Monitoring XenDesktop Aplications

eG Enterprise v5.6

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Introduction

Citrix XenDesktop 7 is the latest release from Citrix. XenDesktop 7 represents the merging of the XenApp and XenDesktop technologies into one cohesive package that's built on the same back-end components. Previously, XenApp servers were running on the Citrix Independent Management Architecture. Citrix XenDesktop 7 however is built on the Citrix FlexCast Management Architecture. This architecture is made up out of Delivery Controllers and Agents. XenDesktop 7 supports two types of Delivery Agents: one for Windows Server OS machines and one for Windows Desktop OS machines. As shown in the diagram below, both Delivery Agents communicate with the same set of Delivery Controllers and share the common management infrastructure in XenDesktop 7. This infrastructure consists of the following core components:

- **Receiver** provides users with self-service access to published resources.
- **StoreFront** authenticates users to site(s) hosting resources and manages stores of desktops and applications that users access.
- **Studio** is a single management console that enables you to configure and manage your deployment. Studio provides various wizards to guide you through the process of setting up an environment, creating workloads to host applications and desktops, and assigning applications and desktops to users.
- **Delivery Controller** distributes applications and desktops, manages user access, and optimizes connections to applications. Each site will have one or more delivery controllers.
- **Server OS Machines** are the "XenApp" replacement – these are VMs or physical machines based on the Windows Server operating system used for delivering applications or hosted shared desktops to users.
- **Desktop OS Machines** are the "XenDesktop" replacement – these are VMs or physical machines based on the Windows Desktop operating system used for delivering personalized desktops to users, or applications from desktop operating systems.

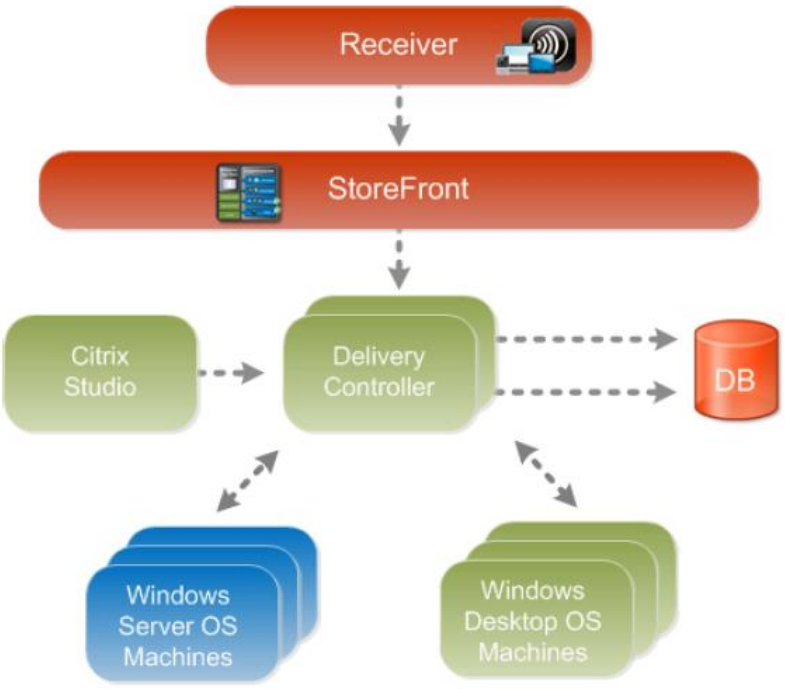


Figure 1.1: The Citrix XenDesktop 7 architecture

Since these components closely co-ordinate with each other to deliver desktops and applications to end-users, a problem with any of these core components – say, the unavailability of StoreFront to authorize user logins, the failure of the broker service, performance bottlenecks with the hypervisor, resource-intensive user sessions to the Server OS machines, snags in the internal operations of the Desktop OS machines – can significantly impact the user experience with Citrix XenDesktop 7. Therefore, to ensure a high-quality user experience with the application/desktop delivery service, administrators should closely monitor each component of the XenDesktop 7 infrastructure, proactively capture performance dips, and accurately isolate where the root-cause of the problem lies – is it with StoreFront? Is it with the delivery controller? Is it with the Server OS machines? Is it with the virtualized platform? Or is it with the Desktop OS machines? This is where eG Enterprise helps!

The eG Enterprise Suite performs **end-to-end monitoring of the Citrix XenDesktop 7 infrastructure!** Dedicated, web-based monitoring models are offered by eG for each component in the XenDesktop 7 infrastructure. While the *Citrix StoreFront* model focuses on the health of StoreFront and promptly captures issues in user authentication, the *Citrix XenDesktop 7* component monitors the Delivery Controller (or the XenDesktop broker) and reports how well it manages the delivery agents and brokers connections to the Server OS and Desktop OS machines. Moreover the *XenDesktop Apps* model that eG Enterprise provides zooms into the overall performance and problems related to the Server OS machines (that typically run Citrix XenApp) and helps isolate pain-points. Also, to monitor the resources allocated to and the resource usage of hypervisors and the Desktop OS machines operating on them, eG Enterprise offers a specialized monitoring model per hypervisor (such as Citrix XenServer, VMware vSphere, Microsoft Hyper—V, etc.).

Detailed service topology maps in eG represent how these heterogeneous models interact with each other and how dependencies flow.

In the event of a slowdown, eG's patented virtualization-aware root-cause analysis engine analyzes these dependencies, auto-correlates the performance results captured from the different monitoring models in the light of these dependencies, and accurately diagnoses the source of the slowdown. Proactive email/SMS/web-based alerts are then promptly sent out to administrators to alert them to the potential slowdown and what is causing it. This way, eG Enterprise emerges as the ideal solution for monitoring Citrix XenDesktop 7.

This document deep dives into the *XenDesktop Apps* monitoring model that eG Enterprise offers.

2

Monitoring Citrix XenDesktop Apps

As already mentioned, the *Citrix XenDesktop Apps* model of eG Enterprise monitors the Server OS machines, which are nothing but VMs or physical machines based on Citrix XenApp server technology, used for delivering applications or hosted shared desktops to users.

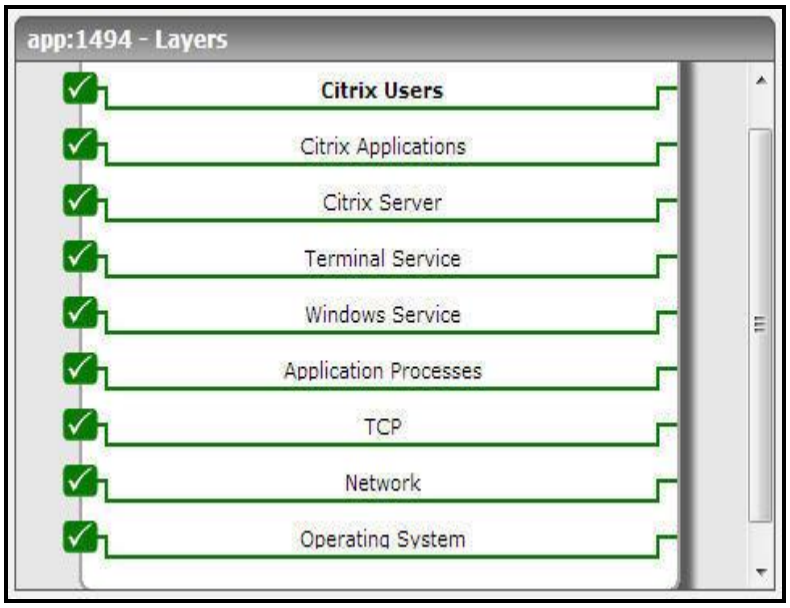


Figure 2.1: he layer model of the Citrix XenDesktop Apps server

Each layer of Figure 2.1 above is mapped to a series of tests that periodically check on the availability, responsiveness, and overall performance of the XenDesktop Apps server, and report a wealth of performance information related to the server. Using the metrics so reported, administrators can find quick and accurate answers to the following performance queries:

Server Monitoring	➢ Is the Citrix XenDesktop Apps server available to service user requests? ➢ Are there sporadic disconnects from the Citrix Xendesktop Apps server?

