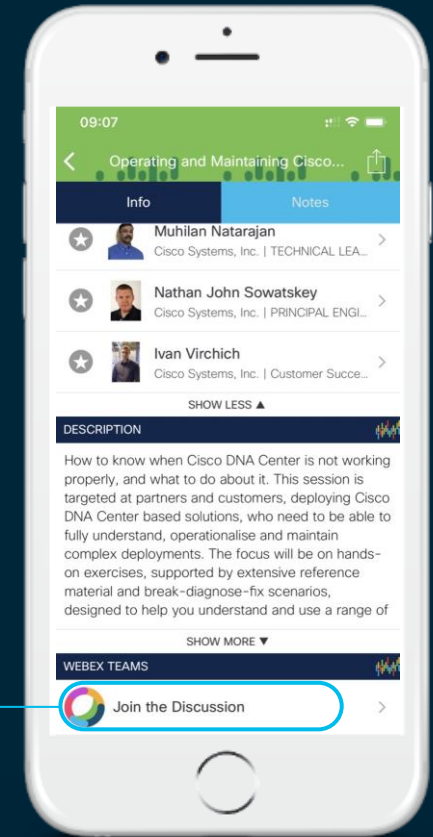CISCO

You make **possible**

Cisco Webex Teams

Questions?
Use Cisco Webex Teams to chat
with the speaker after the session

How

1. Find this session in the Cisco Events Mobile App
2. Click "Join the Discussion"
3. Install Webex Teams or go directly to the team space
4. Enter messages/questions in the team space

Agenda

- NSO and how it makes people happy

- New NSO features since Cisco Live EMEAR 2019

- Cisco NSO Core Function Packs

- Helping customers to deliver on automation

- NSO use cases discussion

- Conclusions

NSO and how it makes people happy

What do your stakeholders think?

Infra Operations | I need to increase responsiveness and still lower opex

Service Automation | I am on the front line for customer experience
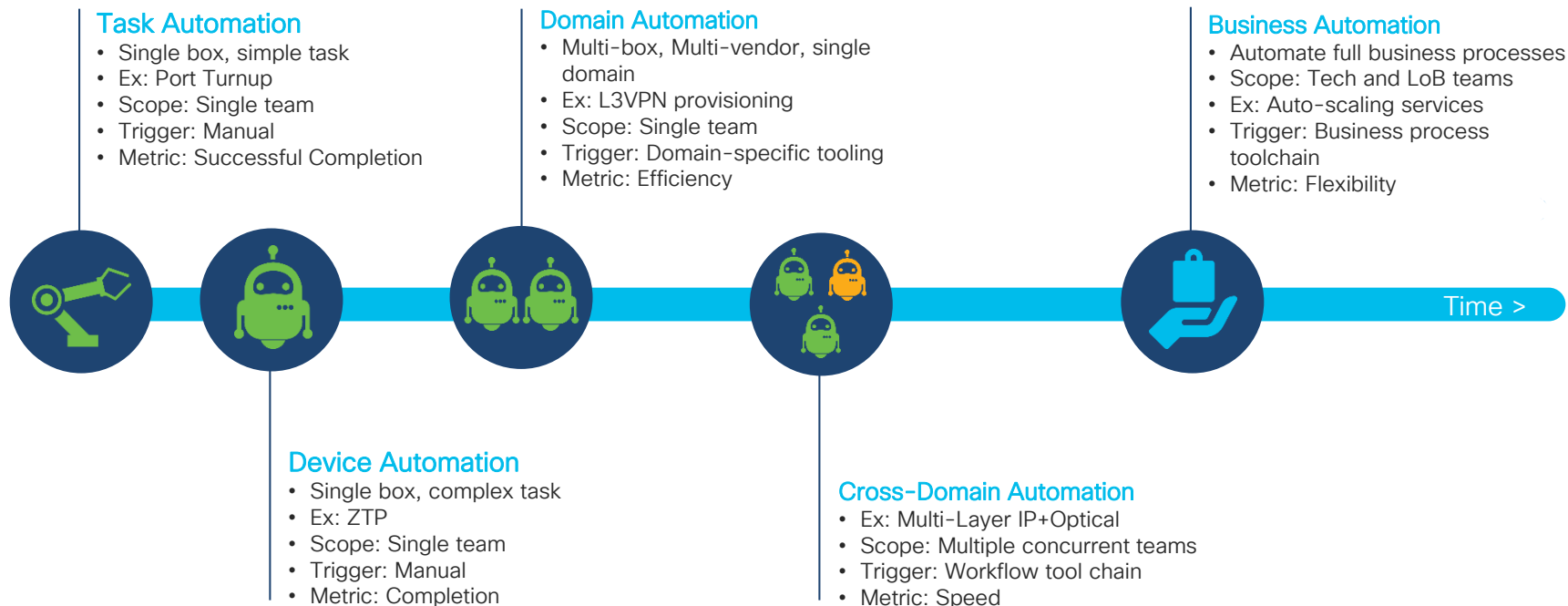
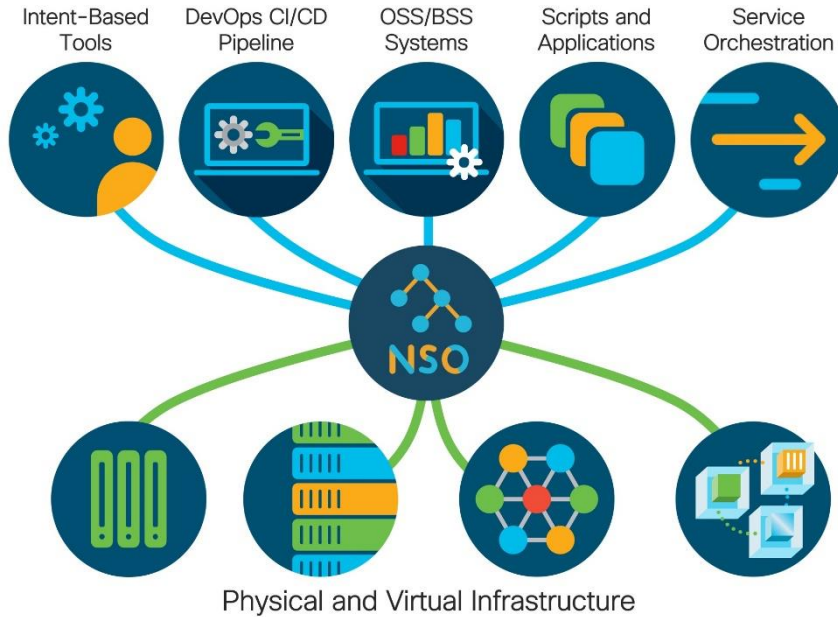**Service Developer** | I need to out-innovate the competition

Business Owner | I don't care about the tech, show me how you can drive growth

What do you need your tools to do?

