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VMware Private Mobile Network

Pairing the best of enterprise IT and MSP expertise

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Introduction

Appledore tracks developments in the [industrial automation and private networks](#) space. In our market outlook, Appledore identified that much of the new opportunity in 5G would be in private networks. We estimated that the incremental market for industrial 5G is between USD $115B and $130B by 2029, a significant growth opportunity globally. However, this opportunity will vary between different industrial segments and global regions. Success in private 5G and industrial automation requires new business models, ecosystems, and cross-industry relationships.

With 5G and Open RAN technologies, we believe that there is an opportunity for vendors that can combine both telco knowledge and enterprise IT expertise. Vendors with this combination of skills have an opportunity to define and grow a new networking market.

We believe that VMware is putting in place the right approach by leveraging both its strong telco network credentials in 5G and LTE, with its strong position in enterprise IT. With this foundation it can focus on the key needs of enterprises, whilst encapsulating the existing complexity of telecommunications networks in an easy to use and functionally rich solution.

In this profile, we discuss how **VMware** is taking a leading role in bringing LTE and 5G private mobile networks to a wider enterprise market. We look at both the opportunities that the VMware's approach can facilitate, but also look at the challenges they face in what is a non-traditional field for telecoms technology and vendors.

This report should be read in conjunction with our VMware profiles on [VMware SD-WAN by Velocloud](#), [VMware Smart Assurance](#), [VMware in Cross Domain Service Orchestration](#) and [VMware Telco Cloud Automation](#) which look in more detail at some of the component parts on which VMware is building its enterprise Private Mobile Network (PMN) solution.

About VMware

Major software provider VMware focuses on edge-to-cloud computing, virtualization, and related technologies. Established in 1998, the company is well-known for its flagship virtualization product vSphere. Cloud infrastructure, software-defined networking, hyper-converged infrastructure, end-user computing, multi-cloud management, and security services are just a few of the many solutions that VMware provides. As a global company they support enterprises worldwide embracing cloud and virtualization technologies.

Table 1: Company Snapshot

Name	VMware
Year founded	1998
Headquarters	Palo Alto, California, United States
CEO	Rangarajan Raghuram

Company type	Publicly traded
Employees	38,300
Products and services	Virtualisation software Software as a Service (SaaS) Cloud
Strategic partnerships	Dell, Fujitsu, Hitachi HPE, Intel
Geographic focus	Worldwide

Source: VMware

VMware estimates that the total Edge Cloud Market will be $317 billion by 2026 and is positioning itself as the partner for enterprise's undertaking Edge Digital Transformation. This is in line with Appledore's own estimate for the telco network edge cloud growing to USD 25.1 billion in 2025 and over USD 75 billion in 2030

VMware has a long-standing pedigree in virtualization, with strong technology credentials, but equally importantly a focus on the business needs of enterprises. VMware positions itself as a complete solution provider, with a strong Edge portfolio, built on its position as a significant player in the virtualization market. VMware's edge portfolio includes Edge Compute Stack, Private Mobile Network, SD-WAN, SASE, and ENI (Edge Network Intelligence), each addressing specific needs for enterprise edge transformation. VMware's strength lies not only in its technological prowess but also in its ability to simplify operations and ensure successful edge-enabled businesses.

Building on this enterprise edge pedigree, VMware is now introducing a Private Mobile Network solution targeted at enterprises who want to leverage the edge more fully, enabled by the higher performance of 4G and 5G private networks.

VMware Private Mobile Network Solution

Strategy

VMware has a strategic focus on the enterprise market based on its existing Virtualization and now Cloud infrastructure portfolio. Enterprise use cases are central to making the business case for 5G, with 80% of the data in networks being associated with the enterprise, compared to 20% for consumers. VMware's private mobile network strategy is based on the following pillars:

- **Cloud Orchestration**, allowing service providers to pre-provision sites, allowing quicker deployment. Full visibility into each private network—including log files, packet captures, alarms, events, and KPIs allows remote troubleshooting reducing the need for on-site visits, and reducing operational delays and costs.

- **Multi-site Support**, PMN ensures that all enterprise sites are interconnected and treats devices as part of a unified enterprise system. This allows device movement between sites, individual site alarm/event monitoring, and easy replication across multiple locations.

