

About the Webinar

- Ask a question in the Q&A panel, send to All Panelists
- Join the WebEx Audio > Select Communicate > Join Audio
- For a WebEx call back > Click allow phone button at the bottom of participants side panel
- Recording will be sent after the webinar
- Please complete the post-event survey
- Join us for upcoming webinars: <http://bit.ly/DevNetWebinarWed>
- Join Cisco DevNet, go here > <http://bit.ly/NtEngineer>



DEVNET

Welcome to Webinar Wednesday with Cisco DevNet

How to be a Network Engineer in a Programmable Age

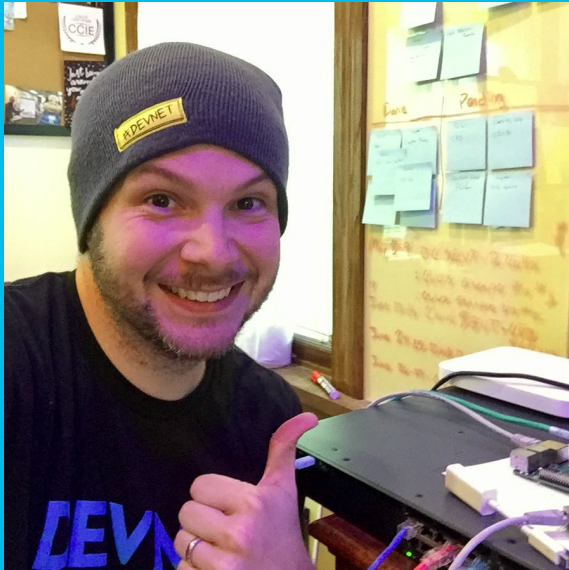
Hank Preston, ccie 38336

NetDevOps Evangelist

@hfpreston 

@CiscoDevNet
#DevNet

About the Speaker and Panelist



Hank Preston

@hfpreston

NetDevOps Evangelist

Focus: Network Programmability

Cisco DevNet



Matt Denapoli

@denapom11

Developer Evangelist

Focus: CMX, Meraki, Coding

Fundamentals

Cisco DevNet



Ashley Roach

@aroach

Principal Developer Evangelist

Focus: API and Cloud

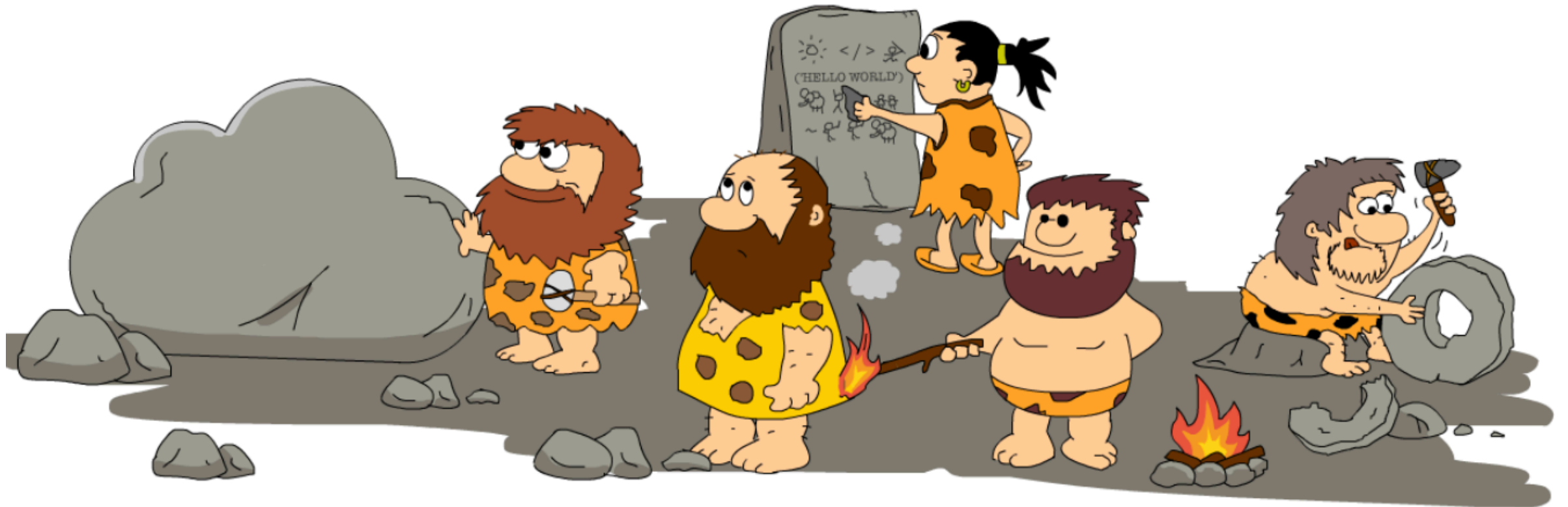
Cisco DevNet

Topics to Cover

- The Network Engineer of Old
- The Four Ages of Networking
- Cloud to the Rescue
- Today's Network Engineer

