



# Enabling next-generation cloud architectures with AI-powered observability

Essential guide to full-stack, intelligent observability on Azure:  
Strategies for planning, building, automating and operating  
a well-architected cloud framework

# What's inside

## CHAPTER 1

**Roadmap to a successful cloud modernization journey — going beyond traditional monitoring capabilities**

## CHAPTER 2

**Mastering observability at scale: Five challenges and how Dynatrace eliminates them**

## CHAPTER 3

**Full-stack intelligent automation: A must-have for modernized architectures**

## CHAPTER 4

**The pillars and power of a well-architected cloud**

## CHAPTER 5

**Dynatrace: Empowering cloud modernization with comprehensive observability**

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## CHAPTER 1

# Roadmap to a successful cloud modernization journey — going beyond traditional monitoring capabilities

Achieving end-to-end observability is critical to achieving your cloud modernization journey.

## The cloud modernization journey goes beyond traditional monitoring

With the meaning of monitoring and observability often conflated, it's important to understand the differences.

Monitoring is the process of collecting, analyzing, and using information to track a program's progress toward reaching its objectives and guide management decisions. Monitoring focuses on watching specific metrics. Logging provides additional data, but it is typically viewed in isolation without a broader system context.

Because modern cloud environments are dynamic — constantly changing in scale and complexity — most problems aren't known or even monitored. Observability empowers you with the ability to understand these common "unknown unknowns," identifying what is slow or broken and what you need to do to improve performance.

With an observability solution in place, your team gets alerts when issues arise so they can proactively resolve them before they impact users. Observability is the very lifeblood of a well-architected cloud and a key component of a successful modernization strategy.



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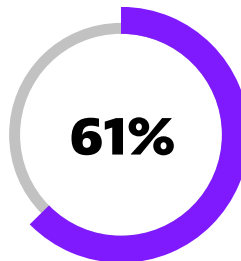
## Obstacles to building a well-architected, modernized cloud

While end-to-end observability is imperative for successful enterprise cloud modernization, it's important to understand what cloud modernization means and why it's important.

First, it's a continual, iterative process that ensures that your applications and infrastructure can evolve at the speed and scale you need to support your business. More importantly, it's a key driver for accelerating innovation and enhancing business agility. Every organization is at a different stage in this journey, and business units within the same organization may even be at different stages of the journey.

Successful modernization is built on a well-architected cloud that informs changes and improvements to your architecture over time. The design principles behind a well-architected cloud include the ability to conceptualize capacity requirements fully, track changes to automated processes — including auditing impacts to the system and reverting to the previous environment states seamlessly — and ensure that your architecture is nimbly able to evolve.

But transitioning from your legacy IT infrastructure to a modern cloud — including changing the way development and operations think — is challenging. Adopting new cloud platforms, technologies, and services, combined with the speed and scale made possible by clouds, amplifies those challenges.



of IT leaders say **observability blind spots** in their environments are a great risk to cloud modernization as teams find themselves without an easy way to monitor their technologies end to end.<sup>1</sup>

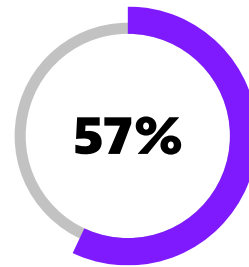
## Observability is more than metrics, traces, and logs

Timely observability is another vital component of cloud modernization. But most monitoring tools can't deliver the performance necessary to make that happen. That's because these tools typically rely on metrics, traces, and logs to deliver information about your systems.

Observability relies on telemetry derived from instrumentation that comes from the endpoints and services in your multicloud computing environments. In these modern environments, every hardware, software, cloud infrastructure component, and container, open-source tool, and microservice generates records of every activity. Observability ensures that you understand what's happening across all these environments, and among the technologies, so you can detect and resolve issues quickly and efficiently.

Using multiple monitoring tools adds other challenges. There are also open-source alternatives that deliver some level of observability but require massive planning, integration, and large teams to continually manage and maintain them. Only Dynatrace offers a radically different approach that meets these modernization challenges head-on.

