How to choose the right Application Performance Management solution for your Software-Defined business

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Introduction: The need for Application Performance Management in today's Software-Defined business

Today the term "software" generates confusion. For some, it refers to desktop suites like Microsoft Office or back-end enterprise applications that undergird an organization's IT infrastructure. For others, the word software is interchangeable with "applications."

Both mindsets are misinformed. Software powers everything—from the CRM application used by your marketing and sales staff to the millions of apps running on mobile devices. It manages your supply chain, and it purchases tickets to the latest *Avengers* movie weeks in advance. It administers university curriculums, catalogs U.S. Federal Court decisions, secure your credit card information, and comprises just about everything that makes Amazon.com the e-commerce behemoth that it is.

Here at AppDynamics we define software as *the lifecycle approach encapsulating the people, process and technology aspects required to deliver great applications that support business outcomes*.

Increasingly, business is becoming synonymous with software. A business may sell pizzas or fly commercial aircraft, but in today's 24/7 world, they require software to manage everything from orders and payments to flying the aircraft itself.

Software provides businesses with incalculable value. However, it also brings about a great deal of complexity. Modern applications increasingly are made up of microservices or small, independent processes that communicate with one another using language-agnostic APIs. Although this allows for rapid application development, it requires multiple components to work together seamlessly, even in the simplest of applications.

Meanwhile, mobile brings about additional levels of complexity. Not only do you have to contend with multiple operating systems, carriers, and variable network conditions, your customers get to decide if they want to upgrade to the latest, greatest version of your app or stick with an earlier, possibly obsolete version of it.

All this complexity has led to an increasing number of publicly reported application performance and availability problems. The result is an immediate business impact causing a loss of revenue, loss of customers, unhappy employees and long-term impact of the company brand.

Software performance failures, often described by that euphemism "computer glitch," can cause untold damage to your business in many ways, including:

- Loss of revenue
- Loss of customers
- Damage to company brand and reputation (often via social media-based word-of-mouth)
- Weakened employee productivity and engagement
- Network security vulnerabilities
- Risk of expensive litigation and regulatory penalties

The importance of software plus the complexity of successful application delivery means that Application Performance Management (APM) is a business necessity. We hope this ebook will give you a better overview of the many challenges that complicate effective application performance—and best practices to overcome them.

Chapter 1

The rise of the ‘Software-Defined’ business

Chapter 1: The rise of the ‘Software-Defined’ business

Before 2007, the year the iPhone was introduced, most web-based applications were limited to browser-based ones accessed via a PC. Except for a few SaaS applications like Salesforce.com, most IT infrastructures were self-contained. Cloud-based architectures were not yet widely integrated into traditional IT environments, and the popular mobile devices of the day, most notably Research In Motion’s BlackBerry line of smartphones, were engineered to work securely in enterprise environments. The IT department controlled upgrades and the level of accessibility to such devices, and managing application delivery, particularly for web-based apps, was straightforward.

Contrast that relatively ancient scenario with today’s world. At a typical business conference, you will see attendees juggling some combination of smartphones, tablets, and laptops, all of which run a number of apps and consume large amounts of bandwidth, at any given time. Between the opening of the iTunes App Store in July 2008 and Apple’s WWDC (Worldwide Developers Conference) in June 2014, Apple reported over 75 billion mobile app downloads from the more than two million iOS apps available on its iTunes App Store. Meanwhile, 1.5 million Android apps are currently available on Google Play.

This transformation has also taken place on the business side of things. With the explosion in mobile devices, e-commerce websites have proliferated. Magento, one of the leading providers of e-commerce websites has over 200,000 customers as of 2015. Medical devices increasingly are powered with apps that access online data to measure a patient’s health. Manufacturers even use apps to redesign the layout of a factory floor to save money on space, cooling, and related costs.

Thanks to applications, our relationship with software is far more intimate than ever before. This will only intensify as wearables, such as Apple Watch, and IoT (Internet of Things) devices, powering everything from home thermostats to city streetlights, become more commonplace.

