AWS/Verizon Secure Cloud Interconnect and LTE Design

LIGHTSTREAM

Integrity in Relationships. **Integrity** in Technology.

Customer:	Energy Company
Objective:	Design, planning, and implementation of private cloud interconnect into customer MPLS WAN environment
Solution:	AWS EC2/VPC with Direct Connect, Verizon MPLS with Secure Cloud Interconnect, Verizon LTE with Private Wireless Gateway
Location:	Denver, CO
Industry:	Energy, Solar Energy, Distributed Energy Resources

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> "Lightstream came in, explained how to interconnect our wireless, wireline, and cloud networks. They steered us clear of problems we didn't even know existed and which we would have spent multiple weeks troubleshooting to try to resolve. They just knew what to do, and they did it. They took us from concept phase to a fully operational dev environment in a matter of days."
>
> **- Energy Company CIO**

Background

A leading next-generation manufacturer in the energy industry (referred to hereafter as "Energy Company") provides both software and hardware that enables rapid connection of grid-ready distributed energy resources – specifically residential solar power systems. Energy Company makes use of IoT and Verizon LTE technologies to remotely monitor, manage, and provide telemetry on installed hardware. Energy Company provides these services to solar power providers and local power companies.

The Problem

Energy Company requires the capability to gather remote telemetry from numerous distributed energy nodes and provide real-time analytics on that data. The solution needed to be highly scalable and elastic in order to support the amount of change resulting from the sale of a large block of new devices associated with a new wholesale customer / energy provider. Traditional data center-based architectures are generally ill-equipped to handle such sudden increases in scale, so Energy Company needed a better solution.

The Technical Business Case

Energy Company selected Amazon Web Services ("AWS") Elastic Cloud Compute ("EC2") infrastructure to be able to deploy analytics

software with a high degree of elasticity and scalability. The purpose of the software is to gather unit telemetry data and provide real-time reporting back to both Energy Company's solar and local power company customers. This required communication between modules installed on solar power systems and the analytics platform in EC2.
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The solar panel modules connect to a private machine-to-machine ("MTM") network over Verizon's wireless LTE infrastructure. The objective of the project was to configure secure bidirectional communication between as many as 4,000 devices on the Verizon MTM network and the EC2 environment. In order to ensure end-to-end Quality of Service ("QoS") and data integrity, two network interconnects would be required. First, connectivity between the modules and Energy Company's private MPLS network required a private wireless gateway (PWG) between the Verizon private LTE network and the Verizon Private IP MPLS

Verizon SCI Diagram
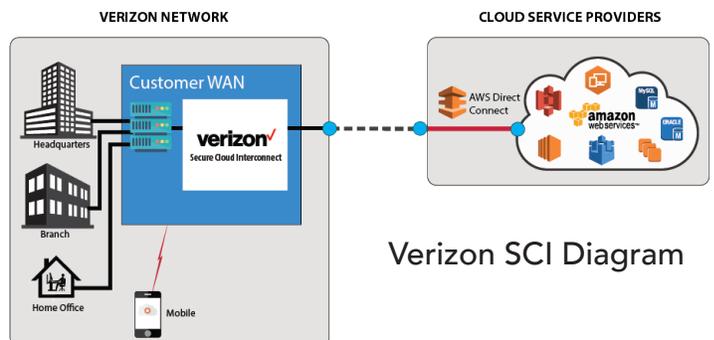
network. Next, in order to ensure dedicated and secure connectivity between the MPLS WAN and the AWS EC2 environment, Energy Company desired to utilize Verizon's Secure Cloud Interconnect ("SCI"), a rapid-deployment SDN interconnection between the Verizon MPLS network and numerous Cloud Service Providers ("CSPs"), including AWS. The PWG and SCI tie the end station modules, the Verizon LTE network, the Verizon MPLS backbone, and the EC2 infrastructure into a single end-to-end, secure, private network.

Why Lightstream?

Lightstream is the only organization that has depth of experience with both CSP and network provider service offerings as well as the capability to interconnect the two. Verizon SCI product management contacted Lightstream for assistance with pre-sales discussions with Energy Company to explain the complexity of the solution as well as for assistance in deployment of both the Verizon and non-Verizon components of the solution.

Lightstream's cloud and network architect teams assessed Energy Company's existing environment and the project technical requirements and validated SCI as the correct solution for interconnectivity.

Solution

Specifically, the expected bandwidth consumption per device is estimated to be very low, necessitating a consumption-based rather than flat-rate bandwidth model, making SCI an ideal choice. The team then presented the end-to-end solution proposal to Energy Company along with an implementation plan.

Finally, Lightstream engineering worked with both the Verizon Wireless and Verizon SCI teams to configure and deploy both the PWG and SCI interconnects. Lightstream assisted Energy Company in designing an IP schema for the MTM network and a tier dev/staging/production environment in AWS deployed across three disparate Virtual Private Clouds ("VPCs"). Lightstream then configured the Virtual Private Gateway ("VPG") and the Direct Connect in AWS to accept virtual connections from the shared Verizon SCI. The dev VPC was then associated with

the VPG to allow Energy Company to test the environment with live end-station modules prior to rolling the solution into production. Finally, Lightstream trained Energy Company's IT organization in the process to associate the VPG with either staging or production VPCs as the project progresses toward live production use. Upon completion of the proof of concept phase, Energy Company will deploy additional virtual connections from each VPC to the SCI, to support concurrent segregated traffic flows between Energy Company and all three VPCs.

Results

Lightstream's principal value throughout the project was to steer Energy Company through the challenges of interconnectivity between multiple disparate network and cloud platforms to be able to present a single end-to-end solution to the business that is scalable, elastic, and supportable. Lightstream's network and cloud architecture teams designed the solution, wrote the implementation plan, and deployed the design into a dev environment for the proof of concept phase. The end result married three disparate networks, including the Verizon Wireless LTE infrastructure, Verizon's MPLS backbone, and AWS' Direct Connect, to ensure functionality across the end-to-end data path. Finally, Lightstream trained Energy Company's IT organization to be able to transition the environment to staging and ultimately to full production.

Customer Benefits

Energy Company benefitted from Lightstream's ability to work with multiple CSP and network providers and provide a seamless solution. Lightstream designed a solution that met Energy Company's scale and elasticity requirements and then configured and deployed the entire solution framework. With the connectivity / cloud architecture in place, Energy Company was able to rapidly turn its development teams lose to deploy the application, first in a POC environment, and then to production – all in a fraction of the time required for typical data center solutions, and without the headache associated with interworking technologies from disparate providers.