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Exam : **1Y0-401**

Title : Designing Citrix XenDesktop 7.6 Solutions

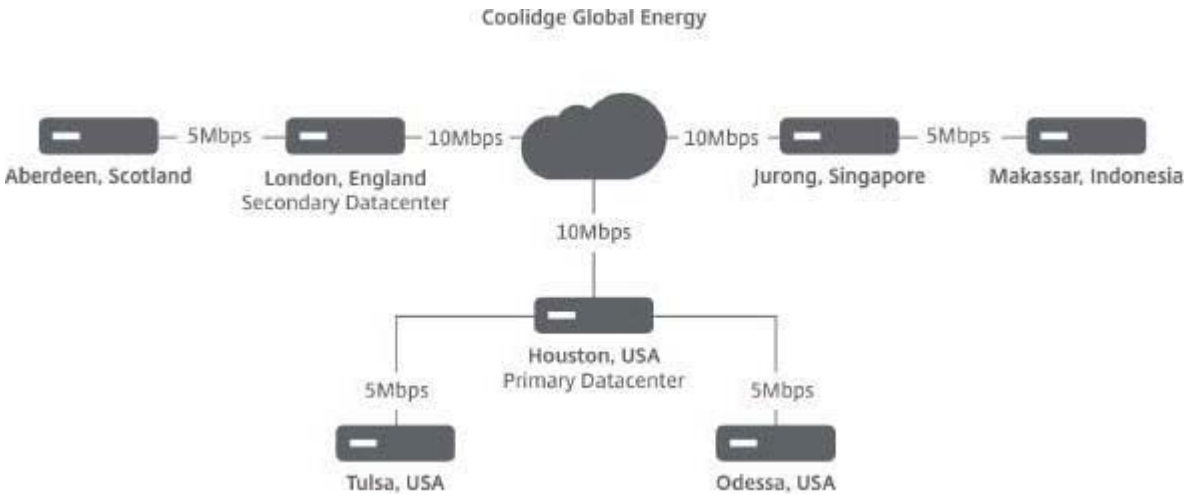
Version : DEMO

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Executive Summary
Project Overview
CGE is a global, diversified, upstream (exploration and production) oil and gas company headquartered in North America. CGE's three main operating areas are North America, Europe, and Southeast Asia. CGE also has a portfolio of international exploration opportunities. CGE began in North America as a small, upstream oil and gas company. Through acquisitions, CGE grew quickly and acquired companies globally. This led to a decentralized IT model, both from systems and personnel perspectives. CGE currently utilizes several Citrix technologies to provide application virtualization to a global end-user base spread across several continents. Its current IT model for application virtualization is based on regional locations; each region hosts its own Citrix environment to support its local end-user base. CGE is moving toward a global IT model in which the entire application and desktop virtualization environment will be hosted in three data centers, each with a highly available NetScaler pair. CGE would like to provide dedicated desktops to some end-user groups to alleviate past issues with applications and performance. In addition, an Internet upgrade project is underway to eliminate slow connections at all sites. This will improve latency and bandwidth issues throughout the environments. CGE engaged Citrix Consulting to determine whether best practices are being followed in its existing Citrix environments; to provide a design document for a new, consolidated Citrix environment; and to point out risks that should be resolved before moving to this new environment. This deliverable represents the output of the requirements gathering phase and will be used as an input during the architectural design phase of this engagement. Through interactive meetings, Citrix Consulting obtained information regarding CGE's existing Citrix XenApp environments and strategic goals. By reviewing this information, CGE can understand and methodically address those areas that represent the most profound risks, improve various facets of its current environments, and prepare for the future design phase of a consolidated environment.

Project Goals
During the course of the project, CGE and Citrix Consulting identified a number of project goals.
The following summarizes these goals:
- Perform a detailed assessment of the Citrix components supporting the existing Citrix environments, which include XenApp 6.x, XenServer, and NetScaler Gateway.
- Review relevant peripheral components that support the existing Citrix environments (for example, Active Directory, storage, SQL, networking) to determine if each can support current production workloads and a new Citrix environment.
- Identify operational and environmental improvements to better account for the environments' growth.

