A Unified Approach to SAP Performance Monitoring

How to Improve SAP User Experience & Productivity

An eG Innovations Technical White Paper

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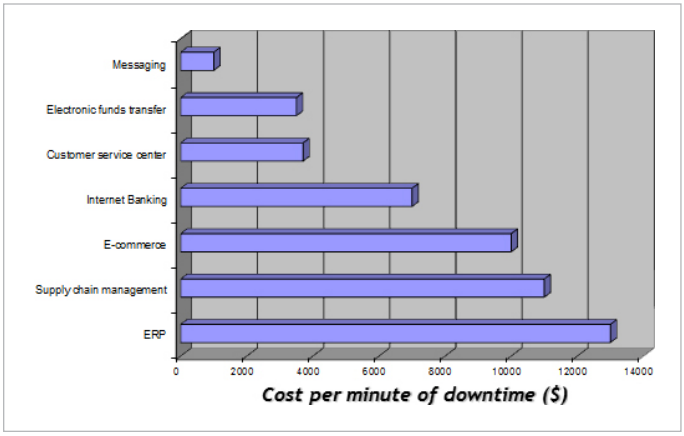
Total Performance Visibility

EXECUTIVE SUMMARY

When you think of mission critical applications in an enterprise network, the first one that comes to mind is SAP. With close to 25% market share, SAP is a clear leader in the enterprise resource planning segment. Over the years, SAP solutions are being used in different industries – banking, automotive, healthcare, defense, oil and gas, etc. - and business lines – asset management, human resources, supply chain and management, finance, corporate strategy & sustainability, etc.

Many organizations run critical business processes on SAP infrastructures. Unavailability or even slow performance of SAP for a short period of time can cost an organization tens of thousands of dollars in lost revenue. Figure 1 below from a report by Standish Company and Computer Associates compares the cost of downtime for different enterprise applications. Notice that the cost of downtime is the maximum for ERP applications like SAP.



Source: The Standish Company and Computer Associates

Figure 1 – Comparison of the cost per minute of downtime for different application use cases. ERP happens to be the most critical application use case with the highest cost per minute of downtime.

In this whitepaper, we will discuss why performance monitoring and management of SAP is becoming even more important than it was in the past. We will enumerate key considerations that you will need to keep in mind as you assess what is an ideal performance management system for your SAP infrastructure.

According to Gartner, SAP has 24% market share in the ERP segment. Oracle is second with 13%, while Sage is third with 6%.

SAP INFRASTRUCTURES TODAY: HETEROGENEOUS, MULTI-TIER, VIRTUALIZED

Several years ago, SAP infrastructures were relatively simple – a user would use a thick client to connect to an SAP R/3 system which in turn used a backend database. Over the years this simple, three tier architecture has given way to a significantly more complex, n-tier architecture (See Figure 2).

As web-based access has become mandatory and to allow easier application development, SAP now supports a Java front-end. As the volume of data that needs to be handled has increased, different high performance database options including in-memory databases like SAP HANA are being used. Since SAP has a wider use, multiple instances of each tier are necessary. As a result, load balancing and communication between instances of a tier become important. In some cases, different instances can be used for different functions in the enterprise, resulting in additional complexity.

The infrastructure is also very heterogeneous – the front-end, the core business application and the backend could also come from different tiers. As SAP has provided additional functionality in its offering, third party integration – e.g., with mailing systems, print servers, external applications, etc. – is also supported.

SAP access is now supported over a variety of clients. Web-based access is enabled from the browser itself. Many enterprises use Citrix and other thin-client technologies for client access – thick clients are published on the servers and users

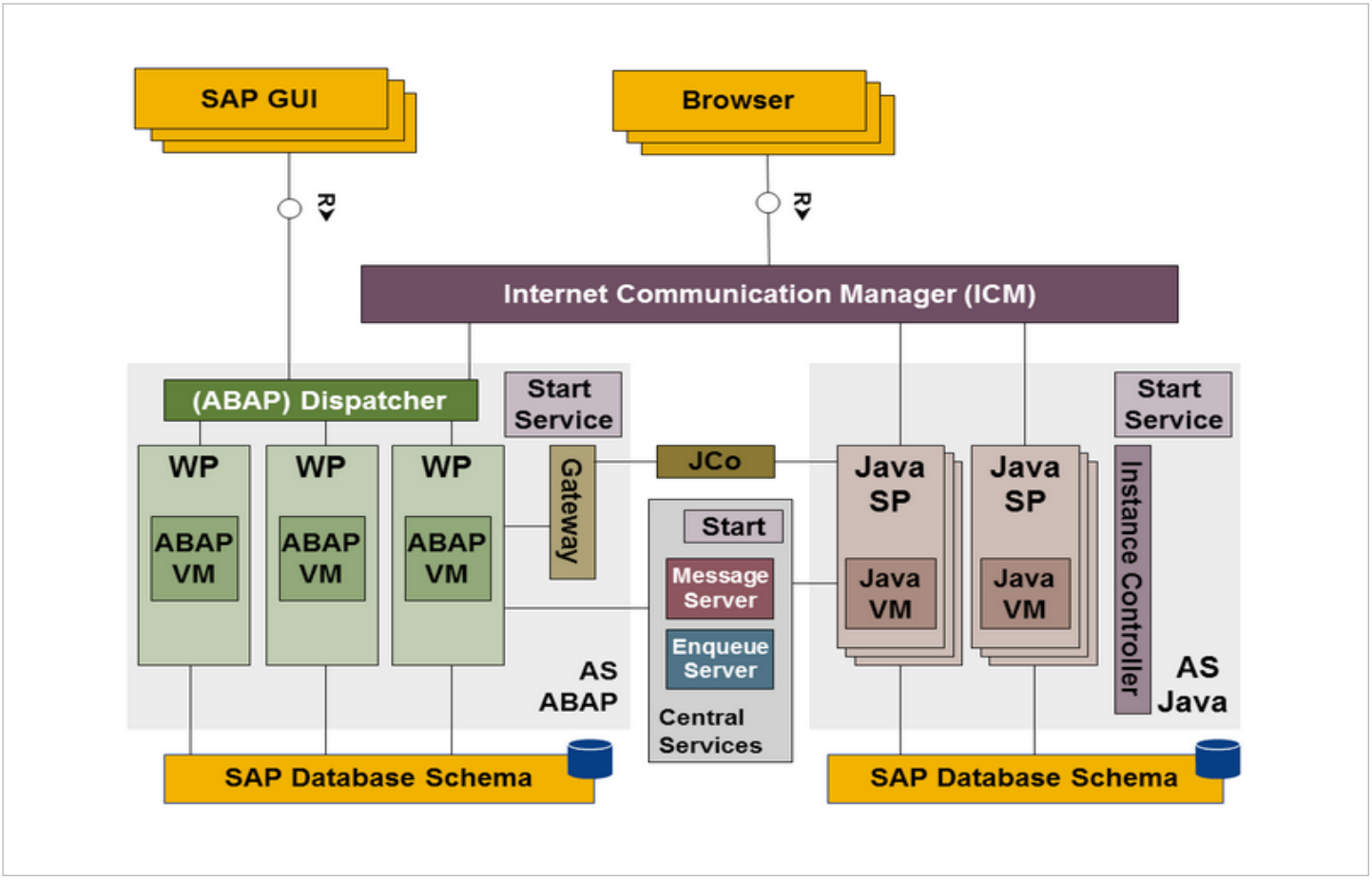


Figure 2 – An SAP dual-stack architecture with the different components that need to function for SAP access to perform well.

access these client applications from thin client terminals or desktops remotely. Access from mobile device is a trend that is just emerging.

Another interesting and important trend is the increasing adoption of virtualization technologies such as VMware vSphere and Microsoft Hyper-V in SAP infrastructures. As virtualization technology has matured, enterprises are starting to deploy every tier of the SAP infrastructure on virtual machines. A recent VMware study of enterprises infrastructures revealed that in the last few years, the segment of applications that is seeing the highest rate of increase in adoption of virtualization is the tier-1 business critical applications including SAP. The latest estimates indicate that over 40% of SAP installations are now virtualized. The ability to respond quickly to business needs, faster deployment cycles, better utilization of key resources (through resource sharing), easy manageability and scalability are some of the reasons why enterprises are looking to virtualize their mission critical applications.

SAP virtualization has been slow to take off - mainly due to fear of performance degradation. In 2010, only 18% of SAP installations were virtualized. In comparison, over 43% of Microsoft SQL installations were virtualized.

Overall, as Figure 3 illustrates SAP infrastructures have evolved significantly in scale and complexity. This makes managing the SAP infrastructure challenging because a failure or slowdown in any tier of the infrastructure can result in SAP slowdown.

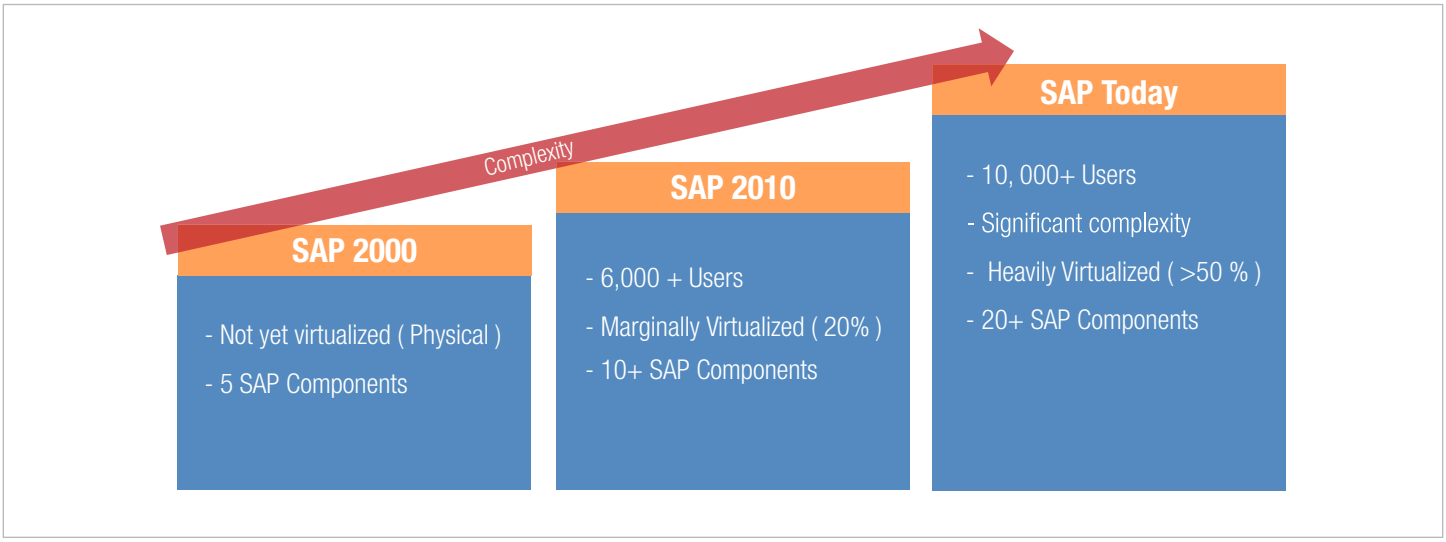


Figure 3 – Illustration of the growing complexity of SAP infrastructures

WHY IS SAP PERFORMANCE MONITORING HARD?

