Intelligent Customer Routing: A New Architectural Approach to Intelligent Customer Service

Moving Beyond “Flatten, Consolidate, Extend”
Leveraging SIP and Open Standards
Adoption of the “Flatten, Consolidate and Extend” approach has provided many businesses an effective communications model for globalizing, and extending reach and operations across the business.

Overview

In the early 2000s, Avaya formulated a significant methodology to deliver a new multi-site contact center model using IP Telephony, breaking the boundaries of distance and geography. Called “Flatten, Consolidate and Extend” (FCE), this paradigm delivers centralized business control and logic, with decentralized service delivery, centralizing the processing and application layer, yet understanding the need for a distributed agent workforce. This methodology follows the “consolidate where you can, distribute where you must” mantra, and delivers a significant reduction in total cost of ownership (TCO) in removing application silos, and return on investment (ROI) in Agent Utilization through virtualization.

Adoption of the “Flatten, Consolidate and Extend” approach has provided many businesses an effective communications model for globalizing, and extending reach and operations across the business. This flexibility provides process and operations returns on resource utilization and productivity, and extends IT a lower cost TCO in delivering their objectives of simplifying support and resiliency at the edge of the business, where your customer facing resources reside.

Today, flexibility, speed, and innovation are key management goals envisioned to deliver differentiated customer service that every business needs to grow and thrive. The task of providing a manageable and cost-effective way to deliver on those aspirations is expected even when business goals are not clear. These new realities are driving a contact center paradigm that takes a step beyond the FCE approach to deliver a more agile and adaptable framework that delivers a superior customer experience while dramatically simplifying applications integration and infrastructure.

Intelligent Customer Routing, coupled with FCE, folds new capabilities such as presence, collaboration and resource virtualization into the contact center. It also extends to parts of the enterprise where back office, branch or partner resources reside and impact business process latency in customer sales and service. The approach establishes a more effective framework for delivering customer service, with simplified integration between the various functions, layers, and applications found in a contact center operation. Open standards help to better utilize the wide range of communications technology and applications already deployed by your organization, removing redundant hardware, software and integrations that have been superseded by a lower cost approach.
**Intelligent Customer Routing**

For the last 20+ years, Avaya customers have invested in feature rich telephony and ACD capabilities to optimally route callers to the most able, least expensive, or most available agent. Today, the contact center is where business applications intersects communications infrastructure, and few other areas in the enterprise more deeply feel the revolutionary impact that SIP, VoiceXML and Web Services bring. These technologies and standards will forever change how Contact centers are architected, and provide unprecedented business value in very simple ways.

Avaya contact center customers need a solution that acts as a bridging architecture between past and future by addressing reuse of telephony software and end points, applications, agent selection, and routing configurations, as well as reporting. Organizations that have adopted IP Telephony need a solution that is consistent with their web-based, SOA strategies.

Avaya Intelligent Customer Routing improves customer service and acts as the bridge between the past and the future while addressing key management and IT needs by providing: 1. a more flexible, adaptable architecture, 2. the reuse of key contact center infrastructure, applications, configurations, and assets, and 3. reduced application integration and infrastructure ownership costs.

One of the keys to this approach is the movement of intelligent call treatment out in front of the call center switching fabric providing the ability to more accurately identify and verify customer needs, self-serve a large percentage of callers, and provide intelligent call treatment options to the remaining customers before transferring those who require live assisted service.

Companies benefit from Intelligent Customer Routing in multiple ways:

1. **Customer Experience** – Today’s customer demands a seamless interaction experience, and expects 24x7 availability, without regard to what platforms, applications, and integrations are involved to satisfy their needs. With Intelligent Customer Routing, cross-platform connectivity is delivered through its SIP and Services Oriented Architecture foundation. Management tools allow for more active monitoring and modification of a customer’s entire customer service experience.

