Security Implementation Considerations for Mobile and Wireless Technologies

NIST HIPAA Conference

May 12, 2010

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Agenda

- Business Drivers
- Risks
- Security Implementation Considerations

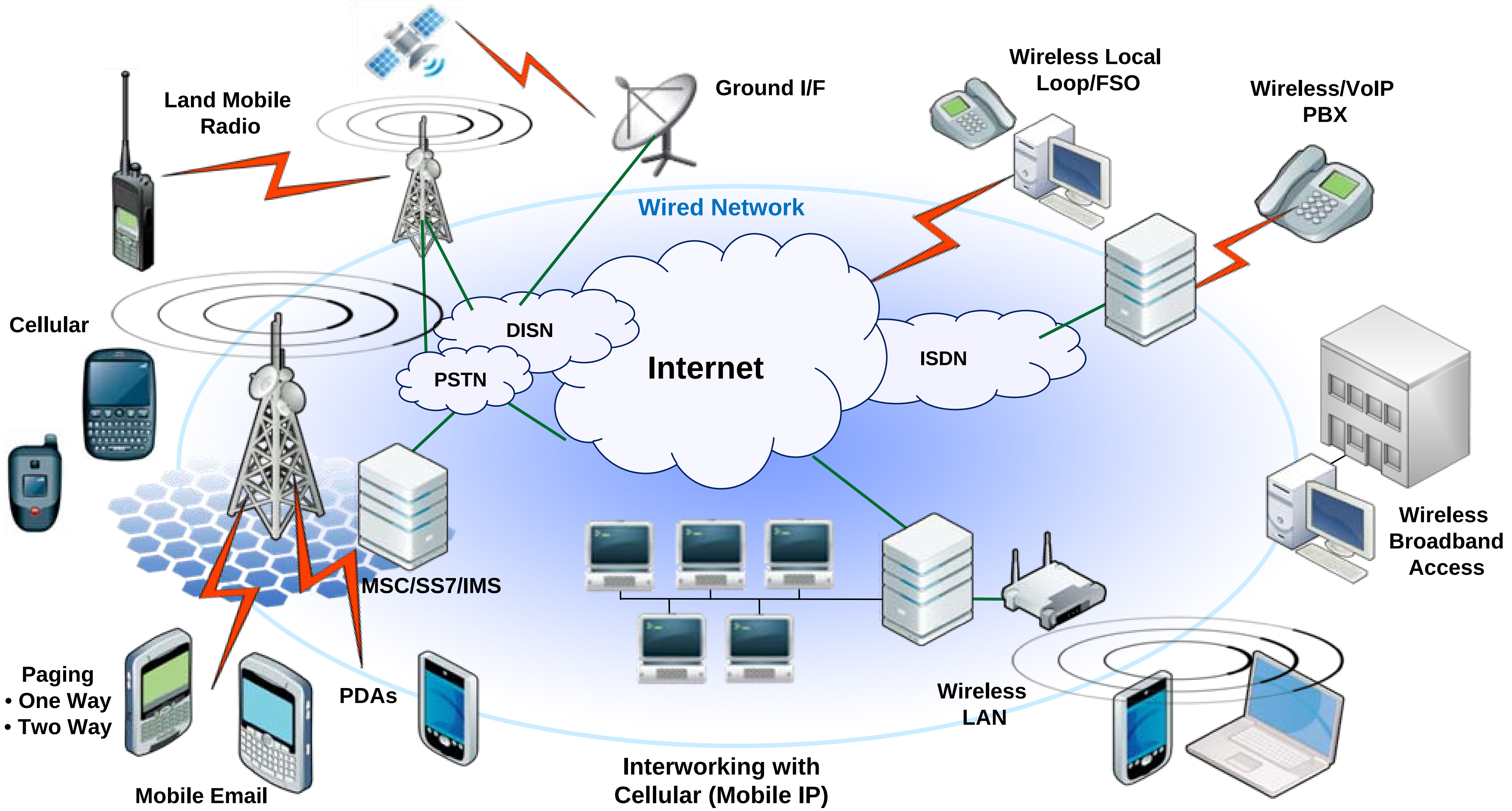
As security professionals, we have been playing catch-up with trying to learn, analyze, and secure mobile and wireless technologies…

- **Capability drives adoption, the market will not wait for your organization to catch-up**
  - Initial adoption of BlackBerry empowered the mobile workforce, and the commoditization of mobility can expose your organization to data-security threats
  - With the rapid increase of mobile platforms, there are more endpoints than ever to secure and manage

- **Wireless devices will inevitably connect to your enterprise resources**
  - The balance between information protection and information access becomes more complex as the availability of mobile devices increases
  - Wireless transport occurs at the core, distribution, and access layers of government networks; it has become a standard feature that is embedded in many products

- **Influence wireless adoption, don’t react to it**
  - Wireless introduces complex security challenges from a planning, policy, technical, and implementation perspective
  - Enforce and influence the development of practical security standards and policies
  - A wireless breach can be equally damaging as a wired breach

