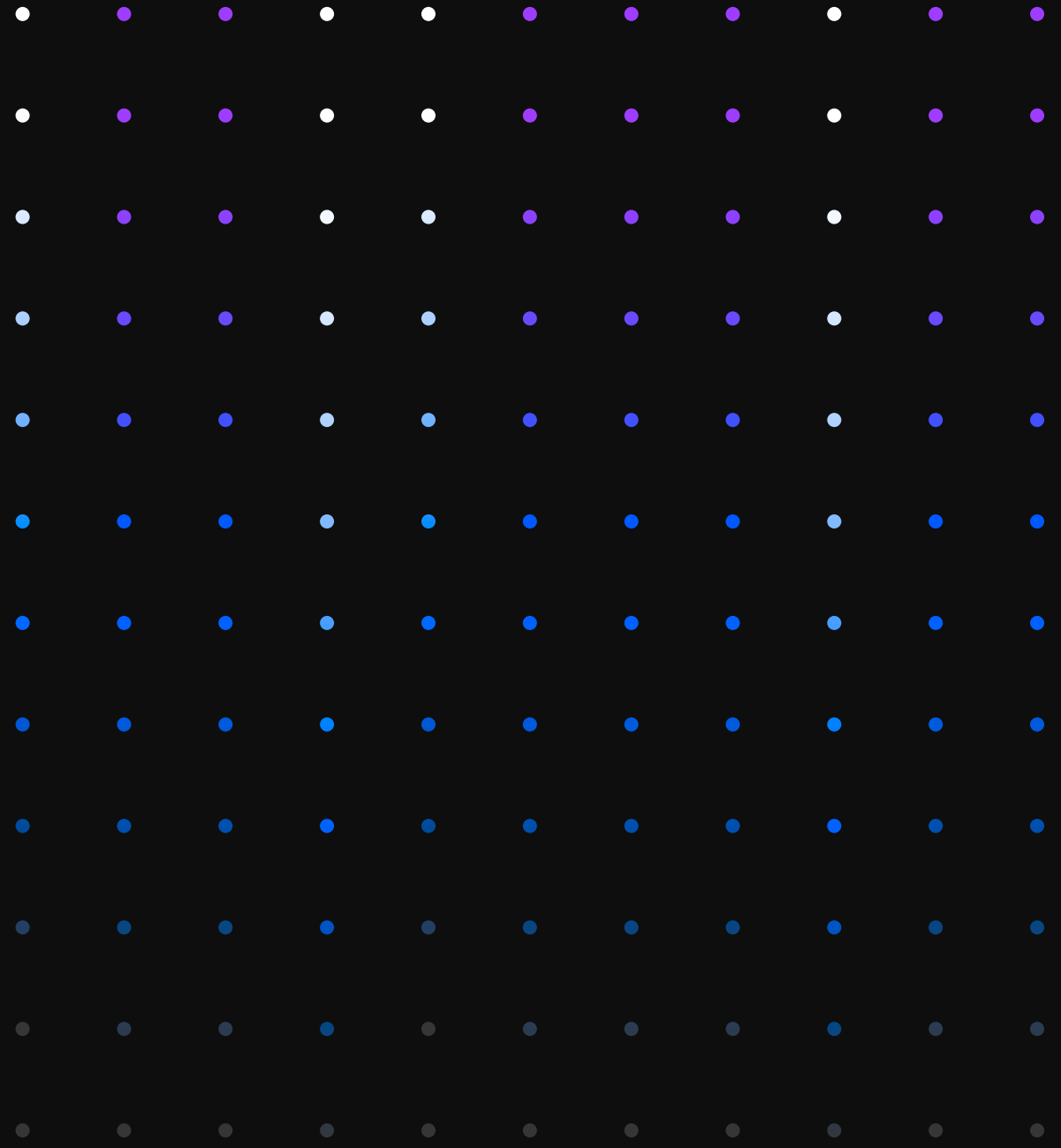
Smarter AIOps

Put AI-powered automation
to work in your business to help
assure application performance

Start here →



IBM

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Why AIOps?

