metaswitch

VOICE OVER WI-FI STRATEGIES

SERVICE, BUSINESS VALUE, AND BENEFITS OF VIRTUALIZED SOLUTIONS FOR SERVICE PROVIDERS

SOLUTIONS MARKETING

JANUARY 2017

EXECUTIVE SUMMARY

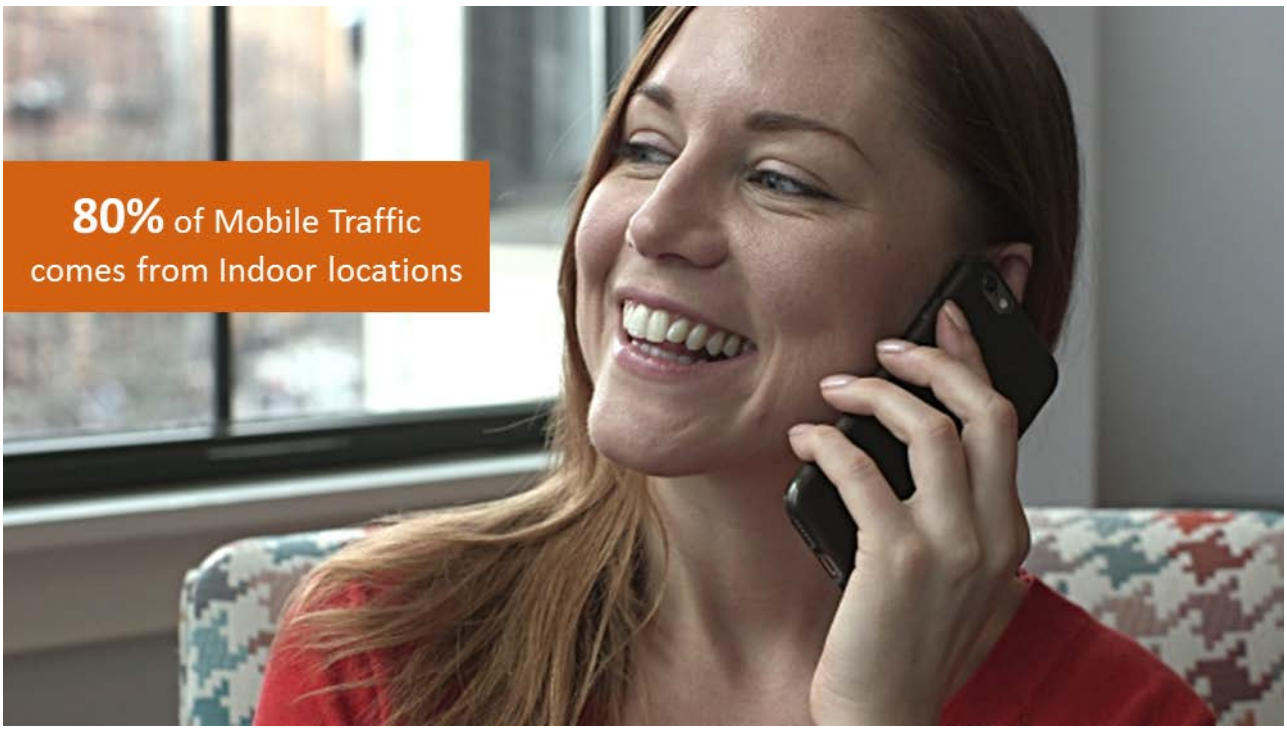
This white paper describes how fixed, mobile and converged services providers can leverage Voice over Wi-Fi as a critical part of their mobility strategy. Native dialer and OTT app approaches are described based on the desired user experience, spectrum assets and overall business strategy. There are clear benefits for the user and the service provider, making VoWiFi a must have in any service provider portfolio. Metaswitch Cloud Native solution accelerates the path to VoWiFi, which increases agility and lowers deployment and operational costs compared to traditional IMS solutions without NFV platforms.

INTRODUCTION

The carrier is no longer up against just other carriers. There's a new type of competitor, and their business operation models are different from the traditional mode from carriers. Service providers need the ability to compete on the same economics as cloud providers and follow the same innovation model.

