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The bridge to possible

EQUINIX

Site-to-Cloud and Site-to-Site Use Cases with Cisco SD-WAN and Equinix

Contents

This white paper describes how Cisco SD-WAN can be implemented virtually via Equinix Network Edge and connected using Equinix Fabric™ for site-to-site and site-to-cloud use cases. It also provides an outlook for automation and integration innovations coming in the near future.

With applications and workloads moving to multiple public clouds, the rise of the global value chain, and ever-expanding traffic, enterprises are facing increasing challenges to adapt their network to meet today's needs for secured access that scales quickly and efficiently. The pandemic has amplified this challenge with the continuous need for hybrid work arrangements. Cisco® SD-WAN offers a unique capability for enterprises to deploy SD-WAN virtually in minutes via Equinix Network Edge, with the advantage of consistent Cisco product quality, management, and licensing control. Equinix Network Edge is packaged with Equinix Fabric, which provides global metro-to-metro connectivity and a cloud edge to connect to multiple public clouds. By using Cisco SD-WAN with Equinix, you get the best of SD-WAN and global connectivity.

Problem definition

With applications and workloads moving to multiple public clouds, the rise of the global value chain, and ever-increasing traffic, enterprises face the following problems:

- Low-quality connectivity over the public internet across different geographical regions (long delays, significant packet loss, high latency)

- Lack of visibility into cloud service provider backbones

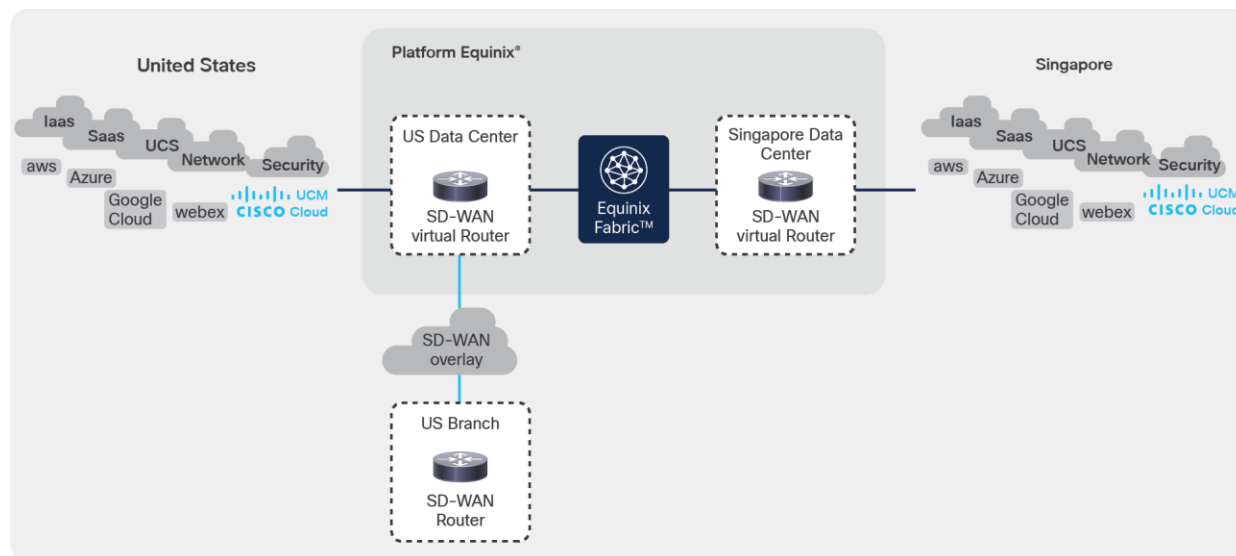- Inability to perform proper application-aware routing across multiple clouds and providers

