

**Lucent Technologies**  
Bell Labs Innovations



# **“JAVA Telephony API (JTAPI)”**

**A White Paper By Lucent Technologies**

**October 27, 1997**

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# 1. Introduction

## 1.1 Market Drivers

The Java\* Telephony API (JTAPI) is a recently introduced, portable, object-oriented Application Programming Interface for Java-based computer-telephony applications. JTAPI serves a broad audience, from call center application developers to Web page designers. JTAPI supports both first-party and third-party CTI application needs. The API is designed to make the development of simple applications easy, while providing the feature functionality necessary for advanced telephony applications.

The JTAPI specification debuted on October 1st, 1996 and the specification is in its third revision as of November, 1997. Lucent's support for JTAPI could not be more perfectly timed as many Chief Information Officers (CIO) and Information Technology (IT) managers are challenged with developing their enterprise-wide strategies for integrating computing and communications infrastructures. Certainly, the Internet and intranets are playing large roles in this arena.

With the growth of enterprise intranets, CIOs and IT managers are looking for ways to link telephones, computers and other devices with this common underlying enterprise infrastructure. A leading candidate for this infrastructure will most probably be the World Wide Web. The goals of JTAPI are to enable the integration of computing and telephony resources using the powerful Java programming language, thus enabling this integration through the Internet/intranet.

JTAPI is an Application Programming Interface for computer telephony applications in the Java environment. JTAPI applications will be able to run on any hardware/operating system platform that contains a Java virtual machine (VM) and a JTAPI-compliant telephony sub-system. It is important to note that the leading Web browsers, such as Microsoft\* Internet Explorer and Netscape Navigator\*, come with Java VMs (Virtual Machines), thus allowing JTAPI applets embedded in HTML pages to run whenever the page is viewed. This allows Internet and intranet JTAPI applications to run on virtually any platform, anywhere - including the emerging Network Computers.

By leveraging the inherent strengths of the Java platform, JTAPI delivers the SUN\* concept of "Write Once, Run Anywhere"\* to everyone from Web page designers to telephony service providers to enterprise call center application developers. As a result, platform-independent Java applications and applets can be created and deployed to provide telephony-enabled solutions for a wide range of environments including customer sales and service, Internet telephony, interactive voice response, directory services and PBX's.

JTAPI is still relatively new. As best as we know, Lucent Technologies has delivered the first *real* implementation of JTAPI to the marketplace. It appears that with the steam that Sun's Java has brewed up, JTAPI will be embraced by the industry. Undoubtedly, JTAPI will influence the call center industry in a big way just as CTI, IVR, the World Wide Web and Java have already impacted this dynamic marketplace known to be populated with "early adopters". Planned extensions to JTAPI to support interactive voice response (IVR) and other media capabilities will further contribute to call center opportunities.

This document provides a brief overview of JTAPI and Lucent Technologies' implementation of its JTAPI Provider, which became generally available on October 27, 1997. Additional information about our JTAPI implementation and PassageWay™ Telephony Services product can be found at this URL: <http://www.lucent.com/enterprise/passageway> .

Detailed information about the actual JTAPI reference specification can be found at this URL: <http://java.sun.com/products/jtapi/>.

## 1.2 History of JTAPI

The Java Telephony API specification represents the combined efforts of design teams from SUN\*, Lucent, Nortel\*, Novell\*, Intel\*, and IBM\*, operating under the direction of JavaSoft\*.

The Java Telephony API version 1.0 specification was released to the public on November 1, 1996. Version 1.1 was released to the public on February 1, 1997. As of November, 1997, the JTAPI specification is in its third revision, Version 1.3.

JavaSoft and the design team decided to contribute the JTAPI specification to the Enterprise Computer Telephony Forum (ECTF) in February, 1997. Lucent is an active member of ECTF, and is continuing to work within ECTF on this API. ECTF is evaluating JTAPI for use as a "Portable API" for CTI applications and is working to extend JTAPI with multimedia and voice processing capabilities.

