  
Sup6-E, 6L-E

HW redundancy:

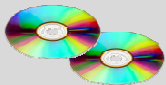
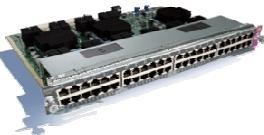


Dual Sup, 2+2 uplink redundancy, Power supply redundancy

Eliminate planned downtime  
<10msec ISSU, NSF/SSO, CoPP

Minimize unplanned downtime  
<10msec NSF/SSO, CoPP

Sub-sec network convergence  
sub-sec UDLD, Flexlink+, RPVST

# Catalyst 4500 im „Access“

		Entry Configurations	Premium Configurations
Software		<b>IP Base IOS</b> <ul style="list-style-type: none"> <li>FHRP, RIPv2, PIM stub</li> </ul>	<b>Enterprise Services IOS</b> <ul style="list-style-type: none"> <li>Route Scalability, Full OSPF, NSF, PIMSM/SSM</li> </ul>
POEP Linecards		<b>WS-X4648-RJ45V-E</b> <ul style="list-style-type: none"> <li>1:2 48 port POEP line card</li> <li>10/100/1000</li> </ul>	<b>WS-X4748-RJ45V+E</b> <ul style="list-style-type: none"> <li>1:1 48 port POE+ 10/100/1000</li> <li>30W/ port (IEEE802.3at standard PoE-Plus) on all 48 ports</li> <li>Cisco Trustsec ready</li> </ul>
Data Linecards		<b>WS-X4648-RJ45-E</b> <ul style="list-style-type: none"> <li>1:2, 48 port Data only RJ45</li> <li>10/100/1000</li> </ul>	
Supervisors		<b>WS-X45-SUP6L-E</b> <ul style="list-style-type: none"> <li>24G/ slot, 225Mpps</li> <li>Flexible Twin-Gig Uplinks</li> </ul>	<b>WS-X45-SUP7-E</b> <ul style="list-style-type: none"> <li>48G/ slot, 250Mpps</li> <li>Flexible SFP+ Uplinks</li> <li>10 slot Chassis support, Netflow</li> </ul>
		<b>WS-C4503-E , WS-C4506-E</b> <ul style="list-style-type: none"> <li>Upto 240 port Access Configurations</li> <li>Investment protection with backward compatibility</li> </ul>	<b>WS-C4507R+E , WS-C4510R+E</b> <ul style="list-style-type: none"> <li>Upto 384 port Access configurations</li> <li>Maximum Uptime with Supervisor Redundancy</li> </ul>

# Catalyst 4500 im Rechenzentrum

GE Uplink



**Cisco Catalyst 4948**

48X 10/100/1000-Gbps  
4X GE Uplinks  
Bandwidth 96Gpbs

10GE Uplink



**Cisco Catalyst 4928  
10GE**

28X GE SFP  
2X 10 GE Uplinks  
Bandwidth 96Gpbs



**Cisco Catalyst 4948  
10GE**

48X 10/100/1000-Gbps,  
2X 10 GE Uplinks  
Bandwidth 136Gpbs



**Cisco Catalyst 4948E**

48X 10/100/1000-Gbps  
4X GE and 10 GE Uplinks  
Bandwidth 176Gpbs



**Cisco Catalyst 4900M**

40X 1GE, 8X 10 GE  
Bandwidth 320Gpbs

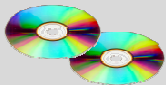

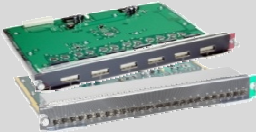
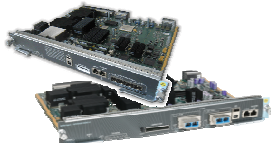
10GE Access



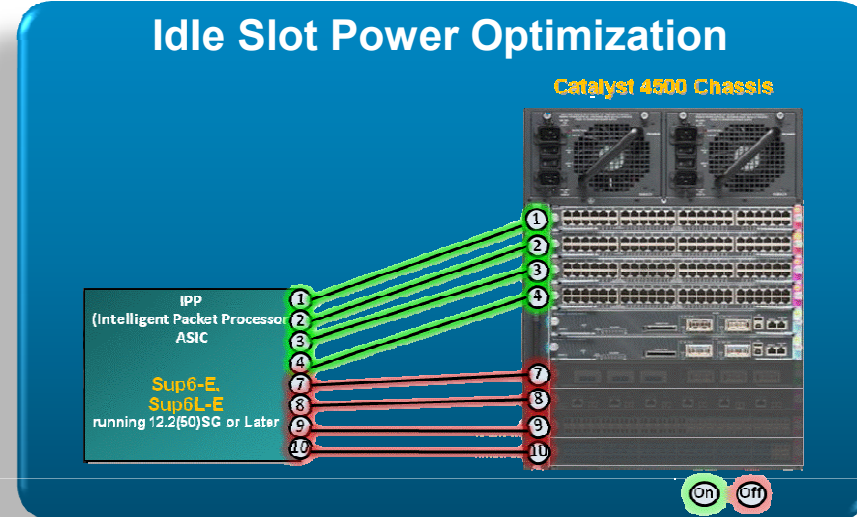
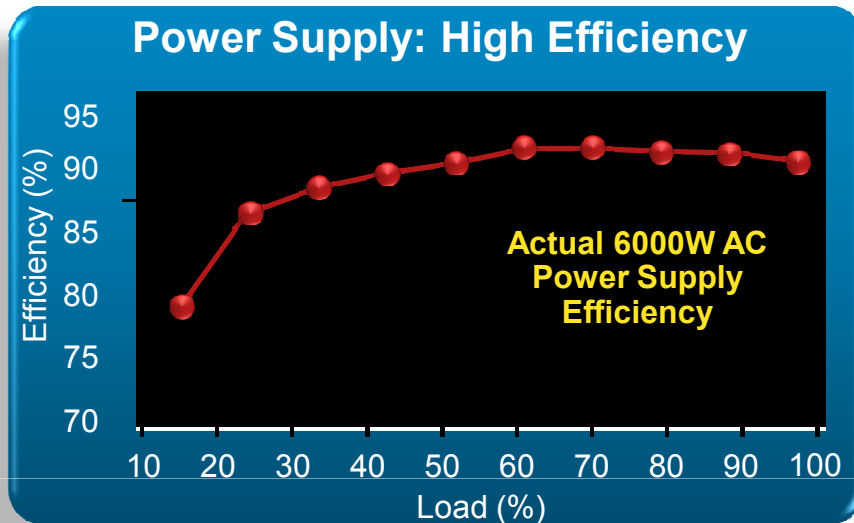
# Catalyst 4900 im Distribution

