



# What should you look for in a CLOUD PERFORMANCE MANAGEMENT SYSTEM?

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## INTRODUCTION

Cloud computing in different forms – public, private or hybrid cloud models - continues its fast-paced adoption rate as enterprises look to leverage it for improving the agility, scalability, redundancy and costs savings of their business operations. According to a recent Cowen & Company IT Spending Survey, 77% of organizations have adopted cloud computing in some form already and believe that many more of their key processes and functions could be moved to the cloud soon.

While cloud computing offers enterprises several key benefits, it also throws up a number of new challenges when it comes to management of the performance of business services delivered from the cloud. For cloud computing to be successful, it is paramount that users of cloud-based services get the same experience as they would if these services were hosted in their corporate network. Poor user experience can threaten the success and ROI of cloud initiatives. Hence, it is essential that enterprises adopting cloud computing, plan how they can manage the performance of cloud-based business services.

## PERFORMANCE MANAGEMENT CHALLENGES FOR CLOUD-HOSTED SERVICES

Although easier to provision and operate, cloud computing does not reduce the complexity of the infrastructure that you, the IT manager, have to manage. If you are moving your key business services to the cloud, you still have to manage applications such as web servers, databases, middleware platforms. in the same manner as if they were on physical servers. What's more, your business service may even use applications that are hosted in the cloud and not directly managed by you or in your control. As the IT manager, you will still be responsible for the performance of the business services.

Business users do not understand or care about the complexity of the underlying infrastructure. What they care about is that the business services are reliable and responsive. Users can experience several kinds of performance issues - connection problems, slow or degraded performance, disconnects, reliability issues. In all these cases, the user complaints always relate to the service (and not the underlying infrastructure).

“My service is slow”, “it is not working”,  
“I can't connect to the service” are all  
complaints you will receive from users.

## What should you look for in a CLOUD PERFORMANCE MANAGEMENT SYSTEM?

As the IT manager, your job is then to quickly figure out what is causing the business service issue and to resolve this rapidly to ensure optimum cloud performance and business productivity.

Your challenge lies in the fact that a problem anywhere in the infrastructure can result in a service performance issue and when a user complains, you have to figure out where the root-cause of the problem lies.

Is it the Network? Database? Application? Cloud platform?  
Third-party application that the service is using?

Finding the exact cause of a service performance issue can be like searching for a needle in a haystack!

Adding to the complexity is the fact that most cloud services involve multiple domains of control. The cloud instances are controlled by one domain, the application by another. If you had a hybrid cloud infrastructure, you will be dealing with the public cloud and private cloud domains. You have to expect that you will get very limited or no visibility into other domains. As the IT manager, your challenge is to identify which domain is causing a service performance problem, even though you may not have complete visibility into each and every domain.

Traditional monitoring systems designed for physical on-premises IT environments often have limited visibility into cloud environments. These tools are designed to operate in a network with a single domain of control.

On the other hand, there are many new monitoring tools that are very specific to the cloud. These tools do not have the breadth of infrastructure coverage, the granularity of the monitoring, or the correlation necessary to pinpoint root cause problems. It is more difficult and time-consuming than ever to pinpoint cloud computing performance problems with traditional monitoring and management tools. A new more holistic model is needed to ensure uninterrupted visibility across every tier and layer of the cloud ecosystem.

# What should you look for in a CLOUD PERFORMANCE MANAGEMENT SYSTEM?

## WHAT EXACTLY IS CLOUD PERFORMANCE MANAGEMENT?

For a long time, cloud performance management has been an overloaded term. Many have referred to the ability to collect metrics from public cloud providers like Amazon EC2 as cloud performance management. However, there is a lot more to cloud performance management than this. There are three different perspectives that cloud performance management can take and there are unique requirements for each of these perspectives:

- **The deployment perspective**  
We refer to this as performance management FROM the cloud
- **The cloud consumer perspective**  
This is performance management OF the cloud hosted applications
- **The cloud service provider perspective**  
This is performance management FOR the cloud

The following sections delve into these three perspectives in greater detail.

