

Avaya one-X Quick Edition Solution

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Avaya's one-X Quick Edition IP telephony product for small businesses and small branch offices is ready to use minutes after a user plugs the telephones and one or more public switched telephone network gateways into a local-area network. It offers significant short- and long-term benefits.

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1.0 Corporate Headquarters

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2.0 Introduction

Avaya has introduced its one-X portfolio, which is intended to provide a consistent user experience regardless of Avaya endpoint and application. Although this report focuses on the capabilities of Avaya's one-X Quick Edition system, it is important to note that, at this time, Quick Edition is the only one-X product that utilizes peer-to-peer technology. Following are three core products:

- **one-X Quick Edition** — A Session Initiation Protocol (SIP)-based peer-to-peer Internet Protocol (IP) telephony solution for small businesses or small branch offices of enterprises
- **one-X Desktop Edition** — A solution that enables users who travel to remotely access capabilities of their desktop telephone through a streamlined interface on their PC
- **one-X Mobile Edition for Nokia S60** — An offer that, by using the corporate IP network, enables users to be accessible via one business number and use a single voice mail system whether they are in the office or mobile

2.1 Fundamentals of Peer-to-Peer Technology

Avaya one-X Quick Edition is a SIP-based, peer-to-peer (P2P) solution that simplifies system setup and configuration. The product requires no central server and configures itself with almost no user intervention. Because the system is simple to set up, configure and use, most users can install and maintain Avaya one-X Quick Edition themselves without the need for technical support.

Systems that use P2P technology inherently have high reliability, robustness and fault tolerance, because there is no centralized server. SIP, in and of itself, can be used in a P2P mode, but because of technical challenges, such as high latency for locating the resources of interest in the P2P environment, SIP is not used that way in any sizable deployments. However, SIP's native ability to set up and tear down calls is optimized when combined with a P2P protocol for peers to learn of one another and organize themselves. The result is a P2P overlay network that is effectively a replacement for the registration, location and look-up steps of SIP that handles the following three things:

- How to register a telephone or a user with the P2P overlay network when the telephone or user joins the network
- How to look up a phone or a user in the P2P overlay network when someone calls the telephone or user is made

- How to dynamically shift information when peers join and leave, so that the load is balanced across peers, and the sudden loss of one or more peers does not cause the P2P network to lose track of its current registrants

Accordingly, at the heart of a P2P-based system is an algorithm that provides an efficient way to search for and retrieve information about the location of peers in the overlay network. In smaller P2P networks, this algorithm can be as simple as every peer knowing everything about every other peer in the network. This is often the case in small and relatively static environments, such as small offices.

Reliability and robustness is important in SIP-based, P2P telephony systems if, for example, a peer, such as a telephone, leaves the network unexpectedly as a result of a hardware or network failure. Moreover, if calls arrive for users when their telephones are not available, the system remembers user-specific call-handling preferences, such as forwarding a call to a cell phone or a voice mail box.

The phones and gateways connect to 10/100-Mbps switched Ethernet ports using Category 5 or better cables and standard RJ45 jacks. The devices interoperate with standard Ethernet LAN equipment, such as switches and routers. Power options include support for IETF 802.3af Power over Ethernet (PoE), as well as support for AC adapters or in-line injectors.

2.2 Target Market

Avaya's primary target market for its first one-X Quick Edition product is very small businesses and small branch offices of enterprises that desire popular communication features and functionality with a low total cost of ownership (TCO). The sweet spot is offices starting with the need for fewer than 10 stations per location, with a growth requirement of up to 20 stations.

