

# Guide to Comprehensive Kubernetes Observability at Scale

Full-stack enterprise observability  
for Kubernetes environments

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## Introduction

Organizations are evolving their pace of digital transformation with the focus on innovating faster. Modern applications are the driving force behind this business initiative as they are agile, resilient and scalable. Kubernetes is the key to modern application development and the industry standard for container orchestration, managing the complexities of containerized applications. However, with the adoption of microservices, containers, and distributed systems architectures, environments become extremely complex. As applications scale, they can span multiple containers across multiple hosts, and operating this massive number of containers in real time becomes more complex over time.

In these dynamic environments, monitoring is not enough. This ebook explores the crucial role observability plays in understanding the relationships in Kubernetes environments (applications, containers, pods, nodes, namespaces, etc.), their dependencies, and how they interact with each other.



## Complexities with Kubernetes

Kubernetes simplifies the deployment, scaling and management of applications but is highly decoupled in nature, made up of different components that work together to support the lifecycle of containers. Containers in Kubernetes are highly dynamic, being spun up and down based on demand.

To keep track of how things are running, you need visibility with analytics, dashboards and alerts into Kubernetes nodes, individual pods, and all application services. You need to understand the dependencies between applications and the Kubernetes environment on which they run. Application performance depends on having enough resources and on the successful operation of the Kubernetes components and services on which the application runs. When a change is made, the impact of those changes needs to be understood on the Kubernetes environment. All of this is critical to being able to determine the root cause of a problem.

For example, if some of the physical or virtual machines in the Kubernetes clusters are overloaded or misconfigured, all other operations within the cluster and the deployed application on top may stop working as well. A Kubernetes API server outage can affect running workloads. Similarly, if there are problems with a service, services upstream and downstream of the application may have issues as well.

