Whitepaper

Optimizing Telco Networks for 5G Enterprise Use Cases

From the enterprise's perspective, 5G is the first wireless network with the high throughput and robust, adaptive backbone needed to spawn a universe of exciting business innovations and use cases.

Although 5G networks are theoretically capable of supporting an endless variety of endpoints, networks and B2B / B2C applications, 5G doesn't natively support them with equal proficiency. The networks must be optimized to deliver the overall enterprise system performance the use cases demand.

This can create disparate and at times conflicting — requirements on underlying network infrastructure, as noted in the three use case examples below.

The need for low latency and bandwidth efficiency requirements in each use case — 5G-based vehicular
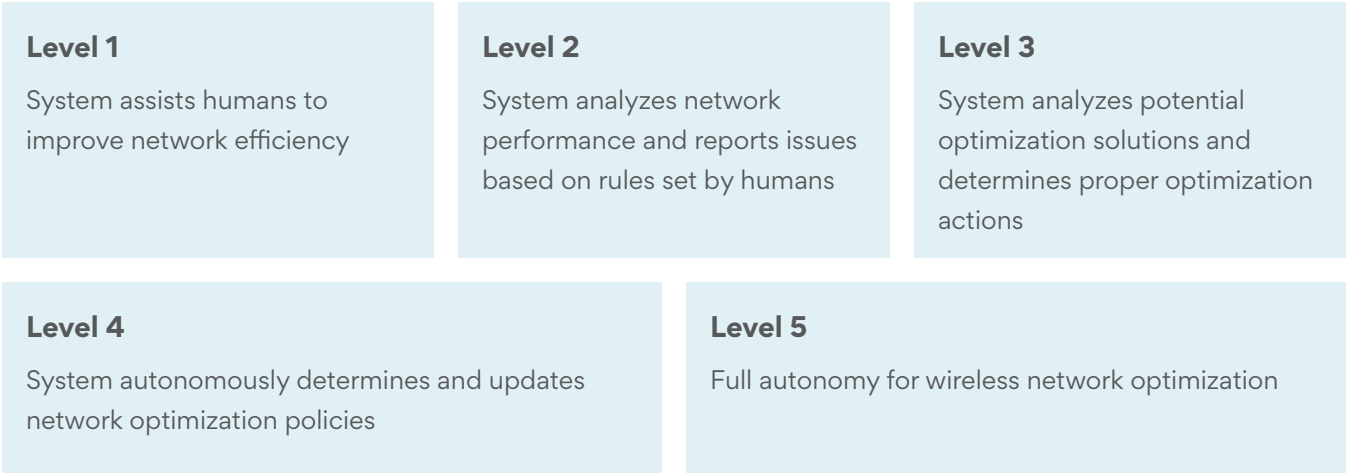
networks, video cache optimization, augmented reality, and smart manufacturing domains, etc. — demands multi-access edge computing (MEC) and edge-optimized environments.

This adds an additional layer of complexity to network resource management and service orchestration across the distributed architecture, increasing the need for Network Ops to leverage AI and other tools to ensure the networks continually and ideally, autonomously meet all enterprise KPIs and deliver business value.

Automotive 5G — C-V2X	Smart Building — FWA	IIOT — Smart Factory
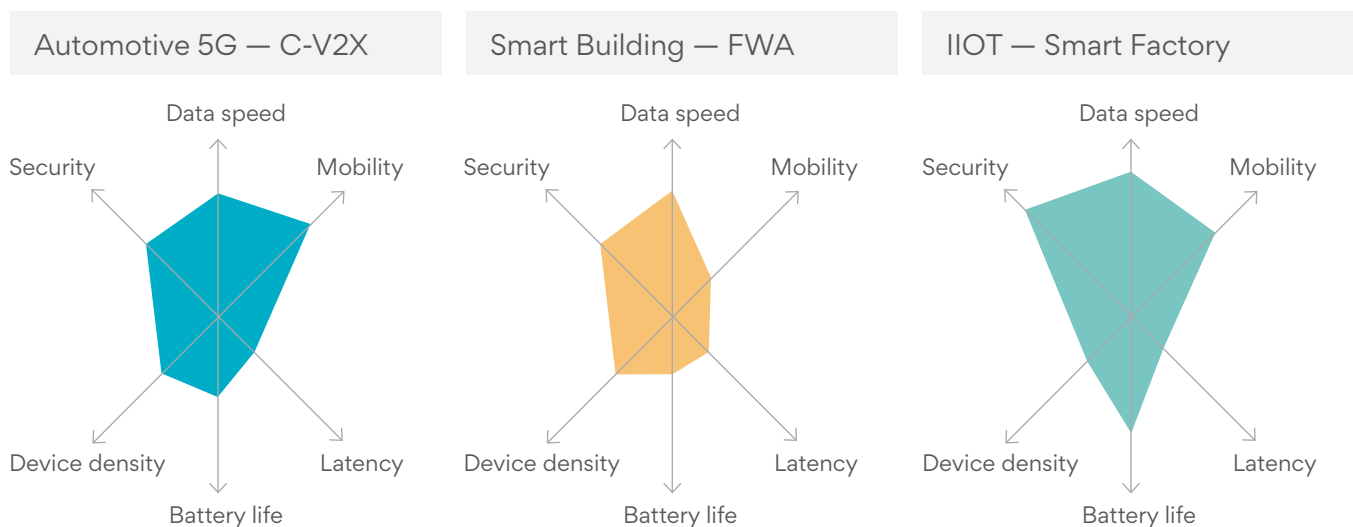
Accelerating from L1 to L5 MEC Network Autonomy