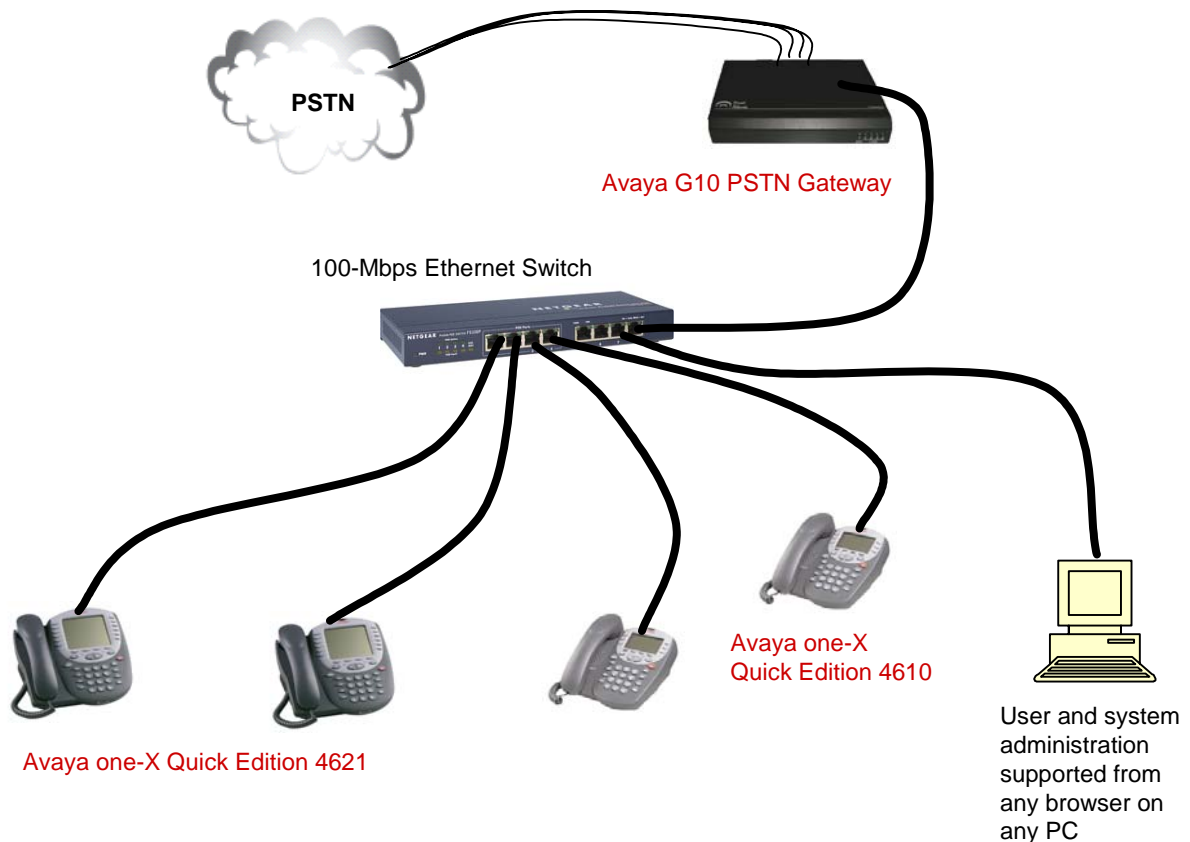
3.0 Avaya Product Overview

Avaya one-X Quick Edition combines SIP with P2P signaling to deliver a telephony and voice mail solution that distributes the intelligence and information across all the telephones and gateways on the same LAN. It combines the hardware of the Avaya 4610SW and 4621SW IP telephones and the P2P telephony value proposition with the Avaya G10 public switched telephone network (PSTN) gateway for connectivity to the PSTN now, with SIP trunking planned by the end of 2006.

Figure 1 shows the position of an Avaya G10 PSTN gateway in a typical company network. Up to 10 G10 PSTN gateways can be connected to a one-X Quick Edition network if an office requires additional central office lines.

The G10 PSTN Gateway connects to four standard analog loop-start lines from the service provider using RJ11 connectors and provides a port for an analog telephone that is connected to the first PSTN line during power failures.

Figure 1. Typical one-X Quick Edition Network Configuration



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Source: Avaya

The Avaya one-X Quick Edition telephones and PSTN Gateway negotiate with each other and assign themselves IP addresses automatically. Dynamic Host Configuration Protocol (DHCP) may be used if a server is connected to the network; otherwise Zero Configuration procedures are supported, as well as static IP address assignment. The system will function without the gateway, so in the next release, the gateway will be optional, because SIP trunks will be supported directly by the telephones. In addition, the PC shown in Figure 1 is an option and does not have to be dedicated.