Every business wants to save time and reduce costs, using resources as efficiently as possible while delivering exceptional customer experiences. Your success depends on application performance and availability, so having full visibility into the health of your application environment is invaluable. But with the rise of cloud-based applications, the modern IT environment has become more operationally complex, with faster application development lifecycles and complicated interdependencies between applications, services and their underlying containers, virtual machines (VMs), cloud resources, servers, storage and networking. As a result, IT operations (ITOps) teams are often bogged down reacting to alerts and resolving incidents.

So, how do organizations simplify decision-making and allocate application resources more intelligently to assure optimal app performance? Most businesses already have some level of application monitoring in place, but that's only the beginning. To really simplify ITOps, you need tools that can automate trusted decisions at scale and reduce the need for manual human intervention.

Automation is the endgame that helps eliminate the resource problems that cause inconsistent application performance.

In a 2021 Forrester study, increased visibility into application performance reduced time to fix application issues by 75%.[1]

The appeal of AIOps

Many businesses already use application performance management (APM) solutions for monitoring. However, these tools need to evolve to provide more granular observability and close incidents faster. Application resource management (ARM) solutions allocate resources to applications in these dynamic environments, helping ensure that the supply of IT resources can meet the demand for optimal application performance.

To assure application performance, organizations are employing AIOps—artificial intelligence for IT operations. AIOps helps you detect patterns and anticipate application performance issues before they affect users. As a result, an AIOps-driven approach delivers faster problem diagnosis and smarter resource allocation in hybrid and multicloud environments, freeing up your IT teams to focus on innovation.

Bringing together application performance and resource management

What differentiates AIOps is the combination of APM and ARM solutions to simplify IT operations. ARM solutions can automate decisions, taking into consideration the dependencies between application demand and infrastructure utilization. Integrating the two allows you to take full advantage of your cloud environment without overprovisioning, helping you reduce operational costs while boosting productivity. It's smarter AIOps—bringing APM and ARM together to address performance issues before they impact users.

Where are you on the journey to AIOps?

If you need more visibility into your application environment, implementing an observability solution like IBM® Observability by Instana® APM can help you monitor the full application stack in a cloud environment. If you need to manage application resources in a dynamic environment, Turbonomic Application Resource Management for IBM Cloud® Paks can help you match application demand to supply without overprovisioning.

Wherever you are in your AIOps journey, faster decision-making and smarter resource allocation are critical to achieving AIOps maturity, as shown in Figure 1.

