

Choosing a Mobile Application Development Platform

A Comparison of Oracle and SAP Solutions and Tools for Mobile Application Development

PIQUE SOLUTIONS

October 2014

THE DEVELOPMENT OF THIS WHITE PAPER WAS SPONSORED BY ORACLE, BUT THE UNDERLYING RESEARCH AND ANALYSIS WERE EXECUTED INDEPENDENTLY BY PIQUE SOLUTIONS.

Contents

Executive Summary	3
Introduction	4
Points of Comparison.....	5
The Mobile-First Challenge.....	6
Methodology.....	7
Oracle vs. SAP MADP Assessment.....	8
Mobile Client Framework	8
Developer Tools.....	10
Business Applications Integration.....	12
Mobile Platform Security.....	13
MAM and MDM.....	16
Service Management.....	17
Mobile Cloud Services.....	19
Conclusions and Guidance	22

All trademarks are property of their respective owners.

Executive Summary

Mobile computing in the enterprise is still relatively immature, primarily due to the complexity of the applications that support mobility. Up to now, the development of these applications has traditionally spanned operating systems, devices, and any number of development frameworks. The vendors in each of these categories have had distinct approaches to mobile application development that reflect their core competencies. Yet, as is often the case with technologies that are rapidly maturing, some of these approaches are on the verge of becoming obsolete. Due to the rise of mobile application development platforms (MADPs) in the enterprise, it is becoming much simpler to develop mobile applications that can run on almost any platform.

Two of the leading vendors in this emerging category are Oracle and SAP. Both vendors are following similar strategies in terms of combining internal development with strategic acquisitions to create their MADP offerings. However, joint research conducted by Pique Solutions and its strategic partner Miratech, a global systems integrator with a dedicated enterprise mobility practice, reveals key differences between these two vendors' MADP offerings. A summary of the differences follows:

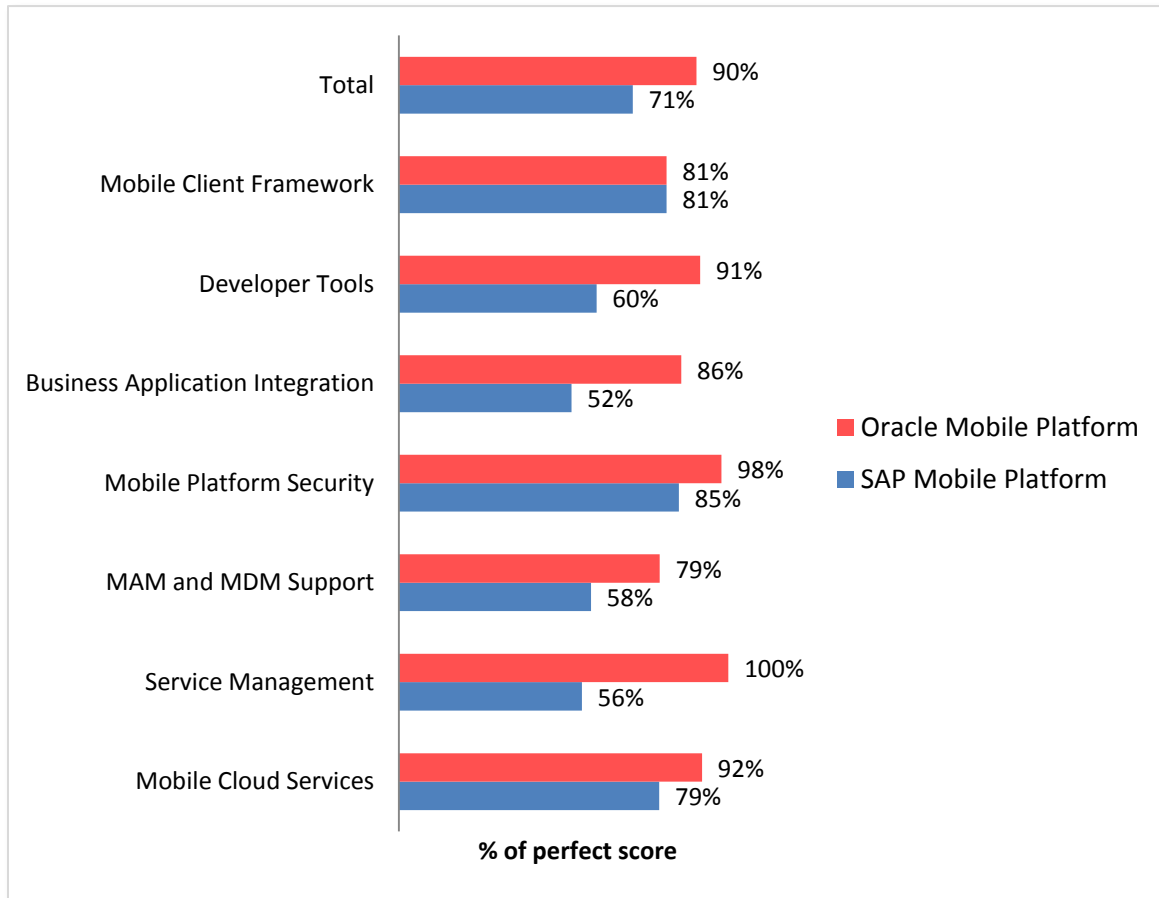
- ⊕ Most of the capabilities of the Oracle Mobile Platform are either native or preintegrated. In contrast, SAP relies on a number of third-party solutions, raising complexity, increasing integration and management costs, and resulting in a longer time to value and higher total cost of ownership.
- ⊕ Feature implementation is significantly more consistent across the Oracle MADP solution than the SAP solution.
- ⊕ Oracle provides powerful and flexible middleware that supports industry standards.
- ⊕ The Oracle Mobile Platform provides more robust security and a simpler approach to authentication and mobile application management (MAM).
- ⊕ Integration with multiple data sources and third-party systems is simpler using the Oracle Mobile Platform.
- ⊕ Oracle provides access to a richer set of monitoring and management services.
- ⊕ Oracle mobile cloud services are better integrated and offer a broader set of features.
- ⊕ Oracle better supports Java development tools that are familiar to a large number of developers.
- ⊕ Conceptual design and integration across all relevant Oracle products and services are superior.

While both Oracle and SAP offer a broad range of mobile application development functionality and services, the two platforms are at fundamentally different points of MADP maturity. SAP provides levels of functionality similar to those provided by Oracle in the Mobile Client Framework category but lags behind Oracle in all other categories, most notably in Service Management, Mobile Application Management, Business Application Integration, and Developer Tools.

Based on our research, the Oracle Mobile Platform enables the development of mobile applications faster and more cost-effectively than the SAP Mobile Platform.

As **Figure 1** shows, when comparing the two platforms against 217 criteria, Oracle scored 90% compared to SAP's 71%. Specifically, the Oracle MADP solution scored an impressive 196 out of a possible 217 points, while the SAP Mobile Platform garnered 157 points.

