The Rise of the Integration Consultant

What this means to you and your industry

Fernando Neto, RCDD, CNID

Arup Canada

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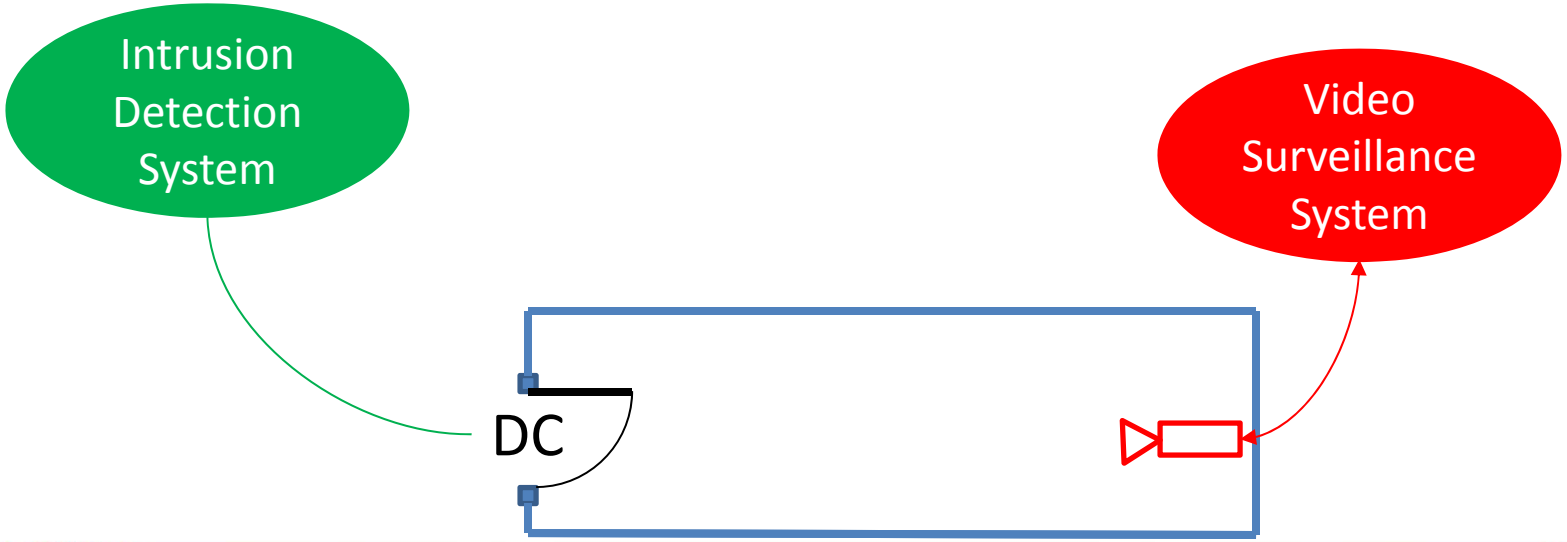
Agenda

- Overview of Systems Integration
- Integration Consultant Qualifications
- Case Studies / Problem Solving Strategies
- Questions / Conversation

What is Systems Integration?

Source: https://skeptics.stackexchange.com/questions/26349/do-these-photos-depict-misaligned-bridge-constructions

Make it simple!



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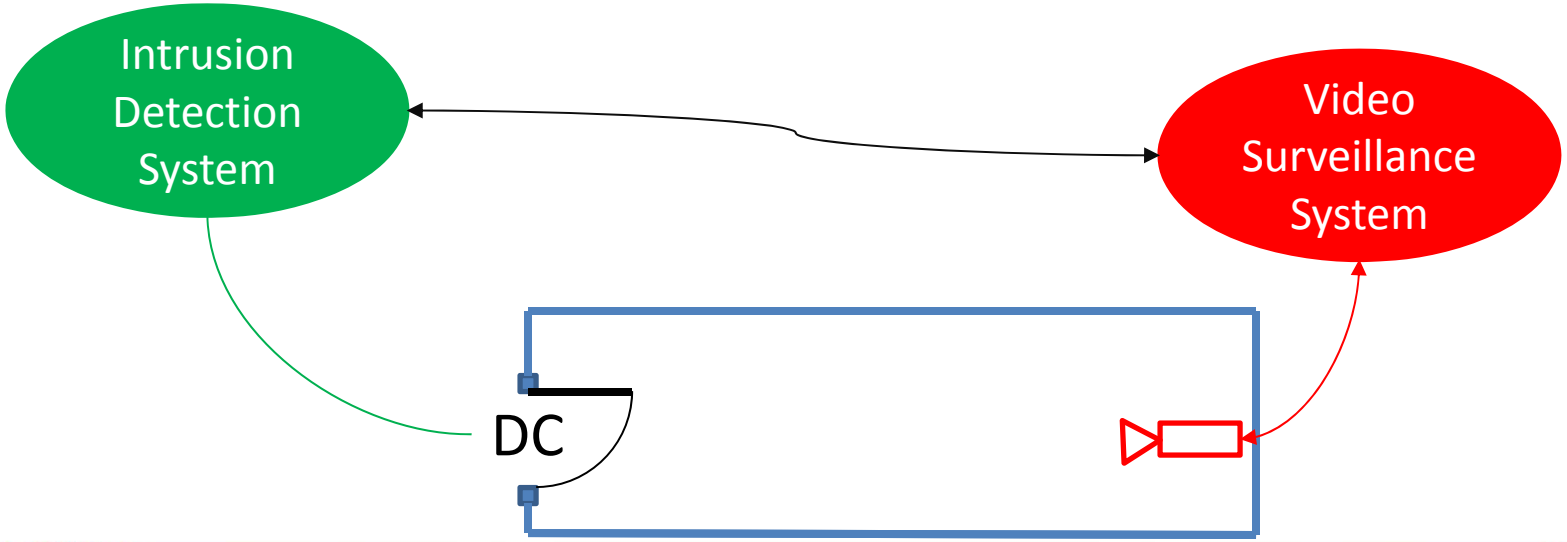