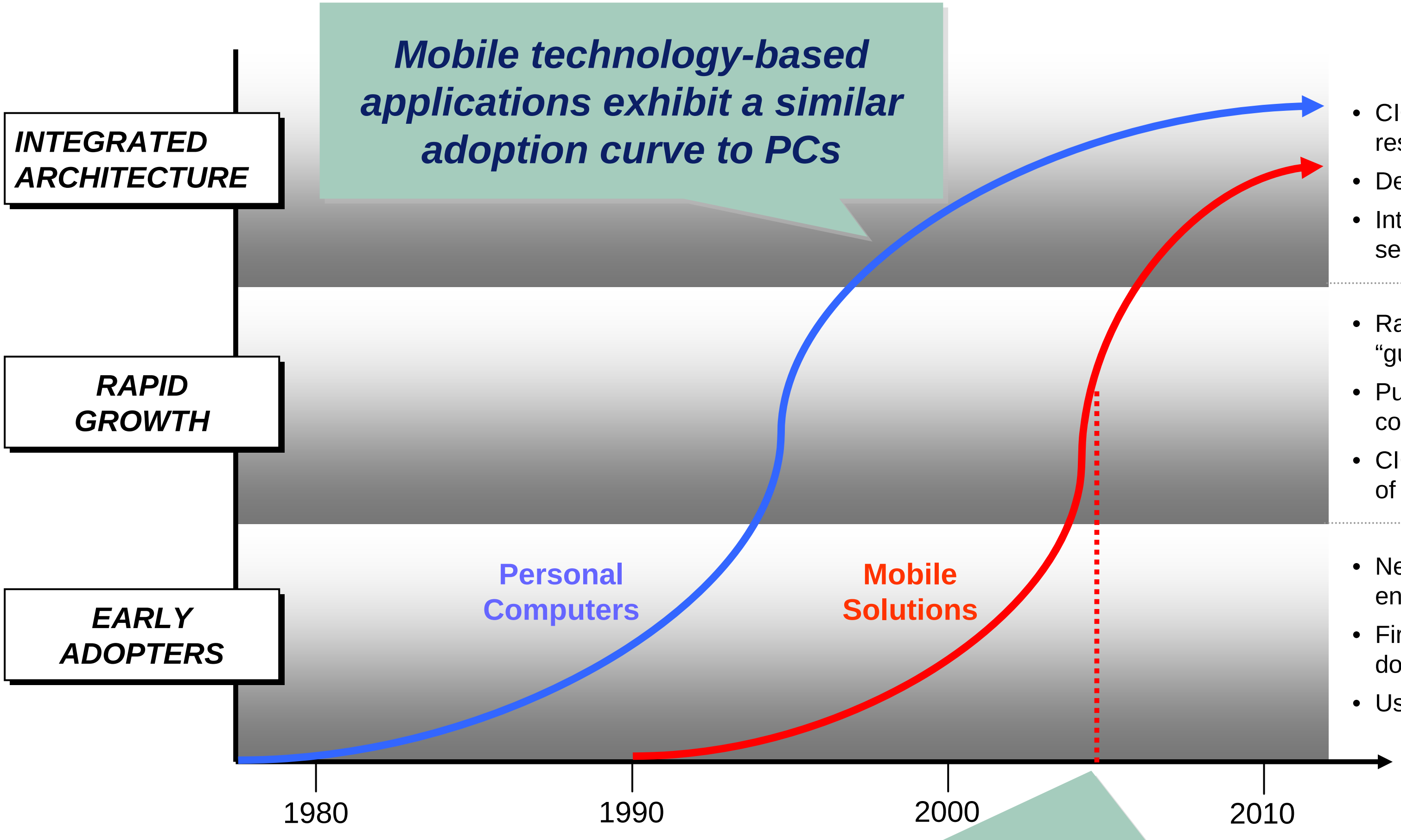
Mobile devices extend the wired infrastructure, increasing the overall risk to our enterprise networks…



The concept of Mobility encompasses everything that touches voice and data that is not considered part of the wired architecture…

- Devices allow data to be **easily moved** and **accessed remotely**
  - Phones
  - PDAs
  - Memory cards
  - Consumer electronics
- This trend toward "**data in motion**" creates security risks to the enterprise

The adoption of mobile solutions mirrors the introduction of another key information technology 15 years ago – personal computers…



Mobile technology-based applications exhibit a similar adoption curve to PCs

- CIO enforces compliance with information resource management practices
- Develop enterprise-wide mobility capabilities
- Integrate into enterprise architecture; comply with security policies

- Rapidly adopted by pockets of users; "guerilla technology"
- Purchased from controllable budgets, not conforming to IT investment principles
- CIO exercises some limited control over adoption of the technology

- New technologies introduced by individuals to enhance mission performance
- First-generation often proprietary technologies; do not meet IT standards
- Use of technology is largely invisible to CIO

CIOs face substantial mission assurance risks – until mobile technology implementations are forced into compliance with IT architectures, policies, and practices

Mobile devices hold enormous potential to streamline and improve the delivery of healthcare…

- **Mobile and wireless computing are advancing the entire health care industry in powerful ways**
  - Asset tracking and management (RTLS)
  - Streamline processes
  - Reduce administrative redundancy
  - Decrease costs
  - Improve patient safety
  - Provides emergency access to EPHI
- **Use of Handheld Mobile Devices growing rapidly**
  - 30% of physicians access EPHI using a handheld device (31% are iPhone users) [source: SDI]

- **Mobile computing solutions**
  - Diagnostic
  - Treatment
  - Patient History
  - Billing
  - Reference
  - Drug Interactions
  - Referrals
  - Prescriptions
  - Patient Monitoring
  - Laboratory Services
  - Discharge Protocols
  - Communication with insurers,

  and much more…

Booz | Allen | Hamilton

Mobile and Wireless technologies offer key advantages over traditional telecommunications solutions…

Mobile Attributes

- Always on (anytime)
- Portability (anywhere)
- Location-aware (geographic context)
- Context-aware (volume and content)
- Reduction in operating costs
- Remote access

