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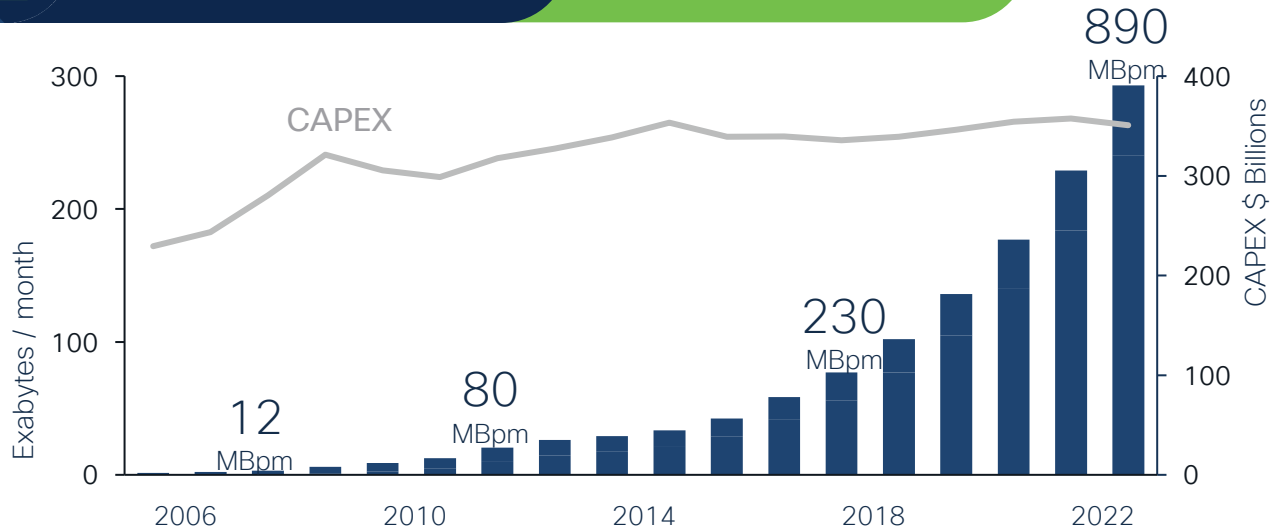
Service Provider Economics are Changing

The importance of Investing for Scale and Outcome-Driven Automation

$1 CAPEX in 2022
11X work it did in 2012

$5 OPEX today
For each $1of CAPEX



Sources: IHS Technology, "Service Provider CapEx, OpEx, Revenue, and Subscribers Database, Q1 2017"; Cisco Visual Networking Index (VNI)

Success depends on Modernized Operations

The bridge to possible

Simplify Operations across Service Lifecycle with Cisco Crosswork Network Controller (CNC)

Modernized Service Operations

Deepak Bhargava, Product Line Manager - @deebhargava
Krishnan Thirukonda, Technical Marketing Engineer - @Kris_Thirukonda

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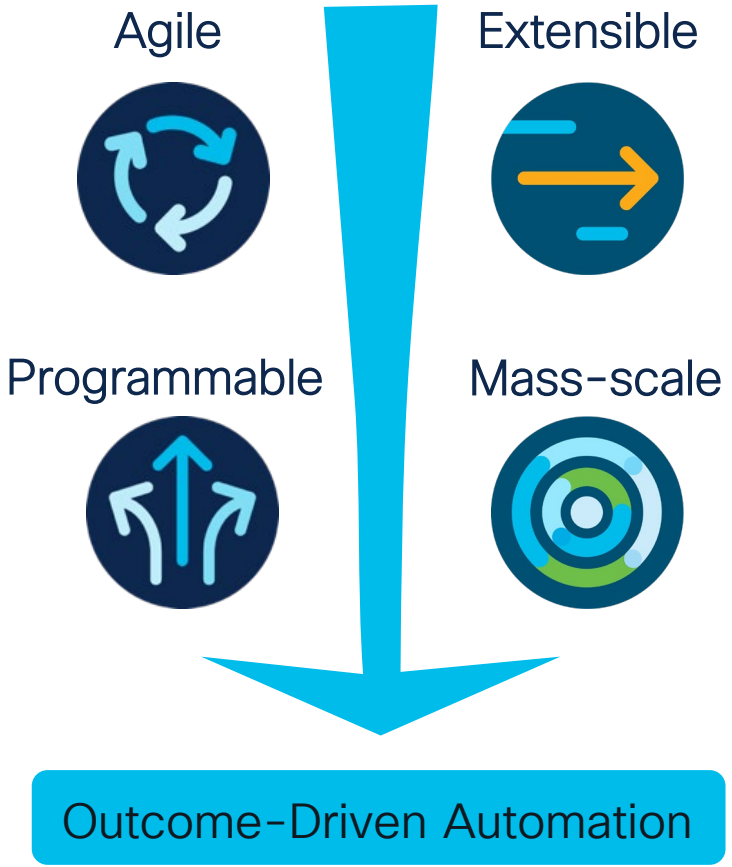
Agenda

