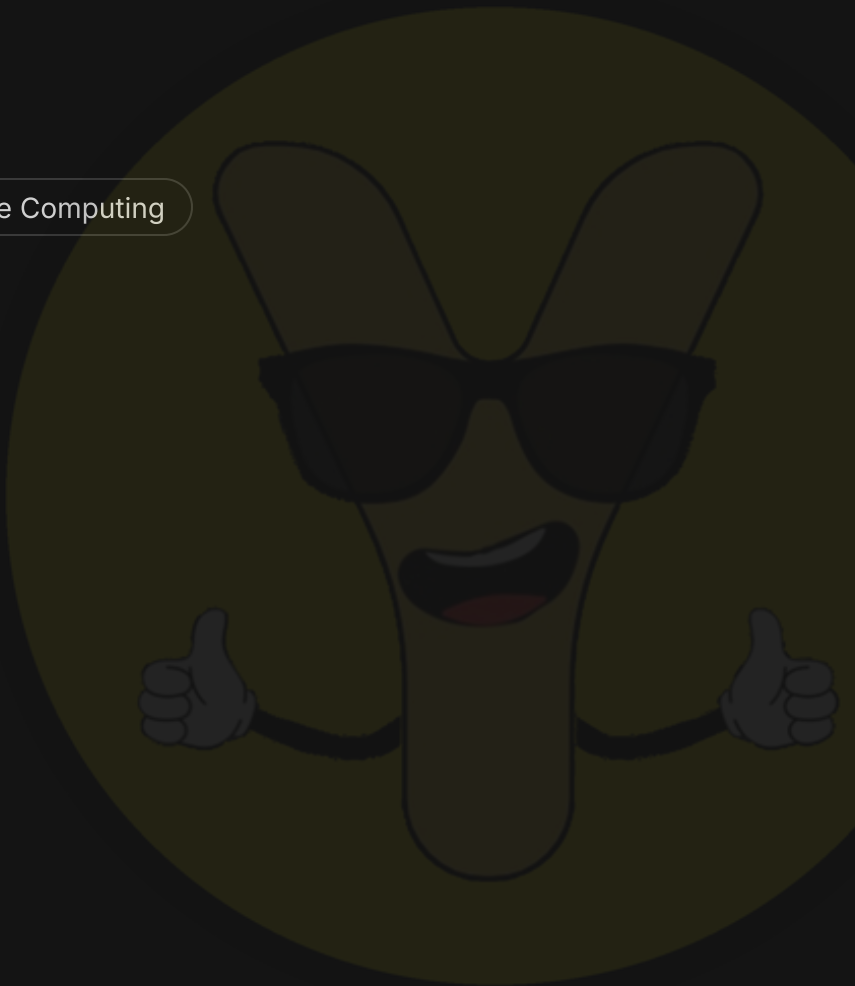
AKTU · 2ND YEAR · BCC301 / BCC401

Cyber Security

Unit 2 — Cybercrime: Mobile and Wireless Devices

- Introduction to Mobile and Wireless Devices
- Proliferation of Mobile and Wireless Devices
- Trends in Mobile Computing
- Credit Card Frauds in Mobile and Wireless Computing Era
- Security Challenges Posed by Mobile Devices
- Registry Settings for Mobile Devices
- Authentication Service Security
- Attacks on Mobile/Cell Phones
- Mobile Devices: Security Implications for Organizations
- Organizational Measures for Handling Mobile



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Introduction to Mobile and Wireless Devices

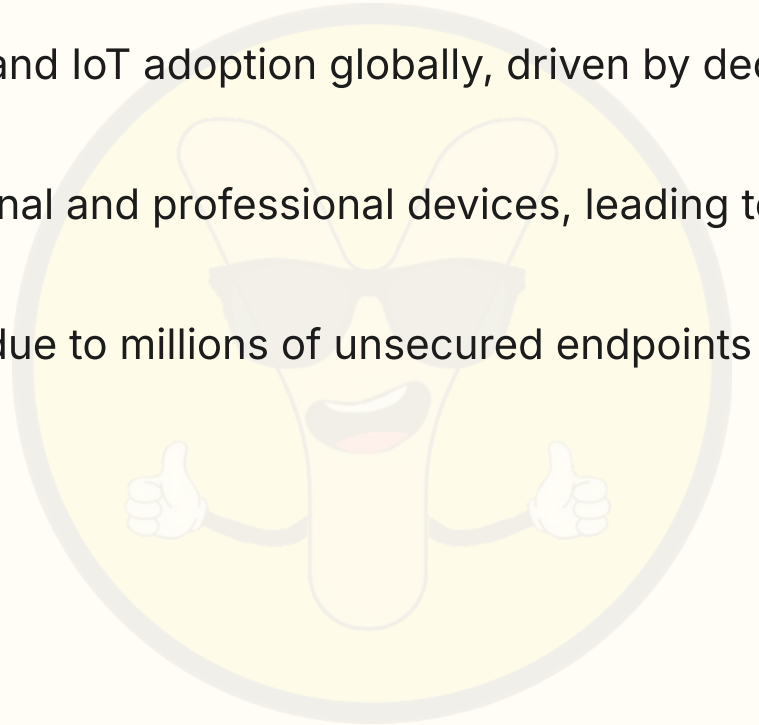
Fundamental concepts defining mobile computing, wireless communication, and endpoint convergence.

