Market Profile: Rich Mobile Application Platforms for the Smartphone 2010

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TECHNOLOGY THREAD:
Presentation Strategies
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Summary of Findings

**Bottom Line:** Rich mobile applications (RMAs) provide powerful new business opportunities for enterprises to interact with employees and customers via the smartphones in their pockets. RMA platforms provide the tools and services to develop and distribute RMAs. But the RMA platform market is a hotbed of innovation, cutthroat competition, and complex, incompatible ecosystems. No single RMA platform supports all leading smartphones. Apple is leading the charge in innovation. BlackBerry is holding its own, and still growing in the enterprise. The other players are fading. But there's a new kid on the block: Google Android is looking to take on Apple.

**Context:** RMAs are smartphone-resident software applications that integrate with and leverage advanced device features, such as accelerometers and global positioning system (GPS) chips to provide a compelling and innovative user experience (UXP). The enterprise RMA market is still nascent, but it won't be for long. In short order, customers will begin demanding smartphone-enabled touch-points, and organizations that don't leverage smartphone-enabled business processes will find themselves competitively disadvantaged. Enterprise RMAs are rapidly shifting from “nice to have” to “mandatory.” Unfortunately, customers and employees use a wide variety of smartphones, and each RMA platform is different. Portability across platforms isn't an option.

**Takeaways:** The RMA platform market is complex, innovative, and very competitive:

- An RMA platform is a complex ecosystem of six interdependent components:
  - An application distribution channel
  - The RMA application development and runtime environment
  - The mobile operating system (OS)
  - The smartphone device
  - The network standards it uses to communicate
  - The network operator
- The RMA market includes three types of vendors:
  - Device manufacturers (e.g., Apple, Nokia, Palm, and Research In Motion [RIM])
  - Mobile OS vendors (i.e., Google, Microsoft, and Symbian)
  - Portable mobile runtime vendors (i.e., Adobe and Oracle)
- Apple fundamentally altered the smartphone market with the iPhone:
  - Established the gold standard for smartphone UXP
  - Apple's most significant innovation was the App Store
  - “There's an app for that”: 140,000 applications available
- All other vendors are scrambling to catch up with Apple's innovations:
  - Symbian still dominates the worldwide market but is losing ground rapidly.
  - RIM is popular with business users and is growing rapidly
  - Microsoft and Palm are fading fast
  - Adobe and Oracle are falling off the radar
  - Google is the new kid on the block and is gaining momentum

**Conclusion:** RMA platform vendors use a variety of strategies to advance their solutions. Apple maintains tight control over the iPhone experience and the applications that can run there. Other vendors, such as Google and Symbian, favor an open ecosystem, but they risk fragmentation as their platforms are adopted by multiple device manufacturers. Adobe and Oracle emphasize cross-platform portability, but neither Flash nor Java runs on all devices—specifically, they don't run on the iPhone. And Apple seems disinclined to cave to public pressure to open the iPhone environment. It appears certain that the fractured mobile ecosystem is here to stay.
Burton Group's Opinion

The release of Apple's iPhone in 2007 threw the smartphone market into a state of frenzy. The iPhone's unprecedented combination of capabilities and applications sparked a whirlwind of innovation, and vendors are now engaged in a vicious battle to provide the most compelling smartphone experience possible.

The iPhone is a remarkable device innovation that has established the gold standard in smartphones, but Apple's most disruptive innovation has been the App Store—an application distribution channel and business model that launched an entirely new market for rich mobile applications (RMAs). As of January 2010, the App Store offered over 140,000 applications, and consumers had downloaded more than 3 billion applications. As the iPhone commercial says, “There's an app for that.”

The App Store fundamentally changed the smartphone experience: Smartphones were suddenly good for a lot more than just telephony and e-mail. And the market responded. Sales of smart mobile devices grew by 58% between 2006 and 2007, and an additional 33% by 2009.

Other smartphone vendors have scrambled to play catch-up with Apple. Today consumers have a dizzying array of powerful smartphones from numerous vendors—all with a host of RMA options.

The RMA market opens powerful new business opportunities to enterprises. Smartphones provide a new touch-point with customers, and they supply numerous productivity advantages for employees. Some organizations may also build a new revenue stream by monetizing RMAs.

The enterprise RMA market is still nascent, but it won't be for long. In short order, customers will begin demanding smartphone-enabled touch-points, and organizations that don't leverage smartphone-enabled business processes will find themselves competitively disadvantaged. Enterprise RMAs are rapidly shifting from “nice to have” to “mandatory.”

Today, the most popular RMA platforms include solutions from device manufacturers (e.g., Apple, Nokia, Palm, and Research In Motion [RIM]), mobile operating system (OS) vendors (e.g., Google, Microsoft, and Symbian), and portable mobile runtime vendors (e.g., Adobe and Oracle). Although all platforms are packed with functionality and power, each has a unique blend of strengths and weaknesses. The fierce competition and fractured mobile ecosystem make RMA platform selection a daunting task.

