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Fulfilling Retail Expectations with Mobile

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Agenda

- Retail business background
- Warehouse stock control
- The mobile use-case
 - Prototype and Proof of Concept
- Exploiting mobile capability: now & future



- The mobile business case: Lean Process Optimisation
 - Indicative savings of \$2.32M per year
- Looking ahead...



Retail Business Background

Top 5 Largest WW Retailer

>\$100Bn

2013 Revenue

6,000+ Stores across the world

75 million Shopping trips/ week

> Nearly 100



The Chief Technology Officer Challenge

► 5 year infrastructure strategy and roadmap session with the Chief Technology Officer



Ability of core mainframe systems to deliver DevOps, Cloud, Mobile solutions Securely

"You can do mobile on a mainframe? Really?"

"Show me"



Warehouse stock control



Warehouse Stock Control

- A key area of differentiation for Retail is in the Supply Chain
 - Using advanced technology, they support a modern, efficient & cost-effective supply chain
- Operating over 25 Distribution Centres in one country
 - Totaling over 11.5 million sq. ft.
 - Operating 365 days/yr; 24 hours a day 7 days a week
- Underpinning its fulfillment process is their Warehouse Management System (WMS)
 - A CICS application delivered on a z Enterprise
 - Provides logistics, stock process and flow in all DCs across the country
 - That's over 40 million cases. Every week!



Warehouse Stock Control: Use-cases for Mobile

- The WMS provides a rich set of functions for warehouse staff
 - Today the WMS is accessed via a console, as an extensive menu sub-system
 - For this piece of work, focus was given to 2 key functions / use-cases provided by the WMS
 - Use-cases that would be valuable to access via a mobile device
- 1) Order Fulfillment Progress
 - Stock must be picked, packed and made ready for distribution by end-of-day truck collection
 - Managers use this information to optimally allocate staff
 - As a result, the manager must cross the floor (500,000 sq ft) throughout the day to ensure appropriate progress
- 2) Internet Direct 'Orders Held'
 - Specific high-value orders from the internet can be held, potentially for premium customer service or delivery
 - Warehouse managers review these orders and allocate the most appropriate delivery service





WMS Access: Today

- ► The WMS provides a rich set of functions for warehouse staff
 - Accessed via a 3270 console, as an extensive menu sub-system

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WMS Access: Challenges of mobile - Screen size

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WMS Access: Challenges of mobile - Keyboard



WMS Access: Challenges of mobile - Menu navigation

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Prototype and Proof of Concept



WMS Mobile Proof of Concept Overview

- In order to assess the viability of mobile-enabling the WMS, a proof of concept was undertaken by the Client and IBM teams
- The objectives of the proof of concept were to:
 - Identify a few key functions that would be valuable to be made available throughout the DC
 - Assess the effort required to make the necessary functions available on a mobile device
 - Identify ways to simplify the user interface (UI) with the use of mobile app technology
 - Explore the possibility of extending WMS functions through the use of colour-coding
 - Exploit the mobile UI to more naturally render KPIs and charts of information

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WMS Mobile PoC: The technical challenge

- The technical challenge was to take the existing WMS CICS application and make it available to multiple mobile devices in the form of a consumable mobile app
- There are many options available today for mobile-enabling a mainframe applications
 - Messaging paradigms, such WebSphere MQ
 - Web Services [SOAP over HTTP/s]
 - Direct mobile technologies, such as JSON
 - Bridging technologies, such as Link3270
 - Direct RESTful interfaces (z/OS Connect)
- Specific business requirements
 - Make bare minimum of changes to the CICS system
 - Make absolutely no changes to the WMS application
 - Exploit the existing Linux for System z implementation
 - Deliver this PoC as rapidly as possible: days/ weeks not months
- ► The in-built bridging technologies were chosen call the WMS application
- ► IBM Worklight on Linux on z was chosen to deliver the mobile app capability



Denver Mobile PoC: Solution Components

The key components of the solution included:

- The Denver Warehouse Management System, based on CICS Transaction Server 4.2
- A custom-designed mobile app for Android and iOS, built using Worklight Studio 6.1
- A set of re-usable adapters for integration and packaged function using Worklight Server 6.1
- An enterprise app store using using the Worklight App Center



WMS Mobile PoC: App Screen-flows (1) Order Summary



WMS Mobile PoC: App Screen-flows (2) KPI Dashboard



WMS Mobile PoC: App Screen-flows (3) Colour extension



WMS Mobile PoC: Current and future Worklight exploitation



The mobile business case Lean Process Optimisation



Mobile-enabling WMS: Lean Process Assessment (1)

- In order to determine the business impact and potential benefit of mobile-enabling WMS, the IBM team undertook a Lean use-case assessment in parallel to the technical engagement
- Supply Chain Management is a key part of the Retail business model
 - Distribution processes, systems and network of DCs are designed to maximise efficiency
 - Labour scheduling and transport planning systems are designed to enable pickers and drivers to operate highly effectively
 - Distribution networks are optimised to minimise the mileage needed to get products to store in perfect condition
- Warehouse Problem Statement highlights
 - Total space of 13 million sq. ft. of warehouse
 - Spread across 25 Distribution Centres
 - Each DC is supervised and run by 4 managers
 - DC managers can cross the floor up to 10 occasions
 - They may spend up to 10 mins each time in doing so





Mobile-enabling WMS: Lean Process Assessment (1)

- 100 managers making 10 trips of 10 mins back to their screen a day
- 100 x 10 x 10 = 10,000 mins/day walking across the DC across all the managers
- 10,000 mins/day x 5 days a week x 48 weeks a year = 2,400,000 mins/year or 40,000 hrs
- Fully burdened rate of a DC Manager = \$105k per annum
- Cost per hour of a managers time = 105,000 / 48 weeks / $37\frac{1}{2}$ hours = -58 per hour
- Cost of wasted walking time = 40,000 hours x \$58 = \$2,320,000 per annum
- This works out at about \$6,390 per day

If Worklight costs \$100K then this business case pays for itself in ~16 days!



Summary: Mobile-enabling WMS CICS application

- Working closely together as a joint IBM/Client team, the PoC was a great success!
- The team were successfully able to:
 - Get access into the CICS system in a matter of days
 - Exploit access using Worklight adapters in 1 week
 - Develop a simple-to-use mobile app in 1 week
 - Optimize the 8-level sub-menu to a 3-level sub-menu
 - A team of 3 IBM specialists and 2 Client specialists
- What's next...?
 - IBM Worklight was acquired to mobile-enable WMS in Dec 2013
 - Work progresses in earnest to deliver this in production
 - Extend the original scope for additional use-cases
 - Expand the architecture for production-ready deployment
- And then...?
 - The retailer runs many strategic applications on System z, such as:
 - Store replenishment & Global ordering Systems
 - Global logistics management
 - All of which could benefit from mobile access



