

Connect for new business opportunities



M2M BUSINESS ENABLEMENT PLATFORM

The world of connected objects

How do we monitor the carbon footprint of a vehicle? How can we track and trace cargo on the move? How do we know when a vending machine needs to be refilled? How do we remotely monitor the consumption of energy? How do we remotely control street light usages? The answer is: by making these objects intelligent, by adding devices to them that provide valuable information in real-time or allow controlling the assets. This will allow billions of objects across the world to generate valuable business information. Machine-to-Machine (M2M) is the technology that makes it all possible. M2M allows both wireless and wired systems to communicate with each other without manual intervention. The overall environment within which these objects are connected and business value is created is called 'The Internet of Things' (IoT).

The evolution to this age of connected devices, sensor-embedded objects and other smart objects, has led to a swarm of new innovative offerings. With advances in communication networks and cloud services, there has been a marked trend where enterprises want to exploit the communication capabilities between the devices and harness real-time information from these to create differentiation in services and enhance profitability against their competitors.

Innovations in platform technology have made it possible to reduce the complexities and costs involved with service enablement. This has been achieved by providing solution frameworks and tools that allow for plug and play environments. Enterprises can now rollout M2M services easily with minimal IT overheads leading to faster time-to-market and thus gain competitive advantage and scope for innovation.

This white paper is intended for an audience that understands or works with technology. The objective is to give a high level technical overview of CGI's M2M Business Enablement Platform and its capabilities. Readers of the paper will be able to understand the M2M ecosystem and where the platform fits in.

Be smart everywhere. With CGI.

Enterprises need platforms that support a wide array of data-collection interfaces and aid in the automatic discovery and dissemination of information. CGI's M2M Business Enablement Platform addresses the needs of enterprises and M2M application owners. As a result, their organisational assets become system aware without human attention or intervention, detecting device characteristics/parameters automatically and providing contextual information.

The platform offers a seamless interface for business applications, irrespective of the networks or devices being used. It allows the business application to innovate around their core business value, where their strength lies, while letting the platform take care of the network or device complexities and the common services. Enterprises can stay neutral with respect to network and devices, thus bringing in the agility and flexibility they would need to meet the dynamic needs of their businesses.



The ecosystem

The M2M/IoT ecosystem consists of four distinct entities, as described in the picture below. The objects in the field that need to be connected are termed assets. The asset could be a vehicle, a patient, a home, and so on. Each asset would have sensors or actuators (for monitoring or controlling, respectively) and communication elements that are termed devices.

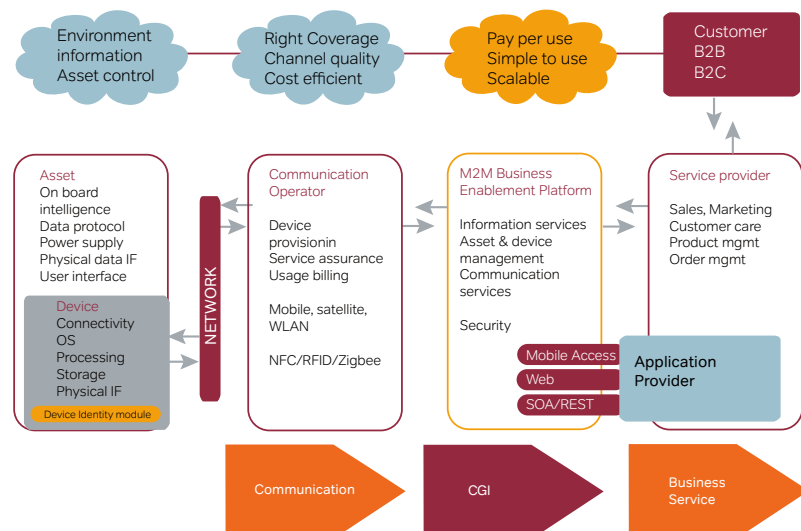
The assets use a network operator's infrastructure for communication with the Business Enablement layer. The network operator is responsible for the communication provisioning, service assurance, usage billing, and so on. The communication providers generally have dedicated M2M platforms to cater to the unique M2M business requirements in the telecommunications space.

CGI has conceived, built and continues to support two of the world's three largest and most complex M2M platforms.

The M2M platform in the telco's network is complemented by our M2M Business Enablement Platform, which provides communication services (device and network abstraction), information services (such as event processing, analytics, data modeling) on the data aggregated from the assets in the field and common reusable services framework.