Today, over-the-top (OTT) providers are offering personalized, differentiated voice and messaging services and are a real threat to the telecom service providers. These real-time communication services are the heart of service providers and deliver most of their revenues. Therefore, to compete, telecom network operators need to take these core telecom services beyond the plain, standard service offerings and attract new, and retain existing, customers. IMS and VoLTE provide a natural route for operators to compete with OTT, and preserve their value to users.

However, IMS is "business as usual" for the traditional telecom vendors in that they have closed proprietary solutions that are complex and costly to implement, standard non-extensible voice services and long release cycles. This model enables OTT providers to run rings around telcos as they innovate rapidly and creatively use cloud and open source software.



Source: Mobile Data Moves Indoors, Senza Fili Consulting

The time is ripe for a change. Voice over Wi-Fi is one of the key services that any service provider can use to enhance their portfolio, and the only way to implement today is based on a cloud native core network.

The Metaswitch virtualized solution provides a fully featured VoWiFi core solution, including:

- Support for both IR.51 VoWiFi and app overlay Wi-Fi deployment models
- A fully standards-compliant IMS core, VoWiFi and VoLTE TAS, SBC and ePDG (fully integrated partner)
- Service continuity across different access technologies (Wi-Fi, LTE, CS)
- Flexibility to customize and extend services, driving service innovation
- NFV support, enabling a quick and cost-effective deployment in virtual environments
- Integration with existing SS7 applications via IN, providing service parity to users

This solution also allows telecom operators to extend the solution, to go beyond the plain vanilla quickly, cost-effectively and safely, thus enabling telecom network operators to be more competitive and effective.

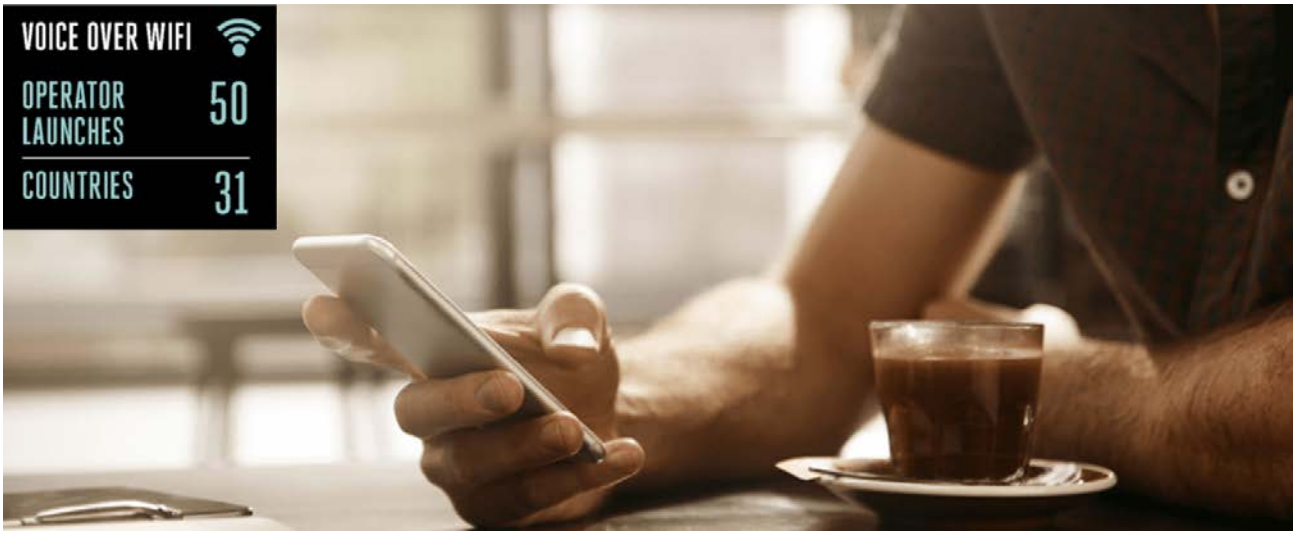
SERVICE PROVIDER STRATEGIES

MOBILE SERVICE PROVIDERS

With 7 billion handsets and 2.5 billion data contracts set to climb to 10 billion and 6 billion by 2018[1], mobile service providers are looking for ways to improve spectrum utilization and access for subscribers. Ever increasing data needs increase costs and cause frustration with network. Eighty percent of calls are in-building, but structural penetration is worse at higher frequencies (LTE). There is never enough spectrum, even though VoLTE has 3x the spectral efficiency of CS LTE, it still cannot cope. And in-building issues harm the customer UX, device battery life and macro RAN performance. VoWiFi can offer a solution to both spectrum and UX that enables mobile carriers to improve service while decreasing their costs.