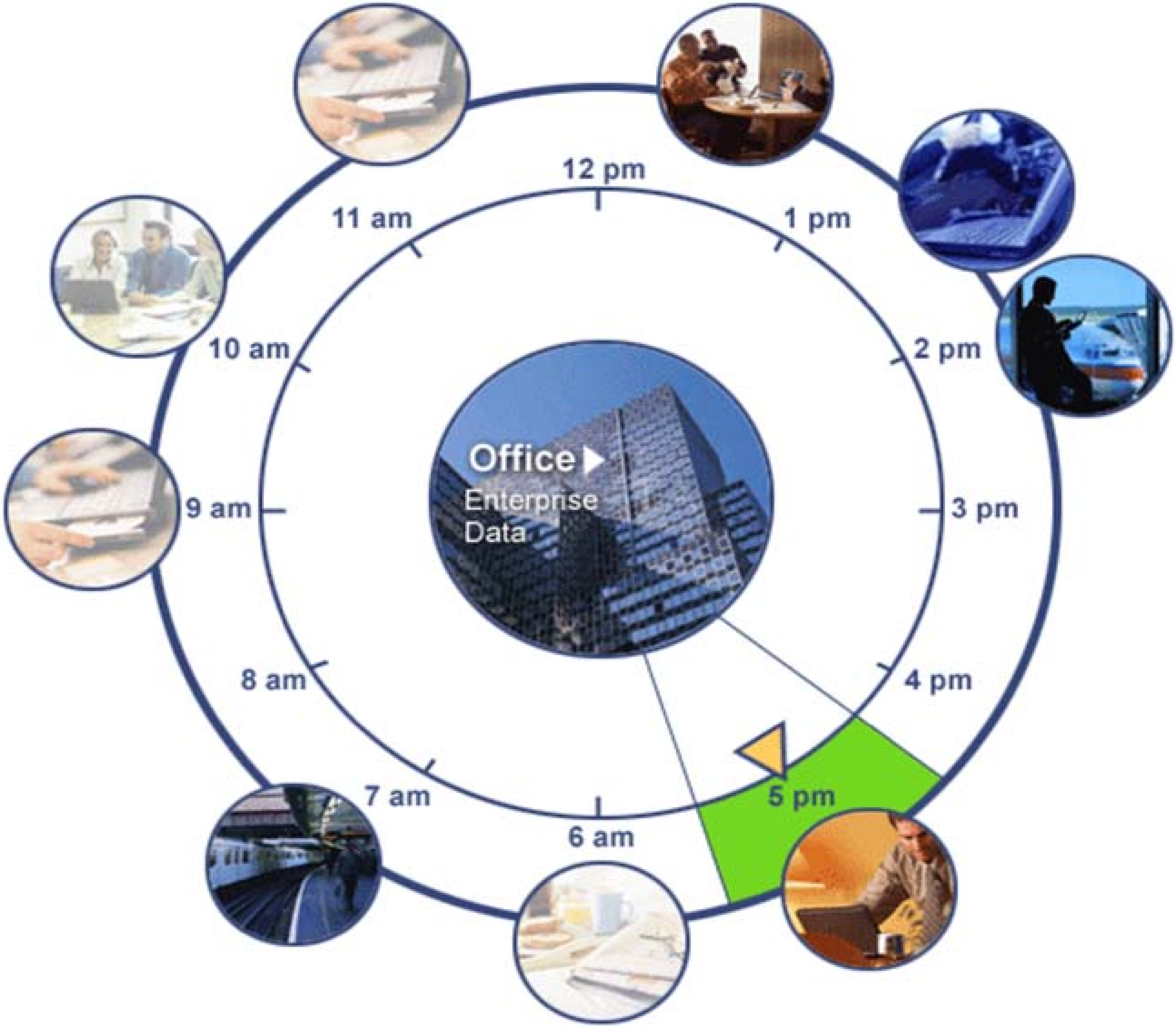
Benefits

- Coordination and response
- Data collection & accuracy
- Speed
- Productivity
- Real-time actionable information
- Continuity of operations

53% of organizations have at least 20% of their employees working remotely

- 2009 Yankee Group Study

A day in the life of a mobile worker…



6am – Checks e-mail from home via cable provider WLAN

7am – Files expense report from metro via wireless WAN

8am – Docks laptop at desk to print report for meeting

9:30am – Makes live demonstration at a meeting using laptop connected via office LAN

10:30am – Returns to desk and uses Bluetooth keyboard to input and send email

Noon – Collaborates on presentation during lunch via commercial Wi-Fi hotspot

1pm – Checks e-mail via wireless WAN in taxi en route to airport

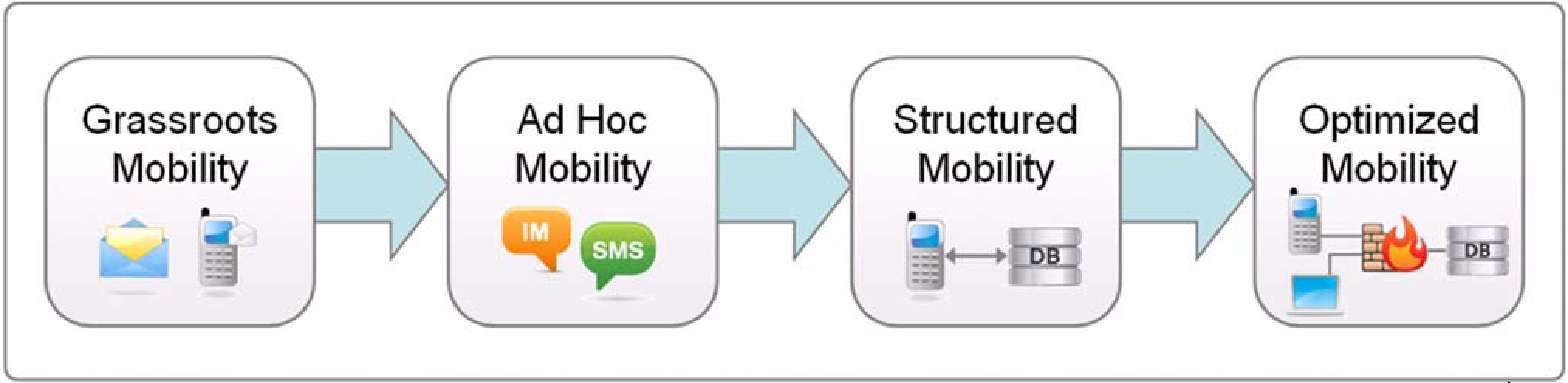
2pm – Continues to work on email in airport via public Wi-Fi hotspot

2:30-4:30pm – Onboard airplane

5pm – Sends report via e-mail connected to hotel wired Internet connection

- Business Drivers
- Risks
- Security Implementation Considerations

Where is your organization today? Is your mobility operating out-of-band?



Increasing Security Posture

- Realize substantial savings, increased information dissemination from previously disparate systems, and enhanced real-time and operational efficiencies
- Ability to integrate communications more closely with business processes
- Anywhere and anytime access to email, calendars, and applications
- Enabled business processes applications, with automated alerts and context-driven architectures