Learn more about AIOps →

The ITOps maturity curve

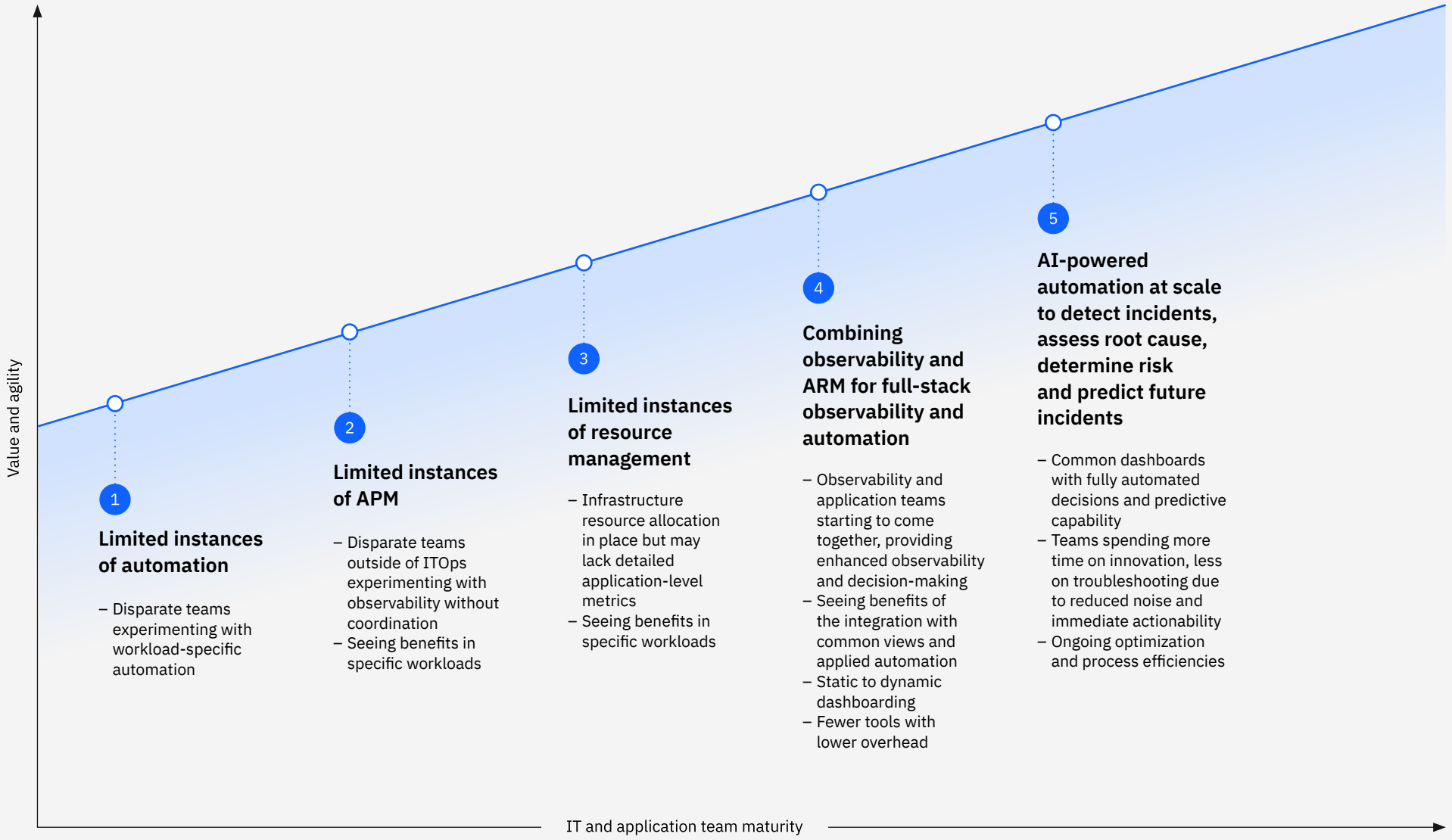

Figure 1. The ITOps maturity curve

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Accelerate decision-making with enterprise observability

The challenge
Incident prevention is the gold standard for every business. The promise of full automation is that application performance issues could be resolved with machine learning (ML) or AI, without human intervention. But let's be honest: in most application environments today, it's not a matter of if incidents will happen but when.

Cloud-native environments are characterized by rapid application development cycles and complex interdependencies between applications and microservices. Identifying and addressing application performance issues in such environments has become cumbersome for IT teams, and they're suffering from incident fatigue. That's why full-stack observability across the entire IT environment is critical.

Questions to consider
- Does your organization have access to all the application performance and infrastructure data that could impact the health of your applications?
- Can you see the dependencies between application components and the IT environment?
- Do you see every transaction, and can you trace its flow through your services?

To address these questions, businesses need automated, full-stack visibility of the application environment with no manual instrumentation—in other words, enterprise observability.

Dealerware reduced delivery latency in its fleet management solution for automotive retailers by 98%—from 10 minutes to 10–12 seconds—with Instana.[2]

Key use cases
Detect app performance problems before production.

To iterate faster, developers need to automate each step of the application development cycle. Finding potential issues early in the development of a feature can prevent long rebuilding cycles. Automated regular load tests help create short feedback loops and early validation of models. With continuous delivery, it's critical to quickly recognize failure situations, find the root cause and apply the fix. Then the pipeline can kick off with build, test and deployment of the new version in production.

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Accelerate decision-making with enterprise observability

Cut through incident noise.

Site reliability engineers (SREs) look for outliers and anomalies in application metrics to investigate, but sometimes IT teams need to answer questions from a bird's-eye view. Using custom dashboards for infrastructure metrics, teams can compose a set of statistically relevant aggregations on any dimension and slice of components. Then, they can combine those broader aggregations with application-specific metrics. These metrics may include transaction rates or response times to get an in-depth understanding of how things like garbage collection times or physical memory usage may influence the overall application performance.

Debug tools in development and production.

When a deployment fails or a new version behaves erratically, it's critical to respond quickly, either by rolling back to an older version or finding a fix. Teams can be overwhelmed with irrelevant alerts, notifications and data. Developers and SREs need a personalized platform, including the most relevant service and infrastructure maps, dashboards, alerts, traces, profiles, incidents and even analytics for their tasks.

