

Cybersecurity in Data Centers

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What is Cybersecurity?

- Information Security
- IT Systems Security
- Physical Security



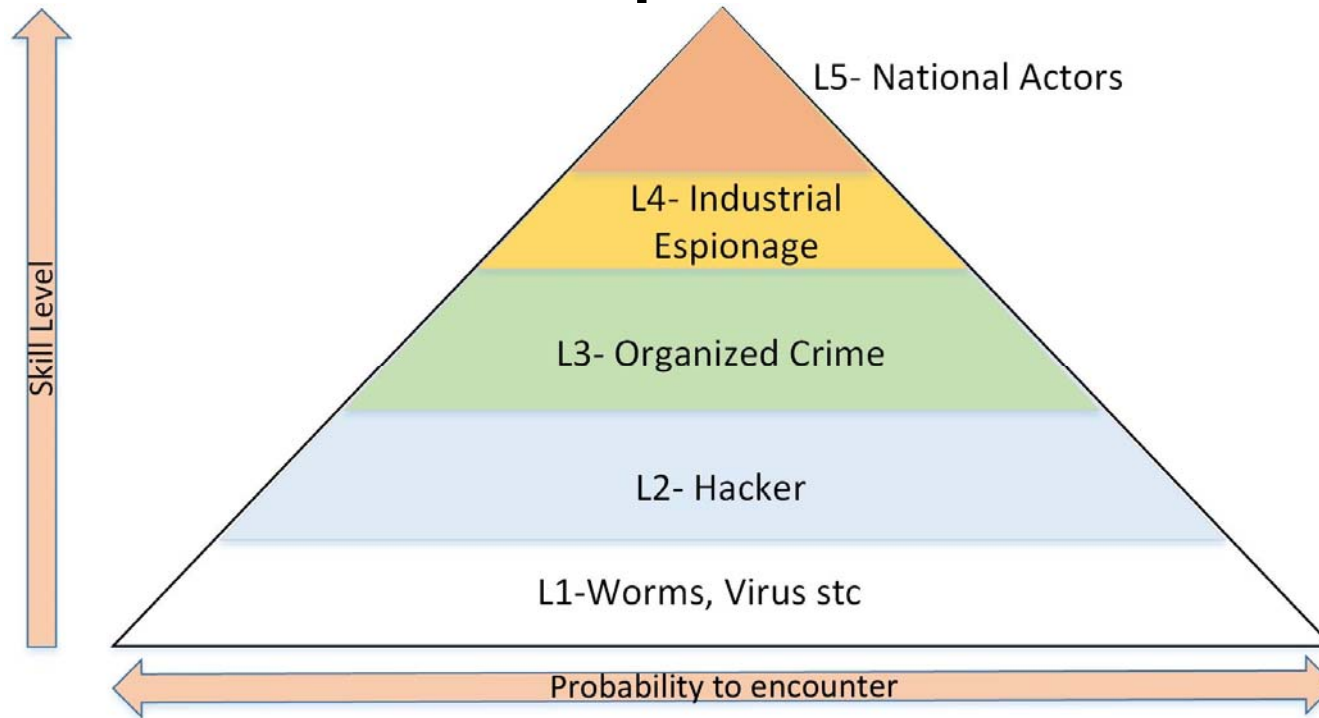
International Standards

- Certified Information Security System Professional (CISSP) Common Body of Knowledge (CBK).
- International Organization for Standardization (ISO) 27001 and 27002, version 2013
- (NIST) Risk Management Framework (RMF) and SP 800-53,63



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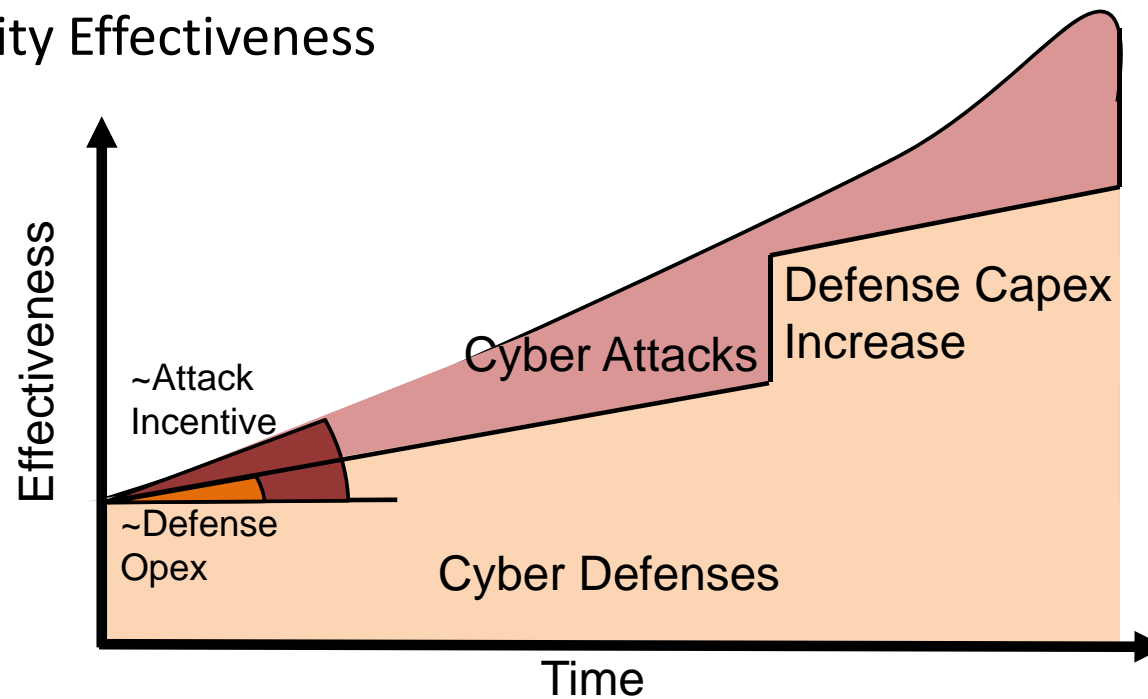
Threat landscape and motivations