This talented design team of key industry players is composed of solid CTI API experts. Several of these companies have already been very active in helping to develop the CTI API standards over the years. For example, Lucent and Novell were instrumental in the CSTA-based Telephony Services API (TSAPI) based upon third-party call control architecture. Meanwhile, Intel, along with Microsoft, developed the Telephony API (TAPI) designed with a first-party call control functionality in mind.

JTAPI does not compete with these other call control specifications directly. In the JTAPI model, industry vendors will implement their JTAPI classes by invoking telephony functionality using TSAPI, IBM's CallPath, TAPI, or any other standard or proprietary call control mechanism. The idea is that implementations of JTAPI will be available for existing computer-telephony integration platforms such as TSAPI, SunXTL\*, TAPI, and CallPath. Independent hardware vendors may choose to provide implementations of the Java Telephony API on top of their own proprietary hardware. It is also important to note that Java applications written using one of these JTAPI implementations (assuming the implementation adheres to the official specification) are portable across these CTI servers (e.g., TSAPI, CallPath, etc.) as well as being computing-platform (hardware and operating system) and telephone-system independent.

## 2. Overview of JTAPI

### 2.1 Why Java ?

Java is a new *object oriented, component-based* computer programming language. These architectural characteristics make programming easier and more flexible by supporting modular, reusable components (logical code with specific functions) that enable plug-and-play design. Furthermore, Java Beans component technology allows developers to use application builder tools to easily employ components to create new applications.

Computing hardware platform and operating system independence is achieved by the concept of a Java virtual machine (Java VM). A Java VM emulates a computer in software, allowing Java applications to execute and behave as if they were computers. SUN promotes the Java promise of "Write Once, Run Anywhere". As a result no modifications are needed to the application to run on different platforms. Applications are written once and can run on Windows\*, UNIX\*, OS/2\*, Macintosh\*, etc.

Java can be used to write programs that can be downloaded and executed on any computer. For example, you can create Java-based programs to make Web pages more interactive. Java applications can run standalone as Java programs or they can run inside a browser, such as Microsoft Internet Explorer and Netscape Navigator, as Java applets imbedded in Web pages.

In the marketplace, we are seeing a move towards Web-based computing, where networked personal computers are linked to server-based applications. Companies around the globe are providing access to enterprise applications and tools through Web Browsers on their enterprise intranets. This is in contrast to the 1980's trend of putting more and more applications resident on the desktop. Network computers and "thin clients" are emerging to fit this new architecture. The cost of the desktop throughout corporate enterprises and call centers can be lessened by such network computers. The network computer is typically configured with only a display, keyboard, processor, and some limited memory. It accesses network resources, making use of a centralized server for common administration and maintenance of shared applications. There can be significant cost savings associated with this model. Network computers are ideal for the call center agent where most of the activity is accessing and inputting information, with no need for intense number crunching or graphics creation.

## 2.2 Why JTAPI ?

The goals for JTAPI are simple: to create a Telephony API that allows applications to run on a variety of operating systems and hardware platforms, against a variety of telephony networks. Leveraging the promise of Java, JTAPI is portable in that it provides software, operating system and hardware platform independence. Applications can run on a wide range of configurations wherever Java run-time can be used. Applications can be written once with less work and re-writes required to run on multiple systems. This means faster time to market for application developers and investment protection for customers as they grow and change their computing environments.

JTAPI is intended to be a simple API as well. JTAPI still requires application developers to be knowledgeable about telephony, but reduces the amount of implementation-specific knowledge required to develop applications.

The “targets markets” for JTAPI ranges from the largest call centers, to desktop systems, to network computers, to “network telephones”. This range is the reason for the “core plus extensions” organization of JTAPI. (See the JTAPI specification for details about the set of modularly-designed JTAPI packages: Core API plus extensions).

JTAPI spans borders. It spans across first-party and third-party call control and it ultimately will span across call control and media control, blurring the distinction. The next release of the JTAPI specification will add a media extension package supporting robust IVR applications fully integrated with JTAPI call control. Lucent is a primary contributor to this effort.

JTAPI isn't “just another telephony API”. It was also designed to allow implementers to build on top of existing telephony APIs, such as TSAPI.

