



White Paper

The Future of M2M Application Enablement Platforms

Prepared by

Ari Banerjee
Senior Analyst, *Heavy Reading*
www.heavyreading.com

on behalf of



www.aeris.com

September 2013

Introduction: Trends in the M2M Market

Machine-to-machine (M2M) has been around for many years. Though enterprises operating in various industries, such as utilities, retail, healthcare and automotive, have long utilized M2M technologies to provide services to their end customers to monitor and control machines, they are banking on the evolution of M2M technologies to radically transform the services they offer to their end customers.

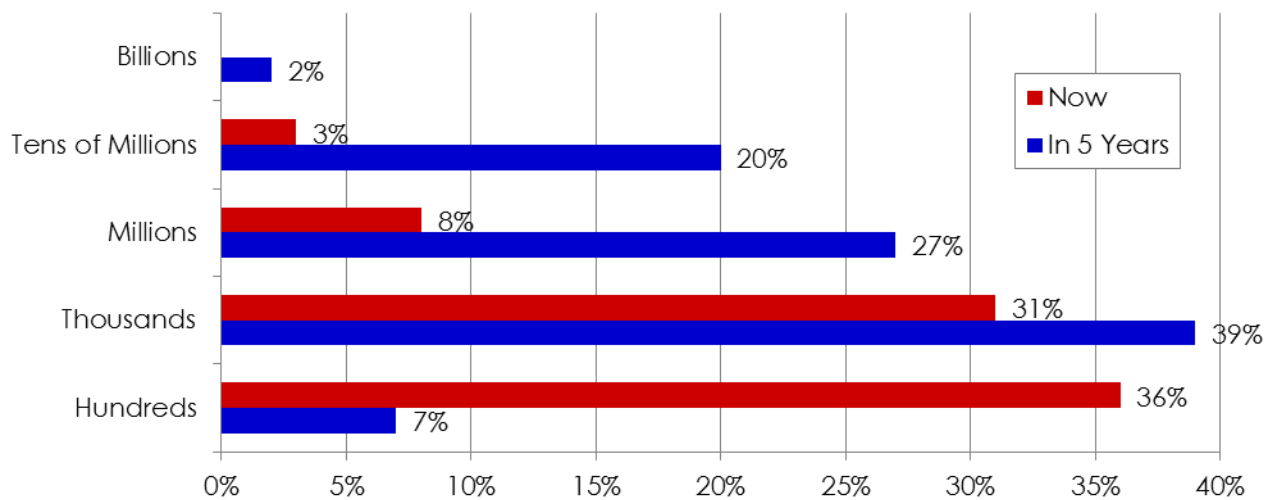
Over the last few years, the convergence of sensors, wireless technologies such as Long Term Evolution (LTE), smart devices, smart grid, cloud computing, etc., has paved the way for more innovative M2M solutions, consolidating their importance in the running of enterprise operations.

Heavy Reading's recent research has shown that the M2M market is on the verge of significant evolution that, we believe, will turn M2M technologies into a truly strategic asset for enterprises. Below we discuss several trends that are contributing to this evolution.

Trend 1: Significant Increase in the Number of M2M Devices

As technology, network and connected devices become the fulcrum of modern life, we will witness a sharp increase in the number of M2M devices; thus resulting in more transaction traffic. Results in a recent *Heavy Reading* study of telecom operators illustrate this trend (**Figure 1**). When asked about the number of M2M devices these operators are managing in their network today and an estimate of this number in five years, most operators predict a significant growth in devices in future years, heralding the beginning of a truly device-centric networked society.

Figure 1: How Many Devices/Machines Does Your Company Manage as Part of Its M2M Service Portfolio?



Source: Heavy Reading, 2013, n=68

Most respondents in **Figure 1** are cellular operators. Most mission-critical M2M solutions depend on cellular connectivity, as it offers far better quality of service (QoS) compared to other cellular technologies. The increase in the number of

M2M devices by operators implies an increase in capacity-related pressure on operators' network resources. This will result in increased pressure on an enterprise infrastructure, forcing it to adopt more scalable solutions.

Trend 2: Rise in M2M Solutions, Driven by Economic Factors & Availability of Cheaper Connectivity Technologies, Such as Wi-Fi

Gone are the days when M2M was just about service-intensive, complex and customized go-to-market models that concentrated on a handful of customers. With the proliferation of wireless connectivity, mobile broadband, Wi-Fi, new channels of business and faster networks, M2M will focus on consumers with a long tail of applications on top of their core services, which can be provisioned by consumers via self-service. This will call for more rapid and easier deployment of M2M solutions.