Task Automation
- Single box, simple task
- Ex: Port Turnup
- Scope: Single team
- Trigger: Manual
- Metric: Successful Completion

Domain Automation
- Multi-box, Multi-vendor, single domain
- Ex: L3VPN provisioning
- Scope: Single team
- Trigger: Domain-specific tooling
- Metric: Efficiency

Business Automation
- Automate full business processes
- Scope: Tech and LoB teams
- Ex: Auto-scaling services
- Trigger: Business process toolchain
- Metric: Flexibility

Time >

Device Automation
- Single box, complex task
- Ex: ZTP
- Scope: Single team
- Trigger: Manual
- Metric: Completion

Cross-Domain Automation
- Ex: Multi-Layer IP+Optical
- Scope: Multiple concurrent teams
- Trigger: Workflow tool chain
- Metric: Speed

Cisco NSO is a bridge

Intent-Based Tools   DevOps CI/CD Pipeline   OSS/BSS Systems   Scripts and Applications   Service Orchestration

NSO

Physical and Virtual Infrastructure
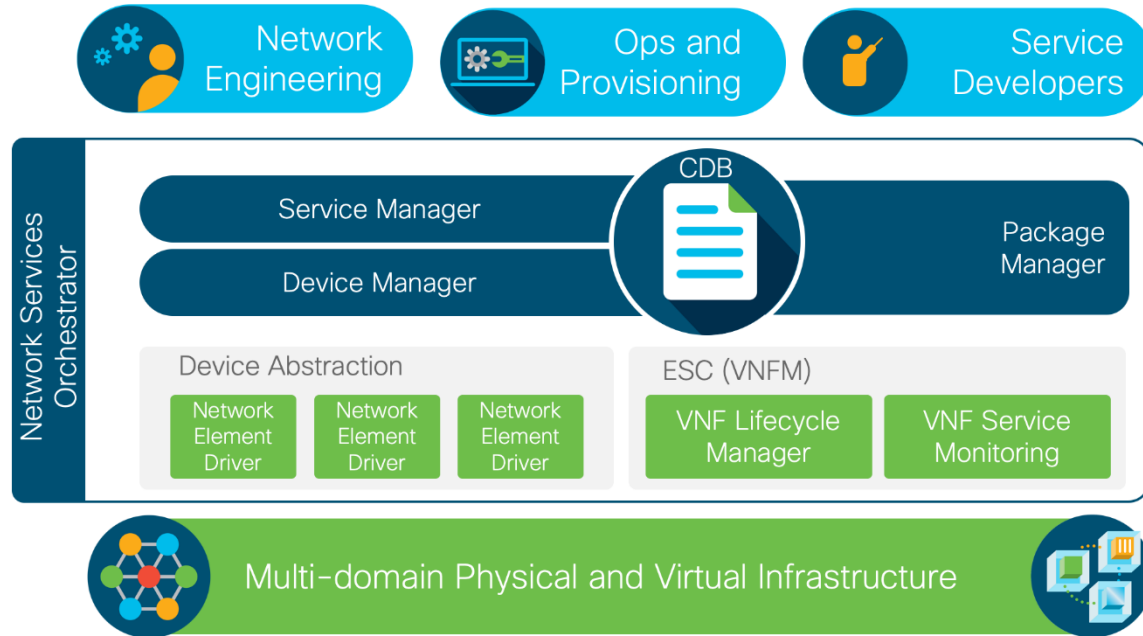
Between people that build services and ones that operate infrastructure

Across different domains and vendors

Over both physical and virtual infrastructure

NSO Architecture

Network Engineering

Ops and Provisioning

Service Developers

Network Services Orchestrator

Service Manager

Device Manager

CDB

Package Manager

Device Abstraction

Network Element Driver

Network Element Driver

Network Element Driver

ESC (VNFM)

VNF Lifecycle Manager

VNF Service Monitoring

Multi-domain Physical and Virtual Infrastructure

Model-driven, end-to-end service lifecycle and customer experience focused

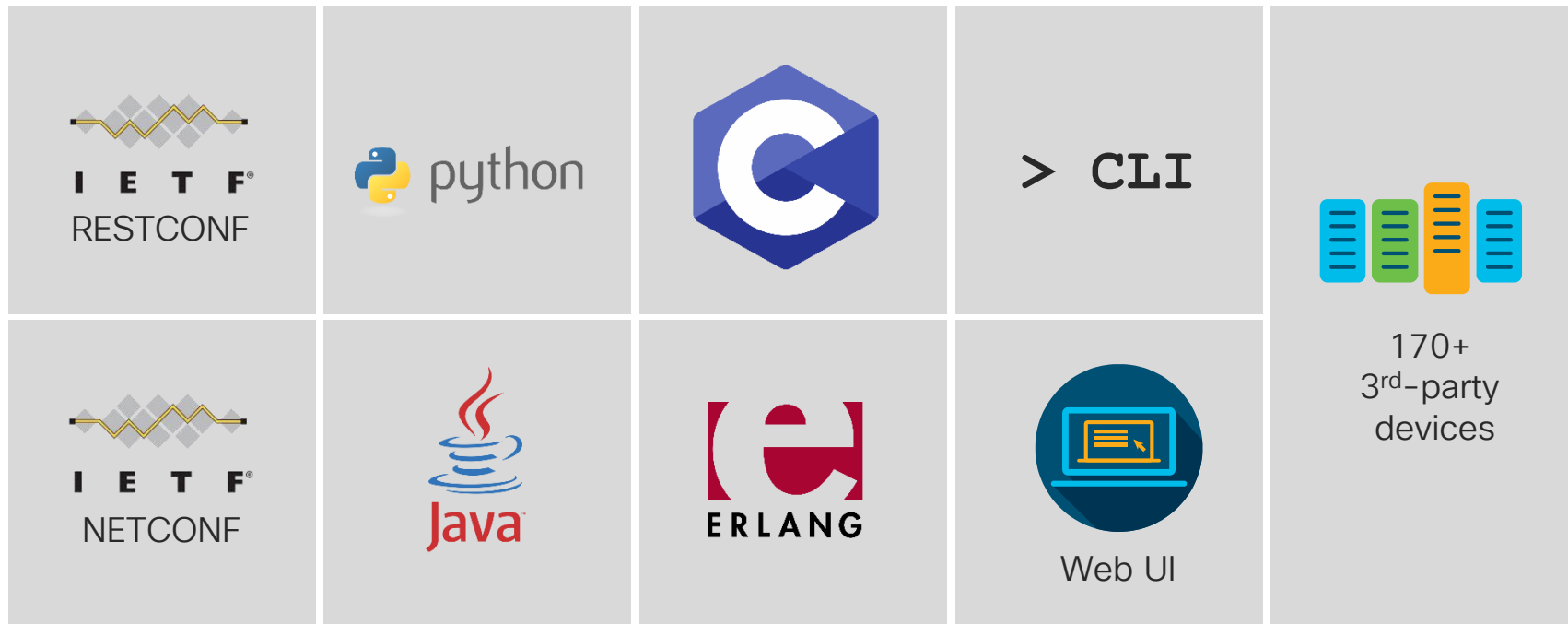Seamless integration with northbound tooling

