



WHITE PAPER

Turning Up the Heat on Mobile Application Development with ColdFusion 11

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IDC OPINION

For almost two decades, ColdFusion has delivered an end-to-end Web solution for productively and effectively building highly functional Web sites and Web applications of significant complexity and richness. The secret to ColdFusion's endurance is constant evolution and adaptation to changing application patterns and requirements. This evolution continues with ColdFusion 11, which builds new mobile development capabilities on top of the multiparadigm integration capabilities of the platform. ColdFusion offers the following key benefits:

- An easy-to-learn and easy-to-master programming metaphor builds on the general Web architecture and provides flexibility in the way it can be programmed. The platform supports both tag-based and script-based programming styles, allowing flexibility in expressiveness.
- A new mobile application development workflow introduces the ability to write mobile apps with client-side version of the CFML language familiar to ColdFusion developers and integrates Adobe's popular PhoneGap tools to create mobile hybrid apps.
- A reengineered IDE, ColdFusion Builder 3.0 provides higher performance and scalability than its predecessor and supports new mobile application development capabilities.
- A revamped, high-performance Portable Document Format (PDF) manipulation engine is available in ColdFusion 11 to build on existing strong document manipulation and integration features available in the product. Automatic document generation and flexible manipulation is one of the most commonly highlighted usage scenarios for ColdFusion.
- ColdFusion benefits from the industrial strength and extensibility of the underlying Java platform with which ColdFusion is built and on which it runs. In addition to integrating upgraded Java-based technologies (e.g., Apache Tomcat), ColdFusion 11 supports Java 8, the latest Java standard.
- ColdFusion 11 adds many new features in security, programming language enhancements, and interoperability. A number of ColdFusion customers have deployed this release, and some are featured in this white paper.
- ColdFusion has hit a sweet spot in various customer segments, especially midsize companies and smaller ISVs, because of its ease of development and flexibility. IDC believes that the unique blend of developer productivity, document integration, and Java fallback puts ColdFusion 11 on a lasting and potentially growing adoption curve.

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IN THIS WHITE PAPER

In this white paper, we examine the value proposition of the Adobe ColdFusion application development platform and assess its position in the market. We take a look at the unique set of capabilities that ColdFusion has delivered over the years as it has cultivated certain use cases for which it is exceptionally well-suited. We also explore the outlined road map for the technology and identify some of the strategic challenges and opportunities that it faces. We end the document with customer case study examples that illustrate these usage scenarios.

SITUATION OVERVIEW

ColdFusion plays in a widely covered area of the market, namely that of server scripting technologies such as PHP, JSP, and ASP.NET. However, it differentiates itself from other products in this broadly popular competitive landscape by offering a variety of unique capabilities and a blend of characteristics that have kept it popular among its loyal following of developers and allowed it to continue to garner new deployments.

Going Mobile

Organizations are increasingly gravitating toward mobile-first application development approaches as they continue to assess the degree to which their application portfolios need to be revamped to support touch computing and mobility. Consumerization has brought higher expectations for application usability along with the mobile devices themselves. Enterprises are increasingly shifting their new application acquisitions and development efforts toward mobile platforms. With this backdrop, it is natural to expect application platform vendors to invest in mobile application development workflows. ColdFusion has taken an aggressive jump into the mobile world with ColdFusion 11, building on Adobe's experience with HTML5 and the PhoneGap technology Adobe acquired in 2011.

Approaches to Developing Mobile Apps

In general, there are a variety of approaches available to tackle application development for mobile devices with varying degrees of synergy and productivity. The best approach for a particular organization will depend on the type of applications to be developed and the existing skill set.

The ColdFusion 11 approach essentially follows the Web and hybrid app approach. Developers are provided with a choice to deliver either of the two types depending on the degree to which the app uses native device features. Applications that do not use device features beyond the capability of the browser can be delivered as mobile Web apps leveraging the native device browser to run the HTML/JavaScript applications. Most enterprise applications are more likely to be delivered in hybrid form, where they can be packaged with other libraries, offline databases, or device APIs to do more interesting things from within the application.

Mobile Application Creation

One of the key new innovations in ColdFusion 11 is bringing the power of the server programming language to client devices. Client-side CFML is very similar to server-side CFML and features some of the most powerful CFML tags such as `cfoutput` and `cfquery`, but it is processed differently. Unlike server-side CFML, which is translated into Java bytecode and runs in a Java Virtual Machine (JVM), client-side CFML is translated into JavaScript. The translation of client-side CFML is performed on the ColdFusion server, but resulting JavaScript code runs on the client. Translated code can be executed either in the device's browser or in the WebView component available on the device platform for embedding into hybrid apps.

In ColdFusion 11, code intended for device execution is demarcated with the use of the `cfclient` tag. The advantage of this approach is that developers can insert chunks of ColdFusion code in their application to produce the client side of the mobile application using many of the powerful, mature, and familiar features of the CFML programming language. The ColdFusion approach for the creation of mobile apps allows developers to use a mix of ColdFusion skills and standard Web ecosystem skills (e.g., HTML5/CSS/JavaScript) to construct the app. This allows developers with different skill sets to collaborate on projects.