When an environment has been fully instrumented to provide complete observability data with the Dynatrace platform, you can flexibly explore what's going on and quickly figure out the root cause of issues you may not have been able to anticipate.



of IT leaders say **multiple monitoring solutions across multicloud environments** make optimizing infrastructure performance and resource consumption difficult.<sup>1</sup>



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## CHAPTER 2

# Mastering Observability at Scale: Five challenges and how Dynatrace eliminates them

The intricacies of today's ever-changing hybrid multi-cloud landscapes require enterprise organizations to go beyond traditional monitoring and siloed operations. Scaling observability and maintaining always-on intelligence requires AI within a unified platform.

## 1. Dynamic multicloud environments are complex.

Slow, labor-intensive manual efforts, combined with disjointed and disconnected data silos generated by multiple tools that can't be integrated, waste precious IT time better spent on higher-value activities including operations automation and innovation.

Dynatrace scales observability and eliminates blind spots across your ever-expanding environment with automatic topology mapping that continuously discovers and maps components, cloud services, and dynamically changing relationships between potentially billions of interdependencies.

The platform's always-on autodiscovery of new components prevents gaps in coverage in real time. And its no-code approach frees up skilled developers to focus on more important projects.

## 2. Monitoring dynamic serverless technologies and containers in real time is incredibly hard.

The dynamic nature of containers, like those managed in Kubernetes, and event-driven, serverless code introduces several significant obstacles to scaling observability. With instances of these technologies constantly spinning up and down and executing based on pre-set conditions, lacking real-time visibility means your IT team can't understand their relationships with upstream and downstream components that can impact them.

You also can't connect end-to-end tracing from real users accessing the microservices to the nodes, services, and containers they run on or gain code-level visibility into what's inside the workloads running within containers.

Because Dynatrace automates the discovery of containers — and everything running within each container — at start-up, you can continuously understand system behavior and the origin of anomalies, making them easy to isolate and precisely pinpoint at scale.

Because anomalies can happen outside of Kubernetes nodes, pods, containers, and clusters, the platform also provides you with a topology context external to the containers. The result is full-stack visibility from the pod through the cloud provider and application to the end user. That ensures you understand the end-to-end business impacts of your efforts.





### 3. The volume, velocity, and variety of data alerts is overwhelming.

Dynamic multicloud environments massively increase the amount of telemetry data your systems generate. The result is alert storms that overwhelm your IT team as you try to monitor and make sense of every data point as the environment continues to scale.

Any approach requiring manual effort can't keep up with the need to continually define and redefine "normal" for constantly changing anomaly thresholds in dynamic environments. And a manual approach won't find and can't monitor issues you aren't already aware of or don't understand. At best, siloed data can send mixed signals, and at worst, send wrong signals that multiply alert storms while wasting precious IT time as multiple teams struggle to pinpoint issues across different tools.

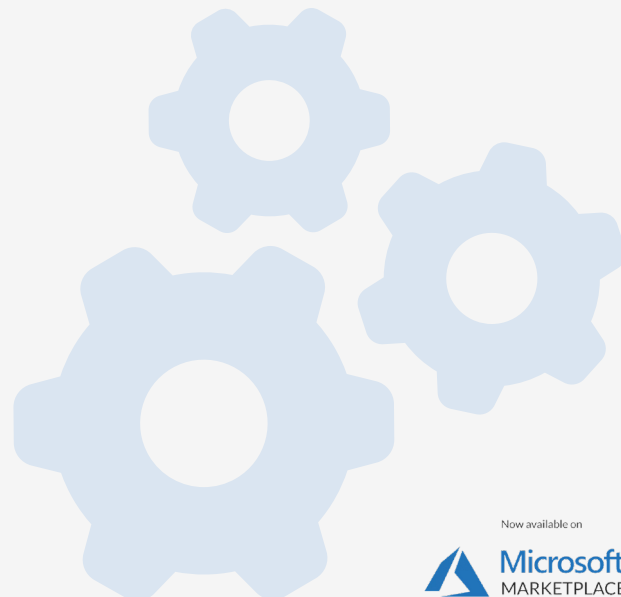
Dynatrace employs AI to deliver the critical capabilities necessary to achieve observability at scale. That includes auto-adaptive threshold baselining for anomaly detection that helps you prioritize what matters. The platform intelligently groups related anomalies into a single problem, automating root cause analysis and eliminating redundant work across teams.

