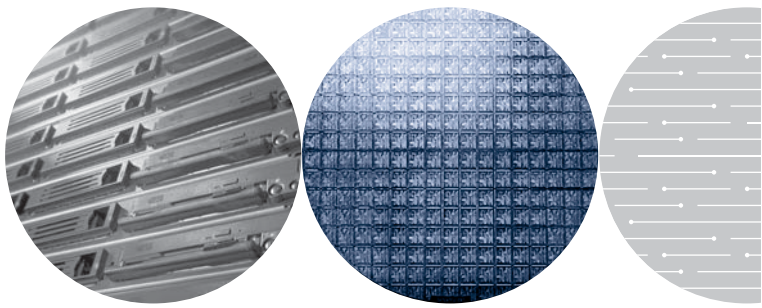
White Paper

Megatrends in the Contact Center

Intel in Communications



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Executive Summary

For both large and small enterprises, the contact center often provides the first interaction customers have with the company. The success or failure of that customer experience can set the stage for all subsequent interactions between customers or prospects and the company. And how effectively a company interacts with its customers and prospects sets the baseline for the company's customer satisfaction, loyalty—and, ultimately, for its long-term success.

To retain customers, enhance customer satisfaction, and reduce expenses, enterprises are looking to a new array of contact center services such as video, wireless access, and compatibility with personal digital assistants (PDAs) and other smart devices. A number of technology trends—including communications web services (CWS), host media processing (HMP), wireless communications, and high-speed Ethernet—are enabling these services and shaping the strategies enterprises need to implement as they look to the future of their contact centers.

Enterprise decision-makers should evaluate their technology strategies by focusing on balancing customers' personal and automated experiences. This paper highlights six key strategic technology megatrends that can help support that balance and enable contact centers to keep meeting customers' expectations into the future.

Meeting Growing Customer Expectations

Competition for customers—and the investments an enterprise must make to attract and retain them—are fundamental needs at the core of today's contact center strategies. Equally important is how to heighten contact center productivity and reduce costs by retaining experienced agents and keeping them working at maximum efficiency.

Both current and evolving technologies can address all these needs and help to maximize both customer satisfaction and employee productivity in today's and tomorrow's contact centers.

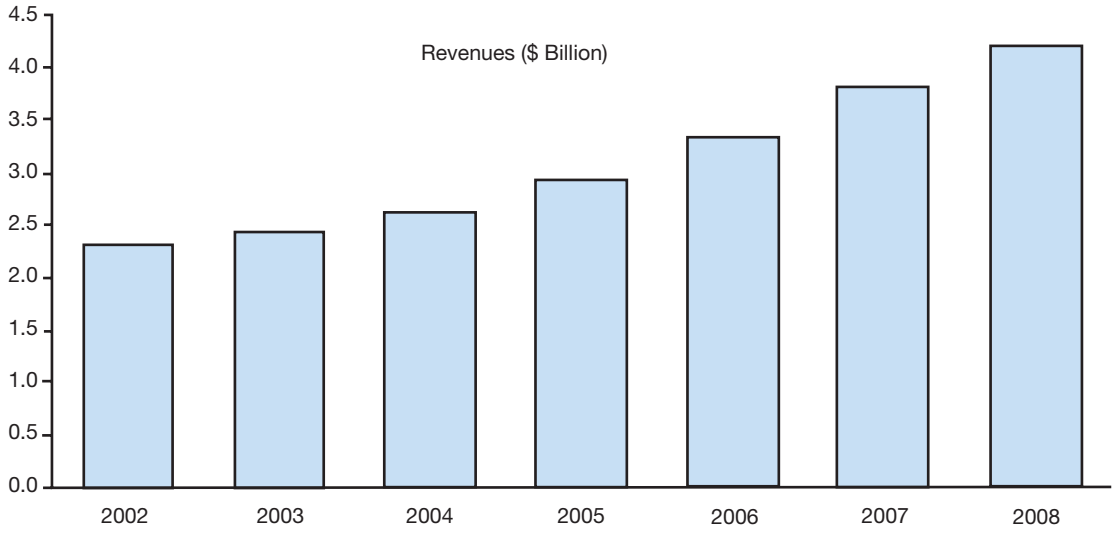
The two key technology trends having a direct impact on enterprise contact center strategies are the proliferation of mobile devices and customers' growing expectations of a multimedia experience. As an enterprise plans the future of its contact center, it should consider how to develop a strategy that incorporates these two trends.

