Vendor Profile

Oracle: Putting the Business Process First in IoT

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IDC OPINION

As organizations around the world embark on digital transformation (DX) projects, one of the most valuable assets they have at their disposal is data. The Internet of Things (IoT) can be one of the richest sources of this data, providing information on the current state of almost anything that can emit a signal. Organizations can then apply analytical tools to these signals so they know when a given reading (or set of readings occurring together) should trigger a response. While these responses may require human interaction today, the goal for many IoT projects, especially in the industrial realm, is to move more toward automation over time. In addition:

- Enterprise IoT projects consist of hardware, software, some form of connectivity and, most often, a services provider that can help tie the piece parts of these solutions together. The enterprise IoT software market consists of platforms to help companies gather, store data from, and communicate with disparate IoT endpoints in a secure way; analytics to make sense of the data; and applications that allow organizations to visualize and take action on the insights gleaned from the data. The enterprise IoT software market attracts vendors from both the information technology (IT) and operations technology (OT) world.

- As a key provider of enterprise application and infrastructure technology, Oracle is well positioned to play in the enterprise IoT market. The company offers a suite of configurable applications that span a variety of IoT use cases, including asset management, connected logistics, worker safety, work order tracking, and remote diagnostics. These IoT applications are supported by foundational IoT platform capabilities that span both the edge and cloud, as well as other technologies in the broader Oracle portfolio, including data science, networking, security, and the core applications business.

IN THIS VENDOR PROFILE

This IDC Vendor Profile provides analysis of Oracle's Internet of Things (IoT) strategy.

SITUATION OVERVIEW

Company Overview

Based in Redwood City, California, Oracle is a global provider of enterprise software. Oracle is currently led by CEO Safra Catz and cofounder and CTO Larry Ellison; fiscal year 2019 revenue totaled $39.5 billion. Oracle broadly splits its product offerings into two buckets: infrastructure software and application software. The infrastructure bucket includes all non-application software, including data management, analytics, and application development. The application bucket includes a variety of enterprise applications, including ERP, HCM, SCM, sales, service, and marketing. Offerings in the IoT portfolio span both infrastructure software and application software.

Company Strategy

Oracle has stated its mission is to help people see data in new ways, discover insights, and unlock endless possibilities. IoT serves as a key enabler of this strategy by providing new kinds of data from which organizations can glean these insights. In the early days of IoT, many software vendors took a horizontal, technology-first orientation to IoT. While the market has evolved more recently toward use case-oriented messaging, Oracle's strategy for several years now has been to try to understand the key uses cases where IoT offers business value for customers, and the company works from the enterprise applications out to the devices at the edge to ensure its IoT product portfolio meets those needs. This approach has led the company to take a more application/solution orientation to the IoT market versus a platform orientation. However, it is important to note that Oracle's solutions do offer foundational IoT platform capabilities, although the company's go-to-market approach is to lead with the domain-specific IoT solutions instead of the foundation.

IoT Products

Oracle's IoT architecture consists of four main components:

- **IoT Foundation**: The IoT Foundation is the core "IoT platform" component of Oracle's IoT offerings. It offers connectivity to devices, management of time series data, streaming analytics, machine learning tools, and application integration.

- **Oracle IoT Edge**: Customers can gather edge data and send it to the Oracle IoT Cloud via an SDK for devices, via gateway software, or cloud-based IoT connectors that can do protocol translation and then send messages to the cloud service. Oracle also offers special gateway software to connect to OPC UA servers or OSIsoft PI System servers. Oracle's Exadata database now supports time series data, making it a viable option for companies that want to store and process data on the edge.

- **IoT Insights and Intelligence**: These are a series of modules that can be used across the application templates that are described in the next bullet. They include digital twin modelling, anomaly detection, predictive/prescriptive analytic tools, and intelligent workflows.

