

Supporting and Troubleshooting Mobile Devices

CompTIA®

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



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	<p>Mobile devices:</p> <ul style="list-style-type: none">• 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. <p>PCs and laptops:</p> <ul style="list-style-type: none">• 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	<p>Tablet RAM is a low power DDR SDRAM variant. Works similarly to PC/laptop RAM.</p>
Storage	<p>SSDs used in mobile devices instead of HDDs.</p>
Component replacements and upgrades	<p>More FRUs for PCs and laptops. Tablet components are soldered and glued, making it necessary to replace the entire device.</p>
OSs	<p>More OS options for PCs and laptops. Mobile devices limited to the mobile OS they were designed to run.</p>

Mobile Display/Touch Interface

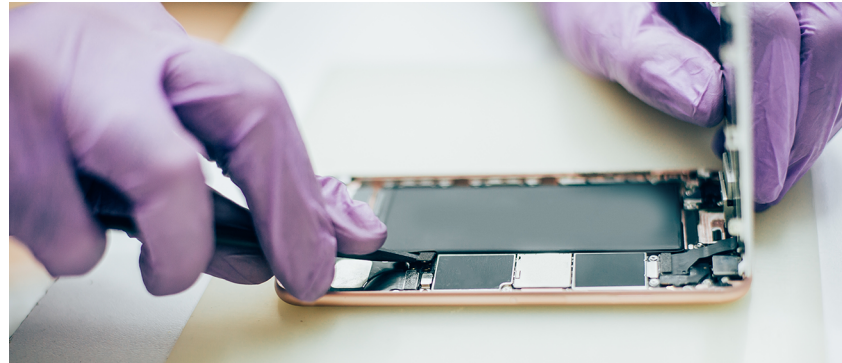


Touchscreen: A display screen combined with a digitizer that is responsive to touch input.

- 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.

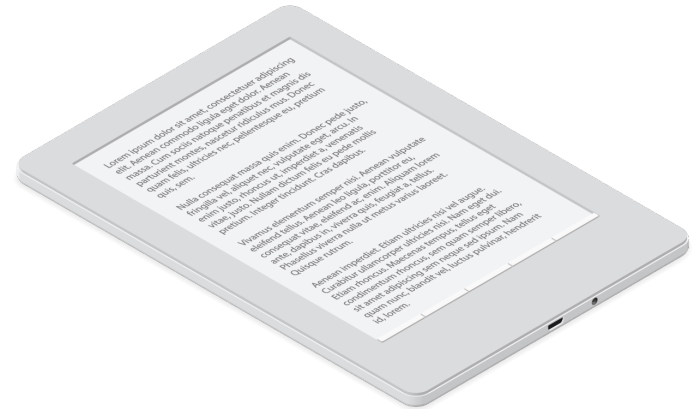


E-Readers



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.

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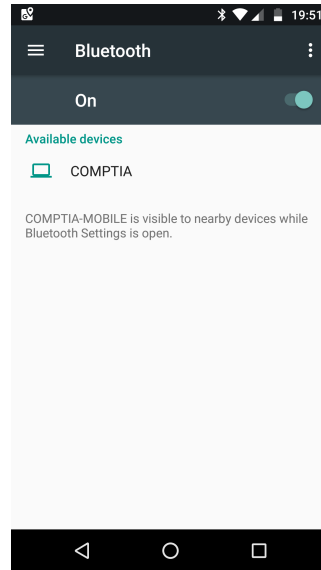
Discussing Mobile Device Types

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.

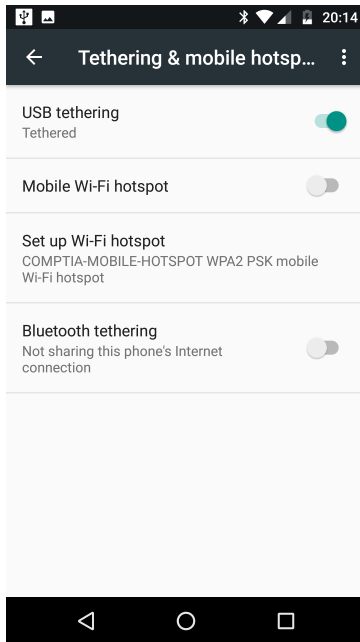
Wireless Connections for Accessories (slide 1 of 2)

