Web-Centric Self Service

The World Wide Web has grown and matured in ways that have profound implications for self-service applications.

Leverage Web application advances—and your existing Web infrastructure—to empower your self-service voice processing, to engage with customers, and to serve them more effectively than ever before.
Executive summary

The World Wide Web has grown and matured in ways that have profound implications for enterprises and hosted service providers. Dynamic content generation... exponential gains in computing power and storage capacity... easy exchange of data and voice across platforms... open standards for natural language speech recognition... advances such as these introduce new possibilities to reinvent self-service applications.

What if you could empower your voice processing applications with the resources of the Web? This blending of telephony and Web paradigms would enable self-service applications to take full advantage of the huge investments already made in Web applications.

This ability to capitalize on the Web in this way would completely redefine the possibilities for self-service applications. The means to achieve it will be available in the form of Nortel Networks Web-Centric Self Service (WCSS) solutions.

This portfolio of self-service components represents the next step in helping enterprises transform themselves into “engaged businesses”—organizations that provide exceptional levels of proactive personalized service and close customer relationships.

Nortel Networks is unique in supplying all of the pieces necessary for this “engaged business” model of self-service, including secure network connections, high-speed reliable networking equipment, and a portfolio of contact center solutions that capitalize the power and ubiquity of the Web.

The end-to-end solution uses open industry standards, open interfaces to popular Web development tools, and open inter-working with standard server and desktop platforms. The result is a distributed architecture that doesn’t lock you into a single vendor, platform, protocol, or practice. You can evolve on your timetable—using versatile server platforms that support traditional and emerging protocols, enabling phased migration of services while preserving your hardware investments.
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Reinventing voice processing applications for the Web age

Most enterprises today interact with their external audiences through segregated, discrete communication channels. First came telephony, with its promise of anywhere, anytime voice and touch-tone access for anyone who had a telephone. Then came the Web—and the promise of anywhere, anytime multimedia access for anyone who had an Internet-connected computer.

First there was access to a human or automated system at the other end of the telephone line... then access to millions of pages of content on the other side of the Internet connection.

Given the merits of each contact channel, most enterprise and hosted service providers today have both a telephony-based contact center for agent-assisted and self-service support, and a well-developed Web presence that provides multimedia information and e-mail contact portals into the organization.

What if you could empower your voice processing applications with the resources of the Web? This blending of telephony and Web paradigms would enable self-service applications to take full advantage of the huge investments already made in Web applications. In the process, it would completely redefine the possibilities for self-service applications.

The time is ripe to capitalize on the Web for self service

Beyond Web-blended contact centers and “click to call” capabilities

The World Wide Web has grown and matured in ways that have profound implications for enterprise applications and hosted services:

- Web servers that formerly delivered only static content can now generate content dynamically using scripts, server pages, servlets, Java applets, and access to databases and legacy systems that change with the dynamics of business and customer climates.
- Browsers that were once limited to pointing-and-click or entry of URLs can now accept entries in forms, templates, and other interactive formats.
- Infrastructure standards such as J2EE allow for multi-tier business applications where business logic is separated from customer data.
- Advancements in Web data representation make it easy to exchange data and voice across platforms and formats.
- Powerful programming tools make it easier for developers to create applications using open standards.
- Improvements in Web bandwidth, performance, and quality of service lead to new opportunities for applications and services.
- The general growth in computing power has made it feasible for Web-based systems to support huge databases and speech-recognition vocabularies with thousands of words.

What if you could leverage all those Web advances for your self-service systems and use the wealth of Web resources to provide better customer service? What if callers could access all the richness of information delivered through your Web servers—from their telephones?

This convergence will be achieved in the form of Nortel Networks Web-Centric Self Service (WCSS).

Introducing Nortel Networks Web-Centric Self Service

Nortel Networks Web-Centric Self Service offers a new range of self-service options for enterprises and hosted service providers—leveraging the existing Web infrastructure for new levels of customer engagement through automated self service.

This evolution to a Web-centric architecture mirrors the transformation in networking in general, which acknowledges the inherent efficiencies and cost advantages of IP and application programming languages such as CCXML and VoiceXML (VXML), compared to traditional touch-tone solutions.

Just as J2EE (Java 2 Platform, Enterprise Edition) provides a standard for developing multi-tier applications by separating customer data from business logic, WCSS provides a standard for creating multi-tier, Web-based voice processing applications. It allows the core application logic to reside separately from branding, service, and operational elements. Through WCSS, developers can quickly deliver consistent operational, reporting, and context services across disparate voice processing applications.

