



Oracle Cloud Extensibility Framework: Protect Upgrades, Customize the cloud to fit business specific requirements



PURPOSE STATEMENT

This document provides an overview of features and enhancements included in release 20B. It is intended solely to help you assess the business benefits of upgrading to 20B and to plan your I.T. projects.

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INTRODUCTION

Organizations of every size, in all industries and every major region around the world, are investing heavily in cloud technology to accelerate their growth and increase their competitive advantage. Cloud computing is evolving in an unprecedented growth curve as companies adopt this new technology. Experts across multiple industries believe the trend will only grow more widespread in the coming years. Cloud computing's benefits are multi-faceted. From being the most cost-efficient method to use, maintain and upgrade software to almost unlimited storage and compute capacity with unmatched scalability, cloud computing is technologically superior. In addition, cloud computing also has built-in backup and recovery options, automatic software integration, and enables easy and speedy access to information across the globe.

As organizations consider making these investments in the cloud however, there is considered deliberation in adopting “off-the shelf” cloud software. Each company is proud of its uniqueness and competitive differentiation. And rightly so. If every firm were just like one of its competitors, there would only be a race to the bottom. Differentiation is key to survival, growth and most importantly, profit margins, the very lifeblood of a business. “Am I certain that the cloud software I am about to adopt for my company will still allow me to differentiate?” is one of the most important questions that any CIO goes through as they consider their journey to adopting the cloud. Studies have consistently shown that feature availability runs neck and neck with pricing as the top factor affecting a company's choice of cloud-based software (Figure 1).

Leading factors affecting Software as a Service (SaaS) choice among small-to-medium businesses (SMBs) in the United States in 2015

Main factors affecting choice of cloud business applications for SMBs in U.S. 2015

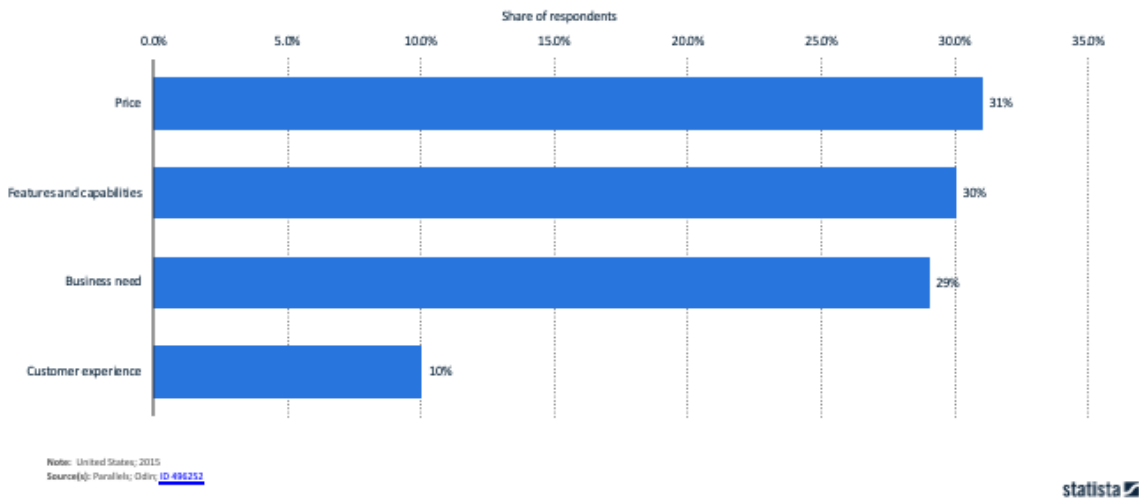


Figure 1. Factors affecting the choice of SaaS applications.

Luckily, there need be no such fear. The sophistication and customization of features offered in Oracle's industry-leading suite of applications means companies can move to the cloud with ease, confident that their unique requirements will be met. Regardless of where organizations may be on their technological cycle, the benefits of quarterly updates to their applications in the Oracle Cloud and the rapid pace of innovation is an overwhelming benefit. For many companies, experience shows that more than 80% of their needs can be met with standard capabilities built into cloud application software. The remaining capabilities, where an organization's desire to differentiate typically occurs, can be solved with the powerful capabilities within the *Oracle Cloud Extensibility Framework*, which can customize everything from the look and feel to exposing application level interfaces that make the transition to the cloud that much easier, while still preserving unique differentiators. Oracle is indeed unique in its integration and extension capabilities – a key reason the world's leading companies have come to rely on Oracle to run their most critical business functions, including Manufacturing, Logistics, Supply Chain Planning and Finance, to name a few. In fact, one of Oracle's customers chose Oracle due a simple fact: “The one size fits all *is* so flexible that it fits.”

We shall drill into more detail and review a few examples of how this is possible with the Oracle Cloud Extensibility Framework, one of the hidden gems of the Oracle Cloud Applications suite enabling companies across multiple industries to customize Oracle's cloud applications to their specific, individualized business needs.

ORACLE CLOUD EXTENSIBILITY FRAMEWORK: WHAT IS IT?

But first, what is the Oracle Cloud Extensibility Framework? Put simply, the Oracle Cloud Extensibility Framework allows greater integration and flexibility to cloud applications within the Oracle Fusion Cloud suite. It allows customizations of everything from role-centric views to mobile application interfaces, to Excel plug-ins, to a more comprehensive custom application that integrates with the core application using web services. The Oracle Cloud Extensibility Framework has truly enabled a “one size fits all” approach to cloud applications for addressing the needs of multiple industries, ranging from Manufacturing, Distribution, Consumer Goods, and Agriculture.