RMA platform vendors use a variety of strategies to advance their solutions. Apple maintains tight control over the iPhone experience and the applications that can run on the device. Other vendors, such as Google and Symbian, favor an open ecosystem, but they risk fragmentation as their platforms are adopted by multiple device manufacturers. Adobe and Oracle emphasize cross-platform portability, but neither Flash nor Java run on all devices—specifically, they don't run on the iPhone. And Apple seems disinclined to cave to public pressure to open the iPhone environment. It appears certain that the fractured mobile ecosystem is here to stay. For advice dealing with these challenges, see the Burton Group guidance document “A Guidance Framework for Developing a Mobile Application Strategy.”
Market Landscape

The rich mobile application (RMA) platform market offers a dizzying array of options. This section defines and segments the RMA market:

- **Market definition**: Defines the maturity, scope, and boundaries of the market
- **Market segmentation**: Segments the market by vendor type, openness, and platform pervasiveness

Market Definition

RMAs are software applications that provide a rich user experience (UXP) by integrating with and leveraging mobile device features, such as telephony, cameras, accelerometers, and global positioning system (GPS) chips. Organizations can provide enterprise RMAs for customers, partners, and employees. These enterprise RMAs execute on the smartphone and connect to enterprise applications using mobile phone networks and other wireless technologies (e.g., Wireless Fidelity [Wi-Fi]). For instance, a customer RMA could allow an insurance policy holder to report a traffic accident and contact the nearest agent from the scene of the accident. An employee RMA would allow the insurance adjuster to file a damage report from the body shop.

Organizations develop and deploy enterprise RMAs using an RMA platform. These platforms are dynamic, programmable environments with sophisticated user interaction and device interface capabilities. An RMA platform has three components:

- **Software development kit (SDK)**: The SDK includes tools for writing, compiling, debugging, testing, and packaging RMA applications. Often times, a simulation environment aids testing by providing an execution environment on the desktop that mimics application execution on the device.
- **Runtime environment**: The runtime environment is the container in which the RMA executes on the device. The runtime environment may be preinstalled by the device manufacturer or mobile service provider or installed by the device owner.
- **Server-side software**: RMA platforms supply server-side software that eases application distribution and device management. Some vendors also provide middleware and packaged applications that ease integration with enterprise applications.

The RMA Ecosystem

RMAs are influenced by a complex ecosystem of six interdependent components. All six aspects of the ecosystem influence the development and management of RMAs and the RMA UXP:

- **Application distribution channel**: Some vendors restrict RMA distribution to their certified distribution channel, while others are more lax.
- **RMA platform**: The platform affects the programming experience and determines what features and capabilities are available to an RMA. Each RMA platform is available for a limited set of smartphones and operating systems (OSs).
- **Mobile OS**: The system utilities and graphical user interface (GUI) framework supplied by the OS impact the look and feel of an RMA and the way the user and the applications interact with the phone. Each OS supports a limited set of smartphones and RMA platforms.
- **Smartphone**: The form factor and processing power of the hardware device on which the RMA runs constrains the usability and capabilities of the application. Each device type supports a limited set of OSs, RMA platforms, and mobile network standards.
- **Mobile network standard**: The network standards supported by the device limit the mobile network operators that can support the device, and they impact the geographical reach of the RMA and its communication bandwidth.
• **Mobile network operator:** Operators control which devices can use their networks, and they influence the kinds of applications that may run on their networks.

Figure 1 illustrates the major options available for each RMA ecosystem component.

![Image](image_url)

**Figure 1:** The RMA Ecosystem

### Related and Adjacent Markets

RMAs are not the only way to deliver enterprise application functionality to mobile customers and employees. Other options include:

- **Mobile web applications (MWAs):** Organizations can support mobile interactions via web applications that are specially designed for access via a mobile web browser. MWAs, which run on a web server, support any device with a mobile web browser, but they have limited access to a specific device's capabilities. Developers have a wide choice of MWA development frameworks, including open source frameworks such as iWebKit and PhoneGap. A number of commercial mobile application vendors, such as Usablenet and Volantis, specialize in delivering MWAs.