## Base Configurations

## Premium Configurations

Software		<b>IP Base IOS</b> <ul style="list-style-type: none"> <li>FHRP, RIPv2, PIM, PIM SSM</li> </ul>	<b>Enterprise Services IOS</b> <ul style="list-style-type: none"> <li>VRF-Lite, VRF aware services, Full OSPF, NSF</li> </ul>
10G Linecards		<b>WS-X4606-X2-E</b> <ul style="list-style-type: none"> <li>1:1, 6 port 10G</li> <li>G/10G Flexibility with X2</li> </ul>	<b>WS-X4712-SFP+E</b> <ul style="list-style-type: none"> <li>1:1, 12 port 10G with Mac Sec</li> <li>G/10G Flexibility with SFP+</li> </ul>
GE Linecards		<b>WS-X4612-SFP-E</b> <ul style="list-style-type: none"> <li>1:1, 12 port SFP</li> </ul>	<b>WS-X4624-SFP-E</b> <ul style="list-style-type: none"> <li>1:1, 24 port SFP</li> </ul>
Supervisors		<b>WS-X45-SUP6L-E</b> <ul style="list-style-type: none"> <li>24G/ slot, 225Mpps</li> <li>Flexible Twin-Gig Uplinks</li> </ul>	<b>WS-X45-SUP7-E</b> <ul style="list-style-type: none"> <li>48G/ slot, 250Mpps</li> <li>Flexible SFP+ Uplinks</li> <li>10 slot Chassis support, Netflow</li> </ul>
		<b>WS-C4503-E , WS-C4506-E</b> <ul style="list-style-type: none"> <li>Low Density Configurations</li> <li>Non Redundant Option for two-chassis Aggregation designs</li> </ul>	<b>WS-C4507R+E , WS-C4510R+E</b> <ul style="list-style-type: none"> <li>High Density configurations</li> <li>Maximum Uptime with Supervisor Redundancy</li> </ul>

# Catalyst 4500 / 4900 Er ist Grün



### PoE Monitoring and Control

Less Than Max Power Consumed

Max Power Consumed

EEE: In Arbeit z.B. für den Catalyst 4500

### EnergyWise

Optimize Power Delivery of Policies

Poll Power of Network-Attached Devices: Phones, APs, PCs, Building Systems

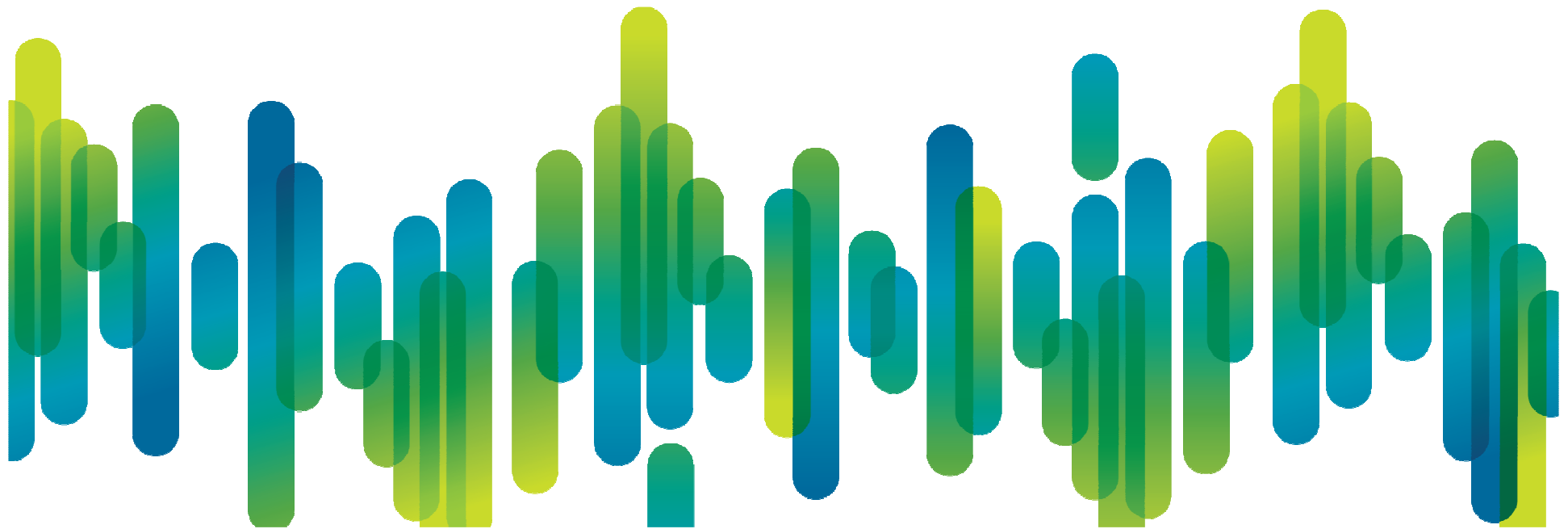
REGULATE MEASURE REPORT

ENERGY

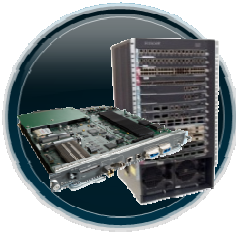
Show Power and Cost Savings  
Correlate Power and Actions

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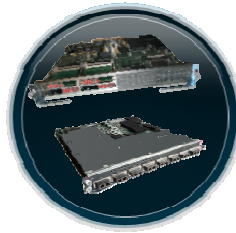
# Catalyst 6500



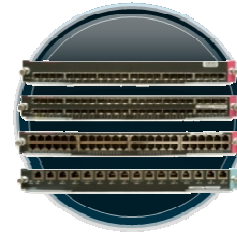
# C6K: Die nächste Generation ist da!



