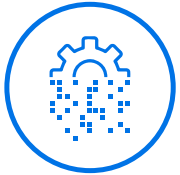


Drive Revenue Beyond Connectivity

Atos: BSS Modernization
Digital BSS

Atos

Trends in Telco



Digital transformation,
customer experience



Enhanced analytics
and AI



5G rollout &
monetization, Open RAN



Operational automation



New digital service

Regional Growth Trends

NAM (CAGR till 2026)

- Service ~ 5,5%
 - Software ~ 11,3%
- Attractive invest.

EMEA (CAGR till 2026)

- Service ~ 4,1%
- Software ~ 7,9%

MEast, Africa (CAGR till 2026)

- Service ~ 8,5%
- Software ~ 10,0%

Business Trends

- Further convergence (media, fix, mobile)
- M&A / market consolidation
- More complex business models (B2B2X, JV, Alliances)
- More vertical orientation
- Expansion into digital services
- Service accumulation (One...)
- Downturn preparation

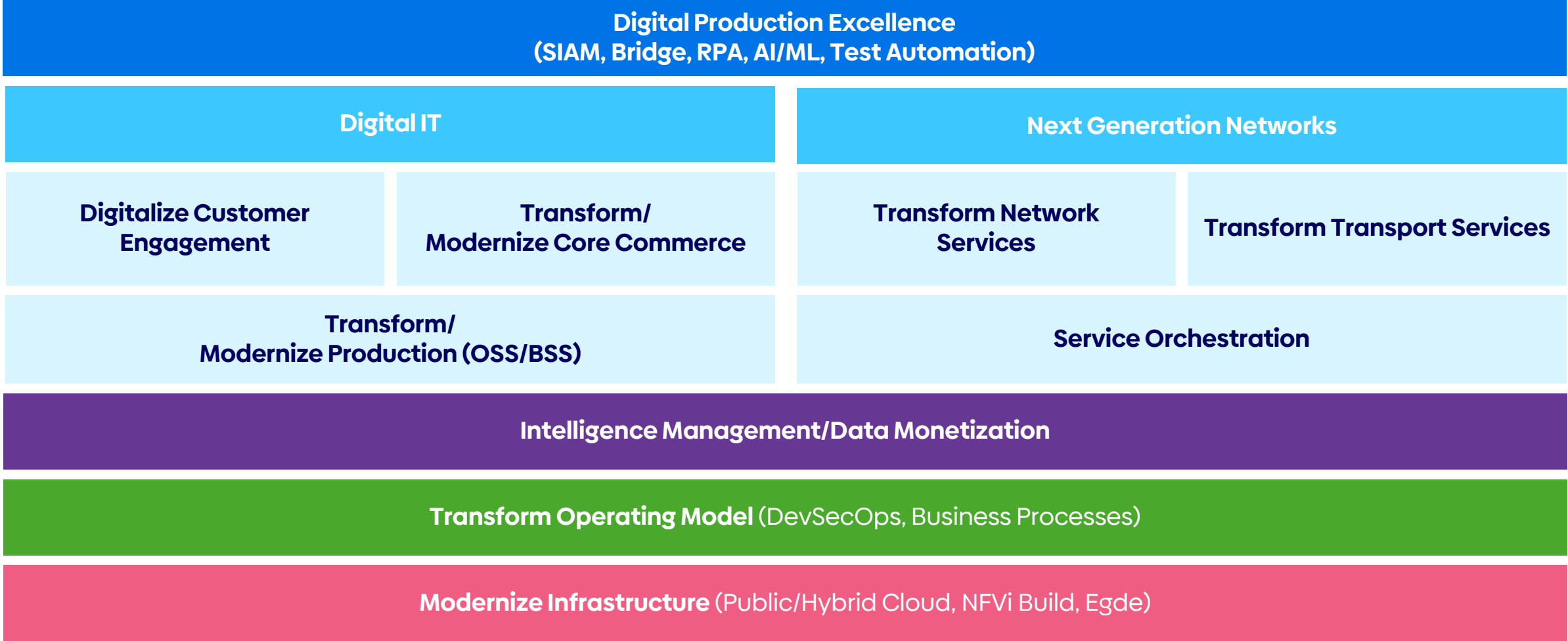
Technology Trends

- 5G rollout (public/private)
- SDN / SD-WAN / NFV / o-RAN
- Edge Cloud & (industrial) IoT
- Multi Edge / Multi Cloud
- ML / operational automation
- AI for customer care
- Enhanced analytics
- Digital transformation
- New (digital) services
- Privacy management
- Cybersecurity

Telco Market Challenges

Customer Challenges	1 Fixed-mobile Convergence (FMC) Offers	2 Improved Customer Experience	3 Cost Reduction	4 New Revenue Generation/ ARPU	5 Reduced Time to Market
Expertise	<ul style="list-style-type: none"> Converged customer experience Dynamic product catalog 	<ul style="list-style-type: none"> Customer journey and user experience design based on persona's 	<ul style="list-style-type: none"> IT and Network Infrastructure Modernization / Move to Cloud Distributed Digital Factory Automation 	<ul style="list-style-type: none"> NFV Lab Atos NGIN B-to-B product catalog 	<ul style="list-style-type: none"> DevOps operating model transformation
Solutions	<ul style="list-style-type: none"> Consolidation & Harmonization of CRM, BSS, OSS, ERP 	<ul style="list-style-type: none"> Omnichannel Customer Engagement Digital BSS Transformation 	<ul style="list-style-type: none"> Mutualize & modernize BareMetal aaS Sell with/through Next Gen Telco Networks 	<ul style="list-style-type: none"> Sell with/through 5G/Edge computing Intelligence Management Data Monetization 	<ul style="list-style-type: none"> Business processes DevSecOps approach High Performing DevOps team
References					
Partners					

Atos Portfolio for Telco



Digital BSS: Industry Trends, Client Priorities

Addressing priorities of clients, users, partners...



Empower IT

- ✓ Debt-free IT architecture to secure IT investments, avoid data siloes, ensure e2e scalability, flexibility, openness and convergence
- ✓ BSS Hybrid cloud architecture that provides unified, scalable and cost-effective BSS infrastructure
- ✓ Operation automation and analytics that assure digital operation efficiency



Empower Client

- ✓ Ensure Great digital customers experience with highly responsive digital frontend/omnichannel
- ✓ Enable digital communication channels (Chatbot/Social media)
- ✓ Ensure digital services security and reliability



Empower Users

- ✓ Transform business processes to establish Customer oriented organization using convergent design
- ✓ Data driven dynamic business process management based on open API including digital OM & digital product life cycle
- ✓ E2E Business processes automation using Open API
- ✓ Realtime business insight & data driven business operation



Empower Partners

- ✓ Implement flexible partner & settlement management processes to ensure agility of business platform development
- ✓ API management to ensure, security, accountability and resilience of the business platform

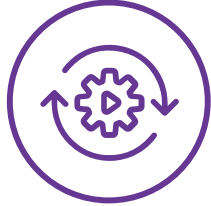
What Services does Atos Offer to enable Digital BSS?