Mobile Application Debugging

The PhoneGap Developer app is a new approach recently made available with the PhoneGap 3.0 SDK for debugging and inspecting mobile apps in development. The PhoneGap Developer app is designed to lower the barrier of entry to creating PhoneGap applications by allowing apps to be previewed on a device without installing platform SDKs, registering devices, or even compiling code. Unlike browsers, the PhoneGap app, which is downloadable from the standard platform owner app stores, allows full use of the standard PhoneGap APIs, including all the core plug-ins, and allows developers to work on Windows machines while developing iOS apps (which in the past have required using the Apple XCode IDE). It is important to note that while core PhoneGap plug-ins are all available in the PhoneGap Developer app, which saves developing and debugging time and does away with the complexity of separate plug-in integration, any additional plug-in the mobile app uses in production should be packaged in the production app.

A remote inspection component is required to enable inspecting of the mobile assets of the app being developed. ColdFusion 11 uses the Apache Weinre (Web Inspector Remote) to accomplish this task. Weinre is a remote Web inspector (similar to standard desktop browser Web inspector components) that can work with any browser remotely. While not a full-fledged debugger, Weinre provides a live view of the DOM structure and access to the JavaScript console. Weinre lets the developer inspect the look and feel of the app simultaneously on multiple connected devices. It also allows the developer to inspect and modify the look and feel on a particular device and push changes directly.

To support more effective debugging, the ColdFusion team developed a mobile debugger that integrates with ColdFusion Builder 3.0 IDE and provides customary debugger functions such as breakpoints, step-by-step code advancement, and variable inspection and setting. The on-device debugging architecture uses a device agent that acts as a broker between the IDE and the application on the device to effect two-way wireless communication. The architecture avoids the use of an emulator and supports the different types of apps that ColdFusion supports such as standalone mobile Web apps and PhoneGap packaged apps.

Mobile Application Delivery

ColdFusion 11 mobile applications are constructed to run either in mobile Web form, using the standard stock browser of the mobile platform, or in hybrid form, where they are packaged with Adobe PhoneGap into native apps. In either case, ColdFusion Builder helps in creating platform-specific installers (.apk and .ipa) by invoking the PhoneGap build service. Packaging the application for specific platforms (e.g., iOS or Android) is required only when using hardware- or device-specific functionality. Once a mobile app is created in ColdFusion Builder, a platform-specific package can be generated to be installed on the mobile device. After ColdFusion Builder sends the ColdFusion (.cfm) files to the ColdFusion server to convert them to .html and .js files, these files are bundled with a generated PhoneGap configuration file (config.xml) and submitted to the PhoneGap build service. Complete builds can then be downloaded to the local file system once the PhoneGap build service completes.

The ColdFusion team has created a complete workflow for mobile development that is highly suited to ColdFusion developers and their skill set, allowing them to leverage their investment in learning and master ColdFusion technology for mobile application development.

Enduring Attributes of ColdFusion

ColdFusion 11 focuses on evolving the platform to support modern application development while building on the core competencies of the platform and its full richness of capabilities developed over the years to integrate a variety of application domains. It is important to review the essential attributes of ColdFusion to best understand how the technology can be compelling for certain types of applications. IDC has found the following to be the most often cited broad qualities that have made ColdFusion an enduring choice for its adopters:

- **Productivity and ease of use.** Almost all ColdFusion adopters cite its approachability as one of the key features that drew them in initially. Allowing developers to accomplish complex tasks with seemingly simple scripting is compelling, but ColdFusion also allows advanced developers to dive in and code in Java. Version 10 further brought the power and versatility of an embedded Apache Tomcat server. ColdFusion 11 adds many new language productivity improvements and most importantly introduces a revamped IDE for developers. ColdFusion Builder 3.0 is a rearchitected high-performance IDE that allows CFML and CFScript to be edited along with Web languages like HTML5, CSS, and JavaScript in a single developer console.
- **Bridging technology domains.** The ability to integrate Java systems with Microsoft systems or data from relational databases with content such as documents and presentations, or to interface with email and text messaging or chat systems, or to integrate with client-side technologies such as Flash- and now HTML5-capable browsers has proved to be one of the most attractive and unique aspects of ColdFusion that has kept users loyal as new technology domains are added. In versions 10 and 11, ColdFusion tackles and improves modern Web development with rich HTML5 and REST support, allowing developers to build modern applications efficiently. In ColdFusion 11, the product enters the mobile and social domains, bringing its rich set of features into these worlds.
- **Document management and manipulation.** ColdFusion includes powerful PDF manipulation and generation features, giving it unique abilities in its class as an app server. These capabilities were first introduced in version 7 where capabilities for Flash-based Web forms and PDF reports were introduced even prior to the acquisition of Macromedia by Adobe.

In version 8, after the close of Adobe's acquisition of Macromedia, ColdFusion gained additional integration features with Adobe technologies, such as extracting and modifying interactive Adobe Acrobat forms and converting them to XML for richer manipulation inside ColdFusion. ColdFusion 11 fully revamps the PDF Engine leveraging technology from Adobe's LiveCycle and Acrobat products and the WebKit project. The new technology improves performance and produces higher-quality PDFs from HTML.