Also, there are more M2M solutions today riding on cheaper connectivity technologies such as Wi-Fi, Bluetooth, ZigBee, etc., which is catalyzing the growth in the M2M market. As the Internet of Things becomes a common phenomenon, we start seeing a blurring of lines between consumer and business applications, which is driving a clear movement from mission-critical applications to consumer applications in the M2M space.

Trend 3: Increasing Importance of Data

In many industries we are witnessing an increased demand for personalized applications and services. Enterprises are demanding that their M2M solutions support improved customer experience and more value-added services. Enterprises that were satisfied with security and reliability of data from remote machines are now demanding solutions that can harness this big data and use advanced analytics to multiply the value of their applications, providing critical and actionable intelligence to their business.

With connectivity becoming ubiquitous (cellular, Wi-Fi, etc.) and an exponential increase of connected devices, there is already an increase in transmitted data that must be harnessed and utilized properly. The raw data transmitted by M2M devices provides nuggets of information, which when mined and harnessed strategically can provide valuable information and value-added resources for the enterprise, enabling them to make decisions at operative and strategic levels. Thus M2M does not simply offer a passive data collection point, but is about to create an intelligent inter-machine ecosystem.

As a result, M2M use cases have increased in size and scope, driven by the significant increase in connected devices and the realization that M2M data can provide new access to intelligence for enterprises.

From the trends discussed above, it becomes apparent that the scope of M2M is shifting from connecting remote devices to making the most of the M2M data to provide more intelligent, knowledge-driven M2M solutions.

Why Does M2M Need Data-Centric Application Enablement Platforms?

Traditionally, streaming data from connected devices was sent directly from networks to applications that not only processed the data, but also stored and managed it, while maintaining mechanisms for application security, scalability and flexibility. This traditional approach was time-consuming and complex since application developers always had to start from scratch to create applications that focus on baseline application infrastructure rather than on higher-level business logic. Furthermore, application reliability and robustness are often compromised since most developers are not accustomed to dealing with the unique nature of connected device traffic patterns.

This has led in the past years to the development of Application Enablement Platforms (AEPs) that have enabled M2M application developers to create applications that incorporate, and draw from, multiple M2M devices. However, today's AEP solutions do not provide adequate support to all the emerging M2M market trends that were discussed in the previous section.

In order to support market demands, the next generation of AEPs – which we call AEP2.0 – must be able to provide data management and analytics functionality for M2M applications and possess the following characteristics:

- Increased scope, scale and scalability of M2M deployments
- Low-cost, open access systems that enable simplification of deployments
- Utilization of M2M data to provide more accurate and finely detailed business information

To do that and maximize business potential from M2M, solution providers (including connected product makers) must transform themselves into value-added players in the M2M business landscape. For that, their ability to manage data securely becomes very critical. Their underlying AEPs must then be capable of not only securely managing captured M2M data, but also of transforming that data into relevant information based on business knowledge and rules. This data-driven approach has the potential to open up further opportunities for enterprises by allowing them to be more intimate with the needs of their end customers, thereby successfully elevating the value proposition for their high-value customers.