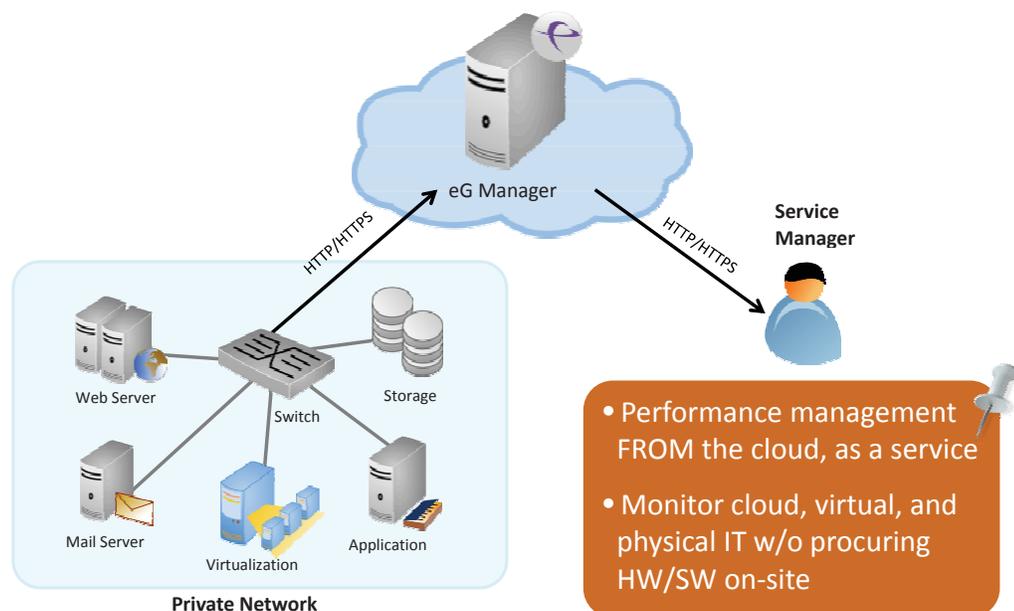
## PERFORMANCE MANAGEMENT FROM THE CLOUD: THE DEPLOYMENT PERSPECTIVE

Conventionally, performance management software has been deployed on-premises. Depending on the complexity of the software, deployment and configuration has often been a time consuming, challenging exercise.

Today, as an IT manager, you have the option to not deploy performance management on-premises but to get this as a service delivered from the cloud. The advantages that cloud computing offers – agility, cost saving and ease of use – also apply to performance management delivered from the cloud. Performance management delivered “FROM” the cloud provides the same advantages that the cloud offers for business applications. With a flexible pay-per-use service model, you can turn on/off the service as you require.

The eG Enterprise-on-Tap service from eG Innovations is a performance management service that gives you total visibility into your infrastructure and is delivered from the cloud. You do not need to have cloud-hosted applications to use this service. Using this service, you can monitor your on-premises physical or virtual infrastructure and the applications you are supporting. If you had cloud-hosted applications, those could be monitored from the same console as well.

# What should you look for in a CLOUD PERFORMANCE MANAGEMENT SYSTEM?



*Deployment perspective of cloud performance management FROM the cloud*

There are several aspects you will need to consider when evaluating different performance management solutions from the cloud:

## ■ HOW WILL THE MONITORING BE DONE AND FROM WHERE?

Monitoring is often done by software agents that are deployed on the servers to be monitored. These agents connect and report metrics to a management platform in the cloud. While agents are known to provide granular monitoring, they also add additional burden from an operations standpoint. So, can the performance management solution also support agentless monitoring? Do you require the monitors to be deployed in your infrastructure or will the monitors also be deployed in the cloud? The ideal cloud performance management solution will give you complete flexibility in deploying monitors. It must support agent-based and agentless monitoring, so you can decide which servers you need agents on and which ones you do not.

## ■ WHAT KIND OF METRICS WILL THE MANAGEMENT SYSTEM COLLECT AND HOW WILL IT ASSIST IN TROUBLESHOOTING SERVICE PERFORMANCE ISSUES?

