COMBATREADYIT.COM

FRISKSI - FOOD RISK AND SECURITY INTEGRITY

Presented by:
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- **PURPOSE**
  - COMBATREADYIT.COM - PROTECTION AND SECURITY SOLUTIONS
    - Our Focus is on Dominions
    - SMBs within Dominions
    - Team Members Organisation within SMBs
    - Broadsourcing and Application Development
    - Security Audits and Security Support
  - OUR MISSION IS TO HELP SUBSCRIBERS AND SMBs SECURE THEIR INFORMATION
  - WE ARE A TRANSFORMATION ADVISORY HELPING SMBs REALISE QUANTIFIABLE COST SAVINGS BEYOND CLOUD
  - OUR PASSION IS PERPETUAL IMPROVEMENT EVERYWHERE

- **PRODUCTS**
  - SHAZOPS
  - VIA FERRATA RISK ASSESSMENTS
  - FRISKSI
  - PROJECT MANAGEMENT
    - ITIL
    - IT STRATEGY
    - SECURITY STRATEGY
    - ORGANISATION STRATEGY
  - DISCIPLINED AGILE DEVELOPMENT
  - RUGGED SECURE APPLICATIONS
  - DEVOPS and SecOPS

- **PEOPLE**
  - BOUTIQUE CONSULTING PRACTICE
  - CONSULTANT HAVE A MINIMUM OF 20 YEARS EXPERIENCE
  - 1400 YEARS OF EXPERTISE ACROSS 62 TEAM MEMBERS
  - SECURE RUGGED DEVELOPMENT AND PROJECT MANAGEMENT
  - 3 DECADES IN IT & OPS SECURITY
  - PROJECTS DELIVERED IN 44 COUNTRIES
  - DEVELOPED PERPETUALLY IMPROVE EVERYTHING

COMBATREADYIT™

COMPANY PROFILE

- **Established 2009 as part of HazardologyLtd based in Vancouver**
- **Focus on CyberSecurity**
- **Our market sector is IT Security, Secure Products and Advisory, Cloud Transitions, Project Managment, Team Member Broadsourcing, Organisation Alignment, Mobile App and DataCentre design**
- **Target Markets are Internet connected Pioneers and SMBs**
- **We are represented in Switzerland, Canada, UK, and USA**

BLACK MINUTE

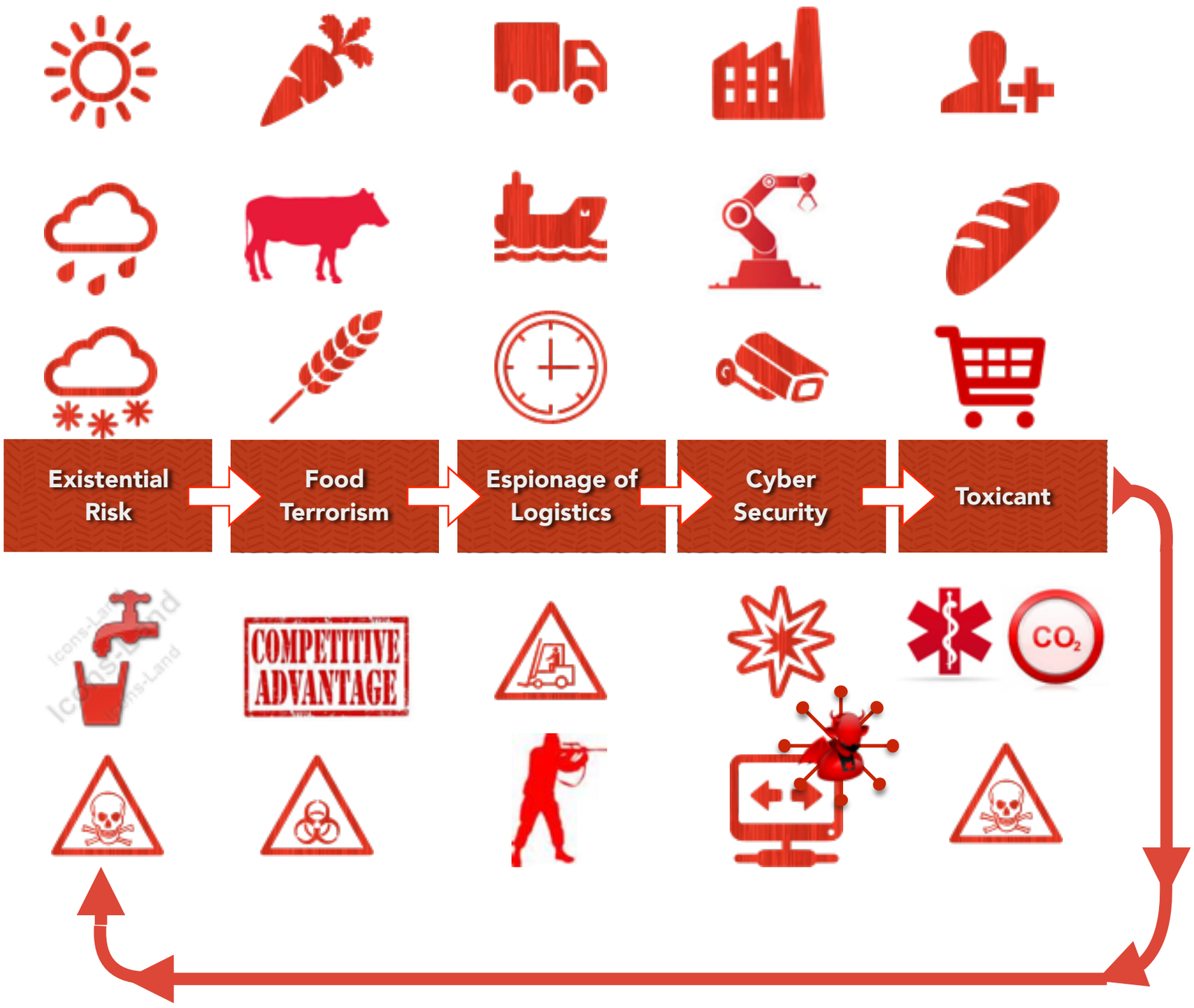
The average cost to a company for a One minute Data Breach is $3 MILLION