Many operations teams look at their SAP infrastructure as a collection of individual tiers – the network tier, the Java tier, the SAP tier, the database tier, the storage tier, and the virtualization tier. However, SAP users do not look at the infrastructure this way. To them what matters is the quality of service delivered to them – i.e., is SAP working, how fast is the access, and how quickly can they perform their tasks? When a performance problem occurs, user complaints are often that "SAP is slow" or "SAP is not working". After all, SAP is the service that the user is accessing.

More often than not, when the helpdesk receives a complaint from an SAP user, the complaint is forwarded to the SAP administrator – after all, the user complaint is about SAP slowness or access. The challenge for the SAP administrator is that the problem may not always be in the SAP tier. For instance, a slow VMware server can impact SAP performance. Likewise, excessive locking in the database tier can slow SAP access. In such situations, with very little or no visibility to the other infrastructure tiers, the SAP administrator has to struggle to resolve the user complaint resulting in long time to repair and resolution. This results in lack of user satisfaction, loss of user productivity and overall lost revenue for the business.

What most IT organizations do not understand is that the SAP infrastructure is providing a service and the SAP service is delivered through the cooperation of a number of infrastructure tiers. So a problem in any one tier can impact the user experience. For instance, consider the SAP infrastructure shown in Figure 4. In this example, the user is connecting through a firewall to a web front-end, and then from the web-front end to an SAP ABAP instance. The user transaction executes on the SAP ABAP instance and relies on a backend database server. Suppose the database tier is 50% slower than normal. This causes the SAP ABAP instance to be slow since it relies on the database. When the SAP ABAP instance is slow, the web server becomes slow – user requests take longer to process - and the user notices the slowness and complains.

Notice how a problem in one of the tiers has impacted all the other tiers and ultimately the user experience. The inter-dependencies between SAP tiers makes problem diagnosis challenging. To be effective, an SAP performance management tool must understand the inter-dependencies between these tiers and use this information to segregate the cause of a problem from its effects.

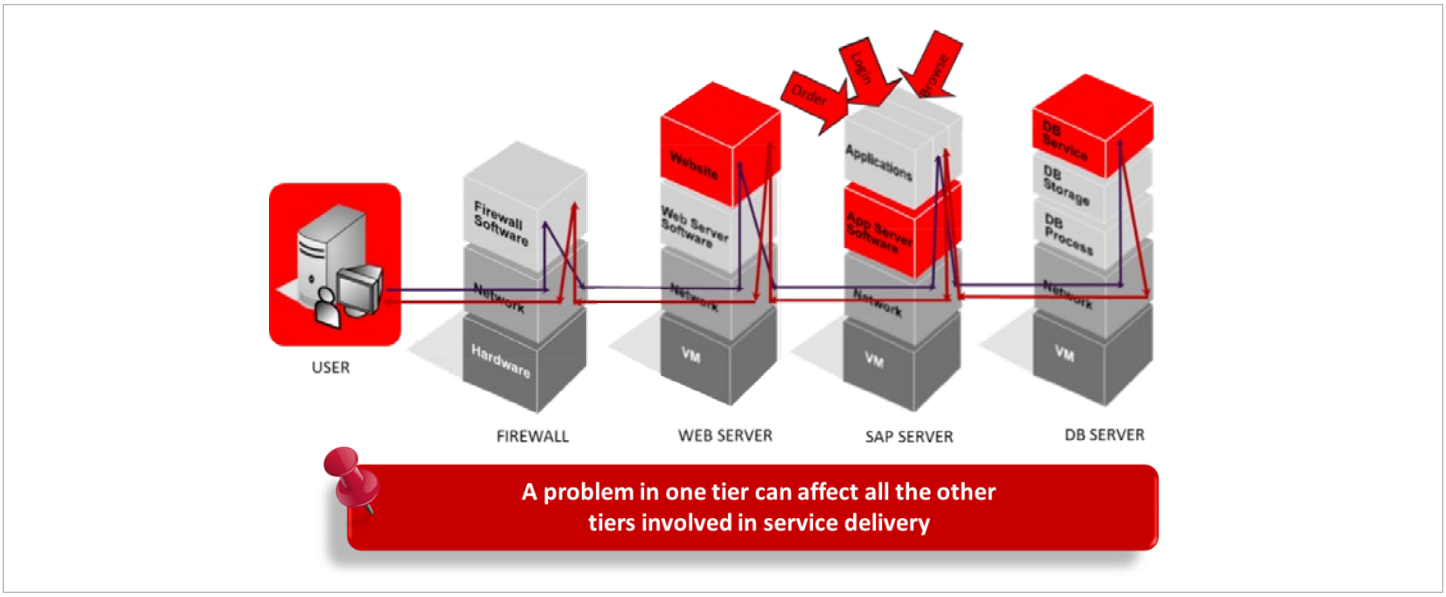


Figure 4 – A problem in any tier of the SAP infrastructure can impact the other dependent tiers, making problem diagnosis hard.

VIRTUALIZATION MAKES PROBLEM DIAGNOSIS EVEN HARDER

In the example of Figure 4, if the applications were running on physical servers, we could have concluded that the problem originated in the database tier. Notice in Figure 5 that the application tiers are all hosted on virtual machines. How does this change the way we would diagnose the cause of a problem?

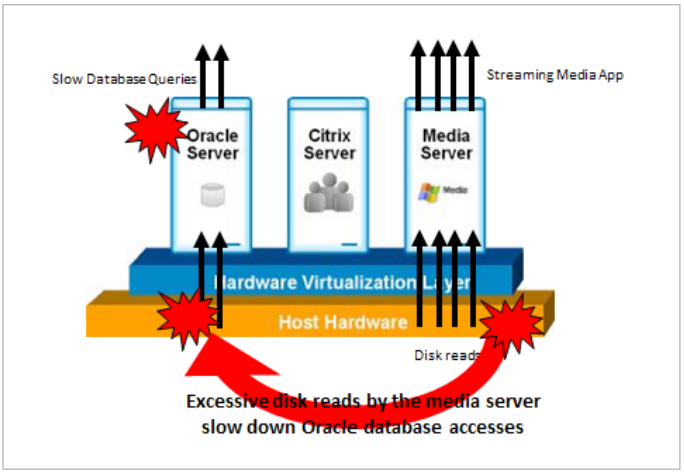


Figure 5 – Multiple VMs hosted on a single physical machine

Consider the scenario shown in Figure 5. The database server from Figure 4 is hosted on a VM that is running on a physical machine. This physical machine is also hosting another VM that has a media server running on it. The media server is receiving a number of requests to stream videos. These requests are causing a lot of disk reads from the VM, in turn causing a lot of IOPS on the physical machine's disk, and slowing down all disk accesses from the physical machine. As a result, the database server and its queries which also rely on the physical machine's disk are affected. Since the database server is slow, SAP performance is poor.

From this example, we can see that virtualization introduces new dependencies that have to be considered for effective SAP performance management. In this example, a media server that was in no way related to the SAP service, was affecting the performance of the service.

According to Aberdeen group, enterprises that have not adopted SAP virtualization perceived that the top most concern about virtualization was performance.

OPTIONS FOR SAP PERFORMANCE MONITORING

Until recently, SAP performance monitoring was almost entirely focused on the SAP tier. SAP's CCMS console was a primary means of tracking the performance of SAP instances. Recently, SAP and VMware have made available basic virtualization metrics through the OS07N SAP transaction. Now using SAP's CCMS, the administrator can have visibility into two of the tiers – SAP and VMware, but not the other tiers. Even with SAP CCMS and the VMware integration, administrators still have to manually correlate and analyze both SAP and VMware metrics to effectively monitor the SAP infrastructure.

A commonly used alternative to SAP CCMS is SAP Solution Manager. SAP Solution Manager provides a more integrated monitoring and reporting solution with additional visibility into the database tier. However, SAP Solution Manager has limited visibility into the SAP Java stack. For additional visibility into the SAP Java stack, a separate monitoring tool- e.g., CA Wily – is required. To provide visibility into other non-SAP tiers, SAP now provides the SAP IT Infrastructure Management solution. However, this is more of a configuration management database than a performance monitoring solution.

Overall to get complete visibility into the SAP environment, organizations have to use different silo monitoring tools – for SAP, database servers, Java stacks, VMware servers, the storage tier, the network tier, etc. Each of the tiers has a different domain expert responsible for that tier. As a result of this decentralized view of the infrastructure, when a user complains about a performance problem, the SAP service desk has to often struggle to identify which domain expert they need to contact to resolve the problem. As we have seen earlier, an SAP environment is very inter-dependent - a problem with one tier can affect the other dependent tiers. Therefore, without a correlated single pane of glass view into the entire SAP service end-to-end, an SAP service manager has to spend hours analyzing all the information obtained from different domain experts to determine which tier could be the root cause of the performance bottleneck.