To see how these technology trends apply in today's evolving contact center, we must first consider what an enterprise's contact center needs to do for customers to make the company competitive. It must:

1. **Solve problems.** Consider insurance claims, for example. It is easy to imagine that in the near future, a person who has been in an accident would take video of an accident aftermath, and then transmit it by telephone to an agent anywhere in the world, either in real time or later. As the insurance company plans its contact center, it needs to consider the technology implications of streaming videos, prioritized queuing, skills-based routing, storage, and bandwidth.
2. **Communicate.** Consider a typical customer's experience with mobile technology and wireless communication. Customers today are looking for a personalized service experience where they have control over their interactions in their communications format of choice (e.g., cell phone, Internet, PDA). Customers also expect a virtual workplace that allows them to communicate within their own organization or with other companies—anywhere, at any time, using any device they choose. They expect to be able to collaborate with family, coworkers, or contact centers the same way.
3. **Provide Content.** Besides wanting to be productive and solve their own problems, customers want to retrieve information or content in today's mobile world. This is already being done today, but we should expect to see applications providing, for example, the ability to download movies and other video onto mobile devices on-demand.

Underlying these expectations—and the technology to deliver on their promise—is convergence, the ability to deliver voice, data, and entertainment-based applications to users 24/7, over any device the user chooses.

Each of these converging channels separately may be a key element of a contact center. However, it is the convergence of all three that will stretch the contact center's technology platform. For instance, a data channel may be enough if a contact center does all its work over email or other computer connection. A voice channel may be sufficient if the contact center conducts all its interactions over the phone. But it is rare for a contact center to use just one communications strategy. Most contact centers face the challenges of managing phone calls, email, fax, and instant messaging through several queuing mechanisms. As customer expectations expand with mobility and multimedia, contact centers must respond. If they do not, their competitors will.



Note: All figures are rounded; the base year is 2003.

Figure 1. Total Contact Center Solutions Market Segment Revenue Forecasts for North America (2002 through 2008) [Frost & Sullivan]

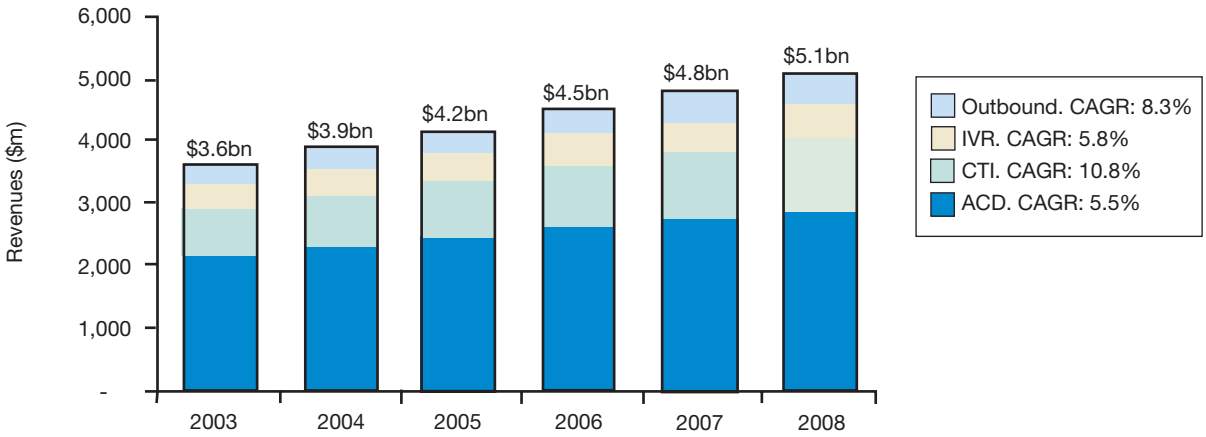


Figure 2. Global Contact Center Technology Product Revenues by Technology, 2003 to 2008 [DataMonitor]

Analysts back up this view. A recent Frost & Sullivan report forecasts that technology expenditures in the total contact solution market segment will grow to $4.2 billion by 2008, with a compound annual growth rate (CAGR) of 12.0% (Figure 1).

