Optimize the Network: Crosswork Optimization Engine
Cisco Knowledge Network

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Crosswork Network Automation

**Situation Manager**
Connect events from multiple sources together and provide root cause analysis, collaborate on events for resolution.

**Change Automation**
Safely execute operational tasks with structured workflows.

**SON**
Intent based automation for RAN

**Health Insights**
Learn and measure health of network elements.

**Network Services Orchestrator**
Mass scale intent-based configuration across multi-vendor

**Optimization Engine**
Optimize network paths to improve utilization & efficiency (SR-PCE)

**Data Gateway**
On-premise single point data collection

**Network Insights**
Analyze and identify the source of routing anomalies

**Trust Insights**
Track integrity of infrastructure

**Collection of data from Data Gateway**

**Converged SDN Transport**

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Automation is Needed

Too Many...

- Devices
- Traffic
- Threats
- Changes

...paralyze Business Agility

*Our goal:* Deliver outcomes that enable our customers to reduce...

- Mean-Time-To-Value
- Mean-Time-To-Repair
Applications needs have changed
Network operations approach needs to evolve as well
Converged SDN-enabled Network

Service A

Smart City/IoT
AV/VR/Gaming
End/Public Sector Applications
Collaboration Services
Security Services

Service B

Service C

Intent-based Controller

Centralized DC

Internet

Core

Service Chaining

SR Traffic Engineering
SR MPLS or SRv6

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Cisco Crosswork Optimization Engine

1. Define Intent
2. Deploy Intent
3. Analyze Intent
4. Refine Intent

Realtime end-end visibility
Closed-loop Intent-driven Optimization leveraging Segment Routing
Open and Programmable Platform for multi-point integrations
Our solution’s approach

- Capacity Planning
- Traffic Engineering
- Multi-layer optimization
- T-SDN Use Cases
- 5G Network Slicing Admission Control

Faithful Representation of Network

Access, Aggregation, Core
Crosswork Optimization Engine – Product Goals

• Provide a Real-time Network Optimization Engine Leveraging on SR-PCE and WAE (BW-based optimization)
• Graphical User Interface
  SR Policy Visualization
  SR Policy Provisioning
• Open and Programmable
• Core component of T-SDN Controller
• Non-goal: Service assurance
Crosswork Optimization Engine Components

- GUI
- API
- Crosswork Infrastructure Services:
  - Network Model
  - Collection
  - RBAC
  - Logs/audit
- Function Packs
  - Bandwidth Optimization Function Pack
- SR-PCE
- Network equipment
1. Real time Visualization
2. Explicit SR Policy Provisioning

1. User set explicit SR List

2. Provision SR Policy via PCEP
3. Dynamic SR Policy Provisioning

- **Path Computation Objectives:**
  - Min IGP metric
  - Min TE metric
  - Min delay

- **Constraints:**
  - Affinity
  - Disjoint Group
4. Path Compute Delegation

- Path Computation Objectives:
  - Min IGP metric
  - Min TE metric
  - Min delay

- Constraints:
  - Affinity
  - Disjoint Group

Configure SR policy

1. **Configure SR policy**

2. **Path Delegation**

3. **Path Computation**

4. **Computed Path**

5. **Optimization Engine**
5. Bandwidth Optimization

1. User set BW Optimization intent

Optimization Engine

Optimization Computation

BGP-LS
SR-TM

Provision SR Policy via PCEP

Remove SR Policy via PCEP

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6. Class-based Bandwidth Optimization

User set BW Optimization intent

Optimization Engine

Optimization Computation

BGP-LS SR-TM

Provision SR Policy via PCEP

Remove SR Policy via PCEP

Non-critical
Crosswork Optimization Engine Roadmap

Mar 2019
Rel 1.0 EFT
- Realtime topology Visualization
- Static/Dynamic SR Policy CRUD

Jul 2019
Rel 1.0 GA
- Bandwidth Optimization Function Pack
- Multiple SR-PCE

2H2019
Rel 1.1
- Crosswork Data Gateway integration
- NETCONF/RESTCONF based Northbound API
- Multi-layer

RADAR
- Hierarchical controller
- 5G transport controller integration
- SRv6 & FlexAlgo
Demo