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1 Executive Summary

The ‘mobile space’ has witnessed tremendous momentum in the recent past. New-generation mobile devices and applications are radically transforming the current state of business across industries. This rapid proliferation of smart devices is an indicative measure of the tremendous potential of ‘mobility as a channel’ and guarantees a phenomenal business growth in the times to come. Superior experience, along with a boost in productivity, is gradually blurring enterprise boundaries and providing a better engagement model between customers, partners and employees of an organization.

As mobility achieves enterprise adoption, there is an evident shift from typical ‘point-based’ solutions to a full-blown platform, commonly referred to as Mobile Enterprise Application Platform (MEAP). In this white paper, we have cross-evaluated MEAP with some other commonly followed approaches for mobile-enabling applications. Since every business problem is unique in itself, the challenge lies in analyzing and identifying the right approach or mobile strategy best suited to a business. Being the most diverse and rapidly evolving channel, it is utterly complex to design a mobile strategy for achieving enterprise mobility.

We recommend a ‘3 Step Approach' that can help organizations get started in crafting the right strategy. In the process, we touch upon various models of mobile application development, exploring the pros and cons of each. Finally, we infer some key advantages of implementing a platform-centric strategy for an enterprise and understand why MEAP is becoming the de-facto standard for enterprise mobility.

We also examine the core components of MEAP, its various types and benefits.

2 What is ‘Smart’ about Smart Devices?

Call and email-centric phones are being progressively replaced by fully loaded smartphones that are capable of running a range of applications, be they light-weight enterprise applications or critical corporate applications. Their inherently “personal” character, along with their ability to provide access on-the-fly, gives mobile channels a clear edge over the Web channel. Smart devices bring the best of both the worlds together -- features of a mobile phone alongside the capabilities of a personal computer -- thus providing real-time access to highly personalized information.

The following are some of the features that make these devices ‘Smart’:

- Access - anywhere, anytime
- Sophisticated networking and social media features
- Better computational capabilities
- Ability to run mission-critical applications
2.1 Business Value

Once limited to a small number of applications and catering to a small set of users, smartphones are increasingly used by enterprises to form more meaningful engagements with customers, increase user adoption, and provide new products and services directly to end-users.

The following are crucial areas where smartphones contribute toward business development:

- Enhance user efficiency and productivity
- Foster timely and informed decision-making
- Boost the overall reach and adoption of applications, both new and existing ones
- Reduce time-to-market and turnaround time for new products and applications
- Enhance customer service, support, and responsiveness.

2.2 Facts and Figures

Researchers from top agencies, including Gartner, Nielson, and Forrester, have clearly placed mobility as the most promising and profitable business for many years to come.

Here are some interesting facts and figures:

- As cited in a Gartner report published in January 2010, “By 2013, smartphones will overtake personal computers and emerge as the most common device for web access.”

![Global Mobile vs. Desktop Internet User Projection](image)

- In April 2010, Mary Meeker, an Internet Analyst, reported that smartphone and tablets are projected to outsell desktops and laptops by 2012.
- In January 2011, Mary Meeker forecasted that mobile Internet usage is expected to overtake fixed Internet usage by 2014.
As per Gartner, the mobile applications downloads market will be worth $58 billion worldwide by 2014.

3 The Opportunity

The statistics given in section 2.2 validate the fact that mobility will undoubtedly remain the most profitable technology in terms of business investments and returns. Mobility is still in its early stage of existence and smartphones are expected to play an even more important role in customer engagement and retention in the future. Herein lays the opportunity to adopt mobility tactically and strategically to reach out to customers, boost demand, and crunch time-to-market. The coming years promise an unprecedented growth in mobility accompanied by huge investments in the domain across industries.

4 The Challenges

Regular churn in mobile technologies and complementing frameworks have quickly changed the dynamics. As a result, within a short stint, the overall stability and maturity of this space has moved miles. Now is the time when organizations need to look back and re-analyze their mobile adoption roadmap and come up with a comprehensive strategy, tailored as per their business model.