The Network Engineer Evolves





The Network Engineer of Old

Meet Carl the Network Engineer

Programming Skills

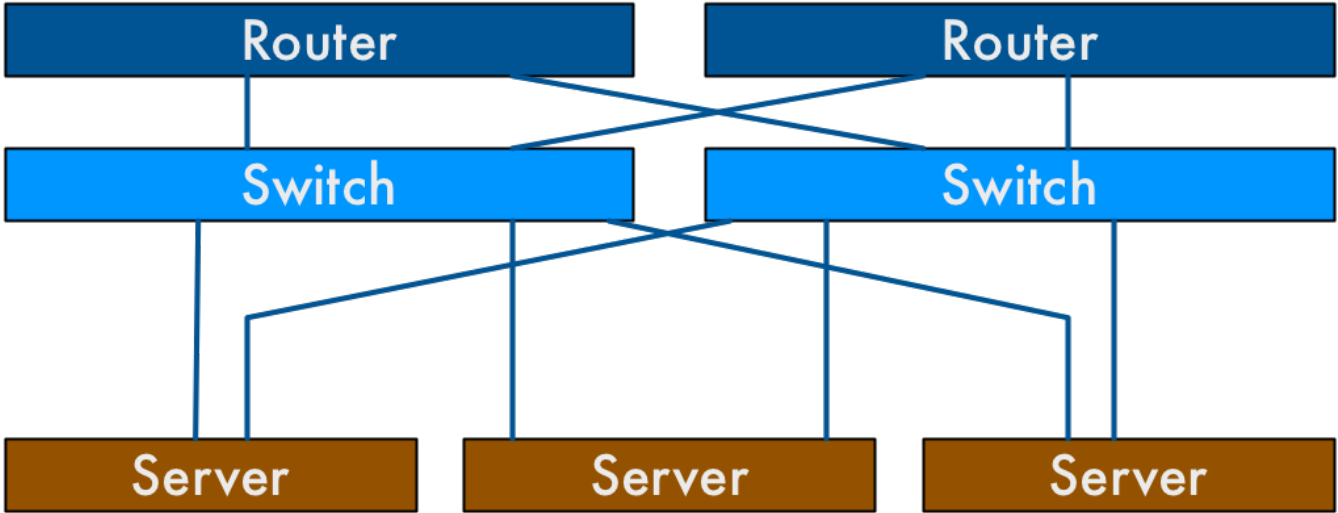
- TCL
- EEM
- Expect Scripts



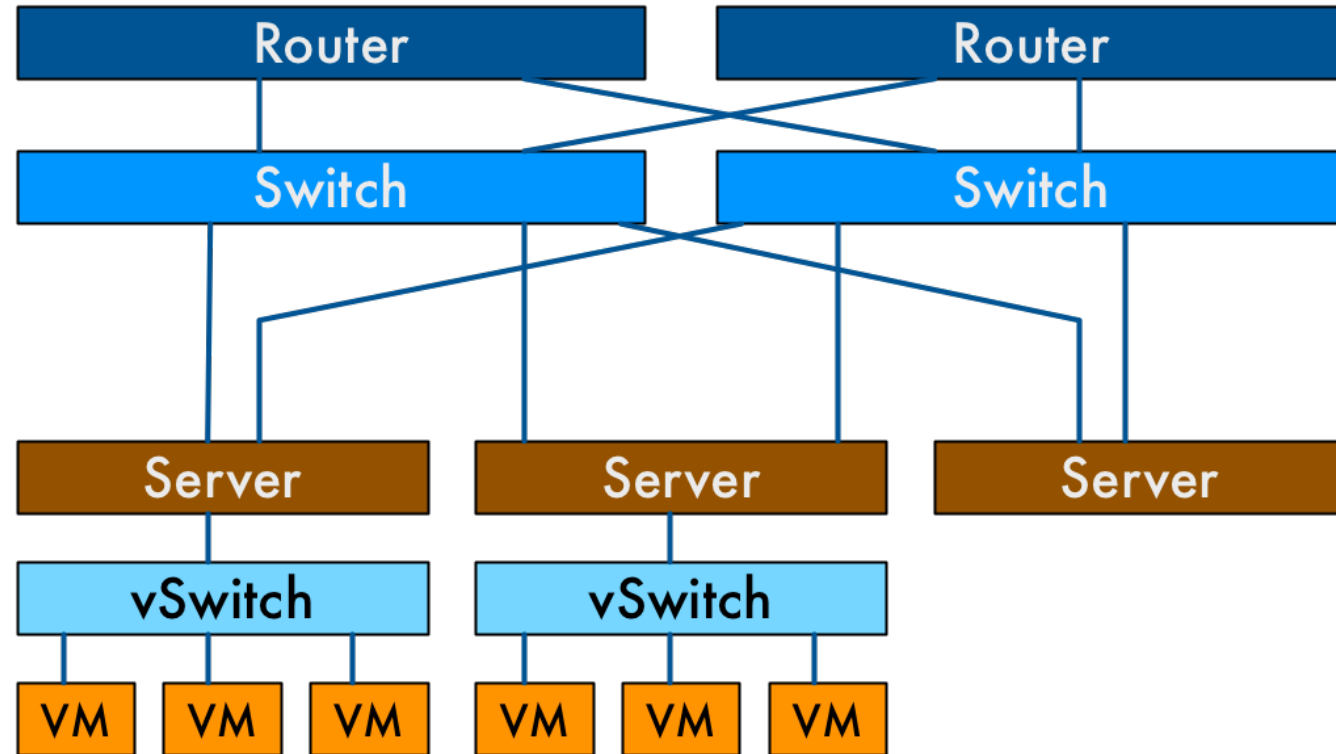
Networking Skills

- Spanning-Tree
- Routing Protocols
- QoS
- VPN Design
- Spanning-Tree
- VOIP
- Fibre Channel
- Security Policy
- MPLS
- Spanning-Tree
- Did I mention Spanning-Tree?

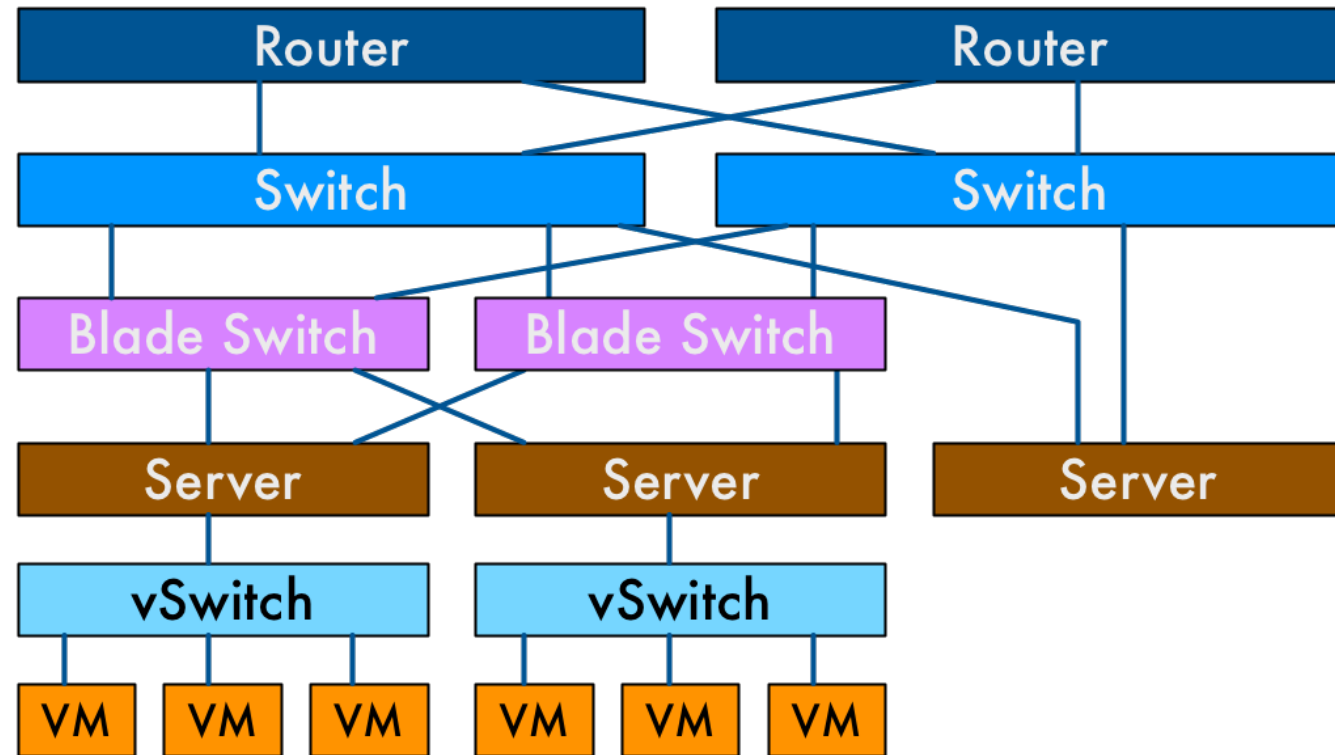
The Network...