For focus and brevity, we shall dig deeper into the capabilities and provide a few examples of such extensibility in the Oracle Supply Chain Management (SCM) cloud suite. The Oracle Cloud Extensibility Framework enables all cloud interfaces to be exposed directly to customers. The integration framework reduces manual integration development tasks such as:

- Creating physical connections
- Data transformation
- Entity cross-reference or trading partner cross-reference between cloud applications and other external applications
- Routing and orchestration
- Event management

A comprehensive view of currently available features of the Oracle Cloud Extensibility Framework for Oracle SCM applications is shown in Figure 2. In the examples that follow, Oracle Cloud Extensibility Framework has:

1. Enabled deeper analytics, reporting and seamless data export
2. Extended User Interface (UI) customizations and data models
3. Defined detailed behavior of applications with various workflows, rules and option settings
4. Allowed file uploads
5. Created custom web and mobile applications and other services, in addition to or in lieu of using standard ways of interacting with the application

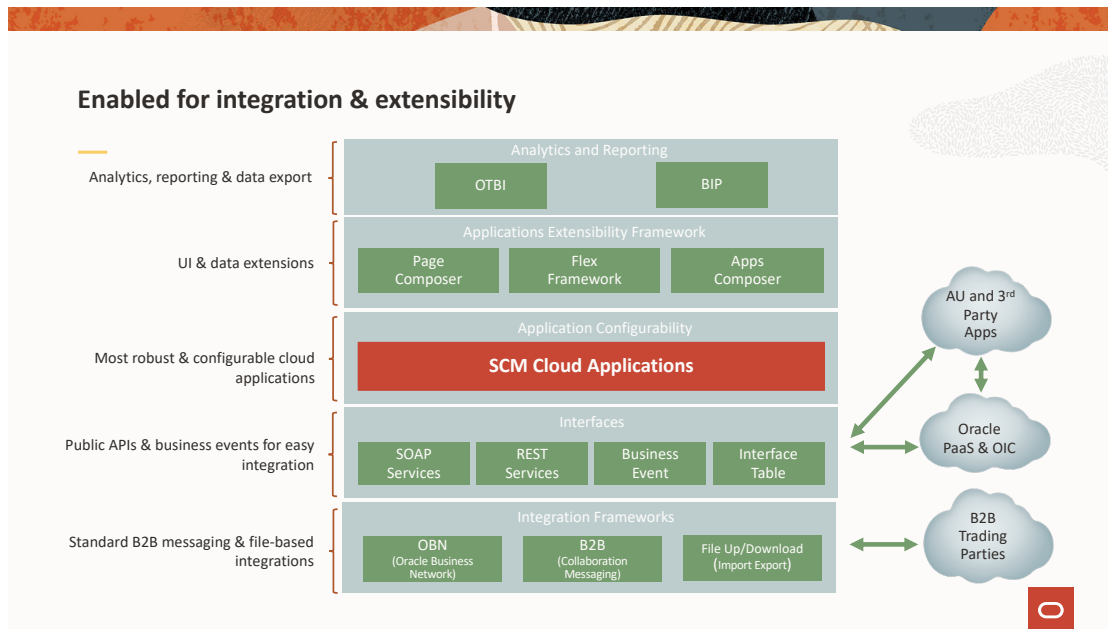


Figure 2. Oracle Cloud Extensibility Framework available in Oracle's Fusion Cloud.

Integrations and Customizations in Oracle's Fusion Cloud Architecture

Oracle Cloud Extensibility Framework works at every level, whether at a high level, in BI Reports, or all the way down the stack to intercompany transactions. They can help tailor the cloud application to suit the needs of every kind of user, providing the flexibility that users need, while still protecting the ability of organizations to seamlessly upgrade and obtain new features as applications and platform services in the cloud are updated on a regular basis by Oracle. Let us take a look at some of these extensions and the flexibility they provide in the subsequent sections below.

Business Intelligence Integrations and Customization

At the top level, when users need reporting and analytics to aid in their decision making, Oracle's embedded business intelligence makes it possible. Business Intelligence Publisher (BIP) and Oracle Transactional Business Intelligence (OTBI) are sophisticated tools a user may use to read, extract or report using the embedded data model that eliminates standard ETL (Extract, Transform, Load) functions typical of BI products. Oracle Data Integrator (ODI) is another popular approach that our customers use for powerful ETL capabilities for large batches of data. Business intelligence capabilities enables you to analyze data to gain insight that you can act on, gathering information to meet specific requirements. You can use different types of predefined analytics and reports, or create and edit them, to support your specific business needs. Customers can create, run and view their own reports. They can even edit layouts, templates and sub-templates. Want even more customization? How about creating data models and diving into the data model editor? One could even define flexfields, a flexible data field that can be customized to your business needs without programming. It can provide attributes that can be used in deeper analysis or capture additional information should you so choose. What if you need ad-hoc reporting? Not a problem. OTBI enables real-time self-service across the entire gamut of Oracle's Fusion applications, whether the data in question spans a year, a week, or a day. The architecture supports up-to-the-minute BI analysis on the state of the business according to each user's job role and privileges. With integrations to the Oracle Digital Assistant, ODA, Oracle Internet of Things, and Oracle's AI and Machine Learning capabilities, the possibilities are only limited by your imagination.

Application Extensibility

As the name suggests, pre-built application UIs (user interfaces) and data models can be customized to suit a particular business' need and layout to best serve the users of the applications. There are several ways in which Oracle helps our customers achieve this.