	➢ At what times do peak usage of the servers happen and is the server capacity adequate?
User Monitoring	➢ What is the average response time that critical users are seeing when connecting to Citrix XenDesktop Apps? ➢ How many users are logged in to each Citrix XenDesktop Apps in the Citrix farm? ➢ What is the resource usage (CPU and memory) for each user?
Operating System Monitoring	➢ What is the average CPU and memory usage on all the servers in the farm? ➢ Is any unusual memory scanning/paging activity happening on the systems? ➢ Are the critical Citrix XenDesktop Apps server processes processes up? What is their resource consumption?
Published Applications Monitoring	➢ What are the published applications on the server? ➢ Who is using each application? ➢ What is the resource usage for each published application?

The **Operating System**, **Network**, **TCP** and **Windows Service** layers of Citrix XenDesktop Apps are similar to that of a *Windows* server model. Since these tests have been dealt with in the *Monitoring Unix and Windows Servers* document, Section 1.1 focuses on the **Application Processes** layer.

2.1 The Application Processes Layer

This layer tracks the TCP ports and reports the availability and responsiveness of each port. Besides, this layer depicts the states of the different processes that must be executing for the application service to be available. Since the Processes and Windows Processes tests mapped to this layer are detailed in the *Monitoring Unix and Windows* document, let us now discuss the Port Checks test in detail.

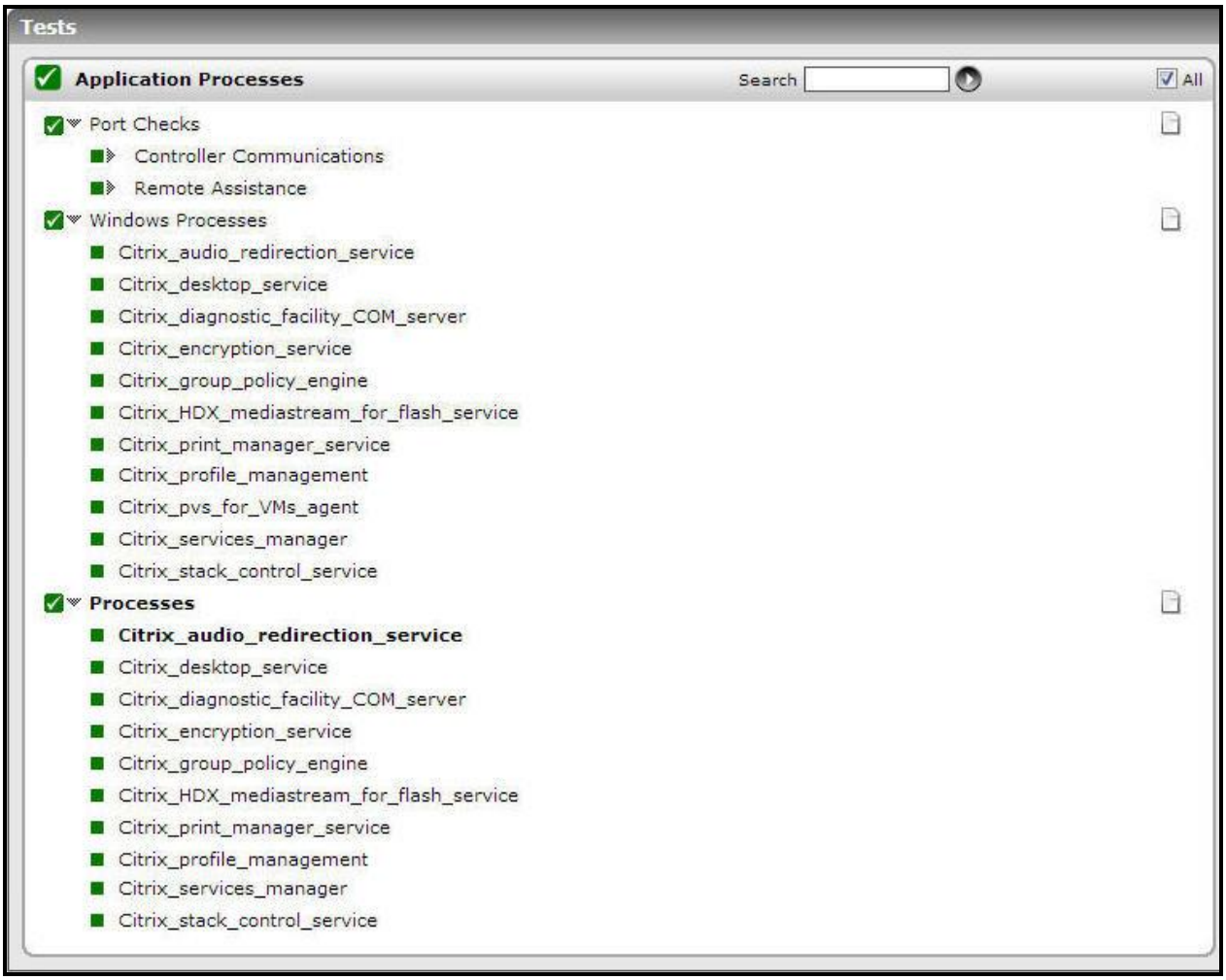


Figure 2.2: The tests mapped to the Application Processes layer

2.1.1 Port Checks Test

This test primarily checks whether the critical TCP ports on the Citrix XenDesktop Apps server are up/down, and reports the responsiveness of each configured port to client requests. However, these checks might not be adequate at all times; you could have a case where the Citrix XenDesktop Apps server port is up but the server is still not responding. When a connection is made to the Citrix XenDesktop Apps server, it will typically send a message "ICA" to the client. This check connects to the port and then validates the response from the Citrix XenDesktop Apps server to see if the ICA stream is being received by the client. Hence, this test additionally reports the ICA connection availability.