- **Integration with Microsoft technologies.** First introduced in version 8, .NET integration was a key enabler because it allowed code to leverage .NET assemblies, making ColdFusion a true crossover technology connecting both the Java and the Microsoft platform technology ecosystems. ColdFusion additionally is able to integrate with Microsoft Exchange and the Active Directory database and extract and manipulate documents from Microsoft Office and SharePoint.

A Brief History of ColdFusion

As shown in the Appendix, ColdFusion has seen persistent R&D investment as it has evolved through its 19-year history. The Appendix highlights some of the new features introduced with major versions over the years and paints a picture of a product that flexibly evolves with market conditions and customer needs, always providing its customers added value. This relatively aggressive pace of evolution, with an average release cycle of 18 months, ensured that ColdFusion kept up with the requirements of its customer base. This is an important history to emphasize because it shows a commitment by the vendor to continue to invest and follow its user base as it navigates new market conditions in the fast-changing Web ecosystem of technologies. To do so while ensuring compatibility with existing applications and maintaining older versions is part of what defines a successful enterprise platform technology.

ColdFusion 11 Evolution

It is important to note that recent releases of ColdFusion over the past five years have provided a comprehensive update for the technology, bringing it thoroughly up to date with the requirements of modern application development. In the following bullets, we review some of the most important recent changes:

- **Revamped PDF manipulation.** ColdFusion 11 features a fully revamped PDF Engine leveraging technology from Adobe's LiveCycle and Acrobat products and the WebKit project. The new technology produces high-quality PDFs from HTML using a new high-performance architecture (i.e., CFHTMLToPDF and CFHTMLToPDFItem tags). The Enterprise Edition of ColdFusion 11 features clustering support. ColdFusion 11 also has an enhanced PDF archiving feature with the ability to convert PDF documents to the PDF/A-1b format for archiving as self-contained documents. The new release also features digital signature capabilities and full DDX support for advanced PDF manipulation, which utilizes the LiveCycle Assembler functionality. These capabilities are provided in addition to the functionality added in ColdFusion 9 to generate PDFs from Microsoft Word and Microsoft PowerPoint file formats and to convert Microsoft PowerPoint and Microsoft Excel spreadsheets into HTML or read into internal memory variables with the cfspreadsheet tag for complex manipulation. Overall, ColdFusion 11 adds to the product's existing powerful capabilities for integrating with Microsoft SharePoint and IMAP-compatible servers such as Microsoft Exchange.

- **More HTML5.** ColdFusion 11 builds on the WebSocket support provided in ColdFusion 10 by adding to the scalability of the feature. Support for clustering is now provided in the Enterprise Edition of the product, and the capability to support SSL and port 80 for external connections is now provided in the Standard Edition. The capability of the new release has been successfully tested and found to support up to 60,000 connections on a standard machine. The limits of this capability are largely bound by system resources, such as RAM. ColdFusion 10 provided support for new HTML5 capabilities such as server mapping support for browser geolocation features, built-in HTML5 video player, and WebSocket support for permanent, full-duplex connections to clients for efficient and secure communication. Permanent WebSocket connections contribute significant efficiency and performance to Web applications compared with alternative methods of communicating.
- **More security enhancements.** ColdFusion 11 builds on the investments made in ColdFusion 10 by adding several new features such as Default Server Lockdown and Concurrent Login (CFLOGIN) controls and by enhancing the Secure Profile support introduced in ColdFusion 10 that allows admin enabling and disabling after the installation process. One of the key new features in ColdFusion 10 was the set of built-in functions that can be used to prevent XSS (cross-site scripting) and CSRF (cross-site request forgery) attacks. This capability has now been enhanced with more XSS encoding options. ColdFusion 10 also introduced improved session management, including functionality to invalidate and rotate a session, and HttpOnly session cookies, which can be made to apply only to a particular domain. ColdFusion 10 introduced significant security-strengthening measures such as authentication of applications using the enhanced log-in mechanism, user-input sanitizing to mitigate cross-site scripting and cross-site request forgery, and more secure default settings.
- **Advanced charting enhancements.** ColdFusion 11 brings new improvements to server-side charting to go along with the enhanced client-side charts from ColdFusion 10. These new features use the same syntax for CFCHART and provide a utility to convert XML-style charts to JSON styles. ColdFusion 10 added extensive charting capabilities implemented in HTML5 and supported with Flash fallback in case of a non-HTML5-compliant browser. The capabilities provided built-in advanced zooming and previewing that brought ColdFusion's easy charting capabilities to a new level of sophistication for supporting deep analytic capabilities in applications.
- **Apache Tomcat updates.** ColdFusion 11 features an upgraded version of the Tomcat Web server (version 7.0.41). The new version features multiserver instance support and allows ColdFusion developers to take advantage of the latest Tomcat security updates and the active community working with this more recent release. Adobe plans regular updates for ColdFusion 10 and 11 Tomcat engines at the typical faster cadence of Tomcat updates. ColdFusion 10 integrated the popular Apache Tomcat Web application server into its delivered code. Tomcat replaced the older JRun application server, which has been deprecated. The integration of Tomcat brings this category-leading Java technology to the ColdFusion developer without the need to learn Java and its complexity. In addition, features that ColdFusion 9 developers have come to rely on, such as search engine-safe URL rewriting and session replication in a cluster, were added to Tomcat. It should be noted that ColdFusion 9 introduced Apache's Solr indexing and search engine, which is based on the Java Lucene Search Library.

