

Selecting an Application-centric Unified Monitoring solution

Nearly every organization is increasingly reliant on software to orchestrate all aspects of daily operations. This mandates intense focus on software quality, responsiveness, and the overall user experience. At the same time, today's technology solutions are much more complex – and involve more moving parts – than ever before.

Application-centric Unified Monitoring is an excellent strategy for achieving comprehensive, intelligent visibility into the software that drives the enterprise's critical business transactions. This strategy focuses on discovering, monitoring and managing these essential transactions end to end - from the end-user client app to the individual software applications and supporting infrastructure that constitute the entire software portfolio. This makes it much easier to identify and correct issues even before they start, and to also quickly determine the root cause of the application performance problems. The result is smoother application operations and more satisfied users.

In this paper, we explain why overseeing modern web applications, enterprise software and systems has become so arduous, introduce Unified Monitoring, and provide suggestions about how to evaluate these exciting new solutions.

Challenges of running the software-defined enterprise

Businesses of every type are looking to re-write and automate their business processes using software as a way to stay efficient, competitive, and in-tune with their customers' needs. Labeling these organizations as 'software-defined enterprises' is an accurate reflection of how vital software has become.

However, today's software systems are highly complex and built – or composed - of numerous technologies and architectures supplied by different vendors. This makes it very challenging to accurately oversee the day-to-day operations of these applications.

As recently as 10 years ago, most enterprises employed a relatively straightforward, conventional three-tier architecture, which was comparatively easy to visualize, monitor, and correct when problems arose. But in the mid-to-late 2000s, a series of interrelated trends began disrupting the traditional order:

- Data center virtualization and diverse flavors of cloud computing, such as public, private, and hybrid cloud architectures
- Browser, mobile (and even Internet of Things (IoT)) access to applications and information
- Distributed computing software architectures such as service-oriented architecture (SOA) & APIs
- Growth of Big Data
- Speedier software delivery strategies, such as Agile, Continuous Integration, and DevOps

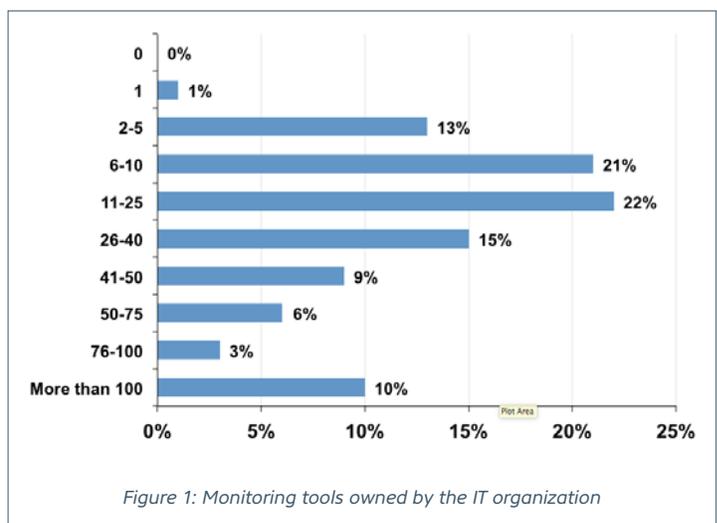
The upshot is that a single business application or transaction may now span a dozen or more components and technologies. For example, just one user request or interaction might flow from a mobile device to a web server to an application server to a message queue to a database and to one or more external APIs and services and then back to the user!

At the same time, user expectations are growing for responsiveness, uptime, connectivity, and support. In fact, in a recent AppDynamics study, more than 65 percent of respondents agreed that their expectations of app performance are increasing over time. In the same survey, respondents also said that when faced with a performance issue (e.g. slowness, crash, app hang), 38 percent will switch to another app, while approximately 34 percent will go as far as to stop using the app. This survey demonstrates that the stakes for app performance have never been higher.

Enterprises have long relied on both component based (e.g. application, server, and network) solutions to monitor their environments. However, the increasing complexity of today's applications means that using these bottom-up, siloed approaches does not work well and far outstrips the capacities of even the most dedicated system administrators and support staff. After all, knowing that the server or network or JVM works well does not imply that the application is performing to the end-user expectation.

