Citrix NetScaler 10.5 Essentials and Networking

1Y0-351 Exam

Preparation Guide 1.0
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Citrix Systems, Inc.

851 W. Cypress Creek Road
Ft. Lauderdale, FL 33309
http://www.citrix.com

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Disclaimer

This exam preparation guide is designed to provide candidates with necessary information about the 1Y0-351 exam, including study resources and ways to interpret the exam objectives to better enable candidates to assess the types of questions that may be asked during the exam. Please be aware that the content of this guide in no way ensures a passing score on the certification exam.

Author

Lourdes Soler

Subject Matter Experts

Ayd Asraf
Bino Gopal
Byron Campbell
Christopher Chadd Goliath
Craig Pickford
Dave Gunn
David Jimenez
David O'Connor
Denis Gundarev
Gaston Brait
Jacob Wilson
Joel DonaldsonJuan Pablo Otalvaro
Mark Casey
Mark Jubb
Markus Darda
Matthew Bodholdt
Mike Nelson
Morten Kallesøe
Nelson Esteves
Ronan O'Brien
Simon Gottschlag
Stuart Souter
Thomas Daugaard
Tony Zhang

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1 The Exam

1.1 Purpose of the Preparation Guide and Exam

This guide provides a detailed description of the exam, including intended audience and topics covered, as well as direct links to resources used to build the exam, information on how to prepare for the exam and details on the types of questions the exam contains. The guide is intended to help candidates prepare for the 1Y0-351 Citrix NetScaler 10.5 Essentials and Networking exam. Candidates should read this guide carefully before attempting this exam.

The 351 exam was developed to measure the minimum knowledge and skills required to install, configure and/or operate NetScaler 10.5 in enterprise environments.

Unless otherwise indicated, the Citrix products referenced in this exam are the Enterprise edition of the product.

1.2 Number of Questions

The 351 exam is a 72-question exam written in English.

1.3 Passing Score

The passing score for this exam is 61%.

1.4 Time Limit

Type of Candidate	Time Limits Allowed	Notes
Native English Speakers	120 minutes	
Non-native English speakers who take exam in countries where English is a foreign language	120 minutes +30 minutes (time extension)	Time extension granted automatically
Non-native English speakers who take exam in countries where English is NOT a foreign language	120 minutes +30 minutes	Must call Pearson VUE or register in person to explicitly request the time extension *A $7 USD surcharge will be added to phone registrations.*

1.5 Registration and Administration

This exam is administered at Pearson VUE testing centers worldwide. To learn more about the rules and process of taking an exam, please visit http://training.citrix.com/exams.

Worldwide, visit the Pearson VUE website (www.pearsonvue.com/citrix) to locate a testing center in your area and register for an exam. To register in the United States and Canada, you may also register in person at any Pearson VUE testing center or call 1-800-931-4084. *Note: A $7 USD surcharge will be added to phone registrations.*

1.6 Certification Tracks

The 351 exam is a requirement for the Citrix Certified Professional – Networking (CCP-N) certification track.

This exam may also fulfill requirements for advanced certification tracks. For the most up-to-date certification information visit http://training.citrix.com/cms/education/certification/.

1.7 Citrix Exam Retake Policies

Candidates must wait 24 hours from their original appointment time before they can register to retake an exam. After a second attempt, and any attempt thereafter, the candidate must wait 14 calendar days to retake the exam. Beta exams may only be taken once.

Citrix Education monitors retake activity for breaches of this policy. Breach of this policy can result in sanctions up to and including a temporary ban from taking Citrix exams and/or decertification.

For more information on the Citrix Exam Retake Policy, please visit http://training.citrix.com/exams.

1.8 Citrix Candidate Conduct Policy

All Citrix Certification candidates are required to read and agree to be bound by the Candidate Conduct Policy. This policy details specific information regarding what Citrix Education defines as cheating and breaches of security. Violations of this policy can result in actions including, but not limited to, classification of scores as invalid, decertification and testing bans.

To review the Candidate Conduct Policy, please visit http://training.citrix.com/exams.

1.9 Commenting During Live Exam

Citrix Education is committed to continually monitoring and updating our exams as needed. As a practice, Citrix Education regularly reviews and revises exams even after closing the beta period. Comments typed into the exam interface during an exam are considered when making decisions about revising questions.