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Trends in Cybersecurity

Cybersecurity Effectiveness



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Trends in Cybersecurity

Intelligent Attacker

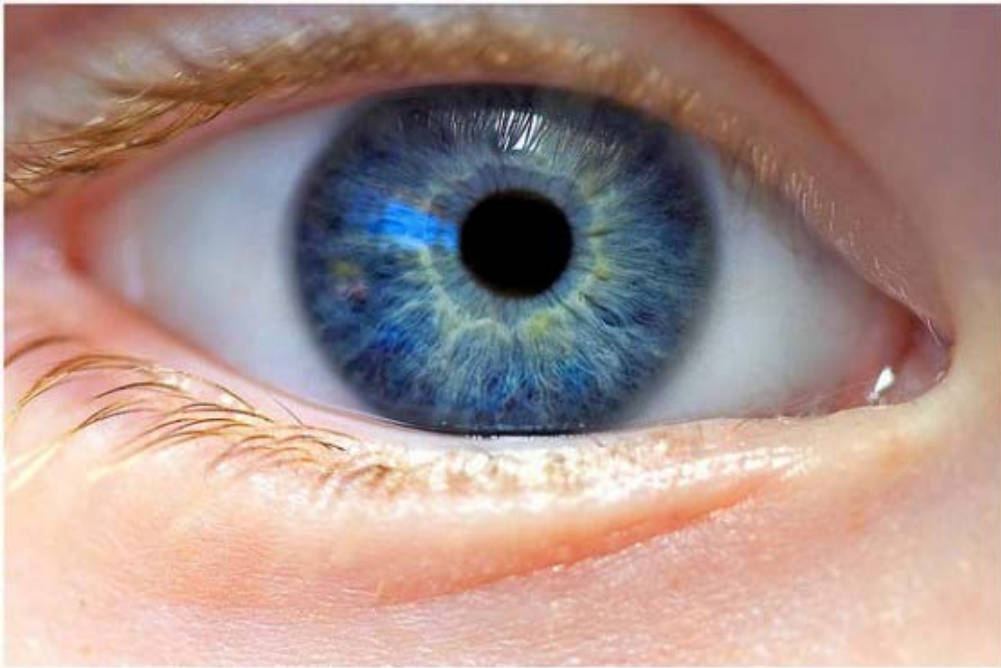
- 7x24 In shifts
- Attack research
- Trained professionals



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Trends in Cybersecurity

Detect and Delay



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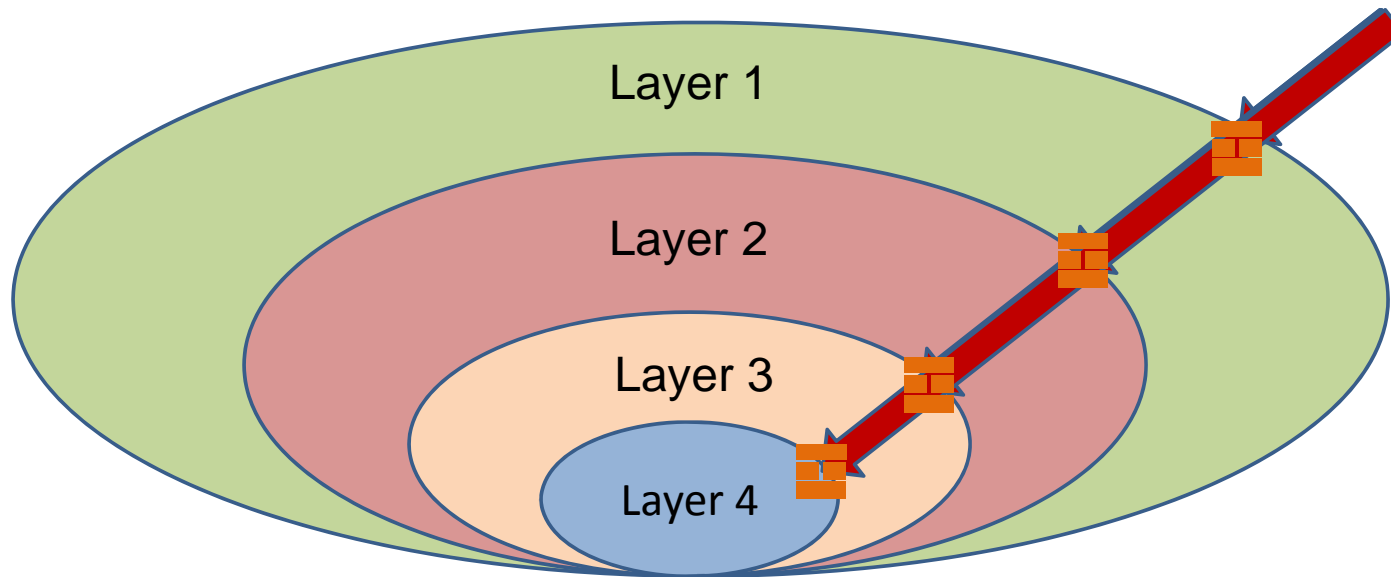
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Trends in Cybersecurity