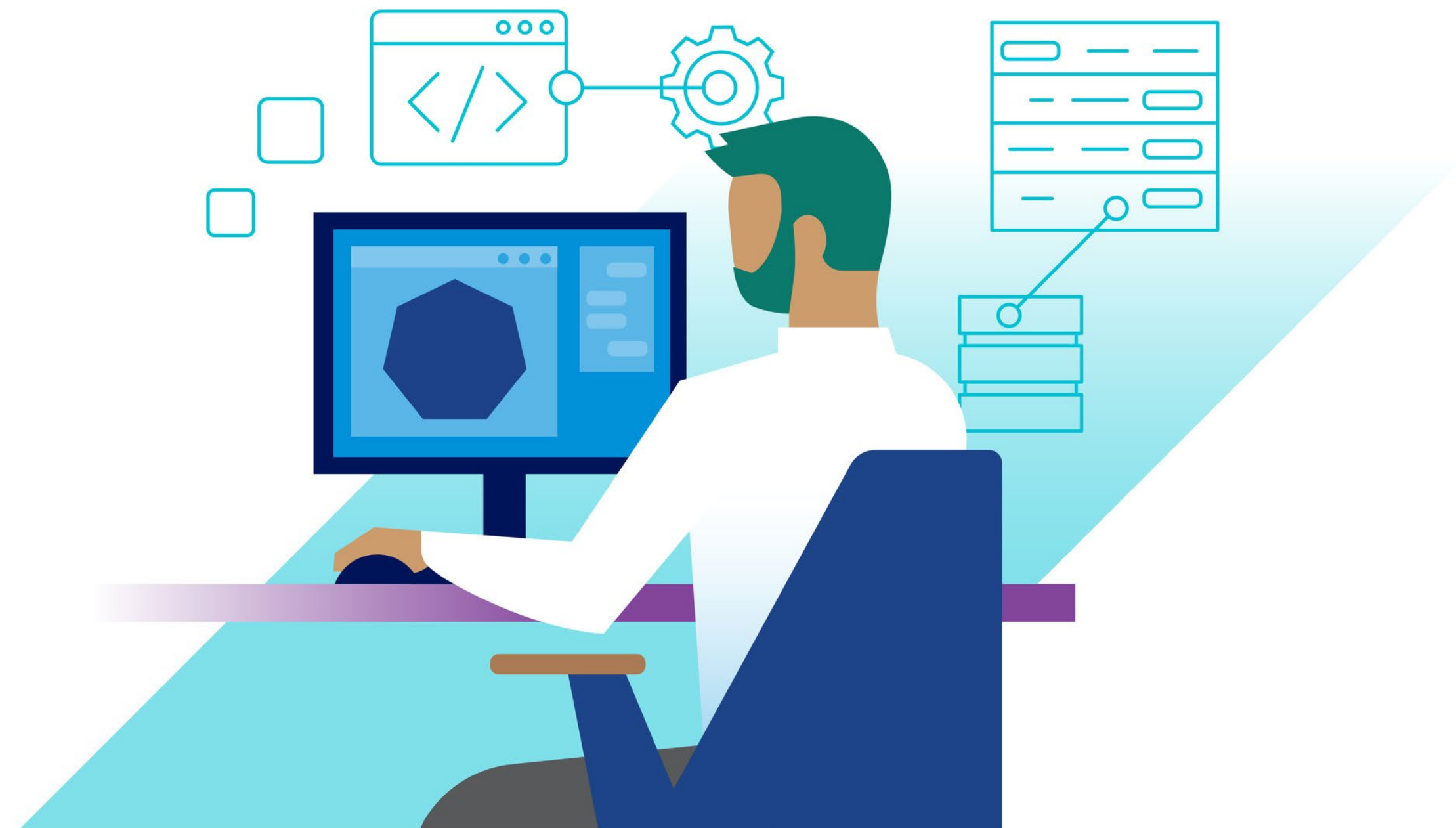




## Why observability is needed for Kubernetes

Monitoring is a tool of the past. For modern applications and Kubernetes, you need observability. Observability provides context on how Kubernetes components influence the performance of Kubernetes applications, and correct problems before they become end-user problems.

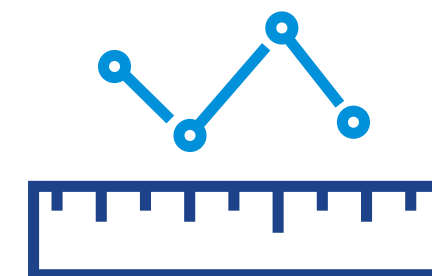
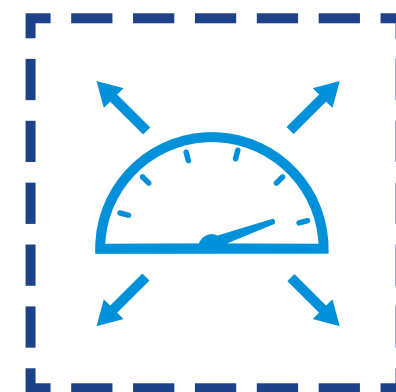
Because Kubernetes does not optimize performance on its own, engineers must identify the types of instances. Only observability provides engineers with a complete picture and all the necessary information for increasing performance and improving the stability and resiliency of applications, the Kubernetes components, and the underlying infrastructure.



# VMware Aria Operations for Applications for Kubernetes

VMware Aria Operations™ for Applications (formerly VMware Tanzu® Observability™) delivers full-stack observability for Kubernetes with advanced analytics on metrics, traces, histograms and span logs that come from the applications themselves, from application services, container services, and your multi-cloud environment. VMware Aria Operations for Applications supports metric-intensive workloads and millions of data points per second, and can scale across multi-cloud environments.

With enterprise-grade observability for Kubernetes, developers, site reliability engineers (SREs), and Kubernetes platform operators get accelerated time to value with automated and unified comprehensive insights into the health, state and performance of their application, Kubernetes and multi-cloud environments. Engineers use VMware Aria Operations for Applications to proactively alert on problems so they can troubleshoot and optimize the performance of their modern applications rapidly.