As a result of this sea change, we expect applications to behave more as our brains do. They should work as quickly as our neurons without the mistakes our neurons sometimes make (it’s technology after all!) and supply information that engages and even delights us.

Therefore, software can make or break your business. In fact, there is a direct link between a company’s success in delivering great apps and your organization’s overall success. We’ll discuss this further in the next chapter.

Chapter 2

How application delivery affects your customer relationships

Chapter 2: How application delivery affects your customer relationships

Applications have become a key component to presenting an image of your business. They're not just tools to complete a given task. They also say something about the quality of your brand.

Need real-world examples? Here are two contrasting examples to illustrate how software can impact your brand's reputation.

Pizza Chain

A popular pizza chain faces greater competition than ever before. Not only does it have rivalries with regional and national pizza franchises, it also must contend with food delivery services like GrubHub and Eat24 that enable diners to order from local eateries that previously lacked the resources to offer delivery.

In its efforts to stay competitive, our pizza chain builds a mobile app that makes ordering food easy and entertaining. This app lets you:

- Input an order with natural language voice commands
- Create an order by building your own pizza
- Add sandwiches, sides, and drinks to your order
- Remember past orders
- Apply coupons to your order
- Track the pizza as it's being made
- Track the ETA of that order

Not only is this app convenient and intuitive to use, it's more engaging (and less stressful) than placing a phone order to a bored teenager or hoping a third-party online service gets your order right.

By providing such functionality, this app has boosted the pizza chain's profits and significantly improved its brand image. The iOS version of its app boasts an average rating of nearly five stars with almost 2,500 reviews. A sampling of recent (March 2015) reviews includes such praise as:

> *Lifesaver - This app is an amazing tool for me when I need to grab something for the kids on short notice.*

And

> *Quick and easy - Super easy way to order...It allows me to make sure the pizzas are ordered just how I want them.*

Airline

The airline industry is, of course, much harder to break into than the restaurant industry. As a result, this particular airline can get away with unreliable, buggy software because, well, the situation isn't much better at other large carriers!

However, if this airline faced even remotely the same competitive landscape as our aforementioned pizza chain, it wouldn't last very long. Recently the airline experienced what media outlets called a "computer glitch," that resulted in customers getting error messages when trying to book flights on its website and mobile apps and prevented passengers from checking in at airport kiosks. Almost immediately, Twitter was overrun with complaints from customers nationwide:

> *+45 mins on hold with...reservations because their website is full of #fail today*

And

> *...Now b/c I try to log in and your IT is down, I've exceeded your login attempt threshold and you've locked me out*

Again, airlines don't face the same competitive landscape as pizza chains, but you can imagine the fallout such a debacle can cause. When your applications have availability, performance, or reliability issues, you can no longer relegate that problem to your IT department (or use them as a convenient scapegoat). It will be public record, and the damage can range from lowered stock prices (something to which even airlines are vulnerable) to loss of trust and ultimately, the viability of your business.

Chapter 3

How application delivery affects your reputation with employees

Chapter 3: How application delivery affects your reputation with employees

Software can also harm your business's reputation from the inside. Employees expect your applications to perform at the same level as the apps they use on their own devices. In many companies, a "Shadow IT" underground has formed where employees ditch company-provided storage in favor of Dropbox to access their work on multiple devices and teams use Slack and Asana, instead of the IT-approved project management application.

Employees respond to lousy application delivery much like outside customers do. Twitter and feedback sites like Glassdoor are filled with complaints about internal software and systems that don't work:

> *Processes are extremely frustrating and IT systems often limit the effective flow of business. There is no real strategy towards which employees work.*

> *Never thought I could detest an enterprise program more than Siebel. Congrats, Qlikview, you just surpassed that hate and kept on going.*

Ultimately, your software and IT services play a critical role in recruitment and staff retention, and complaints like the ones above tell potential employees you're incapable or unwilling to provide the necessary tools for them to be productive members of your organization—and maybe they should take their skills elsewhere.