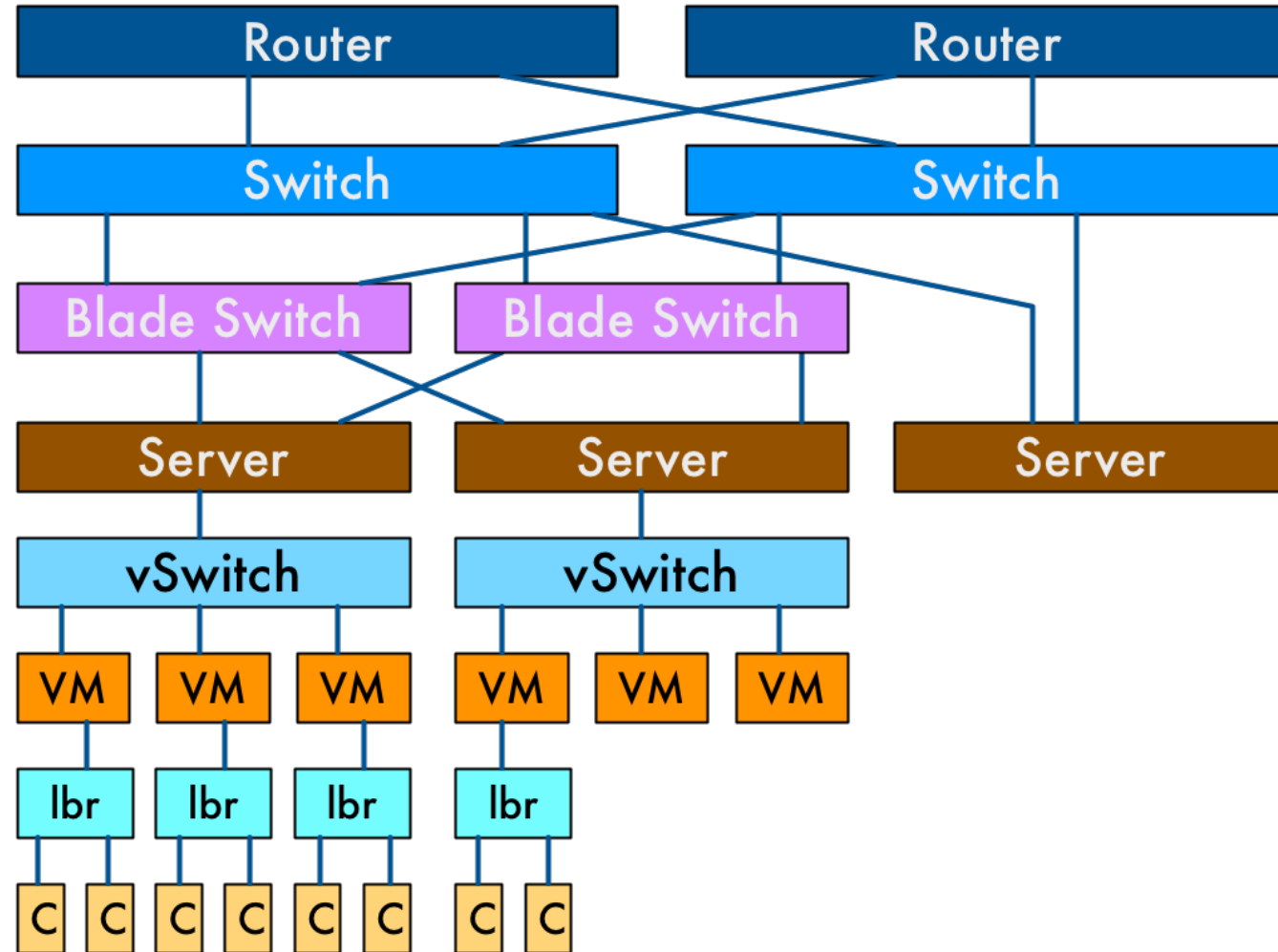
The Network...