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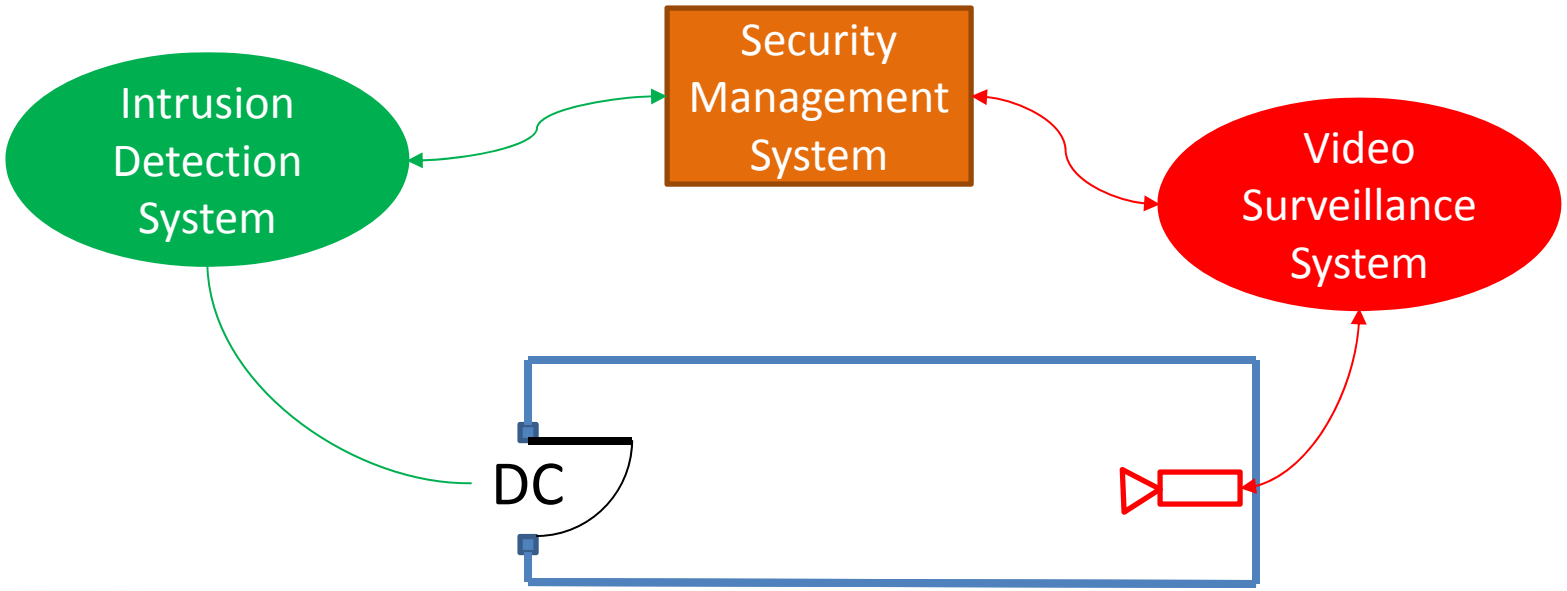

