



# Software Defined Everything

Wie Software Cisco-Netze verändert



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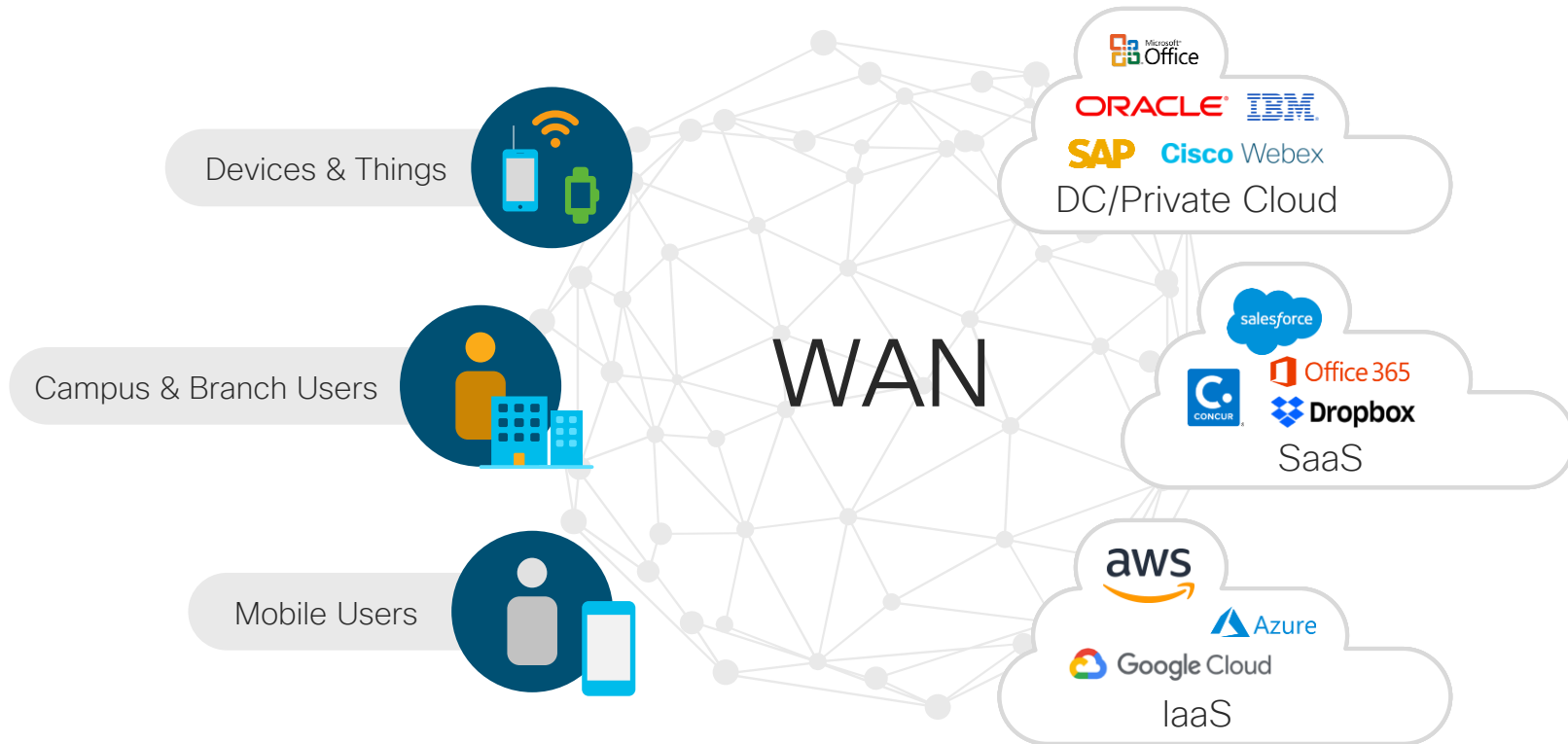
[@KristinaAppelt](https://twitter.com/KristinaAppelt)

