USE CASE

Enabling Cost-Effective Multi-Cloud Connectivity with SONiC VPP

Overview

As enterprises increasingly rely on a mix of public clouds and on-premise infrastructure, the need for scalable and secure **multi-cloud connectivity** has grown. This use case highlights how a global team built an automated, open, and cost-effective network solution using **SONiC VPP**—demonstrating SONiC's potential as a virtual router across hybrid environments.

The Challenge

1. Complex Multi-Cloud Configuration

There is a growing need in the telco and enterprise markets for multi-cloud connectivity. Enterprises of all sizes, from small to large, have been deploying services not only in their on-premise clusters but also in hypervisor clouds such as Azure, AWS, and GCP.

The challenge begins when enterprises need to connect all these services to achieve their use case goals. To establish multi-cloud connectivity, multiple networking services must be configured, such as IPsec tunnels, BGP, VPN gateways, sub-interfaces, VLANs, and more.

Most enterprises do not have the technical expertise required to complete these tasks manually. Therefore, automating these steps is essential to provide multi-cloud connectivity without added technical complexity.

2. High Cost of Managed Routing Services

Multi-cloud connectivity requires a network device capable of handling the networking protocols that may run between clouds. In most cases, this device is a virtual router that must be implemented across all cloud environments.

When high-throughput connectivity is needed, this virtual router can be provided to the enterprise by the interconnectivity hub provider as a managed service. The cost of such managed services from some providers can range from $1,200 to $1,800, depending on the features the enterprise requires.

It's important to note that, among all the managed services involved in a traditional multi-cloud connectivity solution, this is by far one of the most expensive.

To reduce costs, using an open source network operating system like SONiC could be a beneficial alternative, allowing the enterprise to provide the virtual router service while handling the management in-house. This could **result in cost savings of approximately 30%**.

Solution

The demo was made using the following architecture:

It consists of one on-premise (in Equinix's cloud) SONiC VPP instance that interconnects two public clouds as well as the on premise hypervisor.

All the infrastructure was provisioned using Terraform and the servers were configured using Ansible playbooks.

Monitoring of the SONiC VPP instance was done through the metrics exporter that was included in the SONiC Docker image. This was polled using Prometheus and visualized in a Grafana Dashboard.

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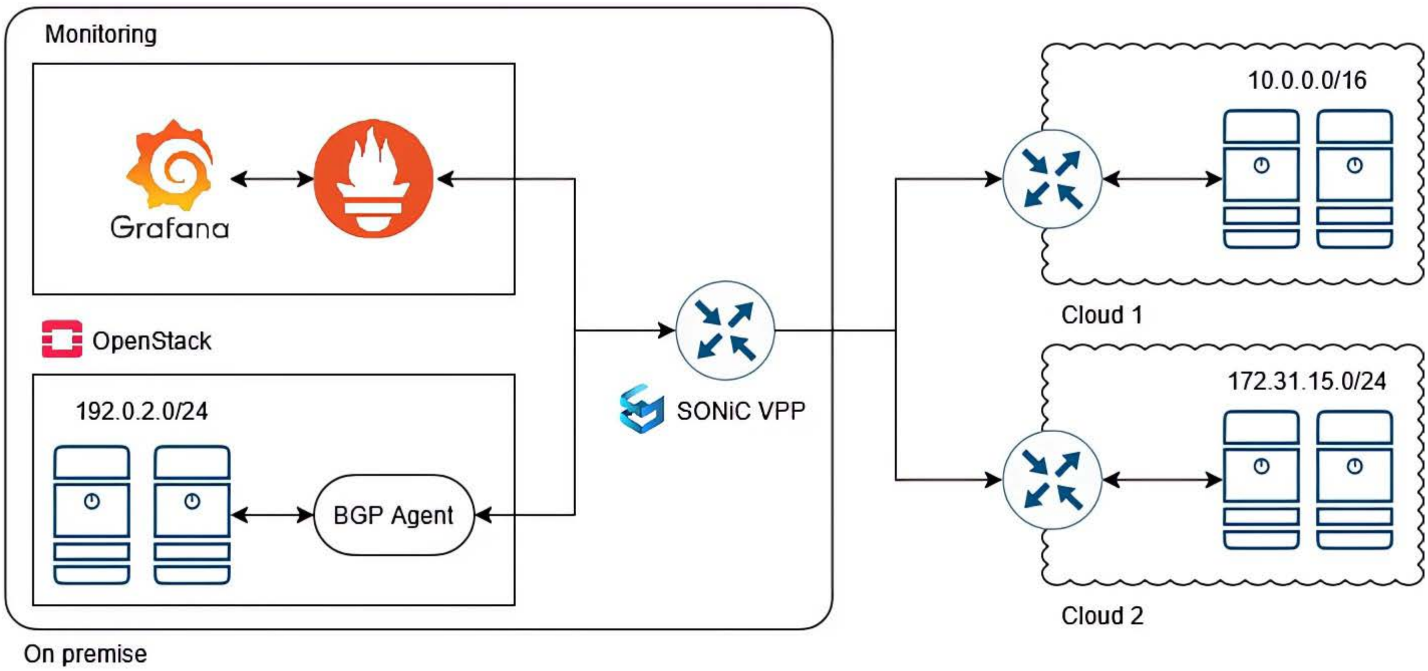
Figure 1: SONiC Demo



Technical Deep Dive

Building the SONiC VPP Docker Image

The key components for this use case were the SONiC VPP Docker image and the correct configuration of the multi cloud connectivity.

We first started by building the SONiC VPP Docker image. There is an existing Github repository with the tools to build the Docker image, however, when we started working on the project, it was not well maintained. We had to debug the build process step by step and fix any issues that were raised. We had to change lines of code, template files and old URLs for the build to be successful.

Multi-Cloud Connectivity Setup

Once we had a functional SONiC VPP Docker image, we had to troubleshoot the connectivity between the different environments that were involved. The correct configuration of the Equinix servers and public cloud connectivity were important to be able to bring up the desired topology.

As a global team working on this project, we had to have very good communication so that every team member was updated on what needed to be done. Every team member was important for the development of this use case, as everyone had different areas of expertise and something new to contribute.

Benefits & Use Cases

- To address the first challenge, we've developed an automated system that simplifies multi-cloud connectivity deployment. Our solution uses Terraform and Ansible to configure a high-throughput topology that connects two hypervisor clouds and an on-premises OpenStack cluster. It automates the setup of essential networking components such as virtual interfaces, VLANs, SONiC BGP, OpenStack VMs, the OpenStack BGP agent, and the multicloud networking services required by hypervisor clouds—eliminating the need for manual configuration and reducing the technical burden on enterprise IT teams.
- To address the second challenge, we use SONiC's virtual router feature on top of a virtual machine to implement all the required networking configurations, avoiding the need to use the managed interconnect hub virtual router service.

Next Steps and Get Involved

The team plans to further explore:

- **SONiC VPP with Mellanox NICs.**
- **Integration with memif interfaces.**
- **Additional IPSec-enabled topologies** across public and private clouds.

These new use cases could expand the areas of application for SONiC VPP in different industries.

To know more about the project or collaborate with us, please contact Michel Ramirez (michel.xw95@gmail.com), Julio Shin (julio.e.shinjo@gmail.com) or Vivek (vivekananda.muthukrishnan@gmail.com).

Join SONiC

Become a SONiC member to collaborate, learn and shape the future of the Open Network Operating System.

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