- **Client virtualization:** Leveraging server-hosted virtualization, software applications can be delivered as a service to smartphone devices (e.g., **Citrix Receiver**). Alternatively, client-hosted virtualization solutions allow the smartphone to host multiple OSs—and switch between the two—without rebooting (e.g., **VMware Mobile Virtualization Platform**). For instance, organizations might create separate virtual environments on a smartphone device—one representing a personal environment, the other the corporate environment—that can be managed separately and independently. For more information on client virtualization, see the Burton Group overview **“Desktop Virtualization: Choices and Challenges.”**
• **Supplemental vendors:** Supplemental vendors provide solutions that aim to simplify development of RMAs. Some provide solutions that abstract device-specific platform dependencies (e.g., PhoneGap, Rhomobile, Appcelerator, Unity, Usablenet Mobile, Everypoint, MobileIron, and Ansca). Others emphasize providing out-of-the-box RMAs to access packaged applications offered by SAP and Oracle, connect to back-end data sources, or help manage enterprise RMAs (i.e., Sybase Unwired Platform, Syclo, Antenna Software, Spring Wireless, Vaulitus Mobile Technologies, and Pyxis Mobile).

• **Other Internet-enabled mobile devices:** Many mobile devices besides smartphones provide Internet connectivity via mobile phone networks and Wi-Fi (e.g., feature phones, personal digital assistants [PDAs], digital book readers, netbooks, and tablets). These Internet-enabled devices typically support a mobile web browser, and netbooks and tablets also support RMAs. As of January 2010, the netbook and tablet markets were still quite small. Time will tell if Apple's recently announced iPad has the same impact on the tablet market as the iPhone did on the smartphone market.

## Market Segmentation

Given the diversity of market leading RMA platforms, as well as the fragmentation across these platforms, it's useful to segment the market in the following three ways:

- **Vendor type**
- **Open vs. closed**
- **Platform pervasiveness**

## Vendor Type

RMA platforms are supplied by three types of vendors:

- **Device manufacturers** provide a complete integrated stack, including the hardware device, the OS, and the RMA platform.
- **Mobile OS** vendors provide an integrated environment comprising the OS and the RMA platform. These environments are available for a variety of hardware devices.
- **Portable mobile runtime** vendors provide RMA platforms that can run on a variety of OSs and devices.

Table 1 shows the leading RMA platform vendors by vendor type.

<table>
<thead>
<tr>
<th>Vendor type</th>
<th>Vendor</th>
<th>RMA platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device manufacturer</td>
<td>Apple</td>
<td>iPhone</td>
</tr>
<tr>
<td></td>
<td>Nokia</td>
<td>Maemo</td>
</tr>
<tr>
<td></td>
<td>Palm</td>
<td>webOS</td>
</tr>
<tr>
<td></td>
<td>Research In Motion (RIM)</td>
<td>BlackBerry</td>
</tr>
<tr>
<td>Mobile OS</td>
<td>Google</td>
<td>Android</td>
</tr>
<tr>
<td></td>
<td>Microsoft</td>
<td>Windows Mobile</td>
</tr>
<tr>
<td></td>
<td>Symbian</td>
<td>Symbian OS</td>
</tr>
<tr>
<td>Portable mobile runtime</td>
<td>Adobe</td>
<td>Flash</td>
</tr>
<tr>
<td></td>
<td>Oracle (formerly Sun)</td>
<td>Java</td>
</tr>
</tbody>
</table>
The Integrated Stack Experience

The device manufacturers and the mobile OS vendors provide an integrated stack experience. The RMA platform is tightly integrated with the OS, and the SDK provides easy access to smartphone features. On the other hand, applications built using these platforms are not portable to other OSs or devices.

The Limitations of Portable Runtimes

Organizations that intend to deploy mobile solutions across multiple devices and OSs might be tempted by the portable mobile runtime value proposition. Unfortunately, the “write once, run anywhere” mantra doesn't apply to the RMA market. And the portable platforms provide less integration with the device and its OS.

At one time, Java Mobile Edition (Java ME) was quite pervasive on mobile devices—particularly feature phones. But Java's popularity in the mobile market has fallen off. Among the leading smartphones, only BlackBerry, Symbian, and Windows Mobile support Java. Unfortunately, these Java platforms are inconsistent, so application portability is not guaranteed. Sun's new platform JavaFX Mobile has gained even less traction than Java ME. Only Windows Mobile supports JavaFX.

Flash has broader support than Java, but Apple has made it clear that Flash is not welcome on the iPhone or the new iPad. The bottom line: None of the portable mobile runtimes support all the leading smartphones. Table 2 shows the OSs that support the portable runtimes.

<table>
<thead>
<tr>
<th>Operating systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMA platform</td>
</tr>
<tr>
<td>Android</td>
</tr>
<tr>
<td>BlackBerry</td>
</tr>
<tr>
<td>iPhone</td>
</tr>
<tr>
<td>Maemo</td>
</tr>
<tr>
<td>Symbian</td>
</tr>
<tr>
<td>webOS</td>
</tr>
<tr>
<td>Windows Mobile</td>
</tr>
</tbody>
</table>

Table 2: Portable RMA Platforms and OS Support

Open vs. Closed

Another layer of segmentation within the RMA platform market is the degree of openness of the platform. Apple represents one end of the spectrum: Apple controls the iPhone environment with an iron fist. The iPhone supports only one OS (i.e., iPhone OS), one RMA platform (i.e., the iPhone SDK), one programming language (i.e., Objective-C), and one application distribution channel (i.e., the iPhone App Store). Apple also maintains exclusive agreements with network operators in a number of areas (e.g., AT&T Wireless in the United States).