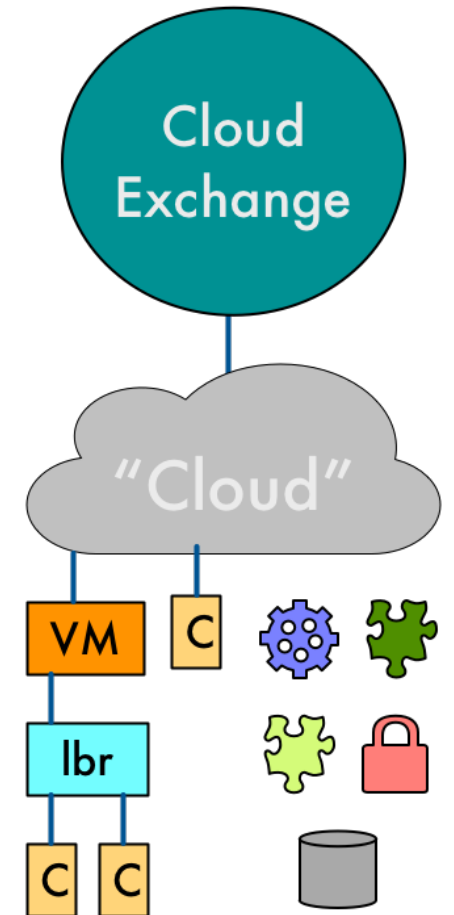
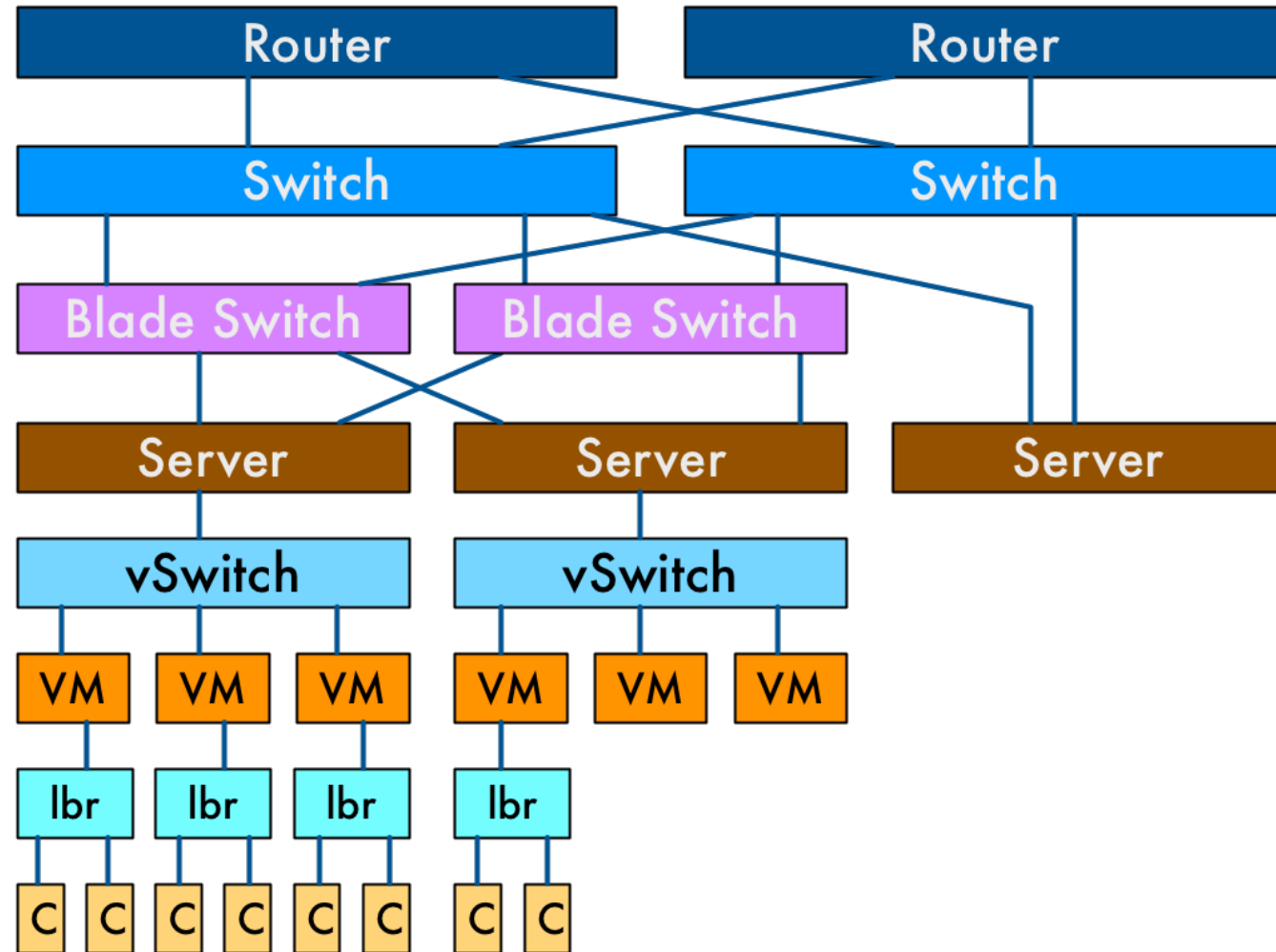
The Network...



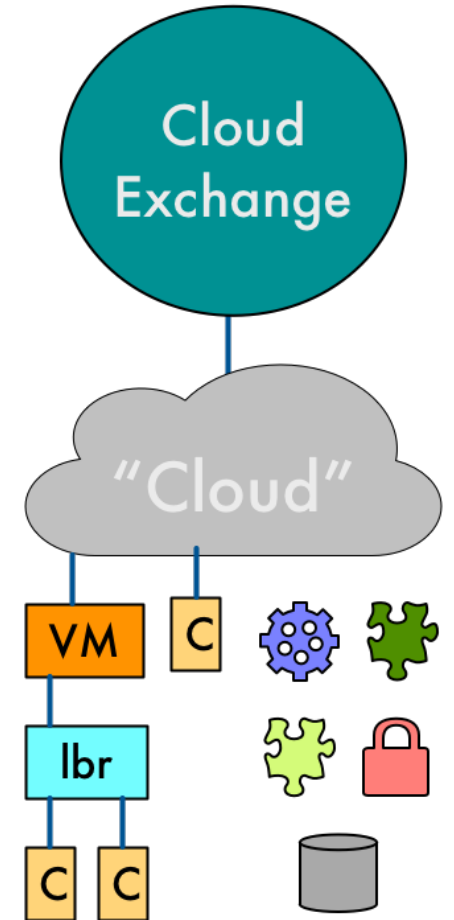
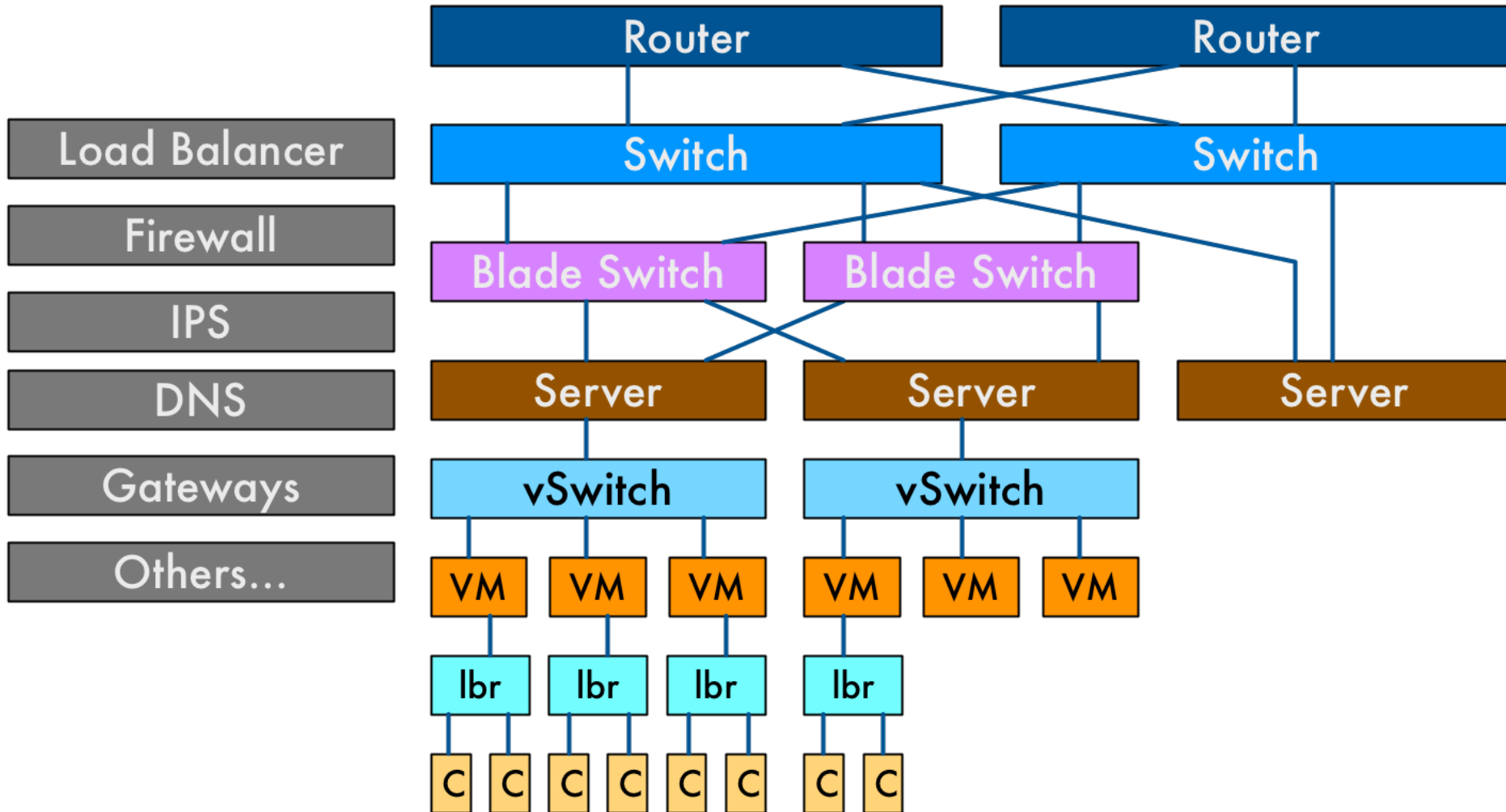
The Network...



