

JD Edwards EnterpriseOne Integration Platform

The Right Tools for the Job

ORACLE WHITE PAPER | JANUARY 2015





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Introduction

Most businesses today deal with the reality of using multiple technologies and applications across their enterprises. They find themselves in this situation for multiple reasons ranging from technology choices to business needs to legacy systems inherited from mergers or acquisitions. To enable companies to derive business value from its technology investments, it is critical for this diverse ecosystem of applications and technology to enable unimpeded process flows and sharing of information. Even companies that primarily rely on a single ERP system still typically use at least some additional applications to address specific business needs that their ERP implementation does not meet. Companies also want to have the ability to take advantage of the newest technology to take their business into the future.

Regardless of the specific driver, in this business environment, integration becomes a key focus for designing flexible business systems that support not only current enterprise requirements, but are capable of supporting the strategic objectives of an agile enterprise into the future. To make well-founded implementation or upgrade choices, it is therefore important to evaluate not only the functional capabilities of any given system, but also the available integration platform and the level of complexity of interfaces.

The purpose of this white paper is to provide an overview of the integration platform available through Oracle's JD Edwards EnterpriseOne and to explain the value proposition for customers who choose Oracle's JD Edwards to meet their business technology needs. There is no "one-size-fits-all" approach to integrations. JD Edwards supports a wide variety of standards-based integration techniques from simple point-to-point integrations using import and export tables to sophisticated real-time approaches using Service-Oriented Architecture (SOA) and modern lightweight standards and protocols supporting mobile applications and the Internet of Things.

Depending on the company's business requirements, some or all of the following integration options and methodologies can be an integral part of the total solution:

- » JD Edwards's seamless delivered ERP business process
- » JD Edwards Integration Platform: Business interfaces, modern architecture, mobile applications, and the Internet of Things
- » Delivered Business Interfaces delivered as starter kits
- » Starter Kit integration to Oracle Cloud Solutions

JD Edwards Integration Platform Overview

Integration of applications and business processes across the enterprise is a fact of life for most ERP implementations. JD Edwards's customers have the flexibility to select among various solution options and their application footprint could contain some or all of the elements as shown here:

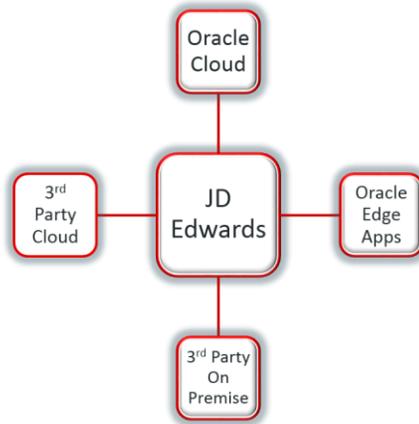


Figure 1. Generic business and IT configuration with integrations

A fundamental part of the JD Edwards value proposition for integration is the fact that, as part of Oracle, JD Edwards offers many best-in-class and industry-leading solutions our customers can leverage when and where needed and still get the benefits of a single source vendor. JD Edwards integration capabilities, however, are not limited to Oracle solutions: If customers need an application from outside the Oracle family, JD Edwards makes it easy to bring other products into the mix: An array of tools and technologies are available to achieve integrations in a way that fits the specific need based on the premise that a single approach simply cannot accomplish every integration task. While the idea of multiple integration methods might seem daunting, the JD Edwards value proposition is that the different integration options are well-supported by JD Edwards and allow customers to use the right integration tool for each integration project, ultimately giving customers choices for how to best meet each integration project's unique requirements.

JD Edwards EnterpriseOne architecture enables us to stay abreast of quickly develop new integration technologies. A separate tools layer that is used for system administration and extensibility enables the adaptation to continually advancing technology and evolving IT platforms. This capability has effectively supported the deployment of EnterpriseOne applications on mobile devices and also enables JD Edwards to offer rich ERP functionality while simultaneously delivering on the benefits of evolving integration technologies.

A critical part of the integration development process is to consider a number of integration criteria and make the decisions that are appropriate to a given business scenario. For example, the integration choices may be driven by the question whether data availability and processing should occur in real time or near real time, or whether batch processing is sufficient. In addition to the time factor, the business analysis supporting an integration needs to consider issues, such as number of touch points, shared standards across the systems that need to be integrated, data complexity, reuse, deployment of mobile applications, use of composite applications, security, and duration of integration need. To meet business needs and balance demand on infrastructure with IT cost, each connection needs to be evaluated for these criteria to create a smart integration plan. JD Edwards offers an array of integration approaches providing choices that makes sense for different integration projects.



