

# Does HTML5 Make Sense for Mobile Enterprise Applications?



WHITE PAPER

Web applications were originally considered inappropriate for mobile enterprise applications because of their inability to work offline, and the generally superior performance of native apps that were developed for specific operating systems and mobile devices. HTML5 and the rapidly changing enterprise mobile computing ecosystem are changing that. Now that there are HTML5-based field service, ERP and other enterprise software packages on the market, the growth in BYOD and cloud computing environments is leading more ISVs to create HTML5 applications, and the number of mobile devices with HTML5 browser support is projected to nearly double in 2013.

This momentum is causing companies to reconsider their mobile strategies and grapple with two fundamental questions:

1. Why are enterprises, software application providers and device makers adopting HTML5?
2. Should we as well?

This white paper will help you determine if HTML is right for your mobile environment by:

- Providing insight into why HTML5 is popular now;
- Highlighting important new capabilities in HTML5;
- Explaining how HTML5's characteristics, advantages and limitations relate specifically to field service, route sales, delivery, inspection, production, warehouse management and other mobile enterprise operations that require rugged computers with automated data collection tools.

## HTML5 Surges

HTML5 was initially adopted for consumer-facing applications such as games or mobile Web services because of its device independence. However HTML5 is quickly evolving into an enterprise technology. It has been embraced and promoted by leading enterprise software enterprise software providers including Oracle®, SAP®, Salesforce.com®, Infor™ Software Solutions and SYSPRO™. Leading field service solution providers like Astea International, ClickSoftware™, ServiceMax and TOA Technologies have also adopted HTML5 for their applications.

The ability of HTML5 applications to run on any device with an HTML5 browser also means that enterprises do not have to maintain technical expertise in multiple operating systems. This can allow them to reduce staffing requirements and increase the efficiency of their IT group.

VDC Research, a leading analyst firm focused on enterprise mobility, found that 39 percent of developers for enterprise markets plan to do more HTML5 projects in 2013<sup>1</sup>. On the hardware side, the number of deployed mobile devices with HTML5 browser support will increase 87 percent in 2013, to 1.4 billion, according to ABI® Research<sup>2</sup>.

The HTML5 support momentum is expected to sustain, and will be aided by continued enterprise adoption of cloud computing. And because HTML5 is well suited for applications that are delivered over the Web, as the cloud market continues its growth so will HTML5 application development.

## The Mobile Software Menu: Native, Web & Hybrid Apps

Before delving into the specifics of HTML5 it is important to review the fundamentals of mobile application options and their place in the market. "Native" applications are developed to run on specific devices and operating systems, while Web apps are developed for browsers. This fundamental difference in approach enables native apps to support more device features and Web apps to run on a broader universe of devices (because they are OS and screen-size independent). The native vs. Web debate used to be fundamentally an argument of depth vs. breadth, but because of technology advances it is no longer that simple.

Most mobile enterprise operations use native applications that run on one operating system having been developed for a specific device or family of rugged data collection computers with features like integrated bar code and RFID readers. These applications can be highly functional, but need to be updated when devices or the OS are upgraded to the next generation. Native apps will need to be completely redeveloped if the enterprise chooses to support an additional or new operating system. This is a particularly important consideration for companies that are considering a bring-your-own-device (BYOD) mobility strategy.

Web apps, on the other hand, can be implemented to run on any device that supports a Web browser. When a new device is deployed, or an OS is upgraded, few, if any, changes to the web application are required. However, the security sandbox of the Web browser makes it difficult to access device-specific features like bar code scanning, RFID reading, receipt and label printing or even much on-device memory.

Hybrid apps attempt to combine the best of both worlds. Hybrid apps use HTML5 and web app concepts for developing the user interface and other easily portable modules. Native code is used to access hardware and peripherals and to accomplish performance critical tasks. This means that only the native code portions need to be re-written when the application is moved to a new platform. The downside to hybrid application development is that it typically means buying into the methodology of a specific hybrid application framework.

<sup>1</sup> VDC Research "Is HTML5 Functionality too Narrow for the Future of Enterprise Mobility?"

VDC Views article by Catherine Madden, Eric Klein and David Krebs, January 2013.

<sup>2</sup> ABI Research press release April 9, 2013 "1.4 Billion HTML5-Capable Mobile Devices in 2013, But Developer Uptake Requires Stronger OS, Chipset Integration."

