

5 Key Considerations for Enterprise Cloud Monitoring

Introduction

Software is taking over the world. As a result, every business needs to embrace software as a core competency to ensure survival and prosperity. However, the transformation into a software company is a significant task, as building and running software today is harder than ever. And if you think it's hard now, just wait. Your journey has just begun.

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Software is taking over the world



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Speed and scale: a double-edged sword

You invested in an enterprise cloud solution to build and run your software at a speed and scale that will transform your business—that's where cloud platforms excel. But are you prepared for the complexity that comes with speed and scale?

As software development transitions to a cloud-native approach that employs microservices, containers, and software-defined cloud infrastructure, the immediate future will bring more immense complexity than the human mind can envision.

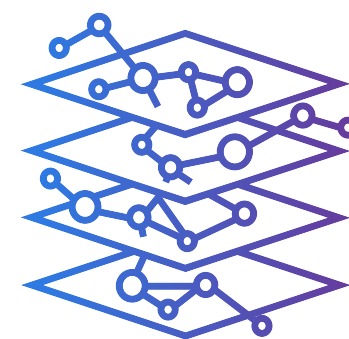
You also invested in monitoring tools—lots of them over the years. But your traditional monitoring tools don't work in this new dynamic world of speed and scale that cloud computing enables. That's why many analysts and industry leaders predict that more than 50% of enterprises will entirely replace their traditional monitoring tools in the next few years.

What killed traditional monitoring?



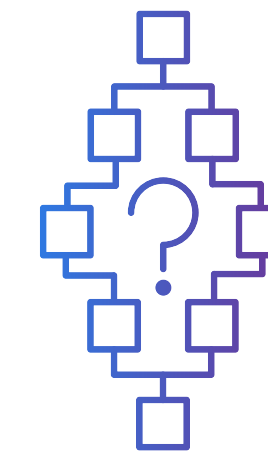
◀ Manual effort

Slow, manual deployment and configuration + manual upgrades and re-work for changing environments = a maximum of just 5% apps are monitored



◀ Agent complexity

Complex mix of agents for diverse technologies, types each with different deployment, installation, and configuration processes



◀ Monitoring tool proliferation

Multiple monitoring tools for different purposes with siloed teams looking at myopic data sets



◀ Charts and data, but no answers

Data from multiple agents and different sources look great but are just a bunch of charts on a dashboard with no answers

Which brings us to why we've written this guide. Your software is important, and choosing the right monitoring platform will make speed and scale your greatest advantage instead of your biggest obstacle.

We worked with your industry peers to arrive at our insights + conclusions

Dynatrace works with the world's most recognized brands, helping to automate their operations and release better software faster. We have experience monitoring the largest cloud-hosted implementations and assisting enterprises as they manage the significant complexity challenges of speed and scale. Some examples include:

- A large retailer with 100,000+ hosts managing 2,000,000 transactions a second
- An airline with 9,200 agents on 550 hosts capturing 300,000 measurements per minute and more than 3,000,000 events per minute
- A large health insurer with 2,200 agents on 350 hosts, with 900,000 events per minute and 200,000 measures per minute

Read on to reveal five critical factors that dictate the right monitoring platform for the enterprise cloud.

At Dynatrace, we experienced our own transformation—embracing cloud, automation, containers, microservices, and NoOps—and now we're prospering, while other vendors who haven't transformed are left behind. But don't just take our word for it. Forrester recognized our achievement and shared **our story** with the broader IT community to help them transform in the same way we have. You're welcome.