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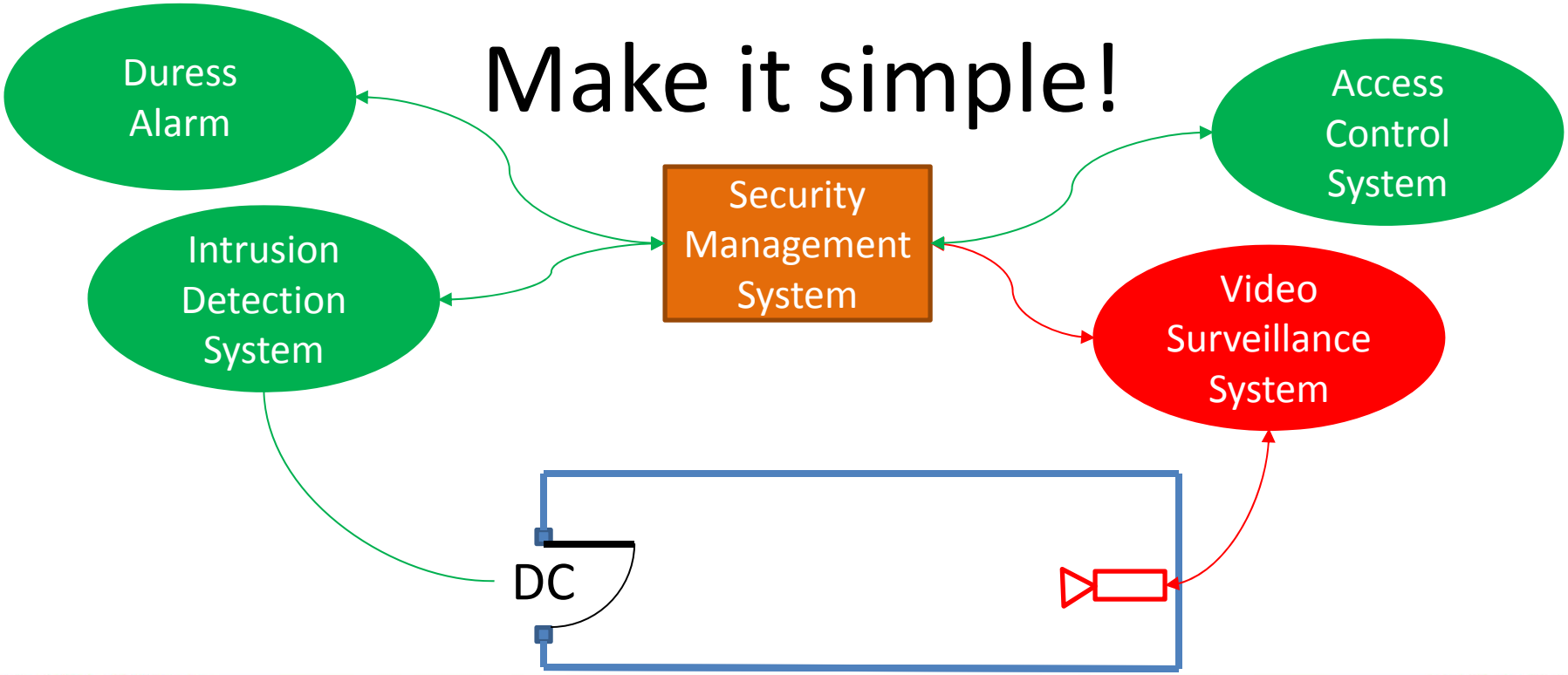
