eG Innovations

# How to Achieve Full Observability in the Cloud: Nine Practical Steps to Go Beyond Cloud-Native Monitoring

In today's rapidly evolving technological landscape, achieving full observability in cloud environments is essential for maintaining resilience and performance. This eBook delves into the critical distinctions between observability and traditional monitoring, with particular focus on the advantages observability offers for cloud platforms such as AWS, Alibaba, Azure, and GCP.

Explore the inherent challenges of implementing observability solutions in complex cloud architectures, including distributed architectures and dynamic scaling. We present nine practical steps to guide you in integrating AIOps, automation technologies, and cloud-native tools across cloud, hybrid-cloud and multi-cloud environments.

Discover key features and actionable strategies to bridge common observability gaps. By leveraging the insights and methodologies detailed in this eBook, you will be equiped to optimize your cloud environment, ensuring robust, data-driven observability that enhances both performance and reliability.

## What is Observability?

Observability, as defined in engineering control theory, refers to the ability to infer the internal states of a system from its external outputs. This concept is fundamental to understanding the challenges of achieving observability in cloud-native ennvironments.

In the context of cloud services, the detailed, insightful data that is typically accessible in on-premises setups often becomes obscured. Many components of cloud services turn into black boxes with internal states that are not easily accessible. When available, information about these internal states usually depends on cloud vendor APIs, logs, and other supported interfaces. The unique characteristics of cloud infrastructure, including its distributed and dynamic nature, further complicate the task of gaining  comprehensive insights into system behavior.

## Monitoring vs Observability?

In most scenarios, the difference between monitoring and observability can be summarized as "Monitoring tells you **when** something is wrong, observability tells you **what** is wrong".

### Monitoring

- **Is** my system working?
- Tells you **when** something went wrong
- **Reactive** in nature
- Enables **quick response** when an incident occurs

VS

### Observability

- **What** is my system doing?
- Tells you **why** something went wrong
- **Proactive** in nature
- **Reduced the duration and impact** of incidents

### Observability for Cloud Computing is Challenging - Not just Virtual Machines in the Cloud!

Cloud environments are often as complex, if not more so, than on-premises environments. The unique characteristics and challenges of cloud computing include:

- Many tiers involved
- Security considerations
- Dynamic – scale up/scale down
- Cost implications
- Sizing and its impact on performance
- Multi-domain issues
- Limited access to metrics