Symbian and Android represent the other end of the spectrum. Both platforms are open source; they support multiple programming languages; the platforms are supported by a variety of device manufacturers and network operators; and applications are generally portable across devices and operators. Both platforms provide an application distribution channel, but they don't restrict using other means to distribute applications.
An open platform fuels innovation as vendors seek new ways to leverage the platform to develop cool new devices. But an open platform also risks fragmentation as device manufacturers aim to differentiate their device offerings from other vendors. For more on fragmentation, see the “Impending Platform Fragmentation?” section of this market profile.

Table 3 shows the leading device and OS RMA platform vendors with their OSs, supported development kits, supported programming languages, and whether they restrict application distribution.

<table>
<thead>
<tr>
<th>Platform vendor</th>
<th>Operating system</th>
<th>Supported development kits</th>
<th>Supported languages</th>
<th>Distribution restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>iPhone OS</td>
<td>iPhone SDK</td>
<td>Objective-C</td>
<td>Yes</td>
</tr>
<tr>
<td>Google</td>
<td>Android/Dalvik Virtual Machine (VM)</td>
<td>Android SDK, Android Native Development Kit (NDK)</td>
<td>Java, C/C++</td>
<td>No</td>
</tr>
<tr>
<td>Microsoft</td>
<td>Windows Mobile</td>
<td>Windows Mobile SDK, .NET Compact Framework (CF), JavaFX Mobile</td>
<td>Visual C++, C# and Visual Basic .NET, JavaFX Script</td>
<td>No</td>
</tr>
<tr>
<td>Nokia</td>
<td>Maemo</td>
<td>Maemo SDK</td>
<td>C/C++, Python</td>
<td>No</td>
</tr>
<tr>
<td>Palm</td>
<td>webOS</td>
<td>Mojo SDK</td>
<td>HTML, CSS, and JavaScript</td>
<td>No</td>
</tr>
<tr>
<td>RIM</td>
<td>BlackBerry OS</td>
<td>BlackBerry Java Development Environment (JDE)</td>
<td>Java</td>
<td>No</td>
</tr>
<tr>
<td>Symbian</td>
<td>Symbian OS</td>
<td>Flash Lite, Java ME, Web Runtime Widgets, C/C++, Python, Ruby</td>
<td>ActionScript, Java, HTML, CSS, and JavaScript, C/C++, Python, Ruby</td>
<td>No</td>
</tr>
</tbody>
</table>

Table 3: Device and OS RMA Platform Vendors and Offerings

Platform Pervasiveness

Determining the pervasiveness of an RMA platform (i.e., how common the RMA platform is in the wild) is challenging, but indicators can be extrapolated from market share information on smartphone devices and OSs. The pervasiveness of an RMA platform in a specific geographic region impacts target RMA platform decisions. The market share of mobile OSs is fairly well known, as depicted in Figure 2. Symbian OS is the worldwide market leader, followed distantly by RIM BlackBerry OS, Apple iPhone OS, Microsoft Windows Mobile, and Google Android. Even after releasing its flagship product in 2009, the Palm Pre, Palm still hasn't cracked the top five.4
Interestingly, although Symbian dominates worldwide RMA platform market, Apple's iPhone reigns supreme in terms of worldwide mobile traffic (i.e., the percentage of Internet access based on the OSs browser). Figure 3 illustrates Apple's dominance and growth in this area during 2009. Traffic rates also indicate that Google Android is gaining momentum. Apple's exclusivity agreements with various network operators continue to hinder iPhone adoption. For instance, it's very likely that if the iPhone were available on the Verizon network in the United States, adoption rates for the iPhone would rise dramatically.

Figure 2: Platform Pervasiveness

Interestingly, although Symbian dominates worldwide RMA platform market, Apple's iPhone reigns supreme in terms of worldwide mobile traffic (i.e., the percentage of Internet access based on the OSs browser). Figure 3 illustrates Apple's dominance and growth in this area during 2009. Traffic rates also indicate that Google Android is gaining momentum. Apple's exclusivity agreements with various network operators continue to hinder iPhone adoption. For instance, it's very likely that if the iPhone were available on the Verizon network in the United States, adoption rates for the iPhone would rise dramatically.
Figure 3: *Worldwide Mobile OS Traffic Share*\(^5\)

Figure 4 illustrates the significant difference in mobile OS presence in various geographic regions around the world.
Figure 4: Percentage of Mobile Traffic by OS in Various Regions of the World
Market Dynamics

The Burton Group root document “Application Platform Strategies for the 2010's” describes the business, cultural, and technology pressures causing application platforms to evolve. This section discusses how the rich mobile application (RMA) platform market is evolving, as well as the major technology innovations that are emerging in response to market drivers. This section discusses the following drivers and trends:

- Market drivers
- Technology trends
- Vendor trends

Market Drivers

Since the unveiling of the iPhone in September 2007, the smartphone market has undergone amazing transformation. Below are the market drivers that continue to spur evolution of the market.

