

Achieve operational efficiency
through end-to-end
Azure observability

OPERATIONAL
EXCELLENCE

The background features a hexagonal grid pattern. A hand is visible, pointing towards a target icon (a bullseye with an arrow) located in one of the hexagons. Other hexagons contain various icons: a shield with a checkmark, a rocket, a gear with an upward arrow, a checkmark with a gear, and a group of people.

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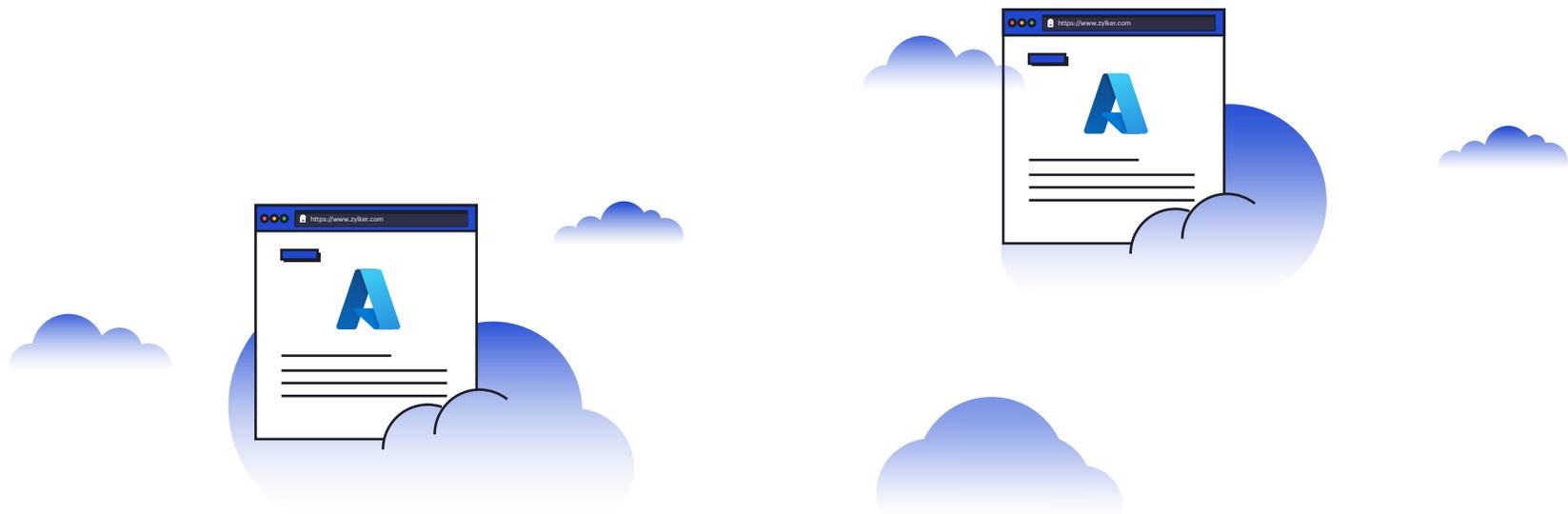
Introduction

In a dynamic landscape of cloud computing, enterprises operating on Microsoft Azure often find themselves struggling with a crucial challenge to tackle—the lack of visibility or, worse, siloed visibility into their Azure cloud ecosystems. According to the "Enterprise public cloud platform and infrastructure service usage worldwide 2017-2023" report from Statista, about 75% of enterprises are running on Microsoft Azure, increasing their market share amongst the global cloud services by 2% since 2022 and contributing to an overall cloud expenditure of \$270 billion.

Azure provides over 200 services and over 90 compliance offerings, which makes tracking availability, configuring changes, troubleshooting operational issues, and managing cost a complex challenge for an organization. As enterprises transition their critical workloads to the cloud, the complexity of Azure's diverse services, coupled with the increased volume of the distributed microservices, poses a hurdle to obtaining a holistic understanding of the Azure deployment's health, efficiency, and potential setbacks in the performance, hindering the possibility of an observable environment.

Microsoft Azure defines observability as the ability to understand what's happening inside a system by looking at the output data. The most significant outputs among them are called the three pillars of observability: logs, metrics, and traces. As businesses mature, their quest for holistic observability platforms will force them to look beyond these three pillars and seek additional parameters from which to track, monitor, correlate, and derive insights, including compliance, events, security, and cost management. This more comprehensive approach to observability will help organizations adapt to the ever-changing competitive landscape.

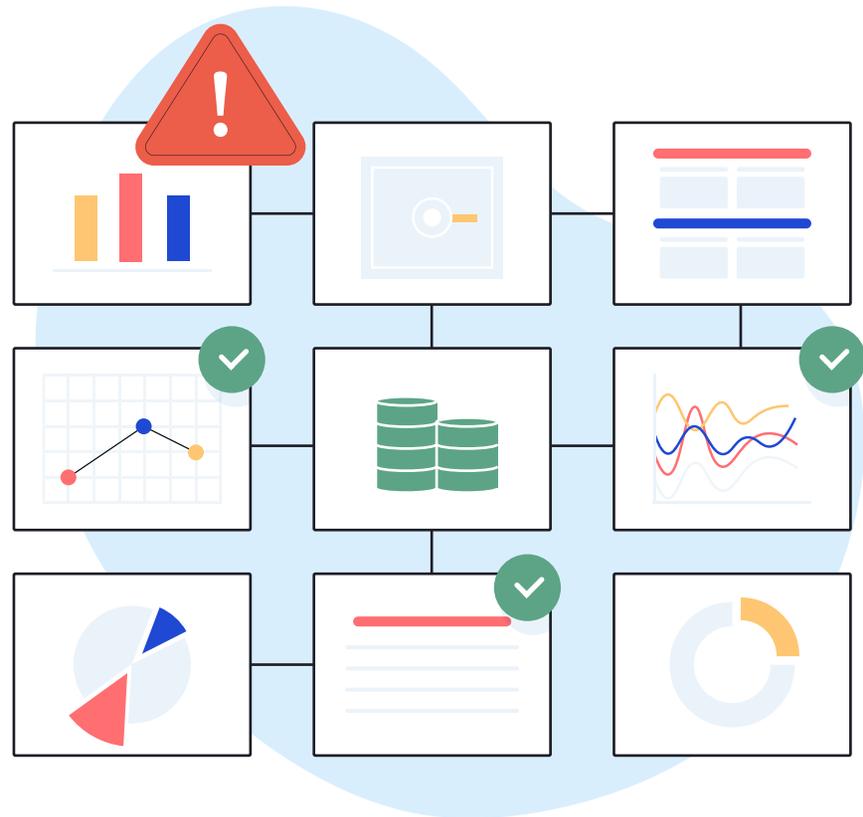
Note that whenever we mention the observability bubble, we assume organizations have elaborate setups with streamlined workflow and instrumented applications using distributed tracing and structured logging. But in reality, observability is a faraway concept in most business organizations. Businesses might not know that the path to observability often starts with monitoring tactics. Most often, it begins with Azure's native monitoring tool, and later, as the organization scales, it is extended to observable strategies based on the organization's specific needs and requirements.



Challenges

As distributed microservices in the cloud architecture increase and infrastructure stacks evolve, the difficulty of accurately identifying and troubleshooting issues also increases.

In the case of Azure, one of the most sought-after public clouds, if observability strategies like performance monitoring, metric tracking, log collection, tracing, anomaly detection, and event correlation aren't in place, then managing your Azure environment can be a challenging feat. The sprawling nature of cloud environments, diverse Azure services, and the dynamic nature of modern applications are roadblocks to achieving comprehensive visibility.