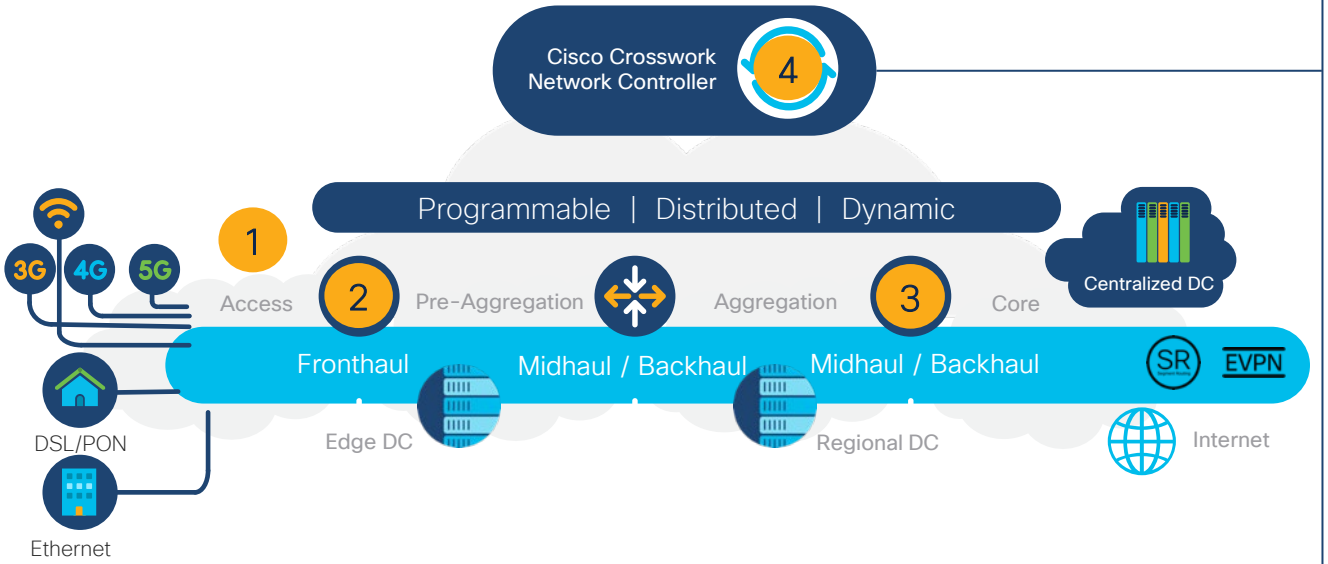
- Enabling Modernized Operation
- Introduction to Crosswork Network Controller (CNC)
- Solution Use Cases Examples and Demonstration
- Conclusion

Cisco Crosswork: Built on Architectural foundation to enable Modernized Operations



Crosswork Network Controller (CNC)

