Securing Smart Spaces

Consulting

Software

Support

ConfiguredThings

Cyber Accelerator Member

in association with
National Cyber
Security Centre

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Executive Summary

To date, smart city innovation is coordinated by single, costly, system integrators who retain the system design authority adding cost and latency; leading to siloed data and processes. What if cities were designed to adopt innovation by many third parties, including citizens, NGOs, startups or academics? These solutions could sense data, combine datasets and trigger actuators to generate value for the city whilst the city retained design authority and the innovators were allowed to do what they do best. Local governments could gain increased returns from their assets, whilst providing access in an open way and maintaining their citizens' security and privacy.

The evolution of Smart Spaces

Smart Spaces are the combination of physical spaces with arrays of sensors, displays, actuators and real-time analytics that aid in decision making. Examples include Smart Cities (Singapore), Smart Venues (Tottenham Hotspur Stadium) or Smart Rooms (flexible control rooms). In all cases the challenges are similar, only the scale of the problem changes.

In terms of future growth, the global smart cities market was valued at $529 billion in 2017 and is forecast to reach $1.9 Trillion by the end of 2023, with a CAGR of 24.21% (Orbis research).

According to Gartner's "top strategic technology trends for 2019", Smart Spaces are a key focus area for business leaders to consider in 2019.

Smart Cities

Sensing systems have been deployed for many years in venues and cities, but there are dramatic changes occurring at present. The improvements in network throughput, sensor accuracy, rapidly reducing sensor costs and the power of "computing at the edge" are allowing the solutions to become more open, connected, coordinated, intelligent and broader in scope.

- Efficiency
- Flow and availability of information
- Safety
- Quality of life for the citizens
- The ability to deploy innovation

The Market

"We believe the market is entering a period of accelerated delivery of robust smart spaces with technology becoming an integral part of our daily lives, whether as employees, customers, consumers, community members or citizens"
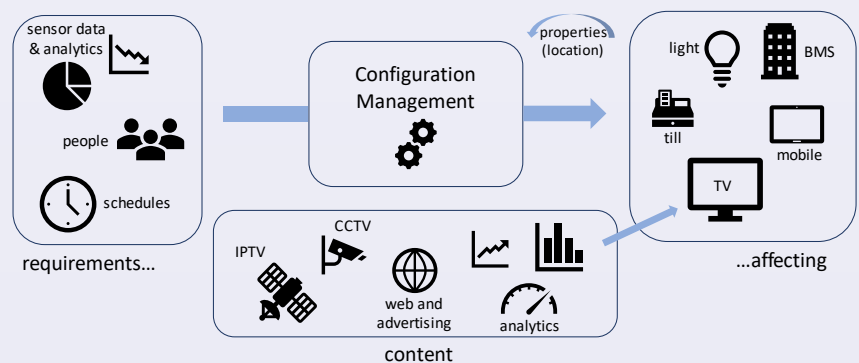
Gartner

Cyber risk

Whilst cities have adopted technology through the widespread deployment of full-spectrum CCTV, emissions sensors and digital signage,

Currently incident responders (beyond what can be communicated over radio) are largely blind to the situations into which they are called, despite the technology in their location such as the CCTV and 4G access network. What if the control room operator, bronze-silver-gold command structures and responder could access shared situational awareness of the incident with relevant imagery, environmental readings and other critical data feeds actively streamed to and from their devices?

Analytics can greatly improve the costs of cities. Imagine if abandoned vehicles could be detected using static cameras and mobile patrols could utilise ANPR analytics to automatically generate tickets for a central service desk.

Smart Venues

Venues are exploring many of the same aspects, but also include the key requirement to grow merchandising revenues and build community amongst their fan bases.

Smart Cities

"The Fourth Industrial Revolution will unleash creativity with limitless potential. City administrators need to prepare by adapting the physical, digital and environmental elements of their cities to better respond to their citizens' dynamic and constantly evolving needs"

World Economic Forum

However, as these increasingly connected and capable solutions are deployed, care must be taken to provide the appropriate security, visibility and control across the solution stack.

Smart Control Rooms

Public sector funding constraints and ever increasing demands are creating additional pressure to do more with less.

Smart control rooms are an effective method of achieving this by delivering the maximum level of capability with the minimum number of staff. There are a number of key requirements including,

- Real-time feeds including camera, GIS data, traffic flows
- Flexible integration and visualisation of key content
- Cross-environment analytics
- Collaboration between teams using shared data
- Significantly improved situational awareness

Solution Overview

Configured Things was founded upon the vision of composing systems across organisational and technological boundaries - applying the concepts of federation, enterprise integration and abstraction to declarative model-based configuration management.