Conventional CPU, memory, and disk metrics are important to understand how your servers are being used. Given the complexity of today's infrastructures, you need a management system that can do much more. It must include monitoring for all the virtual and physical infrastructures you are responsible for. It must also have in-depth visibility into key application components you are managing including databases, web servers, middleware servers, messaging systems.

# What should you look for in a CLOUD PERFORMANCE MANAGEMENT SYSTEM?

## ■ HOW DOES THE PERFORMANCE MANAGEMENT SOLUTION HANDLE THE SECURITY CONCERNS YOU WILL HAVE WHEN MONITORING PERFORMANCE FROM THE CLOUD?

One of the major concerns you have to take into account when deciding whether to use performance management from the cloud is security: What new firewall rules do you need to configure? Do the servers that you want to manage have to be directly accessible from the cloud? What new TCP ports do you have to open? Ideally, none of these should be necessary. The ideal performance management solution from the cloud should be 100% web-based, so it can use HTTP/HTTPS for all communications between its monitors and the management platform. If all the communication is initiated from the monitors (rather than from the management platform), there is no need to open any new TCP ports as well.

## ■ HOW WILL YOU ACCESS THE PERFORMANCE METRICS COLLECTED AND REPORTS GENERATED?

Most cloud performance management systems allow IT managers to access the management platform to get access to metrics, alerts, and reports about their key network, server, application and service components. This software as a service (SaaS) approach allows organizations to access performance metrics, dashboards, reports and alerts directly FROM the cloud. Using this service, enterprises can monitor their cloud, virtual, or physical infrastructures without having to procure and deploy the software and hardware necessary for provisioning a performance management system in-house.

## ■ HOW WILL THE SERVICE BE LICENSED?

Finally, there is the question of licensing. Will the service be licensed based on what applications you want to monitor? Will it depend on the size of the servers (number of CPU cores and sockets) you plan to use for your business? Today's IT infrastructures are dynamic. Applications come and go and your infrastructure changes over time – you may add more memory or CPU to get an application to work better. You don't want to have to worry about the licensing of the performance management system every time you make a change in your infrastructure. Therefore, it is essential that the performance management system be licensed based on the number of servers you want to monitor and not based on the size of the servers or the type of applications you want to monitor.

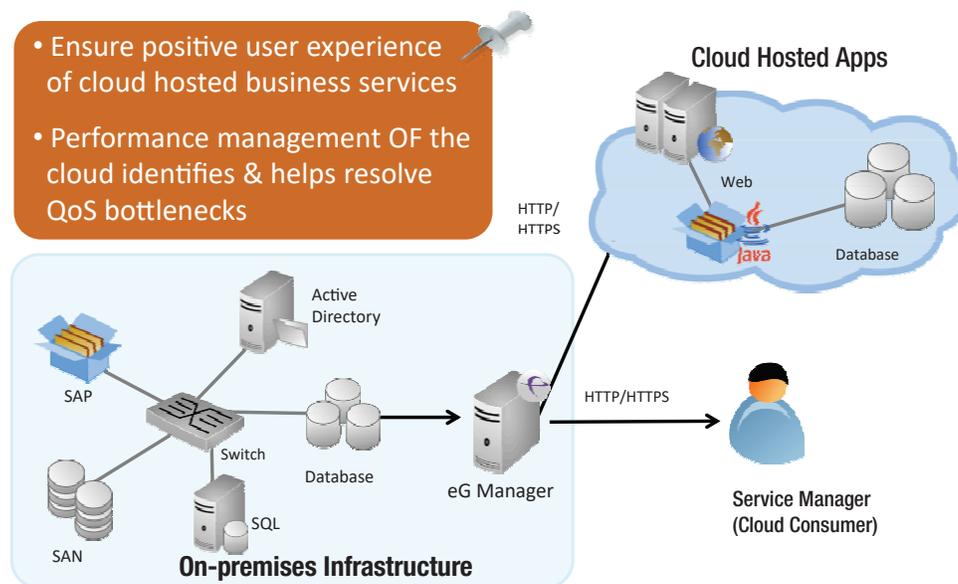
The key benefits to you from such a cloud-based management solution are:

- No investment in hardware or software for the management solution.
- Pay as you go model allows for addition/removal of monitors as required.
- Rapid deployment of the management service (only need to set up monitors).

