The Foundations of Enterprise Observability

INSTANA
an IBM Company

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The foundations of enterprise observability

When it comes to observability, talk is cheap. Most modern application performance monitoring (APM) and observability solutions promise deep insight into complex applications, but what they really deliver is just basic visibility under a different name.

For modern IT and DevOps teams, this is a problematic limitation. Application architectures and deployment techniques have grown tremendously more complex over the past decade due to the widespread adoption of microservices architectures, multicloud strategies, continuous application release pipelines and more. Yet many monitoring and observability tools are still stuck in the past. Despite efforts to rebrand themselves as more sophisticated platforms, their core functionality hasn't evolved significantly.

To manage the ever-increasing complexity of modern applications, DevOps and IT engineers need to think beyond conventional visibility. They must embrace enterprise observability, which provides the technical enhancements and business insights that are crucial for achieving true optimization of IT system performance.

As this ebook explains, enterprise observability is about much more than just talk or branding. It's an integrated suite of technologies and practices that enable teams not just to know what is happening within their applications but also to take meaningful action, no matter what types of applications they deploy or which architectural patterns they adopt. Just as important, enterprise observability means being able to monitor and manage the entire application delivery pipeline and collaborate readily with all stakeholders.

The following pages walk through the meaning of enterprise observability, discuss what it takes to achieve it and explain how the IBM Observability by Instana delivers the full suite of monitoring and observability solutions that teams need to thrive in a fast-moving, microservices-oriented world.

02

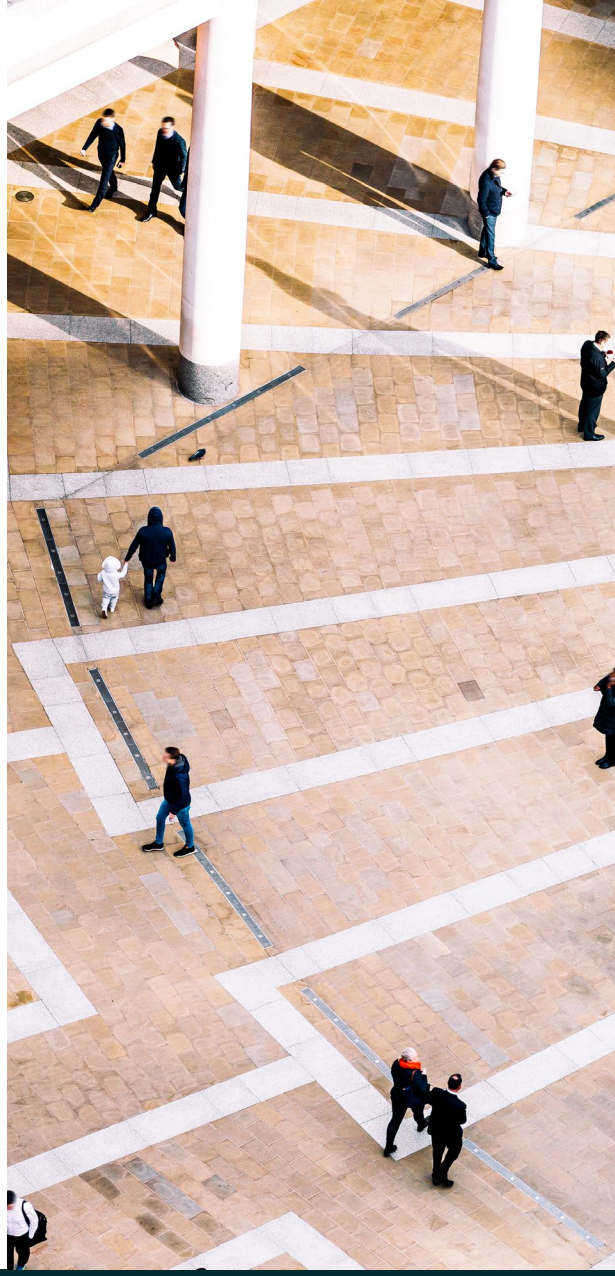
A brief history of monitoring and observability

To understand what enterprise observability means and how it's different from the functionality provided by conventional monitoring and observability tools, you must understand the state of the monitoring and observability landscape over the past decade.