JD Edwards builds and delivers integrations to selected Oracle products (cloud and on premise) and even 3rd party solutions. We do this in a pragmatic way which recognizes that business process requirements vary from customer to customer. We thus identify the most common business process flows and data sharing needs, and develop integration solutions to address those. In this way JD Edwards provides a significant benefit in delivered integrations, and customers can then extend the JD Edwards delivered integration solution to address their unique requirements, selecting the right JD Edwards provided integration technology.

JD Edwards EnterpriseOne – Seamless Delivered ERP Business Process

Oracle's JD Edwards EnterpriseOne is an integrated applications suite of comprehensive enterprise resource planning software that combines business value, standards-based technology, and deep industry functionality into a business solution with a low total cost of ownership.

While JD Edwards enables customers to take advantage of a wide range of best-of-breed Oracle and third-party technology and applications, JD Edwards's modules provide the benefits of tight integration with each other. End-to-end business processes and transactions typically require more than one JD Edwards EnterpriseOne module to complete. Using JD Edwards's modules, such as Financials, Manufacturing, Distribution, Asset Management, Project Costing, Inventory Management CRM, HCM, these business processes are supported by an unimpeded flow of data from one module to the next. Each JD Edwards module is completely integrated with the other modules that are needed to manage a business process from beginning to end. There are over 80 JD Edwards Modules and thousands of application touch-points and process flows that are designed to work seamlessly across the modules. Oracle's continued support for the JD Edwards product lines underscores the continued business value of an integrated comprehensive application system. Our customers benefit from more than 40 years of ERP industry and functional maturity and experience dramatic cost savings by leveraging a broad JD Edwards integrated footprint rather than having to integrate many disparate system. The total cost of ownership over time will also be significantly less because with a JD Edwards EnterpriseOne implementation, customers do not have to bear the ongoing cost associated with supporting multiple platforms, tools, technologies that inevitably come with disparate systems.

This example shows how JD Edwards EnterpriseOne modules work together to support the Rental Management business process flow:

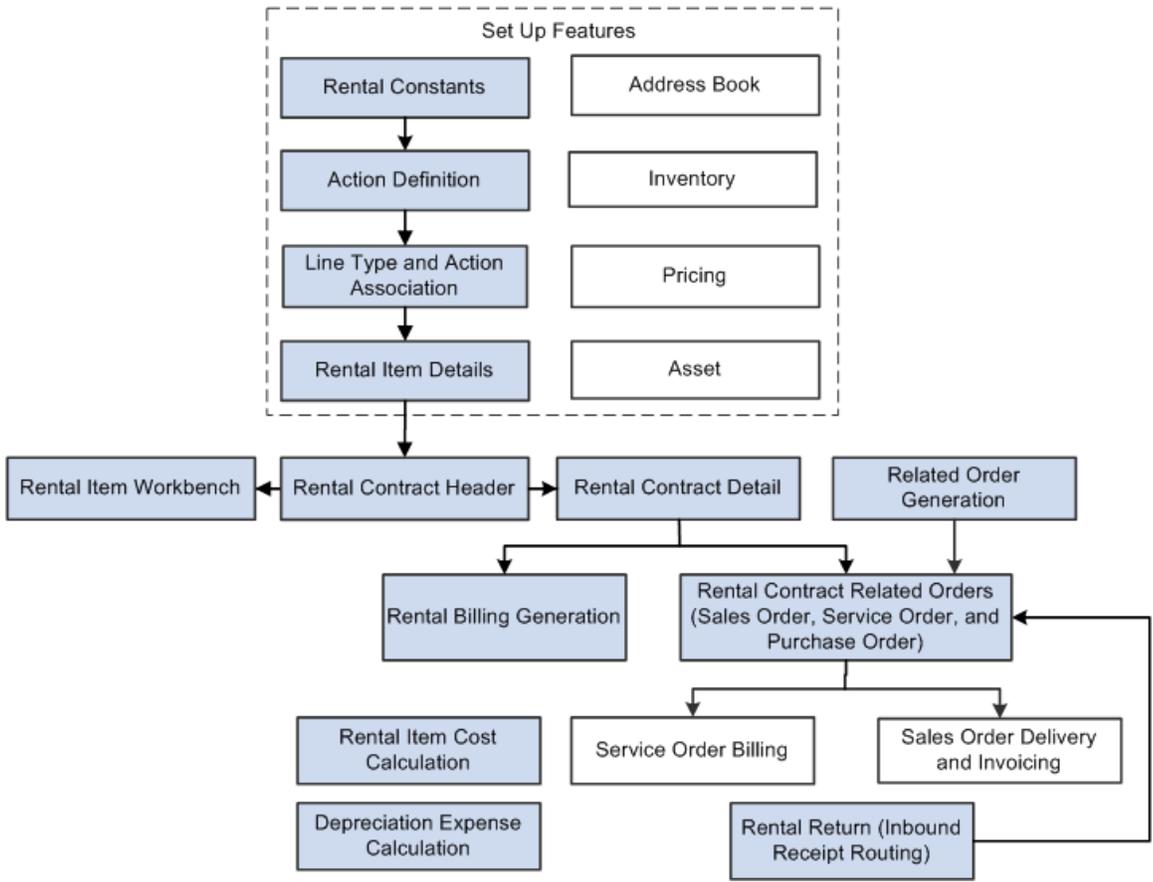


Figure 1. JD Edwards EnterpriseOne process flow example – Rental Management

This comprehensive JD Edwards suite also supports the deployment and integration of numerous mobile applications. The mobile integrations are enabled through lightweight modern standards and protocols and will be discussed later in this paper.

The tight integration illustrated above applies to all JD Edwards's applications and modules. JD Edwards EnterpriseOne application guides contain detailed information about the seamless integrations that connect JD Edwards ERP applications with each other. The extensive core ERP integrations of JD Edwards's software, in turn, support successful integrations with other Oracle or third-party integrations by offering mature and robust functionality for processing incoming data and transactions and for exporting information to other applications.

JD Edwards Integration Framework

Service-Oriented Architecture

While JD Edwards EnterpriseOne at its core is a tightly integrated comprehensive ERP and industry solutions, JD Edwards embraced the philosophy of Service-Oriented Architecture (SOA) early to identify efficient methods for integrating JD Edwards's core ERP solutions with other solutions that customers need to meet their business requirements. JD Edwards has built an extensive repertoire of integration methods based on SOA:



The JD Edwards SOA-based integrations consist of a broad set of tools for building application integrations. These tools enable customers to build integrations or business interfaces as needed.

- » Business Services
- » Real-Time Events
- » Oracle SOA Suite

Business Services

Business services are standards-based web services that enable interoperability between JD Edwards EnterpriseOne and other Oracle applications or third-party applications and systems. They are a set of self-contained, stateless business functions that accept one or more requests and returns one or more responses through a well-defined, standards based interface. These services perform discrete units of work such as editing and processing a transaction. Examples are transactions, such as price look-up or adding an order. Business services enable software applications that are written in various programming languages and running on various platforms to exchange information in real time. In JD Edwards EnterpriseOne, published business services are exposed to consumers as web services. A web service is a standardized way of integrating web-based applications. These web services enable JD Edwards EnterpriseOne to expose native transactions to other applications and systems. To date, JD Edwards has delivered more than 150 business services.

Real Time Events

A real-time event (RTE) is a standards-based business event, for example a notification to a third-party system that a business transaction has occurred in the JD Edwards EnterpriseOne system. Third-party systems can subscribe to the JD Edwards EnterpriseOne system to receive notification when a specific transaction occurs. You can use any JD Edwards EnterpriseOne interface, such as HTML, WIN32, and terminal servers to generate real-time events. Real-time events can be used for both synchronous and asynchronous processing.

A XAPI event is similar to a real-time event in that an outbound notification is sent to subscribers when a specified transaction occurs in the JD Edwards EnterpriseOne system. The difference between a real-time event and a XAPI event is that the subscriber to a XAPI event returns a reply to the originator. XAPI events use the same infrastructure as real-time events. XAPI events also provide a way for two different JD Edwards EnterpriseOne systems to communicate with each other.

JD Edwards provides dozens of real-time events.

Oracle SOA Suite

The JD Edwards EnterpriseOne integration framework is supported by the Oracle SOA Suite. This suite delivers the following tools provide simplifications when organizations have many complex integrations scenarios to manage:

- » Oracle BPEL Process Manager – Enables enterprises to orchestrate disparate applications and web services into business processes. The ability to quickly build and deploy these processes in a standards-based manner delivers critical functionality for developing a service-oriented architecture.
- » Oracle Service Bus – A proven, lightweight and scalable SOA integration platform that delivers low-cost, standards-based integration for high-volume, mission critical SOA environments. It is designed to connect, mediate, and manage interactions between heterogeneous services, legacy applications, packaged applications and multiple enterprise service bus (ESB) instances across an enterprise-wide service network.

