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# Bolstering Competitiveness by Virtualizing the IMS

**Enabling communications service providers to increase agility, improve innovation, and deploy new services quickly and cost-efficiently**

The high barriers to entry in the traditional telecom industry have been torn down, leaving a hugely competitive market where agility, creativity, and low cost of ownership are critical to ongoing business success and innovation.
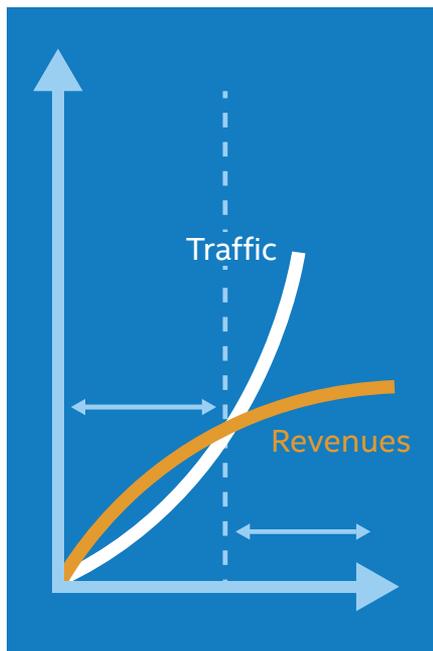


### Executive Summary

As revenues and margins from traditional services decline, communication service providers (CSPs) are looking for alternative revenue streams and ways to reduce costs while maintaining high levels of service quality. Meanwhile, over-the-top (OTT) services such as Netflix*, Hulu*, instant messaging, and voice-over-IP (VoIP) that ride on top of CSP networks continue to cut into revenue share by offering low-cost or free services with corresponding acceptable service quality while displacing traditional services such as phone calls, texting, or video-on-demand.

As service providers consider new ways to compete, they are paying renewed attention to the IP Multimedia Subsystem (IMS), an architectural framework for delivering IP multimedia services. At its core, IMS opens the capabilities of the network to innovative applications that are not part of the initial solution. In essence, the network becomes "programmable," which creates the opportunity for the CSP or its customers to innovate and create new revenue-generating services such as Web Real-Time Communication (WebRTC), Voice over Wi-Fi (VoWiFi), or other services not yet envisioned.

While IMS is not new, complete virtualization of IMS (vIMS) is new. Network functions virtualization (NFV) provides operators with the ability to rapidly and inexpensively deploy, configure, launch, and upgrade services, which can lead to faster time to market and lower operating costs, providing an important competitive advantage against traditional CSPs and new OTT service providers. It can also reduce the business risk associated with new service introductions. This agility allows operators to offer trials of new service offerings on a much larger scale, leading to acceleration of new revenue generation.

### Competitive Market Drives the Need for Business Agility

The complexity of legacy CSP service structures, high infrastructure costs, and other challenges are making it more difficult for traditional service providers to compete with new entrants, especially when it comes to overlapping offerings (Figure 1).

The lack of flexibility and agility of legacy networks poses a serious challenge to service providers in terms of increased investments, slower time to market, and the risk associated with any new product or service. For CSPs, new services not only require an overlaid network infrastructure, but also new management, control, and data planes specific to that service, along with additional customization of support systems. Any deployment delay negatively impacts the strategic competitive advantage of the new offering and the associated return on investment.

**Figure 1.** CSP business challenges

Service providers want to introduce new services with greater speed and efficiency for sustained competitive advantage. Additionally, they want a way to deliver these services across multiple network access types and end-user devices to ensure a consistent customer experience. IMS can help meet these needs. The system enables the transportation and interoperation of voice calls through the all-IP network, and tight integration into the circuit-switched network when necessary. This capability is significant because it offers the final realization of a single network that can carry both high-quality voice and data traffic at the core of the next generation of services.

IMS consists of a large number of functional elements—such as session control, connection control, and an application services framework—all working in concert to enable the operator to deliver the services that involve voice enablement over the all-IP network. These functions have traditionally been deployed on purpose-built hardware and have been sized to meet the maximum expected network capacity when installed and operationalized. Thus, they require a large investment up front and lengthen the return on investment.