Extending the access networks to Wi-Fi allows operators to fully embrace the global aspect of the Wi-Fi availability and provide their customer with cost-effective access to their services while roaming removes the need to look for alternative communication means. It also allows consumers to access their services while using the popular commuting services such as undergrounds, ferries, trains or busses previously unavailable due to coverage restrictions.

Over 95 percent of smartphones include a Wi-Fi-capable radio, and more than 30 percent include IR.51. With all new phones from leaders like Apple and Samsung having IR.51, availability of these devices is projected to climb every year until IR.51 is a ubiquitous feature in 100 percent of VoLTE capable handsets (predicted to happen in 2025).



Source: Voice over WiFi Launches, GSMA Network2020, Feb 2017

FIXED AND CONVERGED SERVICE PROVIDERS

For fixed carriers or converged carriers, VoWiFi takes advantage of the fixed broadband networks already in place to provide access and coverage where it is needed. Broadband providers that aspire to offer mobility services can also deploy a VoWiFi infrastructure today and then deploy an LTE or unlicensed-LTE solution on the same infrastructure in the future as and when spectrum is acquired or partner as an MVNO with a host mobile network operator. Service providers targeting the enterprise market can combine micro RAN, and fixed BB/Wi-Fi networks providers can dramatically increase coverage and performance for the entire network on campus, as well as decrease roaming costs on macro networks.

MVNO USE CASE

Many MVNO companies rely on VoWiFi as a cost-effective way to operate their network and provide service to their customers. With a Wi-Fi-first approach, macro network utilization and roaming are both minimized, improving the cost of delivering service by as much as tenfold. And, if the MVNO operation is being run by a fixed broadband provider, QoS and accessibility enhancements can be made that further add value and improve the overall customer experience.

VOWIFI AS A SERVICES PLATFORM

A critical part of strategic consideration today is to look beyond just providing voice as a service to the user, and instead leverage this as a customer relationship to offer new services. For enterprises, a VoWiFi offering with a set of business services can provide value to end users and help generate additional revenues. The same infrastructure can also connect a new set of devices such as security cameras, microphones, customer service kiosks, applications (such as Amazon MayDay) and more as new IoT devices are available in the market to serve as new use cases for the end users, enterprises and service providers.

