

InSync Automation Engine – Whitepaper

Digital disruption is affecting all industries and communication service provider industry is no exception. Fueled by shifts such as cloud computing, IoT, Apps and 5G; communications service providers are compelled to change their businesses strategies to create value over merely being a connectivity provider. Along with above trends, challenges such as increased data consumption needs, lower ARPU and high competition has resulted with CSPs to transform their strategy to become a digital service provider (DSP).

Legacy ways of offering network services to consumers takes time, involves human intervention therefore less scalable and rigid. In this journey towards transforming into a digital services provider, CSPs need to evolve their customer experience and legacy operational structures. This is where technologies such as network automation plays a major role in the transformation journey of a CSP.

InSync Automation Engine is a software platform purpose built for network automation and orchestration. Underneath the platform is a powerful python-based core that runs on virtual environment for flexible deployment across both on-prem or cloud. With InSync Automation Engine, you can easily provision or deprovision enterprise network services such as L2/L3 VPN, ILL, & Broadband links, orchestrate multi-vendor network environments, monitor near real-time network state, automate workflows, manage devices and services and custom build use-cases for network automation and orchestration needs.

InSync Automation Engine offers a superior user experience for network consumers such as enterprise customers and administrators through its web interface. With role-based access, network consumers are provided with dashboards and portals for self-servicing which creates greater efficiency, agility and superior service delivery. End to end service delivery is orchestrated without the involvement of manual operations minimizing human error. Platform uses model driven network automation through its own decoders and through network models such as YANG.

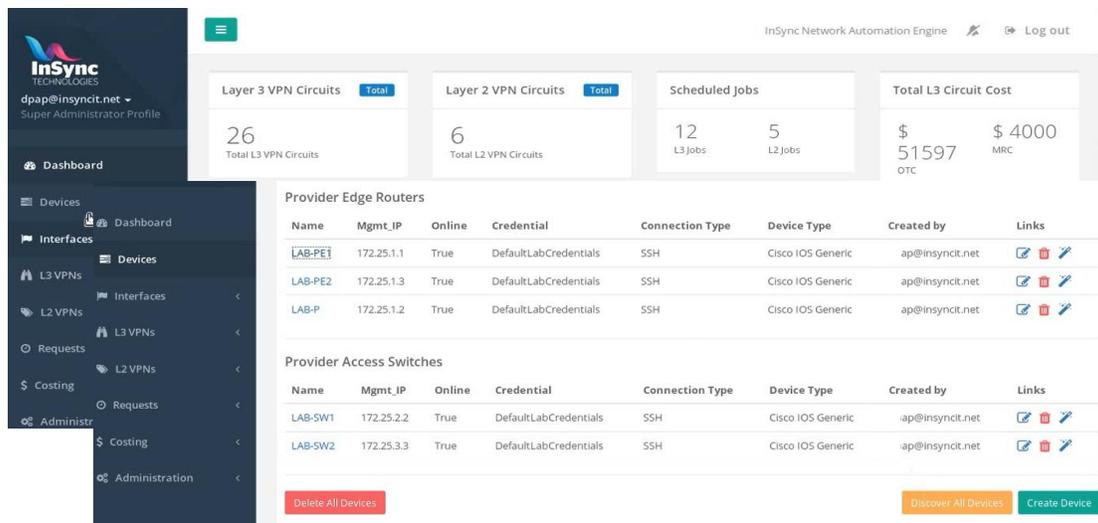


Figure 1: Superior user experience through portals and dashboards

With InSync’s automation engine you can define services you want to automate and represent it in its self-care portal for consumption. As the self-care portal is self-explanatory, your network consumers can now make requests for services over the portal on on-demand or scheduled basis. Once a service is requested, InSync’s platform can make sure the request is validated, executed and tested. This gives a greater level of scalability for a business as the need for manual intervention is minimized. Going further ahead, InSync automation engine monitors state and health alerting any deviations to the administrators. This way, InSync automation engine can manage the entire lifecycle of a service with least human intervention for greater productivity.

How InSync automation Engine performs automated service operations is through its own logics that’s built for each service. Logic layer of the platform consist of devices and services that are modelled. Decoders are available to extract the details out of a device that are required to construct a network device. Upon requesting a service, respective configuration for the service is automatically generated and pushed for respective devices. Entire process is orchestrated through the platform making it a seamless operation.

In order to provision a network service, it is essential to learn the network and its services. InSync’s platform use its decoders to read and write configuration and operational state of a network. Once state details are collected, InSync automation engine runs a discovery of the network which automatically provides the view of network and its services. Discovery includes network topology, services and services related insights. Discovery can be configured to run on a periodic basis or on-demand basis. Discovery also serves the purpose of identifying deviations to network services and can be used to monitor the network and services states.