DataMonitor projects the global marketplace for contact center component technology will grow to $5.1 billion by 2008 (Figure 2).

Now consider the architecture the contact center market segment needs to deliver the breadth and depth of applications to meet its customers' needs and its own productivity goals. To satisfy platform requirements to deliver the rich applications to meet customer demands, and to provide high-speed connectivity and connectivity to legacy infrastructure, the contact center needs an architecture that is very modular.

For several years, the communications industry has talked about the convergence of voice and data onto a single modular network. Some were disappointed that convergence did not take hold as quickly as promised. However, today, convergence truly is taking hold—not with irrational exuberance, but in a real and managed way.

There are three key reasons that convergence is now taking root and poised to grow rationally:

1. **Demand for converged applications.** Customers are experiencing the converged environment daily in their homes, at work, and in the car. For example, many mobile workers now use a single device as both a mobile phone and an email reader. Contact centers should plan to coordinate many communications channels to support their goals of customer loyalty and cost reduction through enhanced productivity.
2. **Ability of technology to satisfy demand.** The contact center is evolving from a voice-only interaction center to a multimedia interaction center. The contact center that has been primarily focused on voice solutions can now incorporate new, rapidly maturing technologies such as voice over IP (VoIP) networks to reduce costs, enable additional applications, and provide more flexible customer interactions.
3. **The cost savings are real.** As underlying computer platforms become more cost-effective, standards-based, low-cost computing technology is available to be applied to communications in the contact center. Now enterprises can apply a greater percentage of their capital resources to applications that add value.

Modular Platform Trends in the Contact Center

The computer industry of the 1990s in many ways parallels the communications industry of today. In the computer industry, large, monolithic mainframes were gradually replaced by a layered, modular collection of silicon, operating systems, applications, and system integrators. This same phenomenon is now taking hold in the communications industry.

The transition from closed, proprietary systems to an open, modular communications infrastructure may happen in phases, but clear signs already show that it is happening in a big way:

- **Enhancing revenues.** Enterprises need to address their revenue stream and pinched margins by finding new sources of revenue. An open, modular architecture enables a continuous stream of new, innovative services and applications—which is essential to remain competitive.
- **The mobility boom.** Demand for mobility and multimedia solutions is growing dramatically. Wireless penetration rates in some countries are approaching 100%, with a recent significant increase in the number of users opting for wireless as their primary home service provider, the rapid proliferation of smart endpoints (e.g., PDAs such as Blackberry*, laptops), and the rapid growth of Wi-Fi. Modular solutions provide increased flexibility and scalability to provide faster deployment of revenue generating applications—while at the same time holding the line on costs.
- **Lowering ownership costs.** There is an almost obsessive drive toward lower total cost of ownership. Enterprises are aggressively looking to provide their customers with the most affordable solutions possible and seeking out new revenue sources. Many see this as their only way to make money in the future. A modular architecture makes it all easier.
- **Being first is essential.** As the communications landscape evolves, being first to offer a new service is a key differentiator for service providers. A modular architecture makes it quicker and easier to roll out new services.

Contact Center Solutions from Intel

Solution providers build next-generation contact centers with powerful, open, building block technologies that handle media and call processing. Intel provides a comprehensive suite of hardware and software components, as well as development tools and professional services, to help solution providers build diverse systems and applications including:

- **Communications infrastructure.** Contact centers typically require advanced communications systems to process contacts from multiple communications channels. Switching systems such as private branch exchanges (PBXs) and automatic call distributors (ACDs) route and process calls across single or multiple sites.
- **Inbound contact centers.** Interactive voice response (IVR) systems, with value-added features such as screen-pop and intelligent call routing, let users access information and process transactions around the clock with high-quality customer service.
- **Outbound contact centers.** Automated outbound dialing increases the number of customer contacts, growing revenues while maximizing agent productivity.
- **Contact center management tools.** Call logging and recording applications provide security and quality assurance while helping managers assess agent performance and balance workload requirements.