Figure 1.
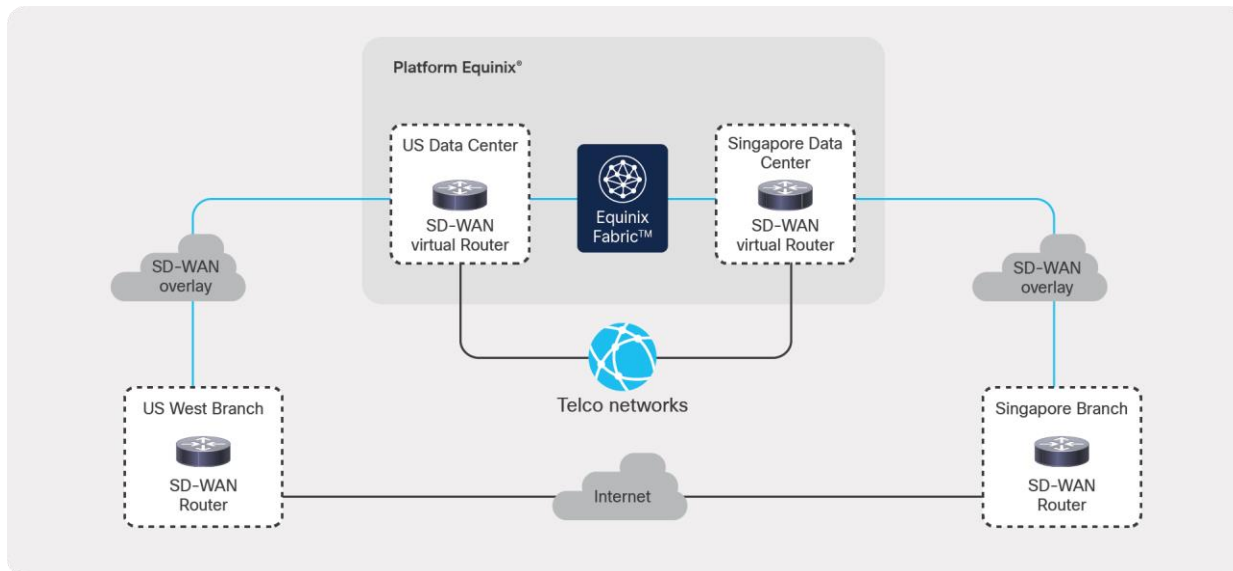Site-to-cloud use case diagram

Figure 2.
Site-to-site use case diagram

## Solution: Cisco SD-WAN with Equinix

Overview

Implementing the solution involves executing the following five simple steps:

1. Create, in Cisco vManage, a configuration template for virtual SD-WAN routers, which will be running in the Equinix facilities.

2. Export the day-0 configuration from Cisco vManage for virtual routers as a .cfg file.

3. In the Equinix Fabric portal, create SD-WAN virtual routers and upload the day-0 configuration in the .cfg file. Once booted, the SD-WAN virtual routers will join your SD-WAN fabric automatically.

4. Now, in the Equinix Fabric portal, you can create point-to-point connections between related SD-WAN routers. SD-WAN routers will establish SD-WAN tunnels over Equinix connections automatically.

5. As a last step, in Cisco vManage configure an SD-WAN control policy to steer the traffic based on your requirements.

Example: Enabling site-to-site connectivity between one branch located in Los Angeles and a second branch in Singapore.