The Rise of the Enterprise Smartphone

In 2002, Research In Motion (RIM) released the BlackBerry. Although the BlackBerry was not the first smartphone, it was the first smartphone device optimized for wireless use. Using RIM's server-side software (e.g., BlackBerry Enterprise Server), users were given over the air (OTA) access to their corporate calendar, the ability to browse the web, and push e-mail. These early generation smartphones were appealing to enterprise customers who couldn't stand to be disconnected from their e-mail while traveling. But the small screen and primitive browsing capabilities limited their appeal to the mass market. Few consumers viewed the convenience of e-mail anywhere worth the cost of the smartphone device and its associated data plan.

The Rise of the Consumer Smartphone

The market has evolved quite a bit since 2002. Modern smartphones offer an aesthetically appealing experience with large, high-resolution touchscreens and desktop-grade web browsing capabilities. Network operators now offer more affordable data plans. Additionally, application stores offer consumers the ability to download applications and tailor the device to suit their personal interests.

Smartphones are no longer significantly limited in their capabilities when compared to the desktop. Many boast a powerful processor, large touchscreen display, and ample storage. A virtually ubiquitous connection for access to online services, global positioning system (GPS) chips, and accelerometers provide capabilities beyond those of the desktop. And the luxury of a small form factor means the device is typically at hand at all times.

Consumers are now flocking to the smartphone. In Q3 2009, worldwide mobile phone sales totaled 308.9 million units, representing only a 0.1% increase over that same period from 2008. Smartphone sales, however, increased 12.8% over that same period, with sales totaling 41 million units. Smartphone use is definitely on the upswing, and consumers are demanding RMAs. The success of consumer RMAs will depend on the key functions that organizations deliver to their smartphone-wielding customers.

The Global Workforce

RMA technologies for communication and collaboration (e.g., e-mail and personal information management [PIM]) have already been successful, but these are general-purpose RMAs developed by operators. The success of enterprise RMAs will depend on a growing need to access and input enterprise information in context.
As organizations become more global and workers travel, there is a growing need for a smaller, more portable device than the laptop for specific and focused tasks such as quick access to product and customer information. Field workers are increasingly using RMAs to enter field data, customer orders, and tracking progress on tasks. For example, delivery services and telecommunications workers commonly carry very advanced field devices with RMAs designed specifically for their job and company.

As RMA technologies become more capable, the appeal of using a smartphone to interact with the enterprise will grow—being tethered to a desktop computer or lugging around even a small laptop is a burden and runs contrary to a global trend for enterprises to become more agile and responsive.

Mobile applications are different from their desktop counterparts in many ways. The smaller screens hinder data entry, and limited bandwidth can severely affect application performance and reliable access to information. Developers must accommodate for these differences, while also tapping into the unique capabilities of the mobile device.

A More Demanding User

Users are becoming more advanced in their use of technology, and IT consumerization is driving an explosion of devices and personal choice. Although people are flocking to the smartphone, the enterprise is faced with a quandary. Employees no longer want to carry multiple devices. They are asking the enterprise for access to information from their personal devices. The line between the consumer and employee is beginning to blur. For more on consumerization, see the Burton Group Perspective document “Taking Control: Strategies for Any Economy.”

As consumerization continues to rise, a wide range of market drivers is emerging that presents new opportunities and challenges, as illustrated in Table 4.

<table>
<thead>
<tr>
<th>Market driver</th>
<th>Opportunities and challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-channel access</td>
<td>Consumers are demanding access to their favorite applications from a variety of devices.</td>
</tr>
<tr>
<td>Powerful device capabilities</td>
<td>Consumers are demanding applications with advanced graphics, alternative interaction models, and that leverage their devices' GPS chips, accelerometers, and broadband connections.</td>
</tr>
<tr>
<td>Branded and interactive experience</td>
<td>Consumers expect interactive applications that are personalized based on their individual preferences.</td>
</tr>
<tr>
<td>Context-aware experience</td>
<td>Consumers are demanding applications that react to the user's changing environment, such as geographic location, time of day, and social settings.</td>
</tr>
<tr>
<td>Market competition</td>
<td>Enterprises cannot dictate mobile platform or device options, and application portability isn't realistic. Enterprise must deliver different versions of the same application to support multiple devices.</td>
</tr>
<tr>
<td>Application management</td>
<td>The application distribution, provisioning, and management capabilities of mobile devices is still immature. Storing sensitive information on devices that are easily lost or stolen is also a major enterprise concern.</td>
</tr>
</tbody>
</table>