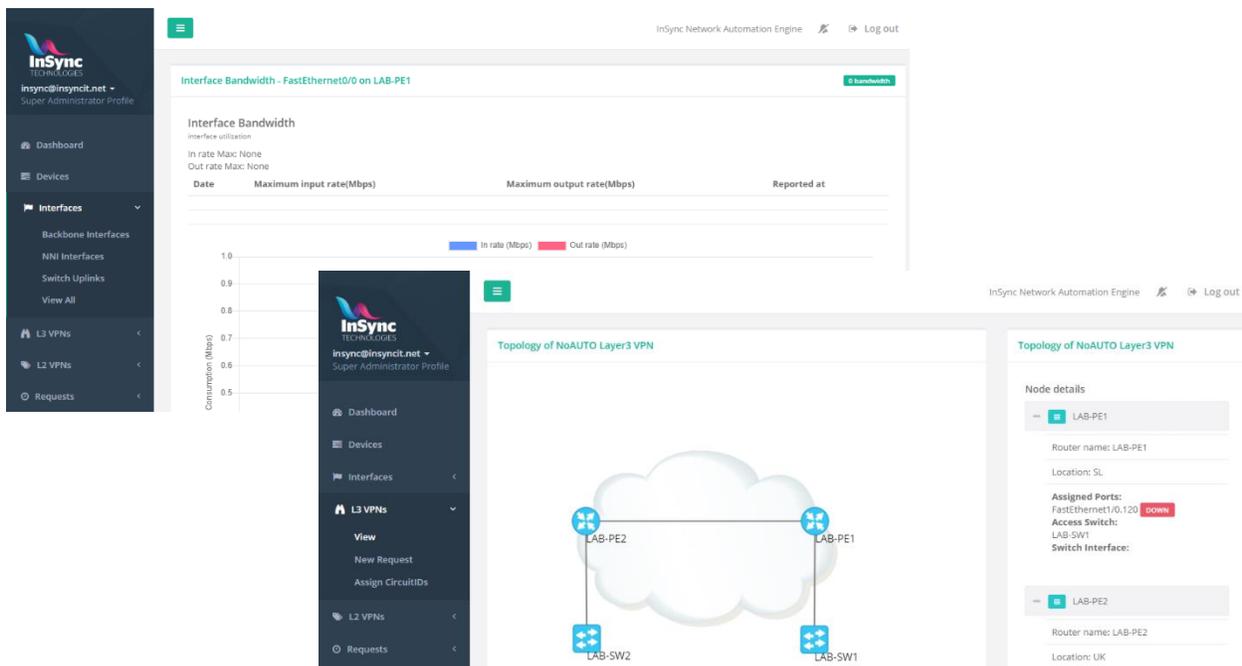


Figure 2: Circuit utilization monitoring & topology view

InSync automation engine retains both devices related data as well as services. Data collected through decoders are being used to model devices and network services. As the platform has device related data, it has a comprehensive collection of device statistics or a list of device inventory.

Modular nature of the platform also allows integration with third-party systems on northbound interfaces for client needs. As modules are loosely coupled, it can be integrated with existing or umbrella systems at a customer premise for effective usage. For instance, InSync automation engine can integrate with a service desk where service requests and approvals are handled only requiring network integration and administration capabilities of InSync's platform.

InSync Automation Engine consist of elements such as service catalogs, fulfilment, validation and monitoring that are essential for lifecycle service orchestration.

Platform can implement services across devices from different form factors either physical legacy devices, virtual network functions (VNFs)* or SDN controllers*.

**Future roadmap*

Software components

InSync Automation Engine's architecture consist of four loosely coupled modular components; device communication, logics, web based self-servicing portal and privilege access management. Each element has their own functionality and inter-operate to deliver intended services.

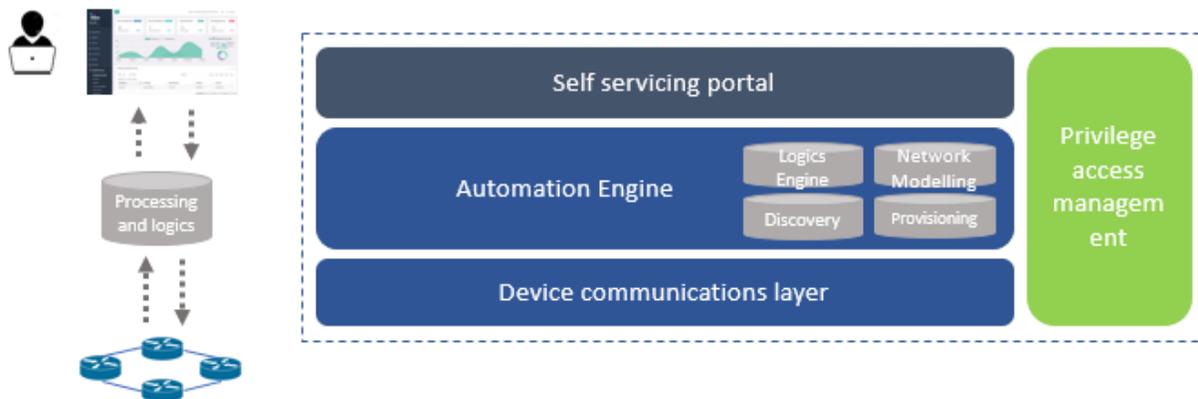


Figure 3: Software components

Platform is vendor agnostic and communicates with devices through legacy protocols and APIs.

