Compression Deployment Guide

A Step-by-Step Technical Guide

Deployment Guide

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Introduction

Citrix® NetScaler® optimizes the delivery of web applications — increasing security and improving performance and Web server capacity. This approach ensures the best total cost of ownership (TCO), security, availability, and performance for Web applications. The Citrix NetScaler solution is a comprehensive network system that combines high-speed load balancing and content switching with state-of-the-art application acceleration, layer 4-7 traffic management, data compression, dynamic content caching, SSL acceleration, network optimization, and robust application security into a single, tightly integrated solution. Deployed in front of application servers, the system significantly reduces processing overhead on application and database servers, reducing hardware and bandwidth costs.

The Compression feature of the Citrix Application Switch Provides transparent compression for HTML and text files using the Gzip compression protocol. The typical 4:1 compression ratio yields up to 50% reduction in bandwidth requirements out of the data center. This also results in significantly improved end-user response time by reducing the amount of data that must be delivered to the user's browser.

This deployment guide was created as the result of validation testing with the Oracle Enterprise Business Suite v12 application. This deployment guide walks through the step-by-step configuration details of how to configure the Citrix NetScaler application switch for Compression and some of the considerations necessary for integration with Oracle EBSv12.

Solution Requirements

- Application Delivery Front-End
  - Compression
  - Oracle E-Business Suite v12

Prerequisites

- Citrix NetScaler L4/7 Application Switch, running version 8.0+, (Quantity x 1 for single deployment, Quantity x 2 for HA deployment).
- Layer 2/3 switch, w/support for 802.1q VLANs, (Quantity x 1)
- Client laptop/workstation running Internet Explorer 6.0+, Ethernet port
- 9-pin serial cable -or- USB-to-serial cable

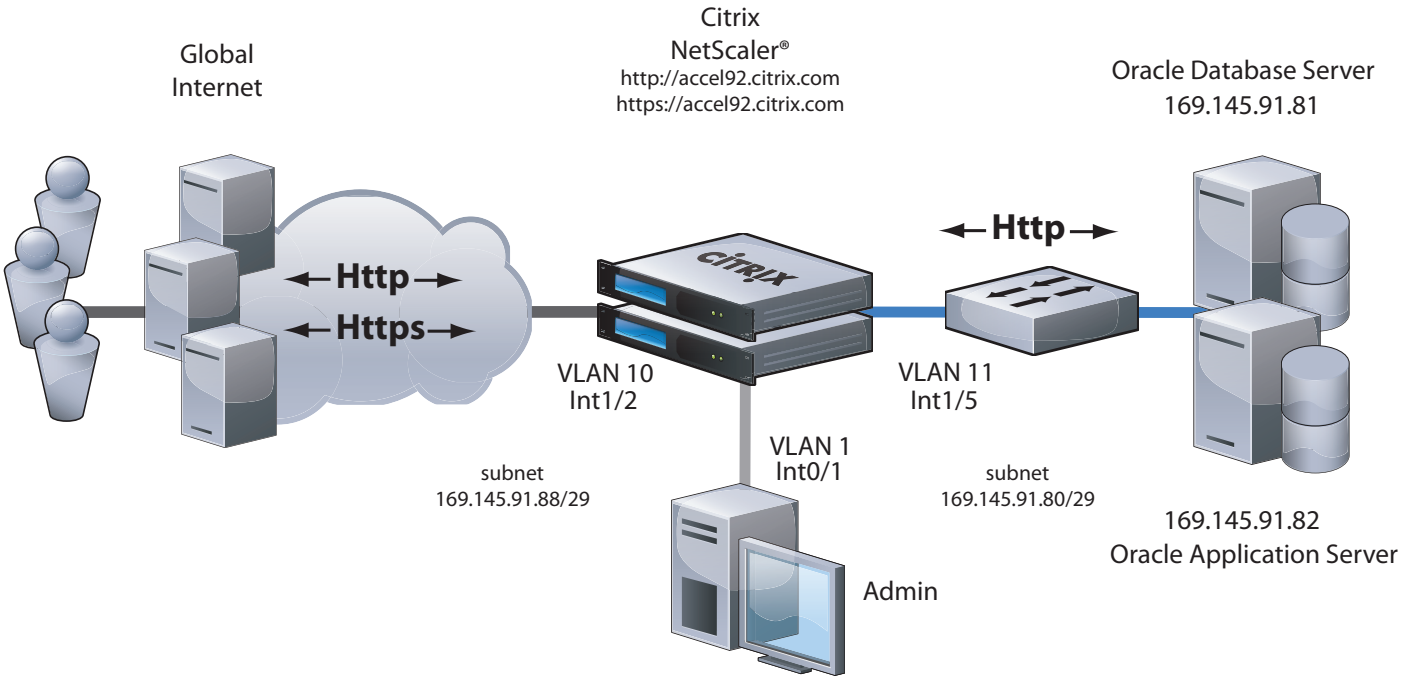
NOTE:

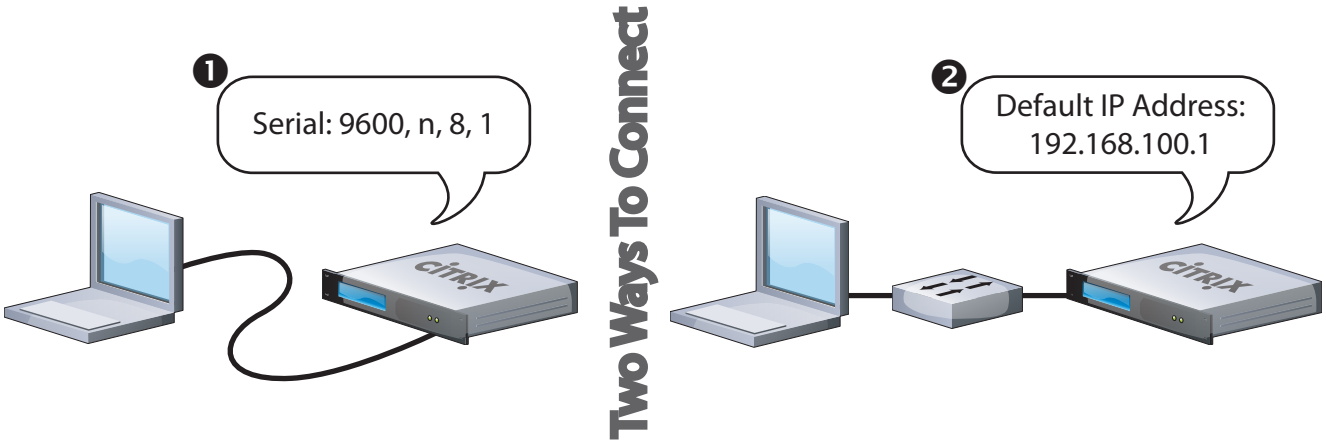
The policies in this guide are based on the Policy Engine (PE) architecture in NetScaler version 8.0. The policies for NetScaler version 9.0+ use the Policy Infrastructure (PI) architecture which are different in syntax and methodology. Policy Infrastructure is not discussed in this guide.