Candidates are encouraged to use the commenting feature to provide feedback to Citrix Education. However, candidates should be mindful of the time used to provide comments on an exam as it will be subtracted from the allocated time of the test. Candidates can refer to the time clock at any time to view and be cognizant of the test time remaining.

2 The Intended Audience

2.1 Intended Audience

The 351 exam is focused on the topics that are most important to those who perform the role that focuses on networking and traffic optimization with Citrix NetScaler 10.5 environments. Citrix Education selected these topics based on feedback from subject matter experts (SMEs) who perform these tasks in the field. Those who install, configure and/or operate NetScaler 10.5 in enterprise environments may hold various job titles such as:

- Network Engineers
- Network Administrators
- Citrix Administrators
- Operations Engineer
- Systems Engineers /Systems Administrators
- Cloud Administrators/Engineers

3 Preparatory Recommendations for the Exam

3.1 Introduction

Citrix Education recommends that prior to taking this exam candidates have the knowledge, skills and abilities required to install, configure and/or operate NetScaler 10.5 in an enterprise environment.

3.2 Recommended Knowledge and Skills

Specifically, candidates should have the following knowledge and skills prior to taking this exam:

- Knowledge of:
  - TCP/IP, HTTP and SSL protocols and the OSI model
  - Web server software (e.g. Apache, IIS, WebSphere)
  - Windows and Linux Server administration
  - DNS, SSL, and compression concepts
  - Server load-balancing and content switching concepts
  - Network security threats and site protection concepts
  - The intersection between servers, networking and applications
  - Active Directory
  - Application optimization
  - Cloud computing concepts
- Experience with:
  - L1-L7 technologies
  - Network devices (e.g. routers, switches), various networking protocols, and aspects of application and site architecture (e.g. DMZ, VLANS)
  - UNIX (particularly BSD variants)
  - Basic systems administration, including logging, software upgrade procedures and high availability operations

3.3 Recommended Product Experience

We recommend that candidates have about six months of experience with the following tasks in a NetScaler 10.5 environment:

- Analyzing and designing a NetScaler 10.5 implementation for Enterprises
- Configuring basic settings in a NetScaler 10.5 implementation
- Configuring NetScaler 10.5 network-related settings
- Maintaining networking and security hardware and software
- Configuring and managing security modules of NetScaler

- Configuring load-balancing in a NetScaler 10.5 implementation
- Managing high availability features
- Configuring SSL Offload
- Optimizing the performance of applications
- Monitoring network-related activities and performance
- Troubleshooting issues in a NetScaler 10.5 implementation

3.4 Recommended Course

Citrix Education recommends that candidates have hands-on experience with NetScaler 10.5 prior to taking this exam. One of the best ways to do this is by taking formal Citrix training courses. The following courses provide basic training on administrative tasks.

- CNS-205: Citrix NetScaler 10.5 Essentials and Networking (instructor-led training course or self-study)

As with all Citrix exams, it is recommended that candidates get hands-on experience by working directly with the products covered on the exam. This includes setting up a NetScaler 10.5 environment with at least two NetScaler devices and multiple load-balancing virtual servers.

While this hands-on experience can be done on the job, Citrix Education official courses offer a safe and robust environment to learn these tasks. Thus they are one of the best ways to prepare for the exam.

3.5 Unauthorized Preparation Materials

Citrix Education monitors exam results to ensure that candidates are not using unauthorized materials to prepare for exams. If it is determined that a candidate used unauthorized materials to prepare for an exam, the candidate's score will be invalidated and his or her certification will be revoked.

When looking for materials in addition to authorized Citrix training to prepare for certification, Citrix Education recommends visiting http://www.certguard.com/ to ensure that a site is indeed legitimate. This site flags sites that are acting as brain dumps.

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4 Exam Sections and Weights

4.1 Introduction

The 1Y0-351 exam is divided into nine (9) sections.

4.2 Section Titles and Weights

Each section of the exam is weighted as follows, totaling 100%.

