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APPLICATION SESSION CONTROLLERS:

An Innovative Approach to Solving the Problem of Application Deployment and the Evolving Network

Enabling Service Providers to Manage the Evolving Network Layer for Rapid Application Deployment

A Frost & Sullivan White Paper

Sponsored by AppTrigger

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"Partnering with clients to create innovative growth strategies"

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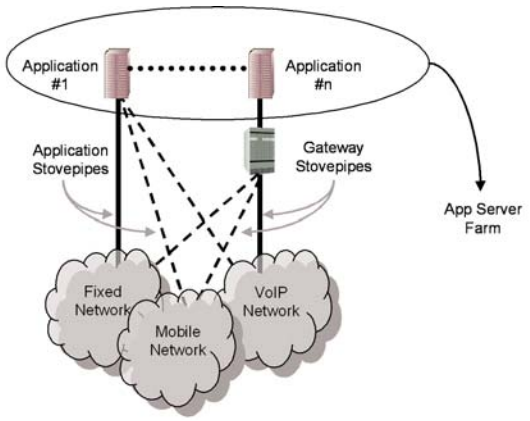
CURRENT STATE OF THE MARKET

Services and the Network Evolution

Market conditions directly impact how service providers operate: as dynamics change, so does business planning. From a business standpoint, the higher level of competition has led to an increased commoditization of voice services. Consequently, operators began to look for ways to leverage their core capabilities in order to benefit from increasing convergence of their products. In addition, carriers are also looking for ways to curb their operational expenditures, including network operation, service maintenance, and setup and teardown, among other costs. Carriers also need to push new innovative voice/data services that can increase their Average Revenue per User (ARPU), in order to offset the decline in voice revenues, and to be more flexible in what services they offer and how they offer them.

The telecom world is undergoing a profound transformation and aligning itself more closely to the IT model of a fast and flexible rollout of new services. However, the traditional approach to services in the telecommunications network is based on vertical "stovepipe" architecture (see Figure 1) that prove to be inflexible in delivering new applications/services in a fast and efficient way. Common functions such as billing and network connectivity are often duplicated in the "app server farm" residing at the service node, which inevitably cause scalability and system integration issues and ultimately slows time to market.

Figure 1: The Traditional "Stovepipe" Approach to Services



Source: Frost & Sullivan (adapted from AppTrigger diagram)[1]

The telecom network is continually changing and evolving as new technologies and elements are introduced to help optimize and increase network performance, so this further compounds the duplication of stovepipe services. In a perfect world, the underlying network infrastructure (i.e. at the transport and control layers) would be fairly

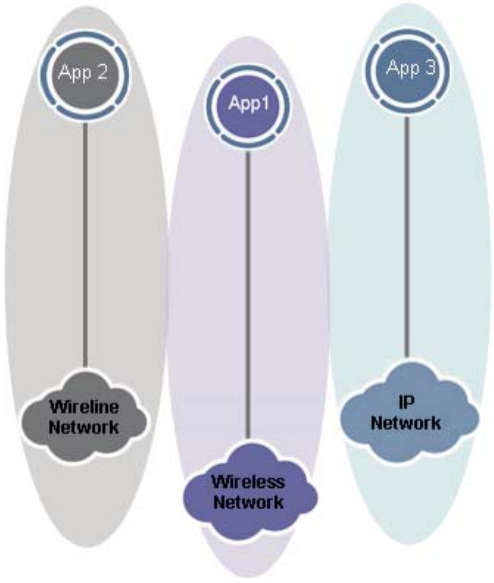
1. All figures contained within this white paper (with the exception of Figure 5) have been provided courtesy of AppTrigger.

stable and insulated from rapid change, thereby enabling application developers to focus solely on delivering innovations at the application layer. However, the reality of how networks are built and evolve makes this ideal goal virtually unachievable today. Service providers have deployed dozens of different standards for networking and signaling over the years. Data networks still consist of multiple protocols, such as asynchronous transfer mode (ATM), frame relay and IP, with many variations of each. With the introduction of mobility and Voice-over-Internet Protocol (VoIP) services, the complexity increases with protocols such as H.323, IS41, Mobile Application Part (MAP), and Session-Initiation Protocol (SIP). This constant network evolution creates a series of challenges for the service provider ranging from application feature transparency loss to proprietary solutions resulting in applications being network isolated.

