Wowza Streaming Engine™

Dynamic Load Balancing AddOn

Wowza Streaming Engine: Dynamic Load Balancing AddOn

Version: 4

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http://www.wowza.com

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Document History

Version	Description	Date
Doc v4.0	Initial Release.	09-05-2014
	Updates to better support JW Player.	09-29-2014
	Documented Cross-origin resource sharing (CORS) header support for Wowza Streaming Engine 4.1.2.	04-15-2015
	Documented legacy MaxMind GeoIP version support.	12-08-2017

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Overview

This document describes how to install and configure the Wowza Dynamic Load Balancing AddOn to enable geographic, bandwidth, and connection-based system load balancing between multiple servers running Wowza Streaming Engine software.

Note

Wowza Dynamic Load Balancing AddOn 4.0 is for use with Wowza Streaming Engine™ software version 4.0 to 4.7.2. If you're using Wowza Streaming Engine 4.7.3 or later, we recommend that you use the Wowza Dynamic Load Balancing AddOn 4.5. If you're running Wowza Media Server™ software, you must use Dynamic Load Balancing AddOn 2.0 to enable system load-balancing.

Dynamic Load Balancing AddOn for Wowza Streaming Engine has the following functionality:

- Geographic load balancing provided by MaxMind GeoIP Java module
- Geographic server grouping enables multiple servers in the same geographic region to be further balanced
- Bandwidth usage-based load balancing:
    - Bandwidth usage across the entire server with a resolution in kilobits per second (kbps)
    - Ability to exclude or include specific applications (case-sensitive)
- Connection-based load balancing:
    - Connections across the entire server are taken into account
    - Ability to exclude or include specific applications (case-sensitive)
- Decision-based chaining based on geography, bandwidth, and connections can be specified in any order
- Client-based exclusions for direct connections to the Load Balancer server:
    - The Load Balancer can accept direct connections from publishers such as Adobe Flash Media Live Encoder, Telestream Wirecast, and so on
    - Wowza edge server connections are excluded from load balancing automatically so that live stream repeater (origin/edge) configurations are transparently supported
- Ability to specify URL and/or port for redirection:
    - Load-balancing servers can be configured to return a specific hostname/port when redirecting so that Load Balancer/Server can use private IP addresses if required
- Soft shutdown of load-balancing Servers:
    - Prevent clients from being redirected to specific load-balancing Servers until they're restarted. Allows for connections to be dropped gracefully without needing to shut down a Server

    - Basic Web interface for removing load-balancing Servers
- Automatic re-registration of load-balancing Servers with the Load Balancer:
    - If the Load Balancer server must be restarted, the load-balancing Servers re-register automatically
- Load-balancing Server statistics:
    - Each Server reports bandwidth, connections, and countries that are currently active to the Load Balancer
- Support for specific server name/port, XML and RTMP redirect for live and VOD streams:
    - XML-based redirection for JW Player and Flowplayer
    - HTTP redirection for HTTP-aware clients
    - RTMP redirection for JW Player and other Flash-based clients
    - RTSP redirection for VLC media player and other RTP-based clients
    - Ability to return a specific hostname/port for integration elsewhere
- Secure communication between Load Balancer and load-balancing Servers:
    - All communication is encrypted between the Load Balancer and load-balancing Servers using a common key

Deployment architecture options

Simple load balancing

The simplest load-balancing configuration is to have one Wowza server that acts as a load balancer (the "Load Balancer" server) and then any number of other Wowza servers that act as load-balancing edges (the load-balancing "Servers"). Requests to the Load Balancer are redirected to one of the connected Servers. In this scenario, each load-balancing Server has an equal chance of being redirected to.

