A NetDevOps Story

Network Snapshot, Workflow and Service Orchestration, Template Config Automation

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"NetDevOps brings the culture, technical methods, strategies and best practices of DevOps to Networking."

Implement DevOps Principles

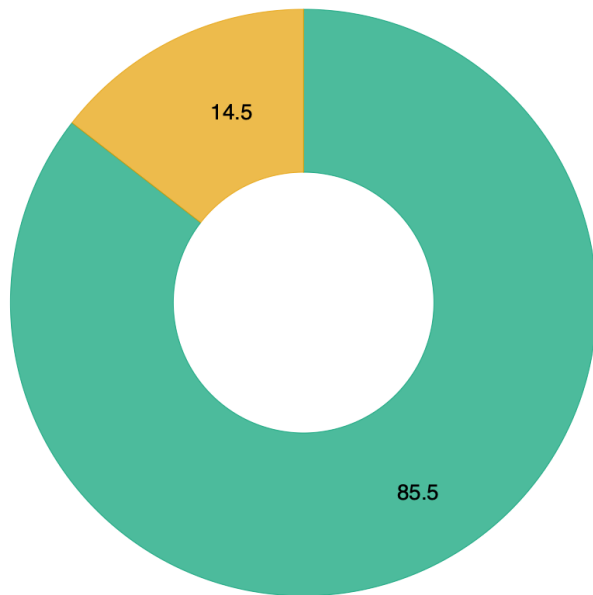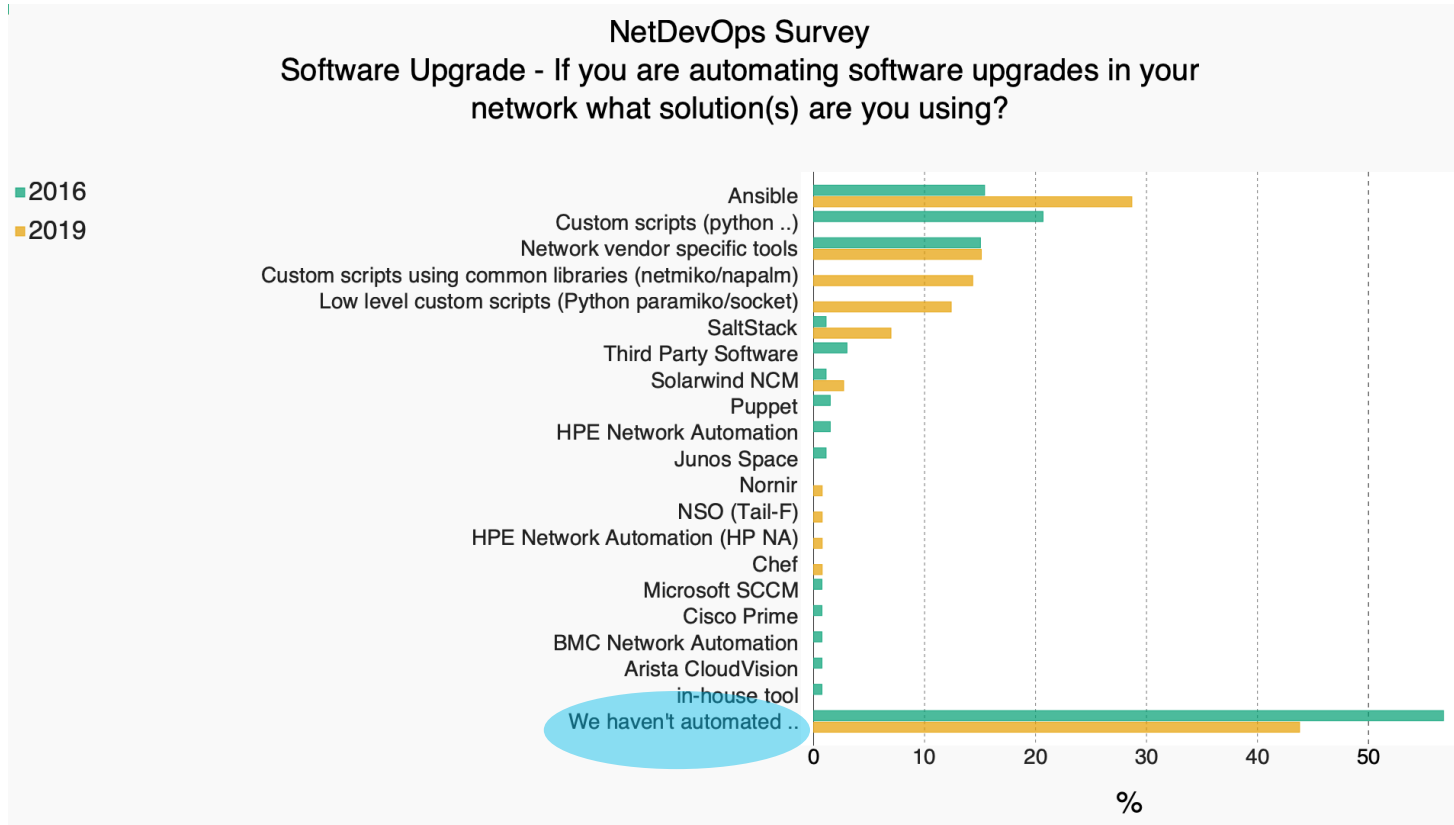| Instead of..	we want to..	target
Configuring by hand	Automate	Deployment Orchestration
Manually responding to alerts and events	Automate self-healing	Closed Loop Automation
Configuring devices manually	Automate & enforce desired state	Intent based network services
Find errors by incidents..	Be proactive	Proactive Assurance Automation

