

An Open, Modular, Scalable System for the Delivery of Converged Communications

Executive Summary

Most carriers have a communications infrastructure composed from an assortment of dedicated, purpose-built systems, optimized individually for voice, video, text, or email services, but not readily adaptable to new uses. This means that carriers attracted to the notion of convergence must make compromises in features, performance, services, or some combination thereof. Historically, the rich functionality of these dedicated systems could not be economically replicated into a general-purpose superset.

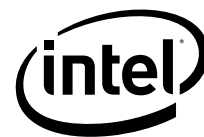
But that's not the case with the Alcatel-Lucent Converged IP Messaging solution, which allows carriers to deliver new services without compromise. Because it is built on a standards-based hardware platform that allows for incremental deployment of converged communications, the Alcatel-Lucent solution is both scalable and cost-effective – and therefore adaptable to new uses. Using an existing IP infrastructure and a unified network store, the Alcatel-Lucent solution gives users access to all types of messaging regardless of location or device. That means end-users can enjoy the benefits of converged communications without sacrificing features in the services they use today.

Fundamental to this design is a new way of thinking about communications. Rather than treating each type of messaging as a separate and distinct service, Alcatel-Lucent has consolidated them all into a platform-level solution. Essential to the solution is the open, modular and scalable hardware platform based on new multi-core Intel® architecture.

By leveraging the tremendous increase in computational power and memory capacity of the multi-core architecture, Alcatel-Lucent's solution can deliver speed, rich features, and rich media from a single platform. This system also delivers the carrier-grade features and performance that ensure uninterrupted delivery of even the most demanding messaging applications. And because the Alcatel-Lucent Converged Messaging system is built from the Intel® Carrier Grade Server TIGW1U, it can scale effectively to meet both current and future demand.



Alcatel-Lucent



Carrier Challenges

The problem with messaging services today is that they tend to be location-, device- and/or application-specific. It's easy to see how the industry got to this point. Eager users welcomed each new type of communications service, and providers sensing new revenue opportunities were quick to deliver. Using the most advanced available technology, these new services were deployed incrementally, on purpose-built infrastructure, delivered to a specially designed messaging device, sometimes even over a unique network delivery system.

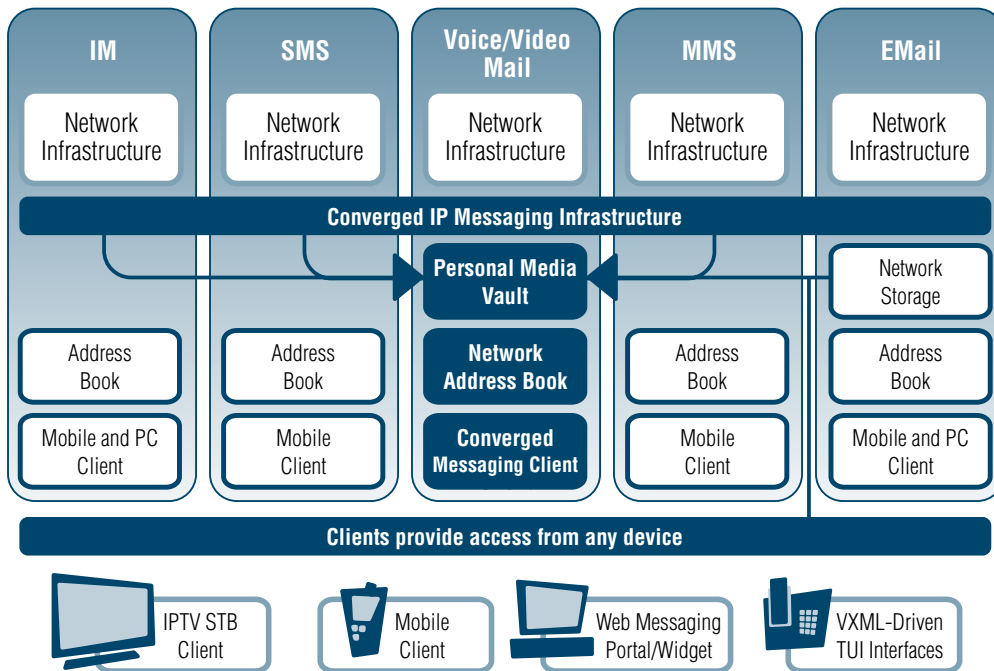
The result is the hodgepodge of messaging services we have today. While users and carriers were initially satisfied with the incremental capabilities of this service-specific approach, frustration is now mounting over access constraints imposed by location and device. As these technologies mature and people begin to take these capabilities for granted, users perceive that the messaging experience is more complex than it needs to be. Users want to connect to anyone, and share and access any kind of content, from anywhere and on any device. And, carriers face the added complication of declining subscriber revenues as basic, single-purpose messaging services are being offered as low-cost or free alternatives to traditional carrier service packages.