# What should you look for in a CLOUD PERFORMANCE MANAGEMENT SYSTEM?

## PERFORMANCE MANAGEMENT OF THE CLOUD: THE CLOUD CONSUMER VIEW

The second perspective is that of the consumer of the cloud – i.e., an enterprise deploying applications in the cloud. Performance management OF the cloud refers to the management of business services that are partly or wholly hosted in the cloud. Monitoring, diagnosis, and reporting OF the cloud is integral to managing the user experience for cloud-hosted business services so that cloud consumers can proactively identify QoS performance bottlenecks, pinpoint the root-cause of problems, and take corrective action to ensure that the cloud service performance and end user experience does not degrade.



*The consumer's viewpoint of performance management OF the cloud*

If you decide to host your key business applications in the cloud, you must ensure that the end user experience matches that of your in-house business services. So what do you need from a performance management solution to effectively monitor the performance of applications hosted in the cloud?

# What should you look for in a CLOUD PERFORMANCE MANAGEMENT SYSTEM?

## ■ MEASURING THE PERFORMANCE OF THE SERVICE:

Firstly, you need to know how your business service is doing: when is it working and when is it not? Having the ability to monitor the service performance will allow you to be aware of performance problems that impact the user experience before you get user complaints. Different approaches are available for measuring and reporting on service performance. In an active monitoring approach, the monitoring system emulates user requests from different locations and measures the service availability and responsiveness. Passive approaches based on packet sniffing or different request capture techniques are also available for service performance measurement.

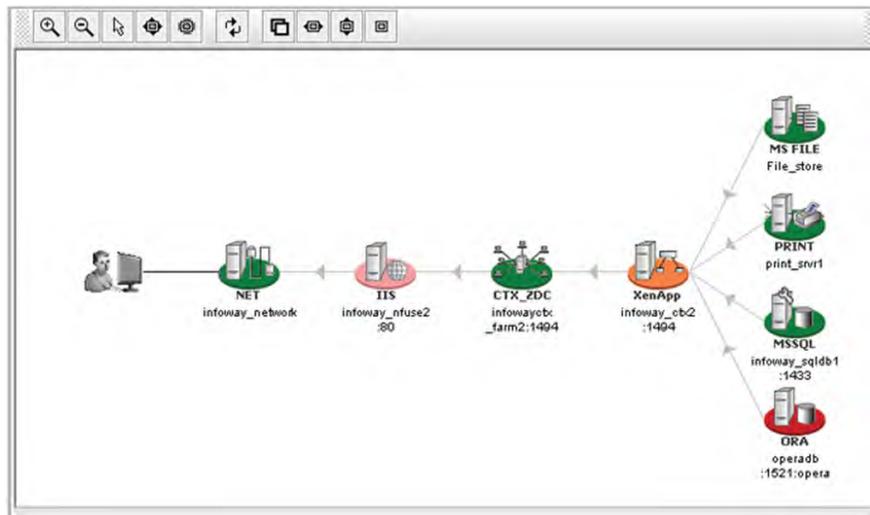
## ■ GETTING TOTAL PERFORMANCE VISIBILITY TO THE SERVICE INFRASTRUCTURE:

The toughest performance problems for you to tackle are those where the users of a business service complain that “it’s slow” or “it’s not working.” To address such situations, you need a performance management solution that gives you visibility into every layer, every tier of the infrastructure – from the networks to the servers to the individual applications (web, databases, domain controllers, messaging servers). For applications hosted in the cloud, it is essential that the monitoring system monitors your connectivity to the cloud, the performance of each cloud instance, the network throughput to the cloud provider, the operating system of each of the cloud instances, as well as the applications running in each of the cloud instances.