Table 4: Market Drivers, Opportunities, and Challenges
Technology Trends

The smartphone market has seen explosive growth and massive innovation over the past two years. Although still limited in many ways when compared to the desktop, recent technology advancements make the device capable of performing certain functions better than a desktop. These advancements include:

- Touchscreens
- Processor power
- Storage
- Battery
- Networking
- Other device capabilities
- Augmented reality

Touchscreens

Recent entrants to the smartphone market have large touchscreen displays that ease interaction with the device and increase the device's ability to perform more-advanced functions. Recent studies show that adoption of touchscreen devices far outweighs adoption of smartphones without touchscreens. The user controls the device through advanced gestures, with an onscreen keyboard that allows text input. Because the viewing area is larger, touchscreen devices are excellent for watching video clips and movies, taking pictures with the device's built-in camera, and viewing information on the device display. The larger screen size allows the user to control the device through advanced gestures, providing advanced capabilities such as zooming.

Processor Power

Smartphones are powerful computing devices with almost the same processing capabilities as computers from a few years ago. For instance, the Google Nexus One has a 1 GHz processor. Developers are able to leverage these more powerful processors to create applications that perform advanced functions, such as video editing.

Storage

Many smartphones now come with a storage capacity up to 32 GB, allowing applications to store more information locally on the device. In January 2010, Apple announced an iPad with 64 GB. Other smartphone vendors will no doubt continue their trend of increasing storage capacity.

Battery

Innovation in batteries continues. Many smartphones support talk time between 7 and 10 hours, standby time approaching 300 hours, Internet use of five hours, video playback exceeding five hours, and audio playback up to 20 hours.

Networking

Networking improvements made by network operators and radio manufacturers increase the viability of using smartphones to access a variety of online services. Studies suggest that network speeds regularly exceed 1 Mbps, though results vary depending on location.
Other Device Capabilities

The advanced capabilities of many smartphones include accelerometers that allow the screen to switch between portrait and landscape, GPS chips for location-based functionality, high-resolution cameras, and the ability to record video. For instance, the Google Nexus One has a 5.0 megapixel camera, while the iPhone 3GS allows users to edit videos captured using the device's video recorder.

Augmented Reality

One example of the advanced functions enabled by these technology enhancements is augmented reality. With augmented reality, the device's camera is used to provide a real-world view that is merged in real time with computer-generated metadata and imagery. With augmented reality, a device could be used as a measuring stick, return information about your current location, or assess the damage to a vehicle by simply aiming the device at the item.

Vendor Trends

The following sections examine the vendor landscape, and explore how the vendors are responding to various market drivers and technology trends. It includes the following topics:

• The Apple effect
• Impending Platform Fragmentation?
• Applications, applications, applications
• The Flash Experience

The Apple Effect

Although the iPhone certainly wasn't the first smartphone on the market, its release has revolutionized the smartphone industry. The iPhone has set the gold standard for smartphones. It provides a user experience (UXP) that is unparalleled. The software development kit (SDK) provides a mechanism for custom RMA development, and the App Store provides a distribution channel for thousands of developers to sell or give away their creations.

The one factor limiting Apple's market domination is its exclusive agreements with network operators. In the United States, many potential customers have been unwilling to sever their relationship with Verizon. Worldwide numbers give insight to the impact of multiple carriers offering the iPhone. In France and the United Kingdom, where the iPhone has recently been offered on multiple carriers, Apple's market share was boosted from 21% to 32% in just three months.10

Playing Catch-Up

Since the iPhone launch, all other vendors have been scrambling to catch up. As shown in Figure 5, vendor market share has shifted dramatically since 2007. Symbian still holds the lion's share of the market (particularly in Europe), but it has lost more than 20% of the market since Q3 2007. Microsoft and Palm have also lost market share. The big winners have been Apple and RIM, and most recently, Google.11
RIM has taken heat for the less-than-stellar UX afforded by its touchscreen offering, the BlackBerry Storm. But RIM remains a favorite with the enterprise market, due to its industrial-strength server-side software offerings and the highly usable BlackBerry keyboards. In the United States, RIM's relationship with Verizon has also helped it withstand the Apple Effect.

The New Kid on the Block

Google is the new kid on the block and, for the moment, appears to be the best contender to stand up to Apple. In fact, Apple actually lost market share in Q4 2009 when Motorola introduced the Droid. Apple's sales grew, but market share dropped from 18.1% in Q3 to 16.6% in Q4.

