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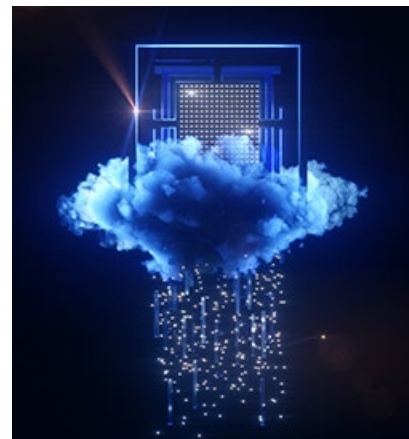
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Start the Journey to Cloudification on Solid Ground

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Escalating expectations for digital experiences are driving the need for ever-faster speeds, better performance, and peak quality of service. Before existing infrastructure can support a new generation of revenue-generating, digital-first experiences, however, many networks are still in need of digital transformation.

To support individualized services from the edge to the mobile core, legacy networks require the agility and scalability that only cloud-native operations can deliver. But a successful digital transformation requires more than simply replacing physical hardware with virtualized network functions.



Today's mobile network operators (MNOs) cannot realize true competitive advantages without fully embracing intelligence, analytics, and automation. Plus, the ability to deliver virtual connected experiences seamlessly from the core to the network edge also requires a healthy, open ecosystem.

With all the factors to be considered, building and executing this transformation strategy can appear to be a challenging and daunting prospect. Nonetheless, in today's competitive networking environment, the road to cloudification cannot be safely bypassed. Cloud-native solutions enable seamless connectivity, data-driven insights, automated intelligence, and productivity innovations, allowing delivery of highly personalized customer experiences that break through the status quo.

As MNOs embark on this journey, the first steps they take are critical to avoiding missteps and stumbles along the way.

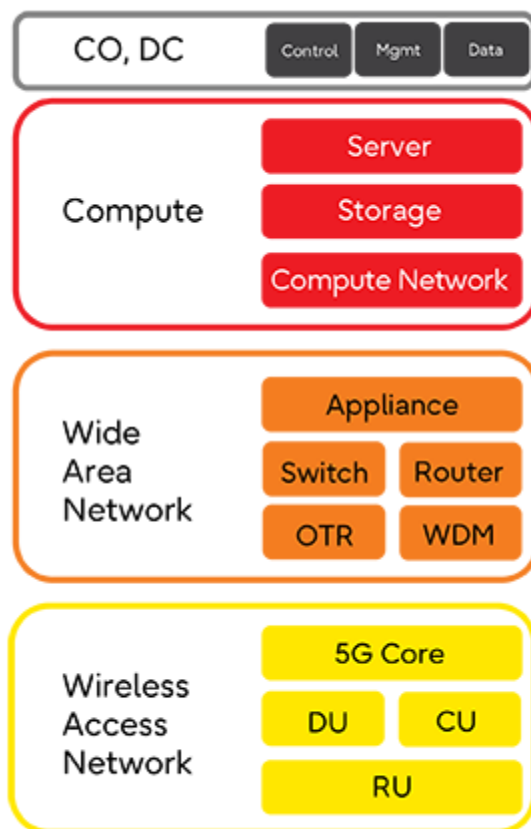


Figure 1: Disaggregated network elements

Open to opportunity

Enabling individualized customer experiences with new and untested cloud technologies can place considerable pressure on the software and services layers of the network stack. This means these underlying layers need to be interoperable and as flexible as possible, requiring greater modularity and the introduction of open, standardized models and application programming interfaces (APIs). As the network evolves to be more cloudified, increased operational agility, visibility, and control become ever more critical in order to enable performance management across multicloud operations. Adopting an open and disaggregated architecture is key to this evolution. By disaggregating network elements and their embedded software, it's simpler for centralized operations to match and control latency, throughput, and other specific connectivity requirements for end-to-end service delivery. This disaggregation varies for different network domains. For example, in the radio access network (RAN), the 5G core, radio units, distributed units, and central units all can be disaggregated, improving speed and cost-efficiency. Likewise, IT infrastructure can be disaggregated into separate compute, server, and storage functions (figure 1 on previous page).

In addition to speeding up deployment of new digital services, separating the network stack into modular, functional blocks with open APIs also facilitates maintenance and network upgrades. This includes control, management, and monitoring applications, creating a basis for centralized network orchestration and automated assurance. The result is improved quality of experience

(QoE), as well as preparing a solid foundation for machine learning (ML) and artificial intelligence (AI) capabilities.

It's important to note that while disaggregation of network elements is a vital part of the cloudification journey, it's not necessary to get there overnight. Distributed network functions and applications can coexist with legacy hardware, and physical and virtual network elements and functions can be configured in different physical locations using centralized management. Moreover, containerized functions can be migrated to the cloud to further support the legacy network while tapping into cloud-native benefits.

Integrate intelligence

Digital transformation creates business value and unlocks true competitive advantage by powering network solutions that span the entire data pipeline—including data ingestion, processing, model training, and automation—across multi-layer, multi-vendor architectures. A variety of opportunities become available for MNOs to monetize data by aligning network value directly to revenue.

With unified orchestration and control that leverages open APIs, valuable insights into subscriber segmentation as it relates to network usage can be gleaned from complete network data analytics. As a result, MNOs can take advantage of a range of dynamic capabilities, such as optimizing speed and throughput, partitioning traffic, minimizing QoE impact from high-traffic users, and setting pricing levels for different types of traffic.