Another challenge with legacy purpose-built hardware solutions is that they can take a year or more to install and configure. This lag time creates risk in a highly competitive, fast-changing market. Purpose-built hardware also serves only one purpose. As CSPs bring out new services, they will need to deploy different hardware and systems. This increases the operating cost and creates a vendor lock-in situation, limiting business agility.

With vIMS, CSPs will be able to grow their networks more economically than in the past, and ultimately grow and refresh their hardware more predictably without being locked into particular solutions as their needs change.

**Providing a Flexible Way to Implement NFV**
NFV changes the landscape for CSPs in several critical ways. NFV enables the development and deployment of network services on Standard High Volume Servers (SHVS) using modern virtualization technology.

vIMS solutions take advantage of the NFV trend and allow CSPs to virtualize their IMS infrastructure. Instead of supporting multiple, purpose-built IMS solutions, service providers can deploy fewer, more flexible systems through virtualization. vIMS offers an effective avenue for addressing the business goals of service providers and their customers. As demand grows incrementally or new services are deployed, CSPs can easily scale their infrastructure by simply adding new nodes for additional workload, unlike solutions based on legacy purpose-built hardware.

While IMS today is already in every CSP network that currently provides 4G-LTE Voice over LTE (VoLTE) service, several factors are driving the market toward IMS virtualization. In regions of the world where VoLTE is not yet online, service providers may choose a vIMS infrastructure over a legacy purpose-built IMS as part of their initial rollout plans. It reduces their overall investment by avoiding the obsolescence of purpose-built hardware in the future, while enabling greater business agility at service launch.

In other cases, CSPs are seeing capacity limits being reached in their current legacy IMS infrastructure and are considering or actively pursuing vIMS. They see vIMS as an opportunity to transform their business to become more agile and cost-effective to win competition from traditional and OTT service providers.

The good news for CSPs is that vIMS is not an "all-or-nothing" set of choices. CSPs can choose the pace and scale of virtualization based on their business priorities and resource availability. For example, a service provider may choose to deploy a virtualized home subscriber server (HSS) on one or more of the signaling nodes of the IMS. Potential candidates include the call session control function (CSCF), multimedia telephony application server (MTAS), and the signaling plane of the session border controller (SBC).

## Accelerating Time to Market and Reducing Costs with vIMS

A vIMS solution creates new upsell opportunities for service providers by enabling them to introduce new services without having to deploy new physical hardware. Such flexibility and business agility transforms the image of communication providers, which was perceived to be moving slowly in comparison with new service providers in the cloud computing age. Customers benefit from the flexibility to quickly add new services or modify existing services to address changing needs—similar to how they are using cloud services.

Likewise, flexible network programmability allows operators to provide tighter control of end-to-end network resource usage, enabling easier business continuity, logistics, and infrastructure reuse with changing demands. For example, the pooling of resources over a large geographic area lets network operators more precisely measure capacity and avoid bottlenecks, thus improving equipment utilization by sharing resources in the pool.

Success in this network transformation goes beyond the initial potential for cost savings and the anticipated agility to adapt and create new services. It also transforms the operation model of the network.

Since the hardware can be changed irrespective of the upper-layer software, effective applications from various vendors, along with state-of-the-art servers, can be mixed and matched to meet the business needs of the operator today and into the future.

Integration of the software into the NFV infrastructure (NFVi) helps ensure the performance metrics of the specific workload can be optimized on standard high-volume servers. Because a vIMS implementation can provide management functionality through software, customers that manage their own equipment might be able to reduce the need for highly skilled—and highly paid—hardware technicians. Customers managing their own equipment can take advantage of the existing skills used for managing other systems in their data center.

