A Network automation story

Julien Manteau

"In short, software is eating the world."
- Marc Andreessen (2011)

CABS   NEWS PAPERS   VIDEO RENTALS

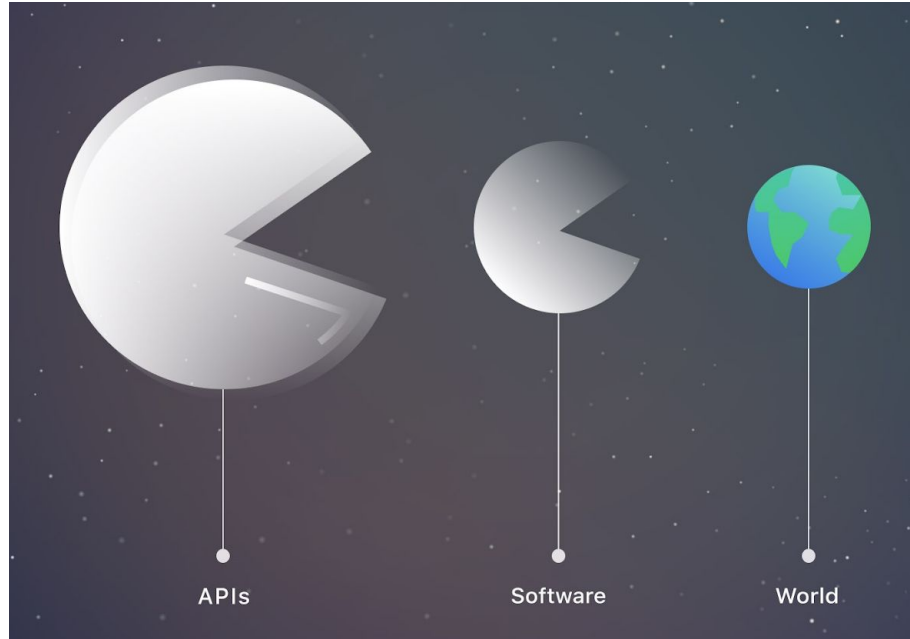Uber

Tesla

Netflix

AirBnB

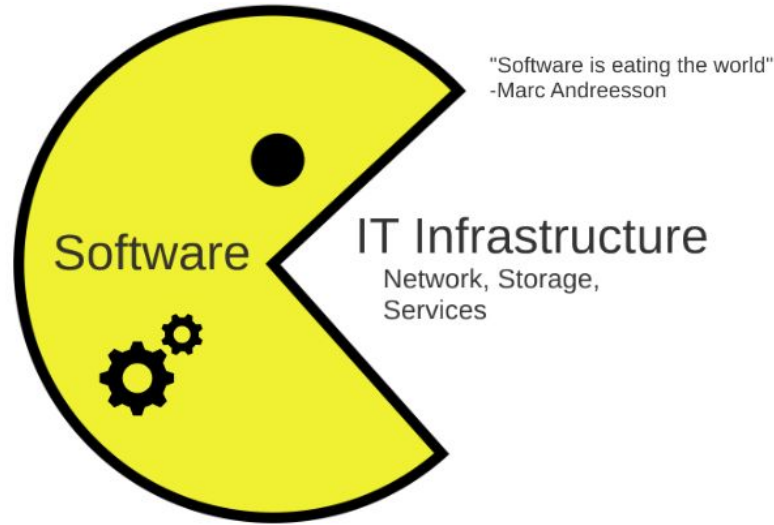Amazon

Alibaba

Zalando

...

In the future, every company will be a software company
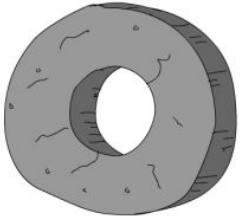
If Software is Eating the World, APIs are Eating Software
Steven Willmott

If software eats everything, are network engineers on the menu?

"Software is eating the world"
-Marc Andreesson

Software

IT Infrastructure
Network, Storage,
Services

Stone Age
Spanning Tree
VLANs

Stone Age
Spanning Tree
VLANs

Bronze Age
Routing Protocols
WAN Design
IP-magedon

Programming Skills

TCL
EEM
Expect Scripts

Networking Skills

Spanning-Tree
VLANs
Routing Protocols
QoS
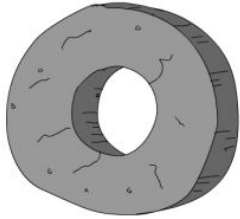VPN Design
Security Policy
MPLS

...