TM Forum previously identified five levels of autonomous network behavior in MEC environments

Level 1

System assists humans to improve network efficiency

Level 2

System analyzes network performance and reports issues based on rules set by humans

Level 3

System analyzes potential optimization solutions and determines proper optimization actions

Level 4

System autonomously determines and updates network optimization policies

Level 5

Full autonomy for wireless network optimization

Persistent has executed projects with global telcos to accelerate their journey from Level 1 to Level 5 MEC network autonomy through close loop automation, delivering the critical orchestration and service assurance needed to streamline and optimize network performance with unprecedented efficiency.

Given below is an example of a leading North American telco we helped accelerate from Level 1 to Level 3 (the current milestone in their journey) in less than 18 months.

Case Study: North America Tier 1 Wireless CSP

Environment

Multi-domain, multi-vendor

\ **Physical:** Redfish

\ **Cloud:** Kubernetes

\ **VNF/CNF:** 5G vRAN, 5G vCore

\ **Adapters:** Kafka, Pulsar, REST, API, EMS, SNMP

Goal

Increase NetOps responsiveness and resiliency to stay ahead of growing network and business requirements
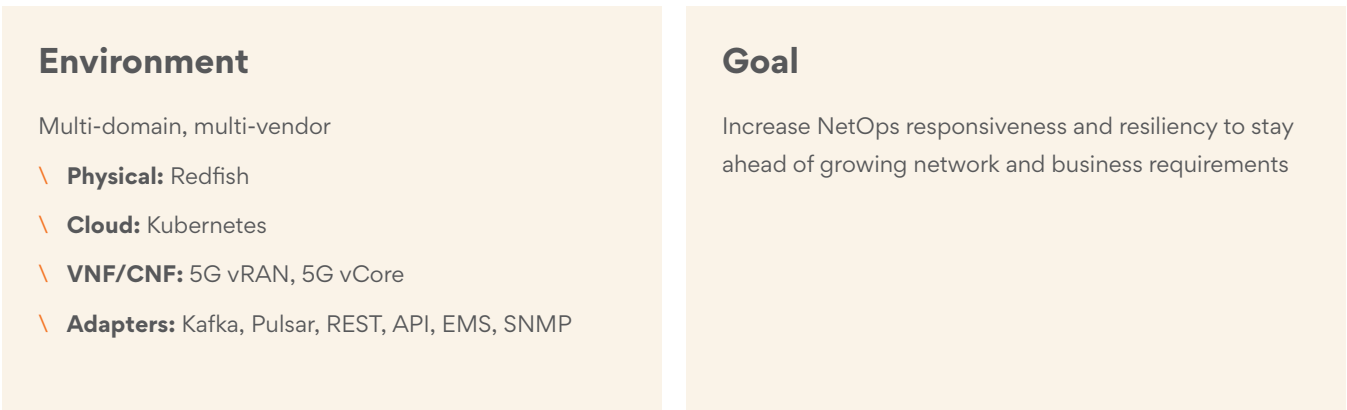
Challenges

\ Monitor end-to-end networks in real time

\ Build a holistic view of network performance across disparate domains and vendors

\ Consolidate disparate monitoring tools (20+ integrations and 40+ resource types) into a single monitoring platform

