Tech Mahindra

FOSTERING 5G POWERED DIGITAL TRANSFORMATION ACROSS INDUSTRIES

WHITEPAPER

Microsoft

Connected World.
Connected Experiences.

Overview

5G promises to be a game-changer for enterprises, enabling everything from augmented reality (AR) experiences to automated manufacturing floors. But for enterprises to play in that game, many will first need to deploy a private cellular network that can support the low latencies, high bandwidth, strong security, and flexible scalability that these new applications will require.

The Wi-Fi networks of today weren't built to handle the wireless applications of tomorrow. The new enterprise wireless network will need to be much faster and more responsive, blend seamlessly with 4G/5G networks, and support a cloud architecture where new services can be automated, orchestrated, and managed for optimal efficiency. Recognizing the need for this new kind of private network experience, mobile service providers have taken the lead by deploying next-generation private cellular networks at the network edge and in the cloud edge—in effect allowing enterprises to manage and operate their own private networks with minimum capital expenditure or consume network as a service.

The network edge is, in a very real sense, a new frontier for both carriers and enterprises. Instead of delivering everything from a centralized core network, edge networking disaggregates compute, network, and storage resources from the core and places them at the edge, closer to the enterprise. With edge-based private networks, enterprises gain ultra-low latencies (under 5 milliseconds), dedicated and scalable bandwidth, network isolation for improved security, and higher performance through guaranteed service level agreements (SLAs).

Why Private 5G?

Carriers have traditionally centralized services, policies, and network functions in the network core, and moving those services to the edge is a new approach. Enterprises, likewise, have little experience in building and managing their own mobile networks. To help carriers and enterprises take advantage of mobile edge computing, Tech Mahindra and Microsoft have combined their industry-leading cloud and mobile core technologies to create a complete turnkey solution for private LTE/5G networks. Our private network solution leverages TechM's partnerships with the industry best of breed components as well as Azure private MEC solution and Azure cloud platform to deliver a highly scalable, rapidly deployable private network solution for enterprises.

Reduces CapEx and OpEx costs	Supports rapid scaling (up or down)	Allows for simple self-activation	Manages private network resources via GUI-driven portal.

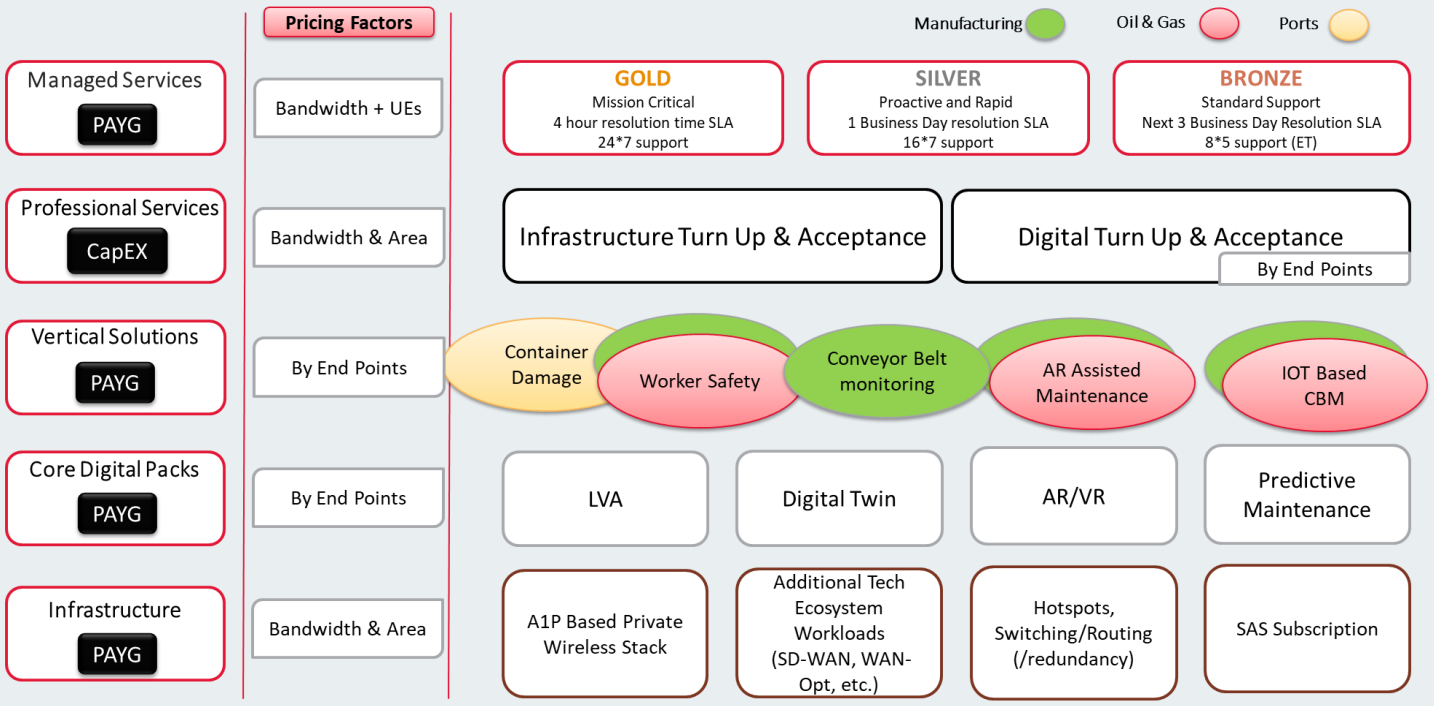
Azure private MEC solution means that we can now deploy a private enterprise network in the customer's own premises while completely managing it from the cloud through a fully automated experience that is underpinned by zero-touch based automation workflows wherever possible. This enables a private 5G network with the same ease as cloud Wi-Fi. A lean on-prem 5G core with minimal compute footprint also maximizes the ability to host digital applications at the customer edge. No other private network solution offers this kind of flexibility. Together, TechM and Microsoft remove the technology, complexity, and cost barriers to deploying a private 4G/5G network and the associated digital transformations. TechM's integrated validated private network solution delivers four important benefits to enterprises :