In an effort to manage the application from the all-important end-user perspective, some organizations have attempted to create their own customized monitoring solution by integrating multiple tools from different vendors. However, many of these approaches have failed because the integration is missing the context of the end-to-end user transactions. Considering how many technologies are involved in a typical business transaction, it's nearly impossible to use these disparate tools to preserve transaction integrity and thus trace an issue from start to finish.

Figure 1 illustrates a study by Enterprise Management Associates (EMA) of more than 300 participants, which discovered that most enterprises are using multiple monitoring tools; in fact, the number of tools ranged from 6 to 40 for the majority of this survey.



These cobbled-together, fragmented monitoring solutions are incapable of tracking a business transaction as it traverses multiple technology layers, and are a big reason why so many of them end up as shelfware. Failed monitoring burdens the entire organization with lengthy mean-time-to-resolution (MTTR), excessive capital and personnel expenditures, and degraded productivity.

Introducing Application-centric Unified Monitoring

The drive towards enterprise-grade monitoring software began more than 20 years ago. Monitoring vendors that were attempting to provide a 'one stop solution' soon discovered that technology innovations and new product categories (such as database engines, web servers, application servers, networking infrastructure, and so on) were proliferating too quickly for them to keep up.

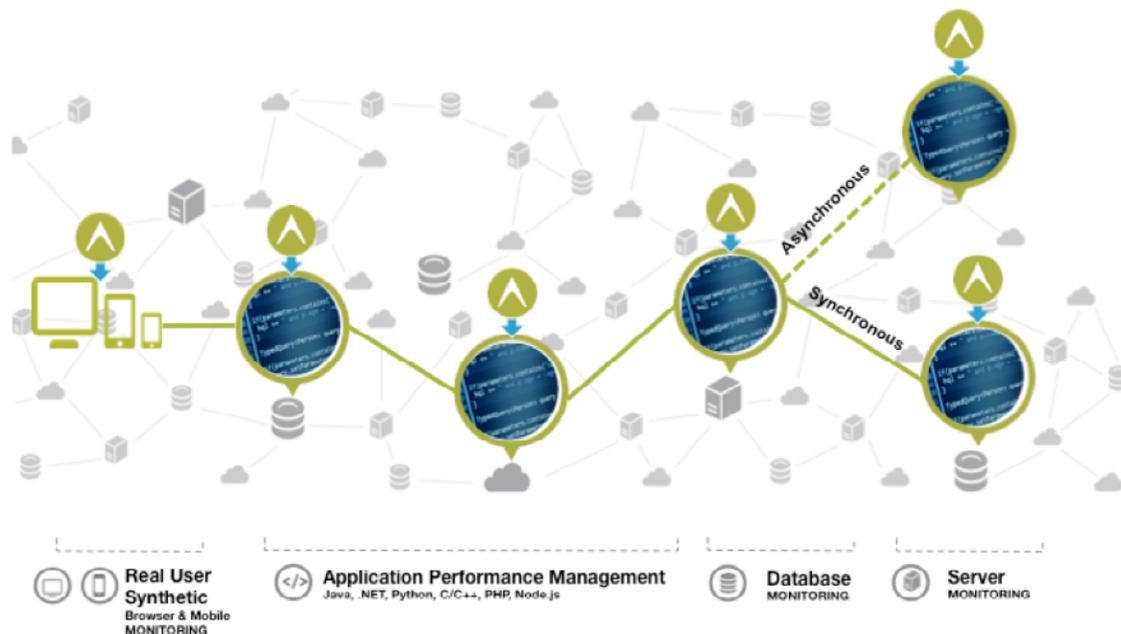
In response, these firms began buying new, specialized point solutions, with the goal to create an "integrated" monitoring solution. But this monitoring unification approach has not worked well. Even 20 years ago, blending disparate monitoring products was not easy; things have gotten much more problematic in today's computing climate. The EMA study reveals the grim numbers for organizations that are falling behind on monitoring:

- 33% of issues are reported by end users, rather than being discovered preemptively
- 64% of issues take more than three hours to diagnose
- 77% of issues require at least five person-hours to resolve

Fortunately, we're seeing a fresh approach towards monitoring today's multifaceted environments, with an emphasis on identifying, monitoring, and helping correct errors throughout the entire business transaction, regardless of the exact mixture of software elements.