- The Black Minute is all an adversary needs to inflict espionage or wipe PLC data or manipulate an entire Process facility to cause damage (or death)
- An estimated 1,250,000 hackers now hack 50,000 websites and installations a day

THE BLACK MINUTE

- Food processing and production data breaches can have major impacts on reputation
- Adversaries and Competitors can manpulate data even at Analytical Data Laboratories which can lead to major recalls of food brands in a country or even globally
- The Food sector is now a leading target for Cyber attacks

E.F.E.C.T.



FOOD RISK & SECURITY INTEGRITY

- FRISKSI - End to End Integrity of the Food Supply Chain
- E.F.E.C.T. LOOP -
  - EXISTENTIAL RISK - manipulation of natural resources
  - FOOD AND BIO TERRORISM - Conflict and Competition
  - ESPIONAGE - Storage of food as target -Conflict impacts
  - CYBER SECURITY - Malware attacks on SCADA and ICS - Explosions/Leaks of hazardous material
  - TOXICANT - Consumption Safety at POS and waste

FRISKSI

COMBAT READY IT™

The Food industry is under attack as part of a hacking campaign by Cyber and Food Terrorists

- Food Processing facilities now account for 24% of known cyber attacks in the first half of 2015
- Dell reported 647,000 attacks globally on the Food sector in 2014
- 1000 directed SCADA attacks on Process facilities in Europe in first quarter 2015
- 67% of Process facilities do not know that they may already be infected
- Over 50% of attacks are initiated internally by Insiders
- Cyber Security tools and practices are brittle
- In the UK alone this costs the food industry £8 BILLION in ANNUAL lost revenue and added IT expenditure
- Global Food Sector losses are estimated at $189 BILLION

FOOD RISK & SECURITY INTEGRITY

- One gram of botoxin (the organism that causes botulism) can kill hundreds of thousands
- 2 Million people die from food related illness
- 1.3 BILLION tons of food wasted

