Princeton University Slashes Network Deployment Times by 95% with Automation

The Customer: Princeton, A Legacy of Scholarship and Innovation

Princeton University, one of the oldest most respected universities in the US, is regarded as one of the world's most illustrious higher education institutions.

It enrolls over 8,400 students and is associated with some of the world's most iconic achievers such as Albert Einstein, Jeff Bezos, and James Madison.

As a leading research university, Princeton boasts connections to 79 Nobel Prize recipients and 17 National Medal of Science recipients.

The Challenge: Princeton's Race to Upgrade the Network

Princeton University's expansive network infrastructure spans numerous research buildings, academic halls, and extensive dormitories, demanding robust connectivity for both research and student life. Upgrading even minor network segments was a time-consuming logistical challenge due to the extensive data collection, design and configuration requirements. Significant upgrades were even more burdensome, requiring the university to divert engineering staff from their primary responsibilities to focus solely on modernizing the network.

The situation reached a critical point when 26 campus buildings needed a complete transition to a new vendor's equipment on a tight deadline. The effort required by the massive project demanded over forty hours of effort per building. In its entirety, the project necessitated over 1,000-hours of effort. Critical personnel would be pulled away from ongoing maintenance, security updates, and user support, potentially jeopardizing network stability and delaying other IT initiatives.
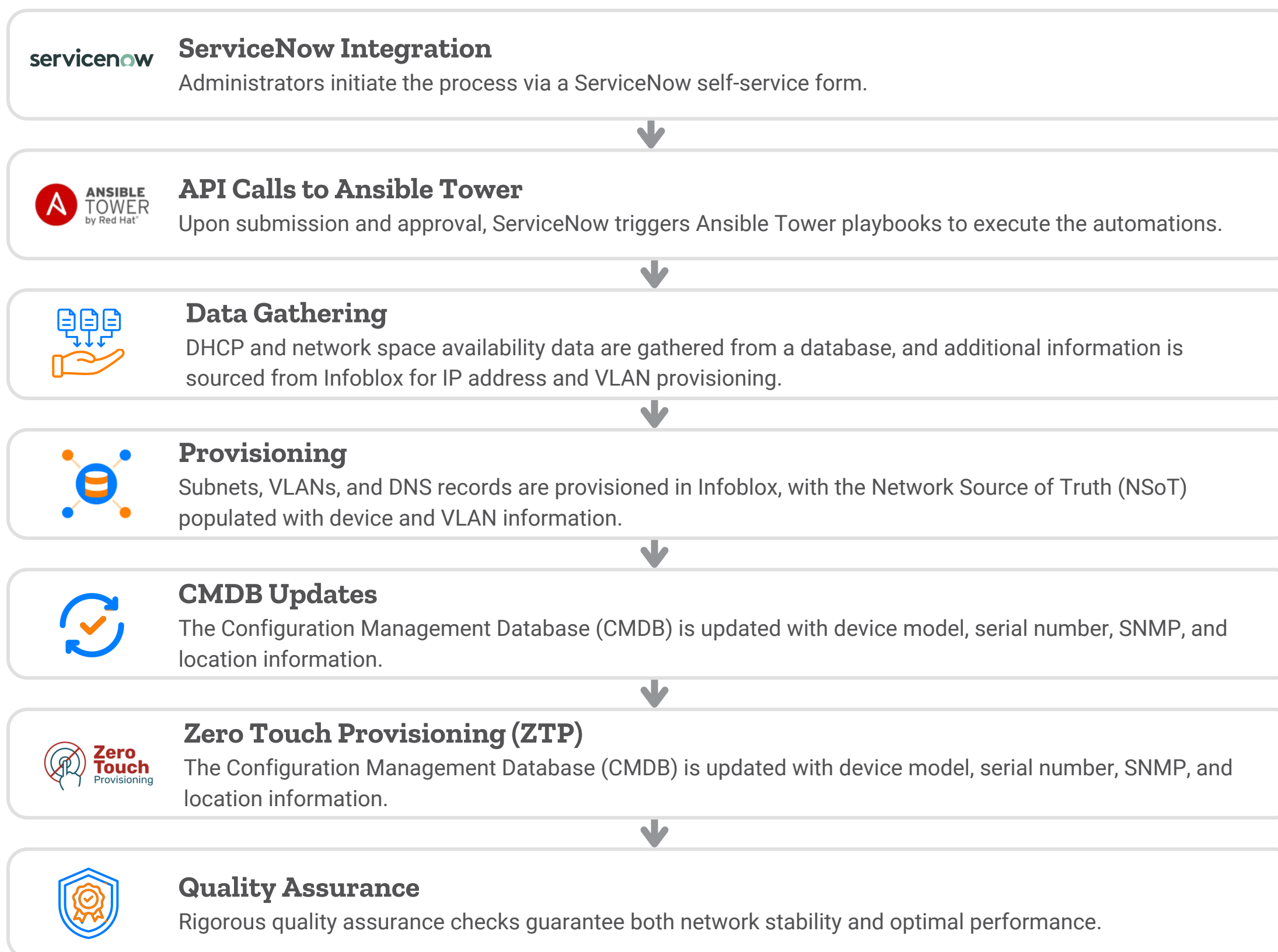
Associate Director Networking Services

"NTC was instrumental to our success in automating building upgrades on our campus"

The Solution

Princeton partnered with Network to Code to use network automation to slash the manual labor and ensure efficient upgrades for both this critical project and future needs. The solution created a fully automated approach to deploy and provision the new network equipment. The automated process begins seamlessly with a ServiceNow self-service form where administrators enter basic information about the campus building. From there, automations handle the rest.

Automated Deployment and Provisioning:

ServiceNow Integration
Administrators initiate the process via a ServiceNow self-service form.

API Calls to Ansible Tower
Upon submission and approval, ServiceNow triggers Ansible Tower playbooks to execute the automations.

Data Gathering
DHCP and network space availability data are gathered from a database, and additional information is sourced from Infoblox for IP address and VLAN provisioning.

Provisioning
Subnets, VLANs, and DNS records are provisioned in Infoblox, with the Network Source of Truth (NSoT) populated with device and VLAN information.

CMDB Updates
The Configuration Management Database (CMDB) is updated with device model, serial number, SNMP, and location information.

Zero Touch Provisioning (ZTP)
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Quality Assurance
Rigorous quality assurance checks guarantee both network stability and optimal performance.

The Results

This enhanced administrative workflow enables Princeton to rapidly update buildings. With automations handling the heavy lifting, the entire campus-wide upgrade project was completed in under 40 hours, resulting in more than a 95% reduction in manual effort. This solution frees up valuable time for the network team to pursue strategic initiatives and focus on their primary responsibilities.

Complementing the already massive time savings, programmatic execution also ensures that all records in IT management systems are updated accurately and configurations are free of human-induced errors. This further benefited Princeton's network team as less time is spent troubleshooting devices as they come online and addressing latent faults in the future.

Looking Ahead

Princeton plans to leverage automation to enhance its monitoring and analytical capabilities. A telemetry solution is currently under consideration, building upon their existing array of monitoring tools. This solution aims to centralize monitoring operations and introduce a highly efficient data querying and manipulation language for improved efficiency and effectiveness.