Juniper Automation Awareness
Anuta ATOM Bootcamp (Day-1)

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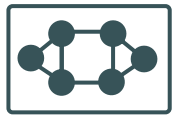
AGENDA

- Why Network Automation?
- Anuta ATOM Introduction
- Day – 1: Compliance Management
- ATOM Use-Cases & Deployments
- Day – 2: Workflow Hands-On
- Day – 3: Service Model Hands-On
- Day – 4: CLA, Scale, Licensing, Administration.

Industry Shifting Focus: from Connecting Things to Service Experience

Operator Focus

Managing Boxes → Controlling Networks Orchestrating services → Controlling Service Experience Guaranteed SLA/O



Tools

Traditional FCAPS / EMS → SDN Tools → Real-time Probing, AIOps, Predictive Analytics, Auto-remediation, Self Service

Network Operations Center → Service Operations Center

Development Focus

Hardware: Speeds & feeds → Network OS: Features & functions → Service Experience / Automation: Outcome & Service quality

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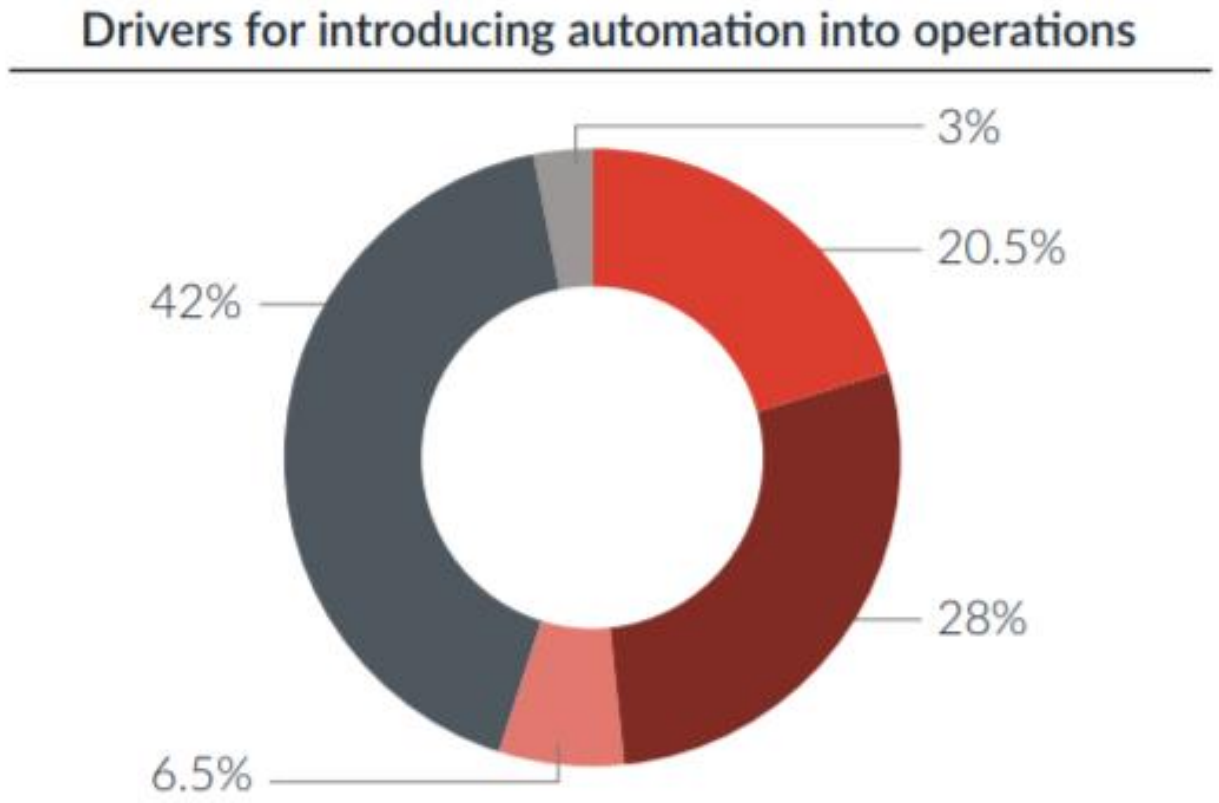
Market Drivers for Network Automation

- We are introducing new technology (e.g. virtualization) that necessitates operations at speeds not feasibile for manual processes
- We need to change processes or settings (e.g. provisioning) more often and more quickly than manual processes allow
- We have new process requirements that are more complicated and change more often (e.g. partner onboarding for IoT) than manual processes can cope with
- We would like to introduce new services that require faster and more complicated responses from operations (e.g. on-demand services) than manual processes can provide
- Other

TM Forum, 2018



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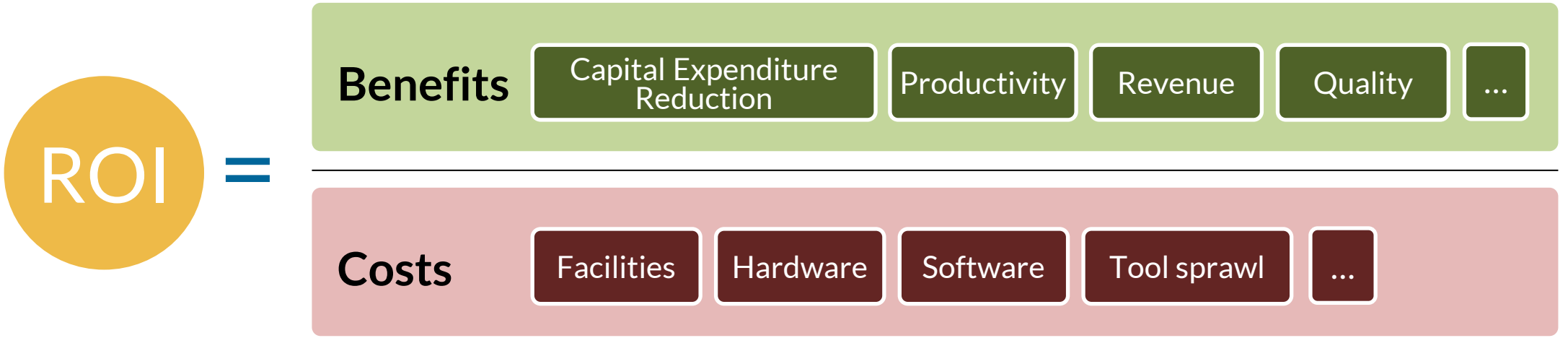
Automation ROI Structure



Productivity
Reduction in time to provision new services

Quality
Decline in errors
Avoid Churn

Economies of Scale
One automation platform for many use-cases

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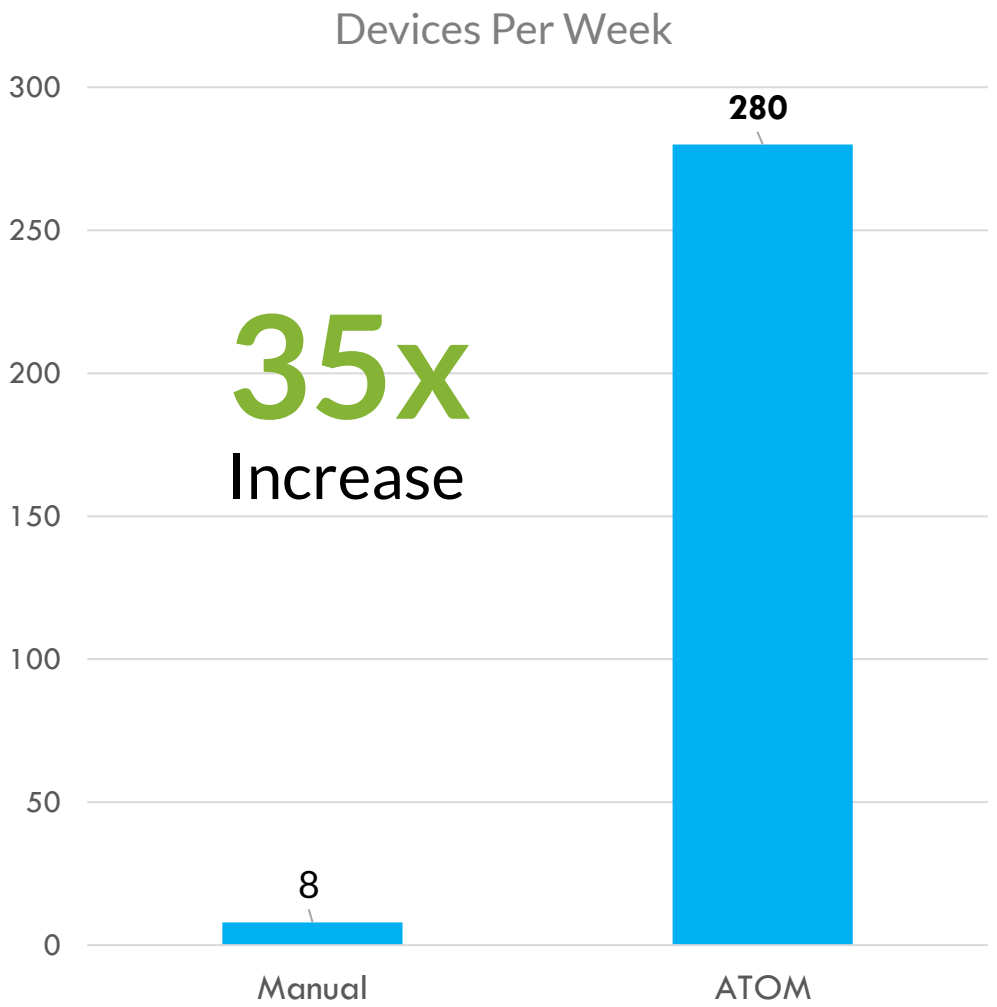
Anuta ATOM ROI – IPV6 Migration

Efficiency gain of ~95 minutes per device

Activity	Manual (sec)	ATOM (sec)
Identify Components	900	10
Config Preparation	900	10
Pre-Check Captures	600	90
Change Execution	900	30
Post-Check Captures & Validation	2400	90
IPv6 Address Management	900	10
Rollback (Automated & On-Demand)	1500	45
Overall (per Device)	**110 Minutes**	**< 5 Minutes**



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Juniper + Anuta Partnership

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Juniper Paragon Automation powers the WAN

Paragon Planner (formerly NorthStar Planner)

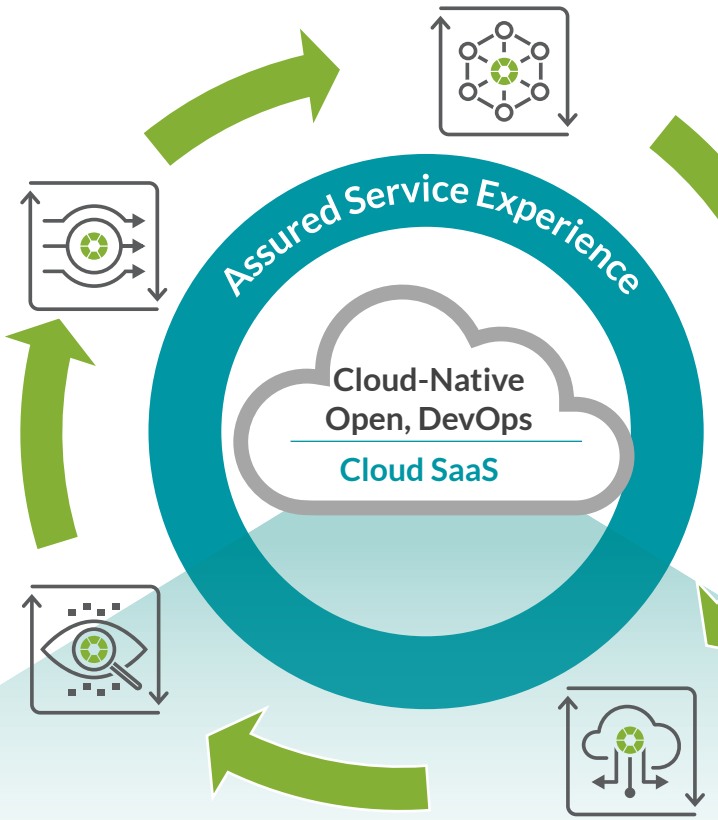
Plan, model, and verify services before deploying

Optimizes network resource utilization and minimize risk

Paragon Pathfinder (formerly NorthStar)

Simplifies path, slice creation and management

Optimizes and assures transport service



Anuta ATOM

Multi-vendor Configuration Management, Compliance, Service Orchestration, Workflow and Closed-Loop Automation to accelerate operations, reduce errors, thus improving customer experience

Paragon Insights (formerly HealthBot)

Proactive service assurance with predictive analytics; Reduces MTTR for better service quality of experience

Paragon Active Assurance (formerly Netrounds)