Chapter 1

Hybrid, multi-cloud is the norm

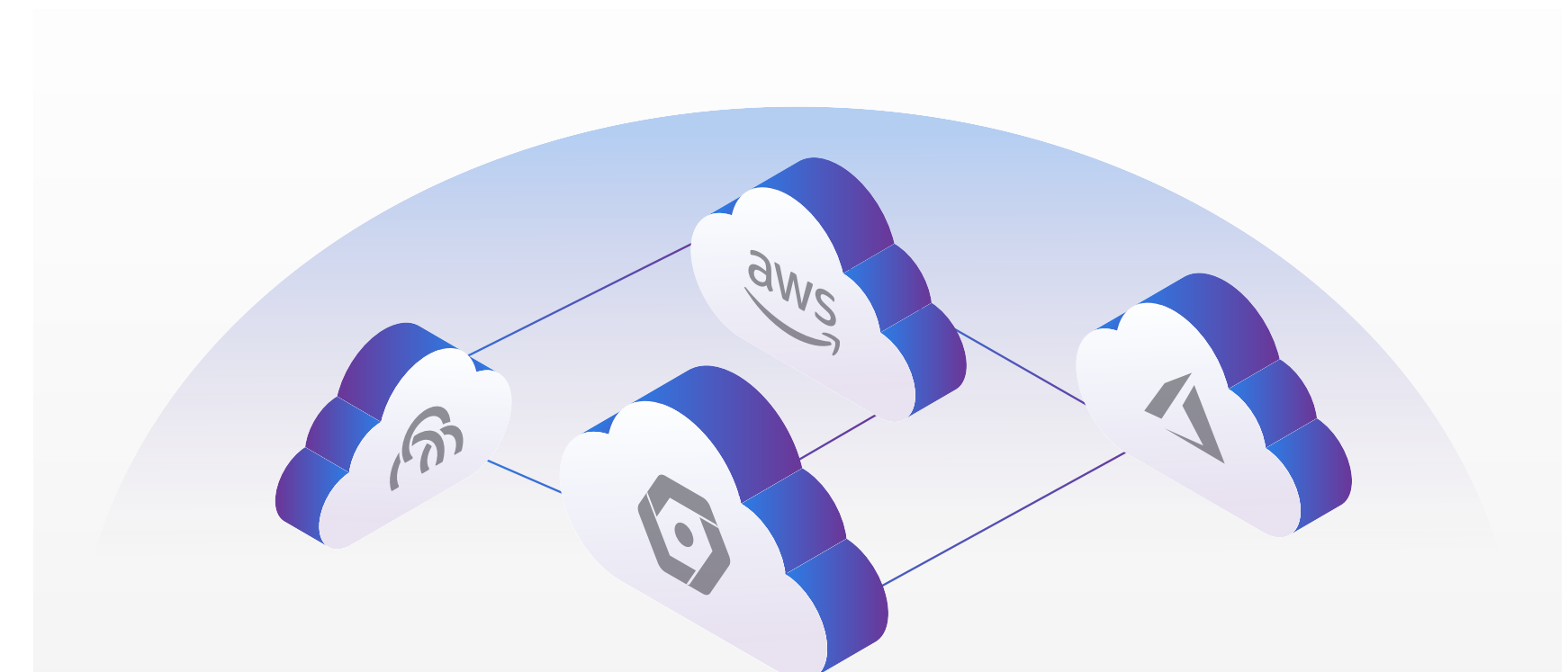
Insight

Enterprises are rapidly adopting cloud infrastructure as a service (IaaS), platform as a service (PaaS), and function as a service (FaaS) to increase agility and accelerate innovation. Widespread cloud adoption has made hybrid, multi-cloud the norm. According to RightScale, 81% of enterprises currently execute a multi-cloud strategy.¹ Meanwhile, 451 Research predicts that more than 66% of enterprises will operate a hybrid, multi-cloud environment by 2019.²



The diagram illustrates a hybrid cloud environment. On the left, a blue 3D building icon represents traditional on-premise infrastructure. On the right, a blue and white cloud icon contains a network diagram, representing cloud infrastructure. A horizontal line connects the building to the cloud, symbolizing the integration of on-premise and cloud resources.

Hybrid cloud
As enterprises migrate applications to the cloud or build new cloud-native applications, they also maintain traditional applications and infrastructure. Over time, this balance will shift from the traditional tech stack to the new stack, but both new and old will continue to coexist and interact.



The diagram illustrates a multi-cloud environment. It shows four distinct cloud icons connected by lines. The icons represent different cloud providers: one with the AWS logo, one with the Google Cloud logo, one with the Microsoft Azure logo, and one with a generic cloud icon. This represents the use of multiple cloud providers for different services.