Converged SDN Transport Automation



Challenges

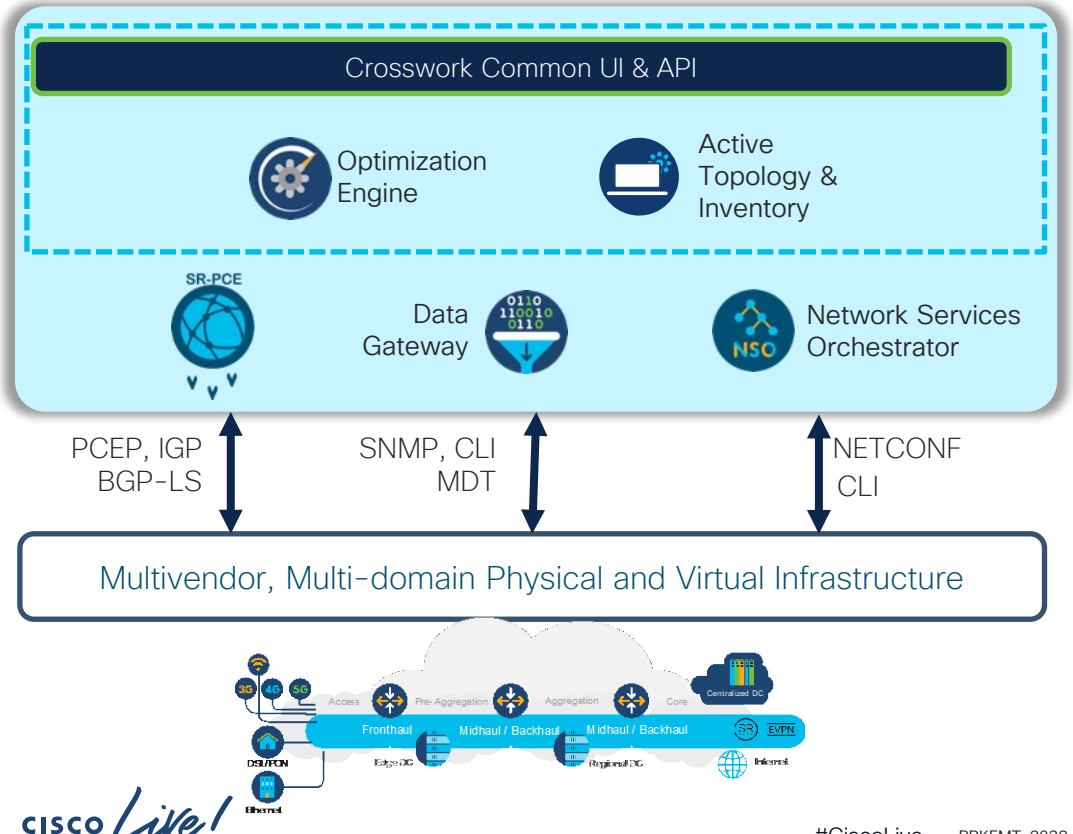
1. Time-consuming Service Provisioning
2. BW swings, over capacity (high capex)
3. Congestion, poor experiences
4. Siloed, ineffective tools (high OpEx)

Outcomes

- Intent-based Automated Provisioning
- Dynamic BW management
- Real time network optimization
- Turnkey solution – across lifecycle