Complexity of the infrastructure

One of the most challenging hurdles to overcome is the complexity of the infrastructure and, following it, the lack of visibility. Businesses migrating from on-premises to cloud environments, and further transitioning from Infrastructure as a Service (IaaS) to Platform as a Service (PaaS) and Software as a Service (SaaS) models, face various challenges including data transfer complexities, integration hurdles, monetary expenses, multi-environment issues, scalability, security concerns, management overhead, and vendor lock-in risks.

Moreover, while Microsoft Azure offers robust monitoring and observability tools, limitations such as service coverage gaps, granularity issues, cross-service visibility challenges, and constraints on third-party integrations can hinder effective monitoring and management efforts.

Achieving observability requires more than just traditional monitoring tools. It involves understanding complex, distributed systems, tracking microservices, and processing large volumes of telemetry data. Attaining complete visibility to understand system behavior and performance can pose a significant challenge.

Lack of visibility

Azure cloud environments are inherently distributed and dynamic, with resources being created, modified, and deleted frequently. Monitoring these resources in a holistic view to detect and address performance issues, anomalies, and security threats would be a challenge. Observing the interactions between these services, tracing requests, and identifying performance bottlenecks while maintaining accurate inventories and dependencies can be difficult in a distributed environment.

Hybrid environment

Many organizations use Azure alongside other cloud providers or on-premises infrastructure. Observing the entire environment, including these hybrid setups, can be tricky. While there are similarities between on-premises and cloud monitoring techniques, the cloud offers superior scalability and manageability, along with a lower total cost of ownership. However, it is undeniable that monitoring in the cloud requires different skills, tools, and processes than on-premises monitoring, particularly when it comes to achieving observability across critical components, including data synchronization, user management, costs, VM and service provisioning, and security.

Scaling of resource

Apart from tackling hybrid setups, Azure environments are known for scalability. Scaling resources efficiently and effectively is crucial for meeting changing demand. Monitoring the dynamic scaling of resources directly impacts the cost spent on Azure cloud; this, coupled with the sprawling infrastructure of cloud environments, further compounds the difficulty of gaining real-time insights into performance and behavior. Traditional monitoring tools may struggle to keep pace with the scale and complexity of Azure deployments, leading to potential blind spots that can impact the overall reliability and performance of applications.

Resource Monitoring

The next significant challenge is Security. When enterprises initially leveraged the cloud as an infrastructure, they migrated their testing/development activities to the cloud. They maintained a secure bubble on-premises for the operation of their

mission-critical applications. However, the next stage of digital transformation has prompted businesses to transition all their mission-critical applications to the cloud. The transitioned data contain sensitive information, and it is important to protect them.

While cloud providers do offer strong security measures, even simple misconfigurations by operators/administrators can lead to a variety of cybersecurity threats like unauthorized access and data breaches. Enterprises that undergo cloud transition depend on prevention-only techniques to mitigate security threats. However, any prevention technique needs to be complemented with additional detection and response techniques to uncover early signs of security anomalies and deviations from expected behavior.

Cost and pricing

In addition to all of the challenges mentioned above, a pivotal point to assess would be the cost and expense factor. Cloud costs have been accelerating for years, even to the extent of rendering organizations bankrupt. Industry leaders recognize that finding a sustainable approach to reduce mounting cloud costs is essential for building a stable business foundation.

Leading enterprises, including Netflix, X, and Airbnb, have publicly announced their intentions to cut cloud costs. Companies may struggle to keep pace with the constant updates, new features, and best practices, leading to gaps in their understanding of how to optimize and secure their Azure infrastructures. It is challenging to keep track of usage and expenditure, especially when resources are dynamically scaled up or down. As a consequence, these organizations face a range of challenges that can result in unnecessary costs, unplanned service interruptions, and sub-optimal end-user experiences.

Apart from finding a solution to cater to the observability criteria, organizations should double up in building a powerful observability solution that caters to the ever growing needs of the rapidly scaling Azure cloud platform. Building a robust observability tool involves getting the most out of your Azure observability strategy, and it requires finding ways to extend your already existing Azure monitoring tool to augment and indulge in elevating an ecosystem rather than confining the capabilities to specific requirements.

Varying requests and demands of the organizations

Azure continually evolves with new features and services. It is important to understand the cloud expectations better to harness the complete potential of your observability strategies to ensure that your organization stays on par with the platform's advancements. This knowledge allows you to adapt your observability strategy to take advantage of new capabilities and best practices, promoting continuous improvement in monitoring and performance optimization. The challenges inherent to the Azure platform necessitate advanced strategies, and an observability solution is expected to fulfill the varying requests and demands of the organizations.

Consider a fictional use case on a company named Zylker, a fast-growing e-commerce platform that has leveraged Azure as its host. Zylker has utilized various Azure services to maximize the benefits of the cloud. Since there is a constant need in the e-commerce industry to deliver a flawless digital experience, it needs a solution that can do more than just monitor. Zylker requires a proactive tool rather than a reactive tool.

Zylker has leveraged an array of Azure's resources: Azure VMs and web apps to host core web applications and scalability, Azure CDN profiles for delivering content related to product images and video, Azure SQL for user data management, and Azure Functions for serverless computing and automation processes. Azure machine learning for providing personalized recommendations. Apart from utilizing the Azure cloud's services, Zylker has also leveraged Google Cloud and on-premises setups for some of its operations.

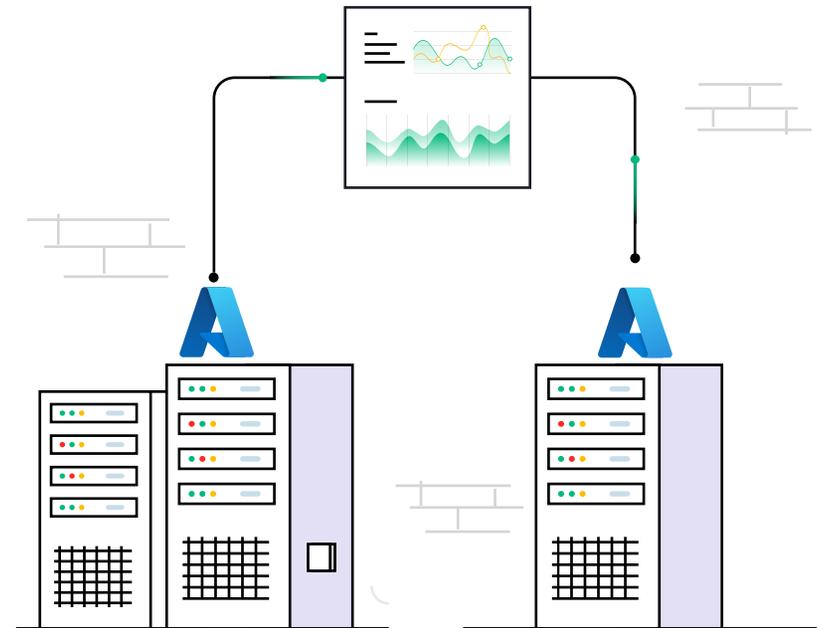
As an enterprise, it faces various challenges in its observability goals due to several blind spots, including lack of visibility, sudden traffic spikes, VM scalability issues, and poor visibility on performance and user experience monitoring aspects. All these factors can affect Zylker's functioning and its goal to deliver a seamless user experience.