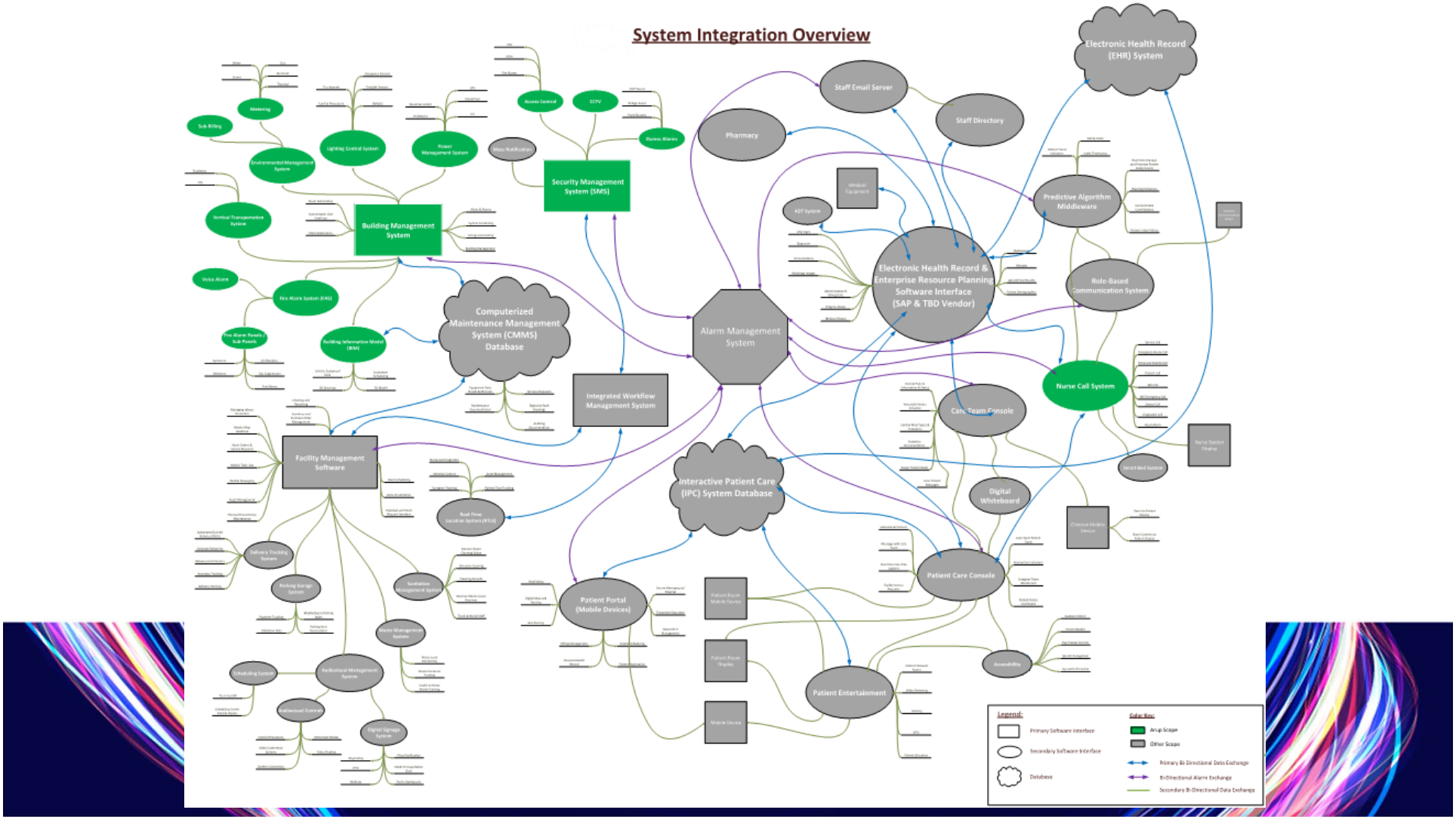
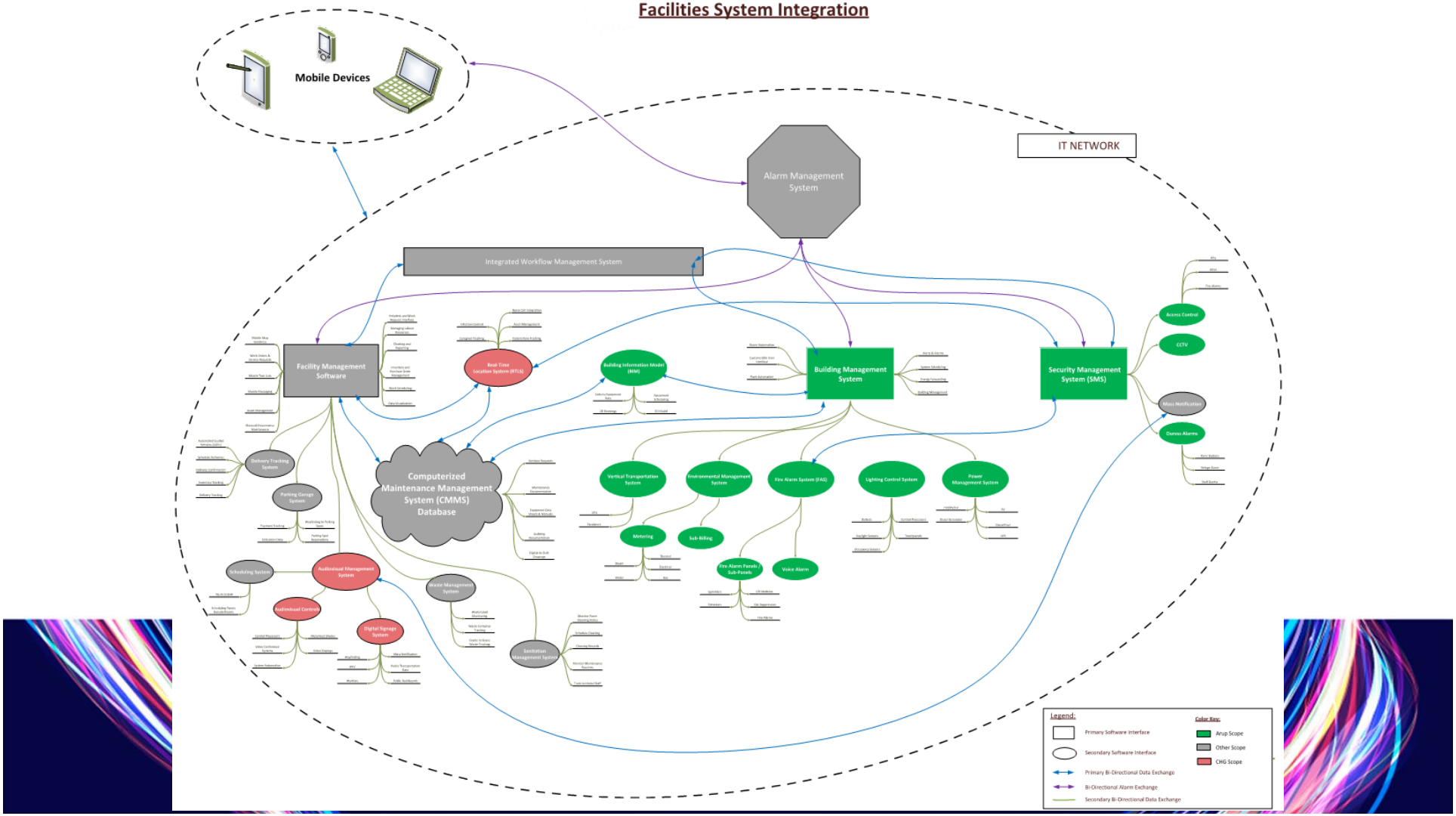


