

Building Blocks For Converged Applications

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Open systems and presence capabilities will change how business is done.

We've been hearing about convergence for a long, long time, and much of it has centered around specific technologies—switches, routers, PBXs, etc. But the long-term importance of convergence at the physical layer is that it enables convergence between communications applications, like voice calling, voice mail, email and instant messaging (IM), and business applications, like workgroup collaboration, customer relationship management (CRM) and other back-office functions.

So, for example, via a combination of “presence” and network integration, users need not be tied to a desktop PC to access email; instead, a text-to-speech application can serve notice that an urgent email has arrived, and it will be able to read that message to the user over a wireless or wireline phone. Or the user can convey to the network that he/she doesn't want to be disturbed, and so incoming “email calls” can be routed to a personal digital assistant (PDA) and email server.

This shift has significant implications for the enterprise, but it won't occur overnight. This article examines some of the key technology building blocks that will comprise a new “logical architectural” model, summarize vendor progress and look at three examples of how this evolution could change how an enterprise operates.

Building Blocks

The piece-parts for applications convergence are being assembled, and include the following:

■ **Voice over IP (VOIP):** VOIP has moved beyond the experimental stage; for most enterprises, it's a question of when, not if, they'll make the transition from legacy TDM systems. VOIP can now provide nearly all calling services provided by traditional phone networks, and the feature set is becoming sufficiently robust so voice calls can be treated by the network architecture as an integrated application, like any other IP-transported application.

■ **Unified Messaging:** The initial phase of unified messaging (voice, data, fax) involved creating a portal, typically on a PC screen, so voice mail could be heard via “click to listen” icon on the screen. Of course, users also could opt to use their phones and dial into a voice mail system.

The next step will be to integrate the advances being made in speech-to-text and text-to-speech technologies along with access to/from mobile devices into the unified messaging system. Text-to-speech has reached the point where email can either be “read” to a user or displayed on a mobile phone screen or wireless PDA. By contrast, while speech-to-text applications—translating a voice message into email—are available, many are not yet ready for prime time.

■ **Computer Telephony Integration (CTI):** CTI has been in the market for more than a decade, but its high cost and complexity have limited its deployment primarily to call centers, where the cost-justification can be measured in hard dollars. However, VOIP and converged networks lower many of CTI's historical barriers, enabling the benefits to be extended to other business units.

For example, let's assume a customer calls a call center equipped with CTI. Caller ID information could identify the caller as a customer with a delinquent account, and then route the call directly to the collections department. With CTI extended to that department, either caller ID or an IVR-prompt can be used to identify the caller, and that information could be combined with a CRM application pop-up screen with a “delinquent account status” to the customer service representative in the collections department.

As noted, IP-telephony and converged networks are important to next-gen CTI, but the real starting point is a detailed definition of business rules and processes. According to David Kiker, general manager of e-business servers at Microsoft, “The ability to create unified business processes that span an enterprise and extend to partners and customers is essential to creating a connected business.”

■ **XML:** The Extensible Markup Language (XML) is a family of rules for designing text formats into a specific data structure. XML is platform-independent, and it has been designed for interoperability with other Web-specific protocols like HTML. It makes it easier for a computer to generate and read data, and to ensure that the data structure is unambiguous.

“Non-communications” systems suppliers, like Siebel, PeopleSoft and SAP, have had XML interfaces available for a long time, but within the past year, Alcatel, Avaya, Cisco, Mitel, Nortel and Siemens have made a noticeable shift to open standards, including XML, for their communications systems software. This reduces the time

required (in some cases by an order of magnitude) to integrate a PBX, CTI, unified messaging and other business applications like document collaboration. Each of these vendors either has or soon will publish XML interface specifications to their communications systems, which will expand the pool of third-party developers who can offer applications integration.

■ **VXML:** The goal of VoiceXML (VXML) is to bring the advantages of Web-based development and content delivery to IVR applications. It is designed to create audio dialogs that allow speech or DTMF key tones to be heard, understood and acted upon by an application, and it provides applications with a means to “talk back” with pre-recorded or synthesized speech.

■ **SALT:** Like VXML, Speech Application Language Tags (SALT) uses existing markup languages like XML to provide telephony-enabled access to information, applications and Web services from PCs, telephones, tablet PCs and wireless PDAs. However, SALT differs from VXML in that users can interact with both the Web and voice applications concurrently. Introduced about 18 months ago by Microsoft and others, acceptance of SALT seems to be growing, but it has yet to gain universal vendor adoption (see *BCR*, May 2002, pp. 54–59).