MOTIVATION

8 Billion earth citizens need feeding - The planet cannot sustain the increasing nutritional demand

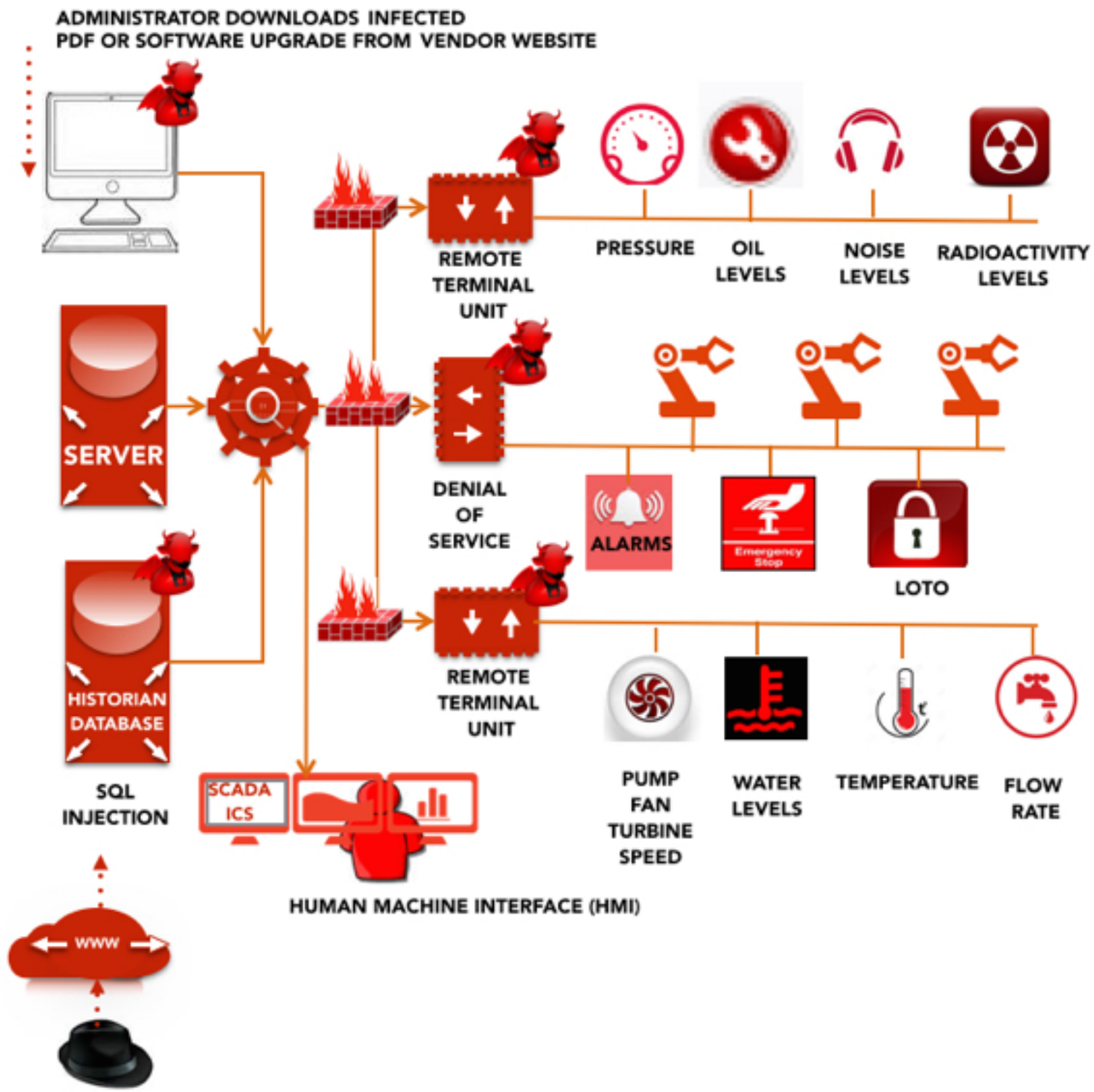
- Food Terrorists seek to disrupt dominons by destroying crops and water supplies and processing in localised conflicts
- 250,000 hackers globally will attempt to infiltrate manufacturers Enterprise and Plant networks JBIT*
- Water supplies are affected by drought or flood
- Essential minerals required to maintain health are being depleted and this increases disease
- The weather is now a deep concern for governments as the costs to maintain sustenance in disaster areas is high
- Food supply needs to increase 70% by 2050
- Patents for gastronomic recipes, synthetic foods (sugar replacements), syrups, molecular level food manipulation and genomics (biotechnology) are goldust to adversaries

FOOD RISK & SECURITY INTEGRITY

- Agroterrorism
- Subversion of Level 2 and Level 3 Supply Chain
- Audit controls on contract suppliers
- Quality and Security assessments on primary growers and providers
- Traceability
- *Just Because Its There

SCADA/ICS

Traditional Process IT Architecture



FOOD RISK & SECURITY INTEGRITY

- Overlap of ISA84 (process safety) and ISA/IEC-62443 (cyber security)
- The safety integrity level (SIL) concept is well established and described in the ISA84 and IEC 61511 standards
- Do they work?
  - Direct Attacks
  - Denial of Control
  - Denial of Service
  - Divergent
  - Dissonant (Insider)