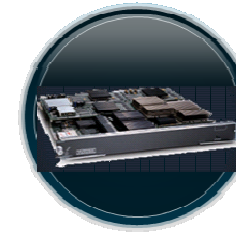
Sup2T and 6513-E



69xx Series 80Gbps  
8p 10G  
in Arbeit/16p 10G  
Built-in DFC4



68xx/67xx  
Series 40Gbps  
1GbE Fiber: 24p/48p  
10/100/1000: 48p  
10GBASE-T: 16p  
10G Fiber: 16p  
Built-in DFC4



Service Modules  
WiSM-2  
ASM-SM  
NAM-3  
ACE-30

Innovation

**Cat6500-E**

Investment Protection

ALL E-Series  
Chassis

Upgrade Option  
for 67xx Line Cards

All 61XX  
POE/ POE+

Legacy Service  
Modules

# Die nächste Generation ist da!

80G/slot in allen E-Series Chassis mit der SUP-2T



**6503-E**

34x10GE

96x1GE

150Mpps

**6504-E**

50x10GE

144x1GE

210Mpps

**6506-E**

82x10GE

240x1GE

330Mpps

**6509-E**

130x10GE

384x1GE

510Mpps

**6513-E**

180x10GE

528x1GE

720Mpps

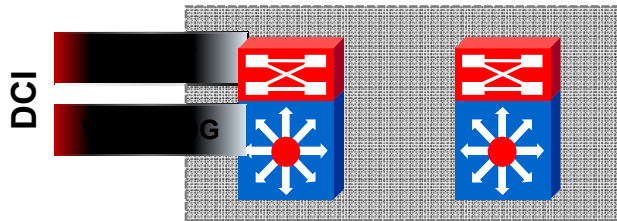
**6509-V-E**

130x10GE

384x1GE

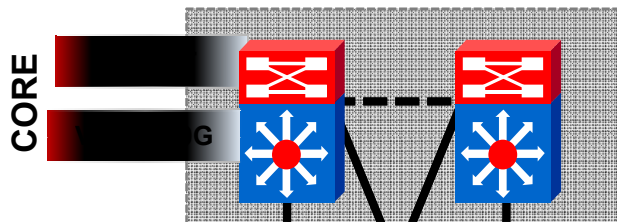
510Mpps

# Distribution, Core und DCI



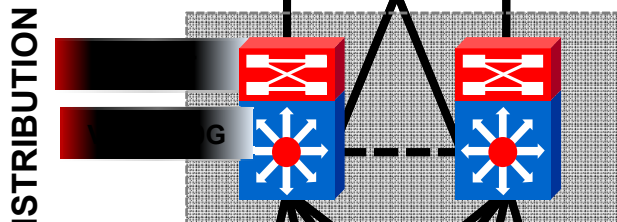
Next Gen  
Cat6k/Sup2T  
VS720-10G

PW  
VPLS und A-VPLS  
H-QoS mit CWAN Modulen



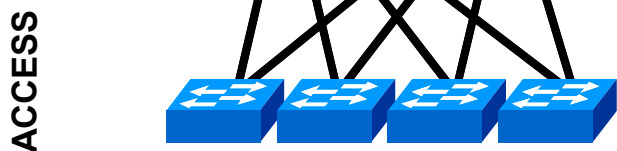
Next Gen  
Cat6k/Sup2T  
VS720-10G

4T VSS (with Quad-Sup VSS\*)  
40G Ready  
Tunnels, L3VPNomGRE  
L3SGT For TrustSec Interoperability  
Sampled Netflow



Next Gen  
Cat6k/Sup2T  
VS720-10G

4T VSS  
Integrated NG Svcs (WisM2, ASA, NAM, ACE-30), Multicast HA  
Smart Install Director\*  
Flexible Netflow, Egress Netflow



Next Gen  
Cat4k/ Sup7-E  
Cat3k/ 3750X  
Cat2K/2960S

TrustSec  
EnergyWise  
NGPoE (60W) Ready  
Flexible Netflow  
IPv6 First Hop Sec.



# Catalyst 6500 die neue Generation

61xx  
Line Cards

Legacy  
Service Modules

Next Gen.  
Service Modules

WS-X6148A-RJ-45

FWSM

ASA-SM

WS-X6148A-45AF

ACE 20

ACE 30

WS-X6148-FE-SFP

WiSM

WiSM-2

WS-X6148A-GE-TX

NAM-1

NAM-3

WS-X6148A-GE-45AF

NAM-2

In Arbeit...

WS-X6148E-GE-AT

SIP Modules, ES40 and VSPA werden  
durch die bewährte SUP-720 unterstützt

# Catalyst WAN-Edge: SIP-400 und ES+

## Gemeinsame Eigenschaften

32,000 Queues

3 level Hierarchical QoS

Dual Rate, 3 Color Policer

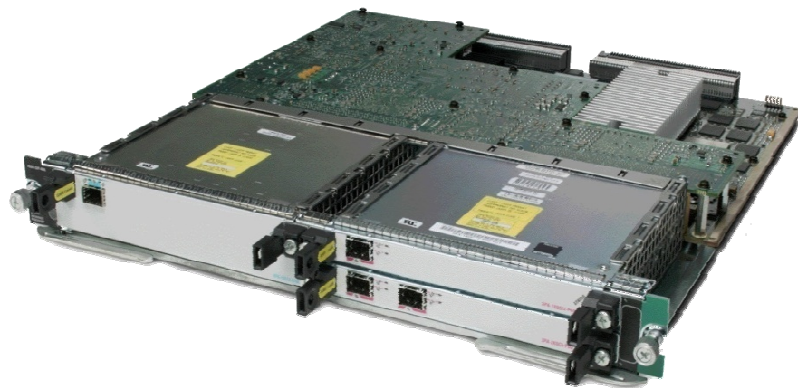
CBWFQ + LLQ + WRED

VPLS, VPLSoGRE

A-VPLS, A-VPLSoGRE

IRB

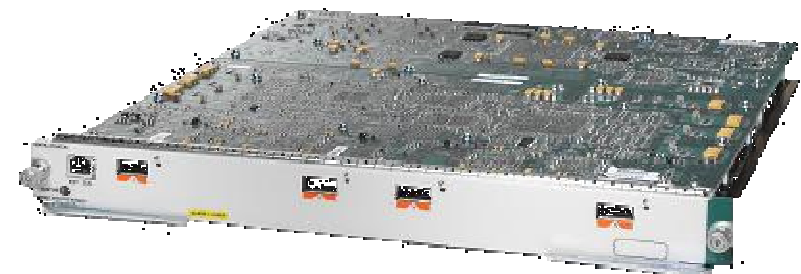
VLAN Translation



SIP-400

Traditional WAN interfaces

4-6 Gbps throughput



ES+

10GE WAN interfaces (2 & 4 ports)