Always-on, causation-based AI with code-level analysis processes billions of dependencies with complete fault-tree analysis for instant answers. Dynatrace integrates these answers with context from external systems, like configuration management databases (CMDBs) and other data sources, broadening your workflow automation efforts across multiple teams.

### 4. Siloed operations, development, and business teams stifle collaboration.

Tool sprawl is rampant as new cloud-native technologies require new methods for instrumentation, monitoring, reporting, and analysis. These tools and point solutions further divide teams as each tries to identify and resolve issues and optimize the environment independently. This division adds even more challenges, from working with disparate data models to isolated observability and monitoring across pre-production and production environments. This can bog down innovation and decrease software quality.

Dynatrace helps your teams collaborate more efficiently by providing a single data model to scale observability across all layers and components of your cloud environments. The platform gives you a shared context that facilitates cross-team collaboration. It also lets you perform analytics across your infrastructure, applications, operations, and business data and seamlessly ties the entire software lifecycle together, from feature development to testing, releases, application security, and ongoing optimization.

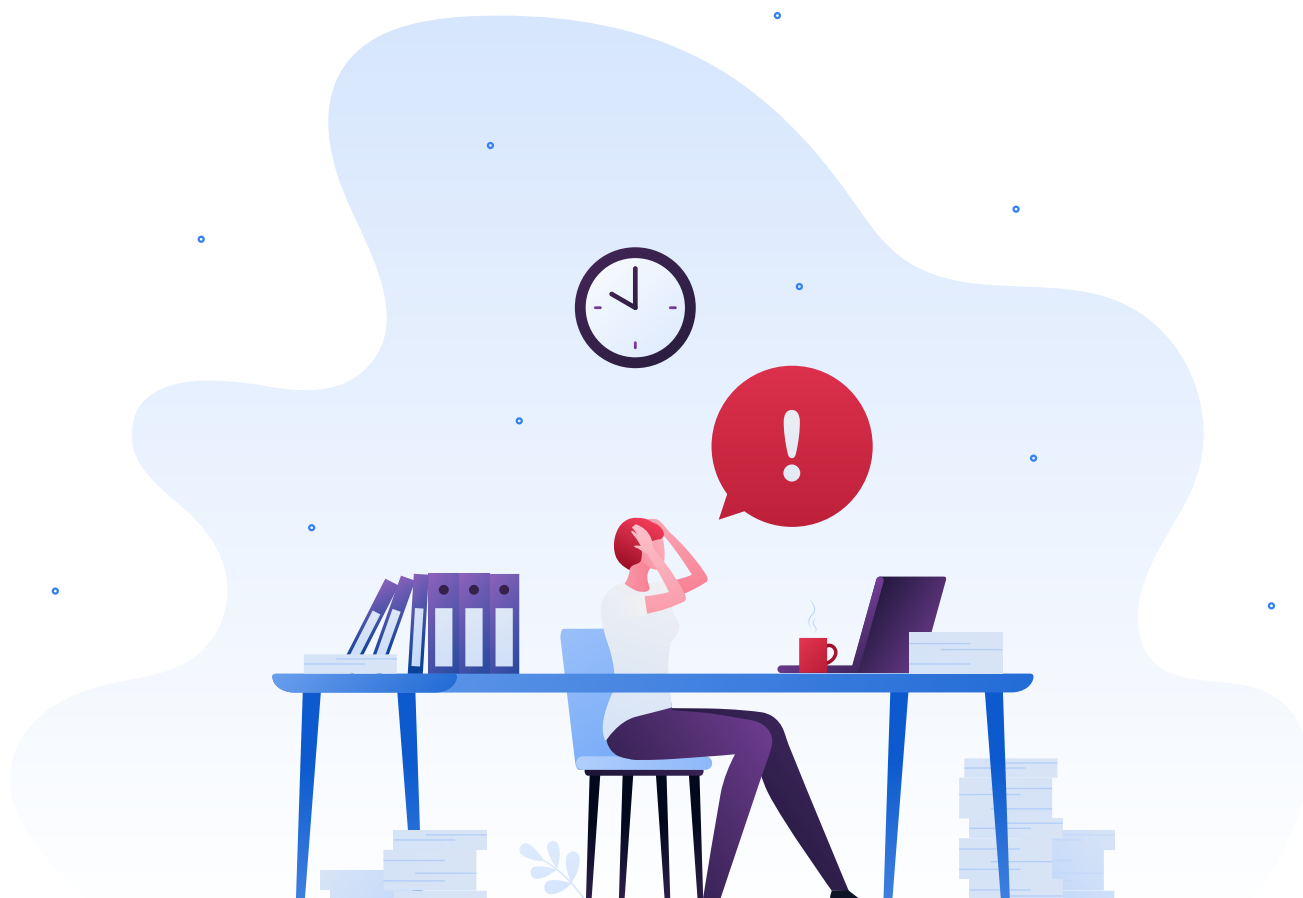


## 5. Suboptimal end-user experiences limit the business impacts of modernization.

The whole point of cloud modernization is to help IT drive business agility. However, your customers, employees, and partners are your real success drivers. If the applications these end users depend on don't meet their performance and usability expectations, it hurts productivity, slows progress, and can ultimately impact your bottom line.

What's needed is an intelligent observability approach that seamlessly connects your front-end digital experience to your back-end applications and infrastructure. Dynatrace does just that, giving you comprehensive insights into a technology's impact on the delivered digital experiences and business key performance indicators (KPIs) like revenue, conversions, and feature adoption.

That observability and monitoring across web, mobile, and internet of things (IoT) help you gain a holistic understanding of the end-user experience across channels — for customers and employees — anywhere in the world.