Because security is one of the most important problems to be solved for any P2P system, a standard HTTPS-secure Web browser is used to check, set or access one-X Quick Edition system and user information. Software upgrades will be available from the Avaya Web site and can be pushed to the phones using the HTTPS connection. Network security is provided by the IP network firewall/router on the Ethernet LAN. To provide an additional layer of protection, messages between peers are encrypted. The Quick Edition system database is replicated across all the peers, and changes to the database are accepted from only known peers or an authenticated user. Access to user settings and voice mail is controlled by a user password that is unique to each telephone; and access to system settings is controlled by a separate, systemwide password.

Extension numbers are automatically assigned to telephones when they are connected to the network and receive power for the first time. Extension numbers are assigned in the 200-to-299 range by default, in the order that telephones register themselves on the network. These automatically assigned extension numbers are retained by the telephones afterward, even through subsequent power cycles.

An extension number can be changed manually at any time. The extension number associated with a telephone is stored on the telephone, which communicates any changes to its extension number to all other telephones connected to the same network segment. The change is also communicated to the systemwide Auto Attendant, the voice mail application that is included in every telephone, and to system users through the Quick Edition directory.

All telephones connected to the network back up each other. When a telephone is disconnected from the network (for example, while a telephone is being moved), two other phones on the LAN back up voice mail for the missing telephone. When the telephone is returned to the LAN, it obtains a copy of the voice mail associated with its extension from the network. All voice mail is password-protected by default.

The telephones alone provide all the telephony functionality, except PSTN connectivity and, in future releases, SIP trunking will make the gateway optional. Among other things, when using a Web browser to administer the system, a user would connect to a telephone on the LAN, not to a gateway. Additionally, voice mail is completely local to the phones, while the Auto-Attendant can run on either a telephone or a gateway.

Analog terminal adapters, which convert analog device access to IP, are not supported. However, users can configure the Quick Edition Auto Attendant feature to not answer incoming calls on a specific line. This enables a fax machine or similar analog device, such as a conference telephone, to answer incoming calls on that line instead. When the Auto Attendant feature is configured to not answer calls on a line, the G10 PSTN gateway ignores incoming calls on that line, which permits a connected fax machine to handle incoming fax transmissions. Furthermore, a line can be connected to a fax machine and the G10 PSTN gateway using a 2-to-1 RJ11 connector.

Users can obtain software updates from Avaya. The software upgrade package can be downloaded and installed on any PC that is connected to the telephone network. The package includes a software installation wizard that guides users through the software upgrade process.

3.1 Avaya one-X Quick Edition Features

Quick Edition delivers many of the features required by small businesses and small branch offices that can be divided into the following categories:

- User
- Voice mail
- Auto Attendant
- Administration

3.2 User

The current version of Quick Edition includes the following user features:

- Call forward
- Call hold

- Hold alerts
- Call log
- Call return
- Call transfer
- Call waiting
- Intercom
- Caller name and number
- Conference calling — Each telephone is capable of establishing three-way calls. Conference chaining of up to two conference groups for a total of five lines is supported, with up to two external parties.
- Direct inward line (private line)
- Corporate directory
- Personal directory
- Do not disturb (DND)
- Group ringing
- Dialing rules by group
- Last-number redial
- Missed-call indicator
- Multiple call appearances (three on 4610, four on 4621)
- Mute
- Paging (internal to the speaker on each phone and/or external to a speaker connected to a G10 PSTN gateway)
- Speed dialing
- Remote access

3.3 Voice Mail Features

Voice mail for a particular user is stored on a telephone at a particular extension, because there is no central voice mail server. If an individual's telephone is not connected to the network, two other telephones on the network will provide backup services and record any new voice mail that would otherwise not be delivered to the offline telephone. When the telephone is reconnected, it automatically checks for and retrieves any voice mail that is associated with its extension. Voice mail features include the following:

- English prompts
- Personalized greeting
- Remote message retrieval

- 20 minutes of message storage
- Voice mail backup
- Message waiting indicator
- User-selectable redirection (to another extension or to an external phone number)
- Voice mail monitoring (which allows a user to listen to a message while it is being recorded)

3.3.1 Voice Mail Options

- Subscriber login
- Password change
- E-mail notification (which sends e-mail with caller ID information when a new message is received)

3.3.2 Greeting Editor

- Record
- Playback
- Save

3.3.3 Message Manager

- Play
- Delete

3.4 Auto Attendant Features

The Auto Attendant answers incoming calls, plays a greeting and prompts callers to direct their calls. Callers can dial a known extension, spell the name of a person (using keys on the dial pad), or press "0" on the dial pad to redirect the call to the designated operator, which by default, is extension 200. The default systemwide Auto Attendant greeting can be personalized, so users can record two custom greetings and play one during the day, the other one at night.