ROASTS

Really Old Antiquated Software Thats Slow

- Most ICS Software has more holes than a Swiss Cheese (Stands to (James) Reason))
- Designed for low latency speeds they let Hackers through Firewalls or Switches and can easily intercepted and reverse engineered….
    - MODBUS
    - PROFITNET (No Authentication, Not encrypted)
    - SIEMENS S7
    - IEC 61850-8-1
    - IEC 404
- Most installations can be compromised in under an hour

FOOD RISK & SECURITY INTEGRITY

- Attackers have access to malware that circumvents old programming language and topologies
- These attacks are well docmented and available freely on the web

ATTACK TYPES

Current thinking and existing IT architectures, Cyber Controls and Protocols cannot handle sophisticated attacks

- Hackers can easily access Process Facilities PLCs
  - STUXNET, FLAME, HAVEX , DUQU, SHAMOON
- PLC Vendors websites and software upgrades are already hacked
- Once a PLC is corrupted a hacker can control energy plants, additive controls, water treatment
- Most PLCs are custom programmed leaving the Operating System open to Insider
- A PLC attracts significant reprogramming costs (7 figures)
- Most Process facilities are connected to the Enterprise networks…everyone uses IP to connect
- Vendors, support and maintenance engineers and operators connect remotely using IP

FOOD RISK & SECURITY INTEGRITY

- Attackers can crack a password in 15 seconds
- An adversary can take over a WiFi network in 30 seconds
- A firewall can be circumvented in under a minute
- A SCADA Command and Control system can be hacked and have malware that hides from normal scanning software
- Traditional Operating Systems have vulnerabilities that have been around for 20 years
- MALWARE SCRABBLE
  - STUXNET - IRAN Centrifuges
  - FLAME- 20 times more powerful than STUXNET
  - SHAMOON- Aramco 30,000 PCs
  - HAVEX-Energy Sector -Remote Access Trojan (RAT)-SInce 2011
  - DUQU-ICS Data collection

ATTACK TIMELINE

Actions that can make a Boiler or Ammonia Plant explode

- Administrator downloads compromised software upgrade from vendors website
- Insider who becomes influenced under the FREXAGON pressures
- Insider can manipulate ICS to misbehave
- Insider has high level of Access and privilege
- Insider creates and sells Admin Accounts (after being bribed or being let go) these accounts are sold on the Hackers sites
- Infiltrate
- Adversary buys Admin credentials
  - Accesses network via VPN
  - Accesses Citrix and Microsoft Terminal Server
- Adversary attempts IP Network attacks, bypass firewalls
- Adversary collects Human Machine Interface
- Accesses PCs and Servers and drops cloaked malware on multiple devices
- Adversary creates additional accounts on TRUs and Wifi and drop off point for data with FTP access. Access Histroy deleted
- Exfiltrate
- Attack Phase
- Mimics Command and Control operator (HMI) using Man in The Middle
- Can use SQL INjection to steal data
- Launch

FOOD RISK & SECURITY INTEGRITY

- Attacks are simple and can be carried out by trainee adversaries

ROOT CAUSES

Use of the Internet Protocol throughout a facility is an open book to an adversary

- The Internet is a 30 year old car designed by motorbike fanatics in the 80's
- Internet Designers scoff at the mere suggestion that IP ubiquity has led to the massive rise in Cyber Security attacks
- Blame and responsibility is aimed at Enterprise IT teams (Its not their Fault)
- Regulatory bodies recommendations are to implement Firewalls and Micro Segment the network…this induces severe latency and impacts on Machine Safety and Capabilities
- Anti-Virus software is only 60% effective by the vendors own admission (can your company handle 1,000,000 new viruses per week?
- Company engineers download unauthorised software from the Internet
- Programmers copy previously corrupted code into new environments
- Penetration and Vulnerability tests and practices are outdated

FOOD RISK & SECURITY INTEGRITY

- Malware can spread through an organisation through the IP Protocol
- The Internet of Things uses IP
- IOT is the biggest growth market in the Food Industry
- This all makes perfect sense right?

