Deploying Oracle Weblogic Server with NetScaler

Deployment Guide

This guide focuses on defining the process for deploying Oracle Weblogic Server with Citrix NetScaler

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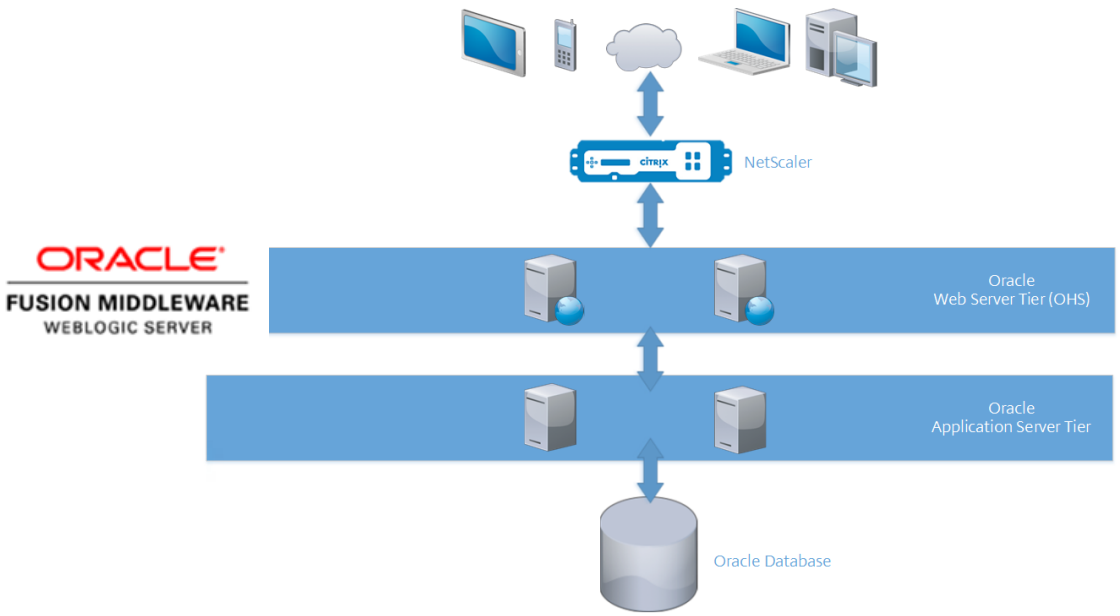
Citrix NetScaler is a world-class product with the proven ability to load balance, accelerate, optimize, and secure enterprise applications.

For several years, Citrix has completed certifications and provided deployment guides for key enterprise applications. NetScaler's rich application delivery capabilities significantly enhance the performance of these applications. With a comprehensive feature set, It provides availability, scalability, optimization and security for Oracle WebLogic deployments.

Introduction

This guide defines the process for deploying Oracle WebLogic Server 12c with NetScaler.
Citrix NetScaler is a world class application delivery controller, with the proven ability to load balance, accelerate, secure and optimize enterprise applications.
Oracle WebLogic Server 12c is one of the industry's best application servers for building and deploying enterprise Java EE applications with support for new features for lowering cost of operations, improving performance, enhancing scalability and supporting the Oracle Applications portfolio.

Configuration



Recommended Product Versions

Product	Version
Oracle WebLogic Server	12c
NetScaler VPX	11.0 (Platinum License) – Load Balancing, Compression, Caching and FEO 11.0 (Standard License) – Only Load Balancing

NetScaler features

The following NetScaler features are discussed in this deployment guide.

- Load balancing
- SSL offload
- Compression
- Caching
- FEO (Front End Optimization)

Other considerations

- Make sure you have installed, at a minimum, one license on the NetScaler appliance.
- Set the time zone and a NTP (Network Time Protocol) server, and check the date and time on the NetScaler virtual appliance, as WebLogic Server server connections can be very sensitive to time differences.
- Configure your DNS settings properly: Note that for the purposes of certificate-based authentication, all addressable hosts that are part of the network setup should have resolvable domain names, not just IP addresses.

Steps for load balancing configuration

Broadly, the steps to configure a load balanced WebLogic Server setup are as follows:

1. Complete initial setup for the WebLogic Server;
2. Create a service for each WebLogic Server and bind the server objects and appropriate monitors to it.
3. Now, create load balancing virtual servers (load balancing vservers) for the WebLogic Server service and bind the appropriate services and certificate to them. For this deployment, we have used a self-signed certificate; however you may use any valid server certificate.
4. When defining the load balancing vservers, provide a valid, addressable IP address.
5. Set an appropriate load balancing method (such as LEASTCONNECTION) and a persistence method such as SOURCEIP. These will ensure effective load balancing.

Solution Description

Quick Configuration Table

<table>
<tr><th>Configuration Item</th><th>Version</th></tr>
<tr><td>Load Balancing
(Traffic Management>Load Balancing>Virtual Servers in the GUI)</td><td>Virtual Servers: Weblogic_lb_ssl, Weblogic_lb (Suggested Names)
<table><tr><th>Weblogic_lb_ssl</th><th>Weblogic_lb</th></tr><tr><td>Protocol: HTTPS
Port: 443 (or alternate as per your configuration)
Load Balancing Method: Roundrobin/LeastConnection
Services Bound:
Weblogic1_svc
Weblogic2_svc
Compression Policy: Weblogic_Compression_Test
Cache Policy: Weblogic_Cache_Test
FEO Policy: Weblogic_Optimization_Test
Certificate Binding: Standard Wildcard/SAN/SNI Server certificate support (Bind the appropriate server certificate as per your configuration)
CLI Commands:
add lb vserver Weblogic_lb_ssl SSL <IP address for vserver> 443 -persistenceType NONE -cltTimeout 180</td><td>Protocol: HTTP
Port: 80 (or alternate as per your configuration)
Load Balancing Method: Roundrobin/LeastConnection
Services Bound:
Weblogic1_svc
Weblogic2_svc
Compression Policy: Weblogic_Compression_Test
Cache Policy: Weblogic_Cache_Test
FEO Policy: Weblogic_Optimization_Test
CLI Commands:
add lb vserver Weblogic_lb HTTP <IP address for vserver> 80 -persistenceType NONE -lbMethod ROUNDROBIN -cltTimeout 180 -downStateFlush DISABLED</td></tr></table></td></tr>
<tr><td>Service Configuration
(System>Load Balancing>Services)
Note: Both backend services are HTTP here</td><td><table><tr><th>Weblogic1_svc</th><th>Weblogic2_svc</th></tr><tr><td>Protocol: HTTP
Port: 80 (or alternate as per your configuration)
IP: IP address of 1st Weblogic server</td><td>Protocol: HTTP
Port: 80 (or alternate as per your configuration)
IP: IP address of 2nd Weblogic server</td></tr></table>CLI Commands:
add service Weblogic1_svc <IP address for 1st CRM front end server> HTTP 80 -gslb NONE -maxClient 0 -maxReq 0 -cip ENABLED X-Forwarded-for -usip NO -useproxyport NO -sp ON -cltTimeout 180 -svrTimeout 360 -CKA NO -TCPB NO -CMP YES
add service Weblogic2_svc <IP address for 2nd CRM front end server> HTTP 80 -gslb NONE -maxClient 0 -maxReq 0 -cip DISABLED -usip NO -useproxyport NO -sp ON -cltTimeout 180 -svrTimeout 360 -CKA NO -TCPB NO -CMP YES</td></tr>
<tr><td>Compression Policy Definition
(Optimization>Integrated Caching>Policies)</td><td>Policy Name: Weblogic_Compression_Test
Response Action: COMPRESS (GZIP/DEFLATE should work too)
Expression: ns_true

CLI Commands:
add cmp policy Weblogic_Compression_Test -rule ns_true -resAction GZIP
bind lb vserver Weblogic_lb -policyName Weblogic_Compression_Test -priority 100
bind lb vserver Weblogic_lb_ssl -policyName Weblogic_Compression_Test -priority 100</td></tr>
</table>