Actively verify service quality across physical and virtual networks; Accelerates time to revenue while reducing time to repair

Open APIs
Real time streaming telemetry
Active Sensing

Access | Aggregation | Edge Cloud | Edge/Core

Scalable IP Service Fabric

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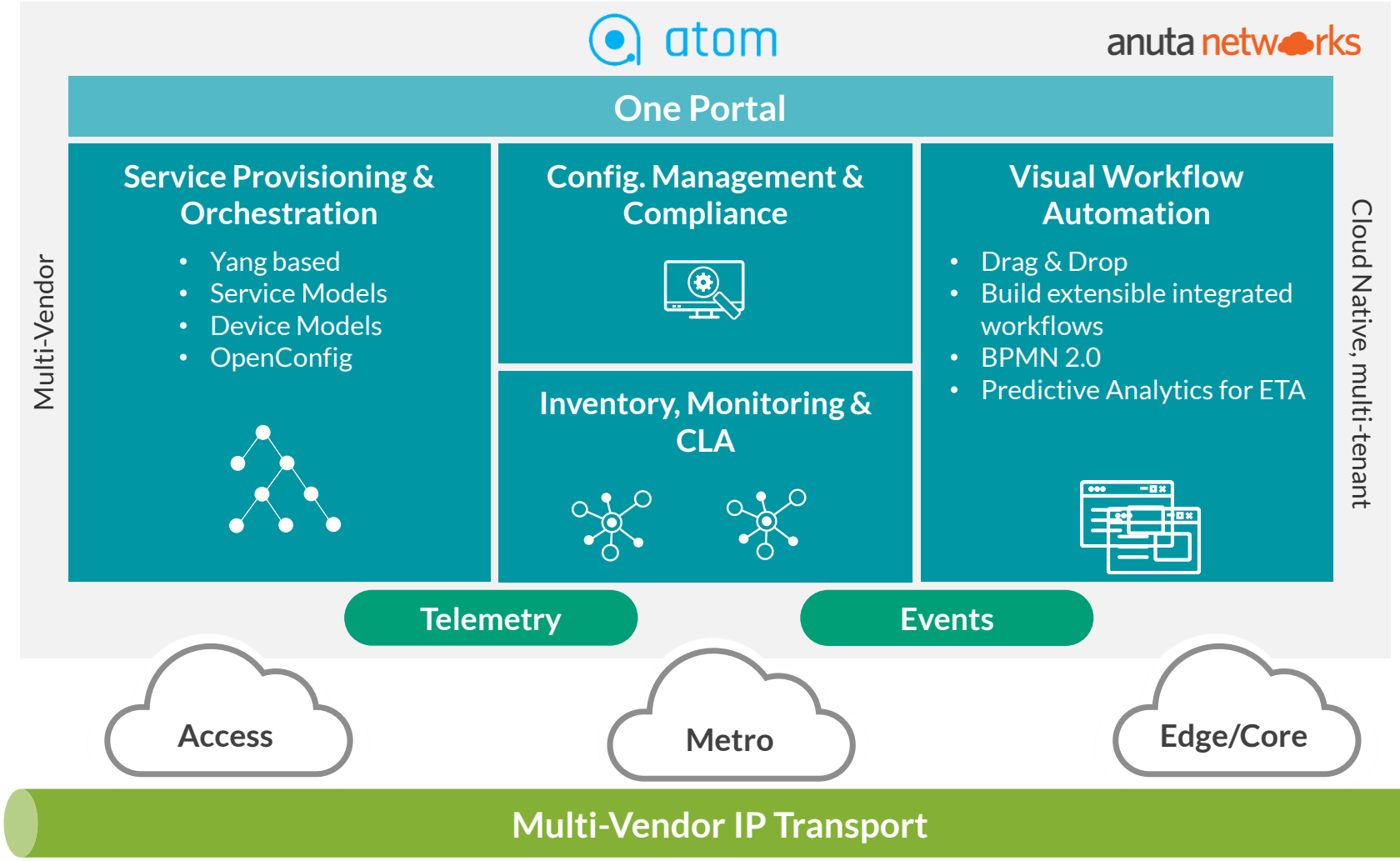
Anuta ATOM

Service orchestration, Workflow and Compliance with Closed loop Automation



- 3rd Party Resale agreement
- On Juniper pricelist
- JTAC
- Juniper Pro services

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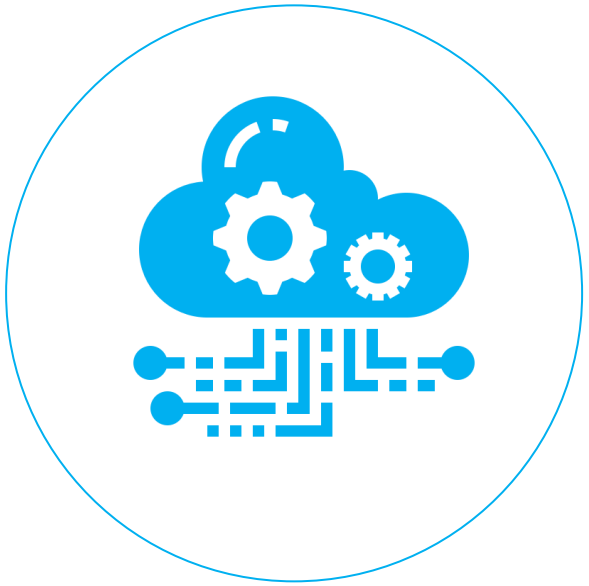
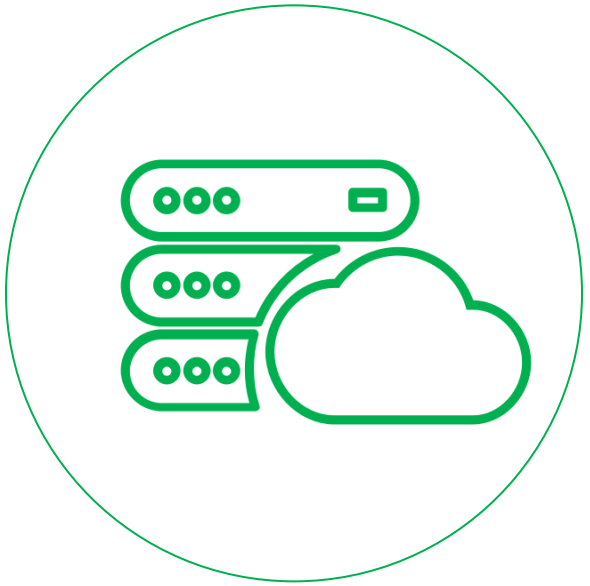
Deployment Models

ATOM Cloud



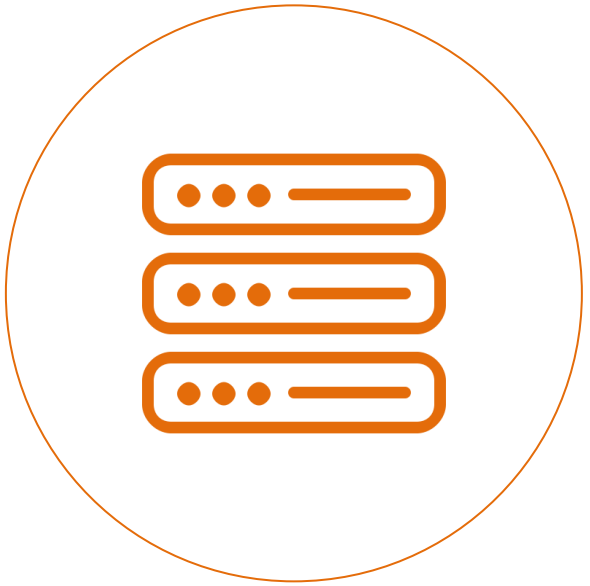
Deployed in AWS

Hybrid (Private/Public)



AWS, GCP, Azure Distributed Architecture

On Premise



Can be deployed on any Docker/K8s infra

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Supported Vendors List

MX Series, PTX, ACX Series	EX Series Switches, QFX, Q Fabric System (DC Network Fabric)	VGW, SRX, Virtual SRX, NetScreen	NFX 250, Contrail/CSO, JUNOS Space
7010, 7050X, 7150, 7500 Series, vEOS	BIG-IQ, BIGIP-LTM, BIGIP-GTM, 3600, VIPRION 2400	VDX 8770, FastIron, BigIron series, SteelApp,vEPC, 6900, 8900, VDX 6700 series, ProxySG	ASR, ISR, Nexus, Cat, ACI, ASA, WLC
Panorama – PA & VM series	Fortigate 3140, 3140B	Checkpoint Provider-1, Security Gateway, R77, R80 Security Gateway	NetScaler MPX, SDX
5800, 5900, 600, 12500, 10500, 7500 series, HP Helion, HP DCN, VSR 1000	IPAM & DNS	ITSM	

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Supported Vendors List – Contd.

riverbed	ciena	BLUECAT	nuagenetworks From Nokia	HITACHI
Virtual and Physical Steelhead	3930, 3900	IPAM & DNS	Virtual Services Platform	Alaxala AX-3650, Alaxala AX1240, AX2530
HUAWEI	ERICSSON	splunk>	Alcatel·Lucent	Microsoft
NE40-X8, NE40-X3 series	SSR 8000	Syslog	7750 series, 7705 series	SCVMM
redhat	ScienceLogic	vmware	cumulus networks	Microsoft
Openstack	Service Assurance Platform	DVS, vCenter, ESXi, vShield Edge Gateway, vRealize, ESXI, vCenter	DC Switching	Azure
ORACLE	VENAFI	radware	TDBFusion	NETSCOUT
Opus switches	Certificate Management	5412XL, ADC-VX	Federos	PeakFlow SP, PeakFlow TMS 1000
aws	centina SYSTEMS	affirmed	neustar	A10
AWS	Service Assurance Platform	vEPC	DNS	vThunder

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Anuta ATOM Top Use Cases

Service Orchestration

- Multi-domain stateful use cases
- L2/L3 VPN, App. Delivery
- 5G Slicing, CSD, Cable DAA Models

Low Code Automation

- Software Upgrade MOPs
- Network Migration
- Stateful, Stateless tasks with Pre/Post Checks

Configuration Management

- Zero Touch Provisioning
- Configuration versioning & archival
- Config Restoration & RMA

Compliance Management

- Standardization, Audit & Reporting
- Compliance checks & remediation
- Service, CLI & YANG compliance

Closed Loop Automation

- Routing metrics & remediation
- Interface health & remediation
- Network Health Statistics

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Case-Study: Multi-Vendor L2/L3 VPN Automation

Use Cases

- Automated L2VPN (E-Line, ELAN) L3VPN services
- CLA for compliance and high availability

Business Outcomes

- Accelerated VPN and Internet Services provisioning
- Avoids down time due to human errors

Why ATOM?

- Modular, Cloud-Native & Extensible Architecture
- Multi-Vendor Support & Scale – Cisco & Juniper (2K devices)

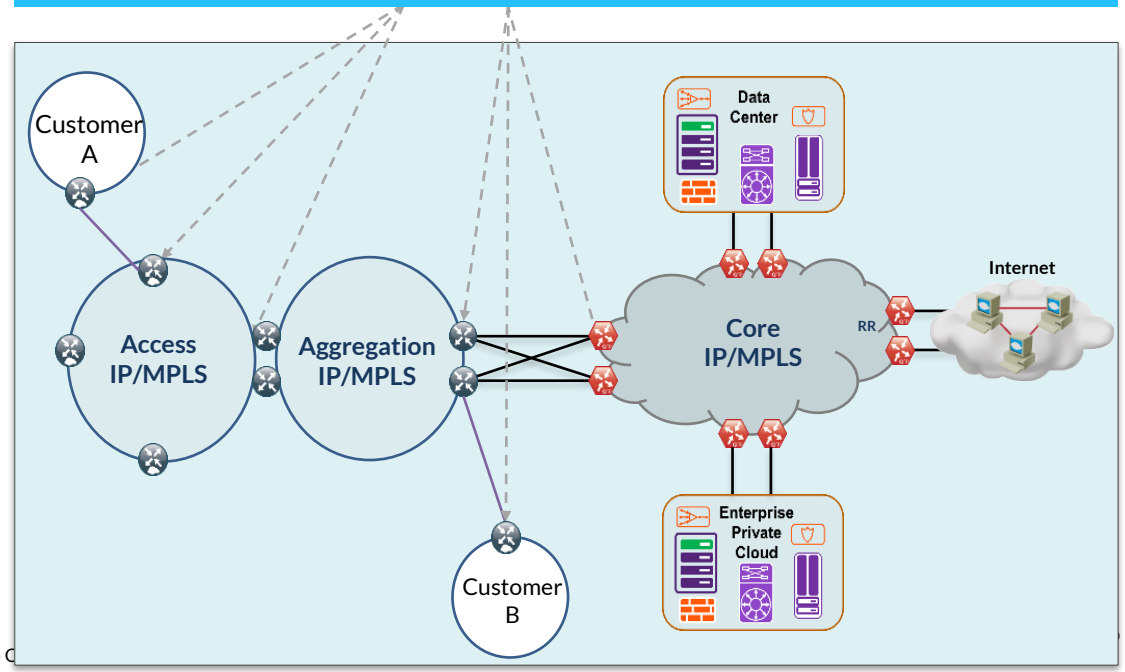
Anuta ATOM solution relieved network engineers from tedious tasks.

