

An Oracle White Paper  
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# Leveraging Visibility Technology for Business Applications

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Table of Contents

Table of Contents .....3

Introduction .....4

What is Visibility Technology? .....4

Enabling “Visibility” Within Business Applications.....5

What is the “Oracle Asset Visibility Integration Toolkit”? .....7

    Oracle Software Product Requirements: .....8

Leveraging Oracle Asset Visibility to Implement Visibility Solutions ....9

Example: Visibility in Asset Management .....12

OARDC Services.....13

Conclusion .....14

## Introduction

With increasing global competition, businesses are facing on-going challenges in collecting and managing their highly mobile, expensive and most critical **Assets**. Enterprises who have visibility into their operations and processes can best adapt to the ever changing business environment and have a much better chance to be successful in the age of globalization. “Visibility” technology is an enabler that allows enterprises to have a clear view or visibility into location and presence of their products and critical assets that are important to their day-to-day operations. OARDC has developed an integration toolkit to provide an “out-of-the-box” solution in developing and connecting your business applications to meet your visibility requirements.

## What is Visibility Technology?

RFID, which until now, has been the primary choice for asset visibility and asset tracking. However, certain limitations in environments with metallic surroundings or near liquids have minimized its uptake. This occurs because the radio waves are absorbed by liquids and are attenuated by steel structures, which results in less than 100% read rate reliability.

To overcome such limitations, a new visibility technology called RuBee has been developed by Visible Assets Inc. RuBee became a worldwide standard issued by the IEEE in January 2009. The RuBee technology is a bidirectional, on-demand, peer-to-peer, radiating (as opposed to backscattering as used in RFID), and transceiver protocol system. It operates at a wavelength well below 450 kHz and typically at 131 kHz. At this frequency, the signal is almost purely magnetic (that is, only the H-field is present). As the signals communicated by RuBee are almost entirely magnetic, the protocol is virtually unaffected by harsh environments. The RuBee network can be made up of over thousand tags and have a controllable volumetric range from a few inches up to 100 feet.

RuBee is advantageous over RFID in terms of its ability to function under demanding conditions of high EM interference. This makes it ideal for applications such as tracking contents in shipping containers and storage shelves. Additionally, unlike RFID tags, RuBee-based tags operate at 100% reliability, in and around metal and liquids, making them suitable for use in serious, industrial environments. Unlike RFID, which can identify a tag when passed through the portal, RuBee tags could provide end users with the ability to ‘visibly’ monitor, in

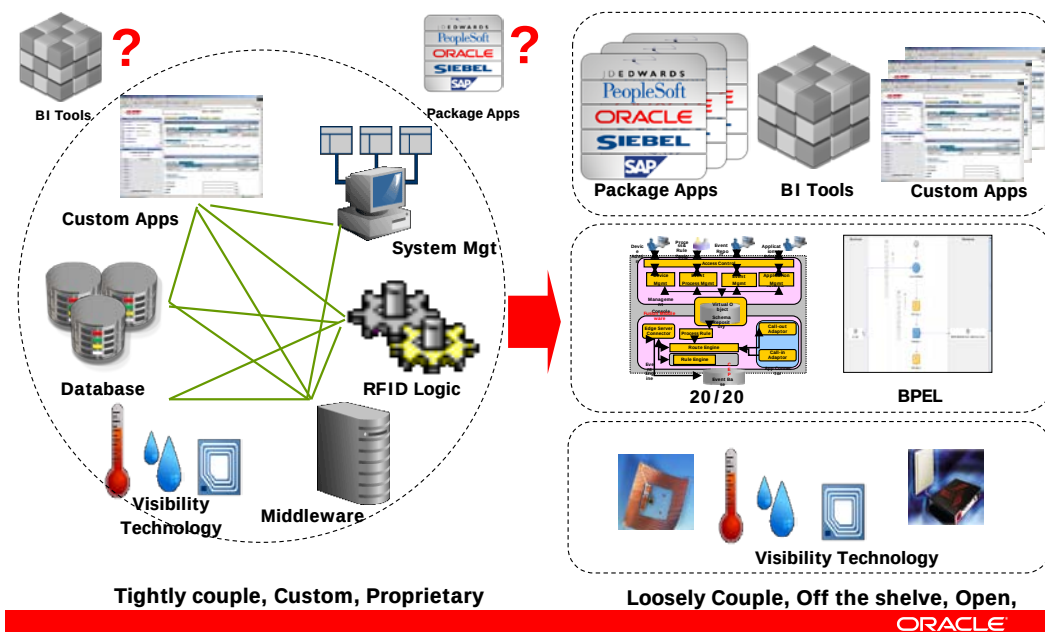
real time, the location of the tagged asset. This is achieved with the help of a large loop antennae, which can be concealed in the floor, walls, or ceiling.

