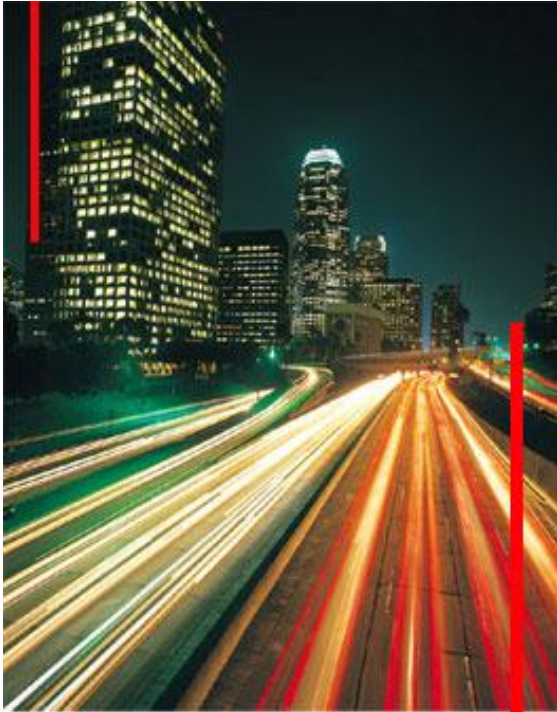# Architecture of Enterprise Mobile Apps

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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

c:t:co
Dynamic World. Stable Solutions.

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
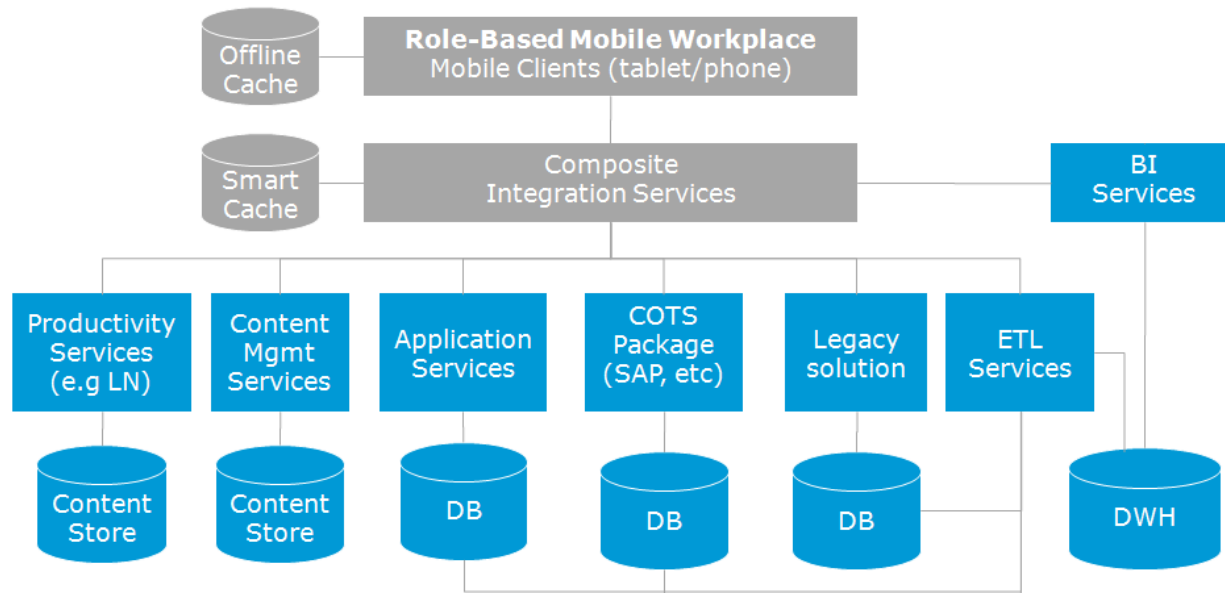
Typical usage scenarios for mobile enterprise apps

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

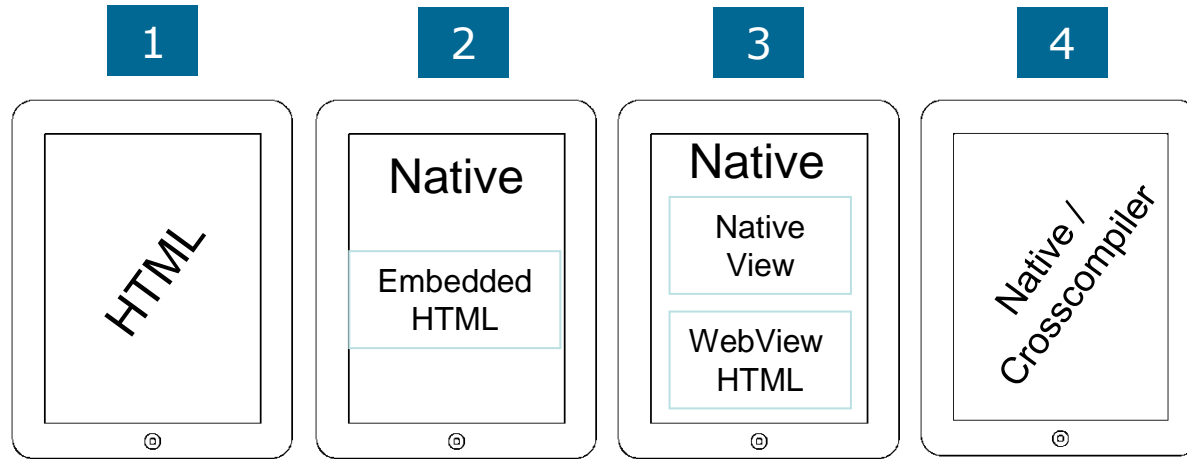# Role-based workspaces, mashups and composite apps