Purpose	Primarily checks whether the critical TCP ports on the Citrix XenDesktop Apps server are up/down, and reports the responsiveness of each configured port to client requests
Target of the test	A Citrix XenDesktop Apps server
Agent deploying the test	An internal/remote agent

<table>
<tr><td>Configurable parameters for the test</td><td colspan="3">1. TEST PERIOD - How often should the test be executed
2. HOST - The host for which the test is to be configured.
3. PORT – The port number at which the specified HOST listens to. By default, this is 1494.
4. TARGETPORTS – Specify either a comma-separated list of port numbers that are to be tested (eg., 1494,1495,1496), or a comma-separated list of port name:port number pairs that are to be tested (eg., ica:1494,smtp:25,mssql:1433). In the latter case, the port name will be displayed in the monitor interface. Alternatively, this parameter can take a comma-separated list of port name:IP address:port number pairs that are to be tested, so as to enable the test to try and connect to Tcp ports on multiple IP addresses. For example, mysql:192.168.0.102:1433,egwebsite:209.15.165.127:80.
5. TIMEOUT - Here, specify the maximum duration (in seconds) for which the test will wait for a response from the server. The default TIMEOUT period is 60 seconds.
6. ISPASSIVE - If the value chosen is YES, then the server under consideration is a passive server in a cluster. No alerts will be generated if the server is not running. Measures will be reported as "Not applicable" by the agent if the server is not up.</td></tr>
<tr><td>Outputs of the test</td><td colspan="3">One set of results for each port that is to be monitored</td></tr>
<tr><td rowspan="4">Measurements made by the test</td><td>Measurement</td><td>Measurement Unit</td><td>Interpretation</td></tr>
<tr><td>TCP connection availability:
Indicates whether the TCP connection is available or not.</td><td>Percent</td><td>An availability problem can be caused by different factors – e.g., the server process may not be up, a network problem may exist, or there could be a configuration problem with the DNS server.</td></tr>
<tr><td>Response time:
Indicates the time taken by the server to respond to a request.</td><td>Secs</td><td>An increase in response time can be caused by several factors such as a server bottleneck, a configuration problem with the DNS server, a network problem, etc.</td></tr>
<tr><td>ICA connection availability:
Indicates whether ICA connection is available or not.</td><td>Percent</td><td>While the value 100 for this measure indicates that the ICA stream is being received by the client, the value 0 indicates that it is not.</td></tr>
</table>

2.2 The Terminal Service Layer

In most environments, the Citrix XenDesktop Apps server functions in conjunction with a Terminal server. To enable the administrators of XenDesktop 7 environment to monitor the movement and resource usage of the Terminal clients on the Citrix XenDesktop Apps server, the eG Enterprise system has introduced the **Terminal Service** layer. The tests mapped to this layer are the same as those mapped to the **Terminal Server** layer of a Windows Terminal server. These tests hence, have already been dealt with elaborately in the *Monitoring Terminal Servers* chapter of the *Monitoring Microsoft Applications* document. So, let us proceed to look at the **Citrix Server** layer.

2.3 The Citrix Server Layer

Citrix XenDesktop Apps server-related performance parameters are monitored by the tests mapped to the **Citrix Server** layer. This includes:

- Profile size
- User login and profile loading process
- User profile management

Since there tests are already discussed in the *Monitoring Citrix Environments* document, let us now proceed to discuss the **Citrix Applications** layer.

2.4 The Citrix Applications Layer

Using the tests mapped to this layer, the resource usage per application executing on the Citrix XenDesktop Apps server can be measured.

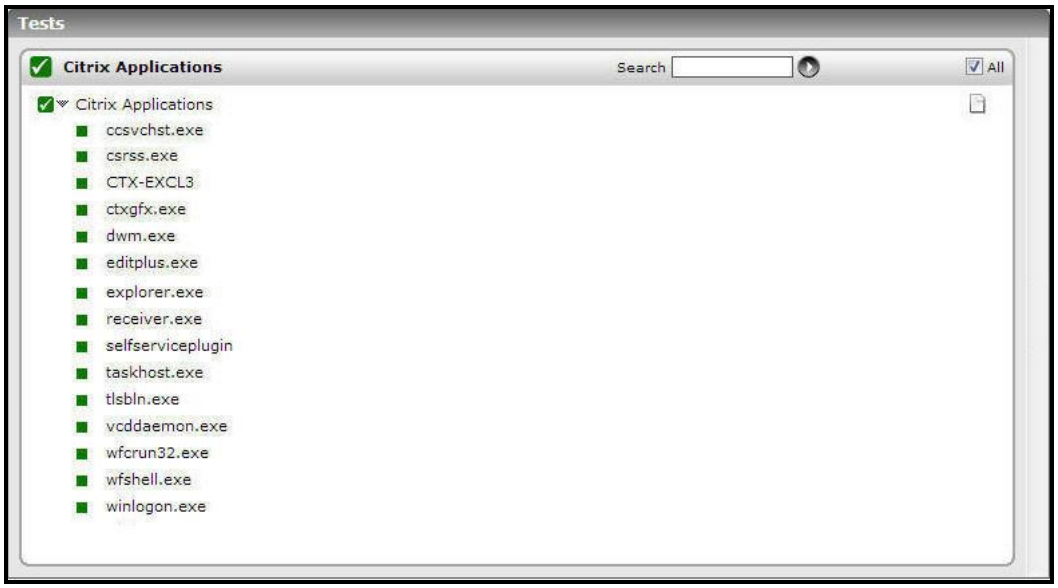


Figure 2.3: Tests associated with the Citrix Applications layer

2.4.1 Citrix XD Applications Test

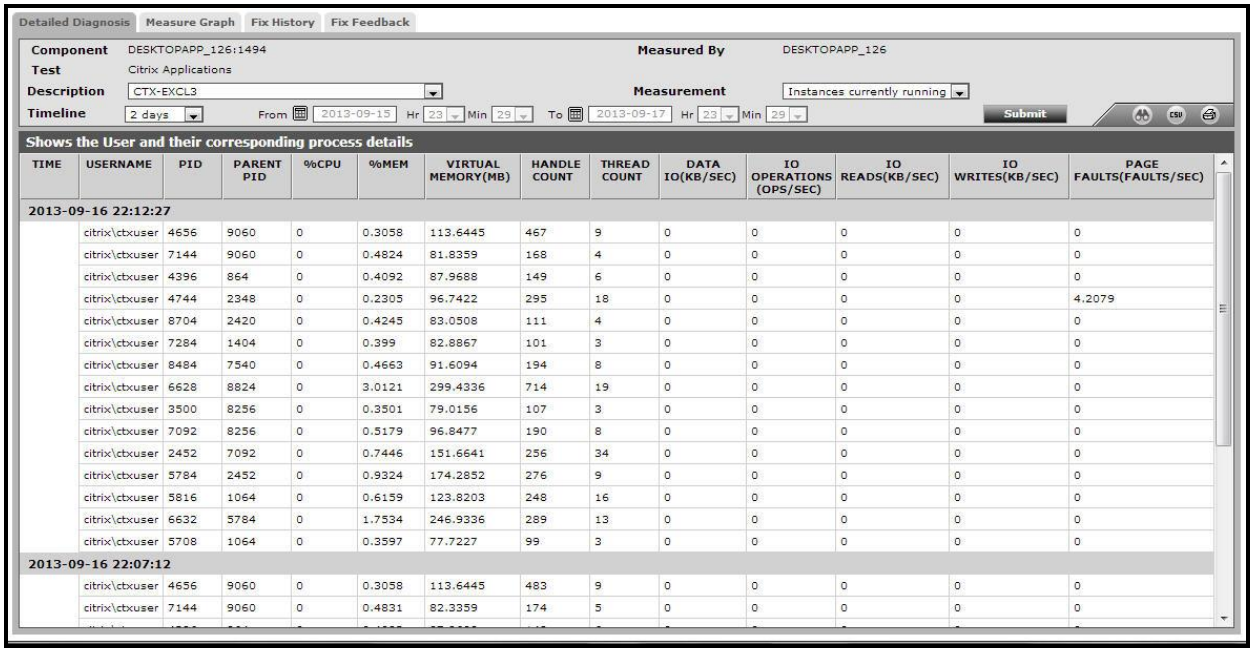
This test reports statistics pertaining to the different applications executing on a Citrix XenDesktop Apps server and their usage by Citrix clients.