The Oracle SOA Suite support real-time and near real-time integrations.

Integration through JD Edwards Business Interfaces

JD Edwards has already delivered and continues to deliver business interfaces, such as business services, real-time events, and batch and EDI processes. These interfaces are delivered with the JD Edwards EnterpriseOne product

or they can be created or customer-specific use cases. Business interfaces provide the JD Edwards side of the integration; they remove complexity and promote reusability.

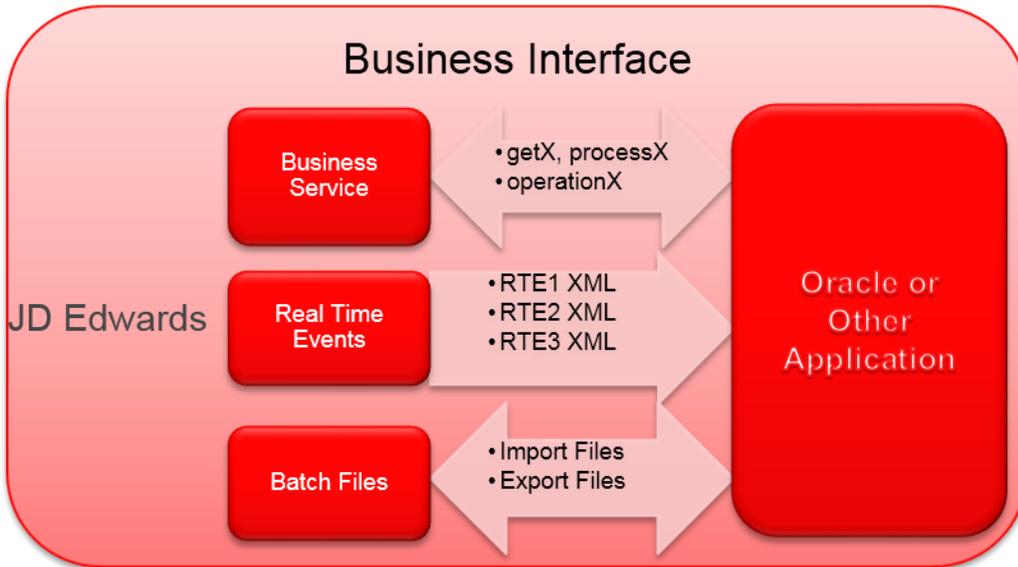


Figure 2. Schema for JD Edwards Business Interfaces

To aid customers in leveraging the JD Edwards business interfaces, JD Edwards has also delivered product collateral, for example the JD Edwards EnterpriseOne Applications Business Interfaces Implementation Guide, which lists all business interface components by Business Object, as well as the Technical Catalog. The Technical Catalog provides information, such as input and output mappings and flow diagrams for business services, flow diagram and data structure details for real-time events, and import/export table specifications and XML schema for batch import and export.