The solution

IBM Observability by Instana APM is an end-to-end enterprise observability solution that helps automate APM—especially for cloud-native applications. It contextualizes information to help IT teams and quickly resolves issues.

What sets Instana apart?

- *Automation:* Automates discovery of new services and infrastructure components in real time, which means less manual work for developer and ITOps teams
- *Contextualization:* Provides always-available context for how each component of the application stack works together, with ready-to-use dashboards that quickly navigate from application to platform to infrastructure
- *Intelligent action:* Offers an AI-assisted analytics engine that correlates events for root cause determination, enabling faster, more accurate decision-making

APM solutions like Instana can also fuel your ARM system with quality data. Applications don't run in a vacuum. To get a true picture of application health, you need to monitor not just application performance but also the underlying infrastructure and IT resources.

When combined with a solution like Turbonomic ARM for IBM Cloud Paks, Instana can help applications get the resources they need to optimally perform and deliver target response times and throughput. Turbonomic and Instana bring together full-stack observability, analytics and smarter resource management to help organizations drive better application performance.

German healthcare technology company Vivy reduced mean time to repair (MTTR) for its virtual health assistant application by 66% using Instana to discover and trace requests, automate root cause analysis and provide full visibility into its application environment.[3]

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Accelerate decision-making with enterprise observability

How Instana addresses the use cases
What do practitioners need to know about automating the delivery of APM and application context to DevOps teams? Instana helps you optimize application performance and the application delivery process.

Detect application performance problems before production.

Once you install the Instana agent, there's no manual instrumentation or configuration required. Whether you have monolithic applications on premises or microservices running in Kubernetes-orchestrated containers on a hybrid cloud, Instana can discover the data and put it into context.

Cut through incident noise.

Instana's dashboard, as seen in Figure 2, is organized around four SRE golden signals: traffic, saturation, errors and latency. With just a click or two, you can get to the exact location and cause of the issue and find suggested remediations. In addition, AI continually generates and adds to the baseline, which also serves to reveal anomalies against a dynamic baseline—not just an arbitrary cutoff. The Application Perspectives feature helps users organize information into the exact visualizations and context they need for the applications and services they're responsible for—and nothing else.

Debug tools in development and production.

Instana traces every request with no sampling, and it pulls data with one-second granularity.

Summary
The best APM solutions provide a fuller picture of your application environment, putting data in context and automating application monitoring. Armed with the best application performance data, teams can take intelligent action and deliver software faster.

With Instana's broad range of capabilities, many businesses are achieving true enterprise observability and accelerating decision-making to improve application performance. When combined with an ARM solution like Turbonomic, Instana can help you take advantage of smarter AIOps to automate resourcing decisions, informed by application metrics and infrastructure awareness.

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Accelerate decision-making with enterprise observability