4.1 Plethora of Devices

As more and more smart devices, built on different technologies and varying in size and functionality, hit the market each day, it can be overwhelmingly costly and time-consuming to develop and maintain mobile applications that support these wide-ranging devices.

This poses serious challenges to organizations which can further turn into nightmare, if not handled tactically.

Here is an interesting prediction by Gartner:

*The demand by enterprises for ‘mobile Web’ adaptation platforms will increase at a compound annual growth rate of 40% through 2014 – Gartner.*

4.2 Selecting the Right Platform

In order to increase audience reach, it is important to cater to multiple platforms than be restrictive to a single one. In the early stages of its evolution, all the mobile platform vendors were on a continuous run, trying to outplay their competitors with an intention to gain the maximum share.

The graph below from a Gartner report depicts how, in the initial stages, the market share cut evenly across primary platform vendors, leading to adoption of each platform by substantial numbers. While the large and ambitious organ-
izations tried to play safe adopting almost all the platforms, the small and mid-sized organizations were happy to stick to limited platforms.

**Mobile Platform Market Share**

![Mobile Platform Market Share](image)

4.3 **Ad-hoc Adoption**
In contrast to all other facts and figures discussed above, the prediction below raises an important concern about how organizations are approaching their mobile strategy. Currently, the overall approach to mobility is ad hoc and often focused on short term goals. This is a clear recipe for failure in the long run.

4.4 **Evolving Landscape**
The smart devices landscape is evolving at a rapid pace and older technologies are being literally wiped out by newer ones. Even as smart applications are being created in millions each day, the platform is constantly evolving and stabilizing. This makes the applications vulnerable and difficult to manage, especially when it comes to cross- and backward compatibility. This poses a huge risk of redundancy for companies wanting to build end-to-end functional mobile applications using current technologies.

4.5 **Security**
Given the inherent nature of smart devices – small size and portability -- security is by far the most important concern.

4.6 **BYOD (Bring your Own Device)**
The growing trend of using personal devices for official use (the BYOD trend) further increases vulnerability of enterprises hoping to use mobility to increase employee productivity.

4.7 **Mobile Usability**
Mobile experience is a radically different ball game in comparison to Web. The change in mindsets took a long time to set in, thus generating new guidelines of usability for smart devices. The following are some areas where these devices have some limitation(s):

> The real-estate of mobile devices is very limited, thus posing a unique challenge while chalking out the information architecture of an application.
The variety and diversities of these devices poses a great challenge to fit in visual assets seamlessly.
> The resource types (images, scripts, etc.) have to be prepared with utmost flexibility and clarity.
> Due to the limited set of keys in a device, the concept of ‘visual clue points’ becomes an important notion of usability
> The content breakdown and design of the navigation menu has to be consistent with the device or easily identifiable through visual queues

5 The Rescue

Organizations must rethink their enterprise mobility strategy to make it practical, scalable, and secure. Adoption of a full-blown enterprise platform such as MEAP could be the way forward for enterprises looking to develop a long-term mobility strategy that maximizes ROI.

MEAP is a framework used to develop, implement, and support multiple enterprise mobile applications. It addresses difficulties of developing mobile software by effectively managing the diversity of devices, networks, and user groups at the time of deployment and throughout the mobile solution’s lifecycle.

In order to chalk out an effective enterprise mobile strategy, a strong enterprise mobile strategy must not only addresses the current challenges gracefully but also exhibit the capability to accommodate future needs skillfully.

At times, it’s better to ‘step back’ than to ‘plan ahead.’ To extract the maximum, one needs to envision beyond the ‘low hanging fruits’ mindset. Plan now for the future.
6 3-Step Approach to Mobile Enterprise Strategy Development

In this section, we describe a step-by-step methodology to progressively find out which technological approach is best suited, given the set of criteria in hand and unique organizational needs. The idea behind this is only to provide a directional thrust to an organization, seeking to adopt a mobile strategy tailored to an organization’s needs.