Enterprises can now “engage” with customers by providing dynamic, adaptive, personalized services that leverage the richness of Web resources—yet are accessed easily using natural speech and that most ubiquitous access device, the telephone.
For your external audiences—customers and supply chain partners, for starters—Nortel Networks Web-Centric Self Service brings the advantages of Web-based development and content delivery to self-service applications:

- **Everyone can access the Web.** Any telephone, even the most primitive old-style phones, can activate self-service applications that access rich resources delivered over the Web.

- **Customers interact naturally with the automated system.** They get the information they are seeking through powerful, flexible applications that recognize natural, freestyle speech.

- **Call treatments can be customized on the fly,** providing on-the-spot customization and personalization of the application tailored to each customer based on their input.

- **Corporations can maintain consistent branding** between Web pages and voice processing applications—instantaneous, parallel branding through multiple media.

- **Customers can pass between different applications seamlessly** while maintaining the context of the session, in alignment with the Web application paradigm.

Nortel Networks is unique in supplying all of the pieces necessary for this “engaged business” model of self service, including secure network connections, high-speed reliable networking equipment, and a portfolio of contact center solutions that capitalize the power and ubiquity of the Web.

"engaged” applications: in which the network enables a proactive level of customer service that could not otherwise be achieved. The engaged enterprise anticipates customer needs and delivers critical and time-sensitive information to customers precisely when, where, and how they want to receive it.

Web-Centric Self Service delivers highly-targeted output that generally is (or could be) available from an HTML Web interface. A typical application is one in which callers dial a phone number to retrieve information, such as stock quotes, airline flight information, or weather from a Web site. Here are some examples:

- **Information retrieval.** Web-Centric Self Service is ideal for applications where input requires a few navigational commands and moderate data entry, such as “Dial or say ‘1’ for yesterday’s production line output metrics,” “Say the name of the program” for updated market reports, or “Enter your department number and password” for company news from the intranet. Voice input can use quite a large vocabulary, such as free-form street addresses for a city, or stock quotes for a specified company and period.

- **ECommerce.** Web-Centric Self Service is naturally well suited for customer service applications (such as ordering merchandise, tracking parcel shipments, checking account updates, and using call center services), as well as financial applications, such as getting stock quotes or conducting online banking.

- **High-touch telephony services.** Personal name dialing, notification services, one-number “follow-me” services, teleconferencing set-up, and other telephony features can be delivered over a Web infrastructure. For example, a company or service provider could place a phone directory of its employees or subscribers on its Web site, which could then be used to voice-dial just by speaking their names.

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<th><strong>Comparison of traditional and Web-Centric Self Service</strong></th>
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<td><strong>Application development</strong></td>
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<td>• Integration with market-leading developers’ tools, such as WebSphere and WebLogic</td>
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• **Directory assistance.** Corporate name dialing as a packaged application on a secure Web site makes it easy to reach colleagues whose numbers you don’t know simply by speaking their name or department.

• **Internal processes.** Because security features that apply to the Web, such as firewalls and encryption, can be applied to voice applications as well, Web-Centric Self Service can be used to create secure intranet applications that voice-enable internal processes, such as supply ordering, HR self-service, and corporate news.

• **Unified messaging.** For mobile employees and those with multiple contact channels (which is just about everyone these days), Web-Centric Self Service can unify voice and electronic channels, for example, by reading and recording e-mail over the phone, and originating and terminating pager messages on the phone.

For all of these applications, Web-Centric Self Service maintains continuity of brand identity across channels. Web pages accessed via HTML browsers have been powerful forces for communicating corporate brand values. WCSS enables those same brand values to be delivered through voice processing applications to both external customers and internal employees.

With the ability to access vast resources on the Web, the application possibilities for self service are limited only by imagination, opportunity, and market demand.

### The components of Nortel Networks Web-Centric Self Service

Nortel Networks Web-Centric Self Service is an integrated portfolio of components that use IP networks and the Internet to deliver self-service applications in a distributed, multi-tiered architecture:

• **Application processing components** manage voice dialogs and call control interactions with users and client devices. For WCSS, the current voice processing components are the Nortel Networks Media Processing Server (MPS) platforms—MPS 500 and MPS 1000 systems—and the Multimedia Communication Services 5100 (MCS 5100).

• **Application service components** provide for rapid deployment of Web applications extended for voice processing. These components run on industry-standard J2EE (Java 2 Platform, Enterprise Edition) platforms, such as IBM WebSphere and BEA Systems WebLogic application servers—and provide the sole gateway to enterprise data and business logic.

• **Management components** run on an industry-standard desktop platform and provide unified administration of self-service platforms and applications.
Development components run on standard desktop PCs as well, and simplify the creation of self-service applications and scripts.