Page Composer enables our customers to edit page layouts, showing or hiding fields and contents of dialog boxes, or adding new objects to the navigation, organization-specific help page customizations, logos and many other customizations at the user or site level. With an easy to use web-based tool (Figure 3), Page Composer allows our customers to modify and personalize their dashboard pages, add and move content such as BI reports, show or hide fields of importance to specific users and user-privileges, and many other customizations.

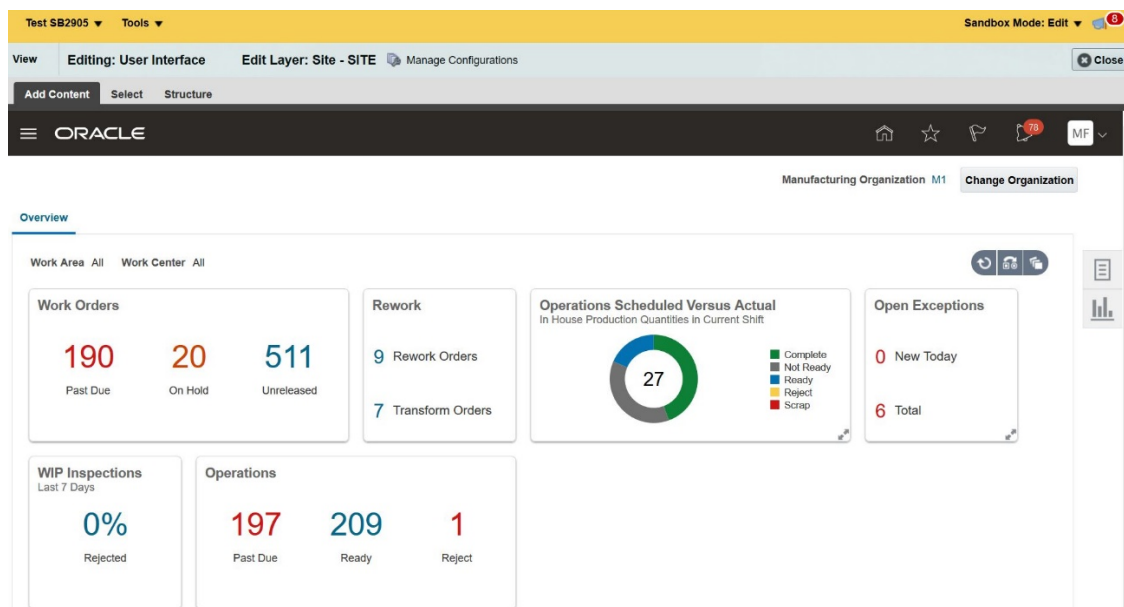


Figure 3. Page Composer being used to create custom dashboards and BI reports.

Meanwhile, Flexfield Frameworks allow more descriptive and extensible flexfields. As the name suggests, flexfields are extensible sets of placeholder fields associated with business objects which can be placed on application pages. They can be used to extend business objects and meet data management requirements without changing the data model or performing any database programming. For even more flexibility, no pun intended, flexfields come in 3 incarnations. Key flexfields are used to store internally defined codes unique to a particular business, such as specifying part numbers, general ledger accounts, and other business entities. A key flexfield consists of one or more segments, where each segment can have a meaning. For example, a part number *10-PEN-BLA-450* might correspond to a black pen from supplier #450 sold by division #10 (office supplies). Behind the scenes, the application uses a unique number, 13452, for this part, but the user always sees the *10-PEN-BLA-450* part number. Descriptive flexfields can store several important details on a form without cluttering it. They provide a way to add attributes to entities and to define validation and display properties for them. Extensible flexfields are identical to descriptive flex fields, however they have extra features.

Administrators can easily configure these by specifying prompts, length and data types. Customers can add as many context-sensitive segments to the flexfields as they need, group them the way they wish, support one-to-many relationships between them, and even hierarchical categories, with absolutely no constraints to the number. Figure 4 shows an example of the construction of Key flexfield or part numbers across multiple geographies in a company.