Section	Weight
Configuring Basic NetScaler Settings	12%
Configuring Network-related Settings of the NetScaler Implementation	14%
Securing the NetScaler Implementation and Traffic	9%
Configuring Load Balancing on NetScaler for Backend Servers and Traffic	16%
Configuring SSL Offloading	7%
Configuring Acceleration and Optimization of Traffic-handling	12%
Customizing NetScaler Traffic-handling	10%
Monitoring of Network-related Activities and Performance	4%
Troubleshooting Issues on NetScaler	16%
Total	**100%**

4.3 How Section Weights Relate to Questions on the Exam

The section weights included in this guide are intended to help you in understanding how much of the exam is devoted to the topics listed. In fact, the percentages directly map to the number of questions on the exam. For example, if an exam has 60 questions, and Section 1 is weighted at 50%, then 30 of the questions on the exam will relate to Section 1 (60*50% = 30).

Please be warned that section weights are NOT used to calculate your score. Scoring is far more complicated as exam questions may be given different weights based on their overall importance. Because some questions may have different point values assigned to them, section weights and exam scores do not always have a one-to-one correlation.

For example, in an exam where each question is worth one point, a candidate's exam score can be calculated using the arithmetic mean. The candidate's final score would be:

Section	Number of Questions	Maximum Points per Question	Number of Questions Correct	Percentage Score per Section	Arithmetic Mean Score ((Section 1 + Section 2)/2)
1	4	1	2	50%	=(50%+50%)/2 = 50%
2	8	1	4	50%	

In the example above, the arithmetic means worked. However, if the same concept is used with questions that are weighted differently, that is, they have different maximum point values, this calculation would not work. See the example below.

Section	Number of Questions	Maximum Points per Question	Number of Questions Correct	Percentage Score per Section	Arithmetic Mean Score ((Section 1 + Section 2)/2)
1	10	1	7	70%	=(70%+30%)/2 = 50%
2	10	10	3	30%	

The final score produced above is incorrect because 30 points in Section 2 weigh far more than 7 points in Section 1. On Citrix exams, we tend to calculate the final score as a percentage of:

Total Points Earned / Total Points Possible

Which means, the correct score should be:

(7 * 1) + (3 * 10) / (10 * 10) + (10 * 1)

Which is equal to: 37/110

And thus, the final score is 34%.

For more information on how scoring works in Citrix exams read the blog The Scoring Secrets for Citrix Exams - Divulged.

5 Exam Objectives and Resources for the Exam

5.1 Introduction

All questions on this exam were developed based on objectives and examples identified by subject matter experts. Exam objectives and examples are used to focus the exam on the most important concepts. The exam objectives and examples for this exam can be found in section 5.3.

In this guide we list all of the exam objectives and examples and provide you with suggested reading material to help prepare for the exam. In some cases, the exam objectives require that candidates have field experience including hands-on experience installing, configuring and/or operating Citrix NetScaler 10.5 in enterprise environments. By obtaining this experience, candidates are more likely to pass this exam.

5.2 Resources Used to Develop the Exam

Citrix Knowledge Base Articles	
Resource	**Location***
Using the NetScaler Appliance in the Use Subnet IP Mode (CTX117360)	http://support.citrix.com/
Using Mapped and Subnet IP Addresses on a NetScaler Appliance (CTX120318)	
How to Upgrade Software of NetScaler Appliances in High Availability Setup (CTX127455)	
How to Configure Link Redundancy Using a Failover Interface Set (CTX114657)	
How to Obtain and Activate NetScaler VPX Trial Licenses (CTX130498)	
How to Allocate NetScaler VPX Licenses (CTX133147)	
How to Enable Secure Access to NetScaler GUI Using the SNIP Address of the Appliance (CTX111531)	
Media Access Control (MAC) Based Forwarding (CTX116201)	
How to Associate an IP Subnet with a NetScaler Interface by Using VLANs (CTX136926)	
FAQ: Citrix NetScaler MAC Based Forwarding (MBF) (CTX132952)	
FAQ: Limiting Bandwidth using Rate Limiting on a NetScaler Appliance (CTX138964)	
Policy Based Routing (CTX124716)	
Using the Network Profile Feature of a NetScaler Appliance to Select Specific IP Addresses for the Connections Initiated by the Appliance (CTX130209)	
Understanding Metric Exchange Protocol and Monitors for Global Server Load Balancing (CTX111081)	
Available NetScaler Client, Virtual Server, and Server Timeouts Options (CTX137362)	
How to Create SSL_TCP Secure LDAP Virtual Server for NetScaler and Access Gateway Enterprise Edition Appliance (CTX133893)	