## Enabling “Visibility” Within Business Applications

Many of the visibility solutions deployed today are mainly proprietary implementations. Developers utilize basic infrastructure components like device readers (RuBee readers), edge server middleware (Dot Tag Server), database, and management tools to develop specific visibility event data logic as well as business application workflow. A vast amount of development resources with various skills in different domains like device technology, API's, middleware, application logic, business intelligence, are required to develop such a solution from ground zero. As a result most of the visibility solutions are relatively small, niche, and are designed to solve a very specific problem.

Visibility information (location and presence) generated by visibility technology has significant value to enterprises. The data represents the characteristics and the trends of the business operations. By leveraging business intelligence and data mining tools, important patterns or trends can be extracted which can provide additional insight for management on the status of their enterprise business.

## Visibility Solution Implementation Challenges



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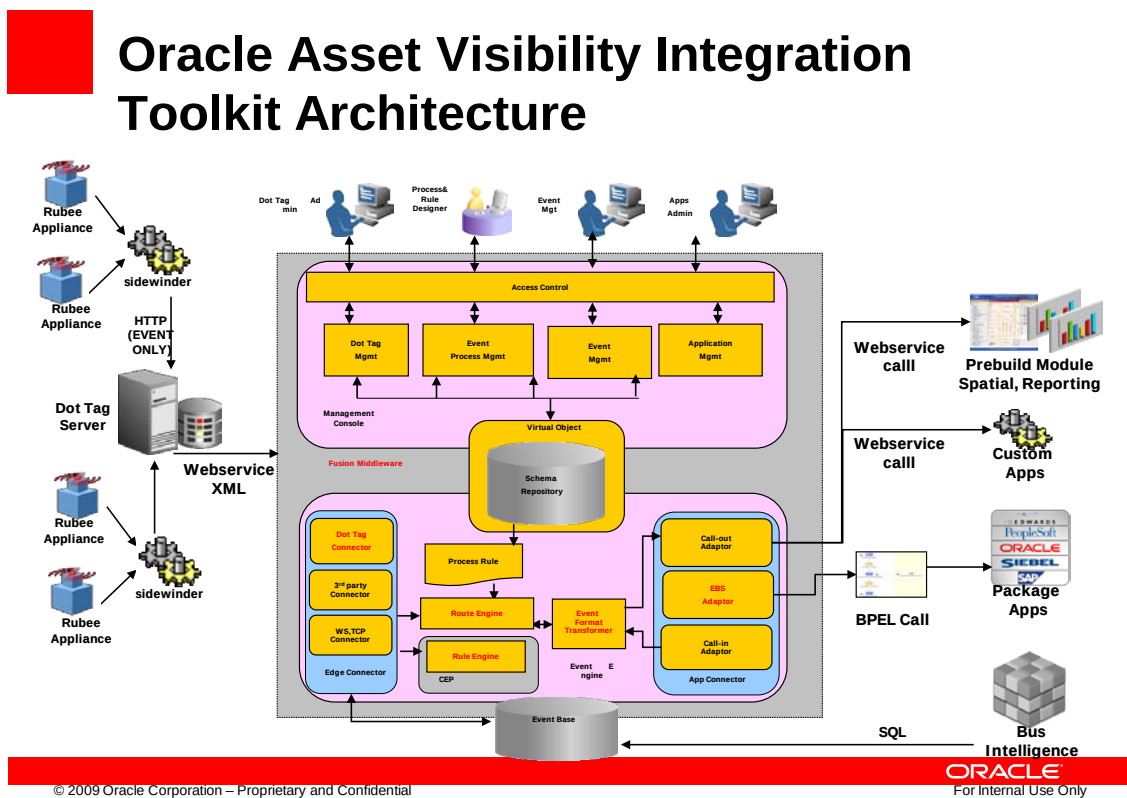
For example, a visibility solution like the “smart shelf” is designed to track whether “tools” are stored on the shelf or is it in use. The “visibility” application only provides the user the visibility of the tools location, however it does not provide us with other business level visibility information like the maintenance status, inventory status, and asset value after depreciation that are normally managed by the backend ERP system. In addition when a tool is missing from the shelf for multiple days, is the tool considered “lost” or “stolen”? Do we need to report the “lost tool” transaction into an inventory or asset management system? Also, what is the definition of a lost or stolen item? How many days is a tool considered missing, before we are required to update the inventory system? Do we want the system to initiate a requisition to reorder the tool?

