

# CGI's Internet of Health Things Framework

With ThoughtWire Ambient Machine Intelligence

## By 2020, 50 billion things will be connected to the Internet.

The Internet of Things (IoT) is a computing paradigm which is quickly becoming the dominant reality of our interconnected world. The paradigm of IoT proposes that everyday objects would be capable of both disseminating information to a network and responding to information from the network—increasingly independent of human intervention. IoT is permeating all industries and, accompanied with the broad technology trends of social media, mobility, analytics and cloud computing, is supporting the digital transformation of industries.

In the context of health, IoT is enabling new business paradigms, such as interacting with patients through wearable or embedded devices. Moreover, IoT is enabling the digital transformation of a hospital. Acute care institutions are already the most complex buildings that people use. Hospitals are populated with thousands of systems—building systems, medical equipment, clinical and administrative systems and now increasingly patients with wireless or embedded devices. These systems have traditionally been standalone, but a distributed network of smart healthcare devices, machines and systems is now able to be connected into an orchestrated Internet of Health Things (IoHT). CGI has created an IoHT framework to assist healthcare provider organizations in structuring their IoHT solutions to achieve targeted outcomes and scale to a comprehensive vision.

## Benefits of IoHT

The digital transformation of the health industry offers comprehensive improvements in patient engagement, productivity, and risk mitigation, as well as new revenue and operating paradigms. Health enterprises are seeking to improve their ability to be aware of the situations in their surroundings and to patients. Having situational awareness requires knowing the location and the status of people (staff, patients, etc.) and resources (medical equipment, devices, supplies, etc.) at any time within the context of patient care. Situational intelligence is taking action on that awareness to improve the delivery of care or operations that support care.

ThoughtWire's Ambient machine intelligence platform enables situational awareness and can be connected to other applications to enhance situational intelligence. CGI has created a comprehensive catalog of workflows and IoHT applications and decision support solutions to assist health enterprises in their journey of achieving situational awareness and intelligence. For example, tracking of medical equipment is transformed by leveraging ThoughtWire's asset tracking and portering workflows, integrated with Active Equipment Management to create situational intelligence and result in a million dollar annual benefit.

## Journey to Situational Awareness and Intelligence

Value	Processes	Description	IoHT Workflows & Value Added Services
Situational Awareness	Patient status	Gives visibility to where patients are in the facility and their current disposition.	Wandering Patient, Infant Abduction
	In-room surveillance	Monitors a patient's position in the room, bed or chair, so timely intervention can be provided if necessary.	Patient Safety Alarms, Nurse Call
	Closed Loop Communication	Allows clinicians to send and receive acknowledgements and responses related to important patient events (e.g. patient fall incident, request for additional pain medication). Replaces open loop communications— paging systems, nurse call	Care Team Closed Loop Communication, Code Calls
	Transportation	Assists in efficiently locating patients, clinicians and wheelchairs at discharge	Portering, Housekeeping
	Transition management	Provides information necessary to remove delays in moving patients between care venues, a routine source of patient dissatisfaction	Portering
	Room status	Alerts housekeeping when a room is available and needs cleaning, and contributes to an up-to-date view of the current census and bed capacity	Housekeeping
	Asset Tracking	Assists maintenance and facilities operations to receive alerts about the location of equipment or leaving the facility	Asset Tracking Workflow
	Building & Support Systems	Assists facilities teams to track and correct status of building systems	Elevators, AGV, Laundry Chutes, Alarms, Fridge Freezer, Medical Gases, Datacentre, Central Dispatch, RTLS, Isolation Rooms, Negative Pressure Rooms
	Infection prevention	Supports programs to improve hand sanitation and hygiene compliance among clinicians	Hand Washing Protocol Adherence
Situational Intelligence	Portable Medical Equipment Management	Verifies equipment inventories and enables the movement of medical equipment that needs to be maintained, cleaned or retired, improving equipment utilization	Asset Tracking, Active Equipment Management
	Clinical Protocol Compliance / Enhancement	Helps clinicians identify and comply to clinical protocols or identify and prevent adverse events	Decisio, Geneva, CGI Patient Safety Service
	Process Improvements	Enables information flow amongst providers, patients and between systems to streamline processes	Ward board, Clinical Desktop, Patient Self-Registration, PACS Integration, EMR Integration
	Patient Satisfaction	Enables information flow to improve patient's experience	Patient Self-Registration, Virtual Concierge, Staff Presence Enunciation
	Key Performance Metrics	Makes it easier to determine laboratory turnaround times, treatment times and staff to patient ratios	CGI Healthcare Enterprise Optimization Constraint based Optimization
	Staffing Optimization	Gives clinical leadership the information required to make real-time workflow and staffing adjustments	CGI Healthcare Enterprise Optimization Constraint based Optimization
	Process Optimization	Provides data necessary for continual process improvement and improved patient flow	CGI Healthcare Enterprise Optimization Constraint based Optimization

