Prodapt powering global telecom

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Case Study: Orchestration of Hybrid Networks

Achieving End-To-End Service Orchestration across Hybrid Networks

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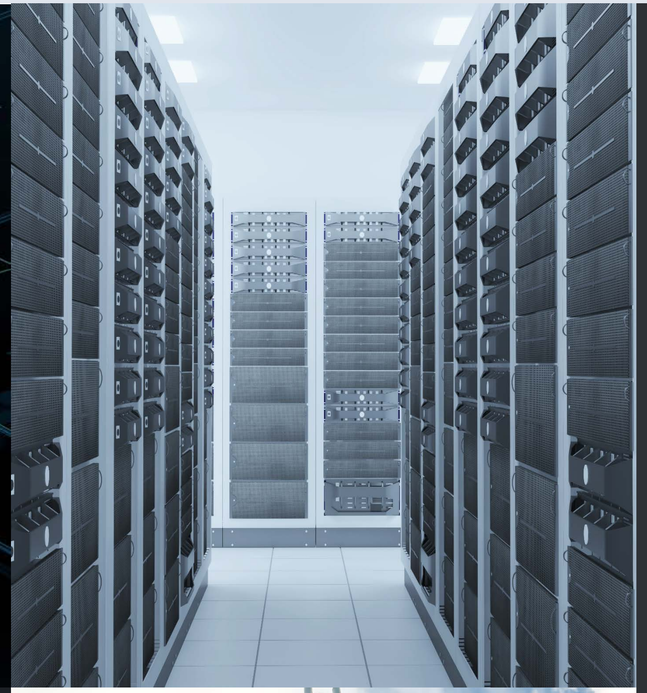
Windstream

Residential, Small Business, Enterprise and Wholesale Business Segments



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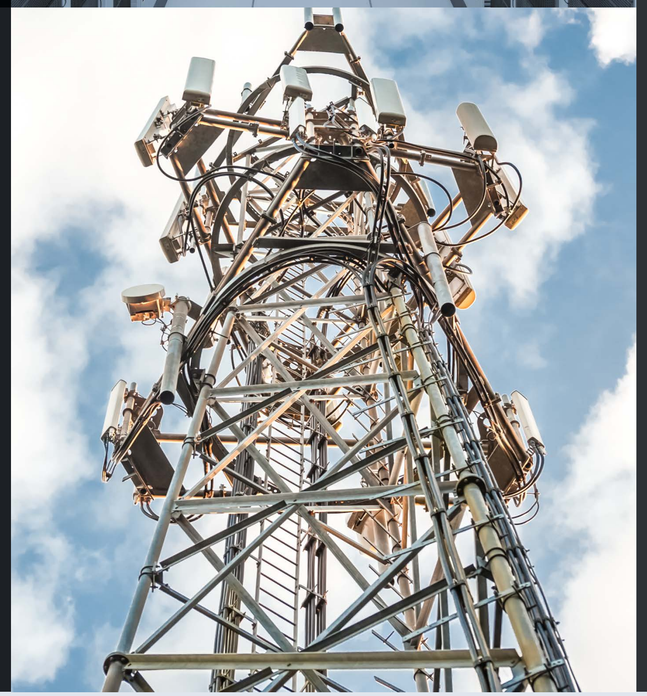
Our Services:

- Data Networking
- Core Transport
- Security
- Unified Communications
- Managed Services
- SD-WAN
- Broadband
- Entertainment

Windstream is a U.S. based FORTUNE 500 company and a leading provider of advanced network communications and technology solutions

SDN Services

- Optical Wave
- Carrier Ethernet
- SD-WAN
- Broadband Element Commissioning



Prodapt → Who We Are

Exclusive focus on the digital service provider (DSPs) vertical

Key Clientele

LIBERTY GLOBAL
CenturyLink
AT&T
windstream
verizon
Virgin media
T-Mobile
Sprint
kpn
HOSTING
Spectrum
TELE2

Trusted partner to leaders in the communications industry, including Fortune 500 customers and 95% of clients have re-engaged