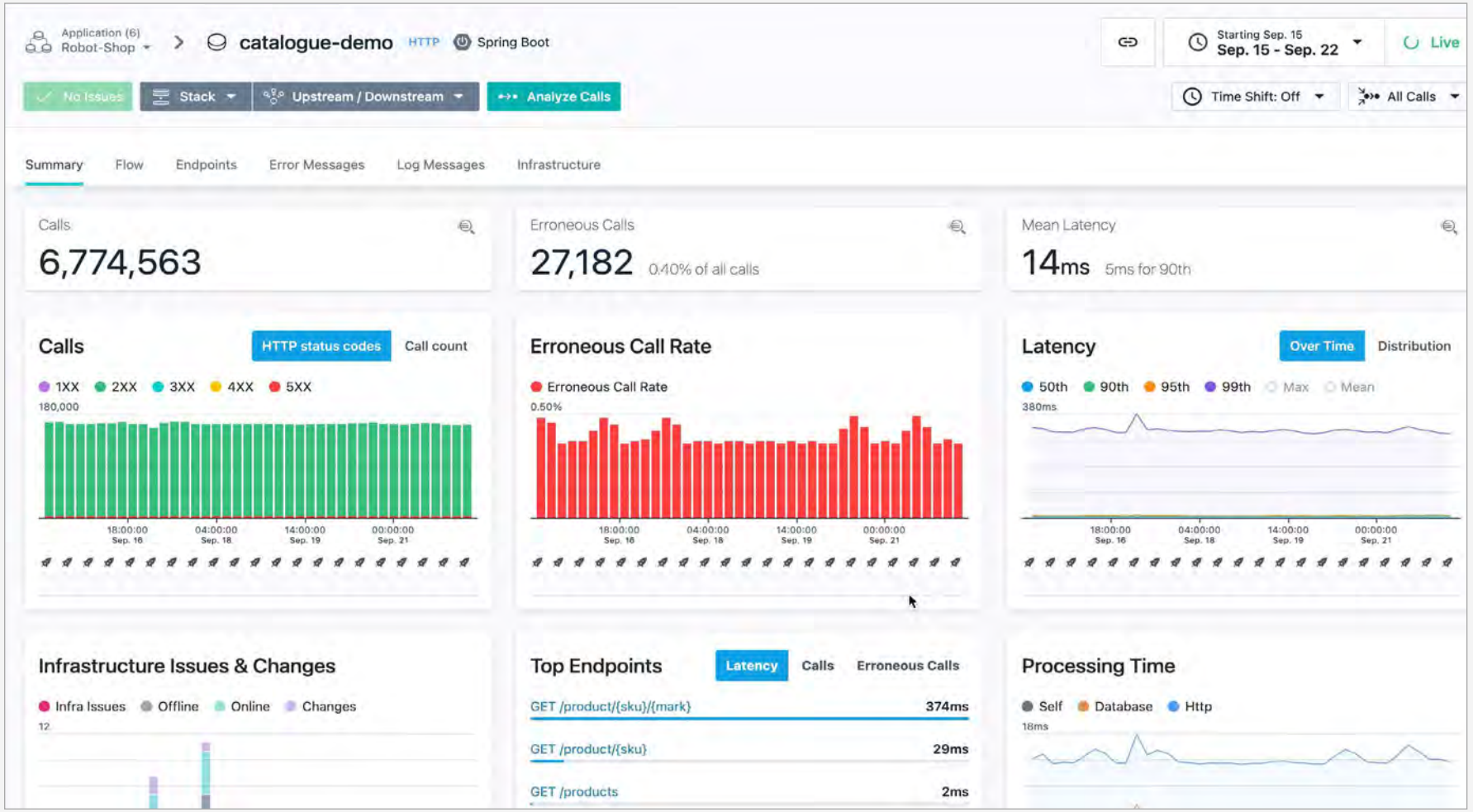

Figure 2. Instana dashboard view

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Improve application performance with dynamic resource management

The challenge

Application performance depends on the availability of underlying resources—containers, virtual machines (VMs), servers, storage,networking and so on. To assure application performance, you need intelligent resource management. ARM helps IT teams to optimally manage the allocation of resources to applications across the IT environment.

Questions to consider

- Do your existing, or future, IT or cloud monitoring tools provide a comprehensive but simple view of your hybrid cloud environment?
- When a user reports an application slowdown, can you quickly identify the root cause and the action to resolve the performance issue?
- Can you trust the recommendations provided by IT monitoring tools for eliminating application performance issues?

Key use cases

Understand the full breadth of your application-to-infrastructure relationship.

In hybrid and multicloud environments, where complex interdependencies exist between applications, services and infrastructure components, dynamic resource allocation is critical. Businesses need an ARM solution that has the power to not only understand the hybrid cloud environment but auto-mate decision-making to optimize resource usage with trusted actions.

Intelligently utilize resources.

You don’t need to create a “security blanket” by overprovisioning to avoid application performance issues. You don’t need to sacrifice performance to save money, either. The performance objective is decision automation with trusted actions for resource management—not just process automation. Reactive and single-resource monitoring tools often fail to comprehend the relationship between applications and infrastructure and, therefore, they rely on manual interpretation and intervention to minimize resource congestion. This manual effort can result in increased MTTR, decreased customer satisfaction and loss of revenue.

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Improve application performance with dynamic resource management

The solution

Turbonomic Application Resource Management for IBM Cloud Paks is an ARM solution that helps to assure applications get the resources they need when they need them. Turbonomic provides visibility, insights and actions at every layer of the application and infrastructure stack without the need for human intervention.