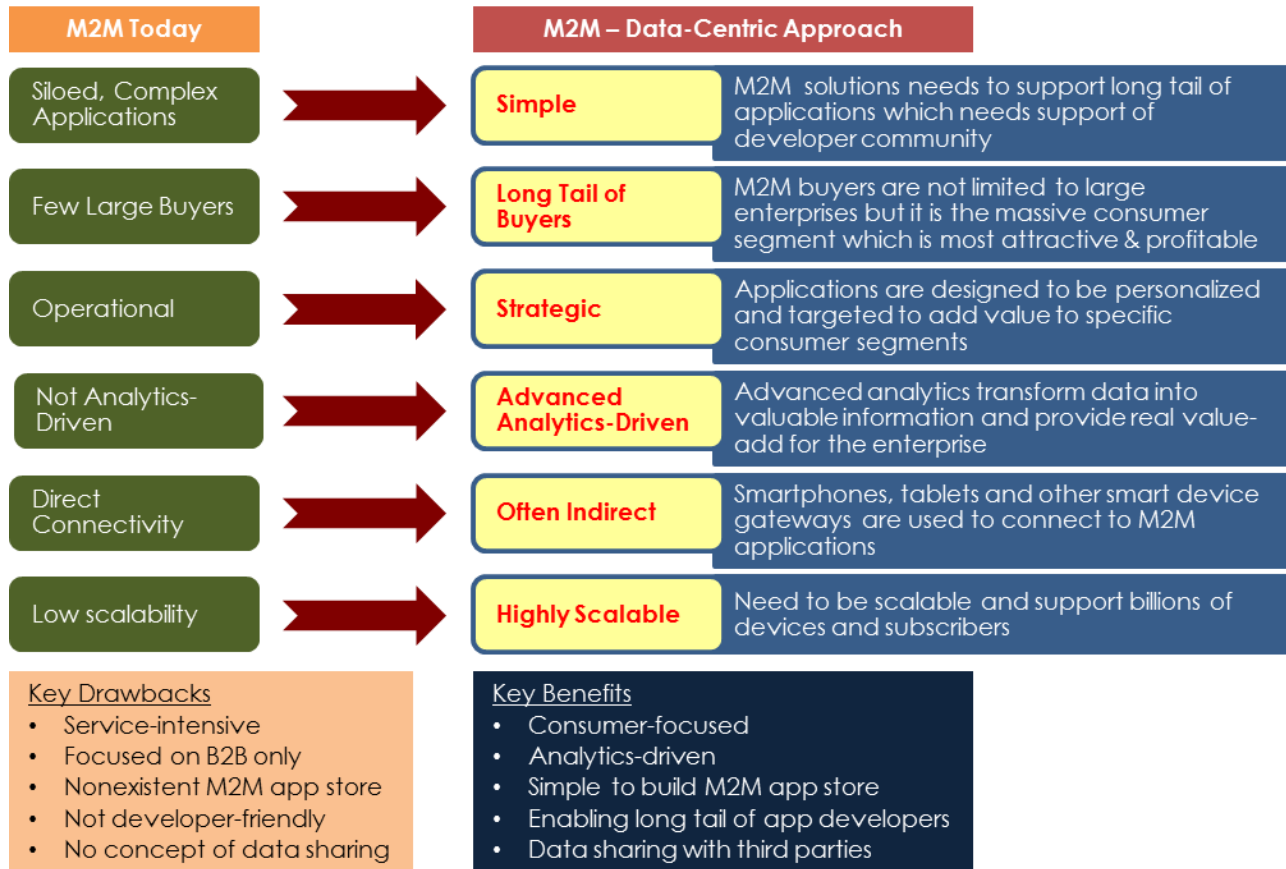
Also, since focusing on consumer demands a long tail of applications, very similar to the Internet model, reducing the time to create market applications becomes increasingly important. Enterprises, therefore, need solutions that can help them differentiate themselves by allowing them to provide services and create applications with a superior quality of experience (QoE). AEPs are solutions that enterprises use to manage and launch services-intensive industrial business-to-business (B2B) use cases. These platforms were previously focused on securely collecting data from remote devices with very limited custom application for enterprise customers.

With M2M's success depending on consumer or B2B-to-consumer (B2B2C) segments, it is time for AEP2.0 solutions to step up their game, be data-driven and focus on consumer applications. The transition from current static, siloed, inflexible M2M market conditions to a more dynamic, nimble and flexible AEP2.0 solution will require a data-centric approach to turn raw data into actionable information.

Key AEP2.0 Capabilities

AEP2.0 solutions enable M2M solution providers to leverage the most precious part of their solutions: data. AEP2.0 allows enterprises to easily and cost-effectively access high-value business data for their operations and establish disruptive models for their business. **Figure 2** examines the benefits that a data-centric AEP will provide to enterprises.

Figure 2: Benefits of a Data-Centric AEP for Enterprises



Source: Heavy Reading

The next generation of AEPs must be data-driven and seamlessly allow enterprises to build and deploy M2M applications that leverage the connected world of devices. AEP2.0 inherits the basic functionalities of the first-generation enablement platform (AEP1.0) like connectivity, vertically integration, limited analytics capability, etc., and builds upon it to make the new platform more data-centric and analytics-driven. AEP2.0 solutions need an abstraction layer between connected devices and applications to make it simple for application developers to collect and store data, mine the data for critical business insights and securely publish the data to applications and third parties. AEP2.0 solutions will need to possess complex event processing capabilities, as they must be able to process huge quantities of data and conduct both batch and real-time analytics.