Portfolio

- RPA/Telebots
- SDN/NFV
- AI/ML & IoT
- O/BSS and BPO
- DevOps & Microservices

Part of
The Jhaver Group

$1.3 Billion
64 Locations
16,500 Employees

Right-Sized, Flexible Partner with multi-shore delivery model

Global Operations

35%+ YOY Growth

Deloitte. Technology Fast50

Business Drivers for Network Transformation

1. Reduce service delivery time
2. Revenue & margin growth
3. Seamless capacity management
4. OPEX and CAPEX reduction
5. Enhanced customer experience with self-service

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Technical Solution Requirements

- Intent-based, multi-domain service orchestration
- Flow through automation
- Network-based topology database
- Interoperability between legacy and SDN-enabled network appliances
- Avoid vendor lock-in
- Microservices-based deployment architecture

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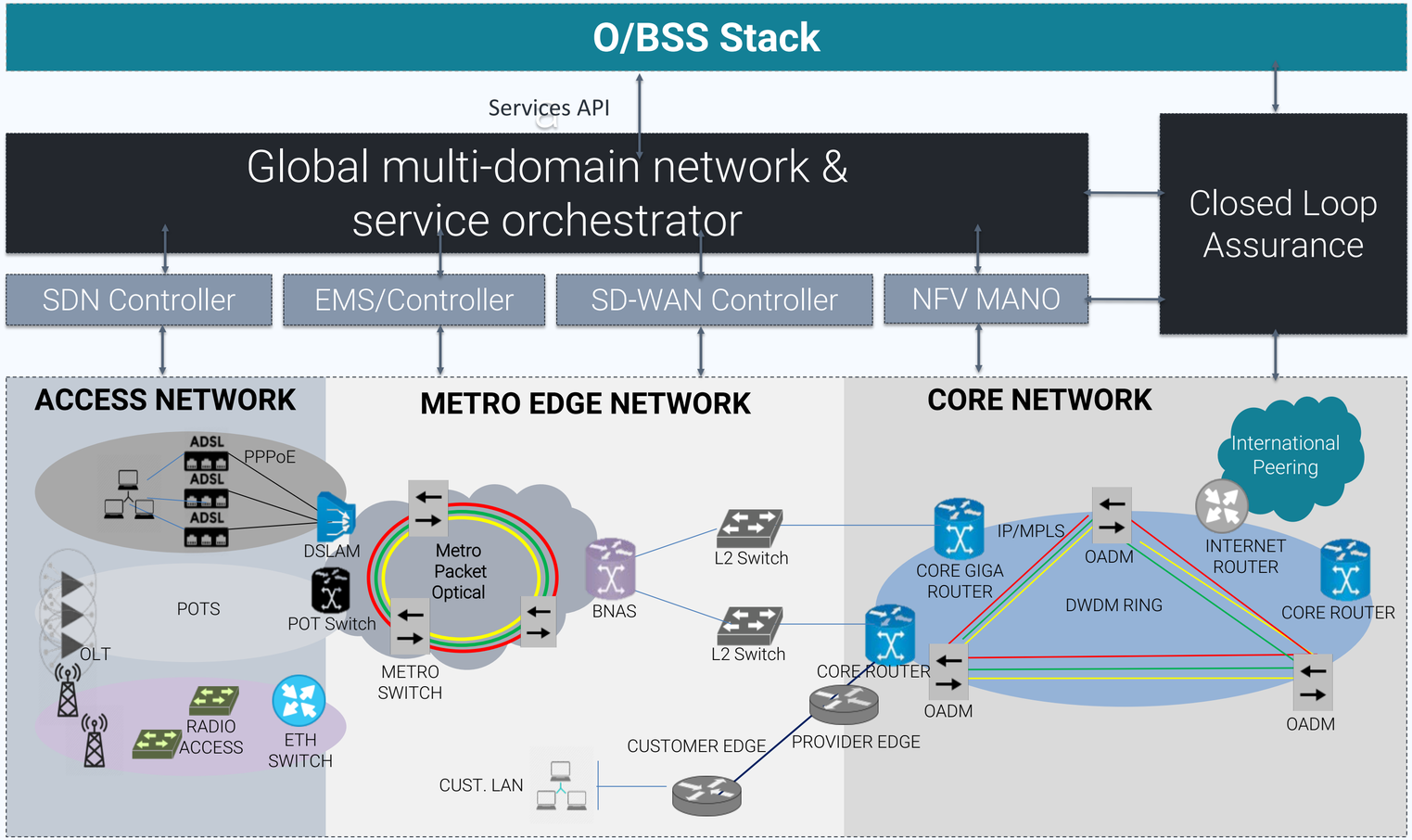
Architecture Vision for Based Multi-Domain Orchestration