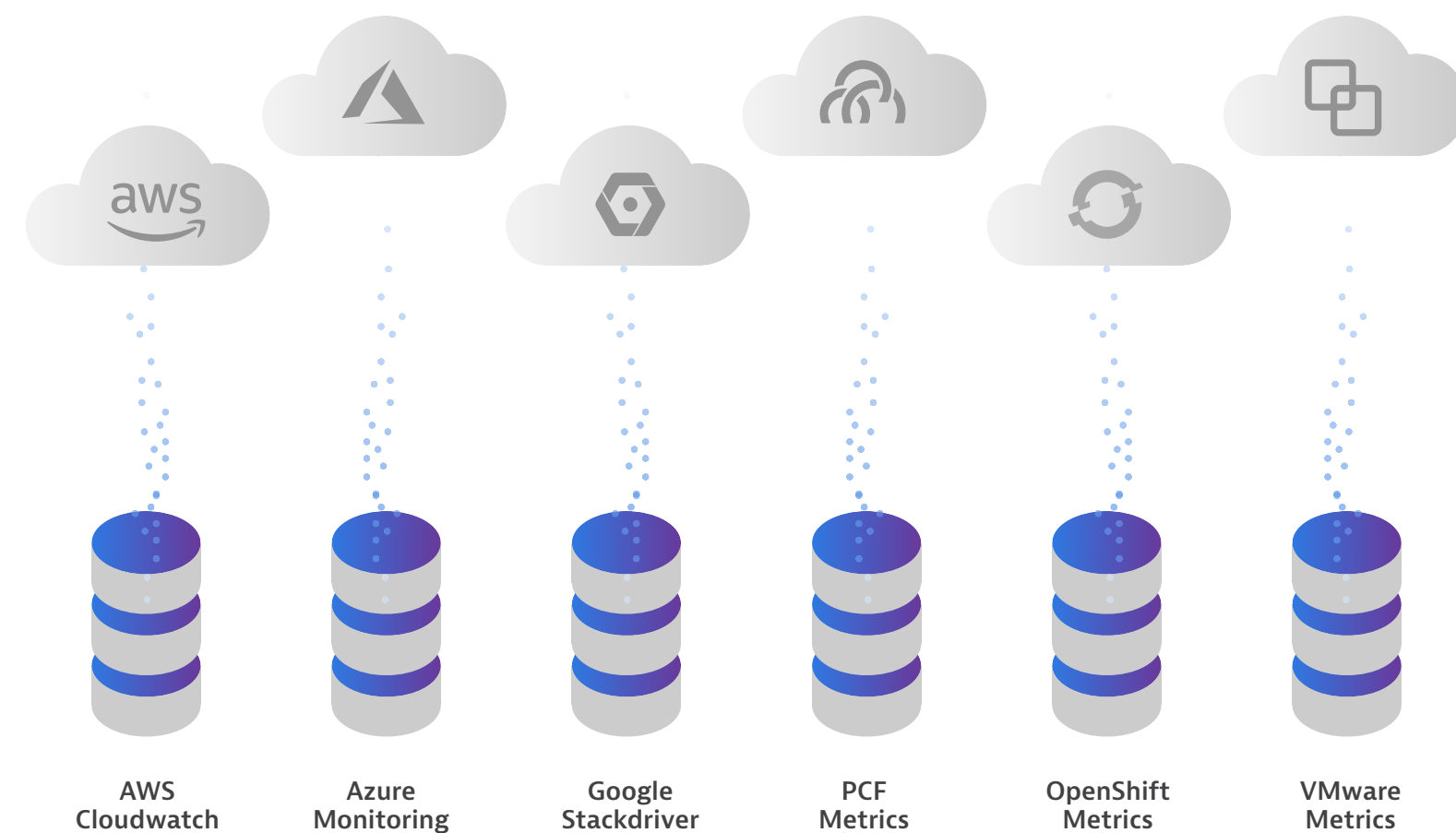
Multi-cloud
Different cloud platforms have different features and benefits, technologies, levels of abstraction, prices, and geographic footprints. Each of these differences make them suitable for specific services. Enterprises started with a single cloud provider but quickly embraced multiple clouds, resulting in highly distributed application and infrastructure architectures.

¹RightScale: Cloud Computing Trends: 2018 State of the Cloud Survey
²451 Research Voice of the Enterprise: Cloud Transformation

Challenge

The result of hybrid multi-cloud is bimodal IT—the practice of building and running two distinctly different application and infrastructure environments. Enterprises must continue to enhance and maintain existing, relatively static environments while also building and running new applications on scalable, dynamic, software-defined infrastructure in the cloud.

Putting traditional IT to one side for a moment to focus solely on multiple cloud platforms—monitoring tools often proliferate as a result of teams operating in silos despite critical interdependencies between services running across clouds.



The challenge of multiple monitoring tools across clouds is further compounded when we bring traditional IT back into focus. With it comes the need to monitor and manage a range of existing technologies with service interdependencies with cloud environments.



Key consideration

Simplicity and cost savings drove early cloud adoption, but today, enterprise cloud use has evolved to a complex and dynamic landscape that spans multiple clouds as well as traditional on-premise technologies.