Key attributes of a modern observability solution

To address these challenges, an effective observability solution in Azure must offer a unified view of the entire environment, entailing aggregating data from diverse sources, such as metrics, logs, and traces, into a centralized platform—a solution that not only solves challenges but also predicts and overcomes these same problems when they recur.

Any tool should be adept enough to communicate between the various layers of Azure architecture, namely, infrastructure, databases, and applications, to understand the bottlenecks in interoperability. It should offer granular insights into the logs, metrics, and traces of each component of the ecosystem including applications, storage, and VMs supported in cloud, hybrid-cloud, and multi-cloud infrastructures with high interoperability. In the case of Zylker, a customer-facing platform, it is important to gauge indicators for improved customer experience by monitoring uptime, conversion rates, and user behavior.



Apart from matching the observability criteria, the tool should adapt to the growing demands of FinOps and security standards. It should analyze data to identify potential security vulnerabilities, offering recommendations to fortify the system against threats. Additionally, the tool should provide visibility into resource consumption and expenditure, offering cost optimization suggestions by identifying unused or underutilized resources.

This multifaceted approach ensures that users not only gain a clear understanding of their system's performance but also receive actionable guidance on enhancing security posture and managing costs efficiently, inching away from the conventional ideas of monitoring and closer to an all-encompassing approach to observability.

By integrating security and cost optimization insights, the observability tool becomes an invaluable asset in achieving a holistic, well-rounded approach to system management, aligning with modern IT goals.

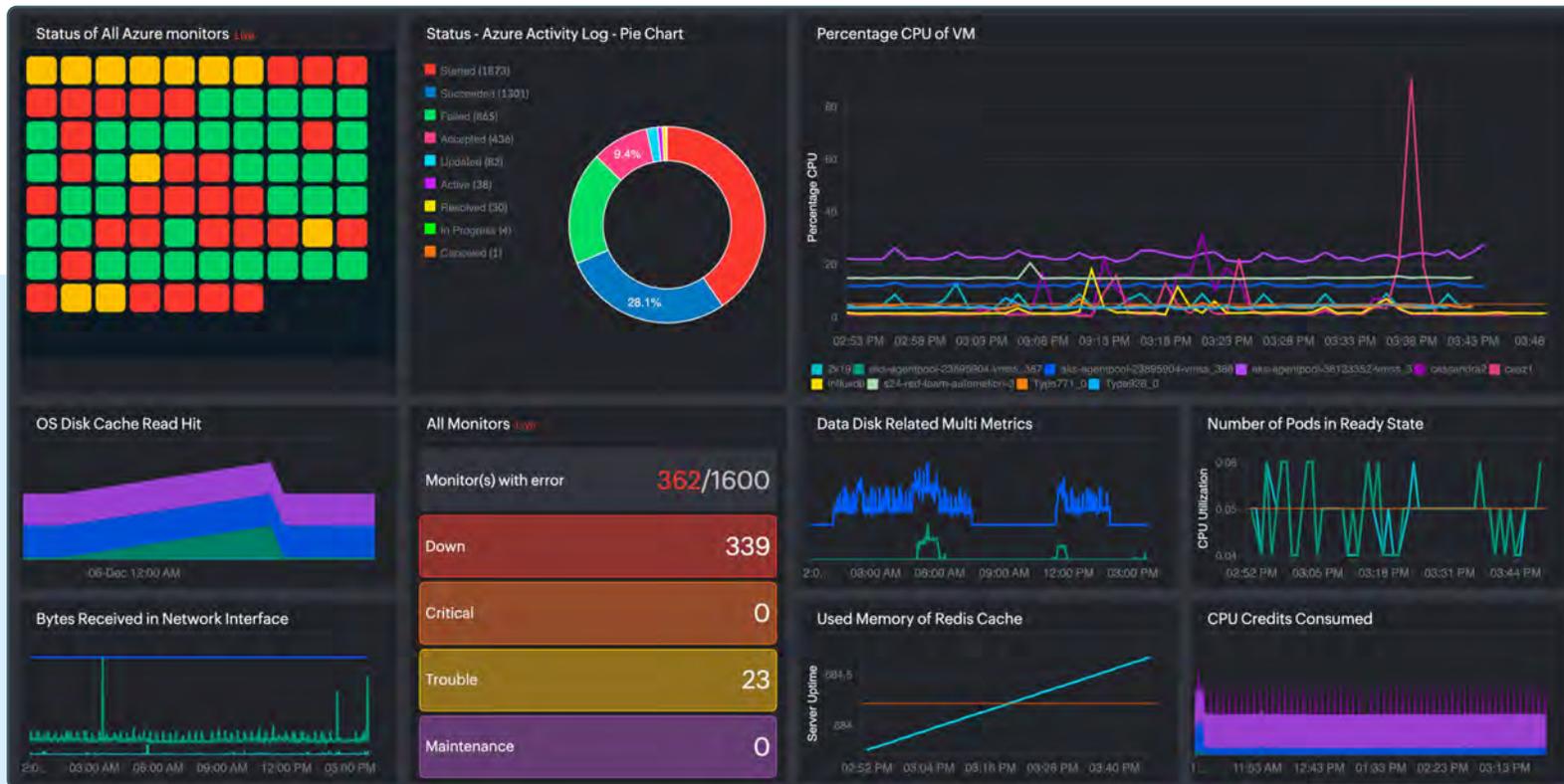


How to achieve observability with Site24x7

ManageEngine Site24x7 is an observability tool that is a modern, AIOps-powered solution designed to cater to the needs of DevOps and IT operations.

Monitor performance metrics in your Azure environment with a performance overview tool

Monitor over 100 Azure services, detect anomalies and performance bottlenecks, and maximize availability with a full-scale robust observability solution.

