

Taming the Heterogeneity Beast

Application Development and Delivery in a “Mainframe to Mobile” World

An ENTERPRISE MANAGEMENT ASSOCIATES® (EMA™) White Paper
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Overview

Today's IT environments are clearly changing as connected, consumer-facing applications become the rule versus the exception. Within this “sea of complexity,” ENTERPRISE MANAGEMENT ASSOCIATES® (EMA™) research has consistently found that the mainframe remains a critical component of modern distributed applications. The average American unknowingly interacts with a COBOL program fifteen times a day, often using a mobile device to do so. In this way, the “old” and the “new” converge as mobile devices become the primary computing platform for many.

Although mainframe-to-mobile applications are now ubiquitous, the use of very diverse technologies and platforms to deliver a single transaction is a comparatively recent phenomenon that has given rise to significant challenges. Part of the problem is that supporting these systems requires both deep and broad skills. Typically developers and IT operations personnel have either mainframe, distributed, or mobile technology skills, but seldom have all three. Yet today's applications are seldom limited to a single platform or environment, and often span all three.

Another complicating factor is the “need for speed” in the modern business. From the business perspective, virtually every company seeks to deliver business-critical applications faster than its competitors. In a world where software is the core around which the business flows, the combination of complexity and accelerated delivery carries significant risk of adverse impact to software quality, stability, and business-readiness. For this reason, people and processes alone are no longer enough—they simply cannot execute rapidly and efficiently enough to support the stringent requirements of modern-day business. In order to achieve required levels of business agility and seamless application delivery, people, processes, and technology must be aligned to a common purpose via automated collaboration, process automation, and technology integration.

In an ideal world, the ability to orchestrate and conduct the software development lifecycle would enable rapid delivery of high-quality software to facilitate business growth. In this scenario, connecting user requirements to the correct software components and automating promotion of code from development to testing and eventually on to production with accompanying automation would accelerate the process while minimizing the risk. In such environments, automation delivers a strong value proposition that continues to build as delivery velocity increases and as applications span an ever-broader diversity of platforms.

This EMA white paper elaborates on the theme of rapid, automated software delivery in a technology landscape spanning mainframes to mobile devices. It discusses automation across the lifecycle stages, with a particular focus on delivery of complex distributed and component-based applications.

Within this context, it also highlights the value proposition of the CA Technologies (CA) portfolio of solutions in addressing the key factors that make mainframe, distributed, and mobile applications unique.

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The Impact of Platform Diversity on the Software Development Process

Delivering software for IT ecosystems that are technically diverse is a challenge for virtually every company. Development teams must accommodate developers with a wide diversity of language and platform skills who are working concurrently on dissimilar platforms and with dissimilar tools. Often, they are in different locations as well.

At the same time, projects must remain in sync with one another to ensure concurrent delivery of mainframe, mobile, and distributed code at the right version, the right time, and to the correct platform. The challenges are particularly apparent because hardware and software span multiple technology generations. For example, the mainframe has been a mainstream technology for more than fifty years, while the average lifespan of a mobile phone is only eighteen months. Built to be powerful and stable, mainframes are run by a select few in highly secure data centers. In contrast, mobile devices are owned by individuals in the massive consumer market and are used in every conceivable environment, from the home to the ballpark. They are dropped on concrete, left out in the rain, and are often replaced as soon as a newer model is available.

The execution characteristics are diametrically different as well. Mainframes are almost always connected to business-grade commercial networks. Mobile phones, however, run on networks delivered by both large and small carriers, with varying qualities of service (QoS) and, when out of range of a cell tower (or WiFi), have no connectivity at all. And while most mainframe COBOL applications were written long before mobile devices were in the hands of consumers, many mobile applications are only a month or two old.

While development remains a challenge, the subsequent phases of the application lifecycle can undermine an organization’s traditional approach to software testing and deployment as well. For applications spanning mainframe, data center, mobile, and web, software testing must be synchronized to ensure that software developed for each platform performs as expected as part of the execution chain. Development and quality assurance teams encounter integration testing challenges since virtually no company has a spare mainframe for testing, or test platforms encompassing every possible smartphone or tablet.

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The Impact of “Real World” Heterogeneity on Development and Operations

How pervasive is this issue? The numbers tell the story:

- Mainframes run 70% to 75% of the business and transaction systems in the world.¹
- Around 5 billion lines of new COBOL code are added to live systems every year.¹
- More than 50% of today’s companies have mainframes. The platform is more pervasive, in fact, than Linux, private cloud, or middleware—all of which get far more press.²

¹ COBOL Institute: <http://cobolinstitute.com/cobol-articles>.