## ■ IDENTIFYING THE PROBLEMATIC TIER OF THE INFRASTRUCTURE:

At the same time, you, the IT manager, may not have the expertise in each of the applications that support your business. So while in-depth metrics for each tier are important, even more important is the ability for you to quickly determine when a slow-down happens, where the problem is – is it in the network? is it in the private cloud? is it the network connectivity to the public cloud? is it the public cloud? or is it one of the applications – the database? the web?. If the diagnosis process can be automated, it is even better for you – you don’t have to spend hours trying to figure out which expert to call to resolve the problem. With one click, you can identify where the problem originated and contact the appropriate domain expert.

# What should you look for in a CLOUD PERFORMANCE MANAGEMENT SYSTEM?



*Topology of a business service showing the applications supporting the service and the dependencies between them*

## ■ MANAGING CLOUD-HOSTED APPLICATIONS AND ON-PREMISES APPLICATIONS FROM THE SAME CONSOLE:

A single business service may involve applications deployed in your infrastructure and some others deployed in the public cloud. Having the ability to monitor cloud-hosted applications and on-premises applications from the same console is essential.

## ■ OPERATION WITH LIMITED VISIBILITY:

Particularly in cloud environments, you will be faced with situations where you don't have control over all the servers your applications are running on. In such a scenario, you want the management system to include external monitoring capabilities so it can at least give you "black-box visibility" (e.g., availability and response time) into these servers and applications that you do not control. Another approach to address the partial visibility problem is to add additional instrumentation at the boundaries where visibility exists. For example, if the network team does not provide access to the network elements, a measure of network performance can be gleaned by looking at the percentage of TCP retransmissions that are happening from servers connected to the network. If the servers show a very high percentage of packet loss, chances are that the network connecting them to the clients has an issue. No additional access rights are needed to arrive at this conclusion.

# What should you look for in a CLOUD PERFORMANCE MANAGEMENT SYSTEM?

The key benefits to enterprises from a management solution that monitors the performance of the cloud are:

- Enables you to manage the experience of users accessing cloud hosted business services
- Ensures high uptime and peak performance by rapid diagnosis of problems
- Facilitates effective capacity planning by tracking the usage of every tier of the service

## PERFORMANCE MANAGEMENT FOR THE CLOUD: THE CLOUD SERVICE PROVIDER VIEW

The third perspective is that of the provider of the cloud service – whether it is the public cloud provider or the private cloud provider. If you are the IT manager of a cloud service provider, the cloud itself is a service that you are delivering to users. Your primary concern is to make sure that users of the cloud service are happy. Cloud service users must be able to login at any time, provision new instances as required, be able to start and stop instances and deploy applications in these instances. For applications deployed in your cloud infrastructure, the performance of these applications should match the performance they would have had if they had been hosted on-premises, on physical machines.

Performance management FOR the cloud helps the cloud provider deliver better cloud performance, maximum service availability, and superior customer satisfaction. The performance management system also helps you right-size your infrastructure, so that you can achieve the necessary returns for your investment in the cloud infrastructure. To manage your cloud infrastructure, look for a performance management solution with the following characteristics:

### ■ **MONITORS THE CLOUD INFRASTRUCTURE END-TO-END:**

Typically, cloud infrastructures are built on a virtualization platform (e.g., VMware vSphere, Citrix XenServer, Microsoft Hyper-V). There are specialized applications that handle security (e.g., VMware vShield), web applications that enable self-service and the cloud platform (e.g., VMware vCloud, Citrix CloudStack) that powers your cloud service. The underlying infrastructure components including Active Directory, SAN, network equipment, also need to be monitored as a failure of any of these components can also impact the cloud service. A performance management solution for the cloud should be capable of handling all of these infrastructure tiers from a central console.