- **Enhanced Web services support.** REST support provides a popular approach for building back ends for mobile applications. ColdFusion 11 brings significant enhancements to the REST capabilities introduced in ColdFusion 10, such as the ability for auto-registration and registration via Administrator Console or API and support for the same app from multiple hosts (an Enterprise Edition feature). ColdFusion 10 revamped the Web services engine to support WSDL 2.0 and SOAP 1.2 and allowed ColdFusion Components (CFCs) to interact through the popular REST Web service protocol with built-in support for all HTTP methods and JSON serialization and deserialization. ColdFusion 11 adds a pluggable JSON serialization and deserialization capability.
- **Operational enhancements.** In addition to the many new mobile development features, ColdFusion 11 supports a lighter server version with quick setup and deployment. This compact version of the engine allows developers to develop and test on their machines but sacrifices some of the heavier footprint capabilities like Solr, .NET integration, and the full production PDF engine, which can be added after the initial installation. The additions come on top of enhancements in ColdFusion 10, which delivered a simple hotfix installer, new notifications to the administration console, and an improved task manager and scheduler that supports application-specific tasks, event handling, grouping, and chaining with cluster support.
- **Object relational mapping.** While introduced in ColdFusion 9 as a new way to deal with relational data, the ColdFusion ORM object relational mapping framework based on the Red Hat Hibernate open source project has been upgraded in ColdFusion 11. The framework encapsulates the complexity of Hibernate while providing its power of data querying and caching and of persistence event handling with significant productivity advantages to the ColdFusion developer. Java development skills are not required to take advantage of this powerful productivity enhancer. In ColdFusion 9, the Hibernate-based object relational mapping was integrated with the Apache Solr full-text search engine, allowing Solr to be used for full-text querying of returned relational data.
- **Language enhancements.** ColdFusion 11 adds significant new improvements in this area. Effectively complete CFScript functionality is now available in the language, offering developers the option to use an imperative style of programming in place of the declarative tag-based CFML style. In addition, member functions have been introduced for key data types to support an object-oriented style of object access. ColdFusion 10 added closures to the language, a feature popular in JavaScript in the client but which has become more common on the server as both Ruby on Rails and PHP (since version 5.3) support it.

A Rearchitected IDE: ColdFusion Builder 3.0

With ColdFusion 11, Adobe took the important step of synchronizing and bundling the ColdFusion Builder IDE with the ColdFusion 11 server. In addition to shipping the IDE and the server at the same time, Adobe now includes a number of user licenses for ColdFusion Builder with its server product, which is a change from prior pricing policy. Just as importantly, ColdFusion Builder 3.0 is a considerable rearchitecture from ColdFusion Builder 2.0, representing a new code base, many improvements, and the culmination of two years of engineering work.

Prior versions of ColdFusion Builder used a version of the Aptana Web IDE. ColdFusion Builder 3.0 uses an internally developed editor component with an updated set of capabilities to edit HTML5, JavaScript, CSS, and XML. This required the CFML editor to work in an integrated fashion with Web languages. The change has meant that the new editor can scale to much larger code bases without

performance degradation and use a smaller memory footprint on the desktop. While a couple of ColdFusion Builder 2.0 features were lost as a result of this change (e.g., advanced search and persistent CFML code folding), many additional new features and enhancements were introduced such as mobile application development and life-cycle support and Linux portability. The following improvements are worthy of note:

- **Mobile application development.** ColdFusion Builder 3.0 supports HTML5 mobile application development, mobile project templates, mobile application packaging, and preferences to set up integration with PhoneGap Build server. In addition, a mobile project wizard is now included to help with the construction process.
- **Mobile application debugging.** ColdFusion Builder 3.0 has a debugger that will stop execution at breakpoints previously added to cfclient code. Weinre (Web Inspector Remote) is a remote inspector that can be used to debug HTML-based mobile applications generated by ColdFusion.
- **Mobile application packaging with PhoneGap.** ColdFusion Builder 3.0 integrates with PhoneGap Build to create Android and iOS packages of mobile applications. ColdFusion Builder 3.0 provides granularity over project properties to select files to be included when packaging mobile apps and also to set many PhoneGap properties and features. The PhoneGap Status view allows for the inspection and downloading of all created PhoneGap builds.
- **Built-in ColdFusion server.** ColdFusion Builder includes a desktop-installable version of the ColdFusion 11 server, which is a heavily requested feature for local development. The capability to import this server into the server manager view is also provided.
- **New language features support.** The new editor naturally provides support for new language features in ColdFusion 11 (including member functions and new tags) but also provides HTML5 code assist in CFML and HTML files, code assist for cfclient APIs, improved JavaScript code assist, and options to set background color for each element in the syntax color preference pages.
- **Configurable editor toolbar.** The Aptana editors had toolbars in each editor with preconfigured shortcut options to insert text in the editor. The new release makes these toolbars configurable with options to add and remove shortcuts in response to user suggestions.