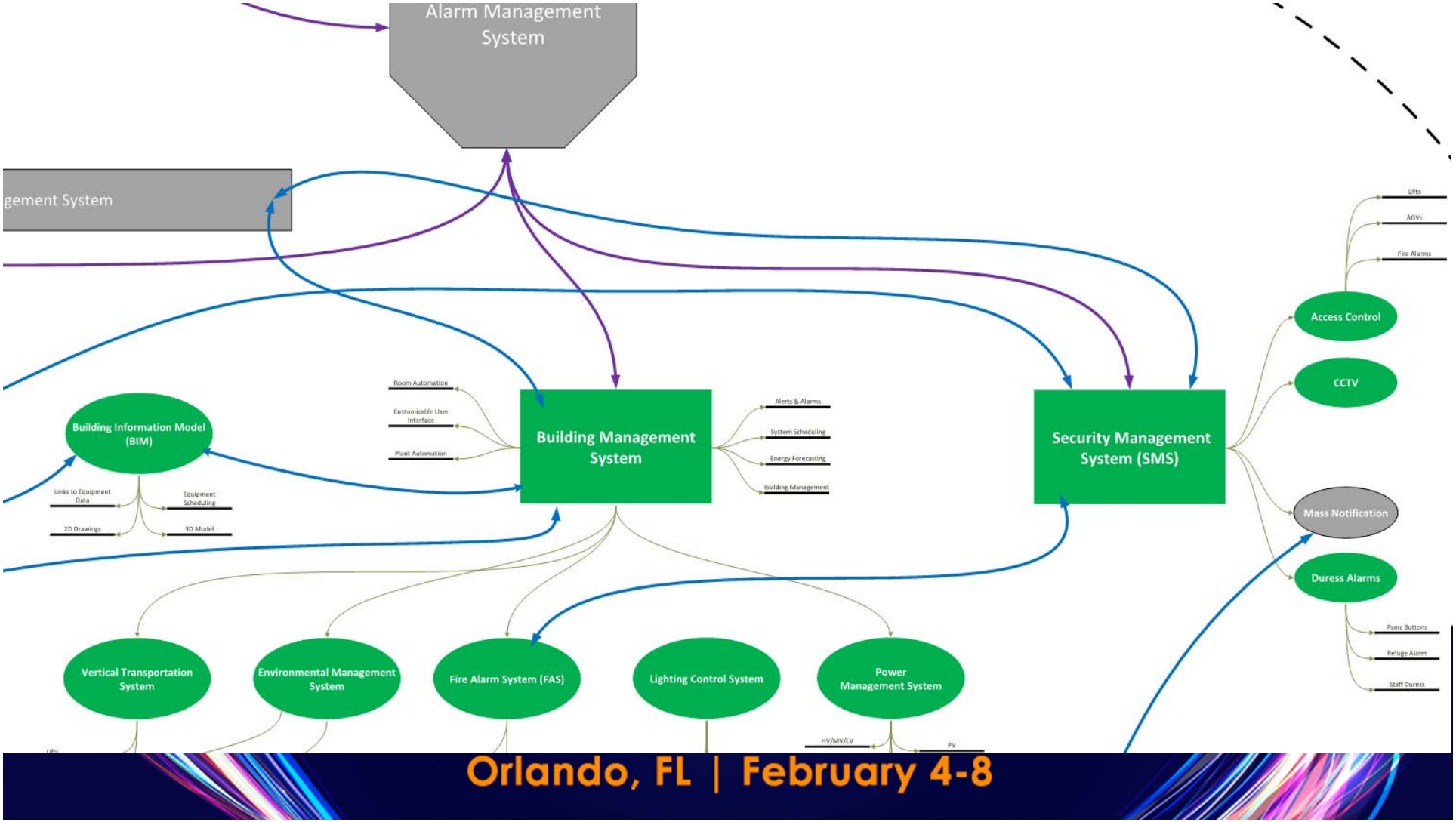
Typical Systems in Healthcare

Electronic Health Record
Mobile Device
Patient Care Console
Vertical Transportation System
VSS
Sub-Billing
Metering
Fire Alarm System
AV Controls
Power Management System
RTLS
Duress Alarms
Delivery Tracking System
Parking Garage System
AV Management System
Sanitation Management System
Mass Notification
Medical Equip
Care Team Console
Patient Portal
Digital Signage
Patient Entertainment
Waste Management System
Nurse Call
Scheduling System
Staff Directory
Email
Environmental Management System
Access Control
Lighting Control System
Pharmacy
Voice Alarm


System Integration Overview
Electronic Health Record (EHR) System
Staff Email Server
Staff Directory
Pharmacy
Security Management System (SMS)
Access Control
CCTV
Duress Alarms
Mass Notification
Metering
Sub-Billing
Lighting Control System
Power Management System
Environmental Management System
Vertical Transportation System
Building Management System
Voice Alarm
Fire Alarm System (FAS)
Fire Alarm Panels / Sub-Panels
Building Information Model (BIM)
Computerized Maintenance Management System (CMMS) Database
Alarm Management System
Integrated Workflow Management System
Facility Management Software
Real-Time Location System (RTLS)
Delivery Tracking System
Parking Garage System
Sanitation Management System
Waste Management System
Scheduling System
Audiovisual Management System
Audiovisual Control
Digital Signage System
Interactive Patient Care (IPC) System Database
Patient Portal (Mobile Devices)
Patient Room Mobile Device
Patient Room Display
Mobile Device
Patient Entertainment
Medical Equipment
ADT System
Electronic Health Record & Enterprise Resource Planning Software Interface (SAP & TBD Vendor)
Predictive Algorithm Middleware
Role-Based Communication System
Nurse Call System
Care Team Console
Digital Whiteboard
Patient Care Console
Accessibility
Legend:
Primary Software Interface
Secondary Software Interface
Database
Color Key:
Arup Scope
Other Scope
Primary Bi-Directional Data Exchange
Bi-Directional Alarm Exchange
Secondary Bi-Directional Data Exchange