PSTN lines connected to the PSTN gateway may be designated as either Auto Attended or Private Line. Calls arriving on Auto Attended lines are directed to the Auto Attendant function. Calls arriving on Private Line lines are routed directly to the extension associated with that line without going to the Auto Attendant. The following summarizes additional Auto Attendant features:

- Functionality distributed throughout the system
- Auto Attendant is populated automatically with names and extensions

Basic functionality includes:

- Dial by name
- Dial by number

- Escape to operator (which can be set to any extension in the system)
- Two custom greetings, enabled manually
- Multiple Auto Attendant configurations can be created through secure Web-based administration interface
- User configurable
- Multiple configurations
- Default greeting
- Caller menu
- Touchtone digit support
- Rotary/pulse redirection
- Call detection
- Blind transfer

3.5 Administration

Most system administration can be done by designated individuals using the screen and keypad of a one-X Quick Edition telephone. Users can also set personal preferences, such as passwords and call-forwarding alternatives. Administrative capabilities can also be accessed using a standard secure Web browser for functions such as remote provisioning, call logs and diagnostic logs.

3.5.1 Groups

Administrative capabilities can be accessed using the following:

- Up to 10 groups can be created.
- Configuration is via secure Web-based administration interface.
- A single group extension and name can be mapped to up to 10 telephone extensions.
- Dialing the group extension rings all the telephones in the group simultaneously.
- Single call appearance remains on the device used to answer the call.
- Specific call-forwarding rules can be applied to the group.
- Custom group dialing patterns and rules can be defined (for example, allow local calls/prohibit long-distance calls).

3.5.2 Options

The following options are available:

- Individual telephone settings affect local telephone only
 - Change-user options and voice mail password, or turn on/off user options password protection (voice mail password stays enabled)

- Adjust call-forwarding settings
 - Programmable number of rings to voice mail, directory number or dialed number
 - All calls to voice mail, directory number or dialed number
- Configure voice mail options
 - Specify number to support caller redirection (zero redirect), record name for Auto Attendant, record personal greeting
- Manage entries in the call log
 - Reset missed-call counter, clear incoming, clear outgoing, clear all
 - Change name to associate with extension in corporate directory
 - Set contrast level of display area
- Systemwide settings affect all peers making up the network:
- Change system options password
- Manage devices
- Change extension, remove extension, reset user password, upgrade software load, return device to factory settings
 - Optionally set the system date and time (which is normally set automatically from caller ID information when connected to PSTN)
 - Configure network options
- Change IP addresses, specify (Simple Mail Transfer Protocol) SMTP (e-mail) server, designate operator extension
- Manage PSTN Gateways
 - View details, select gain setting for PSTN lines, enable/disable music on-hold feature, change IP addresses
- View or modify Auto Attendant configurations
 - Extension, name, prompt, language, PSTN Gateway
 - Record and select custom greeting 1 or 2

3.5.3 Restrictions

The administrator can assign dialing restrictions for telephone groups or individual extension numbers.

3.5.4 Secure Web-Based Interface

User and system options can be viewed and updated through the Web-based interface. Users can review and update their user configurations through the user options interface, and administrators can set systemwide operating parameters through the system options interface. To use the Web-based interface, a PC must be connected to the same LAN as the one-X Quick Edition phones. The Web browser on the computer provides access to the Web-based interface

and provides local or remote password-protected access to user-specific and/or systemwide settings through a standard secure Web browser. Functionality supported includes:

- Determining IP address of a telephone
- Pointing Web browser to an IP address

Logging in to any device on the network accesses system settings and changes are propagated to all devices on the network automatically. HTTPS provides secure connection via an interface with the following attributes:

- Secure Sockets Layer encryption
- Password-protected
- User-specific options
- Systemwide options

4.0 Telephones Models

The system utilizes proven Avaya IP telephone platforms that include dual 10/100-Mbps switched Ethernet ports for connecting the LAN to the LAN port and the PC to the PC port on the telephone. PoE is not provided on the PC port. Specific models are described below.

