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Research Report:

**Application Intelligence &
Connected Devices:
Harnessing The Value**

Introduction

The Internet of Things (IoT) and the rise of a machine-to-machine (M2M) ecosystem have been long anticipated. As this ecosystem converges with trends like cloud computing and big data, businesses need to be prepared to address the new wave of connected intelligent devices and harness the data that comes with them. To help better understand the realities of this coming wave, during June 2013 Beecham Research conducted a research survey for Oracle of the Internet of Things (IoT) market and use of machine-to-machine (M2M) technology. The purpose of this was to identify new trends in the market for connected devices, with a particular focus on application intelligence. Some of the key points investigated were as follows:

- **What are the top requirements for connected devices projects?**
- **To what extent is the intelligence required for M2M/IoT applications expected to change?**
- **Why are these changes expected?**
- **What is their likely impact?**

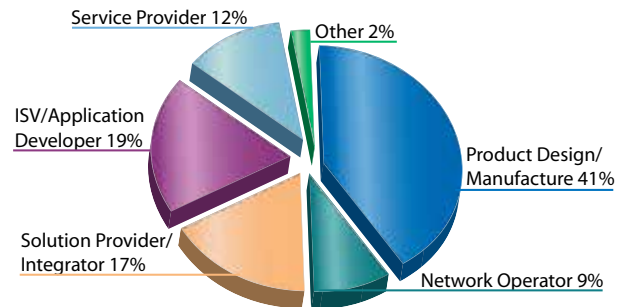
These types of questions required respondents to have detailed knowledge of and experience with the M2M/IoT market, with a particular focus on the connected devices themselves and the expected trends for those. As a result, the survey was aimed at market players rather than enterprise users.

The findings from the survey were presented and discussed in a webinar on June 27, 2013. Follow this [link](#) to access the recording of the webinar.

This white paper is intended to accompany the webinar and to summarize the key points therein. Only some of the charts used in the webinar are included in this paper.

About Survey Respondents

Responses from 193 market players were received over a 10 day period. The breakdown of their business unit's primary role in the M2M/IoT market were as follows:



Source Beecham Research

Business Unit Primary Role in M2M/IoT

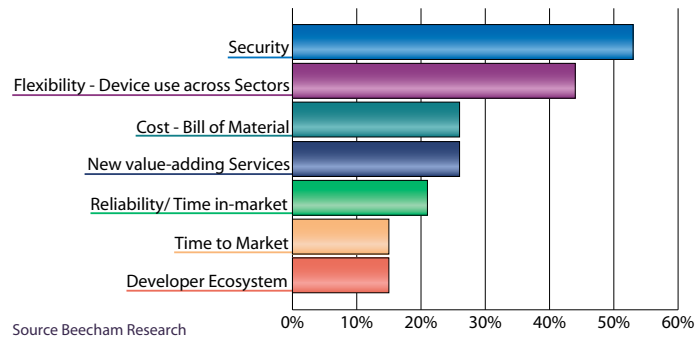
At 41% of the total, there was a particular focus on Product Design/Manufacture and this was made up from a combination of products running user applications and communication hardware devices used for the network connection. In addition there was good representation from Service Providers (12%), ISV/Application Developers (19%) and Solution Providers/Integrators (17%). Network Operators (9%) are an essential part of the connected devices market and were also represented.

In addition, in view of the more technical nature of the research objectives, the split between Technical (62%) and Business (38%) roles of the respondents themselves was weighted towards technical but with a suitable business input. A further parameter of interest was the key regional markets served by respondents' business units. The largest score to this was Europe, followed closely by North America. AsiaPacific also scored more than 50% of the vote.



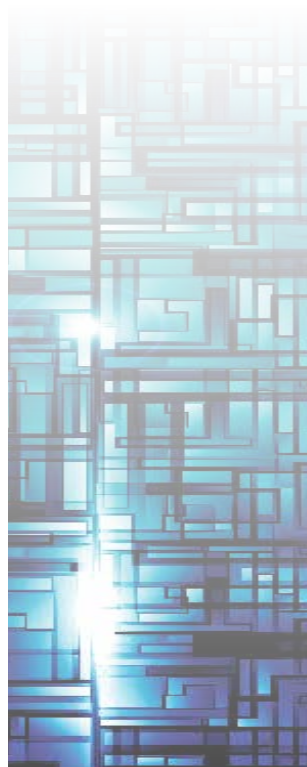
Top Requirements for Connected Devices Projects

The first key question put to respondents asked them to select their top two requirements for projects involving applications embedded in connected devices at the network edge. These were as follows:



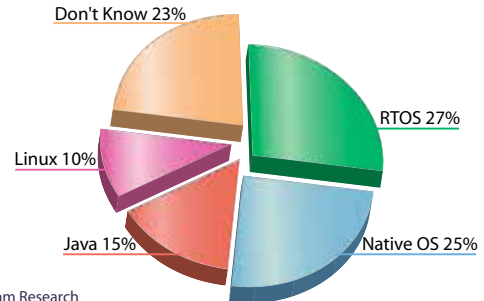
Top Requirements for Connected Devices Projects

In line with other recent surveys, Security was seen as the top requirement. Security has rapidly gained in importance in the market over the last two years as companies begin to use their M2M solutions for business-critical activities and to share M2M data more widely across the enterprise. The high score for Flexibility refers to the need for connected devices that can be adapted to different applications. This implies running a flexible software environment that caters for different application requirements.



About Your Products

For those who identified themselves as representing Product Design/Manufacture, the application development platforms used were as follows:



Which development platform used?

This implies that for these respondents the market is fragmented and there is not a particular standard in place yet.

The same respondents were also asked about the anticipated market life of their products. 61% expected a 2 to 5 year life in the field, with a further 32% anticipating a 5 to 10 year life. This means that over 90% of the product designers/manufacturers expect their products to be in the field for several years, emphasizing the need for a remote software update capability in order to manage costs.

Beecham Research Outlook:

The embedded development market is still at an early stage. While fragmentation exists in embedded application development platforms, companies like Oracle are well positioned based on their expertise and long history with Java for embedded development.

Java for connected devices offers the flexibility of a standards-based, portable and proven platform. Other core strengths include easy availability of common APIs and free development tools coupled with a strong, global developer ecosystem that is currently 9 million strong.

Application Intelligence

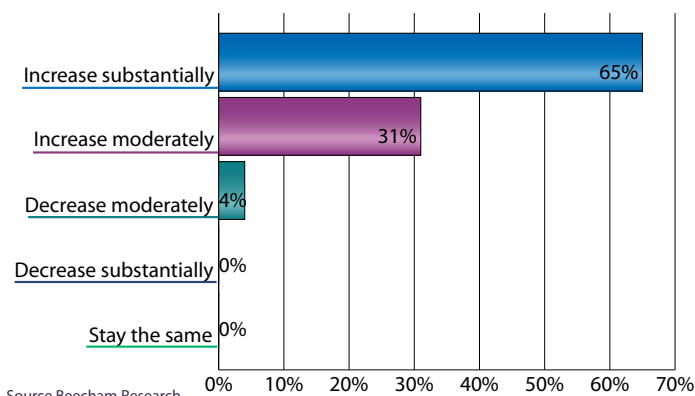
A key question asked of all respondents was how did they expect intelligence required for M2M/IoT applications to change in the next 3 years? 94% expected this to increase, with just 6% expecting it to stay the same. Nobody expected it to decrease.

Perhaps more surprisingly – in view of the increasing interest in cloud-based services – the vast majority also thought that greater intelligence will be required at the network edge. In other words, forget the idea that edge devices will stay the same or get dumber with all the real smarts for applications migrating to the center. According to these respondents, that is not going to happen.

To explain why, the survey found that a full 81% of those expecting more application intelligence being required were anticipating the need for real time decision making at the edge to increase. This represents a substantial shift for M2M/IoT: early M2M applications have typically sent all remote data to the data center for processing. However, as more data is generated at the edge in real time, a greater need for real time decision making also at the edge will be required. This will then need more real time data analysis at the edge. This is consistent with the ideas behind the Internet of Things.

In line with this, 69% of the respondents also expected a greater need for local data storage at the edge.

These changes might imply less communication with the data center. However, this was not indicated in the results. A further question asked of all respondents was – to what extent do you expect the level of network traffic to/from your connected devices and products to change during the next 5 years?



Extent that the level of network traffic to/from connected devices is expected to change during the next 5 years

Virtually all respondents expected this network traffic to increase. This also reflects the expectation of a huge increase in the amount of data expected to be generated by connected devices. Much of this will be processed at the network edge for a wide range of services requiring fast decision-making. Further processing will then also be required at the data center for wider sharing and this is expected to greatly increase network traffic to beyond current levels.

Beecham Research Outlook:

Our research strongly confirms the trends we have seen towards extending intelligence to both edge devices and gateway devices across the key market segments and business verticals in the M2M/IoT market. Oracle is well positioned as these factors (or as yet unknown factors) need to be considered and built into the development cycle of M2M programs. Java by design offers the flexibility to address the new service requirements organizations may not have anticipated in their original designs.