Supporting clients from consulting, to complete transformation



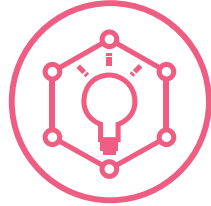
Consulting

- Blueprint transformation roadmap
- Define BSS transformation approach
- Legacy Product pruning
- Simplify & Rationalize Business process



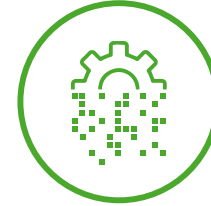
Optimize

- Simplify business processes
- Consolidation & Harmonization of multiple BSS Stacks/apps
- Upgrade legacy BSS
- Consolidate infrastructure, migrate to low-cost components



Modernize

- Modernize legacy BSS:
 - Digital Overlay
 - Modernize Back End



Transform

- Transform to Cloud native, micro services architecture with Tmforum Open API Compliant BSS Components
- Transform Operating model
- Decommission legacy

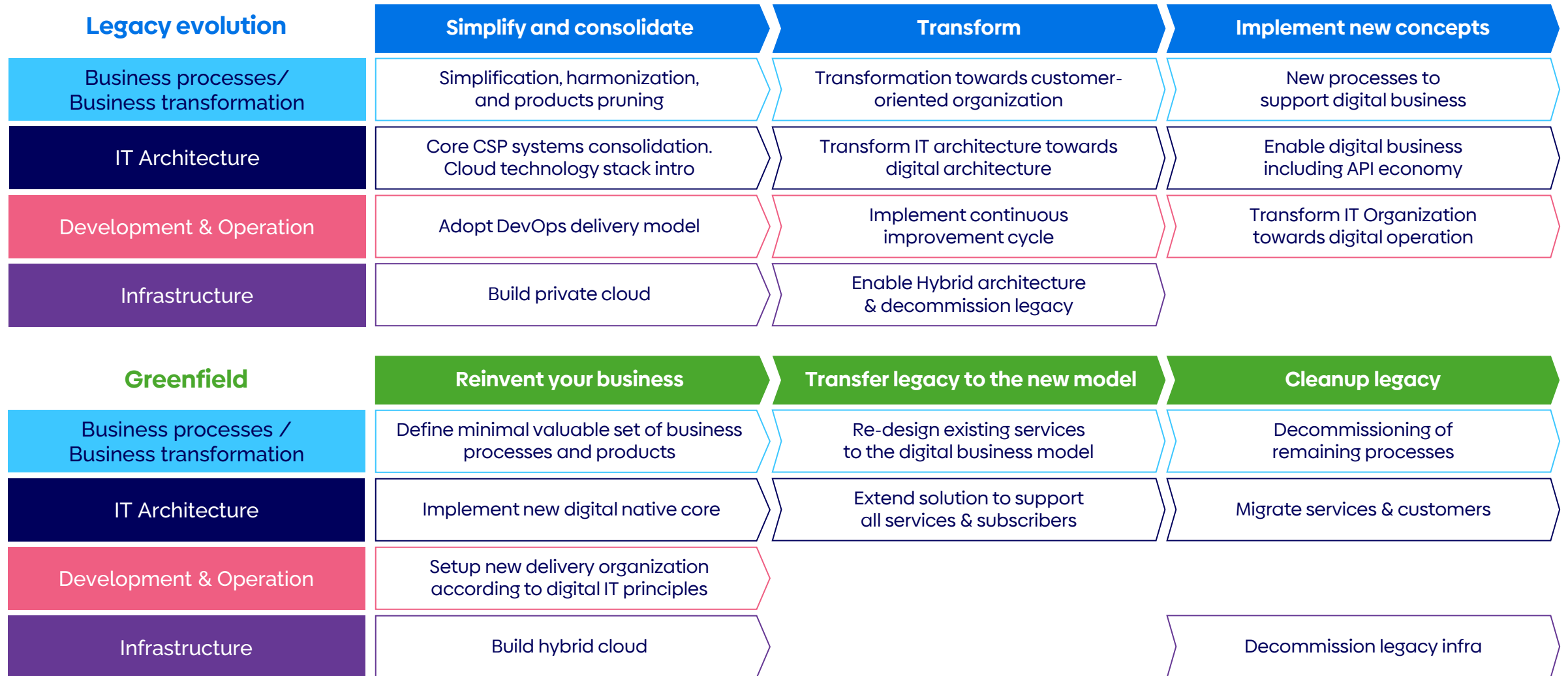


Assurance

- Program Governance
- Testing & Quality Management
- Transformation Program Quality Assurance

Digital BSS Transformation Strategies...

Either Green Field or Legacy Evolution or Hybrid



Benefits with Digital BSS Transformation?

	Legacy	Digital BSS	Benefits
Product and Service offerings	Siloed and ad-hoc	Simplified and consolidated catalogue	Faster time to launch products (20-50%), Improved Customer Experience
Business Process Map	Complex, technology driven	Simplified, agile	Operational Efficiency (10-30%)
IT systems architecture	Multiple stacks and too many systems	Layered architecture, technology agnostic, 2 speed, Open Source	Enables New Revenue Streams, Operational Efficiency (20-30%)
Execution environment	On premise	Cloud, Hybrid	Cost reduction (15-30%)
Organization and people change	Highly specialized	Open, flexible	Operational Efficiency
Partner/supplier Management	Multiple, linked to specific legacy applications	Reduced, shared KPIs, part of innovation process	Innovate New revenue streams



Consolidated Rating, Charging and Billing Functions in a Single Solution

Leading Mobile Service provider in Romania



Client Challenges

- Long TTM for complex products
- Legacy rating and charging system had limited ability to support sophisticated promotions.
- No ability to design complex group charging scenarios.
- Inability to bundle non-telco services.



Atos Solutions

- Atos consolidates the rating, charging and billing functions in a single solution by implementing a new system based on ORACLE BRM/ECE product, integrating the new billing system in an ORO environment and migrating data and processes from the legacy platforms to the new billing system.
- The project was split into two parts:
 - Convergent charging implementation – replacement of Alcatel-Lucen, legacy BRM system with single convergent charging system integrated with legacy billing & invoicing system.
 - Convergent billing & invoicing implementation of billing, invoicing and customer financial processes in convergent environment.