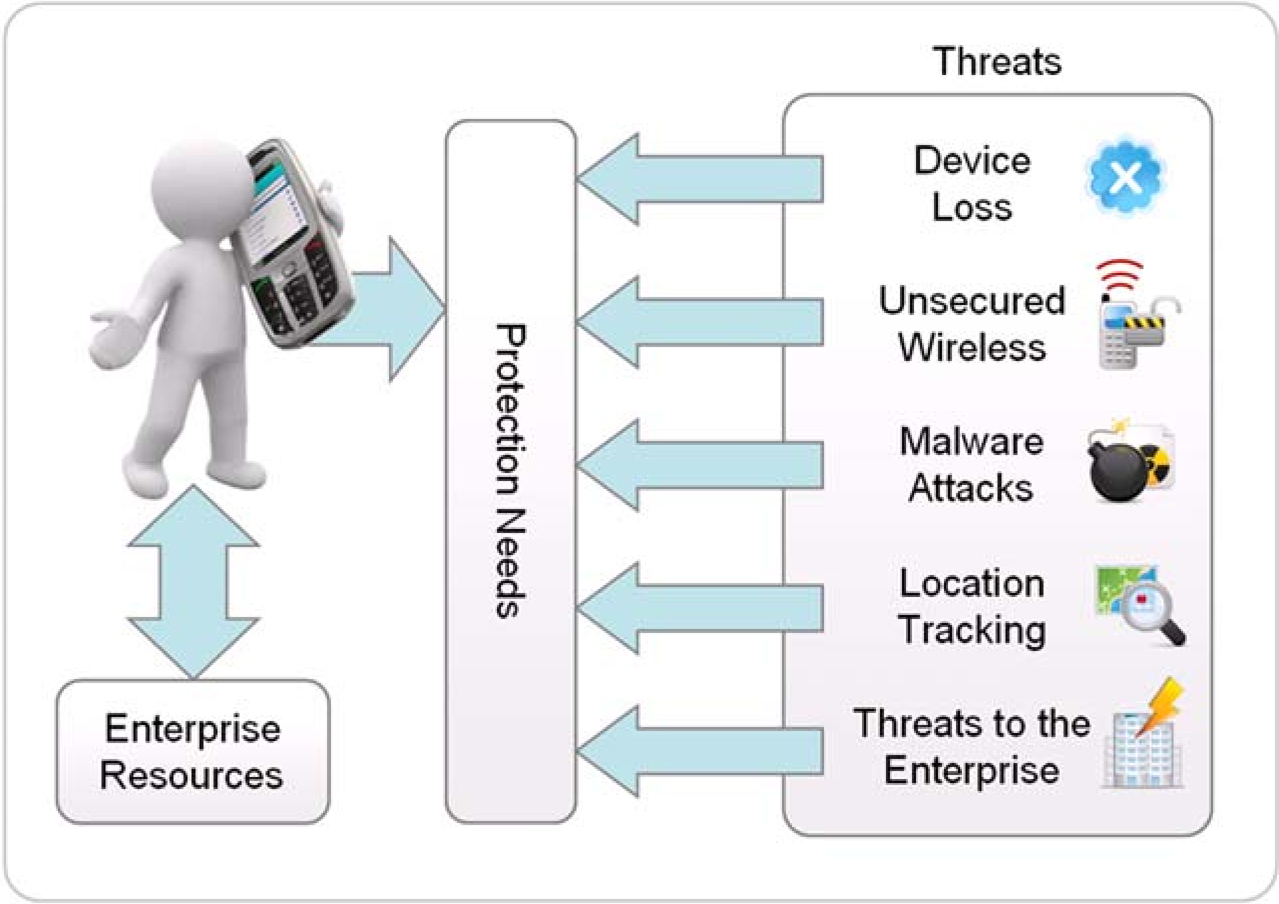
Mobile and wireless technologies introduce many new challenges for information security personnel…

- Personal devices vs. CDO issued
- Connectivity from anywhere and everywhere
- Multiple devices and OS platforms
- Multiple applications to support
- Data is outside the ‘secure’ perimeter
- Hard to distribute security controls
- Access complexities (power users, etc)
- Device management

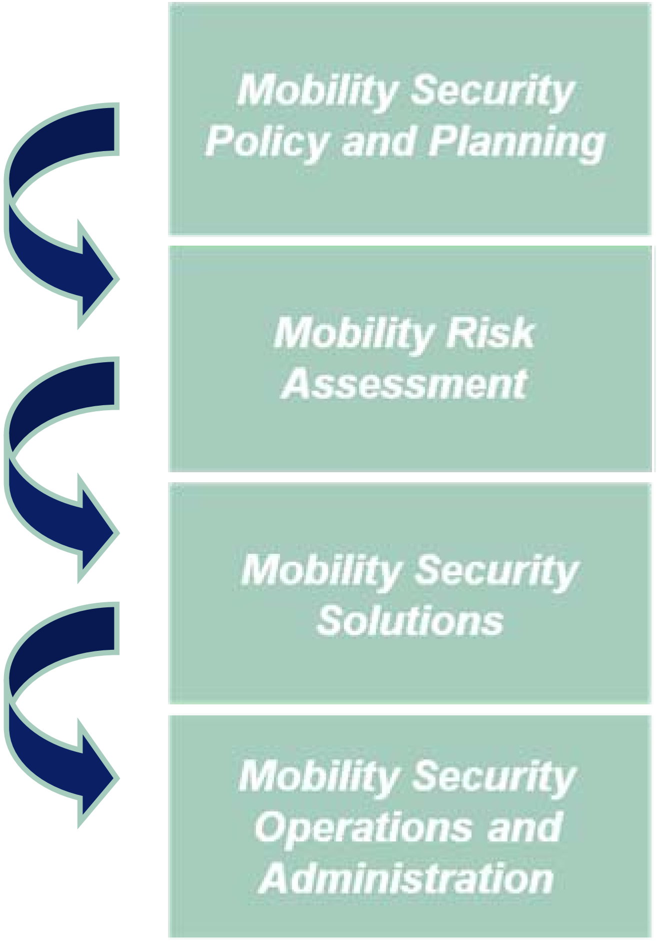
Users will rely on mobile and wireless technologies more and more to store and transmit sensitive data; consequently, the risk of data compromise escalates…

Mobile Device Security Risks

- Access to sensitive data stored on the device
- Access to data stored on corporate networks
- Malicious software entry point to enterprise network
- Ability to impersonate the authorized user



To successfully reduce risk to an acceptable level, your mobile and wireless initiatives should be fully integrated into your IT & IA Programs…



Mobility Security Policy and Planning

Establish a strong security policy foundation and risk management program for mobile solutions; define the mobile concept of operations (CONOPS).

Mobility Risk Assessment

Assess the threats and vulnerabilities faced by the enterprise; define a package of security countermeasures that mitigate the risks to an acceptable level.