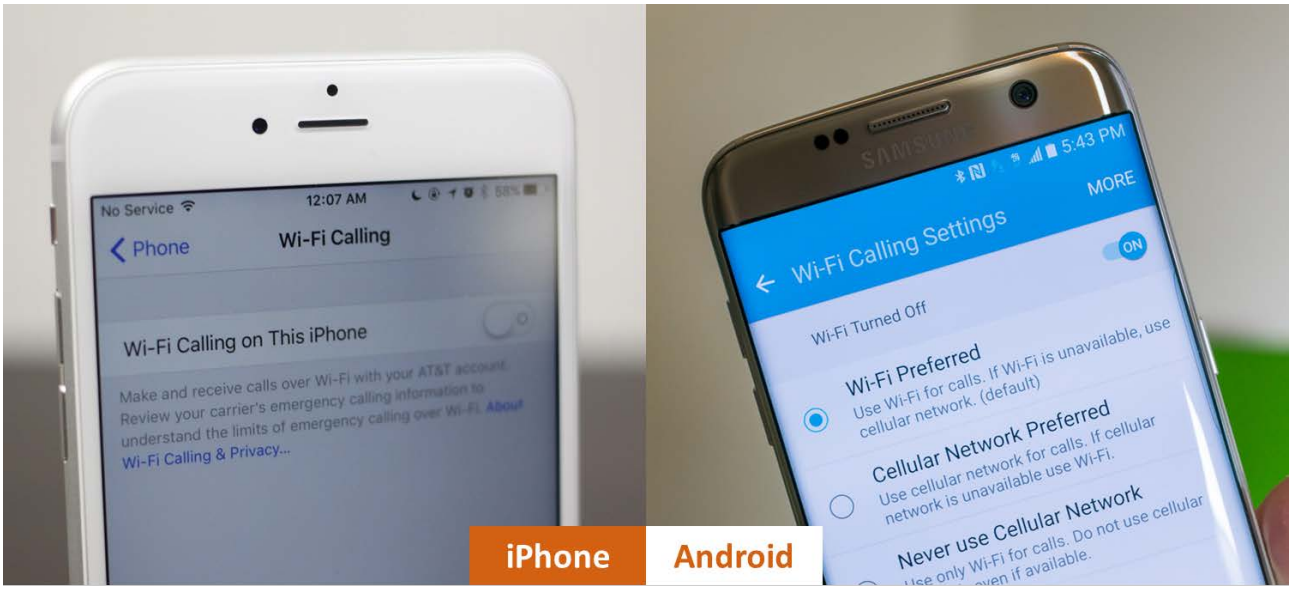
SERVICE OFFERINGS

CONSUMER VOICE OVER WI-FI

VoWiFi has been discussed for more than a decade, but now it typically comes down to two implementations, IR.51 “VoWiFi” or “app overlay” Wi-Fi voice. Both have their uses and positives and, with the correct solution, can be mixed to provide wider coverage across a more disparate group of devices.

IR.51 VOWIFI - NATIVE DIALER EXPERIENCE

IR.51 VoWiFi gives customers a native dialer experience. Fundamentally, it adapts 3GPP GSMA standards to non-3GPP access (IP over Wi-Fi). In practice, it maps an alternate radio layer in Wi-Fi that can supplement or supplant the VoLTE IR.92 layer. IR.51 support allows the customer to have a single DN that works on multiple access networks using the customer’s standard device, contacts and dialer. Today, IR.51 is supported by iPhone 6 and newer, as well as many Android devices, including the Galaxy S6 and S7 family. Since iOS8 added IR.51 support, it is the most common meaning of VoWiFi when discussed in our industry.



“APP OVERLAY” -- CLIENT EXPERIENCE

When using an application overlay to deliver VoWiFi, it is essentially a VoIP call over a data network. Unlike IR.51, this call can occur on Wi-Fi or on 3G/4G/5G data. The app usually uses a unique DN from the native handset, though some solutions can provide single-number integration. There is no GSMA standard for app-overlay-based service, however it can be built using IMS/VoLTE standard components. App overlay is well suited to tablets, which traditionally do not have native voice support. Additionally, it enables sharing DN across multiple devices and also can facilitate multiple identities on a single device (work vs. personal). App overlay also supports subscribers bringing their own devices (BYOD), which can dramatically improve the cost of providing a service like this.

COMBINED EXPERIENCE

By combining IR.51 and app overlay, a service provider can offer a rich multi-identity, multi-device-capable service that provides subscribers with the best of both worlds. Using native dialer integration on the primary device as well as the app to span devices give the customer a feature-rich solution that follows them everywhere.

REVENUE SERVICES

UNIFIED COMMUNICATIONS

Hosted business service providers can use Wi-Fi to extend their offering into a mobility play. By allowing access to Unified Communications features from a smartphone platform, employees are always connected to their contacts, services and customers. VoWiFi or even VoIP over cellular data, deployed via app overlay, enables a BYOD solution for easy integration with modern smartphone platforms. Native dialer integration and IR.51 are even better solutions for offerings where employees are provided with company-owned equipment. Either way, end users have access to their business identity, and all the services that come with it, even when they are away from their desks or offices.

Metaswitch Accession portfolio for Unified Communications

GROUP COMMUNICATIONS

VoWiFi and VoLTE applications can be integrated and layered with exciting new UX to facilitate enhanced customer communications. With access to presence and status information, easy one-push calling or transferring, and push-to-talk, consumers can stay connected with their families, or small business employees and teams can stay connected and be more productive. Other contextual information can be injected into the UX to provide enhancements to the conversation, and new features are easy and elegant to deploy (such as temporary phone numbers or better blacklist/whitelist management).