To retain your best employees and lure top-level talent, your company must work together as a whole to figure out employee needs, find or develop the best software for these tasks, and ensure that downtime and other performance worries are not an issue.

Chapter 4

The 9 pain points preventing fast and reliable application delivery

Chapter 4: The 9 pain points preventing fast and reliable application delivery

The introduction to this ebook lists the many types of damage that can result from a so-called "computer glitch." Ultimately, a computer glitch is just an overused euphemism for software strategy failure. And given the importance of software to today's companies, this failure is fundamentally a business one because it reveals the business failed to ensure the availability, reliability, or usability of their applications.

Unfortunately, this state of affairs is all too common, even with core emergency services. During a six-hour period in April 2014, thousands of 911 calls across seven states and 81 call dispatch centers went unanswered. The FCC found the problem to be "an entirely preventable software error," *The Washington Post reports.*

> *The software responsible for assigning [unique identifying] codes [to incoming calls] maxed out at a pre-set limit; the counter literally stopped counting at 40 million calls. As a result, the routing system stopped accepting new calls, leading to a bottleneck and a series of cascading failures elsewhere in the 911 infrastructure.*

The company responsible for maintaining this software lacked a coherent application delivery strategy, and as a result, mistook the complaints for isolated events. Although alerts did go off, the server responsible for monitoring these alerts classified them as low-level incidents that didn't require a human response.

Strategy failures can happen for multiple reasons. Here are nine of the most common ones:

1. Code

Organizations have a wide range of coding languages with which to build their applications. A large enterprise may deploy a shopping cart app based on .NET, while a startup may build a seemingly identical app using an emerging language like Node.js. Few, if any, organizations limit app development to only one language. Even if they could, they would still have to ensure their apps could talk to other apps built in other frameworks outside their firewall. Not surprisingly, this babel of languages adds to the complexity of managing application performance, availability and also experience.

2. Cloud

Cloud is a natural evolution in the way web applications deliver business solutions. Cloud environments offer cheaper storage than on-premise alternatives, as well as more elasticity for varying traffic loads. Particularly for web-based apps and services, cloud just makes competitive sense. However, it does add another layer of complexity to your IT infrastructure.

3. Mobile

Mobile brings in its own unique challenges. You have to take into account:

- Multiple hardware vendors
- Multiple operating systems
- Multiple versions of those operating systems
- Multiple versions of your apps
- Multiple carriers, often with their own proprietary software
- Multiple access technology standards

Those are a lot of multipliers to factor into your already complex environment.

4. Integration

The first three pain points represent areas that must integrate into your already complex hybrid IT environment for your apps to run. This means integrating mobile apps with legacy back-end systems and making sure your apps can interact with outside APIs, among other scenarios. Meanwhile, application architectures themselves are becoming more complex, which makes these integrations that much harder to achieve.

Chapter 4: The 9 pain points preventing fast and reliable application delivery
(cont'd)

5. Team Silos

Traditional IT is made up of silos, such as the server team, the storage team, the network team, and the applications team. This segmentation worked back when data center infrastructures were fairly straightforward, but today's software-defined business requires communication across all of these silos to find the root cause of performance problems before they impact end users and to optimize application delivery in the face of increasing complexities.

6. Management (the "Too Many Tools!" problem)

Each of these traditional silos has its own monitoring and management tools, few of which communicate with tools from other silos. A typical enterprise has upwards of 13 monitoring and management tools, which means the organization has to contend with more sources of data. Not only is this complexity unnecessary (how often can you say that?), it leads to a situation where such tools are used to exonerate a silo from blame when something goes wrong.

This is a dangerous situation for your organization to be in when your focus should be on serving your customers. Too much time is spent trying to find the root cause among all these different data points, and IT staff from all these different silos end up wasting time performing emergency help desk tasks, rather than doing work that improves app delivery and increases the company's valuation.