Purpose	Returns the performance measures pertaining to the applications executing on the Citrix XenDesktop Apps server		
Target of the test	Citrix XenDesktop Apps		
Agent deploying the test	An internal agent		
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST -** The host for which the test is to be configured. 3. **PORT** – The port number at which the specified **HOST** listens to. By default, this is 1494. 4. **SHOW PUBLISHED APPS** – This flag indicates that the published applications alone in the target environment will be monitored.By default, this flag is set to Yes. If this flag is set to NO, then the agent monitors the applications by process name. 5. **SHOW PUBLISHED DESKTOPS –** By default, this flag is set to **Yes** indicating that the resource-intensive processes/applications accessed by a user will be listed in the detailed diagnosis of this test along with the exact published desktop that has been used by the user or used to access the application. Set this flag to **No** if you do not wish to list the exact published desktop. 6. **REPORT BY DOMAIN NAME –** By default, this flag is set to **Yes**. This implies that by default, the detailed diagnosis of this test will display the *domainname*|*username* of each user who accessed an application on the server. This way, administrators will be able to quickly determine which user logged into the server from which domain. If you want the detailed diagnosis to display only the *username* of these users, set this flag to **No**. 7. **DD FREQUENCY –** Refers to the frequency with which detailed diagnosis measures are to be generated for this test. The default is *1:1*. This indicates that, by default, detailed measures will be generated every time this test runs, and also every time the test detects a problem. You can modify this frequency, if you so desire. Also, if you intend to disable the detailed diagnosis capability for this test, you can do so by specifying *none* against **DD FREQUENCY**. 8. **DETAILED DIAGNOSIS -** To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the **On** option. To disable the capability, click on the **Off** option. The option to selectively enable/disable the detailed diagnosis capability will be available only if the following conditions are fulfilled: ➢ The eG manager license should allow the detailed diagnosis capability ➢ Both the normal and abnormal frequencies configured for the detailed diagnosis measures should not be 0.		
Outputs of the test	One set of results for each application that is monitored		
Measurements made by the	**Measurement**	**Measurement Unit**	**Interpretation**

test	**Instances currently running:** Number of instances of the published application currently executing on this Citrix XenDesktop Apps server.	Number	This value indicates if too many or too few instances corresponding to an application are executing on the host. Use the Detailed diagnosis of this measure to identify all the users executing this application and comparing the users will help you to identify which user is utilizing the maximum memory, CPU etc
	CPU usage: Indicates the percentage of CPU used by the published application.	Percent	A very high value could indicate that the specified application is consuming excessive CPU resources.
	Memory usage: This value represents the ratio of the resident set size of the memory utilized by the application to the physical memory of the host system, expressed as a percentage.	Number	A sudden increase in memory utilization for an application may be indicative of memory leaks in the application.
	Handle count: Indicates the number of handles opened by this application.	Number	An increasing trend in this measure is indicative of a memory leak in the application.
	Number of threads: Indicates the number of threads that are used by the application.	Number	
	I/O data rate: Indicates the rate at which this application is reading and writing bytes in I/O operations.	KBytes/Sec	This value counts all I/O activity generated by each instance of the application and includes file, network and device I/Os.
	I/O data operations: Indicates the rate at which this application is issuing read and write data to file, network and device I/O operations.	Operations/Sec	
	I/O read data rate: Indicates the rate at which this application is reading data from file, network and device I/O operations.	KBytes/Sec	

	I/O write data rate: Indicates the rate at which this application is writing data to file, network and device I/O operations.	KBytes/Sec	
	Page fault rate: Indicates the total rate at which page faults are occurring for the threads of all matching applications.	Faults/Sec	This measure is a good indicator of the load on the application. A page fault occurs when a thread refers to a virtual memory page that is not in its working set in main memory. This may not cause the page to be fetched from disk if it is on the standby list and hence already in main memory, or if it is in use by another application with whom the page is shared.
	Virtual memory used: Indicates the amount of virtual memory that is being used by this application.	MB	

The detailed diagnosis of the *Instances currently running* measure, if enabled, lists the user sessions that are currently open, the process ids of the processes being executed by each of the users, and the CPU and memory utilization (in %) of each of these processes.Additionally, this detailed diagnosis helps you in identifying the handles that are opened, the thread count, the read/write operations as well as the I/O operations for each application. This information enables the Citrix administrator to identify the processes with a high CPU/memory utilization. In the event of a server overload, the Citrix administrator might decide to terminate these processes (see **Error! Reference source not found.**).



TIME	USERNAME	PID	PARENT PID	%CPU	%MEM	VIRTUAL MEMORY(MB)	HANDLE COUNT	THREAD COUNT	DATA IO(KB/SEC)	IO OPERATIONS (OPS/SEC)	IO READS(KB/SEC)	IO WRITES(KB/SEC)	PAGE FAULTS(FAULTS/SEC)
2013-09-16 22:12:27													
	citrix\ctxuser	4656	9060	0	0.3058	113.6445	467	9	0	0	0	0	0
	citrix\ctxuser	7144	9060	0	0.4824	81.8359	168	4	0	0	0	0	0
	citrix\ctxuser	4396	864	0	0.4092	87.9688	149	6	0	0	0	0	0
	citrix\ctxuser	4744	2348	0	0.2305	96.7422	295	18	0	0	0	0	4.2079
	citrix\ctxuser	8704	2420	0	0.4245	83.0508	111	4	0	0	0	0	0
	citrix\ctxuser	7284	1404	0	0.399	82.8867	101	3	0	0	0	0	0
	citrix\ctxuser	8484	7540	0	0.4663	91.6094	194	8	0	0	0	0	0
	citrix\ctxuser	6628	8824	0	3.0121	299.4336	714	19	0	0	0	0	0
	citrix\ctxuser	3500	8256	0	0.3501	79.0156	107	3	0	0	0	0	0
	citrix\ctxuser	7092	8256	0	0.5179	96.8477	190	8	0	0	0	0	0
	citrix\ctxuser	2452	7092	0	0.7446	151.6641	256	34	0	0	0	0	0
	citrix\ctxuser	5784	2452	0	0.9324	174.2852	276	9	0	0	0	0	0
	citrix\ctxuser	5816	1064	0	0.6159	123.8203	248	16	0	0	0	0	0
	citrix\ctxuser	6632	5784	0	1.7534	246.9336	289	13	0	0	0	0	0
	citrix\ctxuser	5708	1064	0	0.3597	77.7227	99	3	0	0	0	0	0
2013-09-16 22:07:12													
	citrix\ctxuser	4656	9060	0	0.3058	113.6445	483	9	0	0	0	0	0
	citrix\ctxuser	7144	9060	0	0.4831	82.3359	174	5	0	0	0	0	0

Figure 2.4: The detailed diagnosis for the Instances currently running measure

2.5 The Citrix Users layer

To accurately assess the individual user experience on the Citrix XenDesktop Apps server, use the tests mapped to the **Citrix Users** layer.