FUTURE OUTLOOK

ColdFusion has been continuously evolving, though in many cases it has not offered competitive technology as quickly as it has needed to. On the other hand, the product has offered substantial value as a Web technology that integrates heterogeneous application areas and paradigms from diverse vendors and ecosystems. ColdFusion's role as an integration hub of multiple paradigms of technologies and multiple developer ecosystems has only expanded with ColdFusion 11 and its new mobile and social capabilities. IDC expects ColdFusion to continue to play this integrative role in the industry and to begin to tackle other capabilities that are becoming more important to enterprises, such as deeper integration with enterprise social engines and the ability to handle big data manipulation. The next releases for both the server and the IDE are expected to continue to build on ColdFusion's integrative value.

Server Road Map

Adobe discussed the broad outline of ColdFusion 11, then code-named Splendor, and its successor, code-named Dazzle, in 2012, some two years prior to shipping ColdFusion 11 in April 2014. The delivery of ColdFusion 11 appears to hit all the targets identified in the road map, and the assumption is that Adobe continues to execute on the outlined Dazzle road map at this time. For example, support for the popular Amazon cloud in the form of a ColdFusion 11 AMI is now available, providing users with a quick and simplified approach to deploying ColdFusion applications in the Amazon cloud. The key thematic areas of improvements for the Dazzle release are enhancements to the mobile support capabilities with improved performance and integration with the latest versions of PhoneGap and support for responsive multiscreen content. Dazzle is also expected to carry the water for Adobe's aggressive push into the digital marketing space by introducing deeper Web, mobile, and social analytics functionality. A customizable enterprise video portal is also planned, and capabilities that will enable ColdFusion to run in cloud environments in major cloud platforms are expected in the Dazzle release. Continued security focus is also expected to be a pervasive part of the planned engineering work.

IDE Road Map

With ColdFusion Builder 3.0, Adobe accomplished a long-running goal of better support for ColdFusion server more fully and in an integrated fashion to modern Web technologies. It also covered significant new ground in supporting mobile application development workflows. In its next release of the IDE, code-named Blizzard, Adobe is hoping to take these capabilities a few steps further. Blizzard is also planned to ship in synchrony with ColdFusion server and is expected to receive more optimized performance and a reduced memory footprint. Blizzard is also expected to add one-click multiscreen support, improved test and debug workflow, and enhanced deployment support in line with DevOps integration trends. Adobe has not identified road map engineering items beyond Blizzard at this point, but IDC expects continued investment in this space and continued integration with Adobe PhoneGap. IDC believes that adding more visually oriented front-end UI building tools and components and support for new Web frameworks is likely on the agenda.

Challenges and Opportunities

While ColdFusion has been evolving on a relatively aggressive schedule, its most recent releases have taken longer to deliver. This release cycle has expanded largely as a function of maintaining the high level of integration with the various evolving domains of technology that ColdFusion integrates with. The result is that ColdFusion is on a treadmill to keep up with all that is transforming the tech industry. We highlight challenges that also present evolution opportunities for ColdFusion.

Progress on IDC's 3rd Platform

IDC has identified four key areas that encapsulate the nature of the changing tech industry over the next few years. The four anchors of the 3rd Platform are mobile, social, cloud, and big data and analytics. Each requires significant deep technical investment for any platform to support. The ColdFusion team has mobilized to seize this opportunity. With ColdFusion 11, Adobe makes significant investments along several areas of the big platform, most visibly along the mobile dimension, but also featuring capabilities to support social integration. In addition, Adobe has worked with Amazon's AWS team to support ColdFusion on the AWS Marketplace, and a number of customers are already running

applications in this environment. Cloud adoption by small to midsize enterprises and ISVs, which is a key area of strength for ColdFusion, is accelerating. Adobe should continue to leverage this opportunity by investing in ties with other cloud providers as well as by considering a multitenant PaaS tier offering that is aimed at reducing installation and management effort. If ColdFusion is to capitalize on emerging growth opportunities in the application integration market, the technology also has to tackle data manipulation and transformation requirements that are beginning to emerge as smaller enterprises adopt social and big data initiatives.

Language and Model Modernization

ColdFusion was born in the early days of the Web and has the inherent charter to be an integration technology for a variety of technologies. ColdFusion has been evolving continuously and is in many ways a collage of features and programming paradigms that were popular in their day. This is a problem for all software as it ages over time, and while regular updates provide alignments with emerging trends and support new ideas, over time, any technology is at risk of losing its design cohesiveness and initial elegance. In particular, software products are at risk of incrementally adding features over time, while retaining older features for existing users, thus contributing to increased complexity in installation, deployment, and development. This complexity, while in many ways a necessary consequence of the need to create new applications and providing flexibility to customers, makes the technology harder to learn than originally conceived and exposes the product to competitors with newer, more elegant alternative application platforms. The types of applications ColdFusion is used to build, namely Web apps, are experiencing a significantly faster pace of evolution than at any point in the past decade. Security issues and constant evolution in the now much faster moving HTML5 browser world, especially on mobile platforms, contribute to this environment of change that keeps Web application developers on their feet, constantly adapting their apps. This provides an opportunity for more proactive product management for application platforms such as ColdFusion, allowing automated updating, faster pace of deprecation of older technology, and episodic reworks of the underlying libraries, APIs, and even tags and language constructs to keep the environment modern and fresh for new developers. Adobe has the opportunity to further invest in such capabilities to make ColdFusion more attractive to new developers.