Currently organisations and consortia must implement suboptimal systems that are either limited in their potential or require a great deal of additional effort to achieve the desired results. In contrast, the Configured Things' approach provides full-stack control, be it at the point of data collection, process, display or actuation.

Configured Things' platform supports both online and offline configuration of systems, allowing sensitive, air-gapped or systems with poor connectivity to still benefit from configuration management, but with the support of manual or managed transfer processes.
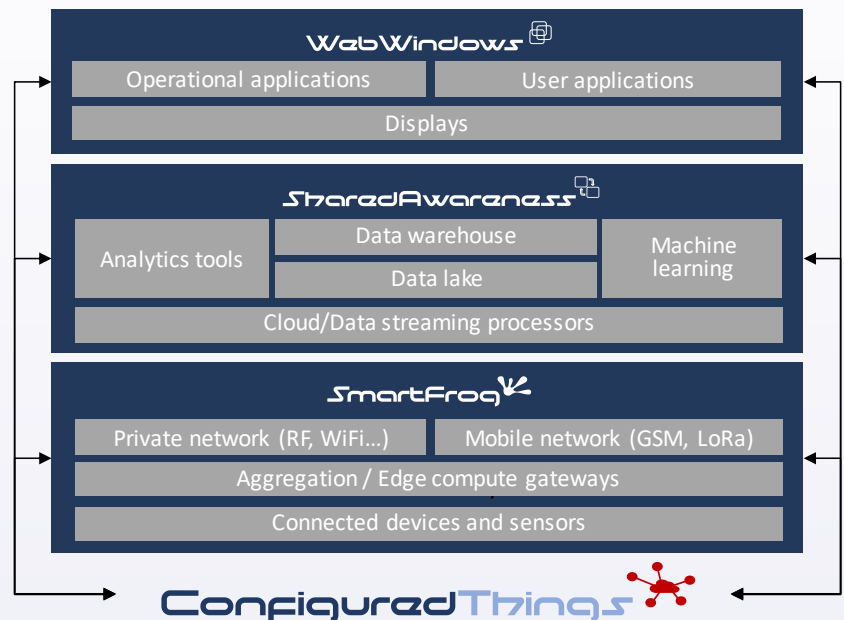
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Threats

"The wider economy faces an increasing threat of large scale cyber attacks launched from large volumes of insecure IoT devices"

DCMS—'Secure By Design'

WebWindows
- Operational applications
- User applications
- Displays

SharedAwareness
- Analytics tools
- Data warehouse
- Data lake
- Machine learning
- Cloud/Data streaming processors

SmartFrog
- Private network (RF, WiFi…)
- Mobile network (GSM, LoRa)
- Aggregation / Edge compute gateways
- Connected devices and sensors

ConfiguredThings

The Configured Things stack is made up of four components:

SmartFrog

The foundational layer is the "SmartFrog" modelling language, a mature open-source product in its own right. SmartFrog provides the model-based lifecycle and configuration management of hardware, virtualisation and software platforms.

WebWindows

"WebWindows" extends this model-based approach into the application domain, enabling the distributed control of content across many devices.
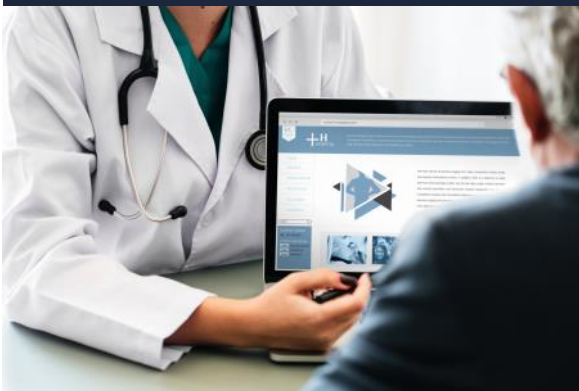
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Government

