Introduction:

In the present context of business, it is becoming essential for the business world to provide electronic commerce in addition to their good old business model. An electronic commerce application adds lot of value to their business model and helps in growth overall in the areas of business, business management, tracking and customer support. Customers find it's much easier to access the products and services of a corporation through the e-commerce application and the corporations find it easier to reach their customers.

Building an e-commerce application is always a time consuming and requires a continuous management of adding new features, products, services and promotions. As e-commerce application demands to support heavy traffic, so these applications need to be build upon enterprise architecture. Building applications on enterprise architecture requires highly skilled manpower, significant amount of resources for high end software and hardware. And managing an e-commerce application adds significant cost and requires skilled manpower which sometimes makes the application vulnerable to failure due inappropriate handling to the application.

Ficus e-commerce engine provides a low cost solution to e-commerce requirements which help enterprises to build e-commerce application on a fly and manage the application with less cost and with out skilled manpower. One of the USP (Unique Selling Proposition) of Ficus e-commerce engine is the in build support for RFID (Radio Frequency Identification) for asset and inventory tracking. RFID support in the e-commerce application adds value to the enterprise inventory management system.

Brief Overview of Ficus E-Commerce Engine:

Ficus E-Commerce engine is a low cost solution which aids an enterprise to commence the e-commerce site at no time and to manage the site with ease. E-commerce site is built on enterprise J2EE architecture with Oracle database at the backend with options to plug and play other databases if required. The salient feature of this engine is to manage the e-commerce site from a web based management console which reduces errors caused by developers.

The overall architecture of the Ficus e-commerce engine is as follows –
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Ficus e-commerce engine is architect to the best industry standards and all the best design considerations are implemented to provide a robust and secured application environment. The best practices implemented in J2EE technology is implemented keeping the performance of the application in consideration.

The Ficus e-commerce engine has developed keeping all the required features of an e-commerce site in mind. The performance of the application is kept as the highest priority as e-commerce application generally deals with high number of hits to the application. The technologies which are used or implemented are as follows –

The E-Commerce engine has two significant components – Management application and E-Commerce site. The Management application helps in managing the E-Commerce module.
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Management Module –

The management module helps the enterprise to set the details which will be reflected on the E-Commerce application. Significant modules of the management application are –

- **Catalog Module** – Manages the different categories that will be supported on the e-commerce site. For example – Books, Electronics, Computers etc. Categories can be created under one parent category. For example – Desktops, Laptops etc under Computer parent category. All the categories configured in this module will be reflected on the e-commerce site.

- **Item Module** – Manages the items which will be listed under the categories on the e-commerce site. For example – different laptop models which will be placed under the
Computers – Laptop category. This module provides scope to add attributes to the items like specifications, price etc. These attributes are dynamically set, which allows the enterprise to set attributes depending on the product. For example – For Computers attributes can be Specifications, price and for Books attributes can be set to Name, Author, and Publisher etc.

- **Customer Module** – Manages the customers who are registered in the e-commerce site.

- **Inventory Module** – Manages the inventory information. This module has support to maintain warehouses and inventories of each item in each warehouse. This module also has support for RFID implementation. This RFID implementation helps the enterprise to track their inventory movement. The RFID implementation support provided with the application supports real time data updation without user interaction. (Automated Asset Tracking)

- **Web Order Module** – Manages the customer orders generated from the e-commerce site. This module helps the enterprise to track each customer order in different stages from arrival to delivered stage.

- **Vendor Module** – Manages the vendors who supply items for business. It keeps track of information related to the vendors with option to define first, second and third preferred vendor.

- **Purchase Order Module** – Manages the POs generated to vendors. It helps the enterprise to track the POs status from PO generation to item arrived at the inventory.

- **User Module** – Manages the users which will be using the management application and allows specifying privilege so that certain users will have access to certain module defined above.

- **Reports Module** – Provides reports of various types. This module has option to define search criteria on which reports can be downloaded. The reports generated can be downloaded and printed.