Loosely-coupled and modular architecture leveraging open APIs and standard protocols

Orchestration across multi-domain and multi-layer for network-wide, centralized policy and services
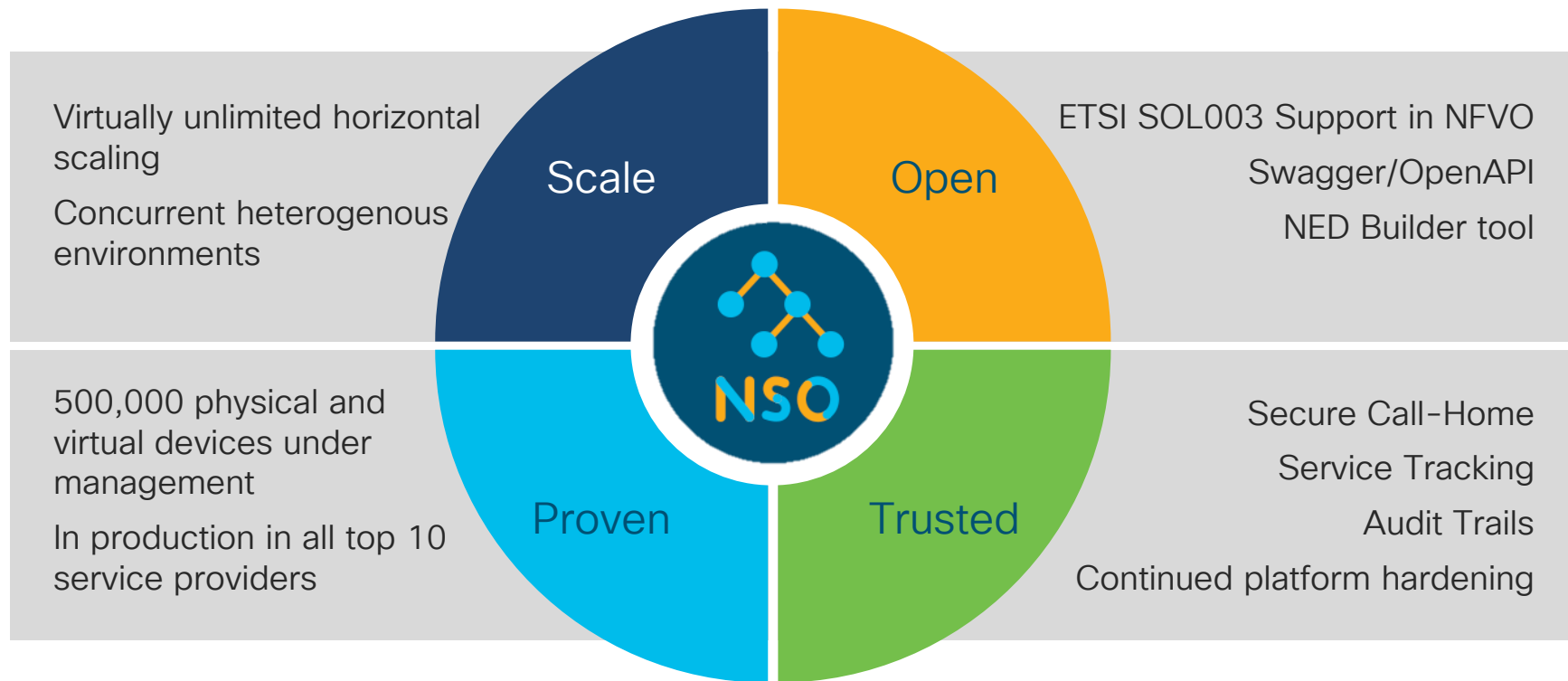
Industry's broadest multivendor support

Over 170 NEDs and growing – custom NEDs available

Rich software interfaces = easier integration

IETF RESTCONF

python

C

> CLI

170+ 3rd–party devices

IETF NETCONF

Java

ERLANG

Web UI

New NSO features since Cisco Live EMEAR 2019

The Age
of
NSO
version 5
has
began

cisco Live!

What's New With NSO 5

Scale
- Virtually unlimited horizontal scaling
- Concurrent heterogenous environments

Open
- ETSI SOL003 Support in NFVO
- Swagger/OpenAPI
- NED Builder tool

Proven
- 500,000 physical and virtual devices under management
- In production in all top 10 service providers

Trusted
- Secure Call-Home
- Service Tracking
- Audit Trails
- Continued platform hardening

Multiple Version Runtime Namespaces

Perf. & Usability

- Allow NSO to runtime-load the same YANG module (as defined by it's namespace) many times over

- This will vastly improve NSOs usefulness in certain scenarios:

  - Runtime analysis of version change impact across versions. I.e. what-if analysis on service code based on NED upgrades

- Migration tooling for minimal impact-NEDs

✓ Robust support for emerging NETCONF/YANG platforms

NED Builder

1 Configure connectivity and log into new device

2 Initiate NED Builder Script

4 Formally unknown device now fully manageable in NSO

Unknown NETCONF Device

3a Script pulls models from device...