März 2020

# Das Netzwerk dringt in alle Bereiche vor



# Anwendungen wandern in verschiedene Cloud-Services (Multiple Clouds)



# Reise zum Intent-based Networking

The Network. **Intuitive.**

Powered by intent. **Informed by context.**

## Digital-Ready Infrastructure

Secure foundation  
Programmability  
Virtualization

## Policy-Based Automation

Business Policy  
Translation  
Segmentation

## Analytics & Assurance

Everything as a sensor  
Telemetry  
Historical & Real-time

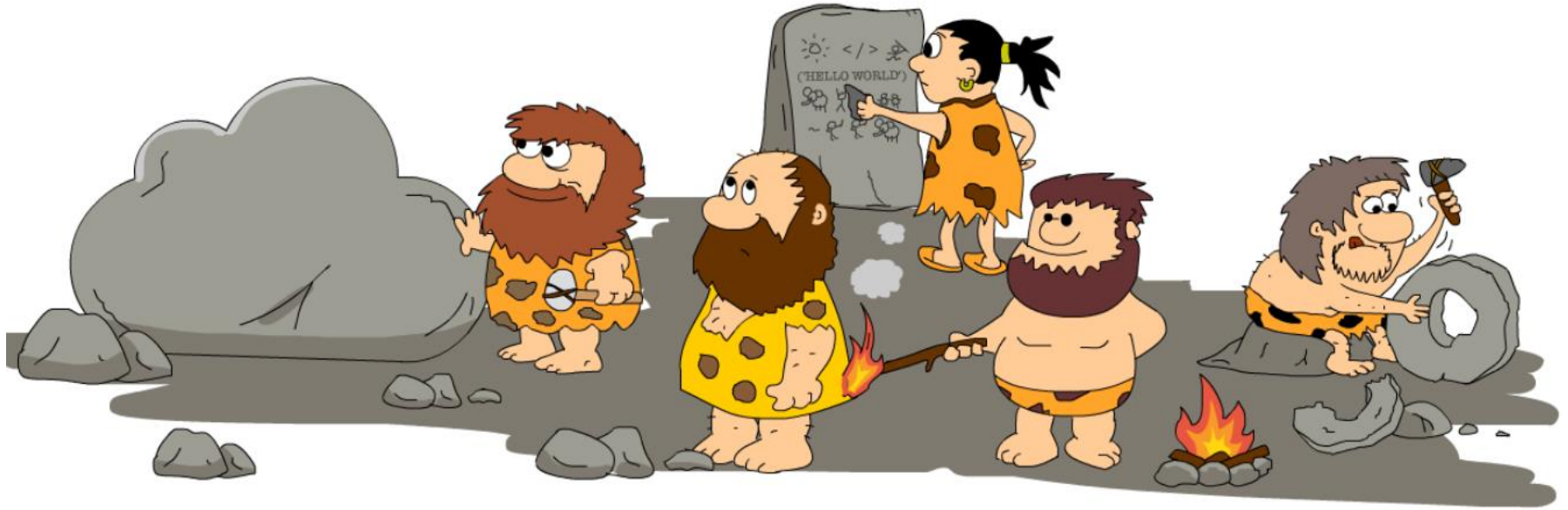
## Machine Learning & AI

Policy Validation  
Predictive  
Self-healing

## Intent-based Networking

Constantly Learning  
Constantly Adapting  
Constantly Protecting

Wir sind  
hier



Networking through the ages...



# The OSI Model of Networking...

**Please don't  
ask about this...**

L7: Application

L6: Presentation

L5: Session



L4: Transport

L3: Network

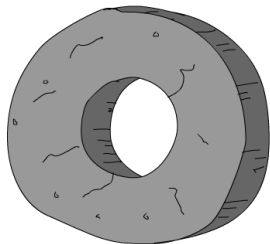
L2: Data Link

L1: Physical

**Oh Yeah... We  
Got this**

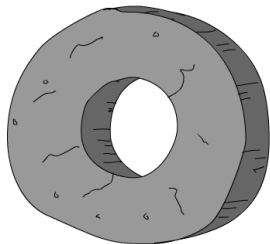
**Black Magic**





Stone Age  
Spanning Tree  
VLANs

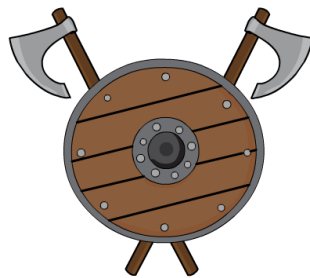
# The Four Ages of Networking.....



## Stone Age

Spanning Tree

VLANs



## Bronze Age

Routing Protocols

WAN Design

IP-magedon

# The Four Ages of Networking.....





***The first step... admitting there is a problem...***

# Unternehmensnetzwerke sind komplex...



Komplexe VLAN  
Konstrukte

Zerklüftete  
Netzwerkbereiche

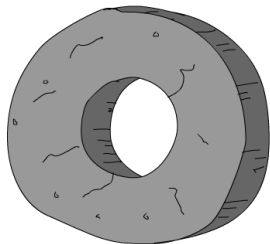
Richtlinien für LAN,  
WAN und WLAN sind  
getrennt