- Bluetooth
- NFC
- IR

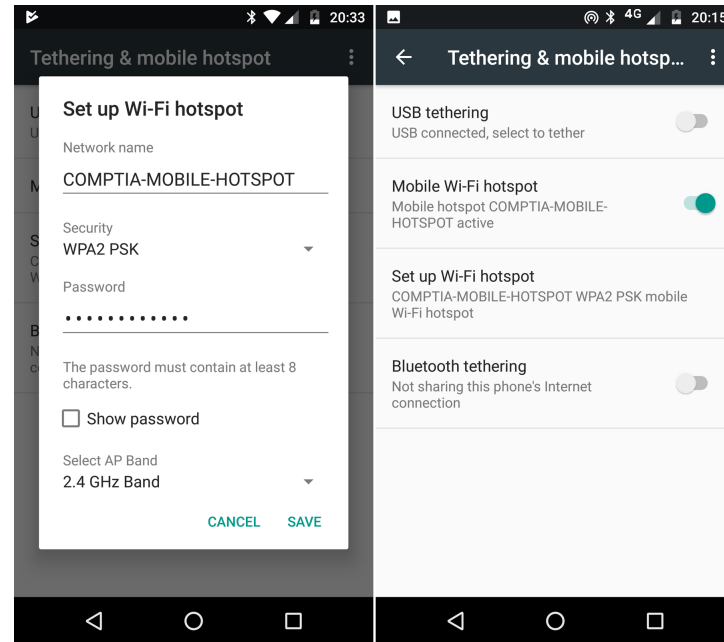


Wireless Connections for Accessories (slide 2 of 2)

Tethering

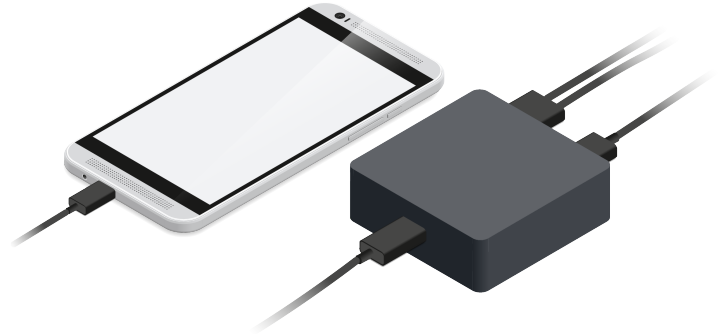


Mobile hotspots



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

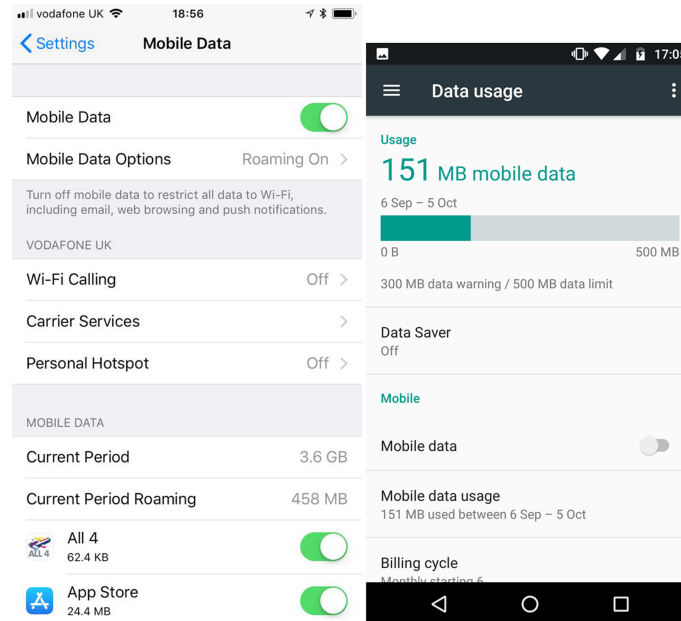
Tethering: <https://www.youtube.com/watch?v=hDxQSedfoKM>

Web

Cellular Data Networks (Slide 1 of 4)