The processed device information and the common services exposed by the M2M Business Enablement Platform are used by the business applications in the service provider layer, for delivering business value to the end consumers.

M2M propositions (in the service-provider layer) are integrated with the M2M Business Enablement Platform in such a way that these applications can focus on innovating around their core business value while leaving the complexities of M2M technology with the platform.



Overview

The M2M Business Enablement Platform aggregates data coming from potentially millions of devices. These could be using different communication networks and different protocols for communication. The devices provide data to the platform. The platform can store this data, pre-process it and/or distribute the information to applications subscribed to it. The platform provides a workbench that allows easy on-boarding of new device types. The platform provides an open application programming interface (API) to enable easy on-boarding of M2M applications, thus creating an ecosystem of devices and applications, which can be offered in a PaaS or a SaaS model to multiple clients. Also, the platform provides services such as business insight and analytics for M2M applications and enterprise clients. The platform has been architected to support new capabilities based on requirements (for example geofencing or maps) and offer them as a service to the M2M applications.

CGI's M2M Business Enablement Platform provides key capabilities to:

- offer the means for M2M business applications to become device and network agnostic
- enable M2M business applications to share, collaborate and make use of the information services provided by the platform based on the device data
- integrate M2M business applications via an industry standard interface
- administer the system and derive reporting through a readily available friendly user interface

- generate application-specific business events and alerts
- store device and business data based on application/client requirements
- provide a self service portal for the partner ecosystem to manage their services with minimal dependencies.

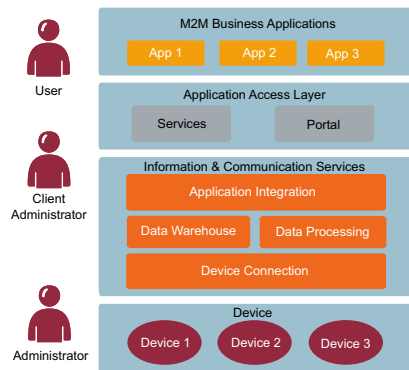
The platform enables development of innovative applications quickly, across many diverse device environments.

APIs provide communication between the M2M Business Enablement Platform and the M2M applications. Communication is based on standards like XML1 and RESTful2 web services, making the interface, technology agnostic. Easy to use graphical interfaces allow the end user to manage clients, M2M business applications, devices and environments (views on the device data exposed to the applications/clients). The interfaces also allow users to monitor and view reports. The architecture aligns to the European Telecommunications Standards Institute (ETSI) M2M Technical Specification.

The ETSI produces globally-applicable standards for Information and Communications Technologies (ICT), including fixed, mobile, radio, converged, broadcast and internet technologies. ETSI is officially recognised by the European Union as a European Standards Organisation. It is a not-for-profit organisation with more than 700 member organisations drawn from 62 countries across five continents.

The component overview

The CGI building blocks of the M2M Business Enablement Platform are illustrated below.



The building blocks are:

Device Connection: This component communicates with the devices in the field. The Device Connection layer can be easily extended to support new device types by adding agents to this component that implements the communication protocol of the device. The agents can be added to the Device Connection component via a workbench.

Data Processing: This component is used to process the data from the Device Connection layer. It allows configuration of business rules. These rules can be configured to translate data received from the devices into business events that can be recognised by the M2M Business Applications for further business actions.

Data Warehouse: Data from the Device Connection layer or business events from the Data Processing component can be stored by the M2M Business Enablement Platform for later retrieval. This is configurable. Reports can be generated based on the stored information.

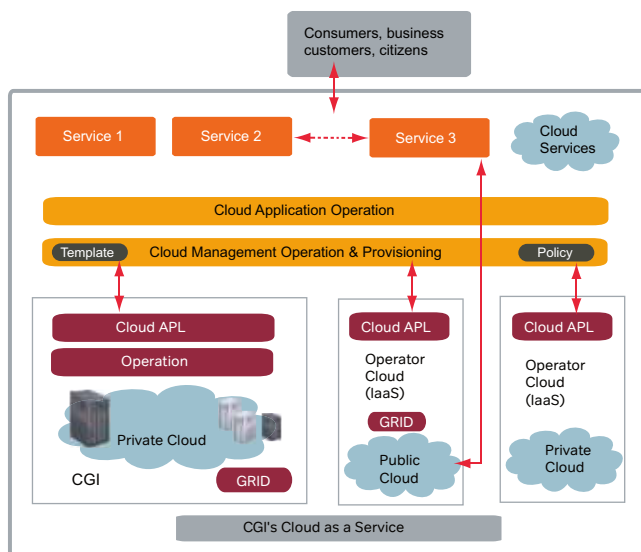
Application Integration: This is the communication and common services backbone of the platform. M2M business applications can subscribe to information or services on the platform. It is responsible for providing the right application with the right platform capabilities.