Device communications: This layer consists of adaptors that communicate with devices over interfaces such as NETCONF, SSH and RESTAPIs in a vendor agnostic manner. Both read and write functions for monitoring, discovery and provisioning are enabled and executed through this layer. Configuration details, operational state, management and utilization data are communicated over this layer. Different southbound interface options are available for both legacy and modern devices from vendors. This layer also supports feeds from SNMP, ST and logs for detailed network monitoring and analytics. Integration with network related services such as DHCP, DNS, IPAM is made possible via RESTAPI.

Logics: This is the central intelligence of InSync's automation engine and consist of functions such as processing of data collected through other modules. It's responsible for network discovery, device modeling, network services modeling, service provisioning and validation. This is also the responsible pillar when it comes to creating custom build logics and policy frameworks.

Self-servicing portal: This is the external facing portal that is used by both administrators and service users. In addition to its web-based user interface, this layer also consists of gateways that connects to third-party applications such as ticketing systems, OSS/BSS and CRM for external system integration.

Privilege access management: Purpose of this module is to manage the administration of the software, store files, logs, reports and to manage user privileges.

Above four modules are the key components of the integrated product that can be deployed on a virtualized or cloud environment on Linux OS.

Product features

Throughout its' operation, InSync automation engine maintains transactional integrity. This means that a network will not be left at an unknown state once a task is executed. It will always be at the current or desired state. In case of a failed attempt, InSync platform will make sure it's rolled back to the current state and alert leaving the network on an always known state.

Platform runs **pre-tests** prior to the execution of an automated task and holds its operation if pre-test network criteria is not met. Upon a successful validation automation engine will make changes to the network; provisioning services and operations as requested. Once completed, platform makes **post-deployment tests** to ensure service establishment and activation. This whole process of validation, execution and testing take hours for manual operation and can be done in minutes with InSync's automation engine saving productive man hours and minimizing error.

One of the main benefits of InSync automation engine is its ability to customize and on-board new services. InSync will make sure new devices are on-boarded, logics are customized, portals are customized, new services are on-boarded based on your need.

Platform supports scalability through multi-node deployment of communication layers. Platform runs on Linux and can be deployed on virtual or cloud environment. Some of the other features of the product are as follows;

- Loosely coupled, modular architecture
- Role based access for privilege management
- Self-servicing portals and dashboards
- Service desk/OSS/BSS/CRM/Ticketing system integration with REST API & integration with third party provisioning applications
- Supports services provisioning and workflow automation
- Supports state discovery & monitoring
- Customizable GUI based web interface
- Reporting and alerting
- Topology view
- Vendor agnostic

Listed above are the features available to date and the product goes through continuous updates and feature additions. Below section highlight some of the use cases that can be catered through the product.

Product use cases for CSPs

Product support numerous use-cases, including out of the box supported use-cases and custom-built use cases. Some of the widely applicable use-cases for CSPs are as follows;

- Circuit provisioning automation (L2VPN, L3VPN, P2P, P2MP, ILL, Broadband circuits) ¹
- Automated circuit bandwidth upgrade/downgrade
- Extending the self-servicing capability for circuit provisioning and on-demand bandwidth change
- Network state monitoring and visibility
- CPE device management for enterprise customers – E.g. managed WAN network²
- Service provider core network device management (Inventory, back-up, migrations, etc) ³
- Service catalog creation
- Configuration comparison against a golden configuration file
- *SD-WAN orchestration – in roadmap as the next stage of major development

Some of the use cases are elaborated as below.

Circuit provisioning¹

Service providers extend layer 2 and layer 3 links to its enterprise clients across multiple geo-regions. These could be circuits provisioned within the service providers own network or with the support of partner networks. In today's competitive business environment, enterprises require flexibility and timely provisioning of circuits for its business operations. Therefore, timely and on-demand delivery of circuits are crucial for service providers to make their enterprise clients enabled. InSync's automation engine provides portals to service provider administrators as well as to its clients enabling them to automate circuit provisioning, on-demand bandwidth and for demand-based billing as opposed to a fixed term billing.

CPE device management & change²

Service providers manage WAN routers for large enterprises such as banks that has a large branch network. Monitoring, troubleshooting and change management of WAN routers is a time-consuming tedious task due to sheer volume of devices and number of customers. InSync automation engine solves this problem by giving portals and dashboards for service providers and to its enterprise customers to manage pre-defined set of change configurations by themselves. Further it gives status comparison of devices for service providers to diagnose WAN related tickets raised by its customers.

Service provider network node management³

Often network nodes go through software upgrades and changes. Performing a network-wide software upgrade and change can be tedious, time consuming and error-prone. With network automation, the entire process of a network wide software upgrade and change management workflows can be automated and tested for validation.

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