3b ...and generates a new NED
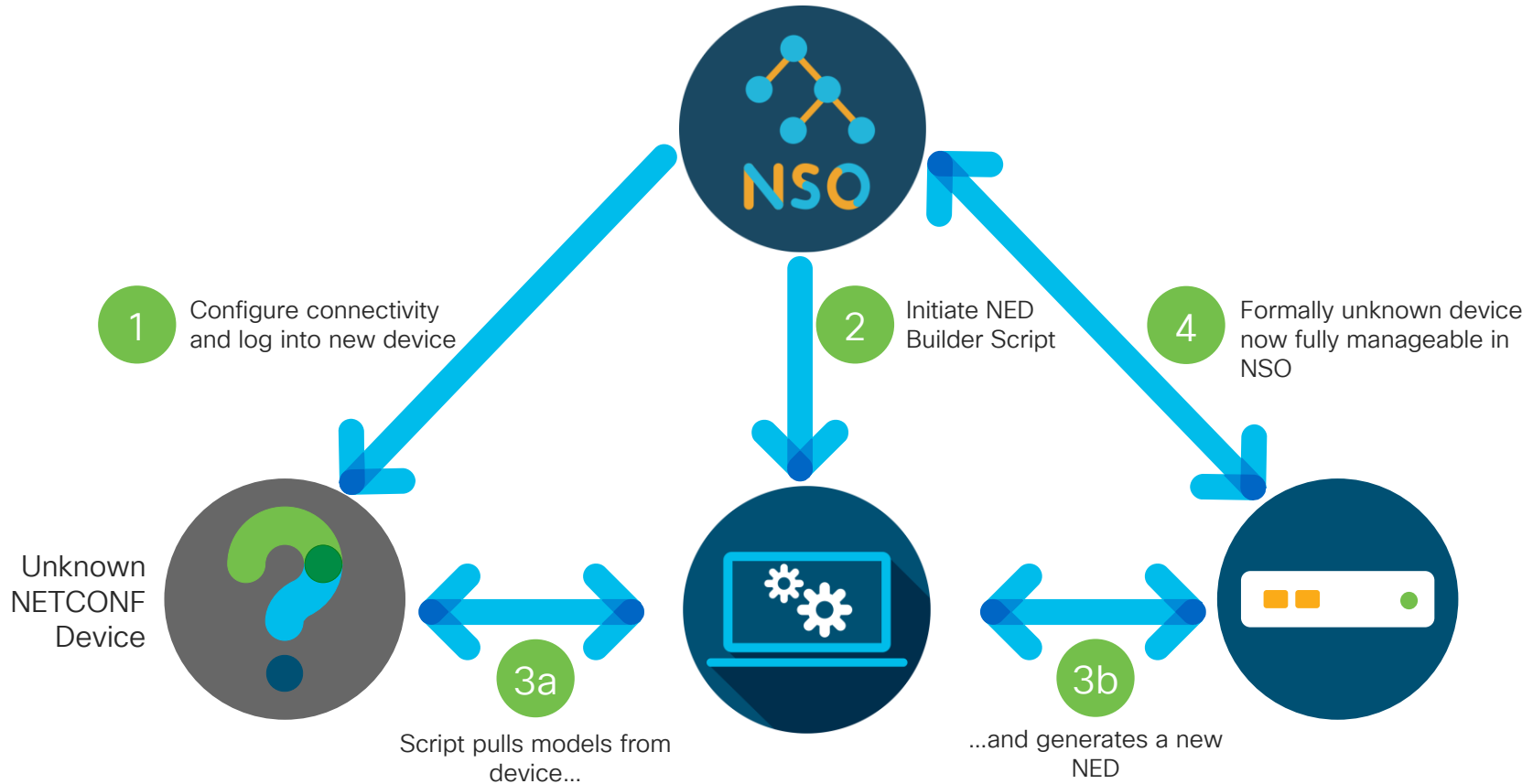
Web UI Updates

New
Features

- Plan component integrated into service manager

- Incremental overhaul of type representations
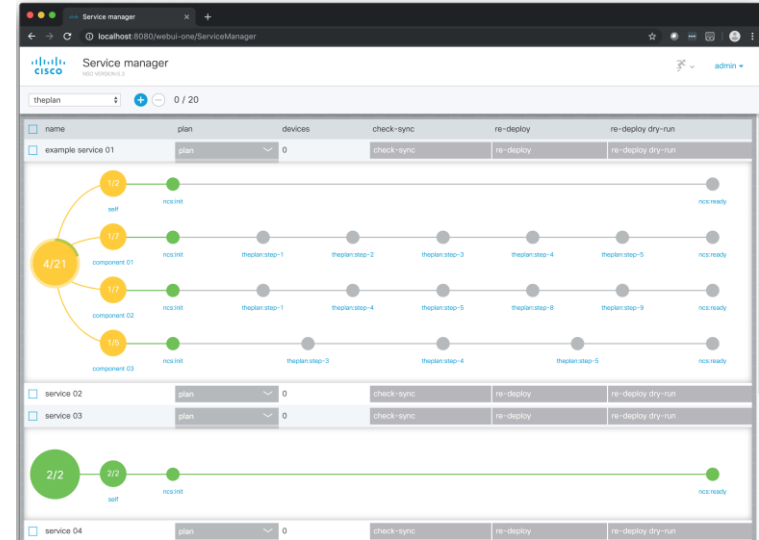
Overview of the running administrative status

NSO and Ansible play great together

- NSO modules are now *core certified* modules in Ansible

- Cisco Live 2019 "Batteries and Pipeline Included with Cisco NSO and Ansible" is available

- Listen to the joint Cisco – Red Hat podcast on how the two play together

More integrations coming: Terraform, ServiceNow, etc. etc.