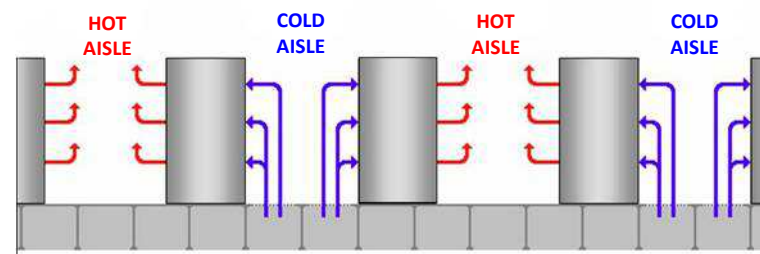
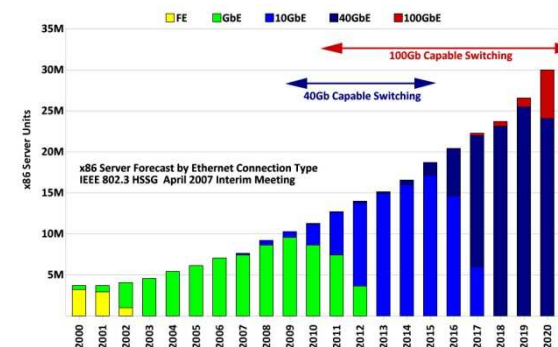
40G throughput

## Teil 2 Das Nexus Portfolio



# Nexus 5000 Teil 1

- 10G Serveranbindung
- Unified I/O, DCB und FCoE
- Nexus 5010/5020
- Nexus 5548
- Nexus 5596
- Layer 3 Option
- Entwickelt für das moderne Rechenzentrum



# Nexus 5000 Teil 2



**Nexus 5010**  
28-Port 1RU Switch



**Nexus 5020**  
56-Port 2RU Switch



**Nexus 5548**  
48-Port 1RU Switch



**Nexus 5596**  
96-Port 2RU Switch

- 10GE line rate ports
- Scales out with N2K for Access Layer Solution
- Best of ToR and EoR up to 576 ports
- 1GE to 10GE migration
- 10GE for 2x the price of 1GE
- High Availability
- Data Center Network Consolidation
- Optional SAN/LAN consolidation via FCoE
- Investment protection with FC SANs

- Access/Aggregation Solution
- L3
- Unified Port (1GE/10GE/FCoE/FC)
- Unified Box (LAN and SAN in a single chassis)
- Reduced latency
- FabricPath
- Scales to over 900 1G ports and over 600 10G ports
- NIV

# Nexus 3000

- Nexus 3064
- HFT := High Frequency Trading



## Ultra Low Latency

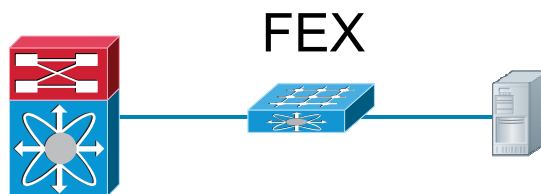
Sub-microsecond Latency  
up to 64 ports of 10G



# Nexus 2000 Teil 1

- Die Idee:

Durch „remote line Karten“ (FEX := Fabric Extender) wird die Infrastruktur (Kabel) optimiert, die Betriebsprozesse und Aufwände bleiben wie bei einer EOR Lösungen konstant und minimiert.



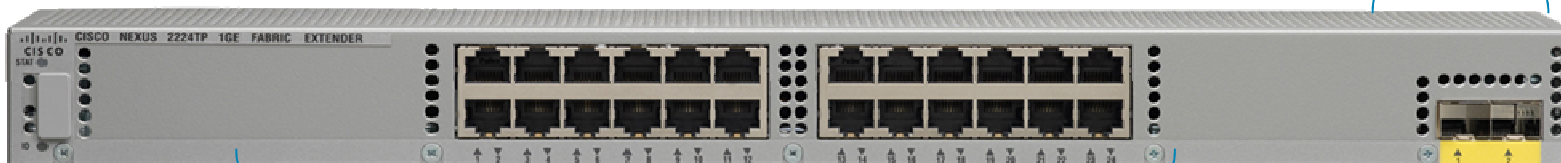
Physical view



Logical view

# Nexus 2000 Teil 2

2 10GE SFP+ Uplinks



24 100/1000-BaseT Downlinks

4 10GE SFP+ Uplinks



48 100/1000 RJ45 Downlinks

8 10GE SFP+ Uplinks



32 1GE/10GE SFP/SFP+ Downlinks

# Nexus 7000

- Modular, stark und zukunftsfest
- 10G/40G/100G
- Ökonomisch für n x 10G
- Virtualisierbar: VDC
- Hochverfügbarkeit und echtes ISSU/ISSD
- Innovatives Team: OTV, LISP, FabricPath, ...
- Unified I/O, DCB und FCoE