# AWS Cloud Architecture

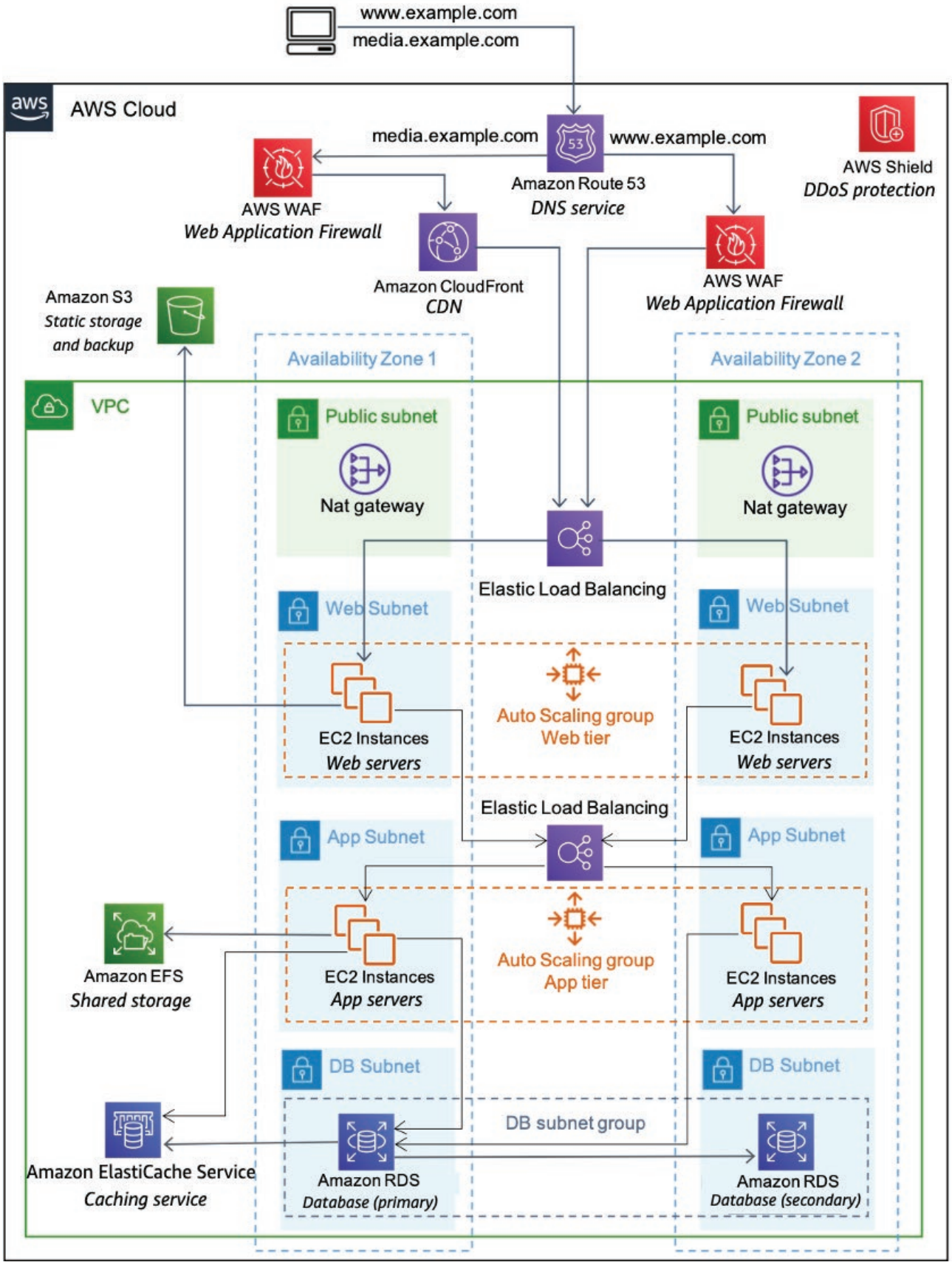


*Figure 1: Cloud architectures are often complex, leveraging multiple cloud services.*

# Nine Practical Steps to Achieving Observability in Cloud

01

## Monitor Digital User Experience using Synthetic and Real User Monitoring.

Synthetic monitoring employs "robot" users to simulate common workflows, ensuring thorough testing of cloud services for availability and performance. This method allows for repeatable testing, facilitating SLA establishment and the detection of gradual changes in performance.

Real User Monitoring (RUM) complements synthetic monitoring by capturing every real user logon, providing valuable insights into user complaints and intermittent issues. Applicable to digital workspaces and Application Performance Management (APM), RUM extends beyond synthetic workflows, facilitating continual improvement.

The combination of Synthetic Monitoring for proactive testing and RUM for real-time user insights is indispensable in the cloud. This approach offers a comprehensive view, enabling preemptive issue identification and immediate responses to real user experiences. Ultimately, it ensures effective observability and performance optimization.

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**Explore the details of synthetic vs. real user monitoring for comprehensive cloud observability in Synthetic Monitoring vs Real User Monitoring – RUM | eG Innovations**

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### Synthetic Monitoring

- Simulate User Interactions
- Repeats steps like a real user would

VS

### Real User Monitoring (RUM)

- Passively observe user activity
- Monitor real users, real transactions

02

# Ensure Monitoring Capabilities Extend to Every Layer and Every Tier of the Service Delivery Chain

For comprehensive cloud observability, it's crucial to ensure that your monitoring tool covers every layer spanning from on-premises dependencies to hybrid cloud scenarios. Metrics should be tailored to specific domains, and your monitoring tools must be capable of interpreting the significance of streamed metric data to enable effective alerting.

