Customer Spotlight

Controlling and securing highly-regulated data center infrastructure with SaltStack automation.
Contents

3 Introduction
3 Cyxtera SRE Use Case Overview
4 Building an Infrastructure Factory
5 Automating Network Control
6 Achieving Continuous Compliance
7 The SRE Automation Trifecta
Introduction

Since its creation in 2011, SaltStack has become a power tool of choice for skilled site reliability engineers (SREs) around the world. This is, in part, because SaltStack is built on three core capabilities—remote execution, state management, and event-driven automation—which together provide the flexibility, speed, and system intelligence SREs need to truly "automate themselves out of a job."

This paper will explore how the SRE team at Cyxtera uses the SaltStack automation platform to control and secure all 57 of their worldwide data centers and the networks that connect them.

Cyxtera SRE Use Case Overview

Delivering secure, compliant infrastructure and networking for 57 data centers.

"Cyxtera SRE helps developers release products as quickly as possible and then, by the same stroke, provides operations with extensible platforms that are documented, secure, and as automated as possible with best-of-breed tools."

Zach Hilliard
Sr. Director of SRE at Cyxtera

Cyxtera is a data center and colocation provider that delivers security-integrated infrastructure and network services to more than 3,500 organizations around the globe.

While the site reliability engineering discipline at Cyxtera is still evolving, its primary objectives are to:

- Provide infrastructure to support all of the hardware, software, and services running in each of Cyxtera’s 57 data centers.
- Improve operational efficiency by shifting workloads left where possible.

The team is currently made up of a small group of highly-skilled SREs who must use best-of-breed automation to amplify their impact and deliver the reliability and security required by internal and external customers alike.

Selecting SaltStack

Zach Hilliard, Cyxtera Sr. Director of SRE, and his teammate, Johnny Cook, were originally introduced to SaltStack while searching for a full-lifecycle configuration management tool when they were working at Verizon. While they were immediately impressed by its simple YAML-based state system for infrastructure as code, they soon realized that configuration management was just one of many uses for SaltStack.

The true value of SaltStack for their team, they discovered, was in its powerful remote execution system.
This became evident not long after deploying SaltStack when a critical Linux vulnerability was disclosed and the security team required that every server be audited and patched immediately.

At the time, the company still had a large Puppet deployment and Zach and Johnny needed to decide quickly which tool they would use for the work. They determined that, based on Puppet’s process for applying configuration, it would take approximately four hours to update every machine and they would still need to confirm patch application.

With SaltStack they would simply run a command that asked every machine if a certain version of SSH was installed and, if so, patch it. They would then run a subsequent check to confirm the version of each machine and output a report for leadership. Using this approach, they remediated the critical vulnerability and confirmed the status of every machine in the data center—all in under ten minutes.

Since then, Zach and Johnny have brought their experience with them to Cyxtera where they now use SaltStack to control and secure their highly-regulated infrastructure and networks.

"You can't wait for scale to be your catalyst for automating. If you’re waiting for the scale monster, the scale monster will eat you. You have to be prepared from day one."

Zach Hilliard
Sr. Director of SRE at Cyxtera

Building an Infrastructure Factory

For the Cyxtera SRE team, supporting Cyxtera’s high-performance platform means using SaltStack automation to create infrastructure that just works.

When the business needs to deploy 500 nodes in a data center, Cyxtera SRE uses SaltStack event-driven orchestration to provision an initial set of VMs, lay down a compliance baseline, configure appropriate firewalls, and start all necessary dependencies and services—all with the push of a button.

SaltStack automation gives them confidence to meet the growing needs of the business with fast, reliable, and secure infrastructure—whether they need to deploy 500 servers or 50,000.

Shifting workloads left

To achieve Cyxtera’s goal of shifting workloads left, they use the SaltStack state management system to define infrastructure as code and the automation that allows a developer to be up and running on a production-identical environment on day one.

By abstracting away the underlying infrastructure with SaltStack, the SRE team removes a developer’s need to think about their infrastructure, freeing them to deliver products faster. At the same time, this allows the SRE team to shift more application security ownership and expectations to the developers.
Automating Network Control

In addition to SaltStack's versatile infrastructure automation, it is also a powerful platform for managing networks.

Johnny Cook, Cyxtera SRE's network expert, prefers SaltStack over other network automation tools because of its ability to abstract away individual network device component nuance, its use of proxy agents (the Salt Proxy Minion) to provide constant visibility and control without running an agent on box, and because he can use SaltStack remote execution to run commands on a network device just as he would on a server.

SaltStack gives the SRE team complete control of every network device from ZTP to the day it’s turned off.

Instant audit and visibility

SaltStack also allows the SRE team to audit their entire network, or a target group of devices, and collect information with a few simple commands. They no longer need to ask the full network operations team to confirm a setting on devices across the farm.

Supported Network Vendors

SaltStack Architecture
Achieving Continuous Compliance

As a data center and colocation service provider, Cyxtera must not only maintain its own high security and compliance standards, but also meet the compliance requirements of its diverse customer base. Cyxtera tasked the SRE team with creating and enforcing compliance profiles such as PCI, HIPAA, NIST, and many more, to satisfy customer needs.

The challenge they found in achieving this was twofold. First, they needed to build and maintain policies based on hundreds of pages of standards and policies that were constantly changing. And second, even if they were able to keep various policies updated, the success rate of applying them varied depending on which team was doing the work and which tools they were using.

This led to inconsistent levels of compliance and a lack of visibility across the data centers.

Cyxtera had already battle-proven the ability of SaltStack to control their diverse infrastructure. So when SaltStack released SaltStack SecOps, an add-on module for compliance and security, Cyxtera SRE chose to use it to tackle their challenges and deliver continuous compliance across their data centers.

Establishing a baseline

SaltStack SecOps includes a library of pre-built, CIS-certified compliance profiles that the Cyxtera SRE team uses to lay down a compliance baseline on every machine they deploy. Because the compliance content is maintained by SaltStack, they never need to worry about tracking down and updating the latest changes and additions to a profile.
Building custom profiles

In addition to standard CIS profiles, Cyxtera SRE also utilizes SaltStack SecOps to build customized compliance policies for PCI, HIPAA, NIST 800-53/171, and more.

They are also able to set exceptions and rules for specific machines, as needed.

Global compliance scanning

Once they’ve defined their policies, the team can create target groups of machines across any of their 57 data centers and scan them to quickly understand their current compliance status.

For example, if an insurance customer is utilizing Windows servers in the San Jose data center, the SRE team can use the SaltStack targeting system to target specific machines and scan them against a pre-defined PCI profile.

When the scan comes back it not only identifies vulnerabilities, but provides the automation action SaltStack will take to remediate. This allows the team to verify and test the action before it is run.

Remediating compliance and vulnerabilities

SaltStack provides remote execution, state management, and event-driven automation to control infrastructure. SaltStack SecOps uses these same core capabilities to remediate compliance issues and vulnerabilities.

Now, instead of manually making changes, Cyxtera SRE uses SaltStack SecOps built-in, automated remediation to fix issues fast and at scale.

Once issues are resolved, the Cyxtera team has a central system of record with dashboards their leadership team can use to understand the real-time compliance status of all of Cyxtera’s 57 data centers.

The SRE Automation Trifecta

By providing powerful solutions for infrastructure, network, and compliance needs—along with flexible automation capabilities—SaltStack empowers the Cyxtera SRE team to deliver secure, optimized systems that drive business forward.
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