The ability to seamlessly monitor the full technology stack across multiple clouds while also monitoring traditional on-premise technology stacks is critical to automating operations, no matter the distribution level of the applications and infrastructure being monitored.

69%
of enterprises
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a hybrid,
multi-cloud
environment
by 2019.

-451 Research

Chapter 2

Microservices and containers introduce agility

Insight

Microservices and containers are revolutionizing the way applications are built and deployed, providing tremendous benefits in terms of speed, agility, and scale. In fact, 98% of enterprise development teams expect microservices to become their default architecture³—and IDC predicts that 90% of all apps will feature microservices architectures by 2022.⁴

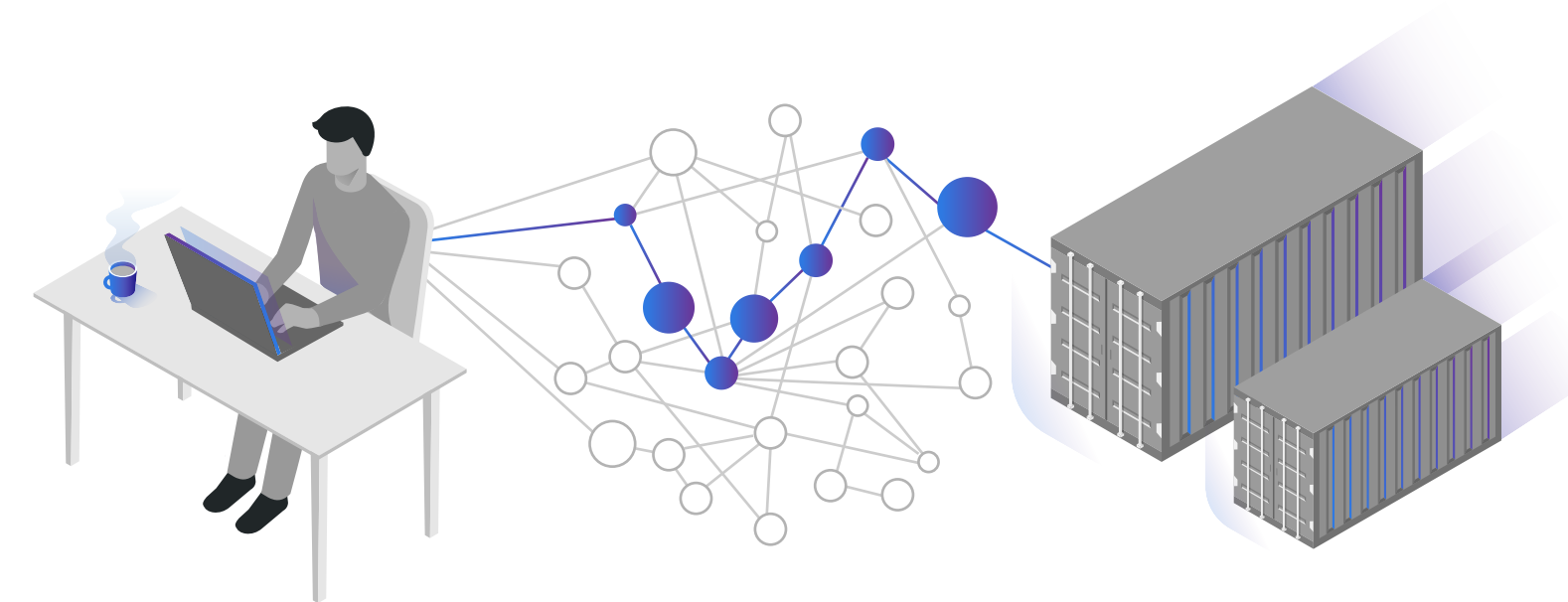
Challenge

According to 72% of CIOs, monitoring containerized microservices in real time is almost impossible. Each container acts like a tiny server, multiplying the number of points you need to monitor. They live, scale, and die based on health and demand. As enterprises scale their environments from on-premise to cloud to multi-cloud, the number of dependencies and data generated increase exponentially, making it impossible to understand the system as a whole.

The traditional approach to instrumenting applications involves the manual deployment of multiple agents. When environments consist of thousands of containers with orchestrated scaling, manual instrumentation becomes impossible and will severely limit your ability to innovate.

Key consideration

A manual approach to instrumenting, discovering, and monitoring microservices and containers will not work. For dynamic, scalable platforms, a fully automated approach to agent deployment, continuous discovery of containers and monitoring of the applications and services running within them is mandatory.