Figure 2.5: The tests associated with the Citrix Users layer

2.5.1 Citrix XD Disconnects Test

A user session is terminated when a user logs off from the Citrix XenDesktop Apps server or when the session is abruptly interrupted (e.g., due to server, network, or application errors). When a user logs off, all the applications started by the user are terminated. However, when a user disconnects, the applications started by the user will keep running on the server consuming resources. Hence, the number of disconnected sessions on a Citrix XenDesktop Apps server should be kept to a minimum. Abrupt disconnects can significantly impact the end user experience, and hence, it is important to monitor the number of disconnected sessions at any point of time.

Purpose	Measures the number of disconnected user sessions
Target of the test	Citrix XenDesktop Apps
Agent deploying the test	An internal agent

<table>
<tr><td>Configurable parameters for the test</td><td colspan="3">1. TEST PERIOD - How often should the test be executed
2. HOST - The host for which the test is to be configured.
3. PORT – The port number at which the specified HOST listens to. By default, this is 1494.
4. RECONNECT PERIOD – This parameter is used by the test while computing the value for the Quick reconnects measure. This measure counts all the users who reconnected to the Citrix XenDesktop Apps within the short period of time (in minutes) specified against RECONNECT PERIOD.
5. REPORT BY DOMAIN NAME – By default, this flag is set to Yes. This implies that by default, the detailed diagnosis of this test will display the domainname|username of each user who disconnected from the server recently. This way, administrators will be able to quickly determine which user belongs to which domain. If you want the detailed diagnosis to display the username alone, then set this flag to No.
6. DD FREQUENCY – Refers to the frequency with which detailed diagnosis measures are to be generated for this test. The default is 1:1. This indicates that, by default, detailed measures will be generated every time this test runs, and also every time the test detects a problem. You can modify this frequency, if you so desire. Also, if you intend to disable the detailed diagnosis capability for this test, you can do so by specifying none against DD FREQUENCY.
7. DETAILED DIAGNOSIS - To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the On option. To disable the capability, click on the Off option.
The option to selectively enable/disable the detailed diagnosis capability will be available only if the following conditions are fulfilled:
➢ The eG manager license should allow the detailed diagnosis capability
➢ Both the normal and abnormal frequencies configured for the detailed diagnosis measures should not be 0.</td></tr>
<tr><td>Outputs of the test</td><td colspan="3">One set of results for the Citrix XenDesktop Apps server that is to be monitored</td></tr>
<tr><td rowspan="3">Measurements made by the test</td><td>Measurement</td><td>Measurement Unit</td><td>Interpretation</td></tr>
<tr><td>New disconnects:
Indicates the number of sessions that were disconnected during the last measurement period.</td><td>Number</td><td>The detailed diagnosis of this measure indicates the user, session ID, and client type for each newly disconnected session. This information can be used to track whether specific users are being disconnected often.</td></tr>
<tr><td>Quick reconnects:
Indicates the number of users who reconnected soon after a disconnect.</td><td>Number</td><td>The detailed diagnosis of this measure, if enabled lists the users who have reconnected quickly.</td></tr>
</table>

	Total disconnects: Indicates the total number of sessions that are in the disconnected state.	Number	

2.5.2 Citrix XD Logins Test

The Citrix Logins test monitors the new logins to the Citrix XenDesktop Apps server.

Purpose	Monitors the new logins to the Citrix XenDesktop Apps server
Target of the test	Citrix XenDesktop Apps
Agent deploying the test	An internal agent
Configurable parameters for the test	1. **TEST PERIOD** - How often should the test be executed 2. **HOST -** The host for which the test is to be configured. 3. **PORT** – The port number at which the specified **HOST** listens to. By default, this is 1494. 4. **REPORT USING MANAGERTIME** – By default, this flag is set to **Yes**. This indicates that the user login time displayed in the **DETAILED DIAGNOSIS** page for this test and in the Thin Client reports will be based on the eG manager's time zone by default. Set this flag to **No** if you want the login times displayed in the **DETAILED DIAGNOSIS** page for this test and in the Thin Client reports to be based on the Terminal server's local time. 5. **REPORT BY DOMAIN NAME –** By default, this flag is set to **Yes**. This implies that by default, the detailed diagnosis of this test will display the *domainname*|*username* of each user session that logged out. This default setting ensures that administrators are able to quickly determine the domains to which the users who logged out belonged. You can set this flag to **No** if you want detailed diagnosis to display only the *username* of the users who logged out. 6. **DD FREQUENCY –** Refers to the frequency with which detailed diagnosis measures are to be generated for this test. The default is *1:1*. This indicates that, by default, detailed measures will be generated every time this test runs, and also every time the test detects a problem. You can modify this frequency, if you so desire. Also, if you intend to disable the detailed diagnosis capability for this test, you can do so by specifying *none* against **DD FREQUENCY**. 7. **DETAILED DIAGNOSIS –** To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the **On** option. To disable the capability, click on the **Off** option. The option to selectively enable/disable the detailed diagnosis capability will be available only if the following conditions are fulfilled: ➢ The eG manager license should allow the detailed diagnosis capability ➢ Both the normal and abnormal frequencies configured for the detailed diagnosis measures should not be 0.

Outputs of the test	One set of results for the Citrix XenDesktop Apps that is to be monitored		
Measurements made by the test	**Measurement**	**Measurement Unit**	**Interpretation**
	New logins: Indicates the number of new logins to this Citrix XenDesktop Apps during the last measurement period.	Number	A consistent zero value could indicate a connection issue. Using the detailed diagnosis of the *New logins* measure, you can not only identify the users who logged in recently, but can also figure out when each user logged in and from which client machine.
	Percent new logins: Indicates the percentage of current sessions that logged in during the last measurement period.	Percent	
	Sessions logging out: Indicates the number of sessions that logged out.	Number	If all the current sessions suddenly log out, it indicates a problem condition that requires investigation. With the help of the detailed diagnosis of the *Sessions logging out* measure, you can identify the users who logged out, when every user logged in and from which client machine, and the duration of each user's session. Abnormally long sessions on the server can thus be identified.

2.5.3 Citrix XD Sessions Test

This test reports performance statistics related to Citrix user sessions of the Citrix XenDesktop Apps server.