Cloud-Based Platforms

With more and more operators planning to support M2M services in the cloud, the AEP2.0 platform must be a virtualized, cloud-based platform. As more and more companies look toward the cloud to support M2M services, it is critical for these next-generation M2M enablement platforms to be cloud enabled. Cloud-based approaches reduce cost of ownership for companies and help them to build innovative, flexible and scalable applications quickly, easily and at a fraction of the cost of on-premises alternatives.

Expand M2M to Consumer Data

AEP2.0 must catalyze "consumerization of M2M," and for that it needs to enable a long tail of services. Therefore, the AEP2.0 solution must provide mechanisms to enable the developer community to create consumer applications that are data-driven and focused on enriching consumer value and experience. Enterprises' need to extend their current services by integrating them with external services and platforms to provide enhanced functionalities is also becoming equally important. Value-added services that are based on triggers and thresholds are obvious extensions of anchor services that are provided by enterprises. Therefore managing, creating and launching value-added applications seamlessly should be an essential component of AEP2.0 solutions.

Easy Access to Data

Data management becomes more profound in AEP2.0 platforms. Flexible, easy-to-create, user-generated data models are used to transform raw device data into actionable information. Data sharing with third parties will enrich consumer-driven enterprise services. The need to make M2M data accessible on smart devices – especially in industries such as automotive, healthcare, home security, smart metering, etc. – will drive the need for shareable data as it provides major value add to the consumer segment. Hence third-party data sharing will be critical in AEP2.0 evolution.

Intelligent Data

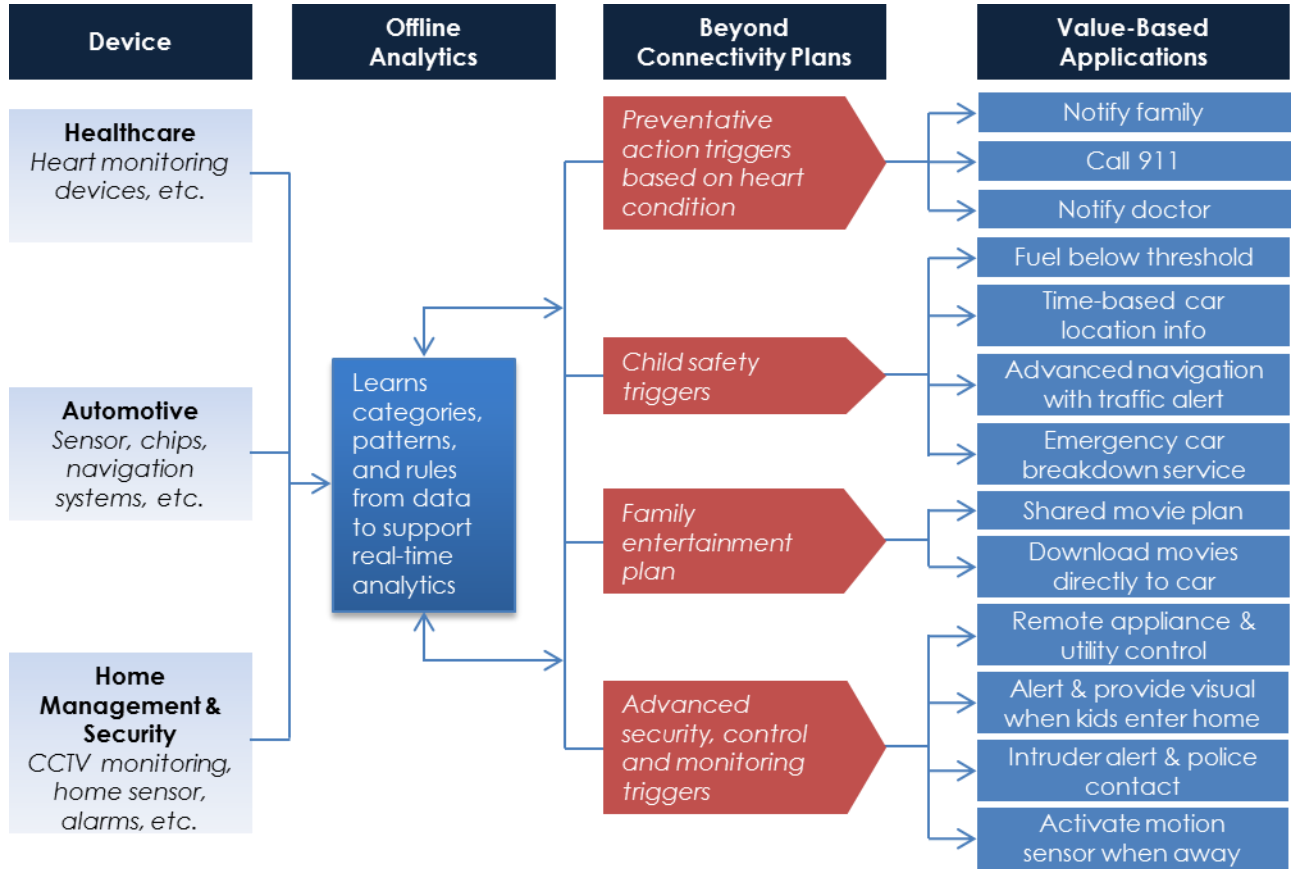
An increase in the number of M2M devices increases raw data exponentially. However, the reality is that most of the collected M2M traffic is not correlated, sanitized or extrapolated in a manner that can provide enterprises with a 360-degree view of their customers and their preferences. In order to deliver new, compelling, revenue-generating, customer-satisfying services without overloading networks or costs running out of control, companies must ensure fine-grained control of their services and provide applications that are grounded in an in-depth understanding of all critical aspects of their businesses. Harder still, they increasingly must be able to make decisions, and react, in real time.