Aware of the new challenges posed by the adoption of microservices architectures and fast-moving continuous integration and continuous delivery (CI/CD) pipelines, most tool vendors have shifted their branding and marketing strategies. They now place more emphasis on the term "observability" and less on "monitoring" to drive home the idea that their solutions do more than just collect data about an application state.

If you peel back the branding, however, it becomes apparent that most solutions haven't evolved significantly from a functional perspective. They still work the same way they did before being rebranded as observability solutions. They can't fully understand the relationships between microservices within a complex, distributed application architecture. They require manual instrumentation and management. Their ability to provide contextual insight into application problems is limited. And they focus mostly on production environments rather than providing visibility across the application delivery pipeline.

In other words, what has changed is the talk surrounding monitoring and observability tooling. For most solutions, the functionality remains fundamentally the same as it was a decade ago.



03 Observability: theory versus reality

To a degree, you can't blame the tool vendors for the marketing strategy they adopted. After all, as APM Experts notes, observability is an ambiguous term, and "every vendor with a solution that might be considered observability tries to define observability in a manner advantageous to them."

It's easy, then, to take an established monitoring solution, put an "observability" label on it and operate under the assumption that whatever the tool does qualifies as observability.

This doesn't mean, however, that there is no such thing as true observability. As APM Experts also explains, an objective definition of observability might be to define it as having "the data that you need (the logs, metrics, traces and dependency maps) for every single unit of work that your application and its underlying system software perform that is of interest to the business." From a technical perspective, that definition gets to the core of what monitoring and visibility tools must be able to do to provide true observability.

At Instana, we'd go further by adding that there is a business element to observability. To achieve complete observability, you need not only the technical ability to track and collect contextual data about every unit of work within your IT environments but also the ability to act on that data in ways that deliver meaningful value for your business. Transparent and observable systems are maintainable only if they are transparent and observable to the teams that rely on them.

Complete observability, then, means pairing technical observability functionality with the processes and collaboration solutions that enable IT and DevOps teams to put that functionality to practical use. This is another juncture where conventional monitoring and observability solutions tend to fall short, despite the branding they apply to themselves.

04 Observability to enterprise observability

So far, we've discussed how the term "observability" tends to be used loosely within the monitoring industry, and what the word means in a fundamental sense. Now, let's take the discussion further by exploring what it means to achieve what we call enterprise observability.

Enterprise observability takes basic observability to the next level. When you have enterprise observability, not only can you monitor individual systems and contextualize data about them, but you can also correlate interactions between discrete applications and systems across your entire IT environment.

More specifically, enterprise observability is founded on several key practices and principles:

- **Systematic optimization.** Enterprise observability focuses not on managing the health and performance of individual applications or systems but rather on optimizing the entire IT environment. To do this, observability systems must be able to map and contextualize interactions between all the resources that exist within a business's IT architecture, even if those resources are loosely coupled and constantly changing.
- **Complete contextualization**. To achieve enterprise observability, every unit of observability data must be delivered with complete context. Teams cannot rely on sampling to make informed guesses about what is happening; they need end-to-end tracing and contextualization of every unit of work.
- **Cloud-native deployment**. Enterprise observability tooling must be able to integrate seamlessly into the cloud-native application environments that it supports. The deployment and instrumentation processes are fully automated.
- **Comprehensive support for data ingestion**. Modern enterprise application environments expose data in various ways. Enterprise observability tools must support all of them. Whether applications expose data as standard output, conventional logs or through open-source monitoring APIs such as OpenTracing, enterprise observability means being able to ingest and contextualize every data source.
- **Observability across the pipeline**. Understanding what is happening within production application environments is not enough to achieve enterprise observability. Instead, teams must be able to monitor and contextualize application behavior starting at the beginning of the CI/CD pipeline and continuing through to deployment. You should not have to wait until a new application release is in production to be able to understand how it interacts with other systems and optimize its behavior.