Network Diagram

The following is the Network that was used to develop this deployment guide, and is representative of a solution implemented at a customer site.

VLAN Legend	Primary NetScaler	Primary/Secondary NetScaler	Secondary NetScaler
VLAN 1 VLAN 10 VLAN 11	IP Addresses: NSIP: 10.217.104.51 / 24	Shared IP Addresses: VIP: 67.97.253.91 / 29 VIP: 67.97.253.92 / 29 VLAN 10: Interface 1/2, Untagged VLAN 11: Interface 1/5, Untagged MIP: 67.97.253.84 / 29 VLAN 1: (Mgmt) Interface 0/1, Untagged SNIP: 10.217.104.54 / 24	IP Addresses: NSIP: 10.217.104.52 / 24





First time connectivity

Serial Connection

The NetScaler can be accessed by the serial port through any terminal emulation program. Windows Hyperterm is commonly used on a laptop or workstation. Connect a 9-pin Null Modem cable (or USB-to-9-pin cable) from the computer to the NetScaler's console port. In the terminal emulation program configure the settings for 9600 baud, No stop bits, 8 data bits, and 1 parity bit. The login prompt should appear. The default login is nsroot, nsroot. It is advisable to change the nsroot password once connected.

Once connected type in the CLI command 'configns' ('nsconfig' if at the shell prompt). Select option 1 to change the NetScaler IP Address and Network Mask. Exit, save and reboot.

Ethernet Connection

The NetScaler can also be accessed by the default IP Address of 192.168.100.1, either through an http, https, telnet or ssh connection. Once connected, the login prompt should appear. The default login is nsroot, nsroot. It is advisable to change the nsroot password once connected.

Type in the CLI command 'configns' ('nsconfig' if at the shell prompt). Select option 1 to change the NetScaler IP Address and Network Mask. Exit, save and reboot.

Note: Changing the NetScaler IP Address always requires a reboot.

NetScaler Configuration

Deployment Model: Netscaler High Availability, Two-Arm Mode, Compression

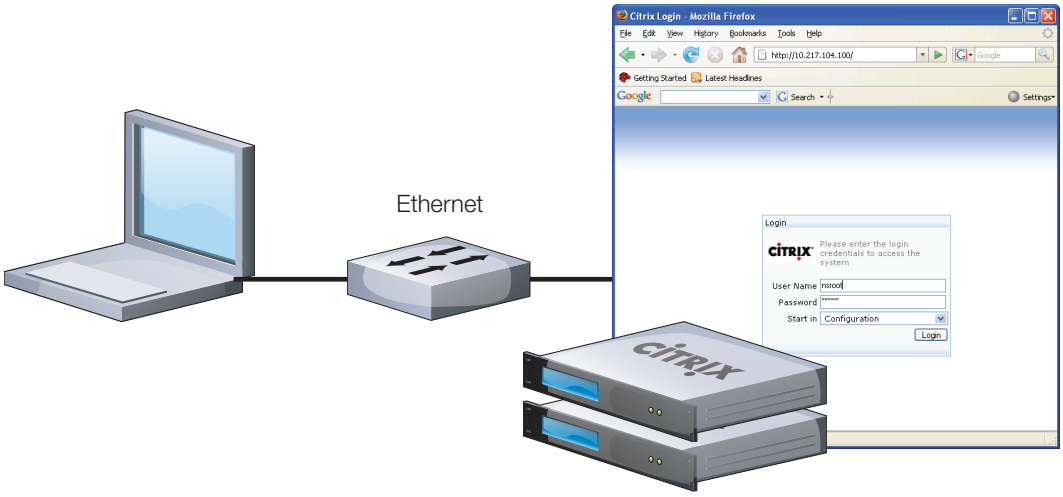
The NetScalers in this example assume a high availability pair configuration, in two-arm mode. All configuration changes will be made on the Primary NetScaler and will be propagated to the Secondary NetScaler.

Connect to the NetScaler via the NSIP using a web browser.

In this example:
NS1: http://10.217.104.51
NS2: http://10.217.104.52

Note: Java will be installed.

Default login is: nsroot, nsroot.



About Compression

The Citrix Application Switch compresses HTTP responses for browsers that are compression-aware. In other words, for browsers that send the header “Accept-Encoding: gzip,deflate”. The Citrix switch automatically compresses text and html. It does not compress images. With the system’s integrated caching feature enabled, compressed content can be cached and served to compression-aware clients without re-compression.

The Citrix Application Switch uses Intelligent response filtering: Responses with a content-length of zero are not compressed. If the response is already compressed, it is detected and bypassed by the compression engine. This enables origin sites to use server-based compression in conjunction with Citrix’s compression feature.

HTTPS is supported when encryption is performed by the Citrix system. The server’s responses are compressed and encrypted before they are sent to the HTTPS client.

Compression works by defining service/service groups and compression polices. Services/service groups are entities that are logical representations of applications on the physical servers. The compression policies enable the system to identify the content that needs to be compressed. A compression policy consists of an expression and an action. An expression is created to identify the files entering the system, for example, HTML files, text files, js files, or css files. An action defines the action the system performs on the file identified by the expression. For example, you can configure a compression policy comprised of an expression that identifies javascript files and an action that compresses the javascript files.

You can enable compression to be applied globally to all traffic or to individual virtual servers (VIPs) where the compression policies are bound to a load balancing vserver. This allows the compression policies to be evaluated for only the services bound to that vserver (VIP).

Compression can be enabled or disabled on the backend, server side of the Citrix Application Switch.

Some content types are considered compressible while other content types are considered to be not compressible, mainly because they are already compressed, and to try and compress them again, would waste precious CPU cycles, and increase latency. Remember that if content is already compressed, Citrix does not try to compress it again. Every application is unique and will have it’s own set of requirements with regard to compression, but some general guidelines to follow.

Note:

With the system’s integrated caching feature enabled, compressed content can be cached and served to compression-aware clients without re-compression.