Key Considerations:

- **Cloud infrastructure at core, edge & premises**
- **Public & private cloud tight coupling for service chaining**
- **Programmable optical network optimizing traffic flows**
- **Overarching service orchestration across physical & virtual network**

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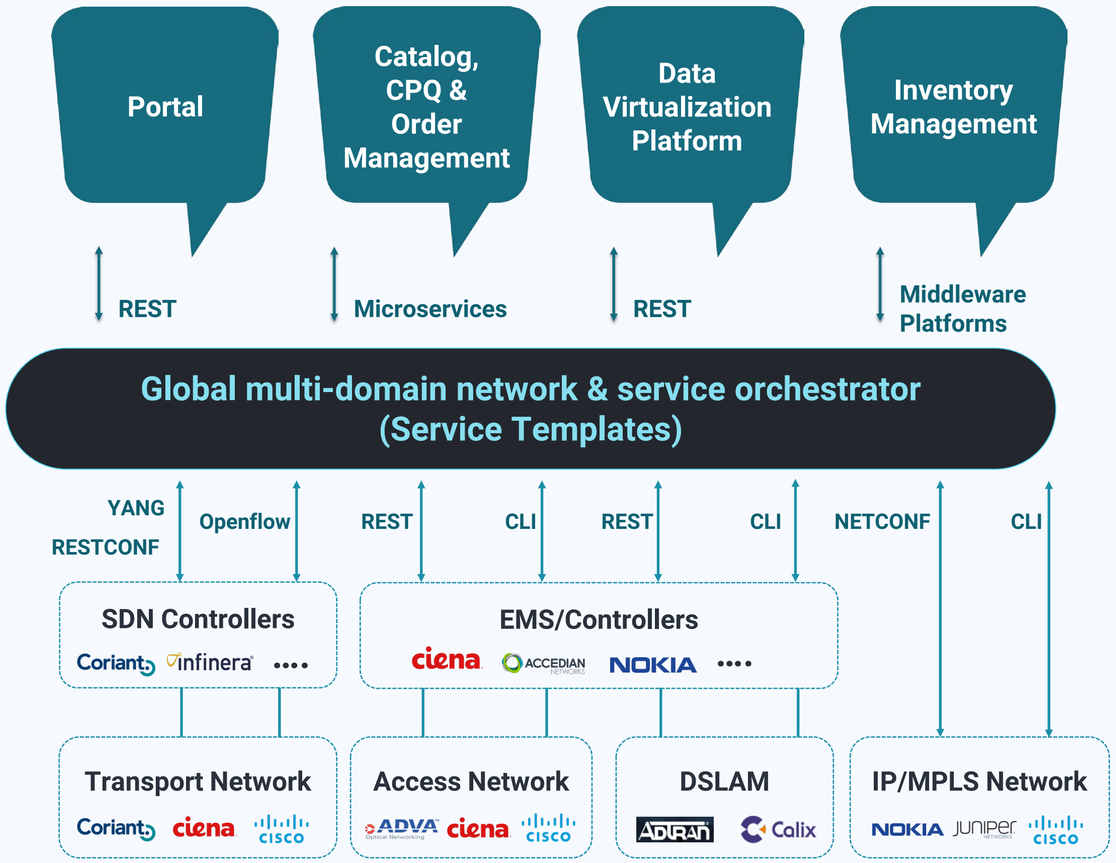
Sample multi-domain, multi-vendor ecosystem architecture



What we did?