Personalmangel





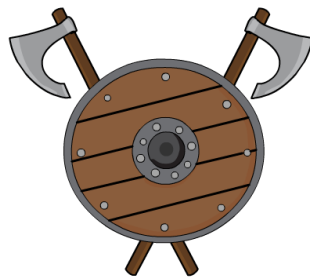
***So what can we do about it?***



## Stone Age

Spanning Tree

VLANs



## Bronze Age

Routing Protocols

WAN Design

IP-magedon



## The Renaissance

SDN

OpenFlow

Controllers

Overlays

MP-BGP

VXLAN

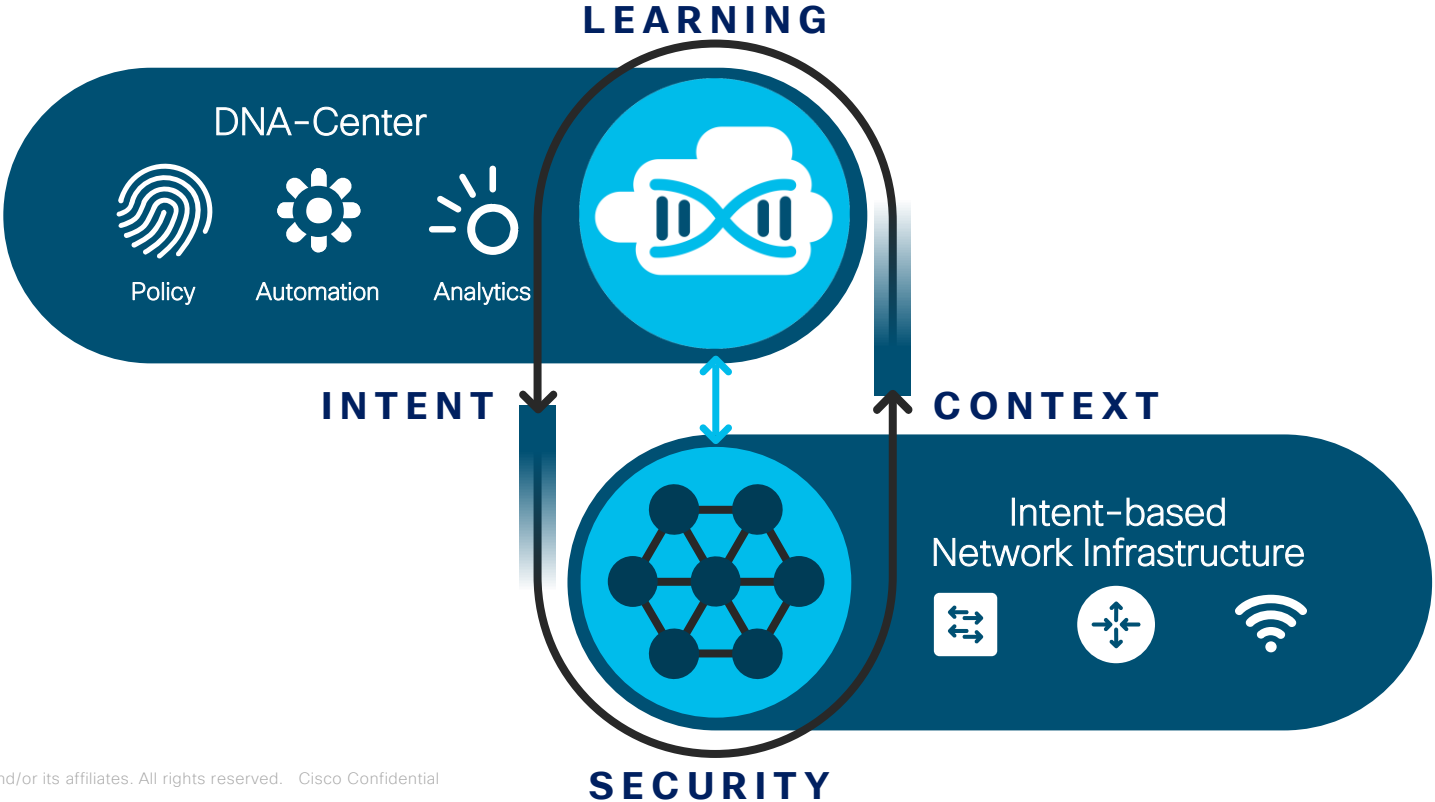
Micro-Segmentation

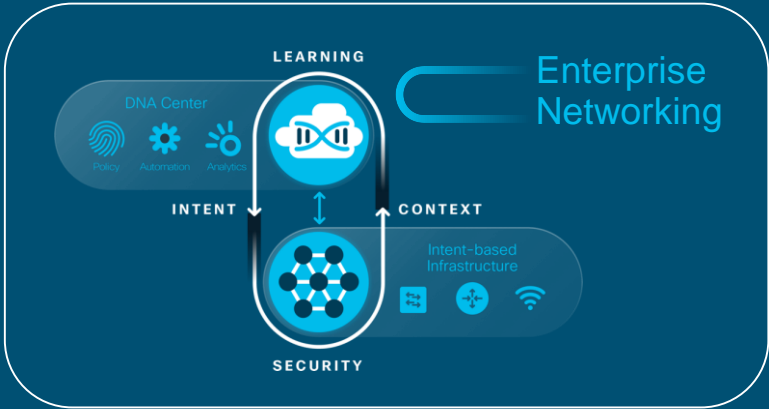
White Box

# The Four Ages of Networking.....

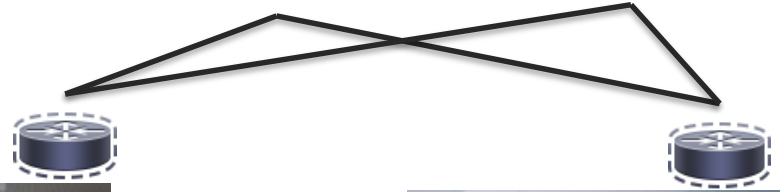
# The Network. Intuitive.

Powered by Intent. Informed by Context.





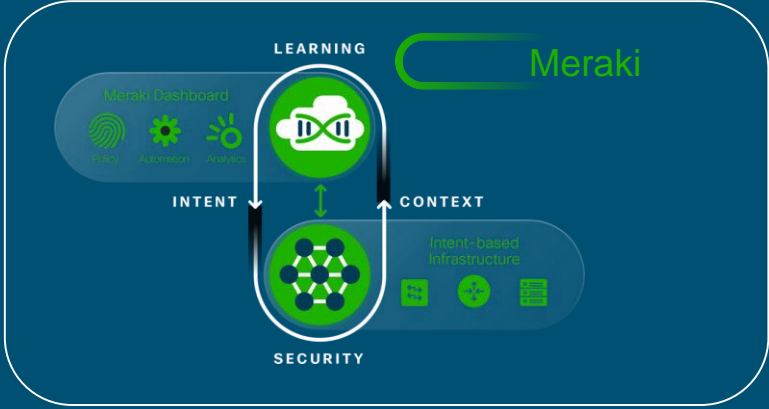
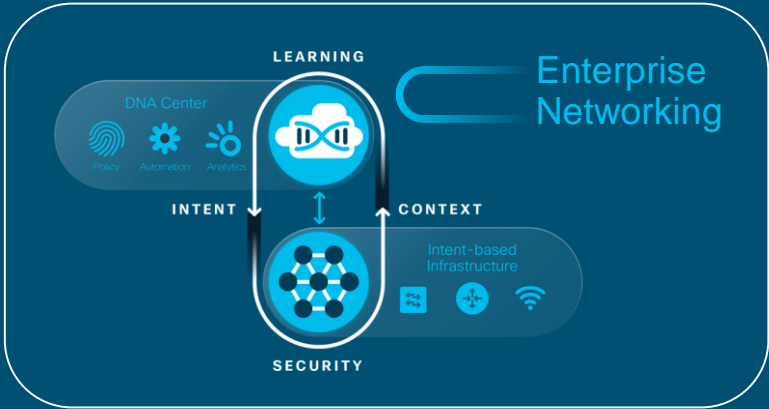
Internet