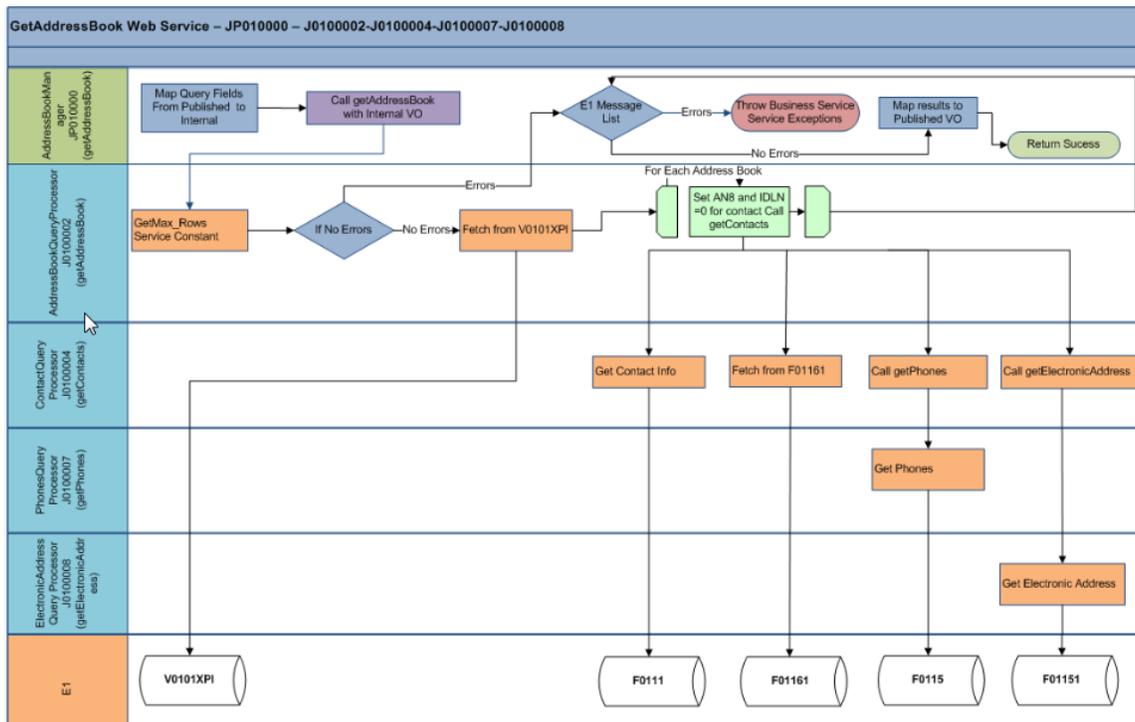


Figure 3. Business Interface example from the Technical Catalog.

JD Edwards also provides business interfaces for pre-built integrations. Examples are business services for mobile applications, Order Promising, or RateWare integration. While these business services were built for a specific solution, they can be used like any other business service to meet the specific needs of an organization.

Delivered Product Integrations Using Starter Kits

Part of the JD Edwards integration strategy is to provide pre-built integration with other Oracle products that complement JD Edward core products. In addition to integrations with Oracle products, JD Edwards also provides integrations with several third-party products.

Some of these integrations, for example with Oracle's Hyperion or with Vertex are fully productized and others are integration starter kits. The following table lists some of the currently available product integrations.

Application	Integration
Value Chain Planning	Supply Chain Planning and Execution
OBIA	E1 FMS Adapter
OBIA	E1 Supply Chain/Order Management Adapter
Hyperion	E1 – Hyperion Adapter
OTM	Transportation Management
RSS	Enable Punch Out to E-Commerce Sites
Vertex	Vertex Sales & Use Tax, Payroll

In addition to the third-party integrations listed in this table, Oracle offers the Oracle Validated Integrations program. This program connects customers with partners who offer integrations that have been tested and validated as functionally and technically sound and are integrated with Oracle applications in a reliable and standardized manner.

Modern Web Services and Mobile Application Development

The advent of enterprise mobility has opened the door for JD Edwards to develop another type of integration by delivering JD Edwards EnterpriseOne functionality on mobile devices. JD Edwards EnterpriseOne mobile applications have a truly native device look and feel and have access to all device capabilities. To date, JD Edwards has released more than 80 mobile applications.

While business services remain a key part of JD Edwards's integration strategy, for mobile applications JD Edwards has been moving forward using the most modern standards and protocols - JSON over REST - simplifying significantly the development of web services.

The mobile applications use the Application Interface Services (AIS) Server running alongside the JDE JAS server for the web-browser client to expose (or silently launch) JD Edwards applications as a REST web service. The integration of mobile applications with Enterprise web applications leverages a light, fit for purpose interface to access and manage EnterpriseOne data from mobile devices. The Application Interface Services (AIS) Server provides a JSON over REST interface to EnterpriseOne applications through the EnterpriseOne HTML Server. The AIS Server exposes this interface to enable communication between mobile applications and EnterpriseOne.

The following illustration shows how the AIS Server functions as the interface between mobile applications and the EnterpriseOne HTML Server:

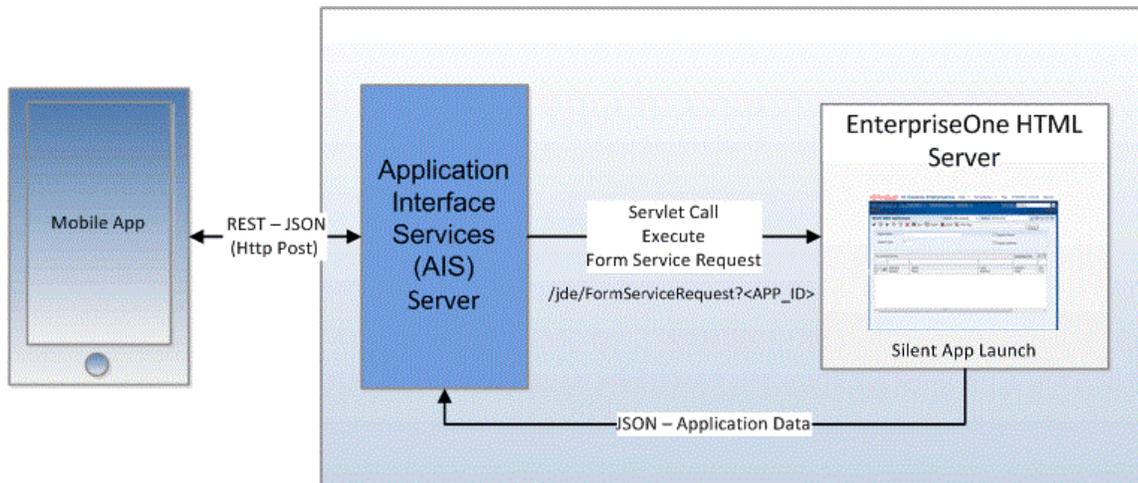


Figure 4. AIS Server for Mobile Integrations

Because the AIS Server simplifies the development process by eliminating the need for new business service development, it can be used to deliver mobile applications quickly and to support mobile development efforts by partners and customers.

To help customers take advantage of this technology, JD Edwards has released the JD Edwards EnterpriseOne Mobile Framework which is a toolset that works with Oracle Mobile Application Framework to make it easier for developers to create new mobile applications that integrate with JD Edwards EnterpriseOne through Application Integration Services (AIS). The framework can also be used to extend existing JD Edwards EnterpriseOne Mobile

Enterprise Applications. Using JSON over REST also enables the integration of mobile applications that were developed using other tools.

On-Demand (“On the Glass”) Integrations

Integrations can be achieved not only within the technology layer as discussed above, but also at the end user level. EnterpriseOne Pages and the Composite Application Framework (CAFÉOne) enable users to personalize their workspace in various ways including integrations to external applications.

CAFÉOne is a user interface framework that enables users to work with content from multiple sources within a single browser window. For example, EnterpriseOne pages allow users to embed external website content via parameterized URLs. The Composite Application Framework enables authorized users to embed external website page content, as well as multiple EnterpriseOne forms, and Oracle Business Intelligence Enterprise Edition (OBIEE) objects directly into a defined EnterpriseOne application form. Once an “on the glass” integration is defined, it can easily be shared with others in the organization.

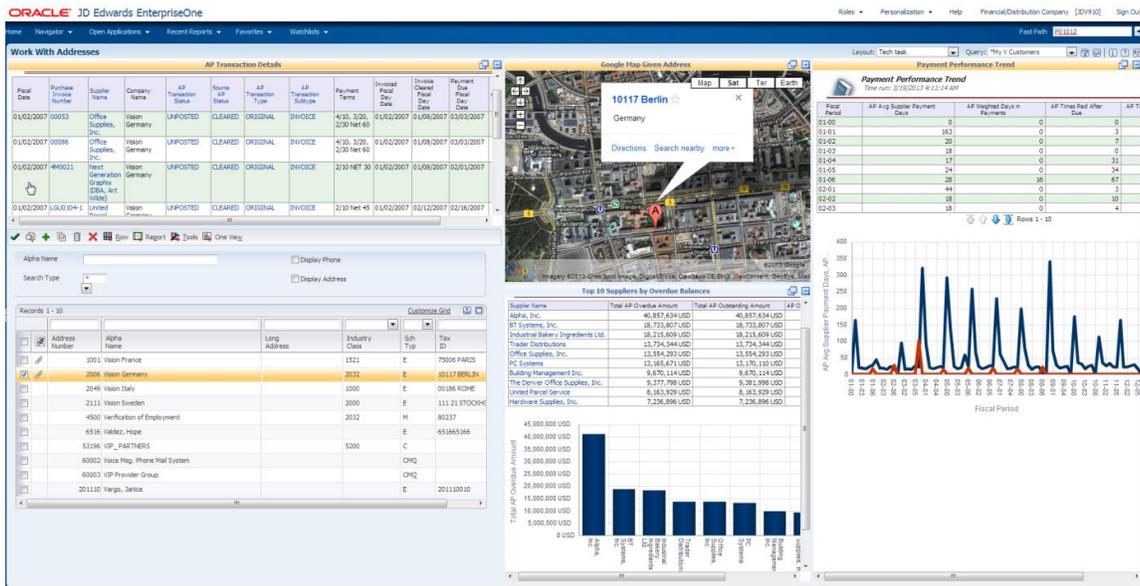


Figure 5. Example of personalized workspace based on the Composite Application Framework

JD Edwards’s Modern Architecture and the Internet of Things

Easily the most exciting development in enterprise technology today is the Internet of Things (IoT). The enormous potential of machine-to-machine communications for the purpose of solving hitherto intractable business that cost businesses millions of dollars are widely recognized. Now, the affordable hardware and infrastructure to support such communications and business solutions are available.

