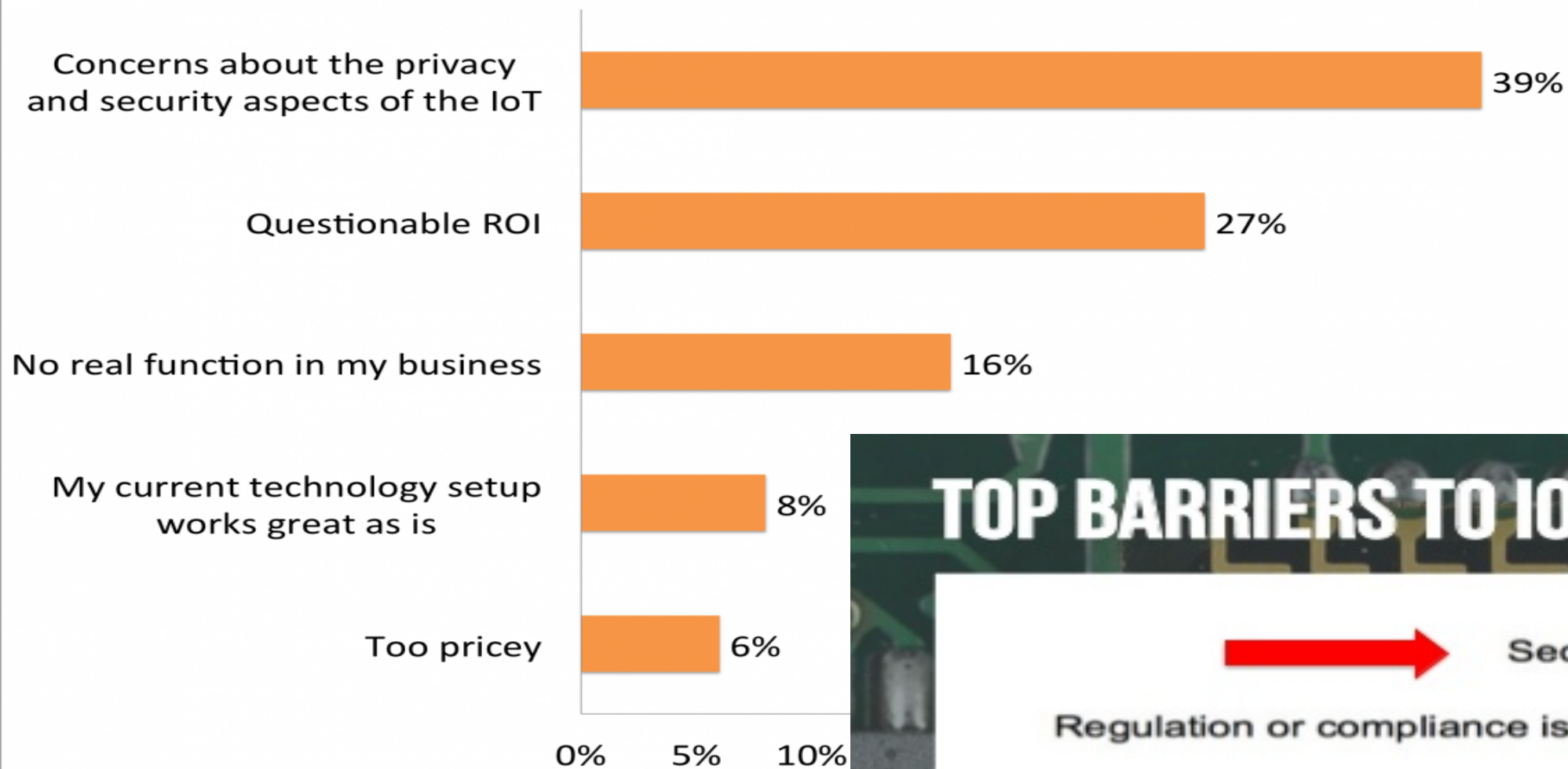




## What Barriers Do Companies See To Investing In The IoT



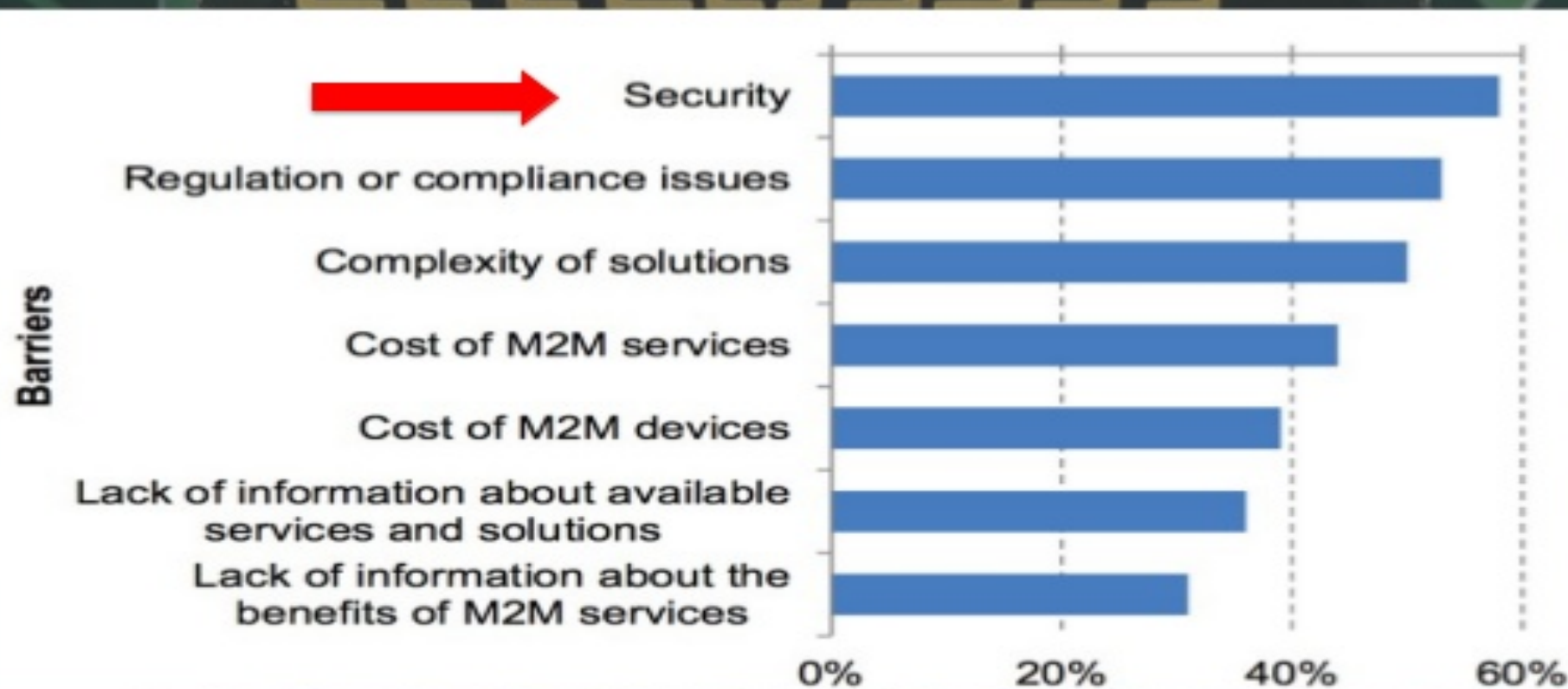
Source: BI Intelligence Survey 2014

34%



of respondents cite data security concerns as the number one barrier.

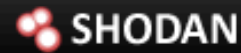
## TOP BARRIERS TO IOT AND M2M ADOPTION



Source: Infonetics, January 2014.

# Maybe you are already in the IoT business!

Try out the new website for Shodan! Click here to visit <https://www.shodan.io> (shodanhq.com is being deprecated)



Search

## EXPOSE ONLINE DEVICES.

WEBCAMS. ROUTERS.  
POWER PLANTS. IPHONES. WIND TURBINES.  
REFRIGERATORS. VOIP PHONES.

TAKE A TOUR

FREE SIGN UP



Popular Search Queries: Snom VOIP phones with no authentication - A list of Snom phone management interface without authentication

Results 1 - 1 of about 1 for wind turbines

