



Intellyx White Paper

Jason Bloomberg, August 14, 2015

Real-Time Digital: Wake-Up Call for IT Operations

Every digital transformation initiative must deal with the ever-increasing pace of change – in the marketplace, in the technology environment, and in the world at large. Clearly, as customer expectations accelerate, technology must keep up. Squeezing every last millisecond of performance leads to the demand for *real-time* – technology with no delays whatsoever, moving at the speed of thought itself.

For the people in enterprise IT, this real-time challenge raises the bar for everything they do. Software development moves more quickly. Security and governance become increasingly automated and real-time. And applications must perform at sub-second speeds, regardless of how complex they are or how many systems they touch.

For IT operations leaders, digital transformation and its relentless push toward real-time performance require a rethink of the entire operations environment, from processes to infrastructure to tooling. All monitoring activities must be end-to-end and in real-time, what we call *continuous intelligence*.

For business executives, how technology performs directly impacts how the business performs. Today's customers are a demanding and fickle lot – if one mobile app or web page is too slow, they're off to your competition.

Make no mistake, today's key performance indicators (KPIs) for the business depend upon the end-to-end operational performance of IT.

Inexorable Forces of Change

The democratization of IT has upended the notion of an enterprise application, as digital transformation initiatives drive the assembly of increasingly complex, distributed, mainly cloud-based apps that deliver enterprise value to technology consumers – within companies of all sizes and among the public at large.

Today, people might use their phones, tablets, televisions, or Internet-of-Things (IoT) enabled touchpoints ranging from automobiles to factory equipment, with new form factors rolling out every day. And everyone expects always-on connectivity and blisteringly fast performance – even

ACTION ITEMS

- ✓ IDENTIFY THE CURRENT STATE OF YOUR OPERATIONS MANAGEMENT TOOLING: STATIC AND ISOLATED, POORLY INTEGRATED, OR END-TO-END?
- ✓ BUILD CONSENSUS WITHIN YOUR ORGANIZATION FOR HOW TO SUPPORT DIGITAL, BORDERLESS APPLICATIONS
- ✓ DEVELOP AN ACTION PLAN TO MOVE TO A CONTINUOUS INTELLIGENCE MODEL FOR OPERATIONS MANAGEMENT

though today's apps may depend upon a complex web of interconnected services across multiple clouds and on-premise applications – what we call the borderless application.

Such applications are far from simple and rarely monolithic. Even a basic web app has multiple pieces, ranging from front-end web server code interacting with application code on the middle tier, which in turn talks to the database underneath.

In the enterprise context, multi-tier web apps are more the rule than the exception. And yet, even older enterprise applications like ERP run on multiple servers, leveraging various data sources and user interfaces, communicating via some type of middleware.

Today's modern digital applications, however, are far more complex and subject to ongoing change. They typically include multiple third-party components, from the widgets, plugins, and tags that all modern enterprise web pages include, to the diversity of third-party SaaS cloud apps that support the fabric of modern IT, thus disrupting every industry.

Furthermore, no enterprise can afford to ignore this trend, as virtually every company is becoming increasingly dependent on software for every aspect of their business. Today's enterprises are software-driven organizations, and their customers expect modern, digital applications.


Managing the Modern Application

Maintaining the application performance that customers demand falls to the application, infrastructure, and network management tools and processes that identify issues and give operations personnel the information they need to address them.

Yet, while such management tools have been around as long as applications have served the business, the world of application management is transforming along with the applications under management.