DNA  
Center





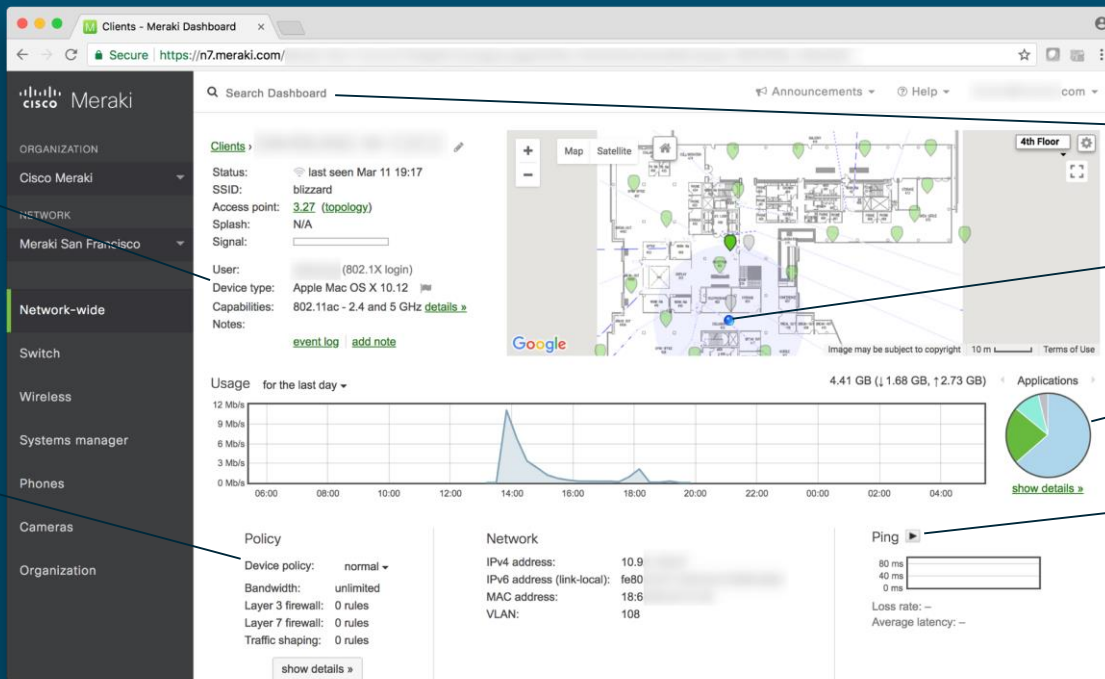


# Intuitive Web-Based Dashboard

Client fingerprints

Single pane of glass IT management

Real-time control