Convergence, then, is emerging as a way to address both the user's frustration and help carriers reverse the decline in subscriber revenue. Although the industry generally agrees that "converged communications" is a great idea and a necessary feature in next-generation services, there is not yet consensus about what that means, let alone how to implement it. Alcatel-Lucent – through the 5100 Converged Messaging System – provides a good starting place with the convergence of discrete media, SMS, MMS, Voicemail and VideoMail.

This much is known: Carriers cannot afford to abandon their enormous investment in existing services. The cost and risks are simply too great. Yet convergence will definitely require changes in both the delivery system and the service model.

Solution Overview and Benefits

Alcatel-Lucent offers its 5100 Converged Messaging System as the centerpiece of a messaging infrastructure. It provides a converged SMS, MMS, email, voicemail, and IM user experience enriched by presence and group list capabilities across a broad range of client devices. This complete hardware-software system uses an IP infrastructure and a unified network store to provide access to all types of communication regardless of the



A Converged IP Messaging Infrastructure Leveraging Existing Network Assets - A network-based "personal media vault" for photos, voice, video, e-mail, and attachments. As well as a network repository for MMS, SMS and IM chat. One Address Book, IMS-Enabled with presence information. A family of "Rich IP Universal Messaging Clients" for mobile devices and a complementary family of messaging clients for other elements of the quad play.

device, network, or application. It uses a network-based mailbox designed around the personal address book found in most messaging applications and includes a flexible notification scheme.

This design provides rapid, reliable and ordered delivery of messages to the handset. The mailbox provides a deferred message storage function as well as a network-based synchronization point for multiple clients including PC, TV, Mobile and Interactive voice clients. This solution is service-scalable to include voicemail and voice and video messaging services as well as traditional SMS, MMS, and IM media. The same infrastructure can support both enterprise and consumer IP messaging offers, with differentiated services for each community based on class of service and carrier policy.

The diagram on page 2 shows where the Alcatel-Lucent Converged IP Messaging solution fits in a carrier's existing service network. (For more detail on this service strategy, please see the related white paper "Converged IP Messaging Overview: Alcatel-Lucent's Vision for the Future of Messaging.")

The Alcatel-Lucent Converged IP Messaging solution can be deployed right along with a carrier's existing infrastructure. It uses a combination of application software and high-availability/high-capacity hardware, including:

Alcatel-Lucent 5100 Converged Messaging System: This unified messaging system supports voice, video, text, and picture media from SMS, MMS, IM, Email, or recorded telephony sessions. The core Converged Messaging system includes a set of telephony clients for call answer deposit and access to messages. This system uses the Intel® Carrier Grade Server TIGW1U with two dual-core Intel® Xeon Processors 5340. A quad-core version of this server is currently being validated on the Alcatel-Lucent system.

Alcatel-Lucent 5150 Messaging Applications Broker (MAB): This remote user agent supports the Alcatel-Lucent Java client, standard-based clients, and other purpose-built clients with content adaptation, protocol conversion, and enhanced notification. This system also uses the Intel Carrier Grade Server TIGW1U.

Alcatel-Lucent IMS 5400 Application Server Platform: Supports an IM Gateway function to interconnect IM services and network-based messaging and presence functions. The 5400 also provides group list management, address book and presence functions.

Alcatel-Lucent 5155 WebDesk: Supports web 2.0 style access to a synchronized view of messages and a unified network address book.

Performance by Intel

Fundamental to the Alcatel-Lucent Converged IP Messaging solution are the multi-core Intel® processing components and the Intel® Carrier-Grade

Servers that make up the hardware components of the system. These products deliver extremely high performance in a power- and space-efficient design that is both standards-based and scalable.

By using the Intel® Carrier Grade Server TIGW1U, Alcatel-Lucent can assemble entire racks of the same server, and assign function simply by loading different combinations of software depending on the carrier's needs. An earlier version of the Alcatel-Lucent system used dedicated DSP blades and a dedicated IP router, both of which are no longer needed with the carrier-grade server. That's because the general purpose computers now can match the performance formerly requiring components that were optimized for specific functions. Multi-core Intel processors now include all of the necessary performance and features to power these functions right on the server.

The result is that Alcatel-Lucent can build their system much more efficiently. For example, just the cabling configuration is considerably less complicated. With fewer parts, Alcatel-Lucent also needs fewer suppliers and fewer spares which translate into lower support costs. And because each rack uses equivalent hardware, Alcatel-Lucent is only required to go through the NEBS certification process once. Even upgrades to newer chip technology takes less time and costs less since the server design and hardware architecture remains fundamentally the same. All of those benefits are passed onto the carrier in terms of faster time to deployment of converged communications solutions, cost-effective scalability and compatibility, and greater efficiency in overall network operations and maintenance.