When the “**Compress**” action is set, the system uses the GZIP algorithm to compress data for browsers that support either GZIP or both GZIP and DEFLATE. Similarly, the system uses the DEFLATE algorithm to compress data for browsers that support the DEFLATE algorithm. If the browser does not support either algorithm, and the action has been set to COMPRESS, the system does not compress data.

Citrix automatically compressed content types

Flow	Content type	Expression	Action
response	text/html	RES.HTTP.HEADER Content-Type CONTAINS text	COMPRESS
response	text/plain	RES.HTTP.HEADER Content-Type CONTAINS text	COMPRESS
response	text/xml	RES.HTTP.HEADER Content-Type CONTAINS text	COMPRESS
response	text/css	RES.HTTP.HEADER Content-Type CONTAINS text/css	COMPRESS
response	text/rtf	RES.HTTP.HEADER Content-Type CONTAINS text	COMPRESS
response	application/msword	RES.HTTP.HEADER Content-Type CONTAINS application/msword	COMPRESS
response	application/vnd.ms-excel	RES.HTTP.HEADER Content-Type CONTAINS application/vnd.ms-excel	COMPRESS
response	application/vnd.ms-powerpoint	RES.HTTP.HEADER Content-Type CONTAINS application/vnd.ms-powerpoint	COMPRESS

Additional compressible content types

Flow	Content type	Expression	Action
response	application/*	RES.HTTP.HEADER Content-Type CONTAINS application	COMPRESS
response	application/pdf	RES.HTTP.HEADER Content-Type CONTAINS application/pdf	COMPRESS
request	*.html	REQ.HTTP.URL CONTAINS /*.html	COMPRESS
request	*.htm	REQ.HTTP.URL CONTAINS /*.htm	COMPRESS
request	*.txt	REQ.HTTP.URL CONTAINS /*.txt	COMPRESS

Non-compressible content types

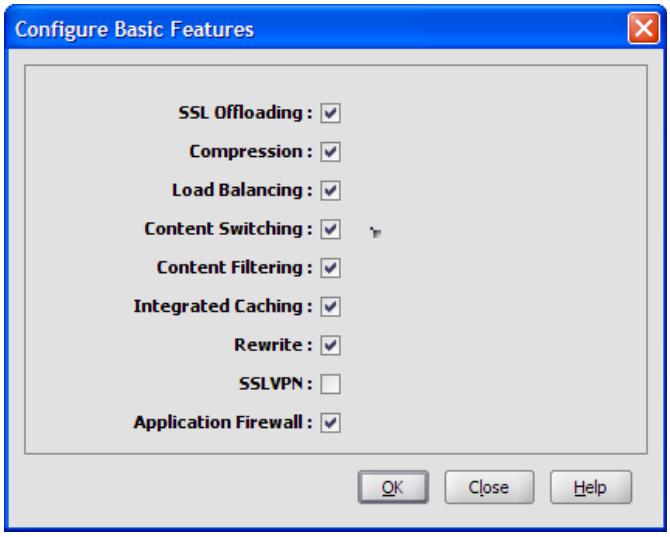
Flow	Content type	Expression	Action
response	application/zip	RES.HTTP.HEADER Content-Type CONTAINS application/zip	NOCOMPRESS
response	image	RES.HTTP.HEADER Content-Type CONTAINS image	NOCOMPRESS
response	content/unknown	RES.HTTP.HEADER Content-Type CONTAINS content/unknown	NOCOMPRESS
response	[unknown]	RES.HTTP.HEADER Content-Type CONTAINS [unknown]	NOCOMPRESS
request	/*.zip	REQ.HTTP.URL CONTAINS /*.zip	NOCOMPRESS
request	/*.cs	REQ.HTTP.URL CONTAINS /*.cs	NOCOMPRESS
request	/*.rar	REQ.HTTP.URL CONTAINS /*.rar	NOCOMPRESS
request	/*.arj	REQ.HTTP.URL CONTAINS /*.arj	NOCOMPRESS
request	/*.z	REQ.HTTP.URL CONTAINS /*.z	NOCOMPRESS
request	/*.gz	REQ.HTTP.URL CONTAINS /*.gz	NOCOMPRESS
request	/*.tar	REQ.HTTP.URL CONTAINS /*.tar	NOCOMPRESS
request	/*.lzh	REQ.HTTP.URL CONTAINS /*.lzh	NOCOMPRESS
request	/*.cab	REQ.HTTP.URL CONTAINS /*.cab	NOCOMPRESS
request	/*.hqx	REQ.HTTP.URL CONTAINS /*.hqx	NOCOMPRESS
request	/*.ace	REQ.HTTP.URL CONTAINS /*.ace	NOCOMPRESS
request	/*.ear	REQ.HTTP.URL CONTAINS /*.ear	NOCOMPRESS
request	/*.compressed	REQ.HTTP.URL CONTAINS /*.compressed	NOCOMPRESS
request	/*.asp	REQ.HTTP.URL CONTAINS /*.asp	NOCOMPRESS
request	/*.jsp	REQ.HTTP.URL CONTAINS /*.jsp	NOCOMPRESS

Configuring Compression

Enabling Compression

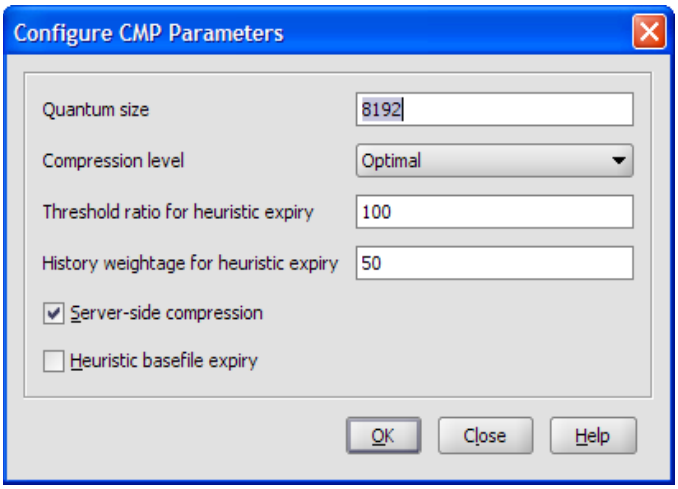
The Citrix Application Switch uses some default compression policies, along with some custom policies that you can configure. Additionally, in order to offload the compression calculation from the SAP servers, you should disable compression from the client requests, this way the Citrix Application Switch will end up doing all the compression work, and the backend servers will not have to be burdened with that. If for some reason, the backend servers send a compressed response, the Citrix Applicaiton Switch will not try to re-compress it, and will pass it through.