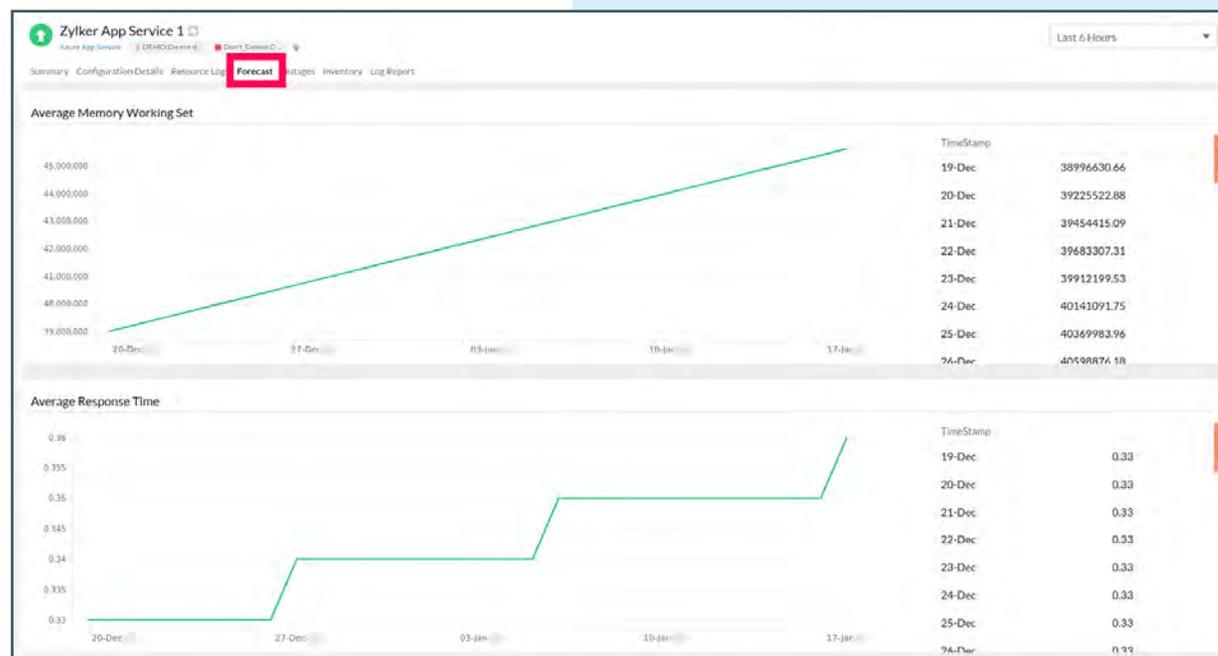


Evaluate KPIs

Monitor critical metrics related to availability and performance to make sure your cloud workload has a continuous uptime year-around response rate for evaluating the swiftness of a transaction and other vital metrics. Monitor specific metrics for various cloud services, including compute, web, analytics, storage, and networking, to ensure sufficient data and visibility so you can debug performance errors easily. Reduce your mean time to resolve (MTTR) to maintain maximum uptime for the cloud environment's data processing and storage processes to run efficiently.

Capacity planning for Azure resources

Forecast the capacity needed for seamless Azure performance with Zia forecasts, and plan your resource utilization way ahead of time. Get insights on the usage patterns of your resources through historical observations and manage the adequate distribution of resources to avoid over- or under-provisioning. Avoid resource contention by predicting and prioritizing resource allocation based on utilization patterns and application requirements.

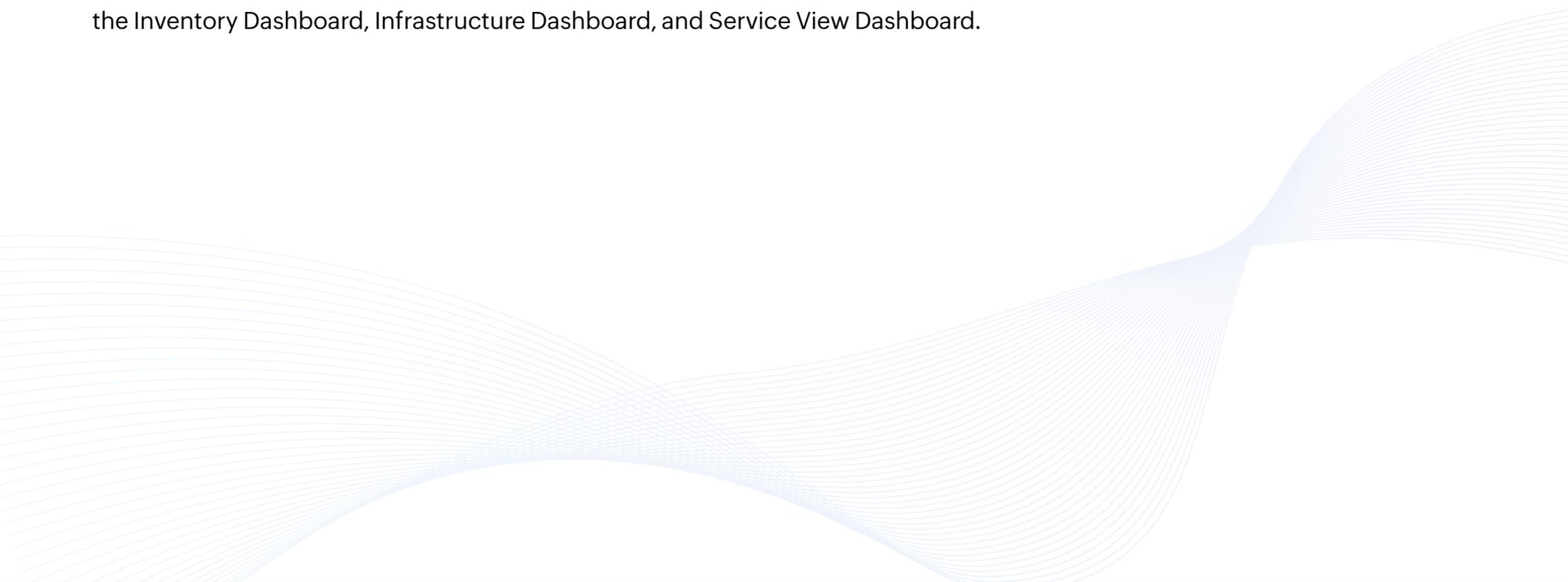


AIOps for proactive issue resolution

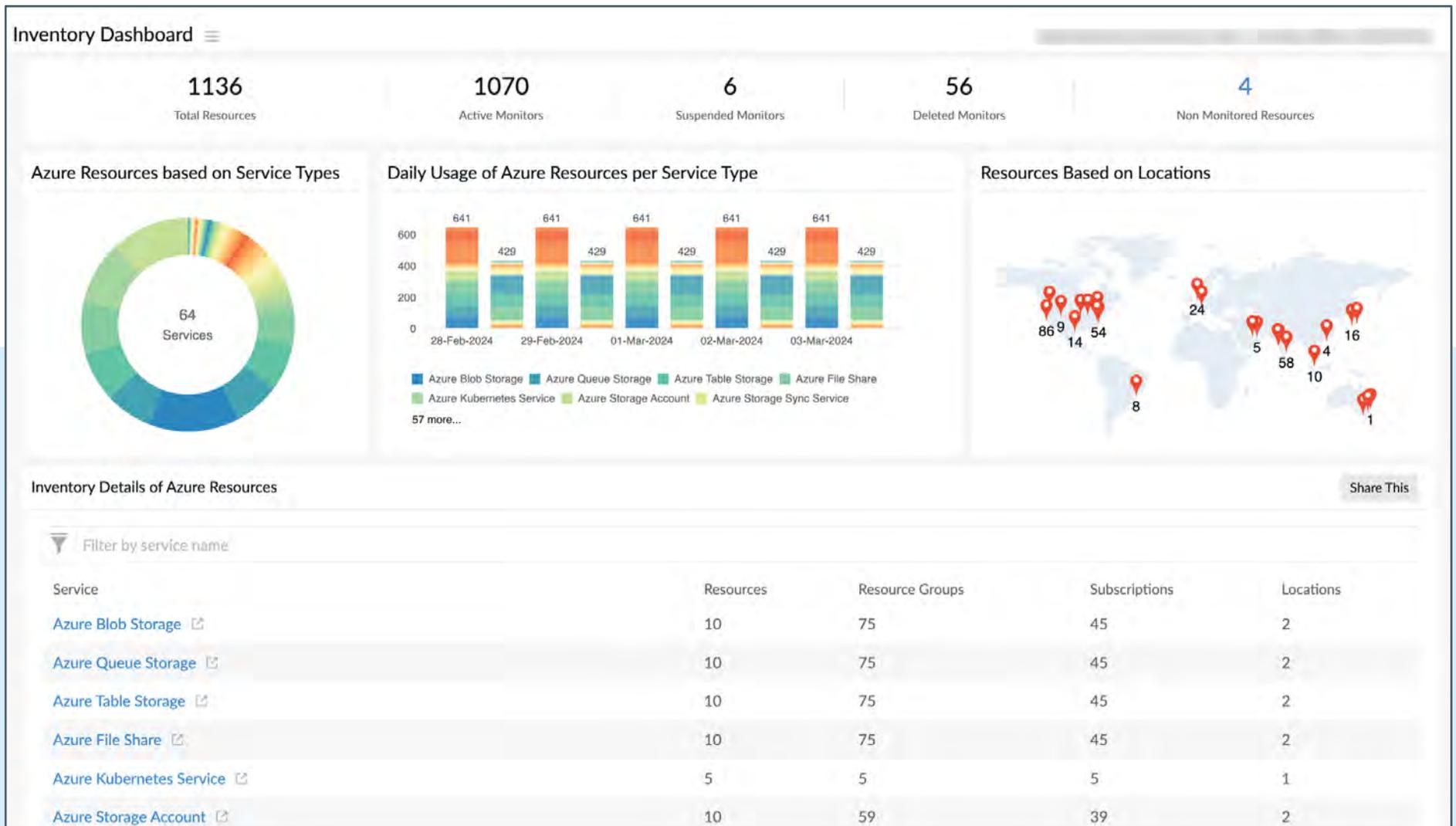
Utilize the Zia-powered AI framework for anomaly detection to identify any unusual spikes or aberrations, and proactively prevent performance crises in your Azure environment before they impact your production setup. The AI-driven threshold reduces the need to recalibrate thresholds across various monitors by detecting abnormal spikes through anomaly detection. It offers dynamic thresholds to adapt in response to evolving data patterns. Compare the performance and values of each resource with its fortnightly data, deduce anomalies based on quantitative and qualitative analysis to segment anomalies based on their severity, and receive notifications aligning to the gravity label.