Mobility Security Solutions

Develop and integrate the applications that allow the mobile services to be secure in the enterprise; make engineering tradeoffs and procurement decisions; migrate legacy systems

Mobility Security Operations and Administration

Enterprise mobile solutions are operated and administered according to defined requirements; security posture is periodically evaluated for compliance.

How bad is it really?

- 03 May – Laptops stolen from California health care organization

- 20 April – Health information contained on physician's stolen laptop
  - A laptop containing the demographic and health information of thousands of patients was stolen from a physician affiliated with the Massachusetts Eye and Ear Infirmary.

- 12 April – BitDefender Discovers PC Malware using iPhone as Bait

- 07 April – Sensitive laptops stolen from California hospital system

- Airport Insecurity (source: Dell and the Ponemon Institute, June 30, 2008)
  - Over 12,000 laptops and other devices lost in U.S. airports each week; only ~30% are reclaimed.
  - Over 50% of the laptops considered to contain sensitive data; ~35% take steps to protect or secure their laptop information

Are you ready for what’s coming next?

- **Near Field Communications**
  - Mobile payment
  - Electronic ticketing
  - Electronic keys
- **Femtocells**
- **Mobile Hotspots (Mi-Fi)**
- **Wireless USB**
- **Bluetooth low energy**
- **…**

- **International Standards Bodies**
  - Internet Engineering Task Force
  - Payment Card Industry
  - IEEE
  - International Organization for Standardization
  - International Electrotechnical Commission
- **Domestic Standards Bodies**
  - National Institute of Standards and Technology / Information Technology Laboratory
  - American National Standards Institute
  - X9
  - International Committee IT Standards

- Business Drivers
- Risks
- Security Implementation Considerations

The proper strategic imperatives to support a mobile and wireless ecosystem must be developed and thoroughly explored in the beginning…

Standardization

HW and SW standardization must be considered from start to reduce maintenance costs.

Patient Safety

Vital factor in driving the implementation of mobility in the health care field.

Integration

Integration is key to the effectiveness of system. Integration with back end systems must be evaluated.

Security

Requirements of: HIPAA, FISMA, OMB, and Privacy Act of 1974.

Asset Management

Hardware and user assessment must be regularly monitored to determine overall system effectiveness and to remove defective care delivery devices.

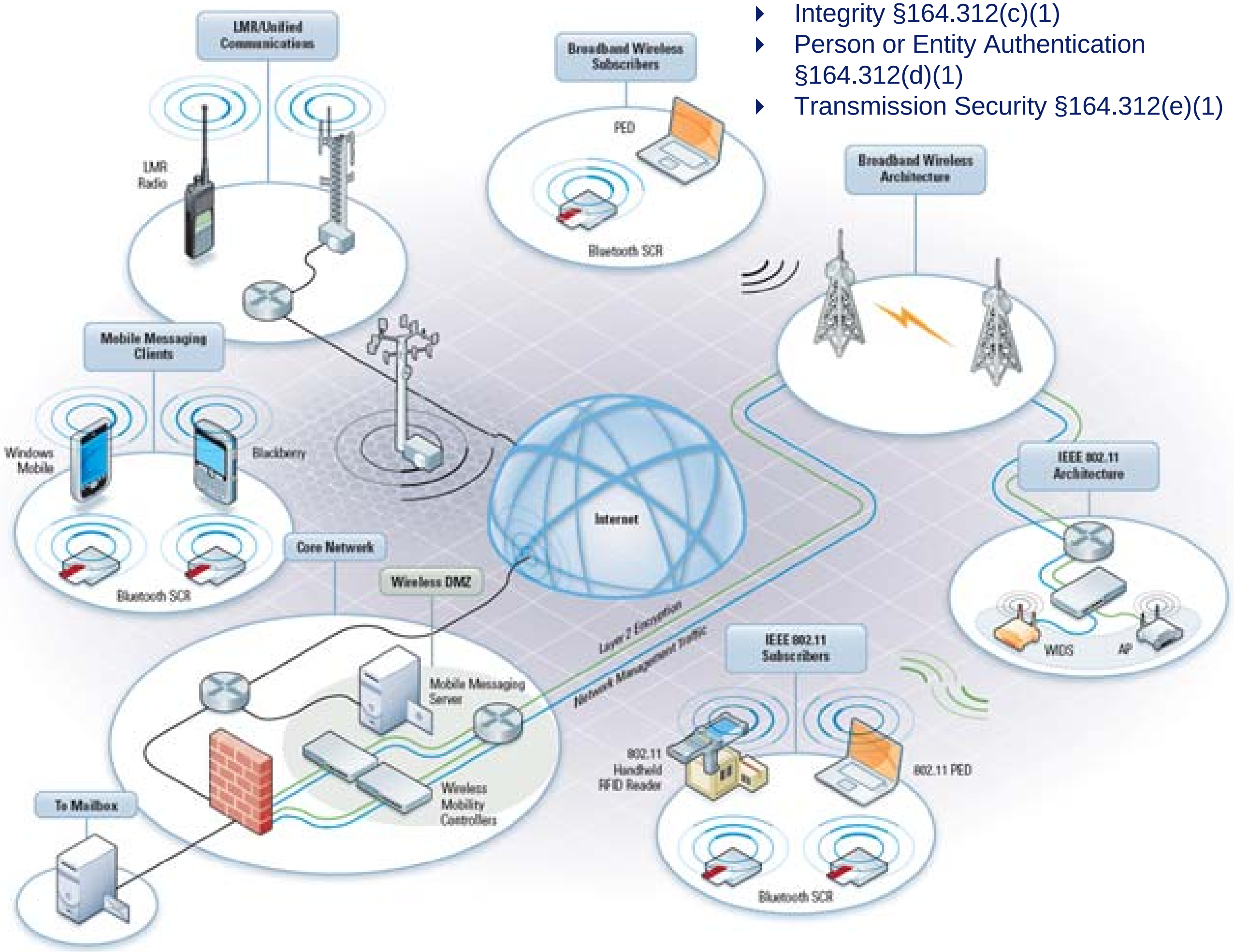
Extending enterprise security throughout your mobile ecosystem…