First make sure that compression is enabled at the system level, before you start creating policies.



Navigate to System ➥ Settings ➥ Basic Features. Select Compression, and click OK.

The default minimum object size for compression in 56k, and this is configurable to suit your taste. The caveat is that the lower the number you make it, could cause unnecessary computation cycles in the Citrix Application Switch, having an affect on performance. If it isn't set high enough, you may not be compressing files that need to be compressed.



From the GUI, select NetScaler ➥ Compression ➥ Configure CMP Parameters.

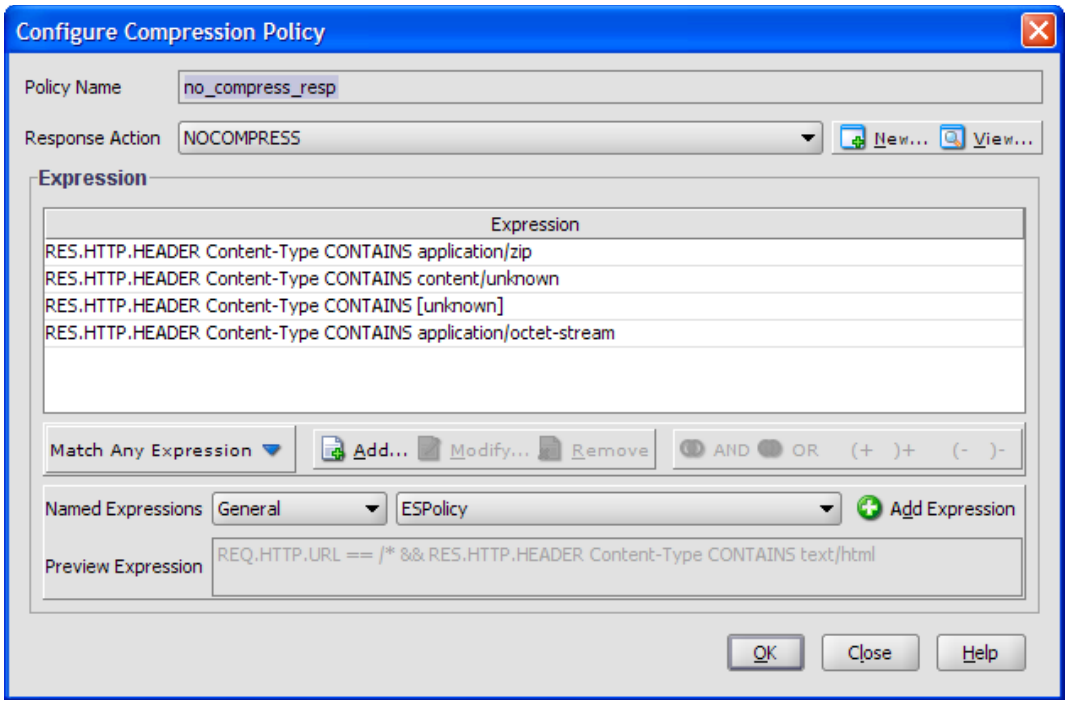
Configuring Non-Compressible Content

It is important to understand what is considered to be non-compressible content vs. compressible content, as referenced in the preceding tables. We configure the expressions for non-compressible content first, and if they match we don't compress that content.

From the GUI, select NetScaler ➥ Compression ➥ HTTP ➥ Add.

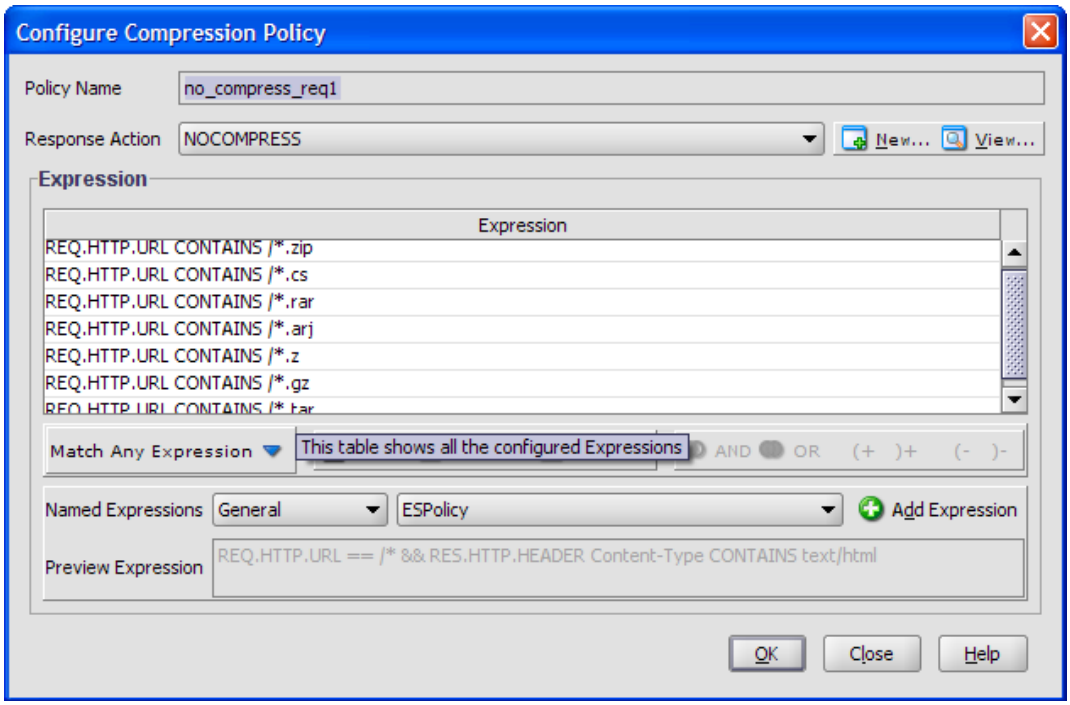
Notice this set of compression policies is for the response flows.