Business Benefits

- Ability to support platform business model with all its complexity driven by multiple partners with sophisticated business models.
- Performance and scalability that support mass real-time transactions processing.
- Quality of service and experience are fundamental to network operators' success in terms of attracting and keeping customers.
- Solution has contributed to maintaining profitability.



Catalog-based Order Management

Leading Service provider in Spain



Client Challenges

- Fragmented Product Catalogs for different customer segments.
- No central point for Order Management.
- Partial-human based and manual fulfillment plans.



Atos Solutions

- Transformation plan to achieve a Convergent, Multichannel Architecture for mobile and wireline.
- Catalog-driven Order Management: the fulfillment plan is built dynamically based on the products requested by customer
- Implementation of TIBCO Fulfillment Orchestration Suite.
- Business consultancy to define service level, independent processes
- Definition of architecture guidelines for processes and catalog configuration.



Business Benefits

- Omni-channel, interoperable customer journeys.
- Optimized and managed sales processes.
- 100% configurable processes and notification points
- Enhanced features added to FOS, as a result of cooperation between Atos and TIBCO
- System ready to support all mobile processes, and solid basis for fixed-mobile convergence



Full CRM Transformation

Leading CSP in Netherlands



Client Challenges

- Complex IT architecture with a high development and maintenance efforts.
- Horizontal sourcing and operating models with fragmented ownership and without strategic alignment.
- Agile delivery with limited productivity controls and without DevOps.
- High Capex and Opex for IT systems.



Atos Solutions

- Implementation of Salesforce Digital Commerce and Vlocity as full CRM.
- Implementation of a Convergent Product Catalog and PLM based on NetCracker BSS Suite.
- Re-engineering of the Sales Front-ends based on Bespoken .Net development with SAFe methodology and DevSecOps chain.
- Implementation of the order management based on Netonomy.
- Use of latest frameworks and technologies: Informatica as ETL, TIBCO as Integration Layer, Copado as DevOps tool, Cervello as Data Archiving.



Business Benefits

- State of the art architecture with standard and highly configurable capabilities.
- Omnichannel customer experience.
- B2B/B2C and Mobile/ Fixed convergent stack.
- Best ITR (IT Spend to revenue Ratio): Top 3 in Europe.
- E2E ownership of development and operations.



Charging & Billing Transformation

Leading Indian telecommunications company



Client Challenges

- Managing 21 instances of Business Support and Control System (BSCS) 6 to provide services across 21 service areas (referred as circles) in India.
- Managing @bility billing instance for newly acquired 22nd circle.
- Roaming management for 22 service areas within and outside India.
- Different operational practices across India.
- Legacy CRM & distributed business critical satellite systems.
- Nationwide service products being deployed area wise.



Atos Solutions

- Single instance of Billing-BSCS iX R2 for retail and enterprise divisions.
- Single instance of roaming in iX R2 for all 22 circle in roamers.
- Data migration of 21 BSCS instances + @bility in phases.
- Integration of single instance of Siebel CRM with BSCS iX R2.
- Consolidated instances of mediation – provisioning and collection of CDRs and integration with BSCS iX R2.
- All business applications integrated via EAI.
- Introduction of common business processes.
- Simplified product catalogue.



Business Benefits

- Reduction in Opex.
- Improved efficiency - faster turnaround time to market.
- Satisfied enterprise customers across country.
- Savings in clearing house TAP file conversions.

Drive Revenue Beyond Connectivity

**Atos: OSS Modernization:
Network on the Cloud**
Networks & OSS Experience

Atos

Atos Telco Strategy

Leveraging Our Strength



1. Full E2E System integrator (Vendor Agnostic)

for Next Generation Telco Networks that Builds-and-Operates Comprehensive Telco Network Installations



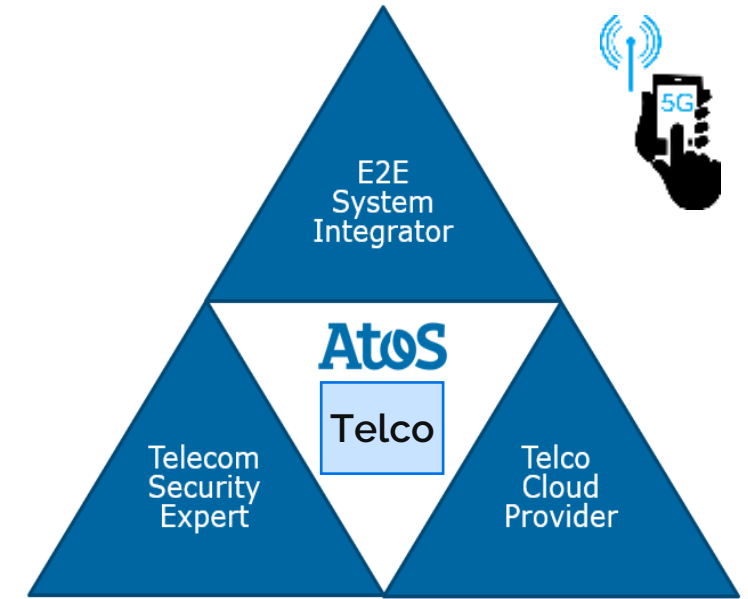
2. Telco Cloud Provider

& Managed Services Partner to build & operate cloudification production platforms for telco networks