**3-Step Approach to Mobile Enterprise Strategy Development**

**Step 1:**
- Analyze Evaluation Criteria

**Step 2:**
- Realize Organizational Factors

**Step 3:**
- Decision Matrix

**Native** (Java, Obj C, .Net)

**Mobile Web** (HTML5, CSS3, JS, Ajax)

**Hybrid Apps** (Web + Native)

**MEAP** (Mobile Enterprise Application Platform)
6.1 Step 1: Analyze Evaluation Criteria
The first step is to look back and analyze the mobile landscape in depth, and consider different segmentations, which also have further distinctions. The following figure depicts the application level segmentation:

![Application-Level Segmentation of Mobile Landscape Diagram]

- **Technology**
  - **Nature Type**:
    - Customer Facing
    - Business Applications
    - Enterprise Applications
  - **Rate of Change**:
    - High (regular updates)
    - Low (once in a while)
  - **Complexity**:
    - Intensive
    - Medium
    - Lower
  - **Security**:
    - High
    - Medium
    - Low
  - **Duration**:
    - Long Term
    - Short Term

- **User**
  - **User Base**:
    - Lean
    - Mid-sized
    - Large
  - **Concurrency**:
    - High
    - Medium
    - Low
6.2 Step 2: Realize Organizational Factors
Since every organization has its unique set of challenges and business drivers, their strategy specifics must also be exclusive and based on various physical, technical, and economical factors:

Factors that Define Mobile Strategy

Size & type of the organization

- Not every Organization needs a full-fledged platform like MEAP. A small company may not need the overhead.

- Large organizations, that need to deploy and support multiple apps on multiple device platforms may need to think of an MEAP

- Enterprises with BYOD policies, may evaluate MEAP vendors both on their ability to support multiple mobile platforms and their agility to adapt to new platforms.

Resource Skillset

- Reuse of existing skillsets or cross technology development

- Resources with any mobile device experience like WAP, J2ME, Symbian would also help.

- When considering a mobile strategy for your business, the ‘most influencing factors’ must include both the technology and the people. Even when using the “best” technology, a poorly executed implementation process will result in a poorly adopted or even unusable solution.

Think Ahead

- This is one of the most important factors which generally fall through the crack

- While you cannot ignore your existing mobility investments, you will also want to understand what would be possible with the mobility solution based on the latest and best industry practices and technologies.
6.3 Step 3: Derive Decision Matrix

Many vendors tout a rapid deployment time-frame of “a few days.” However, the question one must ask is, “does this quick, often cookie-cutter solution suit the specific demands of your business and users?” With a significant sum being invested in technology, it only makes sense to ensure the maximum ROI through a thorough implementation process.

### Decision Matrix

<table>
<thead>
<tr>
<th>Application Type</th>
<th>Lean</th>
<th>Mid-Sized</th>
<th>Large</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Customer Facing (B2C)</strong></td>
<td>Modification (High/Low)</td>
<td>Mobile Web Application</td>
<td>Native Application</td>
</tr>
<tr>
<td>Low</td>
<td>High</td>
<td>Mobile Web Application</td>
<td>Native Application</td>
</tr>
<tr>
<td><strong>Business Facing (B2B)</strong></td>
<td>Low</td>
<td>Mobile Web Application</td>
<td>Native Application</td>
</tr>
<tr>
<td>High</td>
<td>Low</td>
<td>Mobile Web Application</td>
<td>Mobile Web Application</td>
</tr>
<tr>
<td><strong>Enterprise Facing (Internal Enterprise Application)</strong></td>
<td>Low</td>
<td>Native / MEAP</td>
<td>MEAP</td>
</tr>
<tr>
<td>High</td>
<td>Low</td>
<td>MEAP</td>
<td>MEAP</td>
</tr>
</tbody>
</table>

7 Developing an Effective Enterprise Mobile Strategy

Drawing from our rich experience in handling a diversified mobile portfolio across various verticals, we enlist features/considerations that are vital for development of an **effective mobile strategy** within an enterprise.