Avaya one-X Quick Edition 4621SW IP Telephone is a P2P-enabled IP telephone with extra large backlit display, which is shown in Figure 2 displaying user option menu.

Figure 2. Avaya one-X Quick Edition 4621SW IP Telephone



Source: Avaya

Attributes include:

- Embedded one-X Quick Edition software

- 24 Programmable feature keys
- Four application buttons, along bottom of the display: speed dial, Web browser, call log, options
- Extra-large graphical display
- 10/100Base-T Ethernet ports
- 9 fixed feature keys: transfer, redial, speaker, mute, hold, conference, voice mail, drop and volume +/-

Avaya one-X Quick Edition 4610SW IP Telephone is a P2P-enabled IP telephone with large liquid crystal display, which includes the following:

- 12 programmable feature keys
- Large graphical display (10 x 24 character)
- 10/100Base-T Ethernet ports
- Four application buttons along bottom of the display: speed dial, Web browser, call log and options
- Nine fixed feature keys: transfer, redial, speaker, mute, hold, conference, voice mail, drop, volume +/-

5.0 Backup

Backup peers, such as an IP telephone or gateway, are assigned automatically through a proprietary algorithm. Each Avaya one-X Quick Edition IP telephone is backed up by primary and secondary devices while acting as backup for two other devices. Peers can also provide call-processing functions, such as call forwarding and voice mail, for missing devices. For example:

- Voice mail is stored locally unless a telephone is unplugged.
- New messages for unplugged telephone are handled by the backup unit and can be retrieved through any remote touch-tone telephone that has access to the network. Voice messages can be retrieved using the telephone user interface from any other Quick Edition telephone in the network or any touch-tone telephone via the PSTN.
- When the original telephone is reconnected, backup messages are transferred to original telephone and deleted from backup unit.

6.0 Avaya G10 PSTN Gateway

6.1 Installation

An Avaya G10 PSTN gateway provides access to the public switched telephone network through up to four standard analog loop-start or foreign exchange office (FXO) lines supplied by a service provider from a central office (CO). For 802.3af PoE-enabled LANs, one end of a Category Ethernet cable plugs into the LAN port on the G10 PSTN gateway, the other end connects to the Ethernet LAN used by the telephones. After a few minutes, LEDs on the G10's front panel turn green to signal that the G10 is ready for the next step. Avaya recommends that, only after all the telephones have been connected, one or more gateways be connected to the network using standard RJ11 terminations.

For LANS that are not 802.3af PoE-enabled, a 12 VDC power adapter is supplied that is plugged into a jack on the G10. After two or three minutes, LEDs on the front panel turn green to signal that the G10 is ready for the CO lines to be connected.

6.2 Failover and Bypass

To maintain an emergency connection to the PSTN, the user plugs an industry standard 2500-type single-line analog telephone into the bypass port on the G10 PSTN gateway and keeps a PSTN line connected to the L1 port on the G10's rear panel. In the event of a power failure, an internal connection between the L1 port and the bypass port automatically closes, which enables the telephone to place and receive calls.

6.3 Music On Hold

To enable the music-on-hold feature, the PSTN gateway provides an input jack for an audio input (marked Music on Hold on the PSTN gateway), which permits simple connection of a music source like a CD player.

6.4 External Paging

The PSTN gateway provides an output jack (marked External Paging on the PSTN gateway) for broadcasting announcements through the paging feature.

Table 1 describes the Avaya one-X Quick Edition in detail.