# Nexus 7000 ISSU/ISSD



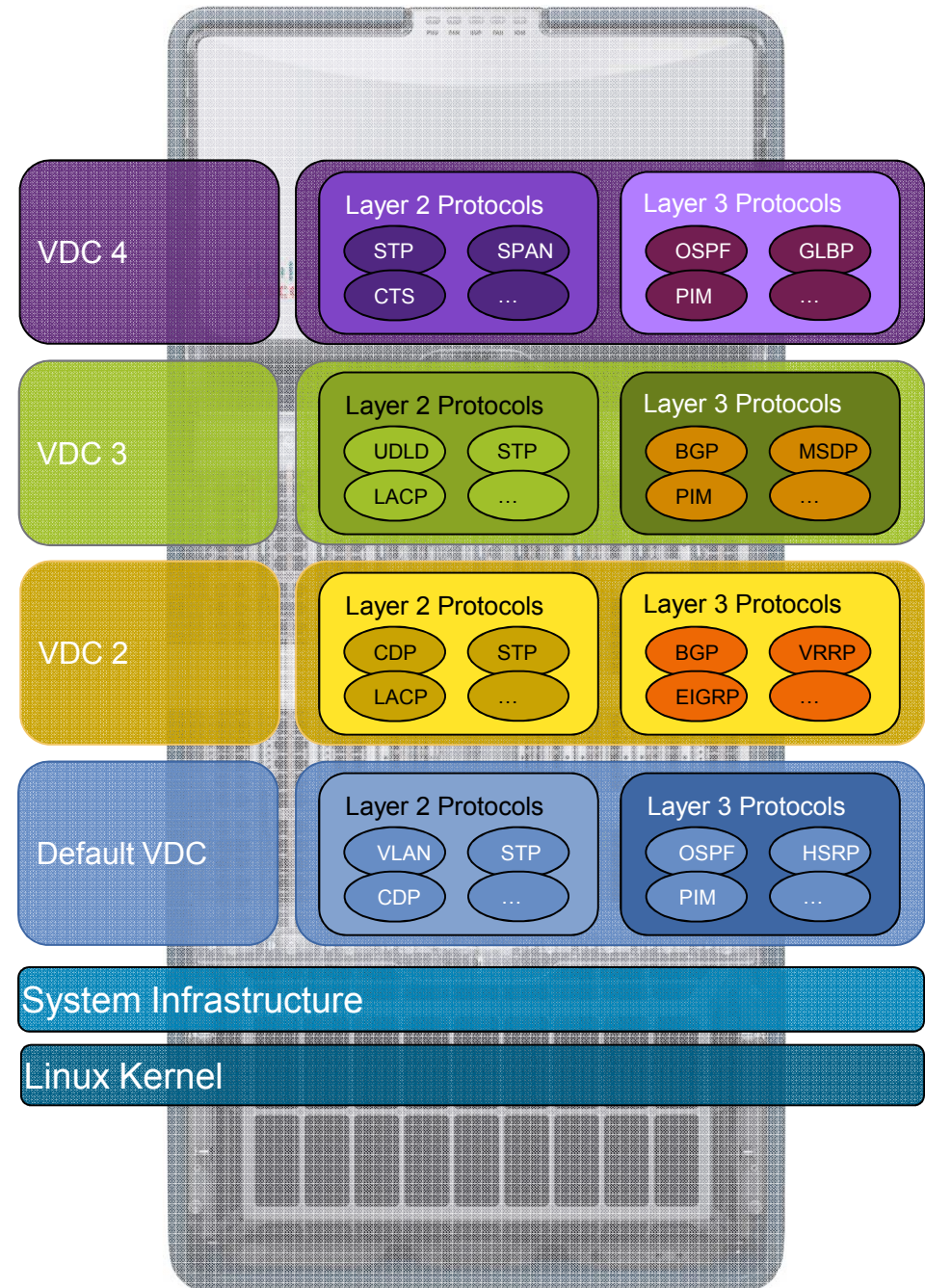
- Zero Packet Loss when Upgrading and Downgrading the software image - ISSU
- Zero Packet Loss when removing Fabric Cards

**Test Conditions:** Nexus 7000 I/O modules load balance all of the traffic across all 5 Fabric Cards. The test was performed with 51,200 OSPF routes, 256 OSPF neighbors (one on each 10GbE port), every packet going through a security ACL of 7000 lines, every packet being rewritten using a 500 line QOS ACL, each line cards was doing 48 Mpps lookup, and Cisco Netflow to track up to 512,000 flows .

# Virtualization

## Virtual Device Contexts

- Ein physikalisches Geräte (Nexus 7000) kann in vier Einheiten mit eigenen Prozessen (wie STP/OSFP) und vier Konfigurationen unterteilt werden
- Ports werden EINEM dieser vier Bereiche (VDCs) zugewiesen
- Sichere Abschottung der VDCs also der administrativen Einheiten.