Figure 1. Oracle vs. SAP MADP Evaluation Results



Introduction

Every journey begins with a single step, but not everyone starts from the same location or point in time. In terms of building MADPs, SAP and Oracle are clearly heading in a similar direction. SAP started down its path much earlier with the introduction of SAP Mobile Engine in the early 2000s, and since then SAP has made numerous acquisitions to add additional capabilities. Oracle, in contrast, has focused primarily on extending its existing application development framework to allow developers to build mobile applications.

For this white paper, Pique Solutions studied the mobile application development technologies and approaches of both vendors to identify the relative merits of each MADP. Our evaluation, augmented by interviews with Oracle and SAP customers, systems integrators, and mobility analyst firms, shows that—thanks to an earlier start—SAP has established a major mobile enterprise computing presence. However, we believe that Oracle’s later entry into the MADP market has resulted in a second-mover advantage that continues to work in Oracle’s favor. With the mobile application development market rapidly maturing and developer requirements becoming clearer, Oracle has managed to build a cleaner, less complicated, more user-friendly, and better integrated MADP. In fact, there is a significant difference between the two vendors in terms of which actually provides the simpler, faster, and less expensive way to build, deploy, and manage mobile computing applications in the enterprise.

Points of Comparison

At its core, an MADP consists of the tools developers use to build their applications, the back-end services developers invoke to access enterprise services, and the management framework used to manage and secure both the applications and the devices they run on.

SAP established itself as a serious player in the MADP market with its acquisition of Sybase in 2010. Sybase had created the Sybase Unwired Platform, which consisted of Afaria mobile device management (MDM), the Sybase 365 short message service, and the iAnywhere database Sybase gained when it acquired Powersoft in 1995. Following the acquisition of Sybase, SAP acquired Syclo, a mobile asset management platform that gave SAP yet another platform for building mobile applications on top of a proprietary framework.

Since those acquisitions, SAP has launched SAP Mobile 3.0, which gives developers the option of building applications in multiple frameworks that connect to several SAP back-end services. For example, developers now can build applications using the proprietary Syclo framework or using an SAP AppBuilder tool based on an open-source UI development kit for HTML5 that SAP created. SAP itself has developed a Fiori implementation of that UI development kit for accessing back-end SAP services that it now gives away. Developers can also opt out of those frameworks altogether by choosing to develop their applications using any number of third-party development tools that connect to back-end SAP services. To that end, SAP has established a partnership with Appcelerator to gain access to tools for building native apps.

The back-end services SAP offers include SAP NetWeaver middleware, the SAP HANA In-Memory Computing Platform, the Sybase 365 short message service platform and, in the near future, a RESTful application programming interface (API) management platform based on technology that SAP has licensed from Apigee.

On the management front, SAP resells a MAM platform developed by Mocano, in addition to continuing to offer the Afaria MDM platform it gained via the acquisition of Sybase.

In contrast, Oracle provides developers with Oracle Mobile Application Framework (MAF), which can be used to develop applications in Java and HTML5/JavaScript. Much like SAP, Oracle also gives developers the option to invoke any number of third-party development tools.

On the back-end, Oracle has created Oracle Mobile Suite, which provides developers access to RESTful API services. With this platform, developers can make use of multiple channels to access a variety of existing applications. Many IT organizations, for example, have applications based on software-oriented architectures (SOAs) that use web services employing the Simple Object Access Protocol (SOAP). Oracle has made it easy to expose those existing services in a REST/JSON format that can be consumed by mobile applications, thereby creating a common service layer through which both back-end services and existing enterprise applications can be accessed via multiple channels of communication. It is also worth noting that both vendors provide facilities for browsing service catalogs, and services may be invoked via SOAP or REST APIs and can make use of XML and JSON data. Support for attachments is also provided, but only the Oracle Mobile Platform provides the ability to search, browse, and consume services/APIs.

From a management perspective, Oracle recently completed the integration of the MAM technology it gained via the acquisition of Bitzer Mobile in 2013 into Oracle Mobile Suite. In addition, Oracle chose to integrate its Oracle Identity Management platform into Oracle Mobile Suite to give developers access to a built-in set of identity and access management services.

It is obvious that both Oracle and SAP offer a comprehensive portfolio of mobile application development and management tools. However, a careful analysis of 217 criteria reflecting the capabilities of the two approaches across seven criteria groups finds the Oracle MADP significantly more advanced in providing the functions and ease of use mobile developers in the enterprise need to succeed.

The Mobile-First Challenge

Organizations of all sizes are investing in mobile computing to foster better relationships with customers and increase employee productivity. No one wants to be tethered to a desk to access information. People want to be able to do what they want when they need to regardless of where they happen to be. Modern organizations must develop a rich portfolio of mobile computing applications to rise to that challenge. If they don't, they risk becoming irrelevant.

As a result, mobile computing has emerged as one of the highest enterprise IT priorities. The challenge organizations face is finding a way to build these applications not only quickly but also as cost-efficiently as possible. Those dual requirements are leading organizations to invest in MADPs that dramatically improve the economics of mobile application development, while enabling the delivery of mobile applications that provide a truly superior user experience.

The mobile application development market today consists of three dominant types of offerings: native development kits, web-based development kits, and complex enterprise-grade platforms. An MADP takes mobile computing development to a higher level by providing a set of tools and technologies that cover the full process for designing, developing, testing, deploying, and maintaining mobile applications in the enterprise. As such, an MADP provides the following:

- ⊕ A cross-platform development framework (usually based on HTML5).
- ⊕ A set of technologies to build native applications against a platform-specific framework.
- ⊕ Middleware that provides user management, security features, connectivity, and integration capabilities.
- ⊕ A framework for connecting client-side applications to middleware, including declarative data bindings, among others.
- ⊕ A UI library or libraries that provide standard UI elements that can be customized.
- ⊕ An integrated MDM or MAM capability.

Regrettably, most organizations have been forced to take a tactical approach to building mobile applications. Rather than deploying a platform through which they can rapidly accelerate the development of mobile computing applications in a way that sharply reduces costs, the majority of organizations have essentially approached mobile computing one isolated application at a time.

One case in point is an SAP customer interviewed for this paper. A Fortune 500 company that manufactures industrial equipment wanted to increase productivity by extending the reach of an existing data warehouse application to a mobile computing device developed by Motorola. Unfortunately, because of a decision to work at a business-logic level using arcane Business Application Programming Interfaces that SAP has historically exposed to application developers, it took the organization more than two years to develop the mission-critical mobile application. "There is no interim database on the client or on a server," said an application support analyst for the company. "The SAP application is always the master." As a result, there is no central point of control through which back-end services can be managed, and there is no mechanism that allows both code and services to be easily reused across multiple mobile applications in the future.

As this organization and others like it move to develop new mobile applications or port existing ones to new devices, they are likely to run into many of the same issues that resulted in a single application taking multiple years to develop.