Solution providers can build or enhance innovative contact center applications by adopting modular platforms built with hardware and software building blocks from Intel. These enable contact centers to add capabilities as needed, providing a more cost-effective approach to the next-generation contact center.
To learn more, visit **http://www.intel.com/network/csp/solutions/contact_cntr/7288ovr.htm**.

Contact Center Technologies

Large enterprises and service providers are rallying around a single, unifying standard. That standard is Internet Protocol (IP), the interface of choice in today's communications network.

IP is easy to trace from its beachhead in the late 1990s in well-managed, long-haul applications to the Ethernet-enabled enterprise around 2000, and now—with the proliferation of broadband for the last mile—even to the home. With the emergence of Wi-Fi and upcoming WiMAX standards, IP is poised to become the universal interconnect standard for data and voice around the world.

Another key technology trend is host media processing, the ability to perform complex media processing right on the Intel® Pentium® processor, with its ever-increasing density and functionality. This transition from a hardware to a software paradigm has the potential to revolutionize large segments of the communications industry. Along with the emergence of the Web-based development model that Intel calls communications Web services, host media processing has the potential to enable a whole new round of innovation, putting voice capability at the fingertips of one of the largest developer communities in the world.

As the modular network evolves, both enterprises and service providers have come to understand the benefits of a distributed, modular architecture that enables them to buy individual network elements from best-in-breed suppliers. Taking that one step further, the industry is now starting to look seriously at modular platforms where economies of scale enable rapid and cost-effective innovation at all layers of the application solution stack.

With these general trends in mind, there are six key megatrend technologies crucial in the evolving contact center:

1. Communications web services
2. High-speed Ethernet
3. Wireless communications
4. Growth of smart, mobile clients
5. Collaboration
6. Host media processing

Communications Web Services

Today's enterprises want a consistent infrastructure on which to run all their applications—not a diverse collection of platforms for applications such as IVR systems and other contact center solutions. This desire is based on the cost savings that come from using a single network, the improved technical depth of the platforms, and easier support.

This need for a single communications infrastructure has driven a transition to standards-based application servers based on Web services—small, building-block applications that can connect to each other as well as to other, larger applications over the Internet. Web Services is a new set of standards for structured transactions flowing between Web servers. Web Services transactions use Extensible Markup Language (XML) encoding. Their schemas are published in directories that can be consulted by participating applications.

According to IDC, worldwide spending on software supporting projects based on Web services will grow from $1.1 billion in 2003 to $11 billion by 2008, driven by the pressing need for IT departments to reduce costs. Web services technology is an increasingly important way to solve crucial integration issues and the technology many organizations are using to address their future application needs. [IDC]

Examples of important new enterprise applications based on the Web services paradigm include:

- **WebLogic* from BEA Systems, Inc.** — Provides an enterprise application infrastructure that can drive new business services and through service-oriented architectures and shared services.
- **WebSphere* from IBM** — A software platform for e-business on demand that enables companies to develop, deploy, and integrate next-generation e-business applications such as those for business-to-business e-commerce.
- **.NET* from Microsoft** — A set of software technologies for connecting information, people, systems, and devices based on Web services.
- **Oracle Application Server*** — An application platform suite that offers full support for J2EE, high-speed caching, rapid application development, enterprise portals, identity management, business intelligence, application and business integration, wireless capabilities, and more.

Communications Web services (CWS) is a term used to describe the provisioning of communications services so that they can be controlled and managed by Web-style applications. CWS provides voice and speech integration to enterprises' existing data infrastructure. Similar to the way in which a customer can access information through a Web interface, CWS enables a contact center customer to access the same information through a phone or other mobile device. This approach provides access to the same information in the contact center, but enables the customer to choose the way in which the information is accessed.

High-Speed Ethernet

As contact center solutions become increasingly sophisticated, it is important to consider the demands that innovations such as video and converged services will place on the network infrastructure. It is also important to consider how to reduce capital and operations expenditures in light of these new demands.

High-speed technologies such as 10 Gigabyte Ethernet can provide the underlying infrastructure for contact centers planning to use video as a customer service element. From its origin more than 25 years ago, Ethernet has evolved to meet the increasing demands of packet-based networks. With a proven low implementation cost, reliability, and relative simplicity of installation and maintenance, Ethernet has grown in popularity to the point that nearly all traffic on the Internet originates or terminates with an Ethernet connection.