## HTML5 Changes the “Native vs. Web” Debate

Web and hybrid apps have been an option for years, but native applications dominated the mobile enterprise landscape. So why are developer and enterprise support for Web apps now surging? There are two strong drivers:

1. HTML5 eliminated several of the important technical and performance limitations of previous-generation Web application technology.
2. The cross-platform compatibility of HTML5 enables enterprises to future-proof their mobile environments; Web apps are an important precursor to introducing BYOD for mobile workers and are compatible with cloud computing and Software-as-a-Service (SaaS) strategies.

## New Capabilities in HTML5

HTML5 has all the common attributes and advantages associated with Web applications plus several important new capabilities. From the perspective of data collection applications, the biggest differences and improvements in HTML5 compared to previous Web application technologies are:

- The ability for applications to run offline when no network connection is available;
- Faster application speeds;
- Features that allow more sophisticated applications and an improved user interface.

These characteristics are highlighted below, with examples of how they relate to field service, delivery and other mobile enterprise operations.

### Offline Execution

Historically, the biggest drawback to Web applications has been that they needed a persistent Internet connection to run. The need for always-on connectivity is problematic for mobile enterprise operations where users work at customer locations and may not have connectivity there or when en route. HTML5 overcomes this limitation through its offline capabilities that allow the application and data to be stored locally in the browser. Offline storage is limited and therefore HTML5 is not suitable for all mobile applications. However, many applications that do not require large databases could be stored locally. Users will be able to work uninterrupted regardless of whether network connectivity is available.

### Faster Performance

Native applications are generally considered faster than Web apps, but HTML5 closes the gap considerably and allows HTML5-based applications to run faster than previous generation Web apps. This is partially because of some complementary technologies that were developed and because the memory cache enables data and application components to be stored locally. The most significant complementary technologies for data collection are WebSockets and Web Workers. WebSockets improves communication between the mobile browser and the host application, and Web Workers allows background tasks to run in a separate thread and helps multicore processors run more efficiently.

*“There isn’t any question about the adoption of HTML5 – it’s already the de facto standard.”*

Janel Garvin, CEO of Evans Data, a market research firm that found 75 percent of developers are supporting HTML5

<http://www.gaditek.com/blog/the-state-of-html5-today-tomorrow/#sthash.yiZigAmx.dpuf>

HTML5 is emerging at the same time 4G wireless coverage is rapidly expanding, which also provides additional speed improvement for mobile applications. HTML5 enterprise applications are usually more than responsive enough to meet user needs.

### Better Experience for Users & Developers

HTML5 supports better developer tools and an improved user interface. For example, Cascading Style Sheets (CSS3) technology is not technically part of the HTML5 specification but is closely aligned with it. CSS3 is important for mobile enterprise operations because it enables development of powerful forms-based applications that are appropriate for field service, inspection, maintenance, route sales and delivery. Cascading Style Sheets bring control to how things display and frees programmers from having to develop codes for different screen sizes.

Two other tools are worth noting for enterprise developers: Canvas™ and WebGL™. Canvas is a drawing tool for adding illustrations, animations, gradient backgrounds and other images to applications. WebGL is a tool for adding shapes, fills and shadings. These tools also support image capture, which is a key requirement for many field service applications. Together, Canvas and WebGL can significantly upgrade the user experience of Web applications.

### Core Web Apps Capabilities that HTML5 Supports

The new capabilities are only part of the HTML5 value proposition. HTML5 builds on the capabilities and fundamentals of Web applications, which are summarized below.

### Platform & Device Independence

The potentially significant time and costs associated with hardware or software transitions compel enterprises to look years into the mobile future and predict which devices, operating systems and development environments will be best for them. HTML5 applications enable enterprises to separate software development decisions from hardware decisions because once an HTML5 application is written it can run on any device with an HTML5 browser. This makes it practical to select the best mobile device by worker role. For example, an enterprise may specify rugged Windows® Mobile handheld computers for field inspectors while allowing managers to run the same applications and/or management dashboards on their favorite Android™, Apple® iOS or Windows-based smart phones.



“HTML5 can be very powerful for portal or dashboard applications, where managers or customers could use all types of devices to check the status of orders or get a snapshot view of operations,” says MobileFrame® CTO and Chief Architect Glenn Wickman. MobileFrame is an Intermec partner that provides a powerful, highly configurable mobility platform that replaces paper-based processes in a variety of mobile environments.