### **What is JTAPI?**

The Java Telephony API (JTAPI) specifies the standard telephony Application Programming Interface for computer-telephone applications running under Java. It defines a reusable set of call control objects that bring cross-platform and cross-implementation portability to telephony applications. It is a simple, modularly designed, object-oriented model that addresses a broad range of computer-telephony functions. Applications written using JTAPI are portable across various computer platforms and telephone systems — and even JTAPI implementations.

JTAPI is a specification that enables the integration of computing and telephony using the Java programming language. It is an industry specification that defines telephony objects that allow

application developers to write Java-based programs that integrate the telephony/voice systems with their data systems. Two important characteristics are:

- Operating System independent programming language (Java)
- Telephony Object definition (i.e., it is an Object Oriented Telephony API).

The JTAPI call model describes the objects that correspond to the actual entities in the real telephony world. Examples of such objects are the Provider, Call, Connection, Terminal connection, Terminal and Address. The Provider object represents the telephony sub-system. This could be a fax/voice card in a desktop computer where the JTAPI application is running on the desktop itself and controlling the fax/voice card. As an alternative, the Provider object could be a PBX switch or an ACD where the JTAPI application is running somewhere in the “network” and has access to the switch using CTI links. (This is the type of Provider that Lucent delivers in our implementation). Call objects are associated with a Provider object. Call objects represent telephone calls. Address objects represent telephone numbers. An Address object represents the logical endpoint of a call. Connection object represents the link between a Call object and an Address object. (For detailed information about the actual JTAPI reference specification, go to the JTAPI specification URL mentioned earlier).

Here are some of the JTAPI design goals:

- Support both third-party and first-party call control scenarios
- Compliment existing call control specifications and applications programming interfaces such as TSAPI and TAPI
- Simplicity, one of the basic themes of the Java language
- Compatibility with the Java Media framework (multimedia interoperability at application level)
- Extensibility of Core functionality (Core JTAPI API + extensions for call center, media, etc.)
- Support for wide variety of telephony applications and systems
- Support for all environments capable of running a Java Virtual Machine
- Support for call control, media stream management, physical phone control, and switch-specific communication



## **2.3 JTAPI, TSAPI and PassageWay: What are the differences?**

### **What is TSAPI?**

Jointly developed by Lucent Technologies and Novell, Telephony Services Application Programming Interface, (TSAPI) is an industry leading server-based CTI API specification that is widely supported by Application Providers, ISVs and PBX vendors worldwide.

Lucent and Novell each offer TSAPI-based products for the Netware\* platform. In addition, Lucent supports a TSAPI-based product for the Windows NT\* platform. This Windows NT product is the platform which Lucent is enhancing to support the JTAPI interface.

### **What is PassageWay Telephony Services? [**

PassageWay® Telephony Services is the Lucent Technologies product offering that enables application developers to implement CTI applications using the TSAPI standard. PassageWay Telephony Services runs on both the Windows NT and Netware environments. CTI applications are supported on the following “Client systems”: Windows 3.X, Windows 95\*, Windows NT, OS/2, UNIX, and Macintosh desktops. The new JTAPI application client library is the latest addition to this list of supported clients. Lucent offers this market-leading CTI product to end-user customers worldwide.

A reasonable question is, “Why is Lucent implementing JTAPI when they already co-developed TSAPI, the market leading Call Control API with industry partner Novell?”

Lucent is supporting this new Object-Oriented Java-based API in addition to its existing Procedural API (TSAPI), because customers and ISVs are saying they are migrating to the new object oriented programming environment for all of the design goals mentioned above. Lucent’s implementations of JTAPI and TSAPI do not compete with one another. By contrast, JTAPI extends TSAPI through it’s object orientated Java programming interface.

Another question might be, “What is Lucent’s plan to support the COM/DCOM environment and TAPI 3.0?” Lucent is actively working with Microsoft to understand their plans for TAPI 3.0. Lucent intends to continue to evaluate new programming technologies such as other object oriented and multimedia interfaces to meet customer needs. As other object-oriented CTI APIs are introduced in the marketplace, we will evaluate our customers’ needs and desires in our future product planning.

