IoT Vertical Case Study

Data exchange is a key enabler for smart cities development

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Data Exchange Platforms | **Case Study**

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In this case study, we analyze how the Chordant Internet of Things (IoT) platform functions as a marketplace that enables the consolidation, sharing and exchange of smart city information from multiple sources to foster technology innovation.

This IoT Vertical Case Study is produced as part of the IoT Vertical Case Study series. These studies are designed to complement the group's already extensive research portfolio by providing in-depth analysis of individual products, services, projects, and deployments.

Company Background

Rebranded smart city platform based on oneM2M standard

Chordant is a technology company offering a smart city-focused IoT platform based on oneM2M, an internationally recognized open communication standard. It is the first product to be certified by a oneM2M global certification body, the Telecommunications Technology Association (TTA)

Chordant, Inc is an affiliate of InterDigital, a US-based mobile technology company that develops a wide range of wireless and cellular products to enhance communication in mobile devices, networks and services. The company originally developed a prototype IoT platform in 2011. Sony is also an investor in Chordant business.

In 2013 InterDigital Europe worked with several local governments and organizations in the UK to launch the oneTRANSPORT initiative. This has since been launched as a commercial service. oneTRANSPORT Data Marketplace by Chordant is a marketplace (exchange) for transport-related information to be shared and used by diverse organizations to improve transport network efficiency and create new services. Data can be monetized or shared freely. The following case study assesses this project.

Solution Background

Standardized and flexible data exchange platform

The Data Exchange/Marketplace solution by Chordant enables data ingestion, exposure, and entitlement across third-party data sources and users. The platform acts as a data marketplace that connects data publishers and data consumers who seek to deploy data-driven solutions. Data publishers are public or private sector organizations wanting to share data within their organizations or with others. In the smart city market, data publishers include municipal authorities, citizens, regional or national governments, universities and other non-profit organizations, and industry.
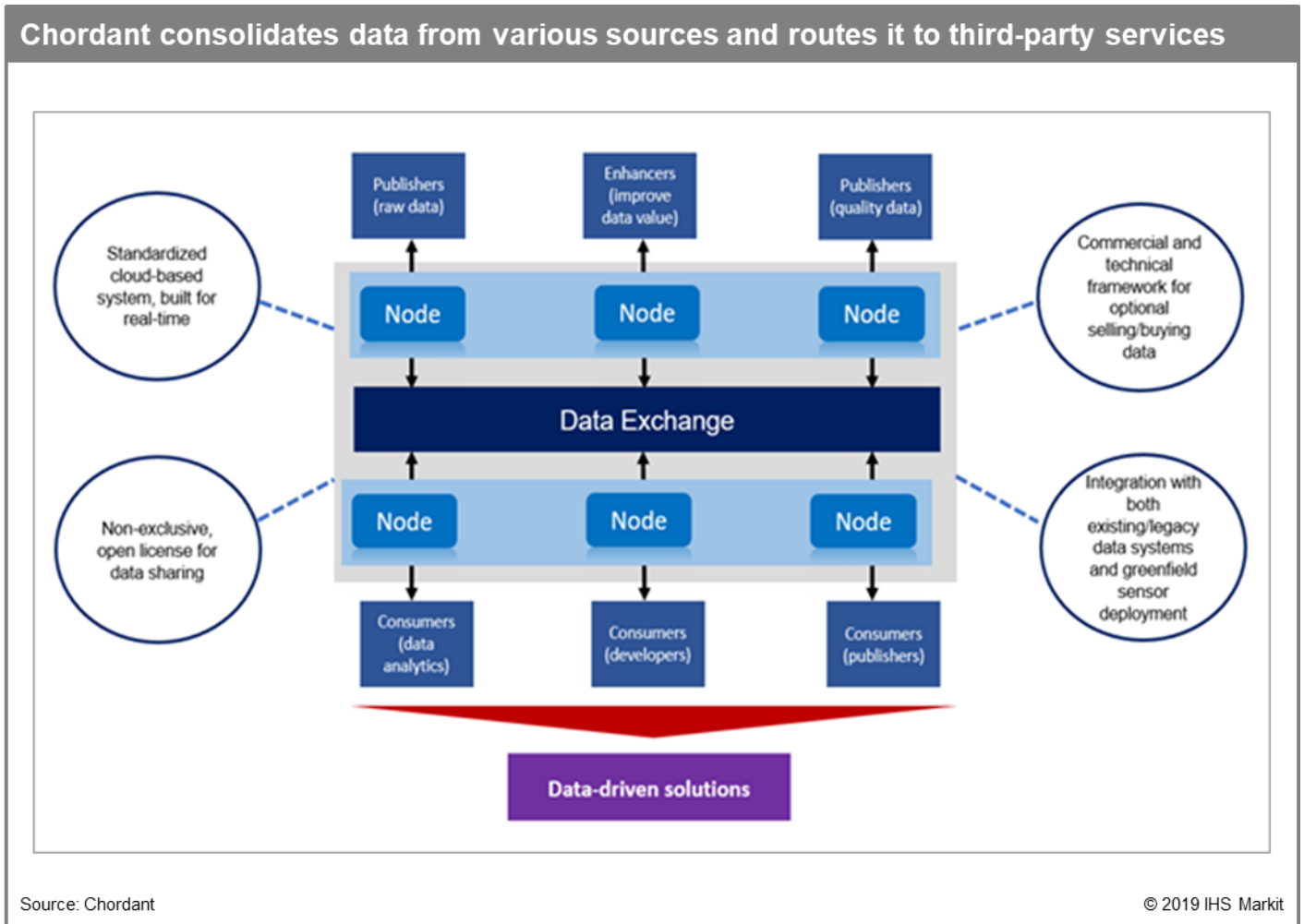
Data consumers are end-users (may include data publishers) that access the data to deliver solutions and services. Another type of participant in the Data Exchange/Marketplace ecosystem are data enhancers who take existing data in the exchange and enhance it to provide more value. This may involve data cleaning to remove anomalies, combining or