Lower cost of entry: Traditionally, a private wireless network meant deploying new hardware, software, and network functions in a physical location. Bringing a virtualized 4G/5G core automatically provisioned from the cloud helps to significantly reduce the cost of deploying 4G/5G technology. Enterprises can simply consume 4G/5G network services as they would any other cloud service or stand up their own 4G/5G mobile core using their existing virtualized infrastructure.

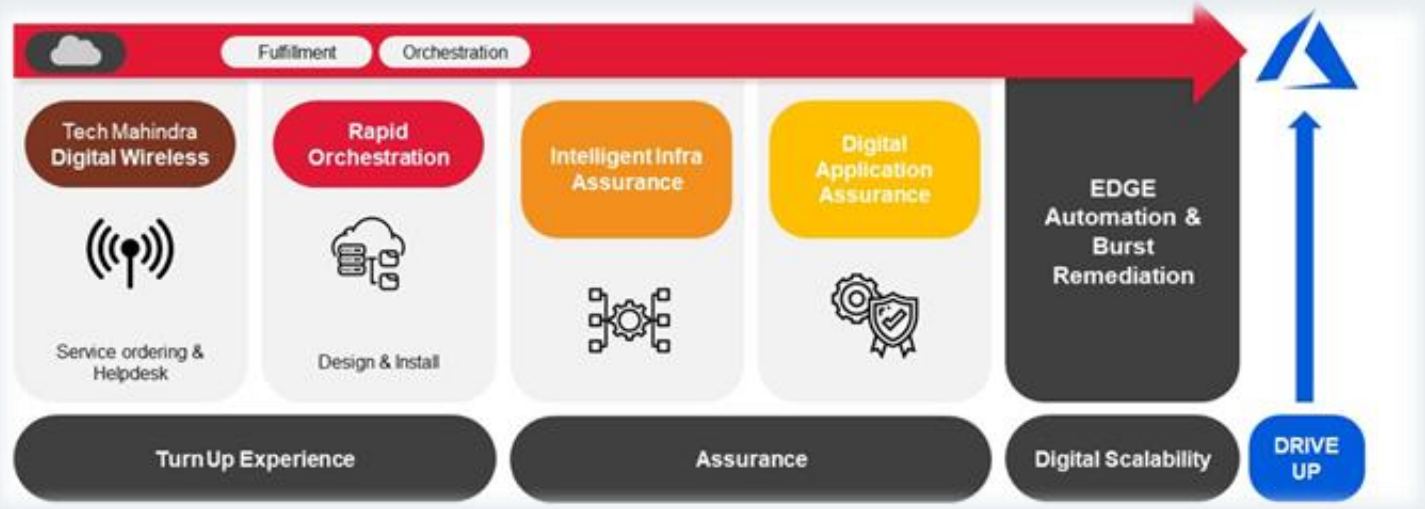
Enterprise Aware: The private 5G network cannot work on an island and has to integrate with the existing security, traffic separation, device admission, and routing policies of the enterprise. Tech Mahindra's end to end automated orchestration and monitoring framework enable the end to end provisioning and management of the private 5G and digital stacks while integrating elements like the LAN, IPS/IDS, SD-WAN, NAC, and DDI environments for holistic service management.