Facilities System Integration




Alarm Management System
gement System
Building Information Model (BIM)
Links to Equipment Data
Equipment Scheduling
2D Drawings
3D Model
Room Automation
Customizable User Interface
Plant Automation
Building Management System
Alerts & Alarms
System Scheduling
Energy Forecasting
Building Management
Security Management System (SMS)
Lifts
AGVs
Fire Alarms
Access Control
CCTV
Mass Notification
Duress Alarms
Panic Buttons
Refuge Alarm
Staff Duress
Vertical Transportation System
Environmental Management System
Fire Alarm System (FAS)
Lighting Control System
Power Management System
HV/MV/LV
PV

Why is it important to you?

- All industries are integrating systems, including Buildings / Facilities of all kinds
  - Healthcare
  - Airports
  - Rail
  - Commercial

Why is it important to you?

- The Edge:
  - Deloitte
  - 430,000 sq. ft.
  - Energy positive
  - 70% less energy
  - Mobile App
  - Louvers
  - PV Panels
  - Smart Lighting
  - Light over Ethernet
  - All IoT – next-to-zero energy use with zero occupancy

Source: https://www.breeam.com/offices/the-edge-amsterdam/

Why is it important to you?

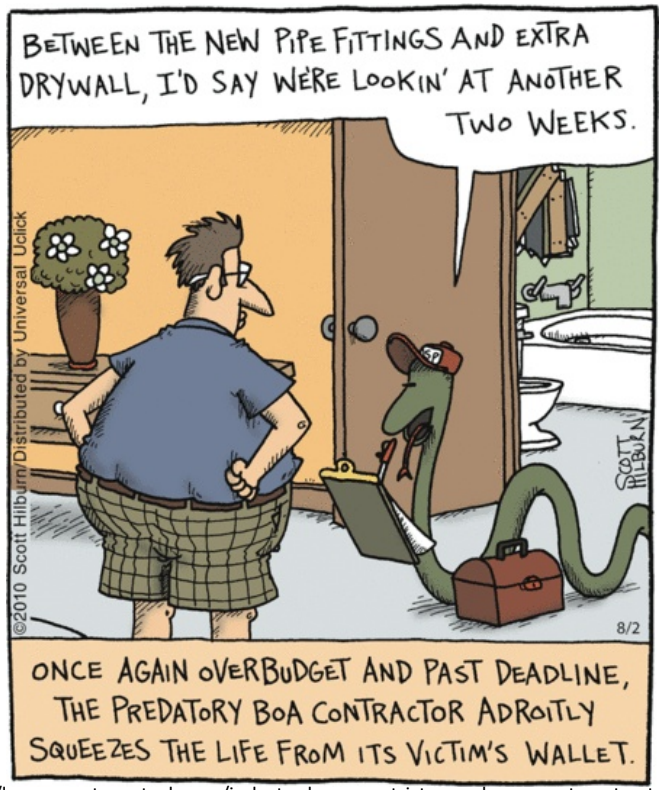
- The future is now!
  - Save energy
  - Staff efficiencies
  - Security
  - Analytics

Why is it important to you?

- Identify integration requirements
- Include requirements in design documents
- Capture costs

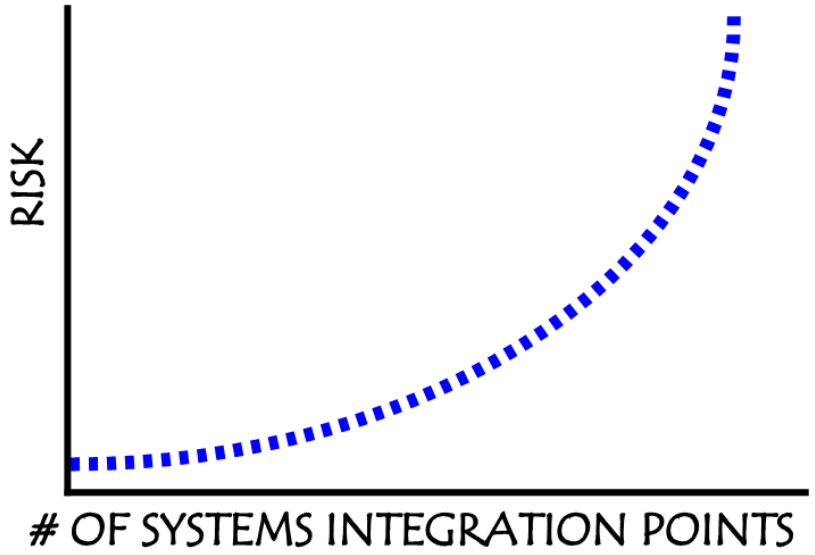
Source: http://www.everydaykiss.com/wp-content/uploads/2012/12/715.jpg

The hidden cost of systems integration



Source: https://s3.amazonaws.com/lowres.cartoonstock.com/industry-boa_constrictor-snake-serpent-contractor-contracting-shl100802_low.jpg

The hidden cost of systems integration



Why require an Integration Consultant?