While companies cannot ignore existing mobility investments, it is time to realign the existing strategies in line with industry best practices and adopt the MEAP framework. As observed from the above matrix, MEAP is a de-facto solution for generally all types of mobile enterprise applications. MEAP is not a single unit but is in fact a combination of different components that work cohesively to address all the challenges of developing an effective mobile strategy. The following diagram shows various MEAP components.
Please note that all MEAPs, whether custom or 3rd party, may not have all the components but a subset of it. In the following sections, we will explore the advantages of this platform along with different approaches to meet the goals of being device agnostic, easily manageable, and highly scalable.

7.1 Mobility Landscape Evaluation
A thorough analysis of the mobility landscape to identify existing challenges in consideration of specific mobility goals is an ideal beginning for development of an enterprise mobile platform. The landscape analysis must result in the development of a decision matrix that specifies the high-level scope of the enterprise strategy in terms of the following:

- Technologies and devices to be supported
- Market segments to be catered to in terms of user demography, geographies, and functionality
- Security paradigm to be incorporated.

7.2 Architecture
The architecture of an enterprise mobile platform must be forward looking to enable mobile solutions to scale in line with changing business needs and technologies. For example, in the current market scenario, an enterprise mobile platform would be incomplete without the following:

- Cloud optimization
- Support for Rapid Application Development (RAD)
Scalability via session-less architecture

The architecture must also lay emphasis on reuse of the existing infrastructure, systems, and device environments to reduce total cost of ownership.

7.3 Enterprise Workflow
Role-based access is one of the primary drivers of the overall workflow when it comes to data/system level authorization. From the time an employee joins an organization to the time he quits, a number of policies and regulations may define his access control limits.

7.4 Cross-Application Approach
Given the rapid pace of churn in mobile technologies and devices, it is important to ensure that newer mobile solutions remain connected with the older ones. The enterprise mobile platform must, therefore, be capable of handling the mobility needs of the enterprise as a whole, rather than proliferate the generation of disparate and disconnected mobile solutions.

It is also interesting to note the growing trend toward mobile Web applications as against native apps.

The following is a competitive study of the two:
## Native Mobile Apps and Mobile Web Apps

### Native Mobile App

**Pros**
- Takes advantages of mobile feature such as touch screen slide and device tilt events.
- App still functions when device is offline.
- Better performance syncing CMS data with app doesn't have to be done real time.

**Cons**
- Only available at app marketplaces.
- More effort needed to deploy to multiple devices.
- Mobile development platforms often don't deliver all advanced features without having to modify native code (Objective C, Java, etc.).

### Mobile Web App

**Pros**
- Reduce development complexity.
- Majority of developments involve configuring a mobile theme and a few key modules.
- Working knowledge of Drupal/HTML/CSS only.

**Cons**
- Features are limited to what traditional web browser offer.
- Not accessible if the device is offline or out of wireless range.
- Web browser differ considerably across devices, requiring significant browser testing.
The demand by enterprises for ‘mobile web’ adaptation platforms will increase at a compound annual growth rate of 40% through 2014. – Gartner.

**Mobile Enterprise Platform in the Mobile Ecosystem**

7.5  **Security**

Security forms the crux of an enterprise mobile platform. While the landscape evaluation helps put several security concerns into perspective, the mobile platform must also address emerging challenges such as BYOD-security, remote management, and asset recovery.

7.5.1  **Security Policies for Enterprises**

Regardless of industry, size, or domain, organizations that aspire for effective mobilization should have a robust security model built into its mobile enterprise strategy. It is, therefore, important to understand and implement key security features and policies based on the following considerations:

> **Data encryption**: eMails should always be encrypted to and from mobile devices.
> **Wipe devices:** If the device is lost or stolen, you can turn it into a brick by remotely wiping the contents.

> **Password locking:** You should protect devices with a PIN (numbers only) or password (numbers and other characters) and you should ensure that these PINs are not the same as your employees’ normal network passwords.

> **Auto-lock after inactivity:** To protect against the possibility that an unauthorized person obtaining access to information while the device is left unattended, devices should automatically lock them after a short time-out.

> **Failed attempts:** You should configure mobile devices to automatically erase data after several failed unlock attempts. The number of such failed attempts should be related to passcode composition and strength.