The Traditional Application Connectivity Architectural Model - Silo Access

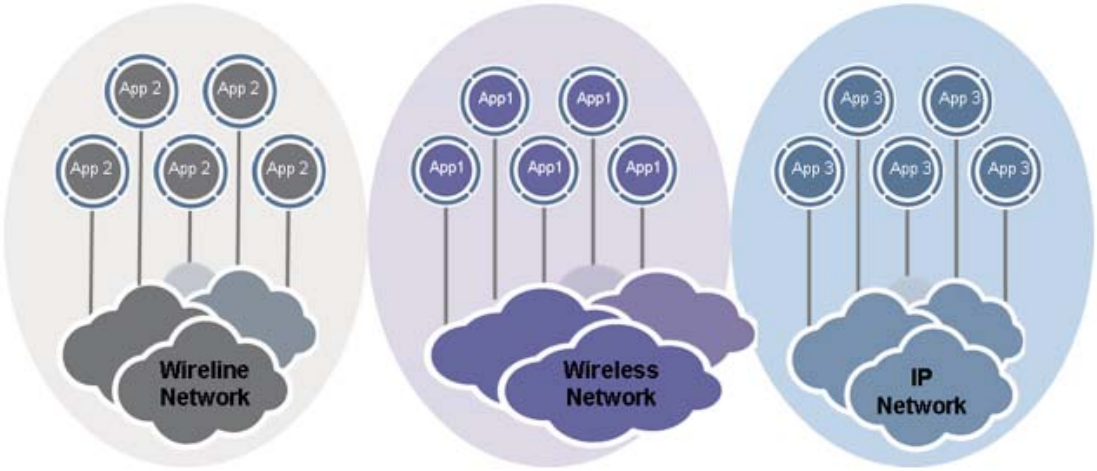
Historical application deployment consisted of embedding network protocols into each application to ensure the application would work across the network. Hence, applications became specialized and optimized to work with a specific network. Application developers specialized in each network type and relied on call control to be performed by generic switches in the network.

Figure 2: Service Silo Access Deployment Model



The result of this method was that each network ends up with multiple stovepipes connecting applications to each disparate network.

Figure 3: Service Silo Access Deployment Model (with Multiple Applications for Each Access Type)



