Converged Application Platforms

Enabling next-generation, media-rich services on the IP network

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Executive Summary

The world of communications is in the midst of a massive convergence. Very rapidly, data networks and voice networks are becoming one, as technologies such as Voice over IP (VoIP) mature and gain traction in the marketplace. In fact, VoIP is opening the door for a host of multimedia services in which voice, video, and data are integrated and delivered over multiple connected networks. As a result, service providers worldwide are finding new avenues for building revenues and enhancing profits. IT managers are also gaining highly efficient and flexible alternatives for supporting a distributed enterprise composed of multiple geographically dispersed offices connected to a central business network. Concurrently, Telecommunications Equipment Manufacturers (TEMs) are finding valuable opportunities to capture market share and drive new business by enabling easy access to these converged network services.

Intel is supporting this powerful emergence of "triple play" services with reference designs for Converged Application Platforms (CAPs) built on versatile, scalable standards-based Intel® building blocks. CAPs integrate features such as routing, firewall, wireless LAN, and VPN support all in a single, multi-function device. By providing reference designs for residential, home office, small business, and distributed enterprise usage models, Intel helps TEMs quickly develop products to meet the growing demand in these high-growth market segments. As a result, service providers gain a powerful tool for enhancing their competitive advantage, while IT managers gain a cost-effective solution to improve business collaboration and communications.

Business Opportunities for Service Providers and IT Managers

The VoIP phenomenon is very real and growing rapidly. According to market research firm IDC, 37 percent of large and medium-sized U.S. firms with Private Branch Exchanges (PBXs) have already deployed VoIP-based equipment.[1] Infonetics projects that global revenue from carrier VoIP equipment will rise to $5.8 billion by 2008 from $1.7 billion in 2004.[2] With branch office and small/medium business (SMB) representing the fastest growing segments in the enterprise communications market, the opportunities for service providers and IT managers are clear.

As VoIP penetration continues to expand, service providers can broaden their market reach by offering additional revenue-generating IP-based services. For example, for the residential market segment, a single IP pipeline enables services such as video-on-demand and instant messaging with presence. When combined with VoIP service; network-based voice mail, customer premises-based conferencing, and three-way calling services are in demand. For the small office, SMB, and distributed enterprise market segments, the expansion of converged IP services opens up tremendous opportunities to provide IT services—everything from voice and secure data networking to audio and multimedia conferencing, customer premises-based automated attendant, voice mail, PBX, contact center, automatic call distributor, and data administration such as backup and redundancy.

For IT managers, the opportunities are equally compelling. The challenges of provisioning home office employees and small/remote branch offices with separate telephony and data networks can be simplified dramatically. With both voice and data services delivered over a single IP network, IT organizations may be able to reduce both the time and cost of support, while strengthening the security of both voice and data communications. Employees gain more efficient and effective services to stay connected with the enterprise network, streamlining business processes, enabling faster and more secure access to business-critical information, and expanding efficiencies up and down the communications chain. The results are increased productivity, improved customer service, and reduced costs—all delivering value to the bottom line.

What is standing in the way? Separate telephony and data networks present an obstacle to achieving these benefits. It is difficult and costly to maintain and upgrade multiple sets of network equipment, which in some cases are handled by different IT staffs. What's more, if data services and voice services are isolated—as many are today—this next generation of integrated, media-rich services will remain out of reach.

The key to combining telephony and data services is enabling access on a single IP-based network—a single point of connectivity to a full range of integrated services. It is a concept that not only introduces tremendous new business opportunities, but creates a much more efficient environment to provision and maintain. Most important, it is a concept that is being made very real today by converged application platforms.