Crosswork Network Controller

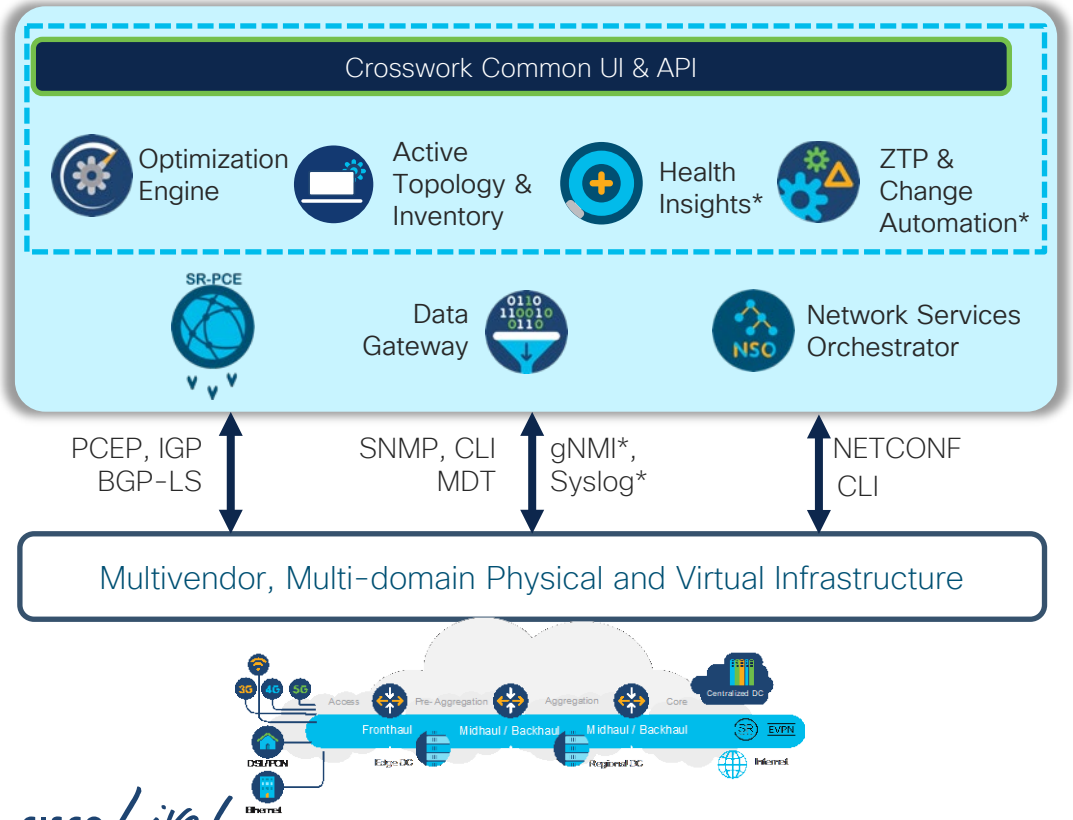
Turnkey solution for deploying and operating IP transport networks



- Service Provisioning (L2VPN, L3VPN)
- Service-Oriented Transport Provisioning (SR-MPLS)
- Bandwidth Optimization
- Real-time Network Optimization
- Topology & Inventory

Crosswork Network Controller 2.0

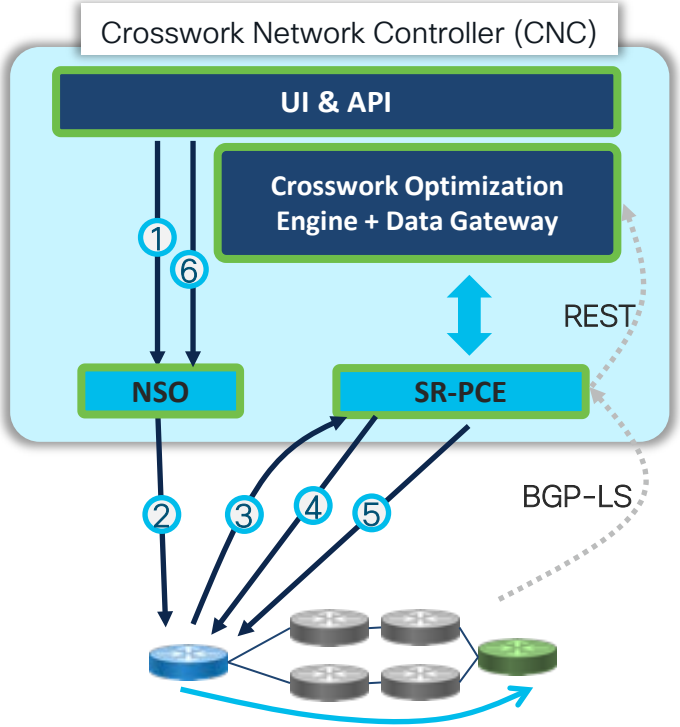
Turnkey solution for deploying and operating IP transport networks



- Service Provisioning (L2VPN, L3VPN)
- Service-Oriented Transport Provisioning (SR-MPLS, RSVP-TE*)
- Local Congestion Mitigation (LCM)*
- Real-time Network Optimization
- Topology & Inventory
- Programmable Closed Loop Automation*
- Network Maintenance*
- Secure ZTP (Day-0)*