3. Cybersecurity Expert

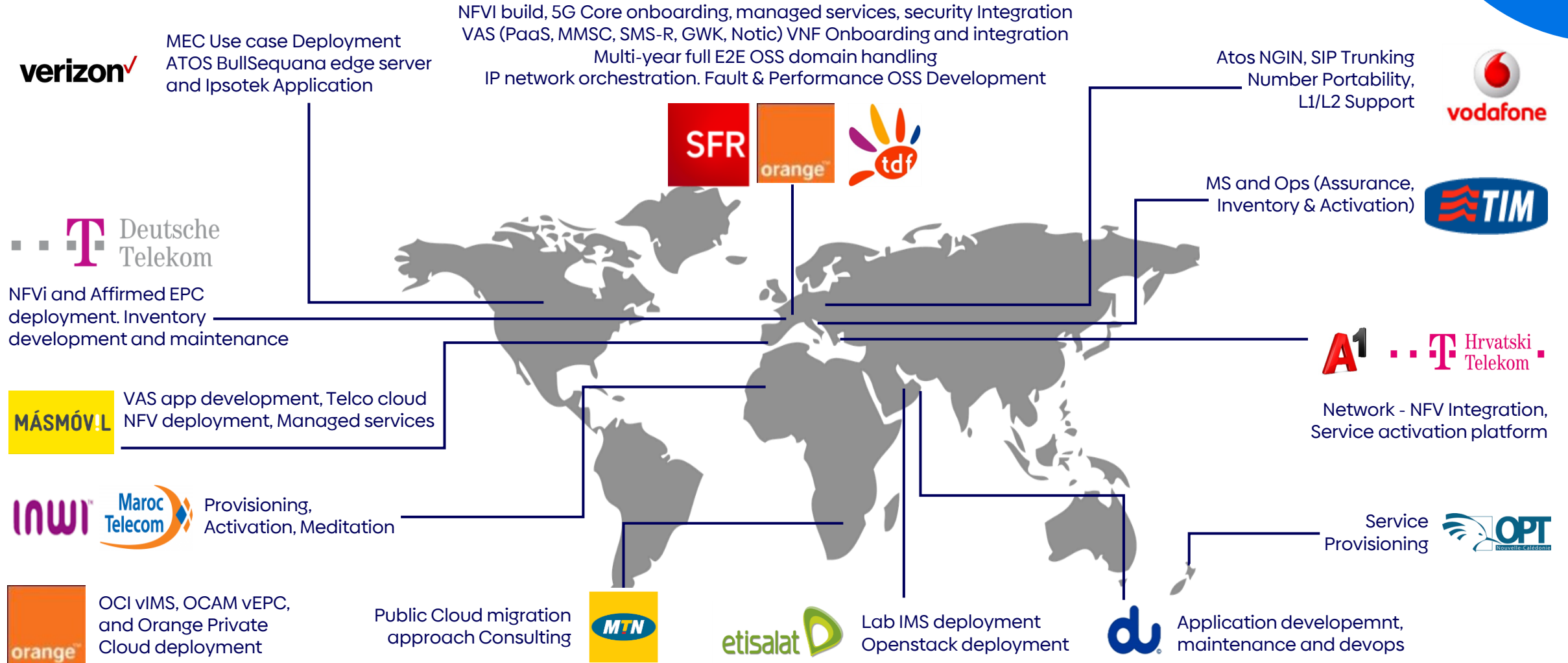
Products and Services for Comprehensive Telco Network Installations