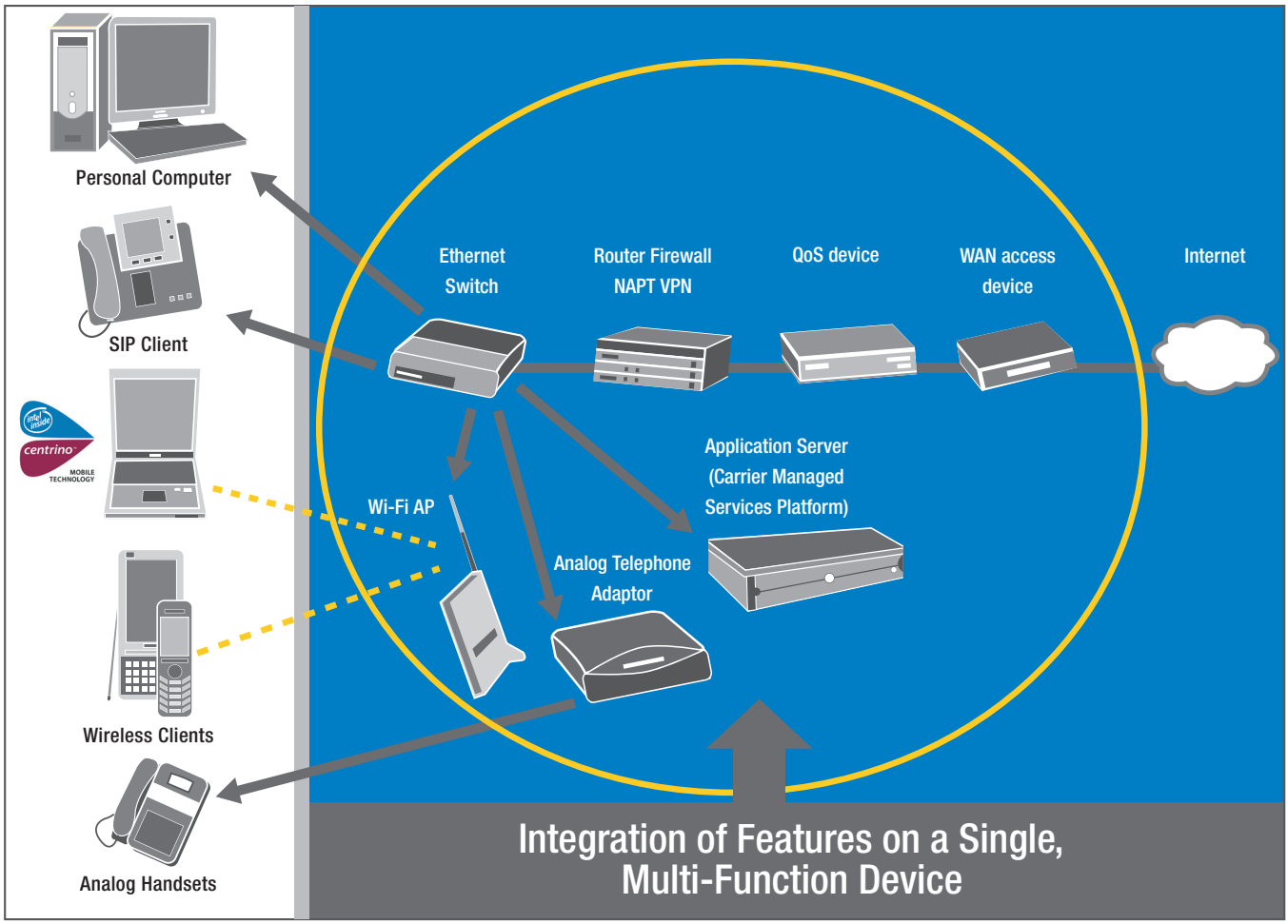
CAP Overview

A CAP provides a common scalable architecture that supports telephony, video, and data services—meeting the needs of service providers, IT managers, and consumer and enterprise end users alike.

CAPs bring together multiple functions such as voice switching, enterprise routing, firewall and VPN, quality of service, application services, WAN and Wi-Fi access, and more—all in a single device accessible by a wide range of clients.

[1] Key Trends in Enterprise VoIP: Survey Shows Strong Near-Term Growth, IDC, Paul Strauss and Tom Valovic, May 2004

[2] Service Provider Next Gen Voice Equipment, *Infonetics Research*, May 2005



CAP Overview Diagram

Multi-function CAP devices simplify installation and operation, while providing over-the-wire manageability.

With this innovative concept, service providers and IT managers have a powerful, flexible platform that offers:

- Increased user control to manage personal preferences, including call logs, security, and privacy
- Reduced burden on network administrators and IT staff by reducing network element complexity
- Remote management, diagnosis, and provisioning to simplify administration
- Reduced footprint appliances for SMB
- Encrypted voice, data networking, and video streaming
- Headroom to enable new services
- Scalability and freedom to distribute anywhere on the network

A key enabler of the CAP reference design from Intel is Intel NetStructure® Host Media Processing (HMP) software.