### Services

Telnet

1



Added on 13.01.2015



Welcome to MTOI **WIND TURBINES**

TANDBERG Codec Release F6.3 PAL

SW Release Date: 2008-01-15

### Top Countries

Spain

1

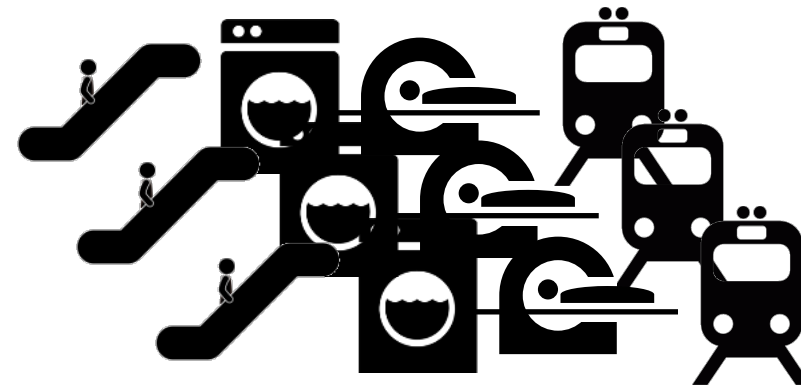
[Redacted] .com

Password:

Why is IoT different from other applications regarding security?



Vs.





ITWORLD Twitter LinkedIn Facebook Google+ RSS Search

## Cyberattack on German steel factory causes 'massive damage'



By **Loek Essers** FOLLOW

IDG News Service | December 19, 2014

A German steel factory suffered massive damage after hackers managed to access production networks, allowing them to tamper with the controls of a blast furnace, the government said in its annual IT security report.

### MORE GOOD READS

First Stuxnet victims were five Iranian industrial automation companies

Iranian hackers compromised airlines, airports, critical infrastructure...