- **Strong IT Integration**, VMware provides tools in compute, transport, network, security, and device intelligence. Their approach allows businesses to extend their existing wireless LAN approach to include 4G/5G access, integrating with existing enterprise network designs.

- A **single coherent management interface** in which all of VMware capabilities, across Edge Compute, SD-WAN, Edge Analytics, and Security can be utilized from one GUI.

- VMware's Private Converged Core, provides both 4G and 5G support from a single instance, allowing for the use of both 4G and 5G radios within a network, whilst maintaining the security of enterprise traffic on a cloud-based multi-tenanted management plane.

- An **ecosystem of certified RAN vendors** that can be utilized by potential customers.

- An MSP Managed Service solution that provides simple to use IT tools that **remove wireless network complexity from the enterprise user**.
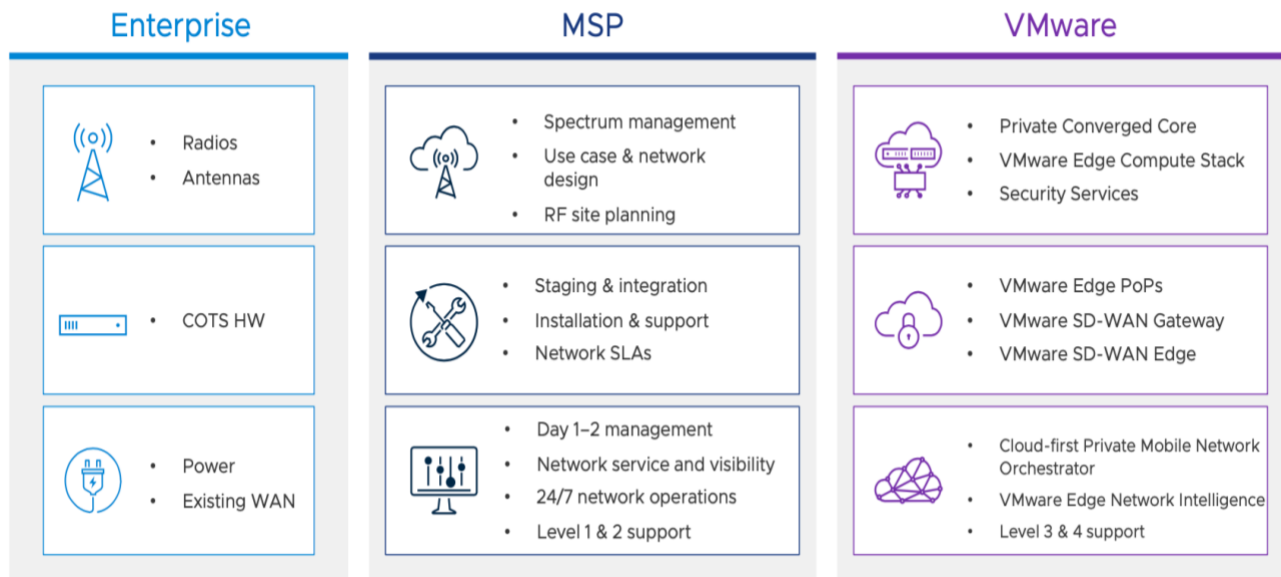
VMware's private mobile network solution addresses five key **shortcomings with legacy wireless technologies, like the current generation of Wi-Fi**:

- Security of data

- Scalability with outdoor and offsite mobility

- Latency

- Resilience with improved coverage

- Scalability with increased bandwidth with 5G

Therefore, VMware is taking a partnership approach for enterprises that do not have the necessary 5G/LTE skills to build their own solution. In particular, this includes abstracting the complexity of 5G/LTE with:

- VMware hosting and management of all cloud components

- The MSP providing site rollout, installation, support, and providing radio/antenna

- The enterprise customer only responsible for endpoints.