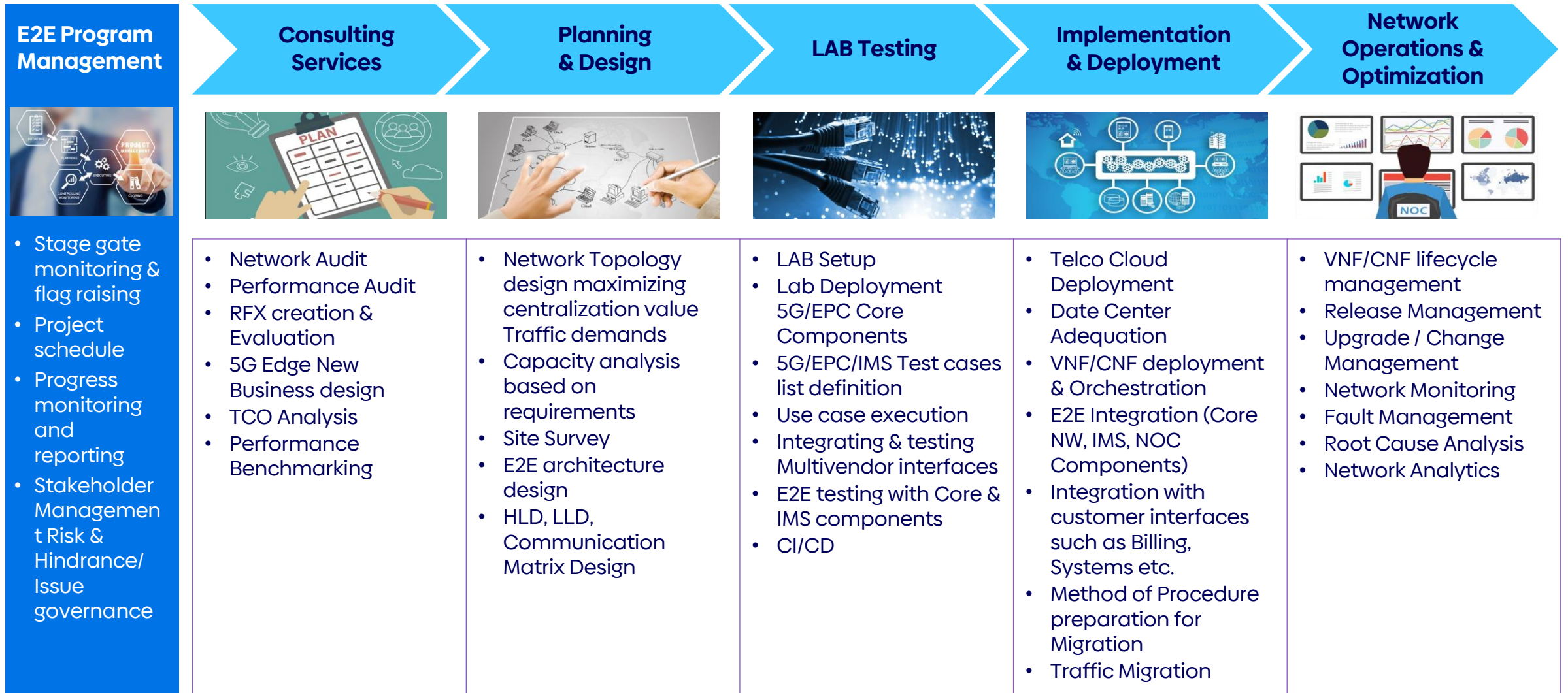
Partner Eco system



Networks & OSS Experience Snapshot

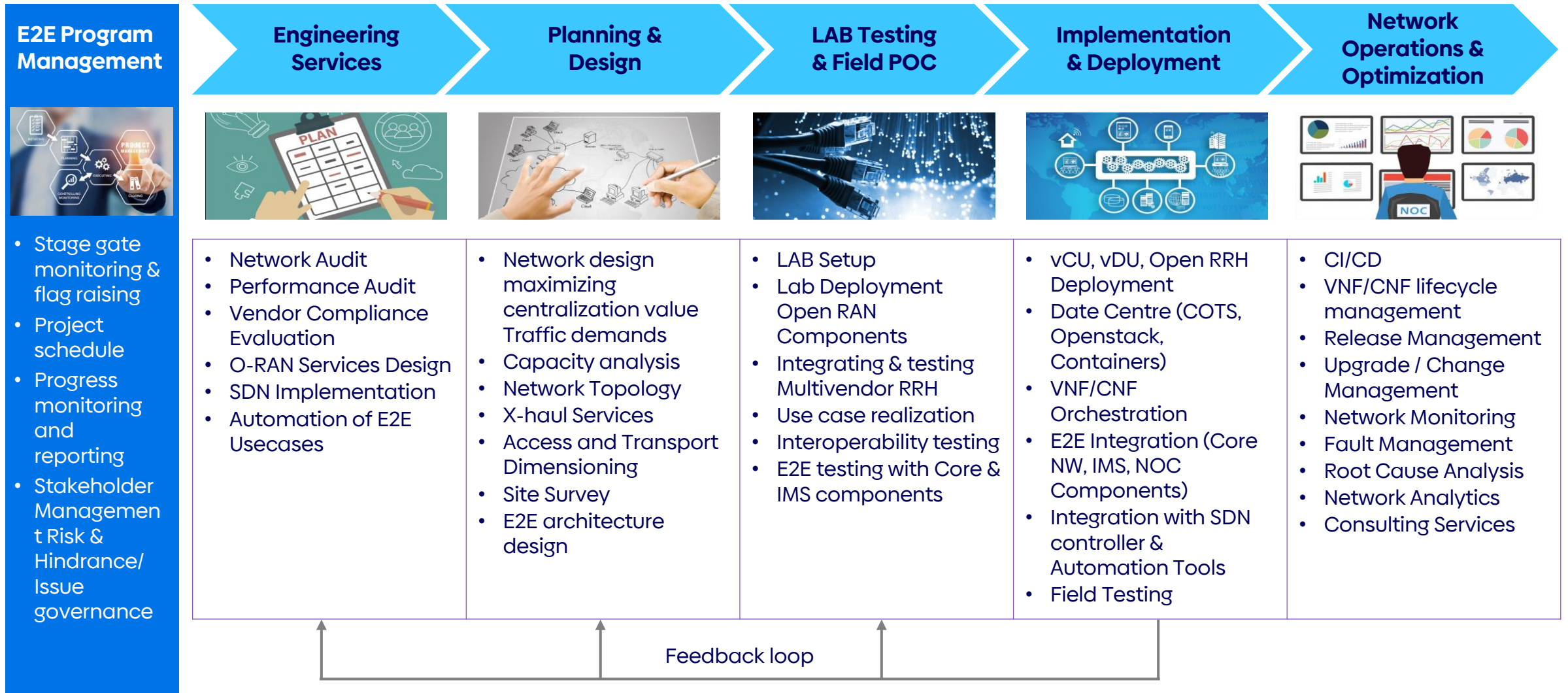


Atos's Comprehensive Core Network Service Portfolio



Atos's O-RAN Comprehensive Service Portfolio

Innovate Together



Atos OSS Portfolio & Capabilities

Wide range of in-house and partners solutions & services to enable OSS Transformation

Our Expertise

400+ OSS specialized professionals.

ONAP Silver Member.

Extensive, long-established experience in implementing, managing and operating network services management systems.

Simplification, consolidation, optimization & transformation of OSS apps & processes using Atos framework and methodology.

AI/ML/Analytics & service centric use cases.

Atos accelerators & use cases.

Our Solutions

NextGen Network Management

- Multi-domain Service Orchestration.
- NFV Orchestration.
- Service Design and Delivery E2E including 5G slicing mgmt.

Network Automation

- AI/ML driven network automation.
- Predictive Maintenance.
- Closed-Loop-Automation.
- Automation UCs Fabric.

Digital OSS Applications Services

- Inventories Consolidation, Transformation & Federation.
- Network Data Management & Migration.
- Provisioning rules & use cases.
- NB/SB open API-based integration.
- Network Supervision E2E umbrella solution.
- Industrialized Fault & Perf, Apps Management.

Our Experience

AppDev & SysInt



AppMgmt & Operation



OSS Transf.