10 deadliest differences of state-sponsored attacks

- Device security
- Vulnerability management
- Device permissions

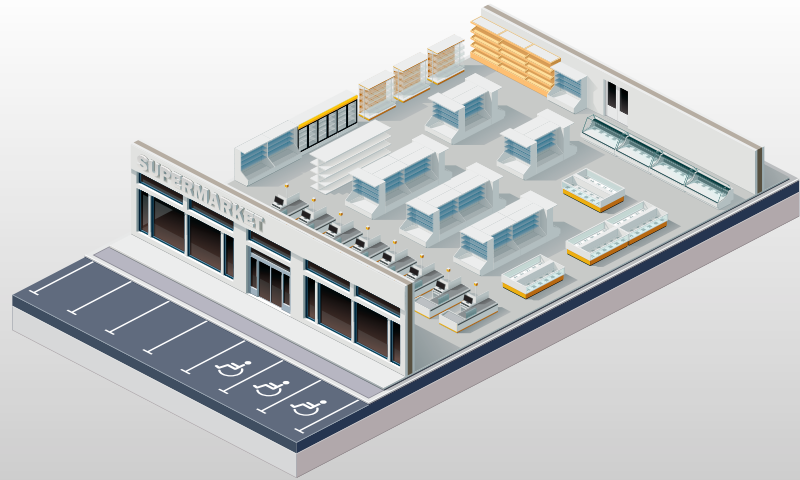


Device Security Case Study

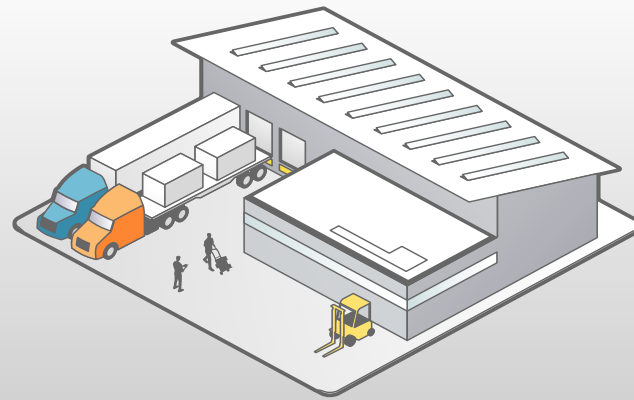
# WHAT DO AIR CONDITIONERS HAVE TO DO WITH IDENTITY THEFT?



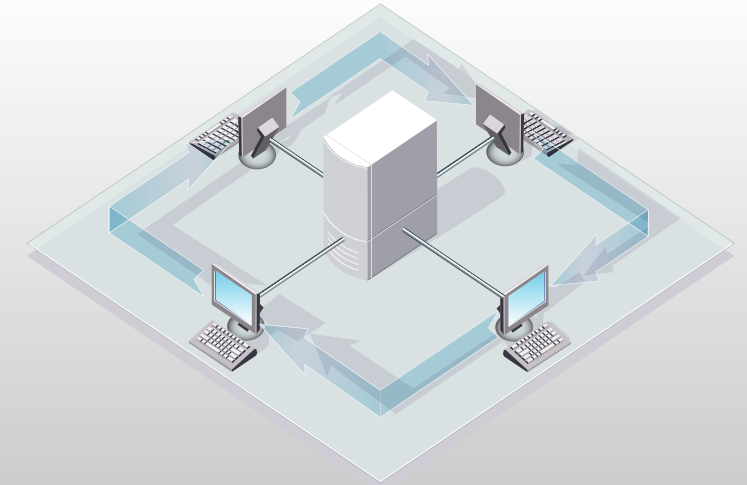




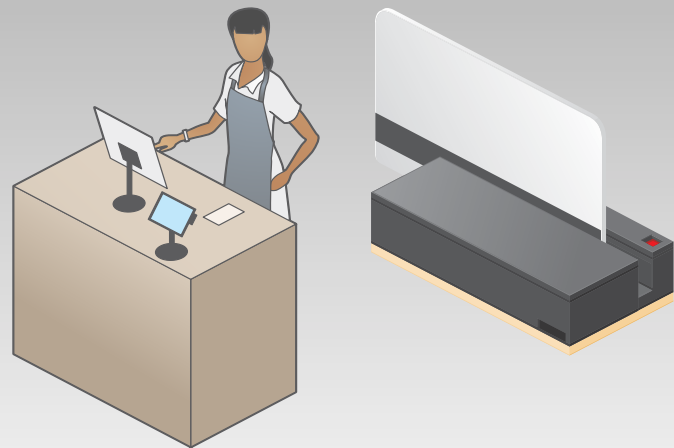
A well known retailer has experienced a security breach resulting in identity theft for millions of consumers.



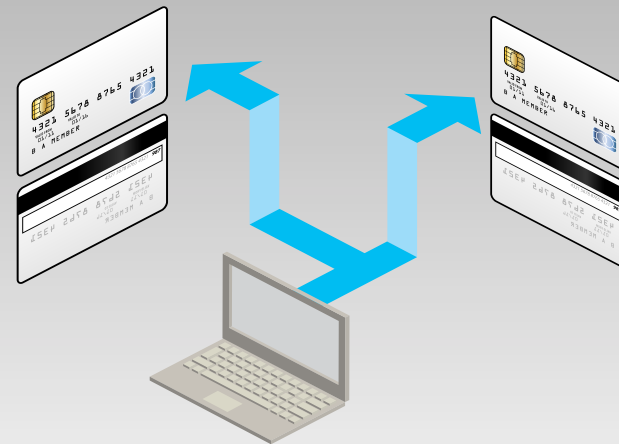
The breach actually began when the retailer's HVAC maintenance vendor was broken into.



Network passwords the vendor used to monitor the retailer's HVAC systems were stolen.



These same passwords gave hackers network access to the retailers Point-of-Sale machines.

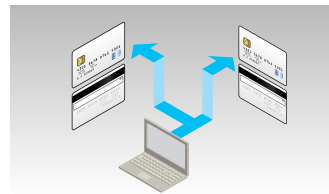
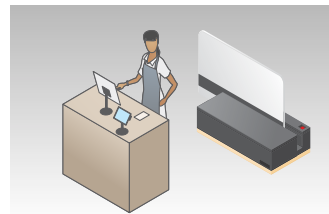
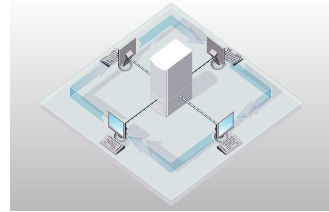
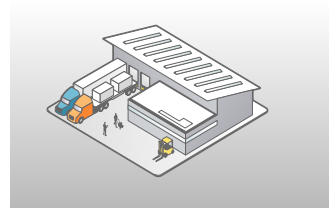
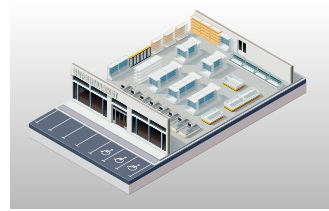


With this access, hackers installed malicious software that captured Credit Card data the time of transactions.