This business level visibility information can be justified as essential to enhance the visibility of the enterprise business operation. The end-to-end solution provides not just the location and presence information but a “true visibility” into the status of their business operations. Therefore to extend the value of the standalone visible solution like a “smart shelf”, a platform is needed to facilitate the integration with a backend ERP system, Business Intelligence, and

Business Workflow. The Oracle Asset Visibility Integration Toolkit was designed to solve these problems.

## What is the “Oracle Asset Visibility Integration Toolkit”?

“The Oracle Asset Visibility Integration Toolkit” is a platform to integrate with Oracle Fusion Middleware, as well extend the Oracle e-Business Suite and other third party business applications. This toolkit is designed to collect real-time data from “visibility technology” devices (e.g. tags, sensors, readers), then manage and direct the data traffic through a routing engine (e.g. BPEL Workflow). The integration is based upon open standard APIs (Web Service, PLSQL, and TCP/IP).



The Oracle Asset Visibility Integration Toolkit's key objectives and key features are:

- Simplify the development of the visibility solutions. Essentially segregate or decouple the management of the visibility technology devices from the application. Support open standards related to the APIs (Web Service, PLSQL, and TCP/IP).
- Transform and manage visibility technology event data into a format that can be consumed by a 3rd party packaged application, hence extend the packaged application like Oracle E-Business Suite to utilize a number of visibility technology readers, sensors, and tags.
- Outsource and store the management of the event data generated by the visibility technology that can be leveraged and analyzed by common Business Intelligence tools (BIEE, BAM).
- Provide a GUI-based, real-time event routing and integrated business processes by supporting complex event rules (CEP) and external business rules (BPEL).
- Provide the capability to manage a massive number of visibility technology through supporting multiple edge server middleware (dot-tag server, SES, device gateway)
- Facilitate the sharing of these devices among multiple applications, as well as grouping devices, so that the applications are shielded from the management of the devices and vice versa.

Oracle Software Product Requirements:

The Oracle Asset Visibility Integration Toolkit requires the following Oracle products:

Infrastructure Components

- Oracle Database Enterprise Edition
- Oracle Weblogic Server Enterprise Edition

Optional: Spatial Component

- Oracle Database Spatial

Optional: Business Intelligence Component

- Oracle Business Intelligence Suite, Enterprise Edition Plus

Optional: Business Application Integration Component

- Oracle BPEL Process Manager

Optional: Development Tools Component

- Oracle Jdeveloper

Optional: Oracle E-Business Suite Applications

- Oracle Enterprise Asset Management
- Oracle Inventory Management
- Oracle Human Resources

## Leveraging Oracle Asset Visibility to Implement Visibility Solutions

Due to the complexity of integrating various technologies components, enterprises have to invest a huge amount of unique skilled resources in order to develop the visibility application solution from ground zero. The complexity together with the high investment cost is the primary reason why enterprises have limited the adoption of visibility technology.