1. Northbound Interfaces (NBI)
2. Service Templates (TOSCA/HEAT)
3. Southbound Interfaces (SBI)

E.g. Challenges mitigated

- Lack of open APIs for OSS
- Lack of single source of truth e.g. inventory data
- Lack of legacy network programmability
- IT & network skillset bridging

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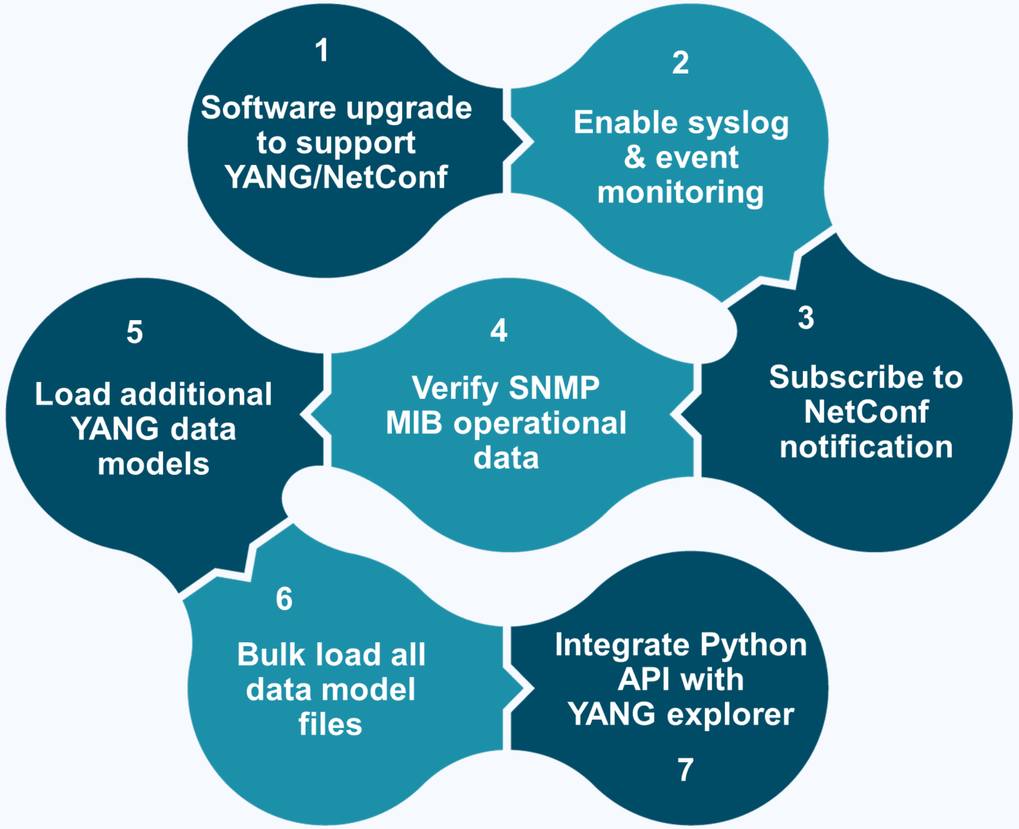
4 Switching & routing enhancements



What we did?

Enabling switches and routers to support centralized configuration

Configure YANG/network configuration models

E.g. Challenges mitigated

- **Many vendor specific features still not available as YANG models**
- **Standard configuration not available across all vendors**
- **Developed CLI-based adapters and Python based APIs**