- **IoT Cloud Applications**: Oracle focuses on five key areas for its IoT Cloud Applications: assets, manufacturing, logistics, connected worker, and connected products. It offers the following application templates for each area:
    - **Assets:** Asset Performance, Predictive Maintenance
    - **Manufacturing:** Smart Factory, Work Order Tracking
    - **Logistics:** Connected Logistics, Intelligent Warehouse
    - **Worker:** Worker Safety, Worker Productivity
    - **Products:** Remote Diagnostics, Product as a Service

Aside from the products that sit specifically within the IoT business, products in Oracle's broader technology portfolio also support the IoT strategy. These include:

- **Endpoint authentication:** Oracle's Java Card technology provides a secured environment for applications that run on smart cards and other trusted devices with limited memory and processing capabilities. Oracle says that, when Java Card is used within connected devices, it can enable access to 5G or NB-IoT networks and offer strong authentication for the IoT cloud.

- **Networks:** Oracle SD-WAN solutions offer increased network capacity, improved traffic reliability, and a higher quality of experience for IoT applications than traditional wide area networks may allow for. Oracle Cloud FastConnect offers an alternative to using the public internet to connect a customer's network to the Oracle IoT Cloud. The company says FastConnect offers higher-bandwidth options and a more reliable and consistent networking experience than the alternative.

- **Applications**: Oracle offers both horizontal and vertical industry applications that can benefit from IoT data. These include Oracle Fusion Applications, a suite of ERP-oriented enterprise applications; Oracle Health Sciences, which provide pharmaceutical, biotechnology, medical device, and healthcare organizations with products that optimize clinical research and development, improve patient outcomes, and accelerate value-based care; and Oracle Hospitality, which delivers integrated technology solutions for hotel property management, casino and gaming, cruises, sales, and events.

FUTURE OUTLOOK

IoT as an Enabler of Digital Transformation

In IDC's 2019 *Worldwide IoT Decision Maker Survey,* 85.4% respondents said they had budget allocated for an IoT project in 2019. While the exact project type may vary from customer to customer, organizations generally adopt IoT strategies to gain operational efficiencies, create better customer experiences, and/or offer new products and services. Increasingly, we find IoT projects are linked to broader digital transformation projects. And this is a good thing, as this tie to strategic organizational goals leads to better funding and support of the IoT project.

While digital transformation can serve as a catalyst to move IoT projects forward, the actual projects themselves can be complex and time-consuming. Often, there are both technical and organizational issues organizations have to contend with as a result of these initiatives. For example, IoT projects in manufacturing settings typically push machine data that only used to live within an operational technology environment into information technology systems. While an operations executive might have been the sole keeper of that data in the past, responsibility for some aspects of that data is now shared with information technology leadership. These two teams must now learn how to work together to create a common data governance plan that will help them jointly achieve the digital transformation goals of the company, even though they may have been measured by completely different KPIs in the past. There are many technology challenges to work through as well, including how to get data from non-IP-enabled machines and building out the right data architecture to provide real-time, actionable insights from IoT data and security, as new vulnerabilities can arise as data gets passed back and forth between OT and IT systems.

Oracle's Approach to Meeting IoT Market Needs

Where there is a challenge, there is opportunity, and Oracle, like many other enterprise software companies, is exploring how it can best help customers be successful on their digital transformation journeys. These digital transformation journeys require customers to first get access to their data, then analyze the data, and then integrate that data with business processes so that it can truly have business value.

We see Oracle's IoT strategy supporting these concepts. Analytics are an important focus area for Oracle, and the IoT business takes full advantage of the capabilities being developed across the company to support trend detection and anomaly detection and make recommendations and predictions. These analytics are supported by Oracle's AutoML (Automated Machine Learning) engine, which provides built-in models for anomaly detection, prediction and forecasting, recommendations, and segmentation. Customers can also surface their own internal models within AutoML using the Predictive Model Markup Language (PMML).

Edge represents another area of investment. While the company has been on a path to bring its customers to the cloud for many years, it now also supports edge computing with the Oracle IoT Edge software outlined previously. An important component of the edge strategy is supporting analytics on the edge. As mentioned, Oracle's Exadata database now supports time series data, making it a viable option for companies that want to store and process data on the edge. In addition, the company supports the ability to push analytics to the edge using declarative tools, allowing nontechnical users to administer changes as necessary. These over-the-air updates to the edge are done via a centralized policy engine instead of requiring an agent on each client device. Updates may be made to analytic models, business rules/events, and security and communication policies.