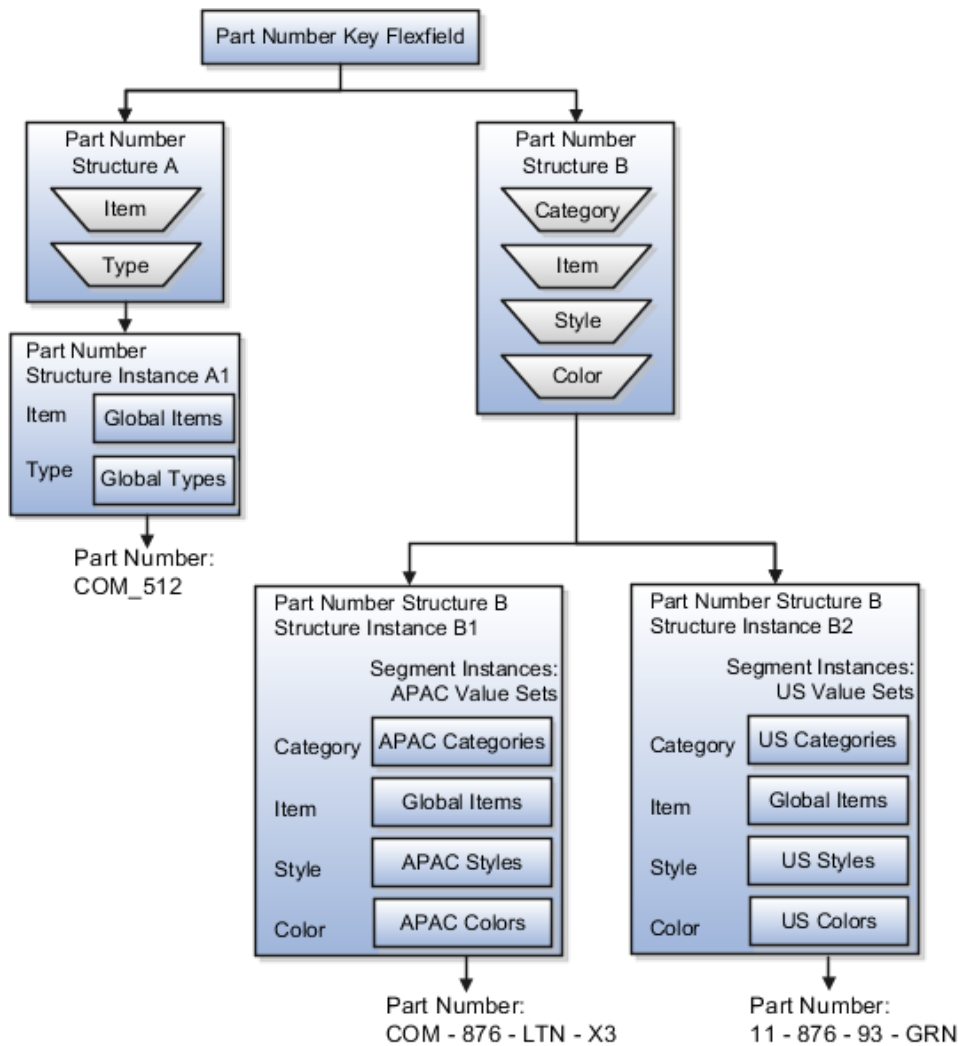


Figure 4. Construction of Part Number Key Flexfields in a Company with Multiple Geographies.

Apps Composer helps customers to quickly build custom tables, apps, extend layouts and meet their unique business requirements. Apps Composer is a browser-based tool that helps administrators extend applications at a deeper level and make actual object model changes. Admins can create new business objects and related fields, and then create new user interface pages to expose those objects and fields to users. All these processes are kept within the SaaS layer, preserving the ability to upgrade seamlessly when the underlying applications are updated and upgraded by Oracle on a quarterly basis in many cases. The kinds of pages that can be created can range from Requirements Specifications to Proposals, Quality Actions, Assets, and the list goes on. And the best part? Our customers don't require any additional licenses to put these into use immediately!

Additional Interface Services

In addition to the above, there is even more customization and tremendous flexibility that is available. With features such as pre-built integration connectors to Oracle JD Edwards, Oracle E-Business Suite and even Salesforce, MS/SQL and Workday, there are more ways in which Oracle Cloud Extensibility Framework can help customize Oracle's cloud applications to your unique set of needs.

Take the Oracle Digital Assistant (ODA) for example. ODA is a multi-input chatbot with options for text or voice input, incorporating the latest developments in Natural Language Processing (NLP) technologies. With deep integrations into Oracle Cloud applications such as ERP, Supply Chain Management, Customer Service, CRM and even HCM, you can have both employees and customers interact with the underlying applications with no learning curve at all. Many of Oracle's customers with customer-facing operations already use the ODA to offload high call volumes to the chatbot, increasing customer satisfaction, and reducing the load on their

resources. Employees too can interact naturally with underlying applications, for example, to know when an Oracle Transportation Management shipment is due to arrive, or be notified automatically of delays en-route, or even proactively receive alerts from their manufacturing operations before maintenance issues cause a slowdown in production. Oracle customers have already deployed ODA with their Oracle enterprise applications in every industry vertical, from Retail and CPG to High Tech and Financial Services. Figure 5 shows some instances how the Oracle Digital Assistant is already helping organizations better support their customers and employees.



Figure 5. Extending the Reach of Oracle Cloud Applications: Integration Examples and Benefits of Oracle Digital Assistant.

Or consider how other advanced technologies such as blockchain can be integrated into your enterprise to improve efficiencies and security. A well-designed blockchain doesn't just cut out intermediaries, it also reduces costs, and increases speed, reach, transparency and traceability for many business processes. Which is precisely what Oracle set out to do, when we built an enterprise-grade blockchain solution on the Hyperledger Fabric. By design, it enhances trust in decentralized manner with a single source of truth enabled by a distributed ledger among network participants. Updates to this shared ledger and its many integrations are made only after consensus among network peers, protecting against fraud, with auditable historic records that can be encrypted for privacy. Companies have used its many plug-and-play integrations for everything from protecting pharmaceutical supply chains from counterfeits, to shipping manifests for ocean-going vessels, to eliminating conflict minerals from the batteries of electric vehicles. Figure 6 shows some of our customers and their use cases.



Figure 6. Oracle Blockchain Implementations in Multiple Industries.

In addition to these integrations, Web services are provided by Oracle Fusion Cloud across every business object that may remotely call for data to be integrated, from transactions to master data to reference data, and allows customers to create, update or fetch data from the cloud. Then, there are business events that help with orchestrating the integrations. While the entire list of these is beyond

the scope of this white paper, every type of [Business Event](#) (link) and [Field](#) (link) can be subscribed to. From Asset Tracking, to see if a particular asset is IoT enabled, to Quality Management, to track which worker signed off on the last inspection, all the way to Shipping and Logistics, to track how many were shipped vs. how many were actually delivered. The list of such integrations runs into the thousands. Table 1 shows a partial list of some the many integrations that are available in Oracle’s applications.

