AVAYA

WHITE PAPER

The Path to Intelligent Communications

Service Oriented Communications and SIP in the Contact Center and across the Enterprise

March 2007

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A world-class soccer club depends on teamwork. But if every player needs to be a striker, defender, mid-fielder and goalkeeper, then they will be mediocre at every position and star at none. Winning depends on each player being a highly skilled specialist in their role.

In this paper we define *service oriented communications,* a business concept that moves the game of enterprise communications to the World Cup level. Self-contained communication applications that once played every role are now moving toward a team approach, where the specialist at a given function provides that function as a service to the other applications on the network. This approach is familiar to information technology professionals as a service oriented architecture, or SOA.

Service oriented communications applies a SOA methodology to converge communications, business applications, and processes over a common IT infrastructure.

To play at the highest level of a sport, teams from around the world adhere to a common set of rules and protocols. Likewise, parts of a world-class communications infrastructure play together best if they agree on a single protocol for all media. In real-time communications, that standard is the Session Initiation Protocol, or SIP.

Together, service oriented communications and SIP bring contact centers and enterprises together with *intelligent communications*. This paper is written for those responsible for business communications and data infrastructures in companies that aspire to the ideal of intelligent communications. It explains how emerging technologies — SOA and SIP — will transform the contact center by the time Italy defends its title.

This transformation is not a choice; it is a necessity in the business arena, where the champion defends its title daily.

Section 1: Contact Centers Are Evolving

Contact centers have reached high levels of sophistication, but their basic role — to serve customers — has not changed. Technological complexity has evolved out of ongoing challenges to improve efficiency and effectiveness.

These challenges have ushered the contact center through three phases of evolution.

Phase I: Conventional call center

Call centers initially operated as isolated business units, separated from the enterprise. Call centers automated for their own reasons, and chose technologies appropriate to their needs. Before long, only a few threads of integration connected call centers to the enterprise, across a gulf of technological incompatibilities.

Just as enterprise systems were disconnected from the call center, so enterprise knowledge workers played little role in improving the customer experience. Applications were segregated in the architecture of a conventional call center — separated not only from the enterprise, but from each other.

Each application might use a different hardware platform, distinct programming model and separate administration. Processes were duplicated in multiple applications, each with its own server and independent reporting. Integration with the IT infrastructure was limited, using proprietary computer-telephony integration (CTI) interfaces developed by skilled specialists.

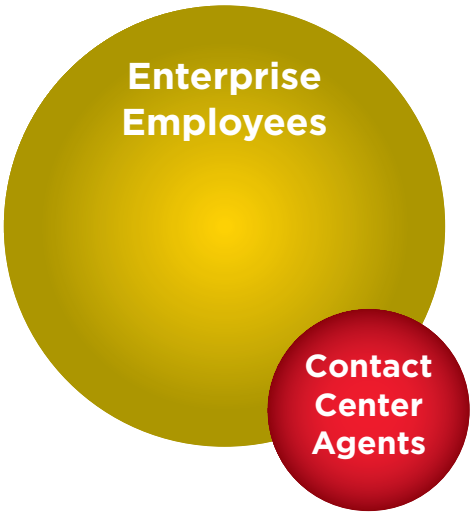
Phase II: IP contact center

IP telephony gained rapid acceptance for its cost savings and provisioning capabilities. Soon it began to transform business operations.

As full-fledged members of the information technology (IT) infrastructure, contact centers now deploy sophisticated applications and leverage universal IT skills. The contact center utilizes enterprise resources, both technical and human. Branch sites assume a role in providing seamless global coverage and responding to spikes in call volume, all through a connection to the central hub.

Even the definition of "site" has changed. IP telephony enables the use of agents from anywhere, including their homes, which has become a cost-control strategy for many contact centers.

Visionaries see an inflection point in contact center evolution, where business applications and communications converge. These worlds are connected today, but not yet truly integrated. Many applications remain segregated in their silos. Base functionalities are replicated in multiple applications, and valuable contact center capabilities remain isolated from the rest of the enterprise.