- Help Owner Define Requirements
- Manage the process
- Ensure all requirements are correctly captured and interpreted
- Ensure risk is minimized if not eliminated

Integration Consultant Role

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Traditional Procurement (e.g. design-bid-build)

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P3 (aka PPP) Process (Public Private Partnership)

Integration Consultant Role

Design-bid-build

- Works for Owner
  - Defines requirements
  - Design / specs
  - Manage sub-vendors
  - Schematics
  - Decision maker
  - Commissioning / Stress

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P3 / PPP – Public Private Partnership

Owner's team (Advisor)

- Works for Owner
  - PSOS Development
  - Advises Owner
  - Provides input
  - Assesses compliance
  - Commissioning help
  - Designing stress testing

Project Co's team

- Works for Project Co
  - Design / specs
  - Manage sub-vendors
  - Schematics
  - Decision maker
  - Commissioning
  - Stress Testing

Integration Consultant Qualifications

- Output and Technical Specifications;
- Projects of a similar type, size, and scale to the given project;
- Specifications for ICT systems, including, RTLS, network topology, WiFi, AV, Security, DAS, nurse call, etc.

Credit: http://cartoonbros.com/wp-content/uploads/2016/07/Iron-Man-2.png

Integration Consultant Qualifications

- Integration and interoperability use cases;
- Developing integrated system solutions;
- Certified? PMP? RTPM? RCDD? Other?

Credit: https://atlas-content-cdn.pixelsquid.com/stock-images/male-and-female-cartoon-engineers-engineer-B50B0K6-600.jpg

Case Study 1

- Rail project / Level of integration 3/5
  - Government use facility;
  - Lots of industrial equipment / multiple suppliers;
  - Campus style facility with multiple buildings.

Case Study 1

- Issues
  - Typically forgotten until problems / missed requirements arise
  - Finger pointing starts
  - Costs for each interface have likely not been captured

Case Study 1

- System Integration
  - What is the function of the interface?
  - How does each system interface with other systems?
  - What are the requirements for the interface to happen?
  - Who is responsible for each of the interfacing systems?
  - Who is responsible for the actual connection (whether physical or software based) between the interfacing systems?

Solutions 1

- Integration Matrix

	Structured Cabling System (SCS)	Owner Network*	Master Clock (Owner)	WIFI**	Wide Arae Network (Owner)***	Corporate Systems (Owner)	Telephony	Public Address (PA)	CCTV	Access Control System (ACS)	Intruder Detection System (IDS)	Intercom / Emergency Comms	Fire Alarm	BMS (Mechanical Systems)	Power management / control	Lighting Control	Facilities Management Platform	Sanding System	Diesel Fuelling	Diesel Exhaust Fluid	Lubricants and Anti-Freeze Distribution	Main Engine Coolant	Waste Oil Recovery	Waste Anti-Freeze Recovery	Waste Engine Coolant	Centralized De-Ionized Water	Toilet Chemicals	Vacuum Sewer Control	Compressed Air System	Pressure Washing	Vehicle Servicing	AWBIS	Locomotive Washing	Operational SCADA	Radio (DAS)
Structured Cabling System (SCS)		1	1	1	2	1	3	4	5	1	1	1	-	4	4	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Owner Network*			6	7	8	1	3	4	5	1	1	1	-	4	4	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Master Clock (Owner)				6	-	6	6	6	6	6	6	6	-	6	6	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIFI**					-	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wide Area Network ***						11	-	13	14	12	12	12	12	12	12	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	58
Corporate Systems (Owner)							15	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Solutions 1