The Network...



The Network...



The OSI Model of Networking...

Please don't ask
about this...

L7: Application

L6: Presentation

L5: Session



L4: Transport

L3: Network

L2: Data Link

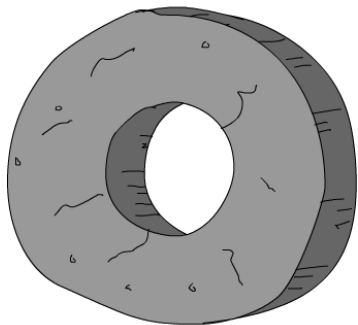
L1: Physical

Oh Yeah... We Got
this

Black Magic



The Four Ages of Networking

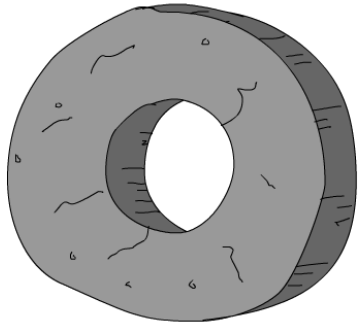


STONE AGE

Spanning Tree

VLANs

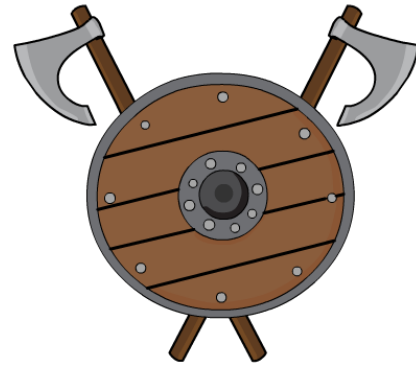
The Four Ages of Networking.....



STONE AGE

Spanning Tree

VLANs



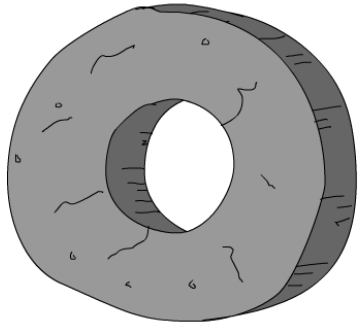
BRONZE AGE

Routing Protocols

WAN Design

IP-magedon

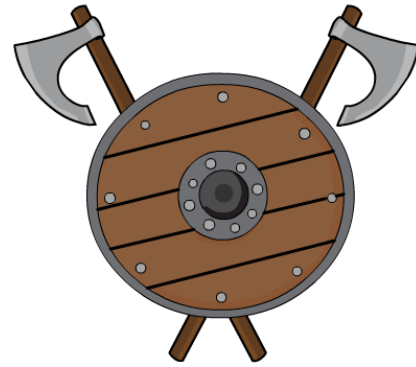
The Four Ages of Networking.....



STONE AGE

Spanning Tree

VLANs



BRONZE AGE

Routing Protocols

WAN Design

IP-magedon



THE RENAISSANCE

SDN

OpenFlow

Controllers

Overlays

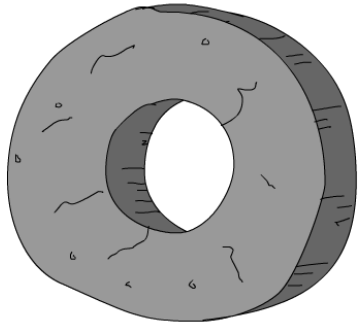
MP-BGP

VXLAN

Micro-Segmentation

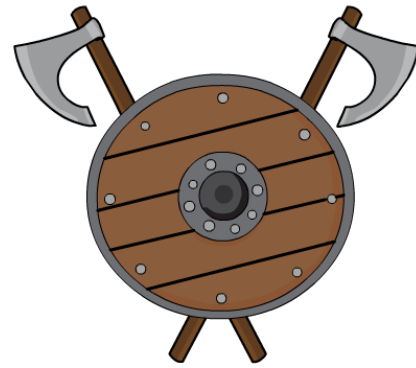
White Box

The Four Ages of Networking.....



STONE AGE

Spanning Tree
VLANs



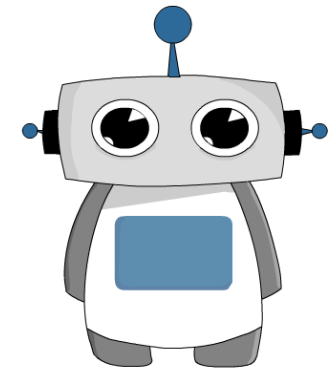
BRONZE AGE

Routing Protocols
WAN Design
IP-magedon



THE RENAISSANCE

SDN
OpenFlow
Controllers
Overlays
MP-BGP
VXLAN
Micro-Segmentation
White Box



PROGRAMMABLE AGE

Cloud
Python
REST / APIs
NETCONF / YANG
“Fabrics”
Network Function
Virtualization (NFV)
Containers
DevOps
NetDevOps!

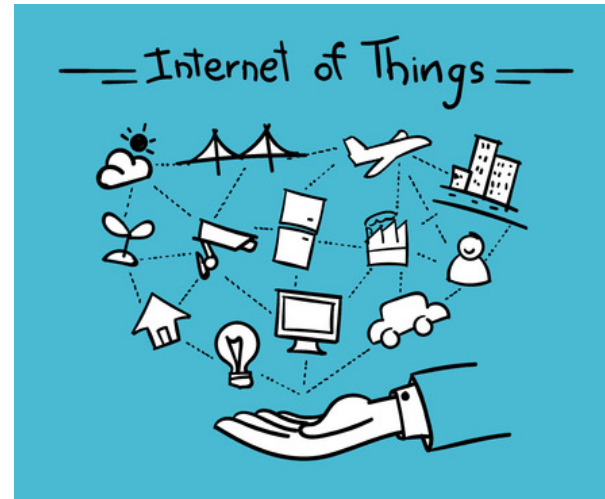
The Four Ages of Networking.....