Standards-based design: The Azure private 5G Core technology supports 3GPP's 4G/5G architectural recommendations and addresses standardized 5G network functions including high performance user plane, control plane, subscriber and policy management. All the lifecycle management, configuration and monitoring capabilities are exposed via APIs. Microsoft Azure supports a myriad of standards for network computing, enterprise applications, security compliance, and more. Together, TechM and Microsoft ensure that private network deployments can be easily integrated into existing enterprise infrastructures.

Soup-to-nuts Offering: The Tech Mahindra managed services offering spans multiple layers that can be leveraged independently as shown in the schematic below. The Tech Mahindra offering enables the infrastructure/network stack, IoT endpoints, digital solutions, professional services, and multiple managed services models. Each of these layers comes as standardized offerings or can be customized as per the enterprise's requirements. Tech Mahindra also offers an as-a-service commercial approach for each of the layers as depicted below.



Overall Customer Experience Construct

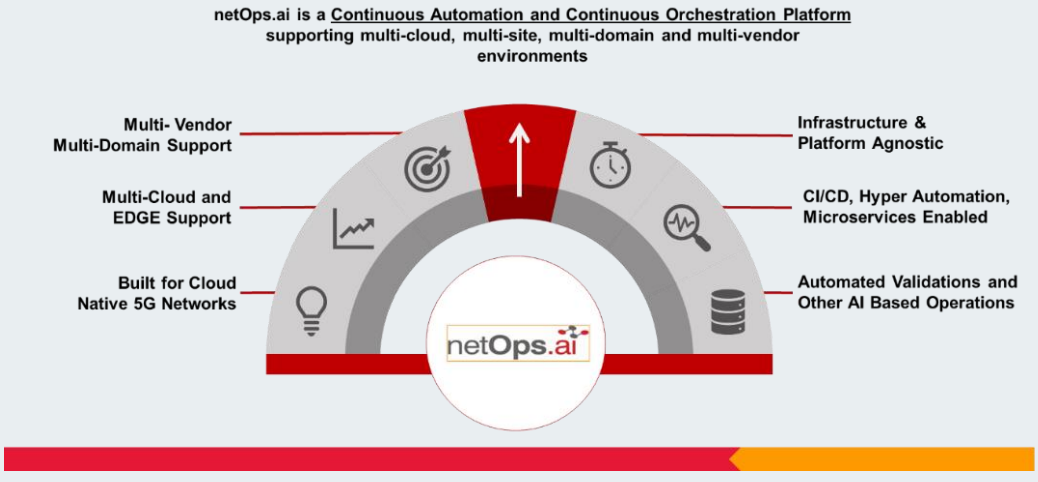


In order to deliver a seamless experience to enterprise customers, the onboarding journey is envisioned in three stages viz. turn-up experience, assurance, and digital scalability -stitched together using Azure products and services

The user experience is initiated from the digital wireless portal which allows the user to consider various alternatives and place an order. Once the order is placed, the helpdesk is continuously available to the customer. Meanwhile, fulfillment and orchestration are kicked off. It brings together the automation provided by Microsoft as well as TechM's NetOps.AI and from other partners to deliver what we call Rapid Orchestration++