In a nutshell, enterprises need their next-generation AEP2.0 platforms to perform a few fundamental tasks:

- Collect, store and manage enterprises' M2M data
- Transform the raw data into operable business data
- Securely share the company's business data with third parties
- Connect to other enterprise systems

Figure 3 illustrates some potential applications that enterprises can provide to add value for their consumers. These value-based applications are data-driven, utilize advanced analytics and are designed to increase consumer value.

Figure 3: Potential Value-Based Applications for Enterprises

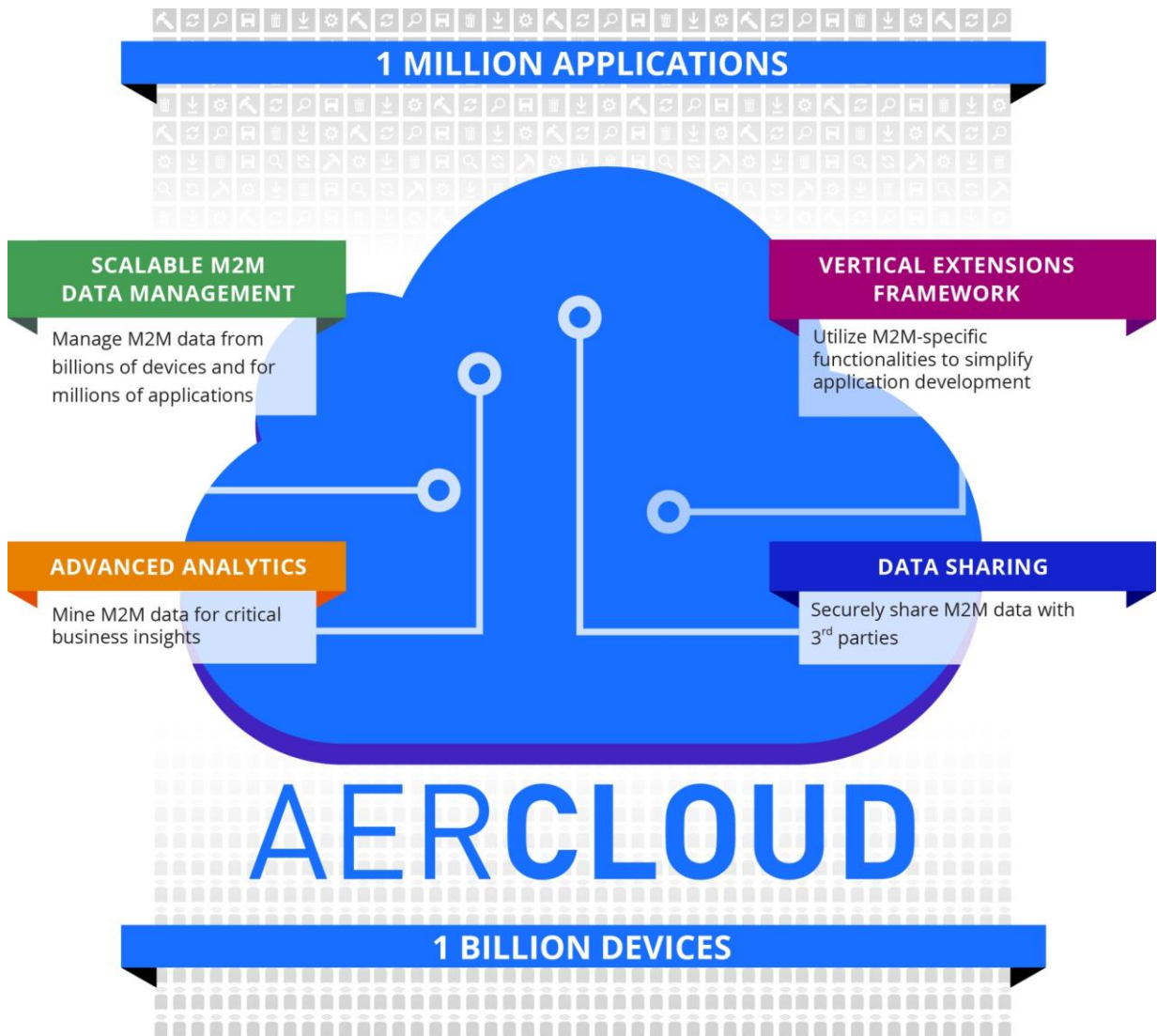


Source: Heavy Reading

Unleashing AerCloud, the Next-Generation AEP

Based on its experience and expertise in M2M, Aeris Communications, the Made for Machines technology and service provider, has addressed this vision by developing AerCloud, the next-generation M2M AEP.

Figure 4: AerCloud Next-Generation M2M Application Enablement Platform



Source: Aeris Communications

AerCloud offers the optimal AEP infrastructure to leverage and multiply the value of M2M data to M2M solution providers, application developers and connected product manufacturers. With AerCloud they have access without any implementation effort to key functionalities to support their M2M applications, discussed in the following.

Highly Scalable & Reliable Data Management

Delivered as a cloud service, AerCloud powers advanced load balancing and auto-scaling capabilities to offer unlimited data capacity expansion and unparalleled scalability to M2M solutions. With AerCloud, M2M solutions can scale for billions of devices and support requests from millions of subscribing applications. AerCloud also offers advanced failover capabilities, including computation nodes and data storage redundancy in multiple regions, to ensure seamless service and no data loss in case of network interruption, hardware failure or unexpected events.

Because of its long-term experience as a trusted partner with M2M solution providers, Aeris has understood the need to architect its new infrastructure as a truly open system. Today, AerCloud can connect with any device via any communication technology (cellular, Wi-Fi, Ethernet) and uses the market-leading protocols (HTTP, HTTPS, MQTT). Besides, AerCloud's standardized Representational State Transfer (REST) application programming interfaces (APIs) suppress complex integration with M2M applications and allow applications to subscribe to and receive the subset of data they need via push notification or long polling.