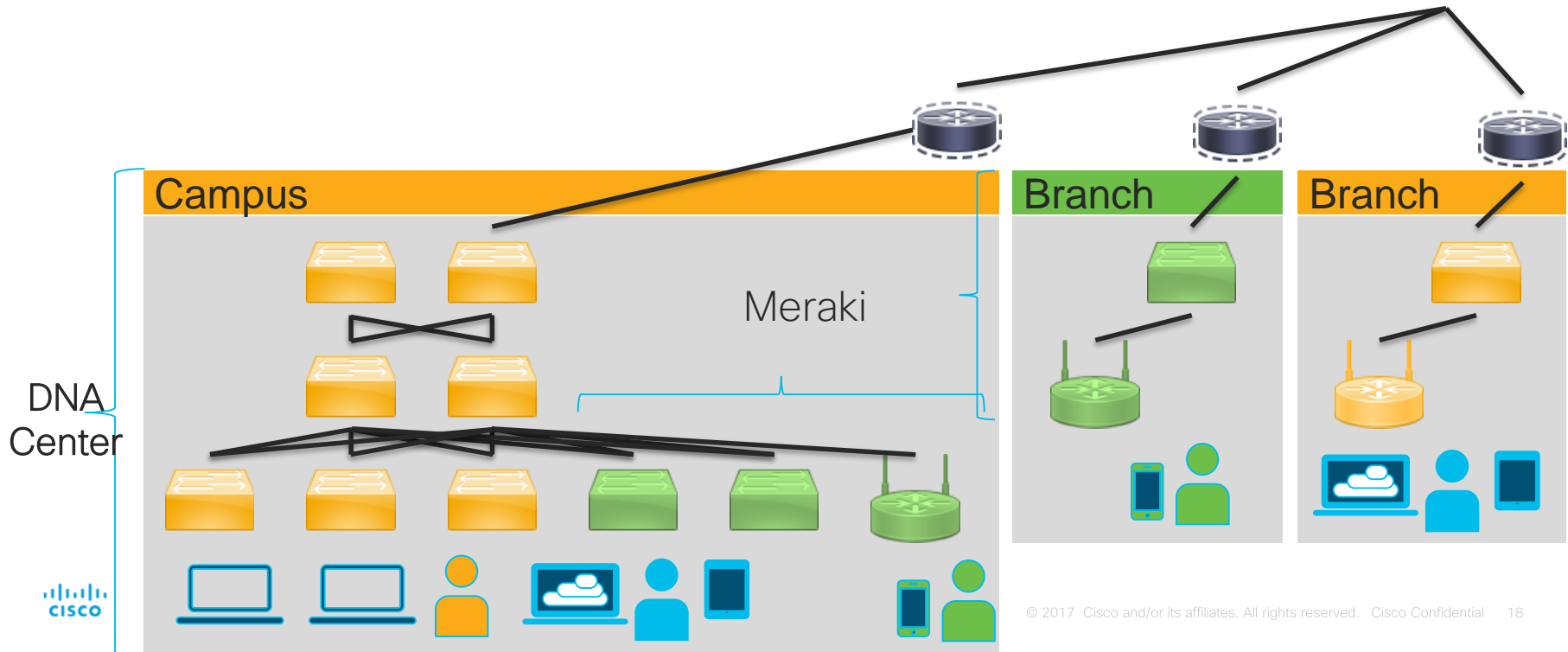
Site-wide search

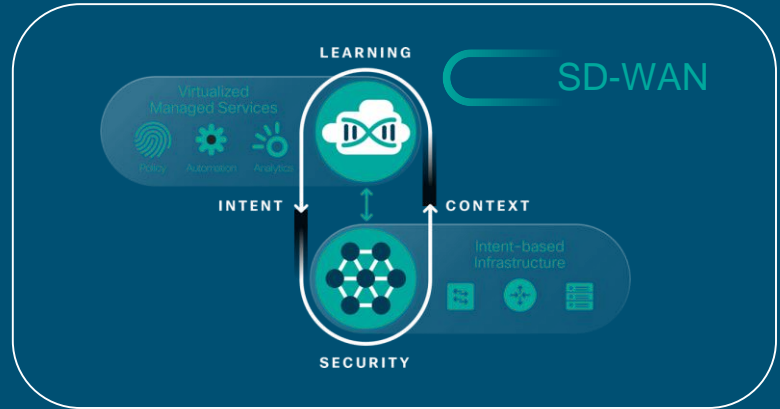
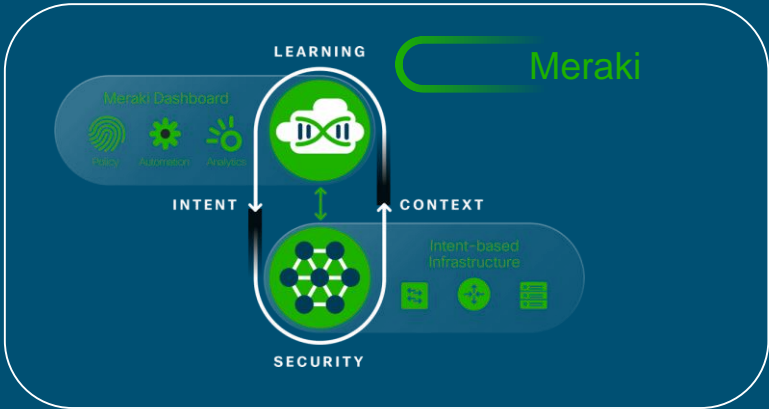
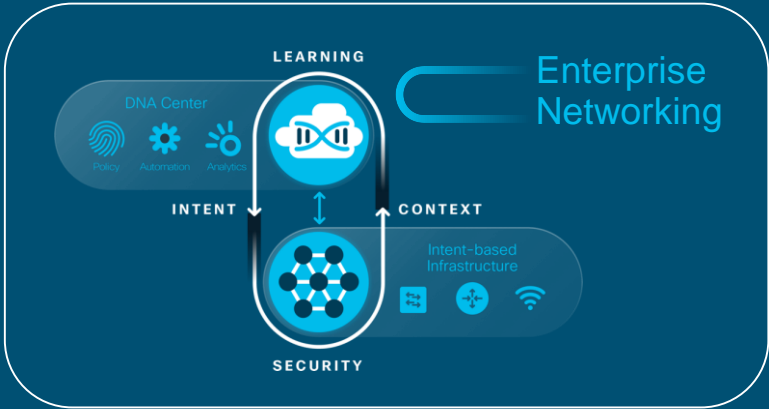
Client location