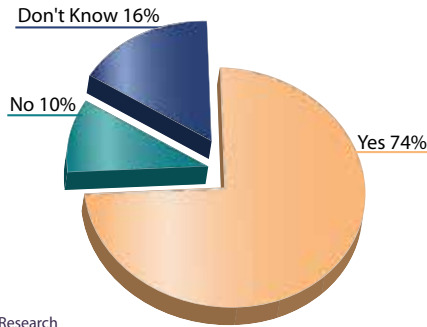
Also, the Java platform includes a complex event processing capability designed to help provide management of in-flight device data, data analysis and for driving real-time decision making closer to the source.

The survey results also clearly show the need for longer, in-market life of devices, among respondents with an average of two (2) to ten (10) years heavily outweighing applications with under two (2) years. For these timescales, managing support related costs needs to be seriously considered. A Java-based development platform can readily support remote application updates, can help reduce cost pressure and support longer in-market life applications.



Device Security & Data Protection

As noted earlier, Security was identified by respondents as their top requirement for connected device projects. Examining this further, all respondents were asked if they expected the need for security in edge devices to increase over the next few years. Their response was as follows:



Source Beecham Research

Do you expect the need for security in edge devices to increase over the next few years?

With more real time decision making and data analysis at the edge, it is perhaps not surprising that three quarters of respondents also expected the need for security to increase in edge devices. It follows that greater use of intelligence will then also be required to make this possible.

As well as this, respondents were also asked if they saw the need for identity management associated with connected devices at the network edge to change. 94% expected this to increase, with the remainder expecting it to stay the same. Nobody expected it to decrease.

This is a further pointer towards greater intelligence being required at the network edge to address data protection issues.

Beecham Research Outlook:

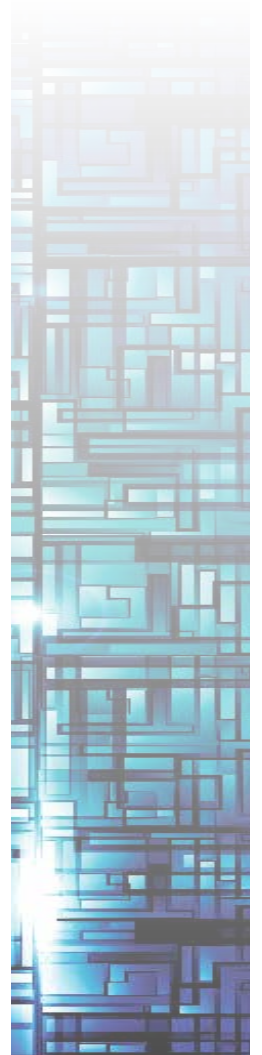
Security was the top requirement for the survey respondents around connected devices for M2M/IoT. Java ranks very highly against this requirement as it was built with security in mind. From its sandbox development model to its support for advanced data encryption and identity management, Oracle is well positioned to support many development security models - including securing patient data for healthcare and securing user and transactional data for financial services.

A future webinar planned for the Fall of 2013 will focus on security and data protection issues for connected devices.

Summary

When looked at simplistically, one might expect that with greater use of cloud-based resources the future for application intelligence in M2M/IoT is at the data center with the edge devices themselves not required to become more intelligent. This survey showed that to be an incorrect conclusion. There are several reasons why application intelligence at the edge is expected to increase. It is not only that more real time decision making, data analysis and data storage will be required at the edge, but other aspects such as device security and data protection will also play a part while still maintaining a watchful eye on costs.

At the same time – and perhaps counter-intuitively – the network traffic between connected devices and the data center is also expected to increase substantially. In the age of Big Data, much higher levels of data processing will be required both at the edge and at the center, and these activities will be complementary.



About Beecham Research

Beecham Research is a leading market analyst and consulting firm that has specialized in the development of the rapidly-growing M2M/Internet of Things market worldwide for over a decade, since 2001. Based in Cambridge UK and in Boston US, we actively participate in initiatives aimed at achieving M2M market development and growth. Recent research has included two market-leading and widely supported studies on M2M Cloud-Based Platform Services and a study of the worldwide Satellite M2M market contracted by the European Space Agency. Ongoing research includes new business models for the Internet of Things, Healthcare and other vertical sectors.

A particular specialty is primary research surveys involving users (adopters) and market players worldwide, in multiple languages.

In conducting our research, we cover 9 key industry sectors and their associated devices including all principle technologies for connecting them – both fixed line and wireless. We offer customized market analysis and consulting services including subscription-based services tailored to individual company needs.

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