Above: Phase II graphic shows that contact center agents remain a separate entity from the rest of the enterprise.

Phase III: Intelligent communications

True integration — embedding intelligent communications in the very fabric of business processes — is a revolutionary concept. It heralds innovative new ways of winning customers, being competitive, and building revenue. In other words, new ways of doing business.

With intelligent communications, the resources of the entire enterprise are brought into play in the customer service process, while sophisticated contact center functionality is leveraged throughout the enterprise. The key to intelligent communications is deep integration — so deep, in fact, that it requires a new way of thinking about integration.

Such deep integration allows events at one point in a system to trigger events at another point. A business event, such as a manufacturing delay, can trigger a communications event in the contact center, such as an outbound call to customers who have that item on order.

Example: A financial service company's market monitoring system notes a sharp drop in a stock held by many of its clients. This event triggers a series of communications designed to protect clients' investments. Within seconds, the lead analyst for the stock receives a call on both his desk and mobile phones. Brokers receive an instant message, with the option to display contact records for all of their clients holding the stock. High-value investors are simultaneously contacted, and connected with their brokers. Lower-value investors receive

a contact from an interactive response system, sending them to the web site for more information or to execute a trade.

Integration enables one part of a company to leverage knowledge resources elsewhere in the company. Agents have convenient access to subject matter experts inside and outside the contact center.

Example: A caller to a biomedical equipment manufacturer asks about the technical specifications of a device when a certain combination of options is installed with it. The agent can provide an answer to the question in a single call, but only if an expert can be found. The agent displays a list of experts and, beside each expert's name, sees an icon indicating the person's availability. The top expert is on a call, but available by instant message. The agent IM's the expert and gets an immediate answer for the caller.

Integration makes it possible for enterprises to build new applications that re-use functionality already created in existing applications.

Example: Conditional alarms are an important tool for contact center management. All alarms from all contact center applications are delivered to supervisors through a single channel that adapts to the supervisor's situation. This common feature that was once redundant in many applications is now centrally managed by a software "service" that prioritizes all alarms from all sources, eliminates duplication, and chooses the fastest way to notify the most appropriate available supervisor. An application simply hands off its alarm — whether it is too many calls in the queue, or an excessive number of callers abandoning from it — and the service takes care of the rest.

Integration can mean time-saving functions as basic as click-to-dial from an agent's desktop, or streaming data to the LCDs on agent desk sets. And integration can mean paradigm-shifting functions as complex as you can imagine.

Above: Graphic for Phase III shows the integration of people in all parts of the enterprise, united together in creating the customer service experience.

New paradigms for new levels of integration

But before getting too imaginative, is it time for a reality check? Intelligent communications will depend on true integration of communications and business applications. To date, those costly integrations — where they exist at all — have been difficult to change with the needs of the business. That cost and inflexibility have posed a stout barrier to breakthrough innovations.

"For enterprises to progress toward SOA governance, a shift not only in technology but thinking and behavior is required."

Nick Lippis,
Next Generation Business Applications, White Paper

Another potential barrier has been the difference in protocols used on IT and communications networks. Numerous gateways connect today's networks and bridge protocol differences to enable IP telephony. With more types of media, and more applications leveraging communications capabilities, will we have more protocols, more boundaries, and more gateways?

What we need are solutions that go beyond connections, and make true integration a reality. We need an architecture that simplifies integrations between the IT and communications domains, and a common protocol that can connect any two endpoints regardless of media.

The solutions are two relatively new technologies that will reach the contact center in the next four years: *service oriented architecture,* and *session initiation protocol.*

Section 2: SOA and Service Oriented Communications

IP telephony brought IT and the contact center closer together. As their technologies merged, so have their paths to future enhancements. IT is now migrating toward an architecture that enables innovations like those imagined in the preceding paragraphs.