These services and network functionalities are not possible, however, without fully embracing intelligence, analytics, and advanced automation. Network analytics and AI can be used to continuously evaluate and analyze digital infrastructure and service performance from distributed datasets across the network. And with the introduction of an end-to-end automation layer, multiple network functions and domains can be managed across physical connections, virtual network functions, and cloud applications.

Likewise, infusing the network with intelligence allows enhanced, real-time monitoring and analysis of network data to simplify operations and tame complexities. This intelligence, plus the application of ML technology, creates a foundation for truly autonomous networking, which aids in planning, root-cause troubleshooting, network upgrades, and proactive cybersecurity detection.

Use and reuse

As the pace of technology-led disruption increases, it's essential to understand how to enable ever more flexible and streamlined deployment models. This means an appreciation for the use of microservices, microapplications, containers, and clusters, as well as a healthy approach to the DevOps practice of Continuous Integration and Continuous Delivery (CI/CD). With microservices and containerized microapplications, predictable environments can be created, isolated, tested and reused with discrete compute and storage overhead. In this way, network teams can perform maintenance operations and upgrades without impacting other applications running in the cloud.

By embracing the DevOps CI/CD methodology, network development and operations teams also can use microservices and containerized applications to work on the same production system at the same time without interference. This continuous innovation not only reduces the time needed to resolve network issues, but also speeds up the introduction of new features and services for faster revenue generation.

Moreover, the ability to containerize network functions and modular applications around specific business capabilities allows resources to be deployed when and where they are needed, helping to optimize capacity usage and improve QoE. This optimization can be further improved with the addition of predictive analytics to isolate subtle patterns that reveal underutilized assets.

Cloudify with clarity

As the number of Internet connections continues to grow exponentially, it’s important that tomorrow’s networks are capable of meeting the demand in a way that ensures seamless performance, reliability, and trustworthiness of real-time data transactions between people, devices, and things. In order to prepare legacy networks to support new revenue-generating experiences with next-generation multicloud environments, a digital-first transformation is necessary.

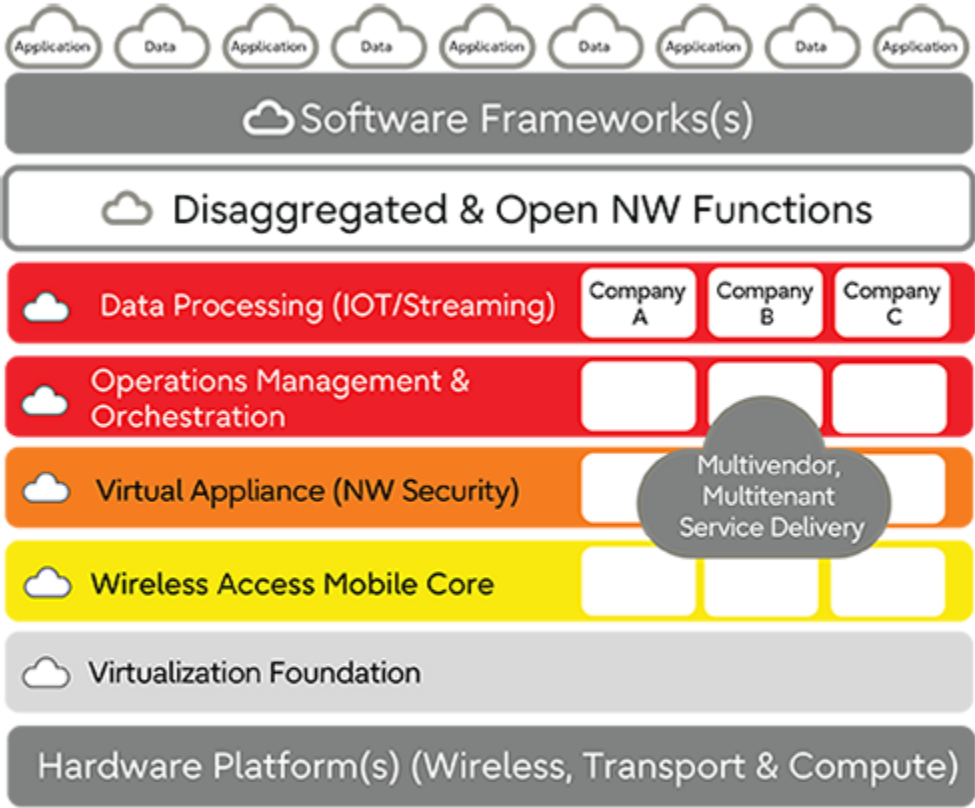


Figure 2: Disaggregated network elements, multicloud automation, and streaming data/analytics

The agility and business value that comes with cloud-native applications, automated intelligence, and disaggregated network components empowers meaningful business development. With virtual network functions and sophisticated applications distributed across multicloud environments, MNOs can select the cloud services that meet their needs, speeding delivery of unique, end-to-end service combinations while reducing costs for improved profitability.

Successful digital transformation enables MNOs to strengthen existing business and partner ecosystems, driving sustainability even as they speed up innovation. But with all the possibilities of digital transformation, it's important to begin by focusing on the steps that can deliver the most network value first. In this way, MNOs can start off on solid footing to begin their cloudification journey with confidence.