- Interface Functional Description

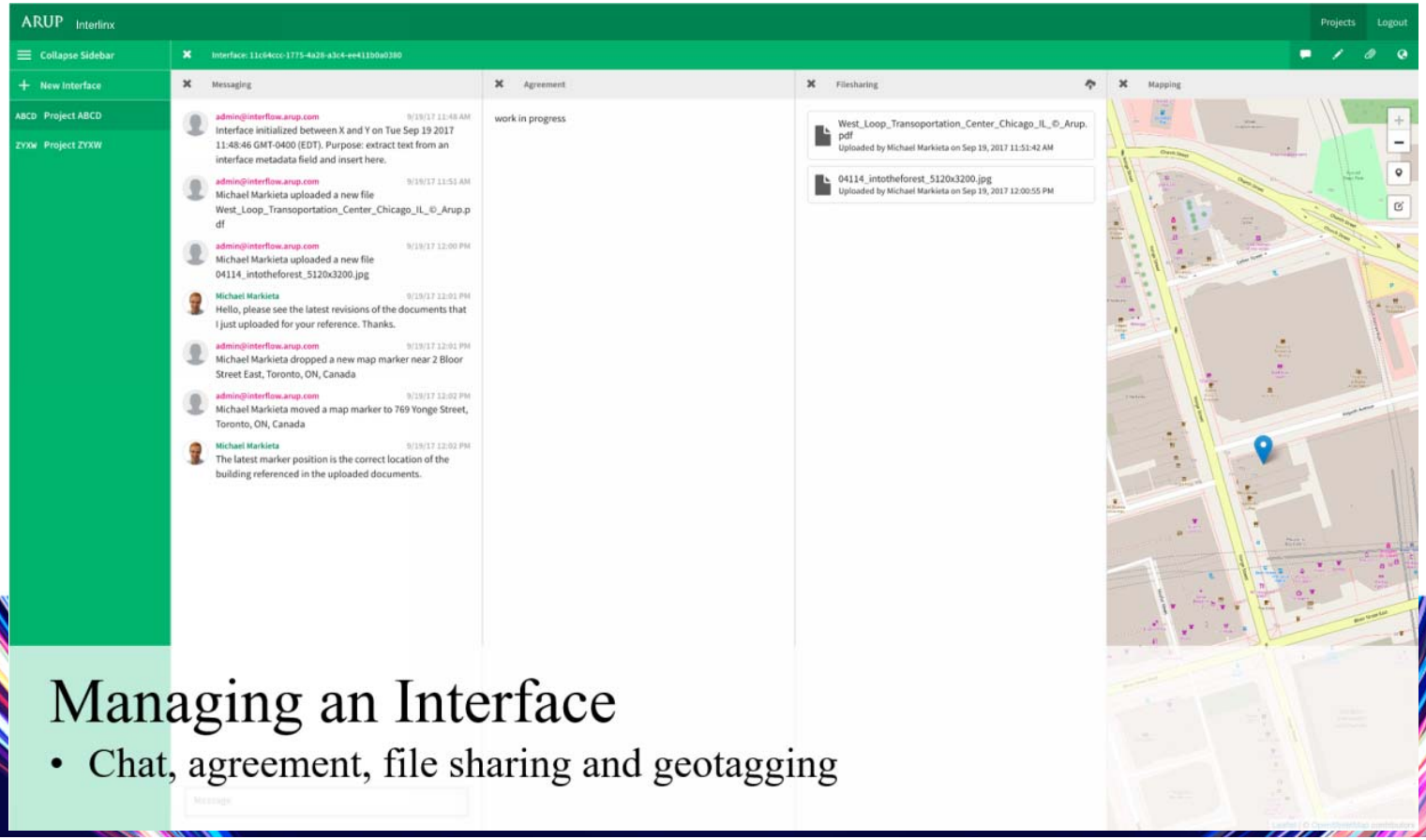
#	Interface functional description
1	Devices / Systems utilize SCS / Ownernetwork for data transmission
2	Bell Canada incoming lines (ordered by Owner) are terminated within the main telecoms room
3	Devices / Systems utilize SCS / Owner network for data and voice transmission
4	Devices / System utilize SCS / Owner network for transmission of monitoring and control functionality
5	Devices / Systems utilize SCS / Owner for data and video transmission
6	Master Clock provides source of time for equipment; enabling sychronisation between systems and recording time and date of events

Solutions 1

- Interface Control Document

7	SEC 7	DB 3	**Integrate Security Data Exchange with Central Database (add/alt)**
	Dependancy:		[INSERT DEPENDENCY]
	Security Contractor		Responsibility: [INSERT RESPONSBILITY SUMMARY]
	Database Integrator		Responsibility: [INSERT RESPONSBILITY SUMMARY]
	Data Flow (A - B)		[INSERT DATA & PROTCOLS AS RELEVANT HERE]
	Data Flow (B - A)		[INSERT DATA & PROTCOLS AS RELEVANT HERE]
	Required Outcome: [INSERT REQUIRED MEASURABLE OUTCOME]		

Solutions 1 - Interlinx



Managing an Interface

- Chat, agreement, file sharing and geotagging

Case Study 2

- Rail project / Level of integration 3/5
  - Rail Facility;
  - Lots of legacy / analogue systems;
  - Upgrade to IP and integration of systems.

Case Study 2

- Issues
  - Integration requirements were not explicitly defined;
  - Designer focused on the individual systems requirements;
  - Designer failed to consider integration requirements.

Solutions 2

- Solutions
  - Communication between stakeholders;
  - Use appropriate software to track interfaces, identify responsible stakeholders, and track progress of the interface process.

Solutions 2

- The Rise of the Integration Consultant
  - At the dawn / inception of the project!
  - In the middle!
  - In good times and in bad!
  - At the End!

Conclusions

1. *Qualifications for the Integration Consultant should be part of the RFQ/RFP. Experience in project management, systems design, and integration design are necessary;*

Conclusions

2. *Contractors will base their price on their interpretation of the RFP. The more clarity provided to the Contractor, the better they can align with the Owner's technology and integration requirements and be able to execute during construction in a way that is expected by the Owners.*

Conclusions

3. *Use a proven process and applicable software/tools to document the requirements, design, and tracking of integration activities.*

Questions / Discussion

Fernando Neto, RCDD, CNID
Arup Canada
fernando.neto@arup.com
+1 647 260 3449