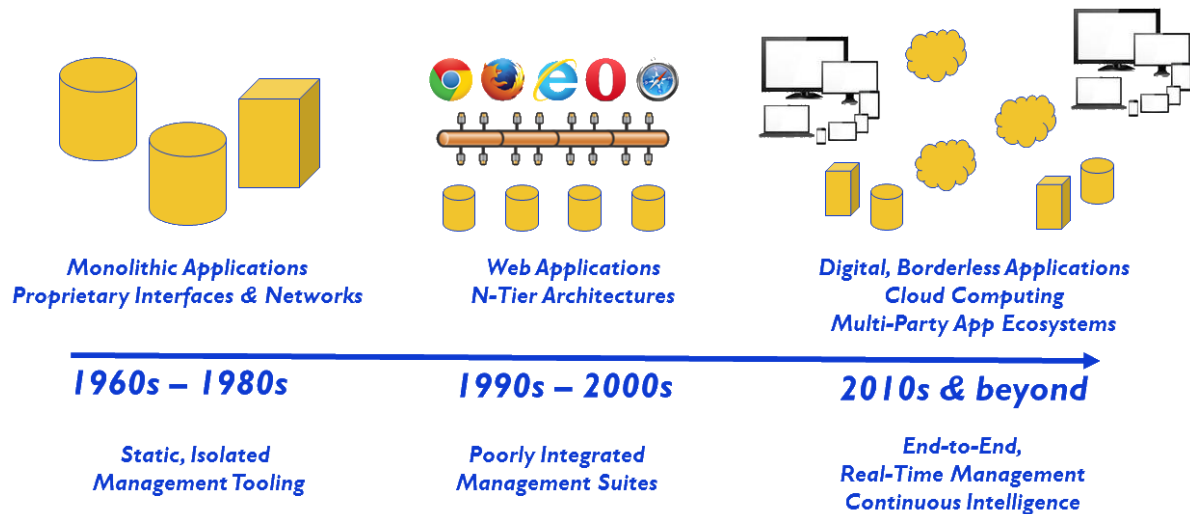
Static sets of dashboards with static KPIs represent the old way of doing things. Today such older tools are not realistic. Furthermore, traditional IT management best practices – for example, the procedures and processes that form ITIL – work best in IT shops with centralized control and carefully phased software lifecycles.

As IT has moved from monolithic to distributed applications, this traditional, waterfall approach to change with centralized control remains, but increasingly becomes a burden to organizations that



ADMINS TYPICALLY QUERY LOG FILES, INCLUDING APACHE LOGS, IIS LOGS, SYSLOGD, OR WINDOWS EVENT LOGS AFTER THE FACT. MODERN APPLICATIONS MAY ALSO REQUIRE THE ANALYSIS OF AWS LOGS AS WELL. FURTHERMORE, LOG ANALYSIS MUST BE IN REAL-TIME TO PREDICT AND PREVENT OUTAGES WHICH IMPACT THE BUSINESS.

need to move more quickly and deal with modern, digital applications with many different components. See the diagram below for an illustration.



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Furthermore, many IT shops relied upon configuration management databases (CMDBs) to act as a central metadata repository for their management efforts. Today, however, CMDBs fall short, as it becomes increasingly impractical to maintain current, accurate information in them, since applications have so many different components.

Distributed applications have had many components all along, of course. What’s different now isn’t the sheer number of those elements – although such numbers have unquestionably skyrocketed – but rather the fact that modern applications are subject to such rapid, never-ending change.

With this dynamic complexity of today’s applications, the boundaries of the cloud itself are becoming unclear. Code may change at any time. And there is no central command and control that encompasses the full breath of such applications.

As a result, new continuous intelligence tooling is necessary for enterprises to meet customer demands, maintain adequate security and compliance, and obtain the business insight they require to succeed in today’s fast-paced, ever-changing digital environment.

The cloud is an important part of the modern digital environment. Now that cloud computing is maturing, enterprises are more likely to implement hybrid architectures that connect on-premise assets to one or more clouds – and modern applications typically span such environments.

In addition, the rise of containers and microservices are both reinventing cloud architecture as well as service-oriented architecture (SOA) to better support the modern, borderless digital app.


In many ways, today's nascent microservices architecture is an extension of – and improvement upon – the SOA of the last decade.

Once organizations figure out how to implement microservices architecture properly (a work in progress in most IT shops), they will find that such increasingly modular, dynamic code shifts the management challenge, as there will typically be large numbers of inherently dynamic microservices.

In fact, microservices generally depend upon the container environment for scalability and elasticity, and by definition, contain no information about other microservices. As a result, microservices externalize management, moving complexity out of the code to the management infrastructure. Management tools become responsible for coordinating all the microservices as well as everything else in the distributed environment.

In contrast, traditional IT management tools, whether they be for managing applications, infrastructure, or the network, are largely static and hardwired to the technology they manage. Such traditional tooling is no longer sufficient.

Modern cloud-based, digital applications require a never-ending, adaptive approach to management that maintains the performance and security of these complex enterprise applications. Without such proactive, adaptive management, the customer experience will suffer – and with it the bottom line.