Does this mean that Lucent is moving away from TSAPI as a CTI API standard? Absolutely not! TSAPI is overwhelmingly successful in the marketplace, especially in key market segments such as Call Centers. Our goal is to protect our customers’ investments in Lucent products while providing them with a graceful evolution to new and emerging technologies , like object oriented programming and Internet CTI. Supporting a JTAPI-based client with PassageWay Telephony Services does just that.

### 3. Lucent's JTAPI Implementation

PassageWay Telephony Services is the Lucent Technologies product that enables application developers to implement CTI applications using the TSAPI specification. It runs on both the Windows NT and Netware environments. CTI applications are supported on the following "Client systems": Windows 3.X, Windows 95, Windows NT, OS/2, UNIX, and Macintosh desktops.

On February 26, 1997, Lucent Technologies announced support for the Java Telephony API (JTAPI) on their PassageWay Telephony Services product. This support is provided on the Windows NT version of PassageWay, and is available starting October 27, 1997.

The Lucent Technologies implementation of JTAPI on PassageWay provides a programming environment that may be used with any switch/PBX for which there is a Windows NT based TSAPI driver. Lucent provides the driver software (service provider code) for its DEFINITY® Enterprise Communications Server (ECS) G3 switch in the JTAPI product offering. Lucent also provides a DEFINITY® ECS G3 PBX simulator in the software developers kit (SDK), for application development and testing. An optional companion to the SDK is the actual DEFINITY ECS G3 driver code for application developers who have a G3 and wish to perform a live test of their application.<sup>1</sup>

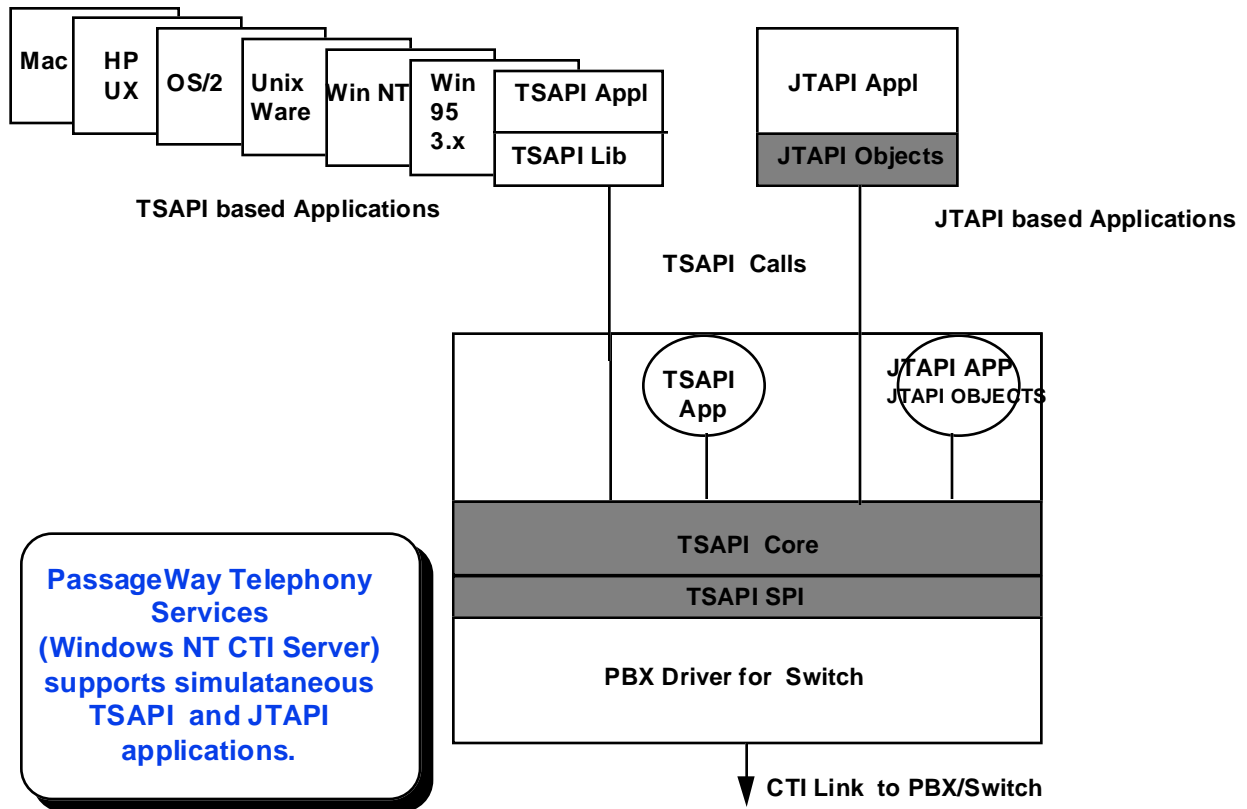
Our JTAPI implementation was designed so that a JTAPI application/applet can run either directly on the PassageWay CTI server platform that is performing the Call Control/CTI operations with the DEFINITY ECS, or on a remote client platform. To support this model, Lucent implemented a JTAPI client library which can be *pushed* onto the application client platform. This is the same model that we have used to support existing client platforms: Windows, OS/2, Unixware\*, etc. The new JTAPI application client library is the latest addition to this list of supported clients. Note: Both JTAPI and Win NT based applications can run either on a remote client platform or directly on the PassageWay CTI server platform.