M2M Analytics

AerCloud also features a unique analytics service that allows solution providers and application developers to bring their development to the next level. Its analytics service features a combination of batch and near-real time analytics to transform M2M raw data in high-value business information and then facilitates decision making for the solution customer. For example, it becomes possible with AerCloud to identify a truck exhibiting dangerous road behavior in a fleet management system, detect a water leak from a water meter or predict potential risks for the user of a wellness solution.

Data Sharing

Another truly powerful feature in AerCloud is its Data Sharing Interface. By leveraging this interface, solution providers can generate "on-the-fly" unique keys to grant access flexibly and securely subset of life data to other parties. The use of M2M data is no longer limited to specific solutions but can be shared within an ecosystem to enable a whole set of enriched and optimized applications.

Vertical Extensions Framework

Finally, AerCloud facilitates and speeds up the development of M2M applications by offering a powerful framework, which enables the creation of services leveraging AerCloud's baseline architecture. These services feature some of the most common and relevant building blocks across M2M applications and verticals. For example, vertical extensions such as geo-grid or nearby-asset search can be easily integrated into M2M applications at implementation time, thus leading to a reduction in the overall project development time.

Conclusions

Next-generation AEP platforms must be data-centric and make it simple for application developers to collect, store and mine that data for critical business insights. This collected data can also be securely published to applications and third parties. M2M application developers can leverage data management components and standardized APIs, resulting in a significant reduction in application development time and cost with increased scalability, reliability and flexibility.