With mobile computing now pervasive, IT organizations must be prepared to develop tens to hundreds of mobile computing applications in rapid succession. Instead of reinventing the wheel for each of those applications, an MADP provides tools and back-end services that enable applications to be built and managed using a common set of processes and unified policies.

For example, a large manufacturer of cement and other related building materials is making use of the Oracle MADP to create applications for both external and internal use.

“With the Oracle Mobile Platform, we were able to build an app from the ground up in two months,” says the vice president of information systems for the manufacturer. “With other platforms and the learning curve involved for our development team, it would have taken more than six months.”

Oracle and SAP have emerged as two dominant providers of MADPs at a time when most organizations are just beginning to realize what it will take to construct a truly mobile enterprise.

“With the Oracle Mobile Platform, we were able to build an app from the ground up in two months. With other platforms and the learning curve involved, it would have taken more than six months.”

Vice President of Information Systems
Cement and Materials Manufacturer

Methodology

The first step in our research was the development of a comprehensive MADP Assessment Framework to encompass all the requirements of mobile and hybrid application development across all potential use cases (B2B, B2E, and B2C).

The two platforms were compared in the following seven assessment categories:

- 1) **Mobile Client Framework:** The client framework environment provides the foundation for building enterprise mobile applications.
- 2) **Developer Tools:** They offer visual and declarative approaches to manage the development life-cycle of applications. They support rapid application development based on ready-to-use design patterns, along with visual and metadata-driven components.
- 3) **Business Applications Integration:** Access to enterprise data and business processes enables developers to create high-value applications.
- 4) **Mobile Platform Security:** Protection of application data and services from various attacks and threats.
- 5) **MDM and MAM:** Tools managing access to corporate data and applications at either the mobile device level or the application level.
- 6) **Service Management:** Tools managing and monitoring the status of various services being invoked by mobile applications.
- 7) **Mobile Cloud Services:** Services providing easy, scalable, and reliable access to applications, resources, and services on demand.

Based on publicly available datasheets, product collateral, and white papers, the second step of our research involved a detailed comparison of each product in Oracle’s and SAP’s mobile application development portfolios.

The third step was a primary research phase consisting of in-depth, multiphase interviews with Oracle and SAP customers, as well as systems integrators who have deployed the Oracle and SAP mobile platforms multiple times and mobility analyst firms. Roles of the individuals interviewed ranged from technology-savvy business executives to IT vice presidents and IT directors.

Based on the research, the most notable advantages of Oracle over SAP are in the Developer Tools, Business Application Integration, Mobile Application Management, and Service Management categories.

Oracle vs. SAP MADP Assessment

The following sections discuss the vendors’ relative capabilities in each of the seven assessment categories.

Mobile Client Framework

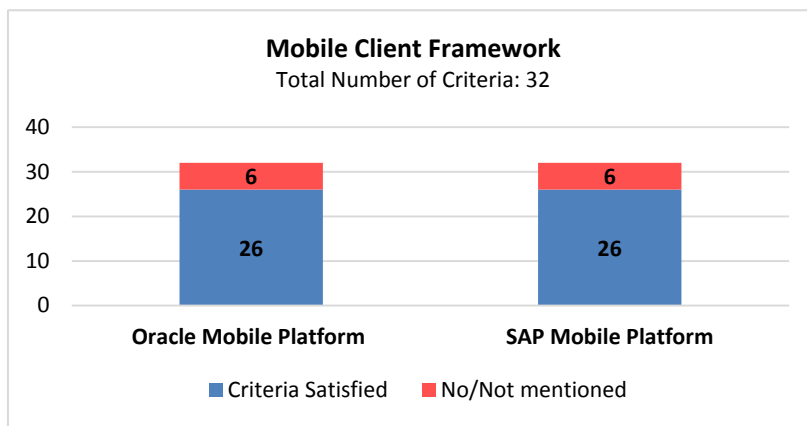
Relevant Products

Oracle Mobile Platform	SAP Mobile Platform
Oracle MAF	SAP Mobile Platform SDK

Conclusion

Oracle MAF gives developers a more seamless development experience, which enhances overall productivity. In particular, the use of Java and HTML5 means that developers only have to write the business logic for their application once, regardless of the mobile platform on which it runs.

Figure 2. Mobile Client Framework Comparison



For developers of mobile applications, both vendors provide a complete set of mobile application development technologies via an application development framework. Each of the frameworks provides a combination of native and cross-platform capabilities, along with a variety of mechanisms for accessing back-end enterprise services. The primary advantage Oracle offers in this category is a consistent set of methods for building mobile applications running on multiple devices that make use of a Java platform, with which many developers are already intimately familiar.

For example, the manufacturer of cement and building materials has been using Java tools for more than a decade. That familiarity allowed it to embrace Oracle MAF in a way that resulted in a mobile application development cycle of only four to six weeks.

In contrast, SAP created a platform based on different technologies, some of which were developed by SAP and some of which were gained via acquisitions or alliances with third-party vendors. SAP still has a long way to go in terms of integrating all of these technologies. By declaring support for miscellaneous third-party and open-source frameworks, SAP contends that a Bring Your Own Toolkit approach for developing mobile applications makes the SAP Mobile Platform more extensible. From the perspective of the developer, however, the Oracle Mobile Platform is more straightforward and easier to master because it contains a solid set of technologies that are conceptually and technically built into the family of Oracle application development platform and tools. An example worth noting is on-device Java runtime, which handles communication with back-end services. This capability is one of the most significant differentiators between the two platforms: While each one has an embedded web browser, the approach to using APIs to create a bridge from JavaScript to native code is different.

In Oracle's case, the bridge to the custom business logic is written in Java. The custom business logic layer itself may be implemented in Java or JavaScript. Because Java is truly cross-platform, more than 10 million developers already familiar with Java only have to write business logic once without having to learn anything new. In the case of SAP, the bridge to the "plug-in" is platform-dependent, which means the SAP business logic must be developed in native code to run separately on each platform. Consequently, developers are forced to learn a completely new set of technologies. To this point, a chief information officer of a \$1B+ real estate and development company said, "Oracle MAF and Oracle Fusion Middleware allowed us to achieve a native mobile app solution using our existing system without redevelopment, saving us time and money."

**"Oracle MAF and Oracle Fusion
Middleware allowed us to
achieve a native mobile app
solution using our existing
system without redevelopment,
saving us time and money."**

Chief Information Officer

\$1B+ Real Estate Company

The degree to which these two different approaches is an issue will vary by organization. Business logic, for example, might be developed in pure JavaScript without any managed back-end at all. JavaScript running in a browser is able to send HTTP/HTTPS requests directly to the business apps gateways using the XML HTTP Request technology supported in virtually all browsers.

In addition, SAP developers may opt to use JavaScript to create a specific code base and then compile that code into the native platform code. For the UI, this means, for example, that developers may have to define a ListBox using the specific syntax. This ListBox would then be rendered using native device capabilities, which is much faster than browser-based ones. This approach is ideal only when one needs to create a very standard app for a limited number of platforms. The larger the number of platforms, the harder it becomes to find the "lowest common denominator" required to make this particular approach viable across a broad range of mobile applications.

