Jio Propels India to Top in Mobile Broadband Consumption by Automating World's First All-IP Network with Cisco

Jio's vision

Reliance Jio (Jio) has launched one of the world's largest 4G LTE network startups, aimed at changing the lives of 1.3 billion Indians and propelling India into a global leadership role in the digital economy.

This revolutionary launch, in partnership with Cisco, aimed to build a first-of-its kind, 5G-ready network, transforming the digital services space and creating an ecosystem of network, devices, applications, and content at affordable cost. The launch revolutionized the Indian mobile communications landscape by offering voice calls to Jio customers absolutely free, across India, to any network at any time for life. This launch propelled India to number one in mobile broadband consumption by automating the world's first all-IP network.

Jio scale: the world's largest all-IP network, powered by Cisco

Groundbreaking scale

- Jio onboarded 160 million 4G subscribers in a record time of 18 months
- Over the past year, the network has nearly doubled, to 2.5 exabytes, and by the end of 2018 it will scale to 6.5 exabytes and have scaled to more than 250k Cisco® routers. With this expansion, Jio will cover 99 percent of India's population, at the lowest cost per gigabyte globally

Architecture for affordable scale

First and largest exchange-to-exchange all-IP network in the world, from cell site to data center, delivering the most affordable services to the Indian population.

Jio in minutes: SIM activation at scale

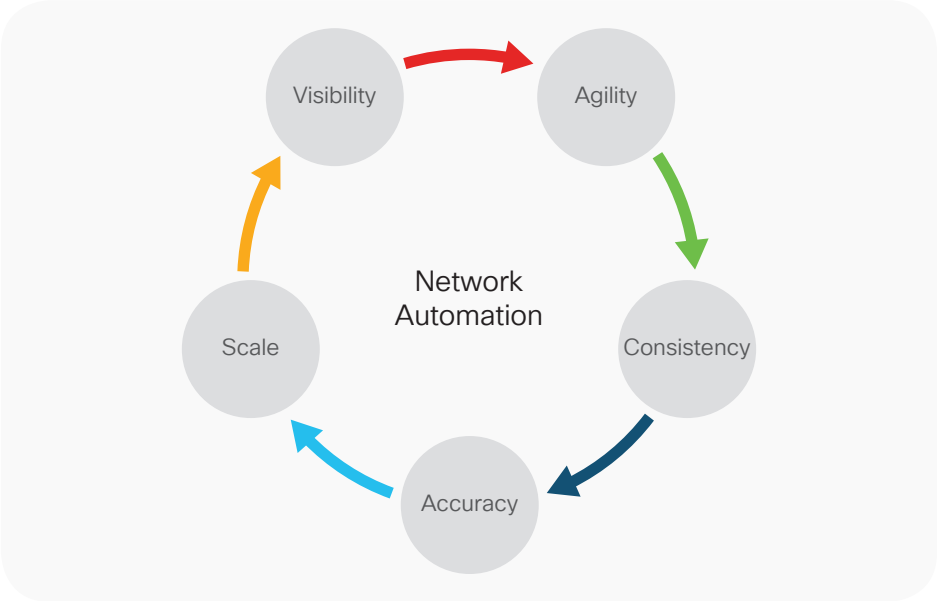
With this launch, Jio also announced a completely new process of mobile SIM activation for Jio customers. Whereas SIM activation previously took three to five days, Jio announced that SIM activation will occur within 15 minutes after you get a Jio welcome offer SIM. This SIM activation process is known as Jio eKYC SIM activation and is done using an Aadhaar card.

Aadhaar card digital data document verification (like fingerprint and iris verification) is done at Jio stores. This is another Jio first of reducing the time for a customer to be onboarded onto the network at Jio speed, the largest SIM activation movement globally.

The need for automation

This launch was the first time globally that a network of this size, scale, and capacity was being rolled out. Deploying network elements, integrating the network, activating services, onboarding subscribers, and managing network operations and service uptime could only be achieved with mass-scale automation. The complete lifecycle management of all the building blocks of an IP/MPLS backhaul network had to be automated to minimize human efforts and errors. (See Figure 1.) The Jio automate initiative was crucial to transparent buildout, integration of various network elements, onboarding of subscribers, and operating the network to provide uninterrupted network coverage and service to all subscribers. Built on the following primary tenets, the whole network was built extremely rapidly, resulting in a faster time to market.

Figure 1. Key building blocks of mass scale automation framework



Cisco network automation platform

Designed and built for Jio scale

To accelerate rollout of the network, Cisco developed a modular, microservices-based platform for network buildout, integration, and operations digitizing tasks, including but not limited to:

- Device onboarding (Zero-Touch Provisioning [ZTP])
- Device installation and commissioning
- Installation quality testing
- Device integration with the network
- Service activation
- Pan-India view of topology for more than 150,000 IP infrastructure devices
- Integrated view of fault and performance dashboards

This platform has enabled Jio to digitize configuration of devices based on golden templates, automatically onboard and integrate cell-site routers after installation, minimize human intervention, and eliminate errors during integration along with automated acceptance testing and remediation of devices failing tests.