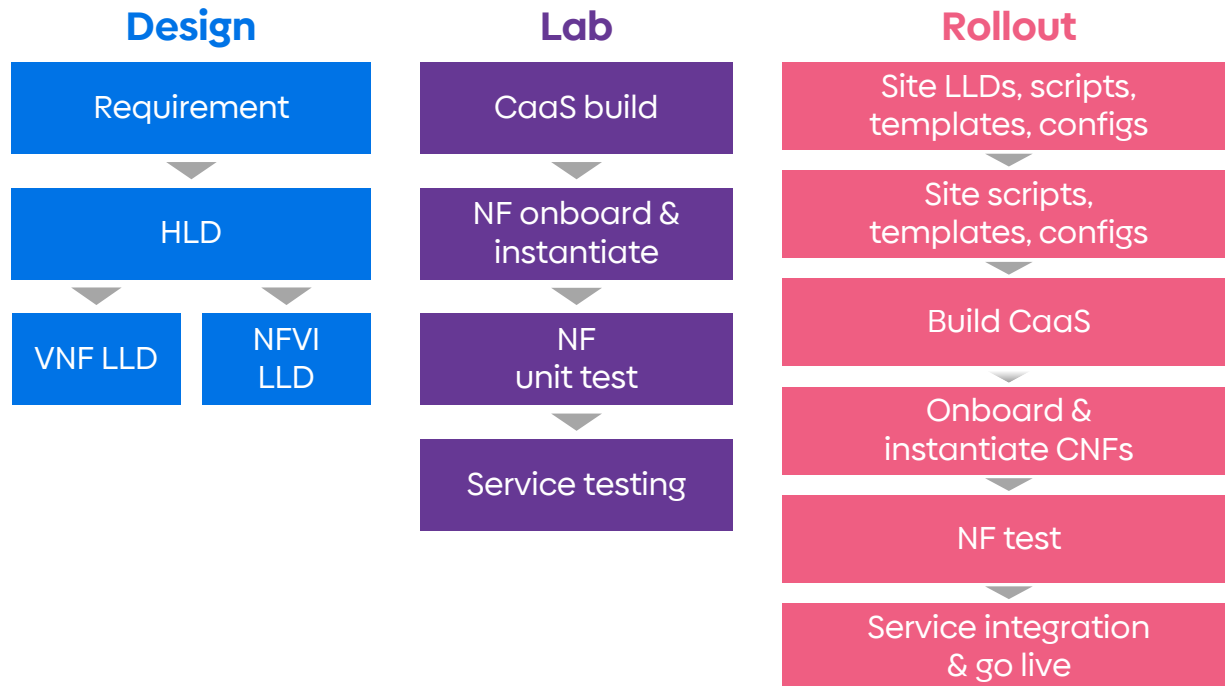
Our Partners



SFR - Network Function Onboarding & Rollout

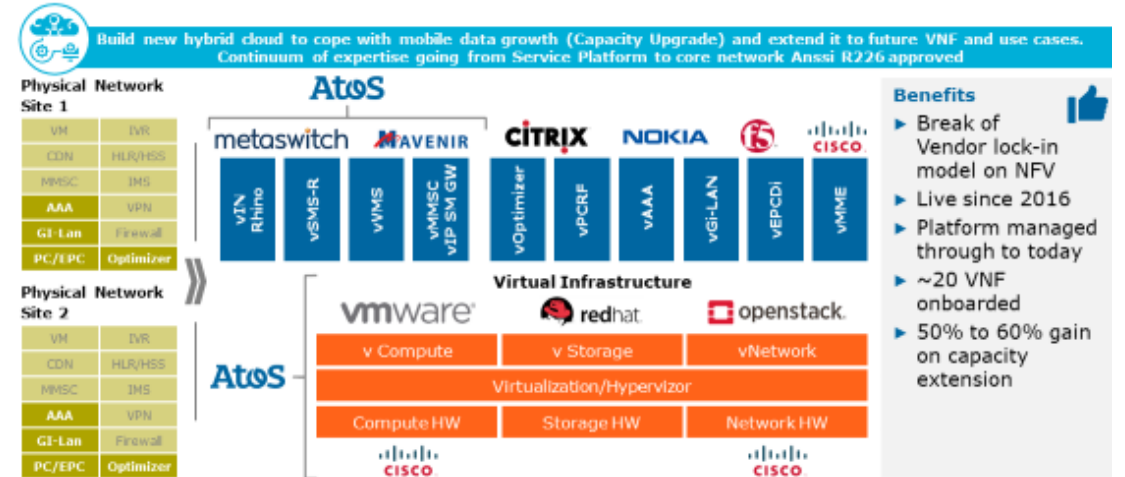
Scope

- Atos views the onboarding and rollout process in three phases: **Design, Lab, Rollout**
- We typically work very closely with the Network Functions OEMs on early rollouts
- Emphasis on scripting & automating build to improve speed and consistency
- Local or factory hardware build options, remote IaaS build



Reference: Leveraging the Real Experience

Large French Telco



Break of Vendor lock-in model on NFV, more than 20 VNFs from various vendors onboarded

Orange - Telco Cloud Implementation (deployment in Cameroon)

Design, Build and Integrate the Telco Cloud

- Redhat Openstack version 10
- Design undercloud OpenStack director, Controllers, Ceph nodes for each site
- Installation & configuration of Redhat Openstack on 3 environment: 1 Testbed & 2 Production
- Implementation and Synchronization of OSP-director with local satellite up to two capsule



Network Function (NF) rollout & transformation

- Roll-out support for vIMS
- Integration of EPC and vIMS
- Performing Functional Tests & Integration test

Huawei & Atos in partnership

Key success:

- A deep knowledge in IT and cloud systems allowed to reduce integration time from 3 months to 7 weeks
- Availability of Skills/Resources on Hardware and Networking foundation enabled a successful IAAS integration

VNF Components	Component Name	Function
	Redhat OSP	OpenStack Platform
	Ceph	Distributed storage
	Satellite	Redhat Product Lifecycle Management
	Ansible	SSH automatic configuration management tool
	Director	Installing and Managing the OpenStack Environment
	IES	Service orchestration based on the ETSI architecture
	eSight	Implements alarm monitoring and log management for Red Hat.
	vIMS	IP Multimedia Subsystem

ATOS main activities

- Design Solution covering below Red Hat software versions:
 - Red Hat OpenStack version 10
 - Red Hat Satellite 6.4
- Design underCloud openstack Director, Controllers, Ceph Nodes for each site
- Installation and configuration of Red Hat OpenStack on 3 environment: 1 TestBed and 2 production
 - (1) Undercloud running openstack director
 - (3) three OpenStack Controllers (configured in a HA configuration)
 - twenty-two (22) compute nodes per site
- Implementation and Synchronization of OSP-director with local Satellite Up to two (2) capsule
- Perform functional tests

Telco Cloud Platform based on Redhat Openstack is among the platforms most frequently deployed by Atos.

CI/CD Platform Build

Case Study for Leading Telco in Germany



Business Challenges

- With the advent of 5G, telecom operators are under increasing pressure to launch innovative services. To stay competitive, they must become faster and more flexible, launching new functionality in days – not months or years
- Multi-vendor workloads deployments with multiple releases
- Multiple CaaS upgrades
- Continuous Testing needs



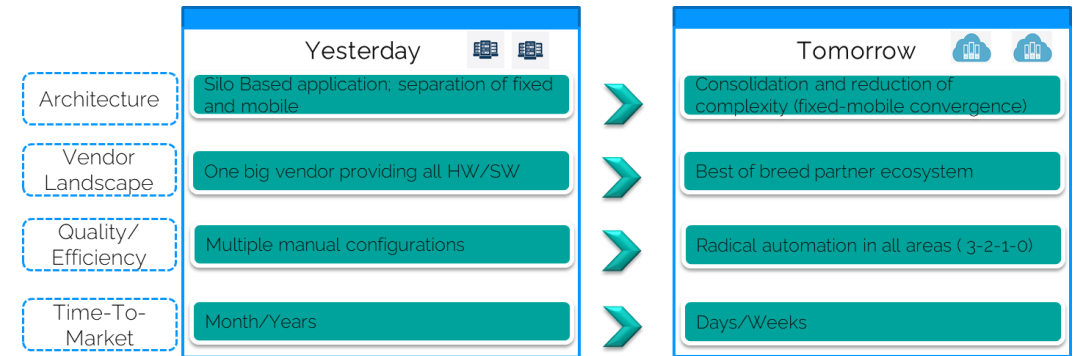
Atos Solutions

- Atos implemented the CNCF tooling set for CICD to onboard VNF/CNF (CSCF, TAS, DNS, Messaging)
- It is based on widely-used open-source components, which eliminates the threat of vendor lock-in inherent with proprietary products or solutions
- CaaS (K8) release upgrades using CI/CD
- Automated Testing Framework integrated with CI/CD toolset for continuous Testing