Expansive visualization of your Azure ecosystem

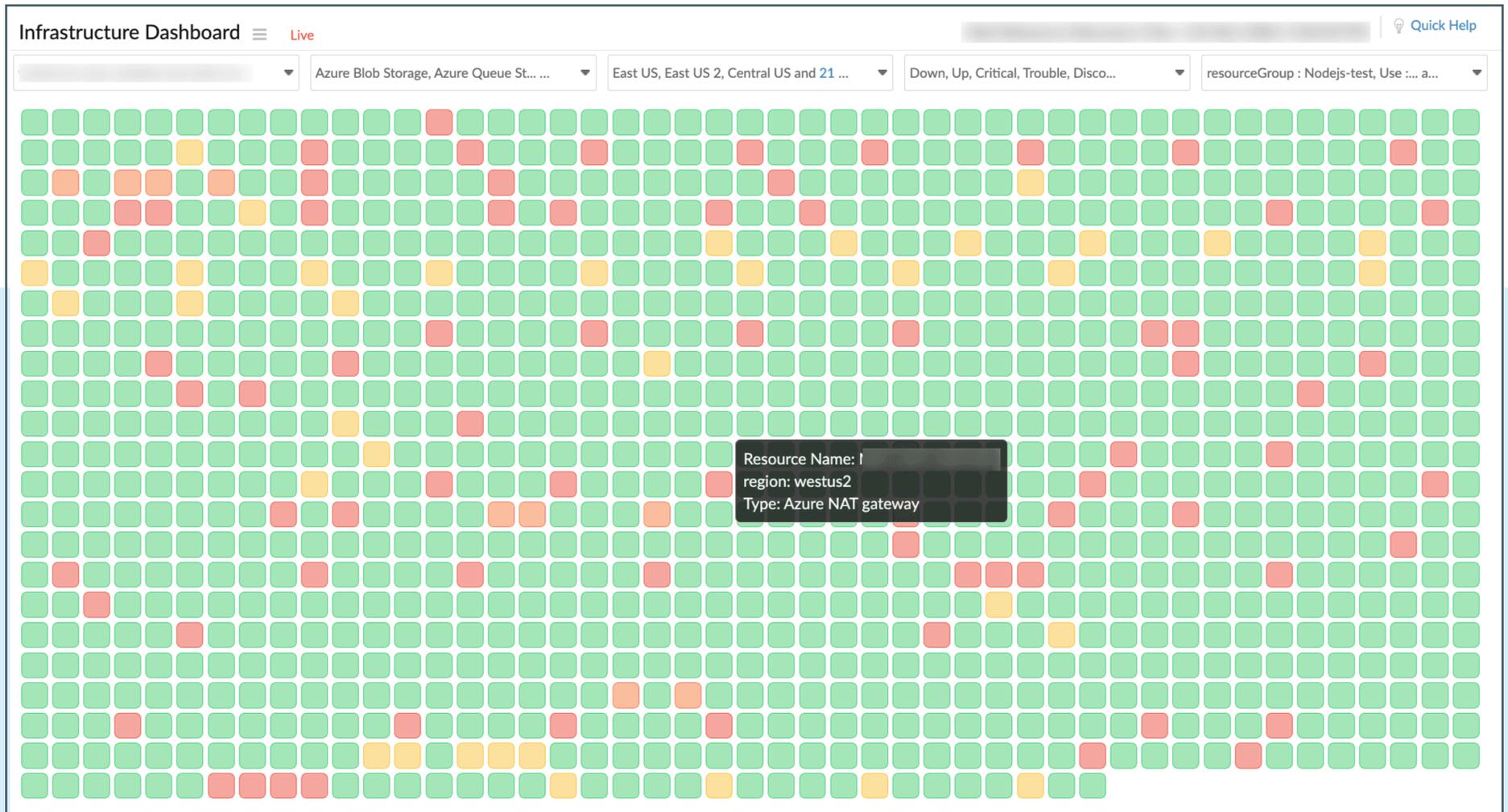
Auto-discover and monitor all Azure resources in a single console. Utilize the various interactive dashboards, including the Inventory Dashboard, Infrastructure Dashboard, and Service View Dashboard.