72%

of CIOs say monitoring containerized microservices in real-time is almost impossible.

-Dynatrace CIO Complexity Report

³Dimensional Research, April 2018 report

⁴IDC FutureScape

⁵Dynatrace CIO Complexity Report

Chapter 3

Not all AI is equal

Insight

Gartner predicts 30% of IT organizations that fail to adopt AI will no longer be operationally viable by 2022.⁶ As enterprises embrace a hybrid, multi-cloud environment the sheer volume of data created, and massive environmental complexity will make it impossible for humans to monitor, comprehend, and action. This critical need for machines to solve data volume and speed challenges resulted in Gartner creating a new category, called "AIOps" (AI for IT Operations).

Challenge

AI is a buzzword across many industries and making sense of the market noise is difficult. To help, here are three key AI use cases to keep in mind when considering how to monitor your enterprise cloud platform and applications:

AI and root cause analysis

The biggest benefit of AI to monitoring is the ability to automate root cause analysis, enabling problems to be identified and resolved at speed. An AI engine that has access to more complete data (including third-party data) will provide faster, contextual insights.

AI and alert storms

AI is perfectly suited to real-time monitoring and analysis of large data sets to provide the most probable reason for a performance issue. AI can recognize when related anomalies occur within your environment (i.e. when thresholds are broken), preventing alert storms.

AI and auto-remediation

AI should be a part of your CI/CD pipeline, deployment, and remediation processes. Problems can be detected instantly, and bad builds will be identified earlier so you can automatically remediate or roll back to a previous state.

Many enterprises are trying to address these use cases by adding an AIOps solutions to the 25+ monitoring tools they already have.⁷ While this approach may have limited benefits, such as alert noise reduction, it will have minimal effectiveness addressing the root cause analysis and auto-remediation use cases as it lacks contextual understanding of the data to draw meaningful conclusions.

⁶AI (in a box) for IT Ops – The AIOps 101 you've been looking for
⁷Gartner

30%

of IT organizations that fail to adopt AI will no longer be operationally viable by 2022.

-Gartner

You will also find there are many different approaches to AI. Here are a few of the more popular ones you are likely to encounter as you move towards an AIOps strategy:

Deterministic AI ★★★★★

This gives you the ability to discover the topology of your environment and the metrics produced by all components. It works immediately and adapts to changes without having to re-learn patterns. It is also excellent at event noise reduction (alert storms), dependency detection, root cause analysis, and business impact analysis.