Numerous device manufacturers have adopted the Google Android platform (e.g., HTC, Samsung, LG Electronics, Motorola, and Sony Ericsson), all hoping to ride the Android wave to compete with Apple. Android systems appeal to consumers looking for a state-of-the-art smartphone experience without the constraints of the Apple-mandated iPhone ecosystem. Apple's tyrannical control over the iPhone platform has played a significant role in its ability to move quickly in delivering compelling products and ensure a safe and resilient experience. Yet, that same control can alienate users, and it poses challenges to the enterprise community, who want to manage and control the devices outside of the Apple ecosystem.

Impending Platform Fragmentation?
Android's openness is a strategic advantage, but it can also present some challenges. Presumably, Android applications are portable across devices and network operators. But the open source platform allows manufacturers and application developers freedom to create a competitive advantage by offering unique device capabilities. Tweaking an application to take advantage of the unique controls on one device might render the application inoperative on another Android device. The problem isn't just confined to devices, however. An application might also be programmed to leverage specific features of a network operator. The same issues apply to Symbian, the other open source mobile platform.

Fragmentation on iPhone and BlackBerry devices is less severe. Small compatibility glitches may occur across device profiles (e.g., iPhone 3G and iPhone 3GS) and operating system (OS) versions, but Apple and RIM can mitigate fragmentation through control over the evolution and capabilities of the platform and the devices. If fragmentation of the Symbian and Android platforms occurs, it will reduce the appeal of devices leveraging these platforms.

Applications, Applications, Applications

A major force influencing the RMA ecosystem is the application-distribution channel. For many consumers, an important criterion in choosing a device is the availability of third-party applications. Devices that lack a convenient application store where consumers are able to purchase or download applications are at a substantial disadvantage to devices that have a robust suite of applications available.

Again, Apple led the way. With the unveiling of the App Store, Apple provided a convenient one-stop shopping center for mobile applications. They also provided RMA developers a new way to monetize their applications. The strategy worked. In January 2010, Apple announced that over 140,000 applications were available on the App Store and that consumers had downloaded more than 3 billion applications since it opened in June 2008.

Although Apple had a notable lead in the App Store market, the other platform vendors quickly followed suit. A number of network operators have also opened virtual storefronts. Table 5 lists vendors and their application stores.

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Application store</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>App Store</td>
</tr>
<tr>
<td>AT&amp;T</td>
<td>MEdia Mall</td>
</tr>
<tr>
<td>Google</td>
<td>Android Market</td>
</tr>
<tr>
<td>Microsoft</td>
<td>Windows Mobile Marketplace</td>
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<tr>
<td>Nokia</td>
<td>Ovi</td>
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<tr>
<td>Palm</td>
<td>App Catalog</td>
</tr>
<tr>
<td>RIM</td>
<td>BlackBerry App World</td>
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<tr>
<td>Symbian</td>
<td>Horizon</td>
</tr>
<tr>
<td>Verizon</td>
<td>V CAST Media Store</td>
</tr>
</tbody>
</table>

Table 5: Mobile Application Stores

The Flash Experience
As the compute power of the smartphone continues to increase, more capable runtimes will find their way to the
devices. Although Flash Lite has been available on devices since 2005, it suffered from poor audio and video
performance. Many of the new smartphone devices (e.g., Apple iPhone) don't support Flash Lite. However,
Adobe has designed Flash 10.1 exclusively for the smartphone. Adobe has released Flash 10.1 for Google's Nexus
One device, and Adobe has announced plans to deliver ports for other Android devices, as well as BlackBerry,
Windows Mobile, Palm, and Symbian. In response, Apple modified the iPhone 4.0 developer program license, and will restrict native iPhone applications to those originally written in C, C++, or Objective-C, essentially shutting the door on Adobe. Adobe has since announced that it no
longer plans to invest in the cross-compilation feature of Flash CS5.

Futures

The smartphone ecosystem continues to evolve at a significant pace. The following developments are likely to
influence the RMA platform market:

- Enterprise app store
- Portable applications
- HTML 5

Enterprise App Store

Although many of the platform vendors, network operators, and third-party vendors are in a race to deliver their
own version of an application store, many target a single-device ecosystem. For the enterprise that must support
multiple devices, managing separate application distribution channels is cumbersome. Additionally, even though
there are thousands of applications in the various application stores today, few are relevant for the enterprise. In
fact, many organizations seek to block access to these consumer storefronts on company issued devices.

The enterprise wants to vet and control the distribution and management of enterprise mobile applications in a
secure environment. For more information on coping with worker demands for access to information from their
personal mobile device, see the Burton Group overview “Securing Mobile—and Home-Worker Access.”

Portable Applications

One of the greatest challenges organizations face in developing an RMA is determining the target platform.
Because applications developed for one RMA platform are typically not portable to other platforms, this decision
can be especially tricky. For example, an application developed using Android SDK will not run on Windows
Mobile.