JD Edwards has been working with customers and partners to identify IoT use cases that enable customers to use beacons, sensors, and other devices to gather information and then use JD Edwards EnterpriseOne applications to use the information to solve the business problems. One of the most extensive, but by no means the only, set of use cases where machine-to-machine communications and ERP are capable of powerful collaboration relates to product and asset tracking, a set of capabilities that is relevant to multiple industries, from Agribusiness to Consumer Packaged Goods (CPG) to Natural Resource and Chemicals. Many of these use cases, when implemented, have

the potential of helping customers avoid losses that until now have been difficult to avoid, for example, cost resulting from asset failure that could have been prevented if the data had been available.

JD Edwards is moving quickly to turn such use cases into business reality. Having already adopted modern technology standards, such as REST, JD Edwards software engineering, in collaboration with customers and partners has quickly developed detailed use cases and is defining and developing the architecture needed to connect the data-gathering devices with JD Edwards EnterpriseOne. Once again, the JD Edwards EnterpriseOne core systems offer the seamless, deep industry functionality needed to turn the data coming in from the devices into actionable information, for example through data visualization and analytics.

For example, sensors can be used to monitor complex system to enable the company to optimize asset performance with operational cost using the capabilities of the JD Edwards EnterpriseOne Capital Asset Management and Condition Based Maintenance systems.



Figure 6. Tracking asset usage to optimize operating output

Integration with Oracle Cloud

Oracle is a leader in the Cloud applications market and continues to advance its Cloud offerings. It is worth noting here that this strategy coexists with continuing strong support for on premise solutions. Oracle's Cloud strategy opens up the opportunity for on premise solutions to integrate with cloud solutions, and JD Edwards has already delivered Business Interfaces for Oracle Cloud applications that give customers more choices and extended functionality. As with mobile applications, JD Edwards is at the front of the pack in terms of utilizing Oracle technologies for the benefit of customers. Currently, JD Edwards EnterpriseOne Business Interfaces exist for the following Oracle Cloud applications:

- » Oracle Sales Cloud
- » Oracle Taleo Cloud Service

These Business Interfaces use JD Edwards's business services to enable the integration from the JD Edward side.

Business Interfaces for JD Edwards EnterpriseOne and Oracle Sales Cloud

The Business Interfaces for Oracle Sales Cloud provide multiple benefits. It brings together the sales force automation of the Sales Cloud with the power of JD Edwards EnterpriseOne backend functionality. On the Sales Cloud side, the user can manage customers, leads and opportunities, territories and forecasting through business interfaces with Oracle Marketing, CPQ, and Service Cloud. JD Edwards EnterpriseOne contributes supply chain management, order orchestration, and financials to support order fulfillment, payments, and other backend processes.

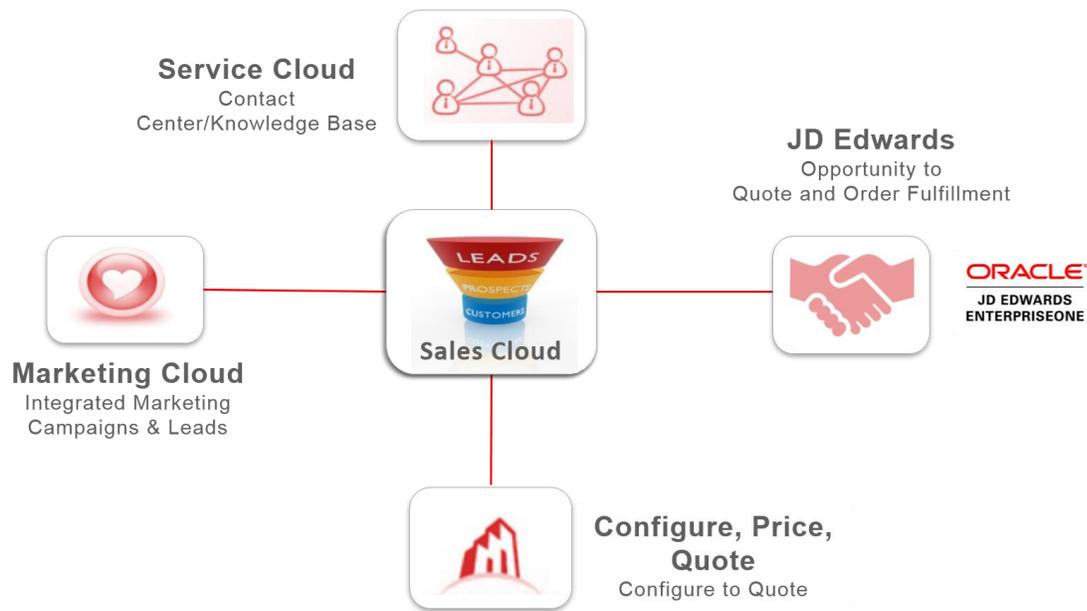


Figure 7. Oracle Sales Cloud and JD Edwards EnterpriseOne.

