Mobile Enterprise Pilot Project

by
Samson Amede and Michael McNair

Just-In-Time (JIT)

What is JIT?
- Elimination of all wastes
- Pull system through plant
- It is a Management Philosophy

What Does JIT do?
- Attacks wastes (Time, Inventory, Scrap, etc.)
- Exposes problems and bottlenecks
- Achieves Streamlined Production

Main Mantras of JIT
- Elimination of waste
- Pull-type system
- Lot size reduction
- Zero defects

What is Required in JIT?
- Employee Participation
- Small Lot Size
- Total Quality Control
- Basics of Industrial Engineering

What is Assumed in JIT?
- Stable Environment
- Commitment to quality and reduction of waste
- Involvement at all levels of organisation

Pilot project for Mobility

Develop Mobile App for Operations phase in value chain
- Streamline production
- Eliminate manual process
- Eliminate downtime (waste)
- Real-time update of inventory
- Product tracking
- Asset tracking
- Quality and error proofing (Inspection)

Terms in Mobile Application

Mobile Application Data:

Mobile Application data are values that take up qualitative or quantitative variables that belong to a mobile application.

Mobile Application Data in Operations:
- User profile data (string, text, image)
- Supplier data (numeric, string, text, image)
- Raw material data (numeric, string, text)
- Work-in-progress data (numeric)
- Finished product data (numeric, string, image)
- Product location data (numeric, binary)
- Asset location data (numeric binary)
- Inventory database (numeric, binar, string)
- Distributor data(numeric, string, text, image)
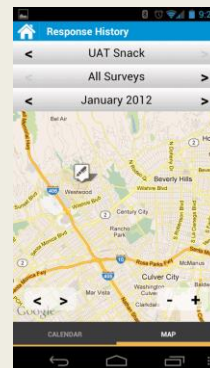
Terms in Mobile Application

Data requirements: are the details deemed necessary by a regulatory body in order for it to fully assess or evaluate the safety and efficacy of a substance or product. These can be additional to the common core data set and may be unique to a given application.

Data requirements in Operations:
- Unique user profiles
- User authentication
- Customer needs

Data modeling: is the formalization and documentation of existing processes and events that occur during application software design and development.

Approaches:
- Conceptual (ex: data structure diagram)
- Enterprise
- Logical (ex: IDEF0, Intergration Definition for Function Model)
- Physical

Terms in Mobile Application

Data structures: It is a particular way of storing and organizing data in a computer so that it can be used efficiently in an organized form, such as an array list or string, in which connected data items are held in a computer.

Data stores: It is a data repository of a set of integrated objects. These objects are modeled using classes defined in database schemas. Data store includes not only data repositories like databases, it is a more general concept that includes also flat files that can store data.
- MySQL
- PostgreSQL
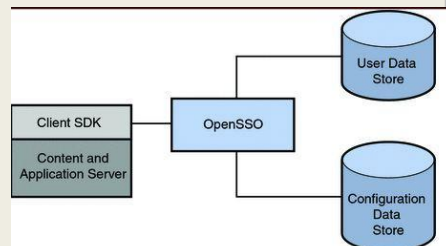
Terms in Mobile Application

Data access: This typically refers to software and activities related to storing, retrieving, or acting on data housed in a database or other repository. There are two types of data access, sequential access and random access. Data Access is simply the authorization you have to access different data files.

Data Access in Operations:
- Authorization level:
  - Plant manager (Admin)
    - Supply/Distribution manager (Admin)
   - Plant worker (Power User)
    - Client/ Third party (User)

Terms in Mobile Application

Data presentation: The purpose of putting results of experiments into graphs, charts and tables is two-fold. First, it is a visual way to look at the data and see what happened and make interpretations. Second, it is usually the best way to show the data to others. Reading lots of numbers in the text puts people to sleep and does little to convey information.

Example: Tabular data, chart data, graphical data

Sample Table 1 – Monthly Snowfall

	December	January	February
Sugar Bowl	12	14	32
Bear Valley	7	19	26
Kirkwood	11	17	36
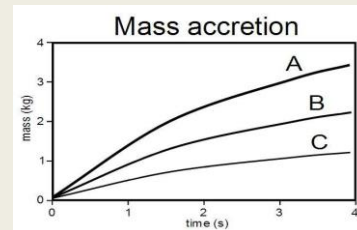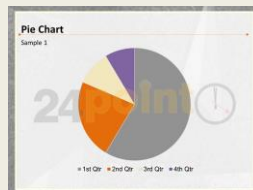
Terms in Mobile Application

Query processing: A query is a request for information from a database. The query processor turns user queries and data modification commands into a query plan - a sequence of operations (or algorithm) on the database from high level queries to low level commands.

Example Query by: Customer data, primary product data, secondary product data, RFID tag #, QR code, barcodes

Business process modeling: is a method for improving organisational efficiency and quality. It refers to a structural representation, description or diagram, which defines a specified flow of activities in a particular business or organisational unit. Business Process Modelling aims to improve business performance by optimising the efficiency of connecting activities in the provision of a product or service.

