Architecture of Enterprise Mobile Apps

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Setting the context

Business trends – need for speed and agility
- Highly competitive, global marketplace
- Increasing speed of new product development and process improvements
- Diverse and increasingly mobile workforce
- Relentless pursuit of productivity improvements
- Shift to dynamic, global, cross-functional teams spanning internal units and multiple organizations

IT trends – challenging the status quo
- Consumerization of IT – user experience matters
- Social, people-centric IT solutions for collaboration
- Role-based workspaces, mashups and composite apps
- Beyond “build vs buy” vertically integrated IT solutions
- Data explosion and need for information delivery / exploitation at all levels of organization
IT application landscape is evolving

With consolidated transactional systems, data integration / warehouses, process integration in place, what’s next?

- More sophisticated information exploitation
- Integrated user experience
- Context-aware information delivery
- More fine-grained triage of business processes, supporting high-end knowledge workers in handling complex cases
- Further integration along the value chain – with customers, suppliers and partners
Typical usage scenarios for mobile enterprise apps

- Dashboards and reports
- Customer information
- Reviews, approvals, lightweight workflow
- Document management
- Collaboration
- Access to information in the field (client, managers, risk engineers, operations personnel)
Role-based workspaces, mashups and composite apps

- User-centric approach, with composite apps shielding the users from the complexity of the underlying IT landscape
- Role-based workspaces, integrating transactional data, document management, business intelligence, collaboration, general productivity
- Leveraging Service-Oriented Architecture and existing IT systems
Mobile platforms in the enterprise

- Usage scenarios vary between the enterprises
- Typically less platform fragmentation than in the consumer market – 2-3 corporate platforms (iOS, Android, Blackberry)
- Smartphones vs tablets
- Tablet form factor enables a different kind of enterprise apps
There are multiple architecture options possible

1. Mobile web apps
2. Embedded mobile web apps with native container (e.g. PhoneGap)
3. Hybrid apps (native container, native extended capabilities, HTML5 for certain content/layout)
4. Native apps
What are the considerations when defining the architecture?

- Actual use cases and available IT infrastructure
- Offline usage scenarios and requirements
- Certain data processing scenarios (e.g. handling large documents, background work)
- Embedded mobile web apps option is becoming more viable over time, but
  - Need to mature further
  - Further performance improvements are needed
  - Ease of development vs complexity of debugging and tuning of UI
  - Some use cases are pushing the boundary of what’s possible
  - User experience: “somewhat OK” vs “uncompromising, the wow factor”

- **If you are starting today:**
  - mobile web architecture for simpler online apps
  - native/hybrid architecture for more complex occasionally offline apps
  - experiment with embedded HTML architecture until you feel comfortable (e.g. converting simple online mobile web apps)
Example:
Hybrid iOS enterprise apps

A hybrid technology is used, with iOS container and a combination of native iOS Objective-C and HTML5 components for the content.

Depending on the use cases and usability considerations the degree of native iOS and HTML5 code can vary.

For example, reports can be pre-rendered in HTML5 and provisioned to the frontend for rendering.

Secure Web Services can be used to handle the communicate between the Mobile Client and Composite Integration Services.

### iOS Container/Framework

- **Objective-C content components**
- **HTML5 content components**

  - Authentication
  - Decryption
  - Caching / offline storage
  - Data synchronization
  - Authorization
  - Communication

### Composite Integration Services Framework

- **Data Aggregation components**
- **Data Transformation Components**
- **Smart Caching Logic Components**

  - Encryption
  - Authorization
  - Communication

### Backend Services
What about operational architecture?

- Depending on the IT landscape, integration with mobile clients can be done in a number of ways:
  - VPN connection (either password or certificate based) for direct access to intranet resources
  - HTTPS connection with client authentication for accessing specially exposed resources in the DMZ

- It is recommended to have an MDM solution for device management, policies provisioning and apps deployment

- Composite server which provides all services to iOS devices sits in the DMZ and has special access to selected intranet services
- iOS apps connect only to the composite server
What about security architecture?

- Security measures can be adjusted depending on the application and the sensitivity of handled information.
- iOS devices should be MDM-managed and security policies should be enforced (device passcode, apps restriction, jailbreak detection, etc).

Alongside default business security features of the iPad, additional features are recommended for the highly sensitive information:

- Communication encryption
- Caching of sensitive data in encrypted form with the decryption key available only on the server
- HTTPS connection with client certificate authentication is recommended when connecting to the server
- It is possible to enroll a single client certificate for use by all company applications, which simplifies management, maintenance and the whole process is automated and user friendly.
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