HTML5 applications also help future proof the enterprise beyond traditional mobile applications. HTML5 integrates tightly with SaaS and cloud applications, and is compatible with many non-mobile computer devices that make up the growing Internet of Things. As Oracle notes on its *Internet of Things* blog<sup>4</sup>:

*“What’s holding us back is the lack of a consistent way to interact with these [M2M] devices. Java was supposed to solve this issue, but it never really became widespread because people don’t want to manage applications (and the JVM) on millions of devices. Browsers accessing the cloud make perfect sense, if the browser could provide all the necessary capabilities required by modern applications. That’s where HTML5 enters the scene, adding rich capabilities to browsers in a consistent manner.”*

### Efficient Application Support

Web applications are extremely efficient to support because they are extremely scalable – support requirements do not change as the user population grows. There is only one instance of a Web application and it resides on a centralized Web server. Maintenance only needs to be performed on one copy of the software even if thousands of workers use it. Maintenance and updates can be performed locally, and users automatically receive the most up-to-date version of the application every time they log on. Having a single, central instance of the application is valuable for mobile operations because one help desk can support all users, no matter how remote, and there is no need to physically access mobile devices to update the application.

“Web applications are very easy to install on devices. Our customers tell us they’ve reduced their installation time and costs with our Web apps compared to native applications they’ve rolled out in the past,” says Arvid Tellevik, president of Parity Corporation, an Intermec ISV partner. The company is a leading software provider to the food processing industry with bar code enabled applications for inventory management, WMS, manufacturing, distribution and other operations. “Customers have also reported that with Web apps they don’t need to do as much training and that users get up to speed more quickly because new applications are more intuitive. That is because of the user interface that Web apps allow us to create. It is much faster and easier to have a user change screens or find information by clicking a link than it is to send them through multiple software screens and tabs. Users can do more without heavy keypad interaction.”

### Strong Developer Base

HTML5 enables Web developers to be mobile developers without having to learn new development tools or operating systems. The broad and growing developer community alleviates some of the resource limitations that frequently arise for specific development skills.

Web apps offer several advantages for ISVs. Developers can offer their software through the cloud, which produces recurring revenue and lowers the up-front cost burden for customers. The support advantages cited earlier for enterprises also apply to developers, making it easier for them to support a large customer base.

The growing maturity and adoption of HTML5 should attract more mobile developers to the platform. One caveat: while Web developers may be able to create mobile apps because of HTML5’s mobile Web orientation and cross-platform support, that does not establish those developers as mobile experts. Intermec can attest to this firsthand. As a leading rugged enterprise mobile computer manufacturer, we have the opportunity to work with many ISVs. We partner only with those who demonstrate proven mobile competency and the ability to create value for their customers.

### Improving Software Support

Commercial software vendors are creating new tools or adding HTML5 to existing products. For example, Oracle included HTML5 support in its Java Platform Enterprise Edition 7 release in July 2013, which includes tool for Web, cloud and desktop development. “Java EE7 brings this widely used enterprise framework to the modern age of HTML5 and also brings significant improvement in developer productivity that will have windfalls in code quality,” Oracle said in the release<sup>4</sup>. Oracle also included HTML5 and WebSockets support in its Cloud Applications Framework 12c cloud development middleware that was released a month later.

HTML5 is increasingly the basis for packaged, applications, not just development tools. Some examples of interest to enterprise decision makers include:

- In May 2013 SAP introduced the “Fiori” suite of 25 applications that were developed in HTML5. Fiori is intended to make popular SAP functions accessible for mobile devices and includes workflows and applications to create and track sales orders, check prices, create invoices, track shipments and manage common business forms and requests.
- In December 2012 SYSPRO launched an HTML5-based mobile ERP solution.
- Infor redeveloped its core ERP solution on HTML5 as part of the Infor 10x release of April, 2013.
- Salesforce.com included HTML5 support in the SDK it released in April, 2013.
- Packaged field service software providers that support HTML5 include Astea Solutions, Click Software, ServiceMax, TOA Technologies and Vertical Solutions.

4 [https://blogs.oracle.com/retail/entry/html5\\_and\\_the\\_internet\\_of\\_thin](https://blogs.oracle.com/retail/entry/html5_and_the_internet_of_thin).