- Mobile devices refer to compact, portable computing gadgets including smartphones, tablets, smartwatches, and PDAs equipped with OS capabilities.
- Wireless devices utilize electromagnetic waves, radio frequencies (RF), infrared, or Bluetooth to transmit data without physical cables.
- Convergence of cellular networks (4G/5G) and Wi-Fi transforms these devices into powerful computing nodes handling sensitive personal and corporate data.

Proliferation of Mobile and Wireless Devices

Rapid market expansion and its implications for modern digital ecosystems.

- Exponential growth in smartphone and IoT adoption globally, driven by declining hardware costs and expanding network coverage.
- Blurring boundaries between personal and professional devices, leading to pervasive computing environments.
- Massive attack surface expansion due to millions of unsecured endpoints connecting to enterprise networks daily.



Trends in Mobile Computing

Emerging technological shifts shaping modern mobile application architecture and usage.

- Bring Your Own Device (BYOD) and Choose Your Own Device (CYOD) paradigms in enterprise workplaces.
- Edge computing integration, reducing latency by processing data locally on mobile hardware rather than remote servers.
- Advanced biometric integration (facial recognition, fingerprint scanners) replacing traditional PIN/password authentication.
- Expansion of 5G networks enabling high-speed, low-latency mobile data transmission and massive IoT connectivity.

Credit Card Frauds in Mobile and Wireless Era

Vulnerabilities and fraudulent mechanisms exploiting mobile payment systems.

- Mobile POS (mPOS) skimming: Intercepting magnetic stripe or chip data via compromised mobile card readers.
- App-based malware: Malicious applications intercepting SMS One-Time Passwords (OTPs) or recording keystrokes during mobile checkout.
- Contactless NFC relay attacks: Scammers amplifying Near Field Communication signals to authorize unauthorized transactions.
- Phishing via Smishing (SMS phishing) tricking users into entering credit card credentials on spoofed mobile web pages.

Security Challenges Posed by Mobile Devices

Inherent risks associated with portable computing hardware and software architectures.

- Physical theft and loss: High probability of device misplacement outside secure organizational perimeters.
- Insecure public Wi-Fi networks vulnerable to Man-in-the-Middle (MitM) snooping and ARP poisoning.
- Sideloading and unverified third-party app stores bypassing official security sandboxing.
- Lack of default encryption on older operating systems allowing direct physical storage extraction.

Registry Settings for Mobile Devices

Configuring OS-level configurations and policies to enforce device hardening.

- Registry settings control hardware feature availability, security policies, and application execution permissions.
- Key registry controls include disabling USB debugging, enforcing mandatory screen lock timeouts, and blocking unknown app sources.
- Centralized management via Mobile Device Management (MDM) pushes secure registry/configuration profiles remotely.
- Prevents unauthorized user modification of critical system security parameters.

Authentication Service Security

Mechanisms ensuring authorized access across mobile network environments.

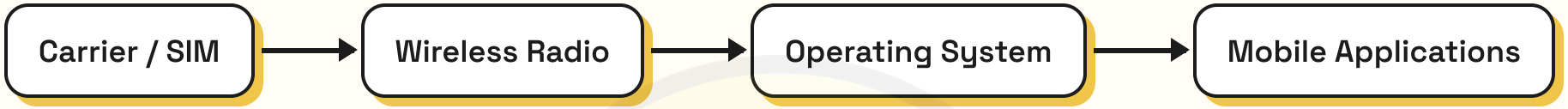
- Multi-Factor Authentication (MFA) combining something you know, something you have, and something you are.
- OAuth 2.0 and OpenID Connect protocols securing mobile app API authorization without exposing user passwords.
- Token-based session management ensuring secure, stateless authentication between mobile clients and backend servers.
- Biometric template protection using secure enclaves and hardware-backed keystores on the device.