These are the core areas of functionality that enterprises need in order to optimize the performance of today's highly complex IT environments. Tools that deliver only monitoring and visibility into individual IT units—without the across-the-board contextualization and correlation features described above—simply can't provide the actionable insights that teams need to manage ever-changing, distributed, loosely coupled environments.

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IBM Observability by Instana

IBM Observability by Instana delivers a complete enterprise observability platform that is powered by more than just talk and promises. Using the platform, businesses enjoy specific features that extend far beyond basic monitoring and observability to provide the comprehensive, across-the-board observability that IT and DevOps engineers need to optimize the environments they manage.

Automation
Automation is part and parcel of the Instana experience. Rather than requiring manual instrumentation, Instana automatically discovers new services when they appear within your environment—a critical feature for dynamic, microservices-based architectures where service mappings are constantly changing.

From there, Instana automatically performs automated, robust tracing. Rather than merely sampling service behavior, we provide complete service profiles for every resource within your environment.

Comprehensive, cloud-native data ingestion
With Instana, you need not worry where or how your observability data originates. Instana is cloud-agnostic, with the ability to observe and monitor applications in practically any public cloud environment. It is also fully compatible with containerized applications and those hosted on Kubernetes, regardless of the logging and monitoring architecture they use. It supports the major open-source observability protocols, including OpenTracing, Prometheus and many more. And legacy data sources, such as conventional operating system logs, can be readily ingested into Instana.

What this means is that, no matter which types of applications you're running or how they are designed, IBM Observability by Instana can ingest and contextualize the observability data needed to provide you with actionable insights. What's more, Instana can do this in a way that natively integrates with whichever application architectures you choose to use. There are no complex agents or abstraction layers to deploy and manage. Whether you're managing a traditional application or a fully cloud-native environment, Instana offers a seamless data ingestion process.

Flexible use cases
IBM Observability by Instana is not designed to support observability for just one set of use cases or one domain. It works with whatever type of applications you need to manage. In this way, Instana delivers the comprehensive coverage you need to optimize the performance of your entire IT environment, even if it includes a diverse mix of different types of applications or evolves to include use cases you didn't initially foresee when you established your observability strategy.

In other words, IBM Observability by Instana can provide observability not just for conventional use cases, such as website monitoring and infrastructure monitoring, but also for more complex needs, such as managing serverless functions, mobile applications and containerized applications hosted on Kubernetes. And, again, because the IBM Observability by Instana offers consistent, fully automated instrumentation and data ingestion processes regardless of what your environment looks like, you enjoy the same observability experience whether you're working with heritage applications, cloud-native architectures or a combination of both.

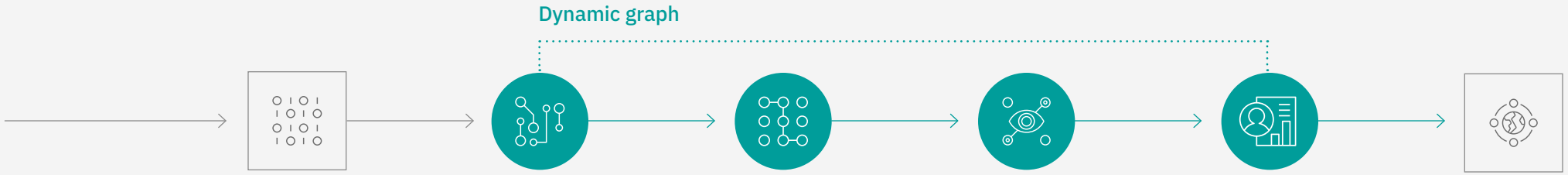
Enterprise ready
Instana is about much more than providing observability in a vacuum. The platform is designed to integrate seamlessly and automatically with the rest of your enterprise IT processes.