The SNI Feature of the NetScaler Appliance (CTX125798)	
SSL Renegotiation Process and Session Reuse on NetScaler Appliance (CTX121925)	
How to Offload HTTP Compression to the NetScaler Appliance (CTX137077)	
How to Configure the Integrated Caching Feature of a NetScaler Appliance for various Scenarios (CTX124553)	
How to Configure Responder Feature to Display User Specific Messages when Rate Limit for Active Connections Exceeds on NetScaler Appliance (CTX128992)	
How to Implement Rate Limiting on a NetScaler Appliance by Using the Responder Feature (CTX134009)	
Protocols and Ports Used for the High Availability Configuration on the NetScaler Appliances (CTX1096870)	
Citrix eDocs	
Configuring the NetScaler IP address	http://support.citrix.com/proddocs/topic/infocenter/ic-how-to-use.html
Configuring Subnet IP Addresses (SNIPs)	
Upgrading a High Availability Pair	
Configuring FIS	
Configuring Link Redundancy	
Configuring Fail-Safe Mode	
Configuring External User Authentication	
Configuring MAC-Based Forwarding	
How Traffic Flows Are Managed	
Configuring Application Access Controls	
Configuring a Backup Load Balancing Virtual Server	
TCP Buffering	
Integrated Caching	
Policies and Expressions	
Disabling and Enabling Extended ACLs	
Customizing a Load Balancing Configuration	
Custom Monitors	
Configuring Monitors in a Load	

Balancing Setup	
Front End Optimization (10.5+)	
Configuring Backup Virtual Servers	
Citrix Blogs	
Flowchart for Upgrading a NetScaler HA Pair to a New Release	http://blogs.citrix.com/2013/11/21/flowchart-for-upgrading-a-netscaler-ha-pair-to-a-new-release-3/

*Links are subject to change

The following table provides a list of the exam objectives, including examples of what you should know about these objectives. These examples do NOT encompass all potential topics that could be tested and are only provided as guidance.

5.3 Sections, Objectives and Examples

Section	Objective Number	Objective	Examples
Section 1	1.01	Set initial Hostname, NetScaler IP, subnet and gateway	*Understand how to set initial hostname, NetScaler IP, subnet and gateway*
Section 1	1.02	Upgrade Firmware	*Determine how to do firmware updates on NetScaler appliance* *Identify the best practices for performing firmware upgrades* *Disable synchronization and propagation* *Extract firmware during installation*
Section 1	1.03	Set up high availability	*Identify how to test high availability* *Enable encryption* *Change the default rpcNode password* *Differentiate between HA and clustering* *Understand why to use HA vs clustering* *Identify the limitations with clustering in regards to feature parity*

Section	Objective Number	Objective	Examples
Section 1	1.04	Obtain a new NetScaler license	*Identify how to license a virtual appliance* *Identify how to license a physical appliance*
Section 1	1.05	Configure management access	*Set up LDAP authentication* *Replace self-signed certificates with ones from customer CA* *Understand why you would configure management on SNIP*
Section 1	1.06	Configure basic clustering	*Determine when to configure basic clustering*
Section 1	1.07	Configure audit rules and policies	*Add audit server and policy*
Section 2	2.01	Enable feature and configure mode advance (MAC-based forwarding (MBF) and edge configuration)	*Determine when to enable feature and configure mode advance* *Understand why to enable feature and configure mode advance*
Section 2	2.02	Configure Interfaces	*Determine when to configure LACP channels* *Understand why to configure failover interface set (FIS)*
Section 2	2.03	Set up IPs, subnet IPs, IPv6 and configure management on IPs	*Determine when setting up IPs, subnet IPs, Ipv6 and configuring management on IPs is appropriate*
Section 2	2.04	Set up VLANs and bind them to interfaces with IPs	*Identify how to bind VLANS to an interface* *Consider the implications of heartbeats if changing the primary VLAN* *Identify what is meant by the concept of heartbeats*
Section 2	2.05	Set up/configure TCP profiles	*Determine when to use which profiles* *Identify what is meant by the concept of TCP profiles* *Identify how to set up TCP profiles* *Identify what can be done with TCP profiles*