Once the Turnup is successfully completed, Intelligent Infrastructure Assurance++ ensures the health and optimal functioning of the deployed assets. Meanwhile, Digital Application Assurance monitors the performance of the digital applications deployed

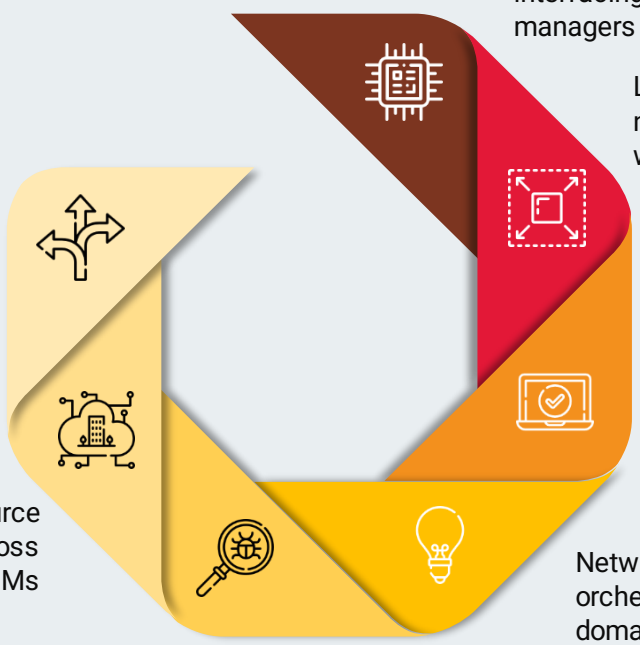
Scalability is ensured using edge automation and burst remediation in order to proactively identify bottlenecks and areas of improvement.



Fostering Digital transformation with End-to-End Orchestration Solution

In the context of 5G for enterprises, TechM provides end to end services through its in house orchestrator Netops.ai. Private 5G enabled digital enablement demands that 5G based services are orchestrated across the application (microservices), infrastructure, and network layers transparently to allow for intent-based goals around service quality, traffic separation, and security mandated by a given digital use case. It also implies lifecycle management, network and application assurance, and closed-loop automation to scale for digital demands of the future.

Features



Enables cross-domain orchestration across access, transport, and core by interfacing with different domain managers and transport SDN controllers

Lifecycle management of infra, network and application workloads

Orchestration of digital application/use cases for various enterprise verticals

Network function orchestration for multi domain and multi vendors

Automatic provisioning of policies and configuration across enterprise network domains like SD-WAN, Network Access Control, Next Gen Firewalls, and DDI for automated and scalable set-up across multiple customer sites.

Infrastructure resource orchestration across different VIMs

Flexibility in managing end to end software lifecycles

TechM's netOps.AI also brings together network and application observability and tools like deep packet inspection for enhanced troubleshooting. Driven by AI/ML based correlation and predictive techniques, it is also built to enable automated remediation actions like burst to cloud for digital applications based on policies like latency thresholds, cost of ownership, and ROI metrics.

Key Highlights

- Vendor Agnostic Platform
- Multi-Vendor Interoperability
- Faster Time to Market
- Future Ready Solution
- Highly Automated Operations

Digital solutions Use Cases over 5G for enterprises

Each generation of network technology has brought new solutions with improved customer experiences in the communication industry, which has traditionally been consumer-based. But the advent of 5G has sparked a digital revolution that shall disrupt the business and the technological landscape in every industry vertical from now onwards. Everyone increasingly acknowledged the new business opportunities that the digital transformation of the enterprise market will create. The 5G-led digital transformation coupled with the virtues of edge, hyper-automation, virtualization, and IT-OT convergence shall entail unprecedented monetary benefits along with new digital use-cases for enterprises. Therefore, mentioned transformation shall also create new revenue streams for the operators and the 5G product vendors, spawning a whole-new digital ecosystem. In a not-so-distant future, we shall witness the circulation of massive data streams, implementation of distinctive IoT use-cases, and highly immersive AR/ VR experiences, leading to the emergence of new business models that will intensify the digital revolution in the enterprise market.