Another major benefit of the browser-based approach is the standard way of storing local or offline data. The frameworks that rely on browsers benefit from local storage and IndexedDB capabilities that are supported on all the major browsers. Those technologies are especially useful when dealing with small amounts of weakly structured data.

Alas, when it comes to the standard relational databases, there’s no silver bullet. Every vendor supports its own technology. Oracle, for example, uses the SQLite software library to give developers access to a self-contained, transaction SQL database engine that is serverless and requires no configuration. A de facto standard in many organizations, SQLite is one of the most widely deployed mobile database engines in the world today. Additionally, Oracle extended this database to enhance local security and encryption features and chose to provide access to SQLite directly from Java.

In contrast, SAP uses the SQL Anywhere mobile database management platform, which requires additional licensing and in many cases provides more functionality than is needed for a mobile application.

Finally, both Oracle and SAP offer the visual tools and declarative binding capabilities that significantly reduce the amount of application code that must be written. Oracle, however, offers a much more consistent environment and UI framework than SAP does.

There are many nuances to selecting a mobile client framework. All things considered, the platform that enables the greatest amount of developer productivity prevails, especially when the backlog of mobile application development projects in most organizations is increasing with each passing day.

Developer Tools

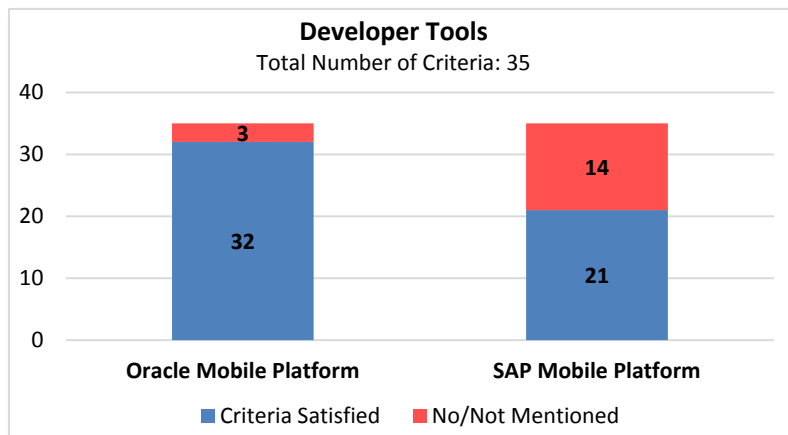
Relevant Products

Oracle Mobile Platform	SAP Mobile Platform
Oracle JDeveloper or Eclipse	SAP AppBuilder, Appcelerator (a third-party product)

Conclusion

Oracle’s developer tools offering is more architecturally consistent and better optimized for cloud computing environments. SAP provides a wider variety of development platform choices and UI frameworks that require more effort on the part of the developer to master. While both vendors offer developers powerful IDEs, many extensions and features are unique to each platform.

Figure 3. Developer Tools Comparison



The Oracle Mobile Platform supports JDeveloper or Eclipse IDEs for building mobile applications using different technologies, such as Java, SOA, web, database, RESTful APIs, XML, and web services. The Oracle development environment also supports automatic deployment of complex applications consisting of mobile apps, databases, web services, and middleware integration to an Oracle cloud, where the testing and debugging of those applications can occur more easily. This creates a unique Oracle ecosystem consisting of developer and application life-cycle management tools, easily accessible infrastructure, and cloud services all rolled up in a single unified environment.

In contrast, SAP's AppBuilder is a separate tool specifically for creating mobile applications. Although SAP AppBuilder is integrated with the SAP HANA In-Memory Computing Platform, it does not scale to building complex applications as well as the Oracle solution does. The Oracle development environment, for example, is the same development environment used for Oracle Fusion Middleware with specific extensions that cover Oracle SOA Suite, Oracle WebCenter, and Oracle Business Intelligence. There are also visual tools from Oracle that allow developers to build business process management, Business Process Execution Language (BPEL), and enterprise service bus processes, as well as a declarative editor that provides an easy way to define business rules for the Oracle SOA Suite.

Because it is a browser-based application, SAP AppBuilder cannot yet deliver the same level of functionality and convenience that Oracle IDE provides. Although it supports visual designing; editing of HTML, JavaScript, and CSS; and managing the sets of source files united into "projects," SAP AppBuilder is still far from what developers have come to expect in a modern IDE.

The Oracle Mobile Platform provides a much richer set of facilities for testing applications. It covers the full development life cycle, ranging from initial design and analysis through the coding and testing phases and deployment. Developers can design, generate, and visualize their code with universal markup language, Java, and database diagrams. Other Oracle development environment features include support for the JIRA task tracking system and Open Services of Lifecycle Collaboration change management alongside other testing tools popular among software developers. The Oracle Mobile Platform also supports automated testing of applications and provides JavaScript APIs for scripts and extensions.

SAP AppBuilder does not require a specific testing framework or routines, instead leaving the choice of the tool to be employed to the developer. There are many JavaScript unit-testing tools available at no cost. Nonetheless, those third-party products may not result in the same level of productivity for developers that must produce quality applications typically demanded in the enterprise.

The IDE for the SAP Mobile Platform does offer frameworks for writing unit tests, and other types of functional testing usually can be performed manually. A separate SAP Solution Manager product, however, enables test case management and bug-tracking. There is also a separate application life-cycle management tool from SAP that is not integrated with SAP AppBuilder at this time.

The Oracle Mobile Platform takes advantage of both HTML5 and Java Runtimes in the same application, thereby enabling the building of applications for all the supported platforms from a single code base and eliminating the need for native code in the application. The business logic that cannot be implemented in JavaScript is implemented in Java—and reused across the platforms. This is a critical capability because the nature of mobile application development requires IT organizations to be more flexible than ever to support any number of mobile computing platforms. "One code base to deploy on both iOS and Android platforms drastically reduces development and ongoing maintenance costs," noted the vice president of information systems for the manufacturer of cement and

"One code base to deploy on both iOS and Android platforms drastically reduces development and ongoing maintenance costs."

Vice President of Information Systems
Cement and Materials Manufacturer

related building materials. “With mobile development, there are a lot of versions and updates, so there’s a lot of prototyping. That requires us to be a lot more nimble, and Oracle MAF supports this need.”

With Oracle there is usually no need to use platform-specific code, whereas SAP developers are required to implement the non-JavaScript logic in native platform language and then build apps separately for each platform. While SAP claims to provide the ability to build native apps for different platforms from a single codebase, this can only be achieved by using Appcelerator, a third-party technology. In addition, this approach requires coding in JavaScript in a specific way defined by the Appcelerator API. This restricts the ability to reuse the code base for creating other applications, resulting in a higher learning curve and higher costs.