Overview
CGE has locations spread across three primary regions—North America, Europe, and Southeast Asia—with its primary headquarters located in Houston. Sub regions exist within each region, each with its own Citrix infrastructure. Once power and cooling upgrades are complete, Houston will be the primary datacenter and London will be the secondary datacenter.
The following diagram details the locations and network connection types.



Business Layer Overview

Since CGE expanded quickly through acquisitions, corporate IT left infrastructure management up to the acquired companies. As a result, some regions have well-run Citrix environments, while others experience critical outages that simultaneously affect hundreds of end users.

CGE's CIO, who has been with CGE for slightly less than a year, was hired to be the central point for IT across all regions. The CIO has engaged with the various business units to understand their processes and received various complaints about the stability of the existing Citrix infrastructures.

The CIO feels that the majority of Citrix infrastructure issues are due to a lack of centralized control and common platforms. Some regions have older versions of XenApp, while some are more current. As CGE moves forward, the CIO plans to use a single vendor for the entire solution, and wants to ensure that the new infrastructure is virtualized and fault tolerant.

End-User Layer Overview

CGE has 10,350 employees, approximately 4,700 of which access the Citrix environments daily. Peak logon times are Monday through Friday, from 8:00 a.m. – 10:00 a.m., based on local, regional time zones. Technicians and engineers are shift workers who rotate to accommodate a 24 hours a day, seven days a week schedule.

End user distribution is as follows:

Location	Number of Citrix End Users	GMT (Greenwich Mean Time)
Houston	1,075	GMT -6:00
Odessa	600	GMT -6:00
Tulsa	600	GMT -6:00
London	400	GMT 0:00
Aberdeen	1,100	GMT 0:00
Jurong	325	GMT +8:00
Makassar	600	GMT +8:00

The majority of end users connect using CGE-owned HP laptop and desktop devices. Over 90 percent of these devices are Windows 7-based, as CGE is in the process of completing a Windows XP to Windows 7 migration.
CGE has standardized all these devices on Citrix Online Plug-in for Windows12.1, and is in the process of testing Receiver for Windows 4.2. In the past, some end users have complained about slowness when typing, which may indicate issues with latency.
CGE also allows end users to connect using non-corporate-owned devices. Many end users connect from personal computers and mobile devices such as Apple iPads and iPhones. End users are instructed to download Citrix Receiver from either the Citrix website or the Android or Apple app stores.
End users can be grouped into six separate categories:
- Executives/Management – Regional upper- and mid-level management staff.
- Back Office – End users that provide functions such as accounting, administration, human resources, and finance.
- Research – End users focus mainly on discovering new energy fields and sources.
- Engineers – End users who work with technicians in a senior lead role for both technical and management functions. There is approximately one engineer for every five technicians.
- Technicians – Field workers who service the oil and gas equipment.
- Sales – Primary customer-facing group.
End-user groups and numbers are as follows:

End-user Group	Total Number of End Users	Physical Location
Executives/Management	300	Houston - 175 London - 100 Jurong - 25
Back Office	500	Houston - 300 London - 200
Research	1,000	Houston - 500 Aberdeen - 500
Engineers	500	Odessa - 100 Tulsa -100 Aberdeen - 100 Jurong - 100 Makassar - 100
Technicians	2,500	Odessa - 500 Tulsa - 500 Aberdeen - 500 Jurong - 500 Makassar - 500
Sales	200	Houston - 100 London - 100

The engineers, technicians, and research groups access Citrix applications primarily in an office-type environment, but may need to access these applications while in the gas and oil fields. In these scenarios, end users connect to Citrix using local Internet connections, ranging from a wireless access point to a tethered mobile device.