- Director, Network Services.

Tenants/Customers

Self-Serve Portal

ATOM (Private Cloud Environment)



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Automation and Compliance for the Next-Gen Network

Use Cases

- E-Line Service Provisioning with Pre & Post Checks
- Juniper MX Software Upgrades

Business Outcomes

- Automated & Standardized Service & MOPs
- Reduced response times with increased service reliability

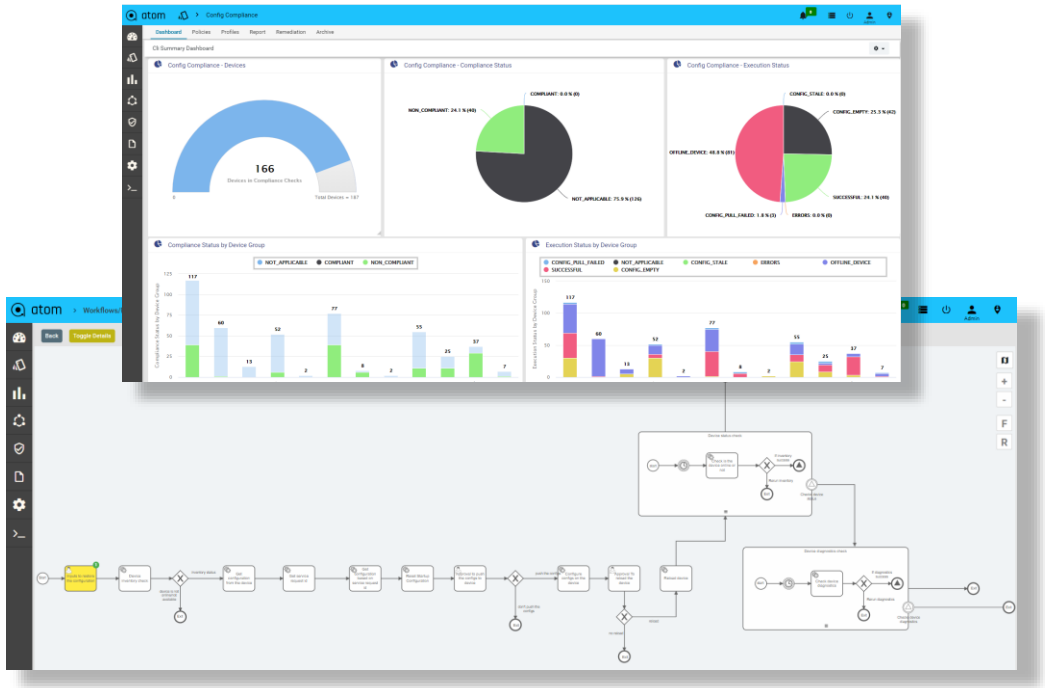
Integrated Solution

- Integrated Solution vs Siloed Products from Competition
- Integrated Service & Workflow Automation

SOW to Production in 6 Weeks

Anuta ATOM reduced service activation times from days to hours and automated workflows reliably without errors.

VP, Engineering & Operations, Tier-2 SP



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Network Migration – Media & Entertainment Company

35x Boost in Productivity

> We are on a mission to transform our customer experience at a global scale. Anuta ATOM's microservices based low code automation platform has been a key partner in our transformation journey.
>
> *VP, Network Services, Tier-1 Media & Ent.*

Challenges

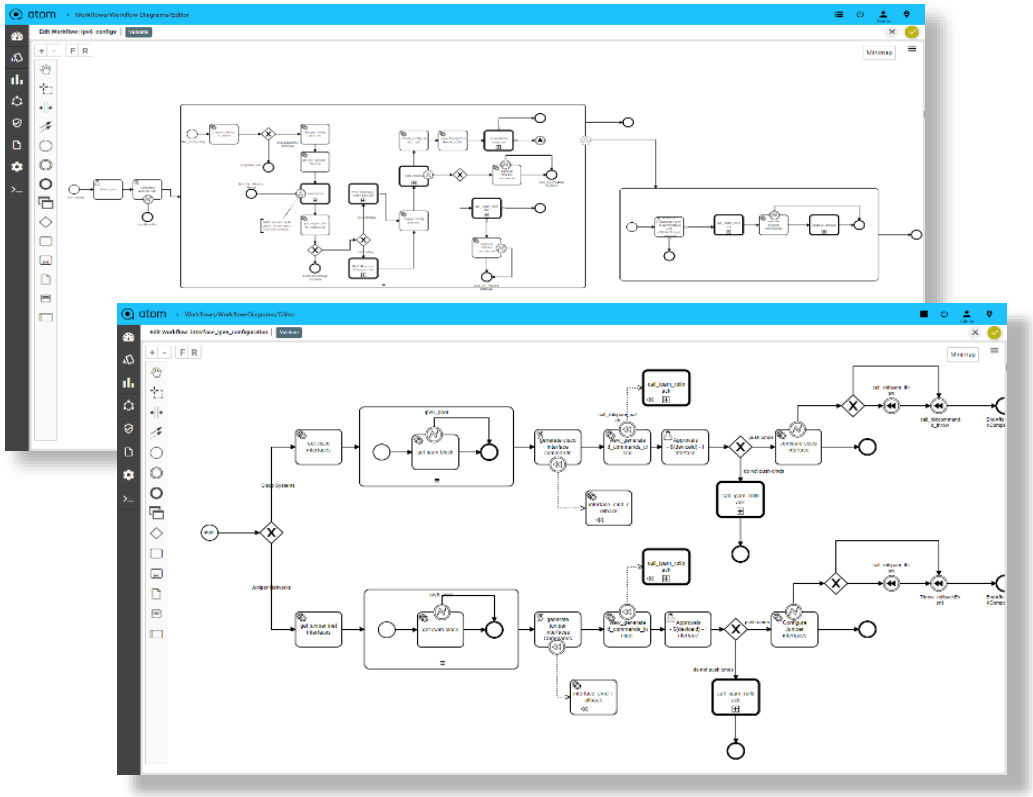
- Multi-Vendor Network with 7 different vendors
- Minimal number of devices migrated per week
- Massive scale network

Use Cases

- IPv4 to IPv6 Stack Migration across 7 vendors
- Pre & Post Checks for multiple vendors
- Config Review/Approvals/Automated Rollback

Business Outcomes

- Expedited Network transformation to 280 devices/week
- Eliminated human errors and outages
- Single-Source-of-truth



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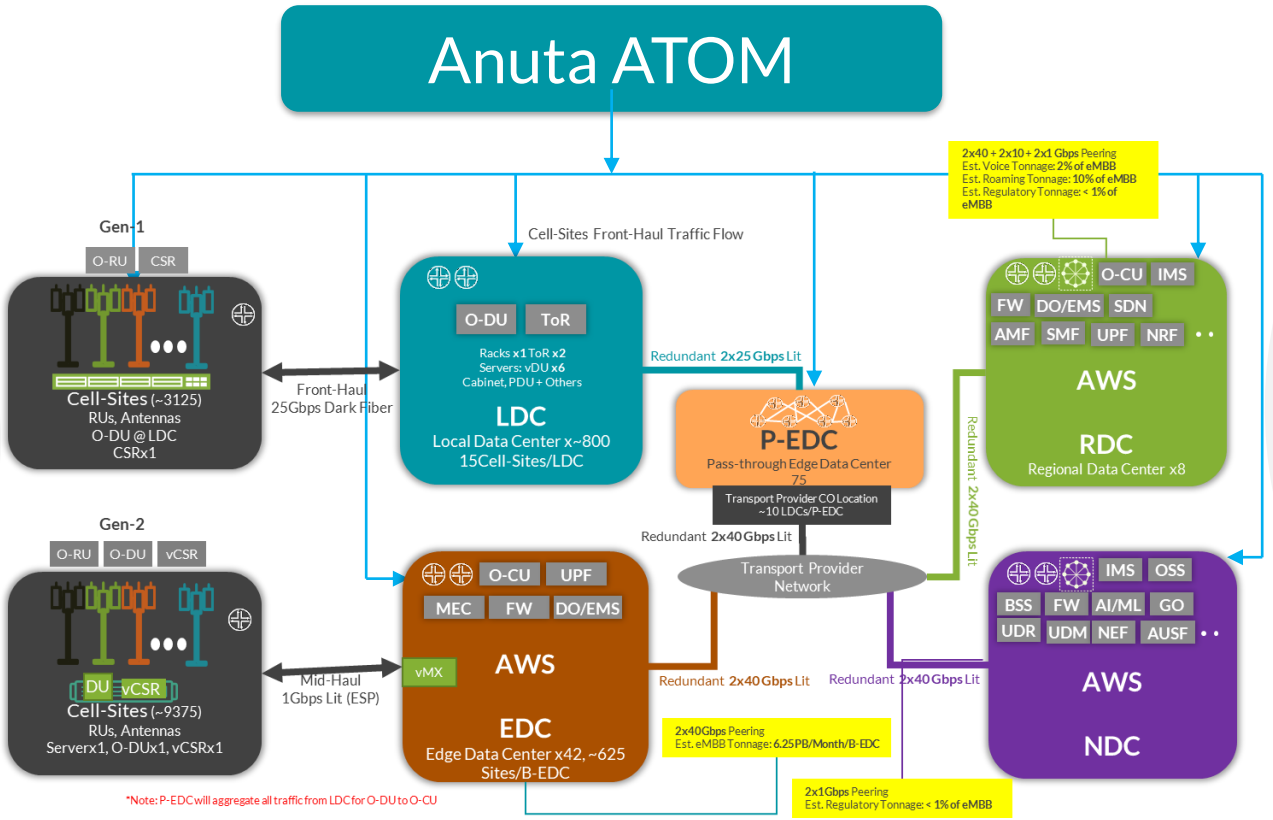
Wireless Provider in North America selects Anuta Networks ATOM to Accelerate its 5G Deployment

Before ATOM

- Manual provisioning of cell-site routers and local data centers (15K sites in 50 cities)
- Complex ecosystem with more than 12 different vendors
- Too many touch points leading to loss of productivity
- Lack of network visibility from a single pane of glass



After ATOM

- Automated ZTP by integrating 12 different vendors via low-code automation
- Boost in productivity by eliminating manual operations
- Sustainable cost reductions
- SLA compliant and low-downtime network

Cloud-native, Massively Scalable and Extensible Automation Platform

Monitoring & Automation Ecosystem – 12 Vendors

Infrastructure as Code

Pipeline

GitLab

Digital Rebar

RackN

Network Elements

Cell Site Router

Juniper Networks ACX

DU

MAVENIR

Cell Site Router

Cisco NCS

DU

ALTIOSTAR

Inventory, VNFM, Alerting

Inventory

ciena | blueplanet

Ticketing

JIRA

VNF Management

vmware

Notifications

slack

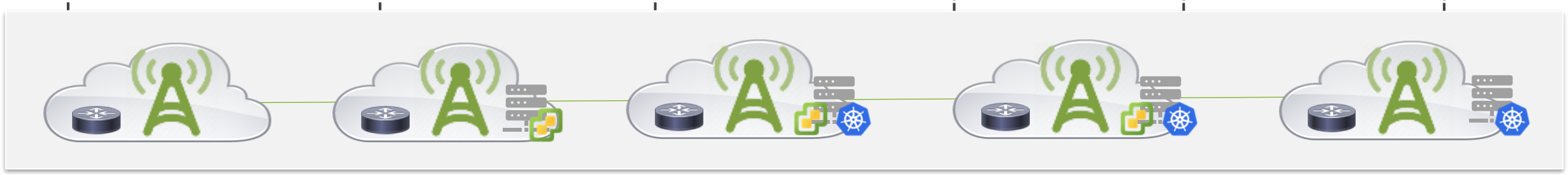
Infra Services.