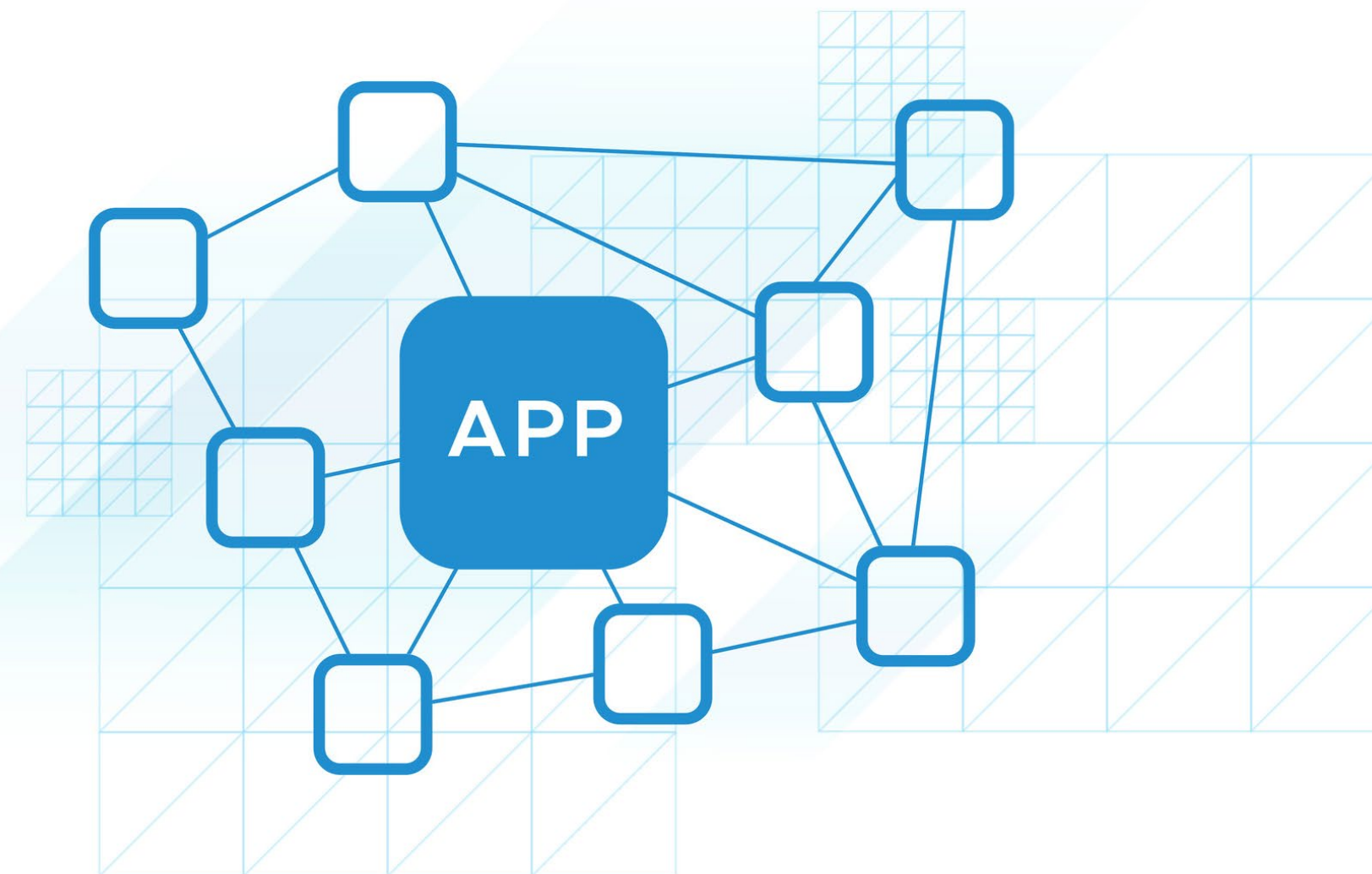
When using VMware Aria Operations for Applications, expect the following benefits:

- Gain full-stack observability into applications running across clouds as well as their associated namespaces, clusters, pods, containers and configuration code.
- Release faster code updates with an automated development continuous integration and continuous delivery (CI/CD) pipeline.
- Quickly identify abnormalities across cluster fleets and applications with powerful AI/machine learning (ML)-driven analytics.
- Drill down, troubleshoot and resolve issues faster with integrated metrics, distributed tracing, histograms and span logs.
- Reduce mean time to resolution (MTTR) to optimize code performance.
- Predict future resource needs to meet customer demands in a timely manner.
- Collaborate better because of the unified applications and Kubernetes observability.

## Observability across the full stack

When dealing with a complex Kubernetes-based infrastructure, performance tuning must be done across the stack, including the host, cluster, container, networking and the applications on top.

VMware Aria Operations for Applications provides automated and unified enterprise observability for Kubernetes and applications running on multi-cloud environments, enabling developers, SREs and Kubernetes operators to get the most from their environments while providing the best user experience:



- See real-time impact of code in production – Deliver faster, high-quality code with full-stack visibility of released code by examining the impact of changes on every aspect of the Kubernetes environment.
- Run the Kubernetes environment with tighter margins – Scale and optimize your Kubernetes cluster and its components dynamically with no performance degradation.
- Map Kubernetes cloud resources to pricing and cut your public cloud bill – Get visibility and optimize Kubernetes cloud resources through VMware Tanzu integrations with leading cloud providers.
- Discover Kubernetes applications performance bottlenecks – Get instant visibility into the request flow, service dependencies, and performance bottlenecks with out-of-the-box application observability.



## Conclusion

Applications and systems are becoming more distributed, and the tools to monitor them must change. Monitoring is no longer enough and can't provide the full picture. For modern applications—microservices, containerized applications, and dynamic environments, such as Kubernetes—observability is needed for a complete picture of the health of your environment.

VMware Aria Operations for Applications (formerly Tanzu Observability) provides full-stack observability for Kubernetes and was named a Visionary in the [2022 Gartner® Magic Quadrant™ for Application Performance Monitoring and Observability](#).<sup>1</sup> With a zero-configuration installation, VMware Aria Operations for Applications delivers immediate observability into Kubernetes environments and auto-discovers Kubernetes workloads. You get full-stack metrics from all Kubernetes layers and unprecedented scale to ingest, visualize and analyze telemetry from 200,000 concurrently running containers per Kubernetes cluster.

Get started today with your [free trial](#).



1. Gartner, Inc. "Magic Quadrant for Application Performance Monitoring and Observability." Padraig Byrne, Gregg Siegfried, Mrudula Bangera. June 7, 2022.

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