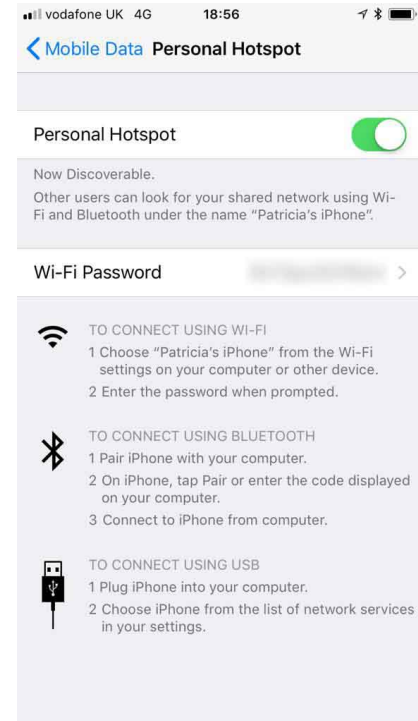


Cellular data: Connecting to the Internet via the device's cell phone radio and the handset's cellular network provider.



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



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 GSM-based networks
 - Mostly a standard in the Americas.

Baseband Updates and Radio Firmware



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.

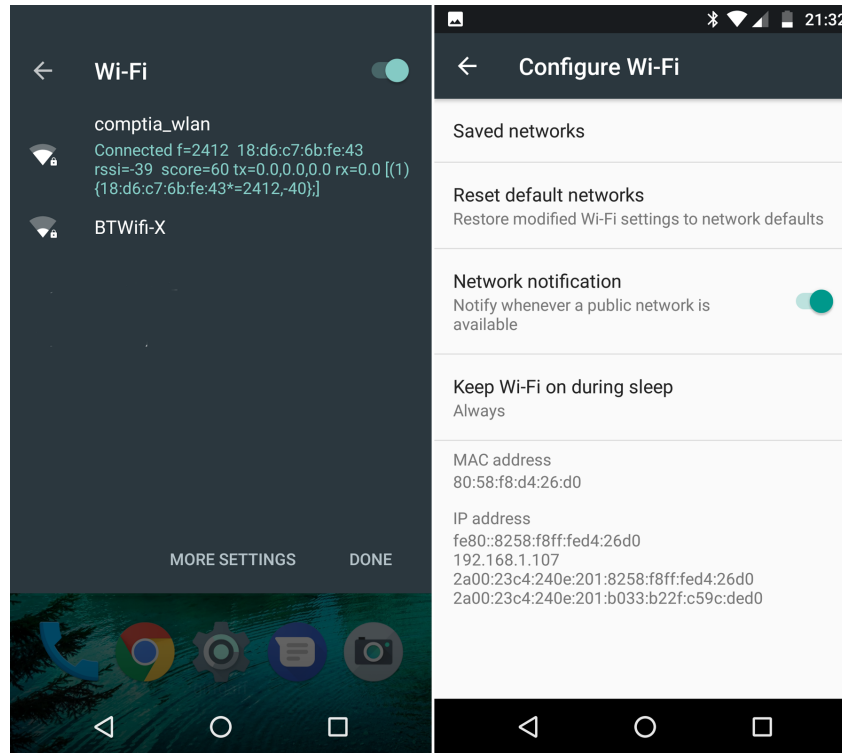
Wi-Fi Networks and Hotspots (slide 1 of 2)



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**→**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)



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)