Where are we?

NetDevOps Survey (2019)
Do you allow configurations to be manually changed via CLI in addition
to automated deployments?

- Yes
- No

14.5

85.5

Source: https://github.com/dgarros/netdevops-survey

How came we here?

NetDevOps Survey
Software Upgrade - If you are automating software upgrades in your network what solution(s) are you using?

- 2016
- 2019

Ansible
Custom scripts (python ..)
Network vendor specific tools
Custom scripts using common libraries (netmiko/napalm)
Low level custom scripts (Python paramiko/socket)
SaltStack
Third Party Software
Solarwind NCM
Puppet
HPE Network Automation
Junos Space
Nornir
NSO (Tail-F)
HPE Network Automation (HP NA)
Chef
Microsoft SCCM
Cisco Prime
BMC Network Automation
Arista CloudVision
in-house tool
We haven't automated ..

%

Source: https://github.com/dgarros/netdevops-survey

Facing Obstacles

NetDevOps Skills: evolving network development

Reporting & regulatory restrictions

Agility: Easy & safe adaption to changes

Danger of "scripts for mass destruction"

Observability: Clear view about running automations

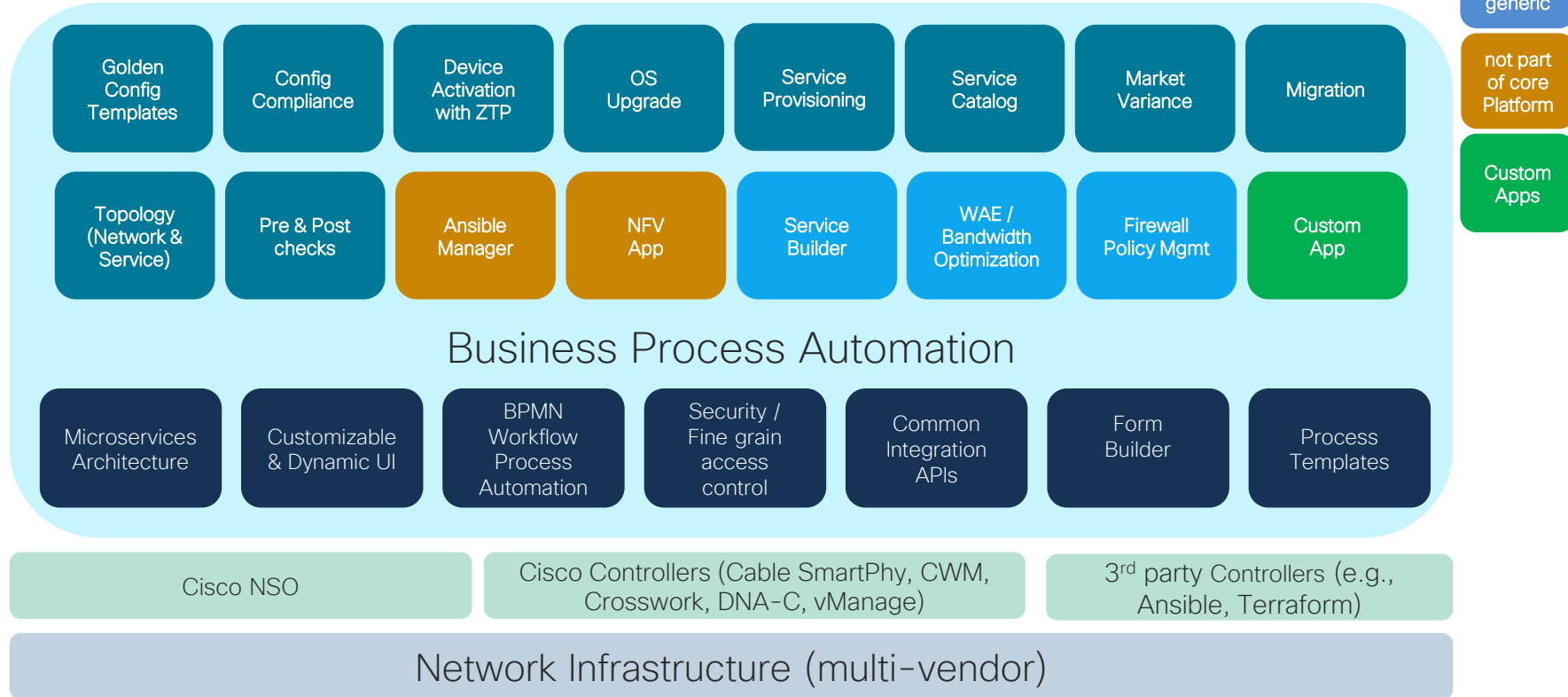Collaboration: Business, Teams, Culture

Agenda

- BPA Introduction

- Demo: Service Catalog

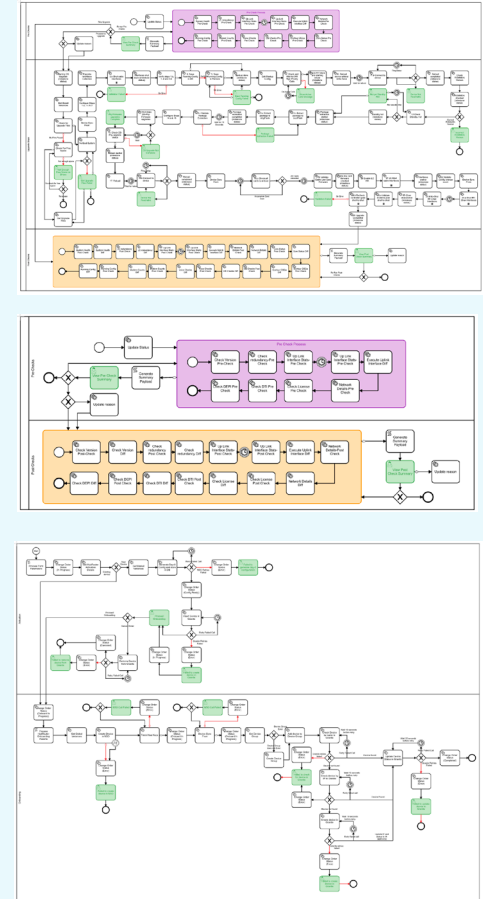- Demo: Templating, Verification
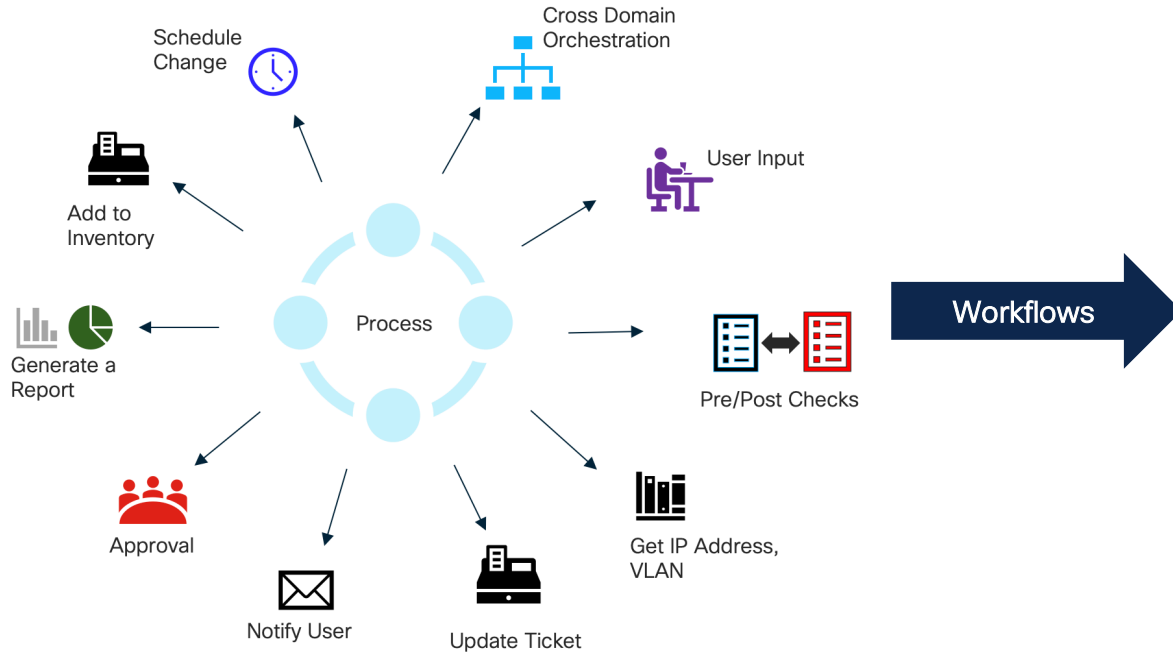
- Conclusion