Certified AT&T

The simplicity and scalability of this solution also allows service providers to support distributed enterprises by outsourcing the provisioning of home office and small office workers. This allows IT managers to off-load the burden of setting up numerous distributed employees, reducing their administrative overhead. For IT managers that need to support small remote offices or retail outlets, the entry-level CAP can also be deployed as an "Office-in-a-Box*"—providing a cost-effective business solution that can be provisioned easily and managed remotely. AT&T is working on an advanced, integrated IP services concept. Initially targeted at remote branch offices of large enterprise customers, the technology is inclusive of the routing platform, the VPN security, wired and wireless data networking, VoIP, and advanced diagnostic capabilities. It is intended to solve a major problem for enterprise IT managers—on-netting (both for voice and data) of remote branch office sites.

AT&T CallVantage®
Phone service for broadband

AT&T

This software eliminates the need for specialized Digital Signal Processors (DSPs) by providing a cost-effective, software-based alternative that delivers scalable, high-quality voice, data, and video on standards-based platforms. In addition, the CAP architecture is supported and enriched by a variety of third-party Intel alliances to accelerate time-to-market with new solutions.

The CAP architecture supports multiple implementation options, including IP Centrex, IP PBX, and hybrid variations of both. It is the ideal platform for service providers that want to reach residential and SMB market segments with value-added services, as well as IT managers that need to efficiently provision small or remote/branch offices with a full range of business services throughout a distributed enterprise.

CAP Application Scenarios

Because CAPs offer versatility and scalability, they can support a range of usage scenarios for both service providers and IT managers.

Residential and Small Office/Home Office Applications

The proliferation of broadband and VoIP lays the foundation for converged network services to consumers and small office/home office (SOHO) workers. The challenge in this market segment is providing an affordable solution that offers clear value and simplicity.

IT managers face extensive complexity in outfitting large numbers of distributed home-office employees, as well as small remote offices or retail outlets. Service providers require a solution to attract new subscribers, ward off competition, and increase revenues through enhanced services. An entry-level CAP is the ideal solution.

By enhancing a broadband router with converged access capabilities, an entry-level CAP can deliver high-quality VoIP services to traditional home phones and also enable high-performance networking for multi-computer homes and small offices. Initially, this CAP provides the home and small office user with a single point of access to voice and broadband services. This allows service providers to offer bundled services at a fixed subscription rate that is very attractive to home users. Once the CAP solution is in place, the service provider also has a platform for offering additional enhanced services over time, including video-on-demand to complete the triple play offering.

Netgear

The NETGEAR WGR826V Wireless Router with Phone Adapter combines multiple devices into one for home networking environments:

- Telephone adapter that is compatible with AT&T CallVantage* service
- Wireless Access Point for 802.11b/g
- Computer network router, with up to three simultaneous Ethernet connections

The NETGEAR WGR826V Wireless Router with Phone Adapter is based on the Intel® IXP42X product line to offer high-performance networking and voice quality, along with built-in security features.

"The NETGEAR WGR826V Wireless Router with Phone Adapter allows people to experience VoIP phone service and a high-speed wireless home network. Using the Intel IXP42X product line, it offers high performance networking and voice quality with built-in security features for an integrated networking solution," said David James, Director, Broadband Services, Netgear.

NETGEAR®
Everybody's connecting.®

The viability for CAP solutions in this market segment is evidenced by the growing number of major network product manufacturers that have already introduced CAP-enabled devices, which are receiving industry accolades.

Intel is leading this effort by providing an entry-level CAP reference design based on the Intel® IXP4XX product line, supported by a vibrant ecosystem of software providers, including MontaVista Software, Intoto, Jungo and others. In addition, Netgear has also deployed solutions based on the Intel® IXDPG425 Network Gateway Reference Platform. With this design, service providers and IT managers have a scalable solution that can easily accommodate anywhere from 1–2 residential access lines to small office/remote office applications with 4–8 access lines. It provides carrier-grade Quality of Service (QoS) and media processing performance, resulting in uncompromised voice quality. And it offers high-performance home networking features such as routing, firewall, wireless LAN, and VPN support—all in an integrated, easy-to-install, easy-to-use device. This is a readily-deployable solution from which service providers and IT managers can receive immediate value.

For more information, see the product brief: *Intel® IXDPG425 Network Gateway Reference Platform*, available at http://www.intel.com/design/network/prodbrf/305303.htm.

An emerging use case for service providers is the delivery of voice communications over wireless IP networks (wVoIP), specifically fixed mobile convergence. Dual-mode wireless handheld phones can support cellular (GSM, CDMA or 3G) networks while outside the customer premises, and also wVoIP through a wireless LAN connection in the home or enterprise using a Session Initiation Protocol (SIP) wireless IP phone. As users move between networks, this configuration helps them to reconnect very quickly, resulting in reductions in cellular and conferencing costs within the enterprise.

