Nine Essentials of
Modern Server Monitoring

**Keys to Optimizing Service Levels
in Dynamic Hybrid Environments**

BROADCOM®

The Imperative: Improved Digital Experiences

In the application economy, delivering improved, innovative digital experiences to users and customers is critical. For the IT operations teams responsible for supporting these digital experiences, the stakes continue to grow.

- **Downtime is costly.** For each hour of downtime, organizations lose between $140,000 and $540,000.[1] And downtime happens a lot. In fact, on average, enterprises lose almost $22 million a year because of it.[2]

- **Slow is the new downtime.** Services don't need to be down for it to cost you. For an increasingly demanding and impatient user population, if performance is slow, they will go elsewhere. Recent data shows that as page load time goes from 1 second to 3 seconds, the probability of a mobile site visitor bouncing increases 32 percent.[3]

Ultimately, servers and systems play a critical role in whether organizations can meet their customers' and users' demands for digital services. Now, it's more critical than ever to track, manage and improve server performance. Consequently, server monitoring represents a vital effort—one with real bottom-line consequences.
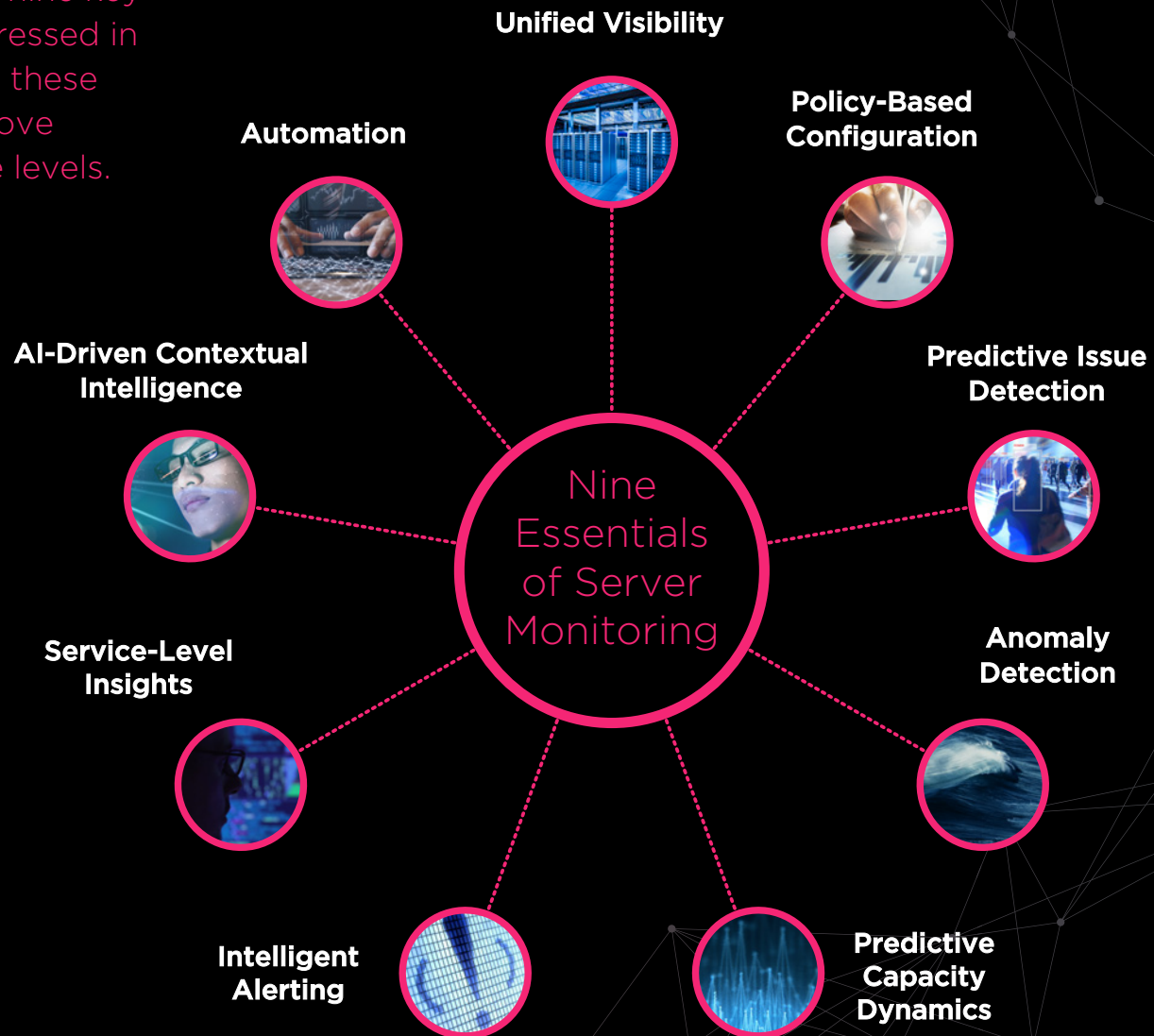
The Challenges of Modern Server Monitoring