7. Speed

As discussed in Chapter 1, applications have become intimate components of our daily lives, and as a result, people see them as extensions of themselves. As a result, users do not tolerate slow-loading websites or apps. According to a 2012 *New York Times* article, most end users considers 400 milliseconds—literally the blink of an eye—too long a delay.

Meanwhile, release and update cycles are continuing to speed up as developers fine-tune their apps to better perform under an endless variety of conditions. These circumstances increase the potential for problems in a production environment, further piling on the complexity in an already convoluted environment.

8. Business

In traditional IT environments, the choice and implementation of software was strictly IT's domain. Today the business side of an organization cares about how applications are chosen, developed, and deployed because these apps are central to the business's success. Unfortunately, business and IT speak different languages, which makes prioritizing and problem solving a protracted and frustrating endeavor at best.

9. End User

Once you release or deploy an application to end users, you have little control over the way they use your app. They may continue to use an outdated version of that app or use that app only for certain functions. Because that behavior varies to such a degree, it's impossible to test every potential scenario for performance problems.

Given all these complexities, Application Performance Management is absolutely critical to today's software-defined business.

Chapter 5

The three challenges of the software lifecycle

Chapter 5: The three challenges of the software lifecycle

Successful APM requires organizations to address the three aspects of the software lifecycle:

1. People

The organizational structure of many legacy enterprises is fragmented at best. Within IT, the various silos limit their activity to areas directly within their area of specialty, such as storage and network, and the teams making up these silos have little interaction with the development teams. To further complicate matters, IT rarely communicates with other divisions of the organization, so that it has little understanding of what processes and technologies would improve overall business outcomes. As a result, teams fail to collaborate, so that application performance issues take too long to solve and software strategy never is optimized.

2. Process

Siloed organizations lead to disjointed processes. IT operations are informed of new application releases or features late in the software delivery lifecycle resulting in a lack of customer centricity when it comes to release and deployment. This also means that operational information is not fed back into development and business processes to optimize software strategy.

3. Technology

Enterprises with fragmented organizational structures and processes find themselves awash in too many monitoring and management tools, few of which communicate with one another. Organizations have to scour multiple, often overlapping, sources of data that usually lead to multiple sources of confusion when trying to figure the root cause of a given performance problem. This lack of end-to-end visibility of application availability and performance leads to long MTTR (Mean Time To Resolution) times and frustrated customers. Moreover, this hodgepodge of tools can't work together to optimize software strategy.

Successful software requires that the challenges affecting these three components be addressed. A great APM solution will help you do so by promoting:

- Proactive monitoring of your applications to find and identify the root causes of potential performance and availability issues before they impact your customers' experiences
- Rapid release and change cadence of your applications
- Optimization of your overall software strategy so that your delivered applications can continue to delight your customers and improve your employees' productivity

Before we discuss what to expect from a great APM solution, let's look at the key driver to making or breaking your application delivery strategy and ultimately your business: people.

Chapter 6

People - the most important aspect of your application delivery strategy

Chapter 6: People - the most important aspect of your application delivery strategy

Given that AppDynamics sells APM solutions, you may have assumed that we consider your choice of APM solutions to be the most important part of your application delivery strategy.

It isn't. Your greatest asset in developing a successful application delivery strategy consists of your people. Human progress is littered with tools, from the first flint tools of the Stone Age and Bronze Age wheels to the personal computer and the Internet in the latter half of the 20th century. As transformative as these tools have been, they would not have propagated (let alone been invented) unless people could put them to use to solve specific problem or improve a series of tasks.