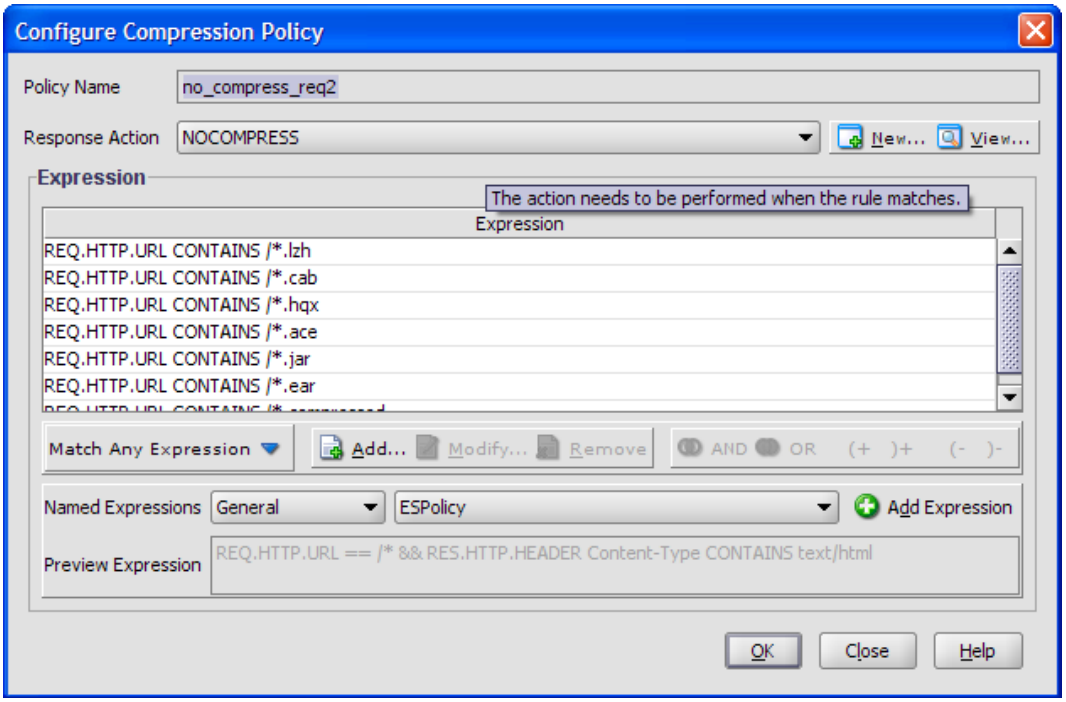
Set the compression response action to NOCOMPRESS. Several expressions can be combined in an "OR" matching algorithm.



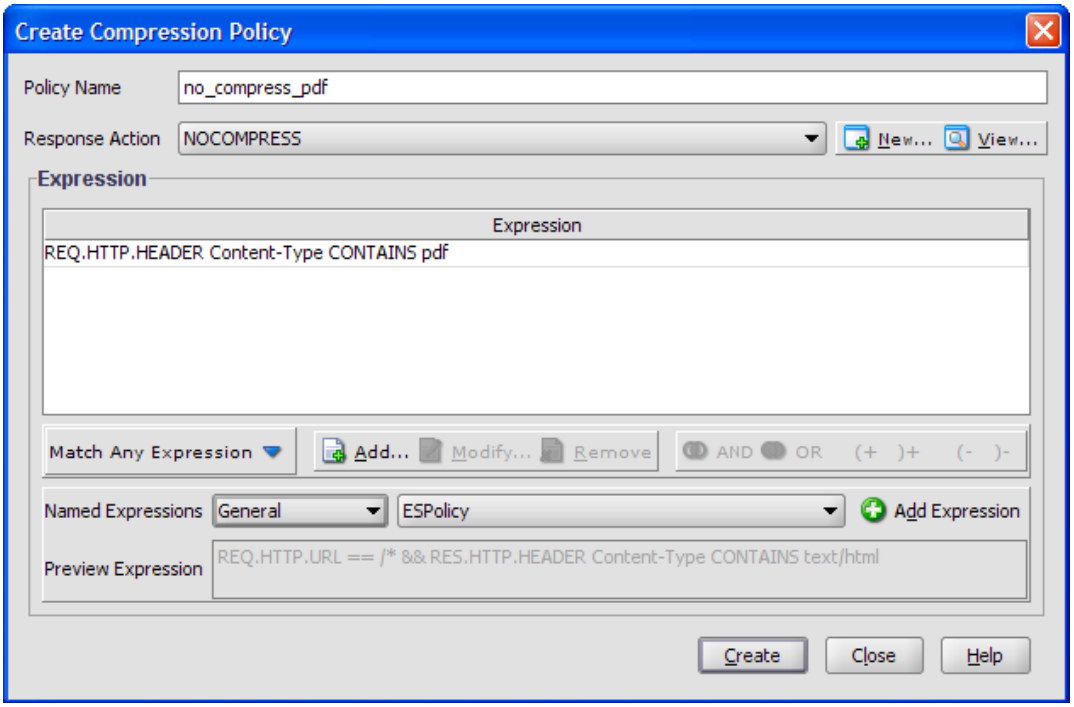
Add the additional policies for the request flows.

Set the compression response action to NOCOMPRESS. Again, several expressions can be combined in an "OR" matching algorithm.





In some cases pdf viewers cannot display compressed pdf files, so you may need to specify that pdf files not be compressed.