IPAM

Infoblox

Secret Management

aws



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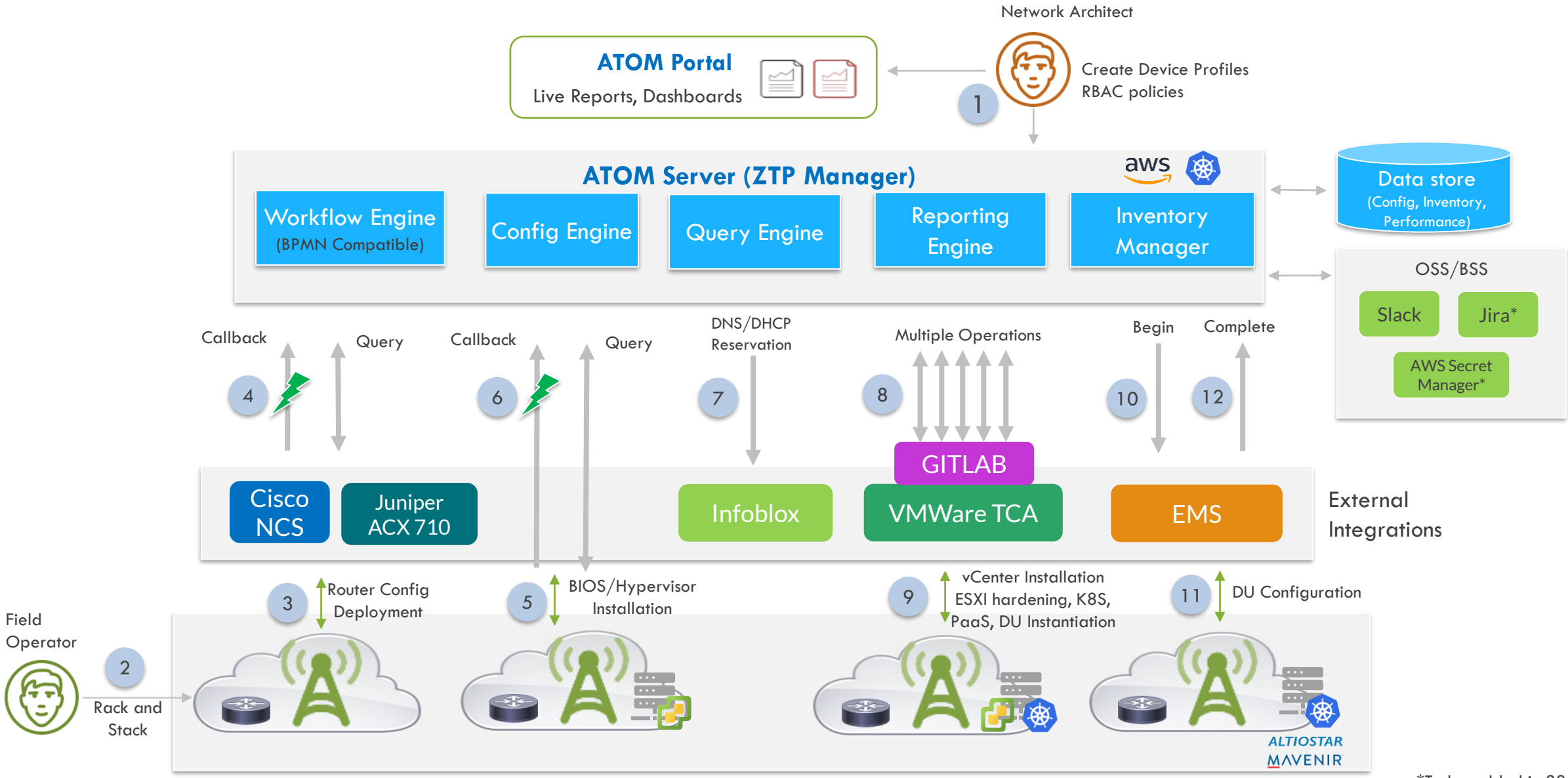
ATOM – ZTP Manager



*To be added in 08/21

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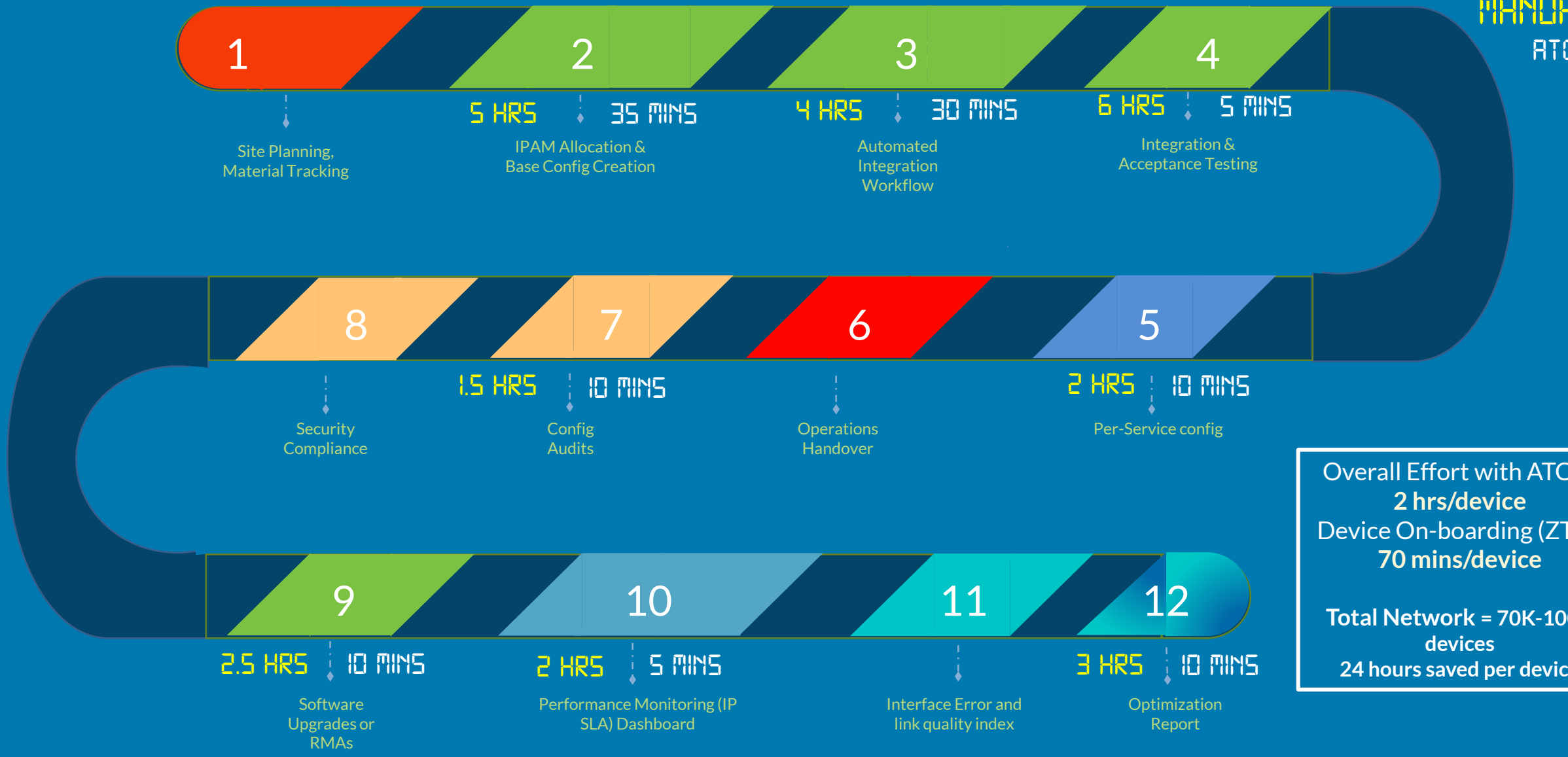
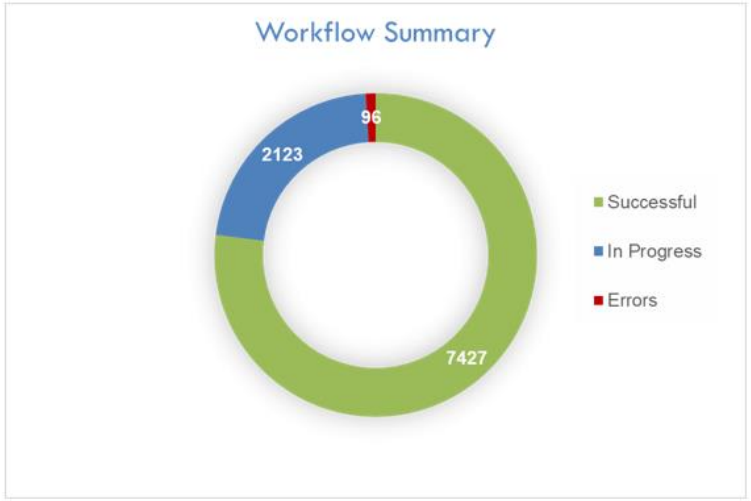
5G Network Build and Operation - ATOM

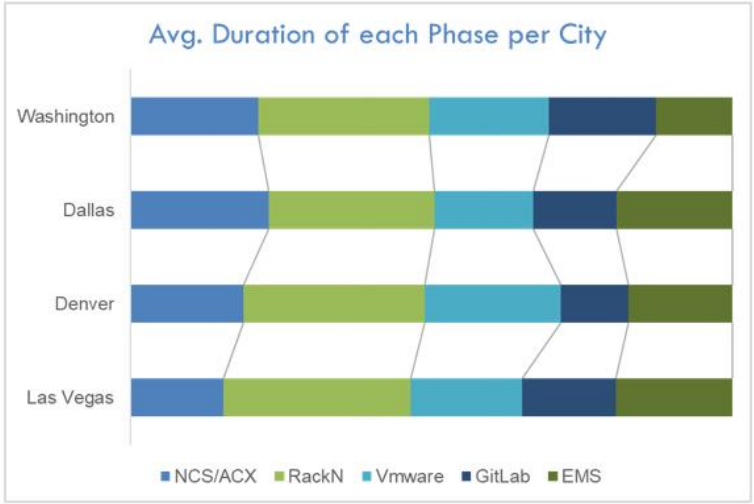


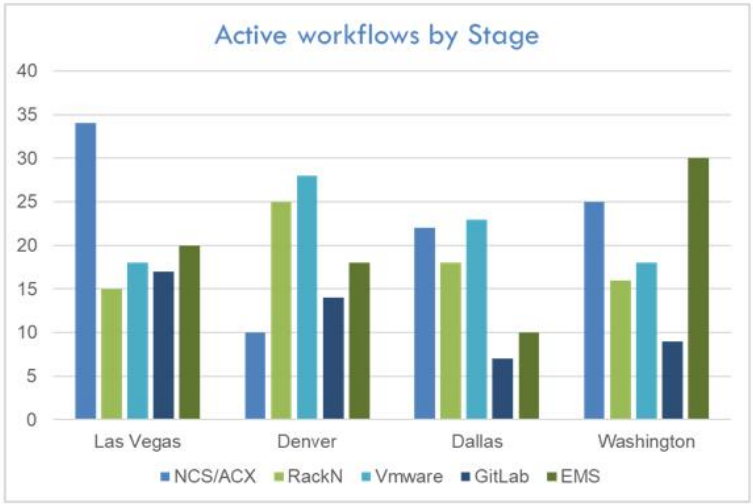
Overall Effort with ATOM
2 hrs/device
Device On-boarding (ZTP):
70 mins/device