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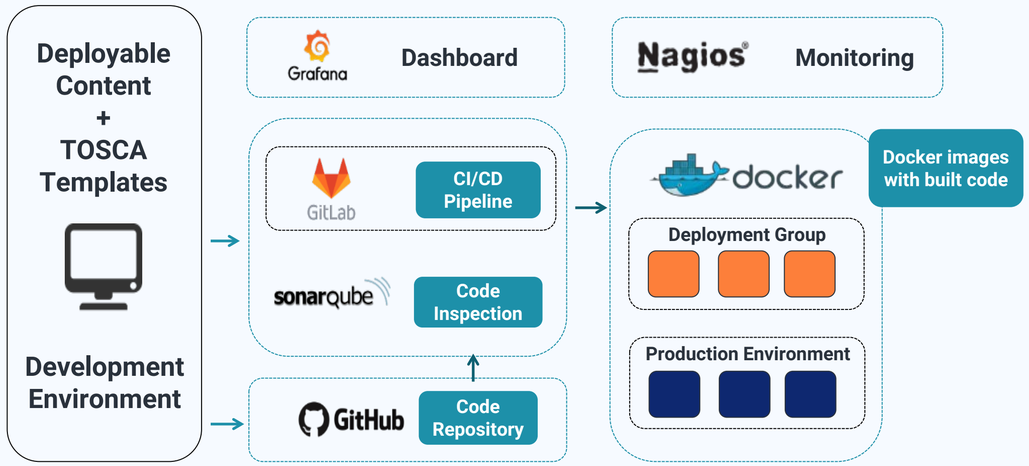
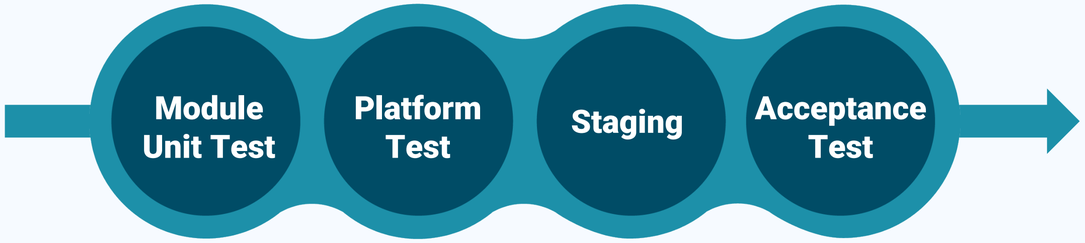
5 DevOps/Agile and testing framework



robotframework
A generic test automation framework



DevOps/Agile Framework

- Automating planning → Deployment CI/CD pipeline

Testing Automation Framework

- Automating system, Interoperability and integration, Simulation testing across domains
- For CE 2.0 (E-Line, E-Access), L2/L3 VPN, Wave, SD-WAN, vCPE.

E.g. Challenges Mitigated

- Change requests approval
- Policy constraints for code change in production

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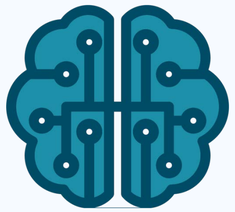
6 Enabling closed loop assurance leveraging AI/ML

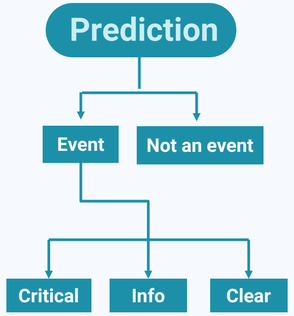
E.g. Performance Management (PM) Data

validity	numSampleSet	TomTxLBCMin	TomTxLBCMax	TomTxLBCAve
2017.09.18 01:45:00	3	900	27.99	28.35
2017.09.18 07:00:00	3	900	29	29.12
2017.10.18 07:00:00	3	900	28.81	28.77
2017.09.24 03:45:00	3	900	29.42	29.57
2017.09.17 15:00:00	3	900	28.58	28.72
2017.09.24 06:45:00	3	900	29.37	29.5
2017.09.24 08:30:00	3	900	29.4	29.53
2017.09.24 08:15:00	3	900	29.4	29.55
2017.09.18 14:45:00	3	900	29.03	29.18
2017.09.18 14:30:00	3	900	29.04	29.16
2017.09.20 05:45:00	3	900	28.98	29.12
2017.09.20 05:30:00	3	900	29	29.12
2017.09.24 08:00:00	3	900	29.43	29.57
2017.09.20 05:15:00	3	900	28.99	29.13
2017.09.23 02:45:00	3	900	29.42	29.56
2017.09.18 00:00:00	3	864000	27.9	28.26
2017.09.22 15:00:00	3	900	29.45	29.58
2017.09.22 15:15:00	3	900	29.43	29.58
2017.09.22 15:30:00	3	900	29.47	29.59
2017.09.22 15:45:00	3	900	29.49	29.63
2017.09.23 02:30:00	3	900	29.43	29.55
2017.10.10 11:15:00	3	900	29.41	29.54

Machine Learning Algorithm



Predicts events of different severities based on the intelligence built



What we did?

