Technical System Documentation

For

Implementation of E-commerce workflows using Apache OFBiz ERP

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1. Introduction (Three Workflows)

Three workflows: Shipping, Payment and Delivery will be implemented using OFBiz ERP component. The report generated from these workflows will be converted into linked data in order to make it computer readable. Three workflows of SNAP-V E-commerce are illustrated in Figure 2. According to these workflows, one can make use of the ERP system and use it. The figure 1 illustrates the concept of an ERP system [2].
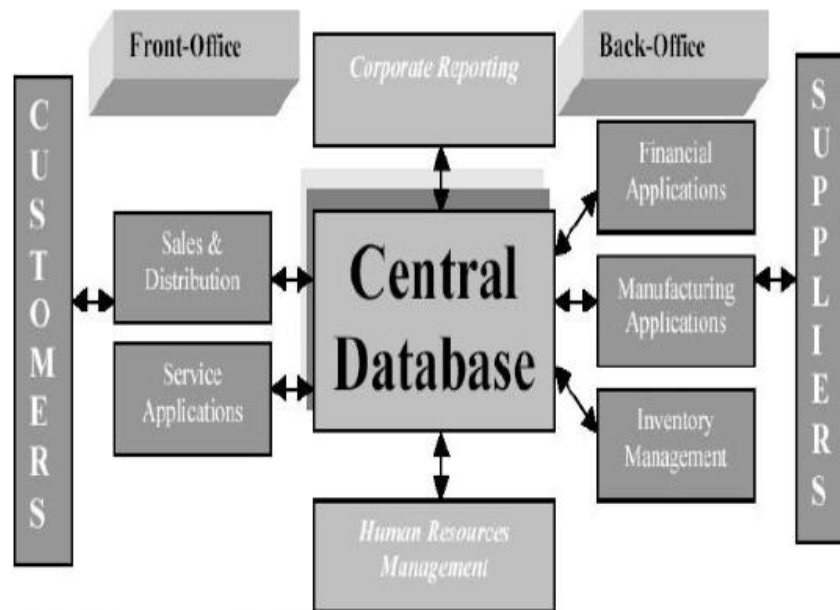
Figure 1: ERP systems concept

1.1 Shopping workflow

The customer follows the below steps in order to complete selecting a product online:

1. The customer should browse the main page containing the catalog.
2. If the customer is already a member, can sign in to the webpage.
3. If the customer is not already a member, can sign up to the webpage.
4. The customer can select or search for the desired product.
5. The customer can add the selected product into the shopping basket/cart.
6. The customer can continue to select other products, and add more to the basket/cart.
7. After finishing the selection of products, he/she can move to the payment webpage.

1.2 Payment workflow

The customer complete her/his shopping procedure with going through the payment workflow, including the below steps:

1. The system checks if the customer is already signed in.

2. If the customer is already a member and not signed in, he/she should sign in webpage.
3. If the customer is not a member, he/she should sign up to the system.
4. The customer can now selects a shipping method.
5. The amount of payment will change depending to the shipping method.
6. The customer has the option of entering another address, different from billing address, in order to get the product in a different location.
7. The customer can select a payment method.
8. After finishing the payment procedure, the customer will get notified if the shopping is succeed or not.

1.3   Delivery workflow

The E-commerce goes through the below steps to complete the delivery of the product, bought by the customer:

1. Customer order will go to the database of the received orders.
2. The order will be packed.
3. The delivery company will collect the packages.
4. The E-commerce will sent the customer an email regarding the product shipping.
5. If the customer send the product back to change or to return.
6. The delivery company will bring the packet back to the sender.
7. The E-commerce will send a confirmation of taking the product back to the customer.
8. If the customer wants to change the product, the process of the sending package repeats.
9. If the customer wants to return the product, the E-commerce will pay the amount back to the customer depending on the payment method she/he has already selected.
10. The system will send the customer a notification of the return of the payment.