# Nexus 7000 Teil 3

## F-Series



Access and Aggregation  
supporting Unified Fabric  
Transport capabilities

**L2+ for highest port density and bandwidth**

**FabricPath, DCB, vPC, FCoE, Low Latency**

**Optimized for the 1G to 10G transition**

## M-Series



L2 / L3 flexibility with greater  
port density and performance

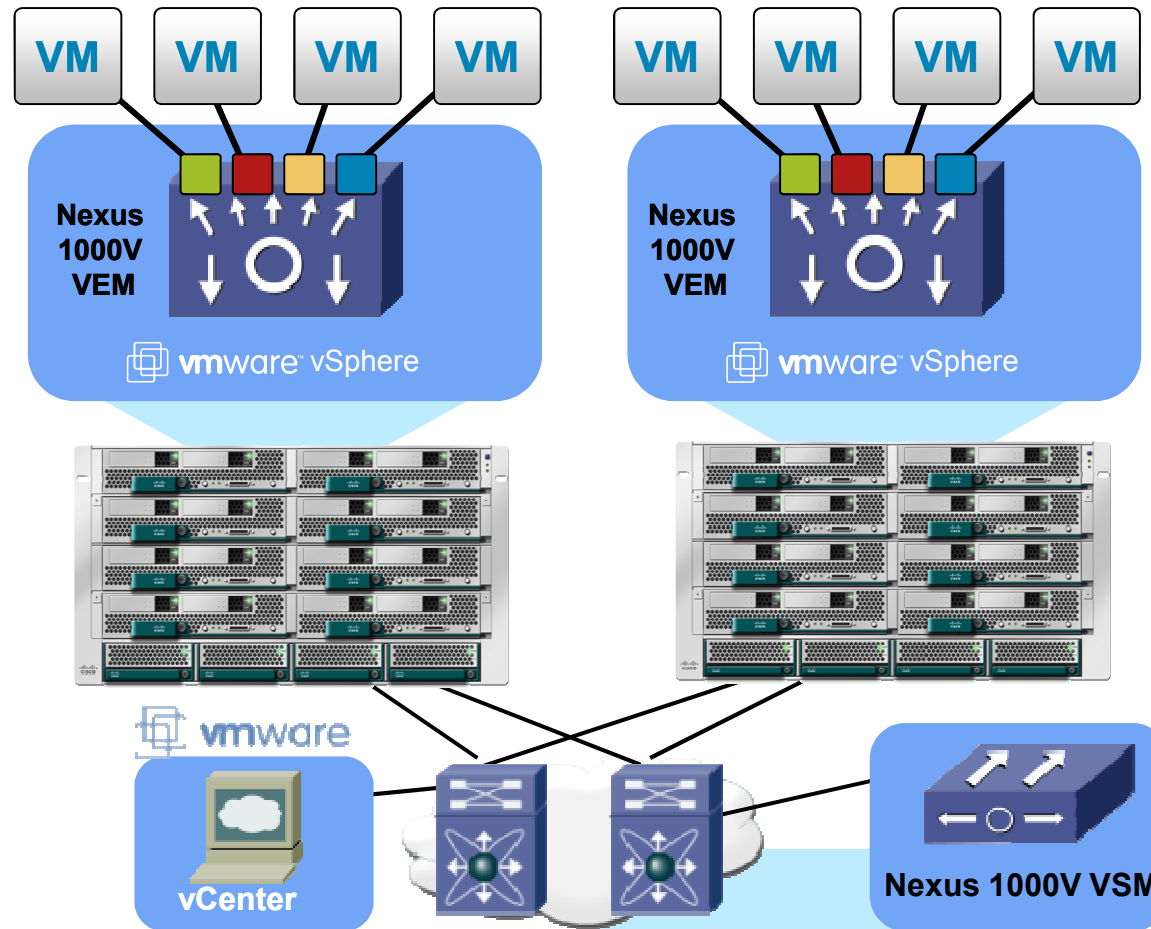
**Broad L2 and L3 features, "6500 HW capability"**

**QoS, Security, Large ACLs and Tables, Netflow**

**10G/1G options with deep buffers**

**Common characteristics:  
Performance, Scale, NX-OS**

# Nexus 1000V & 1010



16 virtuelle Switche (ESX) und  
2 reale Geräte (z.B. Nexus 7000) aber nur  
3 Konfigurationen mit NX-OS

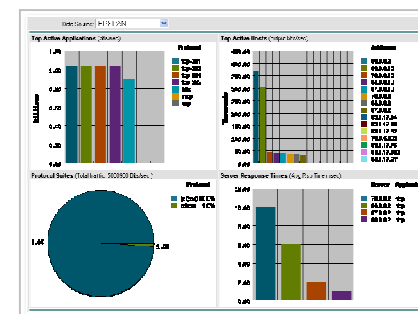
# Nexus 1000V & 1010

- Nexus 1000V
- Nexus 1010
- Sichtbarkeit
- Sicherheit
- ...



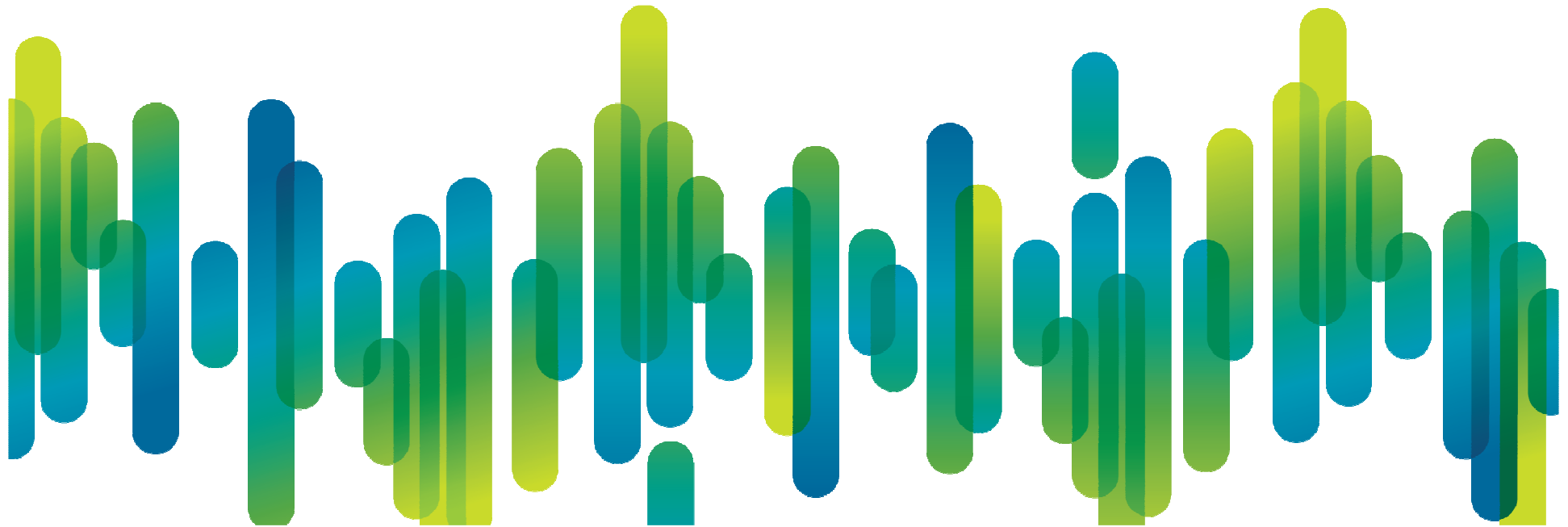
NetFlow

ERSPAN

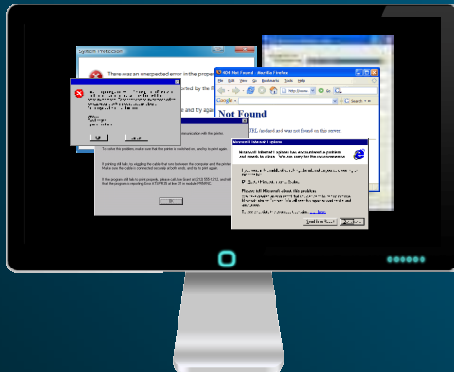


- vSphere 5 und vCloudDirector wird unterstützt werden

# Teil 3 NMS / Cisco Prime



# Network Management Challenges



- X** Complex
- X** Manual
- X** Error Prone

Start Where?