Last, several important removals to be aware of

- NSO version 4.X EoL announced

- Java version minimal increased to 1.8+

- Python 2 not longer supported, you need to migrate to Python 3

- At one point, we want to remove the old REST API, please move to RESTCONF

We have great things in our radar

NSO Enhancement Radar

Operational Enhancements

- No downtime rolling upgrades Package upgrade performance

- NSO restart/upgrade performance

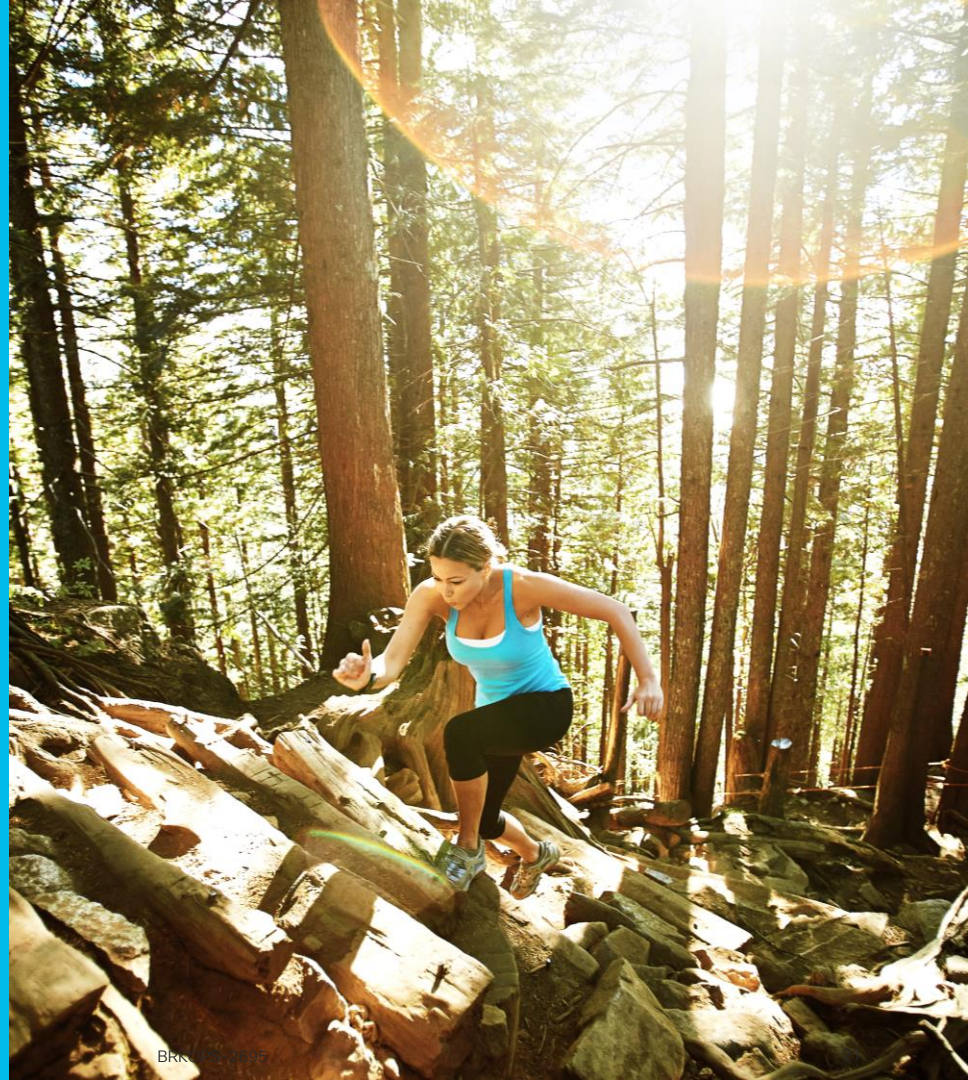- Improved operational tooling (nct++)

Performance insights

- Profiling tools: Where is the time spent in NSO

- Scaling and sizing guidance

- LSA cluster performance visibility

Developer Tooling

- Nano service tooling

- Template studio

- Xpath tooling

- Package creation tooling enhancements

Cisco NSO Core Function Packs

Two types of function packs from Cisco
Different support model and innovation speed

Cisco Core Function Packs

- Ready-made applications from Cisco
- Not meant to be modified in field
- Priced via well-known licensing model
- TAC supported
- Aligned with a Cisco-validated solution

Cisco CX Automation Packs

- Delivered by Cisco CX organization
- Can be modified in the field by Cisco CX
- Typically multi-vendor, focused in usecases
- Cisco CX supported
- Incubation for future Cisco Core Function Packs

Cisco Core Function Packs
Taking you a long way in your automation journey

NFVO	NFV virtualization for Cisco and 3rd party VNFs on top of OpenStack or VmWare. It includes VNF lifecycle.
vBranch	NFV virtualization for Cisco and 3rd party VNFs on top of Cisco ENCS universal CPEs. It includes VNF lifecycle.
SD-WAN	Orchestration of Cisco Viptela SD-WAN solution, including Vmanage/vBond/vSmart/vEdge instantiation and lifecycle
Secure Agile Exchange (SAE)	"DMZ in a box" security solution that includes Cisco CSP for simple enterprise datacenter service chaining
Transport SDN	Transport SDN automation for Cisco IOS-XR and extensible for 3rd party devices. Part of our Transport SDN Solution
5G Datacenter	Cisco ACI and Cisco IOS XR integration for Datacenter and WAN integration

Cisco CX Automation Service Packs – NSO

Jumpstart the Network Automation – Prebuilt Use Cases

Zero Touch Provisioning (ZTP)	**OS Upgrade**	**Port Turnup**	**Compliance**
Migration	**Traffic Drain**	**Metro Ethernet Services**	**Service Discovery Framework**
ACL Management	**5G Virtual Packet Core (VPC)**	**Distributed Access Architecture (Cable)**	**COMPASS Architecture (SP)**