5 Oracle Corp. press release June 7, 2013.

## HTML5 Limitations

HTML5 is the fastest and most reliable Web application technology but it still has limitations and cannot match native apps for some mobile operations.

### Offline Memory Limitations

Browsers typically limit the amount of device memory that can be used for offline data storage. Sometimes those limits can be adjusted. A more significant limitation to HTML5 offline storage is the search capabilities available. The Web SQL option has been deprecated and isn't supported by some browsers. Local storage is an un-indexed key-value pair mechanism that is difficult to search. Indexed DB provides an indexing capability as the name implies, but is still less flexible than an SQL database and is also not supported in all browsers.

### Device Feature Support

While HTML5 allows applications to run across a broad spectrum of devices, native apps enable a developer to go deeper within each device. Feature support is important in the mobile enterprise space because so many operations rely on bar code scanning, signature capture and Bluetooth® connectivity. These features can still be used with HTML5 apps but require more development time. The HTML5 feature support disadvantage can be mitigated or eliminated by developer tools offered by mobile computer makers for their specific products.

### Speed

The speed advantage that native apps hold over HTML5 may be more of a reflection of reputation over reality. In general, native apps launch and execute faster because they do not depend on a network connection. However, the speed gap is closing as developers become more experienced (e.g. executing more of the application from device memory instead of over the air). The speed advantage of native apps is frequently promoted by developers of interactive games. Enterprise applications that require the fastest-possible execution should be developed in native languages, but HTML5 will meet enterprise user needs for many common mobile workflows.

### Limited Rugged Hardware Support

Most of the estimated 1.4 billion mobile devices in use that support HTML5 are consumer-grade smart phones and tablets. Mobile enterprise applications like route sales and delivery, field service, inspection, etc. need more rugged and specialized devices, and HTML5 browser support is limited in that product category.

## Finding Where HTML5 Makes Sense – And Where it Doesn't

HTML5 applications can do what many mobile enterprise users need, but does that make it the right platform? The answer is a very clear: maybe. Whether HTML5 is appropriate for an enterprise depends heavily on several specific factors, including the type of application and its performance and device requirements.

Even as HTML5 adoption is exploding, no one expects native applications to go away because they provide excellent performance. Many organizations have migrated their mobile enterprise applications to HTML5 while others insist on using native apps, and both are very satisfied with their choices. Using HTML5 or native apps is not mutually exclusive – some organizations are using both, with each supporting different user groups and business processes. Many leading analysts and enterprise strategists believe hybrid apps will be the way forward, especially as BYOD environments expand.

The belief that HTML5 and native apps will coexist is not to suggest they are interchangeable. Each approach has advantages and shortcomings depending on the mobile user base, available support and specific application and work process requirements. Here are some guidelines for the mobile enterprise situations where HTML5 apps would be most effective and when other approaches would likely be advantageous. They are based on the current state of HTML5 maturity, capabilities and device and developer support.

### HTML5 Apps Could Be a Good Fit If...

**The enterprise supports multiple mobile operating systems, or its future mobile OS or device platforms are uncertain.**

Multiple operating systems mean applications need to be redeveloped. Redevelopment takes resources away from new development, user support and other activities that move the enterprise to meeting its objectives. Porting applications from one mobile operating system is not trivial or inexpensive – each new OS version of a mobile application costs 50 percent to 70 percent as much as the original to develop, according to Forrester Research<sup>3</sup>.

**Applications don't have demanding database requirements.**

HTML5 applications that can be stored in the browser cache can run seamlessly in either connected or offline mode. As long as these applications do not require high performance database access, they will likely meet the enterprise needs.

**Application delivery through the cloud is desired.**

HTML5 is natural fit for cloud computing environments because it was developed for the Web. Enterprises or developers that are considering using cloud computing or may use cloud in the future would be well served by having HTML5 applications in place.

### Native Apps are Probably a Better Option When...

**The mobile operating system and device population are stable, and are likely to remain so.**

If enterprises know which mobile OS and device families they will be using years into the future, and it is unlikely that others will be introduced, then it makes sense to create native applications that fully exploit device functionality.

**Applications use high performance databases.**

As described above, applications that require high performance database access are better suited to native development.

**Network access is unavailable or undesired.**

If mobile users will consistently be working outside of network coverage or if the enterprise wants to avoid the expense of provisioning devices for network access, it is advisable to develop applications that do not require real-time or persistent connectivity. Native applications are best suited for these environments.