Domain-aware sampling plays a vital role in the context, allowing for the prioritization of signals that are likely to indicate issues while minimizing unnecessary data collection. This approach is particularly crucial in cloud environments, where it helps prevent storage costs and scale limitations.

Observability goes beyond mere metrics and should encompass proactive monitoring of logs for error messages. Tools like eG Enterprise offer out-of-the-box configurations to support this, facilitating efficient error detection and resolution. Additionally, gaining insights into application performance is essential, especially in clouds where native tools often lack comprehensive application visibility. Manual configurations or scripting for basic metrics may be necessary to bridge this gap and ensure a thorough understanding of application behavior.

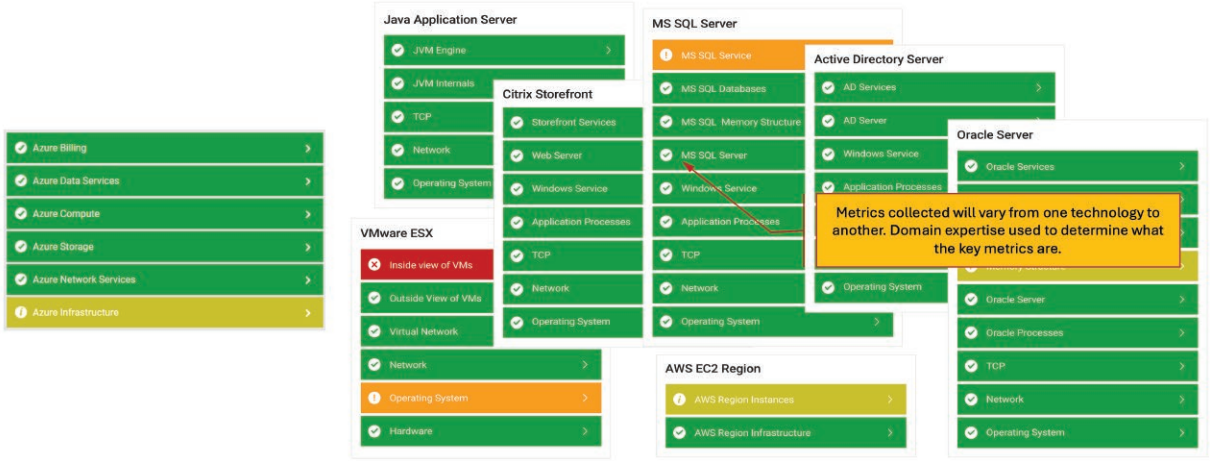



*Figure 2: Domain-aware layer models ensure every layer of every tier and their relationships are understood by eG Enterprise.*

03

# Monitoring must be Cloud-Specific

Public clouds like Microsoft Azure, Google GCP, Amazon AWS, and Alibaba each have unique architectures, services, and billing models. An effective observability tool should provide tailored functionality for each cloud, addressing unique features such as:

- Monitoring brokering for digital workspaces, requires integration with dedicated AVD Brokers for Azure AVD. However in Amazon AWS this data must be captured at the account level.
- Support for cloud-specific services such as Azure Advisor, which offers recommendations for misconfigurations and performance enhancements in Azure.
- Understanding billing models, such as Amazon AWS burstable instances, to prevent blind spots in performance due to credit limitations.

Only a select few products offer comprehensive multi-cloud observability within a single interface, providing domain-specific insights and interdependencies across multiple clouds. An exemplary solution in this regard is eG Enterprise.