*New Capabilities in CNC 2.0 release

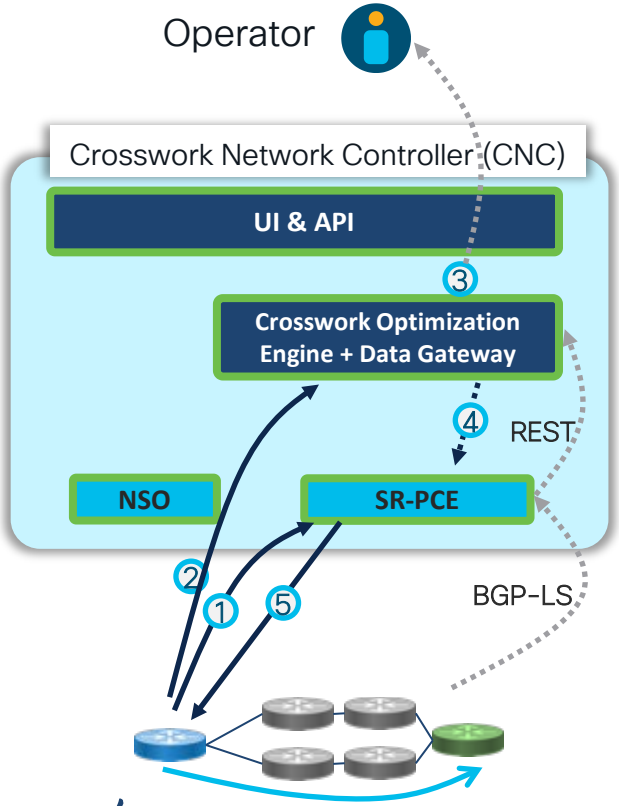
Service & Transport Provisioning



1. User requests a path with SLA (see below)
2. NSO configures SR-TE policy at headend Router
3. Headend requests path from CNC (SR-PCE) via PCEP
4. CNC (SR-PCE) sends path to headend via PCEP
5. CNC (SR-PCE) updates path changes to headend via PCEP
6. User provisions VPN service using such paths, NSO configures PE routers with VPN and binds to SR-TE

SR Policy SLA Objectives and Constraints	
Objective	Latency/IGP/TE Metric Minimization
Constraints	Affinities, Disjoint Paths, Bandwidth

Local Congestion Mitigation (LCM)