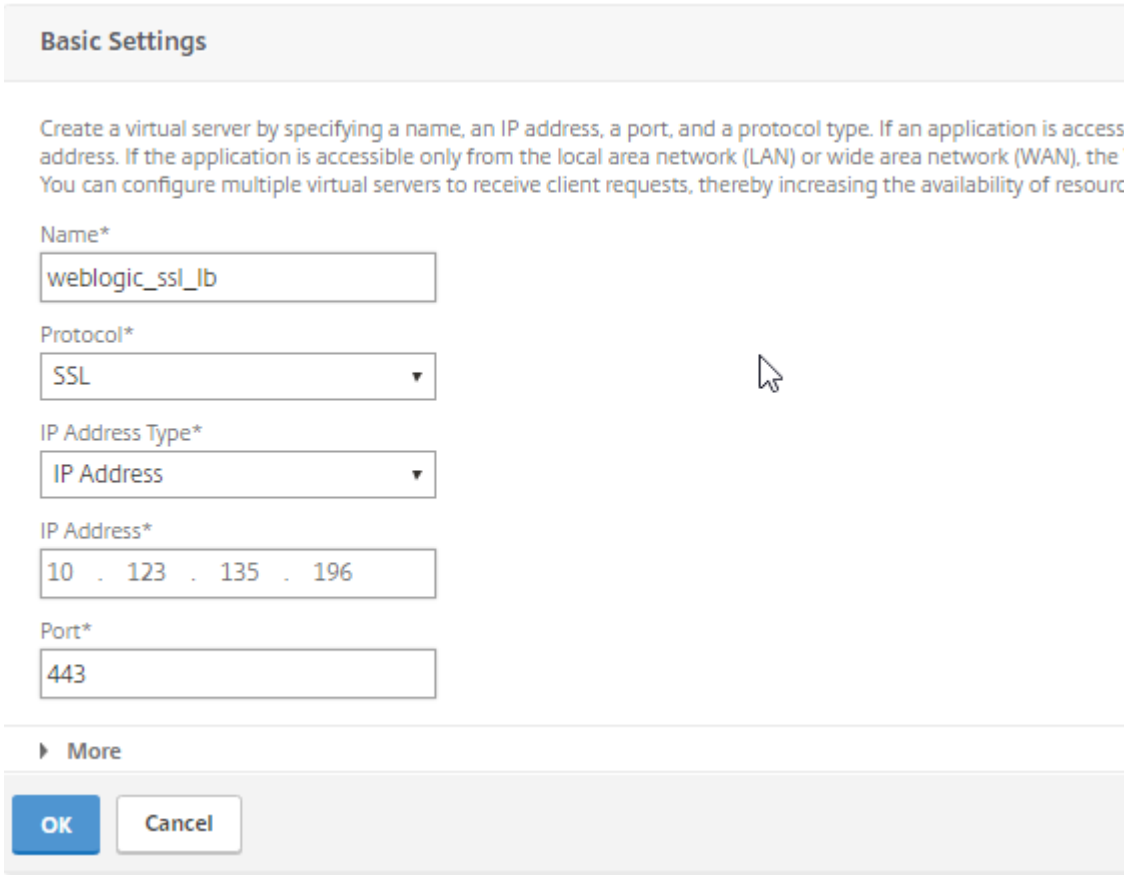
Configuration Item	Version
Cache Policy (Optimization>Integrated Caching>Policies)	Policy Name: Weblogic_Cache_Test Actions: CACHE Cache Content Group: Test Undefined-Result Action: -Global-undefined-result-action (or NOCACHE/RESET) Expression: *ns_true* Cache Content Group: Name: Test Type: HTTP Expiry Method: Heuristic (Recommended)/Custom (if specific settings are required) Default Expiry Times: As per requirement; set to 233 for test deployment. Parameterization: Leave values as is (unless Cache selectors are in use; not configured for our test setup) Memory: Define values as per your system limits Others: Use default settings. All settings have context-sensitive help available if modification is required. CLI Commands: *add cache policy WEBLOGIC_Caching_Test -rule "SYS.EVAL_CLASSIC_EXPR(\"ns_true\")" -action CACHE -storeInGroup WEBLOGIC_Caching_Test*
FEO (Front End Optimization) Policy (Optimization>Front end Optimization>Policies)	Optimization Policy Name: Weblogic_Optimization_Test Optimization Action: MODERATE (Preconfigured) Expression: HTTP.REQ.HEADER("Accept").CONTAINS("html") Alternate Configuration (Custom Policy): Optimization Policy Name: Weblogic_Optimization_TestCustom Optimization Action: samplefeo Expression: *HTTP.REQ.HEADER("Accept").CONTAINS("html")* Weblogic_Optimization_TestCustom Configuration: Enabled Settings: JavaScript/Make Inline, JavaScript/Move to End of Body Tag, JavaScript/Minify, Image/Optimize, Image/Lazy Load, Image/Shrink to Attributes, Image/Optimize, Image/Convert to JXR format, Image/Convert GIF to PNG, CSS/Make Inline, CSS/Move to Head Tag, CSS/Minify, CSS/Image Inline, CSS/Combine, CSS/Convert Imports to Links, HTML/Remove Comments from HTML CLI Commands: *add feo policy WEBLOGIC_Optimization_Test "HTTP.REQ.HEADER(\"Accept\").CONTAINS(\"html\")" MODERATE* *add feo policy WEBLOGIC_Optimization_Testcustom "HTTP.REQ.HEADER(\"Accept\").CONTAINS(\"html\")" MS_CRM_custom* *bind lb vserver Weblogic_lb -policyName WEBLOGIC_Optimization_Testcustom -priority 100 -gotoPriorityExpression END -type REQUEST* *bind lb vserver Weblogic_lb_ssl -policyName WEBLOGIC_Optimization_Test -priority 100 -gotoPriorityExpression END -type REQUEST*

Configuring Load Balancing

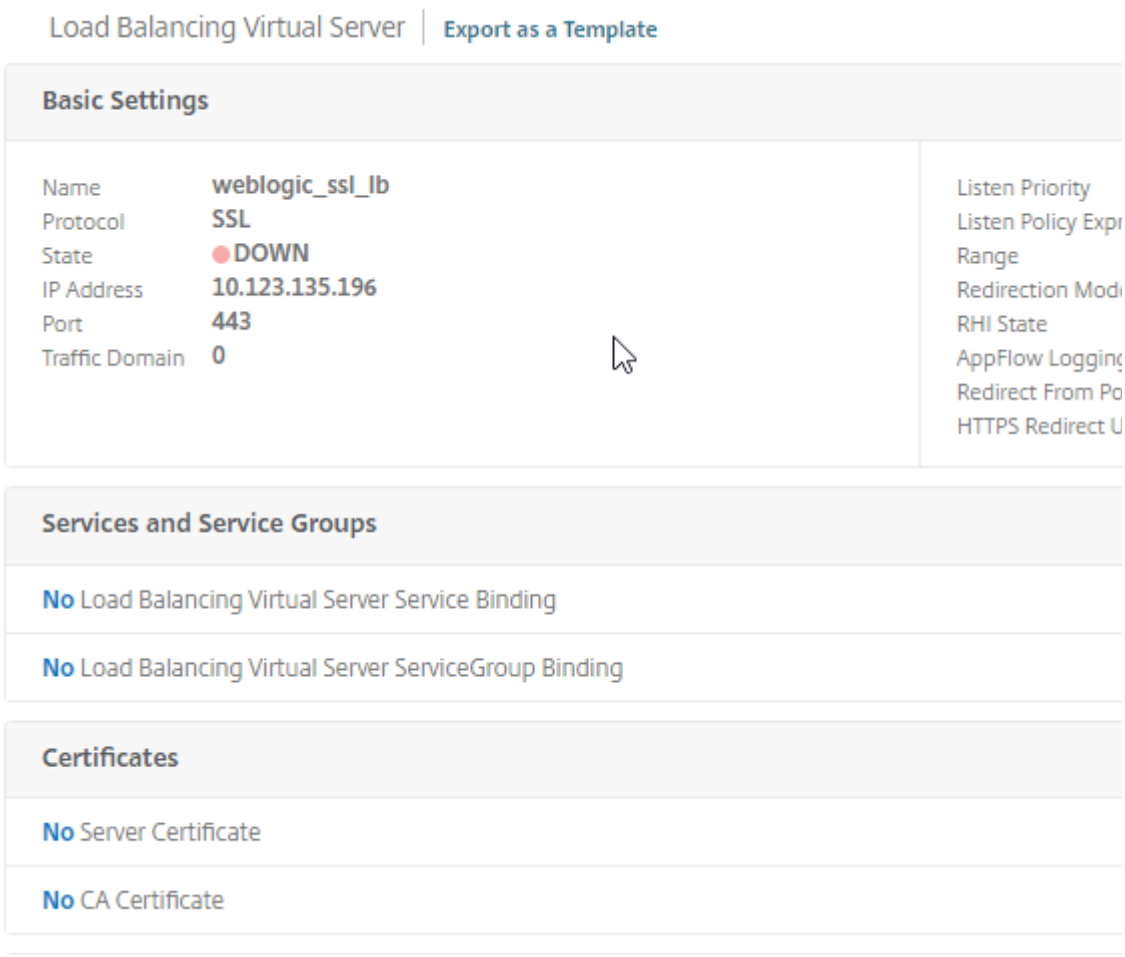
A load balancing configuration consists of the definition of load balancing virtual servers (LB vServers), as well as services that are bound to the LB vservers. A service is simply a combination of a server and a protocol (e.g. HTTP, Port 80 or HTTPS, port 443).

