

Vendor Review

IP-PBX Vendors

Traditional Voice	Traditional Data	Key System	Software
<ul style="list-style-type: none">• Avaya• Nortel• Siemens• Mitel	<ul style="list-style-type: none">• Cisco• 3Com	<ul style="list-style-type: none">• Panasonic• NEC• Toshiba	<ul style="list-style-type: none">• Asterisk• Brekeke• 3cX

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IP-PBX systems are available from a wide variety of vendors, both traditional voice vendors as well as traditional data vendors and 3rd parties. Organizations with sufficient technical expertise may even deploy self-supported VOIP solutions through open-source products and software. Vendors provide VOIP products and solutions for all sizes of businesses.

Organizations tend to select their VOIP solutions from vendors they are comfortable with and have dealt with in the past. If the telecommunications department is driving the move to VOIP, they gravitate to established telephony vendors such as Avaya or Nortel. When the data group is driving the move, they often select Cisco.

Regardless of the vendor chosen, ongoing support and service are important considerations. Will the vendor chosen assist with readiness assessment and at what cost? Is the vendor able to provide sample equipment for suitability testing during the pilot phase? Will the vendor help with initial configurations? How will the vendor be of service during cut-over? Questions such as these should be asked along with those of pricing and feature availability.

Cisco VOIP Products



▪ **Unified Communications Manager**

▪ **UCM Express**

▪ **Unity**

▪ **Unified Contact Center**

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Cisco VOIP solutions are provided under their 'Cisco Unified Communications' product line. This product line is composed of 5 components:

1. IP Telephony products which include call-processing software, telephones, and end-point devices.
2. Unified Communications Applications that include messaging, mobility and conferencing products that presence and preference information.
3. Contact Center applications for multi-channel and self-service capabilities
4. Communications Infrastructure Products – i.e. routers and Ethernet switches
5. Management Tools that are software products that monitor voice elements in the network.

Their flagship call processing product is Cisco Unified Communications Manager which is a Softswitch that can handle up to 30,000 users. Remote offices are serviced by the Cisco Unified Communications Manager Express which runs on a router or the Cisco Smart Business Communications System which runs on a server.

Nearly all of the Cisco IP phones are now SIP compliant and all support Power over Ethernet. 24 different phones are currently offered as current models. Many have built-in Ethernet switches for line sharing with an attached PC.

Unified communications are offered via the Cisco Unity software which integrates with Microsoft Exchange, Lotus Domino and Novel GroupWise. Unity also features interactive voice response (IVR) and automated-attendant services.

Cisco Unified MeetingPlace is the conferencing solution software that supports voice and video conferencing. Teleconferencing is through the Cisco Telepresence server which supports high definition and standard definition digital displays.

Contact center applications include the Cisco Unified Contact Center, Cisco Unified Customer Voice Portal and the Cisco Unified Customer Interaction Analyzer.

Management tools include the Cisco Unified Operations Manager, Service Monitor and Monitor Manager products.

Cisco supports small business through their Linksys product line with the SPA400 and SPA900 gateways and Small Business Voice Systems.

Avaya VOIP Products

- **Aura Communications Manager**
- **S8xxx Server**
- **CM Branch Edition**
- **One-X UC Products**
- **Call Center 5.0**

AVAYA



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Avaya offers a complete line of IP telephony products that are SIP based and provide Softswitch, ACD (Automatic Call Distributor), Call Center, IVR, and messaging features. Avaya also offers expansion cards and software for their Definity line of PBX products to create hybrid solutions.

The Aura Communications Manager is the name of the flagship Avaya software platform that supports a wide range of IP telephones and softphones. Running on an Avaya S8xxx servers and providing control to media gateways and communication devices, Aura Communication Manager can be designed to operate in a distributed or networked call processing environment. Scaling from as few as 100 users to a million users, this product is now completely SIP compliant. Avaya offers a range of voice gateways for trunking and support of analog telephones.

Telephones include the 4600 Series voice over IP business telephones can be deployed in traditional office environments as well as remotely via an integrated VPN client and are easily configured to support both the H.323 protocol and SIP.

Unified communications are delivered through a family of SIP products such as the one-X Desktop softphone, one-X Speech gateway, and software products to integrate Communications Manager with Audix, IBM products, Microsoft products and 3rd party SIP products.

Remote sites are supported through Communication Manager Branch Edition and Communication Manager Software and Remote Gateways. This model consists of Avaya Communication Manager software, Avaya's S8xxx Series servers located at data centers, and Gxxx series gateways including the Juniper IG550 gateway placed at various branches.