Nortel Networks is unique in the market for offering a complete solution that includes all of the four major tiers: server-side, client-side, management, and development components. Let’s take a high-level view of the Nortel Networks architecture in each of these four areas.

Application processing components

Interoperability with multiple protocols and speech engines

A self-service server acts as a client to the Web application server. This specialized voice gateway node is connected both to the Internet (or managed IP network) and the public switched telephone network. In the Nortel Networks Web-Centric Self Service solution, this functionality is provided on MPS 500 and MPS 1000 platforms using the following key technologies:

- A VoiceXML (VXML) interpreter on the MPS platform interprets VXML applications and controls speech and telephony resources, such as automated speech recognition and speech synthesis systems, audio play, and record functions.

VXML applications use a combination of speech and touch-tone commands to exchange data between people and machines, independent of the vendor’s hardware. Developers can create audio dialogs that use speech and DTMF keypad tones as input, and deliver synthesized speech or digitized, pre-recorded audio as outputs. Version 2.0 of this open, industry-standard markup language was published in January 2003.

- A CCXML (Call Control XML) interpreter on the MPS platform provides call control for VXML. CCXML is a dialect of XML that can be used with VXML to provide call redirection, conferencing, and monitoring based on the occurrence of unplanned events.

- SIP (Session Initiation Protocol) is an IP Telephony signaling protocol developed by the IETF primarily for Voice-over-IP calls. This flexible, text-based protocol based on HTTP and MIME is also used for video or other media types, such as instant messaging. Designed for real-time transmission, SIP uses fewer resources and is considered less complex than H.323, the ITU standard for voice and video over packet networks.

Application service components

Server-side components that run on your industry-standard Web server

Your standard J2EE-compliant Web server runs application-development capabilities and VXML application logic which are stored in “documents” created with an XML-type markup. This Web server can be located anywhere within the reach of secure IP connectivity. This server typically contains a database of information referenced by the application, or interfaces to external databases or transaction servers to perform the tasks that are invoked in the application.

In the Nortel Networks Web-Centric Self Service solution, this Web server runs the Nortel Networks Portable Application Framework (PAF)—a collection of J2EE service modules that implement common features required for self-service applications, such as:

- Voice navigation for switching between services (“Sports,” “Weather,” “Stock Quotes”)
- Entry/exit branding (“Thank you for calling BigCorp.”)
- Call routing
- Shared call context across services
- Common alarm/tracing/debugging facility
- Call detail records and service statistics
- Datafill management
- Vocabulary builder
- Web-based configuration
- Authentication/personalization interface

Conceptually, the Portable Application Framework surrounds the applications that operate within it, extending PAF functionality across all applications, with some significant advantages:

- It reduces application development time by providing common foundation functionality (such as statistics, alarms, and tracing) across applications, and by propagating enhancements to the PAF across all applications that are built on that framework.
- It improves application quality and consistency by promoting the re-use of code as working modules, and by propagating enhancements to the PAF across all applications that are built on that framework.
• It improves application performance by handling many serviceability issues instead of relying on the underlying application to handle them, and by offering all applications the advantages of continual serviceability improvements.

The Portable Application Framework and its elements work with either the Nortel Networks Media Processing Server (MPS) platforms or Nortel Networks Succession Multimedia Communication Server (MCS) 5100 platform.

Management components

Unified management of media server and speech platforms

Nortel Networks Web-Centric Self Service integrates with the Nortel Networks PeriView system for collection and reporting of call statistics, alarms reporting, and management of self-service applications running on MPS self-service platforms. PeriView is used to manipulate and view self-service activity and to deploy and maintain applications across multiple MPS platforms in a networked environment.

For Web-Centric Self Service, this ‘thin client’ management application provides consolidated operations, administration, and maintenance for the telephony platform (such as Nortel Networks MPS platforms), and the speech platform (such as the OSCAR platform).

Development components

Faster, easier development of self-service applications

Development components for Web-Centric Self Service reside on standard desktop computers and leverage open-source integrated development environments (IDEs)—for example, providing a plug-in to the Eclipse open-source developer’s workbench.