1.4   Apache OFBiz

Apache OFBiz (The Apache Open for Business Project) is an open source enterprise automation software project licensed under the Apache License Version 2.0. Being open source Apache OFBiz offers both flexibility by design and by access to code, and a solution where one can work with many others [1].
The main functionalities of Apache OFBiz (ERP-system) includes [1]:

● Advanced E-commerce
● Catalog management
● Order management (sales & purchase)
● Customer management
● Fulfillment (pack & ship)
● Accounting (invoice, payment & billing accounts, fixed assets)

1.5　Operating Environment

This project can run on Windows and Linux. The Apache OFBiz runs as a backend and a browser (IE, Firefox, and Chrome) is required as a front-end. The client needs a text reader/editor to read the generated reports. Then to convert The OFBiz report format to RDF report, RDB to RDF mapping language tools will be used. OFBiz includes and is configured for an embedded Java database called Derby.

1.6　Workflow Description

The boundary of this project covered by three workflows which are Shopping, Payment and Delivery. The other workflows such as Accountings, Human Resource Management etc. may covered as a part of future projects. The generated reports can be converted into the Linked Data by using the RDB to RDF mapping tool, which will be in machine readable format, and the client can used this data on different operating system or platforms.
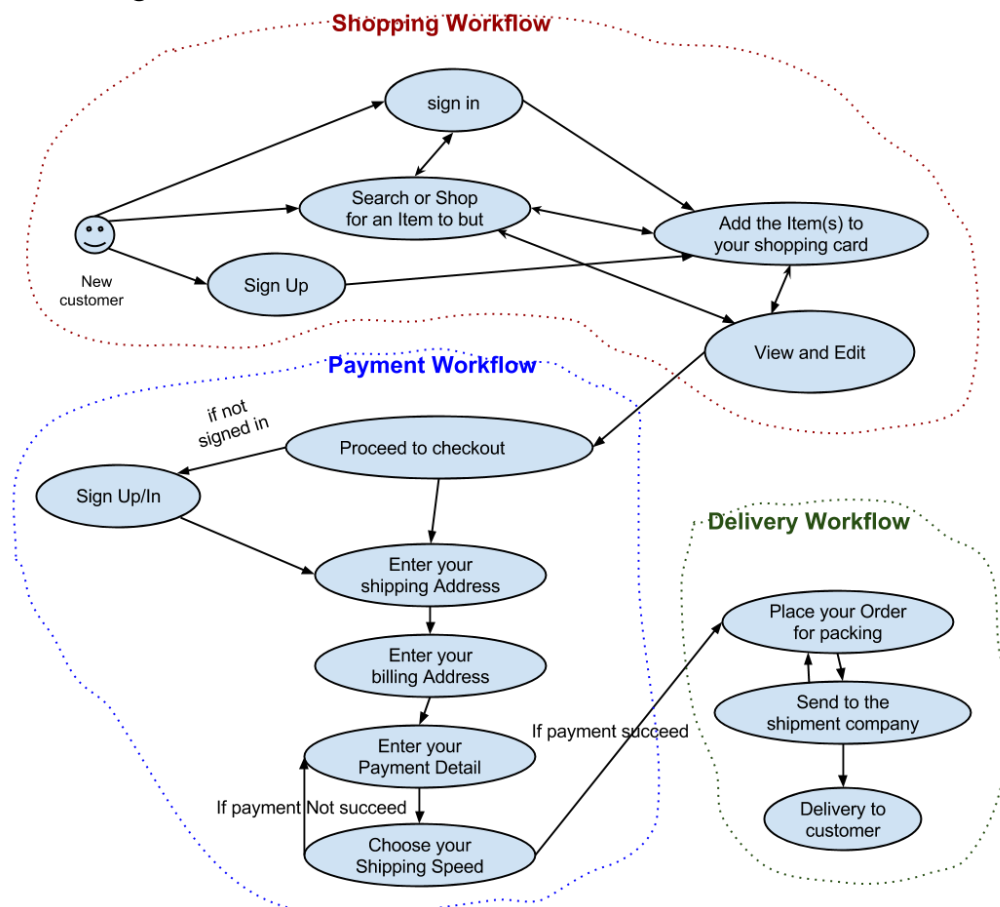
2.0 Architecture Model