<sup>3</sup> Forrester Analyst Jeffery Hammond, quoted in Telerik's white paper "HTML5 Adoption Fact or Fiction: Developers Wade Through the Hype" 2012.

## Consider Hybrids

Most enterprises do not have requirements or conditions that fall neatly within the guidelines listed above. These enterprises should consider hybrid applications. Hybrids have the cross-platform interoperability of Web apps and more of the device-specific functionality of natives, with few tradeoffs. The current thinking among leading analysts in the mobile enterprise industry is that native and HTML5 approaches are complementary and can coexist within enterprise application portfolios. Some consider it inevitable, as reflected in the title of a joint VDC Research and Verivo white paper: [Native & HTML5 Mobile Apps: Not an either or, but a where and when....](#)

The concept of hybrid apps is that HTML5 code is contained within a platform-specific wrapper. The HTML5 component allows the app to run on any device, while the OS-specific wrapper provides full access to the features that the particular operating system and devices support. Various plug-ins are often required to make hybrid applications work and their performance varies on different devices. Hybrids will become more effective as more development tools become available. VDC has called hybrid apps “the best of both worlds” because developers can create highly functional applications and can reuse a significant portion of their code, which enables the apps to run on other platforms. Numerous enterprise software vendors and ISVs are developing hybrid mobile apps.

Even when tools are available, the underlying OS still imposes considerations for hybrid applications. Android and iOS are better suited to hybrid application development than is Windows Mobile – simply due to the lack of Windows Mobile support from the hybrid app tool vendors. Hardware vendors are beginning to address this lack of support for Windows Mobile, but those efforts are often limited to specific tools and/or to the vendor’s hardware.

Many cross-platform mobile environments arise because front-line workers need to use specialty devices that are rugged and have data collection features but their supervisors prefer to use something else, often a personal smart phone. Workers and supervisors typically often have different application needs. Workers require all the functions and support needed to complete their work at the point of activity, while supervisors typically require less-depth of functionality. Supervisors primarily need to know at a glance where all their mobile workers are, how the day’s activity is progressing, and also need to access customer service and other enterprise applications. A hybrid application makes a lot of sense in such a scenario. It would ideally be developed to support the specific features used by the majority of the workforce, while providing role-based access for managers that could be accessed from any device.

## Conclusion

HTML5 is now a practical option for many mobile enterprise operations, but has limitations that make it inappropriate for others. The primary advantage is cross-platform interoperability, which greatly reduces development and support costs. The primary limitations are restrictions to the types of applications that can run offline, and the lack of access to specific device features. Whether HTML5 is advantageous for any specific enterprise depends on its current and future device population, application requirements and support resources.

*“While some two years ago it still looked like 2013 could be the Year of Web App, it’s now looking like that this will prove more like the Year of Hybrid.”*

**ABI Research Analyst Aapo Markkanen**

[www.abiresearch.com/press/14-billion-html5-capable-mobile-devices-in-2013-bu](http://www.abiresearch.com/press/14-billion-html5-capable-mobile-devices-in-2013-bu)

HTML5 performance, maturity and adoption are not currently at the levels of native applications today. However HTML5 is better positioned than native applications to meet the needs of the future environments, where a wide range of mobile devices running different operating systems will access cloud applications. Enterprises need to decide if the future is now for HTML5 mobile applications, or if they will be best served by sticking with their legacy application environment.

Intermec recognizes that there is a place for HTML5, native and hybrid applications in mobile enterprise operations. Intermec has helped companies automate their field service, transportation, DSD, inspection and other mobile operations for more than 40 years and has the experience and product portfolio to offer customers what is best for their needs. Intermec offers components and tools to support both HTML5 and native applications for its line of rugged mobile computers, including the CN51, the 70 Series, CK3X, CK3R, CN50 and CV41.

Use the links below to learn more about Intermec’s HTML5 browser support and capabilities:

- [HTML5 Video Product Profile \(WMV\) »](#)
- [Going Offline with Intermec HTML5 \(WMV Part 1\) », \[Part 2 »\]\(#\), \[Part 3 »\]\(#\)](#)
- [How to Download and Install the Intermec HTML5 Browser \(PDF\) »](#)
- [Configuring the Intermec HTML5 Browser \(WMV\) »](#)
- [Installing the Intermec HTML5 Browser \(WMV\) »](#)

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