Big data lake implementation

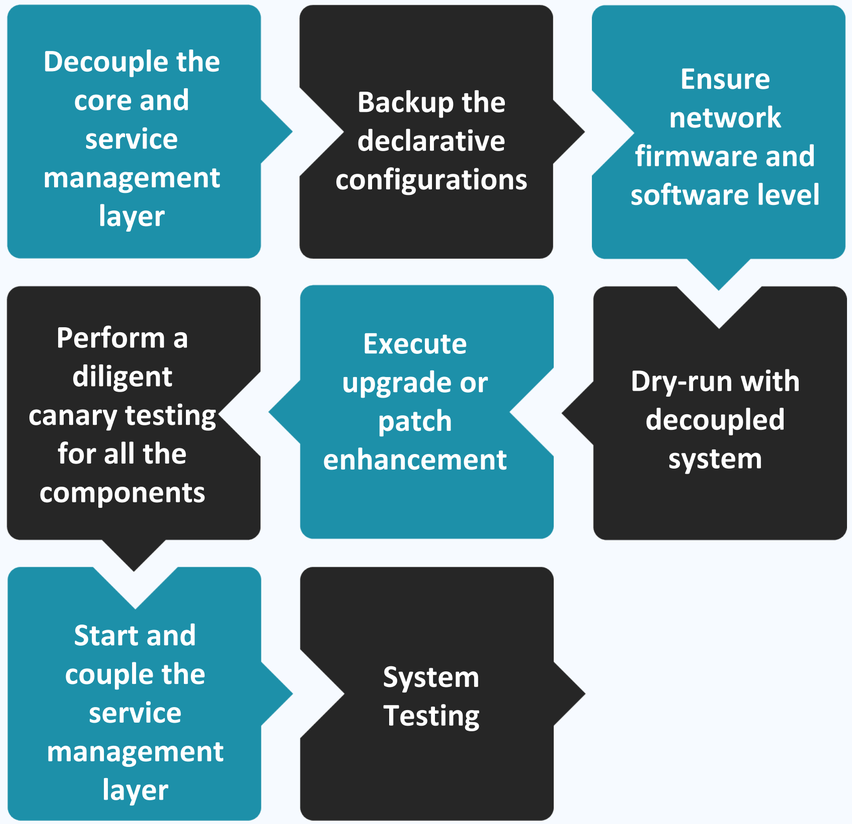
Custom graph visualization

Data prediction PoC & porting into production

E.g. Challenges mitigated

- **Skills pivot for big data lakes, analytics, AI and ML**
- **Custom ingestion code i.e. integration various data sources such as alerts, performance, ticket**
- **Visualization tool development & mail integration**
- **Model selection & training**

7 Applications Operation and Maintenance



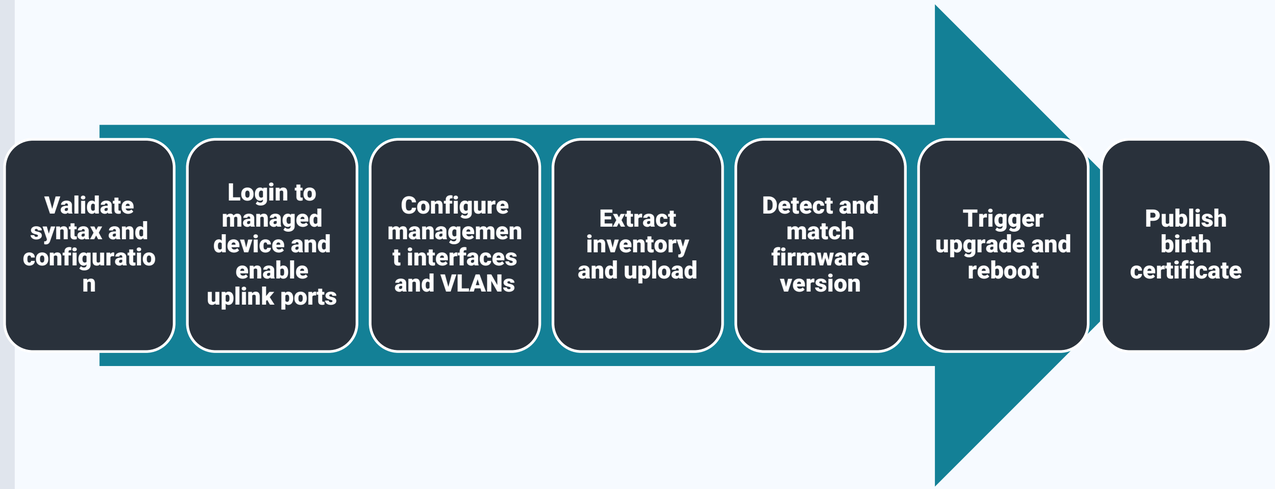
What we did?