2.1　Flow Diagram

Figure 2: Three workflows of SNAP-V

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3. Generated reports from OfBiz - Snapshots

3.1 Shopping [.xml]

```xml
<?xml version="1.0" encoding="UTF-8"?>
<entity-engine-xml>
    <Product productId="ATIV-NP470R5E-K02UB" productTypeId="FINISHED_GOOD" internalName="ATIV
    NP470R5E-K02UB" productName="Samsung ATIV Book 4 NP470R5E-K02UB" description="15.6-Inch Laptop (2.0
    GHz Intel Core i7-3537U Processor, 8GB Memory, 750GB Hard Drive, Windows 8) Mineral Ash Black"
    longDescription="Samsung NP470R5E-K02UB ATIV Book 4 Thin and light its powerful for when you&apos;re
    focused on productivity tasks Powered by with 3 Gen Intel&#174; CoreTM i7-3537U processor Delivers
    powerful performance. It powerfull with 8GB DDR3 memory Memory delivering the seamless performance
    needed to take advantage of the latest in digital media photography and gaming. Samsung
    NP470R5E-K02UB ATIV Book 4 come with 15.6-inch LED high-definition widescreen display experience
    your movies photos and games smoothly and seamlessly with a suite of visual enhancements built into
    the processor . when combine with Intel&#174; HD Graphics 4000 It perfection for you. 1 USB 3.0
    port 2 USB 2.0 ports For fast digital video audio and data transfer. And come with 750GB Serial ATA
    II ha drive (5400 rpm) ha drive large storage and offers spacious storage and fast read/write times
    ." smallImageUrl="/images/products/ATIV-NP470R5E-K02UB/small.jpg" mediumImageUrl=
    "/images/products/ATIV-NP470R5E-K02UB/medium.jpg" largeImageUrl=
    "/images/products/ATIV-NP470R5E-K02UB/large.jpg" detailImageUrl=
    "/images/products/ATIV-NP470R5E-K02UB/detail.jpg" originalImageUrl=
    "/images/products/ATIV-NP470R5E-K02UB/original.jpg" isVirtual="N" isVariant="N" billOfMaterialLevel=
    "0" createdDate="2014-06-28 01:00:18.924" createdByUserLogin="admin" lastModifiedDate="2014-06-28
    01:08:23.164" lastModifiedByUserLogin="admin" lastUpdatedStamp="2014-06-28 01:08:36.835"
    lastUpdatedTxStamp="2014-06-28 01:08:33.095" createdStamp="2014-06-28 01:00:18.924" createdTxStamp=
    "2014-06-28 01:00:18.768"/>
```

3.2 Payment [.xml]

```xml
<?xml version="1.0" encoding="UTF-8"?>
<entity-engine-xml>
    <Payment paymentId="8000" paymentTypeId="VENDOR_PAYMENT" paymentMethodTypeId="EXT_BILLACT"
    partyIdFrom="Company" partyIdTo="AcctBigSupplier" statusId="PMNT_SENT" effectiveDate="2009-07-06
    16:52:52.901" amount="70.00" currencyUomId="USD" actualCurrencyAmount="70.00" actualCurrencyUomId=
    "USD" lastUpdatedStamp="2014-06-10 19:43:04.833" lastUpdatedTxStamp="2014-06-10 19:42:56.581"
    createdStamp="2014-06-10 19:43:04.833" createdTxStamp="2014-06-10 19:42:56.581"/>
    <Payment paymentId="8001" paymentTypeId="VENDOR_PAYMENT" paymentMethodTypeId="COMPANY_CHECK"
    partyIdFrom="Company" partyIdTo="AcctBigSupplier" statusId="PMNT_SENT" effectiveDate="2009-07-11
    12:28:44.034" paymentRefNum="100,100" amount="82.86" currencyUomId="USD" finAccountTransId="9102"
    lastUpdatedStamp="2014-06-10 19:43:26.801" lastUpdatedTxStamp="2014-06-10 19:42:56.581" createdStamp=
    "2014-06-10 19:43:05.212" createdTxStamp="2014-06-10 19:42:56.581"/>
```