There are also a wide range of application integration capabilities with REST and SOAP that are available to further customize Oracle’s suite of cloud applications to the specific business need of our customers. REST APIs allow viewing and managing data stored in Oracle Cloud applications. Customers can easily create, manage and update records, including with external entities in the Oracle Business Network (OBN) or in their own B2B domain. OBN is an open community for Oracle Cloud applications, E-Business Suite, and PeopleSoft customers to exchange business documents with their trading partners. It provides out-of-the-box connectivity for Oracle customers and easy connection options for trading partners. And best of all, it’s free to participate. There are several pre-built B2B messages using industry-standard OAGIS 10.1 and web services, which drastically reduces the cost of developing and deploying interoperable, cross-functional, and even cross-industry integrations. Use cases for such REST API integrations are available in Inventory Management, Manufacturing, Supply Collaboration, Configurations and Quality Management, as well as with B2B Trading Partners, to name but a few.

CLOUD PRODUCT	SUPPORTED BUSINESS EVENTS VIA REST
Inventory Management	Available Quantity, Completed Transactions, Generate Lot and Serial Numbers, Pick Waves, etc.
Maintenance	Create Asset Group Rules, Genealogy Relationships, Maintenance Work Orders, etc.
Manufacturing	Create/Re-schedule Work Orders, Create Flexfields for Project Details, Get Work Order Materials, etc.
Order Management	Available Supplies, Configurations, Price Lists, Pricing Matrices, Order Promises, Discounts, etc.
Product Lifecycle Management	Configurator Models and Workspaces, Item Catalogs, Create Item Structure, Product Change Orders, etc.
Service Logistics	Product Stocking Locations, Return Routing Rules, Preferred Part Sources, etc.
...and many others.	

Table 1. Partial list of supported business events via REST in a few representative Oracle Cloud Applications.

As we have seen, the possibilities are, quite literally, endless.

In the following section, we shall see some of these features in action with real examples of how Oracle’s customers have already deployed these features to customize their implementation of Oracle’s SCM Cloud to suit their unique business needs.

CUSTOMER EXAMPLES

Manufacturing: Automotive Wheels

When one of the world’s largest tier 1 automotive suppliers with a reputation for supplying high-quality wheels needed to get the most powerful aspects of Oracle Supply Chain Management (SCM) Cloud applications directly into the hands of their production staff, they turned to Oracle’s Cloud Extensibility Framework to make it possible.

This European giant was already using several applications from Oracle, from ERP to Internet of Things apps to manage production, to Oracle’s SCM Cloud to tie it all together.

In the midst of this, there was a specific need at the company to account for accurate counts and updates of physical inventory on the factory floor at regular intervals throughout the day. What made their situation particularly unique is that they actively serve both the high-volume OEM market, as well as the specialized after-market for wheels, which has a comparatively lower volume. This makes their situation particularly unique, as they need to drive efficiencies across both markets, which have differing needs. Add to that the need to maintain just-in-time production and delivery to automotive OEMs across the globe. A customized approach to balancing and managing multiple stakeholder markets was critical to ensure the company’s commitments were kept, and costs controlled. The solution was as simple as it was elegant.

The first was a Microsoft Excel plug-in feature in SCM Cloud’s Extensibility Framework that automatically downloaded current physical inventory counts. The second was a mobile integration with Apex, Oracle’s low code development environment. The mobile integration meant that users no longer had to be tethered to a bulky PC; and the Excel plug-in to Oracle SCM Cloud meant the learning curve was as simple as updating a cell with the correct physical inventory and clicking an update button. And that is exactly what happened.

Before their periodic walk-through the plant, plant personnel simply clicked on a download button in the Excel application on their handheld device, and obtained current system counts of physical inventory. As they walked the floor after obtaining these data, all they did was to update the counts on the spreadsheets on their tablet. No complex training was necessary. Neither were months of complex integrations or expensive custom development. The extensions were simple enough they could be deployed in a matter of days. In fact, they could even scan barcodes on inventory directly from the tablet without having to type any details at all. The result: more accurate and near real-time accounting of work-in-progress material, better control of inventory, and lower wastage and operational expenditure.

All this is part of the company's journey to the cloud where more automation is now the norm. Work order completion and preventive maintenance using Oracle's IoT applications form additional pieces of the jigsaw that fit perfectly together to achieve a more synchronized and efficient supply chain.