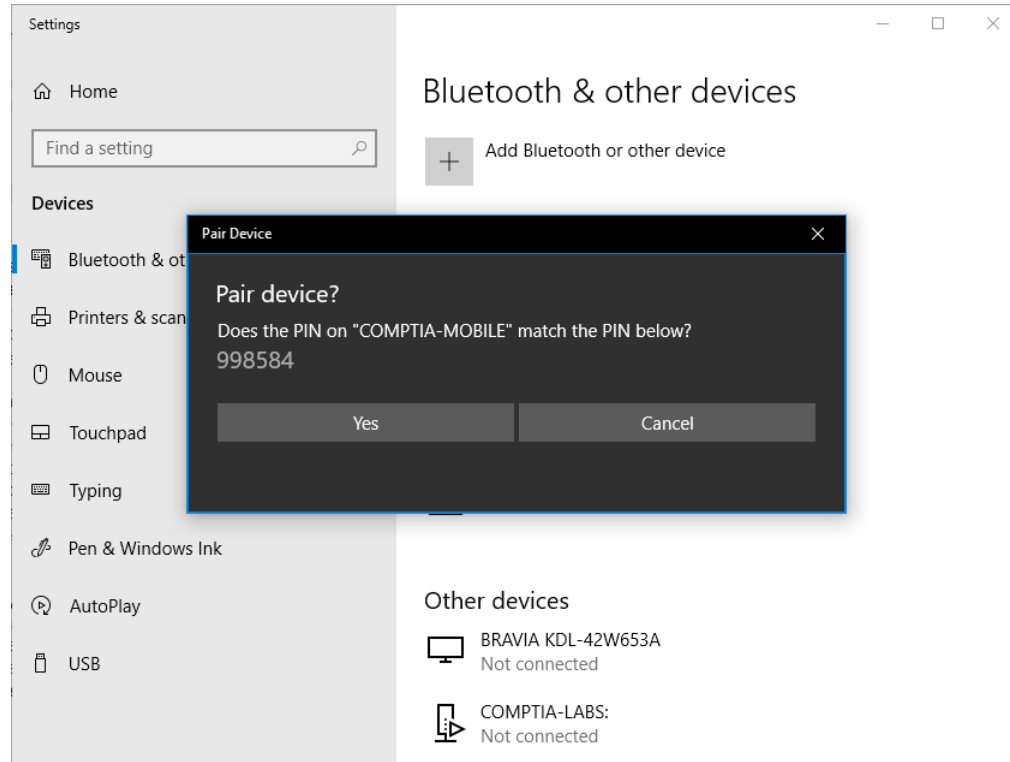
Bluetooth: Short-range radio-based technology, working at up to 10 m (30 feet) at up to 1 Mbps, used to connect peripherals for communication between two devices.

- 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)



Bluetooth (slide 3 of 3)



Airplane Mode (slide 1 of 2)



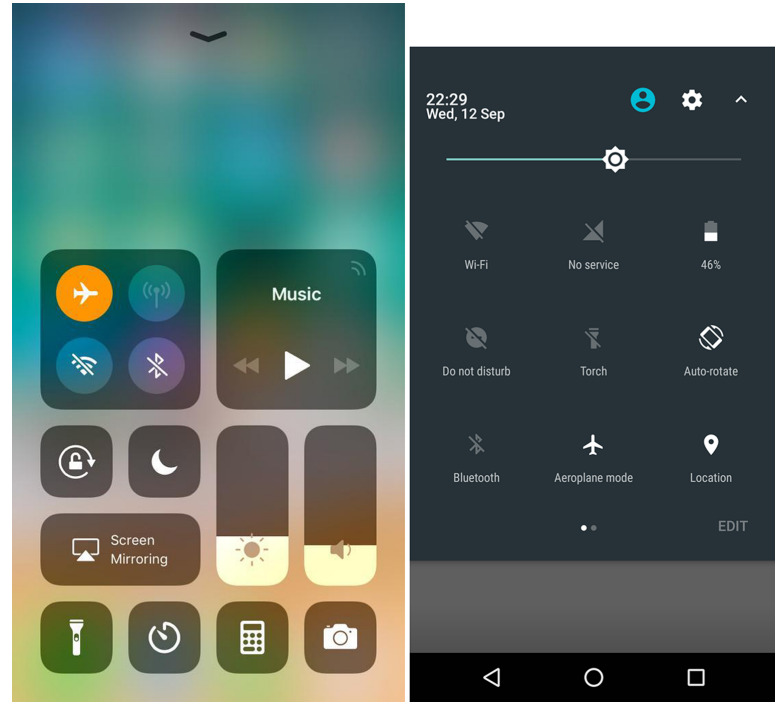
Control Center: An iOS feature that is accessed by swiping up from the bottom of the display to access iOS feature settings.

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.