An important design goal of our JTAPI implementation was to ensure that TSAPI-based applications and JTAPI-based applications could be supported concurrently by a common PassageWay CTI server. Our objective was to enable graceful migration to the new Object Oriented programming environments while protecting the customers' investments in both the CTI server and applications. The following Figure depicts our JTAPI implementation.

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<sup>1</sup> *Note:* If you are an application developer who is looking to develop a JTAPI based application that is interfacing to another type of service provider (non-PBX SPI, e.g., desktop fax/modem card), this Lucent SDK is not for you.

## JTAPI Implementation for TSAPI



### Benefits:

- Single CTI server supporting both the current TSAPI and new JTAPI simultaneously
- Customer's investment in Lucent's PassageWay CTI server is protected
- Graceful migration of applications (large investment protected) to Object Oriented APIs
- JTAPI supported by all PBX vendors who have written drivers for TSAPI (Windows NT)

## 4. Availability and Ordering Information

### When will JTAPI support be available?

Lucent's PassageWay Telephony Services product and software developers kit (SDK) supporting the JTAPI interface became available effective October 27, 1997. The SDK is intended to be used by ISVs and Application Developers to create their applications using the JTAPI interface.

### About the JTAPI SDK:

Included:

- TSAPI For Windows NT 4.0 (also supports NT 3.5.1)
- 17 user TSAPI License
- Client libraries for JTAPI, Windows 3.x, Windows NT, Windows 95, HP-UX\*, OS/2 and UnixWare
- DEFINITY ® G3 PBX Simulator
- Sample Applications
- Related Documentation

Support:

- Toll Free Hotline support to Lucent Technical Support Center (TSC)
- BBS Support

Cost: \$495.00

PEC CODE: 8320-102

Ordering:

- For US orders:  
Call your local Lucent account executive, requesting the PassageWay Telephony Services for Windows NT SDK,  
-or- contact Lucent Direct at 1-888-519-3195.
- For International orders:  
Call your local Lucent account executive, requesting the PassageWay Telephony Services for Windows NT SDK,  
-or- contact BayData at 1-860-434-3961.

## 5. Frequently Asked Questions

Q1. Why is Lucent developing a JTAPI interface?

A1. Our ISV partners and customers have expressed a need to interface with Lucent's switches using the new object-oriented programming languages, such as the Java programming language. The Java client will provide access and control for any PBX vendor that has written a driver for the PassageWay Telephony Services TSAPI service provider interface on Windows NT.

Q2. Are there any ISV's currently writing applications to your JTAPI implementation?

A2. Yes. We are working with many ISV partners in their JTAPI application development.

Q3. What is the customer value or benefit gained from applications using this interface?