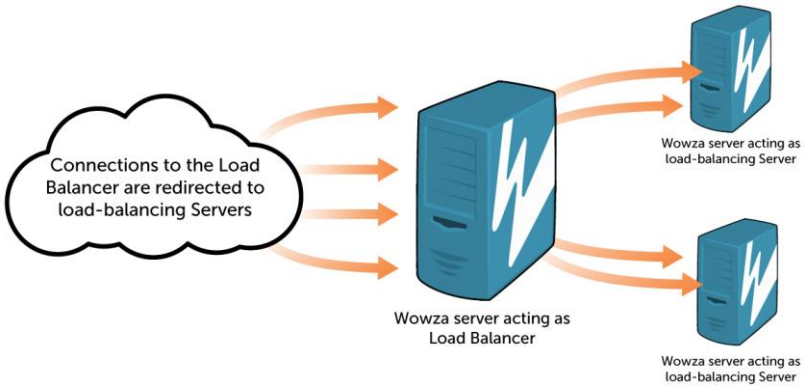

Figure 1 Diagram of simple load-balancing configuration.

Note that the Wowza server that's configured as the Load Balancer can also act as a Server.

Geographic group load balancing

A more advanced load-balancing configuration option is to provide geographic load balancing with geographic grouping. This enables you to load balance multiple Wowza servers in different geographic regions.

The following diagram shows two geographic groups of load-balancing Servers, a group in the United States (**loadbalanceCountryList** = **US**) and another group in United Kingdom and other countries (**loadbalanceCountryList** = **GB,***). A client in the United States that connects to the Load Balancer is redirected to the group of Servers in the US geographical region for load balancing, and then a specific Server is selected to fulfill the client request depending on the configuration. For example, if the configuration is based on the number of connections, the Server with the most available connections is selected to fulfill the client requests. Or if the configuration is based on available bandwidth, the Server that has the most available bandwidth is selected.

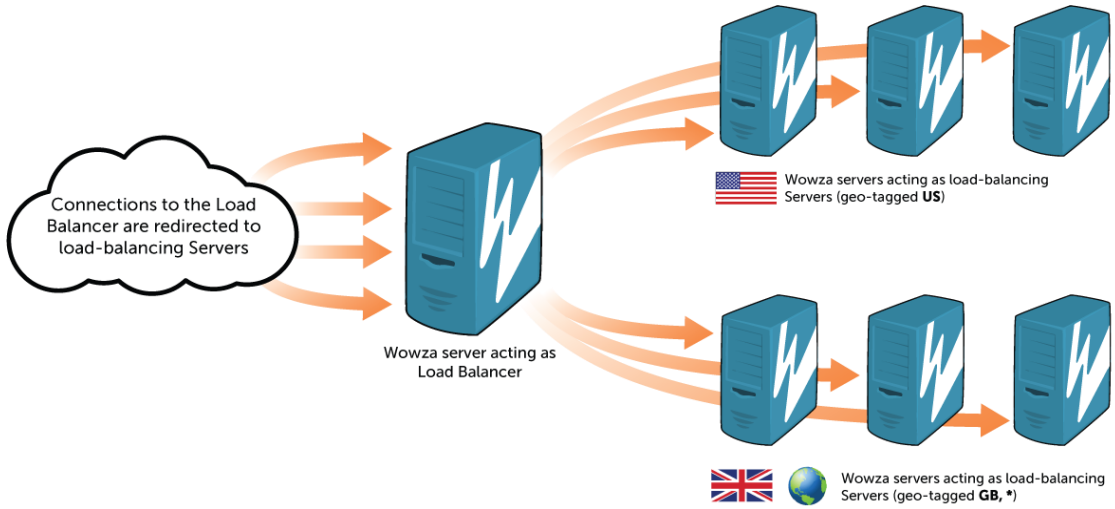

Figure 2 Diagram of geographic group load-balancing configuration.

All of the load-balancing Servers are registered with the Load Balancer and can be removed individually. The Wowza server that's configured as the Load Balancer can also act as a Server and can't be removed from the configuration.

Notes:

- To use geographic load balancing, you must download a legacy GeoIP country database from MaxMind, Inc., and then configure the **loadbalanceGeoDataFile** property on the Load Balancer. The GeoIP Country database is available for one-time purchase or paid subscription. A less accurate version of the GeoIP Country database (the GeoLite Country database) is available free-of-charge.
- Dynamic Load Balancing AddOn 4.0 doesn't support the GeoIP2 and GeoLite2 databases.