Introduction to Cisco BPA

Cisco Business Process Automation Overview
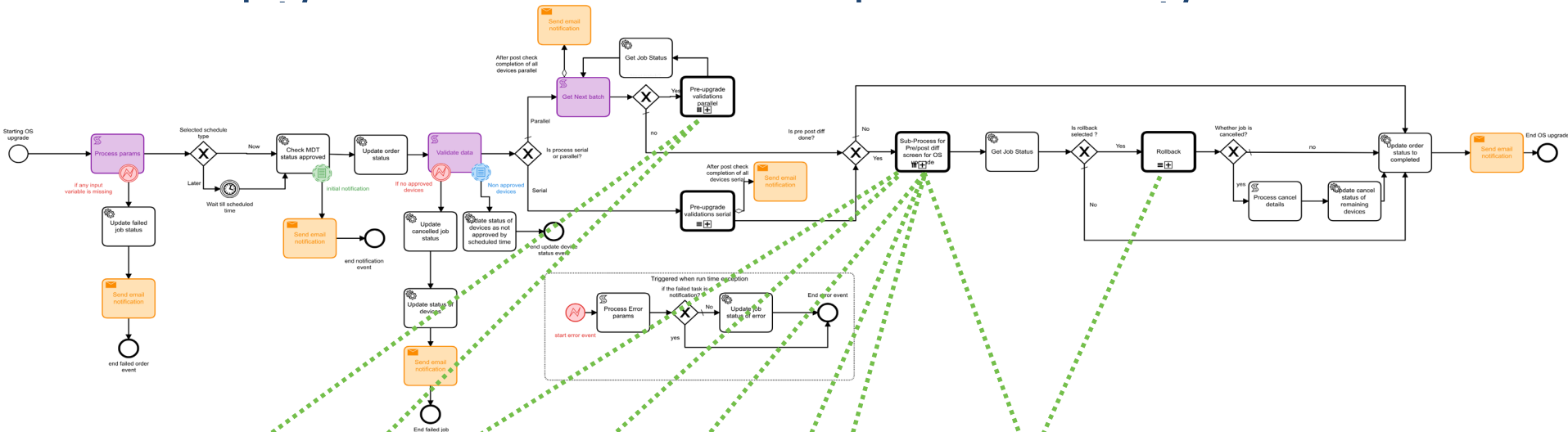
GA Apps

Apps not yet generic

not part of core Platform

Custom Apps

Golden Config Templates	Config Compliance	Device Activation with ZTP	OS Upgrade	Service Provisioning	Service Catalog	Market Variance	Migration
Topology (Network & Service)	Pre & Post checks	Ansible Manager	NFV App	Service Builder	WAE / Bandwidth Optimization	Firewall Policy Mgmt	Custom App

Business Process Automation

Microservices Architecture	Customizable & Dynamic UI	BPMN Workflow Process Automation	Security / Fine grain access control	Common Integration APIs	Form Builder	Process Templates

Cisco NSO	Cisco Controllers (Cable SmartPhy, CWM, Crosswork, DNA-C, vManage)	3rd party Controllers (e.g., Ansible, Terraform)

Network Infrastructure (multi-vendor)