## CHAPTER 3

# Full-stack intelligent automation: A must-have for modernized architectures

Achieving a singular, holistic view across multicloud or hybrid cloud environments is critical to achieving digital transformation initiatives. By providing actionable intelligence that automatically identifies root causes and prioritizes remediation to minimize disruptions and deliver an exceptional user experience.

## Cloud architects and site reliability engineers

Blind spots in cloud infrastructure monitoring create questions and block scalability. This inability to get a singular, holistic view across multicloud or hybrid cloud environments leads to a lack of insights around infrastructure performance, utilization, and resiliency that add challenges to making business decisions. Adopting new cloud technologies and services, as well as planning for successful migration and modernization initiatives, require observability into the massive amounts of data being generated.

Dynatrace delivers real-time, full-stack intelligence across dynamic and complex environments, providing actionable insights about performance and utilization that drive automated processes.



## Development and operations teams

The inability to quickly identify an issue's root cause with context prevents immediate prioritization and mobilization of remediation efforts. Siloed development and operations teams that don't have a unified observability platform to automate pre-production testing of releases against their service-level objectives (SLOs) can find themselves overextending their error budgets or, worse, introducing costly issues into production without a clear line of sight into what needs to be repaired (or how). How and where an app will run within the cloud infrastructure — and still meet SLOs — may be an afterthought instead of a priority.

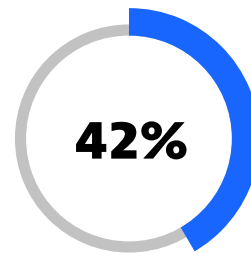
Dynatrace's service-centric approach to both lower environments and production observability — down to the code level — ensures immediate identification and automatic remediation of any issues that arise. The platform even drives process automation and quality checks with data and intelligent insights into SLOs and quality gates while offering software release awareness to mitigate issues as they arise in pre-production environments.



## Business stakeholders

The explosion of cloud adoption efforts has added new challenges in understanding utilization and total cost of ownership (TCO). Disconnected views of applications, business metrics, and customer experiences make solving business problems more difficult. And a lack of reporting and visibility against business goals makes it virtually impossible to make accurate forecasts and assess progress against goals.

