CASE STUDY

Telecommucations
Java & Intelligent Networks

Alcatel USA

JAVA-BASED COMPONENT ARCHITECTURE PROVIDES THE FOUNDATION FOR MANAGING INTELLIGENT NETWORKS FROM VIRTUALLY ANY LOCATION

Highlights

Company

Alcatel USA

Business Challenge

Promote convergence of telephone, wireless and Internet networks by dramatically improving the tools for creating and deploying new network services.

Solutions

Java-accessible Alcatel Intelligent Network platform and services. Make the power of Intelligent Network services accessible over the Internet.

Hardware/Software

- **Sun Ultra1's and 2's**
- **JDK 1.1.6 and 1.2 beta, including JavaBeans components, Java Foundation Classes 1.1, Java Plug-in, Java RMI**
- **Inprise's VisiBroker ORB**
- **Sybase 11 database with Sybase JConnect JDBC driver**
- **Rational Rose - OO analysis and modeling**

Key Business Results

- **Enabled service convergence of telephone, wireless and Internet IP**
- **Simplified development and deployment of new Intelligent Network services**
- **Enabled faster modification of services from a broader range of Java enabled devices**

OVERVIEW

Of the many topics under heated discussion in the communications industry, one is beginning to glow white hot: the rapid convergence of services and technologies from previously disparate networks - telephone, wireless and Internet - to a single manageable network. Through its groundbreaking work with Sun Microsystems and Strategic Technology Resources (STR), a Sun Authorized Java Center, Alcatel USA is leading the way in defining a new era of Intelligent Networks. By developing a highly advanced prototype using Java technology, Alcatel USA has become the first company to demonstrate that the invocation of advanced services on Intelligent Networks from any Java-enabled device is now about to become a reality. This new paradigm has vast and far reaching implications for the telecommunications industry. As part of its Intelligent Network product line, Alcatel USA has leveraged the power of the Java platform to create a new model that raises the bar for speed and ultra flexible service creation and deployment. The end result – faster time to market for new services, more flexible service provisioning without dedicated software, service invocation from almost anywhere, a powerful and agile competitive weapon and, of course, more satisfied customers.

BACKGROUND

The heart of a reliable telephone system, the switch, performs the function of connecting tens of thousands (or even millions) of callers to one another at blistering speeds. Historically, the writing of software that runs on these large switches to provide services - for example, 800 and call waiting - has been the exclusive work of programming masters. Certain specialists write programs with millions of lines of code that use the complex interface to the switch, while others write programs that perform extensive quality assurance testing.

In recent years, the role of the switch has been changing. With new Intelligent Networks (INs), service creation and management have been pulled off the switch and isolated to service creation environments (SCEs) and service management systems (SMSs). This separation from the underlying network structure is a major step toward the simplified creation and management of new services. Alcatel USA has been at the forefront of this trend since 1990 with its Alcatel Intelligent Network product set.

The Alcatel Intelligent Network product line provides state of the art tools for designing, implementing and testing IN service applications. Alcatel's IN platform accelerates service creation by providing developers with a core set of preb-

uilt service independent building blocks (SIBBs) and robust tools for service delivery and management. Alcatel USA helps customers differentiate themselves from competitors with a rapid application development toolkit that enables new services to be created quickly.

To further enhance these formidable IN improvements, the Alcatel Intelligent Network platform is about to undergo another evolution - one that will extend its power even further and in ways unimaginable just a few short years ago.

CONVERGENCE AND MARKET READINESS – THE EARLY VISION

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– Mark Peterson, Director of Product Management, Intelligent Networks, Alcatel USA

After a successful venture into the wireless market several years prior, Alcatel USA found that in many cases, companies in emerging markets were quite adept at deploying new technologies more readily than some entrenched telcos - which can have heavy investments in legacy technologies. Learning from past experience, and with a keen awareness of the rapidly expanding ISP (Internet Service Provider) market, the company identified a range of technology solutions that could be universally applied across all the major communications networks while still being accessible to ISPs, which are typically much smaller than telcos.

During this evaluative cycle Alcatel recognized the huge opportunities in the convergence of PSTN services (from telcos) and IP services (from ISPs). It was in the area between the networks that Alcatel USA could provide the technology to bring disparate networks together - and do so in ubiquitous fashion.