2. **Service Differentiation** – Businesses are always looking for ways to inspire brand loyalty, generate word of mouth, and repeat business. Through the ability to provide applications that are presence aware (i.e. not offering an agent unless there is an agent available) and multimodal in nature (i.e. Video Wait treatments and Visual Menu hints) businesses can deliver on new applications not even possible within previous solution approaches.

3. **Total Cost of Ownership** – Saving money starts with procurement and application development and continues through operations, management, and maintenance elements. Avaya solutions bring added value like license pooling and dynamic license management to maximize uptime while also eliminating initial capital costs.

4. **Reusability and Flexibility** – Encapsulation of common business application elements through Web Services allows for integration with existing web applications environments and a Service Oriented Architecture.

5. **Resiliency and Fault Tolerance** – A multiplex redundant architecture and dynamic management of media servers provides assurance to businesses that their applications will always be up, in service, and providing value.

6. **Investment Protection** – Avaya preserves application and platform investments through open standards support while explicitly providing software platform licensing transfer and the ability to mix a hybrid of existing and new routing and self service applications concurrently.
Technology Building Blocks

SIP, Web services, VoiceXML and a number of other open standards and technologies provide a new framework of building blocks to re-think and optimize the architecture model.

Session Initiation Protocol (SIP)

SIP is an Internet protocol for establishing, manipulating, and managing communication sessions. Organizations today seek to lower operating requirements and simplify support by delivery of service through a common infrastructure while providing a platform for innovation. These requirements match perfectly with SIP as a protocol.

SIP features can be broken down into three primary areas of value: ubiquitous support of SIP and IP trunks, convergence of data with the communications channel as a replacement for computer telephony integration (CTI), and support for new classes of service applications like presence and video.

1. Ubiquitous network support - As more enterprise vendors and service providers have driven solutions into a SIP solution set, procurement, access and operational costs have dropped. Within Intelligent Customer Routing, native support for SIP delivers the following benefits:
   — Integration to service provider SIP trunks without need for traditional switched circuit resources.
   — Integration with multiple SIP endpoints and communication solutions is ensured as all major vendors adopt interoperability standards.

2. Convergence of data and communications channels - The ability to pass data from one endpoint to another in a communication application, whether from IVR to agent (“Please enter your account number”… “What is your account number?”), or agent to agent, has been hampered by CTI complexity and cost. SIP inherently supports convergence between voice and data channels as the SIP data and voice channels are one and the same. Within a SIP-aware network, every device, every service, and every resource is accessible and usable within a solution. This delivers the following advantages:
   — Ease of deployment: CTI deployments have demanded a separate data network and integration points between computers and telephony, meaning additional planning and cost. With SIP, the telephony network is the data network.
   — Availability: Data passed from self-service (account number, account balance, and other arbitrary data) to other SIP elements (Agent Desktop or other application) is always available. Avaya supports inserting arbitrary data into the SIP session so other SIP endpoints can access and use this data.
   — Reliability and cost: SIP promises to eliminate expensive service provider services for multi call center data infrastructures and the associated unreliability and ongoing costs.
3. **New applications** - The promise of SIP extends beyond cost and integration simplicity to provide a basis for new media types and presence-based services.

— SIP provides for not only real-time voice, but also data which can be text, images, video as well as complex location-based video content or presence-aware based data. Now, streaming video content and presence-aware content can be delivered allowing a user to be able to see rich video content driven by a speech interface.

— Presence is an exciting new capability supported by SIP. Now any SIP user or application can express his, her (or its) availability. Traditionally provided by detailed understanding of agents state within a call center, presence and availability can be combined to create new ways of servicing end users and applications. Through SIP presence, end customers will spend less time waiting to get the right answer for their question.