Total Network = 70K-100K devices
24 hours saved per device

5G Network Build and Operation - ATOM



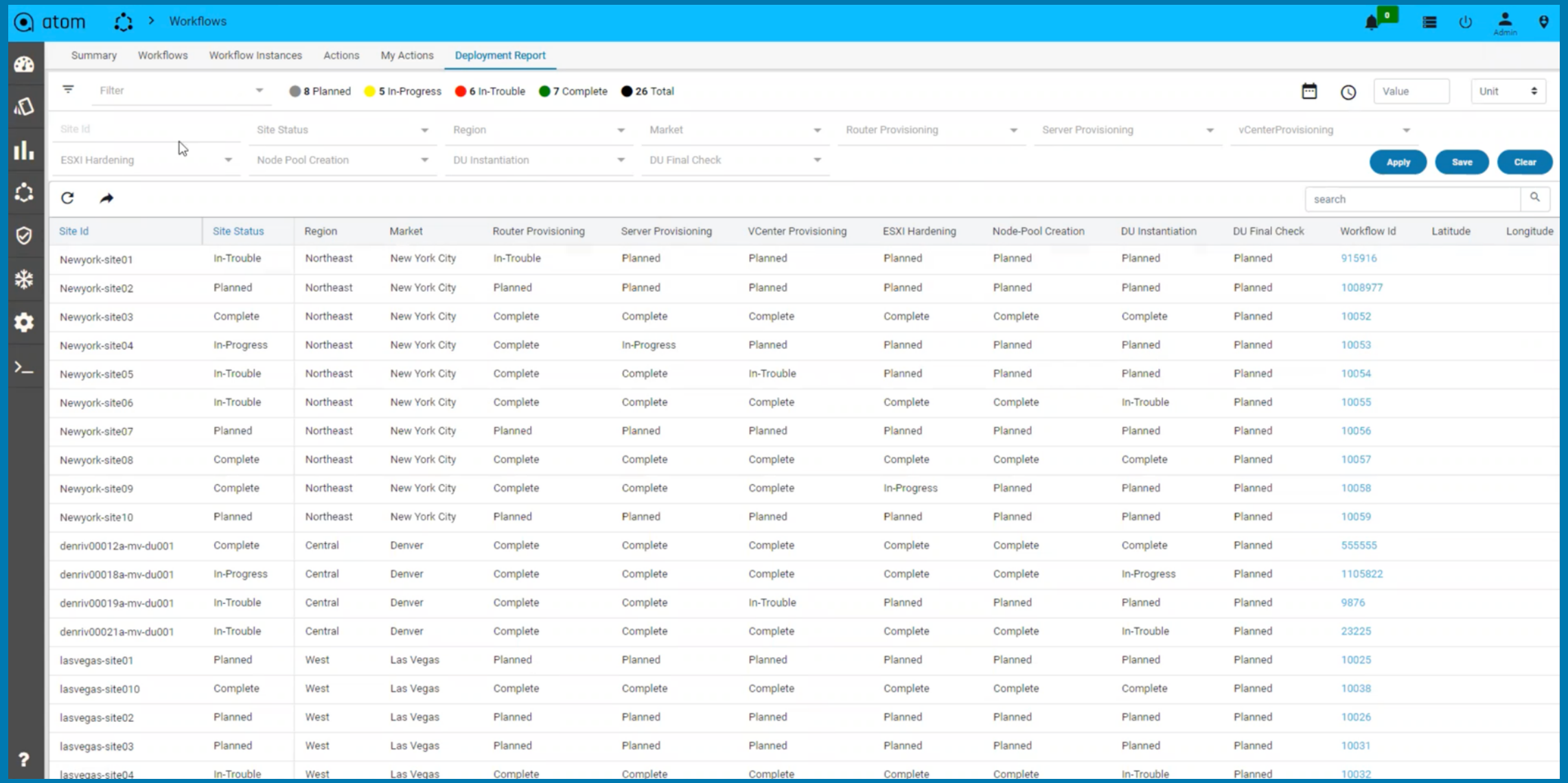




Summary of Workflow Status in Las Vegas

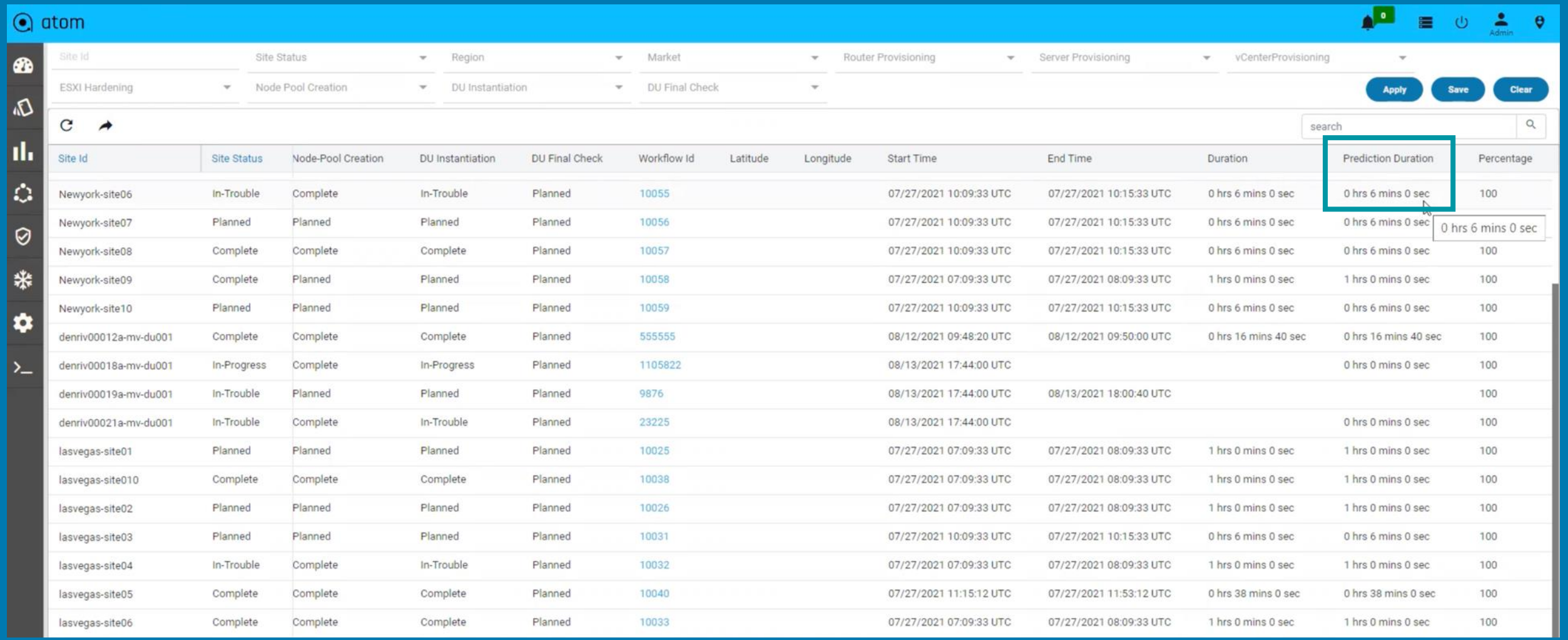
Site Name	In progress	Passed	Failed	Avg. Duration	SLA	Progress
Caesar-1	5	18	2	1:35	1:50	80%
Valencia-2	8	25	1	1:08	1:50	95%
Aria-3	12	29	1	1:05	1:50	95%
MGM-4	9	13	0	1:08	1:50	99%
Venetian-5	15	2	1	1:55	1:50	75%

5G Network Build and Operation - ATOM



Site Id	Site Status	Region	Market	Router Provisioning	Server Provisioning	VCenter Provisioning	ESXI Hardening	Node-Pool Creation	DU Instantiation	DU Final Check	Workflow Id	Latitude	Longitude
Newyork-site01	In-Trouble	Northeast	New York City	In-Trouble	Planned	Planned	Planned	Planned	Planned	Planned	915916		
Newyork-site02	Planned	Northeast	New York City	Planned	Planned	Planned	Planned	Planned	Planned	Planned	1008977		
Newyork-site03	Complete	Northeast	New York City	Complete	Complete	Complete	Complete	Complete	Complete	Planned	10052		
Newyork-site04	In-Progress	Northeast	New York City	Complete	In-Progress	Planned	Planned	Planned	Planned	Planned	10053		
Newyork-site05	In-Trouble	Northeast	New York City	Complete	Complete	In-Trouble	Planned	Planned	Planned	Planned	10054		
Newyork-site06	In-Trouble	Northeast	New York City	Complete	Complete	Complete	Complete	Complete	In-Trouble	Planned	10055		
Newyork-site07	Planned	Northeast	New York City	Planned	Planned	Planned	Planned	Planned	Planned	Planned	10056		
Newyork-site08	Complete	Northeast	New York City	Complete	Complete	Complete	Complete	Complete	Complete	Planned	10057		
Newyork-site09	Complete	Northeast	New York City	Complete	Complete	Complete	In-Progress	Planned	Planned	Planned	10058		
Newyork-site10	Planned	Northeast	New York City	Planned	Planned	Planned	Planned	Planned	Planned	Planned	10059		
denriv00012a-mv-du001	Complete	Central	Denver	Complete	Complete	Complete	Complete	Complete	Complete	Planned	555555		
denriv00018a-mv-du001	In-Progress	Central	Denver	Complete	Complete	Complete	Complete	Complete	In-Progress	Planned	1105822		
denriv00019a-mv-du001	In-Trouble	Central	Denver	Complete	Complete	In-Trouble	Planned	Planned	Planned	Planned	9876		
denriv00021a-mv-du001	In-Trouble	Central	Denver	Complete	Complete	Complete	Complete	Complete	In-Trouble	Planned	23225		
lasvegas-site01	Planned	West	Las Vegas	Planned	Planned	Planned	Planned	Planned	Planned	Planned	10025		
lasvegas-site010	Complete	West	Las Vegas	Complete	Complete	Complete	Complete	Complete	Complete	Planned	10038		
lasvegas-site02	Planned	West	Las Vegas	Planned	Planned	Planned	Planned	Planned	Planned	Planned	10026		
lasvegas-site03	Planned	West	Las Vegas	Planned	Planned	Planned	Planned	Planned	Planned	Planned	10031		
lasvegas-site04	In-Trouble	West	Las Vegas	Complete	Complete	Complete	Complete	Complete	In-Trouble	Planned	10032		