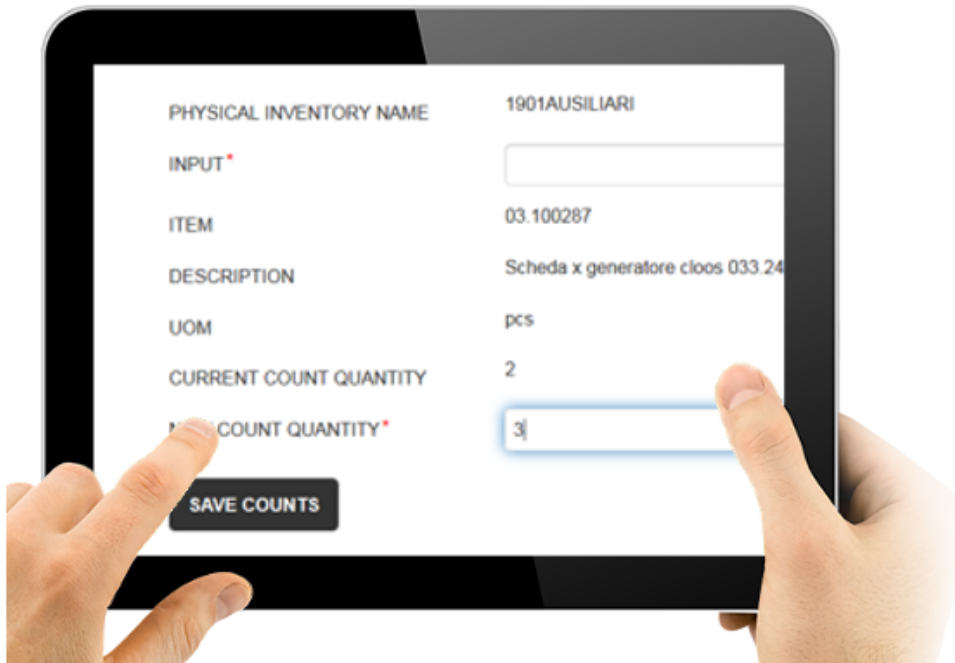


Figure 7. Actual Implementation of Oracle Cloud Extensibility Framework at European Tier 1 Automotive Supplier's Manufacturing Facility.

A 100-year Custom Plant and Horticulture Supplier

From the world of automobiles and machines to that of living plants. A horticultural company with over a century of history is where our next example of fast, customized deployment comes from. This North American company breeds, grows and sells plants for every US Department of Agriculture "Hardiness Zone", that is, plants that are bred to thrive in specific geographic climates, ranging from sub-tropical to temperate to frigid. In fact, it prides itself on being among the few companies in the world that can make such a claim. To deliver on that claim, the company operates multiple nurseries spread across the length and breadth of the country to take advantage of the climate in each zone that would be best suited to grow its end products optimally. Needless to say, their situation was quite unique to the way the company operated, even in their own industry, for the sheer size, scale and complexity of their operation. For starters, the sheer timescale of managing the supply chain from work order to seed germination to final sale, dispatch, and transplantation spans several months, and in some cases, years. Given the very specialized nature of their business, the company had a highly customized Oracle JD Edwards implementation, which their CIO considered "The Best" and was reluctant to move to an off-the-shelf cloud application. Yet they felt the benefits available in the cloud were becoming harder to ignore with each quarterly update in Oracle's SCM Cloud suite.

Their answer to the dilemma?

A phased approach that eliminated a Big Bang implementation with a "customized" implementation with Oracle Cloud Extensibility Framework! In fact, phased migration from JD Edwards and E-Business Suite, a hybrid co-existence, is an important feature where customers can have both the SaaS version and their on-premise implementation co-mingled for a period of time during an implementation. In this particular case, the company used the popular Apps Composer and Page Composer features built into Oracle Cloud Extensibility Framework to achieve the same end-result they had with their older, legacy application capabilities. First, with Apps Composer, they created customer objects that could be completely customized to their unique needs. Next, they wrote simple, custom HTML in the Page Composer to customize their work orders as well as dispatch lists. And finally, importing the customer

objects into the features they had written for work orders and dispatch lists gave them the level of customization they had in the legacy applications, and then some. In the CIO's own words, *"An ERP system that was designed for today's modern world and businesses was just what we needed."* Too, the simple nature of the customization and the speed at which they were able to achieve their customization goals demonstrated the power of Oracle Cloud Extensibility Framework, which is enabling more and more customers' journeys to the cloud each day, each with their own unique requirements, both for their industry and their specific business.

A US\$ 10+ Billion Technology Distributor

Our final example encompasses one of the unseen complexities in supply chain management: reverse logistics. Most, if not all, supply chains are optimized to move goods one way – from production to consumption. When returns have to flow the opposite direction, that is where a lot of organizations usually turn for expert help from Oracle. And when the product being shipped back involves several customizations and options, it makes the problem that much harder. Add to that the ability to specify which serial numbers from which order are tied to the customers' entitlements and credits, the picture becomes fiendishly complex.

Which is exactly the situation that a \$10+ billion distributor of high end, enterprise-grade technology hardware found itself in when it was mapping its journey to the cloud as it expanded its ERP capabilities. Return Merchandise Authorizations, or RMAs, had complex workflows, for all the reasons mentioned above. And yet, with Oracle Cloud Extensibility Framework, not only did the company surmount these issues, but was well on its path to embracing the many other features that Oracle SCM Cloud applications offered, which had been on the "backburner" as they put it, while their team worked out other pressing issues.

Oracle Cloud Extensibility Framework allowed the company to create its own unique set of "default fields" that would be part of an RMA initiated by their customers or the sales representatives (Figure 8.) Despite being one of the largest value-added resellers of high-end enterprise grade systems, the company got to the pinnacle of its industry by pioneering a uniquely high-touch approach. To aid it in not sacrificing margins with this approach, its legacy systems included the automation of the application of Credit Memo Holds, copying of information from the original sales order and linking them to the RMA, tax classifications, and other process activities. With the help of Oracle Cloud Extensibility Framework, this distributor was able to automate all of these and link them to its unique process for a successful transition. With this thorny problem solved and business users and sales teams in their company fully bought in, it made the job of their IT systems professionals much easier. They could now focus on new Oracle solutions and releases with more proactive and continuous executive engagement, both internally and with Oracle, to incorporate the latest Oracle capabilities and tweak them to meet their business requirements.