Machine learning AI ★★

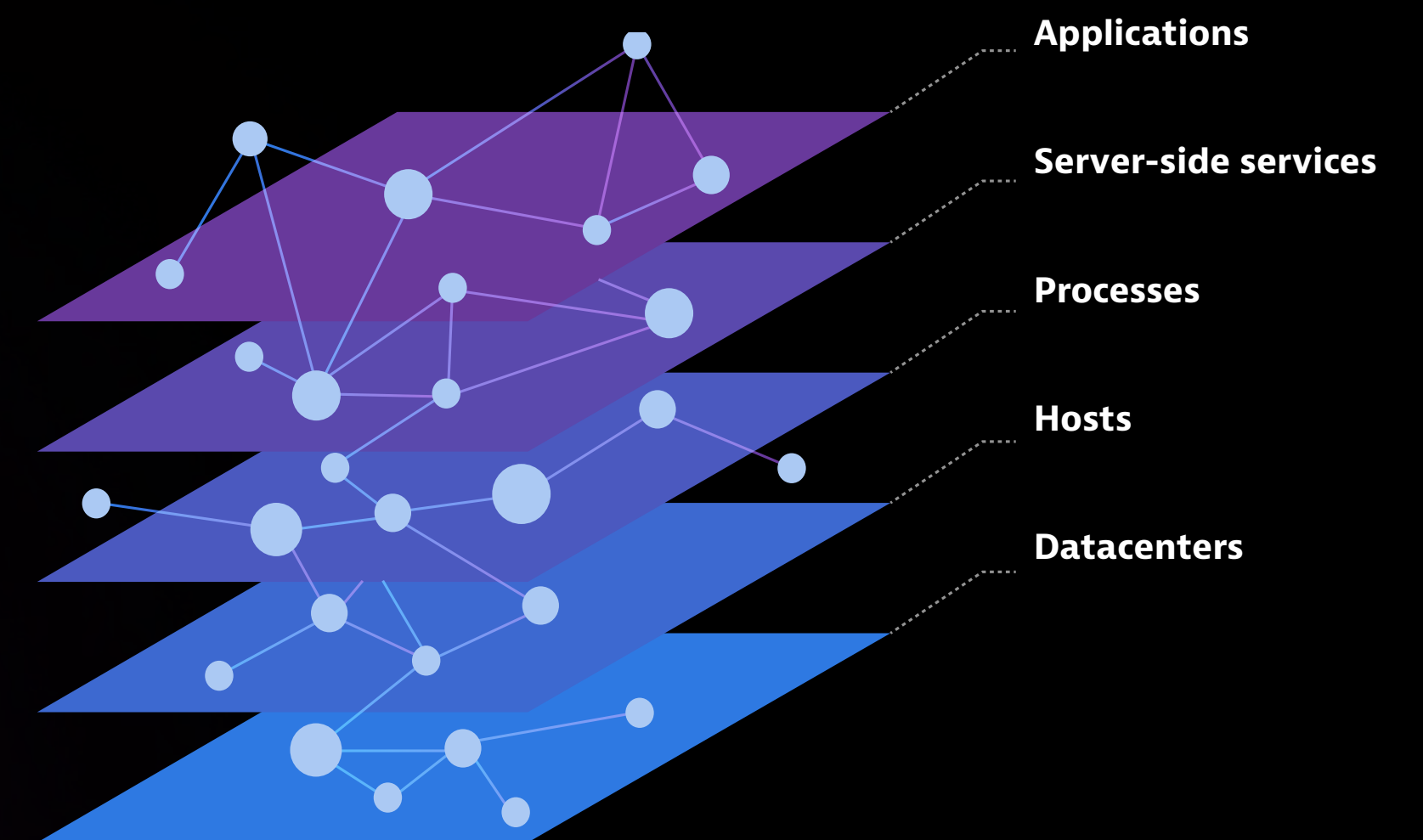
This is a metrics-based approach. It takes time to build a data set to which it can compare previous states. Its strongest feature is limiting event noise reduction. However, it does not offer root cause or business impact analysis.

Anomaly-based AI ★

With this form of AI, both event noise reduction and dependency detection are okay. One of the major drawbacks is that it takes a lot of time to build a metrics model that would show a correlation for root cause analysis.

Key consideration

Not all AI is created equally. Attempting to enhance existing monitoring tools with AI, such as machine learning and anomaly-based AI, will provide limited value. AI needs to be inherent in all aspects of the monitoring platform and see everything in real-time, including the topology of the architecture, dependencies, and service flow. AI should also be able to ingest additional data sources for inclusion in the AI algorithms vs. correlating data via charts and graphs.



Chapter 4

DevOps: Innovation's soulmate

Insight

DevOps is perhaps the most critical consideration when maximizing the value of cloud technologies. Implemented and executed correctly, DevOps enhances enterprise's ability to innovate with speed, scale, and agility. Research shows that high performing DevOps team have 46x more frequent code deployments and 440x faster lead time from commit to deploy.⁸