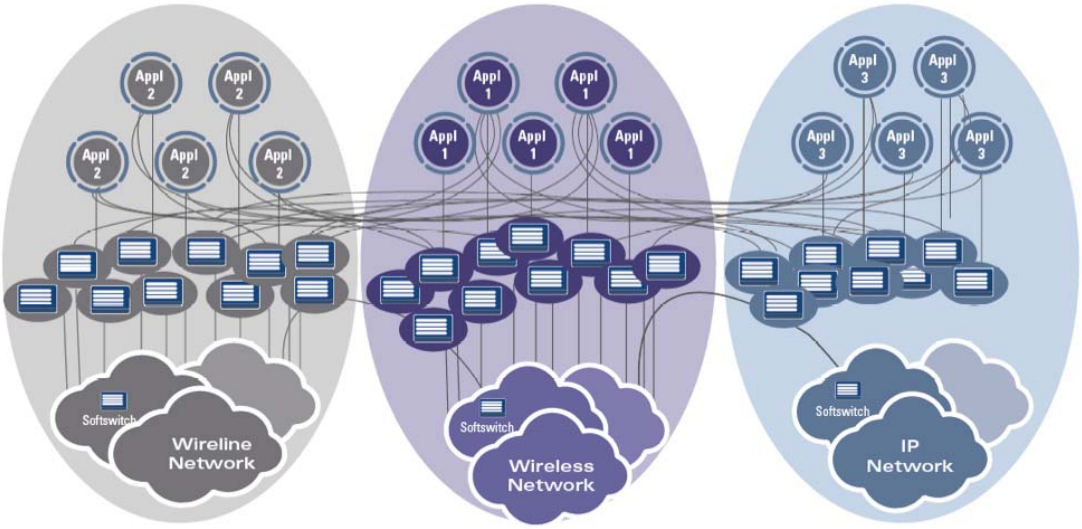
Silos Limit Convergence

Today's subscribers are demanding a transparent experience across all networks regardless of network type. The promise of service providers is moving beyond simply one bill into a converged communications experience across wireline, wireless and IP networks. There are multiple challenges with application convergence, specifically mismatched applications with different networks can create application inconsistency, slow deployment times and impact operational costs. Application developers are slow to keep pace with necessary protocols required to interface applications across evolving networks and as a result, converged applications are only beginning to trickle out.

Today's "stop-gap" answer for silos and across network interworking is gateway technology. Gateways are utilized to solve short-term internetworking problems between dissimilar devices or networks. The challenge with this model, when the goal is to create feature transparency and converged applications, is that gateways only provide connectivity for bearer traffic or native signaling with no feature interworking. To solve the feature inter-working problem today, applications must constantly be re-written and re-connected every time new technologies are introduced into the network. Another significant challenge is that the application "gateway fix" creates a series of CAPEX / OPEX challenges for the service provider. As the network evolves, applications are consolidated and service providers strive to offer the same application experience across multiple networks, gateways will need to be replaced to keep up with the ever evolving network. This constant "rip and replace" approach results in additional and unnecessary CAPEX costs. From an OPEX perspective, gateways create a multitude of network silos

which make it increasingly difficult to manage and operate as service providers begin to offer more multi-vendor converged applications over more networks.

Figure 4: The Gateway Approach (Today's "Stop-Gap" Answer) Increases Network Complexity and Costs