Personas

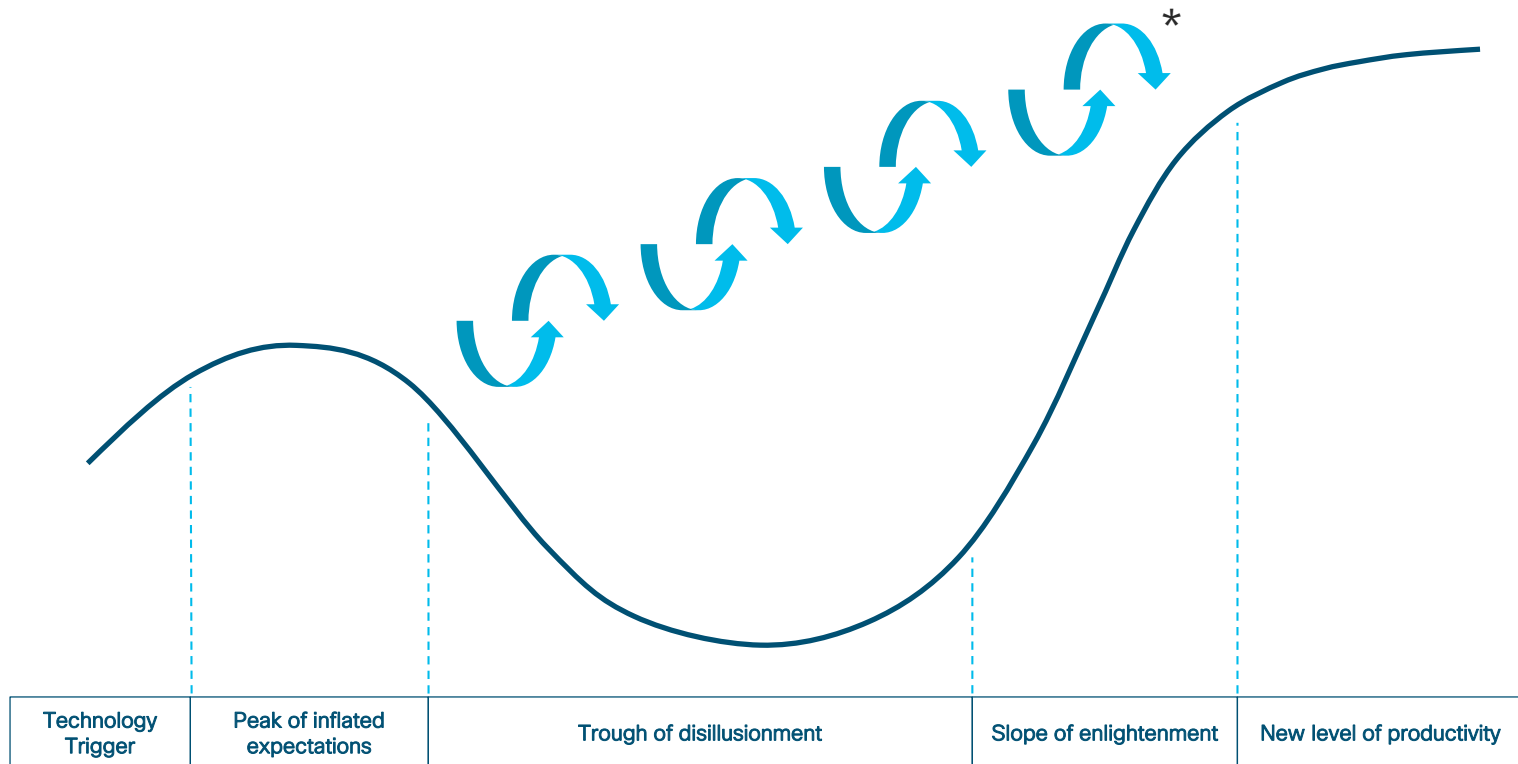Network Engineering | Network Operations | Security Operations | IT / DevOps

Helping customers to deliver on automation

Automation is a Journey

Autonomous

Automated

Semi-Automated

Manual

Best Effort

Journey Stage

Autonomous System

Intent based Network
Closed Loop
Self Managed/ Driving

Orchestrated Assurance

Event Driven Automation
Telemetry
Analytics & Correlations

Multidomain Automation

Multivendor Automation

Modelling, Optimization & Validation

Initial SPN Automation

IDC: 70% of SPs

Provisioning
Physical/ Virtual

Hand Crafted

Manual
CLI Scripting

Agile Methodologies & Maturity

Foundation
Up to 10% productivity gain *

Acceleration
>10%-30% *

Transformation
>30% *

* **Source:** Mindtree's Automation Maturity Model 2017

CISCO Live!

Avoid the Valley of Despair!

Technology Trigger	Peak of inflated expectations	Trough of disillusionment	Slope of enlightenment	New level of productivity

E.g., NADM = Network Automation Delivery Model:
https://developer.cisco.com/docs/network-automation-delivery-model/

Automation journey supporting programs

Continuous Development and Automation Framework

Network Automation Delivery Model

Advisory Services

Automation and Orchestration training

SP Digital Transformation industry insights and benchmark

dCloud AO labs and demo's

DevNet, developers community

Standardized deployment packages to accelerate outcome

Value curve

Getting started			Build automation practice		
Define	Demonstrate	Deploy	Expand	Operationalize	Run

First use case automated

Expected value curve

Start small, and incrementally learn, deliver value and grow

Automation is much more than technology...

|		
Roles	Vision, mission and culture statement	Objectives, strategy and plan
Key Performance Indicators	Development process	Build an organization
Stakeholder management	Use case definition	Deployment & Operations
Continuous integration & Continuous delivery	Testing	Demo
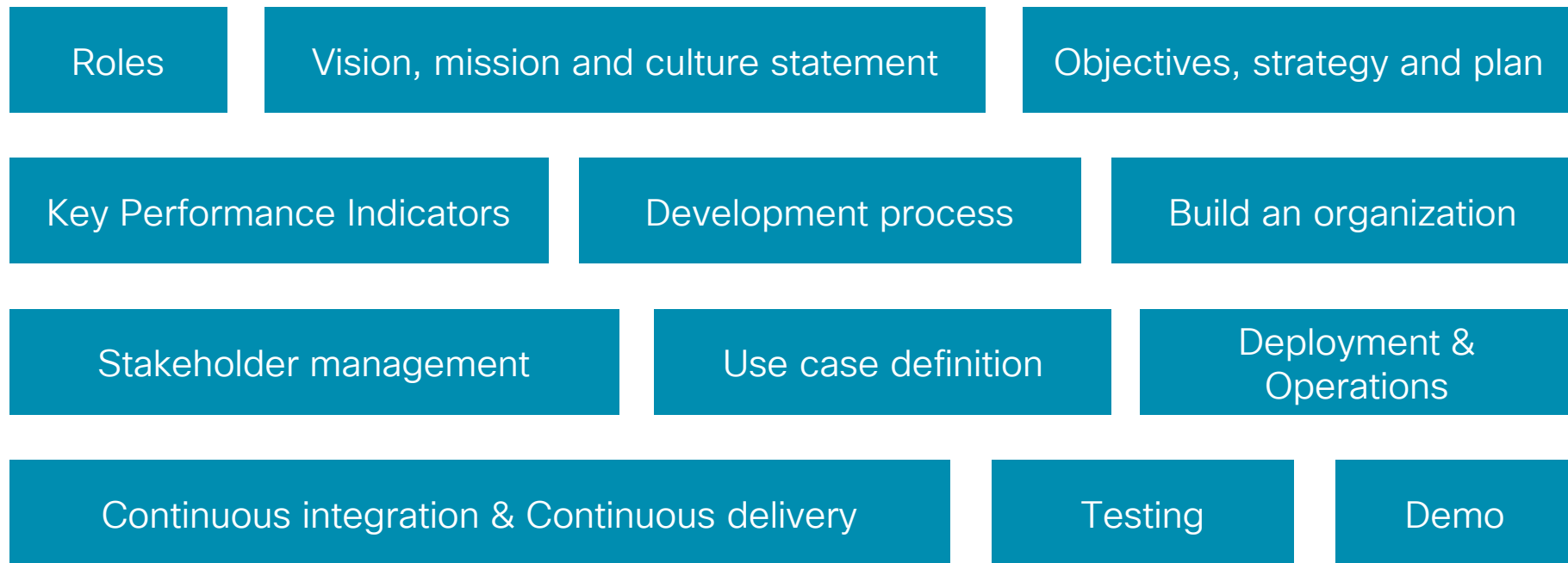
NSO usecases discussion

Automation aligned with business objectives

What are the automation goals?