Technical Safeguards

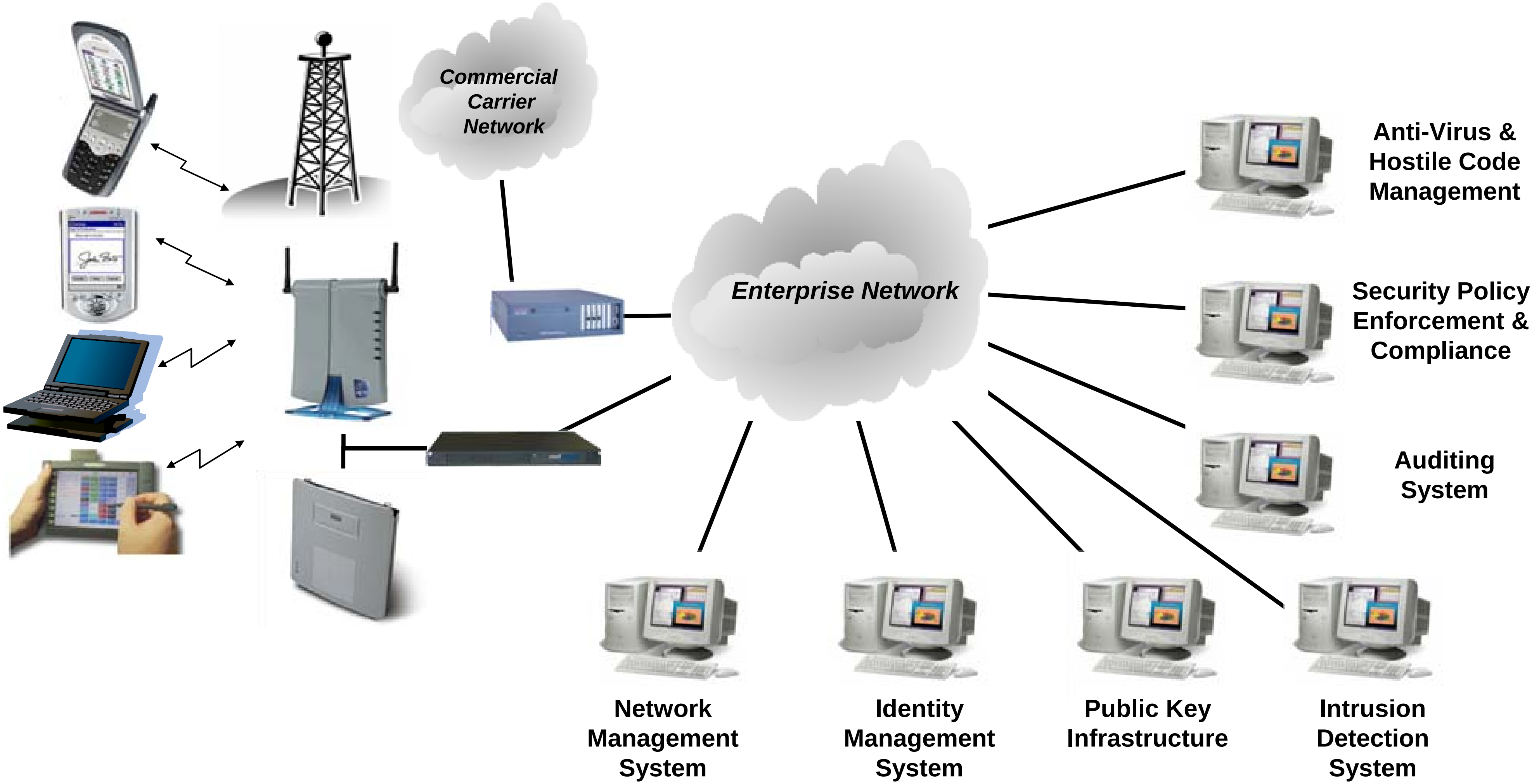
- Implement technical policies, processes, procedures, and mechanisms for electronic information systems that maintain EPHI to allow access only to only those persons or software programs that have appropriate access rights
- Unique user identification, multi-factor authentication (AuthN) and role-based authorization (AuthZ) access controls
- Communications/session automatic logoff
- Confidentiality and Integrity of EPHI
- Audit Controls

The HIPAA Security Rule

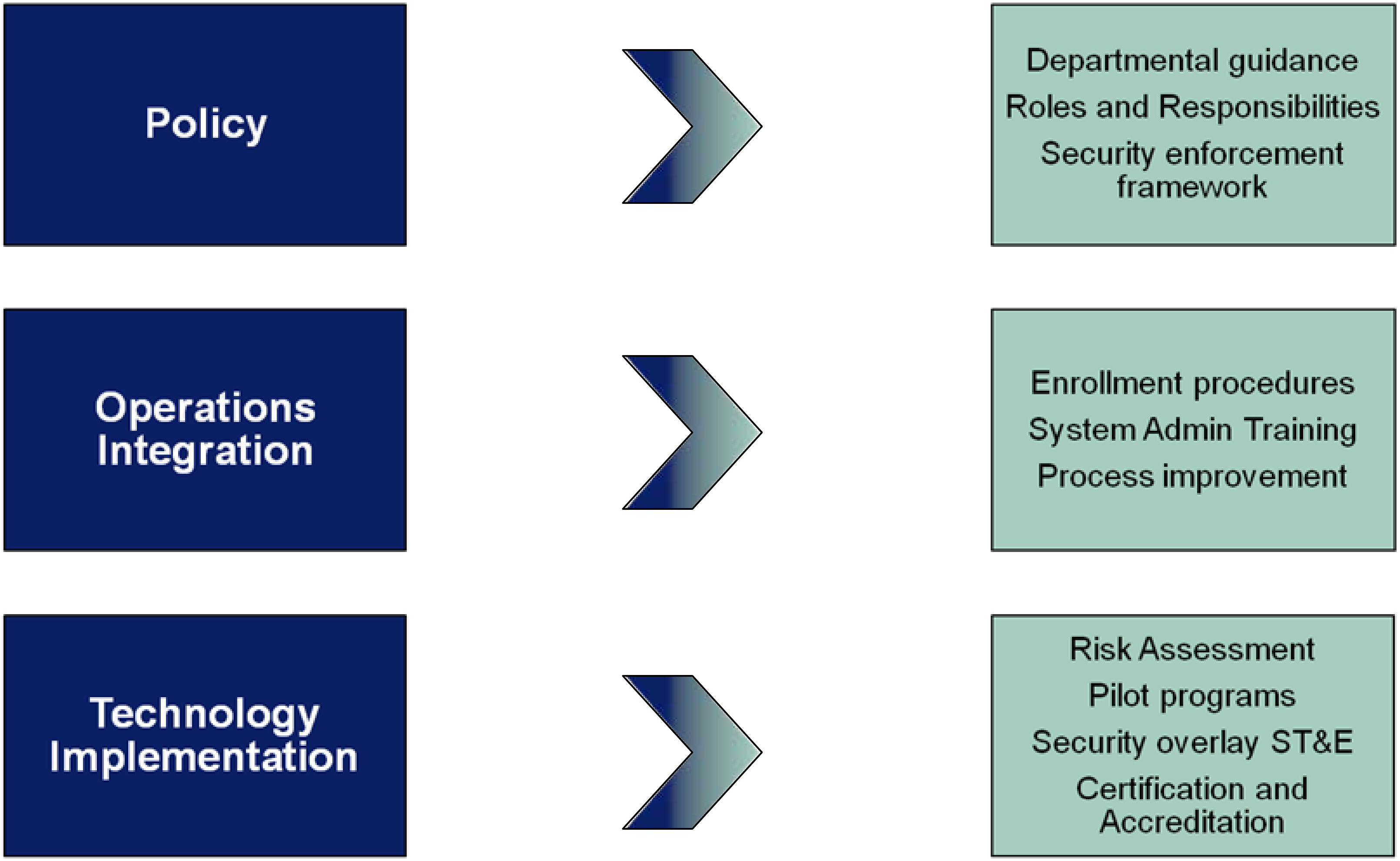
- Access Control §164.312(a)(1)
- Audit Controls §164.312(b)
- Integrity §164.312(c)(1)
- Person or Entity Authentication §164.312(d)(1)
- Transmission Security §164.312(e)(1)