Taking place over the holiday season, the attack captured the identity data from millions of unsuspecting shoppers.

## User credentials compromised on HVAC system



Direct access to corporate network via HVAC

Gained access into Cash Registers

Reverse engineer software & insert malicious code

Fool the Cash register to run compromised binaries

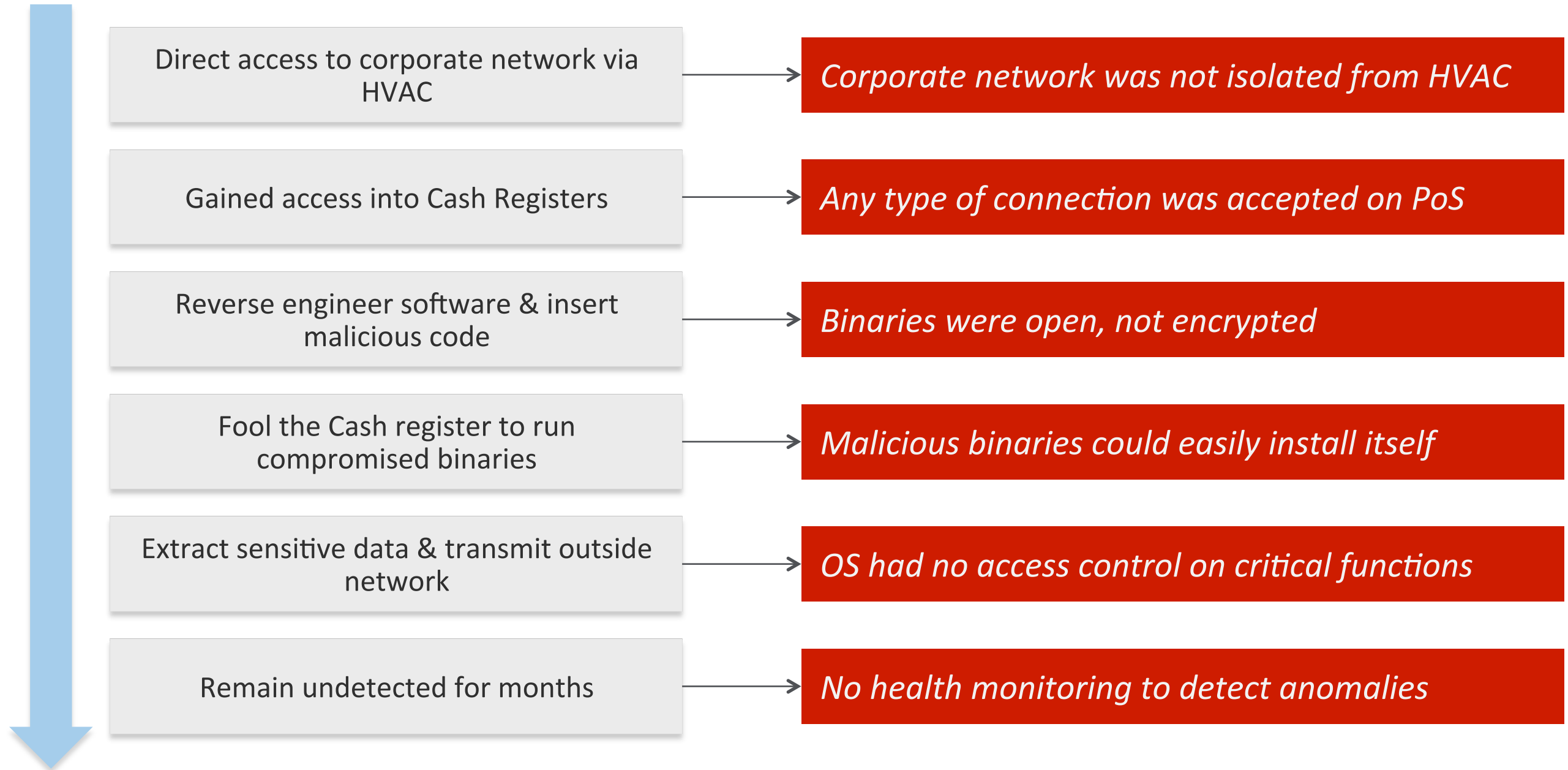
Extract sensitive data & transmit outside network

Remain undetected for months

40 million Credit cards stolen, \$450 million lost by retailer

## User credentials compromised on HVAC system

**What  
went  
wrong ?**



**40 million Credit cards stolen, \$450 million lost by retailer**



Design

Prevent malicious  
code in  
development



Boot

Prevent untrusted  
binaries from  
executing



Run Time

Prevent malicious  
attacks in operation



Power Down

Prevent  
onboard data access  
when at rest



## Design

- Signed binary delivery
- Secure development processes
- IEC 62443
- IEC 27034

## Boot

- Secure boot/load
- Measured boot/load
- Signed binary app authentication
- Digital certificates/PKI
- Remote attestation