Figure 1: VMware PMN Ecosystem

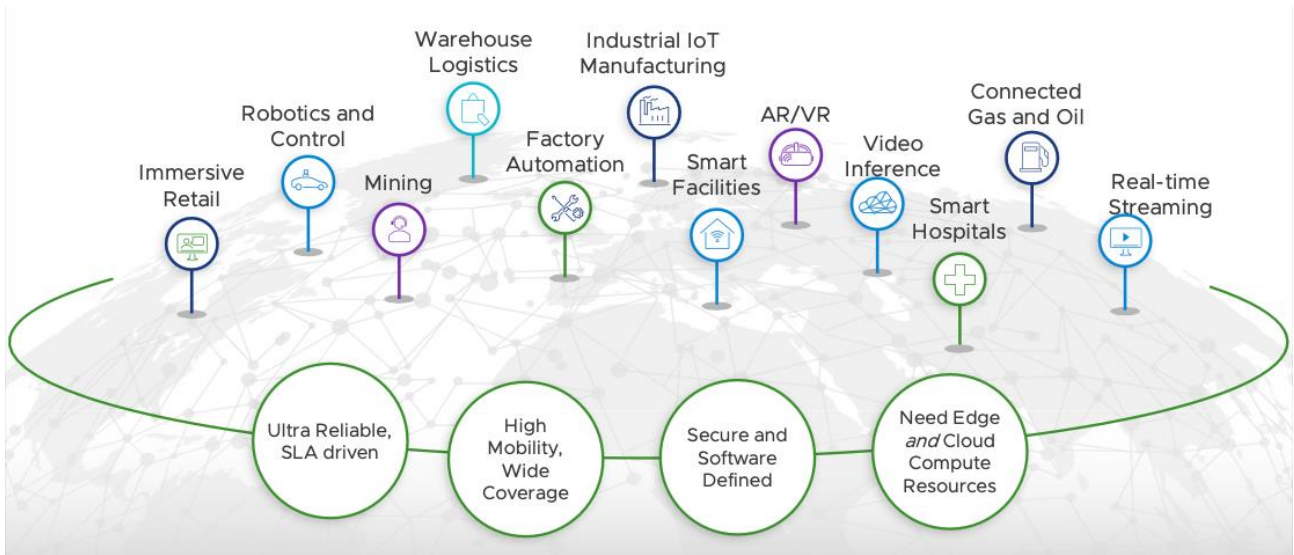| Enterprise	MSP	VMware
• Radios • Antennas	• Spectrum management • Use case & network design • RF site planning	• Private Converged Core • VMware Edge Compute Stack • Security Services
• COTS HW	• Staging & integration • Installation & support • Network SLAs	• VMware Edge PoPs • VMware SD-WAN Gateway • VMware SD-WAN Edge
• Power • Existing WAN	• Day 1–2 management • Network service and visibility • 24/7 network operations • Level 1 & 2 support	• Cloud-first Private Mobile Network Orchestrator • VMware Edge Network Intelligence • Level 3 & 4 support

Source: *VMware*

VMware is seeing increased interest in 5G/LTE private networks, especially from verticals with large-scale facilities or production lines. **Business benefits** from these include:

- New revenue opportunities in stadium and business campus verticals.

- More efficient operational processes in factories, transport, and healthcare environments.

- Higher security, safety and resilience in healthcare, government, and military environments.

- Retail customers who are adopting AI video applications to create immersive new experiences.

VMware envisions different ways to set up private networks, from dedicated setups like a factory's infrastructure to using parts of mobile networks for essential services. They also consider mixing network parts with local improvements, like in stadiums or campuses. The main goal of VMware's Private Mobile Network (PMN) solution is to make these private networks faster and more effective. This helps businesses move their applications to the network's edge while serving various needs in different industries. Removing the setup burden with the benefits of the PMN solution makes it more appealing for enterprises.

**Figure 2: VMware Private Network Use Cases**

Source: VMware

Private Mobile Network in the wider VMware ecosystem

The overall product combines the private mobile network with the broader VMware ecosystem to offer additional benefits to enterprise customers. VMware's Private Network solution is built on three inter-related pillars of the VMware ecosystem: SD-WAN, Edge Compute Stack and SASE.