You can integrate roles and access for the IBM Observability platform by Instana using the same directory service that you use to manage identities across your IT environment, such as Active Directory or LDAP. You can use Git-based configuration management to integrate into a GitOps workflow. You can also integrate Instana directly with whatever logging and API management tooling you already have in place rather than having to build custom integrations or abstractions.

World-class visualizations
The visualization features of IBM Observability by Instana go far beyond simple graphs and dashboards. Instana provides detailed, real-time maps that allow you to visualize the complex relationships between different components of your application environment and understand how a problem with one component impacts others. This is one way in which Instana provides the rich contextual data you need to achieve true enterprise observability, instead of just monitoring individual components in your environment.

Business analysis
Because enterprise observability is about more than just managing technical data, Instana allows you to collect and contextualize data about business performance and the performance of IT systems. By **mapping information such as sales data to website performance data**, for example, you can ensure that your observability strategy drives real business results, rather than optimizing IT performance for its own sake.

IBM Observability by Instana



Sources
- Cloud providers (IBM, AWS, GCP, Azure)
- Containers
- Kubernetes (GKE, AKS, OpenShift, Rancher, Tanzu)
- OS
- 200+ technologies

Data
- Traces
- Metrics
- Logs
- Events
- Beacons
- Profiles

Collection

Automatic collection
- Auto Discovery
- AutoTrace
- AutoProfile

Open source
- OpenTracing
- OpenCensus
- Zipkin
- Prometheus
- Jaeger
- Micrometer
- StatsD

Cloud providers
- IBM Cloud monitoring
- Amazon CloudWatch
- Google StackDriver
- Azure App Insights

Processing
- Real-time data processing pipeline
- High-cardinality
- Data stores
- Data enrichment and contextualization
- No sampling

Capabilities
- Monitoring
- Troubleshooting
- Analytics
- Dashboarding
- Visualizations
- Alerting
- Anomaly detection
- CI/CD insights
- Root cause analysis
- AIOps

Use cases
- Application performance management
- Monitoring
  - Website
  - Mobile app
  - Application
  - Synthetic
  - Service-level
  - Kubernetes
  - Serverless
  - Infrastructure

Digital business
- Developers
- Dev+Ops teams
- IT ops
- Support
- Site reliability engineers
- Business users

Enterprise readiness

Kubernetes-based self-hosted option | SOC II | Role-based access control | SSO | GitOps | API | Ecosystem integrations | Grafana | Logging integrations

06
Conclusion

It's one thing to talk about observability. Anyone can collect data or monitor application state and claim to be delivering observability. It's quite another thing to achieve true enterprise observability. Enterprise observability requires a comprehensive observability solution that can ingest data from any source, contextualize each data point and correlate it with other resources within the IT environment. It also requires the ability to do all of this automatically, without forcing teams to instrument their observability tools manually or rely on inefficient abstraction layers to bridge the gap between traditional environments and cloud-native ones.

IBM Observability by Instana delivers the holistic set of features that IT and DevOps teams need to build a true enterprise observability strategy.

Learn more about the platform →

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About Instana, an IBM Company

Instana, an IBM Company, provides an **Enterprise Observability Platform** with **automated application performance monitoring** capabilities to businesses operating complex, modern, cloud-native applications no matter where they reside—on premises or in public and private clouds, including mobile devices or IBM Z® mainframe computers.

Control modern hybrid applications with Instana's AI-powered discovery of deep contextual dependencies inside hybrid applications. Instana also provides visibility into development pipelines to help enable closed-loop DevOps automation.

These capabilities provide actionable feedback needed for customers as they optimize application performance, enable innovation and mitigate risk, helping DevOps increase efficiency and add value to software delivery pipelines while meeting their service-level and business-level objectives.

Learn more →

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Produced in the United States of America
April 2021