## Run Time

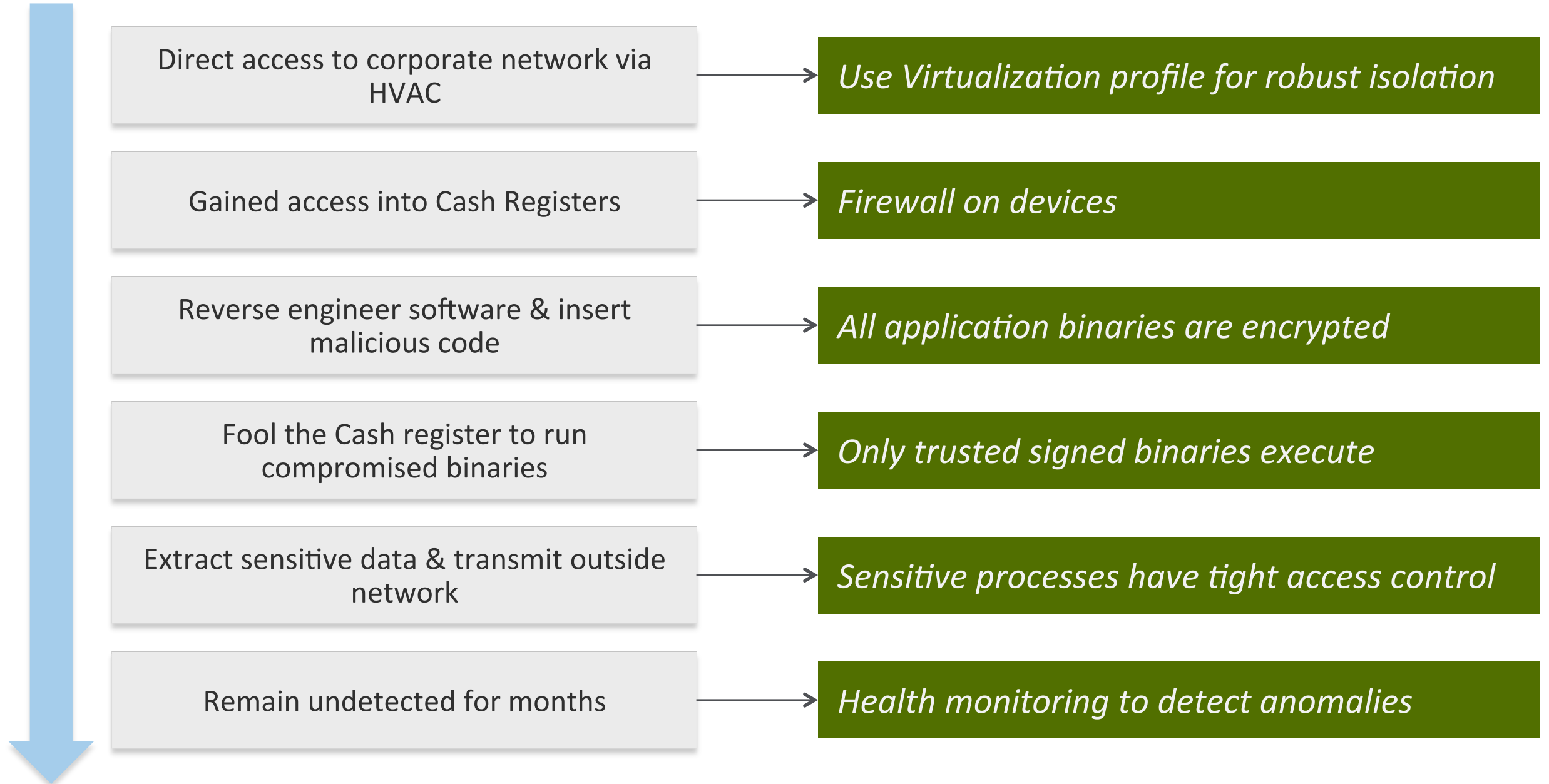
- Cryptography
- User authentication / management
- Network security
- SSL/SSH
- IPSEC/IKE
- Firewall
- Auditing/logging

## Power Down

- Encrypted storage
- Sanitization

## User credentials compromised on HVAC system

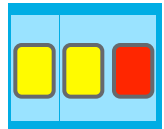
**How Wind River solutions could have prevented the disaster**



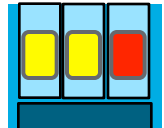
**Company prevents catastrophic hit to their reputation**



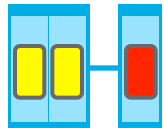
- Process Separation
  - Security in same OS as other components
  - Separate security processes