Installing the Dynamic Load Balancing module

Before you can install the Dynamic Load Balancing module, you must change your Wowza Streaming Engine software configuration. The changes are very simple. The instructions in this section assume that the server software is installed at the following location (depending on your operating system):

Linux

/usr/local/WowzaStreamingEngine-[version]

Windows

/Program Files (x86)/Wowza Media Systems/Wowza Streaming Engine [version]

OS X

/Library/WowzaStreamingEngine-[version]

The above Wowza Streaming Engine installation paths for all operating systems are referred to as **[install-dir]** throughout this document.

Installation files

The installation files for the module are contained in a compressed (zipped) folder (**LoadBalancer-[version].zip**). Download the file to each Wowza server that you plan to use in the load-balancing configuration, and then use the following instructions to install:

1. Extract the files from the downloaded **LoadBalancer-[version].zip** file.
2. Copy the contents of the unzipped folders to the corresponding folders in **[install-dir]**.

Configuring the load balancing system

A load-balancing system running on Wowza Streaming Engine software has the following configuration:

- Server listener (required for Load Balancer and all Servers)
- Properties (required for Load Balancer and all Servers)
- HTTP Provider configuration (required for Load Balancer)

Server listener configuration

To configure the server listener for the Dynamic Load Balancing AddOn, open the **[install-dir]/conf/Server.xml** file in a text editor and add the following server listener to the **<ServerListeners>** section in the file. This must be done on the Load Balancer and all Servers in the load-balancing topology:

```
<ServerListener>
  <BaseClass>com.wowza.wms.plugin.loadbalancer.general.LoadBalancerServer</Bas
eClass>
</ServerListener>
```

Note

The Examples section of this document shows sample **Server.xml** configurations for the Load Balancer and Servers in a load-balancing deployment.

Property configuration

You must specify properties in the **Server.xml** file on the Load Balancer and all Servers to configure the desired load-balancing functionality. Open the **Server.xml** file in a text editor and add the desired properties to the **<Properties>** section at the end of the file. The properties that can be set on the Load Balancer and Servers are described in the following table:

Note

The Examples section of this document shows sample **Server.xml** configurations for the Load Balancer and Servers in a load-balancing deployment.

Property Name	Description	Deployed on [loadbalanceType]
loadbalanceType	Specifies the server type in the load-balancing configuration. The Load Balancer has the value **Server**, load-balancing Servers have the value **Client**, and servers that perform both roles have the value **Server,Client**.	Server,Client
loadbalanceBandwidthEnable	Controls bandwidth monitoring. The default value is **Off**. To enable bandwidth monitoring, set this value to **On**, and then configure the **loadbalanceBandwidthLimit** property.	Client
loadbalanceBandwidthLimit	The bandwidth limit for this Server, in kilobits per second (kbps). For example, if you want this Server to provide only 50 megabits per second (Mbps) of throughput, set the value to **50000**. To allow unlimited bandwidth, set to **0**. If all Servers in the load-balancing deployment are saturated, redirection will fail and you must add an additional load-balancing Server to increase capacity.	Client
loadbalanceConnectionEnable	Controls connection balancing. The default value is **Off**. To enable connection balancing, set this value to **On**, and then configure the **loadbalanceConnectionLimit** property.	Client
loadbalanceConnectionLimit	The limit for outgoing connection on this Server. To allow an unlimited number of connections, set to **0**. If all Servers in the load-balancing deployment are servicing the maximum number of connections, redirection will fail and you must add an additional load-balancing Server to increase capacity.	Client