Attacks on Mobile/Cell Phones

Specific vector analysis targeting cellular hardware, operating systems, and protocols.

- SIM Swapping: Attackers trick cellular carriers into transferring victim phone numbers to attacker-controlled SIM cards.
- Stalkerware/Spyware: Hidden monitoring apps recording calls, location, and messages without user consent.
- Bluebugging and Bluesjacking: Unauthorized exploitation of vulnerable Bluetooth connections to control devices.
- Baseband exploits: Targeting the secondary processor managing cellular radio communications to execute remote code.

Mobile Device Attack Vectors

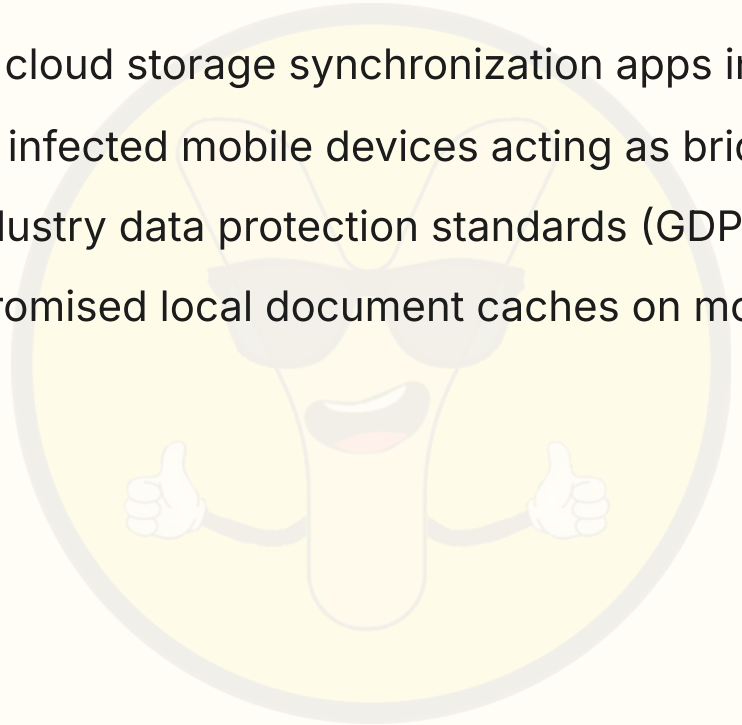


Primary architectural entry points targeted by mobile cybercriminals.

Mobile Devices: Security Implications for Organizations

Risks introduced when unmanaged mobile endpoints interact with enterprise infrastructure.

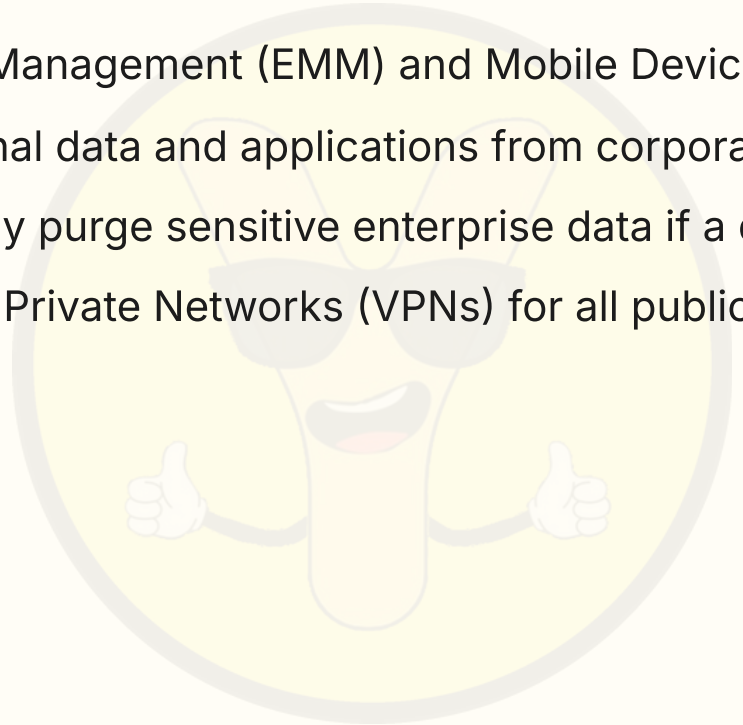
- Data leakage through unauthorized cloud storage synchronization apps installed on personal devices.
- Corporate network compromise via infected mobile devices acting as bridgeheads for lateral movement.
- Compliance violations regarding industry data protection standards (GDPR, HIPAA, PCI-DSS).
- Intellectual property theft via compromised local document caches on mobile endpoints.



