A close look at software Infrastructure business
(Design, Development & Processes)
University of Washington
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CTO & co-founder
4thpass Inc.

Agenda

- 4thpass Overview
- Product History
- MAS Overview (Mobile Application System)
- Development Challenges
- Product Lifecycle Overview
- Engineering Process
- What improvements are needed?
- So what does it take to be successful in software field?
- Discussion
4thpass Overview

- Headquarters: Seattle, WA
- Founded in 1997 (self-funded)
- Current headcount: 68
- Technology focus on Wireless Provisioning Infrastructure
- Series ‘A’ funding in May 2001 (OVP, Invest Corp, Motorola & Nextel)
- Acquired by Motorola in September 2003
- Active member of various standard bodies world-wide (JSR 118, JSR 124, JSR 185, OMA, GSMA)
- Leading next generation technologies development to support 3G and other end-to-end data services initiatives

Product History

- Initial focus on ‘Obfuscation’ technology and Java deployment on clients. Targeted niche market with ‘SourceGuard’ product upon launch of company in 1997.
- Captured 70% of market within 18 months of launch of SourceGuard. Product focused on User Interface and ease of use. Three flavor of product: Enterprise, Professional and Basic.
- Launched KBrowser (micro-browser) in 1999. Launched on Palm platform and preview on Java using the earliest standards, evolving finally into support for MIDP 1.0. Customers: LG Telecom, RIM
- Became apparent that the bigger problems lie in getting applications to handset – Mainly in field of security, billing and authentication. Started design & development of Mobile Application System in fall 1999
- Commercial release of MAS in fall 2000
- First MAS customer - LG Telecom, Korea
- Next MAS Customer – Telefonica Global (Spain)
- Current Customer base: LG Telecom, Telefonica, Nextel, mmO2, China Mobile (CMCC), T-Mobile (USA)
- Potentially 200 million+ customer on MAS system
MAS Overview

End-to-End Carrier Grade Provisioning System for Mobile Applications - Secure, Scalable, fault-tolerant, Modular, Componentized Framework based Application Provisioning System supporting Java and other contents (ring tones, wall papers, smart phone applications).

MAS Functional Areas

- Content Management
- Catalogue Generation
- Device Management
- Subscriber Management
- Personalization Management
- Billing Management
- Proactive Security support
- Web based Server Management
- High Scalability and fault-tolerance support based on horizontal & vertical deployment configuration Support
MAS Architecture Overview

**Development Challenges**

- Maintaining quality of product and at same time releasing product with short cycles
- Maintaining Scalability and fault-tolerance to meet stringent SLAs (Service Level Agreements) that operators want.
- Being nimble and at same time maintaining design and architecture integrity
- Operational challenges: Limited resources, market convergence, organizational challenges with increase in team size
- Commoditization of product: More competitors joining fray – without same feature set but saying ‘yes’ to RFIs anyway!
**Product Release Cycle Overview**

- **Marketing & Emerging Technologies**
  - Problems needs
  - Technical Feasibility
  - Proof of Concept Prototyping

- **Product Management**
  - Marketing Feasibility
  - Requirements
  - Time to Market
  - Priorities
  - MRD
  - Functional Spec
  - UI Illustrations

- **Research & Development**
  - Engineering Feasibility
  - Engineering Planning
  - Preliminary Design
  - Critical Design
  - Implementation
  - Unit Test
  - Integration
  - Alpha Test
  - Beta Release

- **Deployment & Support**
  - Beta Deployment & Test
  - Product Release
  - Acceptance Test
  - Commercial Deployment
  - Post-deployment Support

**Engineering Excellence**

- **Key Areas being focused upon**
  - Fine grained control
  - End-to-end Traceability
  - Focus on Quality

- **Architecture & Design Integrity**
  - Architecture is alive and changes to address new requirements.
  - Architectural integrity is Key. Without it, becomes hard to maintain consistency.