Davis® AI delivers real-time actionable insights that maximize efficiency by automating the scaling of services, processes, and infrastructure. And Dynatrace's real-time dashboards — including business outcomes, end-user experiences, and business impacts — make it easy to understand where things stand at any given time.



of IT team **time is spent on manual, routine work** across their environments, creating a major productivity drain that delays innovation.<sup>1</sup>



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## CHAPTER 4

# The pillars and power of a well-architected cloud

Maintaining a well-architected framework that meets security, reliability, and performance objectives while ensuring long-term operational excellence and sustainability within an optimized cost structure is a continual process. Learn how Dynatrace underpins the pillars of well-architected cloud.

## The cloud modernization journey starts with a well-architected cloud

Cloud modernization is a continuous process that leverages technologies to ensure more efficient business, IT, and development efficiencies at scale. But building a solution that can meet your requirements today and into the future demands a cloud-native platform optimized for an on-demand environment. Getting there starts by creating a well-architected cloud built on five pillars that ensure you gain intelligent insights at every step.



## Five pillars of a well-architected cloud

### 1. Delivers complete reliability.

Lets you operate and test workloads to ensure proper functionality throughout its full lifecycle.

### 2. Secures data, systems, and assets.

Offers the advantage of cloud technologies to improve your security posture and protect your infrastructure and data.

### 3. Optimizes costs.

Lets you run your systems so they deliver business value at the lowest price point.

### 4. Ensures operational excellence.

Effectively supports development and workloads while enabling you to gain insights into your operations to support continuous process improvement.

### 5. Efficiently meets performance requirements.

Meets system requirements to ensure efficiency as demand changes and technologies evolve.

With a well-architected cloud in place, you're ready to support a more agile, innovative business.

## Five ways a well-architected cloud empowers business agility

### 1. Eliminates guesswork on capacity requirements.

A modern cloud infrastructure lets you quickly scale up and down automatically, eliminating costly wasted capacity.

### 2. Lets you test your systems at scale.

Cost-effectively simulate your live environment for production-scale testing on demand.

### 3. Automates tasks to make architectural experimentation easier.

Use automation to create and replicate your workloads while containing costs for experimenting with optimization efforts.

### 4. Ensures support for evolving architectures.

Automate and test on demand, reducing the risks of impacts from design changes so your system can evolve to take advantage of innovations as they arrive.

### 5. Collects data to drive architectural design.

By collecting data on how your architectural changes affect the behavior of your workload, you can inform your choices and make continuous improvements over time.



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## CHAPTER 5

# Dynatrace: Empowering Cloud Modernization with Comprehensive Observability

Achieving cloud maturity is a challenging task, but one that organizations can attain with the right tools and expertise. Dynatrace provides the capabilities and insights needed for organizations to reach their cloud modernization goals, particularly those running on Azure.

## The advantages of AI-driven observability

Successful cloud modernization depends on a well-architected cloud that leverages AI to ensure real-time visibility and actionable insights. Dynatrace delivers on that promise with complete, automated, and intelligent AI-driven, out-of-the-box observability across your entire infrastructure, including container-based and traditional environments.

## Dynatrace offers unmatched cloud automation and intelligence for Azure environments by delivering these core technologies:

### Smartscape: Application mapping visualization

Smartscape is Dynatrace's patented interactive map technology that visualizes dynamic relationships among all application components across every tier. Dynatrace OneAgent automatically and dynamically discovers all the components and dependencies in your application environment. Smartscape simultaneously builds a dynamic interactive map