² EMA Research

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- However, in those companies that run mainframes, fewer than 10% of applications are “mainframe only;” 80% of tiered transactions span both mainframe and distributed platforms.²

The mobile market has its own statistics:

- More than 90% of adults own cell phones, and more than 55% have smartphones.³
- Americans now spend more time on online retail sites on mobile devices (55%) than they do on PCs or laptops (45%).⁴
- Tablet users spend, on average, 50% more than smartphone users when shopping online, and are more than three times more likely to make a purchase.⁵

The verdict is in and it's clear. The demand for mobile applications is growing exponentially, and many of these applications access mainframes. For many consumers, the mobile device is their primary way of shopping, browsing, and communicating. So it's almost inevitable that the “mobile to mainframe” trend will continue its forward momentum. Developing quality software that takes advantage of this trend remains a key business differentiator.

While the trend is inevitable, delivering the software is still a challenge. The latest EMA research reveals that while 55% of IT organizations are under pressure from line of business (LOB) to deliver code faster, both Dev and Ops are constrained from completely meeting the needs of the business due to ongoing demands to be involved in non-core work.

Tables 1 and 2 tell the story from both the development and operations perspectives.

As Table 1 shows, developers spend almost as much time supporting production as they do writing code. They also spend significant amounts of time on development-related operational tasks. As applications become increasingly complex, developers are more often called in to troubleshoot performance and availability problems, significantly reducing the time they could otherwise have spent building “tomorrow’s” applications. This is particularly true for “mobile to mainframe” applications. Since expertise in mainframe, mobile, and distributed technology requires diverse skill sets, multiple developers may be involved in the troubleshooting process.

What are the top three activities which consume the bulk of your development organization's resources?	
Design/development of new applications	48%
Modification of existing applications	46%
Day to day involvement in supporting production applications	46%
Software testing	38%
Day to day involvement in deployment of software to production	34%
Collaboration with non-Development groups, such as business, IT Ops, QA, etc.	31%
Administration of databases and middleware	29%
Operational-related tasks such as setting up testing environments	28%

Table 1: Development personnel spend almost as much time on production support as they do on design, development, and modification of applications. Also note time spent on operational tasks such as administration of databases/middleware and setting up testing environments.

³ Pew Research Center: <http://www.pewresearch.org/fact-tank/2013/06/06/cell-phone-ownership-hits-91-of-adults/>.

⁴ Internet Retailer: <http://www.internetretailer.com/2013/10/01/its-official-mobile-devices-surpass-pcs-online-retail>.

⁵ Fast Company: <http://www.fastcompany.com/1809535/tablet-users-spend-50-more-purchase-smartphone-owners>.

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Application support weighs heavily on IT operations as well, as Table 2 reveals. While it’s commonly believed that the high cost of IT administration centers on actual administrative tasks, operations actually spends more time on application support than on administering servers, networks, middleware, and databases combined! Further, while delivering code faster may be the objective, Ops actually spends less time “deploying new and modified applications” than it does on any other task type.

Which of the following are the top three activities which consume the bulk of your operations organization’s resources?	
Monitoring and managing production applications	53%
Troubleshooting application problems	46%
Administration of networks and servers	41%
Administration of databases and middleware	38%
Troubleshooting infrastructure issues	34%
Collaboration with non-Operations groups, such as business, Development, QA, etc.	31%
“Managing the management tools”	28%
Deploying new and modified applications	27%

Table 2: Operations expends more resources monitoring, managing, and troubleshooting applications than on network, server, database, and middleware administration combined.

These numbers create strong arguments for both development-focused and operations-focused automation. Development teams find it difficult to fulfill the business mandate to deliver code faster when a high percentage of their time is spent maintaining the status quo. Operations teams hesitate to deploy new code when production support already consumes a significant portion of their time. Software tools, both integrated and orchestrated together, facilitate these activities and accelerate the lifecycle.

CA Technologies Across the Lifecycle

CA Technologies has made significant investments in addressing the complex mobile-to-mainframe challenges identified in this report. Spanning the full lifecycle as well as diverse platforms, CA’s integrated product line can make the processes surrounding application delivery and support more efficient. With a broad portfolio of solutions supporting each stage of the lifecycle, CA provides end-to-end coverage by incorporating data from both CA and third-party tools.

CA Project and Portfolio Management (CA PPM) addresses the governance of the full lifecycle. CA Service Virtualization and CA Release Automation address software testing and deployment, respectively. CA Application Performance Management (CA APM) and CA Cross-Enterprise APM address both pre- and post-deployment application performance management, supporting the efficient delivery of application services and helping to quickly detect and rectify performance issues.

Figure 1 shows some of CA’s latest products and feature enhancements in the application development space. The new CA Application Lifecycle Conductor is one of the most notable aspects of the story. It links, synchronizes, and integrates with both CA and third-party products across the lifecycle. With this solution, developers can develop, test, release, and manage new and existing enterprise applications from a single user interface (UI). CA has converted its lifecycle solutions into building blocks that can “talk” to CA Application Lifecycle Conductor, ensuring smooth transitions as code and metadata, such as requirements and configurations, flow from one stage to the next.