By leveraging the toolkit's capabilities, enterprises can shorten the development cycle of the visibility solution by extending commercially available packaged applications with visibility

technology. Using the Oracle Asset Visibility platform, developers can route the visibility event data to applications through the event engine using the standard Web services interface. As a result, the toolkit eliminates the need for the application to handle complex visibility devices, APIs and middleware interfaces. Also, in order to allow packaged applications to consume the visibility event data, the toolkit provides two transformation features that are required to convert the event data into something that packaged applications can understand.

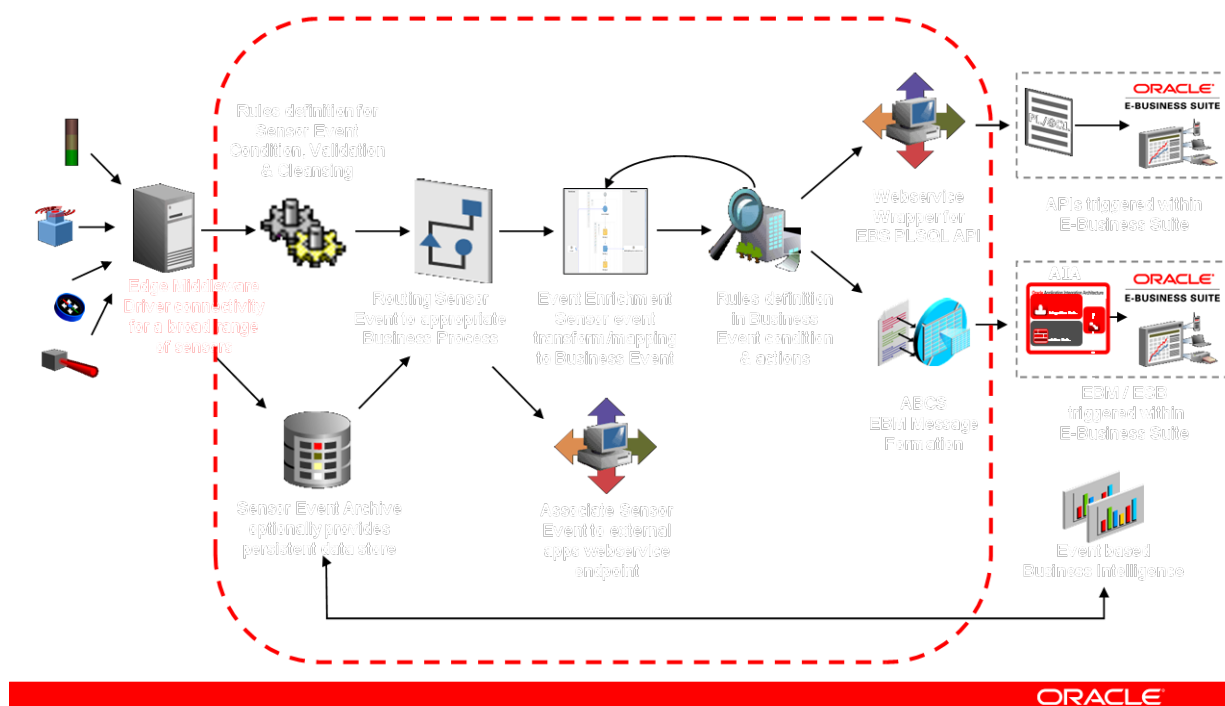
#### 1) Data conversion

As commercially packaged applications are developed, they are not designed to work with visibility technology. Therefore in the application data schema, there are no attributes dedicated to visibility technology. A mapping is required to translate the event data into a foreign key of the application data schema. e.g. a unique identifier in the dot-tag may need to be translated into a serial number or asset number.

#### 2) Event Process Mapping

When a visibility event is generated (reader reads a RuBee tag), it can imply many different business events. The event needs to be mapped into the appropriate business process so that the package can process the event accordingly. e.g. A RuBee tag is read by a reader at the warehouse entrance can imply: (I) an item is moved into inventory; (II) an item is moved out of inventory; and (III) an item has been stolen or lost and inventory must be updated.