Configure What?

Which Services?

Maintenance Plan?



- X** Siloed non-integrated management products and processes
- X** Inadequate tools to rapidly deploy devices and services

# Cisco Prime Addressing Management Challenges



Borderless  
Networks

Collaboration

Data Center

- ✓ Simplified
- ✓ Automated
- ✓ Integrated Best Practices

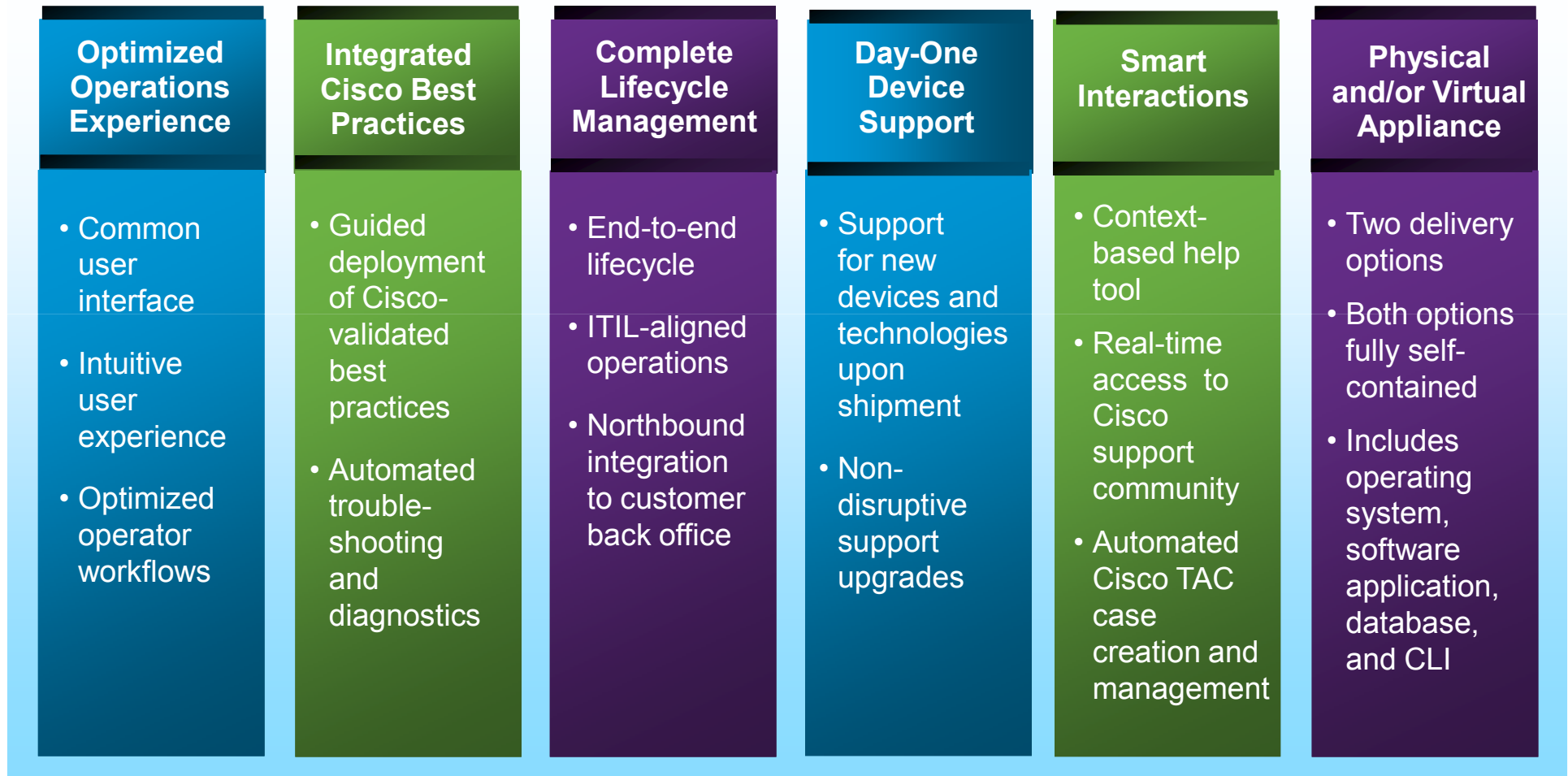
## Complete Lifecycle Management

- ✓ Design
- ✓ Deploy
- ✓ Assure
- ✓ Optimize




































- ✓ Unified management with optimized user experience
- ✓ Integrated workflows and best practices speed operations

# Cisco Prime for Enterprise Common Operational Attributes



# Cisco Prime for Enterprise Product Feature Summary

-  100% support
-  Partial support

Cisco Prime for Enterprise Product Features	NCS 1.0	LMS 4.1	CM 1.0	NAM 5.1
<u>Cisco Prime Features</u>				
• Service-centric foundation				
• Optimized operations experience				
• Integrated Cisco best practices				
• Complete lifecycle management				
• Day-one device support	 <sup>1</sup>		 <sup>1</sup>	
• Smart Interactions	 <sup>2</sup>			
• Physical and /or virtual appliance				
<u>Product Positioning Guidance</u>				
• Converged wired/wireless user access monitoring and troubleshooting	 <sup>3</sup>			
• Complete wireless lifecycle management				
• Complete wired lifecycle management				
• Borderless Networks services: TrustSec, Medianet, EnergyWise				
• Video session/TelePresence monitoring and troubleshooting				
• Application and performance visibility				