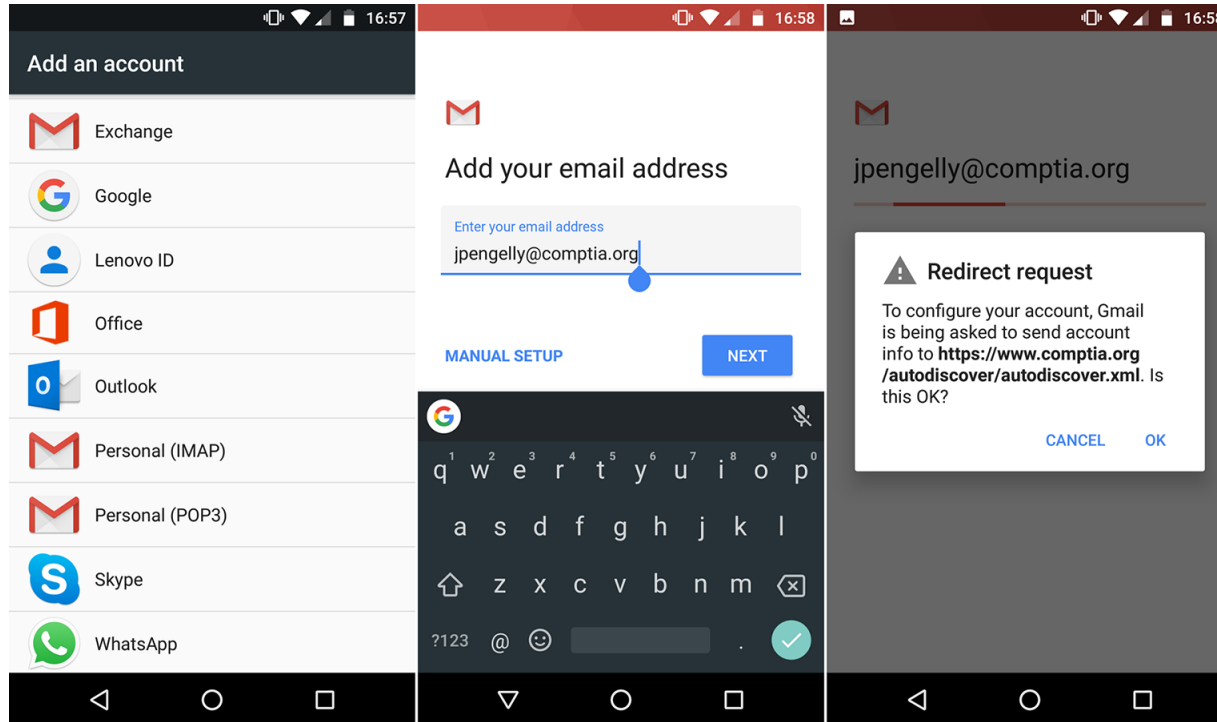
Airplane Mode (slide 2 of 2)

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



Email Configuration Options (Slide 1 of 4)

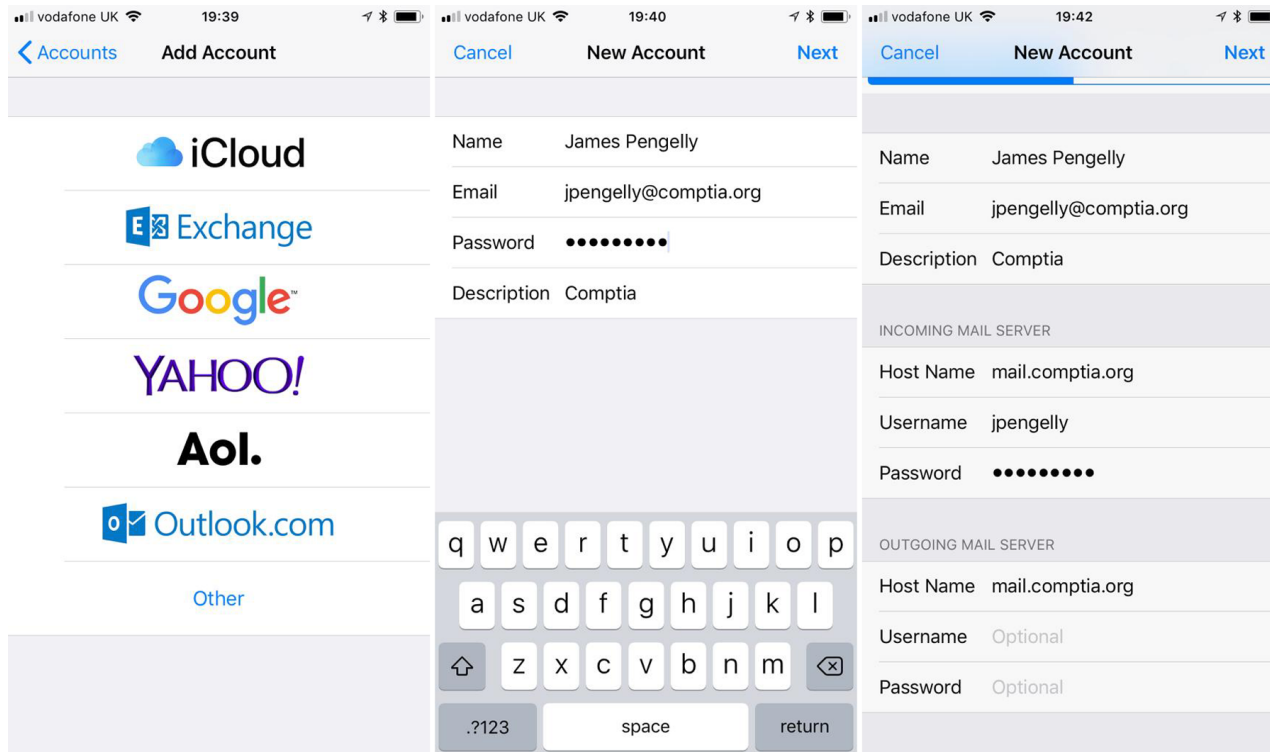
- Commercial Provider Email Configuration