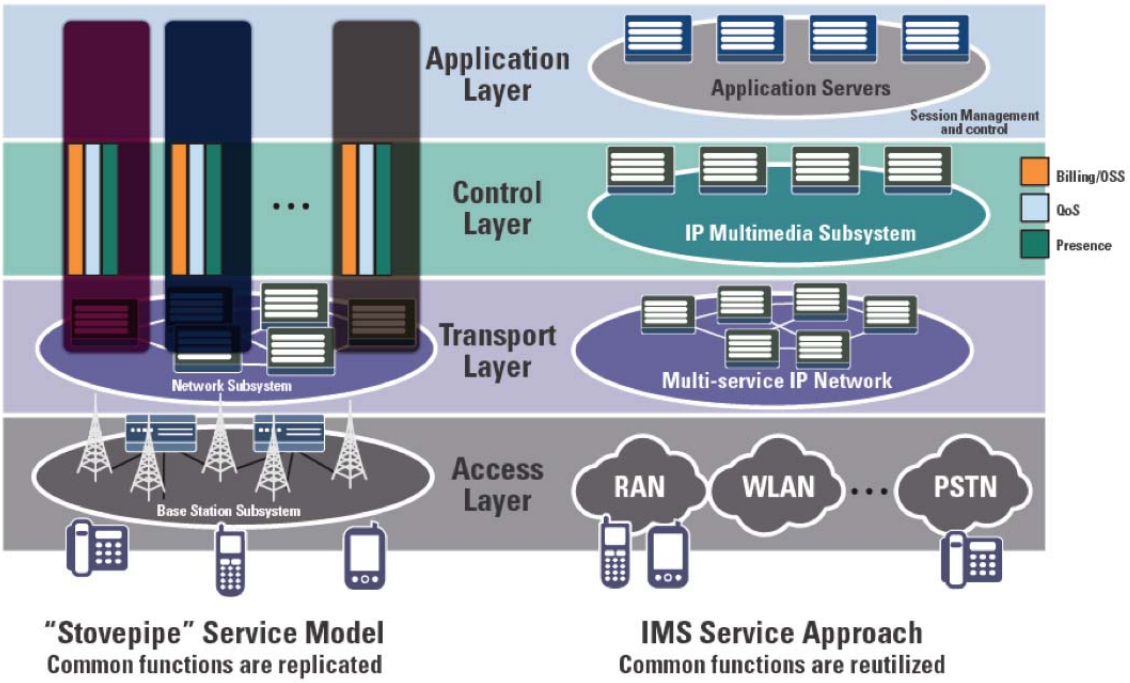


The Long Term Answer Is IMS but Key Issues Remain

The IP Multimedia Subsystem (IMS) architecture offers a new modular approach towards call control and service delivery. This modular architecture is achieved by separating the bearer traffic (in the transport layer) from the signaling traffic (in the control layer). By disaggregating the transport, control, and application layers, IMS promises to allow carriers to quickly and cost-effectively launch a wide array of new multimedia services on their networks. This approach also enables operators to seamlessly run a plethora of next-generation converged services over their fixed, mobile and cable networks, achieve a faster time-to-market for new services and have fewer performance bottlenecks.

The key concept behind IMS is the notion of reutilizing common functions such as billing and presence and integrating them in a horizontal fashion. These functions can be reused for many different applications, as illustrated in Figure 5. This approach, called functional decomposition, is far superior to the traditional vertical integration model, in which common functions are replicated for each application.

Figure 5: IMS: A More Efficient Service Implementation



Source: Frost & Sullivan

IMS will enable subscribers to seamlessly move across wireline, wireless and cable networks without service disruption. The IMS framework is complex, and specifies various functional blocks that Network Equipment Vendors (NEVs) may choose to implement on existing next-generation core network elements, such as soft switches and media gateways, or on new server-based platforms.

The migration towards the "horizontalized" IMS architecture will span over many years to come, which raises several issues for service providers, including how to make new applications coexist with legacy intelligent network (IN) services. Furthermore, services must be transparent to the end user – in other words, while networks may employ many different protocols, end users require seamless access to services regardless of the network type or protocol.

In a recent Frost & Sullivan carrier survey, service providers keyed in on three major IMS challenges:

- Adjusting to new service paradigms: New standards such as IMS are raising many issues in the plans of service providers. The business case for carriers remains somewhat elusive, as the standard is meant to help operators deliver new multimedia services which entail tighter partnerships with third-party application developers and content owners. Carrier business models will likely take more time to be further refined, as there will be more strife between

content owners and distributors – as evidenced by the ongoing "net neutrality" debate. Moreover, while carriers have aggressive plans to offer innovative multimedia services, there is still uncertainty about which types of applications will have the most success and what their revenue potential may be.

- The constant change in the standards: Carriers typically are not willing to take risks on commitments made by equipment providers without having a specification to fall back on. However, a quick scan at the product roadmaps of IMS vendors reveals that large portions of those roadmaps are based on standards that have yet to be finalized. Operators currently committing to an IMS vendor are only purchasing stable elements such as the Call Session Control Function (CSCF) from an equipment supplier. These carriers believe that the vendor will eventually be able to deliver solutions involving the SCIM and policy control by either refining them in-house or relying on third-party developer relationships. However, this is certainly slowing the timeline for a full-blown IMS deployment

- New architectures are not as "open" as advertised: While many equipment vendors frequently promise full IMS capabilities, a more in-depth look reveals that there is already an abundance of "closed" add-ons, such as proprietary SIP extensions, SIP parsers that only work with products from one vendor, and others. Service providers worry that the end result will inevitably be the same vendor "lock in" that they were already so familiar with in the Advanced Intelligent Network (AIN) world, which is contrary to one of the key tenets of IMS: standards-based open systems.