Mobile end points increasingly support and can leverage enterprise security protocols…


Commercial Carrier Network
Enterprise Network
Anti-Virus & Hostile Code Management
Security Policy Enforcement & Compliance
Auditing System
Network Management System
Identity Management System
Public Key Infrastructure
Intrusion Detection System

Secure mobility requires a balance of managerial, operational, and technical controls to secure and protect EPHI…



Policy

Departmental guidance

Roles and Responsibilities

Security enforcement framework

Operations Integration

Enrollment procedures

System Admin Training

Process improvement

Technology Implementation

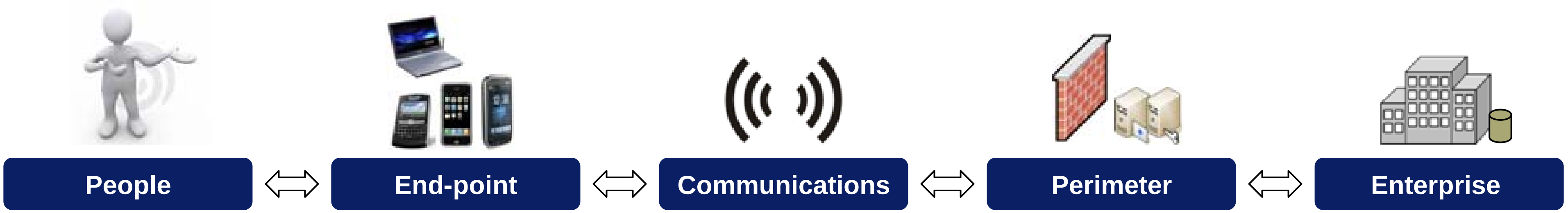
Risk Assessment

Pilot programs

Security overlay ST&E

Certification and Accreditation

Mobile and wireless technology security implementation includes all components of the communications system…



People ⟺ End-point ⟺ Communications ⟺ Perimeter ⟺ Enterprise

People

Implement technical policies and procedures that allow and restrict system and data access

Have an approval policy and process

Use only approved devices and implement controls to grant/restrict remote access

Conduct a solution/technology risk assessment

Provide end user security and awareness training

Policy groups / Role-based access

End-point

EPHI Confidentiality/Integrity

Unique two-factor/PIN local and enterprise AuthN

Access Control To Local Device

Application-level security controls

Device interrogation for enterprise compliance & access

Audit controls

Remote wipe

Data separation (personal versus sensitive)

Automatic logoff

Communications

Confidentiality Over the Air Transmission

Authentication Of Devices

Integrity Of Transmission

Perimeter

Confidentiality (VPN)

Device management

Authentication Of Devices

Authentication Of Users

Identity Management

Access Control To Network Services

Enforcement of Enterprise Security Policy

Audit and logging controls

Provisioning

Application management

Intrusion detection

Enterprise

Integrity Of Application Data

Access Control To Data Bases and Applications

Other application-specific security controls

Access Control To Network Resources

Access Control Related To Specific Content

Audit and logging controls

Established security techniques can be leveraged to help mitigate risks to mobile devices…