To prevent printer driver issues and sprawl, CGE tries to limit end users to their default printer when accessing Citrix. The IT department at CGE's headquarters has mandated that only the Citrix Universal Print Driver be utilized. As each region manages its own Citrix infrastructure, this has been difficult to enforce.
Each end user's home directory is mapped when accessing a Citrix session; the drive-mapping letter varies based on the end user's region. End-user data is stored on different network device types and shares ranging from a Windows CIFS share to an NAS appliance. Corporate IT is unsure if end-user data is being backed up in all regions. CGE hopes to implement formal, corporate-wide standards in the new Citrix environment.

Access Layer Overview
Since each region has its own Citrix environment, end users are fairly isolated within their specific regions. In each region, NetScaler Gateway and Web Interface provide access for internal and external end users. In some regions, Citrix Secure Gateway is still being utilized for external access. This is primarily due to a past budget constraint, but CGE hopes to provide a redundant and fault-tolerant Citrix access solution for all regions with the new environment. Confusion with the use of the appropriate URL also occurs for end users travelling among regions. A common access point that routes end users to their closest datacenter would most likely reduce this confusion.
As CGE is sensitive to the research that is being conducted toward the development of new energy types and methods, external access to the Citrix environment must be as secure as possible. Currently, internal and external end users employ single-factor authentication; however, the development of a two-factor authentication process is desired.

Access Controllers
Overview
The following table outlines the utilization of Web Interface, StoreFront, NetScaler Gateway, and Citrix Secure Gateway in the various Citrix environments.

Region	Internal Access - Web Interface	Internal Access - StoreFront	External Access - NetScaler Gateway	External Access – Citrix Secure Gateway
Houston		Two servers; load balanced by NetScaler	High availability (HA) pair	
Odessa	Single server			Single server
Tulsa	Single server			Single server
London		Two servers; load balanced by NetScaler	HA pair	
Aberdeen	Single server			Single server
Jurong	Single server			Single server
Makassar	Single server			Single server

Resource Layer
- Personalization Overview:

The following table outlines the current overall profile strategy:

Group	Profile Type	Need to Save Data	Folder Redirection	Need to Print
Executives/Management	Microsoft roaming	Yes	Yes	Yes
Back Office	Microsoft roaming	Yes	Yes	Yes
Research	Microsoft roaming	Yes	Yes	Yes
Engineers	Local mandatory	Yes	Yes	Occasionally
Technicians	Local mandatory	No	No	Occasionally
Sales	Microsoft roaming	Yes	Yes	Yes

Corporate IT would like to streamline the profile management solution. Numerous end users complain about slow logon and logoff times, and routine profile corruption is also a concern. It is common for IT to have to reset end-user profiles on a daily basis. CGE hopes to provide a stable end-user profile platform by implementing a standardized set of hardware to host profiles and by employing Citrix Profile Management.

Citrix policies vary from region to region, but corporate IT has tried to enforce the following policy settings (at a minimum):

Policy Name	Policy Setting(s)
Default	Auto-create client printers: Auto-creates the client's default printer only
	Automatic installation of in-box printer drivers: Disabled
	Use local time of client: Enabled
	Client USB device redirection: Enabled

Technicians and engineers require USB mapping for various field devices such as flow meters and sonar devices. Since the majority of the remaining end-user groups probably do not need USB mapping, this could be disabled for those groups in the new environment.

Corporate IT feels that most end users require only their default printer within a Citrix session. However, other end-user groups (primarily Back Office) need to access multiple printers with advanced printing functionality, such as stapling. In all cases, the need to limit native print drivers is critical.

- Applications Overview:

The majority of end users utilize published applications delivered through one of the regional XenApp farms. Some end-user groups require a full desktop instead of published applications. CGE mandates that no new software (agents) may be deployed in the current desktop infrastructure.

The following table provides additional details about the applications and desktops used throughout the Citrix environments.