The following screen shot shows how to generate and download a day-0 configuration for SD-WAN virtual routers in Cisco vManage as a cloud-init file.
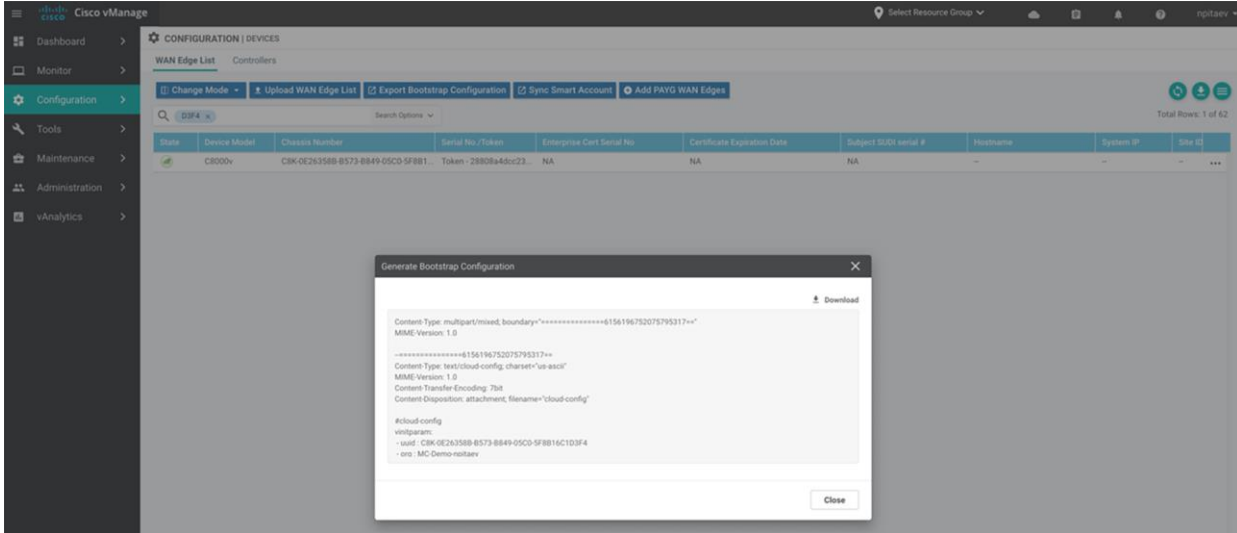
This cloud-init .cfg file with the day-0 configuration contains details such as