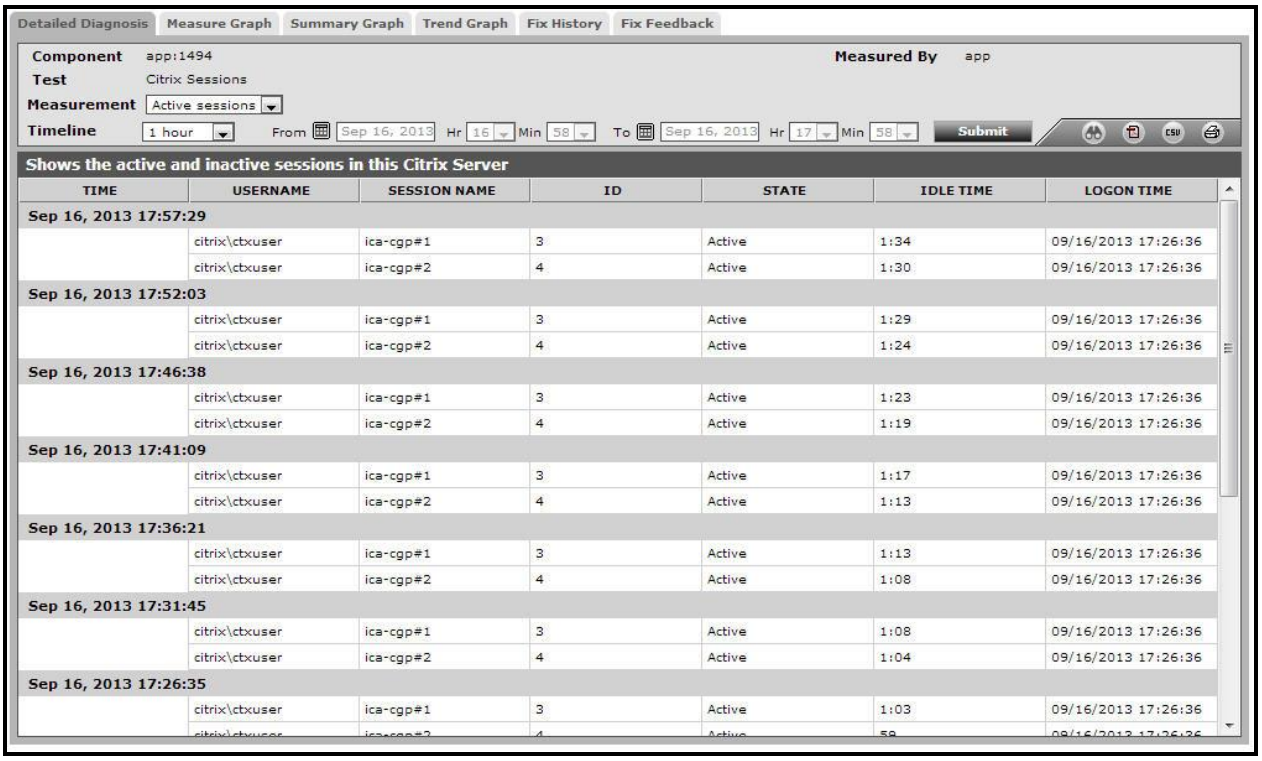
Purpose	Reports performance statistics related to Citrix user sessions
Target of the test	Citrix XenDesktop Apps
Agent deploying the test	An internal agent

<table>
<tr><td>Configurable parameters for the test</td><td colspan="3">1. TEST PERIOD - How often should the test be executed
2. HOST - The host for which the test is to be configured.
3. PORT – The port number at which the specified HOST listens to. By default, this is 1494.
4. REPORT USING MANAGERTIME – By default, this flag is set to Yes. This indicates that the user login time displayed in the DETAILED DIAGNOSIS page for this test and in the Thin Client reports will be based on the eG manager's time zone by default. Set this flag to No if you want the login times displayed in the DETAILED DIAGNOSIS page for this test and in the Thin Client reports to be based on the Terminal server's local time.
5. REPORT BY DOMAIN NAME - By default, this flag is set to Yes. This implies that by default, the detailed diagnosis of this test will display the domainname|username of each user session that logged out. This default setting ensures that administrators are able to quickly determine the domains to which the users who logged out belonged. You can set this flag to No if you want detailed diagnosis to display only the username of the users who logged out.
6. DD FREQUENCY - Refers to the frequency with which detailed diagnosis measures are to be generated for this test. The default is 1:1. This indicates that, by default, detailed measures will be generated every time this test runs, and also every time the test detects a problem. You can modify this frequency, if you so desire. Also, if you intend to disable the detailed diagnosis capability for this test, you can do so by specifying none against DD FREQUENCY.
7. DETAILED DIAGNOSIS – To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the On option. To disable the capability, click on the Off option.
The option to selectively enable/disable the detailed diagnosis capability will be available only if the following conditions are fulfilled:
➢ The eG manager license should allow the detailed diagnosis capability
➢ Both the normal and abnormal frequencies configured for the detailed diagnosis measures should not be 0.</td></tr>
<tr><td>Outputs of the test</td><td colspan="3">One set of results for the Citrix XenDesktop Apps that is to be monitored</td></tr>
<tr><td rowspan="2">Measurements made by the test</td><td>Measurement</td><td>Measurement Unit</td><td>Interpretation</td></tr>
<tr><td>Active sessions:
Indicates the number of user sessions that are currently active on this server.</td><td>Number</td><td>This measure gives an idea of the server workload in terms of active sessions. Tracking the number of active sessions with time, a Citrix administrator can obtain information that can help him/her plan the capacity of their Cenvironment. The detailed diagnosis capability, if enabled, lists the active and inactive sessions on the Citrix XenDesktop Apps server.</td></tr>
</table>

	Idle sessions: Indicates the number of sessions that are initialized and are currently ready to accept connections.	Number	To optimize the performance of a server, two default (idle) sessions are initialized before any client connections are made. For performance reasons, the number of idle sessions should be less than ten. Note that this test does not differentiate between RDP and ICA sessions.
	Connected sessions: Indicates the current number of sessions that are connected, but no user has logged on to the server.	Number	A consistent increase in the value of this measure could indicate that users are having trouble logging in. Further investigation may hence be required. Note that this test does not differentiate between RDP and ICA sessions.
	Connecting sessions: Indicates the number of sessions that are in the process of connecting.	Number	A very high value for this measure indicates a problem with the session or connection. Note that this test does not differentiate between RDP and ICA sessions.
	Disconnected sessions: Indicates the number of sessions from which users have disconnected, but which are still active and can be reconnected.	Number	Too many disconnected sessions running indefinitely on a Citrix XenDesktop Apps server cause excessive consumption of the server resources. To avoid this, a session limit is typically configured for disconnected sessions on the Citrix XenDesktop Apps server. When a session limit is reached for a disconnected session, the session ends, which permanently deletes it from the server. Note that this test does not differentiate between RDP and ICA sessions.
	Listen sessions: Indicates the current number of sessions that are ready to accept connections.	Number	Note that this test does not differentiate between RDP and ICA sessions.
	Shadow sessions: Indicates the current number of sessions that are remotely controlling other sessions.	Number	A non-zero value for this measure indicates the existence of shadow sessions that are allowed to view and control the user activity on another session. Such sessions help in troubleshooting/resolving problems with other sessions under their control.
	Down sessions: Indicates the current number of sessions that could not be initialized or terminated.	Number	Ideally, the value of this measure should be 0.
	Init sessions: Indicates the current number of sessions that are initializing.	Number	A high value for this measure could indicate that many sessions are currently experiencing initialization problems.

	Inactive sessions: Indicates the current number of user sessions that are inactive.	Number	
	Total sessions: Indicates the total number of sessions on the xendesktop	Number	

The detailed diagnosis capability of the *Active sessions* measure, if enabled, lists the active and inactive sessions on the Citrix XenDesktop Apps server.