Application-centric Unified Monitoring is built from the ground up with today's information processing realities in mind. Rather than consisting of shallow, bolt-on amalgamations of disparate tools that can only inspect a single layer, Unified Monitoring is business transaction-centric. Business transactions are automatically discovered and tagged with meta data that keeps track of the business context across distributed software components, no matter which software components participate.

Unified Monitoring avoids the errors of the past by offering a thorough, unified solution that runs on top of a single data store and presents a consistent user interface with fine-grained visibility into the context of all business transactions.



Unified Monitoring also appreciates the fact that many of today's transactions are asynchronous, especially when incorporating infrastructure such as microservices, message buses, and queues.

While static thresholding may have been adequate in relatively simple software architectures of the past, it is not good enough now. For a given application, normal performance may vary at different times of the day, week, or month. Unified Monitoring solutions address this challenge by dynamically adjusting the normal performance baseline based on the historic business transaction performance. Unified Monitoring only generates alerts when there's a statistically significant deviation from normal behavior, thereby avoiding the false positives and alert storms that can afflict traditional monitoring products.

By maintaining a common context and tracking business transaction activity through multiple software layers and technology providers, Unified Monitoring delivers complete situational awareness and end-to-end visibility. It creates a "single pane of glass" to monitor the entire application environment and supporting infrastructure, which eliminates "finger pointing" and helps administrators "fix the yellows before they turn red". After all, by the time the user reports a problem, they've already been impacted and inconvenienced.

Evaluating Application-centric Unified Monitoring

Enterprises with IT landscapes featuring numerous software layers from multiple vendors - and rising support expectations from users - should give serious thought to evaluating a Unified Monitoring product.

Unlike traditional monitoring solutions, which use a bottoms-up, infrastructure-centric approach, Unified Monitoring uses a top-down approach starting at the end-user experience and drilling down to the detailed root cause. This enables DevOps collaboration to improve end-user experience and reduce monitoring complexity.

Application-centric Unified Monitoring is a new and dynamic market category, and naturally, each of the vendors in the space features its own unique design strategies.

This can make appraising a solution a daunting task. However, there are some important considerations to note, regardless of the vendor under examination. For the remainder of this paper, we present four major capability categories that are worthwhile to study during solution review. These categories include: Discovery, Detection, Resolution, and Adoption.

We also provide a more detailed checklist in the appendix to this paper.

Discovery

As described earlier, modern information processing environments are commonly composed of multiple software components, delivered by different vendors, and hosted on-premise, in the cloud, or in a hybrid environment. In addition, these components may be visible to the user or completely behind the scenes.

Discovery refers to the Unified Monitoring's capabilities for automatically discovering all of the active software resources in the environment, including:

- End-user client applications
- Application servers with business logic
- MiddlewareMessage queues
- Databases
- Infrastructure

Unified Monitoring's detection process should be able to automatically discover all these application components and catalog complete business transactions (both synchronous and asynchronous) to gauge end-to-end activity measuring average runtime performance.

Discovery also maps out cross-application dependencies - all the way down to the code level - and conducts both Real User Monitoring (RUM) and synthetic monitoring. Solid discovery capabilities are one of the best ways to ensure that the Unified Monitoring solution is as effective as possible, since missing out on critical elements will present an incomplete picture of reality.

Detection

We've already pointed out that the complexity of today's information processing environments has outstripped the ability of administrators to manually keep track of everything that's going on. Unified Monitoring uses automation to help diminish the amount of time and effort that administrators must expend to identify problems.

Detection employs self-learning capabilities to monitor ongoing operations. Its goal is to come up with normal and abnormal performance metrics, and thus avoid generating the false positive alarms that diminish overall monitoring effectiveness.

