Supporting and Troubleshooting Mobile Devices



Supporting and Troubleshooting Mobile Devices

- Mobile Device Types
- Connect and Configure Mobile Device Accessories
- Configure Mobile Device Network Connectivity
- Support Mobile Apps



Mobile Devices

- Smartphones and tablets used in the workplace need support, too.
- Mobile OSs (iOS, Android, or Windows Mobile).
- Store-based software ecosystems.

Smartphones

- One-handed operation
- Touchscreen displays
- Screen sizes range from 4.5" to 5.7"
- Multicore CPUs
- 2 to 6 GB system memory
- 16 GB+ flash memory storage
- Features:
 - Digital cameras
 - Input sensors
 - Networking via Wi-Fi or cellular data



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Tablets

- Usually 7" or 10" screen
- Might be able to connect to a removable physical keyboard
- Some laptops can also function as a tablet by flipping the screen
- Usually connect to a Wi-Fi network; some have cellular option
- Phablets—cross between a phone and a tablet with 5.5" to 7" screen



Mobile Devices vs. Laptops

Factor	Description
Processors	 Mobile devices: CPUs and chipsets are based on ARM microarchitecture. Dual- and quad-core CPUs are common, with some 64-bit CPUs available. Provide more power and thermal efficiency. PCs and laptops: CPUs and chipsets are based on CISC and RISC microarchitecture. Dual- and quad-core CPUs are widespread, with many 64-bit CPUs available.
System memory	Tablet RAM is a low power DDR SDRAM variant. Works similarly to PC/laptop RAM.
Storage	SSDs used in mobile devices instead of HDDs.
Component replacements and upgrades	More FRUs for PCs and laptops. Tablet components are soldered and glued, making it necessary to replace the entire device.
OSs	More OS options for PCs and laptops. Mobile devices limited to the mobile OS they were designed to run.

Mobile Display/Touch Interface

Touchscreen: A display screen combined with a digitizer that is responsive to touch input.

- Capacitive touchscreens support multitouch (sweep, pinch, etc.).
- Haptic feedback (vibrations) provides a more realistic feel to the user.
- Protected by scratch- and shock-resistant tempered glass.
- Screen orientation is changeable.

Mobile Device Form Factors

- Fewer field serviceable parts than PCs and laptops.
- Return to manufacturer for replacing screens, storage devices, and possibly batteries.
- Some batteries can be replaced by the user.
- Some devices will have a SIM card port.



E-Readers

e-reader: A tablet-sized device designed for reading, rather than for general-purpose computing.

- E-ink technology creates EPD.
- Low-power, high-contrast display.
- Backlights often not needed, saving power.
- USB chargers.
- Wi-Fi connectivity for downloading e-books.



Wearable Technology

- Smart watches
- Fitness monitors
- VR/AR headsets and smart glasses



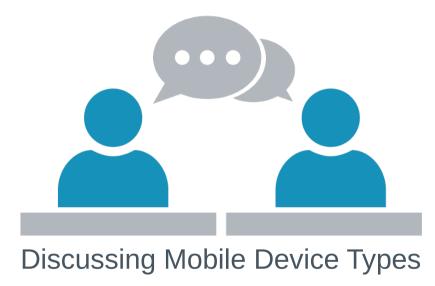


GPS Navigation Devices

Global Positioning System (GPS): Means of determining a receiver's position on the Earth based on information received from GPS satellites. The receiver must have line-of-sight to the GPS satellites.

- Built into smartphones and other devices.
- Dedicated units for vehicles, cyclists, or walkers.
- Geolocation system, map, and local traffic information.
- Route planning and directions.
- Some provide live traffic information.
- Touch and voice controls available.

Activity



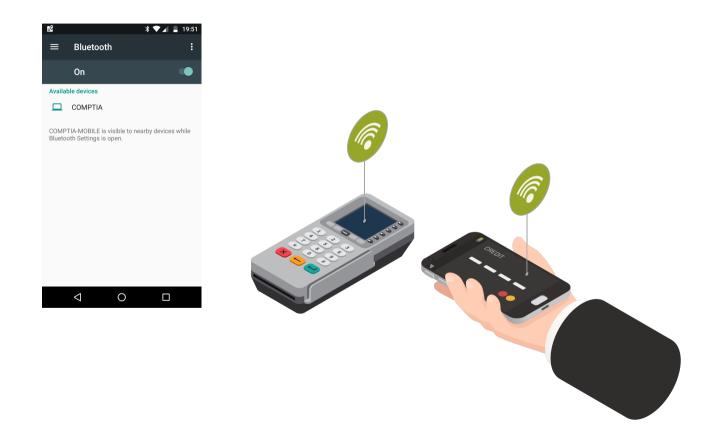


Wired Connections for Accessories

- Apple devices:
 - Apple Dock for older devices.
 - Apple Lightning connector.
- Android devices:
 - Micro-B USB connectors for most devices.
 - Mini-B for older devices.
 - USB-C on newer devices.