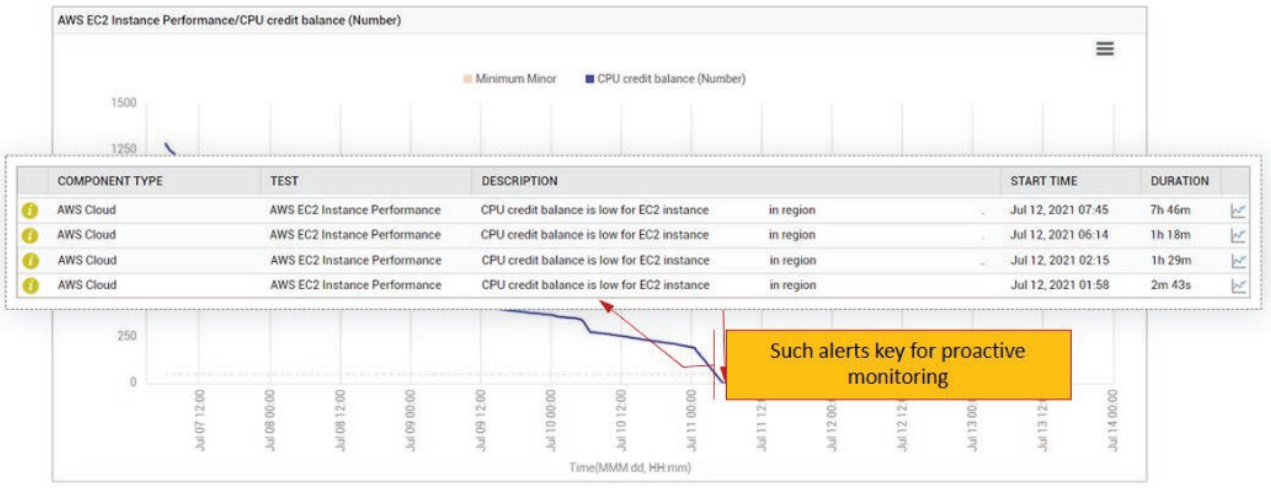



*Figure 3: eG Enterprise understands and alerts on problems with credit limits for EC2 burstable instances.*

## 04 Ensure Rapid Problem Demarcation with Macro Views of Service and Infrastructure Topologies.

Effective observability tools leverage intelligent AIOps-driven auto-discovery and auto-deployment technologies, crucial for managing cloud auto-scale and automatic deployment scenarios. In dynamic cloud architectures, resources may be ephemeral, necessitating tools to adapt to servers, containers, or VMs spinning up and down.

Beyond automation, these functionalities offer rich macro views  of services and infrastructure, providing essential topology information. Topological mapping correlates relationships between applications and infrastructure, capturing dependencies across performance, software, hardware, and platforms.

This holistic understanding ensures comprehensive observability, particularly in modern cloud environments with intricate interdependencies. Tools like eG Enterprise showcase these capabilities, offering robust insights into dynamic cloud ecosystems.

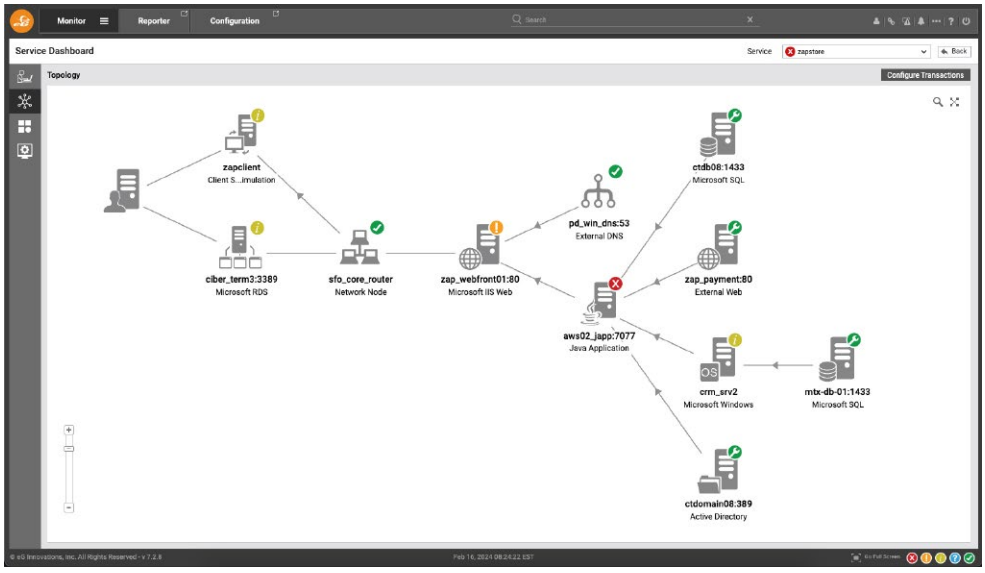



*Figure 4: Rich interactive topology maps help administrators and help desk operators understand the complex interdependencies of their IT landscape..*