App Economy



User Expectations and
Agility

Internet of Things



If it isn't connected, don't
bother...

Tech Unicorns



Low barrier of entry for
disruptors

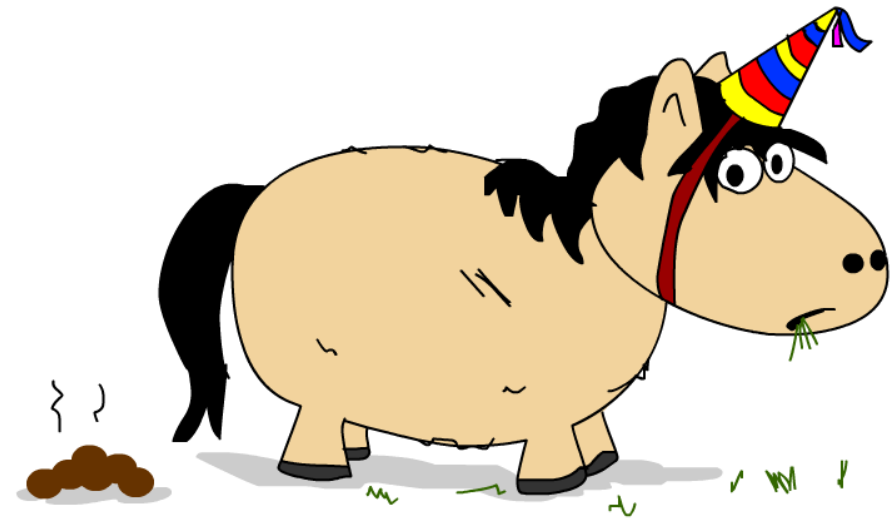
CLOUD



The Cloud You Plan to Build 😊

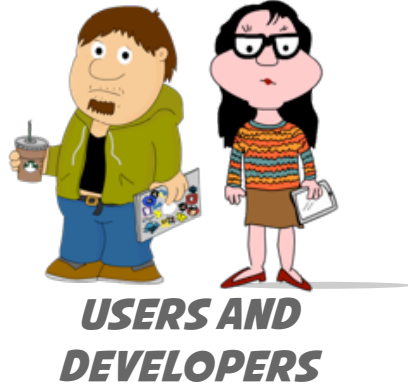


The Cloud You Plan to
Build 😊



The Cloud You End
Up With ☹️

The New Infrastructure Stack



Development Environment	Vagrant, Docker, Vim, Slack, Spark, Git
-------------------------	---



Operating System	CoreOS, Rancher, RedHat, Ubuntu, Microsoft
Infrastructure	UCS/ACI, HP, vSphere/NSX

The New Infrastructure Stack

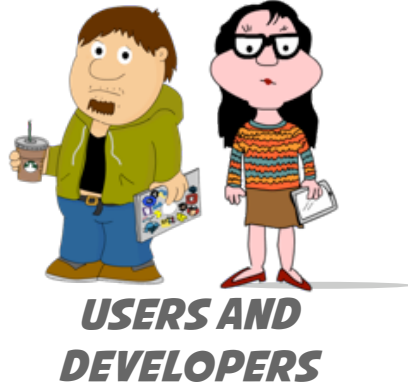


Development Environment	Vagrant, Docker, Vim, Slack, Spark, Git
Delivery Pipeline	GitHub, BitBucket, Jenkins, Team City, Drone, Puppet, Ansible, Chef



Cloud Management and Automation	UCS Director, vRealize, OpenStack, AWS, CloudCenter
Operating System	CoreOS, Rancher, RedHat, Ubuntu, Microsoft
Infrastructure	UCS/ACI, HP, vSphere/NSX

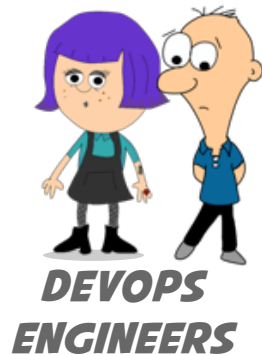
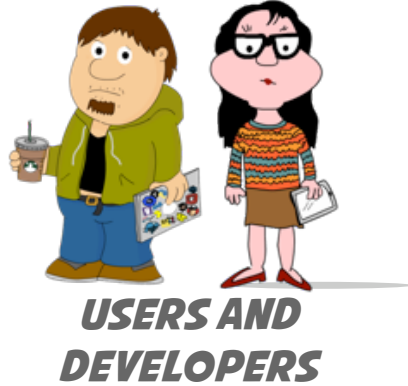
The New Infrastructure Stack



Development Environment	Vagrant, Docker, Vim, Slack, Spark, Git
Delivery Pipeline	GitHub, BitBucket, Jenkins, Team City, Drone, Puppet, Ansible, Chef
Scheduling and Placement	Docker/Swarm, Kubernetes, Mesosphere, Tectonic, Rancher, Rocket
Container Layer	
Applications and Middleware	HAProxy, Cassandra, RabbitMQ, Hadoop, Consul
Cloud Management and Automation	UCS Director, vRealize, OpenStack, AWS, CloudCenter
Operating System	CoreOS, Rancher, RedHat, Ubuntu, Microsoft
Infrastructure	UCS/ACI, HP, vSphere/NSX

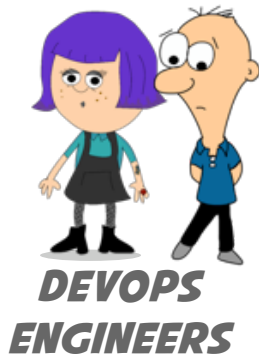
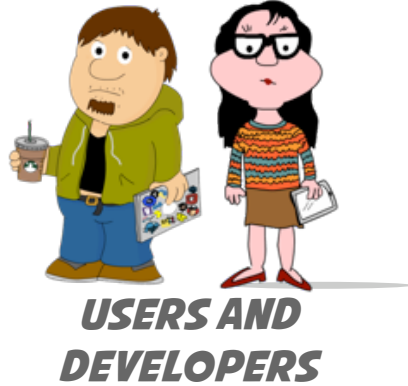