Step 1 - Define the load balancing virtual servers (LB vservers)
Log into the NetScaler GUI. On the Configuration tab, navigate to Traffic Management>Load Balancing>Virtual Servers. For this deployment exercise, we are load balancing two Oracle WebLogic Servers. Here, we will create two load balancing virtual servers – weblogic_lb (HTTP Port 80) and weblogic_lb_ssl (HTTPS/SSL Port 443). Note that either one of the two can also be set up and will suffice for successful load balancing.

When defining a new LB vserver, you will be presented with the settings screen. Here, set the protocol to HTTP for the first vserver and SSL for the second. Set the IP address to the appropriate value.
(The steps shown here are for the SSL vserver. Follow the same steps to configure the HTTP vserver as well, only select port 80 as the port and HTTP as the protocol)



After clicking OK, you will see the Basic Settings screen for the LB vserver. Here, you may change settings such as the session persistence method, authentication and load balancing methods. Set session persistence to SOURCEIP and the load balancing method to LEASTCONNECTION for both virtual servers. For more information on these features, please refer to https://docs.citrix.com/en-us/netscaler/11.html



To enable an SSL-based LB vserver, you should add an SSL certificate and key pair. For this, you may use either a self-signed certificate generated on the NetScaler appliance or a CA (Certificate Authority) signed one. The steps for generating a self-signed certificate on the NetScaler are as follows –

1. Login to your NetScaler appliance via the Configuration Utility.
2. Select Traffic Management > SSL
3. On the right, under Tools, select Server Certificate Wizard.
4. Here, the wizard will lead you through the series of steps for generating the self signed certificate –

- Generate the private key
- Generate the CSR (Certificate Signing Request)
- Generate the Certificate (using the ns-root.cer NetScaler root certificate)
- Save the Certificate and Key pair

Alternatively, if a certificate and key pair is already available, the same can be added by navigating to SSL>Certificates and clicking on the Add button. For more details refer to http://support.citrix.com/article/CTX109260

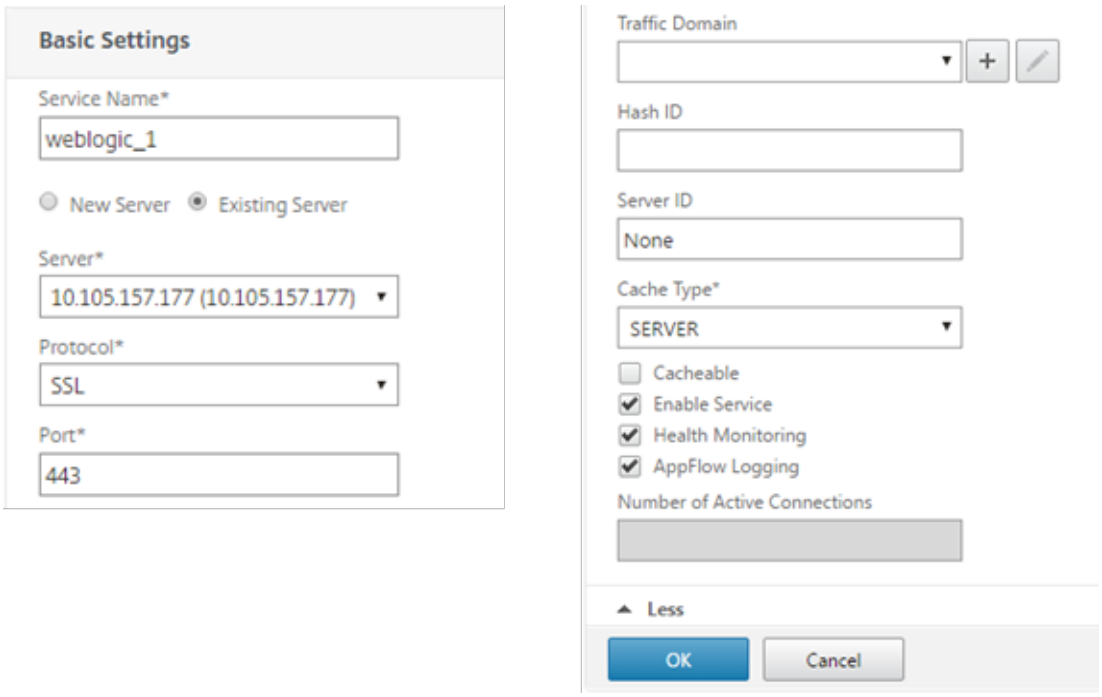
To improve site security and achieve an A/A+ rating on the SSLLabs.com evaluation, refer to https://www.citrix.com/blogs/2016/06/09/scoring-an-a-at-ssllabs-com-with-citrix-netscaler-2016-update/

Step 2 – Define LBVS server service group binding

Now click on the Load Balancing Virtual Server Service Binding tab in the Service and Service Groups section, or alternatively, click on Services in the Traffic Management>Load Balancing subsection and then, click on the Add button.

Every LB service is linked to a server; this can either be a new server or an existing server already defined in the Servers subsection under Load Balancing. Service groups extend this by allowing the creation of a group of services. An LB vserver can use a set of services or a service group.

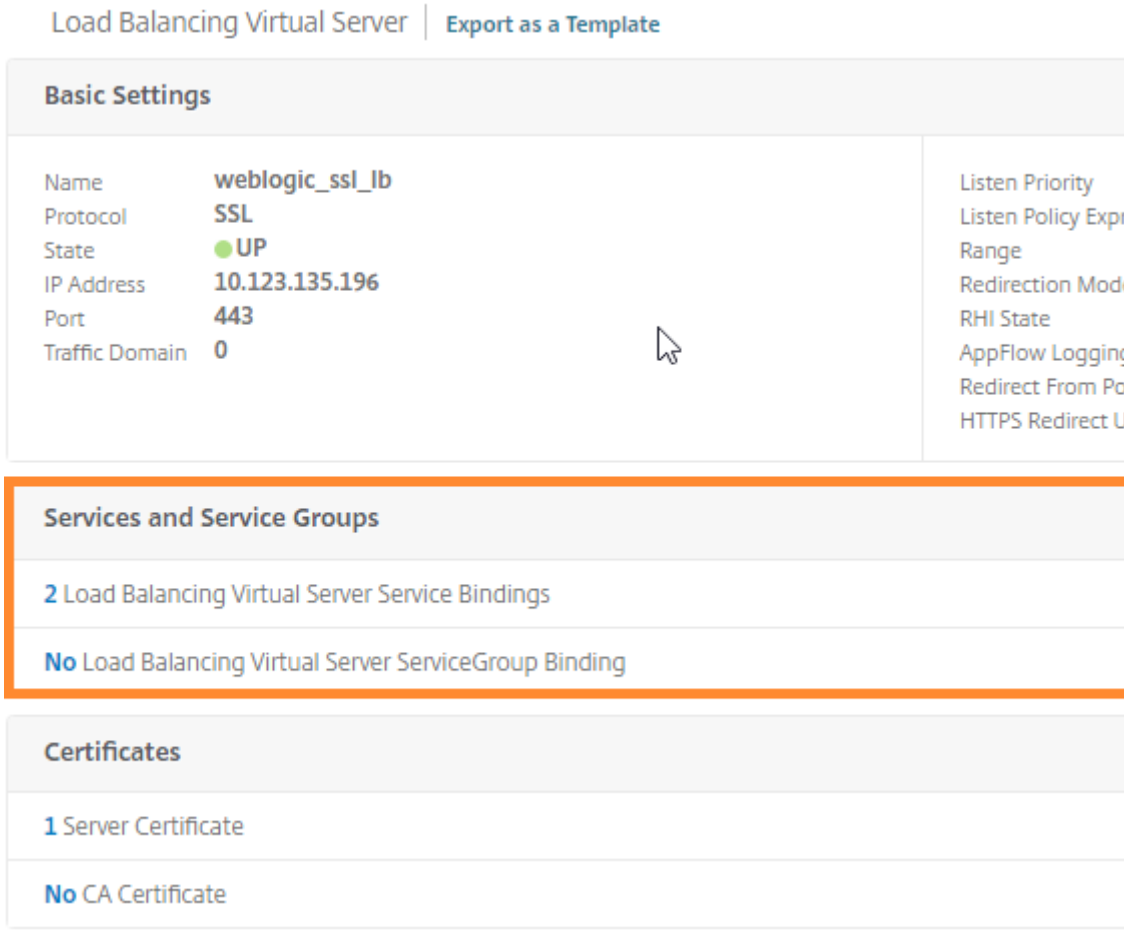
Here, define the names for the services for each WebLogic server instance, the IP address (or choose from a list in the case of an existing server) for the new server and the protocol it operates on. For this deployment, the IPs will correspond to 10.105.157.177 for the first server and 10.105.157.178 for the second one.