# 05 The Imperative of Deep Application Visibility

Modern IT success hinges on ensuring users have unfaltering access to applications and services. Whether it's the seamless operation of a family doctor's appointment system or the flawless performance of an online food delivery app, the cloud's role is pivotal. It's worth noting that application failures predominatly stem from from code issues rather than cloud infrastructure glitches.

To navigate these challenges effectively, organizations must prioritize deep visibility into applications, transcending mere infrastructure oversight. This imperative extends to third-party apps and SaaS implementations, demanding meticulous insights to maintain accountability, and ensure smooth operations.

Here, eG Enterprise emerges as a beacon of reliability, offering a comprehensive suite of Application Performance Monitoring (APM) and Business Transaction Monitoring (BTM) tools. With its ability to provide code-level visibility into various application stacks, eG Enterprise empowers organizations to proactively address issues and optimize performance. Moreover, in the realm of modern, distributed applications, the need for hybrid and multi-cloud support becomes crucial. eG Enterprise rises to this challenge, offering observability solutions that seamlessly adapt to diverse architectures, thereby facilitating uninterrupted operations and fostering organizational resilience.

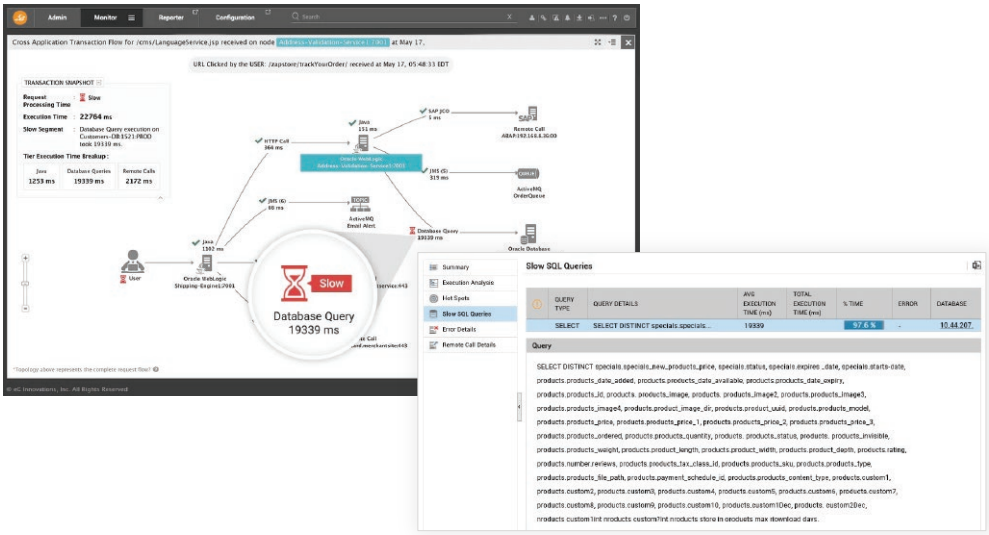


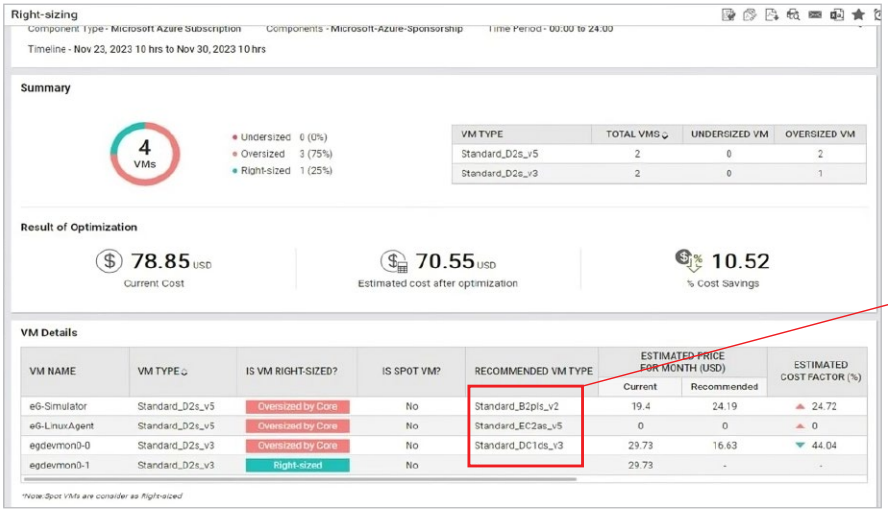

*Figure 5: eG Enterprise not only identifies appplication problems such as database slowness but also will identify the root-cause problematic SQL query call..*

# 06 Right-Size Cloud Environments

Efficient cloud management is contingent upon right-sizing to mitigate billing costs and minimize security footprints. Over-resourced components not only inflate expenses but also pose significant security risks, while under-provisioned resources often result in application failures and subpar user experiences. The troubleshooting of fluctuating resource demands can quickly become a drain on IT staff time. Resorting to quick fixes like server reboots or additional resources may address immediate issues but fail to address the underlying question of whether applications genuinely require the added resources.