While tracking, managing and improving the performance of servers is more vital than ever, these efforts are also more difficult than ever. That's because IT environments continue to grow:

- **More diverse.** Gone are the days of standardized, homogenous server implementations and technology environments. For IT teams, the number of server technologies, platforms and deployment models continues to expand. Teams need to support multiple server platforms running in on-premises deployments, public clouds, private clouds, hyperconverged systems and more.

- **More dynamic.** Technical environments continue to grow more dynamic as the use of virtualization, containers and cloud services continues to proliferate. Further, as organizations continue to embrace agile and DevOps approaches, applications and their supporting infrastructures continue to evolve much more rapidly, and servers are no exception.

- **More expansive.** Not only are server environments more complex, they continue to grow in scope. The data volume being managed and the number of systems that need to be supported continue to grow, as do the associated costs and workloads—putting increased strain on already stretched teams.

- **More interrelated.** While servers represent fundamental assets, they are ultimately one of many different services and elements that comprise the environment. All these different assets need to be aligned and performing efficiently if a quality user experience is to be delivered. As a result, it continues to grow more difficult to gain a cohesive view of the environment and, when issues arise, quickly determine exactly where the cause of the issue is.

In the following sections, we offer guidance for the IT teams grappling with these issues. We detail the nine key requirements that must be addressed in order for IT teams to overcome these challenges and effectively improve server performance and service levels.

Unified Visibility

Policy-Based Configuration

Automation

AI-Driven Contextual Intelligence

Predictive Issue Detection

Nine Essentials of Server Monitoring

Anomaly Detection

Service-Level Insights

Predictive Capacity Dynamics

Intelligent Alerting

Unified **Visibility**

IT teams need a unified view into their entire environment. Given the dynamic, complex nature of today's environments, it is increasingly essential that server monitoring platforms provide comprehensive coverage in terms of the number of platforms supported and the depth of information collected; IT teams simply can't be forced to buy, implement and integrate more monitoring tools whenever there is a new platform to support or new set of metrics to collect.

Whether they are running traditional infrastructures, containers, hyperconverged infrastructures, multiple clouds or all of the above, IT teams need a unified way to monitor it all. To support today's heterogeneous environments, teams need one platform that can track all server platforms, including IBM Power Systems, Linux, UNIX and Windows, as well as VMware environments. They also need to be able to track the servers running in public cloud environments, including AWS, Google Cloud Platform service, and Microsoft AZURE.

IT teams should be able to get proactive, actionable insights and correlation across various elements. They should also be able to get comprehensive coverage, not only of their environments but of the various data types that are needed, including performance, availability, capacity, SLAs, anomalies and log data.

Monitoring tools should also offer an intuitive, contextual interface that enables users to slice data in different ways, including by specific applications, infrastructure elements, development and test environments, and more.

5

Policy-Based Configuration

In the application economy, organizations are under increasing pressure to deliver new applications and differentiated digital experiences. For IT teams, this means not only more agile application rollouts, but also faster monitoring deployments. Today's environments are too dynamic to rely on cumbersome configuration efforts.

To support agile and DevOps approaches, monitoring of cloud and on-premises servers needs to be deployed quickly. When teams need to deploy monitoring for a new server, infrastructure technology or application, the process should be low-touch, automated, and turnkey.

Today, time-to-monitor is a critical metric for IT teams to track and improve. Through dynamic policy-based configuration, IT teams can make significant gains in reducing time-to-monitor metrics. By implementing a standardized, automated approach to

monitoring deployments, IT organizations can better support rapid deployments and improve infrastructure performance. Leveraging platforms that deliver out-of-the-box templates and bulk configuration capabilities, IT teams can more quickly deploy and support systems across development, test and production environments.

Monitoring tools should provide dynamic discovery capabilities so as new systems or services come online, they can be automatically detected and have appropriate monitoring configurations applied. These discovery capabilities should have the intelligence to determine the resource and type of technology, no matter the environment. For example, in the cloud, the platform should be able to discover and distinguish between a new Amazon EC2 instance and Amazon RDS, or an Apache server versus Microsoft SQL Server. This approach also reduces technology-specific complexities and enables staff to adopt new technologies faster.