- Efficient Operations at Scale
- Protect and Grow Revenue
- Improve Service Quality
- Reduce Risk and Opportunity Cost
- Actionable Insight, Optimization
- Simplicity, Velocity and Agility

What is the automation journey?

Revenue

Improved Margins

$

Cost

time

Business Transformation

Technology Evolution

People & Process Changes
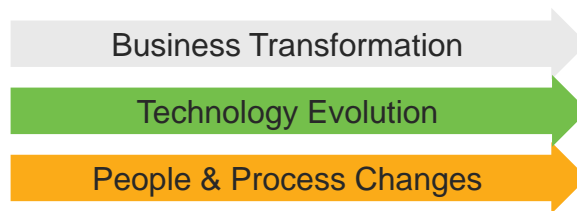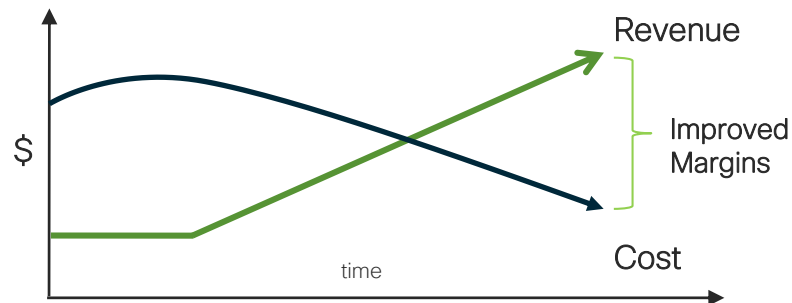
Defining a use case

An automation use case is a set of technical actions that map to a business outcome

1 The budget driver

2 Can apply across different devices and software platforms, and reflects customer business processes

3 Critical for business case qualification, healthy project execution and faster return on investment

Use case best practices

- Have a well-defined process for use case definition

- Fill out RACI matrix for use case generation

- Coordinate the use case with all stakeholders

- Use a common format for all use cases

Use case checklist

✓ Acceptance criteria well defined and understood

✓ The use case fits into current strategy

✓ Business value of the use case is well understood

✓ Use case can be demonstrated effectively

Use-case Expansion Opportunities

Increasing coverage

Use-case expansion

Network expansion

Use-case #2 Network #1	→	
Use-case #1 Network #1	→	
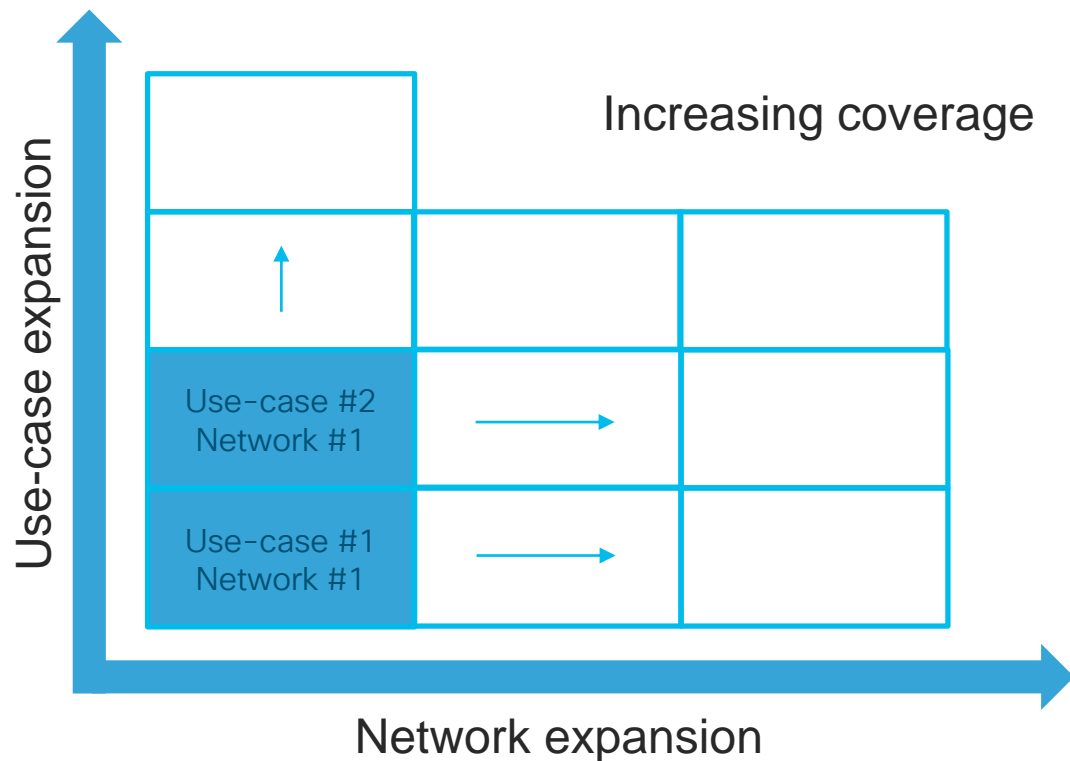
- Network Operations

- Service Operations

- Collection and data analytics integration

- "SDN" use-cases in transport, DC etc.