Quality and Release Cycle Acceleration

ColdFusion 11 ships less than two years after ColdFusion 10, representing the shortest release cycle for the product since 2002 when version 6 shipped roughly a year after version 5, soon after the Allaire acquisition by Macromedia. With ColdFusion 11, Adobe has begun to accelerate the release cycle for ColdFusion. Today, the software market is evolving toward much faster product delivery. Release cycles in the industry are shortening in the age of cloud services and fast-churning mobile devices and platforms. Changing release cycle timeframes without changing internal engineering processes may result in more buggy software and dissatisfied customers. ColdFusion 10 took some time to stabilize, and ColdFusion 11 has likewise required patching, thus hampering deployment and adoption. It should be noted that many of the ColdFusion 11 patches have addressed embedded products like Java and Apache Tomcat and that the new auto-update mechanism has helped developers deal with the change.

Over time, large software products such as ColdFusion have to be delivered in a more incremental fashion. In the long run, as software transforms into cloud services, releases are shifting to annual or semiannual cadence and in some cases to quarterly cadence during the early evolution of a new product.

Adobe has been at the forefront of transformation to a more continuous delivery of product features with its successful and critical Creative Cloud offering. It is expected that the ColdFusion team will absorb some of this product management excellence and transform the delivery of ColdFusion. The team's acceleration of the ColdFusion release cycle is a positive development, but the product would be well-served by an incremental approach to software delivery, which takes into account the entire testing and stabilizing process.

Strong Model-Driven Application Platform Competition

ColdFusion plays in a large and growing ecosystem of Web languages and frameworks. This ecosystem is rich with competent technologies such as Ruby on Rails and PHP. New innovation continues in the field, and more recently, the server-side JavaScript programming language called Node has captured the imagination of Web developers because of the suitability of its asynchronous architecture for back-end API development. In addition, large ecosystems such as Java and Microsoft platform technologies overlap with the Web ecosystem, providing developers a rich and expansive set of options. These ecosystems continue to spawn new technologies that capture the interest of developers. Most importantly, small to midsize enterprises and organizations in the government and education sectors where ColdFusion is most widely used are increasingly looking at more productive approaches to build applications. In particular, model-driven application platforms, which use visual models to construct application visual elements, data relationships, and process workflows, are increasingly popular with this audience. In this context, it is legitimate to ask whether ColdFusion can grow its base of developers and garner more adoption. IDC believes that ColdFusion has a loyal and mature base of developers who are unlikely to leave it as long as the product is aggressively evolved. IDC also believes that the unique blend of developer productivity, document integration, and Java fallback that ColdFusion delivers ensures lasting and potentially growing adoption as long as Adobe's ColdFusion investment endures. Nevertheless, investment in more visual tools at the front end may be important in simplifying application development for business applications, where most of the usage for ColdFusion is found.

CONCLUSION

ColdFusion has hit a sweet spot in various customer segments, especially midsize companies and smaller ISVs, because of its ease of development and flexibility. ColdFusion 11 brings the technology to the modern world of mobile devices and social network integration, allowing it to continue to be valuable to the many applications it now serves. A scan of ColdFusion's evolution exposes a technology on a mission to integrate varied new capabilities from external platforms. If it has to be boiled down to its essence, the key innovation of ColdFusion is to act as the Switzerland of varied technologies and platforms, often bridging diametrically opposed ecosystems such as Java and the Microsoft platform. The amazing applications that result often bring these varied capabilities into rich integrated systems, which are impossible to fashion with so few resources, so few lines of code, or so little time without ColdFusion.

CUSTOMER CASE STUDIES

IDC talked with several ColdFusion customers in the process of researching this white paper. The customers and their ColdFusion applications are profiled in the sections that follow.

Wallstreetmagnate.com

Wall Street Magnate LLC is a start-up company that launched wallstreetmagnate.com, an Internet-based financial market simulation that makes learning and practicing financial trading accessible, easy, and fun. The application has attracted over 40,000 fantasy investors ranging from high school students and novice investors to financial professionals who want to practice their trading skills. Upon joining Wall Street Magnate, members receive \$100,000 in simulated cash that they can use to trade stocks. Each member has an individual profile and is encouraged to join virtual trading clubs built for collaboration and friendly competition. The Web site includes a leaderboard of the top 100 performers and top 10 clubs by both net worth and total returns.

Users can engage with Wall Street Magnate via an HTML5-capable Web browser and dedicated iOS and Android applications. The wallstreetmagnate.com simulator allows users to trade thousands of financial products including stocks, exchange-traded funds (ETFs), and debt securities such as exchange-traded notes (ETNs) listed on the NYSE, NASDAQ, and AMEX. The basic ideas of financial market simulators have been around for a long time, but Wall Street Magnate has woven together social elements, real-time feeds, leaderboards, and rich progress reports into a compelling game-like experience. Of particular note are social features derived from fantasy sports leagues that allow users to form clubs, track member progress, and compete against other clubs.

Why ColdFusion?