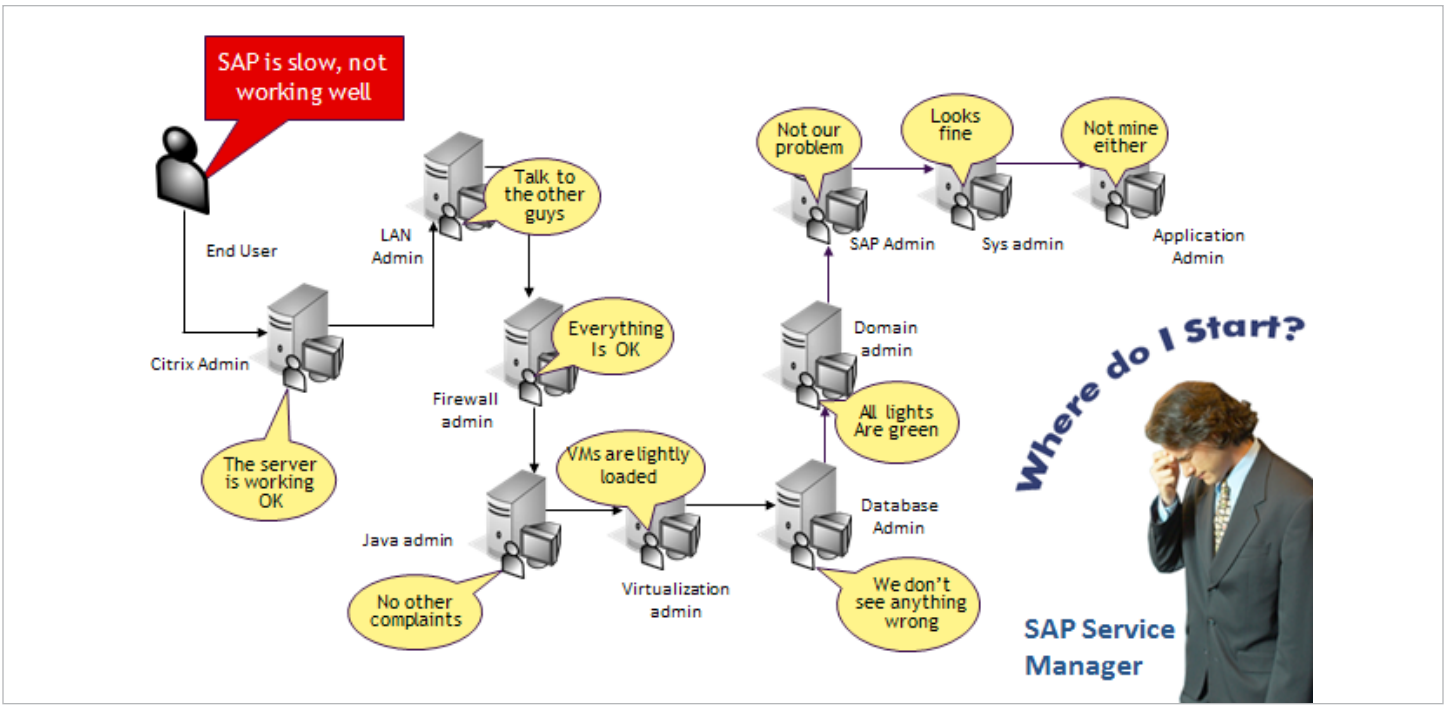


Figure 6 – The challenge of using multiple tool sets and relying on multiple administrators to support the SAP service

The drawbacks of a manual multi-tool monitoring and management approach for SAP are many:

- Problem diagnosis takes a long time, resulting in long downtimes or periods of slowness. This can result in user dissatisfaction and loss of productivity.
- Finger pointing becomes a trend. For instance if there is problem, the database administrator may blame the storage administrator, the storage administrator may blame the VMware administrator and VMware administrator may blame the server administrator (See Figure 6). Finger pointing causes tremendous wastage of IT resources, excessive delays in solving problems and poor user experience.
- Organizations have to employ domain experts and specialized silo tools for different tiers of the SAP infrastructure. Needing experts to analyze performance every time there is a problem increases the cost of operation of the infrastructure.
- In a manual multi-tool monitoring environment, service managers do not have the visibility into all the different tiers and their respective monitoring tools. Often, they also do not have the expertise to drill down into the performance of different tiers. Therefore, many a times, cross domain problems may go undetected. Therefore, with this multi-tool approach SAP performance monitoring is often reactive, and not proactive – i.e., users detect and report problems before administrators notice them.

NEXT GEN SAP PERFORMANCE MONITORING & MANAGEMENT

A next-gen SAP performance monitoring and management system can address the above drawbacks. Here are the main requirements for such a solution:

- Monitor the end user experience and alert on it, so administrators can be alerted to problems at the earliest;
- Monitor every layer and every tier of the SAP infrastructure (network, storage, virtualization, SAP ABAP and Java stack, databases, web, Citrix, etc.), so administrators have a single dashboard that provides an end-to-end view;
- Simple to install and implement, so adoption can be easy and must support all the key operating systems on which SAP applications run;
- Alert proactively so that SAP service managers identify and resolve issues before users experience them;
- Auto correlate metrics and automatically pinpoint the root cause of problems without requiring manual intervention, so even lesser skilled service desk/help desk operators can use the solution;
- Provide extensive reports that enable administrators to optimize their infrastructure and get more out of their investments; Facilitate effective capacity planning so administrators know how to invest wisely; Enable effective post-mortem diagnosis so problems can be detected and fixed with minimal effort;

Figure 7 – An analogy highlighting the benefits of a next-gen SAP performance monitoring solution

Let us use an analogy to summarize how a next gen performance management solution for SAP differs from the current multi-tool approach (See Figure 7). In the past, we used to travel from one place to another

using a map. Now compare this with how we do the same thing today – using a GPS. Key benefits that come to mind immediately include speed of access, convenience, intelligence, and ease of use. The difference between a manual approach to SAP performance management involving multiple tools and an integrated, correlated approach is exactly the same. An intelligent, integrated next gen performance management system for SAP enables faster diagnosis, convenience as in less time spent on routine issues and ease of use, so it does not need an expert to operate it.

eG ENTERPRISE: SERVICE MANAGEMENT FOR SAP

The eG Enterprise solution from eG Innovations addresses the key requirements for a next-gen SAP management solution that we enumerated earlier. To highlight the capabilities of the eG Enterprise solution for SAP performance management, let us take a real-world example.

Monitoring the SAP User Experience

Figure 8 illustrates the eG Enterprise console showing the performance of an SAP service called *"stock_tracker"*. This service is an SAP system to track the stock of inventory in a warehouse. In this example, users are accessing the SAP service through a web browser. To monitor the performance of the business service, eG Enterprise can use either an active or a passive approach. In the active approach, a series of user interactions to the service can be recorded and stored in a script file and these interactions can be replayed periodically to determine if the service is working and how quickly it is responding to user requests. In a passive approach, eG Enterprise embeds a light-weight adapter to the web server. Using this web adapter,

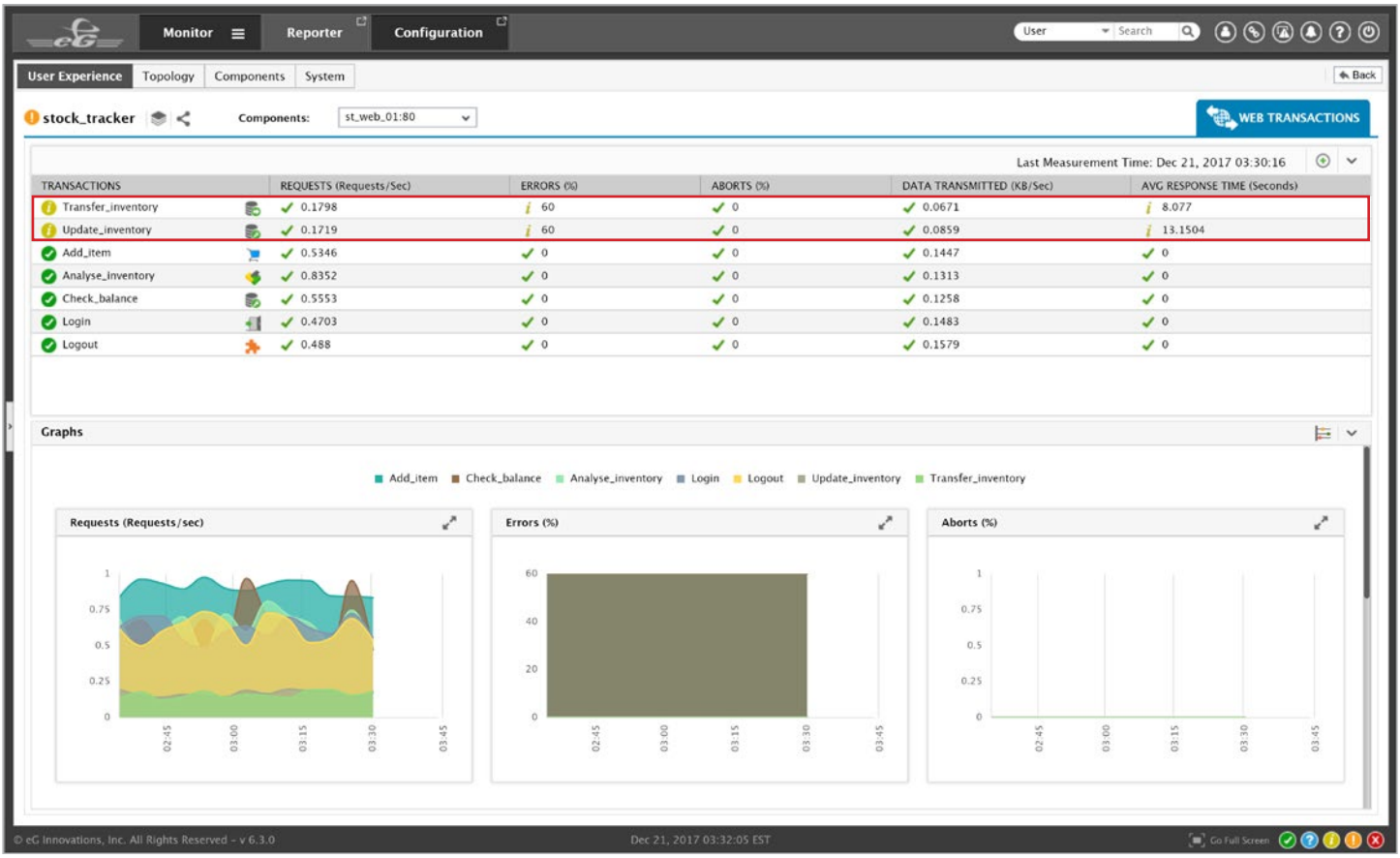


Figure 8 – Real-time monitoring of web transactions for an SAP service. Two of the transactions are currently experiencing slowness.

eG Enterprise watches HTTP/S requests going to the web server and the corresponding responses from the web server. By observing the requests and responses, eG Enterprise detects the performance of the web service.

Figure 8 shows the metrics obtained using eG Enterprise's passive web monitoring technology. The transactions to be monitored are specified by the administrator. Each transaction maps to a URL pattern that the eG web adapter watches for. As you can see from Figure 8, currently the stock_tracker service is experiencing slowness. Two of the transactions – *Transfer_inventory* and *Update_inventory* are reporting slow response times and about 60% of the transactions are seeing errors.

From the color codes of these transactions, it is clear that eG Enterprise has detected an issue. Based on Figure 8, a helpdesk person can understand that there is a problem that is impacting the user experience. But what is causing this issue – is it the network? or the database? or the virtualization platform? or SAP? or storage? The subsequent drilldowns into eG Enterprise reveal the answer.

Identifying the Problem Tiers

Figure 9 shows the topology of the *stock_tracker* service. The topology shows the applications and servers involved in supporting the service and the inter-dependencies between them. Walking the topology diagram of Figure 9 from left to right, one can see that the user on the left extreme is connecting to one of two web servers supporting the *stock_tracker* service. The web servers forward requests on to a load balanced cluster of SAP Java Application servers which in turn pass the user request to a SAP ABAP (R/3) instance. The SAP ABAP instance uses an Oracle database server for the backend.