INTERNET OF THINGS

VoLTE/VoWiFi IMS core infrastructure provides an ideal platform for purpose-built IoT. Metaswitch anticipates IoT will be served by IMS deployments that can scale in the same fashion as today's web-scale services (Facebook, Google, Netflix, etc.) IoT will bring along many more devices than today's telecom networks, but they may also produce very low ARPU and vastly different call patterns. Metaswitch's solution will allow service providers to address the unique service demands of IoT:

- Accommodate diverse session-based communications, from telematics to eCalls to video service kiosks, but also cope with unprecedented scale
- Low-power, low0complexity devices that may register but seldom use the network
- Low revenue per device, requiring equally low OPEX/CAPEX

VALUE

END USER VALUE

Global network operators have been trying to solve the universal issues of capacity and coverage for decades. Most have plans to launch VoLTE to increase capacity, but even with the improved spectrum efficiency that 4G LTE offers it still isn't enough. Also, VoLTE indoor coverage issues are similar if not worse than 3G voice coverage. For both of these issues, VoWiFi can provide a solution. VoLTE and VoWiFi also make enhanced services, such as video calling, viable, and VoWiFi can help with user quality and network costs.

HD HOME COVERAGE

Eighty percent of voice calls on mobile devices take place inside the home. Therefore, it is a major issue that inside the home is also the most challenging environment for mobile network coverage. LTE doesn't inherently improve or solve this coverage issue (in fact, many higher-frequency LTE bands make the situation worse for penetrating structures).

Not only can Wi-Fi provide improved coverage in homes and offices, but it can also provide improved call quality. VoWiFi supports HD voice CODECS, and the available bandwidth is typically suitable for HD voice and clearer voice calls than

are available from the macro network spectrum available inside the home.

HOME TO HOTSPOT

Home coverage is not the only challenge or benefit for VoWiFi. Solutions have typically supported connecting through open hotspots, or secured hotspots where the user has authentication. Handoff among Wi-Fi hotspots can present some challenges in call quality and continuity, but the best solutions support handoff between Wi-Fi access points and, now, can support handoff between the macro network and Wi-Fi, as well as vice versa.

ROAMING

With Wi-Fi access becoming more ubiquitous every day, and technologies like HotSpot 2.0 extending authenticated connections to hundreds of millions of users, the ability to use VoWiFi outside of the home or office is just as big of a benefit. This becomes even more useful as a way to improve international roaming coverage along with decreasing the costs to provide said coverage. Users get a better roaming experience and service providers massively reduce the cost of roaming.

BUSINESS COVERAGE (UC)

Business and enterprise customers can use VoWiFi to solve a multitude of problems. VoWiFi and app overlay provides methods for allowing the business to maintain the number and relationship (as opposed to employees using their personal device and personal number). VoWiFi can help improve coverage for businesses, as well as reduce cost, especially for employees who frequently roam. By integrating with IP-based business solutions, VoWiFi enables employees to “take their desk phone with them,” and still have access to extension dialing, corporate contacts and features like presence or line-state-monitoring.

SERVICE PROVIDER VALUE

COVERAGE EXTENSION

Extending coverage in a variety of situations has been the main driver for VoWiFi adoption. VoWiFi allows for improvements in coverage, especially in modern structures where indoor coverage suffers. Higher-frequency bands are especially problematic, and VoLTE includes many of these. Traditionally indoor coverage issues had to be lived with, or solved with small-cell technologies (pico cells for enterprise, femto cells for small business or residential). Small-cell technology typically required much higher costs for the hardware, and to deploy and maintain. Also, the requirements for small-cell technology were much more deployment specific. Video calling is even more problematic, and in some cases, Wi-Fi is the only solution to enable video calling. VoWiFi provides an excellent feature-based reason to deploy new IMS network elements, which can then be used later to extend other services such as VoLTE or RCS.