Using JD Edwards Business Interfaces represents a win-win for customers wishing to take advantage of both Oracle Cloud and JD Edwards EnterpriseOne capabilities. JD Edwards provides Integration Accelerators in the form of Business Interfaces, extensive supporting content, such as integration process flow and use cases, configuration information for both EnterpriseOne and Sales Cloud, entity mapping and program logic, as well as Business Interface components and run-time services.

Integrating JD Edwards EnterpriseOne and Oracle Taleo Cloud Service

The Business Interfaces for JD EnterpriseOne and the Oracle Taleo Cloud Service use web services for HCM data to manage the flow of information for a requisition-to-hire business process. The Business Interfaces support recruiting activities such as job postings, applicant sourcing and ranking, interview coordination and the offer process are managed through Oracle Taleo Cloud Service, whereas JD Edwards EnterpriseOne is the system of record for Human Resource functions, such as creation and review of requisitions, candidate hiring, and employee onboarding.



Figure 8. Oracle Taleo Cloud Service and JD Edwards EnterpriseOne

Customers can facilitate data integration using various approaches and methodologies. JD Edwards facilitates the integration by providing stand-alone business interface components and by providing an integration reference model using open standards-based concepts as well as JD Edwards EnterpriseOne Human Resources or Oracle Taleo Cloud Service Cloud Service applications or utilities that could be leveraged.

JD Edwards and Cloud Deployment

As Oracle is aggressively moving forward with its Cloud strategy, JD Edwards has not only stepped up its business interface strategy with Oracle Cloud applications but has also provided companies with the ability to deploy JD Edwards EnterpriseOne in the Cloud. Customers can purchase their own hardware and software and deploy JD Edwards EnterpriseOne in a private cloud hosted on premise. Another option is to purchase hardware and software and then deploy with a third-party cloud hosting provider or with Oracle Managed Cloud Services. Thirdly, customers can opt to purchase the hardware, but then subscribe to JD Edwards software on a per-user-per-month basis. In addition, partners provide SaaS offerings where the partner own the hardware and software and customers pay a monthly subscription fee.

As with all integrations, the decision whether to deploy JD Edwards EnterpriseOne in the Cloud should be driven by business requirements. JD Edwards made its reputation as the most flexible ERP solution suite with the lowest total cost of ownership (TCO). Cloud computing offers the opportunity to set a new industry standard in even lower TCO and higher flexibility.



Conclusion

A diversity of applications and the resulting need to find integration solutions are a fact of life for businesses. Rarely, if ever, can a single solution meet all the needs of organizations, large or small. To address what might otherwise be difficult and often expensive integration development, Oracle's JD Edwards EnterpriseOne provides functionally-rich seamless business process flows across JD Edwards EnterpriseOne modules built on a modern and sophisticated technology, and, as importantly, has made integrations solutions as a key component of its value proposition. JD Edwards provides an array of integration options and approaches ranging from the seamless integrations within JD Edwards EnterpriseOne to the ability to integrate with Oracle Cloud applications and deploying JD Edwards EnterpriseOne in the Cloud. JD Edwards EnterpriseOne technology provides customers with significant flexibility in choosing the right integration option.

An analysis of their own integration requirements and an evaluation of the integration options offered by JD Edwards will show customers that JD Edwards EnterpriseOne integrations are superior, flexible, and adaptable solutions to their business problems. In addition, JD Edwards provides not only technical solutions but also extensive content from reference configurations to documentation to ensure implementation success.

The following resources provide more detailed information on the JD Edwards Integration Platform:

[JD Edwards Product Catalog](#)

[JD Edwards EnterpriseOne on Oracle.com](#)

[JD Edwards EnterpriseOne Documentation](#)

[Pricing and Licensing Information](#)

[Oracle Validated Integrations](#)



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Hardware and Software, Engineered to Work Together

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White Paper Title
January 2015
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