5G is transcending boundaries, powering innovation, and pushing enterprises to rethink the way technology is being used. Being at the forefront of this revolution, Tech Mahindra's 5G4E (5G for Enterprises) proposes a consortium approach to 5G adoption. We truly believe that the need of the hour is an end-to-end solution that will help enterprises maximize their returns on investments. We bring to you a pre-integrated, production-ready, and secure enterprise digital solution that will leverage 5G to help enterprises realize their operational efficiencies. A partnership that empowers you to understand 5G to propel innovation, overcome challenges, modernize legacy-based systems and use cases, add new-age digital solutions, optimize Opex and maximize benefits.

As ready to use and part of our starter kit for customers, we have selected two widely used use cases based on AR/VR and vision-based analytics. These use cases can be readily used to run proof of concept for a deterministic time period with our end-to-end solution.

Manufacturing

The global manufacturing sector is on the verge of a major digital revolution fueled by the adoption of Industry 4.0 technologies that can improve 'Overall Equipment Effectiveness'. The advancements in technologies like IoT, robotics, AR/VR, and analytics enable manufacturing units to have end-to-end visibility of operations.

Typical use cases are:

AR/VR based remote maintenance, vision-based quality inspection, condition-based monitoring, predictive maintenance, AGV/COBOT based material movement, asset track, and trace, digital twin, etc.

Benefits

~5-10% reduction in overall maintenance cost

~10% improvement in production efficiency

~30% drop-in inspection time and error rates

~50% reduction in training time

Retail-Warehouse

The retail and warehouse industry is having issues with operation, material handling, automation, etc., considering the size of the area along with vertical space. With the digital revolution and technological enablement with AR/VR, vision-based analytics, AIV, and COBOT, etc., have pushed towards digitization of the retail and warehouse industry.

Typical use cases are:

AR assisted order pickup, vision-based carton, and label inspection, robot and vision assisted storage and retrieval, AIV assisted material movement (loading and unloading), AIV and COBOT based asset pick and place.

Benefits

~20% reduction in operation cost

~15-30% reduction warehouse cost

~25 improve asset utilization

Reduce material handling cost

Oil and Gas

Oil and gas assets are highly complex , spread over remote areas operating in harsh environments. The combination of complex equipment with flammable chemicals makes oil and gas one of the most hazardous and security risk-prone industries of the world. Digital transformation is already a fact of life in the oil and gas industry expanding the boundaries of managing the overall oil and gas industry. Technological advancements of smart wearables, IoT, drones, visual analytics, etc., are expanding the boundaries of managing the overall oil and gas Industry

Typical use cases are:

Safe worker and emergency response, security surveillance, real time asset monitoring, AR /VR based remote maintenance, machine failure prediction, digital twin, digital drilling, digital refinery, etc.

Benefits

~20% to 25% Operational efficiency improvement

~10% to 15% Non-Productive time (NPT) reduction

~23% reduction in accidents and injuries

~30% Downtime reduction by reduced MTTR

Tech Mahindra's netOps.ai solution enabled with private 5G build over Microsoft Azure cloud distributed edge platform provides seamless and quicker experiences to roll out on-premises wireless infrastructure for enterprises. This empowers enterprises to enable 5G relevant use cases and create a business model which is easy to monetize and scale.

Tech Mahindra's network capability coupled with the converged-edge solutions enables a comprehensive portfolio of digital use-cases with low-latency and high-throughput requirements. Tech Mahindra's portfolio of digital applications spans all major industry verticals enabling the digitalization of tomorrow.

Author

Ranganathan Thittai is VP & Chief Architect of Enterprise Network Solutions at Tech Mahindra where he leads the technology and solution strategy to help enterprises make business transformation through disruptive network solutions. As part of the role, Ranga currently drives the strategy, solutions, and technology alliances in areas like SD-WAN, SD-Access, 5G for enterprise, edge computing, public cloud, and enterprise security. Ranga's career has spanned a variety of roles like product management, strategic alliances, product delivery, enterprise architecture, and technical sales with vendors like InfoVista, Telcordia, and Trendium, as well as operators like T-Mobile, USA. Ranga holds a Master of Science degree from the Georgia Institute of Technology (Atlanta) and a bachelor's degree from the Indian Institute of Technology (Bombay).

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