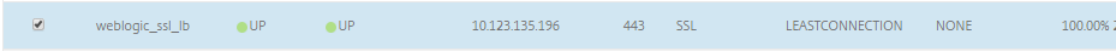
Recommended Best Practices:

- Name your server instances as per their role, not with the IP address (for example, the Oracle WebLogic servers can be named WebLogic1 and WebLogic2)
- As there will be multiple items linked to each application (LB vservers, services, policies among others), it is recommended that they be named appropriately for convenience. For example, the servers above can be named WebLogic1_svr, the services they bind to can be called WebLogic1_svc etc. This will make using tools such as grep with the CLI a lot easier.

You should enable Health Monitoring if you would like to have NetScaler poll the server periodically to verify its health – it is recommended that this setting should not be disabled except for diagnostic purposes. This and additional settings can be accessed by clicking on the More dropdown (as shown above). If Health Monitoring is disabled, the appliance shows the server UP at all times. Bind these service groups to the appropriate LB vservers and confirm that they have been bound correctly by checking the same in the LB vserver Basic Settings screen. Add all the WebLogic Server servers to be load balanced and bind them to the load balancing virtual server.



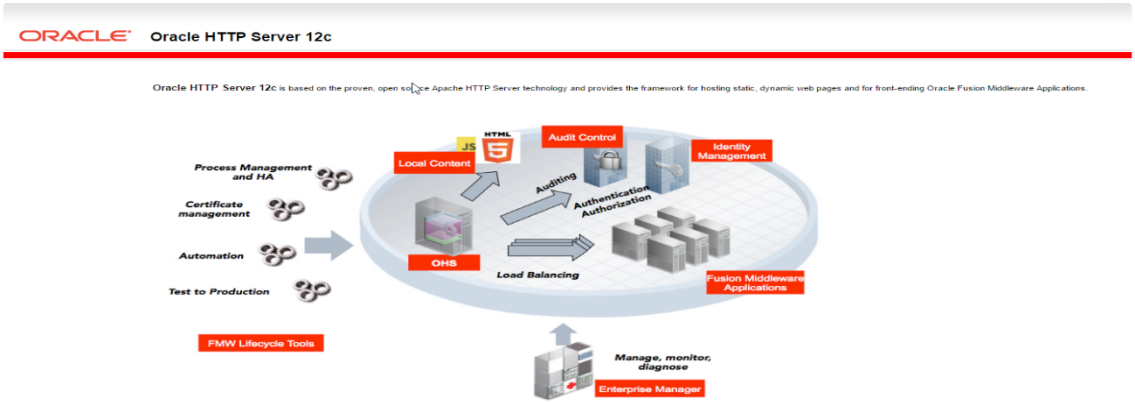
Finally, the LB vservers created will be displayed on the configuration screen to the right in the same screen that is obtained by accessing Traffic Management>Load Balancing>Virtual Servers.



This completes essential load balancing configuration for WebLogic Server.

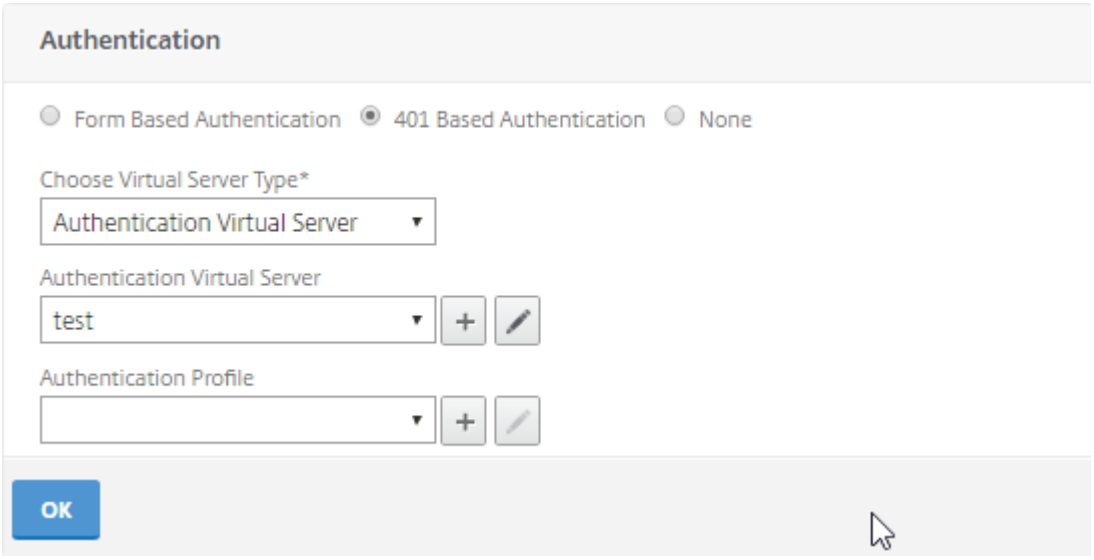
Verification

The functioning solution can be verified with a default WebLogic Server installation by navigating to https://<FQDN of LB vserver>. This will show a default screen with information on the WebLogic and Oracle HTTP Server.



Authentication

NetScaler can be setup to handle authentication for the Weblogic server, if authentication has been enabled for the Weblogic server. To enable authentication, select the authentication tab for the Weblogic load balancing virtual server, then select 401 based authentication as shown below. Advanced authentication configuration will be explained in a later guide.



Configuring Optimization on NetScaler

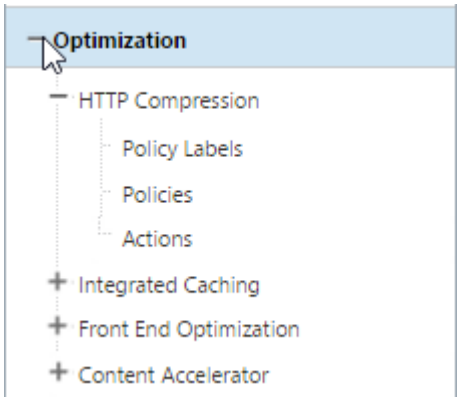
NetScaler provides a flexible, comprehensive suite of optimization capabilities that can be categorized as follows :

- HTTP Compression
- Integrated Caching
- Front End Optimization (additional optimization capabilities)

To configure HTTP Compression, Integrated Caching and Front End Optimization, expand the Optimization tab in the NetScaler GUI's left hand side navigation panel.

HTTP Compression

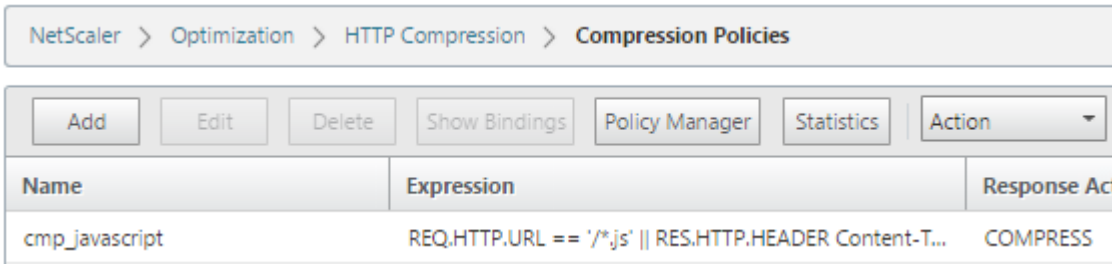
NetScaler's optimization suite is, like other NetScaler features, driven by a policy-action architecture.