The Wall Street Magnate development team experimented with open source CFML engines, so the team understands the value of the Adobe ColdFusion platform. The first implementation of wallstreetmagnate.com was prototyped with an open source implementation of ColdFusion. This was suitable for demonstrating the key elements of the application but ran into scalability challenges as the complexity of orchestrating information required for the application led to persistent engine locking errors on the server that the developers were not able to easily resolve. After spending several months trying to fix locking and concurrency issues, Wall Street Magnate decided to use the Adobe ColdFusion server to overcome these challenges.

The entire wallstreetmagnate.com application was migrated to the Adobe ColdFusion 9 platform in 32 hours. The transition made it possible to expand the features of the application and reach a larger audience of fantasy investors while eliminating outages from the underlying server engine. Wall Street Magnate subsequently upgraded to ColdFusion 11 to enable better support for mobile applications. These transitions were carefully planned because Wall Street Magnate wanted to ensure that the system continued to operate without disruption. "There were no issues encountered with the ColdFusion 11 upgrade, and we gained many new capabilities with the new system," says Wall Street Magnate cofounder Lewis Schlossberg, a lawyer with programming experience. Using the full-featured licensed version of ColdFusion also meant that the developers could use the Adobe ColdFusion Builder IDE and the new mobile capabilities to prototype their app on various devices.

Adobe ColdFusion and Adobe ColdFusion Builder also simplified the ability to add new application features and allowed applications to leverage additional information sources at a faster pace (e.g., with AJAX calls). Underneath the covers, the application leverages a variety of information sources via RSS and XML feeds to deliver investor news about stock prices from Yahoo! Finance, Reuters Business, *The Wall Street Journal*, and CNN Money. Wallstreetmagnate.com also exchanges information with social networks, including Facebook and Twitter.

Silervine Systems

As an independent software vendor, Silervine Systems, or Silervine, is unique in that it caters to a market that demands the type of automated advanced functionality and system maturity that can come only from a broadly installed and field-tested software package but that also needs customizations provided through a high level of service and client intimacy. Silervine is exactly this blend of software publisher and service provider with its flagship Silervine System. According to Tim Cunningham, Silervine's vice president of Sales and Marketing, "The Silervine System is a real-time Internet-ready policy admin system that can provide full policy life-cycle processing capabilities in a unique all-in-one automation system for small to midsize insurance companies."

Silervine clients are not the largest insurers and thus do not have extensive technical talent and resources at their disposal. For this reason, a system that is easy to deploy and manage yet highly automated and comprehensive and deeply supported by its vendor is exactly on target for the company. Silervine has installed more than 50 instances of the Silervine System in the United States, and its customers appreciate not only the core functionality but also the product's ability to integrate with other systems and technologies used at customer sites such as accounting and email systems. The Silervine System is a multifaceted and comprehensive insurance solution targeted specifically at property and casualty insurers in the midmarket.

Why ColdFusion?

When Silervine set about the task of tackling this space, it was looking for a technology that is developer friendly yet rich in features. In particular, the technology had to feature comprehensive capability and yet deploy easily at customer sites without a lot of IT sophistication. "We wanted to offer the property and casualty insurance industry a way to run their entire business online, a system where agents across the country could use browsers to quote, rate, issue, bill, and pay our clients' insurance products," said Cunningham about the Silervine System that was developed to meet this functionality. The system also had to handle both data and documents adeptly.

Documents are at the center of almost all workflows for insurers, and the ability to generate and manipulate printer-ready documents was not typically built into Web technologies. But ColdFusion was no ordinary Web technology, and it provided exactly this blend of characteristics and capabilities. The Silervine System makes extensive use of the PDF integration features offered by ColdFusion. "Without built-in PDF capabilities in ColdFusion, the Silervine System would have taken many extra months to write, and we could not have continued to provide new functionality to our clients with such agility," said Cunningham. Silervine continues to take advantage of new ColdFusion advancements in speed and features and is targeting an upgrade to ColdFusion 11 in 2015. "Performance of PDF generation and manipulation has increased dramatically since moving to ColdFusion 11, due to being able to run multiple PDF services," said Cunningham. ColdFusion 11's support for PDF digital signatures also has simplified

the orchestration of business processes requiring signing, certifying, and validating of approvals. Silvervine is also improving PDF functionality within the Silvervine System by using the extended DDX features now available in ColdFusion 11, which were previously available only in the Adobe LiveCycle business process management product.

One key capability of ColdFusion that was greatly appreciated by the start-up software vendor is the ability to develop large commercial business applications at a rapid pace. "ColdFusion is a technology which allows applications to be developed two to three times faster than other systems we looked at, yet it provided enough scale, performance, and reliability to meet our needs," said Cunningham. One of the most comforting capabilities offered by ColdFusion is that it sits on top of Java, providing it commercial hardening and robustness and allowing the full power of Java to be used to extend the capabilities. "We knew that we could always roll up our sleeves and work directly with Java if the situation called for it," said Cunningham.