A3. Examples:

- JTAPI provides Platform Independence for ISV and Customer Applications because JTAPI is portable across hardware, software and operating system environments
- ISVs can develop an application once and have the application run on any platform with no modifications (this is what SUN promises with Java programming language). This means fewer re-writes and faster time to market for ISV's and investment protection for customers, as they change their computing environments.
- Java is Object Oriented. Application development is focused on objects and their interfaces, promoting reusability, plug and play, cleaner designs
- Customers can use Java-based applications in a CTI environment to Web-enable PC applications, such as softphones
- An example is mission critical call centers where the Internet is starting to have an impact on both the customer access network and the Call Center infrastructure network. Call Center agent desktops and computing environments are diverse and frequently in a state of upgrades and migrations.
- As another example, telecommuting or remote agents and supervisors can access the call center CTI-based applications from their desktop at home or remote office without concern for what type of platform they are using to access these Web-based applications.

Q4. What is Lucent's plan to support TAPI Rel 2.1?

A4. Lucent does not have a plan to support TAPI Rel. 2.1 in the TSAPI-based PassageWay® Telephony Services environment. This support has **not** been a strong requirement by our customers in the markets that we are targeting, including the call center arena. Compared to TAPI 2.1, TSAPI is a much richer procedural API for the Call Center environment. In terms of new APIs on our PassageWay Telephony Services platform, we will put focus on the new object oriented APIs, not on other procedural APIs.

However, we currently do provide TAPI support via our PassageWay Direct Connect first-party call control product.

- Q5. What is Lucent's plan to support the COM/DCOM environment?  
A5. Lucent intends to continue to evaluate new technologies such as other object oriented and multimedia interfaces to meet customer needs. We are working with Microsoft to understand their plans for the COM/DCOM environment. Additionally, there are "Bridges" from Java Beans to ActiveX\* controls available from both Microsoft and Sun that allow Java applications to connect to components developed in C++ and Visual Basic\*.
- Q6. Does this mean that Lucent is moving away from TSAPI as a CTI applications programming interface?  
A6. Absolutely not! TSAPI has been overwhelmingly successful in the marketplace. Our goal is to protect our customers' investments in Lucent products while providing them with a graceful evolution to new and emerging technologies, such as object oriented programming and the Internet. Supporting a JTAPI-based client with PassageWay Telephony Services does just that.
- Q7. What is the relationship of the JTAPI announcement to Internet telephony?  
A7. JTAPI is a call control API. It has been designed to setup, tear down and control calls no matter what medium is used for their delivery. Therefore, it is entirely capable of controlling calls on the Internet. With regard to the currently announced product, the PassageWay product will support any service provider that writes to the TSAPI Service Provider Interface. This includes an Internet service provider.
- Q8. How is this announcement related to the Lucent Internet Call Center solution?  
A8. The Internet Call Center solution has focused on the *customer access* to a business' call center via the Internet and the management of such calls in an integrated way with today's voice calls. For our Internet Call Center solution, JTAPI addresses the other side of the Call Center - the actual Call Center enterprise infrastructure. An area of immediate importance is that of enabling the supervisors and agents to be supported in the Call Center enterprise infrastructure using an intranet / Internet communication vehicle. The Java platform independence and the ability to download current applications from a common server to diverse desktops is very attractive, including:
- Thin Clients on agent desktops
  - Web enabled agent softphones
  - Web enabled call center and routing applications
- Q9. What about S.100 and media control? What are Lucent's plans for them?  
A9. JTAPI includes both call control and media control components. Version 1.0, 1.1, and 1.2 of the JTAPI specification provided some interim media control mechanisms. Version 1.3 of the JTAPI specification will better define the media control interface. Our initial support for JTAPI is based on version 1.2 of the specification and addresses telephony call control only at this time.

A.9 continued

Full media control, such as that provided by an IVR system and supported by S.100, is being added in JTAPI version 1.3. Chairing the ECTF task group that is currently defining these JTAPI extensions, Lucent is committed to drive this work to completion and plans to support them in its product line. Our goal is to provide a fully integrated call control and media API, and to provide a service creation environment based on JTAPI and Java Beans component technology.