**E-Commerce Application:**

This application is the interface of the enterprise to the external world. This application helps the enterprise to provide electronic commerce in addition to their existing business and services. The e-commerce application has the following components and services.

- Listing of items under categories.
- Listing category in a tree structure.
- Displaying item details.
- Shopping Cart.
- Check out mechanism
- Item search on different search criteria. (Search Mechanism)
- New Customer account registration.
- E-mail Support. (Customer required information is sent to the customer with auto generated emails)
- Customer Account Management.
  - Customer Order tracking. – Customer can track their order status.
  - Customer information Management. – Changes customer details
  - Change shipping & billing information.
  - Change password.
  - Forget Password.

**Passive RFID Implementation Details:**

*What is RFID?*
Radio Frequency Identification (RFID) uses radio waves to communicate to the RFID reader to identify individual items on which RFID tag is placed. RFID tags placed on items listen to the query generated from the RFID reader and responded back by transmitting their unique code id. There are two types of RFID, depending on the communication methodologies and power source of RFID tag. The two types of RFID are – Active RFID and Passive RFID.

**What is Passive RFID?**
Passive RFID tags does not have own power supply, but absorbs power from the radio frequency generated from the reader and transmitted back a response. Passive RFID response contains typically the unique ID number only due to low power availability. Lack of power supply makes passive RFID quite small and commercially more viable, and the range of transmission can go from inches to 20 feet.

**What is Active RFID?**
Active RFID has its own power source and has more memory to keep additional information other than the unique id. Due to own power source its transmission range can extend up to 100 feet. It can store additional information received from the RFID reader.

**Where RFID implemented in Ficus E-Commerce engine?**
Ficus e-commerce engine has in build inventory management support and inventory tracking for effective management of inventory and warehouses. RFID technology support is implemented in the inventory management to track individual items in the inventory. This feature helps the e-commerce provider to manage their inventory effectively which will help the enterprise to provide service in a more efficient manner to the customers.

In typical inventory management, same items can be placed in different warehouses (locations). When an enterprise receives an order from a customer, it ships the items from the warehouses depending on the quantity available and other factors. The enterprise need to keep track of which items are shipped and shipped from which warehouse. On the reverse scenario, the enterprise need to keep track of the items received from the vendors to the warehouse due to replenishment orders.

RFID tracking of items is one of the best solutions to satisfy above requirements. The e-commerce engine listens to the RFID data received from the RFID server and stores the data in the database. This RFID data management is done on real time with out any user interaction. On the backend the application receives the RFID information and takes necessary action with out any user interaction and with out effecting the front end application.

**How RFID implemented in Ficus E-Commerce engine?**
As the Ficus e-commerce engine is developed on the J2EE architecture, so the RFID implementation is done using the features of Java Message Service and Message Driven beans. The Java message having the RFID details is delivered to the MDB to take necessary action with out any interaction from the user. The Features of JMS and MDB provide a reliable solution to implement the RFID which is almost fool proof. The high level architecture of the implementation is shown below.
In short summary, the RFID data is retrieved by the RFID reader from the RFID tag and send to the Message producer server. The message producer server compiles the JMS message with the data and sends it to a queue. The message generated is delivered to the J2EE application server asynchronously and JMS takes the responsibility to deliver the message to the message server. The message server receives the message from the queue and sends the message to the MDB. The message driven bean receives the message from the message server and takes necessary action required. The message is delivered to the application server message server which may have built in to the application server or may be add on to the application server.

What Ficus can Offer?:
Ficus offers the expertise and resources to move your organization through the steps of implementing RFID program as per requirements to meet your organization goals and values. Ficus RFID solutions are aimed at providing a helping hand to our clients to discover their needs and to provide an automated solution to effective use RFID to enhance their business values. Ficus expertise in RFID will help your business to attain its aim of smooth implementation of RFID in the business process.

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