Applications/ Desktop	End-user Groups	Delivery Strategy	Notes
Office Suite	All groups	Published application	• Currently using Microsoft Office 2010. Would like to go to Office 2013 in the new environment.
Salesforce, MGMT Application	Sales, Executives/ Management	Published application	• Executive end users have logon scripts assigned that map network drives and copy large template files into their profiles that are updated weekly. • Executive end users report intermittent, very slow logon times (usually once a week). • Salesforce is used by the sales and executives teams to interface with CGE's customers. • The Sales team has hundreds of MBs of unnecessary application log files in the user profiles. • The help desk team notes that in the past, users have deleted profile files and folders during home drive cleanups, which have caused corruption and access issues. • Management uses the MGMT application.
SAP	All groups	Published application	• Used for back office functions such as accounting, payroll, time entry, etc.
Proprietary Energy Application	Engineers, Technicians, Research	Published application	• Main application used by the technical groups. • This application is disk intensive.
Desktop - Research	Research	Published desktop	• Server desktop for the Research end-user group. Required applications are embedded into the server image. • Research end users need to install software; this has been an issue in the existing environments. • Responsible for developing new resources. • End users report that Group Policy settings in the Citrix_User Policy are not being applied and that they receive conflicting, standard end-user policies.
Desktop - Back Office	Back Office	Published desktop	• Server desktop for the Back Office group. • End users report intermittent, very slow logon times (usually once a week). • End users have logon scripts assigned that map network drives and copy large template files into their profiles that are updated weekly • Uses a financial reporting application that requires end-user certificates to function.
			• CGE recently standardized Adobe Reader; however, Back Office end users receive a full version of Adobe Acrobat. • Required applications are embedded into the server image.
OpenGL (CAD)	Engineers	Published application	• Processor-, graphics-, and memory-intensive. • This application often crashes the XenApp server. The only resolution is to restart the server.

Image Design Overview

The following table outlines current application specifics. All servers are Windows 2008 R2 running XenApp 6.5, and all are virtual machines. Applications are delivered based on grouping. For example, Office Suite is installed on a dedicated set of servers.

Application Group	Location	Image Size	vCPU	Memory	Maximum Number of End Users per Server
Office Suite	All	40 GB	4	16 GB	50
Salesforce	Houston, London, Jurong	50 GB	2	16 GB	50
SAP	All	40 GB	2	12 GB	30
Proprietary Energy Application	Houston, Odessa, Tulsa, Aberdeen, Jurong, Makassar	60 GB	4	32 GB	20
Desktop - Research	Houston, Aberdeen	60 GB	4	32 GB	10
Desktop - Back Office	Houston, London	40 GB	2	16 GB	25
OpenGL (CAD)	Odessa, Tulsa, Aberdeen, Jurong, Makassar	60 GB	4	32 GB	5