MACRO OFFLOAD

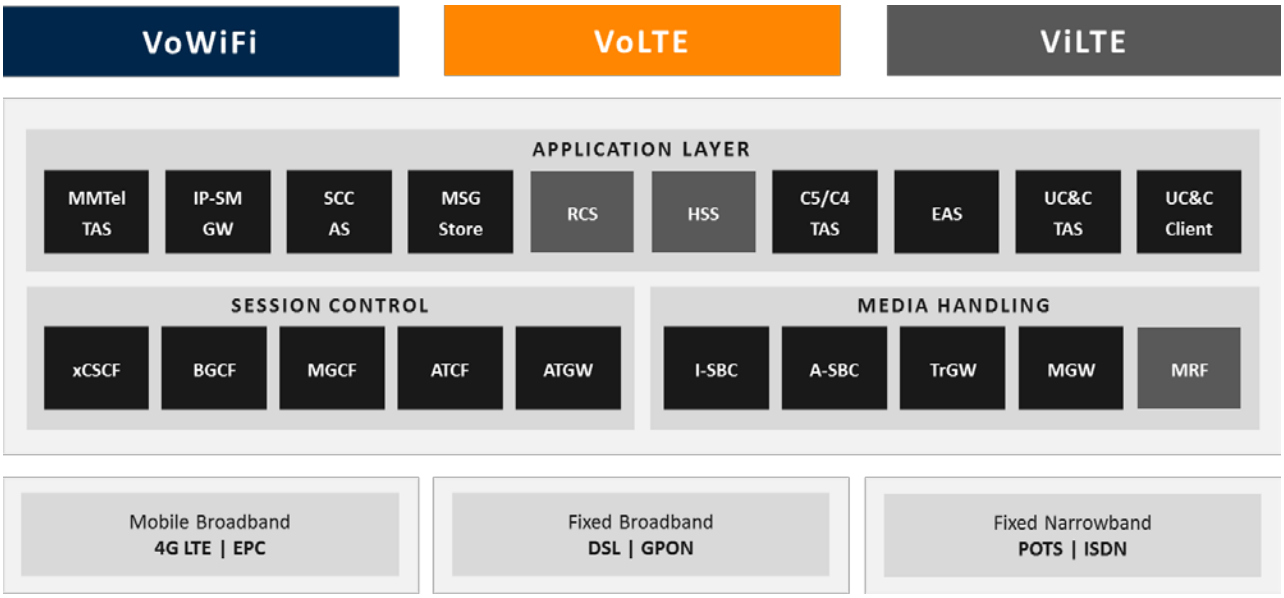
Ever-increasing data capacity demands are driving carriers to improve their use of spectrum. As network operators move voice calls from 3G (or even 2G), they make two to three times the spectrum available for other purposes. This also helps with the problem of aging 2G and 3G network infrastructure, allowing those network components to be retired so carriers can save on ongoing maintenance and support costs. Even as spectrum efficiency improves and new bands are opened up for service providers, the demand for data increases faster still. 4K video especially takes a toll on network capacity. Service providers still need ways to offload service demands from the macro network without adversely impacting quality for the user. For consumers, offloading data from their mobile network to their fixed-data network typically provides cost benefits as well. Unlimited plans based on DSL, cable or fiber are much more prevalent and cost-effective.

FIXED MOBILE CONVERGENCE

If a service provider wants to offer fixed and mobile service, VoWiFi is a good opportunity to help drive services and bundling. By integrating voice, video and messaging via fixed broadband offerings with a mobile solution that maintains continuity, service providers can offer something not currently available from OTT players. IMS-based services can be delivered in such a way as to provide an integrated experience across a variety of devices, and deliver converged services seamlessly. The more services a subscriber utilizes, the less likely they are to switch providers or abandon service completely.

SOLUTION HIGHLIGHTS

Metaswitch brings the entire solution for Voice over WiFi as a virtualized solution for rapid and most cost effective deployment. The IMS solution is based on our industry leading portfolio or cloud native Clearwater IMS Core, Perimeta virtualized SBC and Rhino Telephony Application Server.