That fundamental enabling technology is the service oriented architecture, or SOA.

SOA — high technology, or deep philosophy?

Both. There certainly is a complex, technical aspect to a service-oriented architecture, but equally important is a perspective on SOA as a way of thinking about the systems that make an enterprise run. In this mutualistic view, applications are service providers and service consumers, rather than self-contained units.

This perspective, philosophical as it may seem, has real implications for contact centers. Instead of building common capabilities again and again, developers need only know where to find the capability in the enterprise, and tap into it.

To understand this perspective, consider an analogy using a familiar asset: contact center agent skills. Agents possess specific skills and use them to serve callers. If ten percent of a company's callers are Spanish-speaking, then there are two philosophies for serving them. One philosophy is to train every agent in every branch to speak Spanish.

A less costly approach is to route Spanish-speaker calls to a branch in Monterrey, Mexico. The former philosophy creates redundancy by making every agent a self-contained unit. The latter creates efficiency by having one branch provide a language *service* to callers globally, thus eliminating redundancy.

Similar alternatives pertain when creating applications for business and communications. SOA allows new capabilities to be created by leveraging services from applications throughout the enterprise. In our earlier example, the brokerage notification function consumed services from Avaya Voice Portal (interacting with the client) and Avaya Meeting Exchange (connecting them with their broker).

Applications provide services to each other over SOA

Most software applications embody certain capabilities that are useful to other applications. Paradoxically, the common practice to date has been to re-create those capabilities each time a new application is built — similar to teaching every agent Spanish.

A more efficient method is to create the capability once and re-use it in other applications throughout the enterprise. In our earlier example of intelligent communications, the market monitoring system triggered outbound communications which are delivered by invoking a capability of Avaya Proactive Contact.

The single most revolutionary impact of this philosophy is a new ease of application integration.

Conventional, self-contained applications have their own data formats. Data are shared with other applications only at great expense and peril, requiring specialized skills in translating protocols and establishing an infrastructure over which to communicate data.

SOA applications, on the other hand, overcome these barriers by forging in advance an agreement on how integration will be achieved.

SOA is an agreement on open protocols, formats and infrastructures

In a service-oriented architecture, applications and services use common protocols to communicate, and a common format to share data. Sharing a data format and protocol bypasses the need for hardwired integration.

To make the connection complete, applications abstract their functions into reusable *services*. A service distills the capabilities within software applications into modular, self-contained components.

For services to be useful, they must be able to communicate with business applications and with each other. SOA provides a deployment infrastructure through which these services advertise their availability across the network, and applications invoke those services.

Web services are a typical example, where the consensus protocol is HTTP, the data format is XML, and the exchange takes place in a brief coupling between the application and service.