Challenge

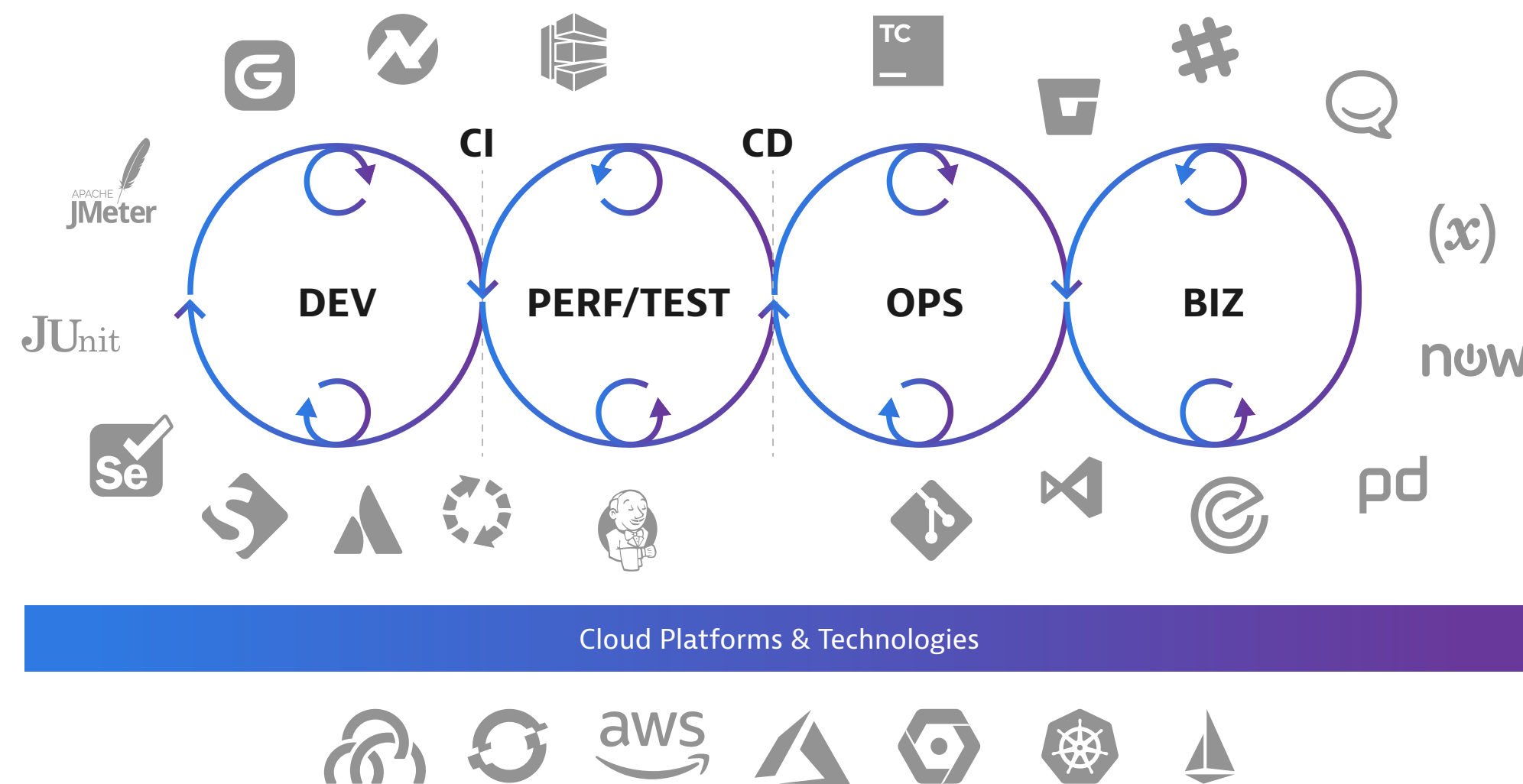
As enterprises scale DevOps across multiple teams there may be hundreds or thousands of changes a day, resulting in code pushes every few minutes. While CI/CD tooling helps mitigate error-prone manual tasks through automated build, test and deployment, bad code still has the propensity to make it into production. The complexity of highly-dynamic and distributed cloud environment like PCF, along with thousands of deployments a day, will only exacerbate this risk.

As the software stakes get higher, shifting performance checks left—that is, earlier in the pipeline—enabling faster feedback loops becomes critical. But this can't be accomplished easily with a multi-tool approach to monitoring. To be effective a monitoring solution needs to have a holistic view of every component, every change and contextual understanding of the impact each change has on the system as a whole.

Key consideration

To go fast and not break things, automatic performance checks need to happen earlier in the pipeline. To achieve this, a monitoring solution should have tight integration with a wide range of DevOps tooling. And combined with the right AI, these integrations will also help support the move to AIOps and enable automated remediation to limit the impact of bad software releases.

- ◀ **Check to see which DevOps tooling a monitoring solution integrates with and supports and consider how it will impact your ability to automate things in the future.**



⁸DevOps Research and Assessment: 2018 State of DevOps

Chapter 5

Digital experiences matter

Insight

Enterprises are striving to accelerate innovation without putting customer experiences at risk, but it's not just traditional end-customer experiences of web and mobile apps at risk. Apps built in the cloud support a broad range of services and audiences:

- The consumerization of IT has evolved to include wearables, smart homes, smart cars and life-critical health devices
- Corporate employees are increasingly working remotely and need access to systems that are in the corporate datacenter and cloud-based
- And employees using office workspaces rely on smart office features for lighting, temperature, safety, and security which are reliant on the emerging paradigm of Machine-to-machine (M2M) communications (Internet of Things)

What was simply regarded as user experience has evolved and grown to digital experience encapsulating end-users, employees and things.