Automating network at Jio scale

In managing the network lifecycle, reporting and resolving of faults, planning for growth, controlling changes in the network, and providing rapid service activation on day 2 are equally important as the day 0 build and day 1 rollout. For a network of Jio scale, an equally agile and scalable framework was required for network operations. Keeping in mind the fundamental principles of openness and programmability, this framework needed to have open and standards-based APIs for:

- Fault reporting and remediation
- Performance management
- Capacity planning and traffic engineering
- Change and compliance management
- Network inventory reporting
- Rapid service activation and modification

Jio used a complete stack of the following platforms with a purpose-built automation platform as the front end to provide aggregated pan-India views:

- Cisco Evolved Programmable Network Manager (EPNM) for fault, performance, and inventory management of cell-site routers and the entire IP/MPLS network infrastructure
- Cisco ACI and Data Center Network Manager (DCNM) for fault, performance, and inventory of telecommunications data centers
- Cisco WAN Automation Engine (WAE) for capacity planning, what-if analysis, and traffic engineering
- Cisco Network Service Orchestrator (NSO) for service activation as well as configuration audit and compliance management

Cisco and Jio teams used the APIs to integrate these platforms with various elements of Jio OSS/BSS and data lakes for big data analysis. The complete tool set has enabled Jio to accelerate fault reporting and remediation and minimize disruption to network and services, optimize the network, and activate new services or modify existing ones in seconds or minutes with minimal human intervention and zero human errors.

Cisco and Jio have thus built a strong and sustainable foundation for an agile, future-proof, scalable, secure, and intuitive network (see Figure 2). This unique approach uses a common intelligence foundation with customizable learning that evolves over time. Following are the primary applications developed to automate the world's largest IP/MPLS LTE backhaul network:

- Automated network planning to assess requirements based on predefined design principles and create a total package of network implementation planning with documentation
- Enhanced ZTP to use the ZTP feature of Cisco devices while eliminating network-based dependencies and handling exceptions in diverse deployment scenarios

Summary

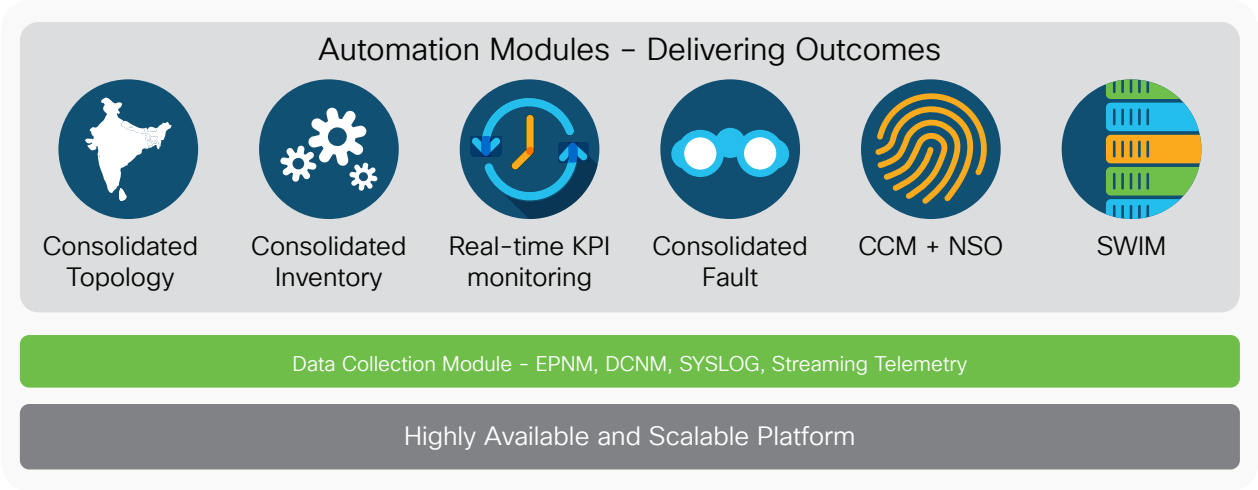
Jio has embraced mass-scale automation during the build phase of the network using a robust, scalable, microservices-based purpose-built platform by Cisco for network rollout. By further building a complete automation stack for full lifecycle management using various best-in-class tools and integrating the same with the build platform as well as OSS/BSS, Jio and Cisco have together achieved the desired outcomes. The framework also became a proof point of how mass-scale automation can help service providers stay competitive, while profitably adding new services and subscribers, thus leading the curve in a rapidly changing technology landscape.

For more information

To find out more about Cisco mobile Internet, visit www.cisco.com/go/mobile. To learn more about Reliance Jio, visit https://www.jio.com.

- KPI dashboard to provide deep insights into the pulse of the network
- Software image upgrades to upgrade devices for new features or fixes and patches with requisite pre-/postchecks with minimal/zero network/service disruption
- Identification, reporting, correlation, and remediation of network faults to:
  - Minimize MTTR
  - Reduce outages
  - Improve the customer experience
- Service activation and compliance management to automate order management and fulfillment using Cisco NSO and to make sure that all changes are compliant through automated audit

Figure 2. Lifecycle – mass scale network automation



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