Section	Objective Number	Objective	Examples
Section 2	2.06	Configure policy-based routing	*Identify how to configure policy-based routing* *Determine when to use policy-based routing* *Differentiate between policy-based routing and MAC-based forwarding (MBF)*
Section 2	2.07	Configure traffic domains	*Identify how to configure traffic domains* *Determine when to configure traffic domains* *Consider the benefits of traffic domains* *Determine how to implement traffic domains in a simple set up*
Section 2	2.08	Configure advanced networking settings	*Identify what Net profiles are and what the best use case for a net profile is* *Configure INAT vs. RNAT vs LSNAT* *Configure L2, L3 options* *Configure Dynamic and static routing* *Configure IP options and ARP / ICMP controls* *Consider the benefits and limitations of LACP* *Configure VMAC/VRID* *Configure IP redirection* *Configure ARP bridge table* *Configure listen policies*
Section 3	3.01	Configure SSL options	*Identify how to secure with SSL* *Identify how SSL policies work* *Identify what you need to consider for configuring SSL options* *Identify SSL renegotiation* *Identify formats, encryption algorithms, SSL options and FIPS compliance*

Section	Objective Number	Objective	Examples
Section 3	3.02	Set up authentication	*Configure two-form factor authentication* *Configure LDAPS* *Differentiate between authentication methods* *Determine which method to use based on different situations* *Identify what is meant by the concept of authentication, policy evaluation and authentication flow*
Section 3	3.03	Disable unwanted protocols	*Identify how to disable unwanted protocols* *Understand why to disable unwanted protocols*
Section 3	3.04	Configure Access Control List (ACL)	*Differentiate between standard and extended* *Determine how to configure ACL*
Section 4	4.01	Choose method of load balancing	*Determine when to use which type of load balancing* *Identify the benefits some load* *Differentiate between the various methods of load balancing* *Determine how to configure load balancing* *Identify the benefits some balancing methods have over others when addressing certain use cases.*
Section 4	4.02	Configure persistence	*Determine when to use certain types of persistence* *Determine how to configure persistence* *Understand why to configure backup persistence* *Identify distinction between certain load balancing methods and some persistency options*

Section	Objective Number	Objective	Examples
Section 4	4.03	Configure GSLB (Global Server Load Balancing)	*Determine when to configure GSLB* *Determine which method of GSLB load balancing to use* *Identify what is meant by the concept of metric exchange protocols (MEP)* *Identify the purpose of metric exchange protocols (MEP)* *Identify how to enable/disable metric exchange protocols (MEPs)*
Section 4	4.04	Configure monitors	*Determine how to configure monitors* *Determine when to use which type of monitor* *Identify USER monitors and networking profiles* *Differentiate between GSLB monitors and load balancing service monitors* *Identify what is meant by the concept of inline monitoring*
Section 4	4.05	Configure load balancing advanced features	*Determine when to configure Spillover* *Identify the use cases for Redirect URL*
Section 4	4.06	Manage Session Timeout Period	*Identify how long a user can remain in idle state without being terminated* *Determine how and why to manage session timeout period of Insight sessions* *Determine how and why to manage session timeout period of load balancing sessions* *Differentiate between client, server and server timeouts.*

Section	Objective Number	Objective	Examples
Section 5	5.01	Create, verify and import certificates and link certificate chains	*Identify how certificates work* *Understand why it is important to link certificates* *Identify what is meant by the concept of private keys and the need to secure them* *Define the process of creating certificates on NetScaler* *Identify what the different types of certificates (root, intermediate, etc.) are used for*
Section 5	5.02	Create SSL virtual server (VServer) plus services	*Determine how to create SSL virtual server plus services*
Section 5	5.03	Configure SSL parameters	*Configure session reuse and renegotiation*
Section 5	5.04	Configure SSL ciphers on virtual server (VServer)	*Determine where and when TLS11/12 is used* *Consider the benefits of ECC and when it is supported* *Understand why to configure SSL ciphers on virtual servers*
Section 6	6.01	Enable and configure compression	*Identify licensing and scalability considerations when using caching.* *Identify how to enable and configure compression* *Understand why to enable and configure compression*
Section 6	6.02	Set up TCP buffer	*Consider the benefits of TCP buffer* *Identify what is meant by TCP buffer*
Section 6	6.03	Enable and set up caching	*Determine how to enable and set up caching* *Identify how much memory to adding to the instance if using caching* *Differentiate between client side caching and transparent caches.* *Define the caching hierarchy*