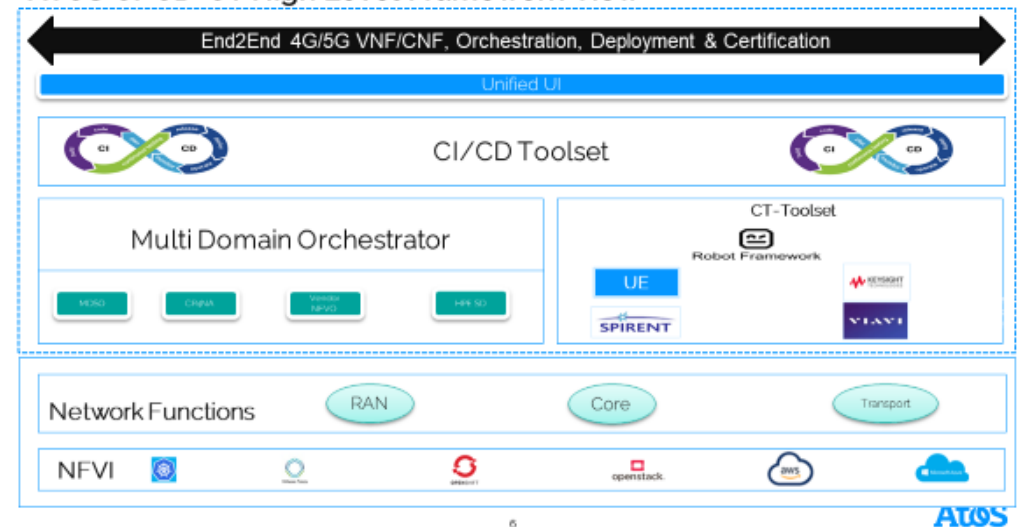


Business Benefits

- Improved TTM for new and upgraded services
- More upgrades does not mean more headcount to operate the release processes
- More automation means more reliable upgrades



ATOS CI-CD-CT High Level Framework View



Atos Observability Platform Build

Case Study for Leading Telco in Germany



Business Challenges

- The current monitoring tools not suited to handle the complexity and dynamic real time needs of Cloud native 5G network
- Legacy monitoring tools lack AI/ML capabilities and are unable to provide contextual data analytics with actionable insights



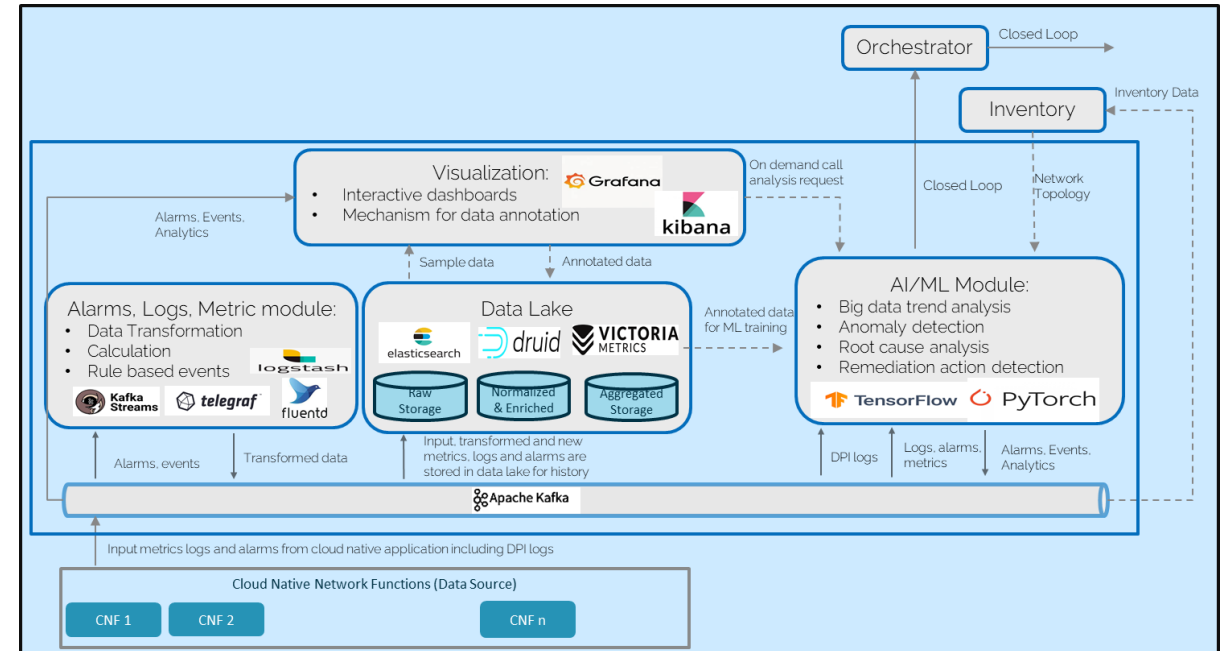
Atos Solutions

- Atos Observability framework is a state-of-the-art cloud native solution for CNF monitoring and automation
- Platform built using CNCF open-source components
- MVP being built with a Tier 1 operator in Germany



Business Benefits

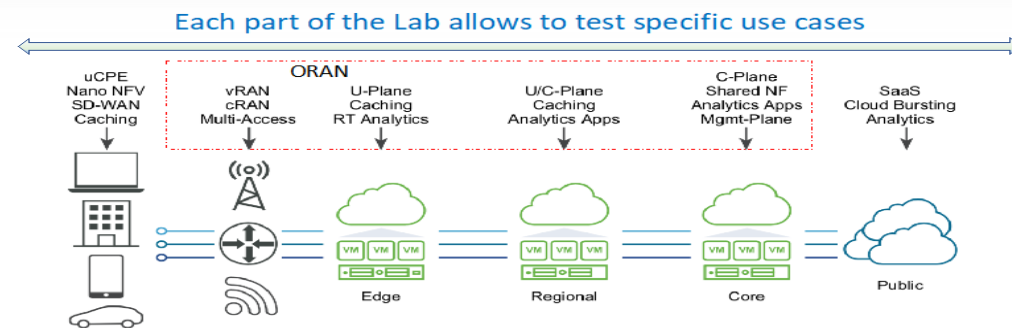
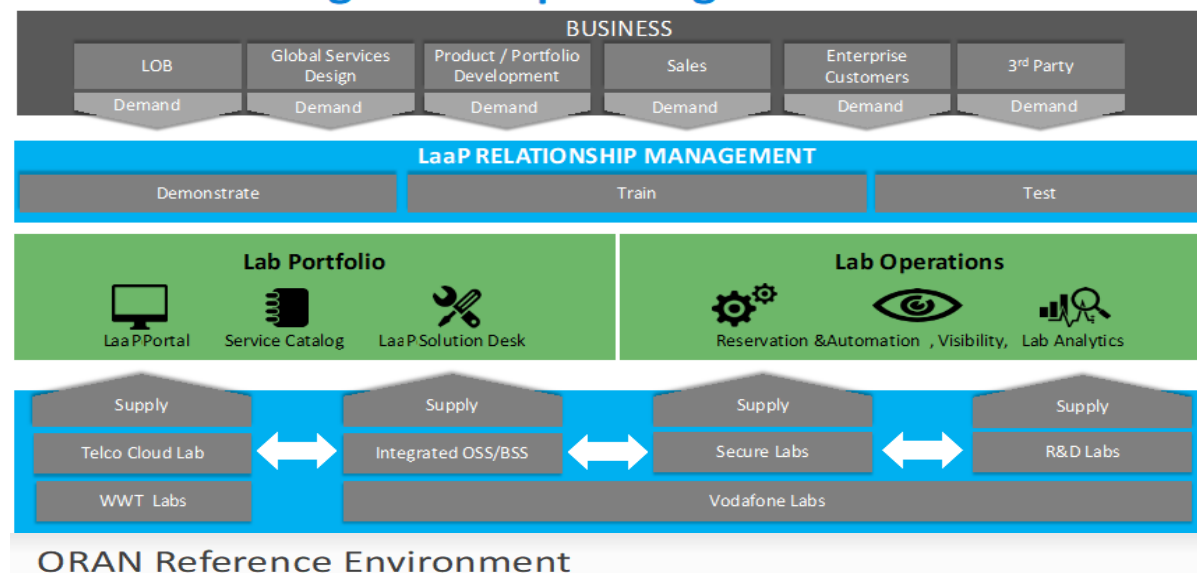
- Automation of tasks performed in operations including AI/ML driven closed control loops predicting and self healing telecommunication network issues
- Cost reduction in operations and higher Service quality