Business Applications Integration

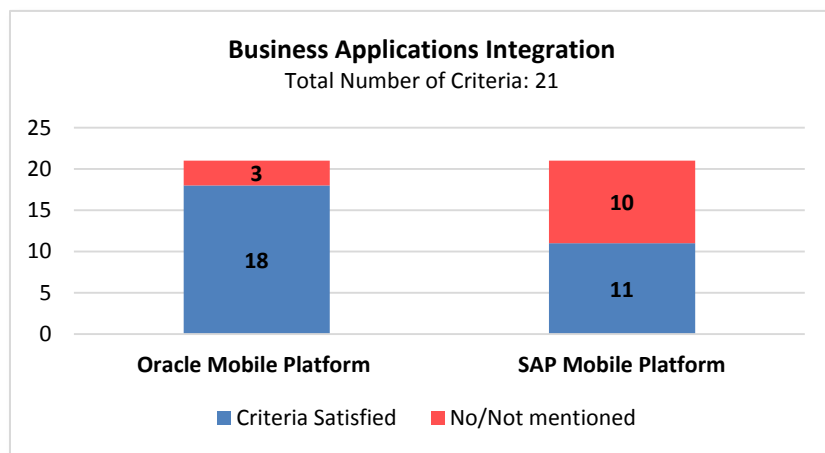
Relevant Products

Oracle Mobile Platform	SAP Mobile Platform
Oracle SOA Suite (Oracle Service Bus, Oracle BPEL Process Manager)	SAP Mobile Platform Server, SAP NetWeaver, SAP HANA

Conclusion

Both Oracle and SAP provide a unified development platform that enables developers to rapidly create applications for various platforms and integrate them with new or preexisting back-end services and business applications. Oracle, however, offers more robust middleware and visual design tools than SAP.

Figure 4. Business Applications Integration Comparison



From an IT management perspective, the integration of business applications is a vital part of any enterprise mobile platform. In this area, Oracle provides logically consistent instruments to integrate many heterogeneous systems into a single workspace. By contrast, SAP is focused primarily on providing deeper integration of mobile applications with their own applications and specific third-party applications that are made available via the SAP marketplace. In effect, SAP has created a separate architecture for developing mobile applications, while Oracle has extended its existing application development framework to both native and hybrid applications that access back-end services using multiple communications channels. Rather than turning mobile application development into a separate

competence, Oracle has made mobile application development a natural extension of its existing application development offerings that are familiar to many developers.

Oracle customers also benefit greatly from rapid business process development tools that share access to the Oracle Service Bus, a platform that supports integration via everything from RESTful APIs and web services to event-driven architectures. A critical component of the Oracle Mobile Platform, Oracle Service Bus is preintegrated into the platform, serving as another example of the out-of-the-box nature of the Oracle MADP solution. Oracle Service Bus provides service virtualization, routing, and data transformation, as well as security and load-balancing features within a single industry-leading solution.

One important tool that is available as an integral part of the Oracle mobile offering and is tightly integrated with Oracle Service Bus is Oracle API Management, which enables the following:

- ⊕ Complete API life-cycle management, including the definition, creation, security, monitoring, and management of APIs.
- ⊕ RESTification of existing and new services for API exposure.
- ⊕ Opportunities to grow and enrich developer communities with prebuilt, customizable portals.
- ⊕ Proven and trusted API management solutions.

SAP developers can create custom integration scenarios by exposing plain HTTP- or SOAP-based adapter endpoints to mobile applications. SAP also recently announced its partnership with Apigee, through which it will make REST API services available to access SAP products and services. While this partnership appears to be a significant advance for SAP, it adds yet another third-party tool that SAP customers have to integrate and separately license to achieve the desired functionality.

In general, Oracle SOA Suite and Oracle Service Bus are consistently rated higher than SAP NetWeaver by customers and industry analysts in areas such as support for heterogeneous environments, ease of development, enterprise features, availability, and performance. In fact, many SAP customers rely more on Oracle Fusion Middleware services to integrate SAP into their business processes than they do on SAP NetWeaver Process Orchestration middleware.

Mobile Platform Security

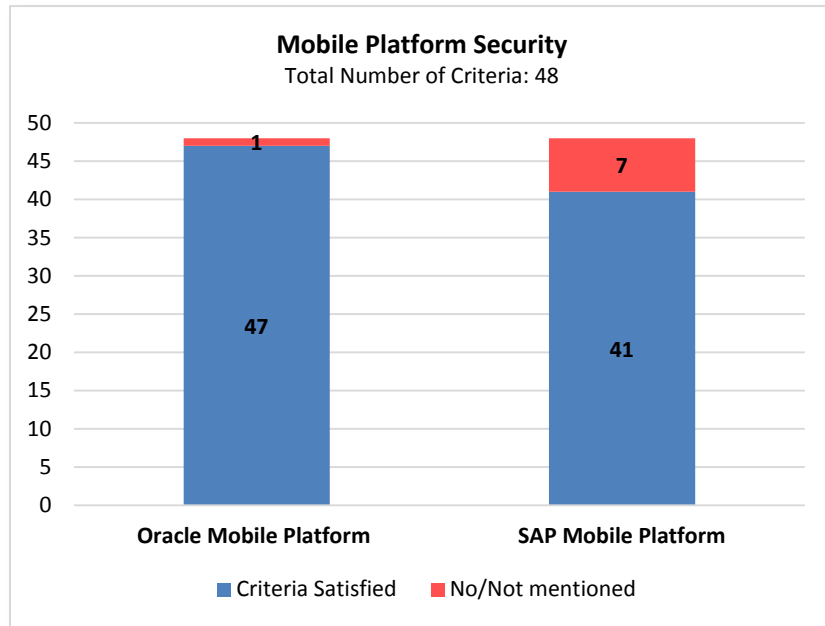
Relevant Products

Oracle Mobile Platform	SAP Mobile Platform
Oracle Mobile Security Suite, Oracle Identity and Access Management Suite, Oracle Adaptive Access Manager	SAP Mobile Platform, SAP NetWeaver, SAP Access Control, Mocana (a third-party product), SAP Afaria

Conclusion

Overall, Oracle provides a more complete set of tools for managing platform security that offers not only higher levels of security but also an environment that is easier to manage. One of the biggest advantages of Oracle versus SAP in this category is the ability to define and enforce identity-level policies.

Figure 5. Mobile Platform Security Comparison



Enterprise mobile security is a broad area that includes virtually anything related to protecting the enterprise information of the greatest concern for IT managers. For this research, our focus is on the security aspects directly related to protecting the business application, the communication channels it depends on, and the mobile device itself.

Both Oracle and SAP enable device provisioning, as well as support for secure containers and the ability to selectively wipe applications. By providing a comprehensive solution for enterprise identity management along with authentication and authorization capabilities that include single sign-on, Oracle has a significant advantage over SAP in this category.

“With Oracle Identity Management, we are now able to grant users single sign-on access to enterprise and cloud applications from anywhere,” said the vice president of technology operations for an online learning service. “By connecting applications to our cloud-based systems with Oracle Identity Management, we can immediately provision and de-provision user rights, thus creating a great user experience while also effectively managing risk for the organization.”

