Visualize, Optimize, and Automate

Use Crosswork Optimization Engine to improve network operations

Network visibility matters

As a service provider, you know that your network architectures are under a lot of stress. And the situation isn't going to get better. By 2022, annual global IP traffic is projected to reach 4.8 Zettabytes.[1] The digital economy depends on networks, and people expect connectivity to be available from anywhere, on any device, so they can access information at any time. You need to be able to see what's going on in your network, so you can determine how well it's operating and if it's supporting your desired business and compliance goals. With visibility into the network, you can identify hotspots in your network and optimize it before they become huge issues that affect users.

The rise of intent-based networking has led to a shift in how networks are planned, designed, and operated. In the past, tools weren't available to declare intent and translate it into the device-level configurations required to achieve a particular outcome. Optimizing the network used to be a manual process. But now with intent-based network optimization tools, it's possible to monitor network behavior, visualize the topology, see segment routing policies, and optimize the network based on criteria you specify.

Contents

The first step

The first step to solving any problem is identifying what the problem is. Crosswork Optimization Engine can provide visibility into your networks, so you can see issues such as congestion in your 5G transport network. Once you have identified the area of congestion, you can take steps to mitigate the issues using segment routing.

Using software, you can optimize for different objectives such as network utilization or latency. For example, suppose that you want to run your network below 80-percent utilization. You can define that intent specifically by creating a policy. The software then tracks transport network activity to ensure your policy is being met. You could set up a segment routing policy that includes or excludes resources, imposes constraints, or defines explicit routing paths. The software continues tracking and reacting to network changes over time so that the limits defined in the policies are dynamically met.

Why optimize?

When you can see what's going on in your network and optimize it, the result is better bandwidth awareness and improved network efficiency. The most obvious effects of an optimized network are a lack of complaints from users. If you have poor connections, slow streaming video, and packet loss, your users are going to tell you about it. And unhappy users tend to tell other people, which leads to a poor perception of your service in the marketplace. In the worst-case scenario, your network problems lead to service level agreement (SLA) or contract violations and the loss of your brand equity.

Obviously, no one wants any of these things to happen. When you optimize your network, you can control and mitigate problems and simplify your operations. If you can minimize events that affect your network, you require less operational capacity to manage the network and can even potentially reduce the number of repairs. By reducing human errors through programmatic and automated optimization, your employees can focus on improving efficiency and streamlining operations instead of dealing with angry users.

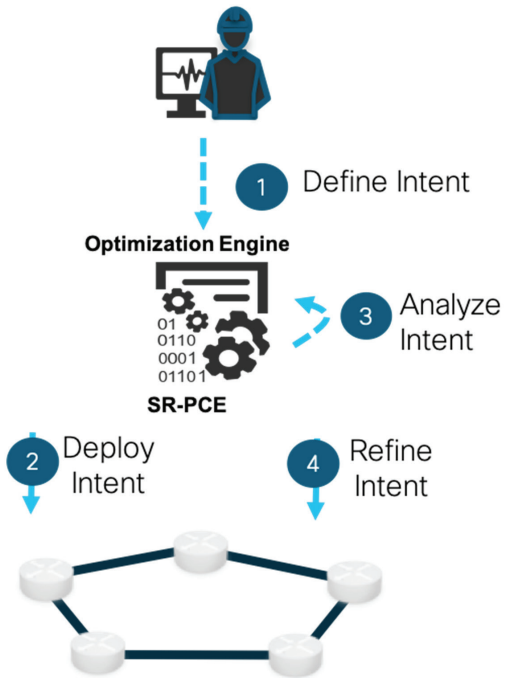
When your customers are happier, your operating expenses (OpEx) go down and your brand equity goes up. And when you are using your network capacity more efficiently, you can lower your capital expenditures (CapEx) and potentially expand your service options.

Another reason to optimize is to maximize the utility of the network resources without increasing the operational risk. Maximizing resources translates to higher return on the investment and can indirectly reduce the CapEx because more revenue could be derived from the existing capacity.

How Cisco Crosswork Optimization Engine works

The Segment Routing – Path Computation Element (SR-PCE) is a feature of Cisco IOS-XR software. The Cisco Crosswork Optimization Engine is an application that complements SR-PCE by providing a user interface and workflow function packs that you use to drive outcomes. It provides real-time network optimization capabilities that help you maximize network utility and improve services.

The Crosswork Optimization Engine displays the real-time network state including topology and traffic information as well as information on segment routing policies and the path the policies traverse through the network topology. In addition, the Crosswork Optimization Engine can be used to create new PCE-initiated policies that have an explicit path or dynamic path. A dynamic path can be computed based on different optimization objectives, such as minimizing an Interior Gateway Protocol (IGP) metric, Traffic Engineering (TE) metric, or delay. The Crosswork Optimization Engine application uses the Cisco Crosswork infrastructure and microservice architecture.



Using Crosswork Optimization Engine, you define your optimization intent, implement the intent, and continuously monitor, track, and react to maintain the original intent. It not only provides network visibility, but it also lets you visualize the network across different layers (optical to IP) and the relationship between each layer.

Crosswork Optimization Engine uses IETF-defined BGP-LS to discover IP networks automatically, with real-time, up-to-date visibility of the network infrastructure so you can see a true representation of the actual topology. Using the hierarchical view, you can define the different levels of granularity in the topology visualization.

How Cisco Crosswork Optimization Engine automates

Crosswork Optimization Engine is designed to be open and programmable with APIs that integrate with other solutions. It also works with Cisco Crosswork Situation Manager and Cisco Crosswork Data Gateway. Together, the applications work in concert to automate a network with each application playing a role. The configuration model is defined and stored and data is collected from the network. You can then visualize that data, find the root cause of issues, and then remediate and re-optimize the network.

As part of the Cisco Crosswork Network Automation suite of solutions, Crosswork Optimization Engine is an integral component in maximizing your network's utility. Teamed together with instant cloud-based SaaS insights through the Crosswork Cloud and other on-prem, multi-tenant, multi-vendor, and multi-domain solutions, Optimization Engine helps round out your complete network automation and orchestration architecture.

Learn more

To learn more about Crosswork Optimization Engine, visit www.cisco.com/go/crosswork.

1. https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white-paper-c11-741490.html