Bell Microsystem - O-RAN Innovation Lab

- This Lab allows the Customer to offer demonstration, training and testing capabilities of ORAN & 5G technologies, and provide lines of business the access to leverage the environment for the purpose of Demonstration, training and testing
- The environment enables the Customer to showcase complex end-to-end use-cases across:
 - The UE equipment to connect the ORAN network (E.g., Samsung handset)
 - The Radio hardware to provide air interface to the UE
 - DU/CU equipment to showcase the option 2 and option 7.2 split
 - The Next generation Virtual Central Office also referred to as “VCO” or “Telco Cloud” to host CU and Core network components

Telco Cloud Edge LaaP Operating Model



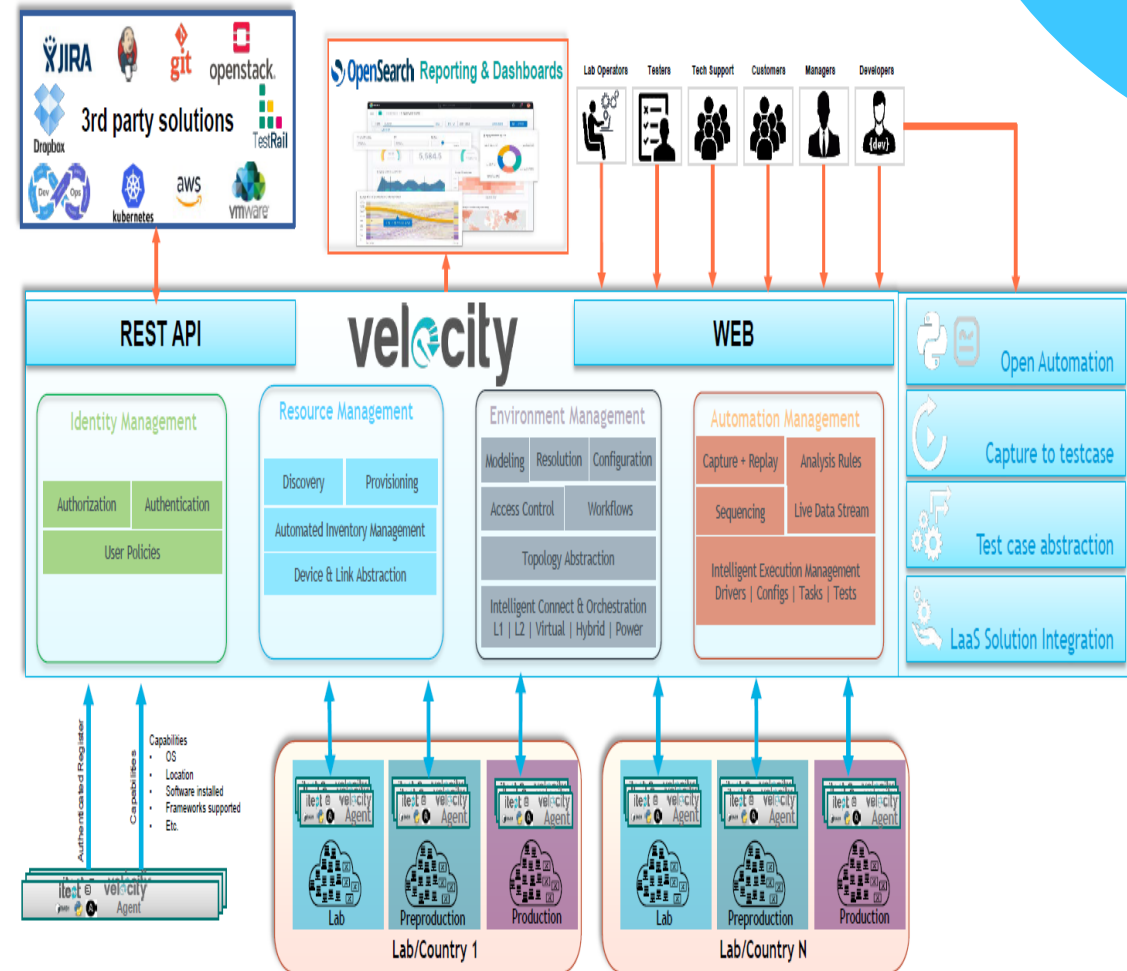
Lab Management using Automation: Spirent Velocity

Lab Automation Platform

- Orchestrate large scale test environments in minutes versus days
- Model complex infrastructures using hierarchical topologies; automate and share.
- Leverage abstract, dynamic topologies for optimal resource utilization
- Dynamically scale with test environments into private and public clouds
- Integrate with CI/CD systems to engineer continuous test

Test Execution Platform

- Publish, schedule and share test cases
- Build and execute test suites that minimize test time and optimize resource usage
- Integrate automation content with Git repositories
- Create custom reports and execution dashboards for fast root cause analysis
- Expand your test coverage from the lab to production environments safely and deterministically





Questions

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