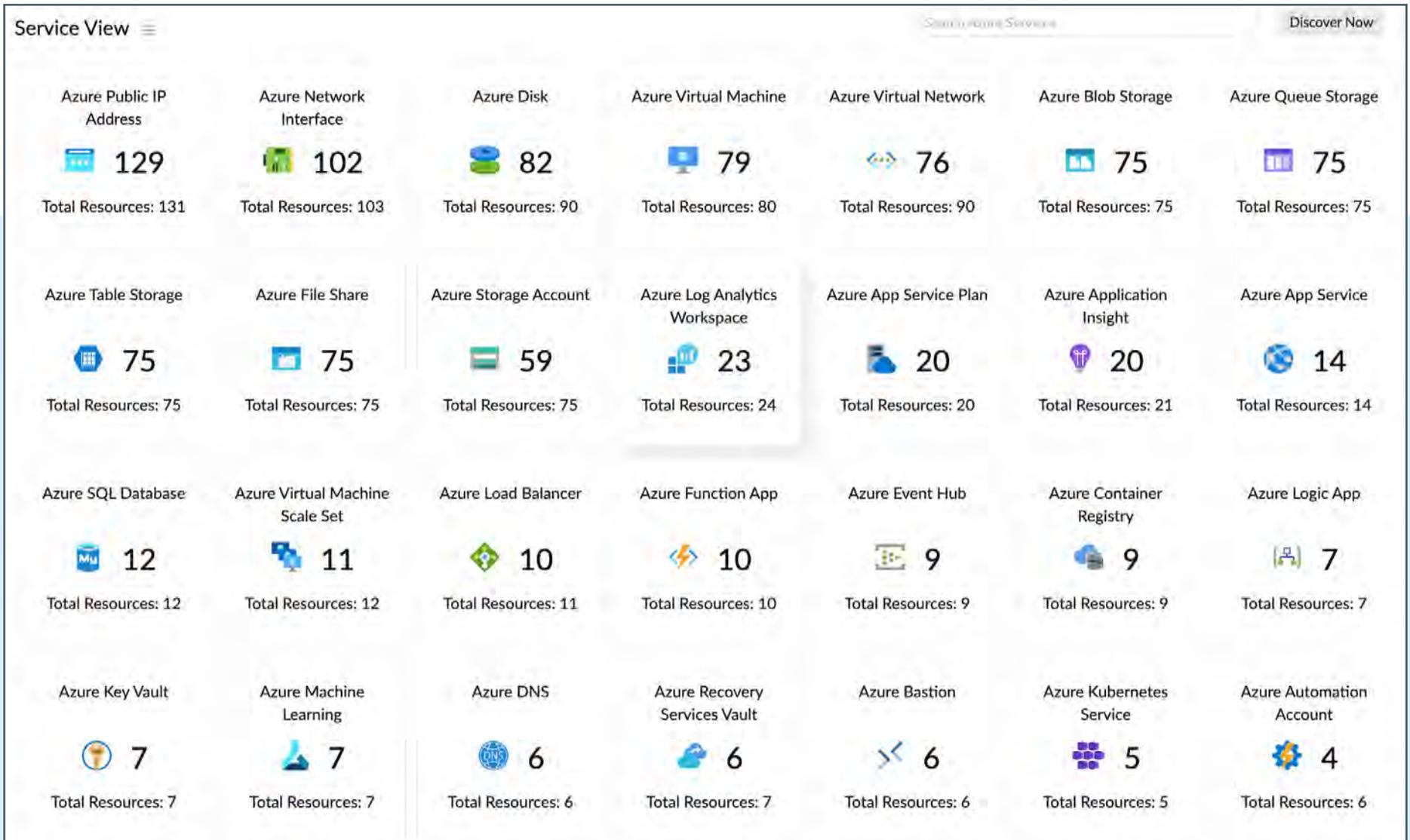
The Inventory Dashboard provides a tabulated view of all your Azure resource types, along with their respective number of locations, subscriptions, and even the daily usage patterns of each resource. The dashboard also enlists the details of the non-monitored resources in your Azure environment, including name, type, resource group, and location, to help you attain a nuanced perspective of Azure's overall performance and easily add more monitors to your monitoring journey.



The Infrastructure Dashboard offers a NOC view comprising the status and the entire resource summary of all the Azure resources discovered in your account.



The Service View Dashboard focuses on specific services along with the total and active count of resources monitored under each service type; you can also enable monitoring for specific service types in one click from this dashboard.



Hand-pick and monitor the KPIs specific to your requirements, and personalize your monitoring experience with the Custom Dashboard. Leverage a variety of reports to schedule, view, and export them based on resource availability, performance, health trends, and more.



Get insight into metrics like overall availability, outage details, and suspended summary of your configured monitors or tagged monitors with a comprehensive Summary Report. Drill deep into the performance of your configured monitors from various attribute levels and monitoring locations, and identify monitors with poor response times to take necessary corrective measures with the Performance Report.

Know about peaks and troughs in Azure resource health with the Health Trend Report and an in-depth inventory summary with the Inventory Report. Also, integrate your Azure VMs with a server monitoring extension to view each of your virtual instances as an individual server and obtain reports for more than 80 performance attributes.

IT automation for incident remediation

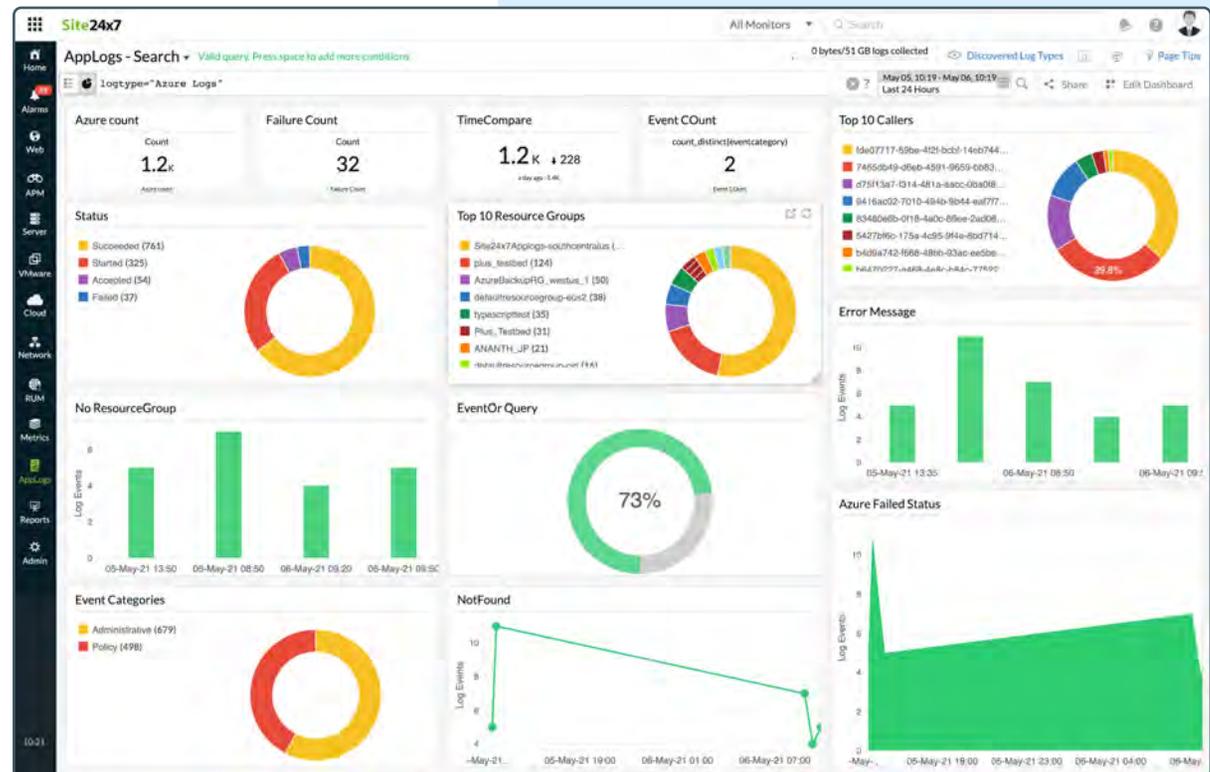
Eliminate the need for manual intervention by orchestrating management actions to initiate corrective actions. Relieve critical operations, including rerunning failed pipelines, running triggers, and VM actions like starting, stopping, or restarting VMs to automate workflows on your Azure resource monitors. Segregate resources based on subscription, resource group, service, and location associate resources tags; regulate alerts; and automate management actions for specific monitor types.



Manage Azure logs for better troubleshooting

Monitor and manage all your Azure-related logs for better understanding and analysis. Document and sift through user-performed and service account activities within the Azure environment, capturing detailed information about who did what, when, and where.