loadbalanceCountryEnable	Controls country balancing. The default value is **Off**. To enable country balancing, set this value to **On** on the Load Balancer and load-balancing Servers, and then configure the **loadbalanceCountryList** property on the load-balancing Servers.	Server,Client
loadbalanceCountryList	The MaxMind ISO 3166 Country Codes that this Server supports. Enter specific country codes as a comma-separated list or enter ***** to specify that all country codes are supported. At least one country code must be specified to enable this feature.	Client
loadbalanceGeoDataFile	The full path to the MaxMind GeoIP Country database file (**GeoIP.dat**) that's used for country balancing. **Note:** You must download a GeoIP country database file from MaxMind, Inc. to use country balancing. For more information, see Geographic group load balancing.	Server
loadbalanceIgnoreClients	A comma-separated list of client names. Clients with these names can connect to the Load Balancer and not be redirected. For example, you can specify the client name **FMLE** to enable a client that has Flash Media Encoder installed to connect.	Server
loadbalanceKey	Enables encrypted communication between the Load Balancer and Servers. The value must be at least 8 characters long and must be the same on all servers in the configuration.	Server,Client
loadbalanceServerIP	IP address of the Load Balancer.	Server,Client
loadbalanceServerPort	Port that the Load Balancer runs on. By default, this should be set to **1935** or to any other port that's configured in your **VHost.xml** file.	Server,Client

loadbalanceDecisionOrder	Order in which decision-making is processed for load balancing. Some or all of the following values can be entered as a comma-separated list: **Geographic** – Select load balancing Servers based on the geographic selector. **Bandwidth** – Select load balancing Servers based on the bandwidth selector. **Connection** – Select load balancing Servers based on the connection selector. For example, to specify geographic-based and then connection-based load balancing, the value is: `Geographic,Connection`	Server
loadbalanceApplicationsExclude	(Optional) A comma-separated list of applications to exclude from bandwidth and connection load-balancing calculations. Applications listed here override the same applications listed in **loadbalanceApplicationsInclude**.	Client
loadbalanceApplicationsInclude	(Optional) A comma-separated list of applications to include in bandwidth and connection load-balancing calculations. Leaving this value blank includes all applications on the Server automatically. Any applications specified in **loadbalanceApplicationsExclude** override this setting.	Client
loadbalanceClientForceIP	(Optional) IP address that's returned when this Server is selected in the load-balancing deployment. This value can be different from the IP address used by the Server to communicate with the Load Balancer.	Client

loadbalanceClientForcePort	(Optional) Port that's returned when this Server is selected in the load-balancing deployment. This value can be different from the port used by the Server to communicate with the Load Balancer.	Client
loadbalanceClientName	Name of the Server that connects to the Load Balancer. A random name is used if one isn't provided.	Client
loadbalanceAllowRemoteClientShutdown	(Optional) Enables load-balancing Servers to be shut down via the Statistics web interface.	Server
loadbalanceDebugServerDecision	(Optional) Controls decision-making debug logging, which helps you to see how the Load Balancer obtained a result. Enabling this property can produce a lot of log entries, which can create very large log files. This should be set to **Off** unless you're having problems.	Server
httpUserHTTPHeaders	(Optional) Controls additional user-defined HTTP headers sent back to a client when requesting a redirection. This allows the addition of CORS headers, if required.	Server

HTTP Provider configuration

To enable communication between the Load Balancer and Servers, and to view Server statistics in a web-based administration interface, you must configure HTTP Providers in the **VHost.xml** file on the Load Balancer. Open the **VHost.xml** file in a text editor and add the HTTP Providers described in the following sections to the **<HTTPProviders>** section for the **Default Streaming** host port in the file:

- Communication HTTP interface
- Statistics and control HTTP interface
- Redirection interface for XML and specific host information

Note

The Examples section of this document includes a sample **VHost.xml** configuration for the Load Balancer in a load-balancing deployment.

Communication HTTP interface

To enable communication between the Load Balancer and Servers, on the Load Balancer, add the following HTTP Provider to the **<HTTPProviders>** section for the **Default Streaming** host port in **VHost.xml**:

```
<HTTPProvider>
  <BaseClass>com.wowza.wms.plugin.loadbalancer.http.LoadBalancerInterface</Bas
eClass>
  <RequestFilters>*loadbalancerInterface</RequestFilters>
  <AuthenticationMethod>none</AuthenticationMethod>
</HTTPProvider>
```

Note

Be sure to add the HTTP Provider "before" the HTTP Provider that has the **<RequestFilters>*</RequestFilters>** property. See the VHost.xml configuration section in this document for an example.