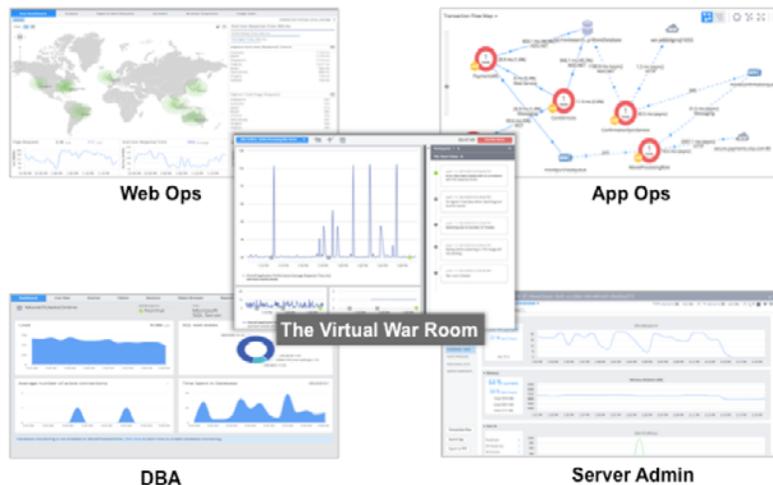
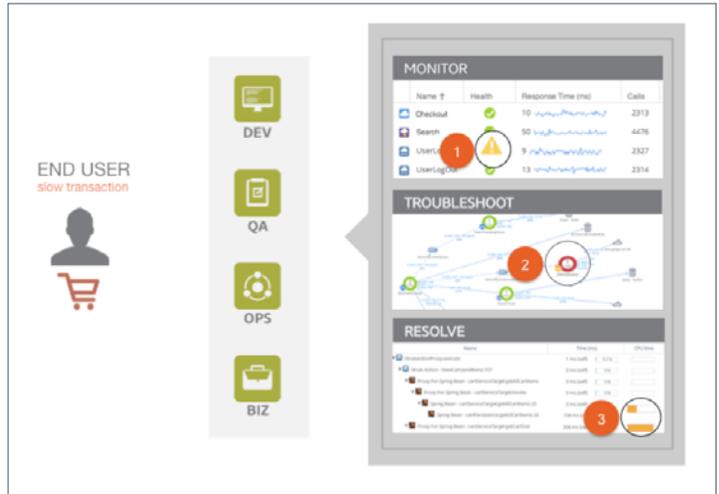
Once a deviation from baseline performance is observed, Unified Monitoring will alert responsible staff of the problem itself, as well as the potential business impact that it will cause. As time goes by, the Unified Monitoring solution will be able to increase its helpfulness by learning from what's already been detected and resolved.

Resolution

Application and business transaction discovery and problem detection are just the beginning: to be truly effective, Unified Monitoring needs to be able to quickly resolve those issues that it uncovers. A worthy Unified Monitoring solution will pinpoint transaction bottlenecks, no matter where they exist in the distributed application infrastructure.

Once a problem is unearthed, Unified Monitoring should automatically spawn run books that are essential for correction based on the configured policies. Resolution will also leverage the deep diagnostics collected during the detection process for all relevant technology elements, including:

- Software running on browser or mobile devices
- Web servers
- Internal application code
- Packaged applications
- Database performance (SQL statements and stored procedures)
- Server performance



Adoption

Because of their complexity and difficult integrations, far too many legacy monitoring solutions were prone to becoming shelfware. The architectural enhancements, ability to use common data models and presentation services featured by modern Unified Monitoring solutions can help reduce the likelihood of this type of event.

Another way to avoid shelfware is to make adoption as smooth and painless as possible, by making it easy to install, easy to upgrade and easy to use. Catering to the needs of the customer's preferences for on-premise, cloud, or hybrid deployments makes it easy for customers to adopt.

Unified Monitoring should not impose a heavy performance burden on the production environment; it must also be highly scalable and utilize its resources efficiently.

Once installed, the solution should be easy to use, and provide a single pane of glass with complete oversight. Finally, ongoing total-cost-of-ownership (TCO) should be minimal.

Conclusion

Although predicting the future is always imprecise and heavily impacted by unforeseen events, it's a safe bet that the technology portfolio supported by IT organizations will continue to expand and become more intricate. This means that fine-grained, effective monitoring will remain an essential responsibility.

Contemporary Unified Monitoring software has been designed with present-day heterogeneous and distributed IT architectures in mind. This means that there's no longer a need to cobble together a monitoring solution from a collection of dissimilar point solutions. By learning from the structural flaws that plagued earlier generations of monitoring software, Unified Monitoring delivers:

- Excellent end-user experience
- Faster problem detection and resolution
- A reduced TCO
- More productive administrators, developers, and support staff

Selecting a Unified Monitoring application is a fundamental IT responsibility. The checklist in this paper can serve as a starting point towards thoroughly assessing the various offerings in the marketplace.

Learn more about Unified Monitoring at appdynamics.com/solutions/unified-monitoring