Figure 2: VMware Private Mobile Network Application Stack
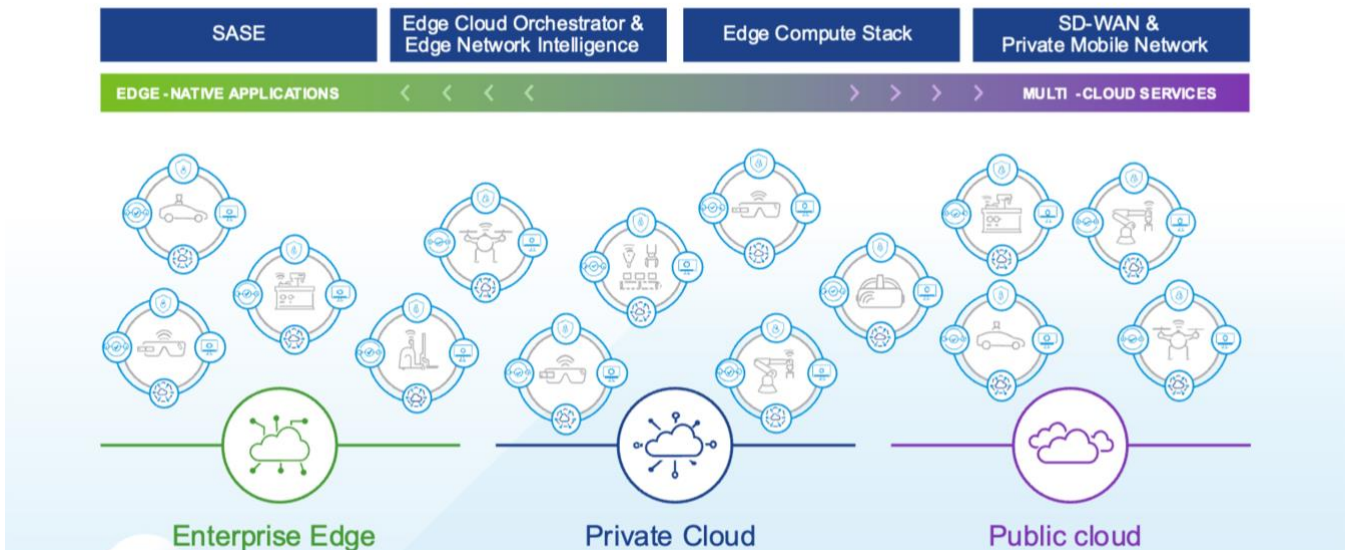
Source: VMware

VMware **SD-WAN** (Software-Defined Wide Area Network) provides high performance, reliable edge access across clouds, with traffic optimized over multiple connections VMware acquired Velocloud, a

leader in the (SD-WAN) market in December 2017. Since then, it has built this into a key component of its modern enterprise network offering, optimizing connectivity across different locations.

VMware **Edge Compute Stack** is a common platform for VMs and containers to support enterprise workload placement. It is focused at addressing the distinct needs of the edge versus traditional cloud, particularly edge device scale, security at the edge and network connectivity limitations.

VMware **SASE** is a secure access service edge platform for cloud-delivered networks, based on a zero-trust network access (ZTNA) framework. It is delivered as a service from over 200 points of presence, located in co-location data centers worldwide, delivering security performance close to enterprise edge users and applications.

Private Mobile Network

VMware's PMN aims to provide a local area network (LAN) experience using 5G/LTE technology. It focuses on creating a private network environment that offers the advantages of cellular technology without the complexity of a commercial public 5G network, geared towards mobile operator infrastructures.

Industry Templates

Recognizing that enterprise use cases do not need all the features of 5G/LTE, VMware PMN aims to allow customers to pick elements that precisely align with their needs.

VMware PMN is targeting an enterprise market that may not possess complete awareness of the potential of 5G. The solution aims to unlock the new capabilities in 5G, including low latency and efficient edge computing. It aims to enable enterprises to incorporate these advanced features, based on their specific requirements, with specific use case templates.

VMware expects very different PMN solutions for specific industries and is creating industry templates for these. Providing easier out-of-the-box solutions to enterprises that solve specific enterprise use cases.

SD-WAN

VMware's PMN solution leverages the benefits of VMware's SD-WAN solution to provide wide-area network connectivity for the private network. We profile this in our [VMware SD-WAN by Velocloud](#) solution profile. SD-WAN gives a cloud-based solution for enterprise use. This includes Dynamic Multi-Path Optimization (DMPO), enabling reliable transmission over multiple WAN paths, even on the unreliable Internet. This is key for enterprise customers in supporting critical automation initiatives where reliability is a key concern, such as in a private mobile network.