This HTTP Provider doesn't require user authentication and user authentication shouldn't be enabled. All communication from Servers is encrypted and can only be decrypted by the Load Balancer.

Statistics and control HTTP interface

A statistics interface enables you to see connected Servers and the bandwidth and countries allocated for them. It also enables you to shut down Servers, removing them from the configuration while leaving other connected Servers unaffected.

To configure this interface, on the Load Balancer, add the following HTTP Provider to the **<HTTPProviders>** section for the **Default Streaming** host port in **VHost.xml**:

```
<HTTPProvider>
  <BaseClass>com.wowza.wms.plugin.loadbalancer.http.LoadBalancerInformation</B
aseClass>
  <RequestFilters>*loadbalancerInfo</RequestFilters>
  <AuthenticationMethod>admin-digest</AuthenticationMethod>
</HTTPProvider>
```

Note

Be sure to add the HTTP Provider "before" the HTTP Provider that has the **<RequestFilters>*</RequestFilters>** property. See the VHost.xml configuration section in this document for an example.

After the HTTP Provider is added, you can view the connected Servers and their status in a web browser. For example, if the Load Balancer has the IP address of **192.168.1.1**, you can open the following address in the browser:

```
http://192.168.1.1:1935/loadbalancerInfo
```

The web-based interface includes a button for each Server entry that enables you to remove the Server from the configuration. This process takes 60 seconds to occur. The Server status displays **STOP** in the statistics information panel until it's completely removed.

Redirection interface for XML and specific host information

A redirection interface enables you to return load-balancing information that can be integrated into well-known Flash clients (such as JW Player) or with your own application returning only the IP/port that's used. To configure this interface, on the Load Balancer, add the following HTTP Provider to the **<HTTPProviders>** section for the **Default Streaming** host port in **VHost.xml**:

```
<HTTPProvider>
  <BaseClass>com.wowza.wms.plugin.loadbalancer.http.LoadBalancerPublicInterfac
e</BaseClass>
  <RequestFilters>redirect*</RequestFilters>
  <AuthenticationMethod>none</AuthenticationMethod>
</HTTPProvider>
```

Note

Be sure to add the HTTP Provider "before" the HTTP Provider that has the **<RequestFilters>*</RequestFilters>** property. See the VHost.xml configuration section in this document for an example.

Redirection

The load-balancing redirection interfaces on the Load Balancer enable you to provide a single URL to clients in the following basic form:

```
[protocol]://[load-balancer-ip-address]:1935/redirect/[application-name]/[stream-name]?scheme=[http-transmission-scheme]
```

The **[load-balancer-ip-address]** is the IP address of the Wowza Load Balancer. The *scheme* URL query is used to specify the manifest file format in the redirect URL that's returned to clients and is only used for HTTP redirection.

A client is then redirected to an available load-balancing Server via a URL that has the following basic form:

```
[protocol]://[load-balanced-server-ip-address]:1935/[application-name]/[stream-name]?[manifest]
```

Notice that the "redirect" part of the request URL is removed in the resulting redirect URL. You can configure your filter to be any name and it too will be removed appropriately. The **[load-balanced-server-ip-address]** is either the IP address of the Wowza Load Balancer or the IP address of a load-balancing Server, depending on the load on the system.

Note

When the **loadbalanceType** property value is set to **Server,Client** on the Load Balancer, it's also a load-balancing Server that can fulfill the client request if not overloaded. Setting this property value to **Server** means that the Load Balancer redirects all client requests to connected load-balancing Servers.

A Wowza load-balancing system running on Wowza Streaming Engine software supports redirection over the following protocols:

- HTTP
- RTMP
- RTSP

HTTP redirection

The HTTP redirection interface enables you to provide a single URL that redirects client requests to an available load-balancing Server. The HTTP redirection supports most clients by enabling M3U8, F4M, Manifest, and RTMP XML outputs to be created. All of the redirection schemes work for live and VOD applications configured in Wowza Streaming Engine software.

HTTP clients are redirected using the HTTP 302 response status code. Your client must support the HTTP 302 code for load balancing to work. RTMP clients that use HTTP requests must support the returned XML (see RTMP XML).