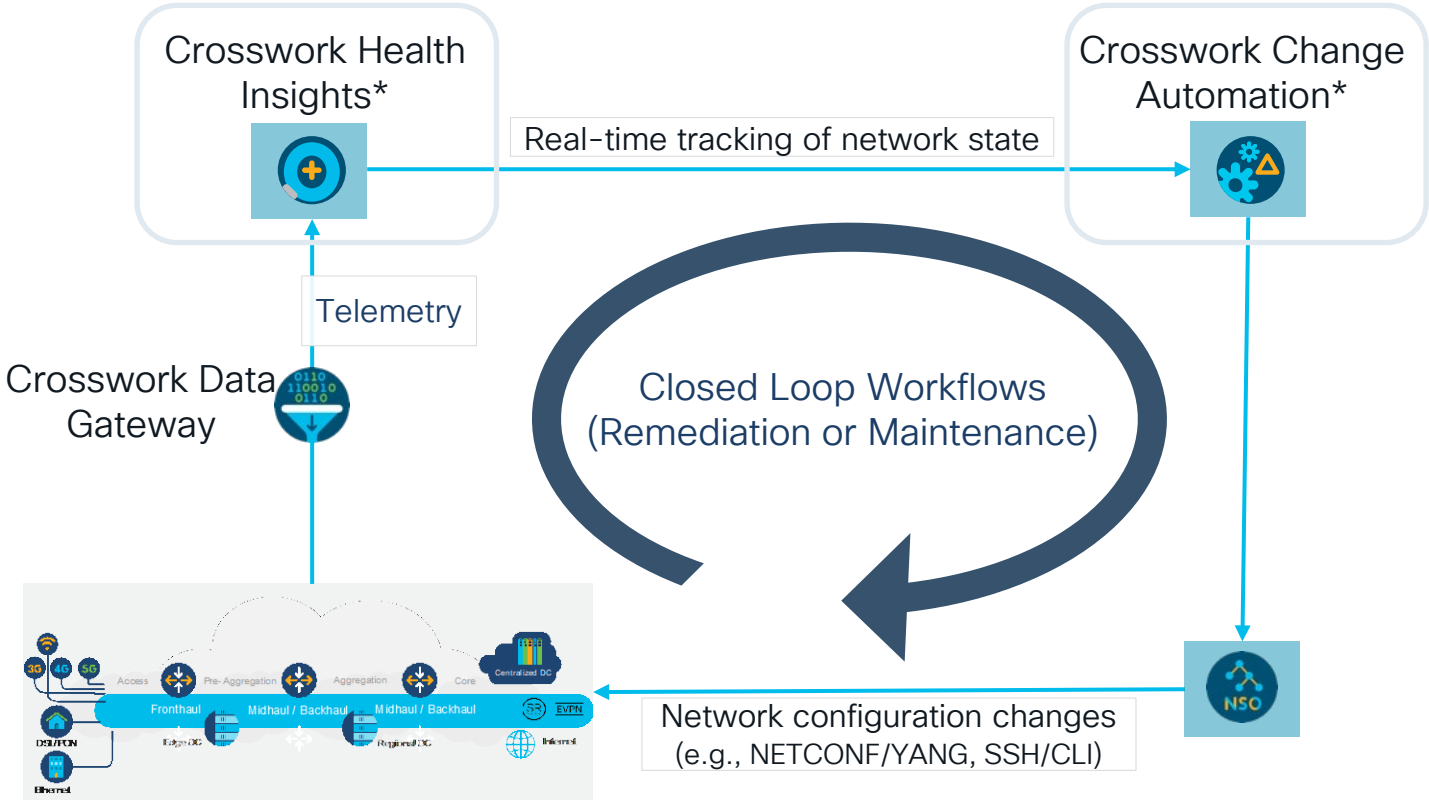


1. Network topology changes tracked by SR-PCE using BGP-LS
2. Crosswork Optimization Engine (COE) tracks bandwidth usage on individual links
3. On detecting link congestion, COE recommends a path to divert some of the best effort traffic using tactical TE (TTE) policy.
4. When operator accepts the recommendation, COE pushes new path to SR-PCE
5. SR-PCE updates headend for the new TTE policy to migrate traffic away from congestion