The New Infrastructure Stack

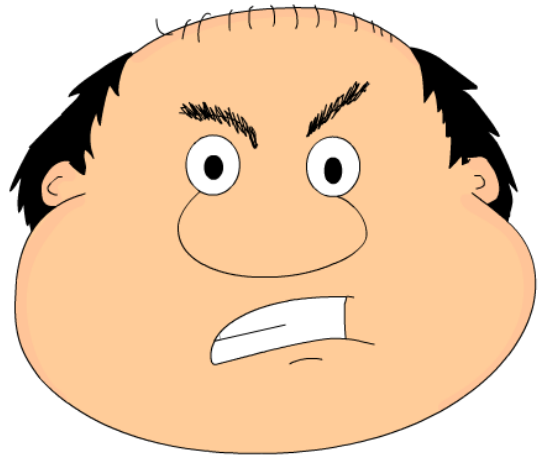


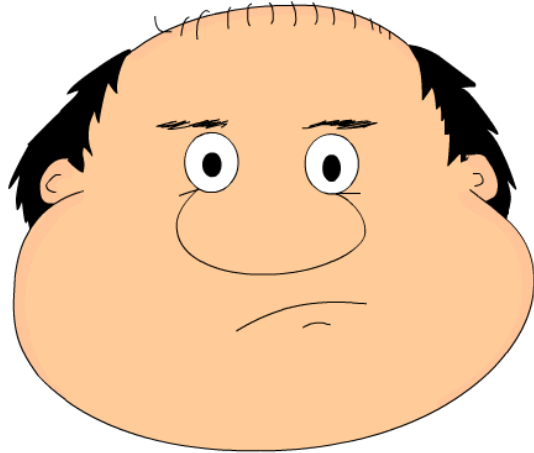
Development Environment	Vagrant, Docker, Vim, Slack, Spark, Git
Delivery Pipeline	GitHub, BitBucket, Jenkins, Team City, Drone, Puppet, Ansible, Chef
Scheduling and Placement	Docker/Swarm, Kubernetes, Mesosphere, Tectonic, Rancher, Rocket
Container Layer	
Applications and Middleware	HAProxy, Cassandra, RabbitMQ, Hadoop, Consul
Cloud Management and Automation	UCS Director, vRealize, OpenStack, AWS, CloudCenter
Operating System	CoreOS, Rancher, RedHat, Ubuntu, Microsoft
Infrastructure	UCS/ACI, HP, vSphere/NSX

The New Infrastructure Stack



Development Environment	Vagrant, Docker, Vim, Slack, Spark, Git	PaaS
Delivery Pipeline	GitHub, BitBucket, Jenkins, Team City, Drone, Puppet, Ansible, Chef	
Scheduling and Placement	Docker/Swarm, Kubernetes, Mesosphere, Tectonic, Rancher, Rocket	
Container Layer		
Applications and Middleware	HAProxy, Cassandra, RabbitMQ, Hadoop, Consul	
Cloud Management and Automation	UCS Director, vRealize, OpenStack, AWS, CloudCenter	
Operating System	CoreOS, Rancher, RedHat, Ubuntu, Microsoft	IaaS
Infrastructure	UCS/ACI, HP, vSphere/NSX	



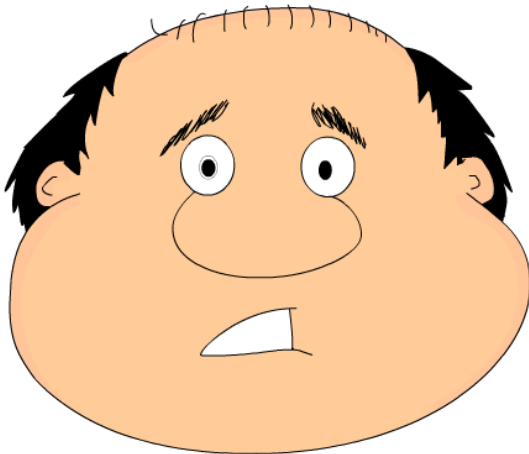


Denial

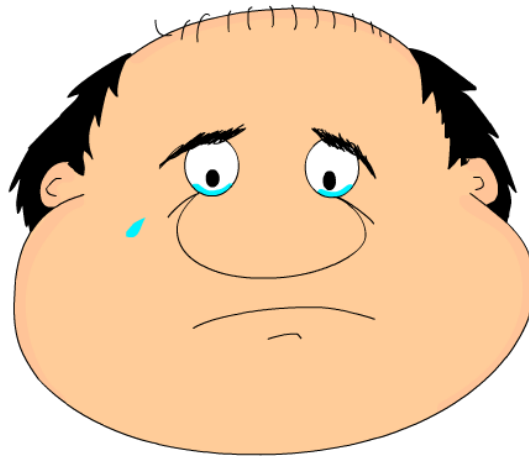


Anger

5 Stages of Grief



Bargaining



Depression



Acceptance

Today's Network Engineer

Carl's 3 Step Approach to Network Programmability

Phase 1

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

Phase 2

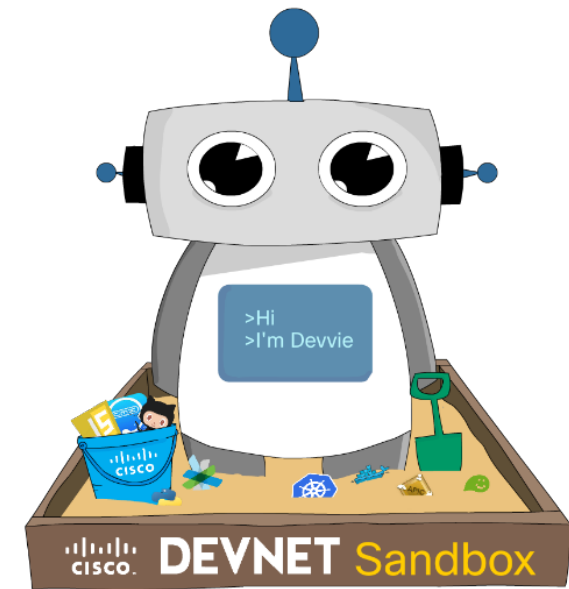
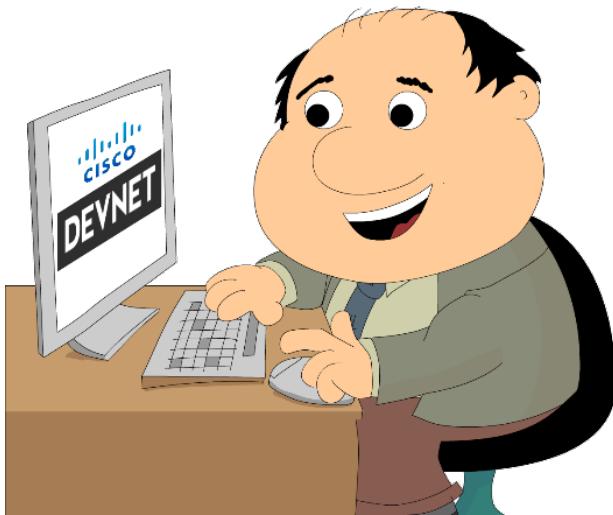
- Linux Skills
- Ansible
- Docker
- NETCONF/YANG