**VoiceXML, CCXML, SOA and Web Services**

In recent years, a set of standards have emerged for integrated voice response (IVR) and speech environments that address the use and reuse of self service applications in a web-based IT infrastructure. VoiceXML and related standards describe a way for systems to interact with end users, while Java technologies have been adopted to speed integration and support of business logic. Increasingly, IT owners have settled on these standards complimented by best practices and expertise from integration experts to create new solutions. Some of the most obvious advantages to these solution sets are:

- Consistently managed and administered application environments
- Common skill sets and tools for developing and maintaining applications
- Less expensive application environments as “vendor lock” is removed
- Common business logic and integration environments
- Greater application sophistication as enterprise applications are directly integrated into self-service

Organizations increasingly require use of Service Oriented Architecture (SOA) best practices. Web services that may include self-serve functionality, for example, a Web service which interacts with an end user to collect identifying information like an account number, may integrate to services that include people like a subject matter expert who will be researching issues related to the provided account.

Intelligent Customer Routing brings a unique value proposition by adopting the above standards and more including:

- Web standards like VoiceXML that separate access (via software-based media processing) from presentation (through optional Java-based software frameworks) from business integration and data access.
• Standards-based network management and operational systems, including roles-based access control, thin client access, and network protocols like SNMP.

• SOA design for data integration, exposure of reusable services, and management capabilities.

• Standards-based design and development practices by supporting an Eclipse-based Integrated Development Environment (IDE)

With an open standards foundation, IT management can be assured that investments made in customer service applications will be less costly in time and specialized resources and more reusable and adaptable as business and customer requirements change in the future.

Solution Architecture

Intelligent Customer Routing leverages standards, best practices, and Avaya expertise to deliver a simple and adaptable approach to intelligent call routing. Let’s take a look at the solution components and a sample call flow.

Key Solution Components

• Avaya or 3rd Party SIP Trunks or Gateways

  SIP Trunks provide Voice over IP streams while SIP Gateways perform TDM-to-IP/SIP conversion. Typically, these solutions provide for high density interfaces (DS3 or OC3). Gateway solutions include Avaya’s G860 High Density SIP Gateway and partner provider NMS with its Vision Media Gateway.

• Avaya SIP Enablement Services

  Avaya SIP Enablement Services (SES) creates a communication services layer within the Avaya Communications Architecture that mediates between Avaya MultiVantage applications and a wide range of standards-based user agents, web-based applications, and communications devices. The main function of SES is to resolve the SIP Invite messages and route calls to the appropriate destination. These services combine the standard functions of a SIP proxy/registrar server with SIP trunking support and duplicated server features to create a highly scalable, highly reliable SIP communications network.

• Avaya Communication Manager

  Intelligent Customer Routing leverages SIP-based Communication Manager ACD resources, with the scalability and robustness that has characterized Avaya Call Center software over the years. In Intelligent Customer Routing, Communication Manager-based systems do not terminate traditional TDM interfaces, dramatically condensing the traditional TDM footprint. The hardware requirements are focused on queuing and media services needs like conference calls, monitoring calls, and remaining analog or digital terminations. For typical calls, the IP media does not pass through Communication Manager ports, but instead moves directly from the SIP Gateway to the relevant agent. In these cases the potential of infrastructure consolidation can be significant.

• Avaya Voice Portal

  Avaya Voice Portal terminates SIP signaling and VoIP media as well as provides speech and touch-tone self service applications to callers. Voice Portal includes a CCXML/VoiceXML Voice Browser that reads and interprets the instructions provided by application servers through standards-based CCXML and VoiceXML documents.

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Voice Portal is also responsible for call routing in the SIP environment. Using non-proprietary CCXML scripts, the application can look at the call and segmentation information in order to define where to route it – which can be a specific ACD node, a VoiceXML application or an outsourcer. Routing information may be stored in databases or may be accessed through Web Services calls that easily integrate enterprise data into the decision making process (for instance CRM, ERP, or other data).

Routing scripts are written in a non-proprietary language using standard CCXML development environments. For Voice Portal, this may be done via the Eclipse-based Dialog Designer application. By using Web Services to obtain external information, the CCXML application is shielded from proprietary access methods and is abstracted from how these external systems are configured.