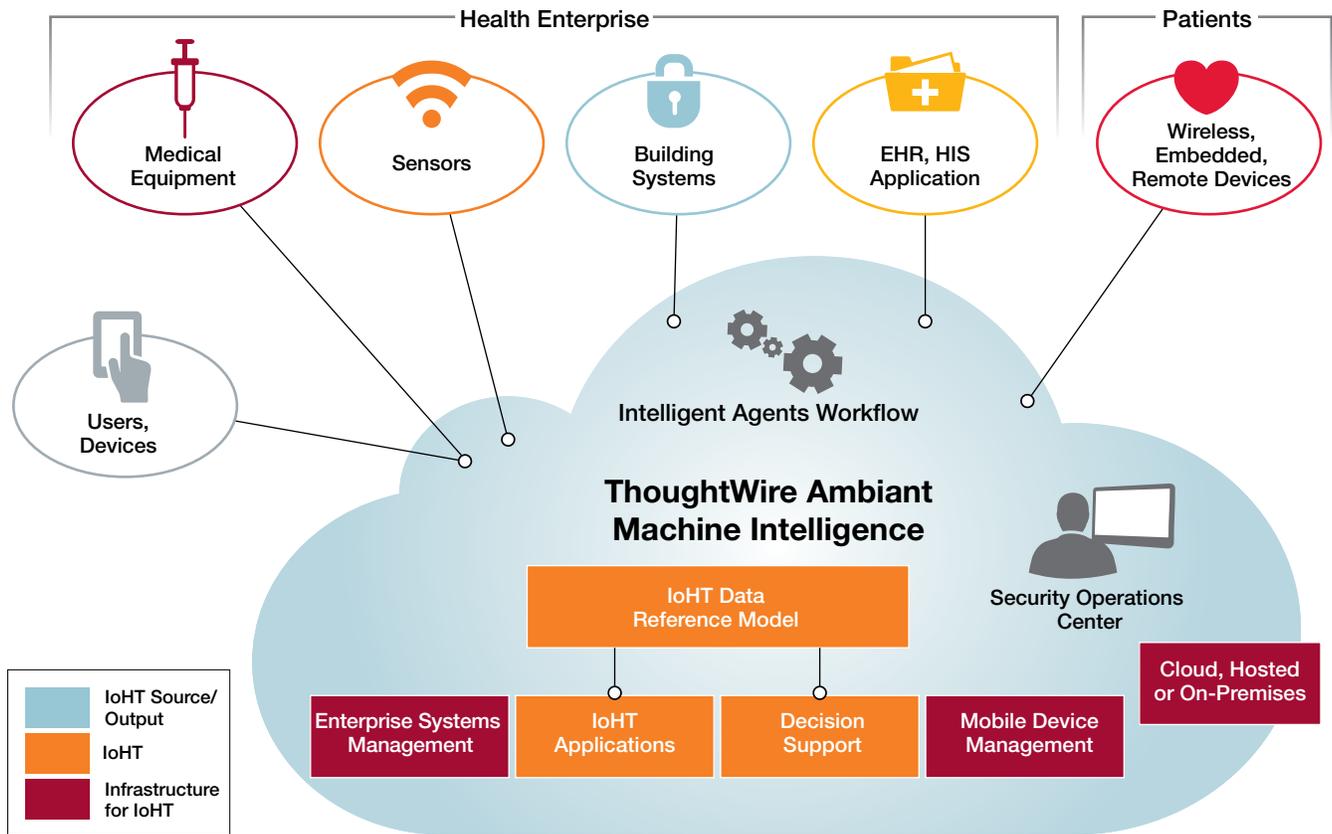
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Active Equipment Management is a tradename of Pentagon Healthcare Limited

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A wide range of IoT data sources from within the health enterprise are connected to the ThoughtWire Ambient platform, including: medical equipment, sensors, building systems (such as elevators and security cameras), clinical and administrative applications (and provincial systems). In addition, patients with smartphones, remote devices and increasingly with embedded devices can now be connected to the Ambient platform. Workflows developed in the Ambient solution will act upon this wide variety of data sources.



Thousands of connected things, thousands of users, millions of transactions, and hundreds of workflows require a comprehensive architecture. The CGI IoHT framework is enabled by the ThoughtWire Ambient platform to provide connectivity of thousands of things and orchestration of workflows acting upon data to pre-configured business rules. Surrounding the core components of the framework are:

- IoHT platform management solutions: to manage the thousands of devices and mobile applications interacting with IoHT data
- An enterprise systems management capability to monitor and manage all the devices across the enterprise
- Comprehensive capability to secure and protect every device on the network, because the weakest device point needs to be secured to prevent a breach.

In a world where everything is connected, the enterprise data assets and systems need protection from things installed in the network and walking in the door with patients. CGI experts are ready to assist healthcare enterprises in achieving situational awareness and intelligence with our IoHT framework, solution and capabilities.



## About CGI and Health

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Founded in 1976, CGI is one of the largest IT and business process services providers in the world, delivering high-quality business consulting, systems integration and managed services. With deep experience in developing and integrating business, clinical and IT solutions for healthcare providers, payers and governments across Europe and North America, CGI helps clients anticipate challenges and achieve real transformation in the rapidly evolving health industry.

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