UUID, token, and SD-WAN configuration, which are needed to join the SD-WAN fabric. You can simply download the whole file and then import it into the Equinix portal as shown below:
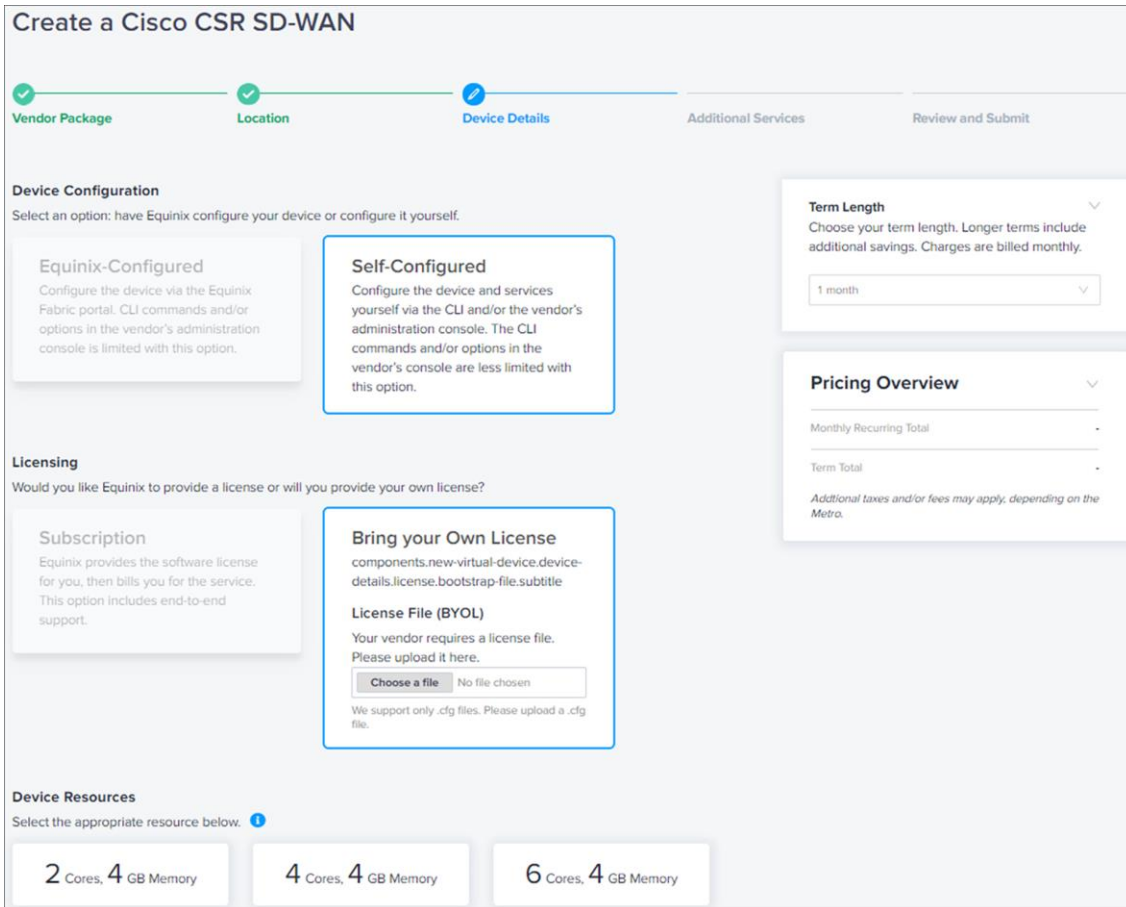
Once you have Cisco SD-WAN virtual routers running in all required