Phase 3

- Linux Networking
- Container Networking
- NFV

As Needed

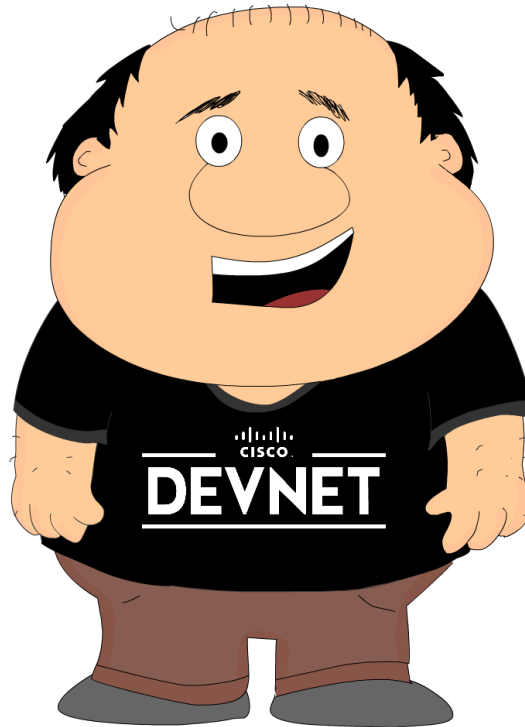
- Network Controllers
- IOT Networking
- Cloud Networking
- NFV
- "DevOps"



Carl has Embraced Programmability!

Core Programming

- Python
- REST APIs
- JSON/XML
- Linux Skills
- Ansible
(Puppet/Chef/etc)
- git/GitHub
- Docker
- "DevOps"



"New" Networking Stuff

- Network Controllers
- NETCONF/YANG
- Container Networking
- Cloud Networking
- Linux Networking
- IOT Networking
- NFV



DEVNET

LEARN CODE INSPIRE CONNECT



DevNet Learning Labs

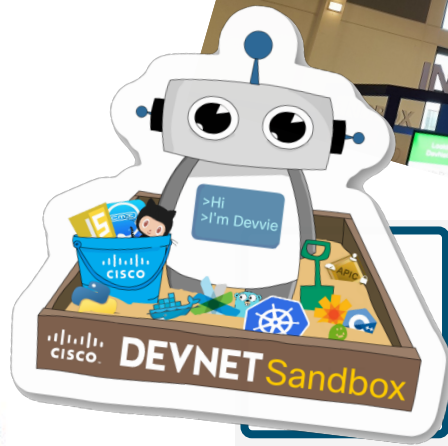
The DevNet Learning Labs will help you dive deeper into Cisco and Cisco Partner technologies, including Enterprise Networks, Data Center, Collaboration, Cloud, SDN, and IoT. If you're just getting started or need a programming REST refresher, the Learning Labs will help you get started with tutorials covering REST APIs, Python, JavaScript, and other programming technologies and concepts.

Springboards are now Tracks.

DevNet Tracks and Modules now make it easier for you to learn. Tracks and Modules are designed to guide you through learning labs that are conceptually related.

Get Started →

- Networking**
Get started with device configuration and network programmability. We have a variety of labs for you to explore.
- Mobility**
Get started with WiFi based indoor location using Cisco Connected Mobility Experience and Enterprise Mobility.
- Coding**
Get started using REST APIs, learn basic Python skills and get help using common developer tools.
- Collaboration**
Learn how to use Spark, Jabber Guest, Jabber for Web SDK, CUMI, WebEx and User Data Services. Learn how to embed voice and video into your applications.



Cloud	Networking	Data Center
Security	Analytics & Automation	Open Source
		Collaboration



ACHIEVEMENTS

- Analytics & Automation**
Complete 1 more Analytics & Automation module to unlock your next level.
- Collaboration Cadet**
Complete 3 more Collaboration modules to unlock the next Medal!
- Data Center**
Complete 1 more Data Center module to unlock your next level.



Network Programmability Foundations @ Cisco Live

- Python
- NETCONF/RESTCONF
- YANG
- Ansible
- APIC-EM & IOS-XE
- NX-OS & ACI API
- Guest Shell
- Meraki

Taking place in: **DEVNET**
developer.cisco.com



Summing up

Review

- We looked back on the history of the network and network engineering
- Traveled through the Four Ages of Networking
- Talked about the impact “Cloud” has had on IT
- Considered the skills a network engineer needs today

So what now?

- Join [DevNet](#) and engage with the community
 - [Learning Labs](#)
 - [Development Sandboxes](#)
 - Code Samples and API Guides
- Earn some Badges!
- Write some code in Sandboxes
- Tweet me a link to your code on GitHub

The image displays a collection of Cisco DevNet resources. At the top left is a 'DEVNET Sandbox' robot. To its right is a grid of development sandboxes, each with a title, version, and a 'RESERVE' or 'ALWAYS-ON' button. Below the grid is a card for the 'Introduction to Device Level Interfaces (ex: NETCONF/YANG)' learning lab, which includes a description, duration, and a list of four introductory topics. At the bottom right is an 'ACHIEVEMENTS' board showing progress towards earning medals in categories like 'Analytics & Automation', 'Collaboration Cadet', and 'Data Center'.

Version	Lab Title	Availability
Version 10.3	CMX Presence 10.3	ALWAYS-ON
16.6.1	IOS XE on Catalyst 9000	RESERVE
Version 16.6 Early Demo	IOS XE Programmability	RESERVE
Version 16.5	Meraki	ALWAYS-ON
Version 16.5	NETCONF/YANG and RESTCONF On IOS XE	RESERVE
Version 16.5	NETCONF/YANG and RESTCONF On IOS XE	ALWAYS-ON
Version 3.0(1k)	ACI Hardware Lab	ALWAYS-ON
Version 2.0.1	ACI Simulator	RESERVE
Version 7.0(3)I7(1)	Open NX-OS w/ Nexus 9K	ALWAYS-ON

Introduction to Device Level Interfaces (ex: NETCONF/YANG)
Understand model-driven programmability and how NETCONF, YANG, and RESTCONF fit into the next generation of standard device-level interfaces.
⌚ 1 Hour 15 Minutes

- 🔍 **Introduction to Standard Device Interfaces**
Understanding how NETCONF/YANG fit into Network Management technologies.
- 🔍 **Introduction to YANG Data Modeling**
Understand what a Data Model is and what YANG provides for Network Management.
- 🔍 **Introduction to the NETCONF Protocol**
Explore the key elements of the NETCONF Protocol and how to use it.
- 🔍 **Introduction to the RESTCONF Protocol**
Explore the key elements of the RESTCONF Protocol and how to use it.

ACHIEVEMENTS

- Analytics & Automation**
Complete 1 more Analytics & Automation module to unlock your Medal!
- Collaboration Cadet**
Complete 3 more Collaboration modules to unlock the next Medal!
- Data Center**
Complete 1 more Data Center module to unlock your Medal!

Thanks for Coming!

- Join us for future webinars: <http://bit.ly/DevNetWebinarWed>
- Please complete our post-event survey
- Recording will be sent out shortly
- Join DevNet: <http://bit.ly/NtEngineer> here
- Follow us @CiscoDevNet



DEVNET