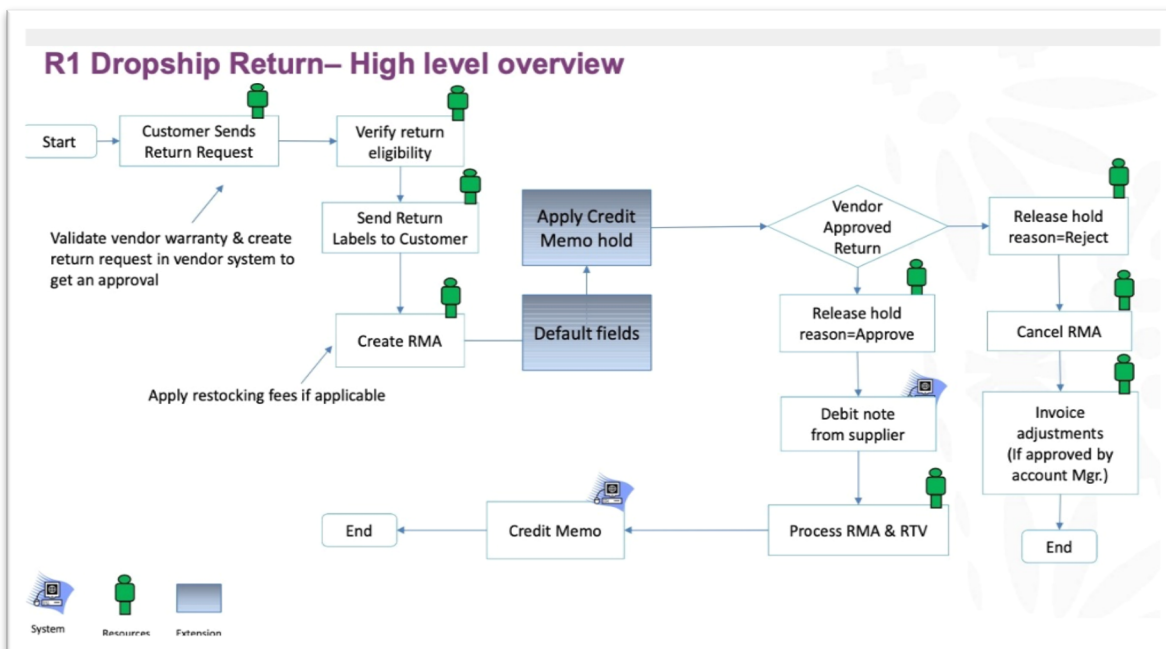


Figure 8. High Level Architecture of RMA Process at Technology Distributor Highlighting Key Linkages Provided by Oracle Cloud Extensibility Framework.

MORE WAYS TO USE ORACLE CLOUD EXTENSIBILITY FRAMEWORK

The story doesn't stop there with these three customer case studies, however.

Take the case of a “mobile-first, cloud-first” startup that is disrupting the traditional pre-owned automobile business in the Americas. In many locations, its customers do not even need to interact with another human for their car's test drive and eventual purchase. This was truly a differentiation for this pioneer with a unique business model that had never been implemented before anywhere in the world. Leveraging the power of Oracle's Visual Builder Cloud Service (VBCS), the company created a custom mobile interface for its frontline employees managing the lifecycle of the cars – all the way from intake to final sale. Firstly, the mobile application interface is used to scan the VIN (Vehicle Identification Number) of the car from when the cars are first purchased at auction. Then, to ensure quality, multiple pictures are captured by personnel conducting a detailed inspection, including annotations, which automatically create repair work order flows. The cars are then moved into their work bays where trained mechanics execute these work orders to bring the cars into saleable condition, followed by inspections and inventory management, leading up to final sale. For this automobile pioneer, every single process runs completely on the Oracle Cloud, leveraging the power of the Oracle Cloud Extensibility Framework, to customize the implementation of these cloud features to their highly specialized business needs.

Or consider how a company that maintains a remote network of compressors to transport natural gas through remote mountainous areas uses these integrations to proactively detect impending faults and optimize field service. Figure 9 shows a block diagram of the system's architecture. The system integrates machines sending real-time data to the Oracle IoT Cloud for analysis, triggering an automatic maintenance work order in Oracle Maintenance Cloud, and further integrating to custom applications for parts ordering and field technician interactions. With the system enabling a much leaner field technician to asset ratio, while still guaranteeing the uptime it needed from its remote fleet of gas compressors, the savings paid for the investment in short order.