■ **SIP and Presence:** Session Initiation Protocol (SIP) is a signaling protocol used to create IP sessions, and it has been adopted as a leading standard for signaling voice applications across IP. It also can provide signaling both for and between other applications—e.g., a user can use SIP to initiate a voice call from an IM application.

Another key attribute is SIP’s support of “presence,” which is best exemplified by instant messaging (IM). While IM began in the consumer market, it is spreading into the enterprise, either informally—a “buddy list” shows who is logged onto their workstations—or formally—as a way for colleagues to indicate whether they’re available and how they’re best reached (e.g., phone, email, etc.).

The concept of presence can also be extended beyond IM to any communications system, including wireline or wireless phones. Using presence registrars, users can prescribe how they wish to be found (or not found), and the network intelligence will combine user preferences with network presence and route the caller appropriately. This technique facilitates real-time communications—directing how and where the called party wishes to be found.

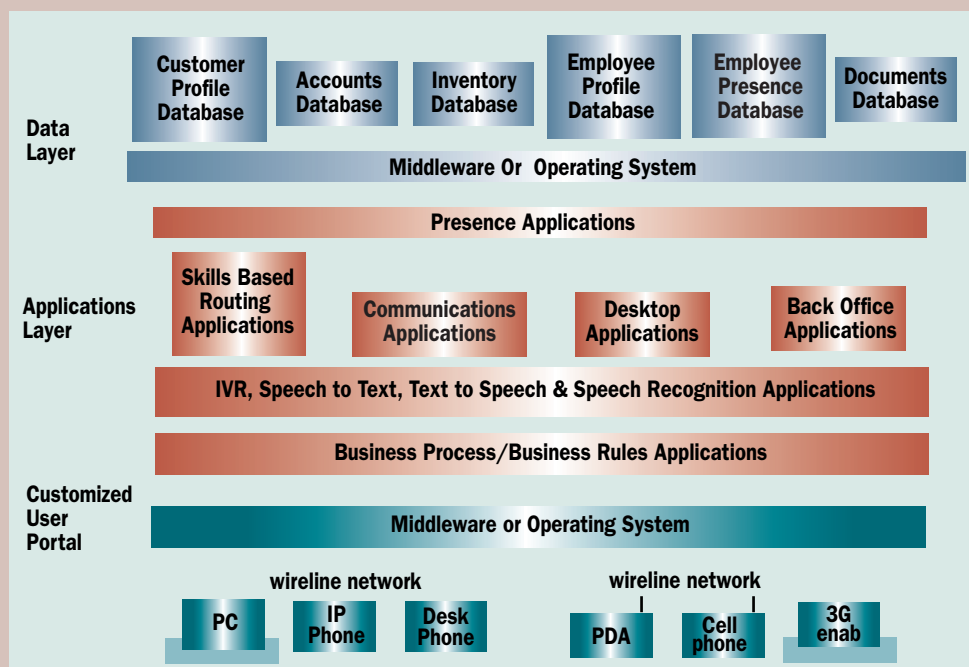
Emerging Architecture Model

Based on these evolving building blocks, a new “logical enterprise” model for IT converged applications becomes possible (Figure 1). It has three layers—data layer, applications layer and customized user portal layer.

Some pieces of this model can be built today, and important elements—especially those between the applications layer and the customized user portal layer—will become available from vendors like Alcatel, Nortel and Siemens over the next few months. In addition, a number of vendors—e.g., Alcatel, Avaya, Mitel and Cisco—already support SIP, and Cisco provides developer support for XML and VXML with its IOS software release

The new architecture combines familiar systems and emerging standards

FIGURE 1 Applications Convergence Logical Model





Data storage will become more application-independent

12.2. Avaya offers integration of XML and VXML along with its call center, CRM and IVR product suites. Still, it will be several years before the entire model can be fully deployed, and even then, some heavy-duty systems integration is likely to be required.

Today, most enterprises rely on server-based applications to store the data shown in the model's independent databases. The disadvantage of this approach is that data is stored according to application, and thus the same data may be stored by multiple applications. While this redundant data is costly, in today's world it's still less expensive than the systems integration that is needed to provide the multiple applications with common data access.

That will change, however, as XML, VXML and SALT mature, and it becomes more cost-effective for multiple applications to access a common set of data. In short, data storage will become increasingly "application independent."

At the bottom of Figure 1, the customized user portal has three noteworthy attributes. First, SIP-based presence implementations, some of which are commercially available, allow the network to understand where the user is "logged in," and the network can use that profile to route email, voice calls, faxes or videoconferences to the appropriate device. The unified messaging logic provides the building block and interacts with the employee presence capability.

Second, the network middleware or operating system can forward communications in the appropriate "format" to send a call or information to whatever device(s) the user has "live" on the network. For example, someone traveling may wish to have email read (by a text-to-speech application) over a cell phone, while the original text is stored on an email server. This capability is currently being demonstrated but is not in general availability.