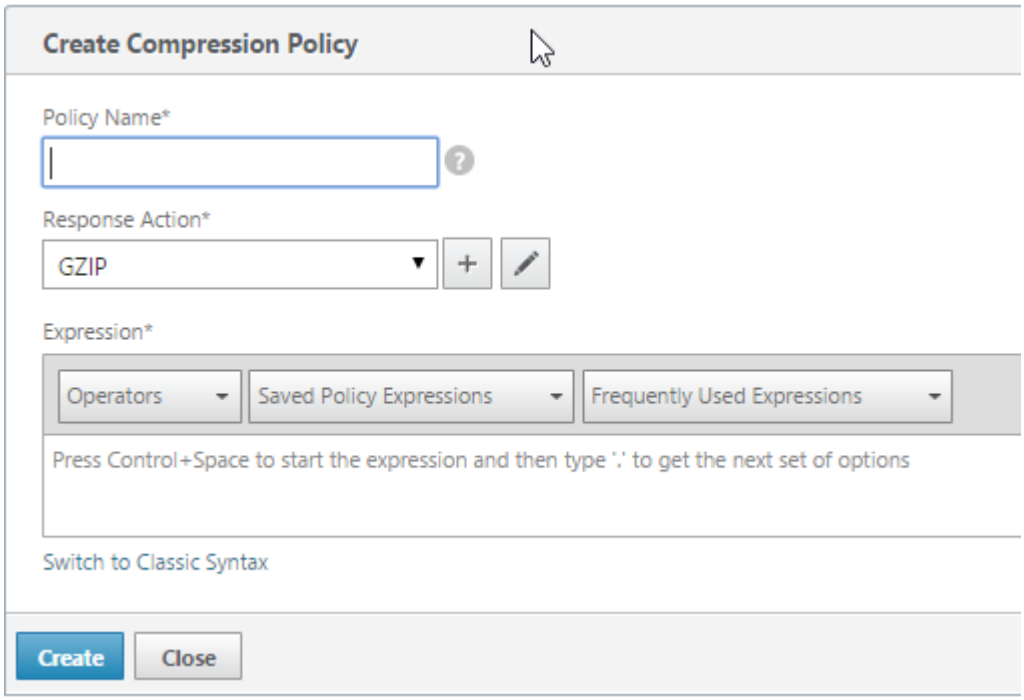
To enable HTTP Compression for a particular service, you should

- Define the HTTP Compression Policy and Action
- Bind the same to the relevant virtual server

To define the Compression Policy and Action, click on the Policies option under HTTP Compression, shown above. This gives you the following screen -

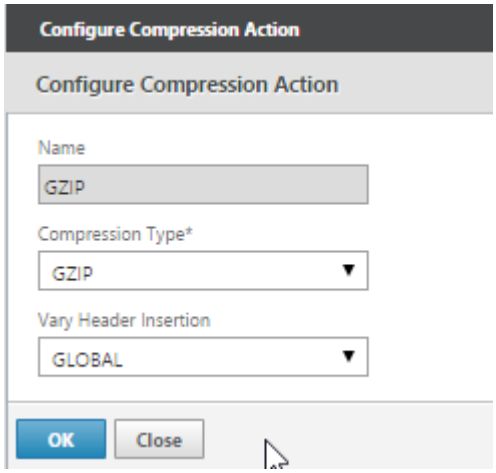


To add a new compression policy, click on the Add button. This will give you the following screen –



Here, you can define a name for the policy, an Expression that defines when this policy is triggered (for example, when a particular URL is encountered. To make the policy apply to all content, use ns_true in the Expression window. For assistance here, click on the Frequently Used Expressions drop down) and the Response Action that should be taken. Here, the Actions available are COMPRESS (GZIP or DEFLATE compression, with GZIP given priority), GZIP (GZIP standard compression), DEFLATE (DEFLATE compression) and NOCOMPRESS.

Here, you have the option to either add a new Action or reconfigure the existing ones. You can Add using the + button, or edit/configure using the pencil-shaped button. Either option gives you a screen similar to the one shown below

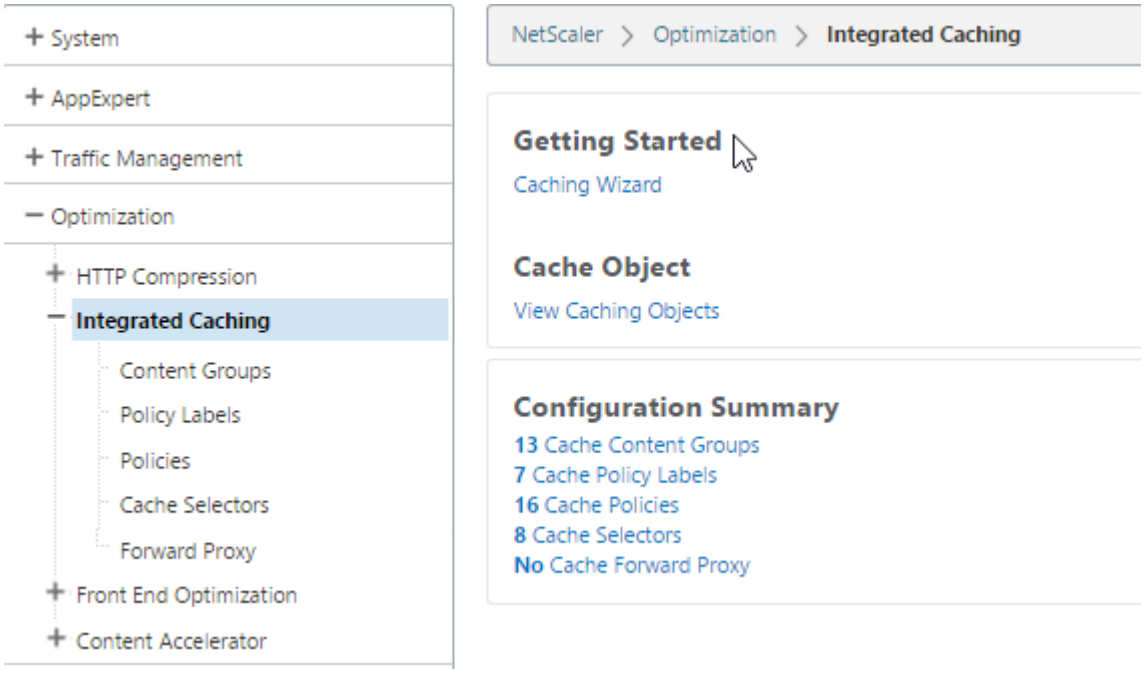


Vary Header Insertion is an option that is relevant for caching; the value of the Vary header allows for different cache results to be returned for similar requests. For now, we will not be changing the options presented here. You can add a new action that uses a compression type of your choice.

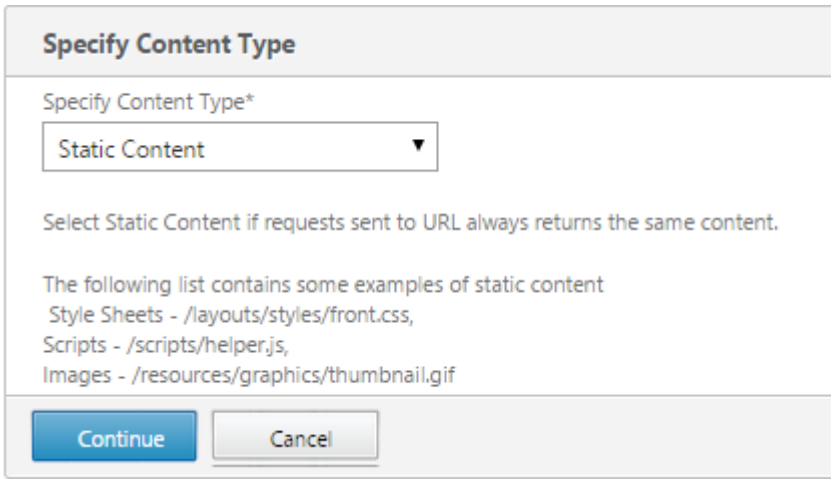
For the Weblogic deployment, the following settings have been used for HTTP compression –
Policy Name: Weblogic_Compression_Test
Response Action: GZIP (Compress/DEFLATE should work too)
Expression: ns_true