- **Design Methodology being followed**
  Feature Driven Development (modified)
FDD – an agile methodology

1. Develop an Overall Model
2. Build a Feature List
3. Plan By Feature
4. Design By Feature
5. Build By Feature

Marketing participates MRD input
Carefully Analyze MRD
Prioritize and plan Code development
Build code in small batches

Wide rather than deep
Deep rather than wide

FDD – How it works

Feature List

Subject Area
- Feature Set
- Feature Set
- Feature Set
- Feature Set
- Feature Set

Subject Area
- Feature Set
- Feature Set
- Feature Set
- Feature Set
- Feature Set

Subject Area
- Feature Set
- Feature Set
- Feature Set
- Feature Set
- Feature Set

Individual Features

A stockpile of inventory
## Project Overview

<table>
<thead>
<tr>
<th>Features</th>
<th>Issues</th>
<th>Milestones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Started</td>
<td>Completed</td>
<td>Total Open</td>
</tr>
<tr>
<td>Not Started</td>
<td>Started</td>
<td>Watch</td>
</tr>
</tbody>
</table>

### Issue List

<table>
<thead>
<tr>
<th>ID</th>
<th>Issue Description</th>
<th>Assigned to</th>
<th>Planned date</th>
<th>Subscribed on</th>
<th>Features affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Development database down.</td>
<td>Long Hoang</td>
<td>11/4/02</td>
<td>907, 509, 509, 511, 511, 517, 518, 518, 520, 521</td>
<td></td>
</tr>
</tbody>
</table>

### Subject Area Summary

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Features</th>
<th>Started</th>
<th>Completed</th>
<th>Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Management</td>
<td>33</td>
<td>47</td>
<td>159</td>
<td>47%</td>
</tr>
<tr>
<td>Device Management</td>
<td>25</td>
<td>0</td>
<td>69</td>
<td>31.84%</td>
</tr>
<tr>
<td>Rules Engine</td>
<td>17</td>
<td>7</td>
<td>8</td>
<td>57.62%</td>
</tr>
<tr>
<td>Filtering</td>
<td>6</td>
<td>6</td>
<td>12</td>
<td>50.93%</td>
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<tr>
<td>SOAP API</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0.93%</td>
</tr>
<tr>
<td>Transport</td>
<td>34</td>
<td>0</td>
<td>48</td>
<td>31.73%</td>
</tr>
<tr>
<td>Subscriber Management</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0.93%</td>
</tr>
<tr>
<td>Admin and Deployment</td>
<td>0</td>
<td>0</td>
<td>62</td>
<td>0.93%</td>
</tr>
<tr>
<td>Navigation</td>
<td>17</td>
<td>0</td>
<td>20</td>
<td>59.43%</td>
</tr>
<tr>
<td>Messaging</td>
<td>0</td>
<td>0</td>
<td>46</td>
<td>0.93%</td>
</tr>
<tr>
<td>Digital Rights Management</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>0.93%</td>
</tr>
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</table>

### CPW Summary

<table>
<thead>
<tr>
<th>ID</th>
<th>Brief Description</th>
<th>Issues Open/Blocked</th>
<th>Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DeviceTypeManager - bundle parsing</td>
<td>0/0</td>
<td>99.0%</td>
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<tr>
<td>12</td>
<td>FilterManager - pipeline configuration and basic filtering</td>
<td>0/0</td>
<td>0.0%</td>
</tr>
<tr>
<td>15</td>
<td>FilterManager - caching and device compatibility updates</td>
<td>0/0</td>
<td>0.0%</td>
</tr>
<tr>
<td>14</td>
<td>DeviceTypeManager - load and store functionality</td>
<td>0/0</td>
<td>99.0%</td>
</tr>
<tr>
<td>15</td>
<td>Incompatibility Reasons</td>
<td>0/0</td>
<td>0.0%</td>
</tr>
<tr>
<td>16</td>
<td>FilterManager - Rules Engine</td>
<td>0/0</td>
<td>100.0%</td>
</tr>
<tr>
<td>17</td>
<td>Content Scanning and Verification</td>
<td>0/0</td>
<td>100.0%</td>
</tr>
<tr>
<td>18</td>
<td>First Content Browser</td>
<td>0/0</td>
<td>99.0%</td>
</tr>
<tr>
<td>19</td>
<td>Delivery Manager Implementation Multiple - XML for MIME/HTTP, Java for HTTP</td>
<td>0/0</td>
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</tr>
<tr>
<td>20</td>
<td>Content Management: Screen Savers and Killswitch</td>
<td>0/0</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