The Intel® Carrier Grade Server TIGW1U is a NEBS-3 and ETSI-compliant rack server currently featuring the 64-bit dual-core Intel® Xeon® processor LV 5148. It delivers industry leading performance and power efficiency in a compact package that scales easily. A newer version of this server currently being validated by Alcatel-Lucent will feature quad-core Intel processors built on 45nm process technology. This extremely efficient chip design will pack more than 800 million transistors onto one chip, more than doubling the performance of the dual-core version without consuming any more power or putting out any more heat.

When Alcatel-Lucent switched their converged hardware platform to the Intel server with Intel processors, one of the primary benefits was the ability to ride the performance gains of Moore's Law. The standards-based, modular, scalable architecture of the Intel server and processors means that every time Intel increases chip performance, Alcatel-Lucent can similarly increase performance without needing to recertify their solution, redesign their platform, or rewrite their software. The ongoing benefit to Alcatel-Lucent's carrier customers means that ever-increasing performance density will be possible without consuming more floor space, more power, or deploying more systems.

Purpose-Built No More

Carriers have widely perceived that this kind of performance was previously available only through purpose-built, often proprietary, hardware systems. And many carriers still use these systems to power their advanced communications services.

But it's important to note that such designs are no longer necessary and may be adding time and cost to the delivery of next-generation services. Consider how an open, standards-based architecture, modular design and scalability can greatly simplify and reduce infrastructure expenses:

Standards-Based Architecture: General-purpose components are built to industry standard specifications, enabling interoperability with other components and systems from any number of different vendors. And because standards-based designs are compatible with commonly used software and networking applications, a lot of the validation and certification work has already been done.

Modularity: Modular, standards-based systems allow carriers to introduce new generations of services in higher performance densities and a smaller footprint than the purpose-built systems they replace. Because they run general-purpose software, these modular systems can be upgraded easily with the newest software and processing components, allowing carriers to repurpose systems for different uses to meet changing customer demands. This modular design has an overall lower cost than earlier generations of purpose-built systems precisely because of the ability to make incremental changes, but also because the higher performance density and smaller footprint delivers greater capacity and higher service volume using less power.

Scalability: Standards-based, modular systems scale easily because carriers can either add more capacity by changing out the processing components and storage elements, or simply add more systems. Scalability enables the carrier to cost-effectively deploy only what's needed to meet immediate demand, and add on when it's appropriate to do so.

Telecom equipment manufacturers like Alcatel-Lucent who use general-purpose processing components in their modular, standards-based systems bring these benefits to the carrier through designs that can be easily deployed with existing infrastructure while preserving an upgrade path to future technology.

Performance Benchmarks

Alcatel-Lucent says that session capacity has historically risen in line with processor speed. This is possible in large part because Intel's new multi-core processors combined with system-level performance enhancements in

the Intel Carrier Grade Servers. Intel has been able to pair faster memory access and I/O performance with the faster computational performance of the multi-core architecture to improve total system throughput in keeping with Moore's Law.

The key here is the performance of Intel's multi-core processing architecture, where performance density increases without corresponding increases in power consumption. By choosing to build their Converged IP Communications solution on the Intel platform, Alcatel-Lucent has the ability to map new platforms to the performance curve of Moore's Law. This enables Alcatel-Lucent to deliver greater leaps in performance than they can with proprietary components.

In performance tests using the Intel Carrier Grade Server TIGW1U, Alcatel-Lucent found that changing processors made a big difference in the audio compression rate and number of sessions supported. No other software architecture or platform changes were necessary to achieve these results. Similar results were measured in VoIP session termination and SIP protocol handling.

In the audio conversion test, the current dual-core Intel® Xeon® processor LV 5148 is able to convert up to six audio messages per second. On the next-generation quad-core processor that is still in testing, Alcatel-Lucent is able to double that rate to 12 conversions per second. This level of performance previously required as many as 8-16 dedicated DSPs on specialized helper cards.

In the second test, Alcatel-Lucent found that the session density supported by the new processor technology is more than double the density of the existing processor, from about 180 sessions per server on the current dual-core chip-based system to approximately 400 sessions per server with the quad-core chip.

Target Markets

The target market for the Alcatel-Lucent Converged IP Messaging solution consists of high-volume carriers worldwide who are aiming to deliver a unified messaging solution to their users. Carriers in Eastern Europe, Europe, Africa, and South America, where video calling and video messaging are considered "hot" applications are primarily ready for such an advanced solution.

For more information:

www.alcatel-lucent.com

www.intel.com/design/servers/cg/tigw1u/index.htm

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