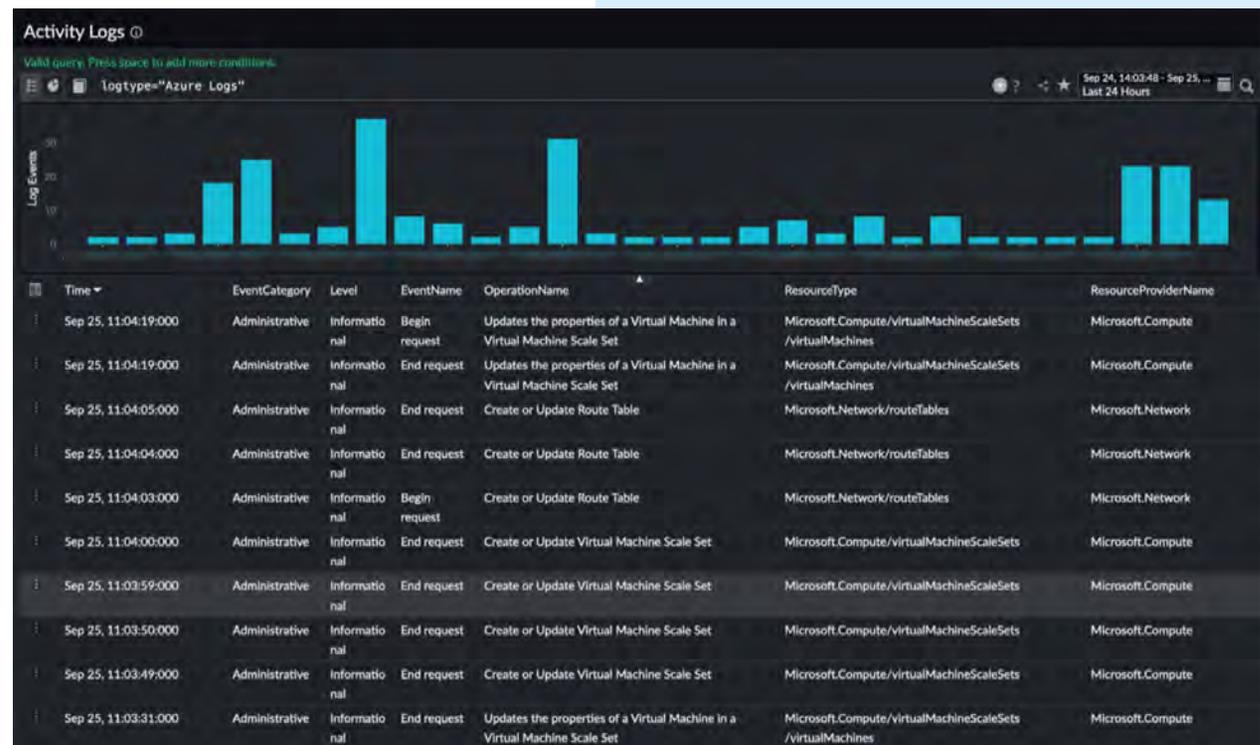
Examine logs from multiple sources for a comprehensive analysis to identify issues and their effects. Track Azure-resource-specific logs for optimizing performance, maintaining compliance and security for applications and infrastructure, and achieving scalability as your needs grow.



Site24x7's AppLogs collects, parses, stores, and analyzes multiple log data from the Azure environment, including Azure activity logs, resource logs including Active Directory logs, and Azure network security groups (NSG) flow logs for efficient troubleshooting.

Azure activity logs

Obtain a comprehensive perspective of your Azure environment by tracking every event performed in your Azure environment by getting insights into the specific operations on each Azure resource from the outside, including the details related to which user performed an operation, what services were used, the timeline of the event, the exact location of the operation, and resource used inside the Azure environment with the administered change.



Azure resource logs

Monitor the events and operations performed within a specific Azure resource to get a resource's perspective of the happenings in the Azure environment. The KPIs of resource logs vary from service to service and resource type to resource type. Track distinct changes and alterations within the resource types, including connections and transaction details for databases and events of auto-scaling, deletion, or resizing for virtual machines by visualizing all your important logs in a single pane of glass.

Entra ID (previously Azure Active Directory) logs

Track the detailed changes made in Entra ID along with login activity. Keep track of and get alerted on all authentication activities related to the directory users. Check the permissions to various resources to help you deduce key details like which administrators have delegated access to users and which users are potential security concerns.



Azure NSG Logs

Gain comprehensive visibility into Azure NSG and operations by integrating with NSG flow logs. Get insights on inbound and outbound traffic to and from Azure resources. Manage data on IP traffic, such as source and destination IP addresses, source and destination ports, protocol, and whether the traffic was allowed or denied. Get real-time alerts on events concerning critical events and detect issues quickly to enhance security and ensure compliance.



Enhance workflows with distributed tracing

Distributed tracing tracks the path of a request life cycle across connected systems with a detailed view of service invocations, failures, and latency. This allows you to identify inefficiencies quickly, troubleshoot complex architectures, and even optimize the workflow to deliver better business outcomes. Optimize and rework the entire communication flow in your whole Azure environment by tracking data traces of a series of related distributed events across a service operation from the initial request up to the service delivery or failure.

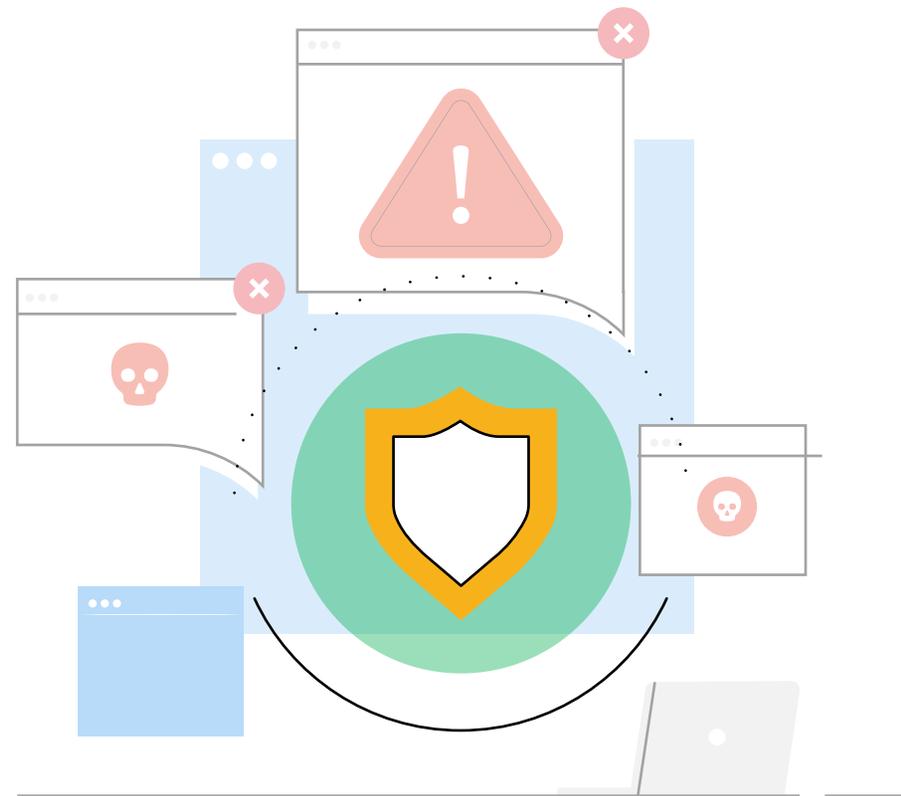
Here are things you can do to optimize your workflows:

- Debug slow method calls, all the way up to their originating request, including their parameters, to identify the cause of slowness.
- Spot performance bottlenecks by tracing the load on services and balancing them.
- Drill down to the root cause of failures by tracing the entire path of your user transaction. Analyze long-term and seasonal trends by correlating similar traces to forecast potential issues to take preventive actions.
- Optimize and verify if the changes have the desired impact by comparing key performance metrics and traces before and after the change.
- Rise above the application levels of tracing and perform RCA for infrastructure events by uniting disparate telemetry data from all corners of the ecosystem and understanding the dependencies of one over the other by correlating events, detecting relevant patterns amidst the deluge of information, and identifying incidents and outages.
- Speed up problem resolution, and enhance system stability and uptime effectively through granular mapping of all your infrastructure events.