Defense in Depth



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Trends in Cybersecurity

Catch and Repel



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Physical Security

Physical Access Control (PAC) Technologies



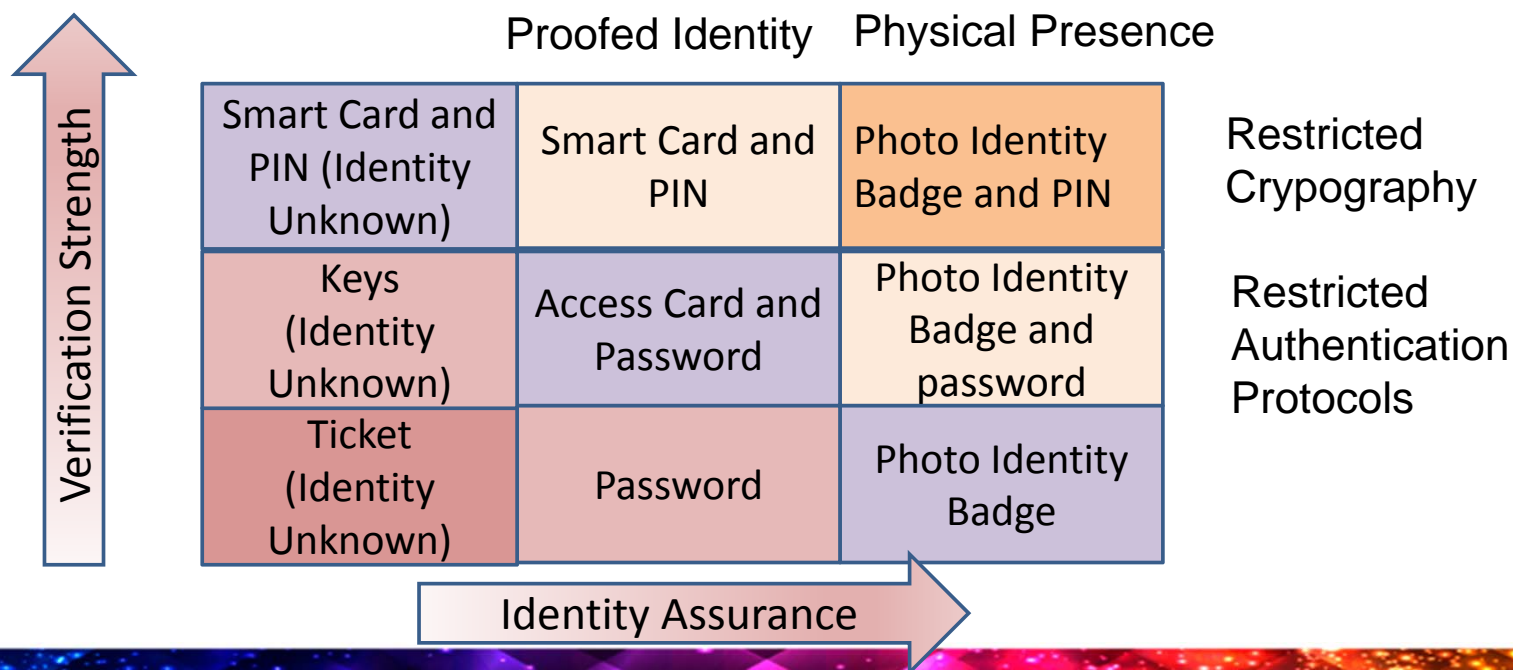
- Components
 - Lock Systems
 - Card readers
 - Backend Servers



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Physical Security

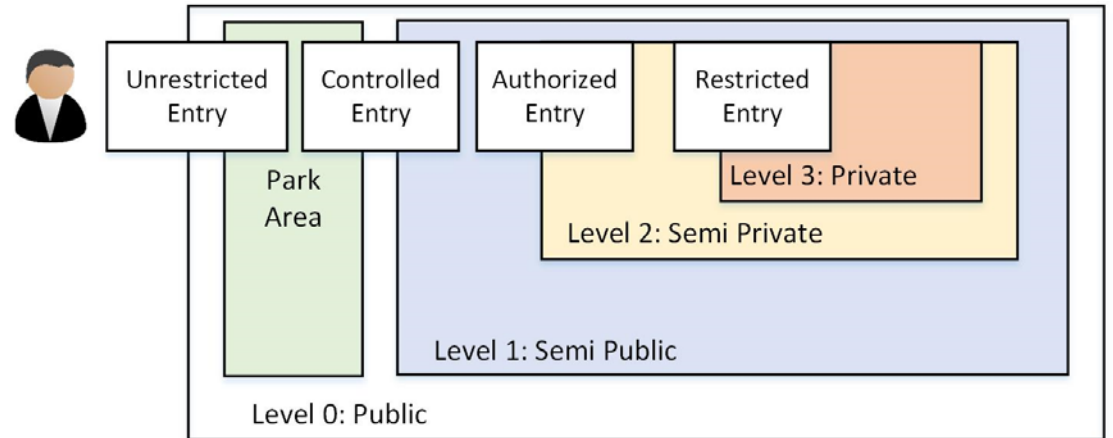
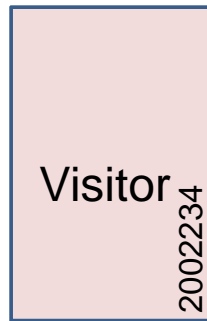
Vulnerabilities and Countermeasures