- Q10. Will a JTAPI applet written with Lucent's SDK work with other JTAPI implementations, or only Lucent's?
- A10. JTAPI applets can work with any JTAPI provider. This includes JTAPI providers written on top of TSAPI, TAPI, or any other CTI applications programming interface.

## 6. Sample JTAPI Enterprise Applications

Since our initial announcement in February, 1997, the ISV community has expressed great interest in our JTAPI implementation. Lucent continues to work closely with many ISVs to provide our JTAPI SDK and to promote related applications development. It appears that with the steam Sun's Java has brewed up, JTAPI will be embraced by the industry. Undoubtedly, JTAPI will influence the Call Center industry in a big way just as CTI, IVR, the World Wide Web and Java have already impacted this dynamic marketplace known to be populated with "early adopters". Planned extensions to JTAPI to support IVR and other media capabilities will further contribute to call center opportunities.

Following are sample applications that can be enhanced with JTAPI.

### Traditional Inbound Call Center

Many enterprises have call centers handling inbound calls. Some of the services these call centers provide are customer service and sales support. When prospects customers or suppliers call an organization's toll free number, the call center ACD telephone system routes their calls to an appropriate agent group. Large inbound call centers may have different agent groups handling different types of telephone calls. For example, sales calls may be routed to a sales agent group, staffed by agents that are trained in the sales process. A customer service group may have a different agent group with agents trained in customer support functions. The ACD will route the caller to the most appropriate agent group. Agents in the group can use Internet or intranet Web browsers to access the business application and get "screen pops" as they answer the caller. The browser can be equipped with JTAPI-based softphone functions (such as make a call, transfer, hang-up, conference and/or login to the ACD) in a frame within the browser.

### Web-based Inbound Customer Care Center

In this scenario, a customer accesses the company's home page or Web site via the Internet to request product or service information on-line. The browser-enabled agent can easily view a customer's purchase history or other supporting information from a database, simultaneously with the Web customer and make changes to their files in real time. The new information can be instantly updated and used within the rest of the organization. Java Media Framework and Java Speech allows for the integration of audio and video, such that both customer and agent can see and talk to each other throughout this process. JTAPI allows the agent to perform traditional telephony functions such as placing the customer on hold while consulting with a supervisor, transferring the call and hanging up directly via soft-phone buttons imbedded in the browser window. JTAPI will enable call center statistics to be displayed in the agent's browser interface.



## Traditional Outbound Call Center

With Computer Telephony you can build dialer applications to help automate outbound call center departments. There are two basic types of outbound dialers. The first is call preview which is able to *preview* information about a prospect or their organization before the application systematically dials the designated caller or prospect. This is useful when calling customers with a high value to the business.

The second type of dialing is *predictive dialing* in which the application automatically dials multiple customers, listening for a live voice answering the call. The application automatically obtains telephone numbers from a database. For each customer listing, the dialer system initiates the dialing, monitors call progress and, if a live voice is detected, transfers the call to the next available agent. At the time of transfer, the agent simultaneously gets a 'screen pop' in their browser with information about the prospect with whom they are about to speak. Both call preview and predictive dialing systems are very useful in automating the outbound call center.

The real value in both Inbound and Outbound call centers lies in the economics of the agent desktops. JTAPI applications can be written to run on shared servers and downloaded onto network computers. The Java platform independence and the ability to download the current applications from a common server to diverse desktops is very attractive in this arena. The measurable benefits are more cost effective agent desktops and savings in the administration and maintenance of the applications that are accessed from shared servers, versus running on each individual agent's desktop. Furthermore, the platform portability of JTAPI applications is ideal where call center agent desktops and computing environments are often diverse and frequently changing with hardware and/or software upgrades and systems migrations.