- 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 **2** **3** **4**

1	HTML
2	Native / Embedded HTML
3	Native / Native View / WebView HTML
4	Native / Crosscompiler

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

iOS Container/Framework

Objective-C content components	HTML5 content components

Authentication	Decryption
Caching / offline storage	Data synchronization
Authorization	Communication

Composite Integration Services Framework
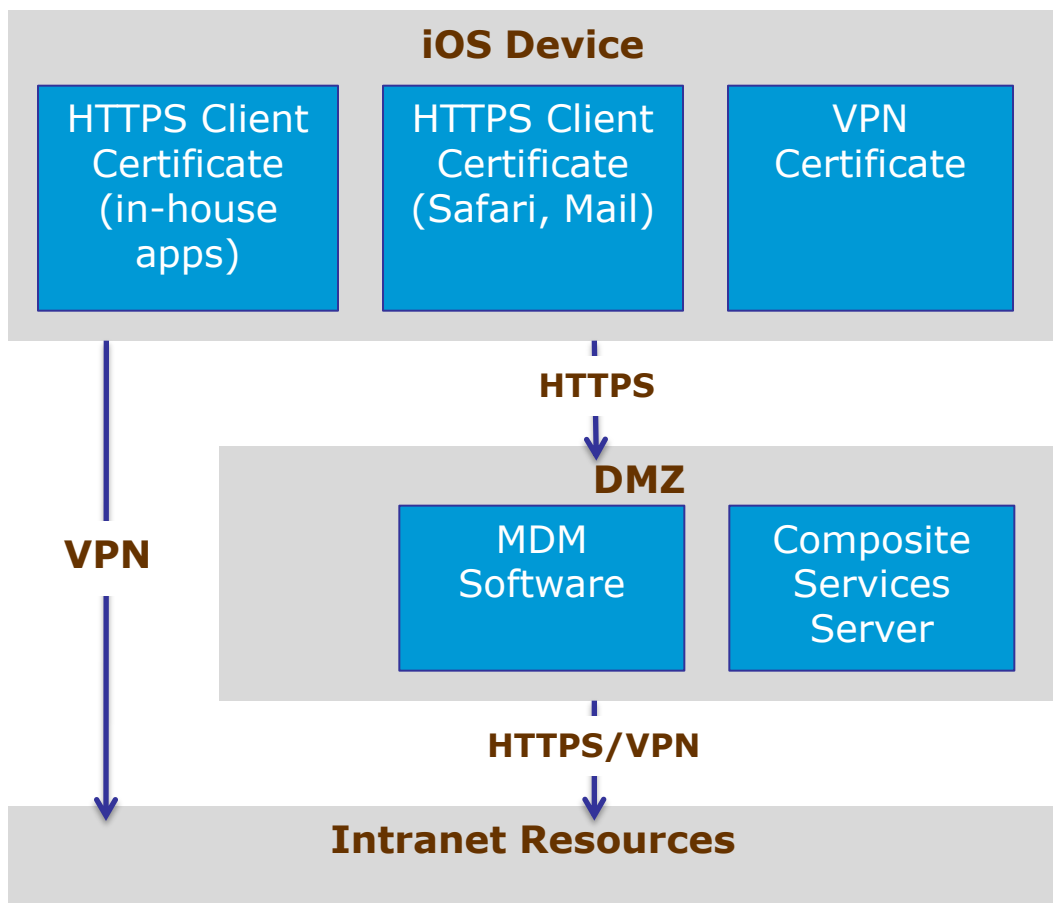
Data Aggregation components	Data Trasformation Components	Smart Caching Logic Components

Encryption
Authorization
Communication

Backend Services

- 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

What about operational architecture?

iOS Device

HTTPS Client Certificate (in-house apps)	HTTPS Client Certificate (Safari, Mail)	VPN Certificate

HTTPS

DMZ

MDM Software	Composite Services Server

VPN

HTTPS/VPN

Intranet Resources

- 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