TIME	USERNAME	SESSION NAME	ID	STATE	IDLE TIME	LOGON TIME
Sep 16, 2013 17:57:29						
	citrix\ctxuser	ica-cgp#1	3	Active	1:34	09/16/2013 17:26:36
	citrix\ctxuser	ica-cgp#2	4	Active	1:30	09/16/2013 17:26:36
Sep 16, 2013 17:52:03						
	citrix\ctxuser	ica-cgp#1	3	Active	1:29	09/16/2013 17:26:36
	citrix\ctxuser	ica-cgp#2	4	Active	1:24	09/16/2013 17:26:36
Sep 16, 2013 17:46:38						
	citrix\ctxuser	ica-cgp#1	3	Active	1:23	09/16/2013 17:26:36
	citrix\ctxuser	ica-cgp#2	4	Active	1:19	09/16/2013 17:26:36
Sep 16, 2013 17:41:09						
	citrix\ctxuser	ica-cgp#1	3	Active	1:17	09/16/2013 17:26:36
	citrix\ctxuser	ica-cgp#2	4	Active	1:13	09/16/2013 17:26:36
Sep 16, 2013 17:36:21						
	citrix\ctxuser	ica-cgp#1	3	Active	1:13	09/16/2013 17:26:36
	citrix\ctxuser	ica-cgp#2	4	Active	1:08	09/16/2013 17:26:36
Sep 16, 2013 17:31:45						
	citrix\ctxuser	ica-cgp#1	3	Active	1:08	09/16/2013 17:26:36
	citrix\ctxuser	ica-cgp#2	4	Active	1:04	09/16/2013 17:26:36
Sep 16, 2013 17:26:35						
	citrix\ctxuser	ica-cgp#1	3	Active	1:03	09/16/2013 17:26:36

Figure 2.6: The detailed diagnosis of the Active Sessions measure of the Citrix XenDesktop Apps

2.5.4 Citrix XD Users Test

The Citrix XenDesktop 7 environment is a shared environment in which multiple users may connect to a Citrix XenDesktop Apps server/server farm and access a wide variety of applications. When server resources are shared, excessive resource utilization by a single user could impact the performance for other users. Therefore, continuous monitoring of the activities of each and every user on the server is critical. Towards this end, the **Citrix Users** test assesses the traffic between the user terminal and the server, and also monitors the resources taken up by a user's session on the server. The results of this test can be used in troubleshooting and proactive monitoring. For example, when a user reports a performance problem, an administrator can quickly check the bandwidth usage of the user's session, the CPU/memory/disk usage of this user's session as well as the resource usage of other user sessions. The administrator also has access to details on what processes/applications the user is accessing and their individual resource usage. This information can be used to spot any offending processes/ applications.

<table>
<tr><td>Purpose</td><td colspan="3">Monitors the resource utilization of every user on the Citrix XenDesktop Apps server</td></tr>
<tr><td>Target of the test</td><td colspan="3">A Citrix XenDesktop Apps server</td></tr>
<tr><td>Agent deploying the test</td><td colspan="3">An internal agent</td></tr>
<tr><td>Configurable parameters for the test</td><td colspan="3">1. TEST PERIOD - How often should the test be executed
2. HOST - The host for which the test is to be configured.
3. PORT – The port number at which the specified HOST listens to. By default, this is 1745.
4. SHOW PUBLISHED APPS – This flag indicates that the published applications alone in the target environment will be monitored.By default, this flag is set to Yes. If this flag is set to NO, then the agent monitors the applications by process name.
5. SHOW PUBLISHED DESKTOPS – By default, this flag is set to Yes indicating that the resource-intensive processes/applications accessed by a user will be listed in the detailed diagnosis of this test along with the exact published desktop that has been used by the user or used to access the application. Set this flag to No if you do not wish to list the exact published desktop.
6. REPORT BY DOMAIN NAME – By default, this flag is set to Yes. This implies that by default, the detailed diagnosis of this test will display the domainname|username of each user who accessed an application on the server. This way, administrators will be able to quickly determine which user logged into the server from which domain. If you want the detailed diagnosis to display only the username of these users, set this flag to No.
7. DD FREQUENCY – Refers to the frequency with which detailed diagnosis measures are to be generated for this test. The default is 1:1. This indicates that, by default, detailed measures will be generated every time this test runs, and also every time the test detects a problem. You can modify this frequency, if you so desire. Also, if you intend to disable the detailed diagnosis capability for this test, you can do so by specifying none against DD FREQUENCY.
8. DETAILED DIAGNOSIS - To make diagnosis more efficient and accurate, the eG Enterprise suite embeds an optional detailed diagnostic capability. With this capability, the eG agents can be configured to run detailed, more elaborate tests as and when specific problems are detected. To enable the detailed diagnosis capability of this test for a particular server, choose the On option. To disable the capability, click on the Off option.
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<tr><td>Outputs of the test</td><td colspan="3">One set of results for the Citrix XenDesktop Apps that is to be monitored</td></tr>
<tr><td>Measurements made by the</td><td>Measurement</td><td>Measurement Unit</td><td>Interpretation</td></tr>
</table>

test	**CPU usage for user's processes:** The CPU utilization for a session is the percentage of time that all of the threads/processes of a user session used the processor to execute instructions. If a user is connected via multiple sessions, the value reported is the sum of all cpu utilizations across all the sessions.	Percent	This value indicates the percentage of Cpu resources that are used by a specific user. Excessive CPU usage by a user can impact performance for other users. Check the detailed diagnosis to view the offending processes/applications.
	Handles used by user's processes: Indicates the total number of handles being currently held by all processes of a user.	Number	A consistent increase in the handle count over a period of time is indicative of malfunctioning of programs. Compare this value across users to see which user is using a lot of handles. Check detailed diagnosis for further information.
	Audio bandwidth input: Indicates the bandwidth used while transmitting sound/audio to this user.	Kbps	Comparing these values across users will reveal which user is sending/receiving bandwidth-intensive sound/audio files over the ICA channel. To minimize bandwidth consumption, you may want to consider disabling client audio mapping.
	Audio bandwidth output: Indicates the bandwidth used while receiving sound/audio from this user.	Kbps	
	Input bandwidth: Indicates the average bandwidth used for client to server communications for all the sessions of a user.	KB/Sec	
	Output bandwidth: Indicates the average bandwidth used for server to client communications for all the sessions of a user.	KB/Sec	
	COM bandwidth input: Indicates the bandwidth used when sending data to this user's COM port.	Kbps	Comparing these values across users will reveal which user's COM port is sending/receiving bandwidth-intensive data over the ICA channel.
	COM bandwidth output: Indicates the bandwidth used when receiving data from this user's COM port.		