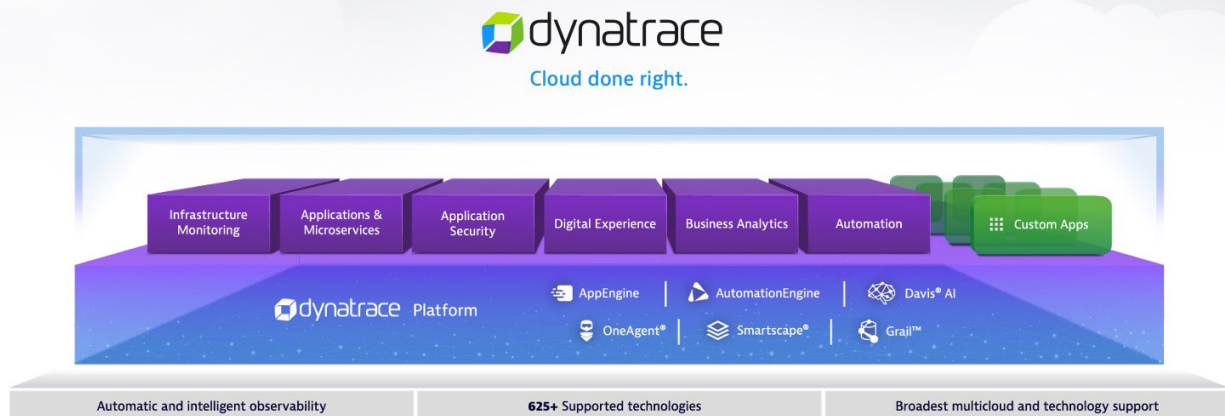
with that information, showing how everything is interconnected — without requiring manual configuration, additional instrumentation, or scripts.

Smartscape's intuitive visualizations give you end-to-end observability that makes it easy to understand the complexities of your application stack and delivery chain. That means no more gaps or blind spots up, down, and across every tier of your stack.

### PurePath: Distributed tracing

PurePath® integrates high-fidelity distributed tracing with user experience, code-level, and open-source technology data — including OpenTelemetry data — and code-level analytics. The technology automatically captures and analyzes transactions end to end across every tier of your technology stack. And it doesn't require any code changes from the browser to the code and database level.

Patented PurePath is the only observability solution that combines this high-fidelity distributed tracing with code-level visibility and advanced diagnostics, delivering leading-edge, cloud-native serverless and service mesh architectures, all while supporting — and enriching — the latest open standards.



## Davis AI

Davis is Dynatrace's radically different AI engine that automatically evaluates billions of dependencies in milliseconds. Davis identifies problems and serves up precise answers by performing root cause analysis that aggregates all issues related to a single root cause. These capabilities drive automation and instantly deliver broader, deeper insights into your environment.

Unlike traditional machine-learning approaches, Davis is purpose built for web-scale modernized clouds by leveraging high-fidelity metrics, traces, logs, and user data mapped to a unified entity model. That means no more guessing or time-consuming model training. With the root cause identified, you can fix problems before they become crises while delivering broader, deeper insights for modern cloud environments.

## OneAgent

Dynatrace OneAgent lets you collect all relevant metrics throughout your application-delivery chain with the one-time installation of a single agent per host. You simply install it and forget about it; Dynatrace does the rest. With only a few mouse clicks, Dynatrace OneAgent automatically activates instrumentation specifically for your stack and auto-injects tags into web application pages. New components are automatically added on the fly.

The technology consists of a single binary file with specialized services configured specifically for your monitoring environment. These services collect metrics on your hosts, including hardware, operating system, and application processes. They can also provide more detailed monitoring for specific technologies such as Java, Node.js, and .NET by injecting themselves into those processes and monitoring them from the inside.

## Azure Native Dynatrace Service

Dynatrace's native integration with Azure helps ensure a successful and accelerated cloud transformation. By eliminating complexity, customers can innovate faster and drive better business outcomes. Seamless experience for using Dynatrace's Software Intelligence platform in Azure.

### Key benefits:

- OneAgent: Continuous, automatic discovery and observability across your full stack.
- Automated Azure monitor metrics: enable Azure monitor metrics for all of your resources within your subscription.
- Hyperscale: Scalable across hundreds of thousands of hosts, millions of entities, and the largest hybrid clouds.
- Davis AI including AIOps: Explainable answers that drive self-healing and automation.
- Unified billing: Purchase Dynatrace through the Azure Marketplace - you can even spend your organization's Microsoft Azure consumption commitment.
- Integrated onboarding and management of Dynatrace through the Azure Portal.
- Integrated single-sign-on for Dynatrace through the Azure portal.