- Intelligent Customer Routing Application

A customized intelligent customer routing Web service application is used by Voice Portal once it is determined that a caller needs to speak with a live representative. A Voice Portal VoiceXML script communicates with Avaya Communication Manager routing logic to determine the best destination based agent skill/queue expected wait time. These algorithms continually update information to the best routing capabilities. Once routing decisions are made, callers may be treated with further self-service applications at Voice Portal while awaiting a live-agent.

- Additional Components

Additional components include a CCXML/VoiceXML application server, agent desktop application server, and the agent desktop application. The CCXML/VoiceXML Application Server hosts the CCXML and VoiceXML documents that are accessed by the voice browser. The agent desktop application server hosts the agent desktop application. The agent desktop application supports a multitude of functions including: ACD controls, displaying SIP Header information, Web Services access to read/write to enterprise data repositories, SIP presence status and external SIP service integration, and optional media termination (in case no phone is used).

Sample Call Flow

The following steps through an example incoming call flow:

1. Customer dials the enterprise – call is routed through PSTN network or call is routed by a SIP Service Provider directly through the SES server and to the Voice Portal.

2. When Voice Portal receives call, it creates a Universal Call ID (UCID) for each call, to be used for reporting.

3. Caller segmentation and self service applications are executed on Voice Portal, with optional data directed routing information gathered from external routing rules and policies.


5. The Intelligent Customer Routing application runs in the background, managing best services routing (BSR) polling of available ACDs and responding to route requests. The routing application returns the “best” ACD route back to the VoiceXML application.

6. Voice Portal adds call context data to the SIP Headers sent to Communication Manager.

7. Call queues on Communication Manager while Voice Portal continues to provide traditional queuing or self service treatment. Thus, the media remains at Voice Portal until agent is available. This approach has potential to create significant network transportation cost savings in scenarios like agent off shoring.

8. When agent becomes available, SIP context data is popped to agent’s client, the Voice Portal script is terminated, and call or media is connected to the agent on Communication Manager.

Solution Evolution

Avaya is continuously exploring new ways of leveraging the latest best practices and technologies to further help organizations achieve their customer service, business, and IT objectives. Multimodal media services, predictive self service, and resident expert approaches are all more attainable with SIP than were possible with a more traditional approach.
Once all circuit switch components migrate to SIP, the customer service infrastructure fundamentally becomes a set of applications running on industry standard servers. Media services for queuing and conference are provided by software-based media processing resources which communicate directly to a SIP facility. These media processing resources can be part of Voice Portal tightly integrated with the agent state control mechanism. Thus this type of approach provides for true interoperability and openness.

On the near term horizon for some businesses is use of multimedia. Organizations are looking to ensure new media services - Instant Messaging, peer-to-peer VoIP, and video/voice services - use the same intelligent routing logic as the contact center. They also want to make it easy to bring in other expert enterprise resources in line to support delivery of customer service. SIP makes the promise of a universal contact center – with e-mail, chat, and other media types – much simpler to implement and operate across the enterprise.

Another key area is predictive treatment and self-service. Avaya routing services like Avaya Business Advocate are predictive in nature, taking information about the caller identity and caller intent and matching this with agent skills and availability to continually refine predictions of not only who a call should be routed to, but how long will it take and at what service level. With Intelligent Customer Routing, this information can be used to better optimize callers’ experiences in queue. A prime example of this is what we have termed predictive treatment and predictive self-service.

In predictive treatment, caller information and past history are used to present information to the caller while in queue to better inform and prepare the caller for the assisted service portion of the customer experience. This may include presenting tailored marketing messages with actions which allow the customer to find additional information, all the while remaining in queue.

Predictive self-service extends this by using predictive metrics (such as expected wait time) to select a transactional self-service application which is designed to achieve a particular goal ahead of connection to the agent. For instance, an expected wait time of 30 seconds will trigger an application which simply collects an account ID and a confirmation of PIN. This information is then sent to the agent on connection. However, the same application with an expected wait time of 5 minutes will trigger a more sophisticated application which may extend beyond the simple identification application and can add additional call triage and basic self-service diagnostics, all while the caller waits in queue.