“By connecting applications to our cloud-based systems with Oracle Identity Management, we can immediately provision and de-provision user rights, thus creating a great user experience while also effectively managing risk for the organization.”

Vice President of Technology Operations

Online Learning Services Company

The clear-cut advantage of Oracle’s approach is the ability to define and enforce identity-level policies. The Oracle Mobile Platform supports single sign-on authentication via Kerberos or NT LAN Manager protocols using username/password or PIN-protected public key infrastructure certificates. As for security and user-management features, both vendors support the use of directories in the cloud to manage user permissions along with device and application access. Oracle leverages multiple components of Oracle Identity and Access Management Suite, including

Oracle Directory Services for direct access of mobile applications to LDAP-based user directories such as Oracle Internet Directory or Oracle Unified Directory. SAP uses ID Federation with SAP NetWeaver Cloud.

Data Encryption

Protecting data on the mobile device and the data transmission channels it depends on is not possible without encryption. Approaches to local storage encryption vary from encrypting the whole device or providing a secure container, to encrypting specific bits of data within the application itself. Encrypting the communication channel is traditionally done using HTTPS and/or a VPN, both of which depend on the implementations supported by the device vendor. Both the Oracle and SAP Mobile Platforms support SSL/transport layer security communication. Oracle is an active participant in the FIPS 140 validations and currently provides the FIPS 140-2–certified security option to protect REST API communications. Understanding the need for FIPS 140-2–certified solutions, SAP has been closely following device manufacturers’ efforts to certify devices and is working to define requirements for an end-to-end FIPS 140-2–certified solution. These efforts will depend on the release of certified devices using certified transports that provide secure paths for email communications, MDM controls, and mobile application data.

Understanding the potential vulnerabilities of device-level encryption technologies, both vendors are working hard to provide application-level communication protection via encrypted secure tunnels. Following its acquisition of Bitzer Mobile in 2013, Oracle now supports a secure AppTunnel that both eliminates the need for mobile VPN and protects from rogue apps. That offering provides additional support for application containerization, authentication and authorization, and integration with social networking log-ins to help verify user identities.

The SAP Mobile Platform supports an application-specific VPN tunnel to prevent rogue apps and malware from accessing or performing reconnaissance on enterprise networks. It can automatically reestablish a VPN tunnel when Internet connectivity changes, such as from Wi-Fi to 3G or LTE. The one-time password business logic from SAP includes a service that sends and validates nonpersistent one-time passwords; however, both platforms support them.

With new capabilities that take advantage of location services and increased usage of analytics to provide more advanced security, Oracle via Oracle Adaptive Access Manager software provides additional security functions—such as device tracking, knowledge-based security, one-time passwords, risk analysis, behavioral profiling, and predictive capabilities—based on statistical algorithms that can more readily identify potential security issues.

The theory behind this level of protection is that the user usually follows predictable behavior patterns. For example, if a user regularly reads emails during business hours from the office, at a café, or in the street at lunchtime, and from home in the United States, and then one evening tries to access the email server from Siberia, the server will deny the request and require additional authentication. Oracle Adaptive Access Manager improves the security of sensitive online operations—such as data access, financial transactions, and business processes—by providing real-time risk analytics, risk-based authentication, and antiphishing and antimalware capabilities.

MAM and MDM

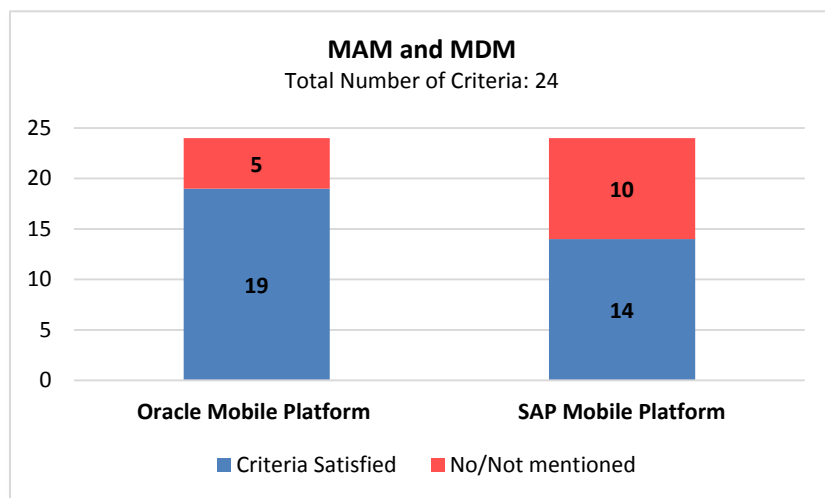
Relevant Products

Oracle Mobile Platform	SAP Mobile Platform
Oracle Mobile Security Suite	SAP Access Control, Mocana (a third-party product), SAP Afaria

Conclusion

While SAP focuses on MDM (versus MAM) and has a strong MDM offering, Oracle’s overall mobile security strategy focuses on separating corporate application data from personal data by extending its MAM and identity and access management solutions via a tight integration with the overall client management framework. With the increasing variety of devices and device platforms, Oracle’s focus on application management is more effective and secure than the device-centric strategy adopted by SAP.

Figure 6. MAM and MDM Comparison



By definition, MDM tools focus on managing devices, which translates to weaker security because MDM does not segregate personal and enterprise environments for messaging and applications. Because MAM tools focus on managing applications regardless of the devices on which they run, MAM is gaining traction in light of both the proliferation of consumer-centric devices and device platforms that lack some critical capabilities enabling endpoint protection and the MDM shortcomings that include privacy issues and overall usability. The replacement of default operating system applications with their MDM equivalents is a questionable solution. This approach sometimes destroys all the advantages associated with a bring-your-own-device strategy. For instance, if an Android or Windows Phone device connects to the MDM tool, corporate email is isolated into a new app that might behave very differently from the one to which the user is accustomed. This might result in user dissatisfaction and productivity loss. The same scenario applies to web browsers and any application that is not enterprise-specific. This is a common approach among MDM systems today, which might—and should—change in the near future. From an enterprise point of view, it matters little which devices employees use; they just need to be secure enough to satisfy enterprise

security policies. The paramount objective is to secure and manage business applications and the data they store and transfer. MAM solutions do this more effectively.

While Oracle offers its own mobile security suite, SAP partners with Mocana to provide application-level security together with some additional MAM capabilities such as usage policies. However, SAP’s MAM capabilities are inferior to Oracle’s underlying Bitzer Mobile MAM technology, which was extended so that the enterprise can establish authentication and usage policies via Oracle’s identity-management gateway. This eliminates the need to set up a separate management component solely for mobile devices. Oracle goes beyond MAM by providing a secure container. As the practice manager of a leading information security research and advisory company stated, “Oracle provides a way to not just ensure secure access to the native mobile apps, but to any enterprise app, along with secure messaging. This is combined with Oracle’s adaptive access management to provide seamless secure access across any device.”