Turbonomic continuously matches application demand to multicloud infrastructure resources to simultaneously optimize performance and utilization. IT teams can use Turbonomic to automatically execute actions when they're generated, before application performance is negatively impacted. This approach keeps the applications in their best state and helps ITOps teams focus on innovation rather than troubleshooting.

What sets Turbonomic apart?

- *Visibility:* Integrates with APM systems like Instana and retrieves application entities as a business application, business transaction, service and application component. Once discovered, infrastructure dependencies, risks and actions are correlated back to the application bridging the gap between application and infrastructure teams. Turbonomic then determines which resources contribute to user response time and throughput and takes action to avoid contention.
- *Insights*: Allocates resources intelligently, maintaining the target user response time and experience for your applications while respecting configuration policies and minimizing waste.
- *Action:* Produces trustworthy actions by matching application demand to infrastructure supply using multidimensional key performance indicators. Customers can automate Turbonomic actions at scale for on-premises virtualized, public cloud and Kubernetes environments.

Turbonomic takes a different approach and generates actions, not recommendations, that are executable in real time to assure that congestion is eliminated at every layer of the stack while assuring application performance.

How Turbonomic addresses the use cases

Turbonomic presents a consolidated view of the target environment's resources and associated applications, runs real-time analytics, executes actions and even automates decisions to address issues and give ITOps teams more time to innovate.

Understand the full breadth of your application-to-infrastructure relationship.

To optimize the hybrid cloud estate, Turbonomic builds a comprehensive view, discovering entities across disparate environments and bringing them under a common data model. It abstracts away the limitless details while providing a useful representation to help IT teams manage the application environment.

When Turbonomic is deployed into your hybrid estate, it uses the APIs of the targeted environments, discovers all the entities in those targets and builds out a "supply chain." It stitches together all the entities from the top-level business application down through the supporting infrastructure.

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Improve application performance with dynamic resource management

The Turbonomic dashboard navigation, which is on the left side of the user interface (UI) in Figure 3, shows the relationships among business application components and their supporting infrastructure components. The main area in the center of the UI shows key performance metrics, from both an infrastructure and business point of view. The dashboard give your ITOps team full-stack visibility into your company's entire hybrid cloud environment. In this example, Turbonomic is consolidating data from several environments:

- Business applications from Instana, as well as their associated transactions, services and application components
- Containers, pods and nodes, represented as VMs, from any Kubernetes environment, whether on premises or in the cloud
- VMs and storage from on premises environments like VMware vCenter Server and public cloud environments like Amazon Web Services (AWS) and Microsoft Azure
- Physical hosts, storage and network

Many more targets are available in Turbonomic. And you don't have to install any agents because Turbonomic discovers these entities automatically using the APIs of technologies like Instana, Kubernetes, VMware, AWS and Azure.