Another area related to edge and analytics where Oracle is making investments is in the area of digital twins. Digital twins are virtual representations of physical things; these are enabled by IoT as it is often sensor data that is providing the bits and bytes of the virtual representation. But viewing a digital twin in a vacuum can only provide you with the current state of the thing. It does not give you any information on the current set of circumstances in which that thing is operating and how that set of circumstances may be impacting how the thing is operating. For this reason, context is an important concept within the world of digital twins. Oracle provides digital twin templates that provide a set of contextual elements that are appropriate for a given thing type. For instance, for an asset that lives outside, temperature may be an important point of context. Digital twin templates offered include asset, factory, work order, shipment, facility, vehicle, worker, and product.

As the IoT market matures, Oracle is seeing the need for more complex solutions than customers have asked for in the past. For instance, instead of just tracking the location of a vehicle, customers may want to track both the vehicle and the conditions of the shipments inside of the vehicle. To respond to this need, the company offers an application workbench that allows customers to create their own custom IoT solutions and application workflows that may be mashups of functionality from different existing Oracle IoT apps or a combination of Oracle apps and third-party widgets as required. This flexibility will become increasingly important to ensuring early IoT investments can scale over time.

Competitive Environment and Ecosystem

Overall, Oracle has a solid portfolio of technology assets to bring to the table for the IoT space. As an enterprise applications provider, it is also deeply involved in some of the key business processes that can be transformed by IoT, like supply chain management. However, whenever a large market opportunity like IoT presents itself, the competition will be fierce.

Oracle has a variety of competitors in the IoT platform and application market. Most directly, it has its traditional competition in the enterprise applications space, like SAP, IBM, and Infor. Like Oracle, these companies also have IoT strategies that span platform capabilities, analytics, and applications. In use cases that involve industrial assets, the company may also be competing with industrial companies such as GE Digital, Siemens, Schneider Electric, Rockwell Automation-PTC, and Hitachi. They may also be competing against hyperscale cloud companies, when organizations choose to build or buy the IoT platform components from these companies. Microsoft also has its own ERP suite within its Dynamics portfolio.

The edge represents another facet of the competitive landscape in IoT. While much of the battleground for the edge is infrastructure centric in nature, the hardware choices customers make can also impact their software strategy. For instance, if a customer decides to standardize on a cloud provider's edge hardware, that piece of hardware will likely come preloaded with software that makes it easier to push the IoT data into their own cloud, versus pushing the IoT data into the ERP vendors' cloud. Of course,

an integration can still be done on the back end to integrate the IoT data with the ERP system, if the customer so chooses, but it might not be the most elegant way to do it. Similarly, much of the edge hardware already existing in an industrial environment will come from industrial companies, and as mentioned previously, many of these companies also offer platforms so that IoT data can flow from their equipment into their own IoT clouds.

So, while it may make a lot of sense for organizations to create straight integration paths between IoT data and ERP systems for certain use cases, the other technology they already have in their environments, as well as the decisions they are making about future technology, will impact how they decide to do that integration. In IDC's opinion, this reality suggests that Oracle should look to develop strong technology partnerships with companies that are at the forefront of these edge-oriented conversations — hardware providers, industrial companies, and other IT software companies. IoT continues to be an ecosystem play and requires companies that have never worked together before to think of creative ways they can come together for the best customer outcomes.

ESSENTIAL GUIDANCE

Advice for Oracle

- Invest in a few strategic alliances with companies that can help bolster the edge strategy.
- While Oracle's IoT go to market is use case oriented, ensure that the important role of IoT in enabling the broader corporate vision is also told.
- Continue to educate the market about the importance of context within digital twins; partnership opportunities with industrial or engineering companies will also be beneficial here.
- Provide more clarity on the strategy for customers with multicloud requirements.

LEARN MORE

Related Research

- *IDC Market Glance: IoT Platforms and Analytics, 1Q20* (IDC #US45859120, March 2020)
- *The Evolution of the IoT Platform Market* (IDC #US46043519, February 2020)
- *Five Key Trends in the IoT Platforms and Analytics Market* (IDC #US45977320, February 2020)
- *Evaluating Strategic Options for Asset Performance Management* (IDC #US45649219, November 2019)
- *Worldwide Internet of Things Software Platform Forecast, 2019-2023* (IDC #US43880319, September 2019)
- *IDC Market Glance: Internet of Things Applications, 3Q19* (IDC #US45457419, August 2019)

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