Apple HLS (M3U8)

The following is an example for generating an HTTP 302 (redirection) response with a redirection URL in the Location header field for use in some iOS-based devices:

```
http://[load-balancer-ip-address]:1935/redirect/[application-name]/[stream-name]?scheme=m3u8
```

In this example, Apple HLS clients are redirected to:

```
http://[load-balanced-server-ip-address]:1935/[application-name]/[stream-name]/playlist.m3u8
```

Adobe HDS (F4M)

The following is an example for generating an HTTP 302 (redirection) response with a redirection URL in the Location header field for use in some Flash-based players:

```
http://[load-balancer-ip-address]:1935/redirect/[application-name]/[stream-name]?scheme=F4M
```

In this example, Adobe HDS clients are redirected to:

```
http://[load-balanced-server-ip-address]:1935/[application-name]/[stream-name]/manifest.f4m
```

Microsoft Smooth Streaming (Manifest)

The following is an example for generating an HTTP 302 (redirection) response with a redirection URL in the Location header field for use in some Silverlight clients:

```
http://[load-balancer-ip-address]:1935/redirect/[application-name]/[stream-name]?scheme=Manifest
```

In this example, Silverlight clients are redirected to:

```
http://[load-balanced-server-ip-address]:1935/[application-name]/[stream-name]/Manifest
```

RTMP XML (RTMP)

The following is an example for generating XML output for use in some Flash-based players:

```
http://[load-balancer-ip-address]:1935/redirect/[application-name]/[stream-name]/loadbalancer.smil
```

In this example, an RTMP client using HTTP requests gets XML returned similar to:

```
<?xml version="1.0"?>
<smil>
  <head>
    <meta base="rtmp://[load-balanced-server-ip-address]:1935/[application-name]/" />
  </head>
```

```
  <body>
    <switch>
      <video src="[stream-name]" />
    </switch>
  </body>
</smil>
```

In the above example, a client connects to the Load Balancer and the original URL parameters are used to construct the application name and stream to be used. If you specify a longer directory structure, this is added to the **src** element in the XML file.

You can also generate a multi-bitrate version of this output to allow redirection for adaptive bitrate (ABR) streams. To do this, the URL requires additional query parameters that describe the assets and bitrates. These should contain a comma-separated list of assets and their corresponding bitrates. If the number of assets and bitrates doesn't match, no output is returned.

The following is an example for generating XML output for use in some Flash-based players:

```
http://[load-balancer-ip-address]:1935/redirect/[application-
name]/loadbalancer.smil?assets=file1.mp4,file2.mp4,file3.mp4&bitrates=250000,3
50000,500000
```

In this example, an RTMP client using HTTP requests gets XML returned similar to:

```
<?xml version="1.0"?>
<smil>
  <head>
    <meta base="rtmp://54.194.186.4:80/vod/_definst_" />
  </head>
  <body>
    <switch>
      <video src="file1.mp4" system-bitrate="250000" />
      <video src="file2.mp4" system-bitrate="350000" />
      <video src="file3.mp4" system-bitrate="500000" />
    </switch>
  </body>
</smil>
```

Any additional query string parameters added to the HTTP request are also appended to the file names presented in the XML file. This can be useful when using the SecureToken feature in Wowza Streaming Engine (available in Wowza Streaming Engine version 4.1 and later).

Cross-origin resource sharing (CORS) header support

To support redirection for some HTTP implementations, additional headers are required to indicate valid access to the resource being presented back for the redirection.

To enable the appropriate headers, on the Load Balancer, open the **[install-dir]/conf/Server.xml** file in a text editor and add the following property to the last **<Properties>** section. The property value is a set of headers that will be added to the response, delimited by the pipe (|) character.