REMEDIALS

By the book - the usual approach. Most common controls recommended by most all regulators

- Identifying and categorizing assets,
- Establishing a plan to eliminate significant vulnerabilities,
- Developing systems to identify and prevent potential attacks,
- Identifying, containing, and fighting back against known attacks,
- Applying and maintaining the latest operating system and application patches,
- Using current antivirus definitions,
- Updating authorized application software,
- Enabling network antivirus software,
- Not using a USB stick unless it's been scanned and malware free
- Hardening servers and workstations,
- Changing default admin passwords,
- Controlling user rights,
- Implementing backup and restoration,
- Taking inventory of network assets,
- Using physical network isolation when possible,
- Using logical network segmentation (secure zones) with strict firewall rules,
- Enabling firewall logging,
- Using Network Management Systems, SIAM, Omniocular Automism
- Creating an incident response plan before an incident occurs.

FOOD RISK & SECURITY INTEGRITY

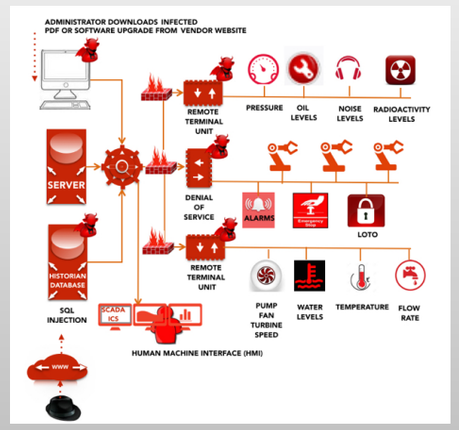
- If you are not doing this now at each facility you are in trouble
- BUT …Paper regulations do not stop hackers
- Look at mircosegmentation and localising the Data Centre
- Use DEVOPS and SecOPs to ensure stability of configurations
- SHAZOPS the code
- Combat Ready Rugged Coding
- Disciplined Agile Development

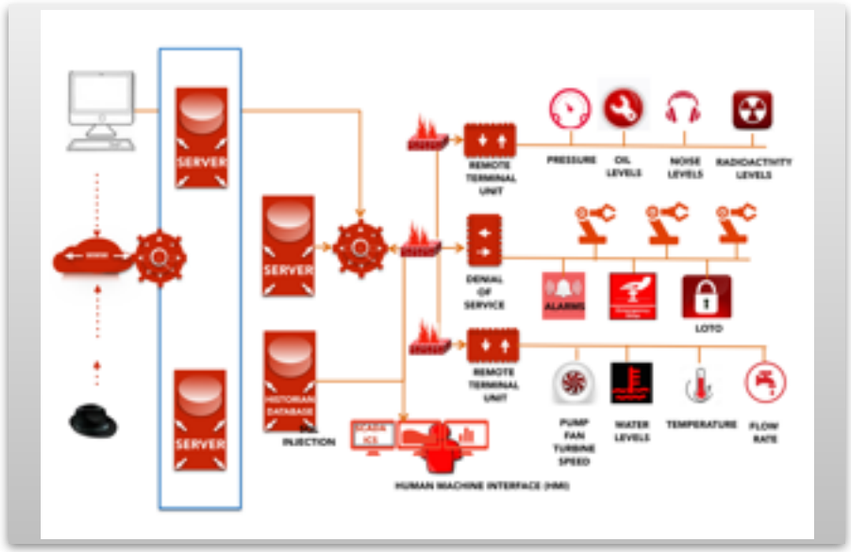
THINK DIFFERENT

IP OPENESS AND UBIQUITY = BAD
LEGACY AND PROPRIETARY = JOB SAVER

FOOD RISK & SECURITY INTEGRITY

- Quick Win: IP (numeric access is an open door to hackers) - Isolate the Process facility from the Internet
- Introduce different device access options for:
  - Localised Authentication
    - Install a Security Bubble (an IP Blanket)
    - IOT Devices Authenticated locally
    - Remove RAT and Network Management SNMP
    - Deploy ENUM
    - Move to Named (an Alpha named schema) - Data Link Switching
  - Remote Access via Browns Boxes (yes… secure modems)





ALL SORTS OF THINGS

IOT Futures

FOOD RISK & SECURITY INTEGRITY

- Traceability and Transparency
- Consumers want to know where their food comes from
  - In the new world…
    - Shoppers pick up milk from local supermarket
    - Milk carton has Smart Packaging and QR code
    - Using a smartphone the shoppers can scan the QR
      - The QR Code reveals:
      - Where the milk came from
      - When the cow was last inspected
      - When it was milked
      - How long it took to package
      - How long it took to reach the store

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