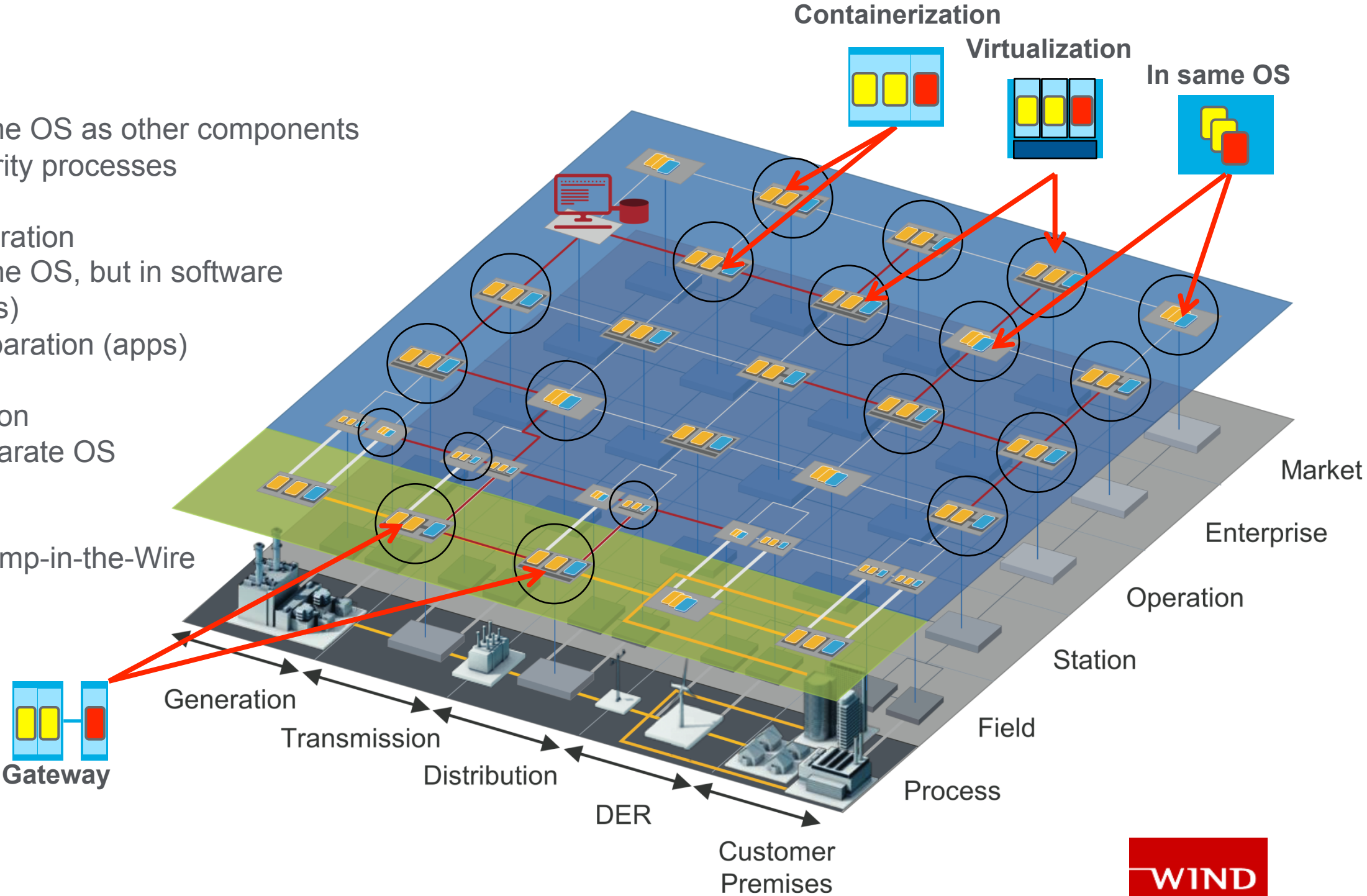
- Containerization Separation
  - Security in same OS, but in software containers (jails)
  - Application separation (apps)