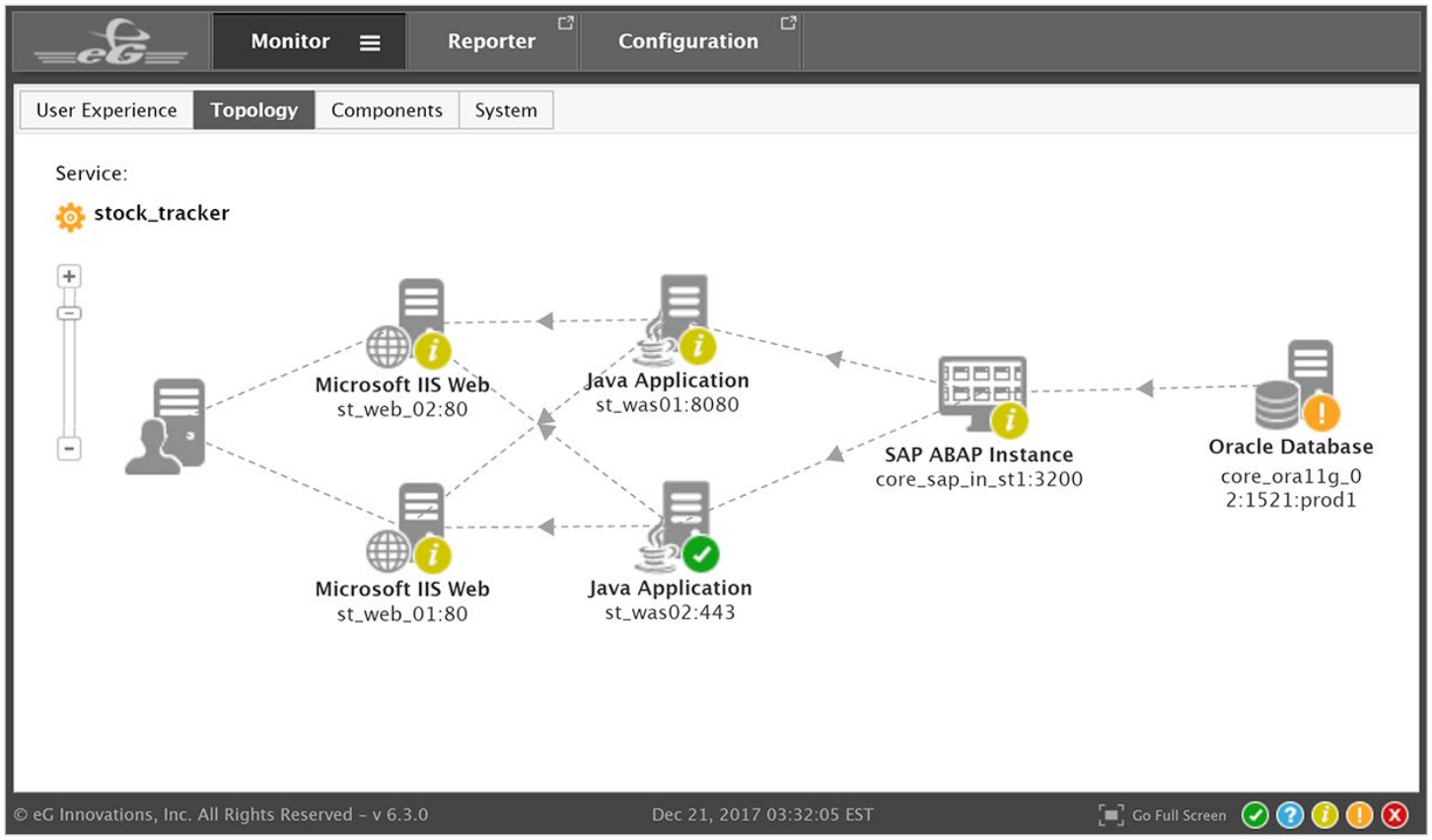


Figure 9 – Topology graph of the stock_tracker service

eG Enterprise has agent and agent-less monitors to obtain metrics from the different tiers of the infrastructure. The color codes in Figure 9 depict the state of each tier. Green indicates normalcy while different shades of red indicate different severities of problems. As one can see from the color codes in Figure 9, the web servers, a Java Application server stack, the SAP server and the Oracle database server are all having issues. We have seen what the issue at the web server tier is – transactions are slow. Let us look at the other tiers.

Drilldowns into Each Tier for Further Diagnosis

Figure 10 shows the drilldown into the *st_was01* SAP Java stack of Figure 9. A Java application server can be a complex piece of software with several threads running, many classes being loaded, memory management happening, etc. When monitoring a single Java application stack, the monitoring system can collect hundreds of metrics. If these metrics were all displayed to the administrator on a single screen, it would take a long time for him/her to understand what is going on.

To simplify this process, eG Enterprise uses a layer model representation to depict the state of the Java application stack. The layer model is loosely based on the OSI model of the protocol stack. OSI was a theoretical model, whereas eG Enterprise includes practical in-depth models for every application and virtualization platform. Figure 10 shows the layer model for Java application stack on the left hand side.

Walking the layer model bottom up, you can see that the operating system which tracks the CPU, memory, and disk resources of the server is doing well. The network layer also looks good, and from the Application Processes layer, it appears that the key application daemon processes are also running.

The Java virtual machine (JVM) internals layer is showing an issue. On the right hand side, you see the tests mapped to this layer. The *JVM Threads* test is showing an issue. From the measurements panel at the bottom of Figure 10, it is clear that a high number of Java threads are waiting. If most of the threads are waiting, the Java application will become slower and slower and the user response will be poor.