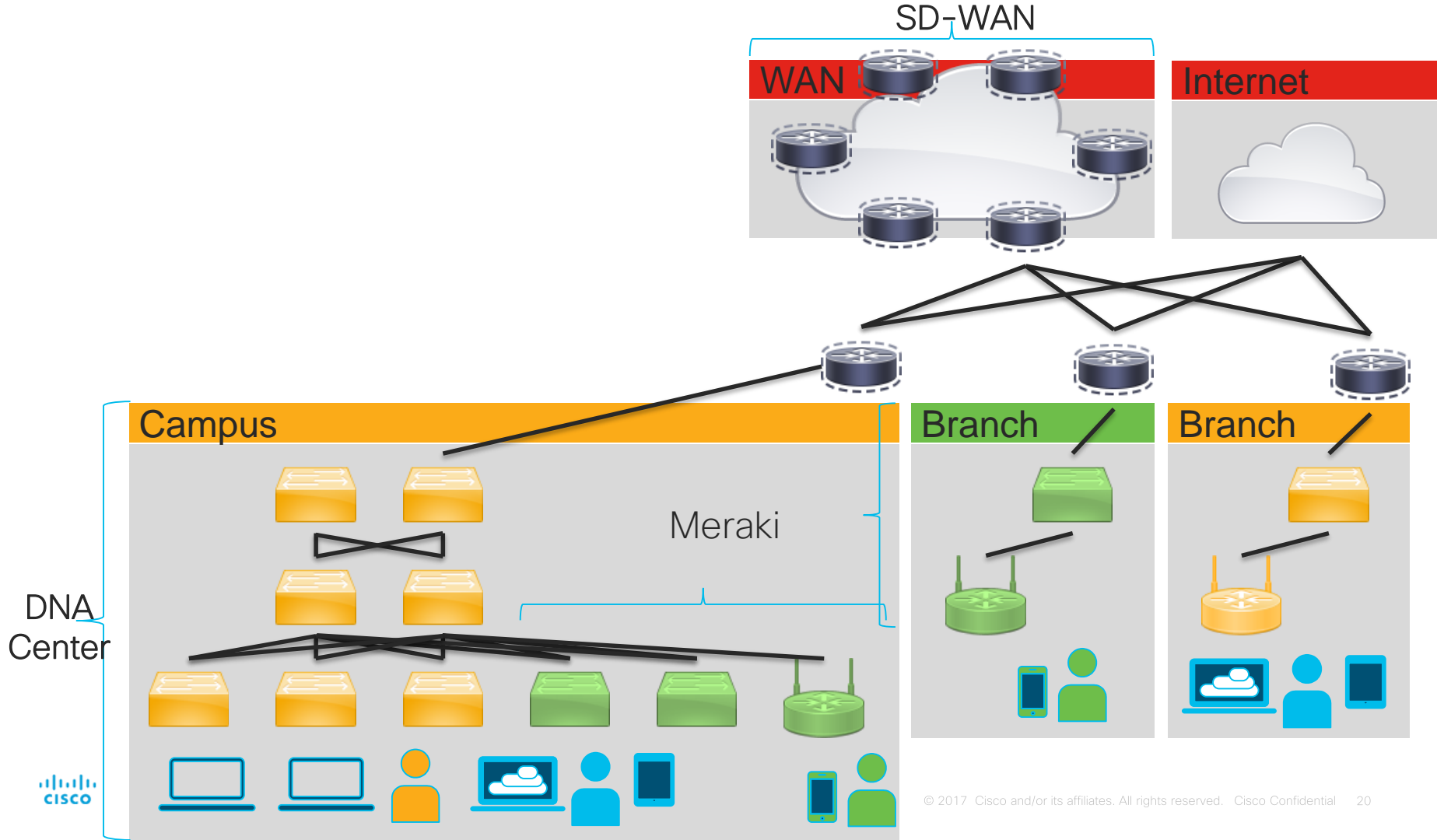
L7 application visibility

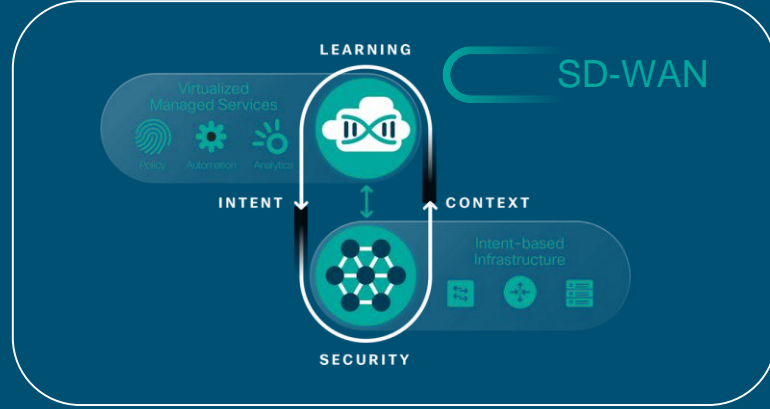
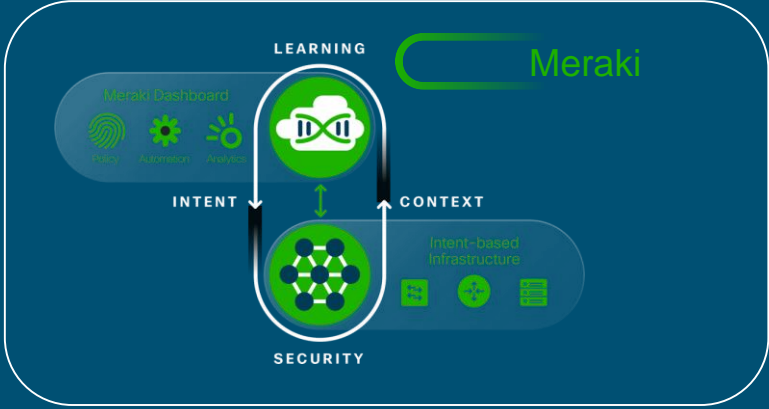
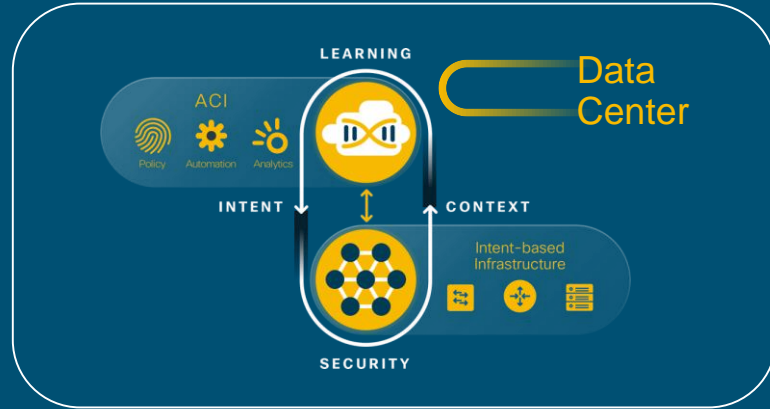
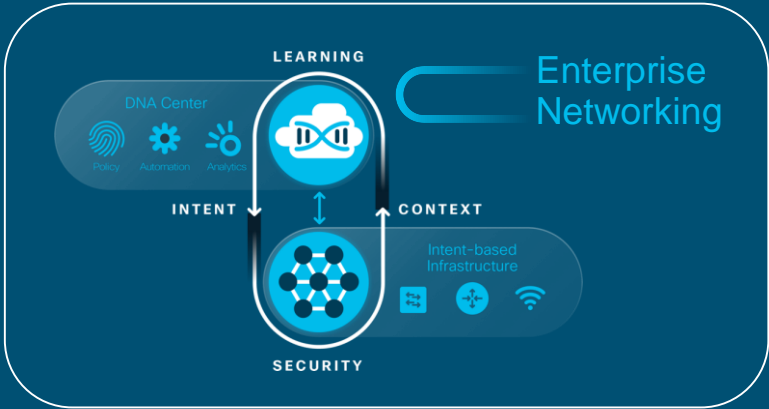
Remote tools