Distinguishing between under-provisioned and resource-consuming applications is where quality observability tools truly shine. By providing insights into resource allocation and application performance,

these tools empower organizations to make informed decisions, prevent unnecessary costs, and enhance security within cloud environments.




Choosing the correct VM type to minimize costs without compromising performance in Cloud is easy with eG Enterprise

*Figure 6: A wealth of out-of-the-box reports supplied within eG Enterprise are available, including capacity planning and right-sizing reports.*

## 07 Optimize Costs and Minimize Unused Resources

Effectively managing your cloud budget requires comprehensive observability into billing and accounting models, which is essential for optimizing costs, particularly in scenarios such as using burstable VMs on AWS. With eG Enterprise, seamless integration with cloud accounts enables the correlation of billing insights with other observability data. Out-of-the-box alerting on billing, coupled with anomalous usage alerts, safeguards against unexpected cloud bills.

For Azure users, eG Enterprise offers full integration with Azure Advisor for tracking best practices and provides custom functionality to identify unused resources. Often overlooked, observability on unused resources is vital. With eG Enterprise, unnecessary resources can be identified and removed, thereby, reducing billing costs and improving security by minimizing attack footprints. This proactive approach ensures optimized cloud spending, enhanced security measures, and streamlined infrastructure.

Choosing the correct VM type to minimize costs without compromising performance in the Cloud is made effortless with eG Enterprise