Section	Objective Number	Objective	Examples
Section 6	6.04	Configure Front End Optimization Support	*Identify how front end optimization support works* *Identify when to configure front end optimization support* *Consider the benefits of configuring front end optimization support*
Section 6	6.06	Configure Max Client	*Understand why to configure Max Client*
Section 7	7.01	Configure Rewrite/Responder/URL Transform	*Determine what to configure (rewrite/responder/URL transform)* *Determine when to configure (rewrite/responder/URL transform)*
Section 7	7.02	Configure content switching	*Consider the benefits of configuring content switching* *Differentiate between basic and advanced expressions*
Section 7	7.03	Enable rate limiting	*Understand why to enable rate limiting* *Identify when rate limiting is supported*
Section 7	7.04	Configure Link Aggregation Configuration Protocol (LACP)	*Identify what LACP is* *Understand why to configure LACP* *Determine how to configure LACP*
Section 7	7.05	Configure Authentication, Authorization and Access (AAA)	*Understand why to configure AAA* *Determine the best option for authentication for a particular service*
Section 8	8.01	Configure SNMP Traps	*Differentiate between SNMP traps and polling a device* *Identify options available for SNMP trap destinations* *Use Command Center to Monitor NetScaler traffic* *Determine how to set up thresholds*
Section 8	8.02	Monitor NetScaler traffic with Insight Center	*Define what Insight Center is* *Understand why to use Insight Center*

Section	Objective Number	Objective	Examples
Section 9	9.01	Troubleshoot Authentication, Authorization and Access (AAA) issues	*Identify what AAA debug is* *Determine what to enable to get the necessary info*
Section 9	9.02	Troubleshoot licensing issues	*Determine how to troubleshoot licensing issues*
Section 9	9.03	Read and interpret logs	*Interpret information in a given log file and determine the issue* *Determine how to resolve a given issue*
Section 9	9.04	Troubleshoot High Availability (HA)	*Identify what is causing a given issue* *Determine how to resolve a given issue*
Section 9	9.05	Troubleshoot traffic and connectivity issues	*Troubleshoot connection table and routes* *Troubleshoot issues with telnet and monitors* *Analyze packet trace* *Differentiate between nstcpdump and nstrace and how to use them*
Section 9	9.06	Troubleshoot SSL, SSL Offload	*Identify possible causes of SSL issues* *Determine how to encrypt SSL traffic* *Explain how to decrypt and analyze SSL traffic*
Section 9	9.07	Troubleshoot policies	*Troubleshoot authentication policies using nsconmsg* *Verify which authentication policies are being applied* *Identify how to get policy counts* *Check/verify whether policy is bound or hit* *Determine how to force a policy to be hit*
Section 9	9.08	Troubleshoot issues caused by caching	*Identify the necessary command to verify whether caching is working* *Determine how to resolve issues with caching*

6 Appendix: Interpretation of Objectives

6.1 Interpretation of Objectives

Exam-takers should refer to the objectives and examples listed in section five of this guide in order to determine not only which topics will be on the exam but also *examples* of the topics that could be tested.

For example, if the **objective** reads, "*Troubleshoot high availability*" and one of the examples reads, "*determine how to resolve a given issue*", exam-takers *could* expect to see:

- **A scenario describing an issue with high availability**
  - ***Scenario:*** *A NetScaler Engineer is attempting to configure high availability for a NetScaler MPX pair. Each NetScaler appliance resides in a different subnet. The engineer noticed that network connectivity between the appliances was lost once the high availability pair was established.*
- **A question that requires determining how to resolve the given issue**
  - *What must the engineer enable to correct this issue?*

As another example, if the objective reads "*Configure monitors*" and one of the examples reads, "*determine when to use which type of monitor*," exam-takers *could* expect to see:

- ***A question that requires determining which type of monitor to configure…***
  - Which type of monitor should an engineer configure…
- ***…based on given requirement(s)***
  - …to validate that a specific text string is returned in a web server response?

Note: Again, the examples listed in section five of this guide do NOT encompass all potential topics that could be tested and are only provided as guidance.

The objectives and examples for this exam were developed by Exam Project Managers and subject matter experts based on identified tasks that relate to installing, configuring and/or operating Citrix NetScaler 10.5 in enterprise environments. The number of questions written for each objective relates directly to the importance of that objective as it relates to the installation, configuration and operation, and is proportional to how frequently that task is performed.