Service oriented communications extend capabilities to the enterprise

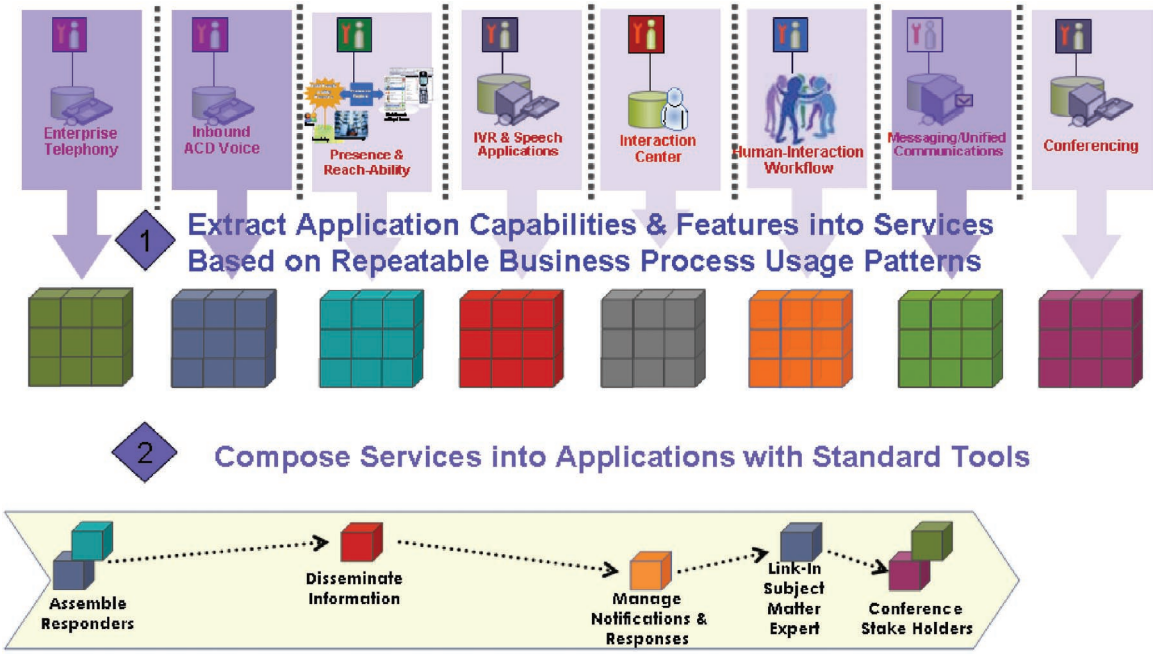
Contact center capabilities are now ready to converge with enterprise applications. Service oriented communications will free these capabilities from the standalone applications where they historically have been locked away.

Service oriented communications will encompass the entire scope of Avaya communication capabilities, ranging from the simplicity of making a call, to the complexity of unified messaging. These self-contained services can be combined to create unique composite processes with capabilities that span Avaya communication applications.

Point integrations that required specialized skills will give way to integrations based on the IT infrastructure. Business and communications applications can be integrated rapidly to deliver new customer initiatives, with a common investment in IT infrastructure and people skills.

Service oriented communications will enable timely response to critical events, and initiate contact with the right parties for a decision or transaction, with the ability to connect any mode of communication.

Imagine skill-based routing exposed as a service to help employees find subject matter experts. Imagine communication services, triggered by a business event, that can connect agents with customers using the customer's preferred method of communication. These are but a few of the ways service oriented communications can play a central role in business transformation.



Above: Graphic showing the extraction of communications capabilities from their parent applications into services that can be invoked by other applications.

Section 3: Session Initiation Protocol

Picture a communications environment where you use one address to reach an individual's work phone, 3G video cell phone, pager, IM, e-mail, and PDA. Now imagine that a server somehow always knows which of these communications methods to use. And if the person is unavailable on any device, contacts are intelligently rerouted to another person or group qualified to provide assistance.

These capabilities are not part of a distant Utopia; they are here today, thanks to a remarkable innovation in communications: Session Initiation Protocol (SIP). SIP is the intelligence that makes these advanced communications capabilities possible.

What is SIP?

SIP is an information-rich Internet protocol for establishing, manipulating, and concluding peer to peer communication sessions between IP-enabled devices. In voice communications, SIP is a surrogate for conventional telephone signaling protocols. But SIP is about much more than voice.

SIP is a flexible standard designed so that developers can extend its capabilities to new media all the while enforcing communication policies and user preferences. Video and instant messaging (IM) are examples of new media extensions. Mobile video is an emerging new media for communication in countries with mature 3G services. IM communicates using various media, and provides information about users' *presence*.

What is presence?

SIP includes a capability that makes people and applications aware of a person's presence, in a virtual sense, and is a step toward determining that person's *availability*. Presence indicates whether a person is "there," and availability is an interpretation of that information to determine whether the person can accept a request for communication.

A familiar example is IM, which distinguishes visually between users who are logged in, on a call, in a meeting, or offline. The probability that a real-time connection can be established is high when a person is present; it is almost a sure thing when the person is available.