<sup>1</sup> Day-one support for selected products only

<sup>2</sup> Includes sub-set of Smart Interactions features

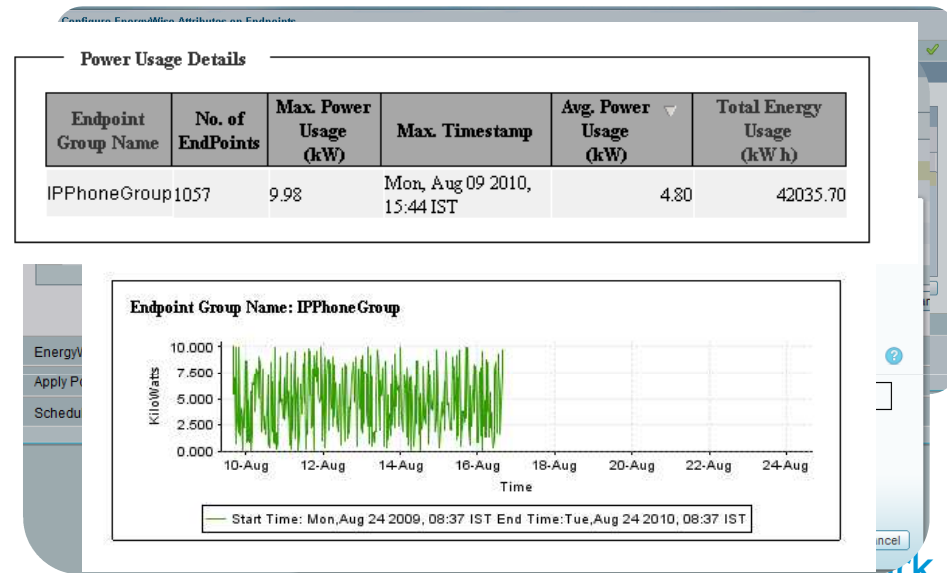
<sup>3</sup> In conjunction with Cisco Identity Services Engine (ISE)

# Simplify Service Deployment

## Using Cisco Prime LMS to Deploy EnergyWise

USE CASE: Corporate IT wants to deploy EnergyWise to save power and lower overall costs

1. Define the policy
2. Prepare the network
3. Configure the network
4. Apply the policy
5. Monitor the savings



Setup for EnergyWise policy on the endpoint groups

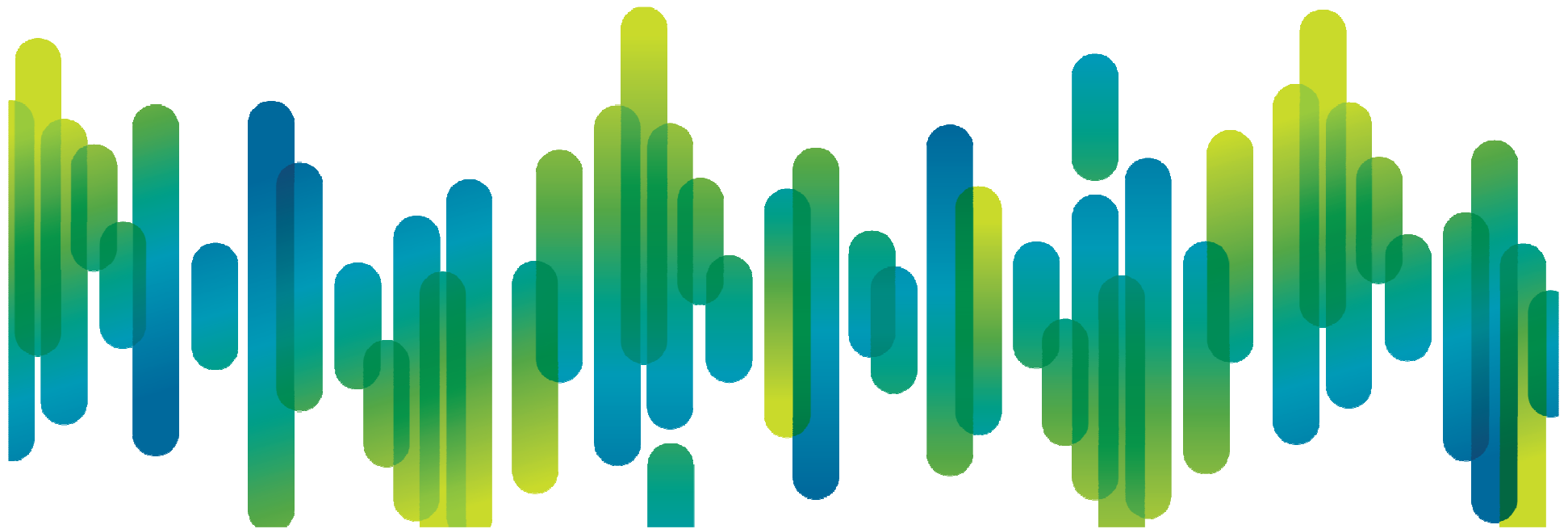


Efficient error free service deployment from days to hours



Save time, reduce errors, and gain immediate ROI

# Fazit



# Fazit

- Die Catalystfamilie bietet Ihnen:
  - 1 Leistung und Funktion nach Maß (umfassendes Produktportfolio)
  - 2 Unübertroffene Funktionsvielfalt speziell für BN (Borderless Networks also Funktionen im Campus)
  - 3 Ökologisch und ökonomische vorbildliche Lösungen
  
- Die Nexusfamilie bietet Ihnen:
  - 1 Leistung insb. +10G und innovative Funktionen (VDC, OTV, LISP und FabricPath (TRILL))
  - 2 Konsolidierungsoptionen (DCB / FCoE / Unified I/O)
  - 3 Konsequente und homogene Unterstützung der neuen virtualisierten Welt (z.B. reale und virtuelle Ports)

# Fazit

- Und Cisco Prime bietet Ihnen

Prime ist ein innovativer Management Ansatz von Cisco, um Netzwerk Management effizienter zu realisieren

Cisco Prime für Enterprise besteht aus 4 Komponenten: NCS, CM, LMS und NAM. Mehr Infos unter [www.cisco.com/go/prime](http://www.cisco.com/go/prime)

- Ausblick

Nächste Woche  
Positionierung Catalyst 6500  
und Nexus 7000