“Oracle provides a way to not just ensure secure access to the native mobile apps, but to any enterprise app, along with secure messaging. This is combined with Oracle’s adaptive access management to provide seamless secure access across any device.”

Practice Manager

Leading Information Security Analyst
Company

As for MDM, Oracle’s strategy continues to stress the need to support integration with a wide variety of third-party offerings. SAP offers its own robust SAP Afaria offering for MDM. The relationship between Oracle and SAP and third-party MDM vendors is an important consideration. While SAP does not seem to integrate with third-party MDM products, Oracle is working toward integration with the leading MDM solutions such as Mobile Iron, VMware AirWatch, Good Technology, IBM Fiberlink, Citrix, and SAP Afaria. As companies increasingly can measure the value of managing applications over managing devices, Oracle’s approach of partnering with MDM vendors while focusing on enhancing native MAM capabilities is proving to be more efficient and secure.

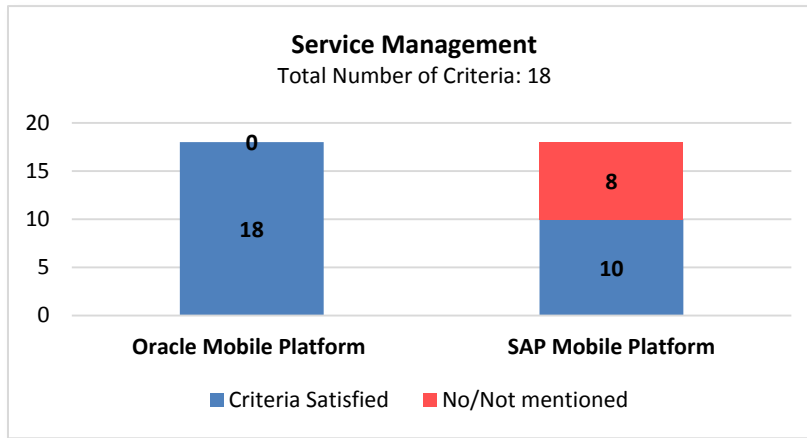
Service Management

Relevant Products

Oracle Mobile Platform	SAP Mobile Platform
Oracle Enterprise Manager	SAP Solution Manager

Conclusion

Service management within Oracle environments is more seamless and sophisticated compared to the SAP approach, which is much more narrowly defined. Specifically, Oracle offers comprehensive life-cycle management for cloud, mobile, applications, middleware, database, servers and storage. It provides superior capabilities for configuration of event types, aggregation of intervals, event collection, and monitoring.

Figure 7. Service Management Comparison

With any enterprise-class mobile solution managed by an IT organization, service management and monitoring are top priorities. Enterprise customers expect flexible service deployments that support version control, service performance monitoring, and health checks and alerts that identify potential service level agreement (SLA) or compliance issues. Those capabilities must be accompanied by visual reporting tools that facilitate effective decision-making when issues inevitably arise.

Service monitoring, analytics, and other related management features have been a core part of Oracle's middleware for decades now. Oracle Enterprise Manager supports everything that might be expected from this kind of system, including configurable event logging and grouping, reporting, and alerts, including SLA violation alerts. The specific features that boost Oracle's position in this category include the ability to configure event types and event collection, aggregate intervals, and the inclusion of a monitoring API. This last capability enables developers to track custom events and analyze different aspects of application behavior.

Oracle Enterprise Manager Cloud Control Mobile, a special mobile management application, offers incident management with service request integration and gives users the ability to track, monitor, and manage incidents directly from a smartphone. Via Oracle Enterprise Manager, the IT operations team can view incident and problem details directly in the application, as well as acknowledge, assign, prioritize, escalate, and annotate incidents. In addition, Oracle Enterprise Manager not only monitors individual components in the IT infrastructure but also the applications hosted by those components. This allows organizations to model and monitor business functions from an end-user perspective. When modeled correctly, IT organizations can accurately measure the availability, performance, and resource usage of any set of services.

Oracle's approach to service management makes it simple to combine multiple services into a single dashboard that organizations can use to readily determine whether or not SLAs are being met.

The Oracle Mobile Platform supports native, short message service, and voice notifications for emails. Applications must register with a notification service to receive push notifications. If the registration succeeds, the notification service issues a token to the application. The application shares this token with its provider running on a remote server, thereby enabling the provider to send notifications to the application through the notification service.

With the SAP Mobile Platform console, developers can configure an availability check for an SAP HANA XS application that allows recipients to receive email alert notifications when the platform is down or responding slowly. The SAP Mobile Platform also provides native push notification support for major enterprise mobile platforms, including

Android (Google Cloud Messaging), Apple (Apple Push Notification Service), and BlackBerry (BlackBerry Internet Service/BlackBerry Enterprise Server). Developers can also enable push notifications using the SAP Mobile Platform, Enterprise Edition, Cloud Version, and SAP NetWeaver Gateway to provide push notifications to Android devices via the Google Cloud Messaging service.

On the back-end, SAP Solution Manager is the equivalent to Oracle Enterprise Manager, but it is not a part of the SAP Mobile Platform and may be used only by services that are specifically compatible with SAP Solution Manager. The solution is not nearly as robust as Oracle Enterprise Manager in terms of holistically allowing IT organizations to manage a broad set of services from applications to disk.

Both Oracle and SAP provide developers with an alert engine that delivers alerts concerning violations of security policies and SLAs. Oracle’s alert engine consists of an Action Framework that can invoke workflow, web services, web content, additional BI content, Java methods, and other custom procedures from any delivery channel. The alerting engine captures and distributes notifications via multiple channels in response to predefined business events and/or data exceptions to improve overall decision-making. The SAP Mobile Platform provides a local alert engine that evaluates the alert rules before creating an alert. Also, the SAP Mobile Platform offers central configuration for each domain, where users create alert rules and the local alert engine receives events from the runtime component. Last, both vendors include reporting tools as part of their mobile platforms, offer the ability to create central monitoring dashboards and alert notifications, and provide service metrics and operations reports.

Mobile Cloud Services

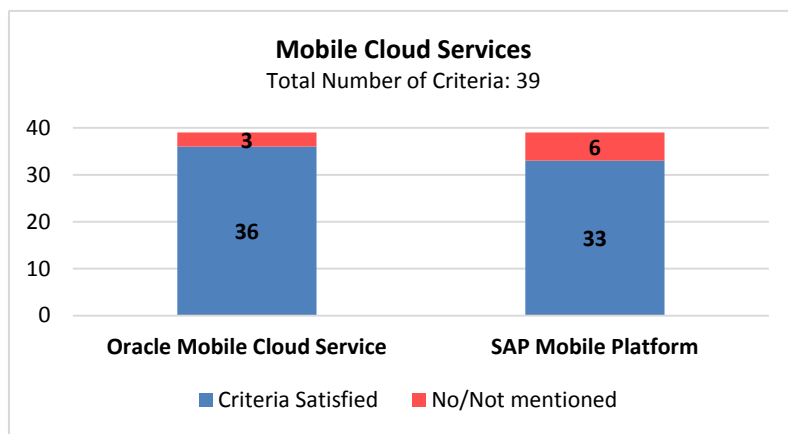
Relevant Products

Oracle Mobile Platform	SAP Mobile Platform
Oracle Mobile Cloud Service	SAP Mobile Platform, SAP HANA Cloud Platform

Conclusion

While both companies aim to provide the complete set of their mobile platform services in the cloud, Oracle provides better integration of mobile application in the cloud with back-end systems through Oracle Fusion Middleware, synchronization services, and the Oracle Identity Management security features.