Orchestration

The PMN solution leverages VMware's orchestration platform. The PMN Orchestrator found within VMware's Edge Cloud Orchestrator is used for cross-domain service orchestration across the PMN solution, including the third-party RAN domains, core, edge, SASE and SD-WAN environments. The solution aims to be **highly automated** throughout the network lifecycle, in deployment and ongoing

fulfilment. We profile VMware's orchestration in the VMware in Cross Domain Service Orchestration solution profile.

Unified Dashboard

VMware provides a single, unified dashboard for the enterprise user of the solution and for the MSP. The dashboard incorporates all aspects of the enterprise PMN solution, including, private mobile network, core, SD-WAN, SASE, and edge cloud.

The dashboard provides functions for customers when setting things up and adding functionality and connections to their private networks. VMware's dashboard gives a big-picture view of all these programs, making it easier to control, monitor, and improve the network system.

With one simple control panel, business can easily manage their PMN as enterprise users, not public mobile network experts. The dashboard hides the complicated 5G/LTE technology from business users removing the complexity that characterized previous attempts to deploy this technology.

Figure 3: VMware Private Mobile Network Dashboard
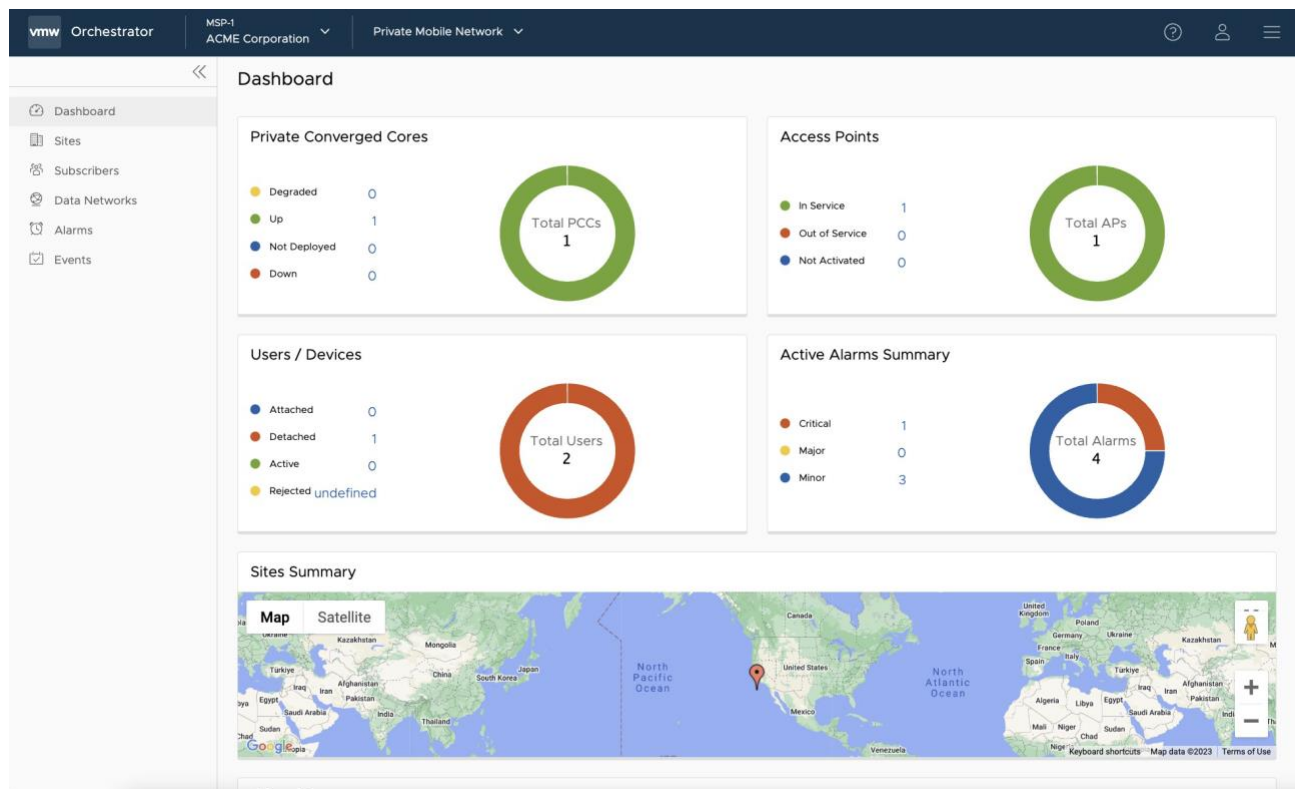
Source: VMware

Market Impact

VMware has clearly designed the Private Mobile Network with versatility in mind. For large CSPs, this means more efficient deployment times and quicker troubleshooting. For smaller MSPs, it presents a

feasible option when building an extensive PMN, that otherwise might not be resource effective. The primary goal is to reduce overall costs and speed up deployment processes, addressing the distinct challenges each enterprise faces.