Therefore, you must revamp your current operating model to a modern one that eliminates the many silos, divisions, and politics that are common to legacy business practices. Your employees need to understand and buy into the understanding that managing and delivering software is a business challenge that requires input from everyone across your organization, including:

- IT ops, including all previously siloed departments (network, storage, servers, etc.)
- Application developers
- Business executives, including those in the C-suite
- Financial staff
- Marketing staff
- Human Resource staff
- Legal Counsel

It's fairly obvious why you would need buy-in from IT ops and application developers. But it's also important to find out from the marketing staff how an application's delivery (or lack thereof) is impacting your end users. Similarly, human resources staff lets you know whether the quality of application and their delivery is hurting employee retention efforts, while legal can put forth the ramifications and penalties that could result if your apps fail to meet their SLAs or inadvertently release confidential data about your customers.

Finally those running the C-suite, particularly the CEO, COO, and CFO need to take a leadership role (and not just relegate any important issues to the CIO) because ultimately, they are responsible for your business's success. If they don't have a handle on the importance of software to their business, they should consider resigning.

Changing your operating model to one that consolidates the talents of people throughout your organization will be the most difficult one you take. It's hard to rouse people from entrenched structures, especially ones like the various IT silos that performed well for so many years. These fiefdoms have their own tools and their own way of doing things, and of course, the ability to evade blame should anything go wrong.

If you truly want to make inroads in this brave new software-defined world, your people need to put aside their differences and band together for the effective delivery of the software defines your business. At the very least you must:

- Dump IT silos, along with their point monitoring tools (cannot stress this enough)
- Consolidate your employees' respective skill sets
- Set up a multidisciplinary team chosen from departments across your organization to lead this initiative

Once you have your people working together toward building a application delivery strategy, then it's time to choose an your APM solution.

Chapter 7

The 3 core capabilities of a great APM solution

Chapter 7: The 3 core capabilities of a great APM solution

Any tool, no matter how complex, must adapt to your needs so that you can do your job. No one is going to exchange their circular wheels for square ones, no matter how well designed or appealing the latter may seem. However, the history of data centers and IT environments is peppered with the detritus of square wheels. Shelfware. Point tools that don't communicate with other point tools. Microsoft Project.

In today's software-fueled world, APM is a core technology. A good APM solution provides you with the information you need to make thoughtful, informed decisions. It should also handle tasks that are inefficient or burdensome for humans to handle, such as tracking the goings-on of your complete application infrastructure, alerting you when thresholds are missed, and data collection and analysis.

Since 2010 there has been tremendous growth of APM-specific monitoring tools and solutions. While there are many industry analyst descriptions of what an APM solution should cover, we believe that any solution should give you the ability to *See, Act, and Know*:

See:

The capability to visualize and monitor all customer- and employee-facing applications and their associated infrastructure workload issues in a way that anyone in your organization can understand. This way your business as a whole can see the importance of applications and the potential business impact should they experience performance or availability failures.

Act:

The capability to let you respond quickly to a performance problem and fix it before impact to customers. MTTR (Mean Time To Resolution) functionality, including rapid root cause analysis, is an indispensable element of this principle.

Know:

Embedded application analytics that help your business optimize their software strategy in three areas. First, they need to provide insight into operational areas of an application to optimize its development. Second, they need to provide vision into the application end user to optimize engagement. Finally, they need to provide awareness into how applications fuel business outcomes, such as the capability to link application performance to revenues.

The aforementioned features are the minimum you should expect from a modern-day APM solution. The next chapter will elaborate on the feature set that makes up a great APM solution.

Chapter 8

7 essential features of a great APM solution

Chapter 8: 7 essential features of a great APM solution

When choosing your APM solution, the first thing on your checklist should be whether your relationship with the potential vendor would be a partnership rather than the traditional vendor/customer relationship. You want your solution provider to understand that the success of their offering is dependent on the long-term success of your customers and employees, not just during the initial sales process. If your potential APM vendor is unable to offer you this level of understanding and collaboration, you can strike them off the list.

Once you've gotten past this hurdle, you want to assess any APM solution you consider offers the following seven features.