As the demand for ever-faster network speeds has grown, Ethernet has been adapted to handle these higher speeds, as well as the surges in volume demand that accompany them. The IEEE 802.3ae* 2002 (10 Gigabyte Ethernet standard) means that Ethernet can now progress to 10 gigabits per second while retaining its critical Ethernet properties. This increased capacity is an important enabler to new contact center technologies such as video.

Wireless Communication

Wireless is one of the largest trends in communications, with the number of digital cellular subscribers expected to reach 1.62 billion at the beginning of 2005. [Gupta] In the contact center, the rapid adoption of Wi-Fi technology, as exemplified by the striking proliferation of Intel® Centrino™ mobile technology, means that the customer experience with the contact center will quickly evolve as wireless access points and technology proliferate. Wireless broadband technology such as WiMAX will offer customers the ability to communicate, transmit video, and provide additional interaction in a wireless environment.

The wireless communication stack has three key elements:

1. Wi-Fi
2. Bluetooth
3. WiMAX

Wi-Fi wireless LAN support provides the ability to connect to infrastructures based on the 802.11b, 802.11a, and 802.11g standards, including thousands of hotspots worldwide. An increasingly popular way to work and play on the go, hotspots provide WLAN service, for free or for a fee, from a wide variety of public meeting areas including coffee shops, airport lounges, and convention centers. In support of Intel Centrino mobile technology, Intel is actively working with various industry leaders to help accelerate wireless LAN infrastructure deployment and expand content and service capabilities to deliver a more compelling mobile experience.

Bluetooth is a low-cost, short-range wireless technology specification for connecting mobile devices and bringing them to market. It is being developed by the Bluetooth Special Interest Group (SIG), a trade association comprised of leaders in the telecommunications, computing, automotive, industrial automation, and network industries. Intel is a member of the Bluetooth SIG.

Today, Wi-Fi and Bluetooth technologies are coexisting, providing a low-power, personal solution for customers.

For the future, the WiMAX Forum is working to facilitate the deployment of broadband wireless networks based on the IEEE 802.16 standard by helping to ensure the compatibility and interoperability of broadband wireless access equipment. This nonprofit association was formed in 2003 by equipment and component suppliers to promote the adoption of IEEE 802.16 compliant equipment by operators of broadband wireless access systems.

The 802.16 standard for 2-11 GHz is a wireless metropolitan area network (Wireless MAN) technology that provides broadband wireless connectivity to fixed, portable, and nomadic users. The ultimate complement to Wi-Fi, the WiMAX wireless MAN standard can be used to backhaul 802.11 hotspots and WLANs to the Internet, provide campus connectivity, and enable a wireless alternative to cable and Digital Subscriber Line (DSL) for last-mile broadband access. It provides up to 50 kilometers of service area range, allows users to get

broadband connectivity without needing direct line of sight with the base station, and provides total data rates of up to 280 Mbps per base station. This is enough bandwidth to simultaneously support hundreds of businesses with T-1/E-1-type connectivity and thousands of homes with DSL-type connectivity with a single base station.

Growth of Smart, Mobile Clients

Infrastructure is only one side of the equation. Contact center users are demanding anywhere, anytime access, which means contact centers also need to work with personal clients. Smart devices such as PDAs and camera phones have shown explosive growth worldwide, and today's growth is only the beginning.

For example, consumers are quickly making camera capability an expected feature on all mid-range cell phones. By the end of 2003, more than 55 million consumers worldwide owned camera-phone handsets—more than double the 25 million mobile units sold in 2002. By 2005, 130 million handsets with camera capability will be shipped globally. With the additional boost of 3G, this figure is expected to increase to 210 million by 2008 [ARC Group].

A good example of an innovative smart client application is the work cell phone giant Nokia is doing with MasterCard International to use payment and messaging technologies in a new way. Now in the second phase of its mobile commerce trial, Nokia is demonstrating how mobile phones can be used as more than a voice communications tool. Consumers can simply tap or wave their Nokia mobile phone enabled with MasterCard PayPass* over a special reader at the point of sale to make a payment [Nokia].