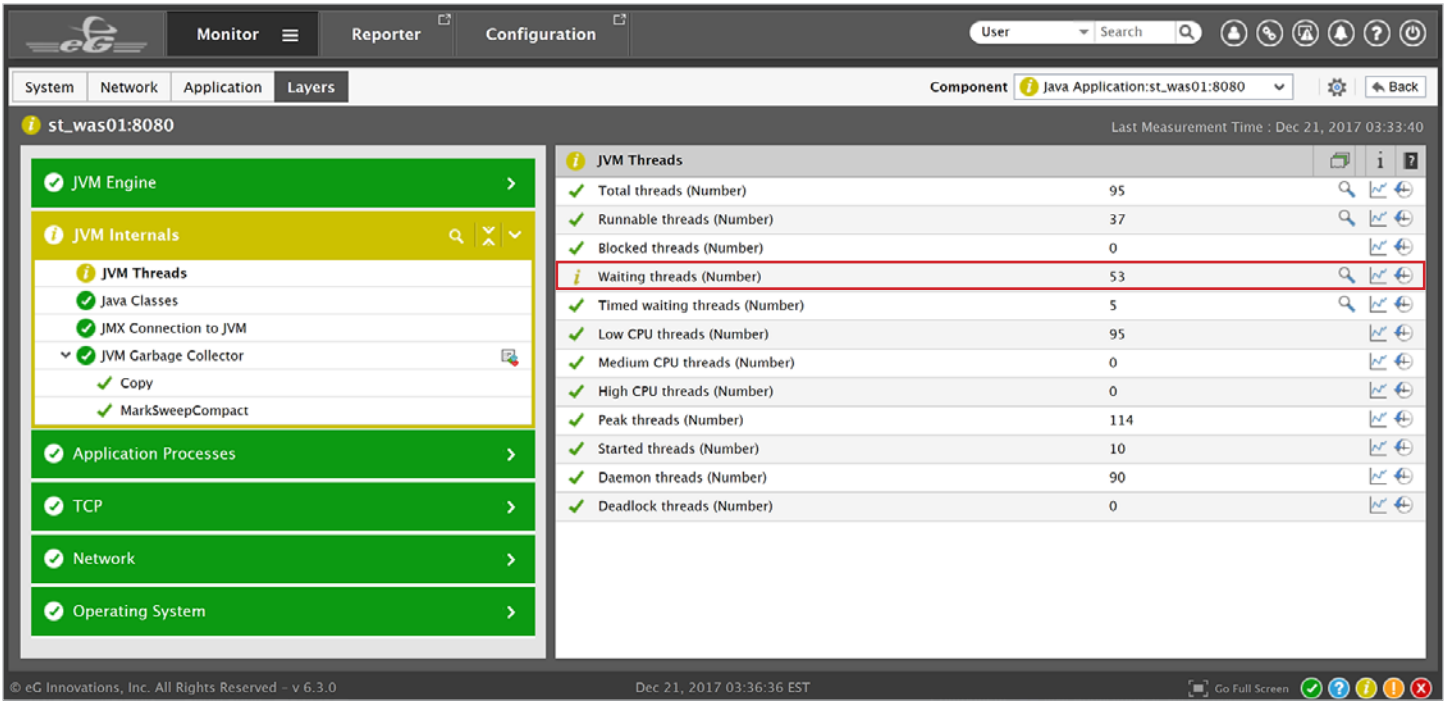


Figure 10 – Drilldown into the SAP Java stack showing many waiting threads

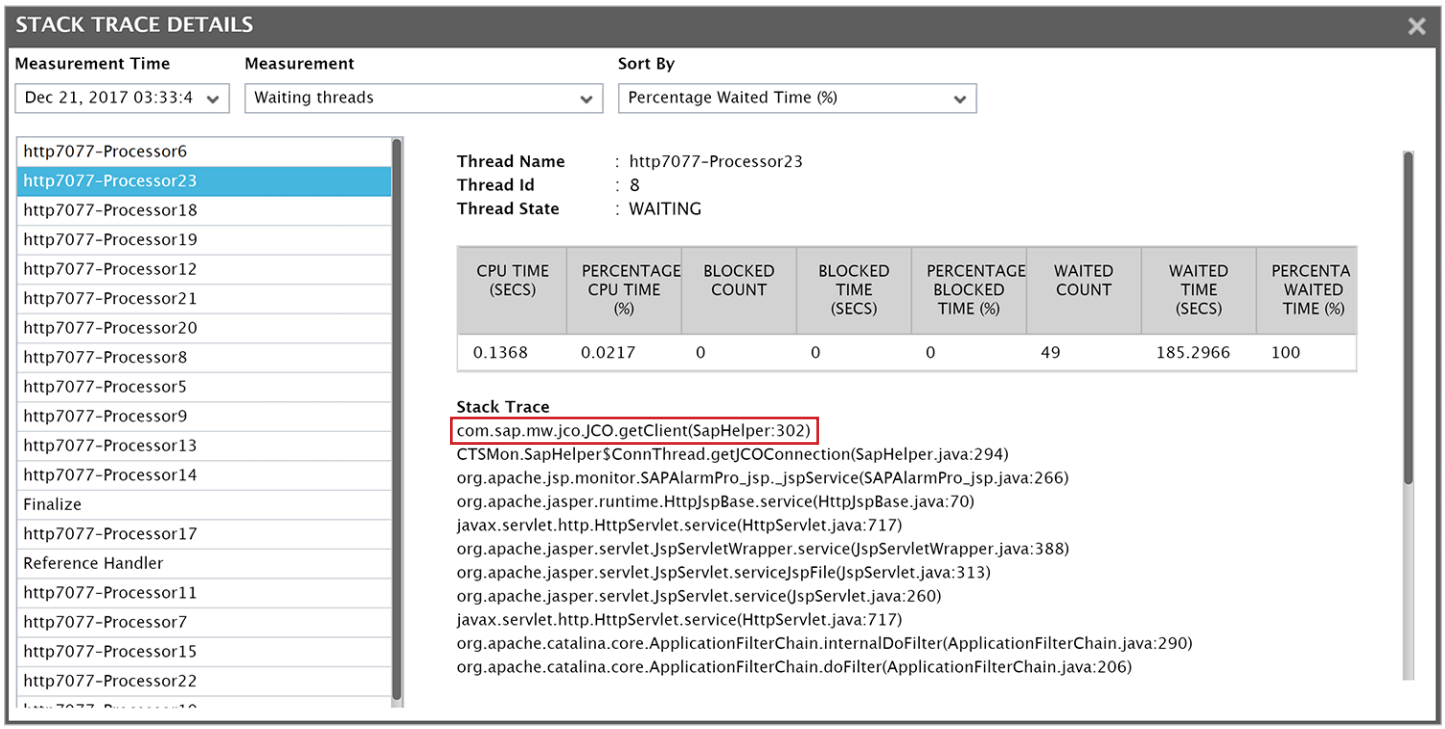


Figure 11 – Diagnosis of the Waiting threads measure showing that all the thread are stuck waiting for the SAP server's response.

So what are these threads waiting for? The diagnosis icon next to the problem measure provides this detail. Figure 11 shows the detailed diagnosis for the *Waiting threads* measure.

The stack trace in the diagnosis shows exactly where each thread is stuck. Notice from the stack trace that the threads have issued Java API calls to the SAP system and are waiting. You can see the exact method where the thread got into a waiting state - *com.sap.mw.jco.JCO.getClient*. This gives us a clue that the Java threads are stuck waiting for the SAP server's response.

The next question then is why the SAP server not responding? To answer this, let us drill down into the SAP ABAP instance in the topology diagram of Figure 9. The drill down reveals the SAP ABAP instance's layer model (See Figure 12). The bottom layers – the OS, network, TCP, processes – are all similar for any TCP/IP application. The layers above the processes layer - SAP Basis layer, the work processes, the gateway and user sessions/transactions - are specific to the SAP ABAP instance. These layers track several key metrics about the SAP instance – for instance, are the buffers of the SAP R/3 server sized appropriately? Are there unusually high swap ins/outs from the SAP buffers? Is there any delay in the database update process? How many requests are queued waiting for free worker processes/data locks? Are any dumps happening? etc.

In Figure 12, the R/3 components layer of the SAP ABAP instance *core_sap_in_st1* is showing an alert. From the tests on the right hand side, you can see that there is something abnormal with the dialog work processes. The measurements panel below shows that a high percentage of the work processes is on hold. When a user connects to the SAP ABAP instance, the user is assigned a SAP dialog work process that performs the tasks requested by the user. When the number of work processes reaches a pre-configured maximum limit, other users will not be able to access the SAP system.

In this case, 97% of the work processes are on hold – which is abnormal. The diagnosis icon next to the problematic measure provides more details on these work processes on hold (See Figure 13).

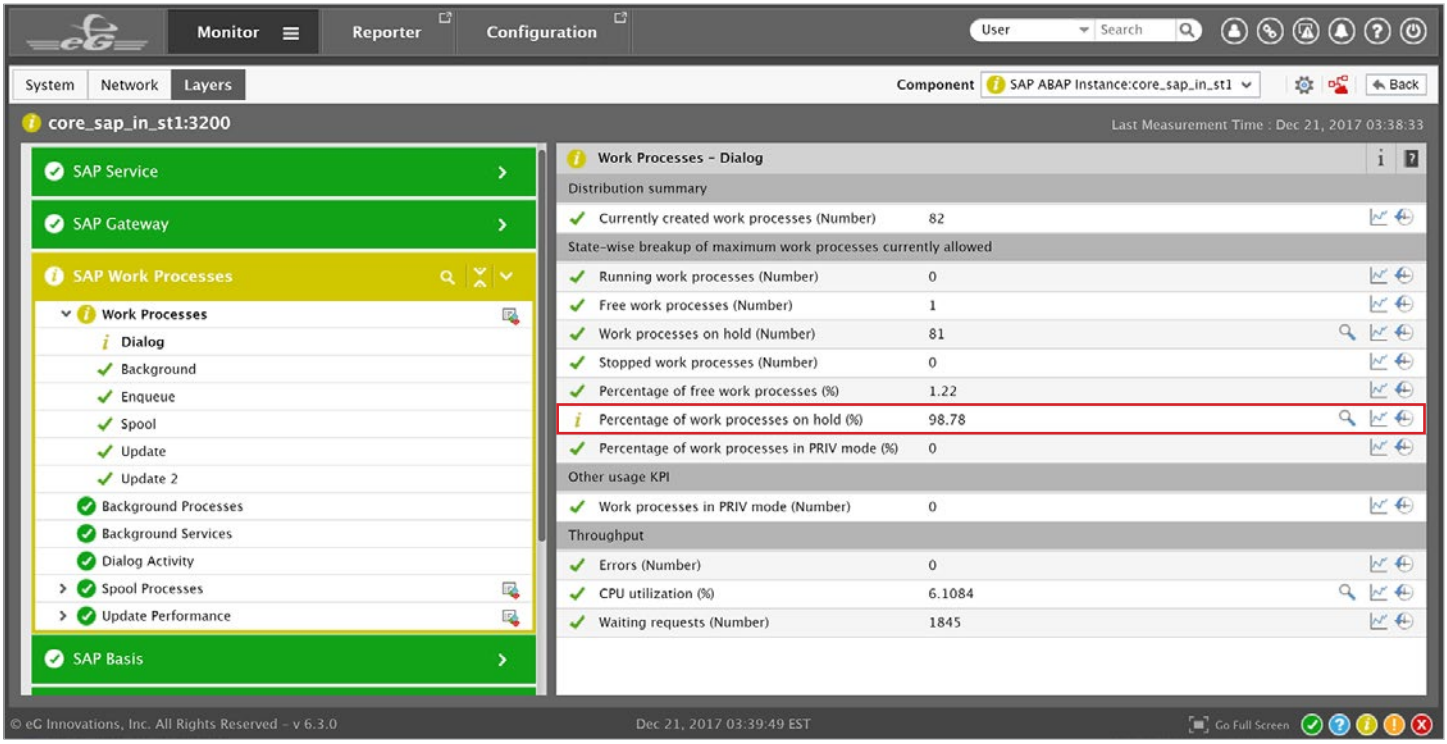


Figure 12 – Drilldown into the SAP ABAP instance showing that many dialog work processes are on hold.

Notice that this is not a case of one user using all the work processes. Different users have logged in and their work processes are on hold. Everything else in the SAP ABAP instance seems to be normal. So from the SAP instance model, we do not know why the work processes are on hold.

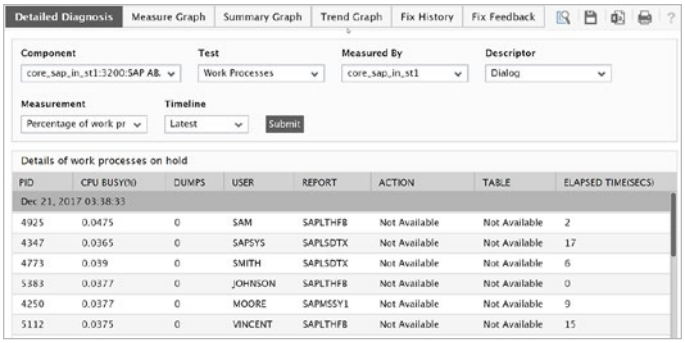


Figure 13 – Details of SAP work processes that are on hold.

To diagnose further, let us go back to the service topology diagram of Figure 9. Looking at the color cues on the different tiers, it is clear that the Oracle database server *core_ora11g_02:1521:prod1* is seeing a more severe problem than the other tiers. Figure 14 shows the drilldown into the Oracle database tier.

Identifying Application to Virtualization Dependencies

If the Oracle database server *core_ora11g_02:1521:prod1* was hosted on a physical machine, the next drill down would have zoomed into the Oracle database server. In this case, the monitoring tool has automatically discovered that the Oracle database *core_ora11g_02:1521:prod1* is running on a virtual machine which is hosted on an ESX server *esx5_sfdc_02*.

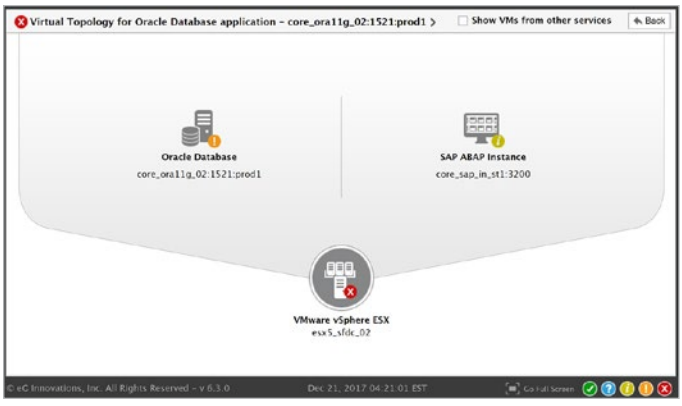


Figure 14 – Virtual topology showing that the Oracle database server core_ora11g_02:1521:prod1 is currently executing on ESX server esx5_sfdc_02

Figure 14 depicts the virtual topology graph showing all the applications hosted on the VMware ESX server *esx5_sfdc_02*. Since the virtual machine to physical machine dependency can change dynamically (based on vMotion), eG Enterprise discovers the virtual topology changes automatically, in real-time.

Drilling down on the Oracle database server, an administrator can identify the problem with it. Figure 15 shows the layer model of the Oracle database server – *core_ora11g_02:1521:prod1*. From this figure, it is clear that there are errors related to the Oracle database server's archive log.

When an Oracle archive log write fails repeatedly, SAP connections can hang. This is why we were seeing a problem in the SAP tier.

But why are writes to the Oracle database server's archive log failing? The obvious place to check is in the Operating system layer to see if the D: drive could be full. However, Figure 17 shows that there is sufficient disk space available on the D: drive. If so, why are Oracle archive log update failures happening? The virtual topology diagram of Figure 14 holds the answer.