Frontech Solutions FAN PLM

As an independent software vendor of product life-cycle management (PLM) solutions, Frontech Solutions Inc. serves a market that demands advanced functionality and system maturity and that can be customized for the individual needs of different businesses. Frontech has been developing PLM solutions that meet the unique business requirements in sectors such as manufacturing, agriculture, green energy, and fashion for over 20 years. These custom applications allow stakeholders in the success of new products to better organize information workflows by orchestrating event-driven alerts, updates, messages, and documentation related to new products in a clearly defined and structured manner. One important product Frontech provides for the highly collaborative fashion industry is the FAN PLM SaaS application. This offering leverages Frontech Solutions' extensive experience in improving business processes in the apparel industry to help product stakeholders across multiple offices or enterprises collaborate, visualize costs, estimate development time, and understand business opportunities. These elements help reduce the operating costs, accelerate delivery, and increase profits of offerings in an enterprise's product portfolio. FAN PLM can improve communication across time zones and currencies and for stakeholders speaking different languages. FAN PLM is used by business stakeholders in the rollout of new apparel products, including executives, planners, merchandising and costing experts, seasonal materials groups, designers, developers, and factories. Customers of FAN PLM include leading apparel and toy businesses such as Sole Technology Inc., Quiksilver, and Apparel Manufacturing Group Ltd. Frontech customers have reported returns of 244% in the first year and up to 741% after 10 years.

Why ColdFusion?

Frontech began using the ColdFusion server offering from Allaire in 1999, before Allaire was acquired by Macromedia and before the latter was acquired by Adobe. Frontech found ColdFusion greatly suited for document and PDF functionality, reporting, data orientation, and pagination features for PLM Web applications for industrial customers. More recently, Boris Djordjevic, founder and CEO of Frontech Solutions, chose ColdFusion as the backbone of the new FAN PLM application. The Adobe ColdFusion platform facilitates information sharing across multiple data formats used in FAN PLM, including PDF, XLS, DOC, XML, and dynamic 2D and 3D graphs. "We adopted the Adobe ColdFusion platform for FAN PLM in order to simplify the implementation of new features, allow scalability, and ensure reliability," says Djordjevic. Adobe ColdFusion integration with the other Adobe tools also made

it easier for Frontech Solutions to create a plug-in for Adobe Illustrator CC, a leading tool for fashion and graphic designers. This integration allows fashion and graphic designers to access FAN PLM System from within the Adobe Illustrator environment.

Frontech plans to leverage the mobile development capabilities of Adobe ColdFusion Builder and mobile integration features built into Adobe ColdFusion to release a mobile application. Frontech is also planning to add merchandising and planning components to the FAN PLM System to improve workflows in the apparel, footwear, and accessories industries. The FAN PLM tool needs to be customized for each engagement in order to support the customer's unique business process. This can include creating seasonal libraries for materials, graphics, and other content that need to be orchestrated to improve the rollout of new products for each Frontech customer. Frontech evaluated a number of application development environments but decided that ColdFusion was the most suited for reducing development time, code volume, and overall development costs for delivering the rich feature set required for FAN PLM. "Writing applications using ColdFusion Markup Language to run on the Adobe ColdFusion platform allowed us to save about 20% of the application development time compared to other tools we evaluated," says Djordjevic.

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- *The Evolving State of PaaS – Strategic Guidance on Cloud Application Platforms* (IDC #244391, November 2013)

APPENDIX

TABLE 1

ColdFusion Major Release History

Release	Date	New Feature Highlights
CF 1	July 1995	Tag-based language for data-oriented Web sites written in C++ by JJ Allaire
CF 2	November 1996	Custom tags and new language features; 150+ new functions
CF 3	July 1997	Custom tags; a search and indexing system for text; ColdFusion Studio IDE
CF 3.1	January 1998	ColdFusion Studio with HTML syntax checking and live page view
CF 4	November 1998	Multithreading and enhanced security and multiserver support
CF 4.5	November 1999	Access to external system resources (e.g., Java objects); enhanced editor; scriptable deployment; advanced project management; true debugger
CF 5	June 2001	After Macromedia acquisition; enhanced query support; new reporting and charting features; user-defined functions; improved management tools
CF MX 6	May 2002	Rewrite in Java to run on Java EE (JRun); object orientation with ColdFusion Components (CFCs); Flash integration features such as Flash Remoting
CF MX 6.1	July 2003	Improved stability, quality, and performance; compilation to Java bytecode; other JEE app servers; CFC model improvements
CF MX 7	February 2005	Flash and XForms-based Web forms; PDF Report Builder; integration with non-HTTP request services (e.g., SMS and IM services)
CF 8	July 2007	Many new features; JSON serialization; PDF and Acrobat Connect integration; Microsoft Exchange and .NET integration; language additions and new tags; AJAX widgets; server monitoring and reporting
CF 9	October 2009	Java ORM with Hibernate; Apache Solr; Microsoft Office and SharePoint integration; CFScript CFCs; language enhancements
CF Builder 1	March 2010	Eclipse-based IDE with CFML, HTML, JavaScript, and CSS syntax highlighting; code folding and refactoring; outline viewing; line-level debugging
CF Builder 2	May 2011	Improved code navigation and searching; granular code formatting; automatic method stub creation; code assists for argument context and hover support
CF 10	May 2012	Tomcat replaces JRun; HTML5 WebSocket, interactive charting; improved Web services and REST support; Hotfix installer; improved scheduler; support for Windows 8 and Windows Server 2012
CF 11 CF Builder 3	April 2014	Included new CF Builder; client-side CFML; PhoneGap integration and mobile debugger; revamped PDF engine; enhanced security; multisite RESTful Web services; social network integration; member functions; full CFScript support

Source: IDC, 2015

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