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## Advanced cloud modernization features

Other important criteria come into play as you consider how to advance your cloud modernization efforts. Dynatrace automates the development process to ensure performance, resiliency, and security across the software development lifecycle. But before any application ever sees the light of day, Dynatrace lets you test it — comparing the resulting metrics against your specified criteria to ensure that it meets your SLOs — before deployment.

The platform also features quality gates that catch issues such as bad code, security vulnerabilities, or performance problems before your app moves to the next phase. Dynatrace uses runtime application self-protection (RASP) to automatically find the root cause of a security vulnerability in your production environment. The platform then prioritizes impacted dependencies across your cloud to secure your applications instantly.



With Dynatrace, we can automatically capture every source of observability and user-experience data in a single place. This shift alone has freed our teams to invest more time in proactively acting on the insights they're getting in real time, so they can create better, more innovative services and experiences while also maintaining focus on our primary goal — meeting our customers where they are, whenever they need our resources.

– **Sean Mack**, CIO and CISO, Wiley

**WILEY**



## Dynatrace-driven results

AI-powered end-to-end observability is the foundation for a well-architected cloud. Our customer successes illustrate what's possible.



**99%**

**Fewer IT tickets,**  
from 700 tickets a  
week to just 7<sup>2</sup>



**20%**

**Higher cart value,**  
made possible by  
Dynatrace<sup>3</sup>



**30%**

**Faster delivery of  
innovations,**  
thanks to Dynatrace  
automation<sup>4</sup>

**25%**

**increase in conversions**  
leveraging end-to-end  
observability to optimize  
user sessions<sup>4</sup>

## Faster innovation and intelligent monitoring for Azure

Your journey to the cloud can help push your innovation efforts into overdrive. Dynatrace can get you there faster. It starts with an assessment, helping you plan better by automatically creating a dependency map of your entire stack — hosts, processes, services, and technologies — in minutes.

Dynatrace then helps you analyze the findings to establish the architecture you'll put in place and the migration process. On migration, you gain instant visibility into your hybrid cloud while simultaneously running two versions of your infrastructure to minimize risks.

Finally, Dynatrace ensures the architectural integrity of the migration, moving to autonomous cloud operations. And Dynatrace automatically links your pre- and post-migration application services, simplifying and optimizing your operations.

As a Microsoft Cloud Platform competency holder, Dynatrace also supports intelligent observability for a full-stack of Azure services.



# Microsoft Partner



<sup>1</sup> 2022 Data at Scale, Dynatrace CIO white paper.

<sup>2</sup> [Kroger Uses Dynatrace to Build Bridges Across IT Domains to Revolve Issues Faster](#), Dynatrace customer story.

<sup>3</sup> [Mitchells & Butlers drives cloud migration and transformation with Dynatrace](#), Dynatrace customer story.

<sup>4</sup> [Rack Room Shoes increases conversions by 25%](#), Dynatrace customer story.

# Ready to fast-track your cloud modernization journey with confidence?

Dynatrace is your trusted foundation for achieving cloud success on Azure. Dynatrace solidifies the supportive pillars of your cloud modernization efforts by merging cloud infrastructure intelligence with application, developer, and end-user insights to deliver end-to-end observability that is informative, actionable, and secure, all within a single AIOps environment. Say goodbye to siloed tools and embrace a comprehensive solution that enables you to optimize performance, reduce costs, and ensure operational excellence.

Experience the power of Dynatrace on Azure and take your cloud modernization journey to the next level.

Learn more

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[Dynatrace](#) (NYSE: DT) exists to make the world's software work perfectly. Our unified software intelligence platform combines broad and deep observability and continuous runtime application security with the most advanced AIOps to provide answers and intelligent automation from data at enormous scale. This enables innovators to modernize and automate cloud operations, deliver software faster and more securely, and ensure flawless digital experiences. That's why the world's largest organizations trust Dynatrace® to accelerate digital transformation.

Curious to see how you can simplify your cloud and maximize the impact of your digital teams? Let us show you. Sign up for a [free 15-day Dynatrace trial](#)