Protect your architecture from vulnerabilities

Monitor pivotal Azure services related to security, including Application Gateway, Firewall, VPN Gateway, Key Vault, Azure App Configuration, Front Door, and Azure Bastion to protect your infrastructure against vulnerabilities and receive alerts immediately in case of any breach. Monitor for signs of malicious activity, ensuring that your Azure is secure against threats like denial-of-service attacks or unauthorized access attempts by monitoring traffic, misconfiguration, and intrusion patterns.

Apart from checking on critical Azure services, improve the security posture of the Azure environment by managing and safeguarding your environment through Azure NSG logs. Evolve your prevention-only security strategies with minute detection and response techniques. Discover early signs of security anomalies and aberrations by addressing weak spots at each resource level. Adopt a series of security-related best-practice recommendations for each Azure resource, including VM-level security profile configurations and public access to storage accounts.



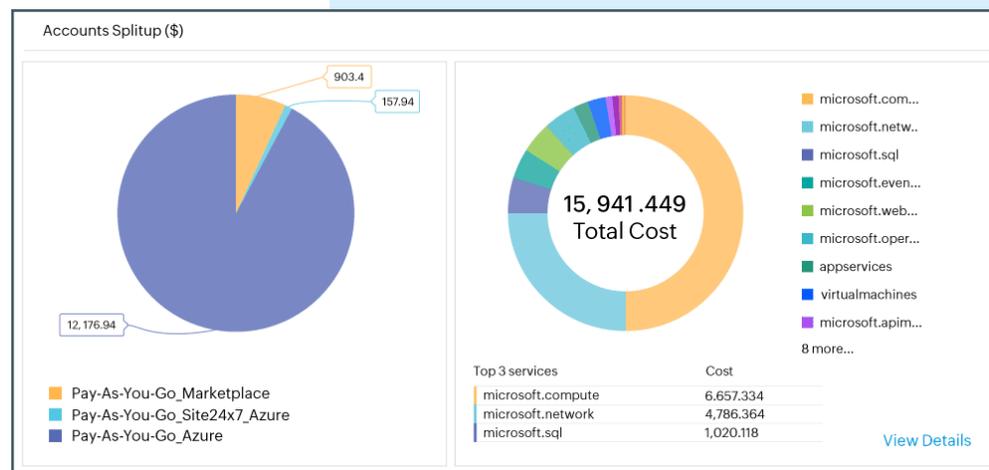
Optimize cloud cost better with CloudSpend

Microsoft Azure offers pricing in a pay-as-you-go format. But with any cloud, sudden spikes in cost will alarm users due to the lack of cloud cost management strategies. Several factors, including resource utilization, data storage and transfer, auto-scaling of VMs, and lack of cost monitoring and budgeting for cloud infrastructure, pose challenges to mounting cloud expenditure.

Azure's native cloud cost management tool, Reservations, also offers expense-optimization strategies but comes with limitations. These include inflexibility in resource selection, leading to potential resource wastage and financial commitments. Additionally, Reservations may not cover all Azure services and require ongoing management to optimize cost savings.

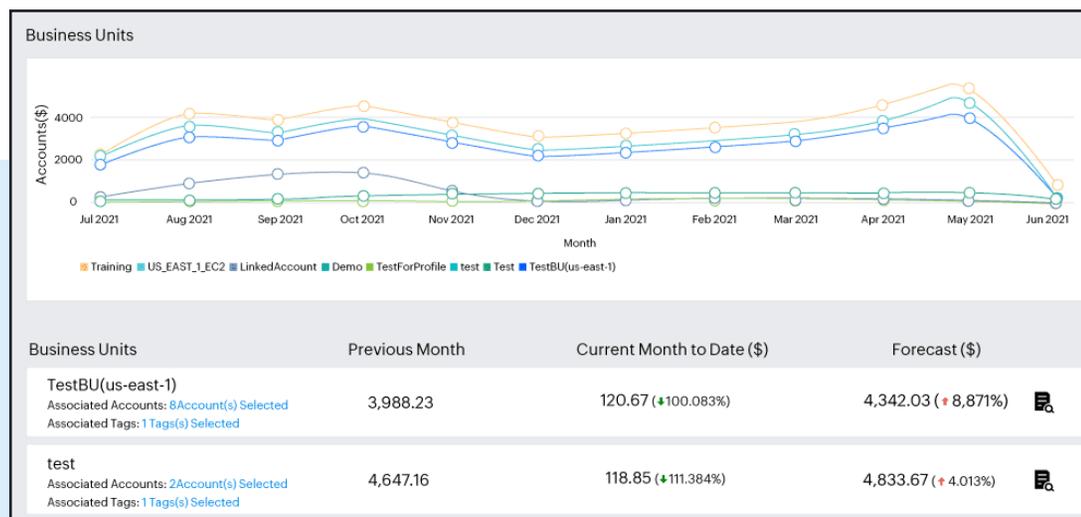
A centralized, approachable mechanism is needed to streamline the process; offer budgeting, forecasting, and anomaly detection capabilities across multi-cloud environments; and mitigate these challenges. Investing in robust cost management solutions ensures efficiency and accuracy, mitigating the challenges of manual efforts and disparate platforms.

Managing cloud expenditures has become a paramount concern, given the complexity of multi-cloud environments and the ever-expanding array of services. With ManageEngine CloudSpend, address challenges to empower businesses with comprehensive visibility, analytics, and control over their cloud expenses.



Here are things you can do to manage your mounting costs:

- Perform specific analysis using various filtering and grouping dimensions.
- Get a detailed view of resource-level spending with CloudSpends's Resource Explorer. Analyze each resource for outliers in consumption and contribution trends, paving the way for an effective resource optimization strategy.
- Gain granular insights into the Azure cloud usage patterns, identify cost drivers, and make informed decisions to optimize spending.
- Set budgetary limits, get alerted for potential overspending, and real-time tracking of actual expenditures against predefined financial plans.
- Identify areas for improvement, including implementing chargebacks, reserving capacity, and right-sizing resources by analyzing cost breakdowns and tracking spending trends.
- Schedule and get reports for flexibility at the Business Unit level. Make informed business decisions with reports on budget alerts, trend analysis, and Resource Explorer, and save on cloud expenses.



Align your Microsoft Azure cloud-cost goals to get the most out of your Azure spending.

Conclusion: An all-inclusive observability platform for your entire infrastructure

Achieving end-to-end observability in Microsoft Azure is imperative for enterprises navigating the complexities of the cloud. ManageEngine Site24x7 emerges as a comprehensive observability tool, offering advanced monitoring, AI-driven anomaly detection, expansive visualization, and enhanced security features. It offers seamless multi-cloud monitoring with a single console view, ensuring panoramic visibility by eliminating operational silos.

As organizations evolve and adopt neo-observable parameters to deepen and diversify their observable strategies, Site24x7 stands as a vital ally in aiding businesses to realize holistic observability, enabling organizations to adapt and thrive in the ever-evolving Azure ecosystem.

About ManageEngine Site24x7

ManageEngine Site24x7 is an AI-powered observability platform for DevOps and IT operations. The cloud-based platform's broad capabilities help predict, analyze, and troubleshoot problems with end-user experience, applications, microservices, servers, containers, multi-cloud, and network infrastructure, all from a single console. For more information about Site24x7, please visit www.site24x7.com.

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