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

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

Health Insights
learn and measure health of network elements.

Network Services Orchestrator
mass scale intent-based configuration across multi-vendor

Trust Insights
track integrity of infrastructure

New

Network Insights
analyze and identify the source of routing anomalies

New

Data Gateway
On-premise single point data collection
Reduce Strain and Improve Scale

New

Converged SDN Transport

Centralized DC

Converged SDN Transport

DSL/PON
access
pre-aggregation
aggregation
core

Internet

SR

Centralized DC

TVPRN

Converged SDN Transport

DSL/PON
access
pre-aggregation
aggregation
core

Internet

SR

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

Capacity vs Time of Day for Consumer and Enterprise

Bandwidth vs Time of Day for Consumer and Enterprise

Applications:
- Smart City/IoT
- Cellular Service
- V2V
- Video Broadcast
- Telemedicine
Network operations approach needs to evolve as well
Converged SDN-enabled Network

Intent-based Controller

Service A

Service B

Service C

Aggregation

Core

Internet

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

Crosswork Infrastructure Services:
- Network Model
- Collection
- RBAC
- Logs/audit

Function Packs
- Bandwidth Optimization Function Pack

GUI
API
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
Path Delegation
Path Computation
Computed Path
5. 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

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6. Class-based 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

Non-critical

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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