Solution

Deployed a multidomain service assurance platform with closed loop fault management and orchestration to:

\ Deliver end-to-end service visibility on a single cloud platform

\ Consolidate all incoming performance data, ingesting millions of metrics per second

\ Deliver NetOps actionable insights on virtualized, containerized networks and underlying physical and cloud infrastructure

Outcomes

\ **Automated network performance surveillance** through centralized configuration of threshold alerts

\ **Reduced mean time to response** (MTTR) by delivering one UI for NetOps to manage all KPIs with far fewer mouse clicks

\ **Lower total cost of ownership** (TCO) through rapid self-service updating of device adapters

Level 3 Autonomy and Successful Support for 300,00+ Endpoints

Persistent built multi-domain service assurance platform, to:

\ Normalize data sources to a standard format, allowing them to be transported to message buses like Apache Kafka.

\ Route the data to different services to monitor fault, performance, and topology.

\ Enable data correlation across platforms.

\ Apply AI / ML algorithms to quickly gain actionable insights and detection anomalies.

\ Consolidate 20+ screens and 40+ resources into a single UI visualization capable of supporting multi-domains (edge, virtual and physical Infrastructures, 5G Core, 5G RAN).

\ This "single pane of glass" provided streamlined context and navigation to support rapid root-cause analysis and greatly reduced MTTR.
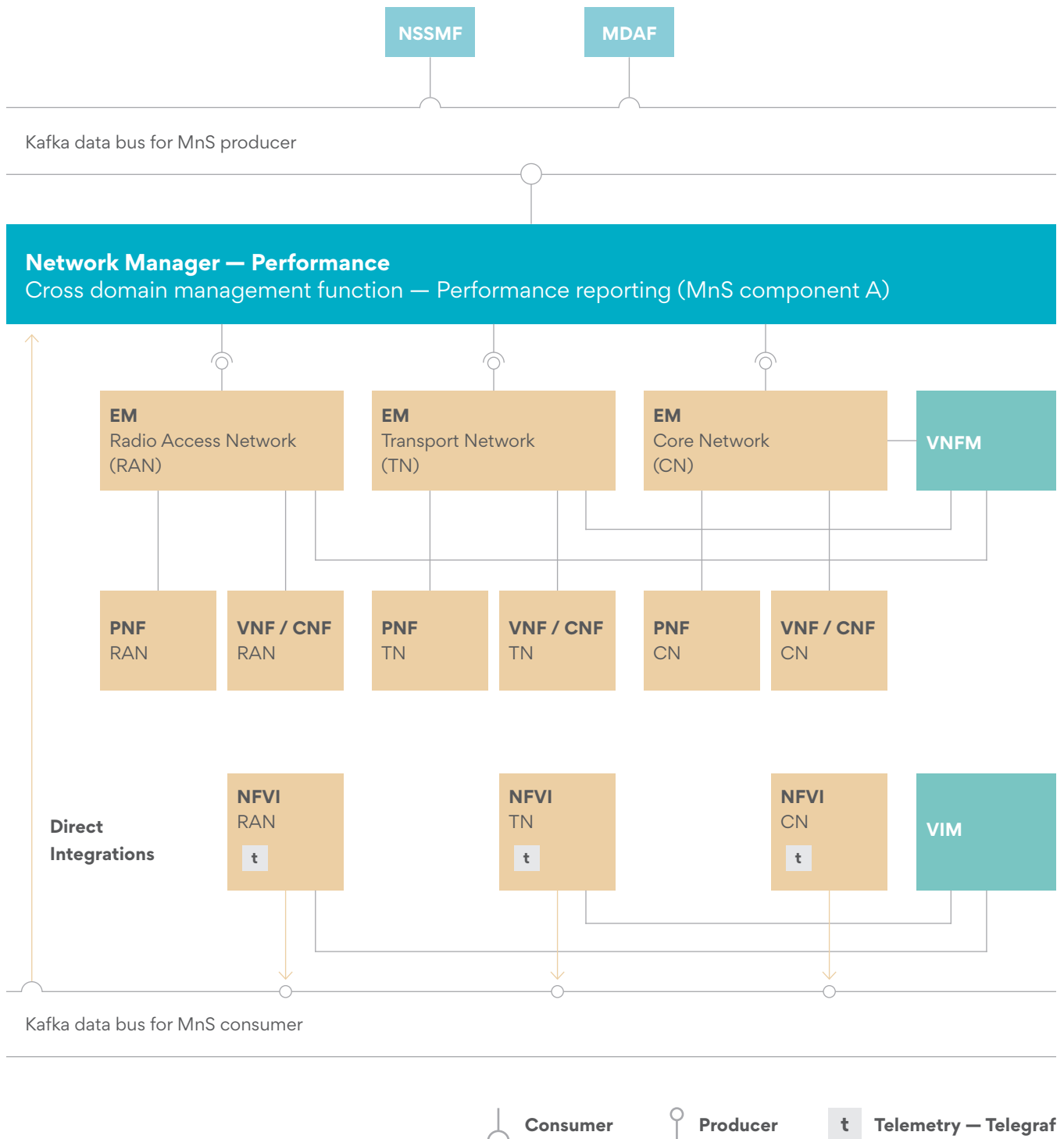
The telco's Level 3 autonomous network is now successfully supporting more than 300,000 endpoints while still meeting all network performance KPIs.