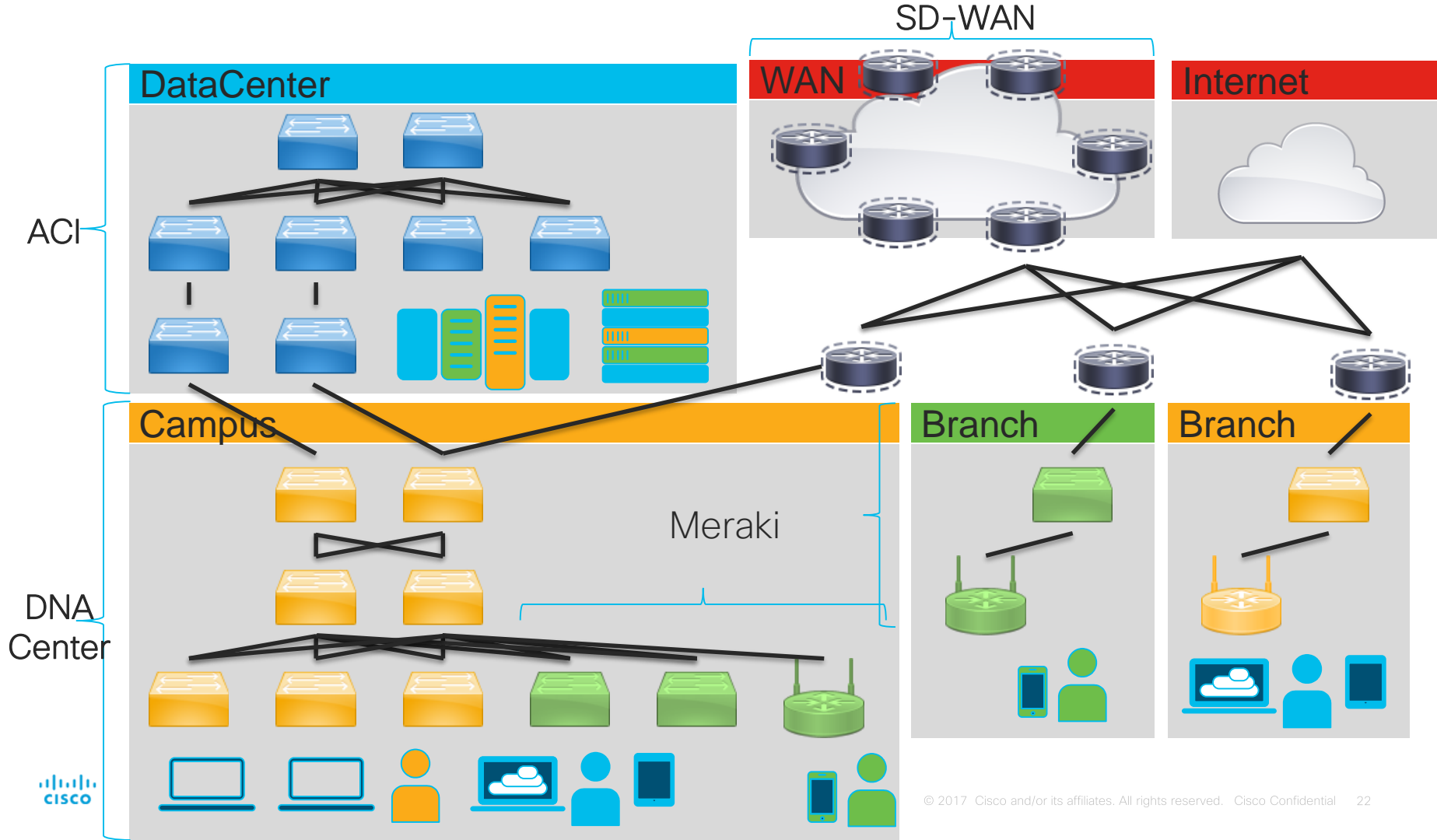
# Internet







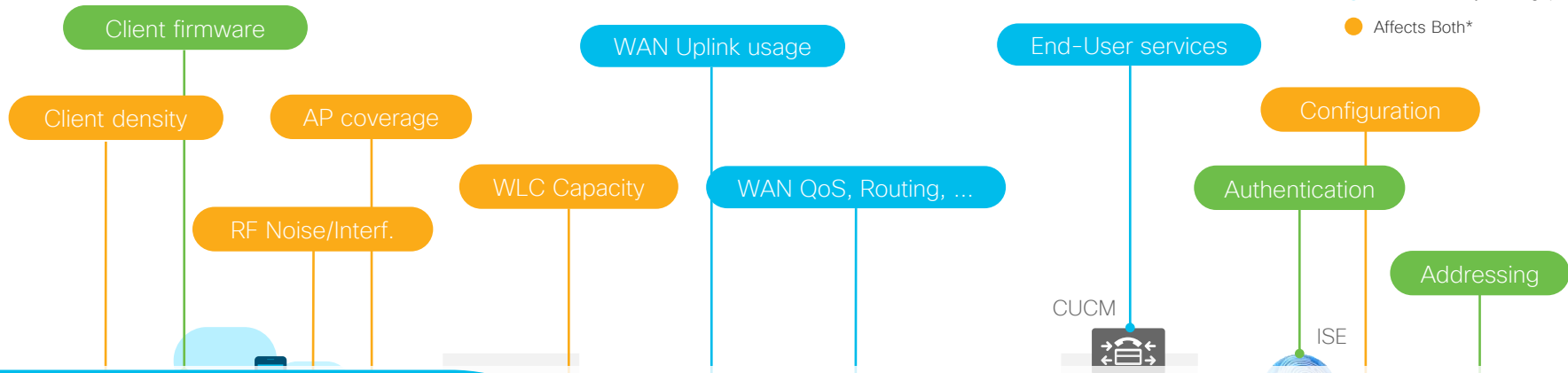






# Netzwerkkommunikation - komplexes Ende-zu-Ende Problem

- Affects Join/Roam
- Affects Quality/Throughput
- Affects Both\*



100+ Fehler-  
Möglichkeiten  
zwischen  
Anwender und  
App



Was ist die Ursache?