Terms in Mobile Application

Web services: describes a standardized way of integrating Web-based applications using the XML, SOAP, WSDL and UDDI open standards over an Internet protocol backbone.

Core Web services standards include:
- Simple Object Access Protocol (SOAP),
- Web Services Description Language (WSDL), and
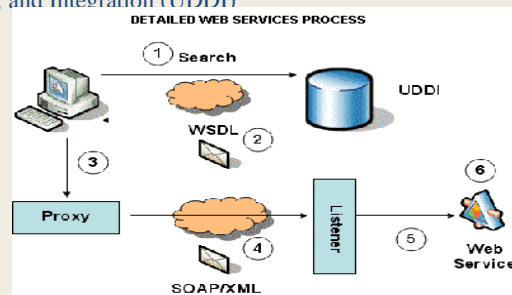- Universal Description, Discovery, and Integration (UDDI)

DETAILED WEB SERVICES PROCESS

Figure 1: The process flow of a Web service

Terms in Mobile Application

Service Oriented Architecture: In software engineering, a service-oriented architecture (SOA) is a set of principles and methodologies for designing and developing software in the form of interoperable services. These services are well-defined business functionalities that are built as software components (discrete pieces of code and/or data structures) that can be reused for different purposes.

Terms in Mobile Application

SOA:

CLASS/ PATTERN	QUERY/REPLY	ASYNC	PUB/SUB
Access	NATURAL LANGUAGE PARSER (Atomic)	UPDATE CUSTOMER PROFILE (Atomic)	
Business	FIND BEST FARE (Composite) AVAILABILITY & PRICE (Atomic)	GET PROMOTIONS (Atomic)	AIRLINE SPECIAL FARE (Atomic)
System	ENCRYPT CUSTOMER DATA (Atomic)		

Cloud computing: is the practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer. It is the Virtualisation of computer hardware or services. These services are accessed without needing to know physically where the service is or how it is run. Google Mail is an example of a cloud computing service. Cloud computing aims to saving money or increase computer throughputs.

Mobile App in Operations

IDEF0 Diagram
Integration Definition
For Function Modeling:
is a modeling language for developing a graphical representation of a system

Integration Definition for Function Modeling (IDEF0) of Mobile Application

Controls:
- Data access
  - User authentication
  - User authorization level
- Data modeling
- Data structures
- Data stores
- Data presentation

Input:
- Mobile App Data
  - User data
  - Supplier data
  - Raw material data
  - Work-in-progress data
  - Primary data
  - Secondary data
  - Distributor data
  - Asset location data

Mobile App

Output:
- Query results
- Product status
- Tracking
- Inventory

Mechanism:
- Query processing
- Business Process Modeling
- Web services
  - XML
  - SOAP
  - WSDL
  - UDDI
- Service Oriented Architecture
- Cloud Computing

Risk Assessment

Risk No.	RISK	I	Po (%)	I Rank	Po Rank	Borda Count	Borda Rank	R
3	Competitive Market	Severe	70%	2.50	1.00	6.50	0	M
2	Customer Buy-In	Critical	50%	1.00	4.00	5.00	1	H
4	Exceed initial start up budget	Severe	60%	2.50	2.50	5.00	1	M
1	Technical inexperience	Moderate	60%	4.50	2.50	3.00	3	M
5	Economic outlook	Moderate	20%	4.50	5.00	0.50	4	M

Companies with Mobile Apps

- Maximo Mobile Inventory Manager (IBM)
- Mobile (Conduit)
- Smart Inventory Manager (Syclo)
- Enterprise Mobility Solutions (@hand)
- Flatworld Solutions
- Mobile Apps development (MindInventory)

Companies with Mobile Apps

Maximo Mobile Inventory Manager

- manage remote and mobile asset data with mobile inventory devices
- perform physical cycle counts
- perform issues, returns, and transfers
- utilize barcode and RFID capabilities for mobile inventory tracking and management
- exchange data with Maximo server using the method best suited for your operating environment: real-time wireless, dial-up, or docking cradle
- store and forward data when continuous connections are not feasible

Companies with Mobile Apps

Mobile
- creates apps for multiple OS: iPhone/iPad, android, Windows Phone
- no programing experience needed
- create apps from scratch
- customize to suit

Companies with Mobile Apps

Smart Inventory Manager
- accelerate physical and cycle counts using drop-downs, wizards, and keypad entry
- track materials by number, work order/service request, location, bin,etc.
- built-in support for leading peripherals, including barcode, RFID, and voice
- keep materials properly organized, tagged and recorded for just-in-time inventory
- maintain an e-audit trail of materials and parts including cost, value, and location

KEEP TRACK OF TOOLS & PARTS

SPEED UP INVENTORY OPS

REDUCE COSTS

Companies with Mobile Apps

Enterprise Mobility Solutions
- improve workforce productivity
- reduce paperwork and errors
- improve accuracy of inventory information
- demand accountability for every transaction

Solution features
- receiving
- delivery confermation
- materials issues
- returns and turn-ins
- physical inventory
- bin transfers
- storeroom moves
- stock search
- electronic signature
- barcode scanning
- workbench approval
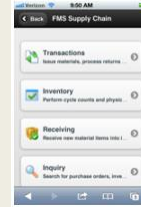
Companies with Mobile Apps