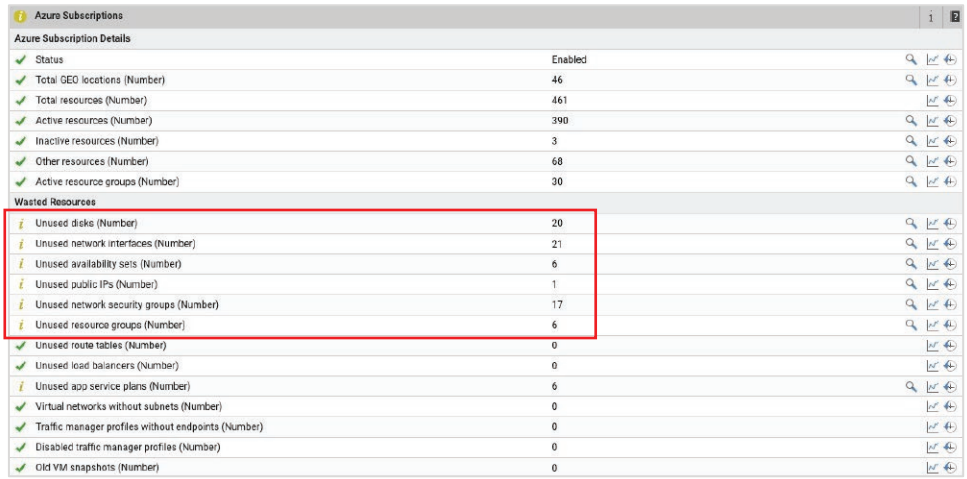



*Figure 7: eG Enterprise continuously monitors Azure Infrastructure for wasted, underused and abandoned resources.*

# 08 Ensure Observability Covers Traceability

Traceability is paramount for ensuring security and accountability in any IT environment. Beyond simply monitoring user logins, observability tools must be capable of providing insights into user behaviors and the authentication infrastructure, as well as automatically detecting unusual behavior.

The ability to track user actions is crucial for compliance purposes. High quality monitoring tools should offer comprehensive audit trails and change configuration tracking, empowering organizations to swiftly identify and address potential threats, while gaining a clear understanding of system changes.

In the cloud, it is essential to have a robust strategy for retaining historical data, not only to meet compliance standards but also to proactively safeguard against unauthorized access through anomaly detection. A robust observability solution enables you to cultivate a secure, accountable, and well-documented operational environment, facilitating efficient and transparent investigations of security incidents.


*Figure 8: eG Enterprise also monitors key cloud access and authentication services such as Azure AD / Entra ID. Unusual access attempts and logins are continually monitored for.*

# 09 Have Visibility on Cloud Outages

Relying solely on cloud native monitoring solutions such as Azure Monitor or Amazon CloudWatch for AWS can pose significant risks. When services within these clouds fail, you may find yourself without access to the very tools you depend on to understand what is happening. Furthermore, if your organization relies on other cloud-based services such as email and MS Teams from Office 365/Microsoft 365 hosted in Azure, communicating issues to end-users can become challenging.

By leveraging an external observability tool such as eG Enterprise, which supports a failover strategy, you can ensure uninterrupted insights into cloud outages. This proactive approach helps prevent unnecessary helpdesk calls from end-users and ensures continuity of operations. This capability is especially important for Managed Service Providers (MSPs) offering cloud-hosted services, allowing them to effectively differentiate themselves and demonstrate accountability when issues arise, all within the framework of service level agreements (SLAs).

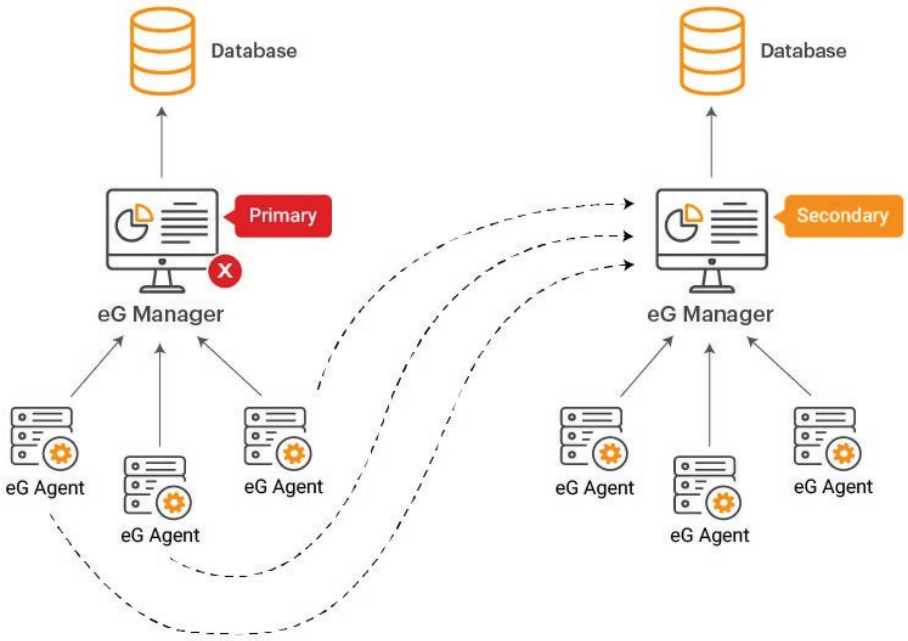



*Figure 9: Choose observability tools with built-in failover capabilities to avoid exposure to cloud outages*