## Building vIMS Solutions with Intel® Technologies

While virtualized network elements offer service providers promising business value, they also present new challenges as CSPs move away from traditional infrastructure. To help remove these barriers, Intel is engaged in various open-standards efforts to advance the open source community, enable the ecosystem, collaborate on trials, and deliver reference architectures—all with the intent to accelerate and ease the network transformation (Figure 2).
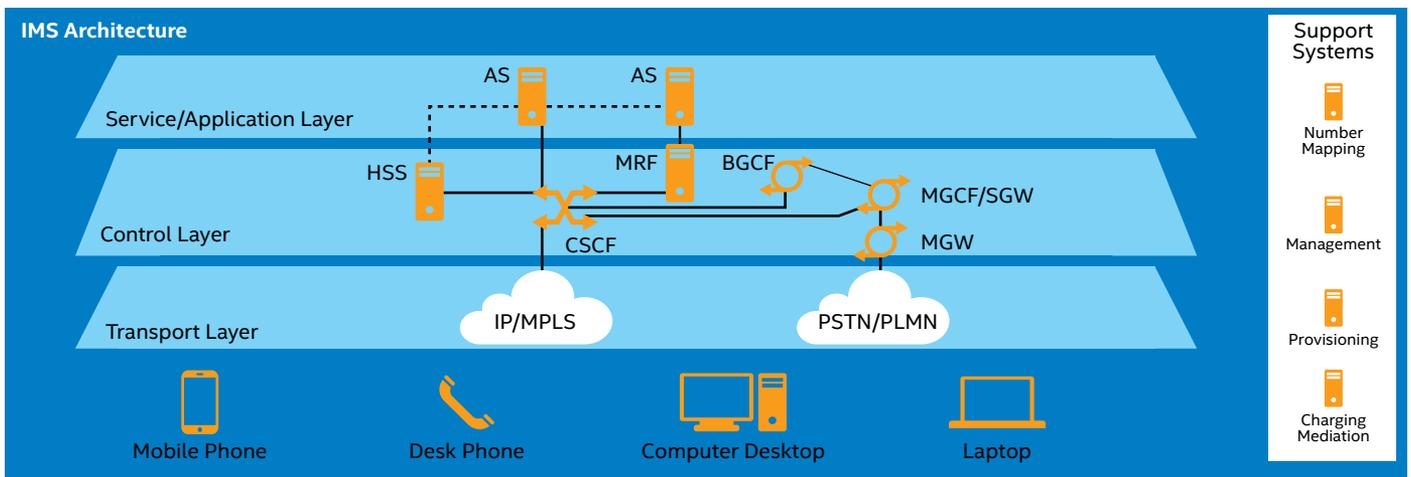


**Figure 2.** IMS contains layers and elements that can be abstracted from the underlying hardware through virtualization

Purpose-built IMS solutions require service providers and their hardware partners to qualify each version of a device, whether it is produced to offer a distinct service or accommodate a different number of users. With vIMS solutions based on industry-standard technologies, service providers can have fewer variations for their solutions, saving time and costs while reducing the expense of servicing equipment and developing new purpose-built solutions. For example, standardizing on Intel® processors for these deployments makes sense due to their exceptional scalability and the fact that they can be allocated based on actual field traffic loads. Meanwhile, service providers can meet each customer's unique requirements without having to offer numerous hardware versions of their solution.

## Summary

As voice and text revenues continue to decline, service providers are exploring new ways to remain competitive, streamline infrastructure management, and reduce costs. To meet these challenges, service providers have an opportunity to evolve their networks into a modular layered architecture in which the applications or services are independent of underlying control, connectivity, and access layers.

By providing a standardized platform with well-defined interfaces, as well as a set of reusable components, vIMS allows CSPs to test new services created by third parties and produce new ones that integrate effectively with other services. In this way, vIMS facilitates an open system to allow the collaboration of services from multiple vendors, giving service providers greater flexibility to choose the most effective way to launch new services.

## For More Information

Intel® Network Builders—one of the key Intel OpenNetwork Platform initiatives—is a vendor ecosystem dedicated to accelerating the adoption of network functions virtualization and software-defined networking. Learn more: https://networkbuilders.intel.com

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