Flatworld solutions
- continuous access to inventory and sales information
- use Wi-Fi to create customers, vendors, items, orders, and more
- orders from suppliers
- recieving
- barcode scanning
- location transfers
- print reciepts
- shipping
- work order picking
- capture signatures
- inventory counts and adjustments
- track lots and serial numbers
- take orders from custormers
- designed for: iPhone, android, BlackBerry, windows Mobile, symbian, J2ME, and Palm

Companies with Mobile Apps

Mobile Apps Developement

- create a custom app
- native mobile application development: iPhone, iPad, Android, HTML5
- mobile web development
- hire a developer for iPhone, iPad, Android, Windows, BlackBerry, or Symbian

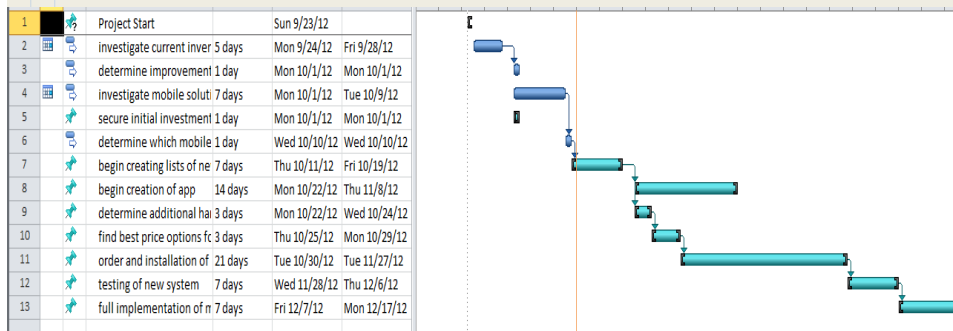| iPhone Application Development | Android Application Development | Windows Application Development | iPad Application Development | Symbian Application Development | BlackBerry Application Development | Android Tap Application Development |
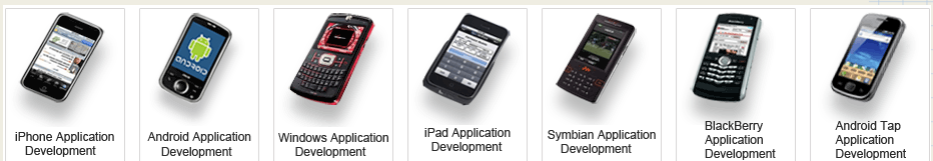
Schedule plan for Pilot Project

- Tasks/Subtasks and durations

			Task	Duration	Start	Finish
1			Project Start		Sun 9/23/12	
2			investigate current inver	5 days	Mon 9/24/12	Fri 9/28/12
3			determine improvement	1 day	Mon 10/1/12	Mon 10/1/12
4			investigate mobile soluti	7 days	Mon 10/1/12	Tue 10/9/12
5			secure initial investment	1 day	Mon 10/1/12	Mon 10/1/12
6			determine which mobile	1 day	Wed 10/10/12	Wed 10/10/12
7			begin creating lists of ne	7 days	Thu 10/11/12	Fri 10/19/12
8			begin creation of app	14 days	Mon 10/22/12	Thu 11/8/12
9			determine additional har	3 days	Mon 10/22/12	Wed 10/24/12
10			find best price options fo	3 days	Thu 10/25/12	Mon 10/29/12
11			order and installation of	21 days	Tue 10/30/12	Tue 11/27/12
12			testing of new system	7 days	Wed 11/28/12	Thu 12/6/12
13			full implementation of n	7 days	Fri 12/7/12	Mon 12/17/12

References

[1] Schonberger, Richard J. "Just-In-Time Production Systems: Replacing Complexity with Simplicity in Manufacturing Management", *Industrial Engineering*, Oct 1984, pg 52-63

[2] Lin, P "Mobile Computing Systems," *Mobile Application Data, Lecture Note ,2012*

[3] "Data access," *Wikipedia, the free encyclopedia*. 08-Oct-2012.

[4] "Data modeling," *Wikipedia, the free encyclopedia*. 08-Oct-2012.

[5] "Data store," *Wikipedia, the free encyclopedia*. 08-Oct-2012.

[6] "Data structure," *Wikipedia, the free encyclopedia*. 08-Oct-2012.

[7] "Business Process Modeling," http://www.businessballs.com/business-process-modelling.htm

[8] "Web Services," http://www.webopedia.com/TERM/W/Web_Services.html

[9] "Web Services," http://www.internetnews.com/dev-news/article.php/3441211

[10] "Service Oriented Architecture," http://www.enterprise-architecture.info/Images/Services%20Oriented%20Enterprise/EA_Service-Oriented-Architecture1.htm

[11] "Clould Computing," http://www.blippitt.com/2010-new-oxford-american-dictionary-new-words/

[12] "Cloud Computing," http://www.ivec.org/glossary

[13] "IDEF0 - Integration and Definition for Function Modeling," *Wikipedia, the free encyclopedia*. 08-Oct-2012