Partnerships

VMware is partnering with RAN vendors to create their complete PMN solution. They are emphasizing a close partnership and integration with Airspan, a prominent provider of wireless networking solutions. This collaboration allows them to combine their respective expertise and technologies to deliver a comprehensive and well-integrated offering for customers.

VMware currently has announced MSP partnerships with [Betacom](), [Boingo]() and [Federated Wireless]() who are already deploying VMware solutions to their markets.

Customer Traction

As a new product, VMware and its partners have not made any announcements on customers.

Appledore Analysis

The private enterprise network market is evolving, with 5G and 4G potentially enabling new and exciting applications across multiple industries. This creates opportunities for innovative companies, such as VMware, to encourage customers in all industries to think differently about how (and how best) to solve a whole range of industry problems that can be addressed with better connectivity.

VMware, with its IT led approach, is well-positioned to deliver enterprise-shaped solutions, not encumbered by the macro cellular technology approach of the traditional telco vendors. VMware is among the first to recognize that private mobile enterprise networks are a supporting tool to enable enterprise, not an end in itself.

In our market outlook on [5G and Industrial Automation]() Appledore identified that much of the new opportunity in 5G would be in private networks. We estimated that the incremental market available for industrial 5G will be between USD 115-130B by 2029, a significant growth opportunity globally. However, this opportunity will vary between different industrial segments and global regions. Success in private 5G and industrial automation requires new business models, ecosystems, and cross-industry relationships.

Network Automation Software Taxonomy position

VMware's Private Mobile Network solution provides a complete out of the box solution for an enterprise, delivered by an MSP. As such it addresses all the key areas of the Appledore Network Automation taxonomy:

- **Distributed Cloud Infrastructure** management with its vSphere and Edge infrastructure solutions.

- **Cloud Network** with network functions for 4G and 5G core, SD-WAN networks, RAN functionality from partners and Security functions from their SASE.

- **Domain Management** provides the management and controller functionality for Core private networks.

- **Observability/Data Management** provides topology and streaming data management to support domain management and AIOps.

- **Continuous Testing** VMware provides pre-integrated and validated private network templates to ease the delivery of enterprise networks, including the ongoing test and validation of the solution through the service lifecycle.

- **AIOps** VMware is providing AIOps functions for the management and assurance of its network as part of its overall enterprise.

- **Service Orchestration** provides an integrated end-to-end orchestrator across core, RAN, security, edge, and cloud to deliver the enterprise private mobile network.

- **Business enablement** VMware provides an integrated dashboard both to the MSP providing the network as a managed service, and to the individual enterprise in a way that fits with the enterprise IT management processes.
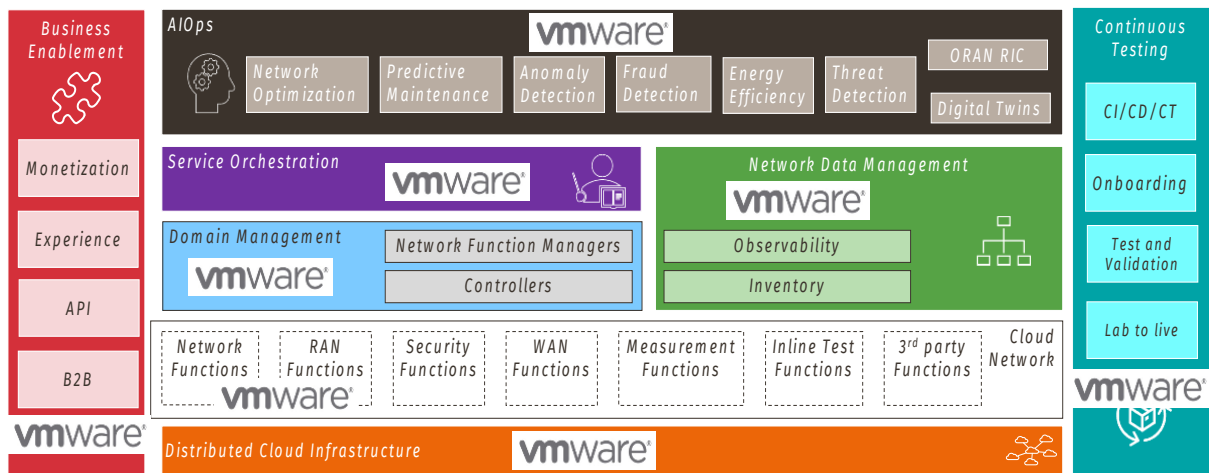
Source: Appledore Research