LCM enables Bandwidth Optimization to be supported across multi-domain networks

Demo

Programmable Closed loop Automation



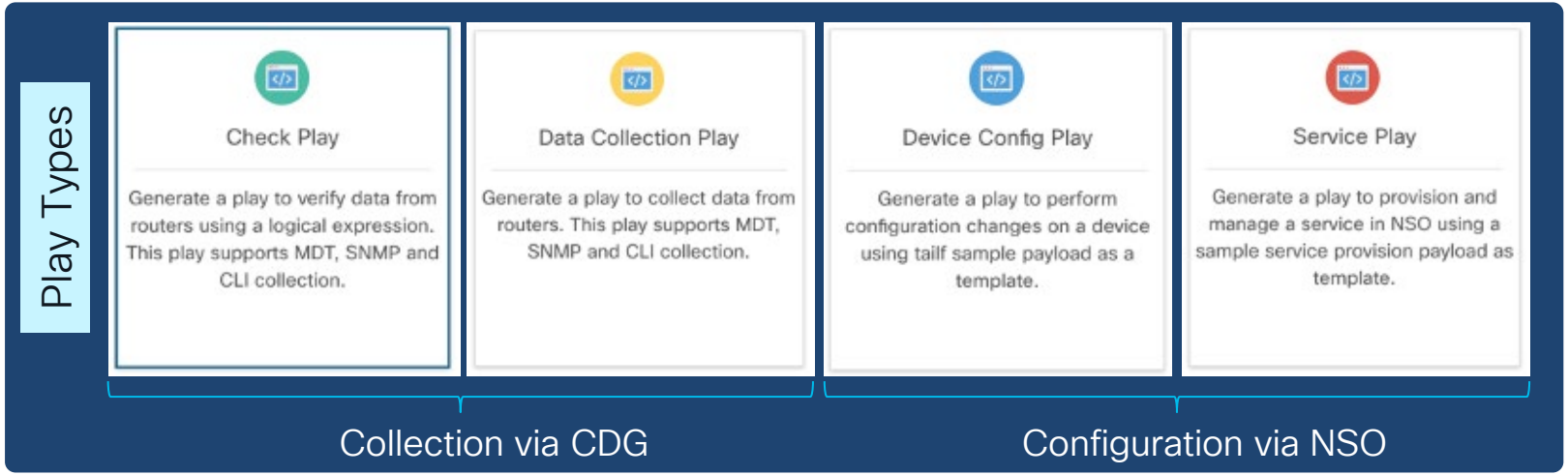
*New Capabilities in CNC 2.0 release

Playbook Generation

Codify and Execute Operational Tasks with Change Automation

Create parameterized Plays* and stitch them into Playbook

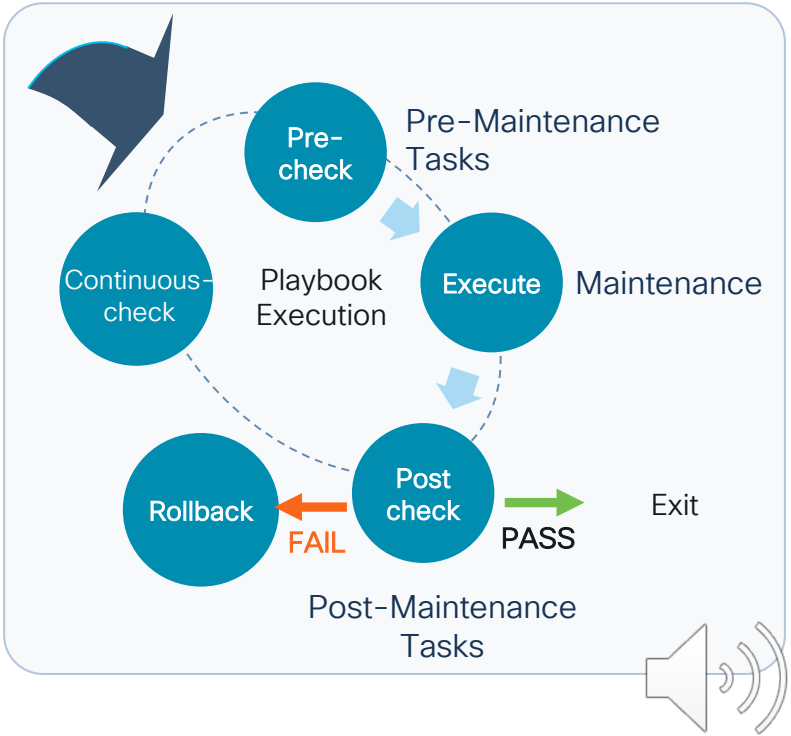
- Enhanced programmability with Register Variables, Conditions and Policies
- Multi-Vendor Enablement with NSO



*New Capabilities in CNC 2.0 release

Workflow Automation Examples

- Cost-out the router (during maintenance)
- Complex device configuration (during network migrations)
- Automated maintenance, e.g.
  - Rapid fluctuation of light level (optical interface) may require interface to be shut
  - Rapid link flaps may require port to be shut
  - BGP Max prefix alert may require operational action
- Software Upgrades



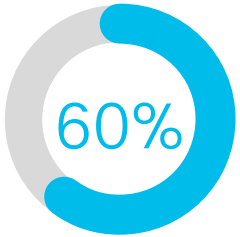
Summary

Cisco Crosswork Network Controller empowers you to modernize network operations across the services lifecycle functions

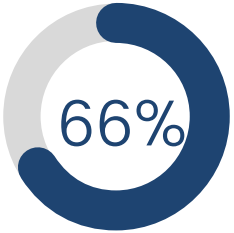
Boost Agility

Improved Service Delivery and End-user experience

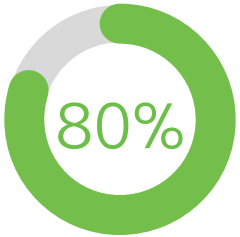
Reduce Cost of Network Operations



CAPEX Savings



OPEX Savings



Faster
Time-to-Revenue

Success Depends on Modernized Operations

The bridge to possible

Thank you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