

Delivering True Value Through Semantic Interoperability

Ultan Mulligan, Vice Chairman of Marketing & Communications for oneM2M, explains why semantic interoperability is key to realising large-scale Internet of Things (IoT) operations that deliver true value



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Mr. Ultan Mulligan is Director of Communications at ETSI, and holds a position of vice-chairman of the Marketing and Communications committee in the oneM2M Partnership Project – a joint collaboration between ETSI and 5 other ICT standards bodies across the globe. Previously responsible for Strategy and New Initiatives, developing new standardisation or pre-standardisation activities at ETSI including establishing the first Industry Specification Groups at ETSI, he has also managed OSA/Parlay API standardisation activities for ETSI. In ETSI's Protocol and Testing Competence Centre he has managed specification

and testing projects at ETSI in fields as diverse as X.25, DECT, V.5, Intelligent Networks, OSA, and DSRC radio (road tolling). Besides ETSI, he has participated in many standards bodies including oneM2M, 3GPP, ITU-T, CEN, and groups such as Bluetooth SIG and Parlay.

Mr Mulligan has a B. Eng. from Dublin City University and an Executive MBA from the ESCP-EAP in Paris.

When it comes to interoperability, the tech industry is well-versed on the benefits it can bring. Despite this, BI Intelligence's US Smart Home Market report in 2016 found that smart home devices were stuck between the early adoption phase and mass-market phase, due to fragmentation. This occurs when different equipment and technology are used by the numerous operators and service providers launching IoT services, with well-known drawbacks including overly complex and time-consuming operations, vendor lock-in and reduced innovation, hindering overall progress.

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However, these are not the only barriers when dealing with a lack of interoperability in smart systems, especially those deployed on a large scale, for example, smart cities.

Why semantic interoperability?

For the IoT to deliver true value to consumers, businesses and city planners, the data delivered by smart technology needs to have meaning, so that numerous applications can interpret the data and use it to respond correctly.

This is semantic interoperability – a key factor in the future success of the IoT market. It uses meta data and ontologies to allow different applications to share information that is “meaningful.” Using meta-tagged data ensures all information can be understood and re-used. This avoids the need for multiple standalone systems of sensor devices and their applications trying to gather the same data but for different purposes.

To give a simple example, roadside sensors would generate various numbers, such as temperature values in Celsius which might be used for local ice-warning electronic signs. But unless we know what these figures stand for, the information has little meaning. If meta-tagged data is used, though, the user can see what the information represents and what it can be used for. It can also be shared with other apps, for example, ones monitoring and forecasting weather. Semantic interoperability is therefore significant and necessary to many different smart technology industries. As an increasing number of applications are developed, integration costs will rise if data formats require as much integration as communication technologies.

On a wider scale, consider the thousands of potential data sources which could be found in a smart city. While many of these will generate data to be exploited by only one application, wouldn't a smart city be even smarter if all of

this data could be combined, cross-compiled and re-used by many applications?

oneM2M and semantic interoperability

Semantic interoperability was introduced in oneM2M's latest set of specifications, Release 2, to allow meaningful, secure data distribution and reuse. Building semantic capabilities into the standard now will allow integration to be significantly easier in the future as the number of devices and applications in use increases.

The oneM2M standard enables the posting of meta-tagged data to a oneM2M resource on a gateway, which notifies interested entities, or which can be found by ‘semantic discovery’.

Making semantic interoperability a reality

In a small IoT setting, it might not be necessary to attach ‘meaning’ to what the data represents as it is often implied by apps developed for a purpose. City planners seeking to fully exploit data assets, however, will be greatly restricted without semantic interoperability.

While there will be some initial costs in bringing apps up to speed with semantic interoperability, achieving similar levels of interaction via traditional data integration processes will see costs shoot up exponentially as apps and devices grow in numbers. Information available for multiple uses is also likely to be limited in such a scenario.

With the number of IoT devices increasing every year, cities serious about getting smart know they can no longer rely on traditional methods if their IoT projects are going to deliver true value. Semantic interoperability is just a small part of the standardisation but it will be integral to enabling this new way of working.

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