## Feature List

### List of Features

<table>
<thead>
<tr>
<th>ID</th>
<th>Feature Name</th>
<th>Type</th>
<th>Subject Area</th>
<th>Feature Set</th>
<th>Complexity</th>
<th>Complete date</th>
</tr>
</thead>
<tbody>
<tr>
<td>427</td>
<td>Normalize boolean expression</td>
<td>PC</td>
<td>Rules Engine</td>
<td>Initialization</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>428</td>
<td>Generate Rule/Filter from normalized expression</td>
<td>PC</td>
<td>Rules Engine</td>
<td>Matching</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>429</td>
<td>Get relevant content profiles from device</td>
<td>PC</td>
<td>Rules Engine</td>
<td>Matching</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>430</td>
<td>Get Rule/Filter from context profile</td>
<td>PC</td>
<td>Rules Engine</td>
<td>Matching</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>411</td>
<td>Get possible Delivery Methods for content profile</td>
<td>PC</td>
<td>Rules Engine</td>
<td>Matching</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>412</td>
<td>Rule/Filter from Delivery Method</td>
<td>PC</td>
<td>Rules Engine</td>
<td>Matching</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>413</td>
<td>Rules Engine</td>
<td>PC</td>
<td>Rules Engine</td>
<td>Matching</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>414</td>
<td>Determine Incompatibility Reasons</td>
<td>PC</td>
<td>Rules Engine</td>
<td>Matching</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>420</td>
<td>Match Category with Filter/Component</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>421</td>
<td>Filter Category using Access/Filter</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>422</td>
<td>Filter Physical/Component using Device/Compatibility Filter</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>423</td>
<td>Filter Application/Physical/Component using ARS/Security Filter</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>424</td>
<td>Build Filter/Component using Filter/Configuration</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>425</td>
<td>Update Filter/Cache for added Filter/Component</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>426</td>
<td>Update Filter/Cache for removed Filter/Component</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>427</td>
<td>Update Filter/Cache for added Category</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>428</td>
<td>Update Filter/Cache for removed Category</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>429</td>
<td>Update Filter/Cache for added Filter</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>430</td>
<td>Update Filter/Cache for removed Filter</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>431</td>
<td>Update Filter/Cache for added Filter/Component</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>432</td>
<td>Update Filter/Cache for removed Filter/Component</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>433</td>
<td>Update Filter/Cache for added Category</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>434</td>
<td>Update Filter/Cache for removed Category</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>435</td>
<td>Update Filter/Cache for added Filter</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>436</td>
<td>Update Filter/Cache for removed Filter</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>437</td>
<td>Validate Filter/Cache type for the Filter</td>
<td>PC</td>
<td>Filtering</td>
<td>Filtering</td>
<td>3</td>
<td>100.0%</td>
</tr>
<tr>
<td>438</td>
<td>SOAP API additions</td>
<td>PC</td>
<td>SOAP API</td>
<td>SOAP</td>
<td>3</td>
<td>0.0%</td>
</tr>
<tr>
<td>439</td>
<td>Log Purchase Agreement on Billing Event</td>
<td>PC</td>
<td>Content</td>
<td>Logging content events</td>
<td>2</td>
<td>0.0%</td>
</tr>
<tr>
<td>440</td>
<td>Log Downloaded Attempt</td>
<td>PC</td>
<td>Content</td>
<td>Logging content events</td>
<td>2</td>
<td>0.0%</td>
</tr>
</tbody>
</table>
Subject Area

Feature Set
What Improvements are needed?

- Communication: Working towards improving communication between team members is very high on my agenda.
- Learn from past: Mistakes are not bad – as long as one learns from mistake. More so in an environment with pressure to succeed.
- Make it more enjoyable and challenging: If one enjoys work and feels challenged, it improves team morale and team works more efficiently.
- Improve on processes as we learn, to make them more efficient and practical.
- Training: Keep team updated on new paradigms and help individual to improve, thus improving team functionality.
- This year focus on three things: Improved Responsiveness, Improved Quality & Improved Bench Strength.
So, What does it take to be successful in software field?

- Technology is ‘mean’ to a business ‘end’: Understand business reasons behind technology that you are asked to build.
- Don’t be afraid of processes – they are there to make life easier, and not harder. Always keep in mind though: you run the processes and not other way around.
- Don’t be afraid of asking questions – if something does not make sense, challenge it.
- Understand bigger picture – not just what you are working on, but where it fits in the bigger picture. It will make you build better and practically usable software.
- Enjoy what you do – don’t do it for sake of doing it. If you enjoy what you do, its bound to show up in your work.
- Work hard – there is no substitute for it. There are no shortcuts. Work hard and doors will automatically open for you.
- “Always aim for stars. Even if you miss, you may end up falling on moon”.

Questions?

- So – what can I answer for you?