Equinix locations and successfully joined to the SD-WAN fabric, you can create dedicated point-to-point links between different locations using Equinix, as shown in the following screen shot:
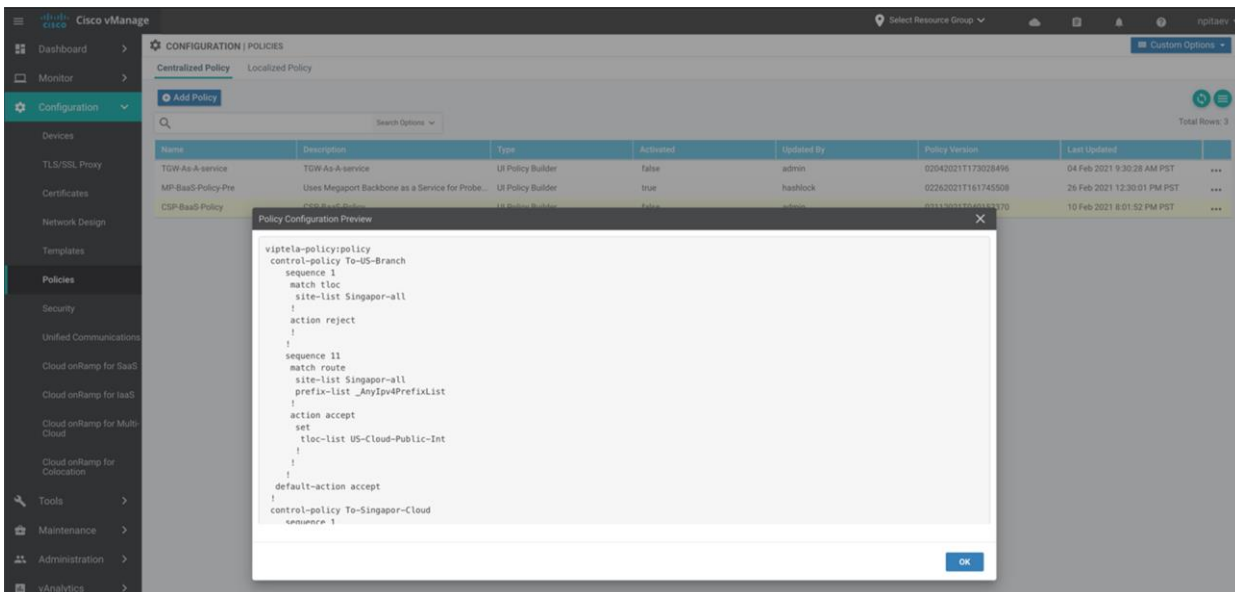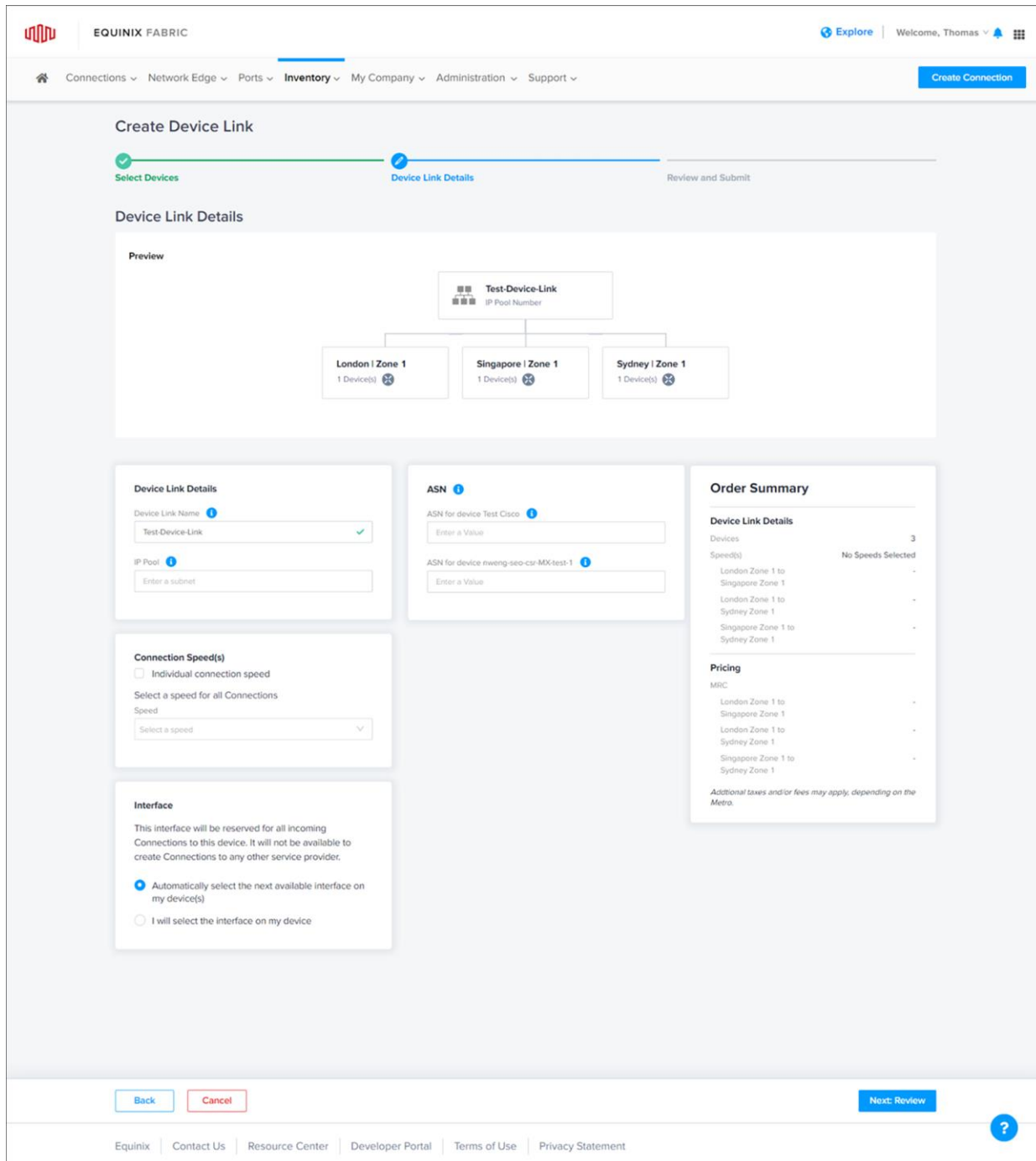