Integrated Caching

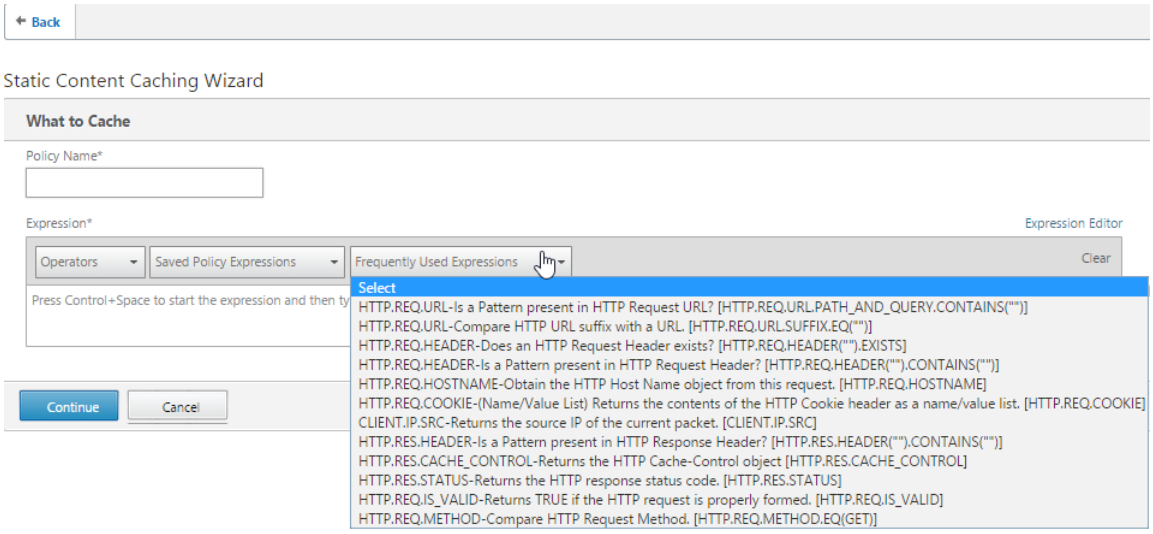
To configure caching, you can use the integrated wizard that makes configuration very straightforward. To initiate the wizard, navigate to Optimization>Integrated Caching as shown below:



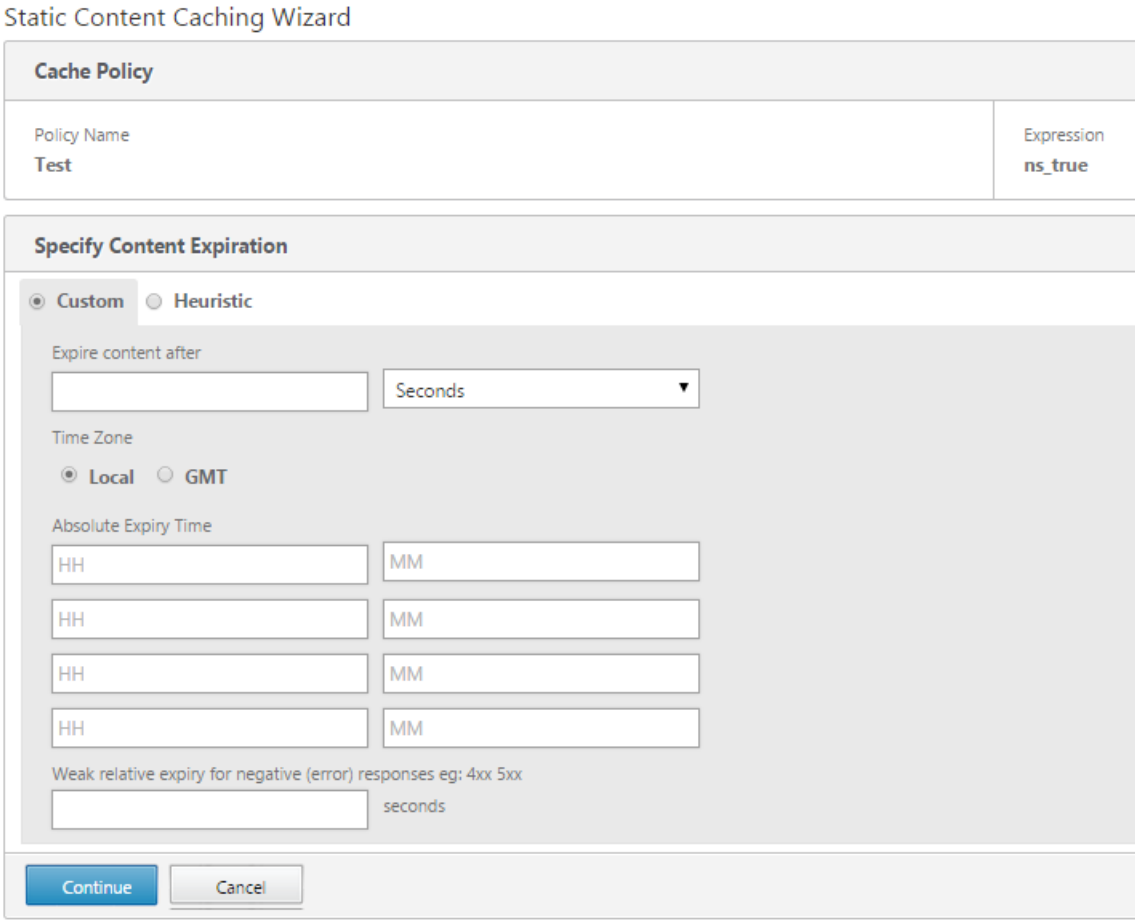
Here, you can initiate the Caching Wizard under Getting Started.

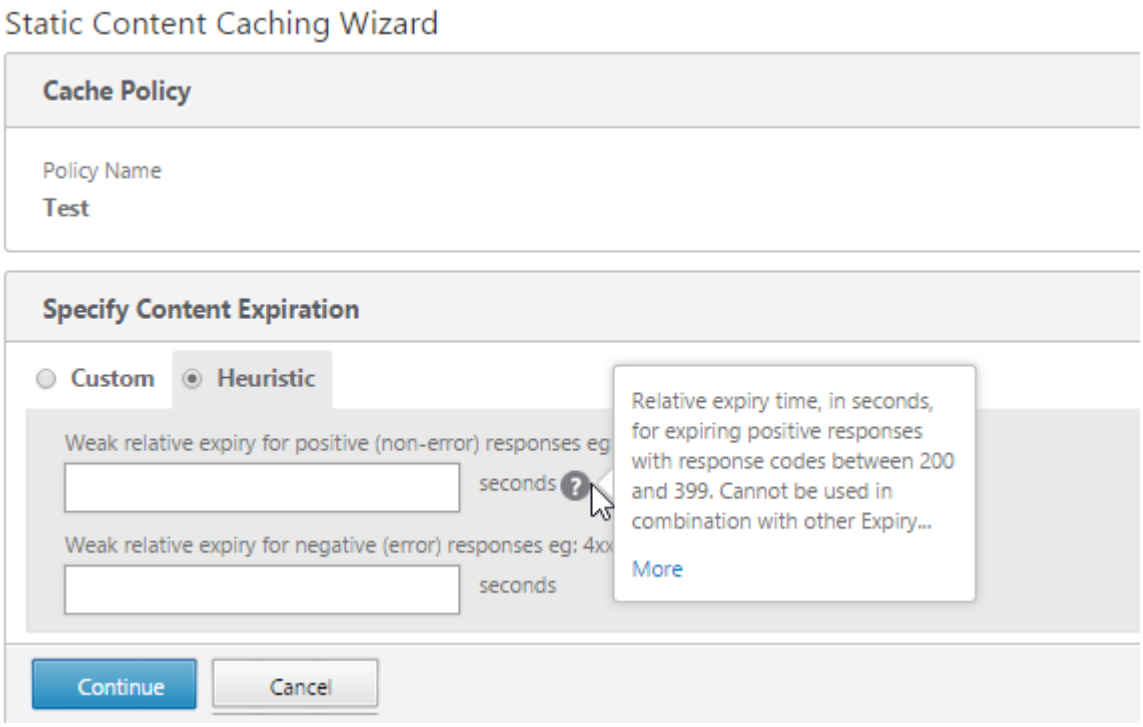


The first step requires you to specify the content type. This can be either static (examples given) or dynamic. Helpful hints are provided as shown above to help determine which type of content is relevant for you.