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This automated, integrated approach supports rapid application delivery with a single interface providing visibility to processes and events across mainframe and distributed platforms at every stage of the lifecycle, supporting:

- Portfolio and project management
- Requirements management
- Source code change and configuration management
- Release management
- Test case and test plan management
- Defect/issue management
- Build and deploy management
- Traceability and reporting

The underlying interoperability enables the flow of processes and artifacts across lifecycle stages and allows for the orchestration of tasks at each stage.

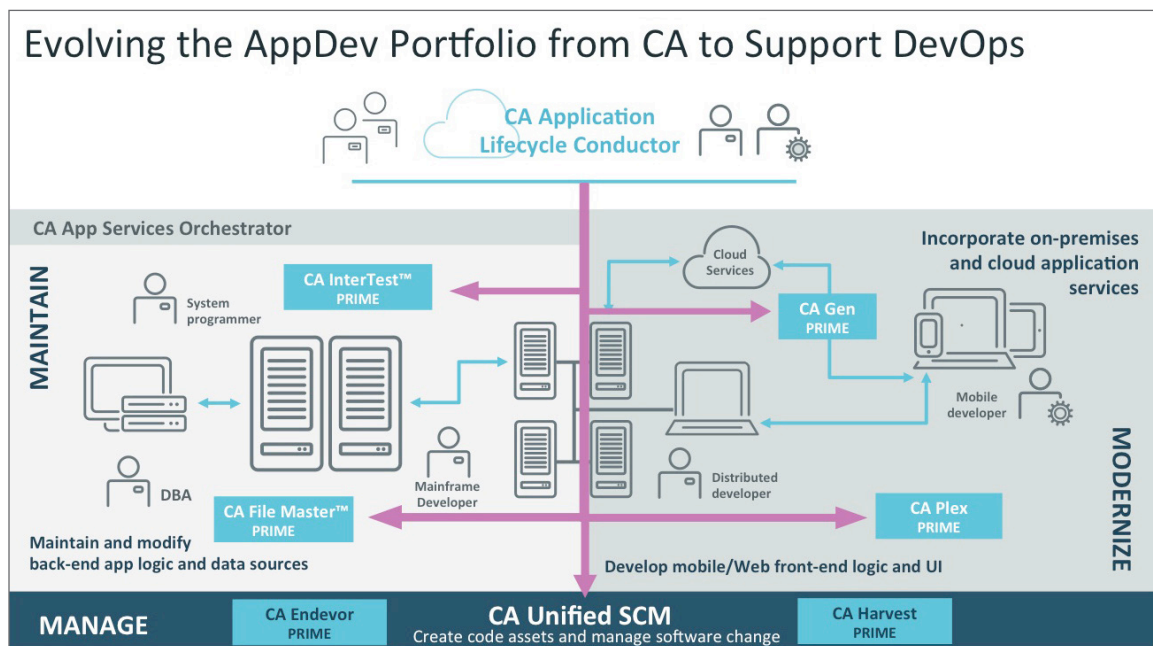


Figure 1. CA's integrated product line supports mainframe (CA InterTest™ PRIME, CA Endeavor® Software Change Manager PRIME) and distributed (CA Harvest PRIME, CA Gen PRIME, CA Plex PRIME) application development from a “single pane of glass.”

CA Application Lifecycle Conductor aims to streamline and speed development processes across the lifecycle, reducing time-to-market for new and updated applications. It also serves to improve software quality and provide the necessary auditing and traceability capabilities that organizations require for compliance. The solution is aimed at addressing two of the key challenges in application development today: the need for speed in the mobile-to-mainframe development world, and the multi-platform challenges resulting from developers with siloed skills and tools that don't interoperate.

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CA will also introduce CA Unified Software Change Manager (CA Unified SCM) to provide developers with a single entry point into CA Endeavor® Software Change Manager (for mainframe) and CA Harvest Software Change Manager (for distributed). Both integrate with CA Release Automation for cross-enterprise release deployments and/or with third-party tools.

CA Technologies has also consolidated the entire toolset for ease of use, enabling developers to access mainframe or mobile development environments without having to access individual tools for each. Enhanced workflow capabilities manage code assets in context with standard processes such as merge, test, and code review. In addition, CA Unified SCM will automatically transfer code to the “right” (mainframe or distributed) backend platform.

Other soon-to-be-announced solutions will automate and accelerate the process of creating mobile, tablet and web-based applications from existing web services; for example, CA Gen and CA Plex services. The goal is to offer a streamlined way to extend the business value of production-grade mainframe applications by transforming monolithic COBOL programs into building blocks for new web and mobile services.