Third, the user's portal can be customized to be device-appropriate in three ways: specific to the user's presence, specific to the calling party (either another employee or customer profile) and, using skills-based routing, specific to the user's skills or job function. The first and second techniques are available for demonstration but not commercially available; the skills-based routing customization technique is still under development.

Where Vendors Stand

Alcatel, Avaya, Cisco, Microsoft, Nortel and Siemens are among the vendors implementing pieces of the new applications convergence model. Avaya and Cisco have commercial products that demonstrate some of the capabilities of this emerging architecture, and the other companies will have products during the 2H03.

"This technology shift allows us to rethink our approach to communications in terms of interactions between people and resources," explained Chris Vuillaume, senior director at Alcatel's com-

munication server business unit. "We've elected to design applications that are independent from a given platform or operating system. This will enable Alcatel and third-party developers to create new services—merging voice, Web, mobile and instant messaging. The shift integrates real-time communications and e-business.

"Open, Web-based service API paths are a disruptive technology that, based on IP convergence, provides us with a new programming model and an enormous developer base," Vuillaume concluded. For example, Vuillaume said, it would take only a few minutes to program a hotel PBX to offer a new wake-up service "hot key" on the room phone using a simple, 19-line XML code.

Ed Simnett, Microsoft's lead product manager for real-time communications, added, "Presence fundamentally changes the way people do business.... People [can] do more with less to maximize communications and decisions."

With Microsoft's approach, when an icon appears, "You know you can get hold of the person," says Simnett, but he went on to add that this is not just about person-to-person communications. "We have integrated with the SQL notification server. It watches for events, then can send messages via SMS [short messaging service], email and instant messaging. We have third-party developers looking at this as a basis for integration with other applications."

Nortel calls its initiative in this area, "Engaged Applications." Vickie Marvich, director, customer contact and self-service marketing explained that these applications "...will enable enterprises to anticipate their customers' needs and deliver time-sensitive information to them in the media that they are using at the time."

At Siemens, Mark Straton, VP marketing explained, "Studies show that users receive 64 times as much information as they did in 1970, and that's the problem we're addressing. Presence, Web services and SALT are coming together into a common, easy-to-use, multimedia wireless or wireline environment. This [architecture] gives users control of the amount of information they get in their own priority."

Real-Time Applications

This emerging architecture enables diverse applications. For example, at BCR's VoiceCon 2003 Conference, Nortel showed a video of how the elements come together to help a traveler whose flight has been canceled. When that happens today, a passenger's only option is to queue up at a counter, hope and wait.

In Nortel's vision, when a flight is cancelled, the reservation system will notify all available agents—be they in a call center or the back office. Multiple agents will then begin the rebooking process in priority order of frequent-flyer status as indicated on the passenger's profile. Once each agent has secured other flight options, the airline

will contact the passenger via phone, PDA and/or communications portal as prescribed by the passenger's presence profile. The customer would then rebook, using IVR and speech recognition or via text (IM, SMS or email), and also have an option to talk with an agent.

In another example, Alcatel shows how a hospital can use a secure wireless PDA interface to link the appointments system, medical records and doctors. Doctors would use the system to send and retrieve patient information, while presence technology and skills-based routing are used to locate the appropriate doctor(s) that can best serve the patient's needs.

In a third example, Siemens facilitates work-group collaboration via an integrated communications portal and its partnership with Webex. The Siemens portal can access office documents that can then be shared and discussed real-time, by sending an instant message or a click-to-conference. While Webex is a first step, the collaboration model can be expanded to other documents that require collaboration, like software programs and computer-aided design (CAD) documents.

Conclusion

VOIP is the first of many steps that will ultimately change communication between an enterprise

and its employees, customers, suppliers and business partners. In the emerging applications convergence model, voice is an application—albeit a complex one.

SIP-based presence will enable users to be reached in whatever way they choose, while protocols like XML and VXML, combined with technologies like speech-to-text and text-to-speech, will interact with legacy unified messaging and call-center programs. Enterprise communications applications will, finally, integrate with end-user and business applications□



Presence will enable users to be reached in whatever way they choose

Companies Mentioned In This Article

Alcatel (www.alcatel.com)
Avaya (www.avaya.com)
Cisco (www.cisco.com)
Microsoft (www.microsoft.com)
Mitel (www.mitel.com)
Nortel Networks (www.nortelnetworks.com)
SAP (www.sap.com)
Siebel (www.siebel.com)
PeopleSoft (www.peoplesoft.com)
Siemens (www.icn.siemens.com)