"*Questions about how we get public services to work together — better and more secure data sharing, adoption of common standards, scaling innovation and smart city technology — are more critical than ever for city administration. This applies not just for London, but nationally."*
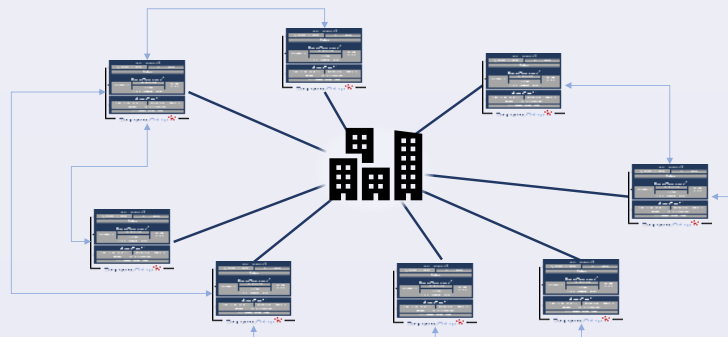
Theo Blackwell, Chief Digital Officer for London

ConfiguredThings

"Configured Things", the integration layer, provides scalability and technology independence, resulting in the cloud-to-edge configuration of devices, platforms, applications and the display of their content. Decoupled data and control planes ensure systems and components can be configured via a common channel, whilst potentially sensitive data is exchanged privately.

SharedAwareness

"SharedAwareness" provides the control layer, allowing data security, aggregation, enrichment and sharing across organisational boundaries.

The Configured Things architecture follows a composite design pattern, allowing for larger systems to be comprised as a federation of smaller individual instances, with policies defining peer to peer information flows between instances:

Governance

"Agile governance involves cross-entity common platforms and initiatives to encourage multi-stakeholder cooperation and collaboration"
**World Economic Forum**

Business Benefits

- Faster time to market yielding increased agility
- Innovation across silos whilst allowing delegated responsibility
- Rapid prototyping and integration between partners, divestitures and acquisitions, yielding decreased project complexity and risk
- Reduced vendor lock-in
- Increased trustworthiness and auditability arising from model-based systems
- Curated sharing of real-time content
- Technology independence - aggregation, normalisation and integration of disparate systems
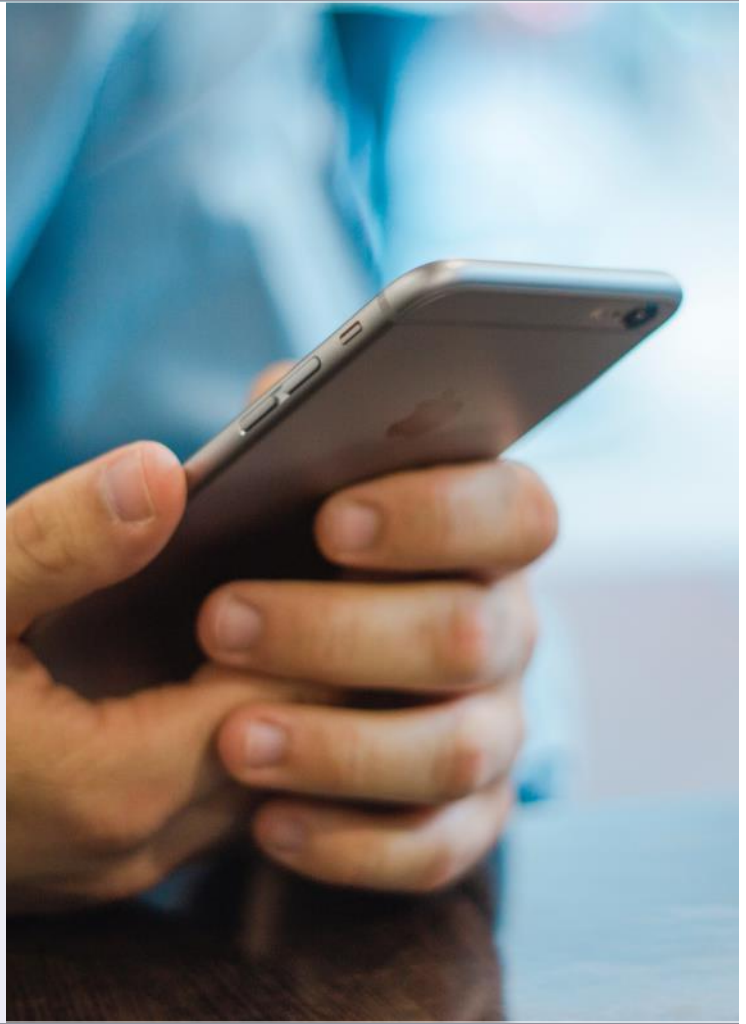
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