# Oracle Asset Visibility Process Flow



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With the help of Oracle Asset Visibility, developers can easily leverage existing packaged application to develop a comprehensive visibility solution. The end-to-end solution provides enterprises with the complete visibility of its entire business process instead of a partial view. In addition, enterprises can increase the value of an existing deployed application by extending the feature(s) of the business application with visibility technology. The toolkit acts as a bridge between the commercial packaged application such as Oracle E-Business Suite, PeopleSoft Enterprise, Siebel, and SAP and visibility technologies to provide a unique value proposition for enterprises to enjoy the benefits of both technologies without incurring a major investment in the development effort.

In addition, Oracle Asset Visibility has an event repository to store and manage event data generated by visibility technology. The repository is implemented by using the Oracle Database server. Therefore, any commercially available business intelligence or reporting

tools that support standard SQL relational database can be used for this purpose. Developers do not have to develop their own business intelligence feature; instead they can leverage standard BI products that can shorten their development cycle.

## Example: Visibility in Asset Management

Comprehensive planning, tracking, and execution of optimal asset performance are key concerns for large global enterprises with millions worth of assets like heavy machinery, vehicles, and valuable spare parts. Leveraging RuBee technology to enable asset tracking and asset management would be a good example for utilizing the toolkit solution. Assuming an enterprise is already live on Oracle E-Business Suite Enterprise Assets Management. As the next step, the customer would invest in the RuBee Tag technology and attach the tags onto its products, as well as installing RuBee appliances to key locations within the enterprises premises.

As the assets pass through each key gateway, the unique RuBee tag number of the product will be scanned. The tag data will then be forwarded to the Oracle Asset Visibility platform and will be cross-referenced to the product's assets number (relevant to the E-Business Suite Enterprise Asset Management Manufacturing applications). Then the BPEL solution will be applied to execute the appropriate workflow and relay the event data to the appropriate operation within the business application. The end result is that the customer will be able to have a real-time visibility of the asset location and its current maintenance status. This information provides a much better understanding of each asset's utilization and operational efficiency.

## EAM Assets on Map

### *Tracking and Manage Asset*

The screenshot displays the Oracle Asset Management web application. The top navigation bar includes links for Home, Assets, Work Requests, Work Orders, Stores, Budget Forecasts, and Failure Analysis. Below this, a sub-navigation bar shows Capital, Rebuildable Inventory, and Mass Meter Readings. The main content area features a map titled 'Asset Map: 105463680555' with various asset locations marked by colored squares. A pop-up window provides details for a selected asset:

| Asset              | Work                                                                               |
|--------------------|------------------------------------------------------------------------------------|
| Tag:               | 105463680555                                                                       |
| Asset Group:       | Dodge Ram 3500 2005                                                                |
| Description:       | Make:Dodge, Model:Ram 3500, Year:2005                                              |
| Address:           | 1100 Abernathy Road, Northpark Towers, Building 500, Suite 1120, Dekalb, 30328, US |
| Owning Department: | Garage                                                                             |

At the bottom of the map, there are buttons for 'Create Work Request', 'View', 'Work Requests', and 'Go'. A 'Return to Search' link is also present.

## OARDC Services

OARDC can offer specific services packages, which are designed to navigate the integration toolkit, customize it for particular needs or integrate it with other Oracle solutions and products. Following services are offered:

1. Installation: 3-7 working days depending on options (Spatial, Business Intelligence, Business Application Integration)
2. Training: 3 working days
3. Implementation services vary upon user's requirements:
  - Driver integration

- API integration
- Configuration & Extension services

## Conclusion

The RuBee visibility solution provides much more insight into location and presence of critical assets that are significant to corporate daily business processes. Developers who build domain specific standalone visibility solutions can write their own code for these applications by utilizing technology components like database, edge server/dot tag server, and middleware. However, as the visibility solution begins to expand, mature and integrate with enterprises core business processes, the lack of a comprehensive integration platform could be a limiting factor to address both complexity and the advanced functions offered by the enterprise solution. By utilizing the Oracle Asset Visibility Integration Toolkit, a comprehensive visibility solution can be configured with significantly less resources in a faster amount of time. Lastly, by leveraging a commercially packaged application, developers can easily enable visibility capabilities into their industry specific solutions.



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