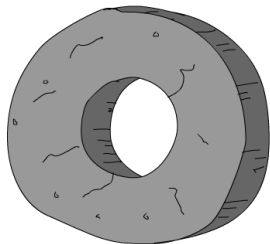


Wo ist das Problem?



Wie kann ich das lösen?

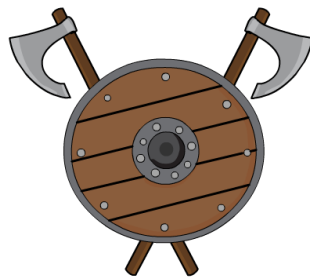
\* Both = Join/roam and quality/throughput



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## The Renaissance

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Controllers

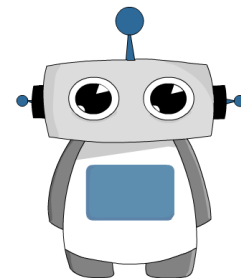
Overlays

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VXLAN

Micro-Segmentation

White Box



## Programmable Age

Cloud

Python

REST / APIs

NETCONF / YANG

“Fabrics”

Network Function  
Virtualization (NFV)

Containers

DevOps

NetDevOps!

# The Four Ages of Networking.....

# Infrastructure as Code... huh?

“Infrastructure as Code (IaC) is the process of managing and provisioning computer data centers through machine-readable definition files...”



[https://en.wikipedia.org/wiki/Infrastructure\\_as\\_Code](https://en.wikipedia.org/wiki/Infrastructure_as_Code)

# Consider the Network Stakeholders

*Their needs drive  
change and Decisions  
Today*



## Network Builders

- Traditional networking teams
- Design, Build, and Maintain the Network
- Responsible for Care and Feeding

## Network Consumers

- The users of the network
- Looking to consume network “services”
- The network is a “utility” – It should just work

A man in a blue plaid shirt is holding a grey Cisco laptop. He is standing in a server room with rows of server racks. The racks contain various network equipment, including switches and routers, with many green status lights illuminated. Blue network cables are plugged into the equipment. The man has a serious expression and is looking directly at the camera. The text 'But I'm just a router jockey...' is overlaid on the bottom of the image in a blue, italicized font.

***But I'm just a router jockey...***

# Yesterday's Network Engineer



## Network Skills

- Spanning-Tree
- Routing Protocols
- QoS
- VPN Design
- VOIP
- Fibre Channel
- Security Policy
- MPLS

## Programming Skills

- TCL
- EEM
- Expect Scripts

# Carl's 3 Step Approach to become a NetDevOps Engineer

## Phase 1

- Python
- REST APIs
- JSON/XML
- git/GitHub

## Phase 2

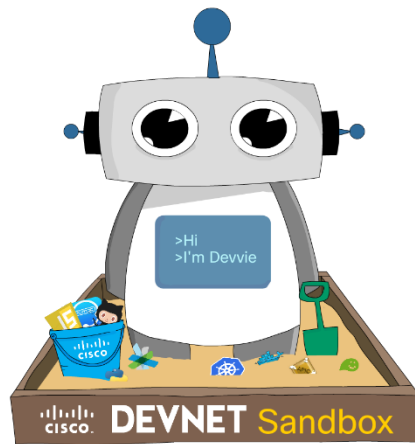
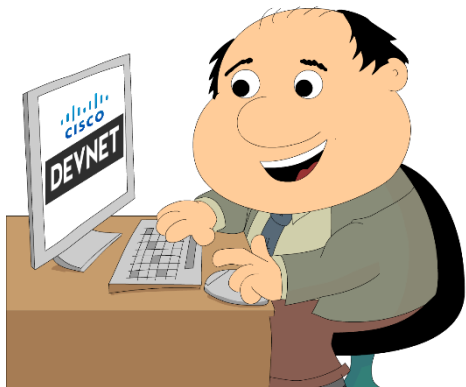
- Linux Skills
- Ansible
- Docker
- NETCONF/YANG

## Phase 3

- Linux Networking
- Container Networking
- NFV

## As Needed

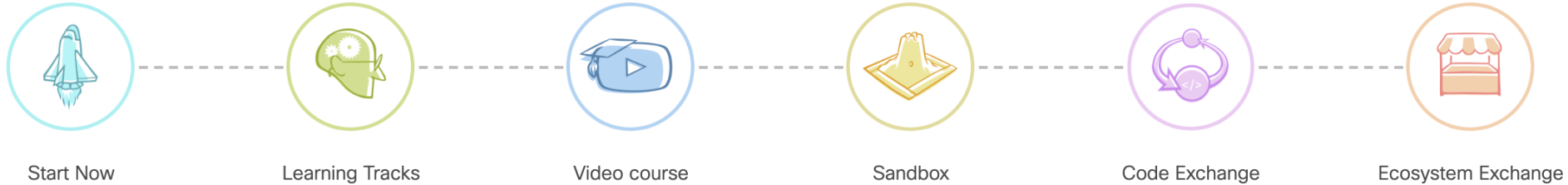
- Network Controllers
- IOT Networking
- Cloud Networking
- "DevOps"





<http://developer.cisco.com>

Get started with what DevNet has to offer



Explore our platforms



IoT



Cloud



Networking



Data Center



Security



Mobility



Open Source



Collaboration



Services

# Cisco's Neue Zertifizierungen

Associate Level

Specialist Level

Professional Level

Expert Level

**Engineering**



**Software**



Future Offering