Service Delivery Platform Alternative

Given that the legacy stovepipe prevails and the IMS architecture is still many years away, the industry has responded with the creation of the Service Delivery Platform. The term Service Delivery Platform (SDP) in the telecommunications space, whether for mobile operators, wireline network operators, or those offering unified services, has common characteristics. An SDP can be concisely defined as an Information Technology-driven solution designed to simplify the service creation process, using relatively common software toolsets, across functional and architectural boundaries, integrating a variety of data-driven capabilities. An SDP is usually positioned as an overlay system for the rapid and cost-effective delivery of advanced services.

SDP as It Relates to IMS

The SDP concept also incorporates multiple components for execution, management, provisioning and billing of end-user services that address market-specific segments. The SDP concept supports voice, data and content services that are also device and network

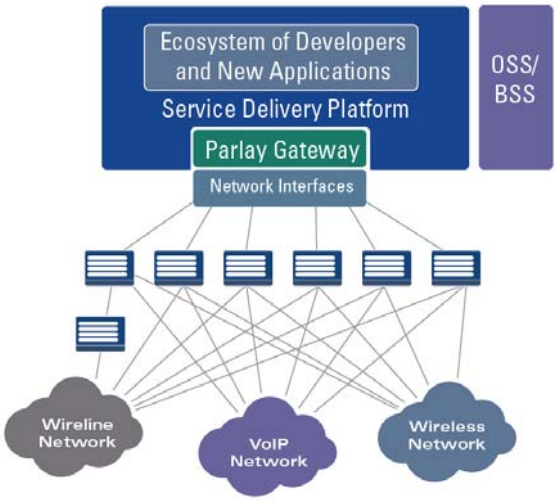
independent, the same as IMS. If an SDP is defined as including the application server, SIP gateway and a content delivery platform then SDP would incorporate a portion of the entire IMS infrastructure. IMS defines and provides tools to support the SDP ecosystem as defined above.

The SDP ecosystem is integral to IMS as fast, efficient creation of services is a key IMS concept. Even more so is the requirement to be able to decommission services quickly if they aren't widely accepted in the market and reduce the CAPEX and OPEX risks associated with deployment of new services and applications.

SDP Network Layer Shortcomings

While SDPs are perceived to be a solution to the stovepipe issue of service deployment, in many ways they can also be seen as a classical computer science solution to a problem: instead of solving the problem, they only redefine it to a higher level of abstraction.

Figure 6: SDP Approach with Parlay Gateways and Media Gateways for Network Connectivity



SDPs have primarily looked at Parlay gateways for network abstraction and cross network connectivity by connecting to media gateways, signaling gateways and soft switches to deploy applications across disparate networks. While the concept behind OSA/Parlay and Parlay X is good in theory, it has practical deployment limitations. In certain instances, Parlay gateway deployments require additional network-specific infrastructure and connectivity (media gateways, signaling gateways and soft switch) between the served networks and the Parlay gateway. This deployment model leads to the formation of new silos and adds CAPEX at the network layer and goes against the SDP promise of a re-usable horizontal solution and pushes the silos further into the network. A second consideration is the fact that OSA/Parlay and Parlay X specifications do not address