7.0 Specifications

Table 1. Avaya one-X Quick Edition

Feature	Details
Extensions	200 to 399. Extensions from 300 and up are not manually assignable; they have to be auto-assigned). (User can choose from among 200 extensions but cannot use 200 simultaneously.)
Speed Dial List	9
Directory Entries	
Corporate	300
Personal	100
Call List	
Redial (Outgoing)	100
Incoming	100
Voice Mail	
Storage	20 minutes total
Groups	9, with a maximum of 10 extensions per group
Paging Zones	7, in addition to the General Page zone
PSTN Gateways	10

Source: Avaya (March 2006)

8.0 Distribution Channels

With one-X Quick Edition, Avaya has chosen to use a multichannel distribution approach. As well as leveraging its existing direct and two-tier distribution resources, it is also making the solution available through DMR channels, such as CDW.

9.0 Pricing

Table 2 summarizes the list price for each component, which also includes all licenses.

Table 2. Avaya one-X Pricing Summary

Component	List Price (\$)
one-X Quick Edition 4610SW IP Telephone	485
one-X Quick Edition 4621SW IP Telephone	585
G10 PSTN Gateway	375

Source: Avaya (March 2006)

10.0 Competitors

- Alcatel OmniPCX Office
- Cisco CallManager Express
- Inter-Tel CS-5200
- Mitel 3340 ICP
- NEC Electra IPK II
- Nortel BCM 50
- Panasonic KXTD series
- Popular Telephony Peerio offers
- ShoreTel Small Office Edition
- Siemens HiPath 3300 and HiPath Biz IP
- Toshiba small Strata DK and CTX offers

11.0 Product Road Map

By the end of 2006 Avaya plans to support the following capabilities:

- SIP connectivity through Avaya's SIP Enablement Services (SES) to connect different Quick Edition offices to other Avaya systems including Avaya Communication Manager
- Centralized remote "bulk" provisioning, which will allow a central administrator to make one or more changes to multiple branches with a single set of commands. Examples include defining several dialing rules and applying them to all branch offices, rather than needing to log into each office individually and defining the rules. It will also allow a central administrator to push a software patch, update or upgrade to multiple branches with a single command.

- Direct SIP trunk termination to support voice over Internet Protocol carriers and hosted IP telephony offers, such as IP Centrex.
- Teleworker applications
- Product availability in Europe, the Middle East and Africa, including a new configurable analog gateway and a Basic Rate Interface gateway; multiple language support; and localizable tones and dial-plans
- Networked branch solution that includes centralized management
- Key system functionality, such as call park/retrieve
- Enhanced toll restriction options

12.0 Strengths

- Simple plug-and-play installation by most users
- Web-based administration
- Scalable one phone at a time
- Software-based intelligence is in the phone
- Most frequently used telephony features packaged all in the phone
- No single point of telephony system failure, except for the gateway
- Telephones automatically back up each other
- Automatic backup for voice mail
- Support for PoE, local and in-line power options
- While the voice mail application is missing features, such as message broadcast and forwarding, it does include an integrated visual interface and telephone user interface (TUI) for voice mail access and control.
- Compatibility with Avaya's SIP SES, to be available during 2006, will enable multiple offices for an enterprise, using Quick Edition systems, to be connected to a centralized enterprise network.

13.0 Limitations

- No support for T1/E1, ISDN, DID and Centrex facilities
- No key telephone system functionality, such as direct line selection and bridged call
- No support for features such as call park, boss/secretary signaling, call pickup and automatic call distribution
- No support for networking with enterprise-level platforms
- No multilingual capability
- No support for wireless handsets

- No IP softphone
- Interoperability with generic SIP telephones on the same LAN is not supported but is planned for the longer term

14.0 Insight

Avaya is breaking new ground for what is likely a ground-floor opportunity. The basic functionality the initial release of Avaya one-X Quick Edition supports is more than made up for by the promise it offers: promise for a small IP telephony solution that is extremely easy to install and manage. Promise for one that is more cost-effective than traditional or IP-based alternatives that require a central server. Promise for a solution that is inexpensive to maintain and can satisfy not only the needs of small businesses but also the needs of large organizations looking for economical small-site solutions that can network with enterprise-based platforms. While one-X Quick Edition competes with Avaya IP Office, users of small Avaya Partner and Legend systems now have another clear and economical migration path to IP telephony. Finally, Avaya is altering its channel strategy to ensure that distribution is cost-effective for dealers that sell systems to small businesses and that users will be able to find competitive pricing.

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