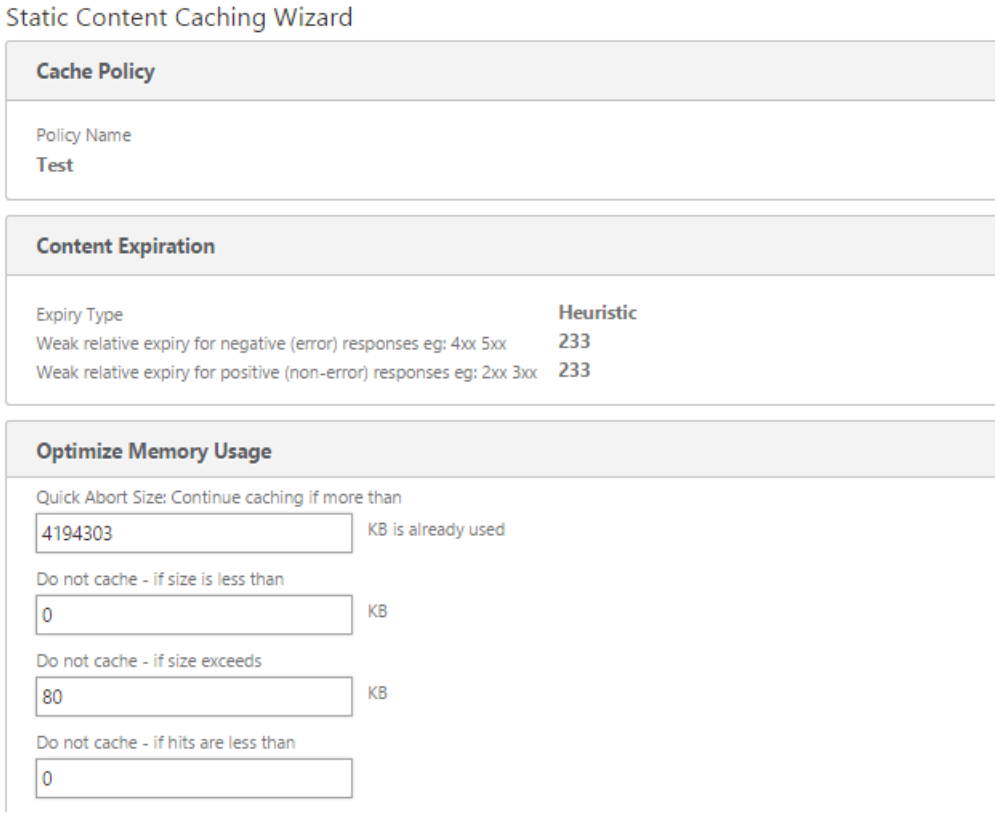


The next step involves defining which content should be cached. The Frequently Used Expressions dropdown helps you define the correct expression; however, if you want the caching policy to run for all content, you can use *ns_true* as the expression as shown below:

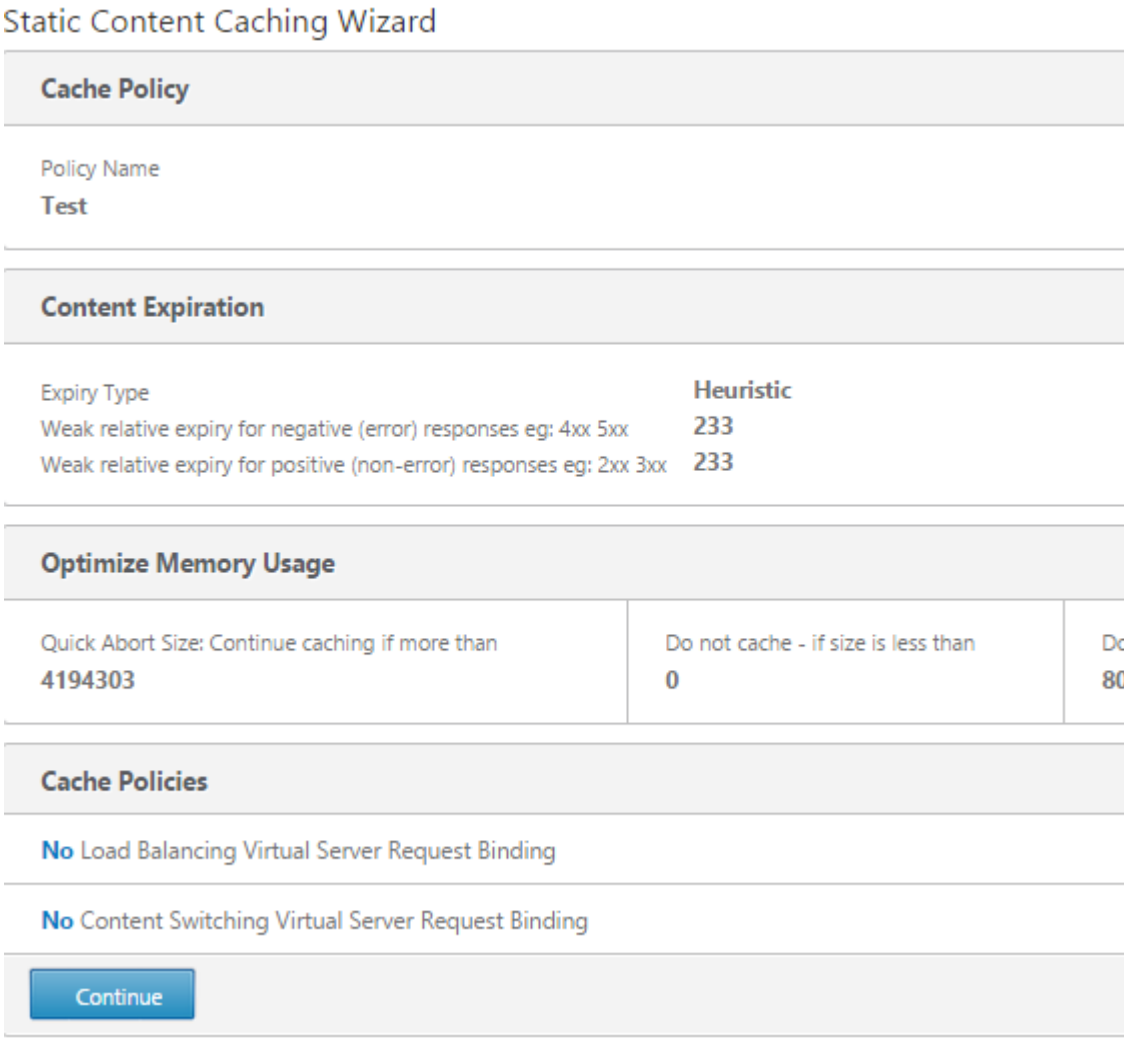




The next step involves definition of the caching space to be used on the NetScaler and the minimum size of objects to be cached.



Finally, the cache policy should be bound to the relevant vserver.



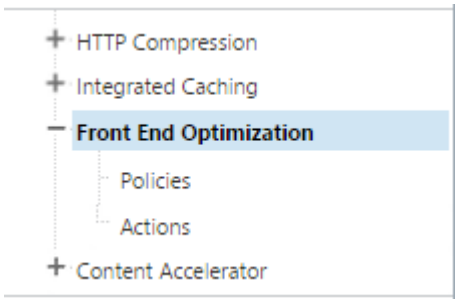
These definitions can be made under Cache Policies as shown in the screenshot above.

For the Weblogic deployment, the following settings have been used for caching –
Policy Name: Weblogic_Cache_Test
Actions: CACHE
Cache Content Group: Test
Undefined-Result Action: -Global-undefined-result-action (or NOCACHE/RESET)
Expression: *ns_true*

Cache Content Group:
Name: Test
Type: HTTP
Expiry Method: Heuristic (Recommended)/Custom (if specific settings are required)
Default Expiry Times: As per requirement; set to 233 for test deployment.
Parameterization: Leave values as is (unless Cache selectors are in use; not configured for our test setup)
Memory: Define values as per your system limits
Others: Use default settings. All settings have context-sensitive help available if modification is required.

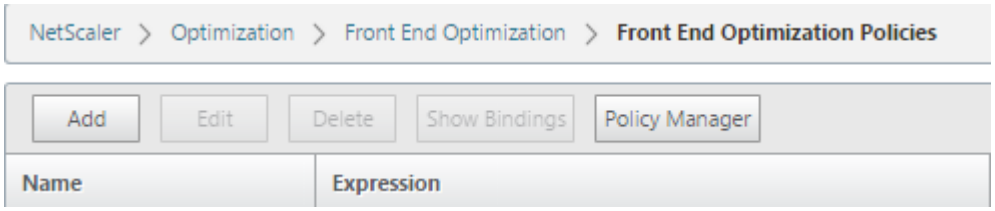
Front End Optimization

The front end optimization feature set makes NetScaler an extremely capable optimization device by implementing enhanced optimization routines for specific front end entities such as images, JavaScript etc. These features provide improved optimization performance than that achieved by compression and caching.