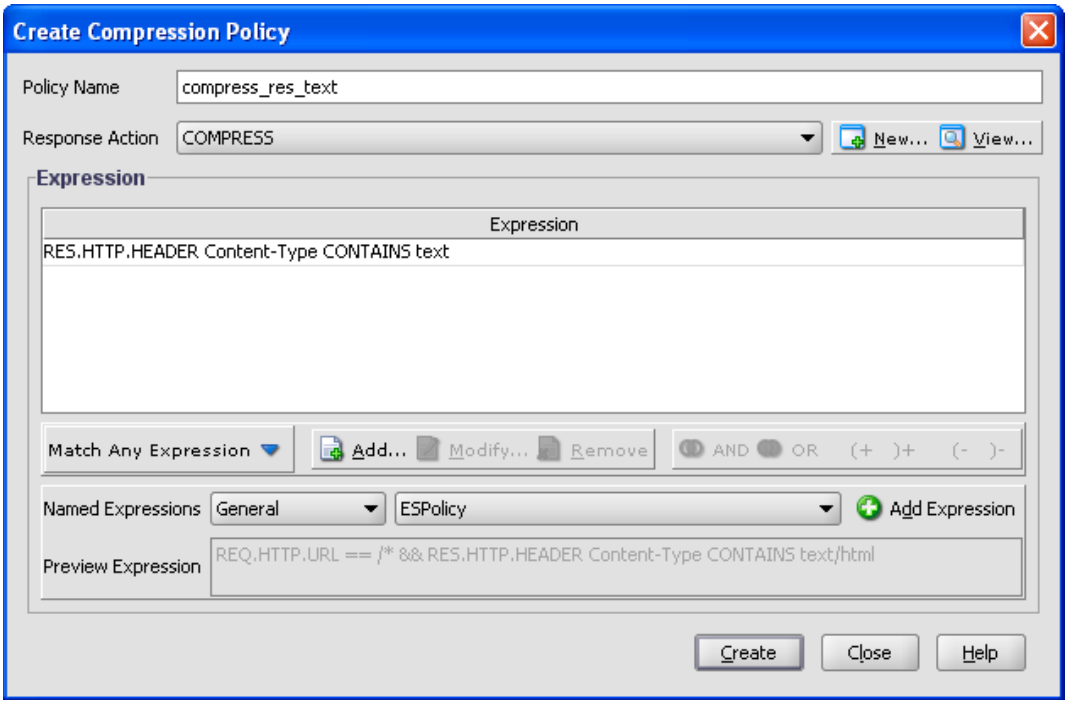
Configuring Compressible Content

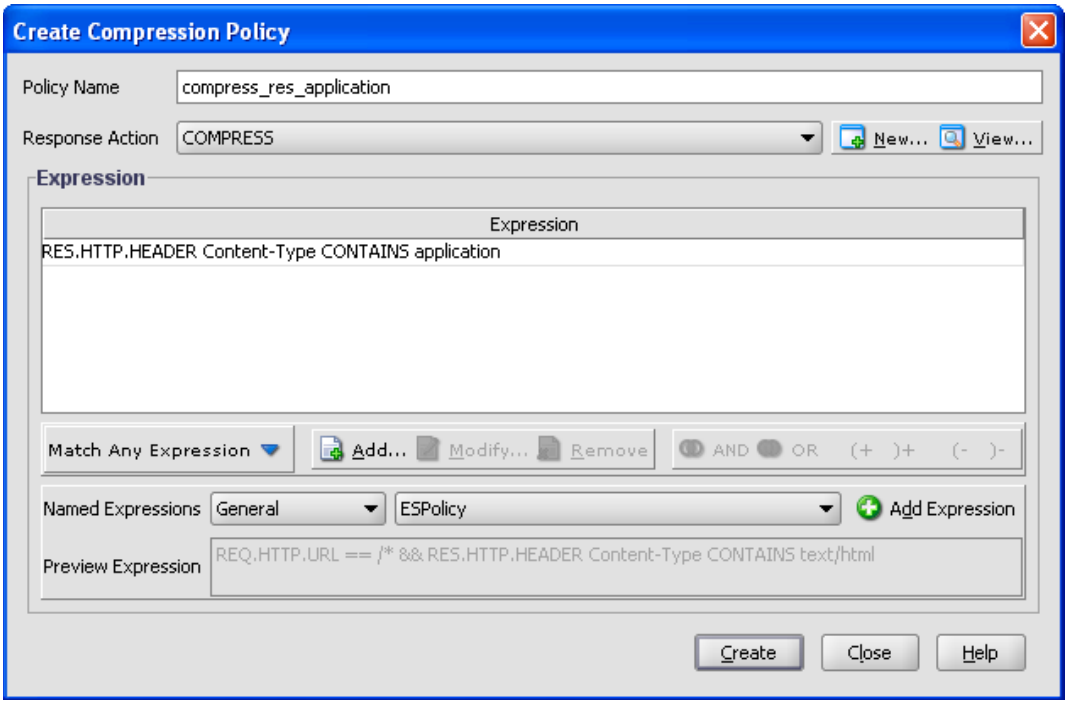
We now add the policies for the compressible content types.

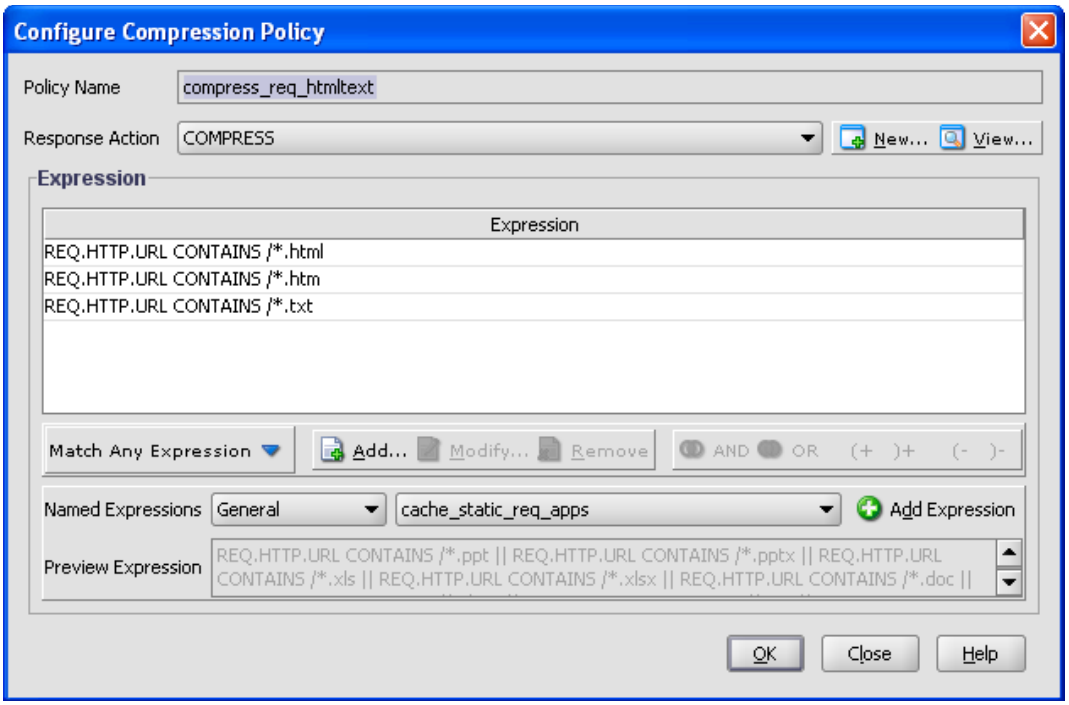
Notice this set of compression policies is for the response flows.

Set the compression response action to COMPRESS. Several expressions can be combined in an "OR" matching algorithm.