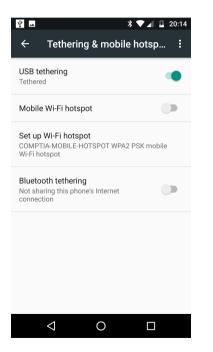
Wireless Connections for Accessories (slide 1 of 2)

- Bluetooth
- NFC
- IR



Wireless Connections for Accessories (slide 2 of 2)

Tethering



Mobile hotspots

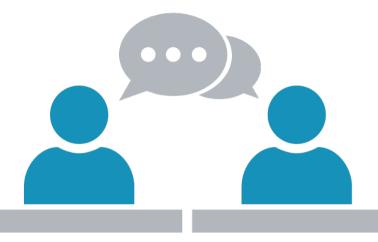
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Tethering & mobile hotspot	\leftarrow Tethering & mobile hotsp
Set up Wi-Fi hotspot	USB tethering USB connected, select to tether
N COMPTIA-MOBILE-HOTSPOT	Mobile Wi-Fi hotspot Mobile hotspot COMPTIA-MOBILE- HOTSPOT active
WPA2 PSK - Password	Set up Wi-Fi hotspot COMPTIA-MOBILE-HOTSPOT WPA2 PSK mobile Wi-Fi hotspot
The password must contain at least 8 characters.	Bluetooth tethering Not sharing this phone's Internet connection
Select AP Band 2.4 GHz Band	
CANCEL SAVE	

Common Mobile Device Accessories

- External keyboard
- Headset
- Speaker dock
- Micro-SD slot
- Docking stations
- Protective covers and waterproofing
- Credit card readers
- Mobile power



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Discussing Mobile Device Accessory Connection and Configuration Tethering: <u>https://www.youtube.com/watch?v=hDxQSedfoKM</u>

Web



Cellular Data Networks (Slide 1 of 4)

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Cellular data: Connecting to the Internet via the device's cell phone radio and the handset's cellar network provider.

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Settings Mobile Da	ita	⊡ • ○ • ♦ .	17:0
		≡ Data usage	:
Mobile Data			
Mobile Data Options	Roaming On >	Usage 151 MB mobile data	
Turn off mobile data to restrict all including email, web browsing and		6 Sep – 5 Oct	
VODAFONE UK		0 B	500 MB
Wi-Fi Calling	Off >	300 MB data warning / 500 MB data limit	
Carrier Services	>	Data Saver	
Personal Hotspot	Off >	Off	
MOBILE DATA		Mobile	
Current Period	3.6 GB	Mobile data	
Current Period Roaming	458 MB	Mobile data usage 151 MB used between 6 Sep – 5 Oct	
All 4 62.4 KB		Billing cycle	
App Store		Monthly starting 6	

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Cellular Data Networks (Slide 2 of 4)

- Mobile hotspots and tethering
- Cellular radios:
 - Base station effective range up to 5 miles
 - Transmitter connects phone to mobile and landline phone networks
 - Works in the 850 and 1900 MHz frequency bands in Americas
 - Works in the 900 and 1800 MHz frequency bands in the rest of the world
 - GSM deployed worldwide
 - CDMA used in the Americas

Pers	sonal Hotspot
Now	Discoverable.
	r users can look for your shared network using Wi- d Bluetooth under the name "Patricia's iPhone".
Wi-F	Fi Password
0	TO CONNECT USING WI-FI
Ŧ	1 Choose "Patricia's iPhone" from the Wi-Fi settings on your computer or other device.
	2 Enter the password when prompted.
•	TO CONNECT USING BLUETOOTH
$\mathbf{\Lambda}$	1 Pair iPhone with your computer.
	2 On iPhone, tap Pair or enter the code displayed on your computer.
	3 Connect to iPhone from computer.
	TO CONNECT USING USB
Ŷ	1 Plug iPhone into your computer.
Т	 Choose iPhone from the list of network services in your settings.