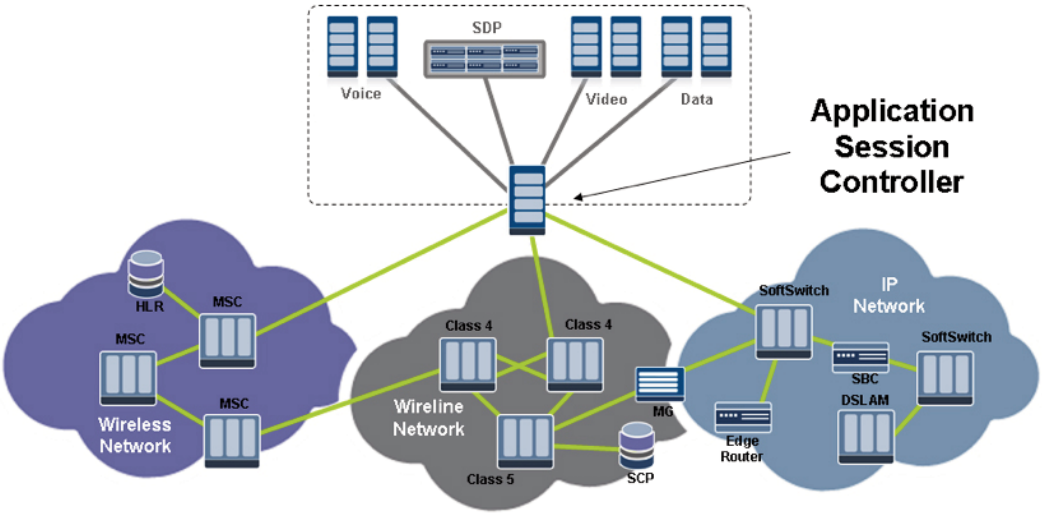
existing legacy IN application support, hence it is only a go-forward model for new applications written to OSA/Parlay and Parlay X specifications. As web services begin to take center stage, simplified application control with call control will be essential. Parlay X has been developed to entice additional web services knowledgeable developers to add telecom functions to their applications; however, Parlay X (still under improvement) does not support complex call control under web services.

THE SOLUTION: APPLICATION SESSION CONTROLLER

In response to the current and the emerging converged application deployment model shortcomings, a new purpose-built application delivery network element called an Application Session Controller (ASC) is emerging. The Application Session Controller network element resides at the application layer and sits between the application layer and the core network to provide and manage connectivity to the evolving network. It insulates the application service node from the network below via a programmable network abstraction engine, thereby providing the application specific call-control functions independent of each network. The ASC incorporates a number of open standard APIs, plus the signaling, media and the feature inter-working between disparate networks that converged and consolidated applications require. It is scalable to support tens of millions of subscribers via a single system or via clustering and provides the necessary calls per second / transactions per second required for large-scale multi-network environments.

The Application Session Controller's role in the network is illustrated below in Figure 7.

Figure 7



The Application Session Controller Advantages

Rapid Service Introduction

The purpose-built Application Session Controller handles application connectivity into the service provider's collection of networks by presenting a normalized view of the network and provides robust protocol support and call control for multiple network interoperability. This eliminates the delays associated with waiting for network-specific versions of hardwired application platforms or testing the interoperability of applications with various general-purpose network infrastructure elements. Once in a service provider's network, the Application Session Controller insulates applications from the evolving network. Having established network connectivity provides the service provider the ability to quickly roll out applications and test them out across a service provider's entire system regardless of the specific nuances of the various networks. This enables a more cost-effective means for test marketing applications and leads to a more informed selection of applications for general market deployment.

Purpose-Built Cost Advantage

The Application Session Controller is purpose-built and includes key network functions combined into one product and optimized for multi-application, multi-network application delivery. This provides the service provider a purpose-built network layer solution for the application layer as opposed to re-purposing general purpose network equipment to provide the required network connectivity. Ultimately, this enables the service provider to reduce application to network connectivity CAPEX.

Protect Investments

Because the Application Session Controller does the heavy lifting for network connectivity, it allows service providers to deploy applications that are not specific to any underlying network. As new networks and signaling protocols emerge, they are systematically incorporated into the Application Session Controller software keeping service providers prepared to address new network changes and market opportunities as they materialize. By deploying the Application Session Controller, service providers avoid the planned obsolescence of specific-use gateways and hardwired network connectivity while creating future-proofed deployments. For example, if the service provider has already invested in a messaging platform for a wireline network, the Application Session Controller can connect that platform into a wireless network as well. This eliminates the cost of deploying a duplicate service platform and leverages the previous investment in the incumbent platform as new networks and protocols are added to the service provider network.