- Virtualization Separation
  - Security in separate OS



- Physical Separation
  - Gateway or Bump-in-the-Wire



**Separation of concerns to manage security apart from operational components – IT/OT**







# Vulnerability management

**MACHINE 1**



Operating system 1  
Protocol 1  
Board 1

**Retrofit**

**MACHINE 2**



Operating systems 2  
Protocols 2  
Board 2

**1<sup>st</sup> Generation  
Manufactured**

**MACHINE 3**



Operating system 3  
Protocol 3  
Board 3

**2<sup>nd</sup> Generation  
Manufactured**

**MACHINE 4**



Operating system 4  
Protocol 4  
Board 4

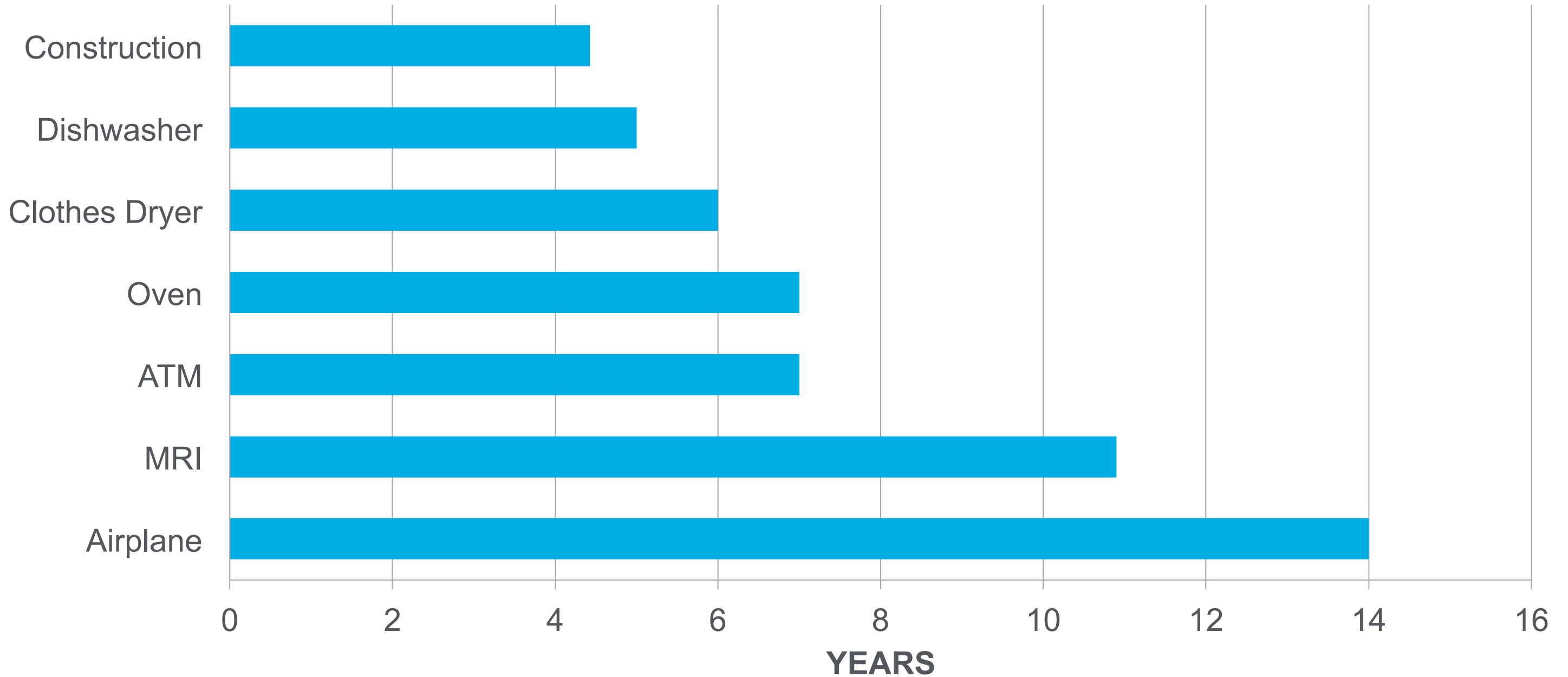
**Acquired**

Many  
**Devices**

Many  
**Operating Systems**

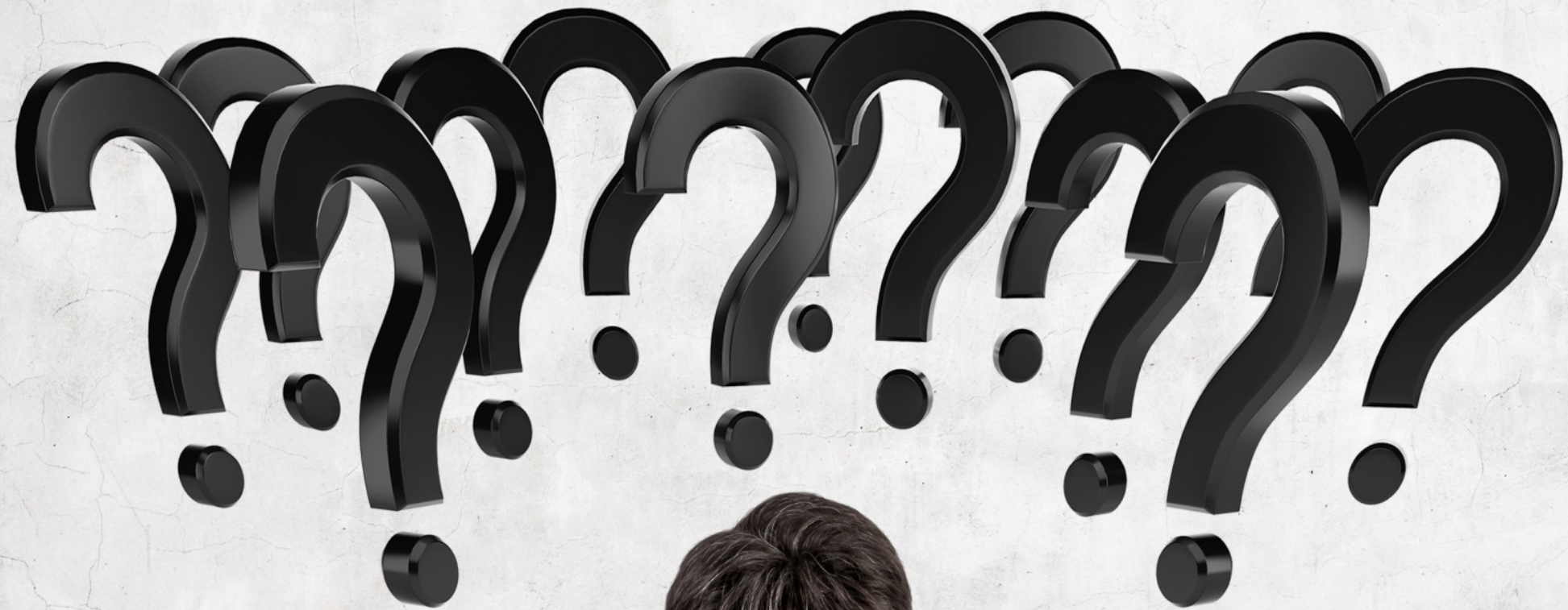
Many  
**Protocols**

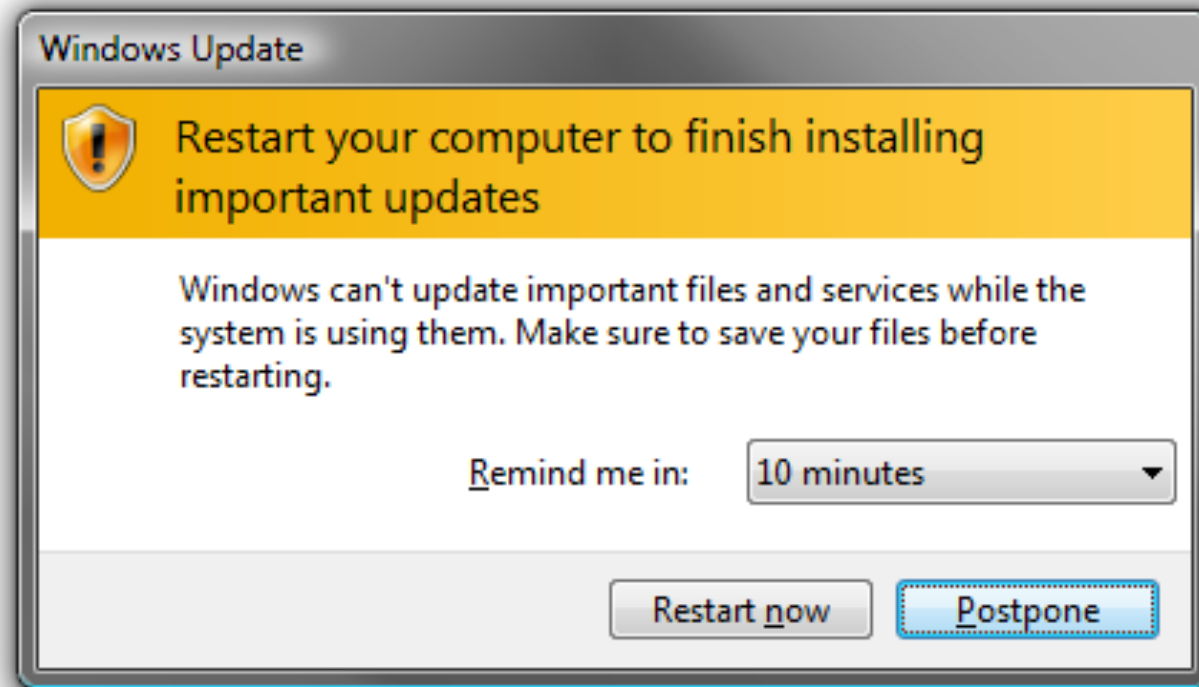
# Average Age of Machine by Type



HEARTBLEED