	Input compression: Indicates the average compression ratio for client to server traffic for all the sessions of a user.	Number	
	Output compression: Indicates the average compression ratio for server to client traffic for all the sessions of a user.	Number	
	Drive bandwidth input: Indicates the bandwidth used when this user performs file operations on the mapped drive on the virtual desktop.	Kbps	Comparing the values of these measures across users will reveal which user is performing bandwidth-intensive file operations over the ICA channel. If bandwidth consumption is too high, you may want to consider disabling client drive mapping on the client device. Client drive mapping allows users logged on to a virtual desktop from a client device to access their local drives transparently from the ICA session. Alternatively, you can conserve bandwidth by even refraining from accessing large files with client drive mapping over the ICA connection.
	Drive bandwidth output: Indicates the bandwidth used when the virtual desktop performs file operations on the client's drive.	Kbps	
	HDX media stream for flash data bandwidth input: Indicates the bandwidth used from this user to virtual desktop for flash data traffic.	Kbps	Comparing the values of these measures across users will reveal which user has been transmitting/receiving bandwidth-intensive flash data.
	HDX media stream for flash data bandwidth output: Indicates the bandwidth used from the virtual desktop to this user for flash data traffic.	Kbps	
	PN bandwidth input: Indicates the bandwidth used from this user to virtual desktop by Program Neighborhood to obtain application set details.	Kbps	Comparing the values of these measures across users will reveal which user has been transmitting/receiving bandwidth-intensive PN traffic.
	PN bandwidth output: Indicates the bandwidth, used from the virtual desktop to this user by Program Neighborhood to obtain application set details.	Kbps	

	I/O read rate for user's processes: Indicates the rate of I/O reads done by all processes being run by a user.	KBps	These metrics measure the collective I/O activity (which includes file, network and device I/O's) generated by all the processes being executed by a user. When viewed along with the system I/O metrics reported by the DiskActivityTest, these measures help you determine the network I/O. Comparison across users helps identify the user who is running the most I/O-intensive processes. Check the detailed diagnosis for the offending processes/applications.
	I/O write rate for user's processes: Indicates the rate of I/O writes done by all processes being run by a user.	KBps	
	Latency avg: Indicates the average client latency for a user. The value reported is the average of the latencies for all the current sessions of a user.	Secs	
	Latency deviation: The latency deviation represents the difference between the minimum and maximum measured latency values for a session. The value reported is the average of the latency deviations for all the current sessions of a user.	Secs	Ideally, the deviation in latencies over a session should be minimum so as to provide a consistent experience for the user.
	Latency last: Represents the average client latency for the last request from a user. The latency is measured by rhe Citrix XenDesktop Apps server based on packets sent to and from each client during a session - this includes network delay plus server side processingdelays. The value reported is the average of the last latencies for all the current sessions of a user.	Secs	A consistently high latency may be indicative of performance degradations with the Citrix XenDesktop Apps servers. Possible reasons for an increase in latency could be increased network delays, network congestion, server slow-down, too many simultaneous users on the server etc. Typically latencies on a erver will be below 5 secs.

	Memory usage for user's processes: This value represents the ratio of the resident set size of the memory utilized by the user to the physical memory of the host system, expressed as a percentage. If a user is connected via multiple sessions, the value reported is the sum of all memory utilizations across all the sessions.	Percent	This value indicates the percentage of memory resources that are used up by a specific user. By comparing this value across users, an administrator can identify the most heavy users of the Citrix XenDesktop Apps server. Check the detailed diagnosis to view the offending processes/applications.
	User sessions: Indicates the current number of sessions for a particular user.	Number	A value of 0 indicates that the user is not currently connected to the Citrix XenDesktop Apps server. Use the detailed diagnosis of this measure to know the details of the sessions.
	Input line speed: Indicates the average line speed from the client to the server for all the sessions of a user.	Kbps	
	Output line speed: Indicates the average line speed from the server to the client for all the sessions of a user.	Kbps	
	Printer bandwidth input: Indicates the bandwidth used when this user prints to a desktop printer over the ICA channel.	Kbps	Comparing the values of these measures across users will reveal which user is issuing bandwidth-intensive print commands over the ICA channel. If bandwidth consumption is too high, you may want to consider disabling printing. Alternatively, you can avoid printing large documents over the ICA connection.
	Printer bandwidth output: Indicates the bandwidth used when the desktop responds to print jobs issued by this user.	Kbps	
	Speed screen data channel bandwidth input: Indicates the bandwidth used from this user to the virtual desktop for data channel traffic.	Kbps	Comparing the values of these measures across users will reveal which user has been transmitting/receiving bandwidth-intensive data channel traffic.

	Speed screen data channel bandwidth output: Indicates the bandwidth used from virtual desktop to this user for data channel traffic.	Kbps	
	HDX media stream for flash v2 data bandwidth input: Indicates the bandwidth used from this user to virtual desktop for flash v2 data traffic.	Kbps	Comparing the values of these measures across users will reveal which user has been transmitting/receiving bandwidth-intensive flash v2 data.
	HDX media stream for flash v2 data bandwidth output: Indicates the bandwidth used from the virtual desktop to this user for flash v2 data traffic.	Kbps	
	Page faults for user's processes: Indicates the rate of page faults seen by all processes being run by a user.	Faults/Sec	Page Faults occur in the threads executing in a process. A page fault occurs when a thread refers to a virtual memory page that is not in its working set in main memory. If the page is on the standby list and hence already in main memory, or if the page is in use by another process with whom the page is shared, then the page fault will not cause the page to be fetched from disk. Excessive page faults could result in decreased performance. Compare values across users to figure out which user is causing most page faults.
	Virtual memory of user's processes: Indicates the total virtual memory being used by all processes being run by a user.	MB	Comparison across users reveals the user who is being a drain on the virtual memory space.

	Processor time used by user's sessions: Indicates the percentage of time, across all processors, this user hogged the CPU.	Percent	The *CPU usage for user's processes* measure **averages out the total CPU usage of a user on the basis of the number of processors**. For instance, if your Citrix XenDesktop Apps server is using an 8-core processor and the total CPU usage of a user across all his/her sessions amounts to 80%, then the value of the *CPU usage for user's processes* measure for that user will be 10 % (80/8 processors = 10). This accurately denotes the extent of CPU usage in an environment where load is uniformly balanced across multiple processors. However, in environments where load is not well-balanced, the *CPU usage for user's processes* measure may not be an accurate indicator of CPU usage per user. For instance, if a single processor is used nearly 80% of the time by a user, and other 7 processors in the 8-core processor environment are idle, the *CPU usage for user's processes* measure will still report CPU usage as 10%. This may cause administrators to miss out on the fact that the user is actually hogging a particular processor! In such environments therefore, its best to use the *CPU time used by user's sessions* measure! By reporting the total CPU usage of a user across all his/her sessions and across all the processors the target Citrix XenDesktop Apps server supports, this measure serves as the true indicator of the level of CPU usage by a user in dynamic environments. For instance, in the example above, the *Processor time used by user's sessions* of the user will be 80% (and not 10%, as in the case of the *CPU usage for user's processes* measure). A high value or a consistent increase in the value of this measure is hence serious and demands immediate attention. In such situations, use the detailed diagnosis of the *CPU usage for user's processes* measure to know what CPU-intensive activities are being performed by the user.

3

Conclusion

This document has described in detail the monitoring paradigm used and the measurement capabilities of the eG Enterprise suite of products with respect to the **Citrix Xendesktop Apps**. For details of how to administer and use the eG Enterprise suite of products, refer to the user manuals.

We will be adding new measurement capabilities into the future versions of the eG Enterprise suite. If you can identify new capabilities that you would like us to incorporate in the eG Enterprise suite of products, please contact support@eginnovations.com. We look forward to your support and cooperation. Any feedback regarding this manual or any other aspects of the eG Enterprise suite can be forwarded to feedback@eginnovations.com.