appending to other data or applying specific analytics or schemas. Figure 1, below, depicts how the interaction between all the participants in a data exchange occurs platforming the Data Marketplace solution by Chordant.

Chordant consolidates data from various sources and routes it to third-party services

Source: Chordant   © 2019 IHS Markit

All parties participating in data exchanges must accept data sharing agreements which specifies data sharing rules and financial terms – like a marketplace. Data publishers supply data through databases, the web, or other data formats either in its raw or refined form (enhanced data). Such data maybe offered "free of charge" or assigned a "fee" based on data access and utilization. Data access refers to a tier-based structure that limits the number of requests or transactions per minute and charged accordingly while data utilization is the use of metering infrastructure to capture data use and billing details. Each data publisher will define its required compensation based on its choosing.

The data exchange process that happens is facilitated by nodes that play a key role in this process. Nodes represent different enterprise systems or IoT platforms while the exchange – which consists of adaptors or Application Programming Interface (APIs) – integrates the different nodes to simplify data aggregation across the networks used by data publishers. Here, the exchange acts as a peering point or broker for data publishers/ consumers to share, access and download data from the network in real-time or as needed.

There are four key features of the Chordant Data Exchange/Marketplace solution:

1. **Standardized-cloud based system**
   The exchange is a standardized cloud-based system that supports real-time data using the oneM2M standard. Standardization minimizes single vendor 'lock-in' problems as any organization that develops products and solutions based on the open IoT standard can interact with the exchange to discover data resources.

2. **Open source platform**
   The exchange supports open source licensing either through Open Government License (OGL), Creative Commons (CC) or other licensing approaches. This allows data publishers to license raw data only for third-party use and not for further sharing.