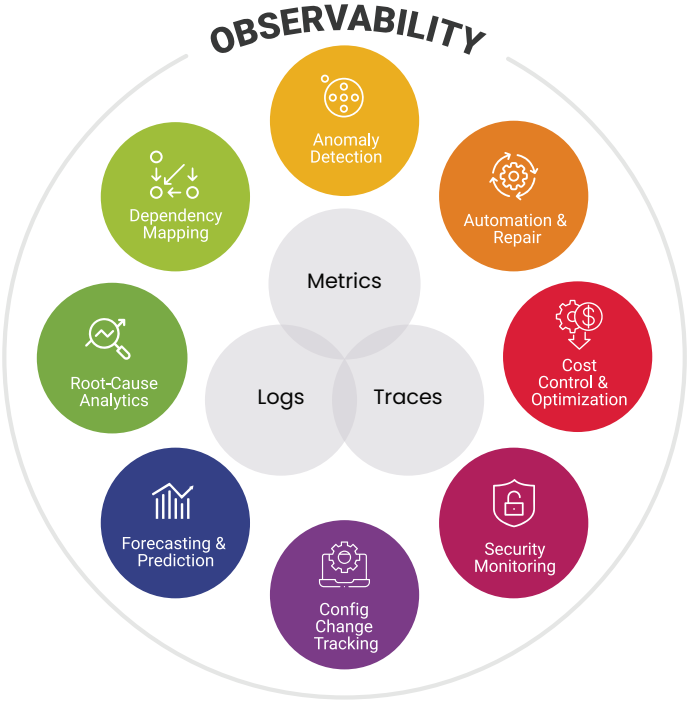
## Next Steps

As you delve into selecting monitoring tools, it is essential to prioritize specific observability capabilities and features. This involves evaluating actual needs, especially when leveraging cloud platforms such as Microsoft Azure, Amazon AWS or Google GCP. Remember the nine key observability features that are essential for success in cloud migration projects. Ensure that your cloud migration project planning incorporates the following capabilities:

- Monitor digital user experience
- Monitor every layer & every tier of the service delivery chain
- Obtain cloud-specific insights
- Have macro views of service topology for problem demarcation
- Get deep application visibility
- Access advice on right-sizing resources
- Track recommendations for cost optimization
- Trace and audit
- Have visibility on cloud outages

By incorporating these capabilities into your monitoring strategy, you can effectively navigate the complexities of cloud environments and ensure seamless operations and performance optimization.

# Summary - The Benefits of Good Observability Tooling in Cloud




Good observability tooling in the cloud offers a myriad of benefits, including automated root-cause diagnostics for swift issue resolution and minimized downtime. Furthermore, it empowers AIOps by providing a wealth of data for continuous learning, enhancing system resilience in dynamic cloud environments.

Moreover, observability facilitates automated remediation, enabling rapid responses to identified issues without manual intervention. Integrating these capabilities not only elevates operational efficiency but also ensures a proactive, adaptive, and resilient infrastructure. This alignment with modern demands for agile and automated IT environments, especially in the cloud, significantly reduces manual effort and troubleshooting for IT staff.

## About eG Innovations

eG Innovations is dedicated to helping businesses across the globe transform IT service delivery into a competitive advantage and a center for productivity, growth and profit. Many of the world's largest businesses use eG Enterprise to enhance IT service performance, increase operational efficiency, ensure IT effectiveness and deliver on the ROI promise of transformational IT investments across physical, virtual and cloud environments.

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