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)



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.

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Discussing Mobile Device Network Connectivity Configuration
30bird 17.3.2-17.3.6

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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)



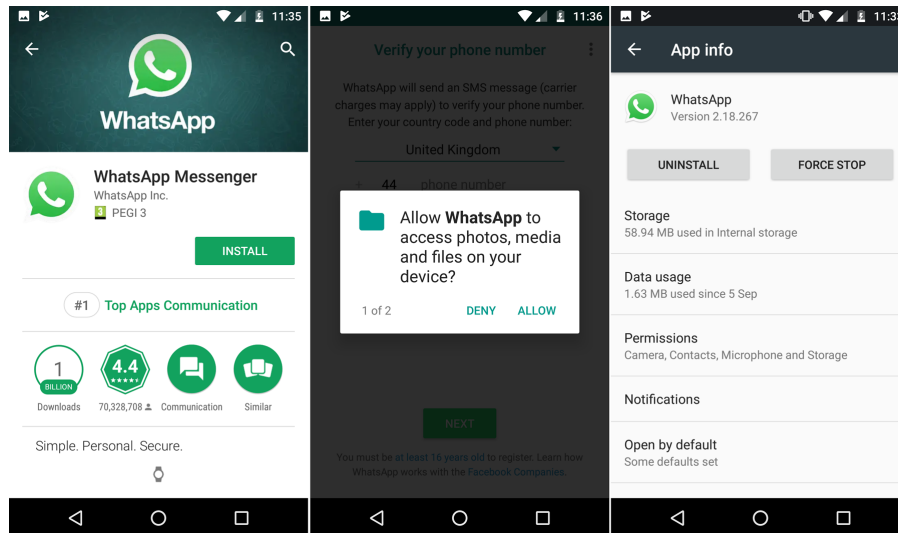
App: Installable programs that extend the functionality of a mobile device.

- 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).