- Proactive operation and maintenance ensuring application availability
- Proactive application upgrade and enhancement based on product rollout

E.g. Challenges Mitigated

- Seamless multi-vendor, multi-domain production environment upgrade
- Network traffic and application load balancing

8 Managed Network Upgrade – Enabling SDN Features



What we did?

- Automated bulk firmware and software upgrade, enabling SDN features
- CLI-based automated bulk configuration across managed routers via orchestrator

E.g. Challenges mitigated

- Heterogenous network elements and software levels
- Multiple legacy NMS and EMS systems

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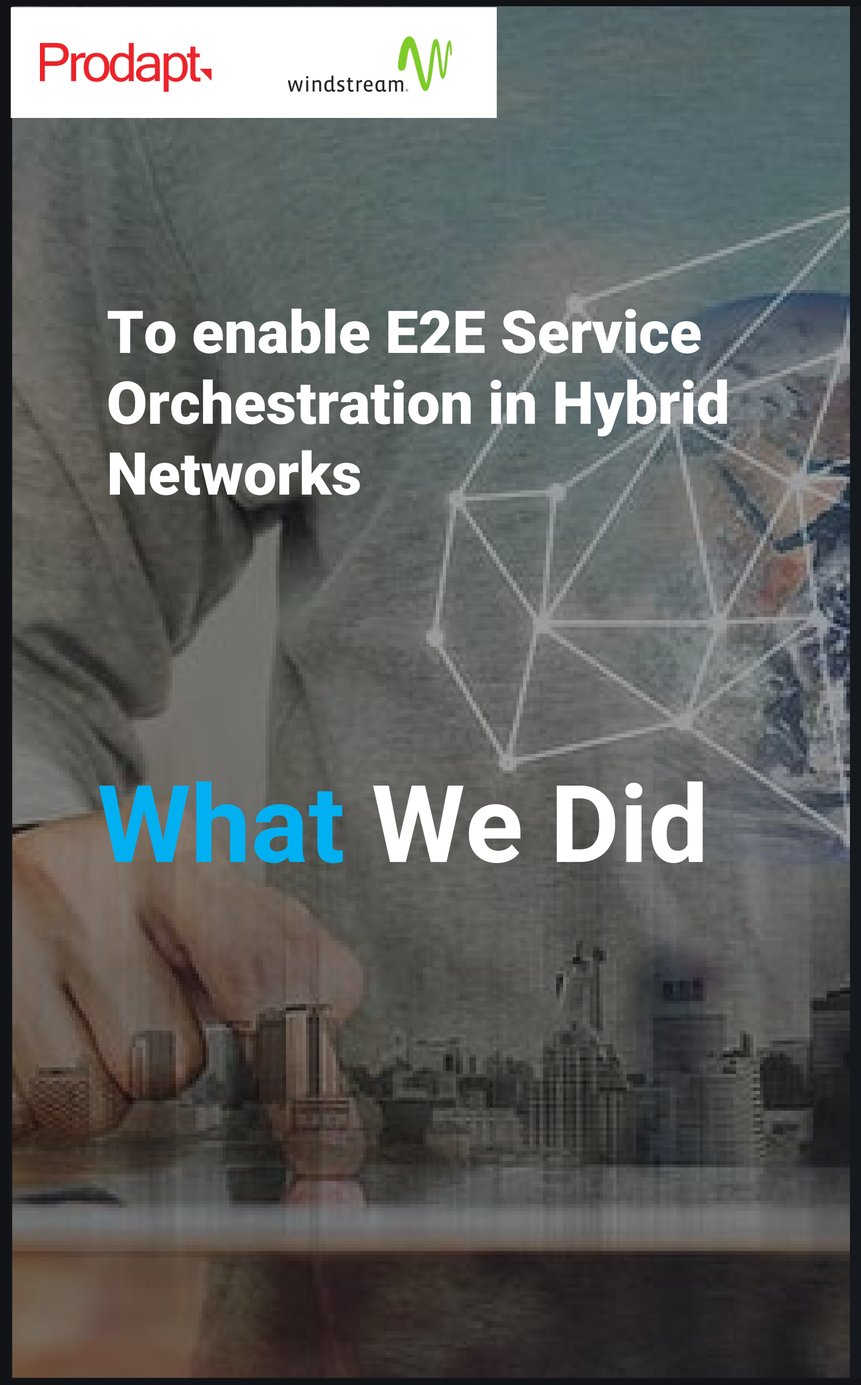

