



**Application and Infrastructure Monitoring In A Distributed World
–Beyond Summary Statistics**

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Introduction

As the world becomes ever more competitive, organizations are seeking ways to differentiate. Delivering data and applications to internal and external stakeholders becomes a central part of what organizations do, increasingly organizations of every type will start to think of software as a critical component to their continued growth and success.

As organizations generally move to a paradigm where software is a central part of what they do, large portions of their operations will need to begin to look and act like technology companies.

It is useful for traditional organizations to look to such Web - Scale operations as Google and Netflix to get a sense of both the operational and the cultural changes that are needed to deliver upon this “software is central” change.

In an organization that depends, at least in part, upon technology to differentiate and deliver innovation, increasingly the availability and performance of these new applications becomes a critical factor. As such the tools that organizations use to create, deploy, manage and work with these applications become critical to delivering an agile application function.

In this paper we take a look at the specific issues related to application monitoring and set in place some key requirements that we believe are already, and will increasingly be needed in terms of these products.

Monitoring In A Modern World – Business Drivers And Operational Needs

The functions around software and applications today are fundamentally different from what has come before. Fueled by both macro - economic changes in the world and organizational pressures, the state of the business and the IT function that supports it is fundamentally different from what has come before.

In order to understand how IT, and the applications it delivers, is different from what has gone before, it is important to understand the macro, societal and organizational changes the create this situation.

The world is undergoing a series of changes: economic, societal and environmental. These macro changes in turn change the environment within which businesses operate. While outside the scope of this report, we believe that organizations are faced with a changing environment caused through the impacts of technological change, societal and generational changes, impacts of an increasingly competitive marketplace and the ubiquity of connectivity and connected devices.

Organizations need to be more innovative and more agile than ever before in order to respond to these varying factors. Technology can be an enabler for much of this organizational reinvention, but that in order to realize this potential, the way technology works within the context of existing organizations needs to change.

Traditional enterprise IT has been typified by monolithic solutions from a small number of distinct vendors. While these monolithic solutions are unable to deliver what modern organizations need, this model is still the norm within most organizations. This status quo will not suffice in organizations where innovation and agility are core.

These monolithic solutions tended to be self - contained and didn't have much of an ability to interact with other systems of record. Implementation of these traditional IT solutions tended to be long and expensive while customizing them for the particular requirements of customers required similarly long and expensive projects.

The applications that this traditional model of IT delivered had a tendency to be similarly monolithic. Application stacks tended to be static, application loads tended to be known and applications themselves were generally stable over time.

Whereas the past was typified by an organization using one technology (be it for software, infrastructure or other distinct functions) the future will be wildly heterogeneous. Different business units and indeed individuals will use disparate systems that best deliver the outcomes they need.

The rise of mobile access, rapid iteration of existing applications and a need for both consistent and low response times means that application design and management is a fundamentally different task than what it has been previously.

The term “composable enterprise” has been coined to describe the way the new IT stack will look, and in turn this new approach towards IT stacks and applications means that the tools that organizations use to create and manage applications will need to change.

The IT Response – Web - Scale IT

As the business demands on application creators and operators change, a new paradigm emerges, the paradigm of Web - Scale IT. In order to understand the new application paradigm it is important to understand what Web - Scale means and why it is different from what has come before.

Whereas applications previously had a generally finite demand profile and generally involved data from a limited number of sources, modern applications are fundamentally different. Applications today might take some enterprise data from within the firewall, mash it up with some publicly available data on the web. It may then transform that data based on some analysis or processing and thence deliver it to a plethora of different devices, potentially spread over a wide geographic area.

Not only this, but modern owners of modern applications expect those applications to have to undergo significant iteration over time. Whereas traditional applications had a lifecycle that consisted of development, testing, deployment and retirement, modern applications are entirely different.