Control Layer

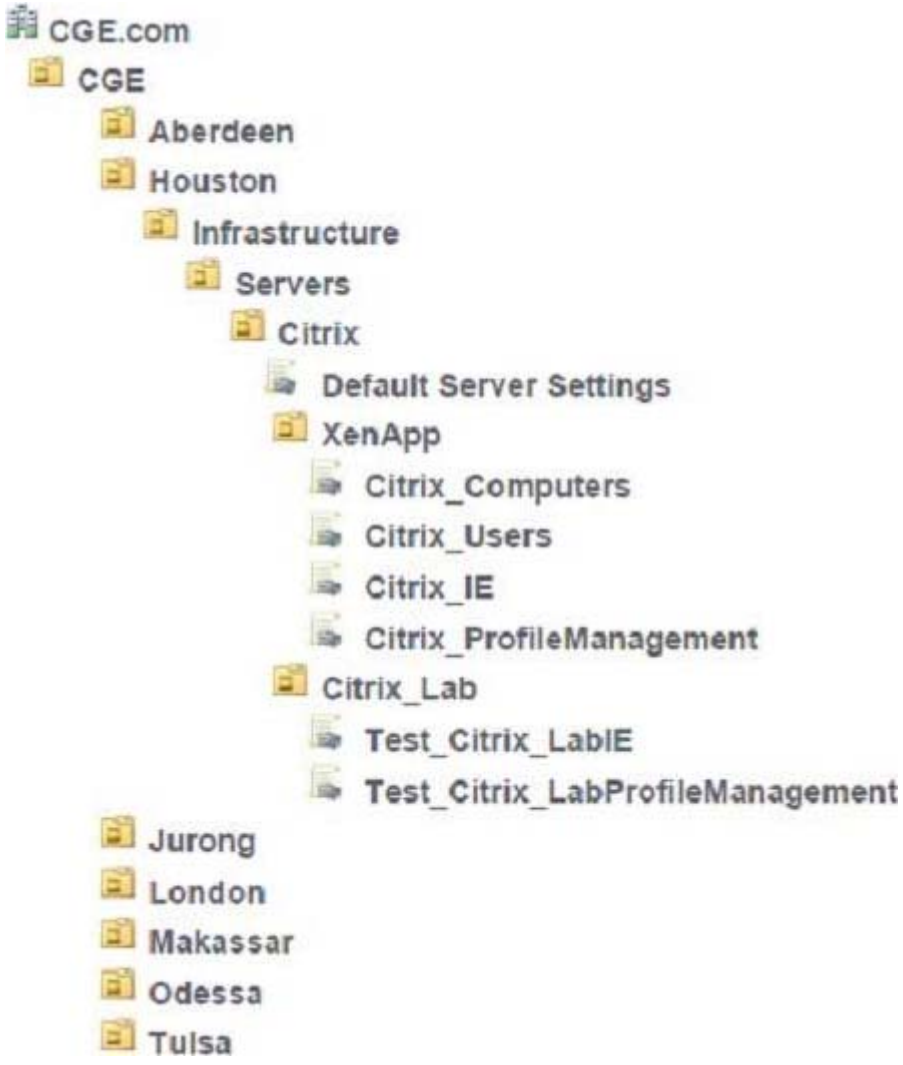
- Active Directory:

Infrastructure Services

Active Directory

As the solution integrates with Active Directory, resources must be easy to manage and maintain within the directory structure. The following details CGE's typical organizational unit (OU) structure for the XenApp environments.

Overview



- Databases Overview:

Infrastructure Services

Databases Overview

CGE manages seven XenApp 6.5 farms—one for each region. A variety of SQL server versions host the farm databases. Some databases are located on a shared SQL cluster, while others are standalone.
The following table provides an overview of each environment, the database location, and the database configuration.

Region	Database Version	Database Type	Shared with Other Databases	XenApp Database Account Type
Aberdeen	SQL 2008 R2 – SP2	Clustered	Yes	Domain authentication
Houston	SQL 2008 R2 – SP2	Mirrored	Yes	Domain authentication
Jurong	SQL 2005 – SP4	Single-instance SQL	Yes	SQL authentication
London	SQL 2008 R2 – SP1	Clustered	Yes	Domain authentication
Makassar	SQL 2005 – SP4	Single-instance SQL	Yes	SQL authentication
Odessa	SQL 2005 – SP4	Single-instance SQL	No	Domain authentication
Tulsa	SQL 2005 – SP4	Single-instance SQL	No	Domain authentication

- Licensing Overview:

Infrastructure Services

Licensing Overview

As each region currently manages its own Citrix infrastructure, licensing types vary from region to region. Some regions have more licenses than end users, while others sometimes reach their limit. Each region has its own Citrix and Microsoft license servers.

Corporate IT will be consolidating the Citrix and Microsoft licenses under a common corporate agreement in the new Citrix environment. This will allow for better cost control and appropriate distribution of licenses.

If needed, additional licenses will be procured to support the new Citrix solution. This may involve purchasing additional Microsoft and Citrix licenses to support a disaster recovery model. The following details the current Citrix and Microsoft license types.