With Aura Call Center 5.0, Avaya offers SIP end-to-end, enabling reduced network service costs, service delivery costs, and even lower endpoint costs with a new value-priced SIP agent telephone. Call Center 5.0 combined with the Avaya Voice Portal, G860 Media Gateway, Interaction Center, and the new SIP Agent telephone deliver more affordable call center solutions.

The Avaya Call Management System (CMS) is a database, administration, and reporting application designed for enterprises that receive a large volume of telephone calls and have complex contact center operations. Working in conjunction with Avaya CMS, the AvayaCall Management System (CMS) Supervisor client provides comprehensive administration and reporting capabilities using a familiar Microsoft Windows interface.

Nortel VOIP Products



- **Communications Server 1000**
- **Call Pilot**
- **Intelligent Contact Center**
- **Contact Center Manager Server**
- **Multimedia Communications Server 5100**

**Telephony & networking assets
acquired by Avaya in December
2009**

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Nortel fell victim to economic forces and filed for bankruptcy in 2009. The telephony and data networking assets of Nortel were sold to Avaya in December of 2009. Avaya's roadmap for integrating Nortel customers into their product lines involves the use of their flagship Aura product line. However, there are still thousands of Nortel products in active use in the world and they will continue to be used for some years. What follows is a discussion of Nortel products as they existed prior to the demise of Nortel.

Nortel offered a full line of IP PBX telephony solutions for all sizes of businesses. For the enterprise, Communication Server 1000 is a server-based, full-featured IP PBX and the cornerstone of Nortel Enterprise Unified Communications deployments. It provides the benefits of a converged network plus advanced applications and over 750 world-class telephony features. Fully distributed over IP LAN & WAN infrastructure with built-in reliability and survivability, Communication Server 1000 supports business-critical applications, including unified messaging, customer contact center, IVR, wireless VoIP and IP phones.

Unified messaging is provided via Call Pilot and the Multimedia Communications Server 5100, which provides access to e-mail, faxes, and voicemail from any touchtone phone, desktop PC e-mail client, browser-enabled PC, or mobile e-mail enabled device. Call Pilot can be used in a variety of client environments, including Microsoft Outlook, Lotus Notes, Novell GroupWise, Internet mail clients including Netscape and Qualcomm Eudora Pro, Macintosh, Linux, and Citrix environments.

Call centers are supported via the Business Communications Manager Intelligent Contact Center. All Business Communications Manager platforms come with the Intelligent Contact Center pre-loaded and can be easily activated by downloading a keycode. Multimedia Contact Center enhances an Intelligent Contact Center by adding Web presence, converging Web pages and contact center agents for a unique, interactive customer experience.

Large and distributed customer contact centers would benefit from Contact Center Manager Server (CCMS), which offers a scalable solution for dynamic contact center environments requiring sophistication and differentiation in the care offered to their customers. CCMS provides skill-based routing; call treatment flexibility, real time displays, multimedia routing, and comprehensive management and reporting functionality - empowering contact center managers with the tools and agility to deliver unique and unprecedented care to their customers. The rich scripting language supports multifaceted call routing and treatment decisions based on combinations of real time conditions. CCMS for Meridian 1/Succession 1000, supports both time-division multiplexing (TDM) and Voice-over-IP (VoIP) network infrastructures.

Nortel is known for their flagship Meridian digital PBXs and provides a hybrid IP capability with the Meridian 1 ITG Gateways. IP expansion options allow the Option 11C and 11CMini to support IP trunking and IP telephones.

Siemens VOIP Products

SIEMENS

- **HiPath 5000**
- **HiPath 4000 SoftGate**
- **OpenScape UC Server**
- **HiPath ProCenter**



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Siemens Enterprise Communications offers SIP based solutions that will meet the needs of businesses of any size. The Hipath series of IP communications systems breaks down as follows:

The HiPath 5000 is an IP communications solution for medium-sized enterprises. Its distributed architecture connects up to 1,000 users at up to 32 locations to a homogeneous IP communications network. The latest release of HiPath 5000 supports SIP and is also available on a “fault-tolerant” platform for further resilience and survivability. It scales up to 10,000 users.

The HiPath 4000 is a converged IP communication platform offering companies scalability from 300 up to 100,000 users. The HiPath 4000 SoftGate is a software application which offers full HiPath Feature Access for IP Endpoints and SIP connectivity for trunking and subscriber based upon a LINUX standard server.