5G Network Build and Operation - ATOM



Site Id	Site Status	Node-Pool Creation	DU Instantiation	DU Final Check	Workflow Id	Latitude	Longitude	Start Time	End Time	Duration	Prediction Duration	Percentage
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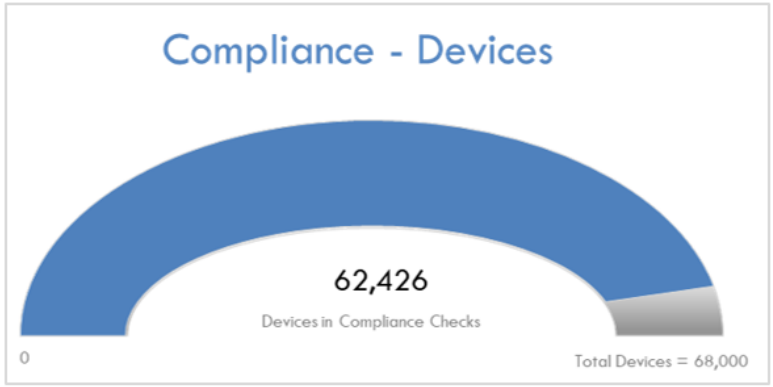
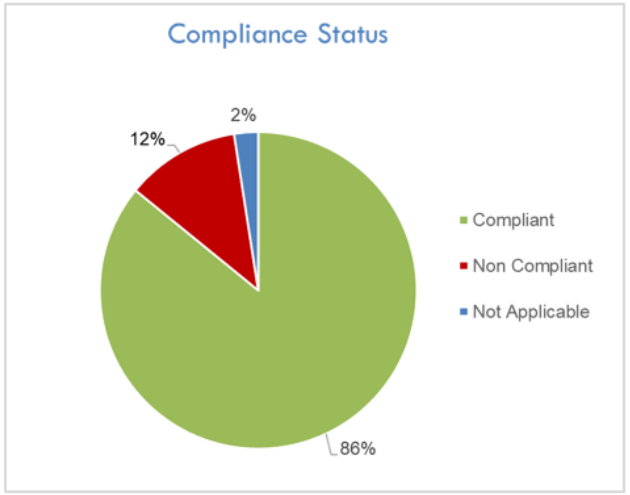
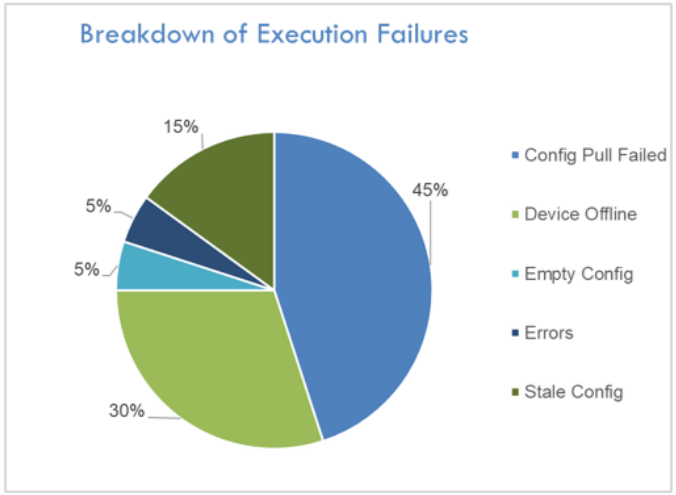
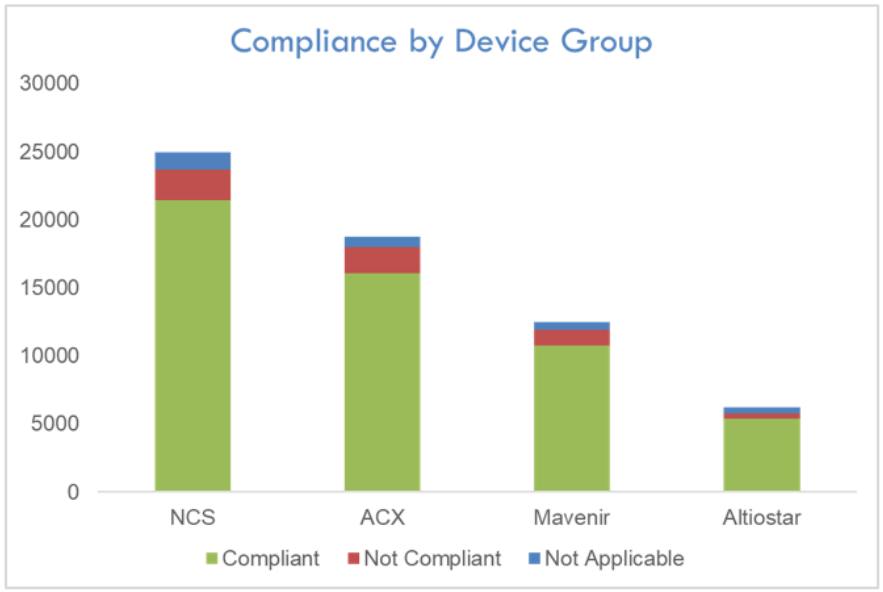
Newyork-site07	Planned	Planned	Planned	Planned	10056			07/27/2021 10:09:33 UTC	07/27/2021 10:15:33 UTC	0 hrs 6 mins 0 sec	0 hrs 6 mins 0 sec	100
Newyork-site08	Complete	Complete	Complete	Planned	10057			07/27/2021 10:09:33 UTC	07/27/2021 10:15:33 UTC	0 hrs 6 mins 0 sec	0 hrs 6 mins 0 sec	100
Newyork-site09	Complete	Planned	Planned	Planned	10058			07/27/2021 07:09:33 UTC	07/27/2021 08:09:33 UTC	1 hrs 0 mins 0 sec	1 hrs 0 mins 0 sec	100
Newyork-site10	Planned	Planned	Planned	Planned	10059			07/27/2021 10:09:33 UTC	07/27/2021 10:15:33 UTC	0 hrs 6 mins 0 sec	0 hrs 6 mins 0 sec	100
denriv00012a-mv-du001	Complete	Complete	Complete	Planned	555555			08/12/2021 09:48:20 UTC	08/12/2021 09:50:00 UTC	0 hrs 16 mins 40 sec	0 hrs 16 mins 40 sec	100
denriv00018a-mv-du001	In-Progress	Complete	In-Progress	Planned	1105822			08/13/2021 17:44:00 UTC			0 hrs 0 mins 0 sec	100
denriv00019a-mv-du001	In-Trouble	Planned	Planned	Planned	9876			08/13/2021 17:44:00 UTC	08/13/2021 18:00:40 UTC			100
denriv00021a-mv-du001	In-Trouble	Complete	In-Trouble	Planned	23225			08/13/2021 17:44:00 UTC			0 hrs 0 mins 0 sec	100
lasvegas-site01	Planned	Planned	Planned	Planned	10025			07/27/2021 07:09:33 UTC	07/27/2021 08:09:33 UTC	1 hrs 0 mins 0 sec	1 hrs 0 mins 0 sec	100
lasvegas-site010	Complete	Complete	Complete	Planned	10038			07/27/2021 07:09:33 UTC	07/27/2021 08:09:33 UTC	1 hrs 0 mins 0 sec	1 hrs 0 mins 0 sec	100
lasvegas-site02	Planned	Planned	Planned	Planned	10026			07/27/2021 07:09:33 UTC	07/27/2021 08:09:33 UTC	1 hrs 0 mins 0 sec	1 hrs 0 mins 0 sec	100
lasvegas-site03	Planned	Planned	Planned	Planned	10031			07/27/2021 10:09:33 UTC	07/27/2021 10:15:33 UTC	0 hrs 6 mins 0 sec	0 hrs 6 mins 0 sec	100
lasvegas-site04	In-Trouble	Complete	In-Trouble	Planned	10032			07/27/2021 07:09:33 UTC	07/27/2021 08:09:33 UTC	1 hrs 0 mins 0 sec	1 hrs 0 mins 0 sec	100
lasvegas-site05	Complete	Complete	Complete	Planned	10040			07/27/2021 11:15:12 UTC	07/27/2021 11:53:12 UTC	0 hrs 38 mins 0 sec	0 hrs 38 mins 0 sec	100
lasvegas-site06	Complete	Complete	Complete	Planned	10033			07/27/2021 07:09:33 UTC	07/27/2021 08:09:33 UTC	1 hrs 0 mins 0 sec	1 hrs 0 mins 0 sec	100

5G Network Build and Operation - ATOM





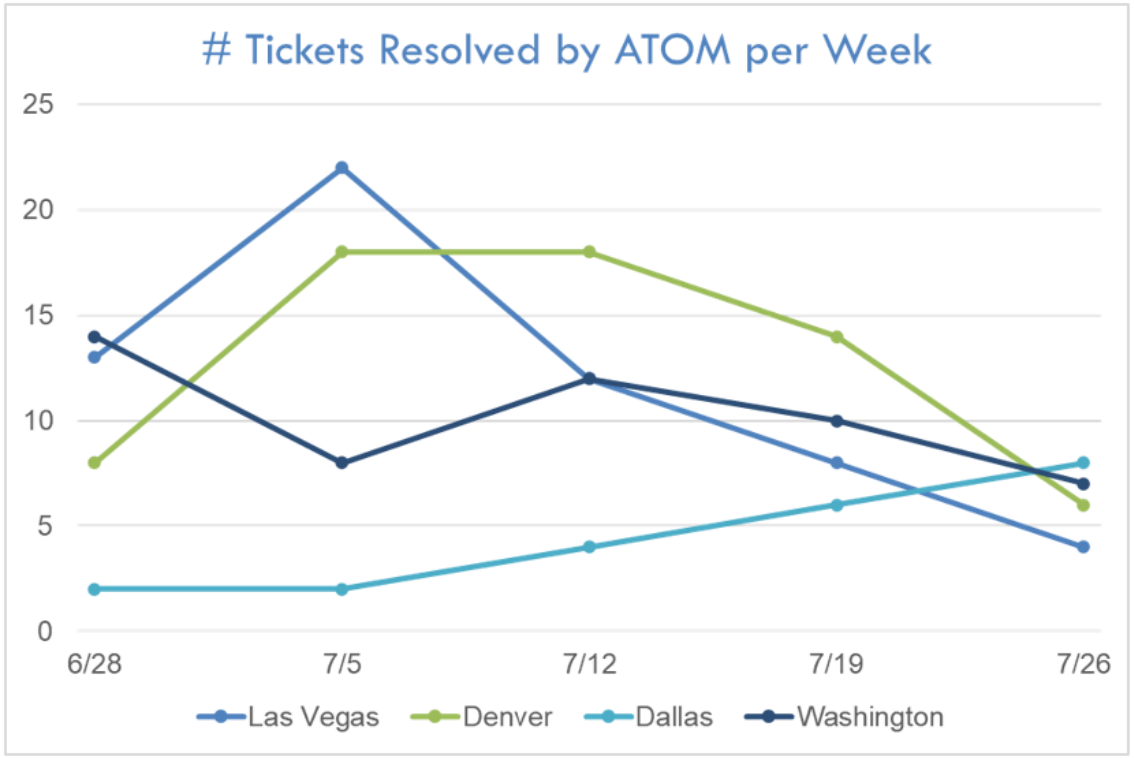


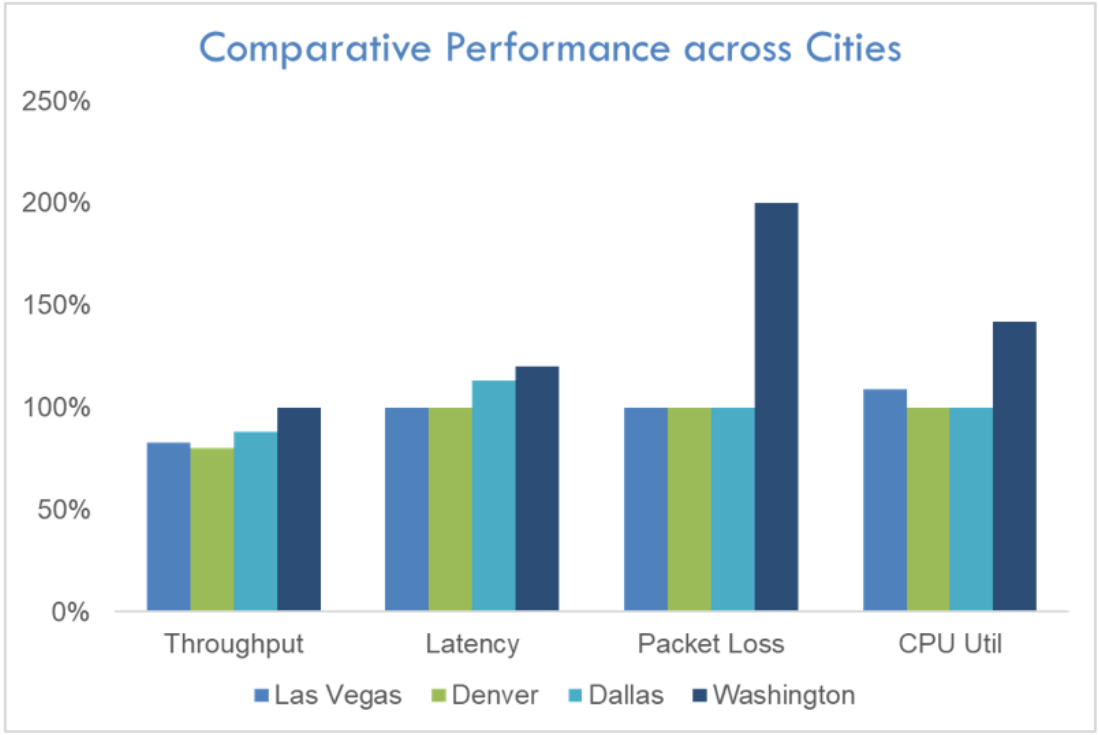


Compliance Rules in Las Vegas

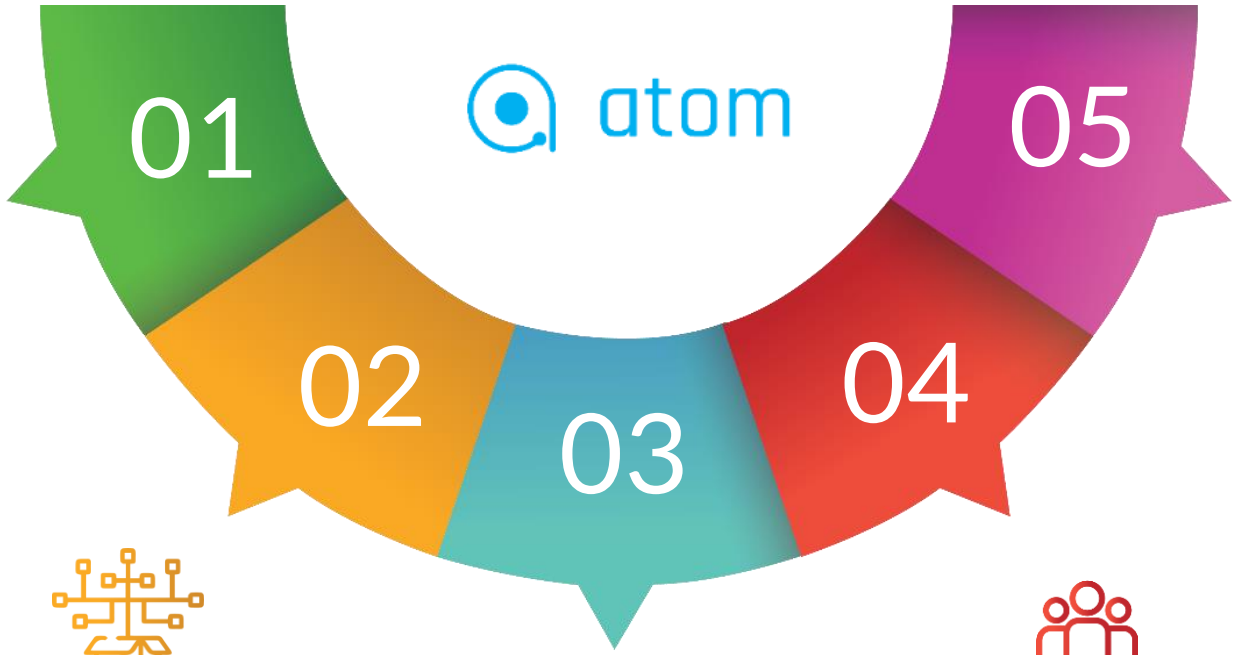
Site Name	Device Type	Compliance Status	Policy Name	Time of Enforcement
Caesar-1	Cisco NCS5502		MTU Policy	07/02/21, 11:59 PM
Valencia-2	Cisco NCS 5502		Disable CDP	07/05/21, 10:30 AM
Aria-3	Juniper ACX 710		NTP Policy	07/017/21, 3:45 PM
MGM-4	Mavenir RCS		SNMP String	07/22/21, 4:31 AM
Venetian-5	Altiostar vRAN		Password Policy	07/26/21, 5:04 PM

5G Network Build and Operation - ATOM





Why Anuta ATOM ?