This set of plug-ins for GUI-based development provides integrated development for VXML 2.0, CCXML 1.0, JSPs (JavaServer Pages), grammar creation, and the Portable Application Framework. With this development toolkit, developers can:

• Manage the play/record/edit functions for prompts in multiple audio formats
• Include dynamic document generation in applications using JSP scripting elements—an extension to Java servlet technology that makes it simple to display dynamic content on a Web page
• Test and debug applications using step-by-step execution, setting breakpoints and triggers, checking syntax, and performing inline editing of values in debugging mode
• Develop, debug, and deploy J2EE applications using EAR and JAR files, such as for WebSphere, WebLogic, and JBOSS
• Use simulation middleware to simulate interactions between media server (MPS) and Web server, or between the media server and speech recognition and synthesis functions—and to inject CCXML events into the simulation
• Invoke and/or be invoked by Nortel Networks PeriProducer applications and subroutines, enabling a smooth transition from traditional to Web-centric self-service environments
• Support conversion to the native grammar format of multiple speech engines, such as SpeechWorks Open Speech Recognizer (OSR) 1.1, SpeechWorks Speechify 2.1, Nuance 8.0 Live Voice Recognition, and Fonix Faast 5.2 text-to-speech
• Simultaneously edit multiple documents and support multiple views of a document including tree view, text view, and call flow view
• Refer to component libraries to find and reuse modules from one application to another
• Take advantage of wizards and online help to improve the design of voice/speech applications and to customize and configure pre-packaged applications

Summary

Nortel Networks has taken a bold step by assembling all the core components of full-featured self service into a cohesive, Web-centric solution—one that offers all the core functions of traditional interactive voice response (IVR), leverages your existing investments in contact center and Web systems, and achieves new levels of customer “engagement” through the convergence of the two.

As an IT decision-maker or contact center manager, you and your organization stand to gain by:

• Creating much more sophisticated self-service applications that blend the advanced speech processing capabilities of media servers with the virtually limitless data resources of the Web
• Capitalizing on an open architecture that uses such widespread industry standards as VXML for voice dialogs, CCXML for call control, and IP for communications
• Developing applications quickly, using familiar and inexpensive Web development tools—as well as the integrated development tool, with its pre-packaged building blocks
• Reusing code among applications and platforms, such as taking code written for an online banking application and reusing it for self-service banking by phone
• Deploying applications easily, since the application logic can reside on any standard Web server, anywhere, and be accessed from any standards-compliant voice server
• **Evolving on your timetable**—using versatile MPS platforms that support TDM, H.323, and SIP protocols, which supports intelligent migration of services while preserving hardware investments

• **Deploying carrier-grade equipment** from the vendor that forged its first century of progress by delivering equipment that meets the unwavering standards of the Federal Communications Commission

For your internal and external customers, Nortel Networks Web-Centric Self Service brings the advantages of Web-based development and content delivery to self-service applications:

• **Everyone can access the Web.** Any telephone, even the most primitive old-style phones, can become a voice portal into the Web.

• **Customers interact naturally with the automated system.** They get the information and answers they need through powerful, flexible, branded applications that recognize natural, freestyle speech.

• **Call treatments can be customized on the fly,** providing on-the-spot customization and personalization of the application tailored to each customer based on their input.

For all these advantages and more, Nortel Networks Web-Centric Self Service is redefining self-service customer contact applications—and the development tools used to create them. Enterprises will be able to “engage” with customers by providing dynamic, adaptive, personalized services that leverage the richness of Web resources—yet are accessed easily using natural speech and that most ubiquitous access device, the telephone. For organizations that have embedded telephony-based contact center systems with useful life remaining, Nortel Networks offers flexibility and choice. You decide how you want to implement self-service applications—retaining legacy components, upgrading to IP-based architectures, or using a hybrid of old and new. You decide when and how your organization gains most from evolving to a Web-centric contact center architecture, and how best to phase in that process.

Find out more by visiting the Nortel Networks Web site at: [www.nortelnetworks.com/solutions/ccvp](http://www.nortelnetworks.com/solutions/ccvp)

**Nortel Networks and IP-based contact centers**

In more than 30 years, Nortel Networks has established more than 40,000 customer contact centers in more than 100 countries, supporting more than 3.5 million agent positions and handling more than 150 million calls a day. We’re also a global leader in creating mission-critical IP networks that offer the performance specifications required by voice service. This unique combination of business and technological expertise produced our present portfolio of contact center solutions.

The Professional Services Organization (PSO) of the Nortel Networks Customer Contact and Self-Service Solutions group stands ready to help with any or all aspects of transitioning from traditional IVR services to Web-Centric Self Service. Our specialists can supplement your in-house team for any stage of the process, from pre-implementation planning to ongoing system maintenance.
Nortel Networks is an industry leader and innovator focused on transforming how the world communicates and exchanges information. The company is supplying its service provider and enterprise customers with communications technology and infrastructure to enable value-added IP data, voice and multimedia services spanning Wireline, Wireless Networks, Enterprise Networks, and Optical Networks. As a global company, Nortel Networks does business in more than 150 countries.

More information about Nortel Networks can be found on the Web at:

www.nortelnetworks.com

For more information, contact your Nortel Networks representative, or call 1-800-4 NORTEL or 1-800-466-7835 from anywhere in North America.

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