Region	Number of Citrix Licenses	Citrix License Type	Number of Microsoft RDS Licenses	Microsoft License Type	Notes
Aberdeen	1,500	Enterprise	1,500	Per user	
Houston	1,200	Platinum	1,200	Per user	Using Citrix EdgeSight feature
Jurong	300	Advanced	400	Per device	
London	500	Enterprise	500	Per user	
Makassar	750	Advanced	800	Per device	
Odessa	500	Platinum	500	Per user	Not using any Platinum features
Tulsa	500	Platinum	500	Per user	Not using any Platinum features

XenApp Controllers Overview

All regions use virtualized XenApp 6.5 servers. Some regions currently use Provisioning Services 6.1, but CGE wants to simplify management processes by moving to Provisioning Services 7.6 in each region. Although there are no test farms in the current Citrix environments, CGE would like to incorporate dedicated test environments in the new Citrix solution. These new test environments should utilize a minimum of storage. The following table details the XenApp environments for each region.

Region	Number of Citrix Licenses	Citrix License Type	Number of Microsoft RDS Licenses	Microsoft License Type	Notes
Aberdeen	1,500	Enterprise	1,500	Per user	
Houston	1,200	Platinum	1,200	Per user	Using Citrix EdgeSight feature
Jurong	300	Advanced	400	Per device	
London	500	Enterprise	500	Per user	
Makassar	750	Advanced	800	Per device	
Odessa	500	Platinum	500	Per user	Not using any Platinum features
Tulsa	500	Platinum	500	Per user	Not using any Platinum features

End users in some regions often complain about slow application enumeration and launch issues. Corporate IT hopes that these issues will be resolved with the new Citrix solution.

Region	Farm Name	# of Zones	Dedicated Zone Data Collectors	Dedicated XML Brokers	# of Application Servers
Aberdeen	CGE_Aberdeen	1	Yes	Yes	125
Houston	CGE_Houston	2	Yes	Yes	150
Jurong	Jurong_6.5	1	No	No	50
London	CGE_Lon	1	No	No	50
Makassar	Mak_6.5	1	No	No	60
Odessa	CGE_Odessa	1	No	No	60
Tulsa	CGE_Tulsa	1	No	No	60

Hardware Layer

- Storage Overview:

Depending on the region, the physical hosts that provide hardware virtualization use a variety of local and SAN-based storage. Using local storage has prevented virtual machines from moving to another host in the event of a host failure, creating some regional capacity issues. Corporate IT is unsure if end-user data is being backed up in all regions.

CGE hopes to implement global formal standards in the new Citrix environment. A fault-tolerant solution is required for hardware virtualization and end-user data storage.

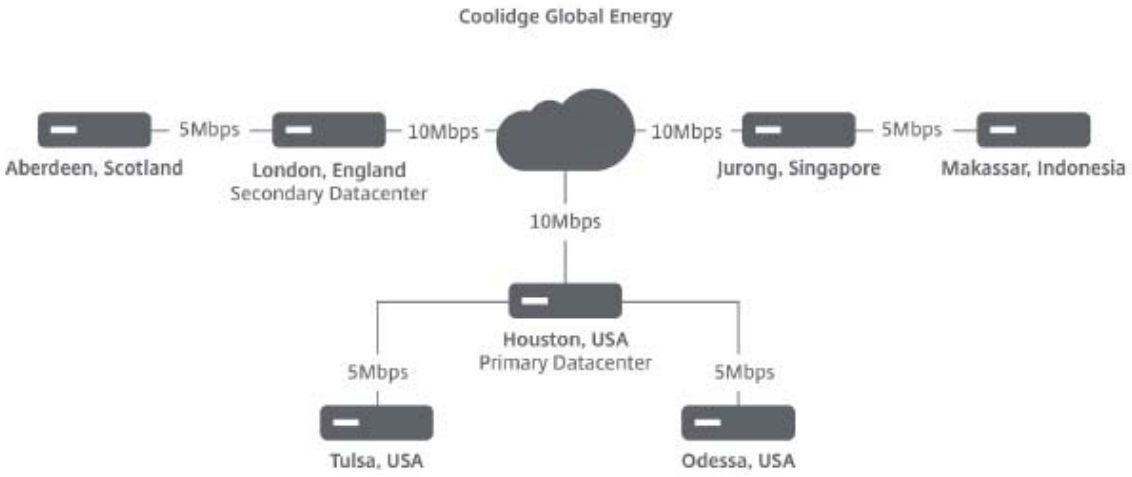
The following table describes the different storage types based on region:

Region	Physical Hosts Used for Virtualization	End-user Data
Aberdeen	Local storage	CIFS share
Houston	SAN storage	NAS storage
Jurong	Local storage	CIFS share
London	SAN storage	NAS storage
Makassar	Local storage	CIFS share
Odessa	Local storage	CIFS share
Tulsa	Local storage	CIFS share

- Networking Overview:

CGE utilizes regional private networks. Not all regions connect directly to each other. The network links range in size from 5 Mbps to 10 Mbps. The networks are congested at times among regions, causing large file copies to be scheduled during off hours to minimize disruption.

CGE currently has a project underway to increase the bandwidth among regions and reduce latency for the new Citrix environment. The following diagram details the links among the regions.



Each region has a separate Internet connection of varying capacity and utilizes its own local network connection for Internet traffic. Microsoft and routing policies are in place to direct Internet-bound traffic to use this local Internet connection. The goal was to reduce the amount traffic on the links among regions, saving bandwidth for interregional traffic. For external Citrix access, each region uses its local Internet connection. The NetScaler Gateways and Citrix Secure Gateways are placed in a demilitarized zone (DMZ). Appropriate firewall ports are configured to allow the Citrix traffic to navigate to the internal resources.

- Control Hosts Overview:

As CGE acquired several companies within a short period of time, it did not change any of the acquired companies' infrastructures. This has resulted in regional inconsistency in hypervisor platforms and versions and with hardware vendors.

Corporate IT hopes to streamline the infrastructure to ensure corporate standards are followed. At a minimum, a standard hypervisor platform must be used to allow IT resources to train on a common hypervisor platform and to quickly assist in other regions when needed.

For the new Citrix solution, CGE has budgeted for the replacement of aging infrastructure equipment, where needed, including the hypervisor platform. Procurement of the best infrastructure components within this planned budget must be ensured.

Operations Layer

- Support Overview:

In the current configuration, each region is responsible for supporting its end users and infrastructure. This often leads to confusion for end users who travel, as well as the for the help desk members who work with these end users.

Corporate IT hopes to develop a centralized support structure from the end-user layer to the infrastructure layer. The CIO envisions a model that allows an end user to call one number for support. Regional staff will support the help desk 24 hours a day, seven days a week. If first-tier help desk support is unable to

resolve the issue in a timely manner, a second-tier support team would be engaged.
In order to facilitate this troubleshooting model, the first-tier help desk and second-tier support teams would require access to the Citrix infrastructure. The CIO would prefer a centralized console for the help desk team, but it is not a requirement.
In the past, some regions had training budgets, while others did not. This has often resulted in lengthy resolution of issues due to improper training. To alleviate this, the CIO has mandated that the first-tier help desk and second-tier support teams be properly trained in the products being implemented in the new Citrix solution.

- Testing and Change Control Overview:

An analysis revealed that none of the regions have a proper test environment. At best, some regions have a few test XenApp servers in their production farms that are used for testing. In addition, the procedures for implementing changes to the systems vary from region to region. Some regions have a documented change control process, while others install changes as application owners or end users request them. This has resulted in overall poor performance of the Citrix environments and has caused outages in some regions. The CIO has mandated that in the new Citrix solution, a change control board must approve changes, and a separate test environment must be deployed.

- Operations Overview:

Citrix Rollups and hotfixes are applied sporadically throughout the Citrix farms. The following table details the implementation of Citrix Rollups.