At the same time, tools should offer the ability to consistently enforce controls. Templates should be available that enable both consistency and efficiency in the application of monitoring configurations for similar resources. Tools should provide templates that have been developed based on industry best practices for each specific technology and environment.

6

Predictive Issue **Detection**

Slow is the new down in the application economy. IT teams need to be able to leverage predictive analytics capabilities that help them proactively identify issues before the user experience suffers. They need solutions that display a prioritized list of problems that represent situations administrators should watch. Tools should also place these items in order of time remaining before a problem is expected to occur, bringing attention to immediate problems first.

By providing analytics that reveal how long it will take for a threshold to be reached, advanced monitoring platforms can issue early warnings about potential threats of performance degradation—before internal and external customers are affected. Teams also need solutions that help speed resolution times through built-in, best-practice-based workflows, intuitive dashboards, reporting and alarms.

7

Anomaly **Detection**

Within many organizations, the process of setting, managing and optimizing alarm thresholds is both time-consuming and ineffective. Too often, staff must spend too much time analyzing metrics and manually configuring thresholds. Further, this effort needs to be monitored and adapted over time, which can make it difficult for organizations to ensure that thresholds are aligned with ongoing changes in usage, traffic and trends. Through these manual efforts, organizations ultimately either experience too many false positives or run the risk of problems being detected too late.

Advanced solutions should provide pre-packaged algorithms that can detect meaningful deviations. These solutions should automatically observe the seasonality and trends of the data and apply the relevant machine-learning algorithms to determine typical values for a given metric based on historical values. With these capabilities, IT teams can eliminate the effort and guesswork associated with manually managing thresholds. Further, they will gain the intelligence needed to more effectively identify, predict and prevent issues.

Predictive Capacity **Analytics**

By only leveraging traditional, piecemeal monitoring tools and approaches, organizations don't get the insights needed to effectively predict capacity utilization, which makes it difficult to prevent capacity-related bottlenecks and optimize resource investments and provisioning. Executives can't intelligently do what-if planning to accurately estimate capacity requirements for planned initiatives. These challenges grow exponentially as environments continue to get more complex, dynamic and hybrid in nature.

Today, operators and executives need an advanced monitoring platform that enables them to better understand, predict and improve resource utilization. In order to do intelligent capacity planning, teams need capabilities for historical trend analysis. They need a solution that applies regression models against collected intelligence and that can support executives' what-if analysis based on detailed workload and usage data.

With these capabilities, IT teams can predict capacity bottlenecks, so they can take steps to resolve them before services are disrupted. Through this intelligence, teams can better manage costs by identifying underused capacity. Teams can better predict near-term and long-term trends so they can better anticipate and meet evolving technical and business requirements.

9

Intelligent **Alerting**

The complex, dynamic nature of today's environments continues to create a number of challenges. One of the chief problem areas is the nature of alarms being generated. In many organizations, operators need to sift through massive volumes of alarms, many of which are either incorrect or redundant.

Because disparate tools lack unified intelligence, one system issue can cause alarms to be generated by many interrelated systems, resulting in so-called alarm blizzards. The upshot of all this alarm noise is that staff productivity suffers, given all the time that gets wasted sifting through useless alerts. Further, the more noise being generated, the less likely it is that operators will be able to determine which alarms are truly meaningful and need to be acted upon. Ultimately, the more alarm noise, the greater the likelihood that critical issues will be missed and service levels will suffer.

For these reasons, it is vital that monitoring platforms deliver capabilities for intelligent alarm configuration, enabling dynamic baselines and thresholds that help reduce false alarms. This provides a better way to reduce noise and manage thresholds. Instead of requiring users to manually manage thresholds, advanced platforms can leverage pre-packaged algorithms that can detect meaningful deviations.

Platforms should feature maintenance mode capabilities that eliminate the false alarms associated with system administration. In addition, look for platforms that offer granular, automated alarm routing policies and integration with service desk platforms. With these capabilities, platforms can automatically open service tickets that include the relevant details on an issue.

Service-Level **Insights**

Given the intense demands being placed on servers and IT infrastructures, it's no longer sufficient to take a compartmentalized approach to monitoring. Ultimately, what really matters isn't the CPU cycles of a web server; it's whether sufficient service levels are being delivered. To track and manage service levels, IT teams need full visibility and control over the entire IT infrastructure that is relied upon to deliver a specific business service.