# What should you look for in a CLOUD PERFORMANCE MANAGEMENT SYSTEM?

## ■ SCALABILITY :

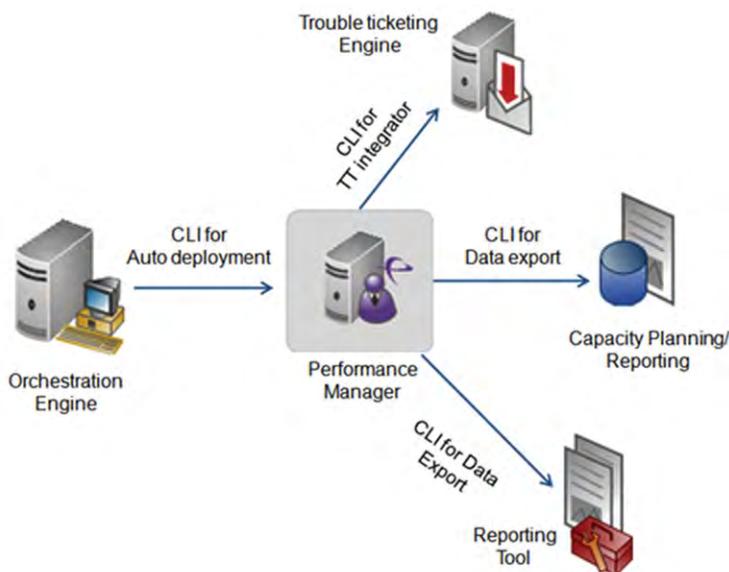
Scalability, to ensure that the management solution can handle the workload as your infrastructure grows, is another key requirement.

## ■ SUPPORTS AUTOMATION:

A key driving factor for cloud computing is agility – the ability to power-up and power-down instances rapidly, on-demand. To achieve the kind of agility that customers expect, cloud service providers must fully automate their operations. This covers the management system as well. When a new cloud instance is provisioned, it should be automatically added to the management system for monitoring. Agent-based or agentless monitoring should be enabled. If required, agents should be installed on the cloud instances automatically. Touch-free provisioning and configuration of the management system is a very key requirement. Likewise, once provisioning and configuration of the monitoring has been done, alerts generated from the management system should be automatically handled.

To support this level of automation, the management system should support open interfaces that can be integrated with toolsets already being used by the cloud service provider. For instance, cloud service providers are already using runbook automation tools like Dynamic Ops, HP Orchestration and others. The performance management system should offer APIs (application programming interfaces) or CLIs (Command Line Interfaces) to allow its integration with the existing automation/orchestration tools.

For alert management, service providers often use trouble ticketing systems such as HEAT, BMC Remedy and others. The management system must support interfaces that allow trouble tickets to be automatically opened when a problem is detected and automatically closed when a problem is fixed.

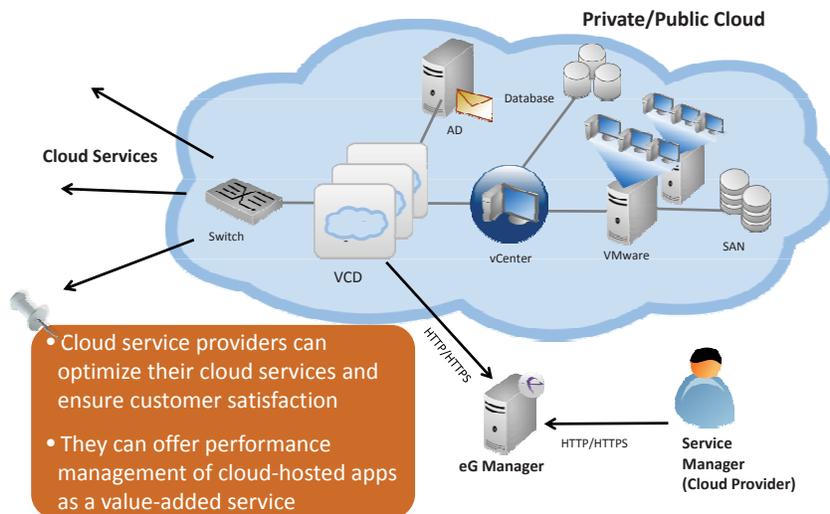


*Integration with orchestration / automation tools is a key consideration for a cloud monitoring system*