Remote Maintenance & Service Solution Architecture

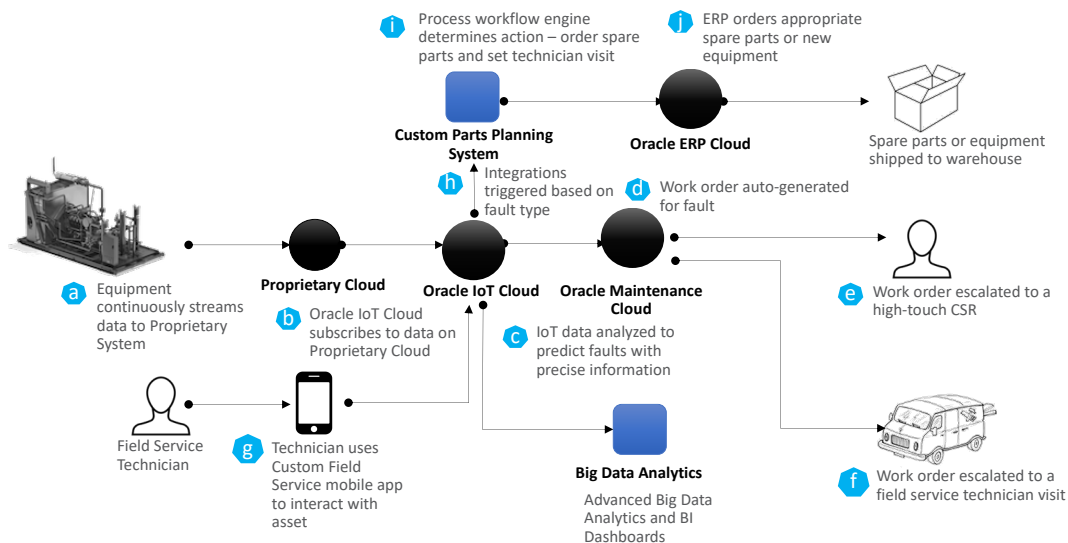


Figure 9. High Level Architecture of Remote Maintenance & Service using Oracle IoT, Maintenance Cloud and ERP integrations.

We have already seen examples of inventory management from Excel plugins for REST service. End users can even create custom serial number sequences when so desired, with the click of a button and uploaded seamlessly to work order releases. Not only does the learning curve flatten significantly with these easy to use features, security issues are also addressed by giving everyone access to just the data they need to fulfill their duties. This makes the application much more useful and scalable, from the executive suite down to the shop floor, each of whom is able to interact with the application at a level relevant to them. Several other implementations, such as adding an OTBI infotile to a SaaS landing page, or accessing a PaaS application from a SaaS springboard, shown in Figure 10, demonstrate the ease of customizing applications to suit business and industry needs.

The simplicity of these implementations demonstrates the ultimate sophistication.

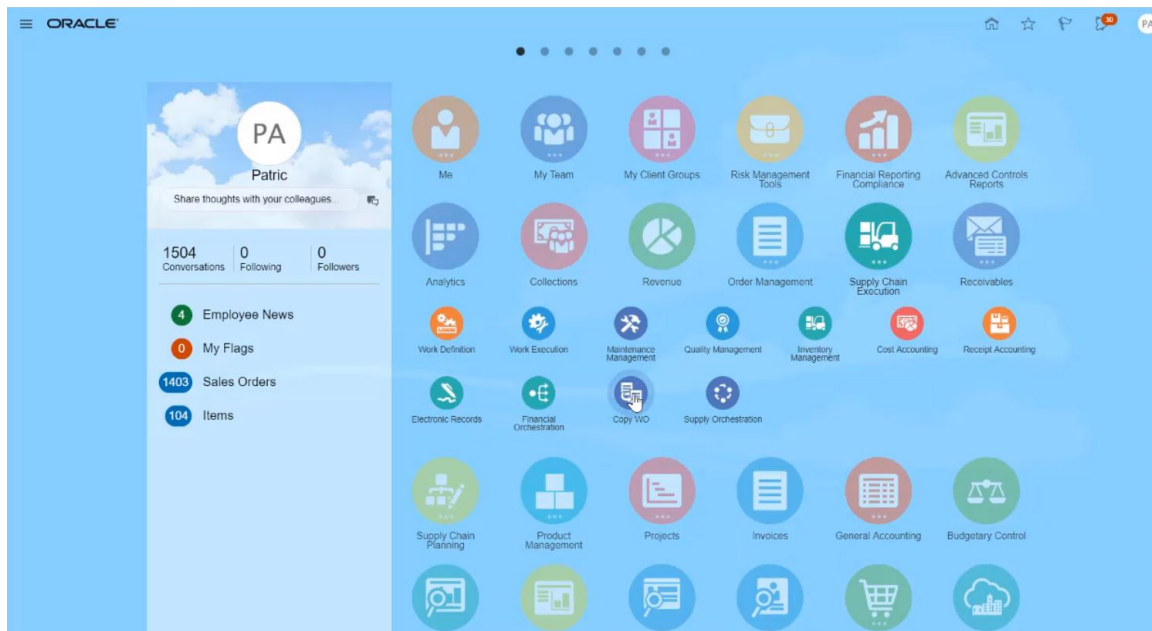


Figure 10. Accessing a PaaS application directly from a SaaS springboard page.

YOUR JOURNEY TO THE CLOUD – ON YOUR TERMS

Oracle’s track record in helping our customers build the most sophisticated, reliable, and yet simple cloud applications is unmatched. Whether it is manufacturing, retail, agriculture, or any other industry for that matter, our commitment to developing the most comprehensive and integrated cloud portfolio has helped our customers realize their vision for digital transformation and industry 4.0 that much faster. And because the Oracle Cloud Extensibility Framework is built from the ground-up to fulfill the needs of a demanding customer base, it is tightly integrated with Oracle ERP, which means all financial reporting controls and security are already taken care of.

In a cloud-first, mobile-first world, the Oracle Cloud Extensibility Framework demonstrates our commitment to innovation and helping our customers achieve their specific business needs, while still protecting their upgrade paths to future versions of our applications. No longer do you have to worry about missing out on advanced features and AI-powered capabilities that may only be available in future releases. Nor do you have to compromise on getting your new cloud solution to meet your unique business requirements.

With the power of the Oracle Cloud Extensibility Framework, *One Size does Fit All.*

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