3. **Flexible, Pay-as-you-grow pricing model**
   A commercial module within the exchange provides data publishers with tools necessary to determine the optimal selling/buying data charges. It also includes a framework that publishes pricing information and tracks consumption patterns for billing and revenue allocation purpose.

4. **Existing and future data integration**
   The exchange can integrate data from legacy and greenfield systems to preserve important historical data with scaling-up flexibility to integrate future data additions.

An important aspect of data exchange is security because the exchange hosts several stakeholders: third-party companies, data suppliers and data consumers. Chordant's solution achieves data security by ensuring data is always encrypted and hosted in the cloud. There is also strict permission control via Identity and Access Management which allows users to share only the data they want, with whom they want. Other security solutions include API Management and Secure Key Infrastructure to verify endpoint identity.

Analysis

Attractive technology with high potential in smart city projects

Data exchange breaks down data silos between organizations simply by providing a marketplace environment that allows data publishers to easily publish data. With typical IoT platforms, organizations leverage the data collected from assets only for specific uses. However, realizing the true benefits of IoT means extending the data usage to auxiliary businesses which is only possible if there is a unified access to data from multiple sources.

Data exchange enables data integration from multiple sources, thus addressing the fundamental problem of data fragmentation between organizations, with additional benefits:

- Data is more accessible within an organization and with third-party partners.
- Full control of data, including the way the data is shared, with which partners and under what licensing conditions.
- Opens new revenue possibilities.
- Fosters technology innovation by lowering the entry barriers for application developers, data analytics companies and data-asset brokers.

Data exchange is particularly relevant for smart cities, given the desire for integrating multiple data sources (including IoT, social media and traditional enterprise systems data) as part of a smart city project. This is evident through some of the major efforts regarding data exchange that are currently underway:

- **FIWARE:** FIWARE provides for context information management, standard application programming interfaces (APIs), and harmonized data models to enable automation of processes across value chains for the creation of marketplaces of portable and interoperable data solutions. The Foundation announced that 75 cities in Europe and Latin America were using FIWARE as of November 2015.

- **ETSI Group Specification CIM 004:** The European Technical Standards Institute introduced its specification concerning Context Information Management in April 2018. The specification defines a simple way to exchange data based on contextual factors such as source, meaning, and licensing rights. ETSI views this specification as a complement to the oneM2M speciation—whereas oneM2M focuses on standardizing the link between sensors and the data storage system, ETSI CIM 004 addresses the management and exchange of data between systems.

- **International Data Spaces Association (IDSA**): The IDSA builds on the "Industrial Data Spaces" initiative started at the Fraunhofer research institute in 2014. Basically, it provides a basis for creating and using smart services and innovative business processes, while at the same time ensuring digital sovereignty of data owners. Roughly 100 companies are currently involved in the IDSA.

As a result, the smart city market has become one of the most attractive IoT vertical markets. Many vendors are entering the market to take advantage of this opportunity. Chordant platform joins the likes of Cisco's Kinetic for Cities, Microsoft's CityNext, Huawei's OceanConnect, Nokia's Impact, NVIDIA's Metropolis, Verizon's NetSense (Sensity), IBM's Watson IoT, SAP's Leonardo and Amazon's AWS IoT platform with its offering. However, the Chordant platform is one of the very few today enables public and private data sharing and monetizing, while also being the full IoT platform behind the solution.

In the next few years, the smart city market is expected to grow strongly with data exchanges/marketplaces contributing to this growth. IHS Markit estimates that overall shipments of connectable smart city devices globally in 2018 at approximately 431 million units, growing to about 862 million units in 2022. While, the installed base of IoT devices using data exchanges/marketplaces is estimated at approximately 56 million units in 2018 and set to grow to about 472 million in 2022, equivalent to CAGR of 69.7%. It is evident that this solution will play a key role in the smart city market growth as vendors look to differentiate themselves in the crowded and highly competitive market.

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