It is worth looking at companies such as Google and Netflix to get a sense of what it means to be an organization embracing Web - Scale IT. These organizations have a massive portfolio of individual applications, consider mobile as the de facto delivery method and have embraced new ways of working that put agility and innovation at the forefront of what they do.

A good way to illustrate this is to explain the difference between traditional enterprise software and modern cloud applications. Whereas traditional software may have a yearly or longer release cycle with very limited patching in between releases, Web - Scale applications have unpredictable, frequent and nearly continuous deployment schedules - based on extensive real time data capture and analysis, application owners can respond to internal and external trends to change their applications at will. Clearly the tools needed to develop, deploy and manage these applications are very different from those previously needed.

Much is spoken about agility within enterprises. It is important to understand that creating an agile organization is a combination of new tools and new processes.

Unless the two parts of this formula work in lock-step, there will be a disconnect. An organization with an agile culture but with no tools to enable that agility will be hamstrung. Similarly all the continuous development, deployment and integration tools in the world will be meaningless within an organization that doesn't have a culture that enables agility and innovation.

Modern applications therefore blend new ways of working, with new tools for performing work - cloud, non-relational or NoSQL databases, API-driven applications and processes such as Agile development, DevOps, and Continuous Integration/Deployment are becoming the norm within forward looking organizations. Add to this the fact that modern applications tend to be highly distributed and you have a paradigm that is very different from what has gone before.

What Do These New Application Types Mean For Monitoring?

It isn't a huge oversimplification to say that monitoring of traditional applications is a simple case of reporting on the availability or otherwise of the application. With a monolithic stack, there are a limited number of critical connections between different application parts and hence all that really matter is the end user view of application availability.

The luxury of a simple monitoring requirement sadly no longer exists. As has been pointed out previously, infrastructure and application design is a constantly moving target. The rapid iteration of applications that deliver so much business value to the organization also results in an application topology that is constantly in a state of flux.

No longer is application monitoring about the servers upon which the application sits, rather it is about the multitude of different services that make up the application. While traditional monitoring solutions needed little or no awareness of the makeup of the application, modern monitoring solutions need to understand application make - up in depth.

As the potential vectors of application performance degradation increase, so too does the need for monitoring and management solutions that are organic in nature; that can analyze and intuit application topologies and dynamically react to changes in these topologies.

The Move To Real Time – Why Summary Statistics Aren't Enough

The name of the game when it comes to modern application monitoring is continuous. Rather than traditional solutions which might have polled the application server every few minutes, in Web - Scale applications there is a requirement for continuous monitoring.

While continuous monitoring is a complex thing to create, it is a fundamental requirement for modern applications. Averaging results from infrequent polls simply doesn't cut it, especially not given that modern applications can fundamentally change within a matter of minutes or seconds or that customers will desert you based on a small increase in response time.

As application owners and managers move from a paradigm of simply responding to outage alerts, they need a monitoring solution that helps them assess performance and infer issues from outliers. Monitoring then moves from a binary situation of application availability alerting to one where the monitoring solution is continually ingesting and assessing data from all points across the application stack. By doing so the monitoring solution builds up a picture of what's a normal state and is better positioned to identify small changes in an application's performance.

By sensing these small changes, which may not yet impact availability in any way, the solution is then positioned to predict potential future issues and give application owners the ability to proactively deal with any issues before they escalate it to something that affects availability or performance.

Continuous monitoring therefore means that organizations find problems that are simply invisible to other solutions, hidden in averages and periodic sampling.

Summary statistics, on the other hand, are compromised, especially when used alongside web - scale infrastructure and applications. Summary statistics take regular measurements of performance and attempt to extrapolate trends and patterns from them. In a world however where applications and infrastructure are continuously adapting to changing factors, a summary approach does not suffice and often results in critical information being lost to the organization or false positives being generated.

Collaboration In Modern IT

As organizations change to react to a changing world, the ability for individuals to work across departments, across geographies and across functional areas becomes critical.