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Cellular Data Networks (Slide 3 of 4)

- GSM (Global Standard for Mobile) networks and SIM cards:
 - GSM is an international system that works with SIM cards
 - Handsets are identified by IMEI (international mobile equipment number)
 - Users are identified by IMSI (International Mobile Subscriber Identity) number
- SIM card number format:
 - 3-digit mobile country code
 - 2-digit mobile network code
 - Up to 10-digit mobile station identification number

Cellular Data Networks (Slide 4 of 4)

- CDMA (Code Division Multiple Access) networks:
 - Locks handset to original provider
 - Does not require use of a SIM card
 - Handsets are identified by MEID (Mobile Equipment ID) number
 - Uses PRI and PRL databases for information needed to connect cellular radio to the network
 - If the handset contains a SIM card, it is to connect to 4G networks, which are GSMbased networks
 - Mostly a standard in the Americas.

Baseband Updates and Radio Firmware

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Baseband update: Modification of the firmware of a cellular modem (controls wireless connections). Uses a
Radio firmware: An operating system that is separate from the end-user operating system in a mobile device. It is a
Realtime Operating System (RTOS): An OS that is optimized for use in embedded or real-time apps.

- Baseband updates modify the radio firmware.
 - Firmware OS is separate from the user OS.
 - Controls low-level timing-dependent functions (USB, network, and GPS).
 - Runs all available radio functions (cellular, Wi-Fi, and Bluetooth).
- Updates usually pushed by device vendor as part of an OS upgrade.

Wi-Fi Networks and Hotspots (slide 1 of 2)

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Hotspot: A mobile device setting or access point that enables using the cellular data plan of the mobile device to connect a PC or laptop to the Internet.

- All smartphones and tablets support Wi-Fi communication.
 - In iOS, select **Settings**→**Wi-Fi** to connect.
 - In Android, use the notification shade or open the **Settings** \rightarrow **Wi-Fi** menu.
- Hotspot implementations:
 - Public access point (free or paid).
 - Smartphone or tablet.
 - Wireless router designed for personal hotspots.

Wi-Fi Networks and Hotspots (slide 2 of 2)

	☑
← Wi-Fi ●	← Configure Wi-Fi
comptia_wlan Connected f=2412 18:d6:c7:6b:fe:43	Saved networks
<pre>rssi=-39 score=60 tx=0.0,0.0,0 rx=0.0 [(1) {18:d6:c7:6b:fe:43*=2412,-40};] BTWifi-X</pre>	Reset default networks Restore modified Wi-Fi settings to network defaults
	Network notification Notify whenever a public network is available
	Keep Wi-Fi on during sleep Always
MORE SETTINGS DONE	MAC address 80:58:f8:d4:26:d0 IP address fe80::8258:f8ff:fed4:26d0 192.168.1.107 2a00:23c4:240e:201:8258:f8ff:fed4:26d0
	2a00:23c4:240e:201:b033:b22f:c59c:ded0

Mobile VPN Configuration

Virtual Private Network (VPN): A secure tunnel created between two endpoints connected via an unsecure network (typically the Internet).

Mobile VPN: A VPN that can maintain the VPN link across multiple carrier networks, where the IP address assigned to the mobile device may change often.

- Tunnel contents often encrypted to secure communications.
- Mobile VPN assigns virtual IP address for connecting to VPN server.
- Links maintained even in sleep mode.
- Available as third-party apps for Android and iOS.

Bluetooth (slide 1 of 3)

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Bluetooth: Short-range radio-based technology, working at up to 10 m (30 feet) at up to 1 Mbps, used to connect peripherals for communication between two devices.

- Latest versions support 24 Mbps data rate.
- Used for PANs (Personal Area Networks).
 - Share data with a PC.
 - Connect to a printer, wireless headset, or other peripheral.
- Pairing connects the devices.
 - In iOS, select **Settings**→**General**→**Bluetooth.**
 - In Android, access through the notification shade.
 - In Windows, access through Control Panel, Windows Settings, or the Bluetooth icon in the notification area.