> **Taking advantage of the emerging mobile devices and platforms:** Some mobile vendors offer more comprehensive security services built into their platforms. The mobility management systems must integrate seamlessly with the company’s existing systems management and security architecture.

### 7.6 Distinguish Between Personal Data and Business Data

One security strategy that many companies are adopting is the “sandbox approach” which involves storing enterprise data, including email and applications, in a distinct area of the device and encrypting and password protecting only that data. All other files, including personal music, videos, photos, etc., are available to the user without logging in to the device, thereby clearly separating out the personal data from the business data.
8 Benefits
An enterprise mobile strategy, if devised, planned and implemented, can deliver the following benefits:

<table>
<thead>
<tr>
<th>Leverage existing IT investments</th>
<th>Reduce Total Cost of Ownership (TCO):</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reuse systems and services</td>
<td>• Little or no custom development</td>
</tr>
<tr>
<td>• Reuse environment</td>
<td>• Open source usage</td>
</tr>
<tr>
<td>• Managed solution</td>
<td>• Rapid Application Development (RAD)</td>
</tr>
<tr>
<td></td>
<td>• IDE’s, toolset and utilities</td>
</tr>
<tr>
<td></td>
<td>• Reduced learning curve.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reduce Time-to-Market:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Rapid Application Development (RAD)</td>
</tr>
<tr>
<td>• IDE’s, toolset and utilities</td>
</tr>
<tr>
<td>• Reduced learning curve.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Real-time access and Security:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Remote Monitoring &amp; Management.</td>
</tr>
<tr>
<td>• Asset Recovery.</td>
</tr>
<tr>
<td>• Server Push – destroy/upgrade applications on remote devices</td>
</tr>
<tr>
<td>• Notifications - Alerts/ Messaging</td>
</tr>
<tr>
<td>• Enterprise Security</td>
</tr>
<tr>
<td>• Mobile Data Encryption.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scalable and sustainable solution:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Cloud optimization</td>
</tr>
<tr>
<td>• Session-less architecture</td>
</tr>
<tr>
<td>• Consumer-grade load tests for geographically distributed deployments.</td>
</tr>
</tbody>
</table>

9 Conclusion
From simple ‘gadgets’ used to talk to someone, mobile phones have transitioned into powerful business tools contributing to simplifying the day-to-day activities of users, and adding value to businesses. Considering the pace at which enterprise mobility has taken off, it is crucial that organizations devise a well thought out and effective enterprise-wide mobile strategy.

Whether the application is consumed internally (by the workforce/employees) or externally (by the customers), mobile solutions need to be scalable and handle a wide variety of security concerns in order to be truly effective.

An enterprise mobile platform must therefore offer capabilities for device management, security, applications, messaging, and development in a secure and scalable environment.

Tavant’s Mobility Unlimited: Device-independent and Platform Agnostic in nature.

To stay competitive in the face of rapidly evolving mobile landscape, organizations need strategies that accommodate varied and emerging technologies.
About Tavant Technologies

Tavant Technologies is a specialized IT solutions & services provider that leverages its expertise to provide impactful results to its customers. We have leveraged our unrivaled capabilities and domain insights to create game changing results for leading businesses across chosen industry micro-verticals. We are known for our long-lasting customer relationships, engineering excellence and passionate employees. Founded in 2000, we are headquartered in Santa Clara, California and service customers across North America, Europe, and Asia-Pacific.

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Moonesh Kachroo works as a Senior Technical Architect at Tavant Technologies. He also heads the Center of Excellence for CMS, RIA and Mobile App Development practice. Moonesh has strong experience in architecture, design and implementation of large scale and distributed mission critical applications based on different architecture paradigms and technologies, including SOA, Client-Server, Mobile, Web 2.0, etc. He is equally adept at open source technology stacks and has worked across varied domains including BFSI, Media/Publishing, and Healthcare, etc.

Moonesh has worked on several strategic accounts, and built competency in cutting-edge technologies and device platforms such as media center, set top boxes, handheld devices/ PDAs, smart devices, etc.

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