The word "HEARTBLEED" is written in a white, outlined, sans-serif font. A large, solid red heart is superimposed over the letters "ART". From the bottom of the heart, several vertical red lines of varying lengths drip downwards, resembling blood.











**Scalable**



**Secure**



**Efficient**



**Flexible**



























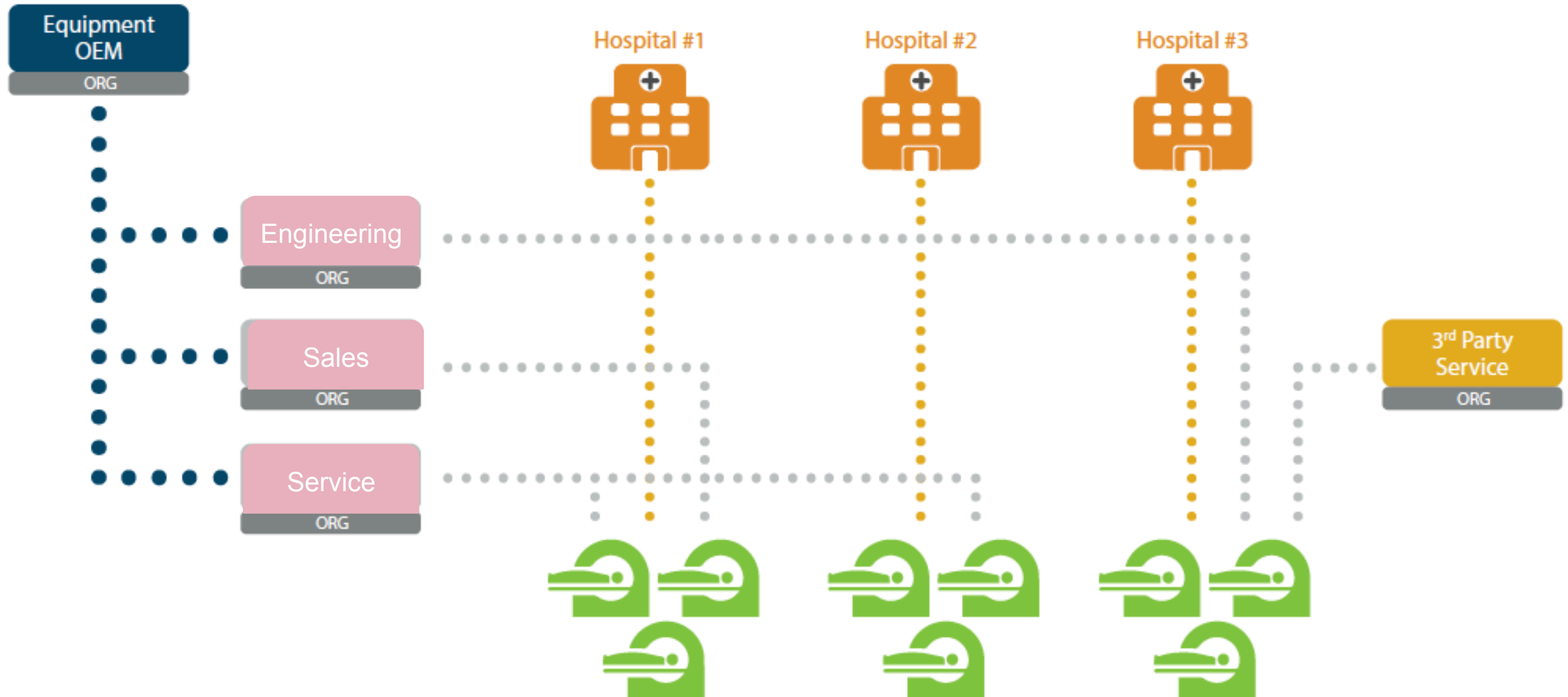








System Administrator	Service Manager	Service Technician	Regional Manager	Product Specialist	Call Center Agent
 	 	 	 	 	 
 	 				
 					





- Device security
- Vulnerability management
- Device permissions



- Your feedback is valuable
- Don't miss out on the chance to provide your feedback
- Gain a chance to win an instant prize!
- Complete your session evaluation now

# PTC<sup>®</sup> Live Global