Process Automation

Schedule Change

Cross Domain Orchestration

User Input

Add to Inventory

Process

Pre/Post Checks

Generate a Report

Get IP Address, VLAN

Approval

Notify User

Update Ticket

Workflows

OS Upgrade Solution Example: Building Blocks

Process Templates

Cisco-IOS:
show version

copy running-config flash:run-#{deviceName}-#{date} | prompts ENTER ENTER
copy flash:run-#{deviceName}-#{date} ftp://#{...}/var/running-config-#{currentRelease}-#{deviceName}-#{date}

copy #{storageType}:#{license} #{repoType}://#{...}/#{releasePath}/license-#{deviceName}-#{license}

show bootflash:

copy ftp://#{...}/#{relativePath}/#{fileName} bootflash:#{fileName} | prompts ENTER ENTER ENTER

verify /md5 #{storageType}:#{deviceImage} #{md5CheckSum}

conf t
boot system #{storageType}:/#{newImageFullPath}
end
write mem

conf t
config-register #{configValue}
end
reload | prompts ENTER

OS Upgrade Solution Example: Building Blocks

Cisco BPA Key Features and Values

- Microservices Architecture: Modular, Extensible, Scalable

- Simplified and Unified User Experience

- Out-of-box: Highly reusable, common use cases / apps

- Industry Standards Compliant: Workflow/Process Automation Engine

- Common Integration Framework via North Bound APIs

- Modular & Reusable Artifacts: e.g. Process Templates

- Dynamic UI Form Builder: auto-rendered from YANG models

- Applicability Across Multiple Domains & Controllers (pre-integrated with Cisco NSO)

- Day-2 Support through Cisco TAC

- Co-development Model with Customer

- Agile & Faster Content Build and Release

Cisco BPA Architecture
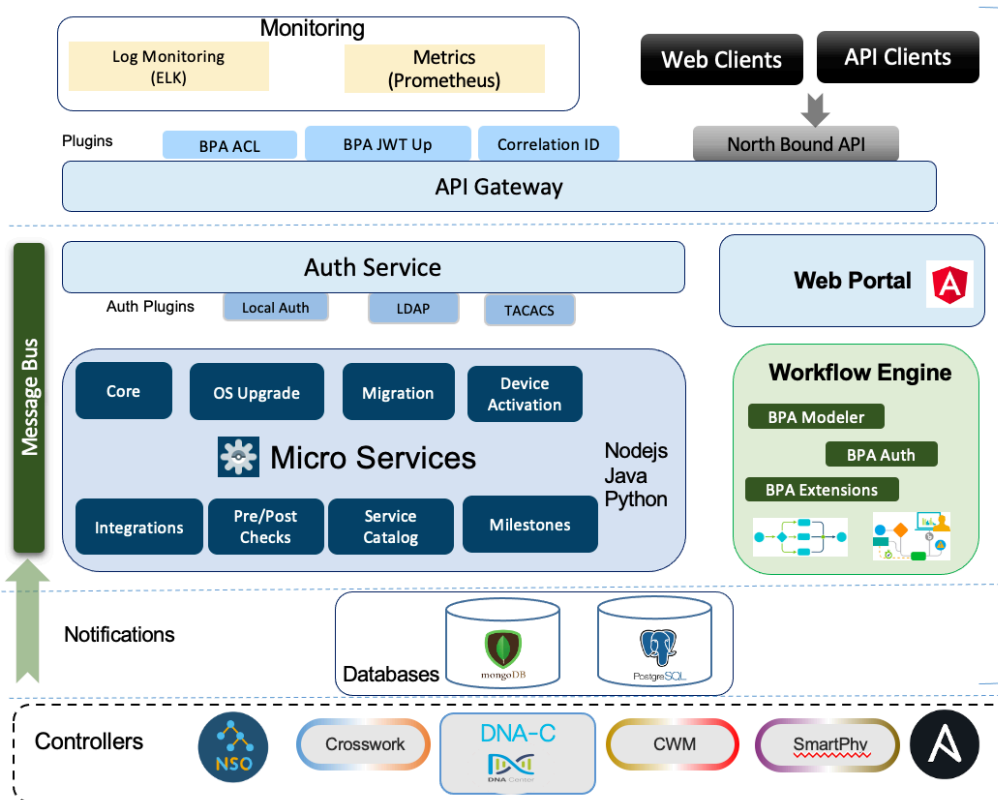
- Highly scalable, modular micro-services architecture
- Modular UI with Angular 6
- Camunda Workflow Engine – BPMN 2.0 Compliant
- API Gateway with custom BPA plugins
- Hosted on Kubernetes with Helm
- Nginx web server for Portal content
- MongoDB and Postgres databases
- Monitoring with ELK and Prometheus (2.0)
- UI/Workflow automation reusable with other Controllers and Orchestrators
- Single/multi node deployments
- Kafka Message Bus