In addition, network performance reports that used to take 5 – 8 hours to compile due to multidomain and edge complexity and delivered are produced in just a few minutes, giving NetOps critical end-to-end information in near-real time.

Use Case: Cross Domain Performance Management

RAN, Transport, Core and NFV Infrastructure in PNF, VNF and CNF Environments

5G Network

NSSMF

MDAF

Kafka data bus for MnS producer

Network Manager — Performance
Cross domain management function — Performance reporting (MnS component A)

| **EM** Radio Access Network (RAN) | **EM** Transport Network (TN) | **EM** Core Network (CN) | **VNFM** |

| **PNF** RAN | **VNF / CNF** RAN | **PNF** TN | **VNF / CNF** TN | **PNF** CN | **VNF / CNF** CN |

Direct Integrations

| **NFVI** RAN t | **NFVI** TN t | **NFVI** CN t | **VIM** |

Kafka data bus for MnS consumer

Consumer   Producer   **t** Telemetry — Telegraf

The Role and Implications of MEC for Enterprise 5G

The MEC concept itself is not new, but for a CSP, the possible B2B revenue sources MEC networks unlock certainly are. MEC networks allow CSPs to become more than just bandwidth vendors to enterprises; they can become value-added partners due to the unique applications, use cases, products, and services they enable.

As MEC networks move CSPs from utilities to value creators, CSPs will need to compete by differentiating themselves. Speed of provisioning and guaranteed latency performance are two obvious opportunities to do so. Ensuring this differentiation as networks increase in complexity demands some level of automated MEC network management and orchestration from Day One. As network architects and engineers consider integrating automation, they'll want to keep the following lessons learned in mind:

1\ MEC platforms support large numbers of IoT and network access points, requiring customer and service-level assurance solutions that can continuously monitor services of differing quality under dynamic conditions.

2\ These solutions must empower NetOps to rapidly conduct root cause analysis with performance, alarm, and topology correlations across virtualized and cloud-native infrastructures.

3\ Performance monitoring capabilities must include user experience and service level KPIs for the various services or applications deployed at the MEC level, including latency, jitter, throughput, loss rate, QoS and MOS.

Persistent: Your Trusted 5G Network Automation and Optimization Partner

5G networks are the first "enterprise-first" networks due to their ability to look beyond the voice, video and connectivity and bring exciting new applications and use cases to life. However, 5G networks require optimization and automation to ensure they continually meet the expectations and commitments of the CSP and its customers, based on the use cases they support.

5G networks are more software defined than their hardwarebased predecessors, which takes many CSPs out of their comfort zone. They're increasingly seeking out software-first partners to help them accelerate their network automation journeys and begin reaping the benefits of automation more quickly and seamlessly than they can on their own.

If your 5G networks aren't able to continuously meet and exceed the performance KPIs your business and customers expect, Persistent can help you realize the benefits of network transformation and automation.

Monetize the power of 5G and Edge — drive the next wave of network transformation into business transformation.

Learn More

About Persistent

We are a trusted Digital Engineering and Enterprise Modernization partner, combining deep technical expertise and industry experience to help our clients anticipate what's next. Our offerings and proven solutions create a unique competitive advantage for our clients by giving them the power to see beyond and rise above. We work with many industry-leading organizations world-wide including 14 of the 30 most innovative US companies, 80% of the largest banks in the US and India, and numerous innovators across the healthcare ecosystem. Our company fosters a values-driven and people-centric work environment. Our strength of over 21,500+ employees is spread over 18 different countries across the globe.

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