We now configure the expressions for compressible content. Be advised that the Citrix Application Switch contains some built-in policies for compression as well. The "text" policy will effectively compress responses for text files, html files, css files, xml files and anything returned to the clients browser as text. Run a trace and check the Content-Type header. The "application" policy will effectively compress responses for pdf, word, excel, powerpoint and javascript.





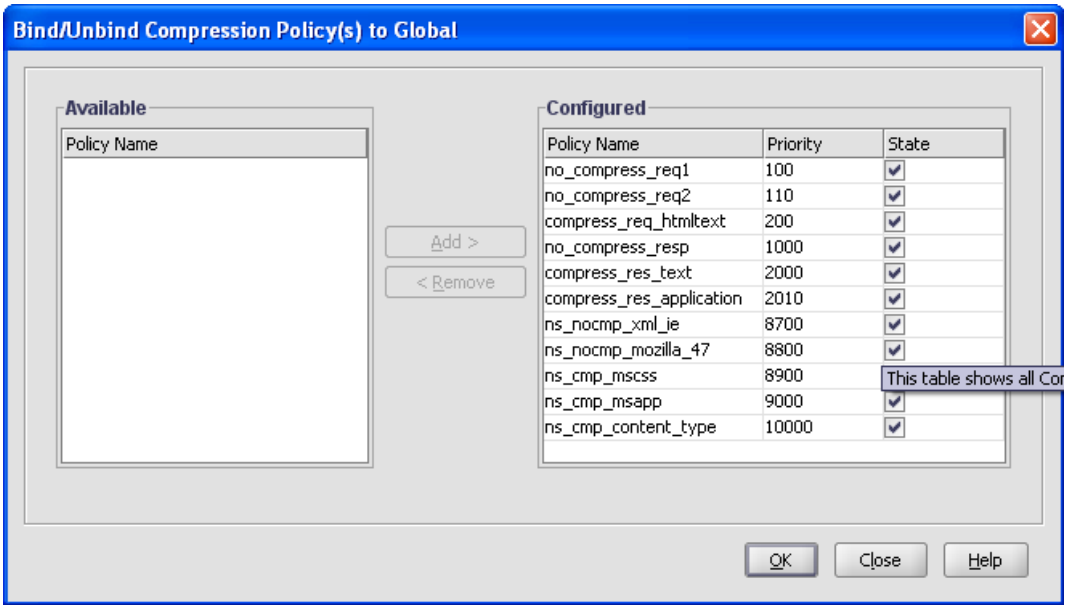


Notice this set of compression policies is for the request flows.

Set the compression response action to COMPRESS. Again, several expressions can be combined in an "OR" matching algorithm.

Activating Compression

Now we need to activate the compression policies we have configured.



From the GUI, select NetScaler ➥ Compression ➥ HTTP ➥ Global Bindings.

We give each policy a priority. The lower the priority takes precedence in evaluation.

We place the no-compress policies higher in the stack, and the compress policies lower in the stack. If the evaluation falls through the no-compress policy evaluation, it is most likely compressible.

Request policies need to be evaluated first before response policies. The default policies contain the prefix 'ns'.

Note:

Compression policies can be enabled on an individual VIP basis, under Load Balancing ➥ Virtual Servers ➥ Open ➥ Policies.

Disabling Compression on Application Responses

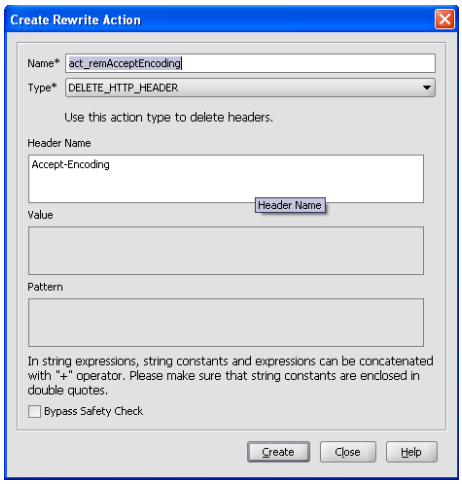
There are two ways to disable compressed content in responses from the Application. 1) Remove the Accept-Encoding headers from the client requests and/or 2) Disable compression on the Service within the Citrix Application Switch. Disabling the compression algorithm on the server free's it up to perform other duties and allows Citrix to offload the compression calculation, along with it's other Applicaiton acceleration technologies. If for some reason, the server still sends a compressed response, the Citrix Applicaiton Switch will not try to re-compress it, and will pass it through.

Removing Accept-Encoding headers

One way to offload the compression calculation from the servers is to remove the Accept-Encoding header's from the client requests, this way the Citrix Application Switch will end up doing all the compression work, and the servers will not have to be burdened with that workload. This procedure is actually done within the Rewrite engine of the Citrix Application Switch.

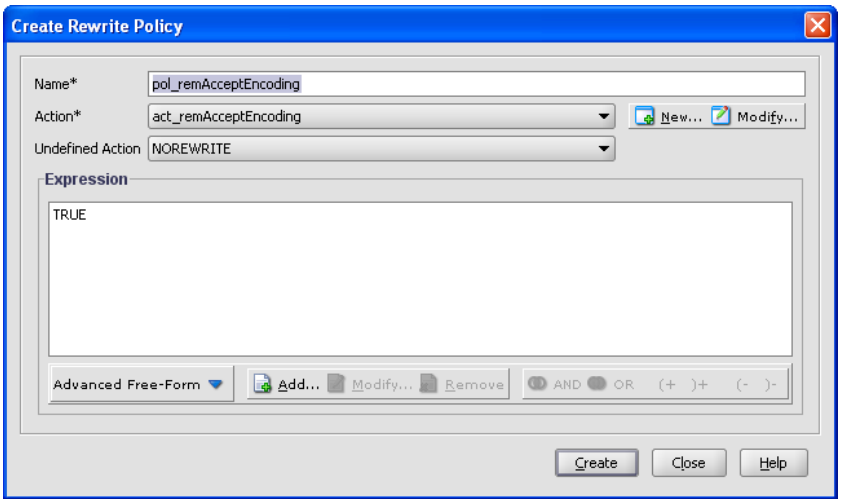
From the GUI, select NetScaler ➥ Rewrite ➥ Actions ➥ Add.