3.3 Order [.xml]

```xml
<?xml version="1.0" encoding="UTF-8"?>
<entity-engine-xml>
    <OrderItem orderId="DEMO10090" orderItemSeqId="00001" orderItemTypeId="PRODUCT_ORDER_ITEM" productId=
    "GZ-2644" prodCatalogId="DemoCatalog" isPromo="N" quantity="2.000000" selectedAmount="0.000000"
    unitPrice="38.400" unitListPrice="48.000" isModifiedPrice="N" itemDescription="Round Gizmo" statusId=
    "ITEM_APPROVED" lastUpdatedStamp="2014-06-16 16:43:24.893" lastUpdatedTxStamp="2014-06-16
    16:43:24.375" createdStamp="2008-04-23 16:49:28.128" createdTxStamp="2008-04-23 16:49:27.349"/>
    <OrderItem orderId="DEMO10091" orderItemSeqId="00001" orderItemTypeId="PRODUCT_ORDER_ITEM" productId=
    "GZ-2644" prodCatalogId="DemoCatalog" isPromo="N" quantity="5.000000" selectedAmount="0.000000"
    unitPrice="21.600" unitListPrice="0.000" isModifiedPrice="N" itemDescription="GZ-2644-5 Round Gizmo"
    statusId="ITEM_CREATED" lastUpdatedStamp="2014-06-16 16:43:26.957" lastUpdatedTxStamp="2014-06-16
    16:43:24.375" createdStamp="2008-06-10 13:27:07.247" createdTxStamp="2008-06-10 13:27:07.022"/>
    <OrderItem orderId="Demo1001" orderItemSeqId="00001" orderItemTypeId="PRODUCT_ORDER_ITEM" productId=
    "GZ-2644" prodCatalogId="DemoCatalog" isPromo="N" quantity="2.000000" selectedAmount="0.000000"
    unitPrice="24.000" unitListPrice="0.000" isModifiedPrice="N" itemDescription="GZ-2644-0 Round Gizmo"
    statusId="ITEM_COMPLETED" estimatedDeliveryDate="2009-08-13 17:43:53.0" lastUpdatedStamp="2014-06-16
    16:43:27.663" lastUpdatedTxStamp="2014-06-16 16:43:24.375" createdStamp="2014-06-10 19:46:05.129"
    createdTxStamp="2014-06-10 19:45:45.484"/>
```

4. Generated reports from R2RML [RDF Format]- Snapshots

4.1 Shopping [.rdf]

```xml
<rdf:RDF
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:prd="http://x2r.com/Property/" >
  <rdf:Description rdf:about="http://x2r.com/Resource/entity-engine-xml/Product57">
    <prd:lastUpdatedStamp>2014-06-19 22:07:54.495</prd:lastUpdatedStamp>
    <prd:lastModifiedDate>2014-06-19 22:07:54.494</prd:lastModifiedDate>
    <prd:isVirtual>N</prd:isVirtual>
    <prd:createdTxStamp>2014-06-19 22:07:54.334</prd:createdTxStamp>
    <prd:productTypeId>FINISHED_GOOD</prd:productTypeId>
    <prd:isVariant>N</prd:isVariant>
    <prd:lastModifiedByUserLogin>admin</prd:lastModifiedByUserLogin>
    <prd:internalName>Galaxy_S4</prd:internalName>
    <prd:productName>Galaxy S4</prd:productName>
    <prd:billOfMaterialLevel>0</prd:billOfMaterialLevel>
    <prd:productId>Galaxy_S4</prd:productId>
    <prd:createdByUserLogin>admin</prd:createdByUserLogin>
    <prd:lastUpdatedTxStamp>2014-06-19 22:07:54.334</prd:lastUpdatedTxStamp>
    <prd:createdStamp>2014-06-19 22:07:54.495</prd:createdStamp>
    <prd:createdDate>2014-06-19 22:07:54.494</prd:createdDate>
  </rdf:Description>
```