Agent Deployment Flexibility

- On-Prem
- On-Cloud

Multiple Domains

- Service Providers
- WAN
- Core
- Edge
- Large Enterprises
- Cable MSO

Out-of-Box Services & Workflows

- L2/L3 VPN
- ZTP
- Compliance
- Software Upgrades
- Config Management
- 5G, DAA, CSD

Out-of-Box Device Support

- All Juniper Platforms (MX, PTX, QFX, ACX, EX, SRX)

Multi-Vendor Support

- 45+ Vendors
- 150+ Platforms

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Anuta ATOM Configuration & Compliance Management

ZTP Support

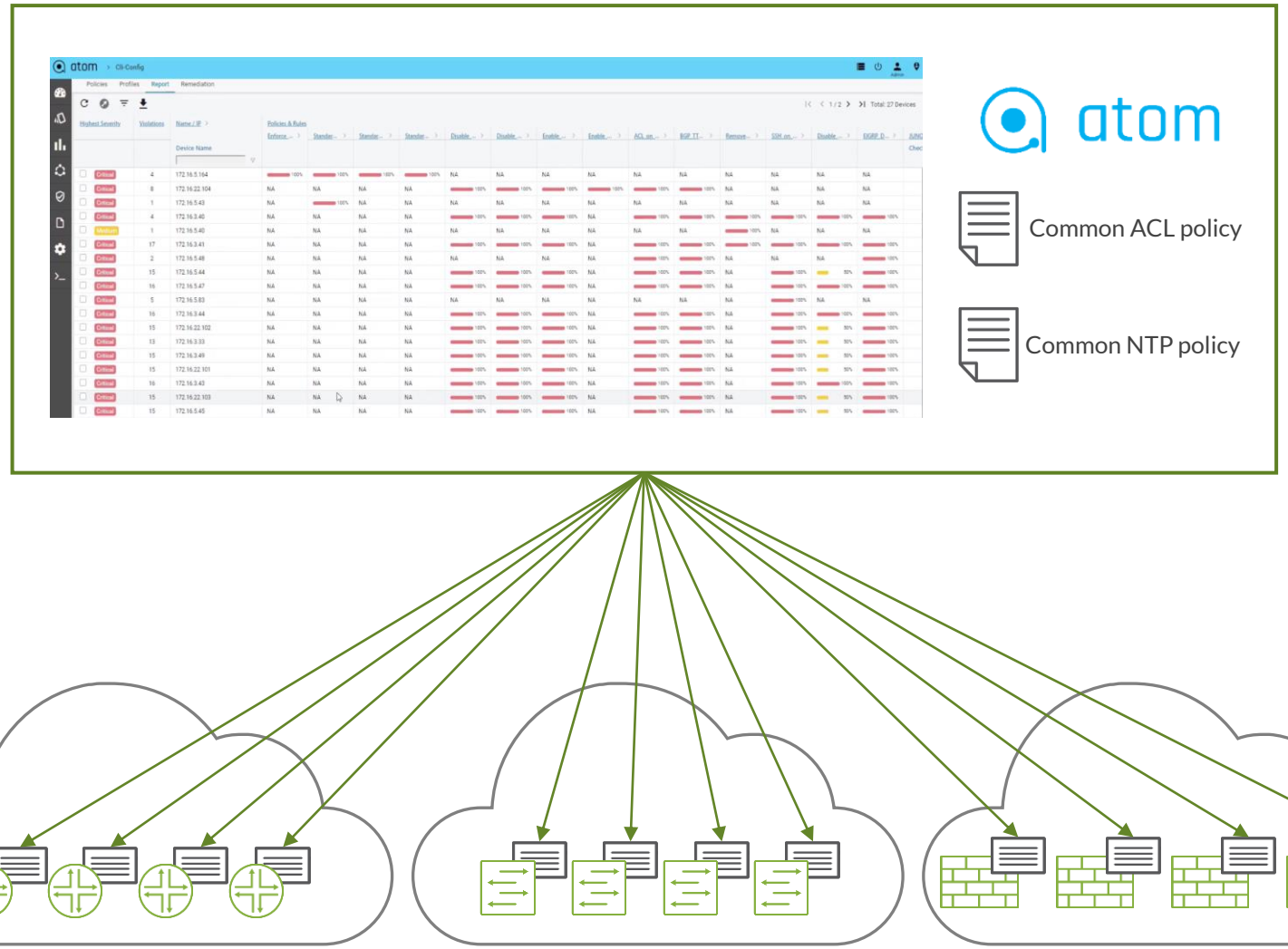
CDP/LLDP/SNMP Discovery

L2 Topology, Config Archival

Define Configuration standards & Remediation Policy by Device Family, Device Type, OS Type etc.,

Reports - Comprehensive compliance reporting view at device level

Remediation - Fix Policy Violations on one or more devices



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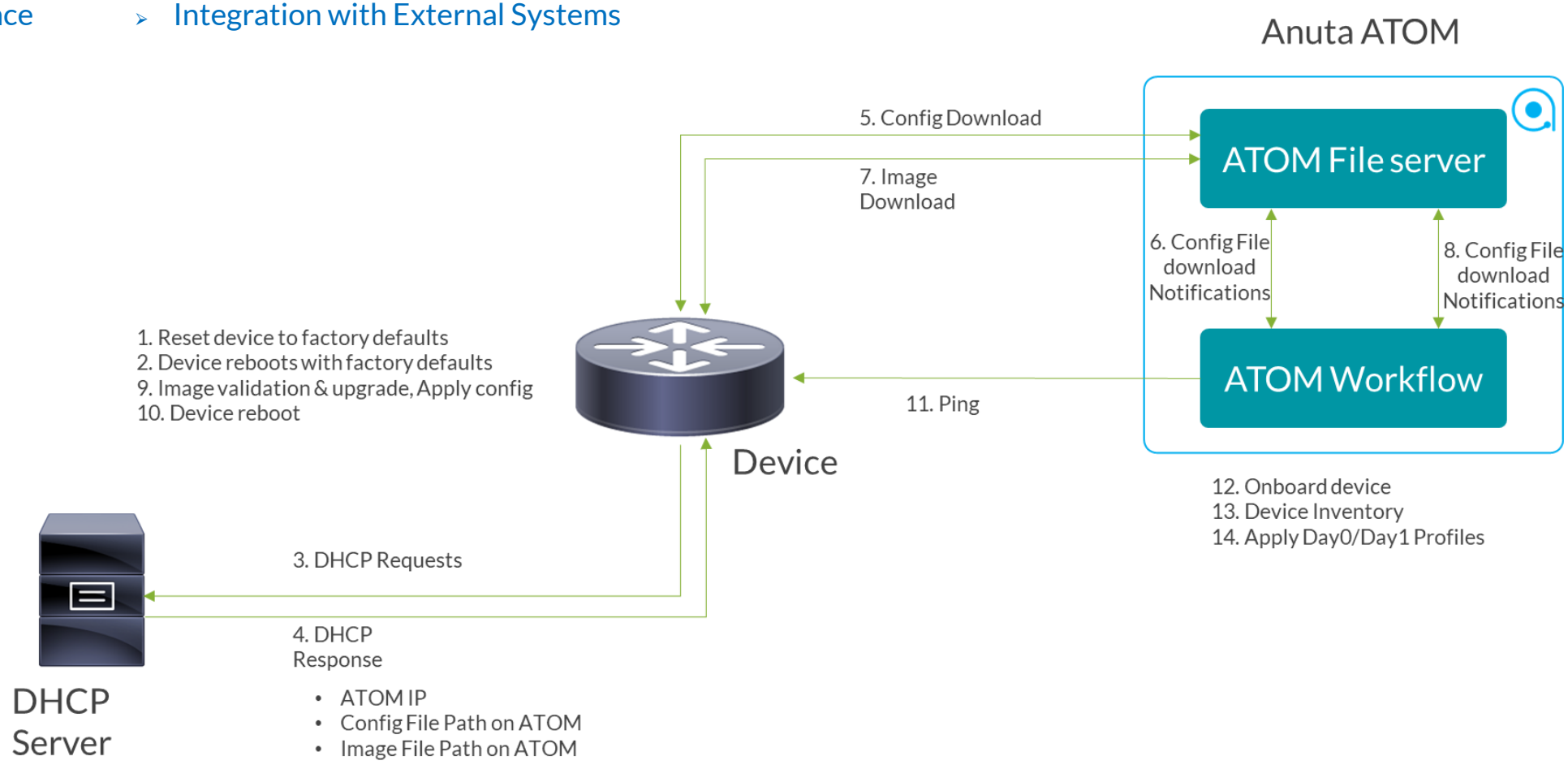
ZTP with ATOM

- Vendor Agnostic Provisioning
- Reduces Truck rolls
- Ensures Golden Config Standards
- Ensures Software Compliance
- Massively Scalable
- Auto IP-Address Allocation
- Library of Config Templates
- Built-in Image Server
- Integration with External Systems



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Anuta ATOM - Out of Box Compliance Policies

Out of Box Compliance Rules

- Policy configuration for all CLI Based devices
- Policy Configuration for OpenConfig and Yang Devices
- Validate compliance of existing services
- Verify Global IP Domain Name configuration
- Verify IP Name Server Configuration
- Check existence of NTP Address
- Validate Global Log Configuration
- Verify Hostname configuration
- Disable CDP LLDP on public interfaces
- Verify ACL configuration
- Validate clock and NTP server configurations
- Allow HTTPs connections only
- Verify Password Encryption
- Enforce OSPF, BGP loopback address
- Assurance - QoS Policies and SLA Profiles on Backbones and Cross-Connects
- Audit Management - TACACS, VTY, SNMP, Banner and NTP Policies on all devices
- L3 - Policy Based Routing, NAT and Routing Protocols across devices
- Security - Management ACLs, Firewall Rules, UTM, Antivirus Configuration

Support for 45+ Vendors
150+ Platforms

- ✓ JUNOS
- ✓ MX
- ✓ PTX
- ✓ ACX
- ✓ QFX
- ✓ EX
- ✓ SRX

- ✓ IOS-XR
- ✓ ASR
- ✓ N9K
- ✓ ISR
- ✓ NCS
- ✓ Cat 9K*
- ✓ Firepower*

* - Roadmap CY21

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Challenges to build a fully compliant network

Multi-Vendor Network

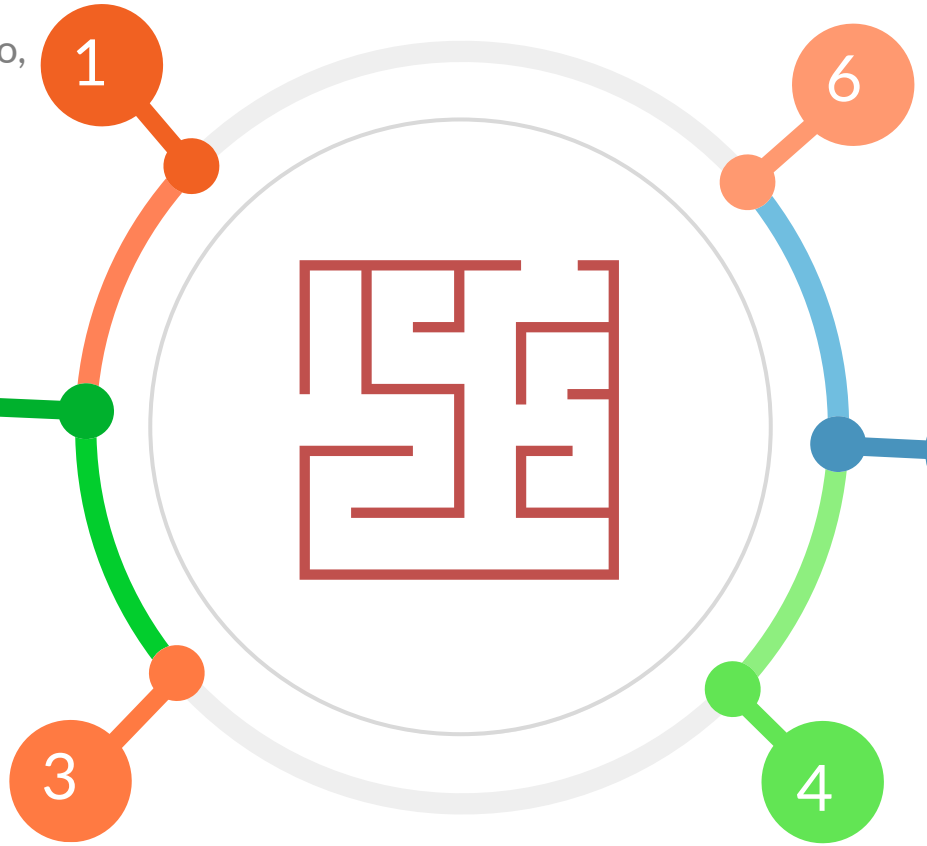
- Juniper, Cisco, Palo Alto, etc.