Feature Transparency

The Application Session Controller in a service provider network allows multiple application platforms to deliver services across multiple network types. This promotes feature transparency for subscribers that utilize multiple networks to access the same service. They can enjoy the same user experience regardless of whether they are on a wireline, wireless, or IP network. For these reasons, the Application Session Controller promotes stronger customer loyalty.

Stovepipe Elimination

The Application Session Controller supports multiple applications and is a re-usable horizontal platform for the network layer. The current deployment model is a single application to a single network deployment model (first silo). As the network evolves, a temporary gateway is installed to provide connectivity (second silo) or general purpose network elements that sit outside of the network cloud are used (more silos). This creates a complex operational challenge and is not cost effective. The Application Session Controller provides a single point of interface for evolving network and signaling requirements and includes all the fundamental functionality (soft switching, signaling, and media) for application delivery across multiple converging networks.

IMS Migration Path

The Application Session Controller is pre-IMS and enables new IMS subscribers (those new subscribers added via SIP and SIP-enabled infrastructure) to access legacy applications and therefore extends the useful life and associated revenue generation already in place by those applications. In an IMS network, the Application Session Controller provides INSCF and INSFF capabilities, ensuring a technology solution for long-term application network enablement.

Converged Application Opportunity

The converged application experience will require leveraging multiple network resources. Current network elements do not support the ability to have two applications involved in controlling the call within the IN environment. Subscribers must provision multiple IN and IP applications simultaneously to create converged application interaction. Certain applications such as Pre-Paid and Color Ring Back are mutually exclusive in today's network. This limits the service bundle revenue opportunities. The Application Session Controller provides mediation between applications that have separate domains.

APPTRIGGER'S SOLUTION

AppTrigger's Application Session Controller provides multiple open standard APIs to suit the requirements of application developers and service providers. Designed to support multiple simultaneous applications, the network element resides at the application layer and sits between the application layer and the core network to provide and manages connectivity to the evolving network and insulates the application server farm from the network below. It supports wireline, wireless, and IP protocols to ensure unparalleled feature transparency and simplifies the operational efficiencies by providing a single network layer management interface.

Key features include:

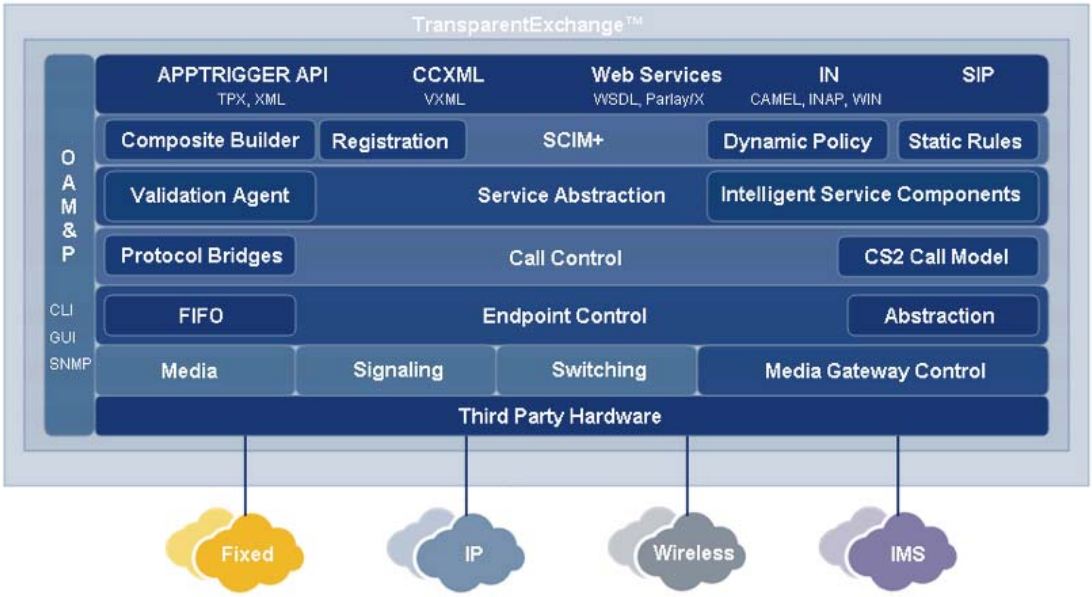
- *Media and Signaling Subsystem*: The media functions convert to and from various bearer traffic formats as necessary to ensure that any combination of circuit- or packet-based applications and networks can interact with each other. Additionally, media functions include media server capabilities such as Dual-Tone Multi-Frequency (DTMF) detection and generation, announcement record and playback, and conferencing. These functions ensure that all of the necessary network and user information is supplied to the application for appropriate service execution. The signaling interfaces play the critical role of connecting to all types of legacy and next generation call set-up and call control signaling networks. This ensures transparent delivery of services across legacy and next generation networks using a variety of protocols.