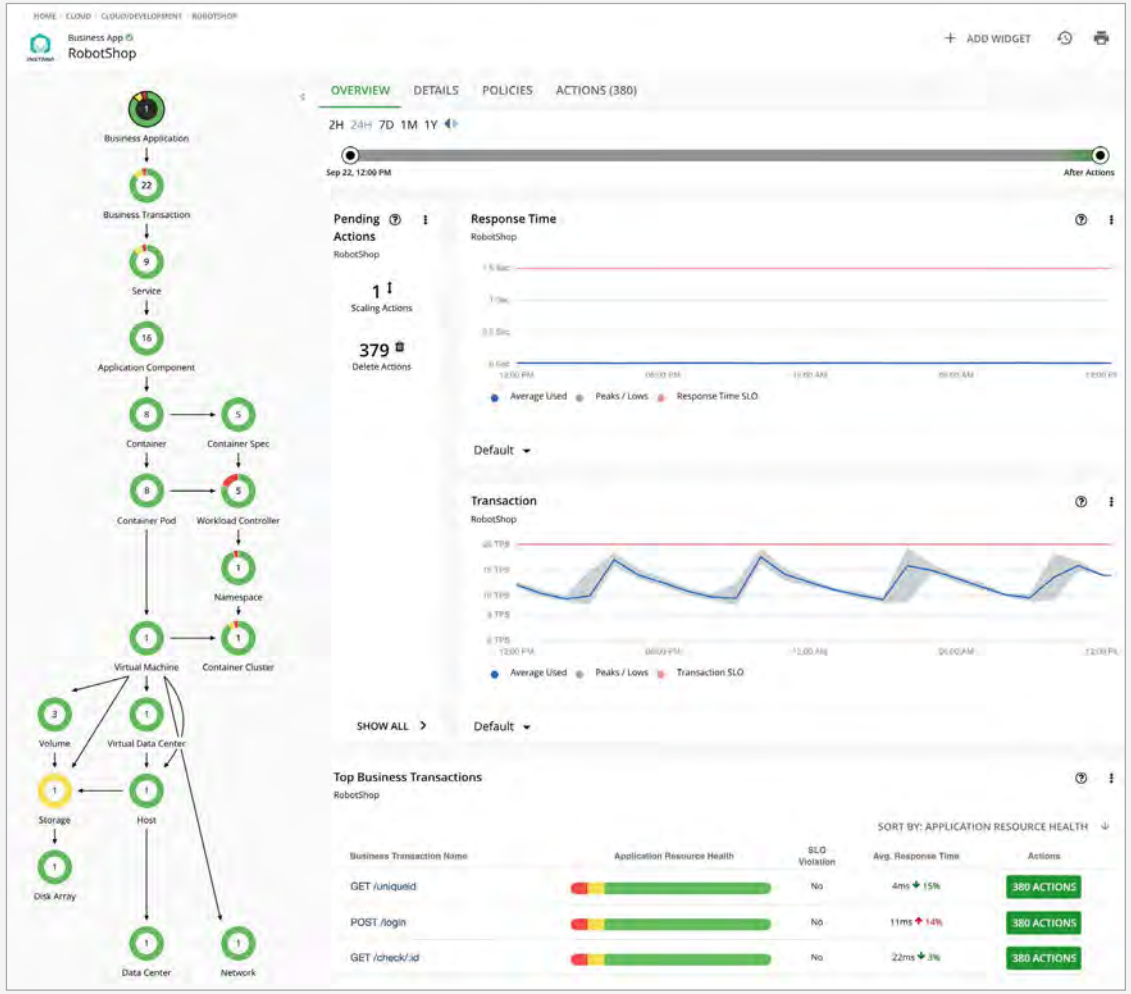

Figure 3. Turbonomic dashboard view

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Improve application performance with dynamic resource management

Intelligently utilize resources.

While automatic discovery of the hybrid estate is powerful, the real-time decision engine is what provides the analytics that guide resourcing decisions. Based on an economic model that matchesapplication demand with resource supply, Turbonomic allows the entities to decide for themselves how they should be resourced. This capability helps assure that resources aren't overprovisioned or undersized, which could lead to service-level agreement (SLA) violations, inefficient manual troubleshooting and continuous resource adjustments.

For scaling containers, Turbonomic uses percentile calculations to measure virtual CPU and virtual memory utilization for requests and limits, and to drive scaling decisions that improve overall utilization and reduce cost for cloud VMs. In the example shown in Figure 4, Turbonomic is pulling in container memory metrics from Instana.

When you examine the details for a pending scaling action on a container, you'll see charts that highlight virtual CPU and virtual memory utilization percentiles for a given observation period, as well as the projected percentiles after you execute the action.

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Improve application performance with dynamic resource management