Over the past few years we have seen the rise of tools within enterprises that mimic the collaboration and communication benefits that consumer tools like Facebook and Twitter have brought.

The ability to communicate with other individuals, share knowledge and communally problem solve is greatly increased by applying this layer of enterprise social networking on top of enterprise tools.

A number of tools from different vendors take this social paradigm and apply it to business use cases. Often however this has been focused on sales and marketing functions. While this isn't a bad thing per se, the use of these tools will spread beyond these initial areas and become more generic within organizations.

Application monitoring is one such area. Take a global application that has teams working on it on a distributed basis, traditional communication channels are hopelessly inadequate - in part because they tend to relate to a fixed point in time, but also because they are apart from the tools that staff use and hence have no context to individuals work patterns.

What is needed is a communication overlay that ensures that everyone involved has access to, and visibility over, the relevant information. It also needs to ensure that, in this time where huge amounts of data are facing everyone within an organization every day, there are ways to contextualize information to an individual's situation.

Increasingly building collaboration into products will be seen as a core part of delivering a solution. Collaboration tools are a key part of delivering the culture and operational shift that allows organizations to work in a Web - Scale way.

Application Monitoring In A Web Scale World

The world is rapidly changing, external and internal pressures mean that organizations will need to fundamentally change the way they work. Even traditional enterprises will need to think of applications as a key part of their business.

The culture, processes and tools used by Web - Scale enterprises will increasingly become the norm for most organizations and hence it is illustrative to look at the way these innovative and agile organizations work.

A move to distributed applications, to rapid iteration of applications and with both a burgeoning number and potential reducing of lifespan of applications means that modern IT will need to think of their application portfolio as a rapidly changing pool of assets.

The tools that organizations use to create and manage applications will therefore need to change accordingly. Organizations need to look at the various management and monitoring tools they use, and assess them in the context of a more agile development and deployment process.

Application awareness, real time monitoring and insights, built in collaboration and flexibility in terms of how individuals interact with these tools will increasingly become a critical requirement that enterprises need.

About Diversity Limited

Diversity is a broad spectrum consultancy specializing in SaaS, Cloud Computing and business strategy. Principal and founder Ben Kepes provides various services including:

- Commentary - Ben is a noted commentator about Cloud Computing and enterprise software - he has written for a broad selection of media outlets, and is often quoted as a subject matter expert and influencer.
- Consulting - Ben is in demand with large organizations who turn to him for advice on technology starting. He spends time with both customers and vendors advising on all aspects of their strategy.
- Advisory - Ben sits on a number of boards, both formal and informal. He enjoys helping startups get to market and grow to scale.
- Investment - Ben is an investor in a number of different companies. These investments revolve around Ben's focus of delivering technology that can make a difference in how organizations work.

About the author

Ben Kepes

Ben Kepes is a technology evangelist, an entrepreneur, a commentator and a business adviser. Ben covers the convergence of technology, mobile, ubiquity and agility, all enabled by the Cloud. His areas of interest extend to enterprise software, software integration, financial/accounting software, platforms and infrastructure as well as articulating technology simply for everyday users.

He is a globally recognized subject matter expert with an extensive following across multiple channels.

Ben currently writes for Forbes and his own blog. His commentary has been published on ReadWriteWeb, GigaOm, The Guardian and a wide variety of publications - both print and online. Often included in lists of the most influential technology thinkers globally, Ben is also an active member of the Clouderati, a global group of Cloud thought leaders and is in demand as a speaker at conferences and events all around the world.

As organizations react to the demands for more flexible working environments, the impacts of the economic downturn and the existence of multiple form - factor devices and ubiquitous connectivity, Cloud Computing stands alone as the technology paradigm that enables the convergence of those trends. Ben's insight into these factors has helped organizations large and small, buy - side and sell - side, to navigate a challenging path from the old paradigm to the new one.

Ben is passionate about technology as an enabler and enjoys exploring that theme in various settings.