4.2 Payment [.rdf]

```xml
<rdf:RDF
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:prd="http://x2r.com/Property/" >
  <rdf:Description rdf:about="http://x2r.com/Resource/entity-engine-xml/Payment1">
    <prd:paymentTypeId>VENDOR_PAYMENT</prd:paymentTypeId>
    <prd:currencyUomId>USD</prd:currencyUomId>
    <prd:effectiveDate>2009-07-11 12:28:44.034</prd:effectiveDate>
    <prd:statusId>PMNT_SENT</prd:statusId>
    <prd:lastUpdatedStamp>2014-06-10 19:43:26.801</prd:lastUpdatedStamp>
    <prd:paymentId>8001</prd:paymentId>
    <prd:createdTxStamp>2014-06-10 19:42:56.581</prd:createdTxStamp>
    <prd:lastUpdatedTxStamp>2014-06-10 19:42:56.581</prd:lastUpdatedTxStamp>
    <prd:partyIdFrom>Company</prd:partyIdFrom>
    <prd:partyIdTo>AcctBigSupplier</prd:partyIdTo>
    <prd:amount>82.86</prd:amount>
    <prd:paymentMethodTypeId>COMPANY_CHECK</prd:paymentMethodTypeId>
    <prd:paymentRefNum>100,100</prd:paymentRefNum>
    <prd:createdStamp>2014-06-10 19:43:05.212</prd:createdStamp>
    <prd:finAccountTransId>9102</prd:finAccountTransId>
  </rdf:Description>
```

4.3 Order [.rdf]

```xml
<rdf:RDF
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:prd="http://x2r.com/Property/" >
  <rdf:Description rdf:about="http://x2r.com/Resource/entity-engine-xml/OrderItem4">
    <prd:statusId>ITEM_COMPLETED</prd:statusId>
    <prd:createdTxStamp>2014-06-10 19:45:45.484</prd:createdTxStamp>
    <prd:lastUpdatedStamp>2014-06-16 16:43:29.295</prd:lastUpdatedStamp>
    <prd:orderItemSeqId>00004</prd:orderItemSeqId>
    <prd:productId>WG-1111</prd:productId>
    <prd:itemDescription>Micro Chrome Widget</prd:itemDescription>
    <prd:lastUpdatedTxStamp>2014-06-16 16:43:24.375</prd:lastUpdatedTxStamp>
    <prd:isModifiedPrice>N</prd:isModifiedPrice>
    <prd:unitPrice>59.990</prd:unitPrice>
    <prd:selectedAmount>0.000000</prd:selectedAmount>
    <prd:orderItemTypeId>PRODUCT_ORDER_ITEM</prd:orderItemTypeId>
    <prd:quantity>1.000000</prd:quantity>
    <prd:orderId>Demo1002</prd:orderId>
    <prd:isPromo>Y</prd:isPromo>
    <prd:unitListPrice>60.000</prd:unitListPrice>
    <prd:createdStamp>2014-06-10 19:46:21.569</prd:createdStamp>
  </rdf:Description>
```

5. Reference

[1]
Apache OFBiz, The Apache Open For Business Project - Open Source E-Business / E-Commerce, ERP, CRM, POS, SCM, MRP, CMMS/EAM. (n.d.). Retrieved August 12, 2014.

 [2]
Singhal, S., Tandon, P., & Sharma, S. (2011, July 1). International Journal of Scientific & Engineering Research Volume 2, Issue 7, July-2011 1 ISSN 2229-5518 IJSER © 2011 http://www.ijser.org Hardware and Software Requirements for Implementation of ERP in Technical Education Institutes in India. Retrieved August 12, 2014.