BENEFITS OF VIRTUALIZATION

The telecom industry is undergoing a network transformation to a software-based model, moving from proprietary network infrastructures to open source, open-standard topologies. This transformation is using NFV and software-defined networking (SDN) to give service providers greater agility and flexibility.

Much more than simply a technical advancement, NFV represents an evolution in the way carriers' infrastructures are designed, purchased, deployed and operated. It can now be said that NFV has completely redefined the supplier landscape and shaken up classic service provider-vendor and vendor-vendor relationships.

The move to open and standards-based virtual network functions (VNFs), deployed within a private cloud optimized for NFV, represents an opportunity to redefine current business models, offering services in a far more cost-effective manner. This approach is not new as web service leaders, like Netflix*, have long decomposed their applications into small, independently instantiated and managed functional elements in order to provide granular scaling and ensure there are no stranded compute resources.

The software-centric nature of NFV favors agile development and operations (DevOps) approaches and nurtures new vendors, providing reusable and individually managed components, referred to as microservices in today's NFV conversations. In addition, a large ecosystem of solution providers helps service providers avoid vendor lock-in associated with earlier solutions.

NFV/SDN concepts applied to IMS and SBC provide valuable benefits to service providers, such as:

CAPEX REDUCTIONS

Individual functions and components can be dynamically and independently scaled (up or down) as demanded by usage patterns. This capability enables service providers to minimize stranded capacity and oversubscription, which improves resource utilization and right-sizes capacity.

FAST PROTOTYPING AND DEPLOYMENT

Service providers can quickly spin up an entirely new vIMS core to conduct small trials, and test innovative features and services by automatically instantiating and integrating new applications. Even in the prototype stage, dynamic linear scaling enables VNFs to be accurately benchmarked and IMS solutions to be evaluated for performance and resiliency.

OPEX REDUCTIONS

Designed to run on industry-standard, high-volume servers, the solution can be managed in a standard way, requiring less effort and cost compared to the assortment of proprietary components comprising IMS solutions.

RESILIENCY AND RELIABILITY

The VNF Manager (VNFM) performs continuous health monitoring and self-healing to recover from failures pertaining to a virtual machine (VM), a host machine or a more catastrophic widespread failure, such as an entire data center outage.

PATH TO IOT AND 5G

A virtualized IMS deployment is not just applicable for VoWiFi or VoLTE needs. By building out a highly scalable, fully virtualized IMS core today, you can prepare to scale and grow cost-effectively in the future to deal with demands of IoT

and 5G. The technologies involved in Metaswitch's VoWiFi solution are equally suited to scale to the massive network demands represented by billions of IoT connected devices. And as network bandwidth requirements scale with 5G deployments, individual elements in the solution can be scaled with them to make sure that your network grows and doesn't strand you like legacy purpose-built hardware-based networks have in the past.

SOLUTION ELEMENTS

CLEARWATER IMS CORE

Since its inception, Project Clearwater, a cloud-native IMS core implementation introduced to the open source community by Metaswitch Networks in 2013, has been a prominent choice for vIMS based on NFV specifications. Architected from the ground up using web design patterns and methods, Clearwater is highly scalable, distributed and resilient, meeting the stringent uptime demands of the regulated telephone operator industry while taking advantage of cloud compute environments originally built for non-real-time applications and services.

With this foundation of community-based NFV infrastructure and commodity platforms, service providers can incorporate DevOps methodologies into their core infrastructure processes, working with in-house or contracted specialists to tune these components for their specific requirements. The move toward open source software also extends to VNFs, with Project Clearwater performing the core IMS requirements for a fraction of the price of classic IMS implementations.

This approach, together with subscription models for commercial platforms, facilitates the adoption of agile new service-introduction practices. The vIMS/ vSBC demo enhances agility with the ability to spin up an entirely new vIMS core quickly by automatically instantiating and integrating new applications with their requisite VNFs or VNFCs.

Instantiated by any standard VNFM in a matter of seconds, the Metaswitch vIMS Core and vSBC are ready to process multimedia calls, either originating natively from VoWiFi and VoLTE handsets, or from clients on mobile devices or PCs. Secured by the vSBC's back-to-back user agent (B2BUA), signaling is processed through the vIMS core with access into auxiliary user databases while call features are applied and managed by the high-level Telephony Application Server (TAS). VoWiFi is implemented by employing the GSMA IR.51 IMS profile for voice, video, and SMS over Wi-Fi. This includes origination, termination, and handover to or from 3GPP access infrastructure along with trusted or untrusted non-3GPP access points. Media calls are secured, transcoded, and anchored for roaming purposes by the media component of the vSBC.