As a result, these teams need comprehensive monitoring capabilities that enable them to centrally monitor and manage every key aspect of the IT environment, including cloud and on-premises servers, hosts, applications, databases, networking services and network devices.

Executives should look for a solution that provides a centralized, cohesive view of their infrastructure so their teams can effectively monitor, understand and manage the ecosystem on which a service is based. The platform needs to provide clear insights that enable administrators to quickly gauge the impact a system issue is having on the service so they can more effectively prioritize their efforts. With these capabilities, IT teams can more proactively spot and avert issues, more quickly respond to issues when they arise and more effectively provide for superior service levels.

Artificial Intelligence-Driven Contextual **Intelligence**

As IT environments continue to grow more complex and dynamic, the volume of monitoring data being generated continues to grow rapidly. Relying on disparate tools and approaches, IT teams are ill-equipped to manage and analyze all the data being generated. Staff members struggle to manually correlate different types of data. For example, they are challenged with correlating log and metric data. They also struggle to correlate infrastructure and non-infrastructure intelligence, such as server hardware errors and data on application performance degradation. In addition, these teams can't effectively correlate business and infrastructure data, which makes it difficult to understand how infrastructure issues affect business users and performance.

To contend with these challenges, IT teams need to augment server or IT infrastructure monitoring tools with AI-driven operations analysis capabilities, also known as AIOps. Through AIOps, administrators can gain the power needed to automatically correlate infrastructure data with intelligence from across the organization, including servers, networks, applications and any business sources. By leveraging machine-learning algorithms, platforms can pinpoint the root cause of issues faster and provide recommendations for potential fixes.

Automation

Today's IT teams are under constant pressure, facing demands to do more with less while at the same time helping to ensure superior service levels. To respond, they must make automation a key pillar of their server management and monitoring strategy.

Automated discovery of new systems, as well as automated deployment of monitoring of these new elements, is vital in order to support today's dynamic infrastructures and DevOps environments. IT teams also need to ensure dashboards and reports can automatically be adapted to evolving environments, and automatically generated and refreshed.

Moving forward, IT teams will also need to leverage capabilities for automated response and remediation workflows. For Instance, once monitoring software spots a potential bottleneck, it could trigger a workflow by passing information to collaboration tools or trigger a remediation process by connecting to a management or automation tool. If a potential utilization bottleneck is identified, a new cloud server, such as an Amazon EC2 instance, could automatically be provisioned. As a result, IT teams can avoid potential disasters and save time.

13

Introducing **DX Unified Infrastructure Management**

DX Unified Infrastructure Management (DX UIM) provides a single, analytics-driven solution for proactively and efficiently managing modern, cloud and hybrid IT infrastructures. DX UIM is the only IT monitoring solution that provides intelligent analytics, comprehensive coverage and an open, extensible architecture. By leveraging the solution, your organization can speed mean time to repair, reduce monitoring efforts, accelerate new deployments and improve the end-user experience.

• Out-of-the-box integrations with over 140 technologies provide immediate value

• Policy-based automated configuration is designed for today's DevOps environments

• Open extensible architecture helps you integrate and customize to your unique needs

• Integration with powerful AIOps solution provides contextual intelligence

Unified Hybrid Infrastructure Observability

Scalability for
IT Complexity

Unified Hybrid
Infrastructure
Observability

Intelligent
Operations

321 percent — **Total return on investment with DX UIM[4]**

50 percent — **Percentage reduction in incidents requiring triage[4]**

14

For more information, visit **broadcom.com**

1 ZDNet, "The astonishing hidden and personal costs of IT downtime (and how predictive analytics might help)," David Gewirtz, May 30, 2017, https://www.zdnet.com/article/the-astonishing-hidden-and-personal-costs-of-it-downtime-and-how-predictive-analytics-might-help/

2 "Overages and Outages? Solving the Problem of Unplanned Downtime," Vincent Bier, May 2017, https://www.nexthink.com/blog/overages-and-outages-solving-the-problem-of-unplanned-downtime/

3 Google/SOASTA Research, 2017, https://www.thinkwithgoogle.com/marketing-resources/data-measurement/mobile-page-speed-new-industry-benchmarks/

4 Benefits realized for a composite organization created for The Total Economic Impact™ Of CA Unified Infrastructure Management, a March 2018 commissioned study conducted by Forrester Consulting on behalf of CA, "The Total Economic Impact of CA Unified Infrastructure Management," https://www.ca.com/content/dam/ca/us/files/industry-analyst-report/the-total-economic-impact-of-ca-unified-infrastructure-management.pdf

BROADCOM®
connecting everything ®