Large & Complex Networks

- **7500+** Devices
- **Max > 70 K** Lines of Config

Compliance Sensitive Features

- Multiple technologies
- **55** different Policies
- Internal standards
- Multiple Platforms



Varied Config formats

- CLI
- Native YANG

Standardization of Compliance

- Establish business process
- Notification & Ticketing

Legacy Config Management Tools

- Siloed approach
- Inability to meet scale requirements
- No templating support
- No support to remove undesired config

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Compliance Standards & Device Summary

Compliance Policies	
ATOM Defined	70
Customer Defined	55
Total	125

Vendor	Number of Devices
Cisco (IOS, IOS-XR, IOS-XE, NX-OS)	6012
Juniper	74
Palo Alto	2
F5	134
Offline Devices	1278
Total	7500

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Why Anuta ATOM for Compliance

Multi-Vendor Support

- 45+ vendors
- 150+ platforms

Exhaustive config & change mgmt.

- Periodic, triggered backups versioning
- Audit trails to track faulty config

Customizable compliance framework

- CLI & YANG Support
- Jinja Templates

Inventory management of resources

- Grouping based on vendor, models
- Grouping based on roles, locations, resources

Continuous Compliance on Device Groups

- Triggered audits for faster detection
- Scheduled & On-demand audits

Auto-remediation

- Auto-Remediation for accelerated compliance
- Notification & ticketing through workflows

Comprehensive Reporting

- Scheduled & On-demand reports
- Dashboards

Scale the breadth of the network

- Microservices architecture
- Rolling upgrades without downtime

Single-Pane-of-Glass

- Integrated platform
- Alerting & Closed Loop Automation

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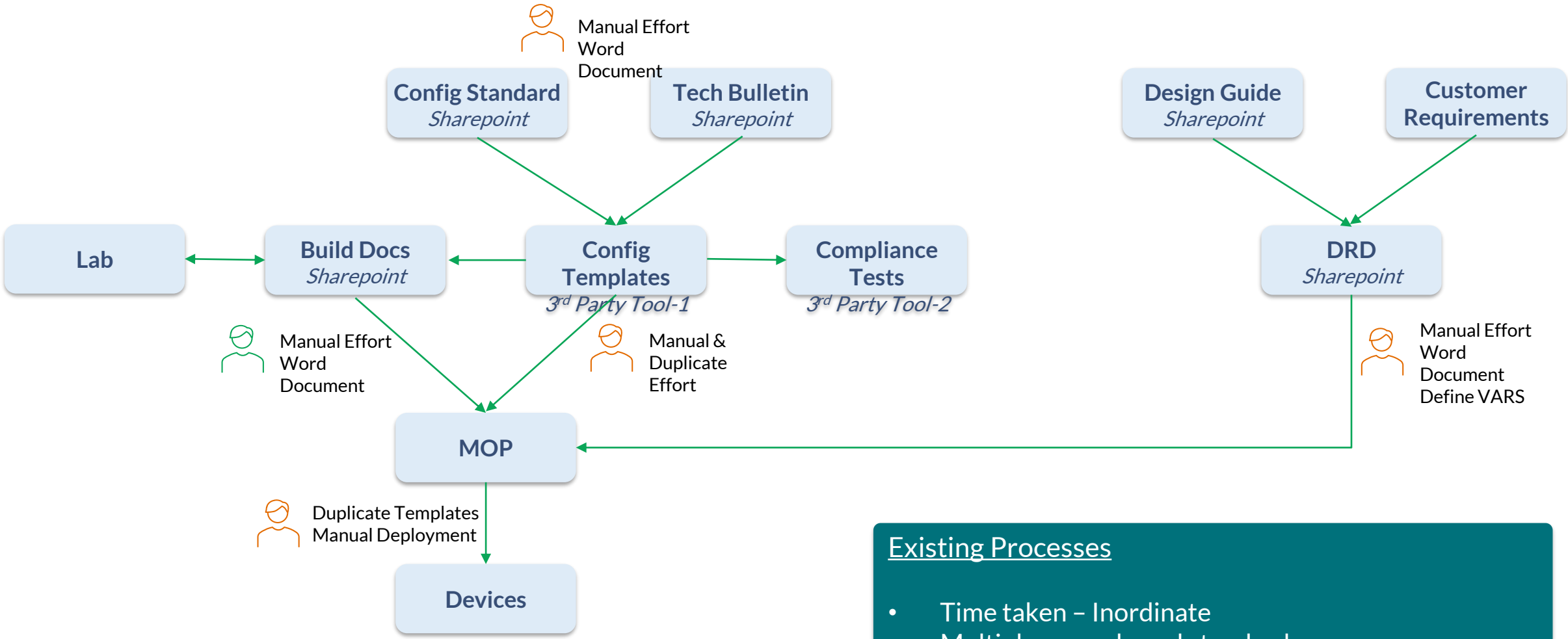
Existing Compliance Audit Process



Existing Processes

- Time taken – Inordinate
- Multiple paper-based standards
- Manual intervention/Cron Jobs
- Error Prone
- No Remediation/Manual Remediation
- No single-source-of truth

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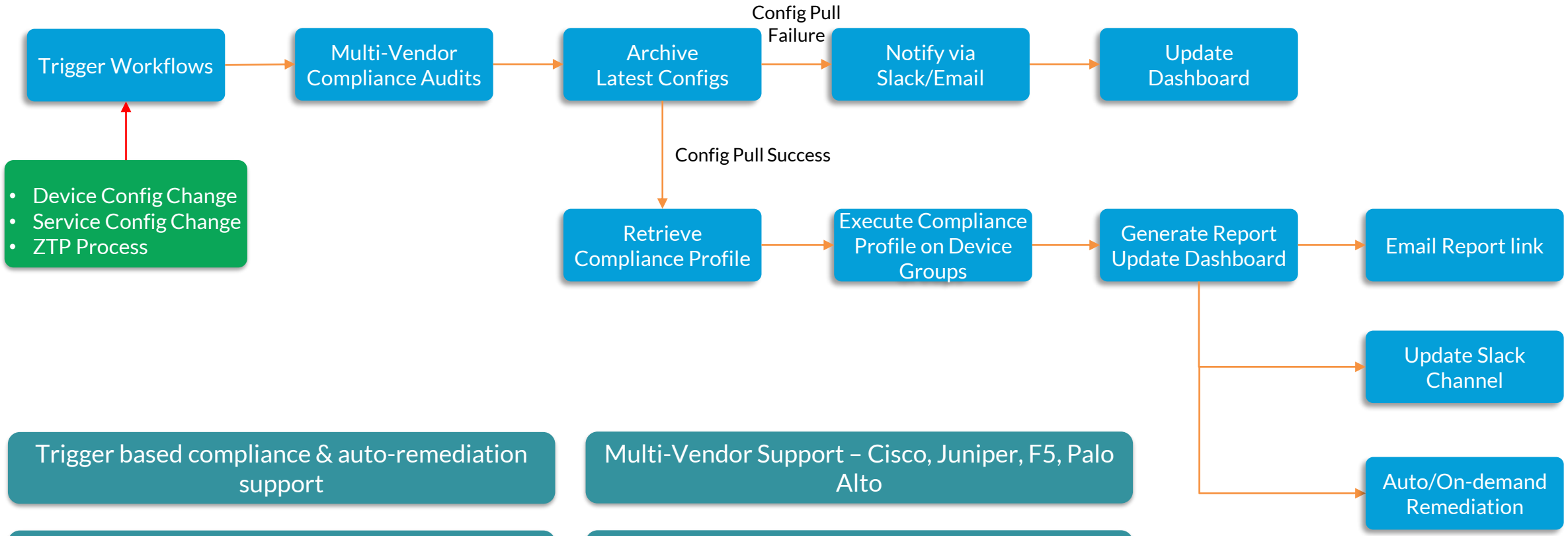
Enhanced Continuous Compliance & Remediation with Anuta ATOM



Trigger based compliance & auto-remediation support

Multi-Vendor Support – Cisco, Juniper, F5, Palo Alto

ATOM detects non-compliance in ~ 10 seconds

Parallel execution of remediation to meet scale

ATOM ensure compliance in < 1 minute through auto-remediation

Workflow Integration to streamline business process

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Anuta ATOM meets Massive scale with ease

Steps in ATOM Compliance	Device Count	Time Taken
Configuration Sync	7500	1.5 hours
Compliance Run		2 hours
Report Generation		20 mins
Remediation		~ 1 min per device

** Enhanced SLAs if additional resources are added to ATOM

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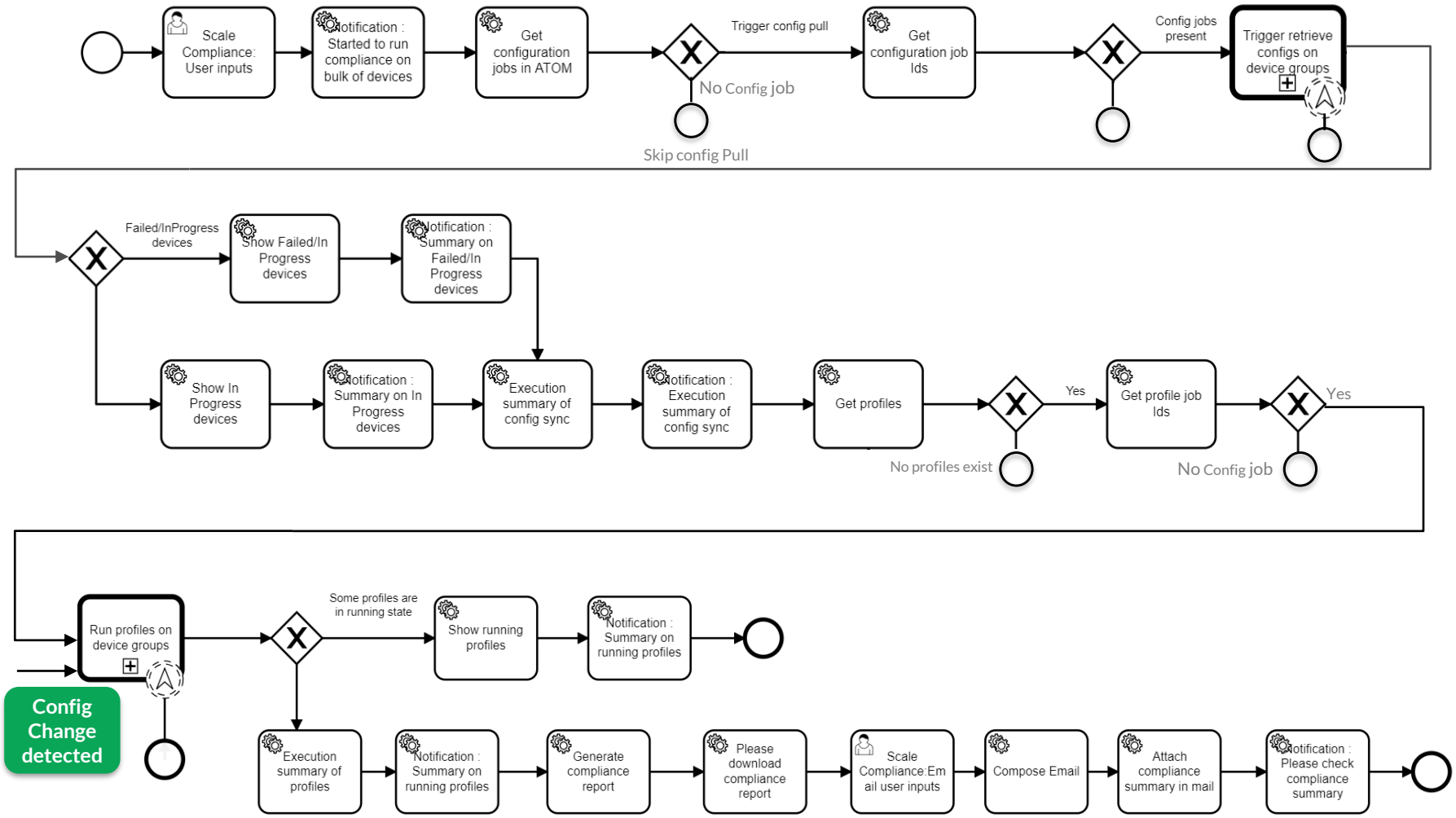
Compliance as a business process



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Engineering
Simplicity