The final step is to create a control policy in Cisco vManage, which will steer traffic as needed.

Packet flow

- Instead of using an SD-WAN tunnel over the public internet between two regions, the packets will be sent from the branch to the closest Equinix data center where a Cisco SD-WAN router is running.

- Then the virtual Cisco SD-WAN router will forward the packets using another SD-WAN tunnel over the Equinix Fabric's global backbone.

- The Cisco SD-WAN virtual router on the receiving side will forward the packets to the final destination.

A simple SD-WAN policy can be used to redirect only critical applications over this optimized path. You can also utilize your telco network contract to supplement Equinix Fabric. Noncritical applications can still be sent to a different region over the public internet.

In the example below, the control policy matches on IP address prefixes for illustration purposes. A traffic data policy can instead match and set the Transport Locator (TLOC) based on critical applications.

Custom automation

All actions in Cisco vManage are implemented with REST API calls, which enables custom automation. For example, use of the device template configuration or SD-WAN control policy on vSmart can be automated.

The best documentation source for API calls into vManage can be found on vManage itself – simply add apidocs to the IP address of your vManage: https://<vManage IP address>/apidocs/
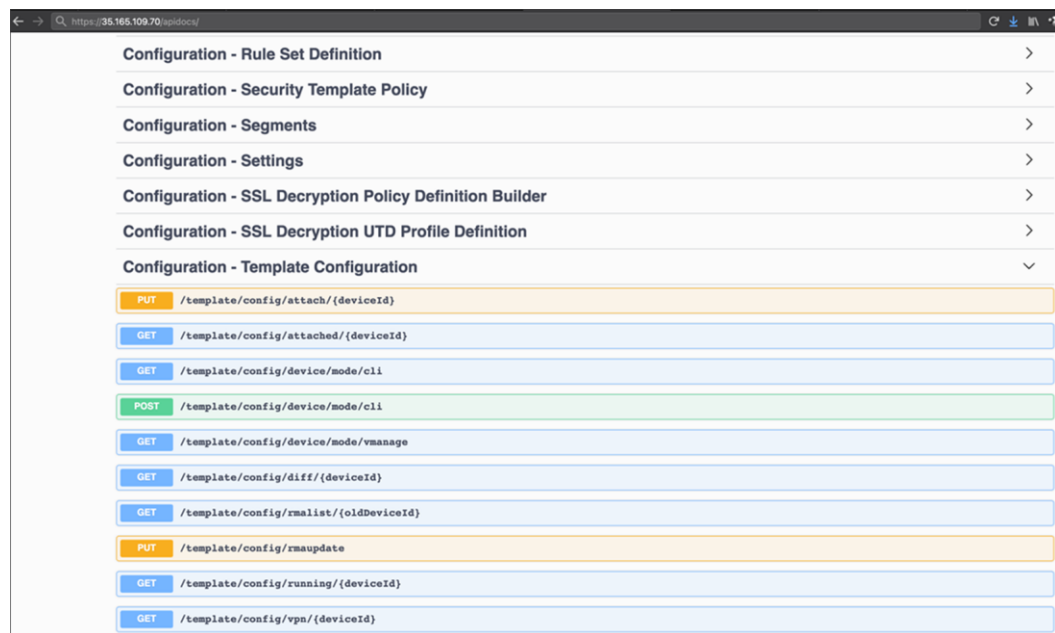
Performance and scale

Cisco SD-WAN virtual routers scale from few hundred Mbps to 10 Gbps or more, depending on VM instance type and feature set used. The virtual router throughput is a function of the number of vCPUs and memory. Currently you can select a Cisco SD-WAN router in the Equinix Fabric portal with two, four, or six virtual CPUs.

If the performance of a single Cisco SD-WAN virtual router is not enough, a horizontal scale model can be used. In this model several virtual routers will be created, and the traffic will be load-balanced across all available routers.

Security

Thanks to Cisco SD-WAN's zero trust model, the whole bring-up process and operation of virtual SD-WAN routers in Equinix data centers has the same industry-leading security standards as every Cisco SD-WAN deployment.

By using IPsec encryption on SD-WAN tunnels over Equinix, we make sure that the communication meets the highest security standards.

Agility - it takes only minutes to go live

The entire setup process takes just a few minutes. By using Cisco vManage to generate a day-0 SD-WAN router configuration and using the configuration during SD-WAN router creation in the Equinix Fabric portal, you will eliminate any manual configuration steps. The new SD-WAN router will join the SD-WAN network automatically within a few minutes.

Outlook

Cisco SD-WAN Cloud Interconnect coming in the near future

This document lists the steps for the configuration through Cisco vManage and the Equinix portal. With Cisco SD-WAN Cloud Interconnect, coming up in a later phase, all of the configurations will be done through the Cisco SD-WAN vManage portal.

Cisco SD-WAN Cloud Interconnect provides a simplified automated user experience to enable programmable end-to-end connectivity from an SD-WAN site to another site or cloud in minutes, with reliable and high-performance connections using middle-mile providers' infrastructure.

Conclusion

The Cisco SD-WAN solution deployed at Equinix offers a cloud-based agile, scalable, secure and service provider-agnostic solution for site-to-site and site-to-cloud use cases today.

The combined capabilities allow you easily spin up an underlay network over Equinix Fabric and use SD-WAN intelligent traffic steering capabilities to route, for example, only critical application traffic to a specific cloud over this path and forward noncritical traffic over the public internet.

Cisco and Equinix are working together to provide automation in a later phase to further simplify the solution.

For more information

Start with a small pilot across a few sites by creating a network using Equinix Fabric and using it as an underlay for Cisco SD-WAN with intelligent traffic control.

Refer to the online documentation and release notes for more information on Cisco SD-WAN, Equinix Fabric and Equinix Network Edge.

Contact your Cisco and Equinix local sales support for details.

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