- *Call Control Subsystem*: This software subsystem includes a built-in call model that enables an application to intervene at any point during a call as necessary to facilitate service delivery. It executes call switching and routing, as well as number translations based on information provided by the media and signaling functions or instructions received from applications through an application control interface.

- *Application Control Interfaces*: The application control interface provides the critical connectivity between a variety of applications and the Application Session Controller. The call control and media and signaling subsystems create an abstracted view of the network. The application control interface presents the view in a consistent manner to the application regardless of the underlying network. The Application Session Controller supports a wide choice of interfaces including Call Control XML (CCXML), SIP, a more powerful custom Application Programming Interface (API), and Parlay/Parlay X.

AppTrigger's solution offers the ability to bring together legacy and new applications in one common network layer which provides operational efficiencies to network operations. More importantly, the application-aware Application Session Controller enables feature transparency across networks, creating a better user experience.

Figure 8: AppTrigger Application Session Controller Functional Diagram



The AppTrigger solution has already been deployed in over 30 networks around the world. One example is a recent design win in Europe with one of the company's large OEM partners. The partner is using the AppTrigger Application Session Controller to manage the evolving network layer for a large-scale wireless service provider, enabling the deployment of voice messaging from the legacy telecommunications network across to the next-generation network for over 20 million subscribers.

In this deployment, AppTrigger's OEM partner is delivering its open-standards IP-based, multi-modal, multi-media communications platform which provides high levels of personalization, voice-navigated messaging, video, web and WAP access – all from a single subscriber mailbox. AppTrigger's contribution to the overall solution involves supplying the network layer for the application providing access to SS7 over SIGTRAN signaling as well as E1 media termination. The application is able to contact a mobile network Home Location Registry (HLR) for subscriber information and location by using the AppTrigger Application Session Controller to provide network abstraction of the native protocols. AppTrigger is also providing the Network Layer for Service Control Point (SCP) development. AppTrigger delivers the abstracted view and interface into SS7 over SIGTRAN, as well as IN protocols such as INAP. This allows rapid development of custom network elements, such as the SCP.

The AppTrigger solution components provide seamless migration and ease of management to ensure a scalable long-term solution.

CONCLUSIONS

The evolving network's impact on both legacy and next-gen applications and the need for a more efficient deployment model suggest that a different strategy is needed.

AppTrigger's Application Session Controller is a software-based solution which eliminates the inefficiency of gateway stovepipes at the network layer while enabling service providers to maintain and support legacy/IN applications – even while deploying and growing their next-gen IMS architectures. The benefits of this implementation include the reduction in network complexity, a faster time-to-market for new applications and lower network costs and management requirements.

By being one of the first vendors to articulate the vision of the Application Session Controller and perhaps even coin the term, AppTrigger has achieved early thought leadership in the multi-network application delivery arena. Therefore, by overcoming the challenges of a new market entrant, and remaining committed to their vision of providing a purpose built network layer solution to insulate applications from the ever evolving network Frost & Sullivan believes that AppTrigger can capture the necessary mindshare to become a key contender in the application delivery space.

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