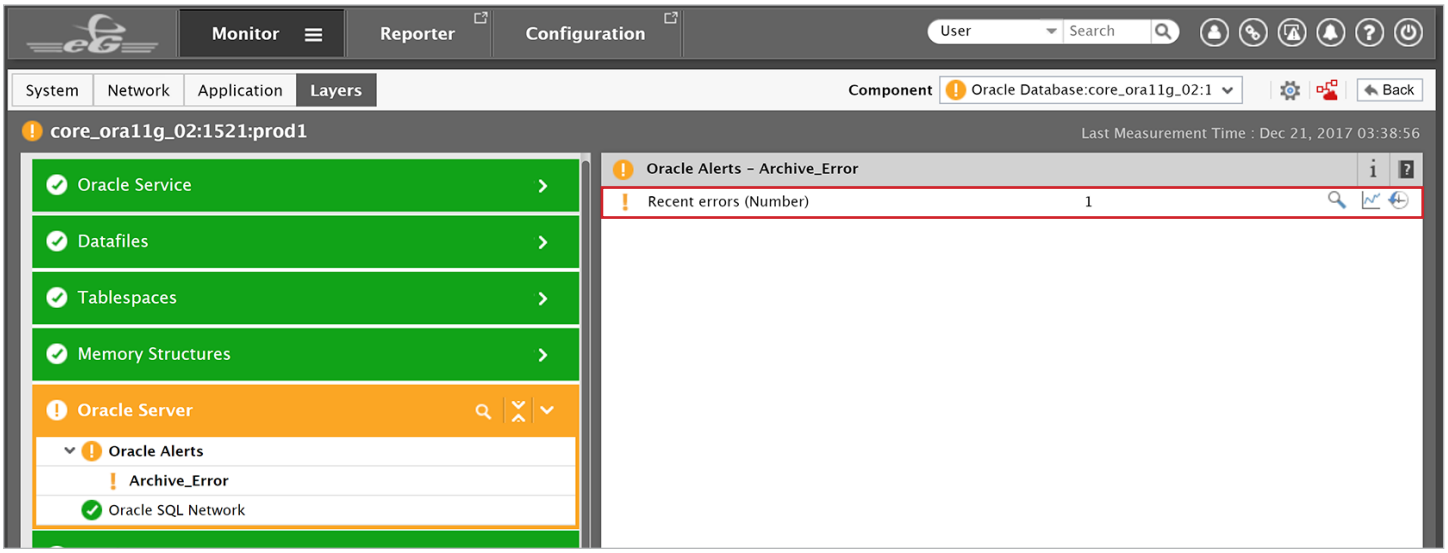


Figure 15 – A drilldown into the Oracle database server core_ora11g_02:1521:prod1 shows that errors with the Oracle archive log are occurring.

Figure 16 below provides details of the Oracle archive log error messages. As you can see from this figure, there were write failures to the archive log file on the D: drive of the Oracle database server. SAP domain experts can relate to this problem.

Notice in Figure 14 that the ESX *server esx5_sfdc_02* is in a critical alert state. That is, the monitoring solution has concluded that a critical event on the ESX server is impacting the performance of the Oracle database server.

Lists the recent errors in the Oracle alert log file
ORACLEALERTS
Dec 21, 2017 03:38:56
Errors in file e:/app/abrar/diag/rdbms/multi/multi/trace/multi_arc1_3256.trc:
ORA-19504: failed to create file "D:/ARCHIVE/ARC0000048557_0791999298.0001"
ORA-27044: unable to write the header block of file
OSD-04008: WriteFile() failure, unable to write to file

Figure 16 – Details of the archive log errors seen on the Oracle database server core_ora11g_02:1521:prod1

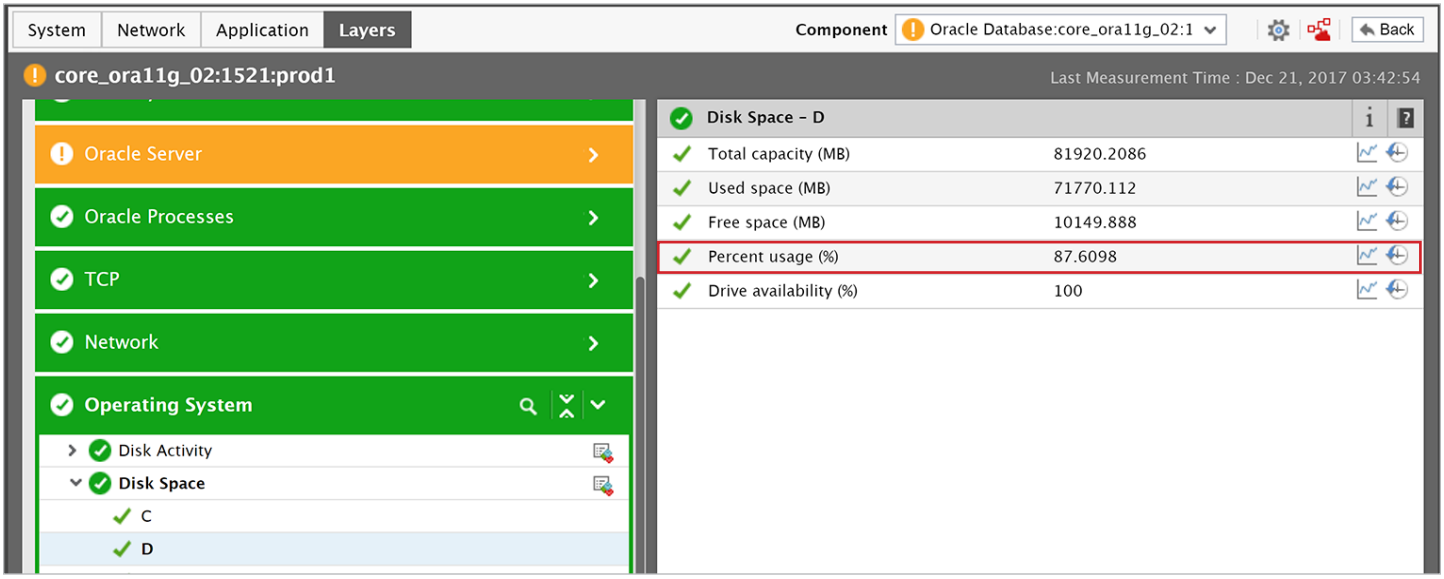


Figure 17 – A drilldown into the database server's Operating System layer, showing that the D: drive still has more than 12% of free space

Figure 18 below provides details on the ESX server *esx5_sfdc_02*. From this figure, it is clear that one of its datastores – Storage_dc – has run out of space. From the measurements panel below, we can see that Physical disk space usage is close to 100%. This is where the root-cause of the SAP performance problem lies.

To understand why a datastore problem on the ESX server can affect an application running on one of its VMs, refer Figure 19. This figure shows that the virtual machine on which the Oracle database server is running has been thin provisioned. Thin provisioning is a great way to efficiently use space at the virtualization platform level. Although a VM may be allocated a lot of space, with thin provisioning, all of this space is not statically reserved for the VM. The hypervisor will allocate space dynamically – when a VM needs it. This results in better disk space sharing among VMs. But it also can complicate the way we

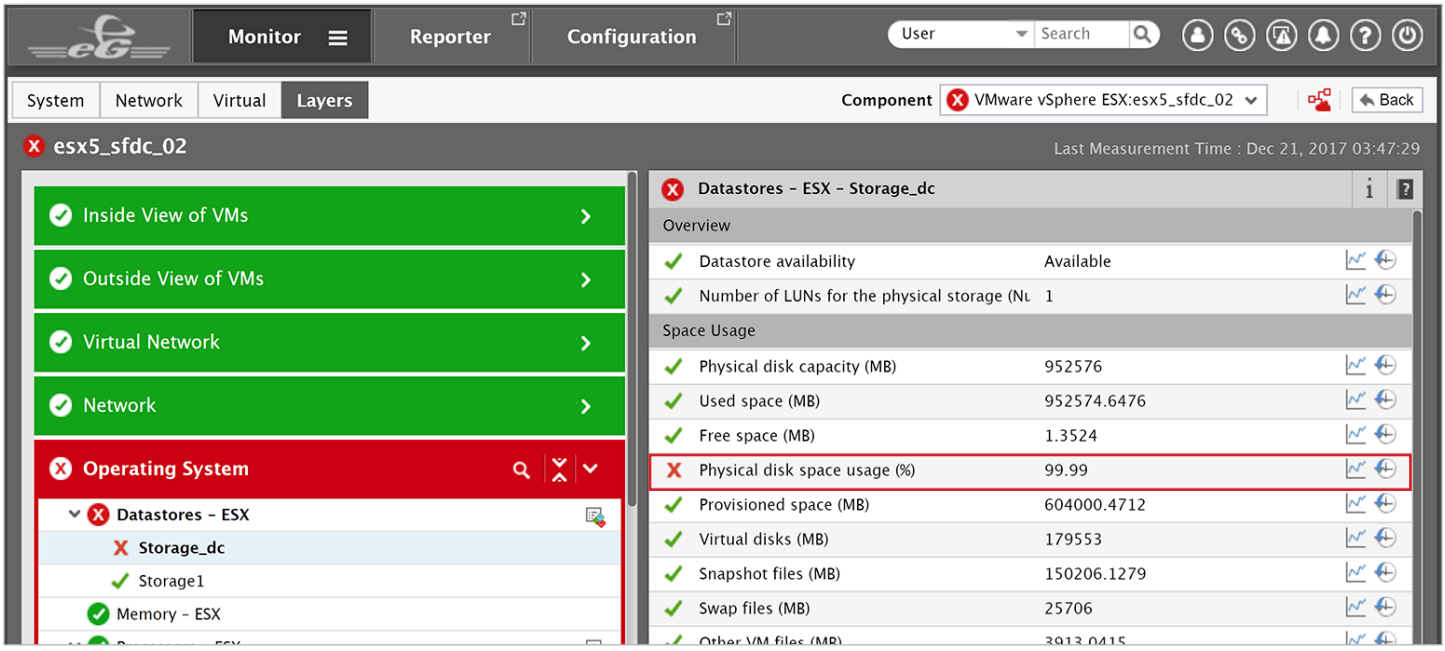


Figure 18 – A space issue with one of the datastores of the VMware ESX server, esx5_sfdc_02