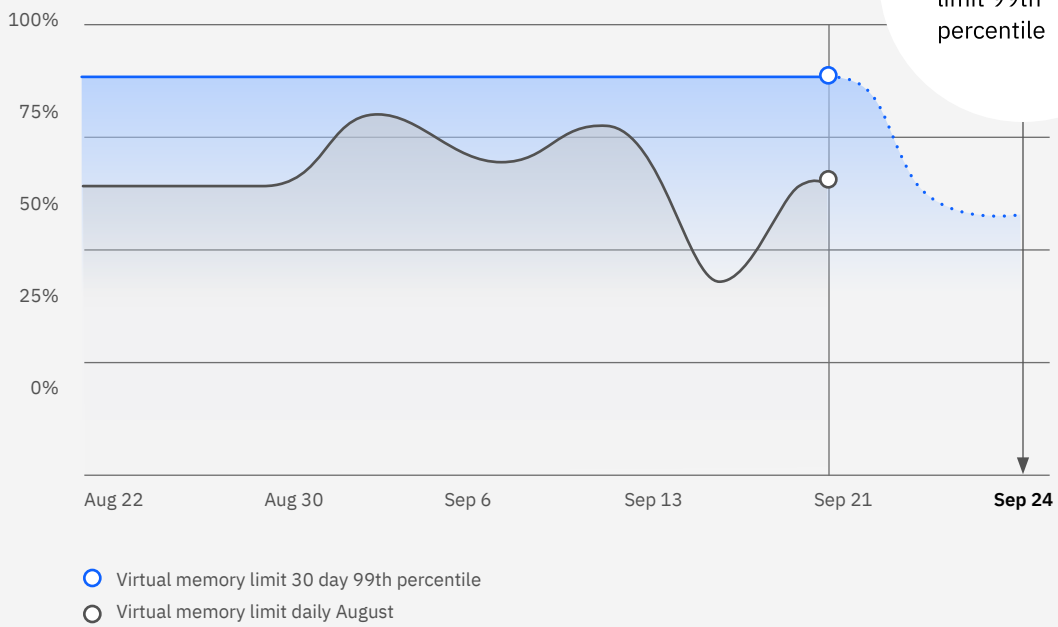
Turbonomic's aggressiveness setting is in the 99th percentile with an observation period setting of 30 days, which means, that, in this example, shown in figure 4, Turbonomic shows that the virtual memory limit percentile utilization was below 87% for 99% of the time over the last 30 days. Because this percentage is above the current setting for the desired state of 80%, there's an action to resize up the virtual memory limit. As Figure 4 shows, after this scaling action is executed, the virtual memory percentile utilization is projected to be below 69.6%.

Summary

Turbonomic is a dynamic ARM solution designed for today's dynamic hybrid and multicloud environments. Its comprehensive set of capabilities can help businesses optimize resourcing decisions to assure application performance without waste or overprovisioning. When combined with APM solutions like Instana, Turbonomic delivers smarter resource allocation informed by application performance metrics.

Example: Automated resource management of virtual memory
Virtual memory limit utilization is below 87% for 99% of the time over the 30-day observation period.

Analysis: Virtual memory usage over last 30 days



Result: Optimized virtual memory allocation based on actual usage

87%–512 MB → 69.6%–640 MB

Figure 4. Container memory utilization in Turbonomic

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Get started with smarter AIOps

As businesses continue to undertake rapid digital transformation, expanding the use of automation in the enterprise is the next frontier. IT automation helps ensure that your applications and infrastructure are always performing, customers never have to wait and your IT resources are being used efficiently. The starting point is full-stack visibility of your hybrid cloud environment, combined with powerful, dynamic resource management. Together, the best APM and ARM solutions can help you bring smarter AIOps to your enterprise.

What organization isn't eager to prevent more IT incidents, respond faster when issues occur and optimize resource utilization and costs? An AIOps-driven approach helps you do all thatand more—so you can be smart and proactive in your IT operations, delivering exceptional customer experiences while improving application performance.

Take the next step

Every business is unique. Whether you're just beginning to explore how automation, APM or ARM can help your organization, or ready to implement AI-powered automation at scale, IBM can meet you where you are and help you take the next step on the AIOps journey.

Does your business need better full-stack visibility into your application environment?

Want to automate and simplify resource allocation decisions in real time?

Ready to bring APM and ARM together for predictive AIOps?

In combination, Instana and Turbonomic can deliver full-stack observability, analytics and self-driving application resource management through automated, application-driven resourcing decisions. In fast-moving, hybrid, multicloud and cloud-native environments, this AIOps-driven approach is transformative, helping you bring cutting-edge automation technology to work in your business.

Turn insights into action with smarter AIOps.

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2 Top-of-the-line performance in fleet management, IBM.com, July 2021. ibm.com/case-studies/dealerware
3 Introducing your digital healthcare assistant, IBM.com, April 2021. ibm.com/case-studies/vivy

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 clients 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 and business-level objectives.

About Turbonomic, an IBM Company
Turbonomic, an IBM Company, provides application resource management (ARM) software used by customers to help assure application performance and governance by dynamically resourcing applications across hybrid and multicloud environments. Turbonomic network performance management (NPM) provides modern monitoring and analytics solutions to help assure continuous network performance at scale across multivendor networks for enterprises, carriers and managed services providers.