The Hipath 2000 supports small businesses on a single server platform. HiPath 2000 is perfect for small businesses with up to 30 users, or branch offices of larger enterprises.

Telephones include the OpenStage and optiPoint SIP phones.

OpenScape - OpenScape Unified Communication (UC) Server provides enterprises with Unified Communications capabilities that combine enterprise-grade voice with carrier-grade scalability and reliability, IP Least Cost Routing, video conferencing and role- and presence-based UC applications. OpenScape UC Server operates in any existing IT or telephony environment. This includes current-generation IP telephony, as

well as legacy PBX environments, whether from Siemens or any other vendor, as well as existing desktop collaboration systems from IBM or Microsoft.

Call centers are supported via the HiPath Procenter which offers multimedia and intelligent call routing features.

Microsoft Office Communications Server 2007



- **A software solution**
- **Integrates voice, IM, email, presence, conferencing**
- **Gateways to PBX and PSTN**
- **Desktop and mobile clients**
- **Optimized desktop phones**

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Microsoft entered the voice telephony arena in 2003 with Live Communications Server 2003. Microsoft sought to leverage their existing strengths in non-voice communications (instant messaging, email, conferencing) to create a software solution for voice communications. The current evolution of software approach to VOIP is Office Communications Server 2007.

The Softswitch component of OCS 2007 is the OCS 2007 software. This server application integrates with Active Directory and SQL databases to integrate existing network users with the voice communications architecture. OCS 2007 provides enterprise class integration of voice communications with presence, email, calendaring, instant messaging and conferencing. It offers a full range of features for standard telephony integrated with other network communications and includes support for receptionist stations and small call centers.

The client for OCS 2007 is the Office Communicator 2007, a softphone. OCS 2007 features remote call control, which allows the server to contact a user on the softphone, cell phones, mobile phones, PBX phones, and PSTN phones simultaneously or sequentially. Users can make call from within Microsoft applications such as Outlook. Microsoft also has a client for Smartphones that run Windows Mobile 5.0 or greater.

Several companies manufacture IP telephones optimized for Microsoft OCS 2007. LG, Plantronics, and Polycom offer such products.

OCS 2007 communicates with enterprise telephony systems and the PSTN through standard media gateways. These gateways are controlled by A/V Edge Servers and Mediation Servers which provide sophisticated call control and security capabilities.

Other VOIP Providers



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In addition to the major vendors discussed previously, there are other vendors for VOIP hardware that fit the needs of small to medium businesses. Some of these vendors are known for selling Electronic Key Systems that are now VOIP-enabled. Other solutions are software only solutions that require the separate purchase of servers, gateways, and telephones.

Vendors include:

- **Toshiba** offers the Strata CIX series supporting up to 1,000 users depending on the model chosen.
- **NEC** – the Univerge product line supports IP connectivity as well as traditional TDM trunks and digital telephones. Their largest system supports up to 1,100 stations.
- **Panasonic** – the KX series of hybrid IP-PBX systems support up to 256 stations and are SIP based.

Most electronic key system manufacturers offer IP trunking and station interfaces for their existing telephone systems to provide a migration path to VOIP.

Software only solutions include:

- **Asterisk** – the most well-know of the open source Softswitches, Asterisk runs on the Linux operating system. There are numerous versions, or distributions, of Asterisk ranging from the full featured Asterisk to the SOHO Trixbox version. The Digium also sells, through VARs, a hardware software package known as Switchbox IP PBX.
- **Brekeke** – The Brekeke IP PBX is a pure SIP Softswitch that support up to 2,000 users and runs on either Windows or Linux servers. Brekeke offers a limited capacity free evaluation copy of their Softswitch.
- **3cX** – this offering of a SIP IP-PBX runs only on a Windows Server. The commercial version supports up to 256 simultaneous calls on an unlimited number of extensions. A free version supporting 4 simultaneous calls is available for download.

- **Office Communications Server 2007** – this latest SIP entry from Microsoft uses the Office Communicator softphone as its primary client. This product is a Unified Communications software suite for IM, voice, video, and teleconferencing. Several vendors provide hardware with embedded support for the OCS client including Nortel, Plantronics, Samsung, and Polycom.

The vendors of the software solutions offer support plans, but the organization is assumed to have sufficient IT expertise to configure, support, and maintain the server environment. Telephones are purchased on the open market. All of the mentioned vendors support SIP telephones, both Ethernet and Wi-Fi.