Solutions like these are just the beginning. By combining 3G technology and smart clients, the global communications industry will be able to kick off a virtuous cycle of new services leading to client upgrades, which will lead to more new services and further upgrades.

Collaboration

The emergence of personalized communications is also allowing new forms of collaboration in the enterprise. Collaboration tools, which started as email and floppy disk swapping, are expanding to include instant messaging, net meetings, file transfer protocol (FTP) transfer, and other real-time collaboration enablers.

Soon, person-to -person phone calls, virtual conferencing, and advanced messaging will become standard add-ons to the collaboration suite. In the contact center, this shift may result in a new paradigm for communications based on an integrated user experience that includes all the modes of human interaction, both visual and verbal. It will result in user-friendly team collaboration spanning geographies and breaking through the walls of the enterprise.

The traditional model for communication—which often originates with a phone call through a public switched telephone network (PSTN) or enterprise phone network—will be replaced by a much richer collaborative experience that can originate through a variety of mechanisms.

For proof that we are truly moving into the era of the boundaryless enterprise, consider that Microsoft, IBM, and Oracle have each acquired a company specializing in collaboration (PlaceWare, Sametime, and iMeeting, respectively).

Host Media Processing

Host media processing is a new generation of media processing technology that enables a significantly lower total cost of ownership. HMP provides the rich media processing for messaging, recording, faxing and conferring all required in a multimedia contact center.

The Intel implementation of this technology is Intel® NetStructure™ Host Media Processing Software (HMP Software), which provides basic media services that developers can use to build flexible, scalable, and cost-effective media servers. Media servers can include voice mail, IVR, and conferencing to build new media servers or extend old ones.

HMP Software moves building media processing solutions from the domain of custom software and specially-designed boards to an open software model for standard, high-volume computing platforms. This offers significant advantages:

- **Lower cost of inventory and startup** – Users have a smaller initial capital investment.
- **Lower development costs** – Development systems do not require specialized hardware.
- **Lower deployment costs** – Software is less expensive to install and configure than hardware.
- **Lower sparing costs** – Hardware can be used for multiple functions.
- **Lower maintenance costs** – Maintenance is easier and less training is needed when system configurations are standardized.

This technology moves algorithms and control software, which previously ran on a proprietary board, to standard computing platforms. Startup costs and total cost of ownership for telecom services will shrink dramatically. Currently, application developers need to buy boards and a computing platform to begin developing new telecom applications. With HMP Software, developers can start work on new telecom applications after a simple software install. This reduced startup cost, along with emerging Internet-telecom integration, promises to spawn a new wave of innovative, cost-effective telecom and contact center applications.

Summary

Contact centers should carefully consider their technology strategies in the context of customer expectations based on convergence—not just network convergence, but true convergence.

Intel believes that that within a few years, every communications device in the world will compute, and that every computing device will communicate. This is happening at all levels of technology, down to the silicon building blocks themselves.

A new array of contact center services such as video, wireless access, and compatibility with PDAs and other smart devices will help enterprises retain customers, enhance customer satisfaction, and reduce expenses. Enabling these services are six key technology megatrends including communications Web services, host media processing, wireless communications, and high-speed Ethernet.

As they move into the future, enterprise decision-makers need to consider all these technologies as they evaluate their strategies to keep meeting their customers' expectations.

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Definitions and Acronyms

ACD	Automatic call distributor
CAGR	Compound annual growth rate
CWS	Communications Web services
DSL	Digital Subscriber Line
FTP	File Transfer Protocol
HMP	Host media processing
IEEE	Institute of Electrical and Electronic Engineers
IP	Internet Protocol
IVR	Interactive voice response
LAN	Local area network
PBX	Private branch exchange
PDA	Personal digital assistant
PSTN	Public switched telephone network
VoIP	Voice over Internet Protocol
XML	Extensible Markup Language

For More Information

Intel® NetStructure™ Host Media Processing Software — http://www.intel.com/design/network/products/telecom/software/index.htm#hmp

Contact Center Solutions from Intel — http://www.intel.com/network/csp/solutions/contact_cntr/7288ovr.htm

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