The final piece of Alcatel USA's vision snapped into place with the use of the Sun Microsystems' Java development platform. Why not, Alcatel posited, tap into Sun's experience in the ISP market, where it was already the dominant player, to help build a Java solution that could play across the targeted networks? "Our original vision was to leverage the service convergence theme in a big way," noted Mark Peterson, director of product management, Intelligent Networks at Alcatel USA. "We turned to Sun because of their leadership in Java technologies and the Internet space. As the definitive source for leading Java technologies, Sun really offered us the clarification and resources we needed for implementing our vision."

The company realized that Java presented several new opportunities in extending the services created with Intelligent Networks to a variety of devices, including personal digital assistants (PDAs), cellular phones, smart cards and set top boxes. "Wherever Java goes and wherever these Java devices go, you'll be able to invoke service logic," said Peterson. "Java can give our customers much easier access to a wide range of services."

Alcatel USA developers quickly designed a Java prototype to demonstrate how a Java-enabled Web browser could interface with the services created with Alcatel's Intelligent Networks. After some preliminary discussions with Sun, Alcatel USA was introduced to STR of Chicago, who was subsequently engaged to build upon the original prototype and define a more extensible architecture for creating a range of client interfaces to network services.

STRATEGIC BLUEPRINT

In its role as an Authorized Java Center, STR's primary mission was to assist in the development of Java-based application components that would be capable of accessing the Alcatel Intelligent Network services from a standard Web browser. From this perspective, Alcatel USA and STR were to refine and facilitate convergence between the existing Intelligent Network (IN) and Internet Protocol (IP) based services. Moving into the project, key project objectives for STR were:

- Formulate a Java-based strategy for creating client interfaces to new IN services.
- Design several prototype IN applications that demonstrate client accessibility to IN service logic execution.
- Develop a high-level component architecture for client interfaces that would ultimately allow for the creation and configuration of new service interfaces via visual tools.
- Implement and test prototype application front-end(s) that would support IN services. Integration testing would be performed on the entire system to ensure seamless end-to-end processing.

DEVELOPMENT

When STR first saw the Alcatel Intelligent Network service creation environment, the lights really came on. The creation environment was literally a drag and drop environment for creating new services. "As we started to see everything that was available from the Alcatel product, we understood our mission - give developers a comparable degree of flexibility in building applications that make use of that logic," said Larry Podmolik, chief technology officer at STR. "By using the power of the Java development platform and JavaBeans to build front-end applications, we could circumvent the need for hardcore programming and make the Alcatel toolkit available to a wider community of programmers."

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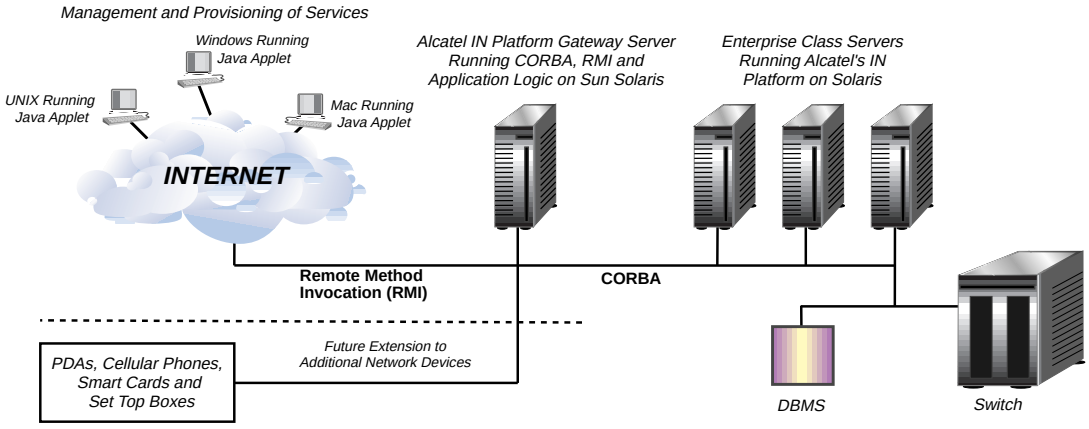

Alcatel's Java-Enabled Intelligent Network Platform

Viewed as a three-tier architecture, the front-end is a Java GUI applet that runs a service application. A middle tier (gateway) server acts as a translation point, serving the client applications, communicating with the Alcatel Intelligent Network server and reformulating

requests for the backend service engine. STR developers worked on the front end, worked jointly with Alcatel's developers in the middle tier, and Alcatel's developers handled the fundamental service logic in the pre-existing Alcatel Intelligent Network toolkit on the backend.