CA “PRIME”

CA Technologies is also re-branding and re-packaging its lifecycle solutions into a “PRIME” line of products intended to make them simpler for customers to purchase and consume. Where practical, CA has combined functions and features that were previously identified as separate product units into more manageable sets of core products.

The PRIME offerings and their latest enhancements include the following:

- *CA Endeavor PRIME*: Software change management and deployment for System z
 - **NEW**: Eclipse GUI interface with Mobile Software Change (package) approval.
 - **NEW**: Integrates with *CA Release Automation* for cross-enterprise release automation.
- *CA Harvest PRIME*: Software change management and builds for distributed systems
 - **NEW**: Distributed builds and “package” creation align CA Harvest SCM with CA Endeavor SCM.
 - **NEW**: Integrates with *CA Release Automation* for cross-enterprise release automation with mainframe assets.
- *CA Gen PRIME and CA Plex PRIME*: Model-based application generators accessible via the Eclipse-based CA Gen Studio
- *CA Gen PRIME*: CA Gen is used to generate native code and deploy to multiple platforms and architectures using a standardized developer skill set. CA Gen can be used to create reusable software components, web-enable applications, modernize legacy applications, and integrate systems.
- *CA Plex PRIME*: Also using a standardized single set of skills and development techniques, CA Plex helps developers create client/server, web-based, service-oriented, character-based, batch, and wireless device-based applications.
 - **NEW**: Both products could previously build software components and are now enhanced to build “restful” services as well. This preserves the investment for existing customers who have built large “Genned” apps, which can now be broken down into smaller pieces and deployed as SOA services.

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- *CA InterTest™ PRIME and CA File Master™ PRIME*: Both products address mainframe technologies, with CA InterTest providing debugging and fault analysis and CA File Master addressing file and data base management. The products now share a common Eclipse interface, enabling IT to test and analyze mainframe issues from one common view.
- *CA File Master PRIME*: File management, data manipulation, and data creation
 - **NEW**: Eclipse UI access to z/OS data files, IMS, and DB2, integrated data masking capabilities.
 - **NEW**: CA File Master can now talk to additional types of mainframe databases, including DB2, ISAM, etc. Additional capabilities are coming in the future.
- *CA InterTest PRIME*: Application analysis and debugging for System z applications
 - **NEW**: Eclipse UI integrating CA InterTest and CA SymDump®.
 - **NEW**: Improved installation and enhanced performance for CA SymDump.

EMA Perspective

In recent years, CA Technologies has assumed a leadership role in addressing the evolving application development space and has been instrumental in developing a unique set of capabilities supporting the continuing popularity of the mainframe and the “aging of the mainframe workforce.” The current enhancements are a mix of both that sets CA apart from the competitive pack.

The context of these enhancements is important as well. Although this paper focuses primarily on the pre-deployment stages of the lifecycle, CA Technologies has delivered related products at a measured drumbeat over the past five years.

With the CA Chorus™ line of solutions introduced in 2010, CA delivered a complete set of windows-based tools enabling “newbie” mainframe administrators to come up to speed very quickly. The acquisition of ITKO in 2011 brought service virtualization capabilities with the former LISA line of products (now CA Service Virtualization), enabling far more in-depth integration testing than was possible with traditional “stub”-based software testing scenarios. Twin acquisitions of Layer 7 Technologies and Nolio in 2013 brought a production-grade integration platform and repository (formerly Layer 7, now CA API Developer Portal), and manifest-driven release automation (formerly Nolio, now CA Release Automation). With these elements already in place, and with CA APM as the capstone of the application management product line, the relevance, modernity, and breadth of coverage CA can offer is difficult for competitors to match.

Now, with enhanced support for mobile, CA is rounding out the portfolio with a focus on true cross-platform development, a challenging problem that few competitors are attempting to address.

Make no mistake about it, these are powerful capabilities, but there are caveats. Automating the lifecycle requires integrations across both tools and processes, neither of which can happen overnight. Process quality is important as well, as automating a poor process always delivers a poor outcome—only faster and more often.

For the more than 50% of companies with mainframe platforms, and particularly for those focused on acceleration of their application delivery cycles, these newly integrated and enhanced solutions differentiate CA Technologies from its competitors and are well worthy of a test drive.

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About Enterprise Management Associates, Inc.

Founded in 1996, Enterprise Management Associates (EMA) is a leading industry analyst firm that provides deep insight across the full spectrum of IT and data management technologies. EMA analysts leverage a unique combination of practical experience, insight into industry best practices, and in-depth knowledge of current and planned vendor solutions to help EMA's clients achieve their goals. Learn more about EMA research, analysis, and consulting services for enterprise line of business users, IT professionals and IT vendors at www.enterprisemanagement.com or blogs.enterprisemanagement.com. You can also follow EMA on [Twitter](#), [Facebook](#) or [LinkedIn](#).

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