Helpful info courtesy of Cisco Networking Academy

When people began to use cell phones, there were few industry-wide standards for cell phone technology. Without standards, it was difficult and expensive to make calls to people that were on another network. Today, cell phone providers use industry standards, making it easier to use cell phones to make calls.

Cellular standards have not been adopted uniformly around the world. Some cell phones are capable of using multiple standards, whereas others can use only one standard. As a result, some cell phones can operate in many countries, and other cell phones can only be used locally.

The first generation (1G) of cell phones began service in the 1980s. First-generation phones primarily used analog standards. With analog, interference and noise cannot easily be separated from the voice in the signal. This factor limits the usefulness of analog systems. Few 1G devices are in use today.

In the 1990s, the second generation (2G) of mobile devices was marked by a switch from analog to digital standards. Digital standards provide higher call quality. These are some common 2G standards:

* Global System for Mobile (GSM)
* Integrated Digital Enhanced Network (iDEN)
* Code Division Multiple Access (CDMA)
* Personal Digital Cellular (PDC)

As 3G cell phone standards were being developed, extensions to the existing 2G standards were added. These transitional standards are known as 2.5G standards. These are some common 2.5G standards extensions:

* General Packet Radio Service (GPRS)
* Enhanced Data Rates for GSM Evolution (EDGE)
* CDMA2000

Third-generation (3G) standards enable mobile devices to go beyond simple voice and data communications. It is now common for mobile devices to send and receive text, photos, audio, and video. 3G even provides enough bandwidth for video conferencing. 3G mobile devices are also able to access the Internet to browse, play games, listen to music, and watch video. These are some common 3G standards:

* Universal Mobile Telecommunications System (UMTS)
* CDMA2000
* Evolution-Data Optimized (EV-DO)
* Freedom of Mobile Multimedia Access (FOMA)
* Time Division Synchronous Code Division Multiple Access (TD-SCDMA)

Fourth-generation (4G) standards provide ultra-broadband Internet access. Higher data rates allow users to download files much faster, perform video conferencing, or watch high-definition television. These are some common 4G standards:

* Mobile WiMAX
* Long Term Evolution (LTE)

The specification for 4G devices requires a maximum of 100 Mb/s communication for highly mobile devices like those in a car. The specification also requires a maximum of 1 Gb/s for devices being used by people moving slowly or standing still.

**WiMAX and LTE**

Even though Mobile WiMAX and LTE fall short of the data rate to be compliant with 4G (128 Mb/s and 100 Mb/s, respectively), they are still considered 4G standards, because they offer so much improvement over the performance of 3G. WiMAX and LTE are also forerunners to versions that will be compliant with the full specification of 4G.

Technologies that add multimedia and networking functionality can be bundled with cellular standards. The two most common are Short Message Service (SMS), used for text messaging, and Multimedia Message Service (MMS), used for sending and receiving photos and videos. Most cellular providers charge extra for adding these features.

Email and Smartphones

Email software can be installed as part of a web browser or as a standalone application. Any email program can be used with Windows 7. Windows Live Mail is an email program that is recommended by Microsoft. It manages multiple email accounts, calendars, and contacts, as shown in Figure 1. To install Windows Live Mail, download and install Windows Essentials from Microsoft. Windows Live Mail is included in Windows Essentials.

You should have the following information available when setting up an email account:

* **Display name** - This can be your real name, nickname, or any other name that you want people to see.
* **Email address** - This is the address people need to send email to you. An email address is a username followed by the @ symbol and the domain of the email server (user@example.net).
* **Protocol used by the incoming mail server** - Different protocols provide different email services.
* **Incoming and outgoing mail server names** - These names are provided by the network administrator or ISP.
* **Username** - This is used to log in to the mail servers.
* **Account password** - The password should be strong, because mail accounts are often available from websites.

The protocols used in email include the following:

* Post Office Protocol version 3 (POP3)
* Internet Message Access Protocol (IMAP)
* Simple Mail Transfer Protocol (SMTP)
* Multipurpose Internet Mail Extensions (MIME)
* Secure Socket Layer (SSL)

You need to know how to configure a device to accept the correct incoming mail format. You can configure the email client software using a wizard, as shown in Figure 2.

**POP3**

POP3 retrieves emails from a remote server over TCP/IP. POP3 does not leave a copy of the email on the server; however, some implementations allow users to specify that mail be saved for some period of time. POP3 supports end users that have intermittent connections, such as dialup. A POP3 user can connect, download email from the server, and then disconnect. POP3 usually uses port 110.

**IMAP**

IMAP allows local email clients to retrieve email from a server. Like POP3, IMAP allows you to download email from an email server using an email client. The difference is that IMAP allows the user to organize email on the network email server, and download copies of email. The original email remains on the network email server. Unlike POP3, IMAP typically leaves the original email on the server until you move the email to a personal folder in your email application. IMAP synchronizes email folders between the server and client. IMAP is faster than POP3, but IMAP requires more disk space on the server and more CPU resources. The most recent version of IMAP is IMAP4. IMAP4 is often used in large networks, such as a university campus. IMAP usually uses port 143.

**SMTP**

SMTP is a simple, text-based protocol that transmits emails across a TCP/IP network and is the email format for text that uses only ASCII encoding. SMTP must be implemented to send email. SMTP sends email from an email client to an email server, or from one email server to another. A message is sent after recipients are identified and verified. SMTP usually uses port 25.

**MIME**

MIME extends the email format to include text in ASCII standard as well as other formats, such as pictures and word processor documents. MIME is normally used in conjunction with SMTP.

**SSL**

SSL was developed to transmit files securely. All data exchanged between the email client and the email server is encrypted. When configuring an email client to use SSL, make sure to use the correct port number for the email server.

**Exchange**

Exchange is a mail server, contact manager, and calendaring software created by Microsoft. Exchange uses a proprietary messaging architecture called Messaging Application Programming Interface (MAPI). MAPI is used by Microsoft Office Outlook to connect to Exchange servers, to provide email, calendar, and contact management.