## Home Agents and Remote Agents/Supervisors

There is a growing trend among companies to deploy various remote or home agent call center applications. The benefits include lower operating costs, improved agent workforce management, improved around the clock call center coverage and improved emergency or disaster recovery response time. JTAPI applications are ideal for the remote agent environment. With an Internet or intranet (PPP) connection from home to the call center browser application server, agents and/or supervisors can work remotely and be able to observe call center activity, including make and receive calls with corresponding screen-pop functionality. Telecommuting or remote agents and supervisors can access the call center CTI-based applications from their desktop at home or remote office without concern for what type of platform they are using. They would be supported with Java browser applications that can be downloaded to whatever PC they happen to have. In addition they will appear as if they are on site being able to answer calls, transfer calls and log into their respective ACD groups.

## Personal Information Manager

Personal information management integrates address books, calendar and expense tracker functionality within a Web browser. Enabling browsers with telephony functionality can be achieved with an appropriate control interface such as JTAPI. With this call control interface, application developers can automate outbound call origination and screen pops on inbound calls within a browser. Automated dialing is as simple as finding the respective contact name in a menu, pointing and clicking.

### Corporate Directories

In larger enterprise organizations, maintaining databases of telephone numbers and extensions for each member of the organization is a time-consuming task. Issuing printed corporate telephone directories every time there is an employee move, add or change can be extremely expensive and time consuming. Providing a Web-based application to access the corporate directory database allows individuals to obtain the latest directory information. Cost of distribution drops to almost zero with electronic access. Allowing individuals to originate calls automatically through this application can be achieved with JTAPI. Dialing, conferencing and transferring calls can all be accomplished using this simplified call control interface and simply pointing and clicking.

### Telephony-enabled Contact Management

Many individuals in the company enterprise maintain databases of contacts with whom they interact frequently. Information about conversations, addresses, and telephone numbers are maintained in these databases. Allowing individuals to also originate calls automatically through this browser based application can be achieved by using JTAPI.

## **7. Lucent Technologies February JTAPI Press Release**

**Reprint of the Wednesday February 26, 1997 news release**

### **LUCENT TECHNOLOGIES BREWS UP JAVA TELEPHONY SOFTWARE**

MURRAY HILL, N. J. – On Wednesday, February 26, 1997, Lucent Technologies announced new telephony software for Sun Microsystem's Java programming language.

Lucent Technologies will demonstrate Java telephony on its market-leading computer telephony integration product, PassageWay® Telephony Services, at the Computer Telephony Expo trade show in Los Angeles next week. PassageWay Telephony Services uses the industry-standard Telephony Services Application Programming Interface (TSAPI) to integrate telephony with computer networks.

The new Java software adds Internet integration to the networks that PassageWay Telephony Services supports. PassageWay Telephony Services already integrates telephony with Novell and Microsoft Windows NT corporate networks. Java telephony software developers kits for PassageWay will be available in the second quarter, with final product delivery in the third quarter.

"I'm pleased to see that Lucent Technologies is exploiting the platform independence that Java provides for computer telephony integration," says Art Schoeller, research director of voice call processing at Gartner Group. "Software developers remain challenged by the difficulties of writing to multiple platforms, and many are looking for the kind of relief this may offer."

The recently finalized Java telephony specification, called Java Telephony API or JTAPI, uses Java and the Internet to link various computers, like Microsoft Windows\*, Apple Macintosh\*, UNIX\* systems and OS/2\* with voice networks. This allows multimedia conferencing and collaboration across different computer systems, mixing electronic mail, fax, video, documents and telephony. The Java Telephony specification represents the combined efforts of Intel, IBM, Nortel, Novell, Lucent Technologies and Sun Microsystems, before its adoption by Sun.

This work follows Lucent Technologies' development of the current market leading computer telephony integration standard, TSAPI, with Novell in 1994. This standard is supported in PassageWay Telephony Services.

Developers or customers who want more information on Java Telephony support on PassageWay Telephony Services or wish to receive the Lucent Technologies' Java Telephony software developer's kit should contact Ketty Ombadykow at [kettyo@lucent.com](mailto:kettyo@lucent.com).

Lucent Technologies designs, builds and delivers a wide range of public and private networks, communications systems and software, consumer and business telephone systems and microelectronics components. Bell Labs is the company's research and development arm. Lucent became an independent company -- totally separate from AT&T -- on September 30, 1996.

# # #

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