Organizational Measures for Handling Mobile

Operational protocols and defense-in-depth strategies for mobile workforce management.

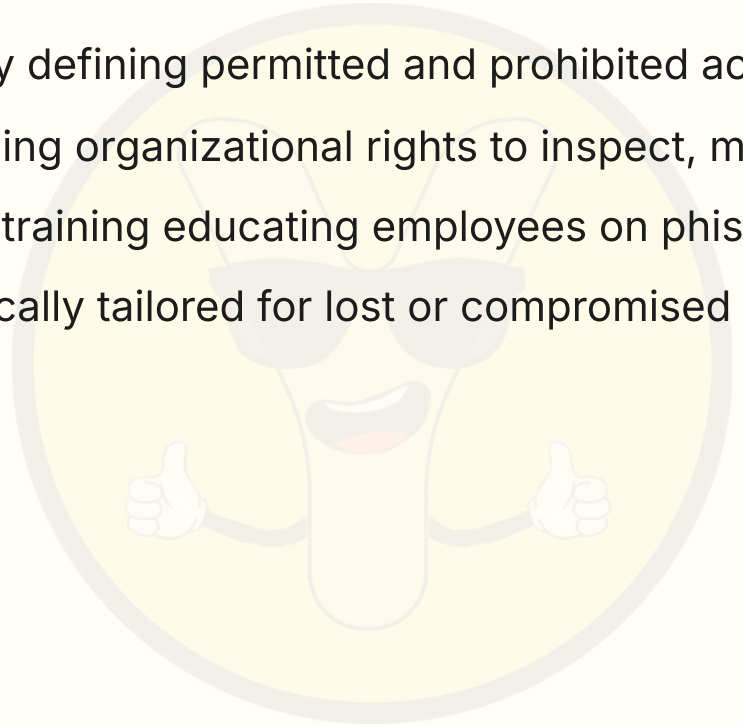
- Deployment of Enterprise Mobility Management (EMM) and Mobile Device Management (MDM) solutions.
- Containerization: Separating personal data and applications from corporate data within a secure sandbox.
- Remote Wipe capabilities to instantly purge sensitive enterprise data if a device is reported lost or stolen.
- Mandatory use of corporate Virtual Private Networks (VPNs) for all public wireless traffic.



Organizational Security Policies and Measures

Governance frameworks establishing rules for mobile computing engagement.

- Acceptable Use Policy (AUP) clearly defining permitted and prohibited activities on mobile hardware.
- BYOD enrollment agreements outlining organizational rights to inspect, monitor, and wipe corporate data.
- Regular mobile security awareness training educating employees on phishing, smishing, and app hygiene.
- Incident response protocols specifically tailored for lost or compromised mobile endpoints.



Laptops

Security considerations for portable personal computers in mobile computing environments.

- Full Disk Encryption (FDE) tools like BitLocker or FileVault protecting data-at-rest against physical extraction.
- Endpoint Detection and Response (EDR) agents monitoring real-time process execution and network connections.
- Physical security measures including cable locks, privacy screens, and secure storage during travel.
- Vulnerability management ensuring regular OS patching and third-party software updates.

Comparison: Smart Phones vs. Laptops in Security

Security Feature	Smartphones / Mobile Devices	Laptops / Portable PCs
OS Sandboxing	Strict application isolation by default	Traditional file-system permissions
Hardware Security	Secure elements / Biometric enclaves	TPM chips / BIOS password protection
Data Encryption	Built-in hardware encryption standard	Requires third-party or native FDE (BitLocker)
Peripheral Control	Limited USB/Port configuration	Extensive physical port vulnerability

Exam corner

- **Q1** Explain the security challenges posed by mobile and wireless devices in modern enterprise environments.
- **Q2** What is SIM Swapping? Discuss the mechanism and countermeasures against mobile cellular attacks.
- **Q3** Differentiate between MDM (Mobile Device Management) and EMM (Enterprise Mobility Management) with suitable examples.
- **Q4** How do credit card frauds occur in the mobile and wireless computing era? Explain mPOS skimming and NFC relay attacks.
- **Q5** Discuss the organizational security policies and measures required to manage a BYOD (Bring Your Own Device) environment effectively.
- **Q6** Explain how Full Disk Encryption and containerization protect organizational data on mobile endpoints and laptops.

Unit 2 done. You are exam-ready.

Revise the Exam corner once more, then open Unit 3 on theycotes.com. Every AKTU subject, unit by unit, free. Notes by Chirag Jain, Ycotes.