Standards for SIP and presence are being developed by the Internet Engineering Task Force (IETF) through participation from major vendors. Avaya is leading the way by helping to define the standards.

SIP and presence are technology disrupters that bring together the contact center, the enterprise, and its customers, in a new paradigm for the customer-interaction process.

In-the-Know Lingo
Technology professionals refer to SOA by saying its initials, "S-O-A," although it is also common to pronounce it phonetically, "so-ah." However, always refer to SIP by pronouncing the acronym like the word it resembles: "sip."

SIP leads to a simplified contact center architecture

Leading organizations are investing in SIP-based technologies to help lower ownership costs. Service provider networks are standardizing high density trunks on SIP, and it is coming quickly to enterprise networks. In place of many signaling and communication protocols, SIP will bring a single standard interface for adding endpoints, deploying contact center services, or even for connecting trunk services for external communications.

SIP is software centric

SIP standardization within the enterprise and service provider networks will reduce the need for hardware gateways. Old signaling protocols and physical interfaces will cede to a logical SIP interface that connects endpoints through industry-standard server platforms.

SIP supports multimodal communications

SIP natively supports multiple media types — voice, text, video — within a single communication session. This broad support creates an inherently multimodal architecture that can adapt communications to users based on their situation and the communication device they are using.

Definition:
SIP Federation Service: Enables enterprises to communicate using SIP in a trusted environment. Comprises a uniform policy for authentication and security, network discovery and a common directory service, and the ability for organizations to define access policies for their domains.

SIP trunks complete the IP connection

Separate circuits dominated the transportation of voice and data until IP telephony layered voice onto the IP network. SIP completes the transformation enabling enterprises to carry voice data onto carrier networks over a pure IP connection. SIP trunks eliminate the requirement for gateways between enterprise and carrier SIP networks. SIP is its own intrinsic unifying protocol across these domains.

The SIP standards continue to evolve. Avaya has submitted a draft proposal to IETF, with co-sponsors, guiding the standard toward meeting the needs of contact centers.

SIP trunks offer flexibility

DID and 800-number mobility allow calls destined to a local or 800 number to be rerouted over the service provider SIP network to another enterprise location. These capabilities offer flexibility for contact centers providing a local presence in global markets, while routing calls to a centralized call center.

SIP trunks are only the first step

The combination of SIP and SOA creates an open communication architecture that will support multi-vendor integration. Through direct peering arrangements or the use of federation services, companies will be able to link their contact centers together to virtualize the customer service process spanning organizations.

Section 4: Contact Center Implications of Service Oriented Communications, SIP and Presence

"SIP is more than savings on telephone calls... Its value is summed up by one word: Transformation. Communications, deeply embedded into the heart of business processes, to redefine the way we work, and create substantial value."

Carl Baptiste, Vice President, Product Management
Avaya Converged Systems Division
SIP Summit, June 7, 2005

SOA is gaining traction in IT departments, and it will have a place in contact centers through service oriented communications. Within the communication applications that make a contact center work are common functions that can be abstracted as services. Such services as outbound contact, call routing and threshold alarms can be shared throughout the enterprise, enabling new business practices and capabilities beyond the contact center.

Integration demands are reduced with service oriented communications

Service oriented communications moves the contact center out of the realm of point integrations, where each new application requires work to connect it to each existing application. Within an SOA construct, a new application consumes the published communication services of the existing contact center applications. Once a communication service is published, or *exposed*, it can be invoked from anywhere in the enterprise. The power of SOA comes from flexibility and ease of re-use, reduced programming time, and ease of reconfiguring to meet changing business needs.

SIP and SOA leverage ordinary IT skills for integration

In a more traditional contact center, deployment of more sophisticated contact center capabilities required expensive CTI middleware integration and specialized skills for design and use. The ability for SIP applications and SIP end points eliminates the complexity when compared to traditional CTI approaches In a SOA environment, the interfaces are ready to connect. The universe of integrators expands as the required skills become more common and are readily available in the IT department.