A burgeoning vendor market is emerging that addresses the challenge of creating cross-platform RMAs. These
solutions provide development tools that allow developers to create a single edition of an application that can be
compiled to a native application that targets a specific RMA platform. For instance, Rhomobile's Rhodes
framework allows developers to create applications using a proprietary version of Hypertext Markup Language
(HTML) and Ruby on Rails, which can then be compiled to a native application for different platforms.
Virtualization vendors, such as VMWare and Citrix, are also developing products that allow smartphones to host multiple OSs or deliver software applications as a service to the smartphone device. Each would help increase the portability of smartphone RMAs. For more information, see the “Related and Adjacent Markets” section of this market profile.

**HTML 5**

The evolution of the HTML 5 specification will also bring portability of mobile web applications (MWAs) that rival the power of RMAs. Unfortunately, unless the HTML 5 specification allows web-based applications to leverage advanced smartphone capabilities, it will lack impact. For more information on the evolution of HTML, see the Burton Group “Market Profile: Fit Clients and Next-Generation Presentation Technologies.”
Industry Impact

Although signs of stabilization within the smartphone market can be seen, and trends more clearly identified, it is still a highly volatile ecosystem. Significant disruptions loom on the horizon.

Emergence of the Tablet

A great strength of the smartphone is its ultra-portability and broadband connectivity. The small form factor makes carrying the device easy, and an instant high-speed Internet connection gives the smartphone user on-demand access to online services. The screen real-estate is still rather limiting, however. Tablets generally overcome this limitation by offering a larger form factor without compromising portability or connectivity.

With the recent announcement of the iPad, Apple hopes to emerge as market leader in the tablet space. Just days after the announcement of the iPad, Apple sent the e-book market into turmoil, forcing Amazon—creator of the popular Kindle—to capitulate to publisher Macmillan and raise prices of the e-books Amazon sells to its customers. Speculation looms on the impact of the iPad on the smartphone market. The larger display makes specific use cases more viable than on the smaller form factor smartphones, and Apple has ensured a marketplace for the iPad by ensuring any application written for the iPhone also executes on the iPad.

Platform Vendors over Network Operators

For a long time, the smartphone market has been controlled by mobile network operators who were able to dictate which devices, network standards, operating systems (OSs), and rich mobile application (RMA) platforms would be sold. However, Apple and Google have had a tremendous impact on the shift from network operator dominance to an ecosystem that is more heavily influenced by smartphone manufacturers and OS vendors. The OS now dictates the RMA development platform and tools that enterprise developers can use to create applications for the devices.

The control of the network operator will be relinquished even more as device manufacturers sell the devices directly to consumers, allowing the consumer to choose which network best suits their needs. For instance, Google currently offers the option to purchase an unlocked Nexus One device that can work on any network operator supporting the Global System for Mobile (GSM) Communications standard. Motorola is also reportedly working with Google to sell their next Android device directly to consumers. Not all device manufacturers, however, allow purchasing the device without a network contract. For instance, in the United States, AT&T maintains network exclusivity rights to the iPhone.

Although iPhone sales continue to trend upward in the United States, the constraining relationship with AT&T hinders adoption. Had Apple offered the iPhone on a variety of networks, it's likely the smartphone race would already be over. Even now, if Apple were able to offer the iPhone on the Verizon network, sales of the device would likely explode.
Further Information

Related Burton Group Research

• “Market Profile: Fit Clients and Next-Generation Presentations Technologies” (market profile)
• “Application Platform Strategies for the 2010's” (root document)
• “Rich Internet Applications: Creating an Effective Web Experience” (overview)
• “Web Application Frameworks: Evolving to Support the Interactive Web” (overview)
• “The World Wide Web: An Introduction” (overview)
• “Ajax: A Rich Internet Application Technology” (report)
• “Desktop Virtualization: Choices and Challenges” (overview)
Notes


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Background: Kirk Knoernschild is an analyst for Burton Group Application Platform Strategies. He covers development platforms, programming languages and frameworks, and the software development lifecycle (SDLC). Prior to joining Burton Group, Kirk was a software developer who could be found working in the trenches on enterprise software development projects. With over 15 years of software development experience, Kirk has filled most roles on the software development team. In 2002, Kirk wrote the book “Java Design: Objects, UML, and Process”, published by Addison-Wesley. Kirk is an open source contributor, has authored numerous articles, and is a frequent conference speaker. He has trained and mentored thousands of software professionals on topics including Java/J2EE, modeling, software architecture and design, component based development, service oriented architecture, and software process. Kirk is trapped in a software developer’s body, and continues to enjoy hacking in a variety of languages, including Java, .Net, Ruby, and PHP.

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