Finally, organizations are looking to involve more than just the frontline agents in better servicing customer needs. An emerging enterprise customer service approach is Resident Expert. Resident Experts are not agents in the contact center but rather they are other employees with subject matter expertise in all the various enterprise functions and roles that have an impact on a customer transaction or experience. The challenge of involving enterprise knowledge workers and people in a call flow process is that they are not easily identifiable as busy or available as are agents. In a sense, they are always busy – on calls, e-mails or meetings. The routing decisions have to be changed from being based solely on resource availability (leveraging SIP presence information) but as well as whether the person’s current activity can be interrupted.

Intelligent Customer Routing moves intelligent, integrated self service resources in front of the enterprise establishing a foundation for future evolution. With full and direct access to caller information and history, enterprise data and applications, full knowledge of available agent and knowledge worker availability and expertise, concepts like Resident Expert can be more readily executed.

Business and IT Impact

Significant ROI benefits can result from the Intelligent Customer Routing approach. The model radically simplifies applications infrastructure and support, and drives economies of scale while increasing organizational agility.
The following highlights areas of impact to business/customer service and IT that organizations when considering Avaya Intelligent Customer Routing.

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<thead>
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<th>Business and Customer Service Impact</th>
<th>IT Impact</th>
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<td>• Dramatic reduction in trunking real estate and licensing, leveraging high density trunking SIP gateways and unique Voice Portal in front architecture</td>
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<td>• Enables single global customer service operation with optimal levels of agent occupancy</td>
<td>• Consolidates trunking and application ports achieving better economies of scale — further cost reductions possible using SIP trunks</td>
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<td>• Improves operational flexibility and provides faster response to new customer and market demands</td>
<td>• Reduces software, hardware acquisition, management, and maintenance</td>
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<td>• Improves customer service experience and operational visibility across touch points and multi-site operations</td>
<td>• Establishes a common, standards based environment for call and media segmentation, self service, opt-out segmentation, and routing logic</td>
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<td>• Improves Avaya contact center infrastructure asset utilization, lowers support costs, centralizes management and administration</td>
<td>• Encapsulates common business applications through Web Services allowing integration with existing web applications and Service Oriented Architectures</td>
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**Conclusion**

New technology and changing business drivers are leading organizations to take the next step in open standards architectures. Intelligent Customer Routing facilitates new intelligent customer service operating models delivering more consistent, satisfying customer experiences and simplifies applications and network infrastructure, removing significant operating expenses from an enterprise.

**Learn More**

For more on how Avaya can take your enterprise from where it is to where it can be, contact your Avaya Client Executive, Authorized Avaya BusinessPartner, or visit us at www.avaya.com.

**AVAYA INTELLIGENT COMMUNICATIONS**

As the leader in IP telephony, Avaya sees the “manifest destiny” of intelligent communications as inevitable: the expansion across the enterprise of communications technologies and applications delivering singular and compound value.

Avaya has and will continue to invest heavily in software research and development to continue to further expand the frontiers of intelligent communications. Nowhere is the trust in Avaya’s technology more apparent than in the independent software development community: 4,000 software vendors are currently writing to the Avaya platform, comprised of more than 16,000 developers. In addition, Avaya’s support for multi-vendor solutions, such as its rich integrations with Microsoft and IBM, enable organizations to leverage investments already made and have a choice in the business applications they most need to prosper.

Reliability, scalability, security are the bedrock attributes that Avaya will never compromise. In addition, Avaya’s adherence to open standards means that enterprises can adopt other technologies crucial to its operations that work in concert with Avaya’s complete and innovative solutions. Simplicity is built-in, whether at the infrastructure or the desktop, within the network or for the individual user, making certain Avaya’s innovations are equally available, manageable and usable.

Avaya is helping customers realize their vision of a reinvented workplace by delivering on the promise of intelligent communications. The newest communications revolution has begun and Avaya is transforming business and changing lives.