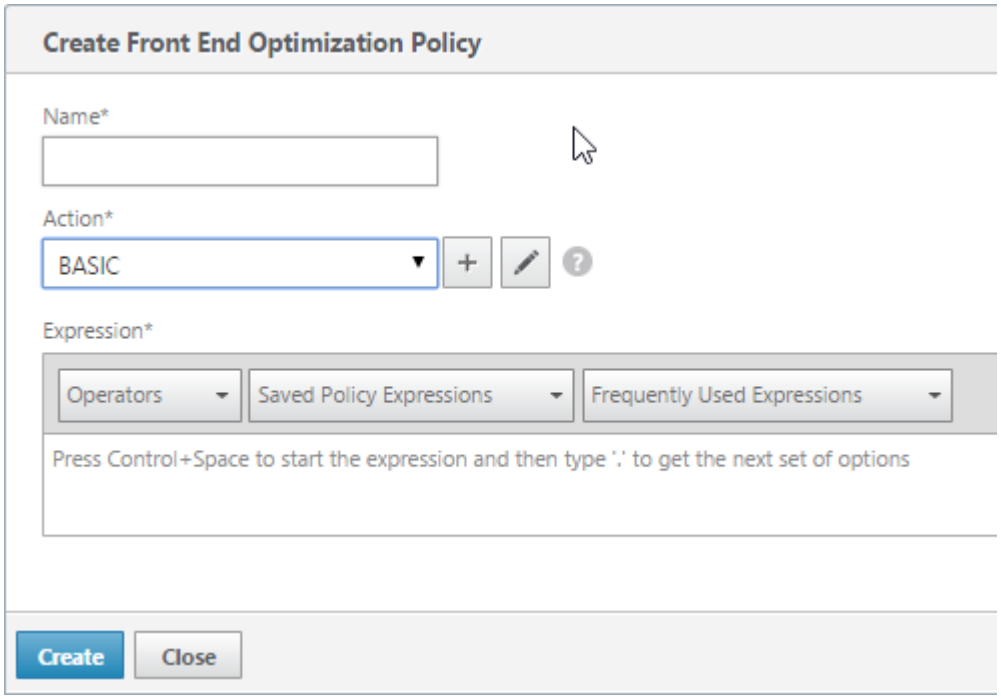


Front End Optimization capabilities can be activated by navigating to Optimization>Front End Optimization. As with all NetScaler features, these are implemented using a policy-action mechanism.

To add a new policy, navigate to Optimization>Front End Optimization and then, click on Policies. To add a new policy, click on Add in the section displayed to the right of the navigation menu.

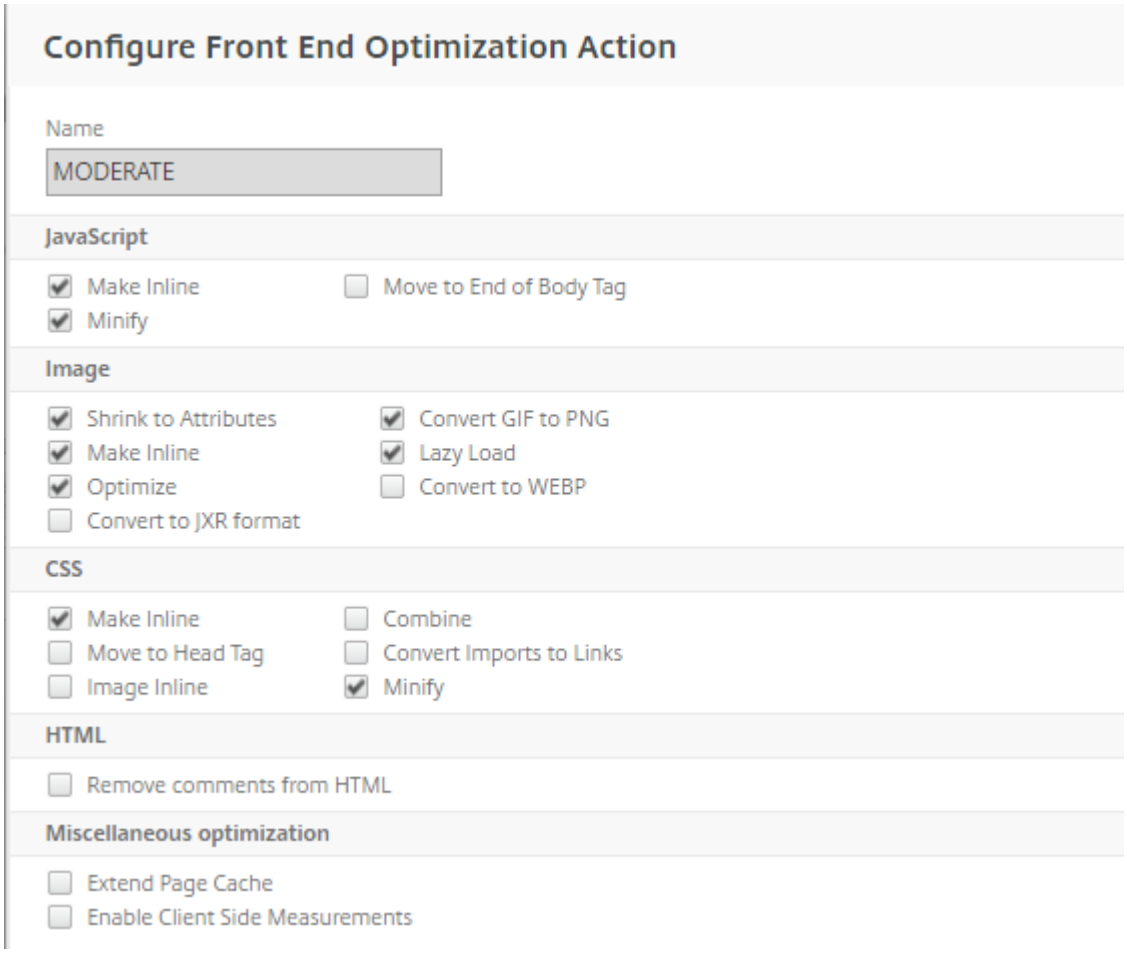


This will give you the following screen for definition of a new FEO policy.



The Expression here works much on the same lines as expressed for the earlier features; the Frequently Used Expressions drop down can be used for assistance. There are certain predefined actions that can be assigned here, all of which have different configurations for the same settings; you can also either edit or create a custom action, which can be done using the plus or pencil buttons next to the Action name. The Plus icon enables the setup of a custom profile.

Upon clicking either of these buttons, the following screen (or a similar one) is observed:



This screen presents all the various front end optimization options available; NetScaler can help to optimize web traffic with JavaScript, Image, CSS (Cascading Style Sheets), HTML and Miscellaneous Optimization. This last section also allows for domain sharding, which splits resources across subdomains to improve optimization and page load times.

For this deployment, the recommended FEO policy setting is Moderate; this default setting provides a good level of optimization while not affecting the performance of the Oracle Weblogic setup. In our deployment lab test scenario, with the recommended optimization settings enabled, it is possible to have over 60% improvement in Weblogic server response rates.

Optimization settings for the Oracle WebLogic deployment:

Optimization Policy Name: Weblogic_Optimization_Test
Optimization Action: MODERATE (Preconfigured)
Expression: HTTP.REQ.HEADER("Accept").CONTAINS("html")

Alternate Configuration (Custom Policy)
Optimization Policy Name: Weblogic_Optimization_TestCustom
Optimization Action: samplefeo
Expression: HTTP.REQ.HEADER("Accept").CONTAINS("html")

Weblogic_Optimization_TestCustom Configuration:
Enabled Settings: JavaScript/Make Inline, JavaScript/Move to End of Body Tag, JavaScript/Minify, Image/Optimize, Image/Lazy Load, Image/Shrink to Attributes, Image/Optimize, Image/Convert to JXR format, Image/Convert GIF to PNG, CSS/Make Inline, CSS/Move to Head Tag, CSS/Minify, CSS/Image Inline, CSS/Combine, CSS/Convert Imports to Links, HTML/Remove Comments from HTML

Conclusion

NetScaler enables highly available Oracle WebLogic Server deployments with its load balancing capabilities. With NetScaler, enterprises can enable a host of additional capabilities including but not limited to authentication offload, end point analysis checks, selective server access, URL rewrites, compression, caching, front end optimizations and much more.

With NetScaler, enterprises can not only enable high availability for their WebLogic environments, but also extend capabilities for security and optimized access. The policy engine used by NetScaler enables enterprises to deploy any specific use cases that they may require, making the NetScaler solution a flexible and robust one that can meet all enterprise requirements.

CITRIX®

Enterprise Sales
North America | 800-424-8749
Worldwide | +1 408-790-8000

Locations
Corporate Headquarters | 851 Cypress Creek Road Fort Lauderdale, FL 33309 United States
Silicon Valley | 4988 Great America Parkway Santa Clara, CA 95054 United States