Services: The M2M Business Enablement Platform provides standard interface to the external world. The interface uses RESTful web services for integration. Applications can configure different elements (for example, devices or environments or common platform capabilities like geofencing and others) in the M2M Business Enablement Platform.

Portal: The multi tenanted portal framework allows users to configure screens for specific needs. With componentised building blocks (portlet), screens can be configured to view the data in the data warehouse and manage the M2M Business Enablement Platform based on client requirements. The framework also allows creation and deployment of client specific portlets to meet specific requirements. This component also provides the self service functionality for the different users of the system to manage their operations independently and easily.

Deployment model

To provide appropriate scalability at the lowest costs, the platform has been architected to run in a public/private cloud environment or data centres. We offer enterprise services across public, private as well as hybrid cloud environments. This helps meet requirements of data security, regulatory requirements with reference to data storage, offering enterprises control over their storage as well as connectivity through secure tunnels or restricted IP ranges. The services are provisioned and managed using cloud APIs and are template-driven, allowing services to be rolled out quickly and easily.



This model offers a truly collaborative approach and it allows our clients a 'pay-as-you-grow' commercial model. It allows solutions to be created from pilot to industrialised global roll-out on a predictable and controllable cost model, using a common cloud-based environment. Most importantly, the platform offers uniform infrastructure that is available globally, thus enabling device independent access to the cloud.

This model offers a single-point server setup, redundant server setups as well as auto-scaling facilities. The redundant server setup allows enterprises to reap benefits from failover and clustering.

Auto-scaling application-server infrastructure in the cloud provides automatic fail-safe mechanisms and ensures data is spread across multiple data stores, guaranteeing higher availability. It also allows computing capacity to adapt to site traffic. Load balancing across all the options ensures optimal resource utilisation and helps maximise throughput and response times, avoiding overloads at any point in time.

The service offering in the cloud allows enterprises to reduce their operational dependency on server availability and instead plan their operations around service availability, which is much more dependable and assured based on service level agreements functionality for the different users of the system to manage their operations independently and easily.

Managed operations. Assured service

CGI has set up a M2M global services organisation to ensure service availability, across geographies and to provide enterprises a managed operation. The organisation has responsibility, not only to ensure the cloud operations and the platform is running but also to keep service available at all times. Support for enterprises is also enhanced by provisioning for second and third line support and the availability of single point of contacts.



Harness the benefits

Enterprises can now develop applications that integrate complex systems and communications networks in a seamless and interoperable manner. With the CGI M2M Business Enablement Platform, the challenges they used to face in developing such applications have become a thing of the past.

With plug and play options that allow addition of devices or networks, we make it possible for enterprise to manage their applications and reduce the complexity of managing connected devices. The business intelligence capabilities of the M2M Business Enablement Platform can be applied across a wide array of vertical services and across diverse industries.

The platform provides a new vision of enterprise systems that bridge the gaps in embedded M2M computing technologies, allowing businesses to reap the full benefits from connected devices and eliminating many of the unnecessary costs in customer support.

The adoption of M2M systems has traditionally been challenging. With CGI's M2M Business Enablement Platform, there is a huge potential to change the business and delivery models. That is not all. By adapting to a new mode of service delivery, enterprises connect better with their customers and build new relationships.



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With over 68,000 professionals in 40 countries, CGI fosters local accountability for client success while bringing global delivery capabilities to clients' front doors. Founded in 1976, CGI applies a disciplined delivery approach that has achieved an industry-leading track record of on-time, on-budget projects. Our high-quality business consulting, systems integration and outsourcing services help clients leverage current investments while adopting new technology and business strategies that achieve top and bottom line results. As a demonstration of our commitment, our average client satisfaction score for the past 10 years has measured consistently higher than 9 out of 10.

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