# What should you look for in a CLOUD PERFORMANCE MANAGEMENT SYSTEM?

## ■ ENABLES YOU (THE CLOUD SERVICE PROVIDER) TO OFFER MONITORING AS A VALUE-ADDED SERVICE TO YOUR CUSTOMERS:

The right performance management system will not only allow you to oversee the operation of your cloud service, but it can also allow you to offer monitoring as a value-added service to your customers. For this purpose, the management system should support multi-tenancy – i.e., the same management platform can be used to monitor networks, servers and applications for multiple enterprise customers. In this case, each customer gets a personalized login and when he/she logs in to the management system, they only get to see the parts of the infrastructure that they have been configured to access and get reports for. The monitoring service can offer monitoring of the cloud instances that the customer is using. Advanced monitoring can also be offered to customers, providing them in-depth insights into applications like databases, web servers, Java applications, that customers are hosting in the cloud.



*The cloud service provider's view of performance management FOR the cloud*

The key benefits to service providers from a management solution that monitors the cloud infrastructure are to:

- Ensure that the performance of the cloud infrastructure meets the expectation of users
- Facilitate effective provisioning of the cloud infrastructure to deliver the expected ROI without compromising on performance
- Enable the cloud service provider to provide performance metrics of the cloud as a value-added service to their customers

# What should you look for in a CLOUD PERFORMANCE MANAGEMENT SYSTEM?

## eG ENTERPRISE: PERFORMANCE ASSURANCE FROM, OF, AND FOR THE CLOUD

The eG Enterprise performance management, diagnosis, and reporting solution from eG Innovations is an integrated solution that supports performance assurance from, of, and for the cloud. The table below summarizes the different capabilities that make eG Enterprise a compelling choice for cloud performance management.

Cloud Performance Management Requirements	eG Enterprise Capabilities
<b>Performance Management From the Cloud</b>	<ul style="list-style-type: none"> <li>• 100% web-based architecture</li> <li>• HTTP/HTTPS for all communications</li> <li>• Agent-based or agentless monitoring flexibility</li> <li>• Active and passive monitoring approaches</li> <li>• Licensed per server, not per CPU core or socket or application</li> <li>• Wide Monitoring Coverage: Monitors 150+ applications, 10+ operating systems, 9+ virtualization platforms</li> </ul>
<b>Performance Management Of the Cloud</b>	<ul style="list-style-type: none"> <li>• Monitoring of service performance using active and passive approaches</li> <li>• Metrics on every layer and every infrastructure tier</li> <li>• Automatic correlation and diagnosis for root-cause diagnosis</li> <li>• Metrics collected are tuned for infrastructures with multiple domains of control</li> <li>• Ability to monitor cloud hosted and on-premises applications from the same console</li> </ul>
<b>Performance Management For the Cloud</b>	<ul style="list-style-type: none"> <li>• Monitoring the cloud infrastructure – the cloud platform, virtualization layer, network, storage, and the infrastructure services that support the cloud service</li> <li>• Scalable to support thousands of applications and instances</li> <li>• Multi-tenant – so multiple enterprises can be supported using the same management system</li> <li>• Web-based – monitor from any where, at any time</li> <li>• Allows for automated deployment and configuration of the monitoring</li> <li>• Easily integrates with trouble ticketing systems used by service providers</li> </ul>

# What should you look for in a CLOUD PERFORMANCE MANAGEMENT SYSTEM?

## CONCLUSION

In summary, cloud performance management needs to be considered from three different perspectives, each of which has unique needs. A comprehensive approach needs to incorporate performance management FROM the cloud, OF the cloud and FOR the cloud. This will provide IT operations management with a new best practice for cloud performance management via a much more holistic view into every tier of the cloud infrastructure than traditional silo-based approaches provide.

Srinivas Ramanathan is CEO and founder of eG Innovations. Prior to eG Innovations, he was a senior research scientist at Hewlett-Packard Laboratories in Palo Alto, California. Srinivas has extensive experience in Internet technologies, performance monitoring and management, and multimedia systems. He has co-authored more than forty technical papers and has been a co-inventor of 14 US patents. Srinivas has a PhD in Computer Science and Engineering from the University of California, San Diego and a Masters in Computer Science from the Indian Institute of Technology, Chennai, India.

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