- Virtualization, NFV-MANO
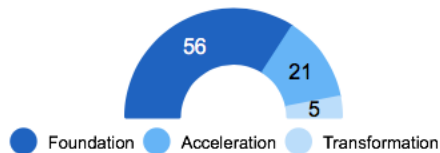
- End-to-End / Cross Domain Orchestration

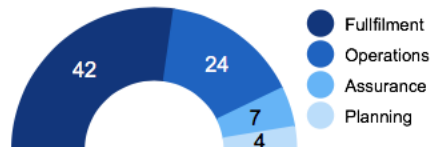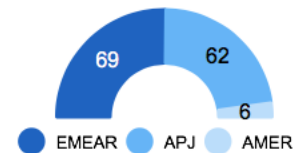# Cisco SP AO | Use Cases Library

66
Total Use Cases

9
SCN Sales Play

Customer Journey Stages

56
21
5

- Foundation
- Acceleration
- Transformation

AO Functional Area

42
24
7
4

- Fullfilment
- Operations
- Assurance
- Planning

Customer Engagements by Region

69
62
6

- EMEAR
- APJ
- AMER

138
Use Case Engagements

Business Objectives supported

Faster Time to Revenue	21
Reduce Opex	21
Improve Service Agility	17
others	14

0   5   10   15   20   25
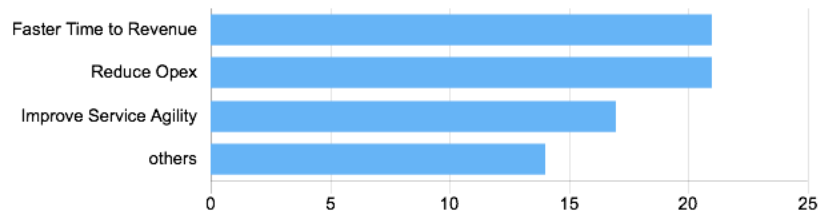
Cisco Technology Adoption

NSO	89
WFM Itential/ Pronghorn	40
SR PCE	20
Netrounds	5
others	28

0 10 20 30 40 50 60 70 80 90
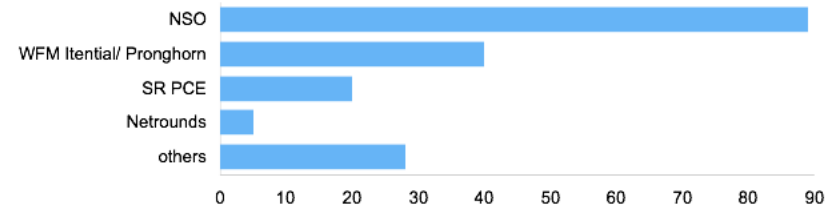
TOP Use Cases Adoption Ranking

Service Packs

Use Case Input Format

Sales Ressources

Some Useful Tips

NEW Use Cases

Your feedback please

IEC 4

Let use cases frame the automation journey

Align automation with business strategy and priorities

Manage expectations and secure buy-in from all stakeholders

Framework for automation roadmap and evolution

Increase scope and complexity as you grow your automation practice and capability

Work with partners and Cisco to explore new and potential use cases

Successfully delivered NSO usecases
Just a summary of what can we do with Cisco NSO

Data Center

- Multi-vendor DC Fabric automation
- PaaS Network Automation
- Zero Touch Provisioning
- NSO + ACI

Security

- Multi-vendor Rule management
- Anti-Spoofing automation
- DMZ: Secure Agile Exchange

Campus

- Multi-technology Layers1/2/3
- Remote worker automation
- Wireless
- SDN-WAN automation

Transport

- Layers 2/3 VPN automation
- Mobile Core automation
- IP + Optical automation
- Transport SDN

Access

- FTTH: OLT, DSLAM automation
- Subscriber automation, including Radius
- BNG, CMTS automation: IP pools

NFV

- Virtual functions instantiation
- Service chaining, across DC, Transport and network functions
- Management of Containers

Successfully delivered NSO usecases
## Just a summary of what can we do with Cisco NSO

Network Operations

| Network Operations to Automate |
| --- |
| Maintenance Window (MOP) |
| ACL Management |
| Device Migration |
| Config audit/validation |
| Network refresh/regional roll-outs |
| Device Provisioning |

Service Operations

Service Operations to Automate
Change Request from Customers
Add New Customer
Service Disconnect
Incident Resolution
Introduction of New Service or Capability
Service Migration

Responding with Poll Everywhere
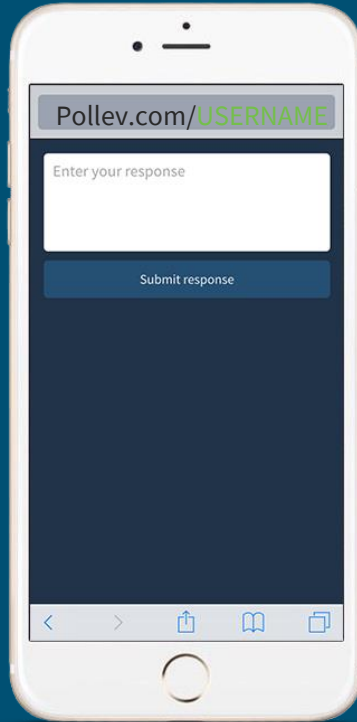
Web voting
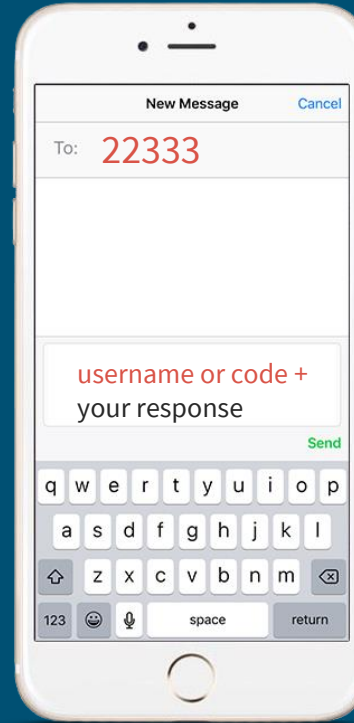
Text voting

Conclusions and take-aways

Conclusions and take-aways

- Cisco NSO is a multi-vendor, multi-domain network orchestrator

- Cisco NSO version 5 is a leap-step forward for the platform, that will enable massive scale and easier to develop and operate

- Cisco has several of assets to help you in your automation journey

- Defining a use case and aligning it to business objects is key

- We have seen successful deployments of NSO automation in Datacenter, Security, Campus, Transport/Core, Access and NFV

Complete your online session survey

- Please complete your session survey after each session. Your feedback is very important.

- Complete a minimum of 4 session surveys and the Overall Conference survey (starting on Thursday) to receive your Cisco Live t-shirt.

- All surveys can be taken in the Cisco Events Mobile App or by logging in to the Content Catalog on ciscolive.com/emea.

Cisco Live sessions will be available for viewing on demand after the event at ciscolive.com.

Continue your education

Demos in the Cisco Showcase

Walk-In Labs

Meet the Engineer 1:1 meetings

Related sessions

Thank you