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Physical Security

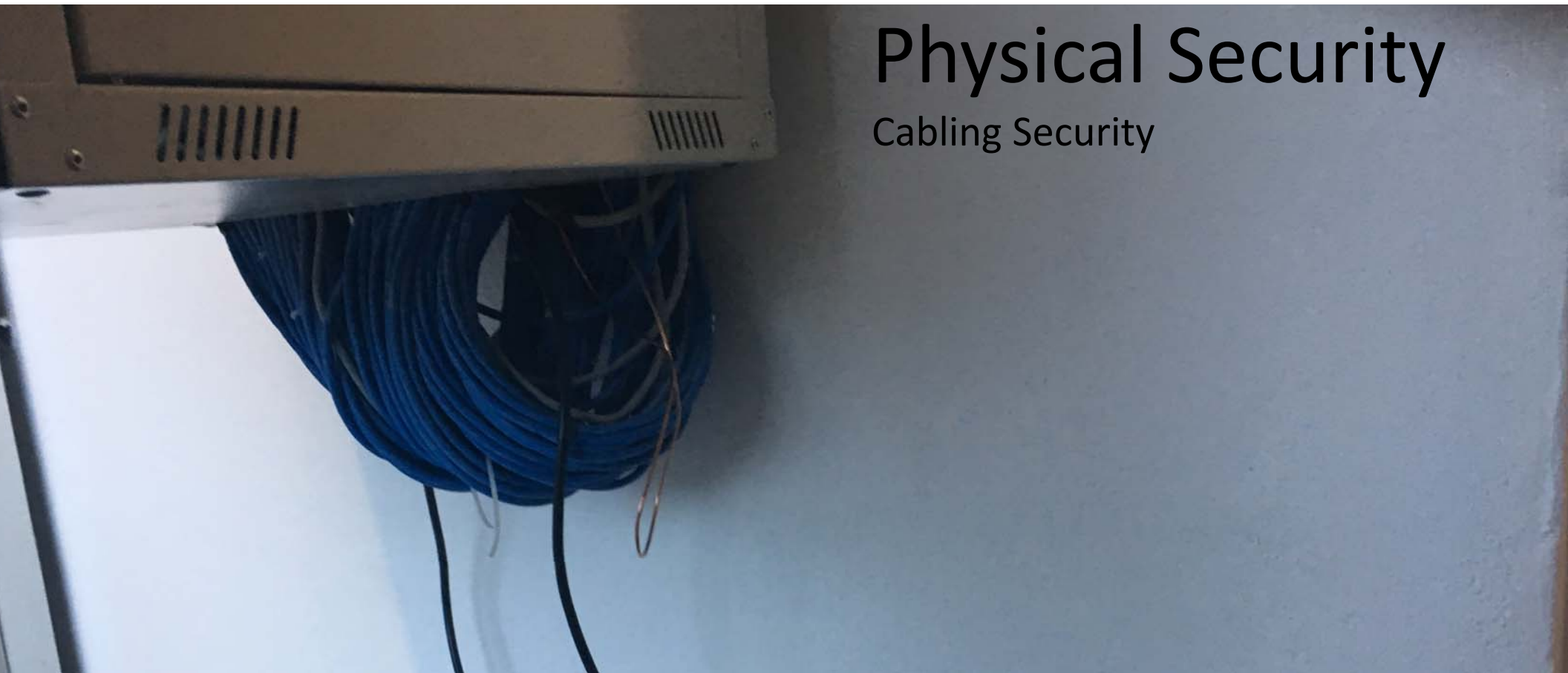
Vulnerabilities and Countermeasures



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Physical Security

Cabling Security



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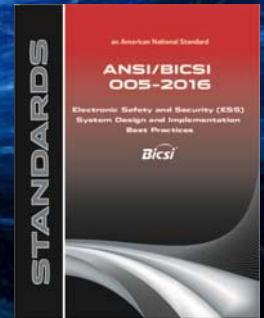
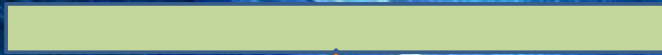
IT Systems Security

Network Security

Installation
Cost

Maintenance
Cost

Separation of Networks



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IT Systems Security

Server Security Technologies

Onboard Security Chips (TPM)

- Cryptokey Generation, Storage
- Best use: Disk Encryption

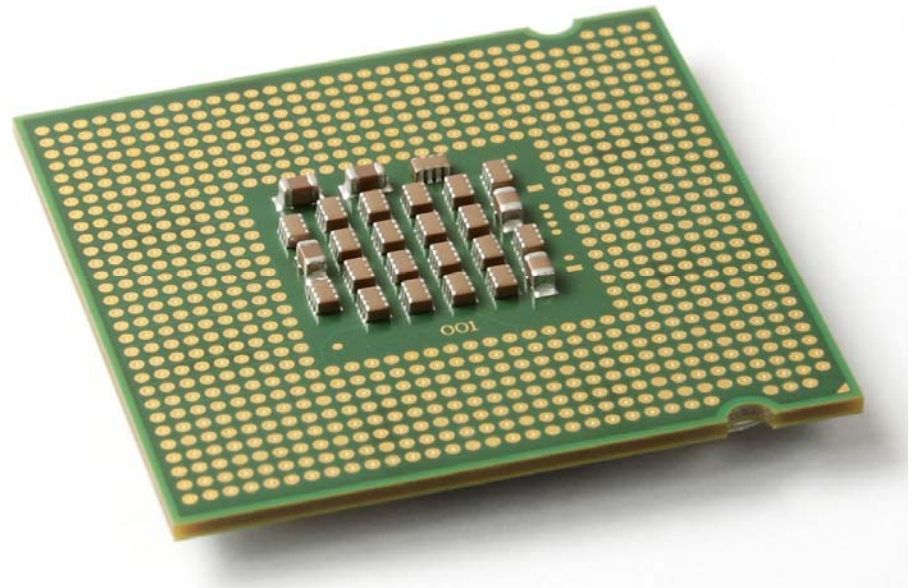


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IT Systems Security

Server Security Technologies

- CPU Security Features
 - Write Protect
 - NXE/XD
- Protects against buffer overflows