Connectivity is taking packet from its source (wherever it is), managing its transport, and delivering it to its destination whatever the target system is.

While taking care of reliability, security and performance from an end to end perspective.

New frontier:
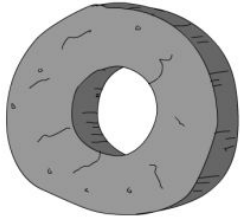4G, IOT, Cloud, SAAS, Container

Stone Age
Spanning Tree
VLANs

Bronze Age
Routing Protocols
WAN Design
IP-magedon

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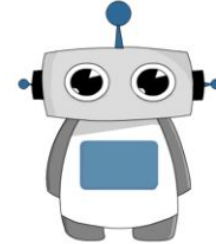**Micro-Segmentation**
White Box

Stone Age
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The Renaissance
SDN
OpenFlow
Controllers
Overlays
MP-BGP
VXLAN
Micro-Segmentation
White Box

Programmable Age
Cloud
Python
REST / APIs
NETCONF / YANG
"Fabrics"
Network Function
Virtualisation (NFV)
DevOps
Containers

Core Programming Skills

Python

REST APIs

JSON/XML

Linux Skills

Ansible (Puppet/Chef/etc) git/GitHub

Docker

"DevOps"

New Networking Things

Network Controllers

NETCONF/YANG

Container Networking

Cloud Networking

Linux Networking

IOT Networking

NFV

NetDevOps

?

Complexity

- Increasing number of complex technologies
- Increasing scale
- Skills shortage

Quality

- Faster time to market
- Differentiation demand
- Security focus

Economics

- Reduce Opex
- Reduce human errors
- Account RoI of technology investment with business outcomes

95%

Network Changes
Performed Manually

70%

Policy Violations
Due to Human Error

75%

OpEx Spent on Network
Changes and Troubleshooting

$60B

Spent on Network Operations Labor and Tools
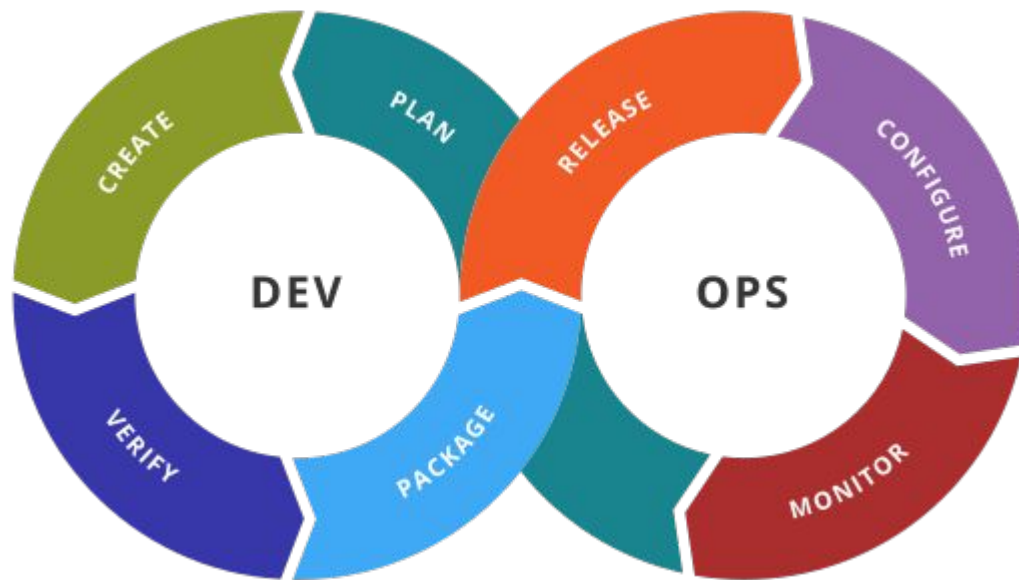
Source: McKinsey study conducted for Cisco in 2016

"Culture of Fear" Reinforcing Loop

Organizations Today

- Changes happen rarely
- All changes are big and complicated
- The team isn't well practiced.
- Change seen as high risk
- Problem occurs during change
- Change seen as failure

"Culture of Change" Loop

Organizations with NetDevOps

- Changes are regular activities
- Each change is small
- The team is well practiced
- Change was tested and verified
- Change was uneventful
- Change seen as success

From culture change to technical approach.

To Achieve :	You need to :
Automation	Simplify
⬇	⬇
Repeatability	Standardize
⬇	⬇
Consistency	Automate
⬇	⬇
Validation	Abstract