Customer use cases and demo
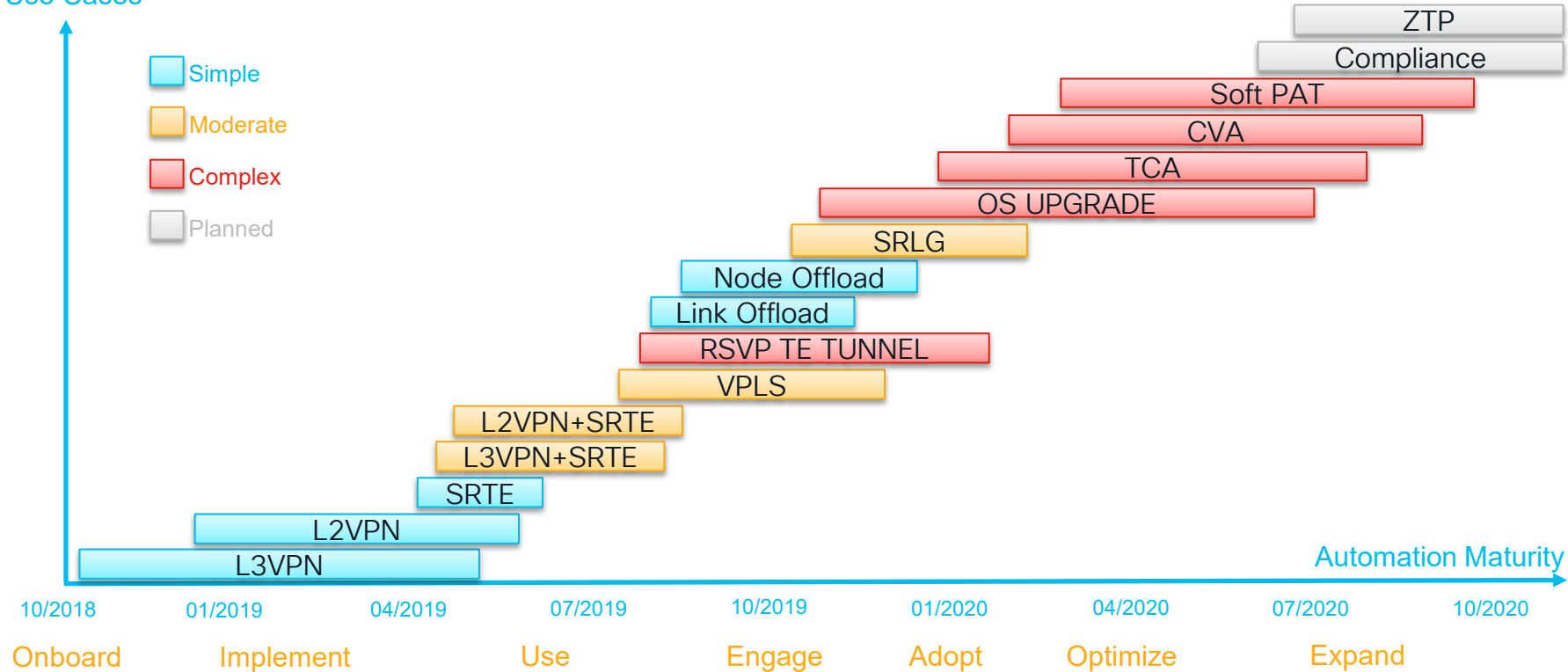
Service Catalog Demo

Template Config and Change Verification Automation Demo

Conclusion

Automation is a journey!

Use Cases

- Simple
- Moderate
- Complex
- Planned

ZTP
Compliance
Soft PAT
CVA
TCA
OS UPGRADE
SRLG
Node Offload
Link Offload
RSVP TE TUNNEL
VPLS
L2VPN+SRTE
L3VPN+SRTE
SRTE
L2VPN
L3VPN

Automation Maturity

10/2018	01/2019	04/2019	07/2019	10/2019	01/2020	04/2020	07/2020	10/2020
Onboard	Implement		Use	Engage	Adopt	Optimize		Expand

Conclusion & Summary

A NetDevOps Story

- Mastering Obstacles

- Centralized "Single pane of glass" Platform helpful

  - Modular and open

  - Cross domain, multi-controller Orchestration

  - API driven

Closed loop, ZTP, Compliance, endless possibilities..

TURN IT UP

CISCO Live!

#CiscoLive