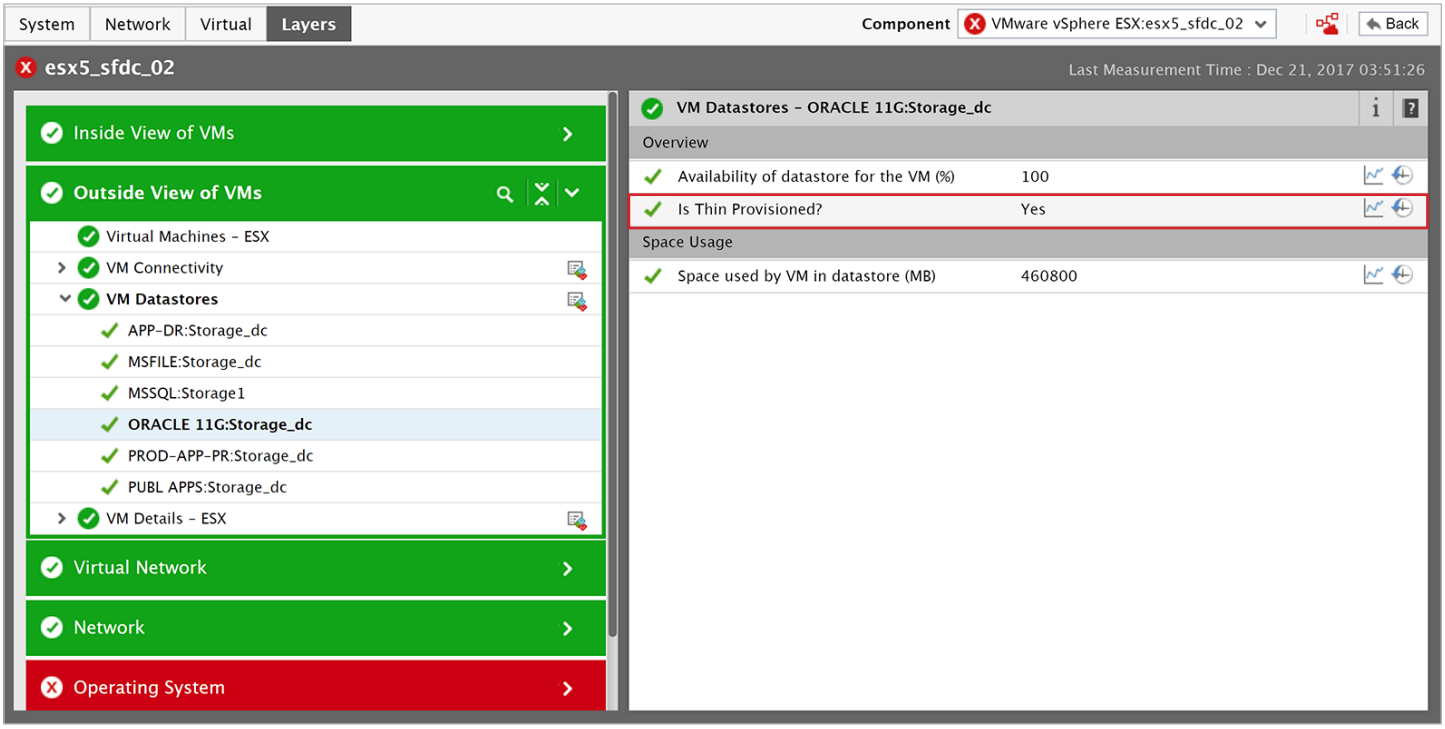


Figure 19 – Layer model of the VMware ESX server, esx5_sfdc_02, revealing that the Oracle database server's VM has been thin provisioned.

troubleshoot applications. In this example, since the datastore is full, the Oracle database server is not able to update its archive log. Thus the ESX server problem is the cause of the SAP performance issue.

Pin-pointing the Root-Cause of an SAP Performance Problem

The drill-downs in Figures 8-19 highlight how eG Enterprise makes it easy to troubleshoot SAP performance issues. There is no need for a SAP service manager or a helpdesk administrator to spend hours and sift through several monitoring tools, manually correlate and analyze all the metrics to identify where a performance problem lies.

In fact, eG Enterprise goes one step further. eG Enterprise's alarm console provides a single click root-cause diagnosis capability. In the alarm console, alerts are prioritized based on their severity. The severity of an alert is determined based on eG Enterprise's automatic root-cause diagnosis technology which correlates alerts from each tier using a patented virtualization-aware root-cause diagnosis technology. As Figure 20 reveals, administrators can easily use the eG Enterprise alarm console to immediately determine where to focus their attention.

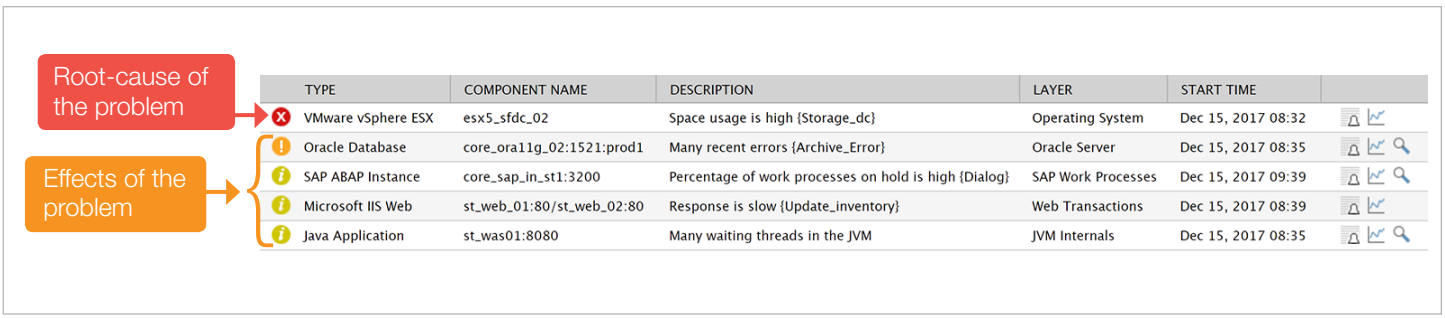


Figure 20 – eG Enterprise's alarm window clearly highlights the root-cause of the problem. Alarms are sorted by severity and administrators only have to focus first on the top most (i.e., most critical) alerts.

eG Enterprise: Managing SAP as a Service, Not as Individual Silos

By way of the above example, we have shown how a true service management system for SAP infrastructures operates. A true service management system does not replace all the deep dive tools you have in place for networks, databases, applications and so forth, instead it complements them. The goal of eG Enterprise is to be the single-pane-of-glass solution from where you can get an end-to-end view of your business services and the infrastructure supporting them. Using eG Enterprise you can quickly detect and resolve the issues you face with your key business services. For those IT experts that need deeper diagnosis, eG Enterprise can lead them to the domain where the problem exists. In that sense, you can think of eG Enterprise as a general practitioner (GP) for your virtual infrastructure. When you are not well, you go to the GP. 80% of the time, the GP solves the problem for you. The remaining 20% of the time when they are unable to solve a problem by themselves, they point you to the right specialist. This is the same function that eG Enterprise performs for SAP infrastructures (see Figure 21).

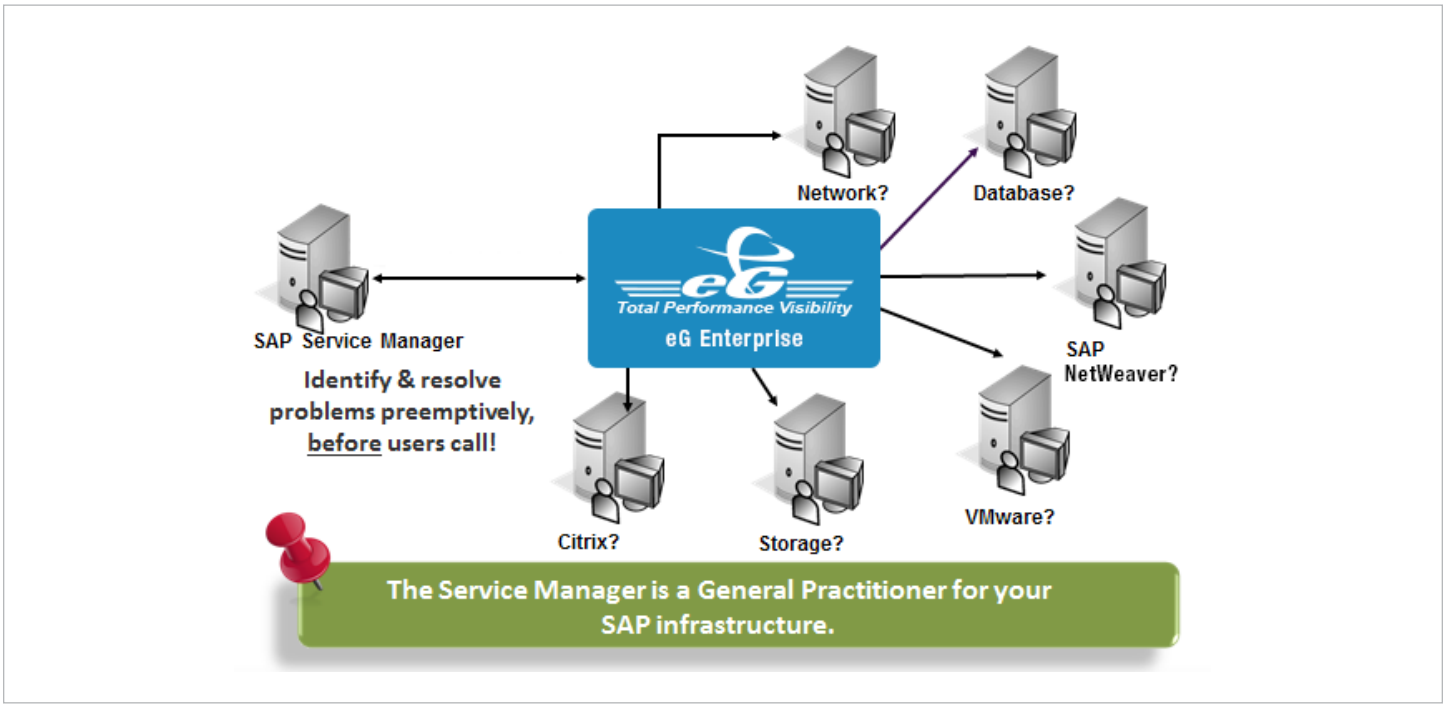


Figure 21 – The eG Enterprise SAP service manager is like a General Practitioner for an SAP infrastructure.

Integrated Web Reporting for SAP Optimization and Planning

eG Enterprise includes a web-based reporting engine that provides a wealth of pre-canned historical reports targeted at different stakeholders in an organization. An executive report shown in Figure 22 provides a high level overview of how the infrastructure has been managed in the last few weeks. The left hand panel shows the number of events that have occurred on a day-day basis. Executives and administrators can focus on days when there were many critical alerts.

The bottom left hand panel shows the service health for the last two weeks. Clearly, in this example, the *stock_tracker* service has had problems throughout. On the right hand side, "Components-at-a-glance" panel helps you determine which infrastructure tier has been a bottleneck. In this example, it is the VMware tier.