PERIMETA VIRTUALIZED SBC

Perimeta is the industry benchmark for VSBC. It provides security and signaling integrity under enormous loads. Perimeta is not only the most widely deployed decoupled SBC, but it also was the first SBC to offer network wide licensing; to be designed for MANO; and to offer cloud DSPs for transcoding. Perimeta has been deployed for access and interconnect by the world's largest operators. Here are just some of the highlights that make Perimeta the ONLY choice for a virtualized deployment:

- N+K redundancy model gives telco-grade reliability without the cost and complexity of a 1+1 redundancy model
- Dynamic black listing helps avoid lock-out of real calls during DDoS attacks
- Linear scaling handles dynamic signaling demands of VoLTE, VoWiFi, RCS, eSRVCC
- Hardware-agnostic highest performance in a virtualized deployment
- Intelligent overload control supports very high signaling demands and overloads in VoLTE
- Fully supports LBO IBCF. Use LBO or S8HR for roaming/peering with the same license

APPLICATION SERVERS

The Metaswitch VoWiFi solution utilizes application servers capable of delivering a wide suite of services. Along with VoWiFi, the AS can deliver VoLTE and IMS services, messaging, UC services, and an entire suite of business services, including hosted PBX and SIP trunking. By deploying the infrastructure for VoWiFi today, you lay the groundwork for migrating or deploying a wide range of other communications services in the future.

Rhino TAS

Rhino TAS implements the Multimedia Telephony Application Server (MMTEL-AS) and the Service Centralization and Continuity Application Server (SCC-AS) and IP-SM-GW network functions. The Rhino TAS is a virtualized element ready to be deployed in cloud (NFV) environments. It is built on top of an extensible framework that exposes APIs for extending its functionality and enable operator differentiation. This extensibility enables operators to avoid vendor lock-in by providing them the freedom to extend and/or create services on their own utilizing the developer ecosystem.

EVOLVED PACKET DATA GATEWAY (EPDG)

The ePDG is enabling technology that allows for secure connectivity between non-3GPP access networks (such as Wi-Fi) and the EPC. The ePDG connects the Wi-Fi-capable UE using IPSec tunnels, and it provides authentication using AAA and network protection mechanisms, as well as interworking with the EPC PGW via S2b interface. The ePDG also facilitates seamless mobility between Wi-Fi and LTE access networks.

ACCESSION CLIENTS

The Metaswitch app Accession provides industry-leading VoWiFi quality. SILK-based voice and transcoding provides HD quality with the best possible performance and smallest bandwidth demands. Video calling is supported by the same client, and MetaQR technology enables excellent video quality, even when network or bandwidth constrained. Call control, integration with Native Dialer and contacts capability, and deployability on a wide range of iOS and Android devices allows for a seamless communications platform.

SAS REAL TIME ANALYTICS

With the always-on Metaswitch Service Assurance Server (SAS) Analytics platform, service providers also have a powerful, proactive troubleshooting tool at their fingertips. It is also possible to trace calls for quality-of-service (QoS) purposes or decode individual SIP messages to identify interoperability issues. This feature is a critical component of any virtualized deployment, providing the means to monitor individual elements that could be widely distributed across the network. Fully virtualized, SAS eliminates hundreds of thousands of dollars in cost per node vs. deploying probes.

ABOUT METASWITCH

Metaswitch is the world's leading cloud native communications software company. The company develops commercial and open-source software solutions that are constructively disrupting the way that service providers build, scale, innovate and account for communication services. By working with Metaswitch, visionary service providers are realizing the full economic, operational and technology benefits of becoming cloud-based and software-centric. Metaswitch's award-winning solutions are powering more than 1,000 service providers in today's global, ultra-competitive and rapidly changing communications marketplace. For more information, please visit www.metaswitch.com.