Region	Citrix Rollup Level
Aberdeen	Rollup 04
Houston	Rollup 04
Jurong	Rollup 02
London	Rollup 04
Makassar	Rollup 02
Odessa	Rollup 03
Tulsa	Rollup 03

Backups of the Aberdeen, Houston, and London SQL databases are conducted daily via SQL. A nightly backup of the Windows server ensures that the local SQL backup is captured. However, the restoration process has not been tested. The remaining locations lack SQL administrators, so it is unclear if SQL backups are being performed.
The CIO recognizes this gap and is taking steps to ensure that all Citrix databases are routinely backed up. For the short term, the SQL administrators in the Houston location will assume responsibility for the SQL backups in the locations that lack SQL administrators. Since each region has operated independently, no central disaster recovery plan exists. Corporate IT hopes to provide a seamless disaster recovery solution for all locations and believes that it may be possible to utilize regional resources with minimal overhead. Corporate IT feels that it is likely that, in the event of a disaster, only a subset of a region’s end users would require a disaster recovery solution, and believes that approximately 50 percent of regional end users would be a good starting point.

- Monitoring Overview:

The Houston location is the only location using EdgeSight. Corporate IT uses EdgeSight for license trending and occasional end-user troubleshooting. Interviews with the IT staff using EdgeSight revealed

that EdgeSight could probably be better utilized. The help desk staff has tried using EdgeSight, but has felt overwhelmed and would prefer a much simpler interface to troubleshoot end-user issues.
CGE recently purchased Tivoli, an antivirus program, and is in the process of rolling it out to all locations. Corporate IT has requested from Citrix Consulting any specific monitoring metrics and alerts related to the Citrix environment. CGE realizes that effective monitoring will allow them to be proactive in addressing issues before they cause critical outages.
The following is CGE's current antivirus policy:
- Periodic scanning of servers must be conducted at 1:00 a.m., local time, each morning.
- All workstations and servers must have antivirus software installed, and real-time scanning must be enabled.
- Periodic updating of antivirus software is required. Currently, antivirus updates are automatically delivered at 8:00 a.m., 1:00 p.m., 4:00 p.m., and 11:00 p.m., local time.
- Only vendor-required exclusions may be used, and all exclusions must be configured for both real-time and periodic scans.
- Real-time antivirus scanning must be configured to scan files when they are accessed and written.
- All servers must be configured to scan their local drives, and all remote network drive scanning must be disabled. Corporate IT has shared several Citrix articles relating to Citrix product antivirus exclusions with the regions. It is unclear if the regions have implemented these exclusions.

Which component of the CGE environment should be updated before implementing a XenDesktop virtual desktop solution in the Houston datacenter?
A. Server infrastructure
B. Network connectivity
C. Storage infrastructure
D. Power and cooling infrastructure
Answer: D

2.A Citrix Architect decides that pooled desktops is the appropriate delivery model for CGE's Engineers end-user group.
Which two reasons explain the architect's delivery model decision? (Choose two.)
A. The CAD application is updated frequently.
B. It allows engineers to install their own applications.
C. It isolates CPU and memory resources to single instances.
D. The instability of the CAD application impacts several end users.
Answer: CD

3.Which tool should a Citrix Architect use to document CGE's existing printer models?
A. Print Migrator
B. Stress Printer
C. Print Detective
D. Print Management
Answer: C

4.Scenario: A Citrix Architect recommends upgrading CGE's Provisioning Services 6.1 environment to

Provisioning Services 7.6. Currently, vDisks in Provisioning Services 6.1 are configured with the write cache location on the target device hard drive.
Which two applications will show increased application performance due to the upgrade to Provisioning Services 7.6? (Choose two.)
A. SAP
B. Salesforce
C. OpenGL (CAD)
D. Proprietary Energy App
Answer: CD

5.Which risk could lead to a lengthy farm outage in the event of a corrupt SQL data store?
A. SQL server backups are encrypted
B. An untested SQL backup and restoration process
C. SQL servers that are NOT running on the same service packs
D. The use of SQL Mirroring instead of SQL AlwaysOn Availability Groups
Answer: B