Competition

VMware's main competition in private networks inevitably comes from enterprise Wi-Fi suppliers with a strong direct-to-enterprise channel, such as **Cisco** and **Juniper**.

At a headline level, VMware's overall **private mobile network** solution competes with CSP vendor solutions from **Nokia**, **Ericsson**, and **Samsung**. Within this its private 5G/LTE **Packet Core** competes with Nokia, Ericsson, Samsung, and **Casa Systems** as well as private network specialists such as **Druid.**

SWOT Analysis

Strengths
• Enterprise first approach backed by strong enterprise IT pedigree in virtualization and cloud native applications.
• Strong telco experience including SD-WAN and Assurance means non naïve abstraction of telco complexity.
• Exposing Wi-Fi-like levels of network simplicity and operational automation to enterprise.
• Clearly articulated role for MSP/CSP that does not bring complexity of public macro cellular networks to enterprise.
• Cloud-native strategy across cloud and edge enables ease of deployment for LTE/5G networks in both RAN and core.
• Pre-defined industry templates for enterprises allow accelerated deployment

Weaknesses
• Continued industry skepticism about the relevance or need for 5G/LTE in enterprises. Industry 4.0 players are delivering solutions for many use cases without it.
• Current low-level of widely applicable experiential differentiators for 5G in enterprises.
• Limited role in VMware PMN solution may make this solution less attractive to some MSP/CSP.

Opportunities
• Leverage enterprise conservatism - enterprises remain wedded to solutions from incumbent industry-specific suppliers like VMware.
• VMware's Open RAN with RIC leadership enables the delivery of RAN networks tailored to enterprise needs "personalization", including incorporating enterprise functions.
• Leadership in proving that private mobile networks can deliver agility and flexibility without added complexity.

Threats
• Continued small scale DIY PMN in enterprises and by their suppliers.
• The market continues to adopt WiFi (and its evolution) private networks for most enterprise use cases, leaving LTE/5G networks in only niche or "bleeding edge" applications and lacking deployment scale.

Summary

VMware is a credible challenger vendor in enterprise networks, to the traditional enterprise Wi-Fi vendors, backed by a strong enterprise IT pedigree. Its focus on simplifying, abstracting 5G and LTE network technology is the right approach, particularly the creation of pre-defined enterprise use case templates which address specific enterprise need. VMware is providing an end-to-end solution for the enterprise, including security, automation, and connectivity beyond just the mobile core and RAN. This further simplifies the adoption of Private Mobile Networks by enterprise.

VMware will need a continued focus on creating strong business case models for 5G/LTE private networks to convince enterprise customers of the benefits of 5G use cases that WiFi cannot address.. VMware will also need to help the positioning of MSPs as the natural delivery mechanism for enterprise private mobile networks, with telcos traditionally being seen as too complex and difficult to deal with by enterprises.

We believe that VMware is putting in place the right approach to using 5G and LTE in enterprise private networks. VMware rightly regard PMN as a complimentary technology to WiFI that enables use cases that are better served by cellular technology. .Its enterprise IT led approach in which the needs of the enterprise, rather than the network technology, take center stage is we believe the right one. In the rush to monetize 5G many in telco have seen the promise of private networks as a great opportunity for more telco network, rather than as a supporting tool for the enterprise's business. The hype has failed to recognize that these networks are only private to telcos. For the enterprise they are **their** networks that need to deliver their business requirements. VMware have a powerful position in providing a practical bridge between the needs of the enterprise and the opportunity from 5G.

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