Bluetooth (slide 2 of 3)



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Bluetooth (slide 3 of 3)

Settings	– 🗆 X	
û Home	Bluetooth & other devices	
Find a setting ρ	+ Add Bluetooth or other device	
Devices Pair Device	X	
Bluetooth & ot		
	PTIA-MOBILE" match the PIN below?	
() Mouse 998584		
Touchpad Yes	Cancel	
I Typing		
🖉 Pen & Windows Ink		
AutoPlay AutoPlay	Other devices	
🖞 USB	BRAVIA KDL-42W653A Not connected	
	COMPTIA-LABS: Not connected	

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Airplane Mode (slide 1 of 2)

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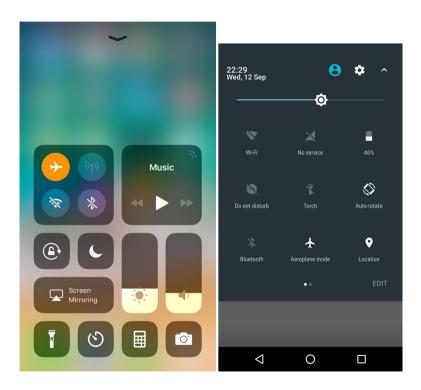
Control Center: An iOS feature that is accessed by swiping up from the bottom of the display to access iOS feature settings.

Notification shade: An Android feature that is accessed by swiping down from the top of the display to access Android OS feature settings.

Airplane mode: A toggle found on mobile devices enabling the user to disable and enable wireless functionality quickly.

Airplane Mode (slide 2 of 2)

- Disables all wireless features.
 - Cellular data
 - Wi-Fi
 - GPS
 - Bluetooth
 - NFC



Email Configuration Options (Slide 1 of 4)

Commercial Provider Email Configuration

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Add an account		
Exchange	Μ	Μ
Google	Add your email address	jpengelly@comptia.org
Lenovo ID	Enter your email address jpengelly@comptia.org	Redirect request
Office		To configure your account, Gmail is being asked to send account
Outlook	MANUAL SETUP NEXT	info to https://www.comptia.org /autodiscover/autodiscover.xml. Is this OK?
Personal (IMAP)	q ¹ w ² e ³ r ⁴ t ⁵ y ⁶ u ⁷ i ⁸ o ⁹	CANCEL OK
Personal (POP3)	asd fghjk	i l
S Skype		
WhatsApp	?123 @ 🙂 .	
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Email Configuration Options (Slide 2 of 4)

- Corporate and ISP Email Configuration:
 - Autodiscover with Exchange and Exchange ActiveSync.
 - For ISPs and corporate mail gateways that don't support Autodiscover, manually enter the mail server address information:
 - Incoming mail server type (IMAP or POP3)
 - Outgoing mail server type (SMTP)
 - SSL setting (enable or disable)
 - Ports

Email Configuration Options (Slide 3 of 4)

Il vodafone UK 19:39 ✓ ★ ■ ✓ Accounts Add Account	•III vodafone UK 🗢 Cancel	19:40 New Account	✓ * ■ Next	Cancel	► 19:42 1 * ■ New Account Next
iCloud	Name J	James Pengelly		Name	James Dengelly
E S Exchange		pengelly@comptia.org		Email	James Pengelly jpengelly@comptia.org
Google	Password • Description (Comptia		Description	Comptia
YAHOO!				INCOMING MAIL Host Name	_ server mail.comptia.org
Aol.				Username Password	jpengelly
od Outlook.com	q w e	rtyui	o p	OUTGOING MAI	
Other	a s d				mail.comptia.org
	ŵ z x	c v b n m		Username Password	Optional Optional
	.?123	space	return		

Email Configuration Options (Slide 4 of 4)

- S/MIME (Multipurpose Internet Mail Extension):
 - Using secure ports alone does not provide end-to-end encryption for messages.
 - Encryption with digital certificates and digital signatures does.
 - PGP and S/MIME use digital certificates and public/private key pairs.
 - When you sign a message, your private key validates who you are and the public key related to that private key goes to the recipients. The public key allows the recipient to verify who you are.
 - When you want to receive secure messages, the sender uses your public key to encrypt the message. Once encrypted, only your private key can decrypt it (your public key cannot be used to reverse the encryption).
 - Digital and root certificates are often added to the device by using MDM software.

Activity



Discussing Mobile Device Network Connectivity Configuration 30bird 17.3.2-17.3.6



Activity



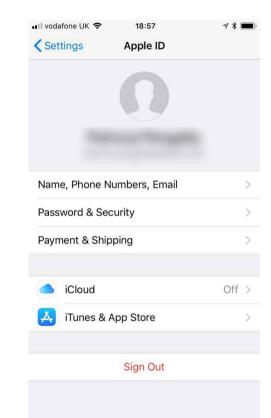
Configuring Bluetooth

Bluetooth: https://www.youtube.com/watch?v=oMzV98a1amk



Mobile Account Setup

- User accounts:
 - Normally 1 per device, created at initial use.
 - For iOS: Apple ID.
 - For Android: Google account, Samsung account, or similar.
 - Unique ID and credentials required.
 - Provides access to app store, email, cloud storage.
- Sub-accounts for additional services and apps:
 - Corporate email or messaging.
 - Facebook.
 - LinkedIn.