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IT Systems Security

Firmware Security Technologies

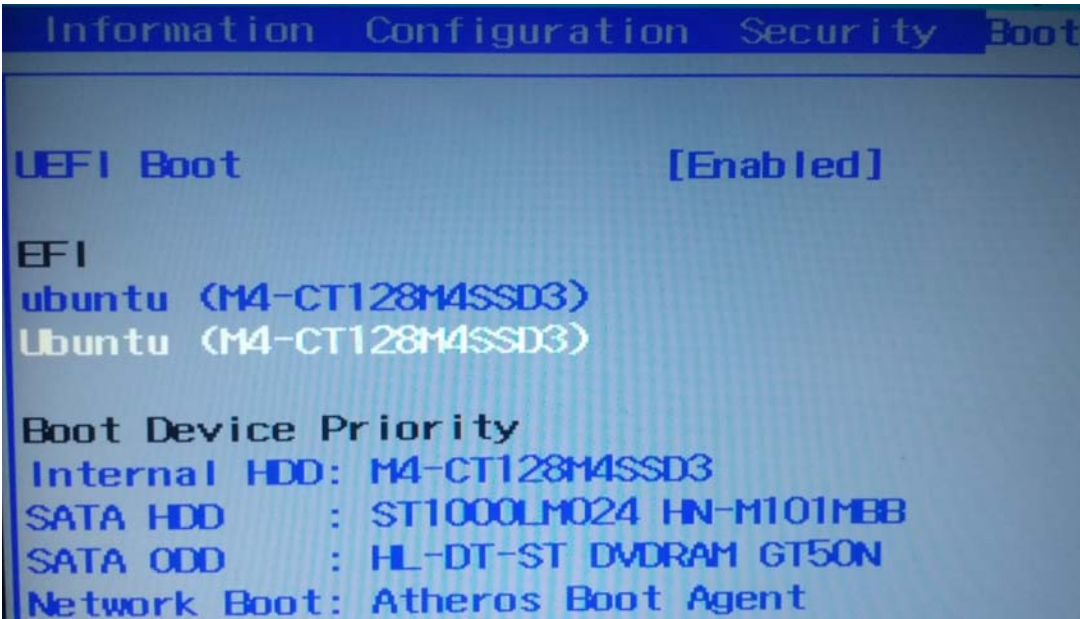
- Provided by Device Manufacturers
- Compliments Hardware provided security



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IT Systems Security

Firmware Security Technologies



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UEFI in PC



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Firmware in Apple iOS



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IT Systems Security

Firmware Security Technologies

- What to look for
 - Trusted Updates
 - Trusted Boot
 - Setup Passwords



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IT Systems Security

Firmware Security Technologies

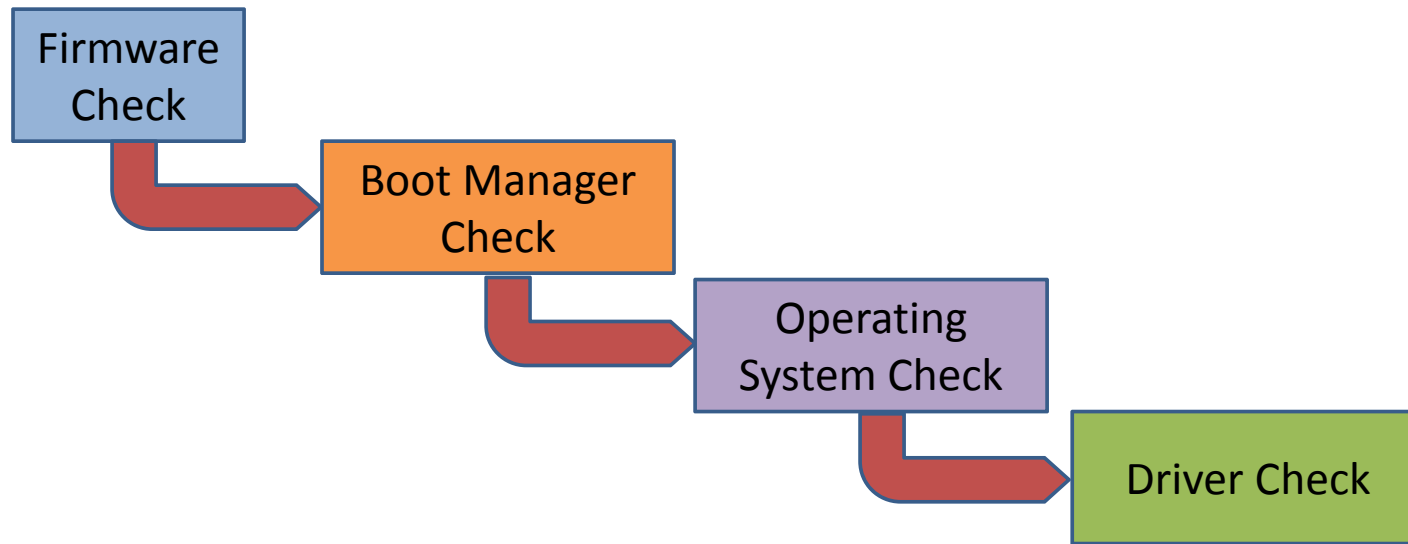
- Remote Management
 - Central Updates
 - Monitor Tampering
 - Change Passwords