1. Rapidly understand emerging issues before customer impact.

A great APM solution needs to automatically identify when application performance could affect your customers quickly. This means it should have end-user experience monitoring features like Real User Monitoring (RUM) that can be done across browsers and mobile apps plus synthetic monitoring (timed scripts) for availability monitoring.

2. Monitor all application transactions in business context.

A great APM solution should immediately identify and display those application transactions that are central to your business and provide value to the end user. Therefore you should investigate automatic business transaction identification features.

3. Understand your customers in detail.

Especially with customer facing applications, your APM solution should immediately be able to provide customer interaction information. This means identifying the number and location of customers, understanding the relative importance of these customers, and having ways to contact them. This information should be accessible through analytics features that provide easy data query, customized dashboards, and report creation capabilities.

4. Identify and isolate the root cause of application problems.

A great end-to-end APM solution lets you dramatically speed up MTTR (Mean Time To Resolution). This means that you should identify whether the APM solution is capable of monitoring end user experience via web or mobile, application code, and the underlying infrastructure through to the backend database or data store of an application.

5. Collaborate business-wide especially during customer impacting issues.

In a software-defined business, an application issue that potentially impacts your customers is now everyone's concern. This means that a great APM solution must provide features that enable business teams, developer teams, and operations teams to collaborate in real time, via one console. Features here must make it easy to access and display relevant information in context of the audience to support rapid MTTR.

6. Automatically configure business relevant alerting and remediation.

A great APM solution should have a number of automation features. It should have the capability to automatically calculate application baselines so that abnormal application behavior is always detected. It should ensure all alerts are relevant to the business itself. And it should provide automated remediation features that allow defined actions, via scripts, to be run in order to resolve emerging issues before impact on the business. These issues may be due to application demand and available capacity, so features such as cloud auto scaling, to automatically provide extra capacity are key in a great APM solution.

7. Utilize its features easily.

Finally, a great APM solution will package its powerful and complex feature set into a simple, elegant solution that anyone in your organization can use. At minimum it should be easy to deploy, support both SaaS and on premises configuration. But it must also make it easy to support variables such as data privacy regulations by industry, nation, or political-economic unions like the EU.

Any selection process for an APM solution should address these seven features at a minimum. It's also important that an APM solution provider that you work with demonstrates understanding of your business, your customers and, your applications.

Conclusion: Finding the best APM solution to grow with your business

Business and software are becoming synonymous. Increasingly your application delivery strategy will dovetail into your overall business strategy. Assuming/putting aside you restructure your organization so that people are attuned to this reality, your APM solution will be arguably the most important purchase you make going forward.

Given that application delivery is fundamental to ensuring the success of your business, you want to choose an APM solution that can manage the complexities you currently face and can grow with your needs as these processes and technologies become more integral to your goals.

In addition to the points already mentioned in this ebook, consider these issues when choosing your APM solution:

1. Choose an APM solution with a roadmap seeking to extend and unify your overall infrastructure monitoring needs.

As IT infrastructures become application driven, the best APM solutions should demonstrate an intent to develop into one that provides full-stack monitoring of your overall infrastructure and networking performance. If you are making the transformation from a silo-based IT organization to a collaborative one that subscribes to DevOps principles, your APM solution should be doing so as well.

2. Choose an APM solution that strives to offer a variety of measurements that support business outcomes.

Analytics have become a primary differentiator when choosing the best APM solution. The best solutions will continue to improve on this functionality to offer a wide range of real-time measurements to dynamically address performance issues, as well as gathered information over specific periods of time to optimize application delivery going forward. And these measurements should provide information about crashes and errors, end-to-end performance, and device resource consumption across all channels—from legacy infrastructure to the latest in wearables and IoT.

Moreover, a great APM solution should move beyond these technology-based metrics to evaluate user engagement and revenues generated as a result of superior application delivery. Qualities such as these will support your software goals and supply you with true business value now and well into the future.

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