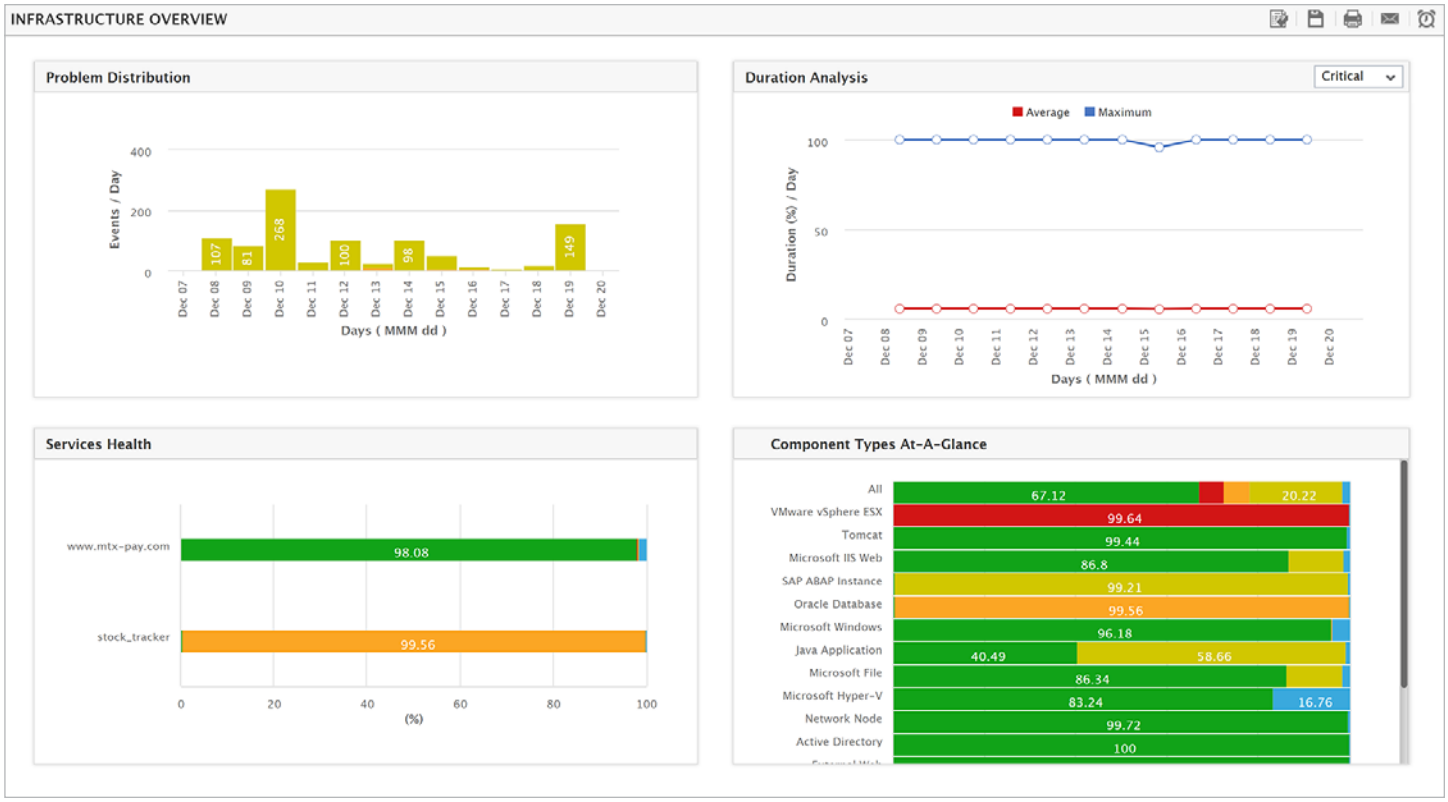


Figure 22 – An executive performance report of an SAP infrastructure.

While the executive reports are great for top level executives, IT operations personnel are more interested in granular technical details of individual servers and applications. Figure 23 shows an operations report of an SAP ABAP instance. This report shows graphs of the different metrics for this application over the same timescale. This report is ideal for post-mortem analysis of issues – so if you had a problem when you were not around, you can go back in history and generate a report that gives you all key metrics for a server plotted on the same time scale, so you can easily cross correlate between metrics.

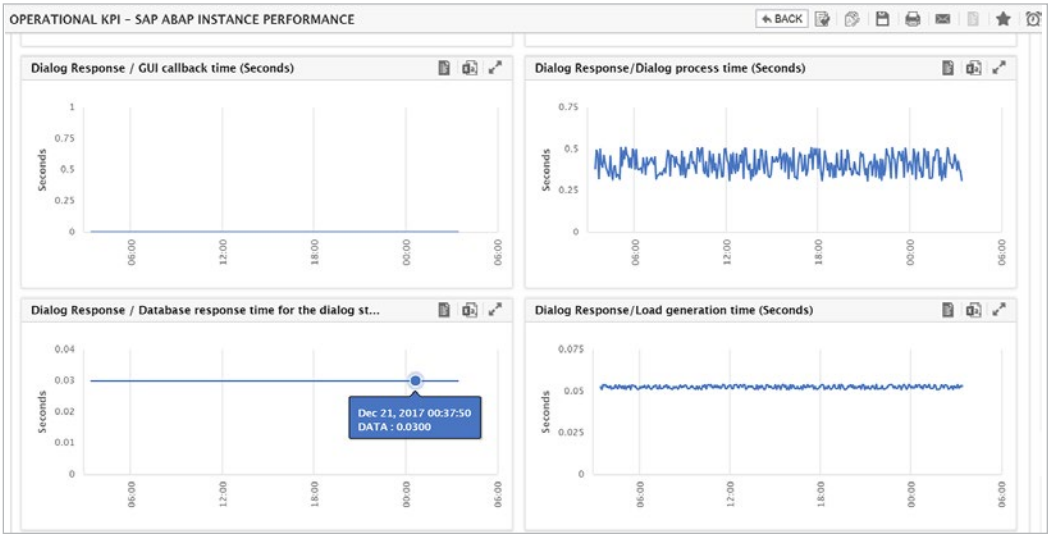


Figure 23 – An operations performance report of an SAP infrastructure.

IMPLEMENTING EG ENTERPRISE FOR AN SAP INFRASTRUCTURE

As we have seen earlier, an SAP infrastructure has heterogeneous network, server and application technologies, all of which need to be monitored. Implementing eG Enterprise for an SAP infrastructure is fairly straightforward. One of the main reasons for this is the universal monitor architecture that eG Enterprise uses. The eG monitor is universal in the sense that it can monitor any of the 150+ applications that it supports. The same monitor can be deployed for the web tier, the Java tier, the SAP ABAP instance, the Oracle database and even the virtualization tier. Figure 24 shows how the eG universal monitor works. The eG monitor can be deployed as an agent (i.e., on the server it monitors) or in an agentless manner (i.e., no software on the server it monitors).

SNMP was a standard for monitoring network devices. Unfortunately, there is no such standard for monitoring operating systems and applications. Hence, the eG monitor uses different protocols and interfaces to monitor each tier of the infrastructure.

Since the same monitor can be deployed on any tier of the infrastructure, the learning curve for administrators is short. The monitoring can also be done from just a web browser. Hence, administrators do not have to learn yet another interface/tool. Intuitive dashboards, real-time alerting, and reporting make SAP performance monitoring extremely easy.

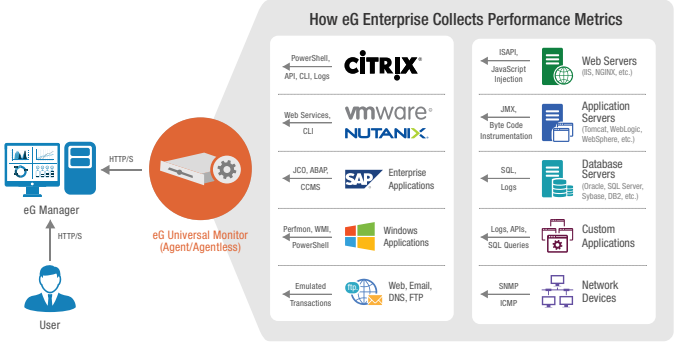


Figure 24 – The universal monitor architecture of eG Enterprise

This universal monitor architecture affords great deployment flexibility to organizations. An organization could be monitoring SAP on VMware to start off with and if they decide to move the virtualization platform to Microsoft Hyper-V, they can just re-use the same monitors for the new platform.

SUMMARY

SAP is an important driver for the success of any business and its downtime even for few minutes can cost thousands of dollars in lost revenue. Hence, effective performance management of SAP services is critical for any organization. SAP environments have evolved into complex, heterogeneous and interdependent systems with many tiers which are often virtualized.

A manual, multi-tool approach that is state of the art today is highly inefficient. The eG Enterprise solution from eG Innovations provides a fully automated next generation performance monitoring and management solution for SAP infrastructures. Its key capabilities include:

- Monitoring the end users experience to proactively alert administrators to SAP performance issues;
- Monitoring every layer and every tier of the SAP infrastructure – network, server, application, virtualization, SAP, Java, thin-client, storage, etc., to allow administrators to determine which tier could be causing an SAP performance problem;
- Simple installation and implementation;
- Proactive and precise alerting so that SAP service managers identify and resolve issues before users experience them;
- Auto correlation of metrics to automatically pinpoint the root cause of problems without requiring manual intervention;
- Extensive reporting to enable postmortem problem diagnosis and capacity planning/optimization.

Some of the key benefits of a unified end-to-end monitoring approach, coupled with automated diagnosis and root-cause identification include:

- Increased user satisfaction and productivity
- Lower total cost of ownership resulting from having lower skilled first level support staff to handle routine issues
- Lower infrastructure cost as a result of greater visibility and improved resource optimization
- Ability to complete SAP migration and virtualization projects on-time and on-budget.

For more information on eG Enterprise solution for managing SAP, visit www.eginnovations.com

About eG Innovations

eG Innovations provides the world's leading enterprise-class performance management solution that enables organizations to reliably deliver mission-critical business services across complex cloud, virtual, and physical IT environments. Where traditional monitoring tools often fail to provide insight into the performance drivers of business services and user experience, eG Innovations provides total performance visibility across every layer and every tier of the IT infrastructure that supports the business service chain. From desktops to applications, from servers to network and storage, eG Innovations helps companies proactively discover, instantly diagnose, and rapidly resolve even the most challenging performance and user experience issues.

eG Innovations' award-winning solutions are trusted by the world's most demanding companies to ensure end user productivity, deliver return on transformational IT investments, and keep business services up and running. Customers include 20th Century Fox, Allscripts, Anthem Blue Cross and Blue Shield, Aviva, AXA, Biogen, Cox Communications, Denver Health, eBay, JP Morgan Chase, PayPal, Southern California Edison, Samsung, and many more.

To learn more visit www.eginnovations.com.