Figure 8. Mobile Cloud Services Comparison



The Oracle Mobile Cloud Service offering is backed by the full-stack cloud platform that spans infrastructure virtualization, computing services, relational databases, and generic application hosting. This creates the advantage of making it possible to deploy almost any kind of mobile application and its accompanying service to the cloud.

In comparison, SAP deploys its SAP Mobile Platform on top of SAP HANA Cloud Platform, which natively supports only databases and applications that are specifically crafted for this platform. Currently, not all the services of the SAP Mobile Platform are available in the cloud. While notifications, security, connectivity, and supportability are available as REST services, other important services such as synchronization, mobile objects, local persistence and cache, and UI are not available.

To fill the gap in its generic platform-as-a-service offering, SAP recommends the use of Amazon Web Services, while Oracle Mobile Cloud is natively a part of Oracle Cloud, a technology that delivers the broadest selection of enterprise-grade cloud solutions, including software, platform, and infrastructure all as a service. “The robust platform-as-a-service environment from Oracle represents an opportunity to replace some existing technologies that early cloud adopters such as us were forced to develop on their own,” said a chief information officer of a European provider of big data analytics services to Fortune 500 retailers. “Early on we determined we needed to build our own data layer to share objects. Now we don’t have to build everything from scratch ourselves.”

“The robust platform-as-a-service environment from Oracle represents an opportunity to replace some existing technologies that early cloud adopters such as us were forced to develop on their own.”

Chief Information Officer
European Big Data Analytics Company

Both vendors focus their cloud strategies on creating enterprise ecosystems that provide additional business agility and more flexible cost structures but, because Oracle provides a platform that allows organizations to deploy applications on-premises or in the cloud as they see fit, Oracle customers have a much greater degree of overall flexibility across an integrated hybrid cloud environment. For example, the head of sales at a global IT services company stated, “Because Oracle Cloud is based on Oracle Fusion Middleware that is highly extensible, we can flexibly integrate up, down, and out. That approach enables us to more easily integrate mobile applications with instances of Oracle running on premise or in a private or public cloud.”

Specifically, Oracle Mobile Cloud Service offers comprehensive infrastructure and platform services for the following:

- ⊕ User-configurable, multichannel notifications (native, short message service, email, and voice).
- ⊕ Data synchronization between on-premises and cloud systems.
- ⊕ Connectors to integrate and access cloud services and on-premises systems.
- ⊕ Capabilities to search, browse, and consume APIs and services that may involve multiple versions of applications and services.
- ⊕ Security, identity management, and policy services.
- ⊕ Real-time monitoring features.
- ⊕ Application distribution and life-cycle management features.

From the mobile application perspective, the SAP Mobile Platform on SAP HANA Cloud Platform may offer the following:

- ⊕ REST services that cover a subset of the SAP Mobile Platform features (notifications, security, connectivity, and supportability).
- ⊕ SAP HANA platform services (computing instances, in-memory database, and specific applications hosting).
- ⊕ SAP Store (app marketplace).
- ⊕ Connectors for integration with back-end systems such as CRM or on-premises SAP HANA.
- ⊕ Security landscape integration.
- ⊕ App usage analytics.

While Oracle and SAP functionality and features within their respective mobile cloud services offerings might seem comparable, Oracle is better designed for dealing with general-purpose solutions, while SAP requires its solutions to be specifically tailored for using SAP technologies.

Conclusions and Guidance

Many IT organizations are approaching a seminal point with their mobile computing strategies, as the numbers of both the mobile applications that must be developed and the back-end services that must be supported continue to grow rapidly. An MADP means the IT organization no longer has to think in terms of individual applications. As MADP solutions mature, IT organizations will shift to a more effective approach for developing mobile applications, one that enables them to be more agile and more efficient without compromising the end-user experience, which is directly tied to the amount of latency that occurs when invoking a back-end service. Thus, before rolling out a mobile application, IT organizations should be certain the back-end services needed to support it can scale dynamically as needed. Mobile application development must be an integral part of business application development. As such, it should be seamlessly integrated across the entire application development life cycle. In addition, every aspect of the MADP should be optimized for the cloud.

The results of our research demonstrate that both vendors have come a long way in integrating mobile applications into the broader enterprise ecosystem. When all the important features and functionalities of the two MADP solutions are directly compared, the Oracle Mobile Platform clearly provides a more cohesive, mature, and comprehensive environment for building mobile applications in enterprise environments. Out of the 217 features considered, the Oracle Mobile Platform addresses an impressive 196 of them, 39 points higher than the considerably more fragmented SAP Mobile Platform. More importantly, the Oracle Mobile Platform is far less complex and, unlike SAP, delivers all critical capabilities preintegrated and out-of-the-box. This directly translates into increased productivity, shorter time to value, and lower total cost of ownership.

Overall, Pique Solutions research and analysis reveal the following key advantages of the Oracle Mobile Platform over the SAP Mobile Platform:

- ⊕ The Oracle MADP solution offers a significantly richer set of features and functionality. Overall, Oracle reached 90% of the perfect score, compared to 71% for SAP. Oracle's advantage over SAP is most notable in the Service Management (100% vs. 56%), Business Application Integration (86% vs. 52%), and Developer Tools (91% vs. 60%) categories.
- ⊕ The Oracle Mobile Platform comes preintegrated. In comparison, the SAP Mobile Platform is fragmented and relies extensively on third-party products and technologies. This results in significantly higher integration and management costs for the SAP MADP offering.
- ⊕ Oracle provides superior application security via its enterprise security and access management solutions and tools that encompass mobile computing.
- ⊕ Unlike the SAP Mobile Platform, the Oracle Mobile Platform supports mobile application development as a seamless extension of its existing application development environment, providing a simpler and more consistent method for reusing code across multiple platforms.
- ⊕ Finally, while Oracle uses industry standard interfaces such as REST APIs, SAP relies on arcane and mostly proprietary interfaces, resulting in lower developer productivity and longer time to value.

For companies bound to an SAP solution such as SAP NetWeaver, the SAP Mobile Platform may be a practical option if the likely higher total cost of ownership can be justified. However, for companies with either heterogeneous or Oracle-centric environments, the Oracle Mobile Platform is conclusively the more sensible option from both the developer and the IT manager perspectives.