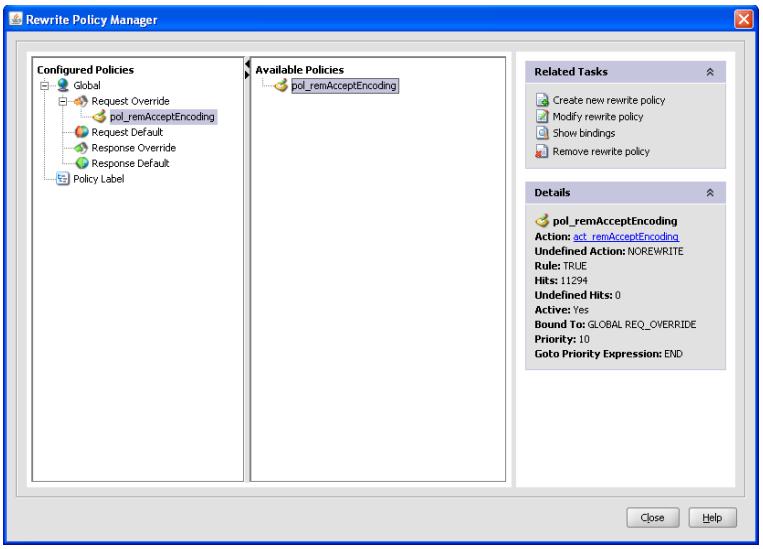
We first create a rewrite 'action' to delete the Accept-Encoding header on it's way to the back-end servers.



From the GUI, select NetScaler ➥ Rewrite ➥ Policies ➥ Add.

We then create a rewrite 'policy' to engage the rewrite action. Give it an expression value of "TRUE".





From the GUI, put the mouse cursor on NetScaler ➥ Rewrite. The select Rewrite Policy Manager.

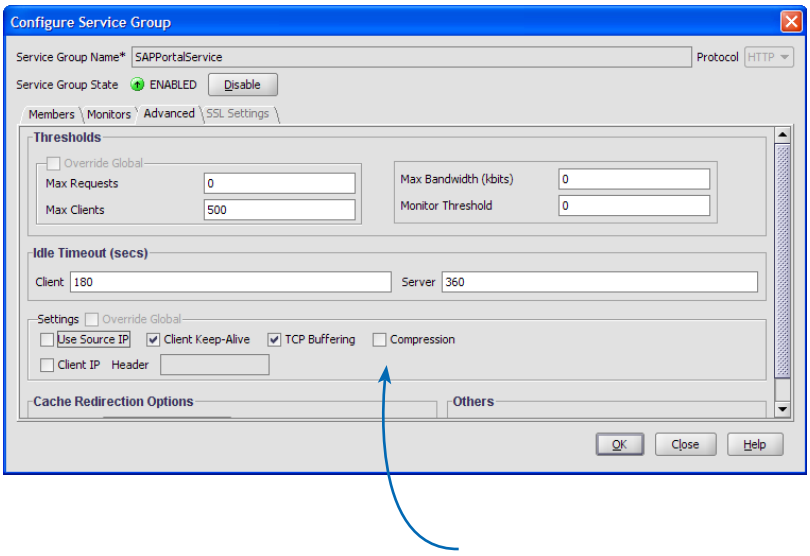
Grab the rewrite policy under Available Policies, and drag it over to Request Overrides.

All requests going to the back-end servers will not have the Accept-Encoding header.

If you don't want to do this on a Global basis, you can assign this policy to the individual VIP.

Disabling compression on the Citrix VIP's

The other method for disabling compression, is to disable it on the Service or Service Group that talks directly to the backend servers.



From the GUI, go to System ➥ Load Balancing ➥ Service Groups ➥ Open ➥ Advanced. De-select the Compression box.

Appendix A - NetScaler Application Switch Configuration

Primary NetScaler

> #NS8.0 Build 51.4

set ns config -IPAddress 10.217.104.51 -netmask 255.255.255.0

set ns config -maxConn 500

enable ns feature CMP REWRITE

enable ns mode L2 L3 USIP CKA TCPB MBF Edge USNIP

add vlan 10

add vlan 11

bind vlan 10 -ifnum 1/2

bind vlan 11 -ifnum 1/5

bind vlan 11 -IPAddress 67.97.253.83 255.255.255.248

set cmp parameter -quantumSize 57344

add cmp policy compress_res_text -rule “RES.HTTP.HEADER Content-Type CONTAINS text” -resAction COMPRESS

add cmp policy compress_res_application -rule “RES.HTTP.HEADER Content-Type CONTAINS application” -resAction COMPRESS

add cmp policy compress_htmltext -rule “REQ.HTTP.URL CONTAINS /*.html || REQ.HTTP.URL CONTAINS /*.htm || REQ.HTTP.URL CONTAINS /*.txt” -resAction COMPRESS

add cmp policy no_compress_resp -rule “RES.HTTP.HEADER Content-Type CONTAINS application/zip || RES.HTTP.HEADER Content-Type CONTAINS content/unknown || RES.HTTP.HEADER Content-Type CONTAINS [unknown] || RES.HTTP.HEADER Content-Type CONTAINS application/octet-stream” -resAction NOCOMPRESS

add cmp policy no_compress_req1 -rule “REQ.HTTP.URL CONTAINS /*.zip || REQ.HTTP.URL CONTAINS /*.cs || REQ.HTTP.URL CONTAINS /*.rar || REQ.HTTP.URL CONTAINS /*.arj || REQ.HTTP.URL CONTAINS /*.z || REQ.HTTP.URL CONTAINS /*.gz || REQ.HTTP.URL CONTAINS /*.tar” -resAction NOCOMPRESS

add cmp policy no_compress_req2 -rule “REQ.HTTP.URL CONTAINS /*.lzh || REQ.HTTP.URL CONTAINS /*.cab || REQ.HTTP.URL CONTAINS /*.hqx || REQ.HTTP.URL CONTAINS /*.ace || REQ.HTTP.URL CONTAINS /*.jar || REQ.HTTP.URL CONTAINS /*.ear || REQ.HTTP.URL CONTAINS /*.compressed” -resAction NOCOMPRESS

bind cmp global no_compress_req2 -priority 100

bind cmp global no_compress_req1 -priority 200

bind cmp global no_compress_resp -priority 300

bind cmp global ns_nocmp_xml_ie -priority 8700 -state DISABLED

bind cmp global ns_nocmp_mozilla_47 -priority 8800 -state DISABLED

bind cmp global ns_cmp_mscss -priority 8900 -state DISABLED

bind cmp global ns_cmp_msapp -priority 9000 -state DISABLED

bind cmp global ns_cmp_content_type -priority 10000 -state DISABLED

bind cmp global compress_res_text -priority 11000

```
bind cmp global compress_res_application -priority 12000
bind cmp global compress_htmltext -priority 13000
```

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