To enable E2E Service Orchestration in Hybrid Networks

What We Did

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Southbound Interfaces (SBI) 1	Service Templates (TOSCA/HEAT) 2	Northbound Interfaces (NBI) 3
Routing and Switching Enhancements 4	DevOps and Testing Automation 5	Closed Loop Assurance with AI/ML 6
Applications Operation and Maintenance 7	Managed Network Upgrade 8	Open Source Solution PoCs 9

Solution Platform Advisory 10

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Key Challenges 

- IT and network skillset combination
- Legacy network programmability
- Moving to agile and DevOps
- Virtualization adoption
- Network automation
- Business and architecture ongoing involvement

…Mitigated 

- Partnerships (Prodapt, OEM vendors), Skills pivot & Cross-trainings
- Plan-prioritize relevant user stories
- Automated key aspects of CI/CD/CT
- Early wins on agility and TTM for service delivery
- Vision alignment and management sponsorship

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01

Model-driven Configuration Templates

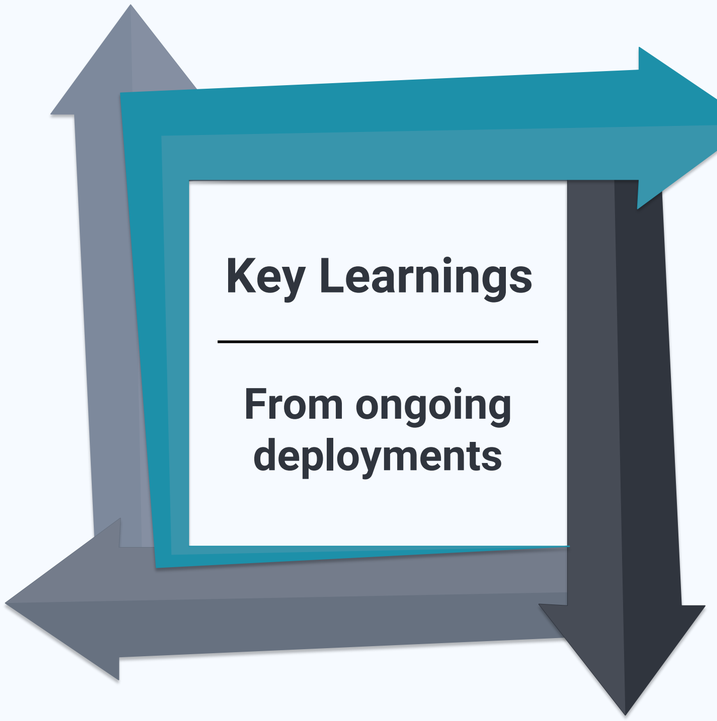
Network abstraction based on YANG Model for templatized configuration

02

API-driven Automated CRUD

Automated service creation based on user configurations via APIs

Only specify CREATE operations, REDEPLOY, UPDATE, DELETE auto-generate



03

Transactional Guarantees

Reduced manual intervention with templates configuration and automated CRUD

Ensure fail-safe operations

04

Enabling Self-healing Network

Data Analytics systems and DSP Data Lakes can be integrated for telemetry forecasting and analysis

Enables error forecasting and demand patterns

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Benefits to our customers

Via an automated provisioning in multi-vendor, multi-domain ecosystem in conjuction with our customer ecosystem

- Reduced time to rollout new services
- Faster revenue & New revenue
- CAPEX/OPEX reduction
- Better customer experience

THANK YOU

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