In this scenario, cellular service providers have the opportunity to serve customers as they move into the corporate network.

For more information, see the white paper: *Enabling Real-Time Business Communications with VoIP Over Wireless Networks*, available at www.intel.com/go/voip.

Small Business, Multi-Tenant Residential, and Distributed Enterprise Applications

Intel strategies, technologies, and reference designs for CAP open up significant business opportunities for broader market segments, including:

- Small/Medium Business (SMB)
- Multi-tenant residential models, such as college campus and apartment communities
- Large distributed enterprises with moderately sized branch offices

Again, the challenge is to support the many telephony and data services that a small business needs to compete, and that branch offices require to ensure enterprise connectivity and access to business-critical applications.

In this market segment, business requirements extend beyond the basic voice and data services offered to residential and home office employees. Small businesses need enterprise-class capabilities to level the competitive playing field. IT managers in large distributed enterprises are under constant pressure to reduce the cost of operations, while boosting productivity, enterprise security and process efficiency.

With a single, multipurpose device providing access to a full range of enterprise IP network services, IT managers can meet their business objectives easily and cost-effectively. Provisioning, administration, and upgrades all are easier. Plus, a flexible range of integrated services can be provided to enhance communications and collaboration. For example, services enabled by the CAP can include:

- High definition audio—high-fidelity VoIP with virtual surround sound, audio conferencing, and voice mail
- Desktop video telephony (peer to peer) and video conferencing
- Intelligent automated attendant/context-based call routing
- Data routing/packet forwarding to LAN and WAN
- Firewall and data stream security services
- Network Address Translation (NAT) traversal
- QoS management for multiple data traffic classes
- High-speed Internet and intranet access
- Next-generation collaboration applications
- Data backup, redundancy, and storage

IT managers may also opt to contract service providers to provision and manage their branch-office CAPs. This option is particularly attractive to enterprises with offices distributed across broad geographies or regions of the world, where local service providers can dramatically reduce the burden on IT managers.

For service providers, this is an exciting opportunity to expand their market reach extensively and deliver full-service communications solutions into business segments that would otherwise not be practical through separate networks and stand-alone devices. It represents a powerful avenue through which to boost revenues dramatically.

Intel offers a CAP reference design for small/medium businesses and distributed enterprises that is ideal for offices with as few as 8 or as many as 120 users. By using a standards-based architecture comprised of Intel® Architecture and Intel® Network Processors, licensable software technology, software development tools, as well as third-party hardware and software solutions, service providers and IT managers gain a solution that can scale to meet a wide variety of implementation requirements.

For more information, see the product brief: *Converged Application Platforms for the Distributed Enterprise*, available at www.intel.com/go/cap.

Conclusion

VoIP technologies are paving the way for a broad range of integrated voice, data, and video solutions that can be delivered over a single IP network. By eliminating separate networks for voice and data, IT managers and service providers can simplify provisioning and administration of services, while also dramatically reducing the cost of equipment support and upgrades. CAPs based on Intel building blocks are enabling this network convergence today.

By offering bundled voice and data services, service providers can expand the scope of their residential offerings and gain penetration in lucrative business market segments. This is a powerful way to boost revenue and profits, while strengthening competitive position. For IT managers, the advent of multi-function devices and integrated multimedia services provides a more cost-effective solution for equipping home office and small office workers—as well as mid-sized branch facilities and retail outlets—with the enterprise communications and collaboration capabilities they need to drive business success.

Through CAP-enabled equipment, the immediate opportunities are significant, and the long-term possibilities very compelling. From the most basic integration of VoIP and broadband services, to video-on-demand, intelligent call routing, voice mail, e-mail and instant messaging with presence, and high fidelity audio/video conferencing, service providers and IT managers can deliver a rich, versatile, and satisfying user experience—with greater efficiency, performance and agility.

Intel provides CAP reference designs to help TEMs introduce new CAP-enabled, multi-function devices to the marketplace quickly, with the scalability to meet a wide range of application requirements.

For More Information

- Embedded Intel® Architecture:
  http://intel.com/design/intarch
- Intel® Communications Alliance:
  http://www.intel.com/go/ica
- Intel® Network Processors:
  http://www.intel.com/design/network/products/npfamily
- Intel Telecom and Compute Products:
  http://www.intel.com/go/telecom
- Voice and Converged Communications:
  http://www.intel.com/go/voip

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