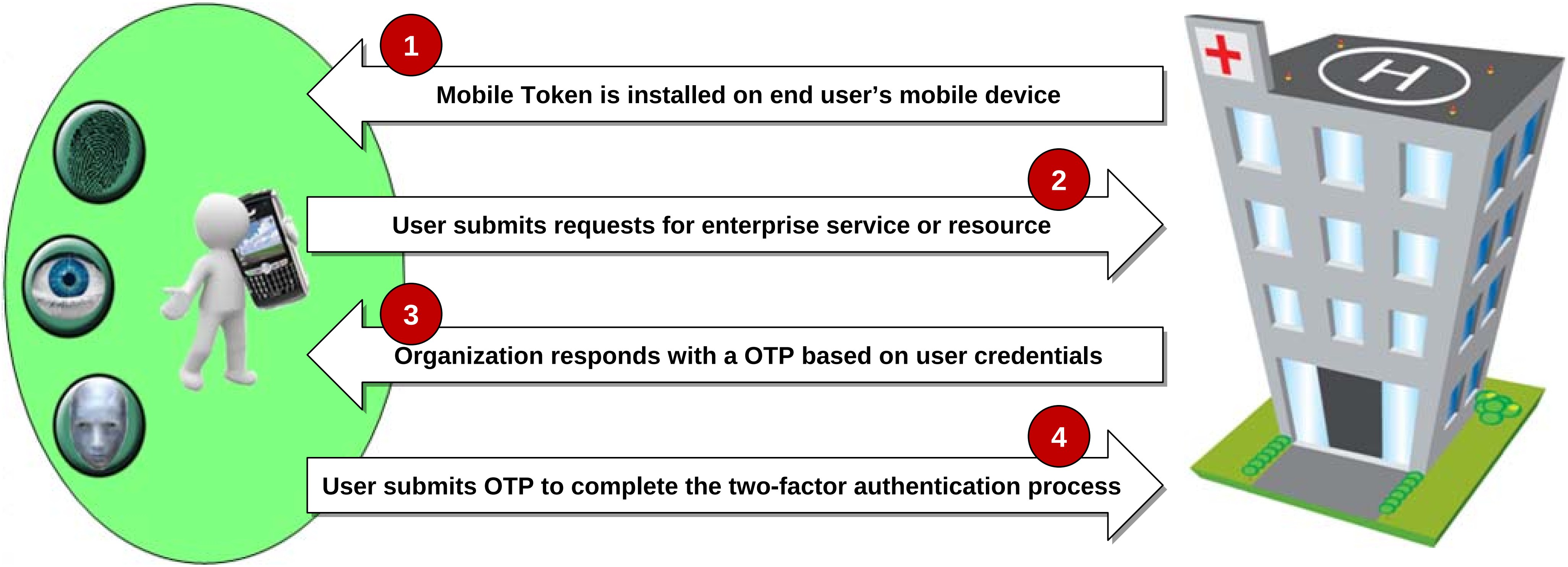
Mobile Device Security Recommendations	
Mobile device access	Power-on authentication – Require a power-on password or PIN, so the device cannot even be powered by an unauthorized user. Implement a standard process for creating unique user names and pins. Controls also applies to session timeouts requiring re-authentication to device to gain local access.
	Auto-lock – Configure device to automatically lock up after a certain period of time.
	Two-factor authentication – Implement two-factor authentication for access to systems that contain EPHI. Consider the use of tokens, call-back, and biometrics.
Data storage	Data encryption – Establish data encryption for mobile devices. Identify the types of hardware and electronic media that must be tracked (hard drives, digital memory cards) and develop inventory control systems.
	Auto-run applications – Prevent memory cards from automatically running specific programs.
	Data erase and recovery – Ability to remotely wipe the remote end point and to conduct forensic analysis.
Data transmission	Cryptography – Implement and mandate appropriately strong encryption solutions for transmission of EPHI. For example access can be implemented over SSL, IPSec or a similar VPN technology. Includes encryption, integrity, authentication, and non-repudiation controls.
Data access	Role-based – Employ role-based access as part of a user-provisioning solution. Different users may require different levels of access based on job function. Develop and employ proper clearance procedures and verify training of workforce members prior to granting access. Access to enterprise resources should be role-based and monitored for abnormalities.
	Logging and Auditing – Implement logging and auditing on device and enterprise network. Ensure that the issue of unauthorized access of EPHI is appropriately addressed in the required sanction policy.
	Signed applications – Allow only signed applications to be loaded onto the devices. Signed applications should be checked during install and execution/runtime.

Security professionals should leverage NIST guidance and other industry best practices to establish baseline security requirements for mobile and wireless technologies…

NIST SP 800-53 Rev3			BlackBerry Enterprise Solution		
Category	**Control Name**	**Control No.**	**IT Policy**	**Recommended Setting**	**Comments**
Access Control	Use of External Information Systems	AC-20	Allow Internal Connections	FALSE	Specifies whether applications, including third-party applications, can initiate internal connections (for example, to the BlackBerry MDS Connection Service)
System and Communications Protection	Mobile Code	SC-18	Allow Resetting of Idle Timer	FALSE	Permits third-party applications to reset the inactivity timeout value, bypassing the security timeout value
Access Control	Concurrent Session Control	AC-10	Allow Split-pipe Connections	FALSE	Specifies whether applications, including third-party, can open internal and external connections simultaneously
System and Communication Protection	Public Key Infrastructure Certificates	SC-17	Certificate Status Cache Timeout	7 days or less	Maximum number of days the device caches the certificate status

Leverage both Civil and Defense policy and guidance to secure your mobile and wireless investments, i.e. CNSS, DHS, HHS, NIST, VA and DISA Wireless STIGs.

Leveraging two-factor, token-based authentication for mobile identities…


1
Mobile Token is installed on end user's mobile device
2
User submits requests for enterprise service or resource
3
Organization responds with a OTP based on user credentials
4
User submits OTP to complete the two-factor authentication process
H

Managing mobile and user identities is a catalyst to extending enterprise services and resources to mobile users. The benefits of extending enterprise authentication services and resources will strengthen an organization's defense-in-depth posture.

Key Initiatives and Resources…

- The HIPAA Security Rule can be found at HHS.gov, http://www.hhs.gov/ocr/privacy/hipaa/administrative/securityrule/index.html
- Health information technology (Health IT) allows comprehensive management of medical information and its secure exchange between health care consumers and providers, http://healthit.hhs.gov/portal/server.pt
- The National Institute of Standards and Technology
  - SP 800-48 Rev1 - Guide to Securing Legacy IEEE 802.11 Wireless Networks
  - SP 800-66 Rev1 - An Introductory Resource Guide for Implementing the Health Insurance Portability and Accountability Act (HIPAA) Security Rule
  - SP 800-97 - Establishing Wireless Robust Security Networks: A Guide to IEEE 802.11i
  - SP 800-98 - Guidelines for Securing Radio Frequency Identification (RFID) Systems
  - SP 800-111 - Guide to Storage Encryption Technologies for End User Devices
  - SP 800-121 - Guide to Bluetooth Security
  - SP 800-122 - Guide to Protecting the Confidentiality of Personally Identifiable Information (PII)
  - SP 800-127 – DRAFT Guide to Securing WiMAX Wireless Communications
  - IR 7497 - DRAFT Security Architecture Design Process for Health Information Exchanges (HIEs)

Closing remarks…

- Don’t ignore, investigate the complete range of mobile devices necessary to enhance various clinical and business workflows within the enterprise.
- Set strategy, realize that mobile and wireless technologies will create new privacy and security challenges that will require new policies and technical controls. Be sure to include device ownership, support and maintenance.
- Set integration approach and employ standards-based technologies where possible.
- Monitor and manage mobile devices and supporting infrastructure.

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