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Furthermore, security and compliance breaches become increasingly likely as the complexity of each application grows. Cyber-criminals are always looking for weaknesses, and the more diverse, distributed, and dynamic an application becomes, the greater the chance of opening a door for an attacker.

Beyond such security considerations, modern applications also raise the bar on regulatory compliance. With traditional applications, annual or semiannual audits are sufficient for ensuring compliance. Today, however, applications may change on a daily basis, and furthermore, will typically include third-party elements that complicate the compliance challenge.

Dealing with the Unknown Unknowns

Fundamentally, enterprises cannot expect centralized command and control in today's IT shop. They need a new approach to IT operations that must be adaptive and interactive.

True, automation is a central capability of modern infrastructure and application management tooling, but the human element is essential to the feedback loop that is a necessary part of delivering agility to the organization.

As a result, the modern application management challenge isn't purely technical. It's also a human challenge. IT managers and ops people can no longer afford to have a static mindset.

Since there's no way to know for sure who's changing what when in the borderless IT environment, the work of the IT manager is an ongoing process of investigation and remediation, as opposed to traditional command and control.

In the traditional IT management context, ops personnel preconfigure their management tooling to look for particular issues. In contrast, people must look for the "unknown unknowns" for modern applications – issues so unpredictable that there's no surefire way to look for them. Instead, management tools must bubble up patterns and anomalies that occur in the raw management data streams.

Anomaly detection, therefore, is an essential continuous intelligence capability of any modern application management tool – but not all anomaly detection is the same. For example, any ecommerce site will experience a daily pattern, as most traffic will occur in the middle of the day in the US, as well as a weekly pattern, as most people order on weekdays from work.

Therefore, any management tool must recognize these daily and weekly patterns, and note that they are not anomalies in and of themselves. If traffic on a Tuesday unexpectedly behaved like normal Sunday traffic, however, that would be an anomaly that the tool should bubble up for human analysis.


The example above also illustrates the importance of having a human in the loop, even when the management process is an adaptive workflow that learns patterns over time. The challenge for any such tool, therefore, is to present the most useful and critical information to the personnel responsible for interpreting it – dynamically and in real-time.

The ecommerce traffic example also illustrates the importance of seeking anomalies in patterns of events – but events aren't the whole story. It's also important to seek unusual patterns in metrics as well.

For example, a traditional management action would be to set a capacity threshold for a hard drive. As the hard drive filled up, it would send an event as the capacity crossed the threshold. In order to identify anomalous patterns in such metrics, the management tool must operate in real-time. Yesterday's capacity metrics, for example, are essentially worthless.

Digital Transformation Hangs in the Balance

The ability to measure the capacity of hard drives, or of similar metrics like CPU or memory utilization, has been around for many years. Over time, management vendors added the ability to



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monitor transactions, ensuring the completion of preconfigured sets of actions. Such capabilities are still necessary for today's management tools, but they are no longer sufficient to meet the needs of modern digital applications.

Today's continuous intelligence management tools must cover the full stack from application behavior to infrastructure to the network. They must bubble up patterns and anomalies for management personnel to interpret and act upon. And they must provide real-time insight into inherently dynamic, borderless applications.

Furthermore, as enterprises leverage new technologies like microservices and containers, the real-time requirement of monitoring and management becomes even more pressing, because these new technologies are so elastic and dynamic. The more elastic the infrastructure, the more dynamic the application, the more critical continuous intelligence becomes.

Without suitable application performance, enterprise digital transformation goals are in jeopardy. Without the appropriate management tools and processes, application performance is likewise in jeopardy.


Digital transformation raises the bar on enterprise applications. The success of the business hangs in the balance.

Managing the Borderless Application

Enterprise digital applications are borderless and end-to-end. Their performance depends upon the performance of every component. IT managers must have a comprehensive view of their infrastructure and applications to properly manage this end-to-end performance.

More than ever before, technology KPIs have become business KPIs. All aspects of the operational environment directly impact the bottom line.

Customers are increasingly demanding and fickle. They require bulletproof, real-time performance from all the touchpoints they use to interact with your business. The burden for meeting such stringent customer requirements falls to the IT operations staff.



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