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IT Systems Security

Trusted Boot Sequence

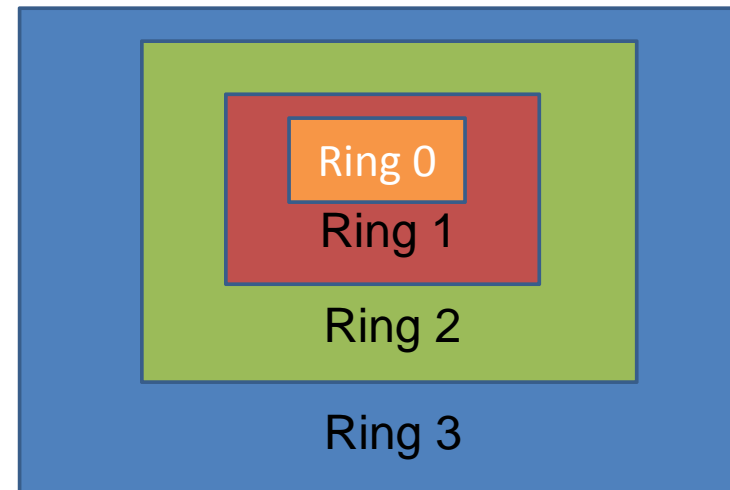


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IT Systems Security

Virtualization Security Technologies

- Execution Partitions
- Virtualization assisted application whitelisting



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IT Systems Security

Power Distribution Security

- UPS/PDU Security
- PoE Security



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IT Systems Security

Management Systems Security



- IP Cameras, Recorders
 - Record Manipulation
 - Denial of Service
- Physical Access Control Systems
 - Unauthorized access
 - Covering tracks

IT Systems Security

Scada Systems Security in DC

- Pumps
- Compressors
- CRAC Units
- DCIM, BAS, BMS



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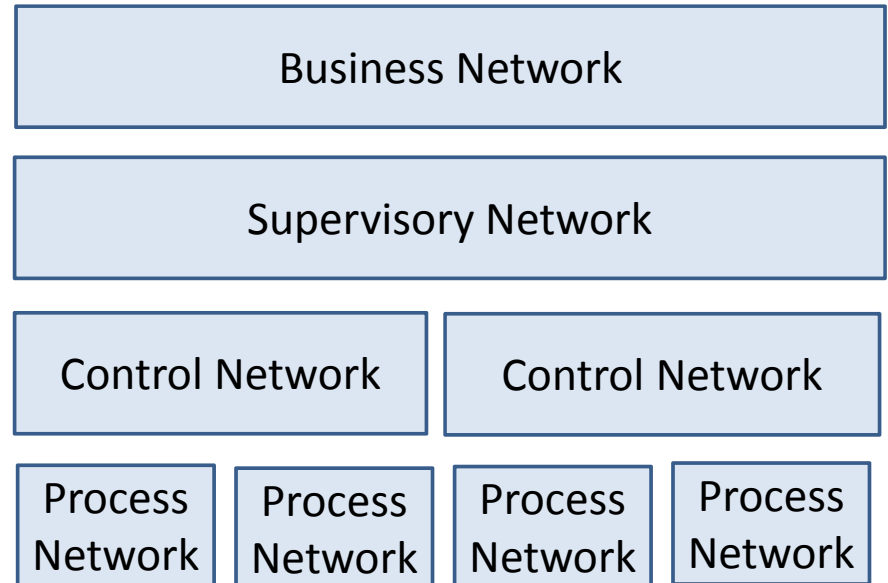


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IT Systems Security

Scada Systems Security in DC

- Separate Networks
- Disable unused services/Controllers
- Replace components that can not be secured



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Cybersecurity Operations

Increased Security for Availability Classes

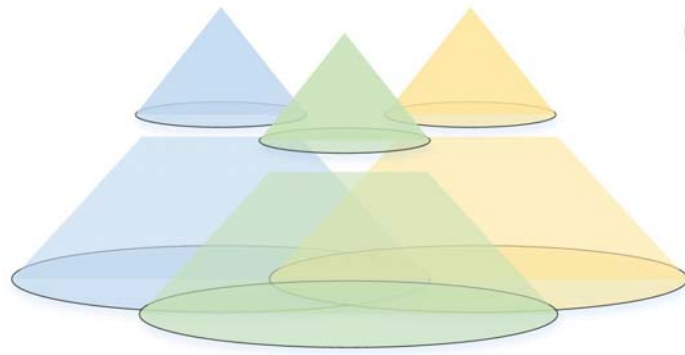
“Match your monitoring system security
AND availability with systems you monitor”