A closer view into the middle tier reveals a CORBA architecture, which was chosen for its ability to integrate with the Alcatel environment and leverage existing legacy systems. Other beneficial CORBA functionality included cross-platform interoperability and the capability to work with multiple languages including Java and C++. STR was deliberate in choosing off-the-shelf products wherever possible such as the VisiBroker ORB from Inprise. This approach allows for continuing improvements from future product releases while preserving the reasonable likelihood of backward compatibility.

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For integrating client applications within the middle tier, the team chose Java Remote Method Invocation (RMI), because it provides additional power and flexibility for Java-to-Java environments. In particular, the Alcatel architecture exploits RMI's ability to download Java bytecode on the fly, which enables the development of highly customized applications that are delivered incrementally across the network.

Developers used Rational Rose for object-oriented modeling, analysis and design. For development, the team used Sun's Java Development Kit 1.1.6 and 1.2 beta, Java Foundation Classes 1.1, and the Java Plug-in, which enabled the latest versions of Netscape and Internet Explorer to run the Java applets. JConnect JDBC links the system to the Sybase 11 database.

Four STR developers and four developers from Alcatel were engaged on site and remotely. The development workstations were of Sun Ultra 1's and Ultra 2's dual processor 250's, all with 128Mb RAM running Solaris 2.6.

RESULTS AND FUTURE

Attendees of the recent SUN ISP conference in San Francisco lauded Alcatel's technical prototype services. The three services presented by Alcatel were Web-800 service, Internet survey service and a time-based Dynamic DNS that redirects URL logins to different Web-servers based on time-of-day routing. "By creating an extensible Java-enabled front end, our customers (service providers) will benefit from having many more avenues for obtaining new subscribers for their IN/IP services," said Peterson.

Early experience with the current Alcatel Intelligent Network toolkit confirms that customers are able to get up, running and creating new services much more quickly. Today a customer can be trained in the current service creation environment (SCE) and be deploying new services within six weeks. In prior years, the same training and service creation work would have taken between four and five months. Beyond that, modifications to existing systems can now be rolled out in just a few days instead of months, a crucial advantage in a telecommunications market where new service offerings are the strategic competitive weapons. "By separating the functions of service creation, service management and service deployment from the switch, Alcatel offers ISPs a greatly simplified avenue for rapid application development," said Reza Nabavi, market development manager at Sun. When the Java-accessible version of the Alcatel Intelligent Network platform is released, third party developers will be able to create Intelligent Network applications that take advantage of its full range of services.

Another major benefit for Alcatel customers is the elimination of specialized, platform specific software previously necessary to invoke Intelligent Network services from different devices. Now, with Java-enabled devices, accessing the service control points that contain

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Alcatel Intelligent Network-created services, (whether through SS7 signaling in the wireline and wireless worlds, and IP in the Internet world), Alcatel customers need only consider one code base for implementing future service changes. Java and the Alcatel Intelligent Network platform make this all possible by providing component architecture standards that are open and extensible. “Service independent building blocks with JavaBeans now offer platform and architectural independence as well,” noted Nabavi.

As Sun continues to extend the Java platform (including standards such as Enterprise JavaBeans, which will help open up IN/IP service application development to more third parties), Alcatel USA will be leading the way in the communications industry. “We wanted to make sure we kept the largest range of options open for the future. the Java platform and other Sun technologies will help us to do just that,” said Peterson.

Alcatel USA

With its recent acquisition of DSC Communications Corp., Alcatel nearly doubles its U.S. presence to become a $3 billion entity. Alcatel USA’s integrated network solutions support voice, data and broadband services, such as intelligent network, wireless and switched digital video applications. Alcatel USA provides solutions and services to operators, service providers, enterprises and consumers, ranging from backbone networks to users’ terminals, in over 130 countries.

Strategic Technology Resources (STR)

As an innovative consulting firm and a Sun Authorized Java Center, STR partners with its clients to deliver practical business solutions in fields such as telecommunications, finance and supply chain management. With years of experience in object, web and Java technologies, STR understands how to create next-generation systems while reducing risk and preserving investments in existing resources. STR is dedicated to providing superior planning, implementation and training services that give its clients a competitive edge and a clear path for growth. For more information about STR and its services, please visit the company’s web site at http://www.str.com.

Sun Microsystems

Since its inception in 1982, a singular vision, “The Network Is The Computer™”, has propelled Sun Microsystems, Inc. (NASDAQ: SUNW), to its position as a leading provider of high-quality hardware, software, and services for establishing enterprise-wide intranets and expanding the power of the Internet. With more than $9.5 billion in annual revenues, Sun can be found in more than 150 countries and on the World Wide Web at http://www.sun.com.

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