SIP is key to new, proactive customer services

In our earlier example of stock alerts, the price change triggered outbound contacts to the user's device of choice at the moment. SIP replaces multiple device addresses with a single logical user address that can be dynamically remapped to any communication device. When combined with presence and user preference information, this enables the contact center to reach customers quickly. The communication model changes from a device-centric focus to a user-centric focus.

SIP makes call-context integration possible

Two decades ago, CTI overcame the separation of telephony and computing, forcing them together via a screen pop. In a SIP network, the request to answer a call is linked to the data learned about the call and caller. SIP enables a contact center system to deliver, in one payload, the call and the data that defines its context.

A new degree of integration becomes possible with SIP, where data can be passed between systems in this way. An example is an interactive voice response system that takes an incoming call and passes it to an agent. Whatever information the IVR gathers about the caller and their reason for calling is delivered to the agent who answers the call. With SIP IVR software like Voice Portal, businesses can deploy rich SIP integration to carrier SIP solutions allowing self-service to handle routine calls. Calls and context are passed to the contact center only when the best agent or resource is available.

Presence makes event-driven communications a reality

An important part of SIP, presence, communicates a user's status to other interested parties before an actual communication session begins. In the context of contact centers, the benefits of presence are not limited to an individual agent. It can also apply to a resource, a device, a resident expert group, or a customer.

Our earlier example of a stock price notification shows how presence can be used to proactively contact customers based on event triggers. The fall in the stock price is an event that triggers different kinds of outbound contact to clients based on policy and presence. Policies dictate whether the client wants to be contacted at home, at work, or at all. Availability information determines which methods of contact are available now for each client.

Presence and availability will also fundamentally change the way contact centers route communications, and are central to the strategy of engaging the rest of the enterprise along with the contact center in the customer service process.

Consider our earlier example of finding a resident expert. It is an example of a service that monitors the availability of groups of enterprise knowledge workers as an aggregated group. Instead of calling from desk to desk until finding an expert to consult, the agent asks for a resource and is connected with the most qualified and available expert.

Availability intelligence redefines work routing

Which agent should handle the next contact? The current routing technology can send work to available agents. It has no insight into what work makes the unavailable agent too busy to handle another contact simultaneously.

SIP-based contact centers will use policy-based routing to turn availability from a binary flag to infinite shades of gray. With information about the agent's activity, a SIP routing system can apply policies to judge whether it is more important for the agent to handle the new contact, or to continue their current activity.

SIP, presence, and current contact center investments

Contact centers have invested heavily in telephony equipment. It may be discomfiting to learn that SIP is coming and will bring changes.

There is, however, a transition strategy that SIP-enables existing equipment. Avaya uses this strategy to protect the infrastructure and application investments of its contact center customers.

In this two-pronged strategy, some pieces are SIP-ready, and others can be SIP-enabled. SIP Services for Interaction Center allows organizations to employ end-to-end SIP customer service capabilities alongside their existing TDM/IP agents. This approach allows businesses to continue to leverage contact routing rules, call recording, workforce management, and CRM applications while laying the foundation for SIP-based innovations like presence management, context delivery, resident expert applications, and policy-based routing. Avaya Modular Messaging and Voice Portal use SIP today, and Avaya IP Agent uses presence. Avaya Communication Manager can be SIP-enabled by adding software, after which Communication Manager provides a SIP solution without removing any equipment.

The business case for SIP and presence

Contact centers do not switch technologies simply for the conversation value at cocktail parties. SIP will need a strong business case to survive internal scrutiny. The journey to SIP and presence begins with the first step. Today, agents can use presence and availability to help find an expert and increase first-call resolutions.

SIP trunking is a likely second step. This decision often has a potential payback that not only covers the SIP trunking outlay, but projects a positive return on investment for the entire SIP infrastructure.

As more applications are available for SIP contact centers, more contact centers will find their own first step that provides the projected payback needed to justify the switch to SIP.