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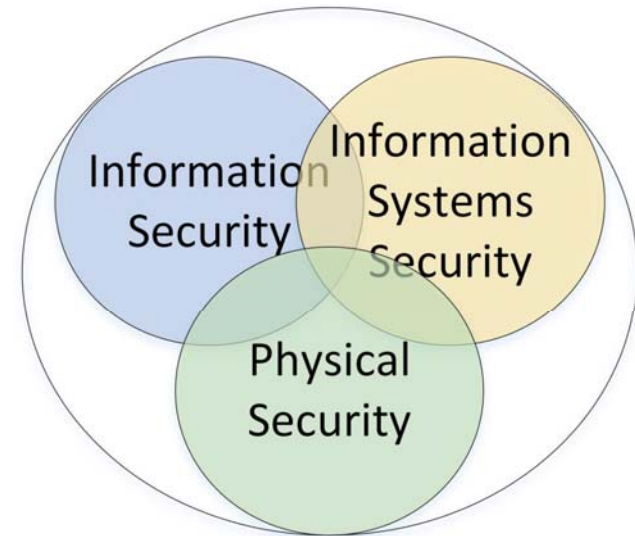
Cybersecurity Operations

Holistic Approach



Governance

Operations



Cyber Security



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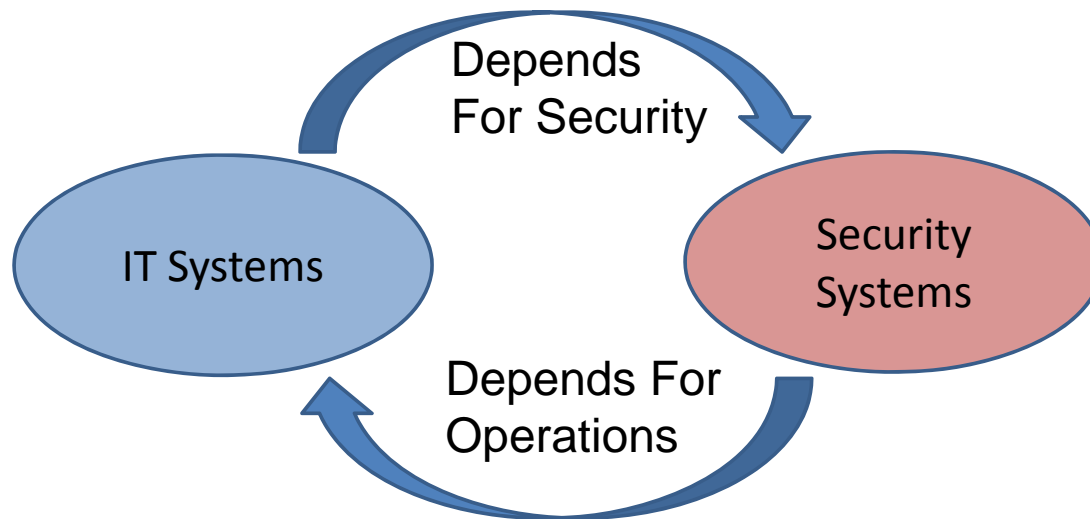
Cybersecurity Operations

Security Operations Center



Cybersecurity Operations

Minimize Operational Dependencies



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Cybersecurity Operations

Cybersecurity Frameworks

- NIST Risk Management Framework
 - Functions (Identify, Protect, Detect, Respond, Recover)
 - Tiers (Partial, Risk Informed, Repeatable, Adaptive)
 - Categories



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What can you do?



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What can you do?

Asses your cybersecurity risks

- You have physical access to critical Data Center systems
- You use a computer connected to the network
- You use Internet for communication (E-mail, Social Media)



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What can you do?

Select your laptop carefully

- Use a system with TPM (preferably with v2.0)
- Use disk encryption
- Use secure boot



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What can you do?

Select your laptop carefully

- All your driver updates should be downloaded from a verified and trusted location



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What can you do?

Select your laptop carefully

- Use a supported and regularly updated OS AND Applications

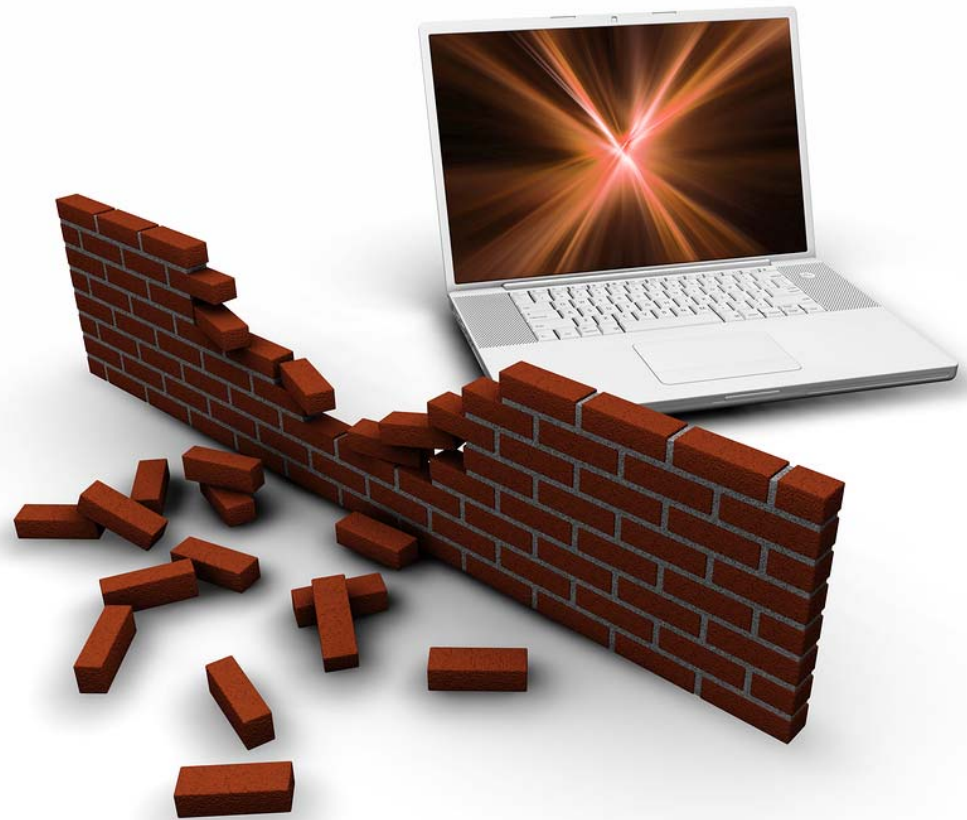


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What can you do?