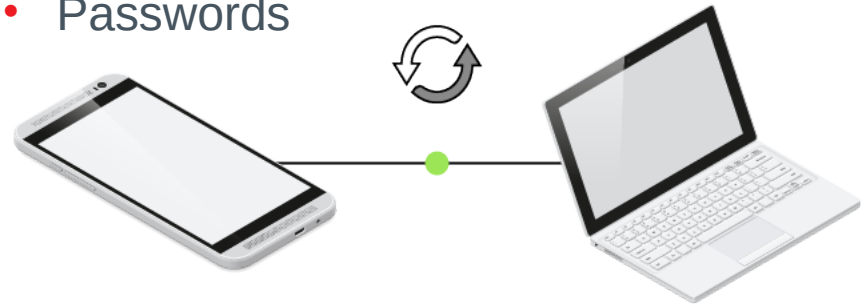


Types of Data to Synchronize



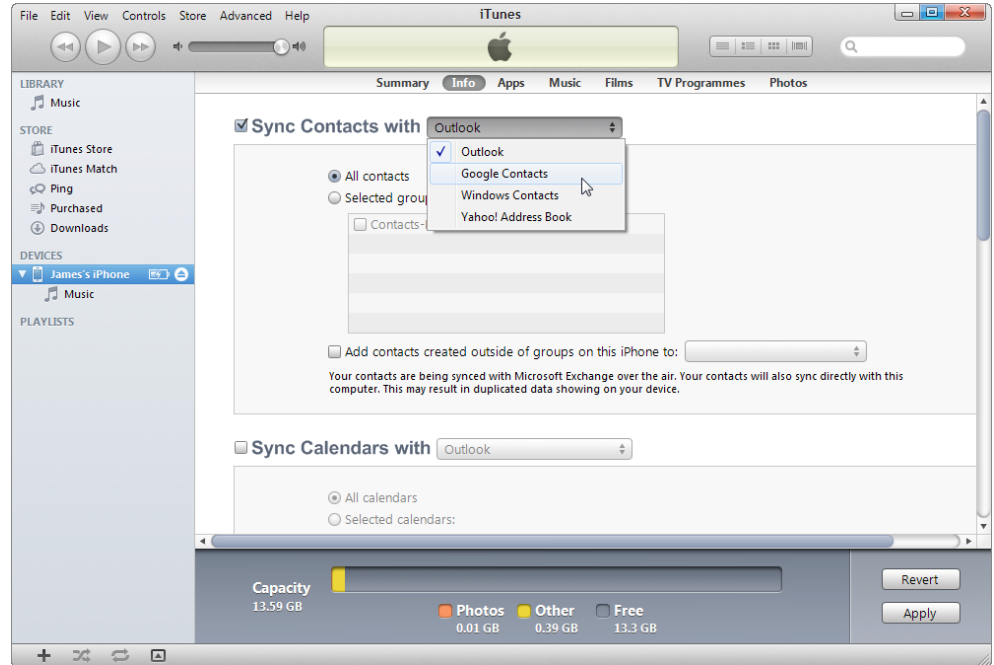
Mobile device synchronization: The act of copying data back and forth between devices to keep the information up-to-date on all of the devices.

- Contacts
- Calendar
- Email
- Pictures, music, and video
- Documents
- E-books
- Location data
- Social media data
- Apps
- Bookmarks
- Passwords



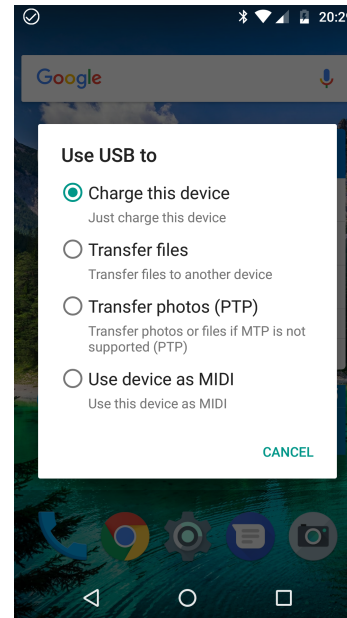
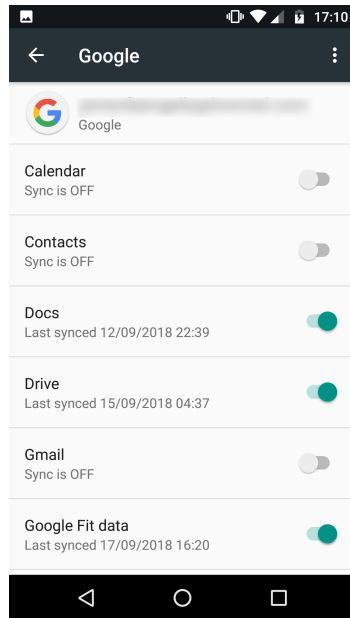
Synchronization Methods (Slide 1 of 3)

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



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

Sideloaded Apps: <https://www.youtube.com/watch?v=U4l260wo9vE>

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?