SIP application availability

Which comes first, the applications, or the infrastructure? There often is a gap between the infrastructure and the applications that make it useful, and that gap creates a chicken-and-egg situation for contact centers.

As is often the case, the infrastructure must come first, and the applications will follow. IP telephony would not have revolutionized enterprise communications had it not been for the global Internet infrastructure and rise of the Internet protocol. When television cable networks were deployed, there were but a few broadcasters — not today's 500 channels — of programming.

The basic SIP infrastructure is here today, and more SIP-based contact center applications are coming. The first step toward leveraging their value is to prepare the infrastructure to utilize them.

Section 5: The Path to the Intelligent Contact Center

Service-oriented architecture and session initiation protocol are revolutionary technologies that promise to transform communications. Many enterprise IT departments have begun deploying SOA, although the contact center may be one of the later enterprise functions to migrate that way. Eventually, contact centers will follow IT to SOA, with the indispensable help of SIP technologies. At some point in the next five years, service oriented communications and SIP capabilities will be widely available and realistic for contact centers.

This step will enable the development of business applications that leverage the contact center's sophisticated communications services. The need for responsiveness to change, and lower costs for computer-telephony integrations, will drive this transformation.

It would be an oversimplification to think of SOA and SIP simply as replacements for routing or CTI. Their value comes not from what existing telephony or contact center functionality they can replace, but from the unique capabilities they can add and make available on the enterprise communications network.

Quantum leap, without leap of faith

The ultimate vision of SOA and SIP is one of decentralized communications — an infrastructure leap of faith — a complete and irreversible switch away from today's technologies. Seldom in the history of technology has change happened in this way.

Revolutionary change can, however, lead to quantum leaps in productivity and service. The reasonable approach for a responsible enterprise is to plan steps toward SOA and SIP, and to take those steps at the appropriate times — early enough to gain a competitive edge with these new technologies, but not so early as to risk the health of the enterprise.

Standards are evolving for SIP; while there are some early SIP applications for contact centers, the technology is still nascent.

Avaya is leading the industry toward a stable future for SIP

SIP is a communications technology. Avaya takes seriously its role as a communications industry leader. Avaya sits on the major SIP standards boards, and is actively participating in shaping a realistic, lasting place for SIP in contact centers.

Contact centers have long trusted Avaya to lead their evolution. Avaya has a long-term vision for SIP, and is guiding Avaya contact centers toward it, with an identified migration path and business benefits at every step.

Above all, the Avaya vision involves protecting the significant infrastructure investments already made by Avaya contact centers.

Avaya has SIP-enabled and SIP-ready products today and is building new products with SIP in mind. This approach to migration takes advantage of the benefits of service oriented communications and SIP, while fully utilizing existing systems.

Your next steps

Share this paper with your peers. Start an active dialog on the benefits and issues of service oriented communications and SIP in your contact center. Work closely with Avaya to determine the steps you should take to make the most of these new technologies.

The move to SIP is not to be taken lightly. Take each step with care, and with the guidance of the industry's leading innovator and most trusted provider of contact center solutions.

Section 6: Learn More

For more information on how Avaya can take your enterprise communications from the sidelines to world class, contact your Avaya Client Executive or Avaya Authorized Business Partner, or visit us at **www.avaya.com/sip/**.

About Avaya

Avaya enables businesses to achieve superior results by designing, building and managing their communications infrastructure and solutions. For over one million businesses worldwide, including more than 90 percent of the FORTUNE 500®, Avaya embedded solutions help businesses enhance value, improve productivity and create competitive advantage by allowing people to be more productive and create more intelligent processes that satisfy customers.

For businesses large and small, Avaya is a world leader in secure, reliable IP telephony systems, communications applications and full life-cycle services. Driving the convergence of embedded voice and data communications with business applications, Avaya is distinguished by its combination of comprehensive, world-class products and services. Avaya helps customers across the globe leverage existing and new networks to achieve superior business results.

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