Select your laptop carefully

- Use Advanced Threat Protection End Point Software

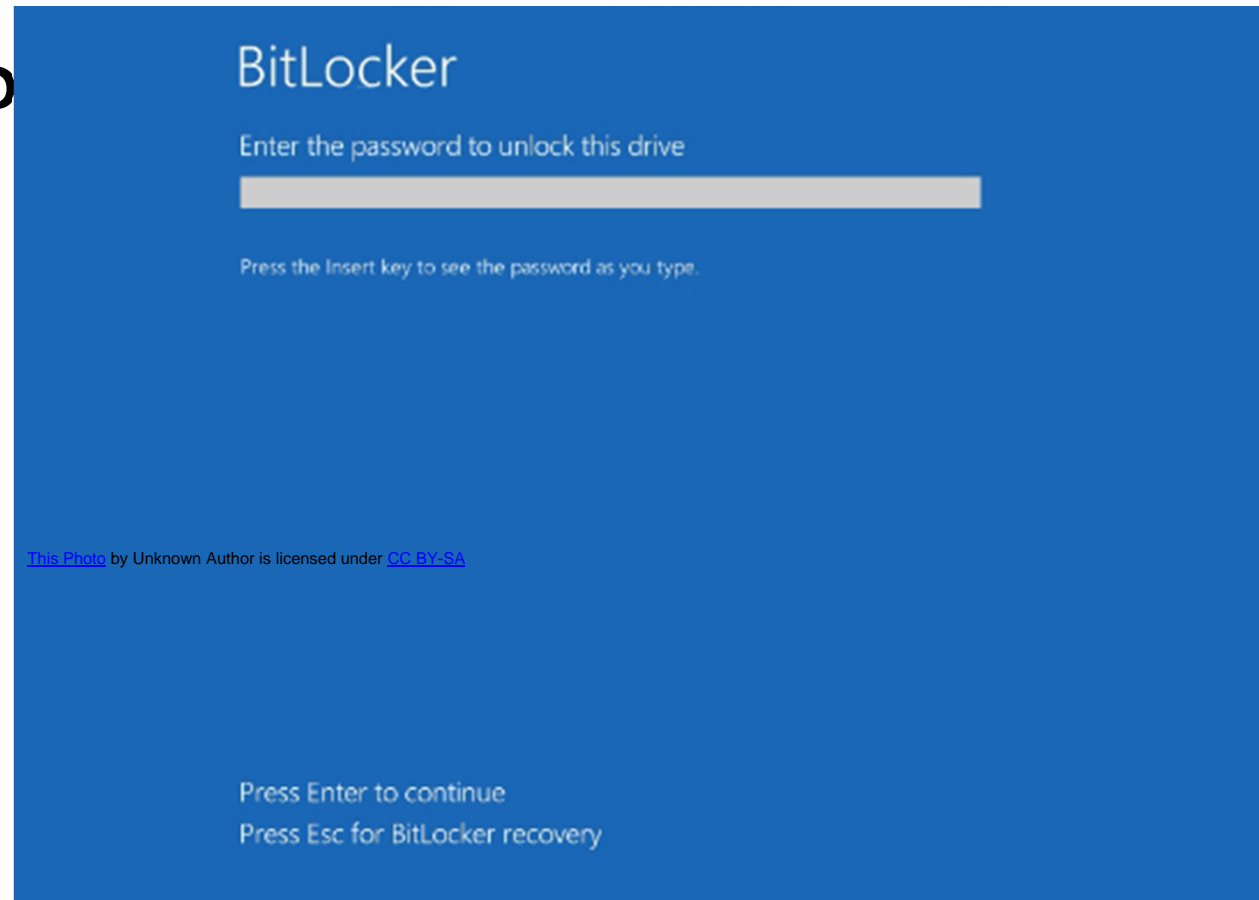


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What can you do?

Use Secure Logon

- Use BIOS password
- Use Startup password



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What can you do?

Use Secure Logon

- Use Multi-Factor Authentication for your laptop AND all your cloud applications
- Come up with a system for generating and remembering passwords



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What can you do?

USB Devices

- Best Solution: Do NOT use USB at all, network is easier to secure
- Second best: Do not insert ANY USB device to your machine that you do not know the origin. Use your own with a known brand.



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What can you do?

Daily Cyber Hygiene

- Beware where you send your password
- Do not use public Wi-fi without VPN
- Do not connect to sites if SSL is broken
- Do not leave your computer with even screen locked



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What can you do?

Secure your home network

- Use proper security on your wireless/Ethernet over power network



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What can you do?

Secure your home network

- Never put any device on your local network that you can't update firmware
 - Network Printers
 - NAS Devices
 - Smart Home devices
 - Ethernet over power switches



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Questions?



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