Mobile Applications and App Stores (slide 1 of 2)

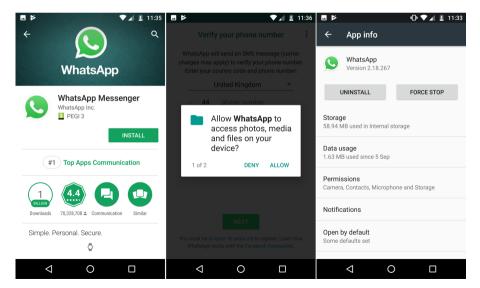
App: Installable programs the extend the functionality of a mobile device.

- iOS apps:
 - Get from App Store.
 - Free or paid.
 - Walled garden model—all apps reviewed and approved by Apple.



Mobile Applications and App Stores (slide 2 of 2)

- Android apps:
 - Get from Google Play Store or third-party sites.
 - Free or paid.
 - More open model for app acquisition: store model, or APKs (sideloading).



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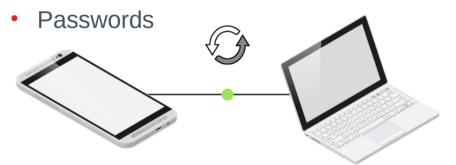
Types of Data to Synchronize

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Mobile device synchronization: The act of copying data back and forth between devices to keep the information up-to-date on all of the devices.

- Contacts
- Calendar
- Email
- Pictures, music, and video
- Documents
- E-books

- Location data
- Social media data
- Apps
- Bookmarks



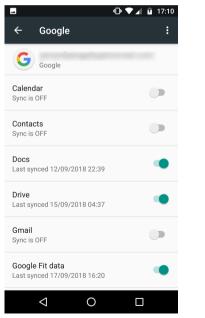
Synchronization Methods (Slide 1 of 3)

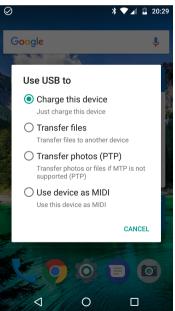
- iOS syncs to desktop via iTunes
- iOS syncs to cloud via iCloud

File Edit View Controls Store	Advanced Help iTunes	X
•		
LIBRARY	Summary Info Apps Music Films TV Programmes Photos	
J Music STORE Image: Trunes Store Image: Trunes Match OP Ing Image: Purchased O Downloads DEVICES Image: SiPhone Image: Match Image: Match Image: Match Image: SiPhone Image: SiPhone	Selected group All contacts with Outlook Contacts Selected group Yahoo! Address Book Add contacts created outside of groups on this iPhone to:	
	Sync Calendars with Outlook +	
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) + (
	Capacity Revert 13.59 GB Photos Other Free Apply 0.01 GB 0.39 GB 13.3 GB Apply	
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Synchronization Methods (Slide 2 of 3)

- Android uses the gmail account to sync with cloud storage and Google Play Store.
- You can connect to a PC via USB to transfer data directly.







Synchronization Methods (Slide 3 of 3)

- Microsoft synchronization products
 - OneDrive
 - Outlook.com
 - Office 365
- Third-party synchronization products
 - Vendor-based cloud services
 - Dropbox
- Sync to automobiles.
 - Newer vehicles use head unit to manage entertainment and navigation.
 - Smartphone can be attached to head unit.
 - Apple CarPlay
 - Android Auto

Mutual Authentication for Multiple Service

Single Sign On: (SSO) One service accepts the credentials from another service. Also known as **federated identity management**.

- Sign in once to authenticate to many services
- Enterprise networks:
 - Email
 - Database
 - Document management system
- Mobile device apps use device sign-in credentials:
 - iPhone with an Apple ID
 - Vendor cloud services

Activity



Discussing Mobile App Support

Sideloading Apps: <u>https://www.youtube.com/watch?v=U4I260wo9vE</u>



Reflective Questions

- 1. In your professional experience, have you supported mobile devices? If not, what kind of experience do you have with them?
- 2. What type of technical support do you think will be expected of an A+ technician as mobile devices become even more prominent within the workplace?