76%

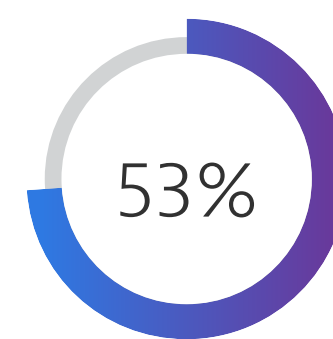
of CIOs say multi-cloud deployments make monitoring user experience difficult.

-Dynatrace CIO Complexity Report

Challenge

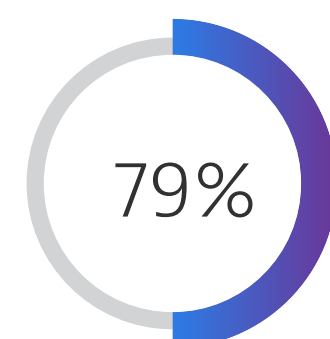
Enterprise IT departments face mounting pressure to accelerate their speed of innovation, while user expectations for speed, usability, and availability of applications and services increase unabated. Combined with the explosion of IoT devices and the increasingly vast array of technologies involved, managing, and optimizing digital experiences while embracing high frequency software release cycles and operating complex hybrid cloud environments presents significant challenges.

If digital experiences aren't measured how can enterprises prioritize and react when problems occur? Are they even aware there are problems? And if experiences are quantified, is it in context to the supporting applications, services, and infrastructure that permit rapid root-cause analysis and remediation? Only enterprises able to deliver extraordinary digital customer experiences will stay relevant and prosper.



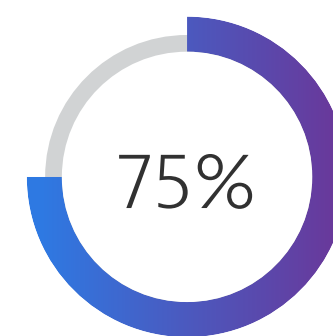
Performance

of mobile users abandon a session if it takes longer than 3 seconds to load⁹



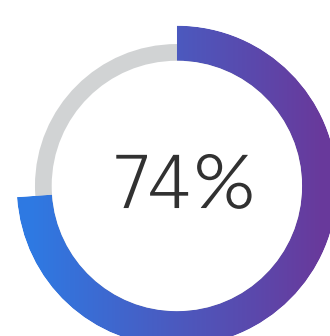
Impact

of users will not return after a negative experience⁹



Root Cause

of customers expect online help resolution within 5 minutes⁹



Revenue

of CIOs fear IoT performance problems could derail operations and significantly damage revenues⁹

⁹Dynatrace CIO Complexity Report

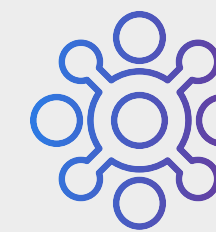
Key consideration

Enterprises need confidence that they're delivering—or on the path to delivering—exceptional digital experiences in increasingly complex environments. To achieve this, they require real-time monitoring and 100% visibility across all types of customer-, employee-, and machine-based experiences.



Visualizing and prioritizing impact

Understand how specific issues or overall performance impacts every single user session or device and prioritize by magnitude.



Visibility from the edge to the core

A single view across your entire multi-cloud ecosystem. From the performance of users and edge devices to your applications and cloud platforms all in context.



A single source of truth for all

Ensure stakeholders, from IT to Marketing, have access to the same data to avoid silos, finger-pointing and war rooms.

Enterprises use cloud technologies to fundamentally transform how they build and run applications.

At speed. At scale. And in highly distributed, multi-cloud environments.

We hope this **5 Key Considerations for Monitoring Enterprise Cloud** eBook has provided helpful advice and guidance you on your Enterprise Cloud journey. Dynatrace is committed to providing enterprises the data and intelligence they need to be successful with their enterprise cloud and digital transformation initiatives, no matter how complex.

Learn more

If you are interested to learn more about Dynatrace, please **visit [Dynatrace.com/platform](https://www.dynatrace.com/platform)** for assets, resources, and a **free 15 day trial**.



About Dynatrace

Dynatrace provides software intelligence to simplify enterprise cloud complexity and accelerate digital transformation. With AI and complete automation, our all-in-one platform provides answers, not just data, about the performance of applications, the underlying infrastructure and the experience of all users. That's why many of the world's largest enterprises, including 72 of the Fortune 100, trust Dynatrace to modernize and automate enterprise cloud operations, release better software faster, and deliver unrivaled digital experiences.