An example entry:

```
<Property>
  <Name>httpUserHTTPHeaders</Name>
```

```
  <Value>Access-Control-Allow-Origin:*|Access-Control-Allow-
Credentials:true|Access-Control-Expose-Headers:Date|Access-Control-Allow-
Methods:HEAD, GET, POST|Access-Control-Allow-Headers:Overwrite, Destination,
Content-Type, Depth, User-Agent, X-File-Size, X-Requested-With, If-Modified-
Since, X-File-Name, Cache-Control, Range</Value>
  <Type>String</Type>
</Property>
```

RTMP redirection

To add RTMP redirection functionality to the Load Balancer, configure the load-balancing system, add an application named 'redirect', and then add the following module to the application's **Application.xml** file. Be sure to add it "after" the last **<Module>** that's included in the **<Modules>** section in **Application.xml**. The following example shows the redirection module named **redirect**:

```
<Module>
  <Name>Redirect</Name>
  <Description>Redirect</Description>
  <Class>com.wowza.wms.plugin.loadbalancer.redirect.ClientConnections</Class>
</Module>
```

This module returns an RTMP redirect to clients that connect to the Load Balancer, except for those that are configured to be ignored in the **loadbalanceIgnoreClients** property in the **Server.xml** file. Wowza edge servers that connect to a Load Balancer that's also an origin server in a live stream repeater (origin/edge) configuration are also ignored.

An example URL used to redirect RTMP clients is:

```
rtmp://[load-balancer-ip-address]:1935/redirect/[application-name]/
```

In this example, RTMP clients are redirected to:

```
rtmp://[load-balanced-server-ip-address]:1935/[application-name]/
```

RTSP redirection

To add RTSP redirection functionality to the Load Balancer, configure the load-balancing system, add an application named 'redirect', and then add the following module to the application's **Application.xml** file. Be sure to add it "after" the last **<Module>** that's included in the **<Modules>** section in **Application.xml**. The following example shows the redirection module named **redirect**:

```
<Module>
    <Name>Redirect</Name>
    <Description>Redirect</Description>

<Class>com.wowza.wms.plugin.loadbalancer.redirect.ClientConnections</Class>
</Module>
```

This module returns an RTSP redirect to Clients that try to connect.

Note

You don't need to add this module if you've configured RTMP redirection.

Example request URL:

```
rtsp://[load-balancer-ip-address]/redirect/[application-name]/[stream-name]
```

In this example, RTSP clients are redirected to:

```
rtsp://[load-balanced-server-ip-address]:1935/[application-name]/[stream-name]
```

Host-specific information

To determine the IP address and port of a load-balancing Server to use for any client request, you can request this information by using the following URL:

```
http://[load-balancer-ip-address]:1935/redirect/?request=server&IP=A.B.C.D
```

You can use the *IP* query parameter to specify the IP address of a potential client to see which load-balancing Server it would be redirected to. If you omit the query parameter, the IP address of the local client is used.

This will return a text string with the *IP address*:*port* combination, for example:

```
[load-balanced-server-ip-address]:1935
```

Examples

Example Server.xml file (Load Balancer)

```
<?xml version="1.0" encoding="UTF-8"?>
<Root version="2">
  <Server>
    <Name>Wowza Streaming Engine</Name>
    <Description>Wowza Streaming Engine is robust, customizable, and scalable
server software that powers reliable streaming of high-quality video and audio
to any device, anywhere.</Description>
    <RESTInterface>
      <Enable>true</Enable>
      <IPAddress>*</IPAddress>
      <Port>8087</Port>
      <!-- none, basic, digest-->
      <AuthenticationMethod>digest</AuthenticationMethod>
      <DiagnosticURLEnable>true</DiagnosticURLEnable>
      <SSLConfig>
        <Enable>false</Enable>
        <KeyStorePath></KeyStorePath>
        <KeyStorePassword></KeyStorePassword>
        <KeyStoreType>JKS</KeyStoreType>
        <SSLProtocol>TLS</SSLProtocol>
        <Algorithm>SunX509</Algorithm>
        <CipherSuites></CipherSuites>
        <Protocols></Protocols>
      </SSLConfig>
      <IPWhiteList>127.0.0.1</IPWhiteList>
      <IPBlackList></IPBlackList>
      <EnableXMLFile>false</EnableXMLFile>
      <Properties>
      </Properties>
    </RESTInterface>
    <CommandInterface>
      <HostPort>
        <ProcessorCount>${com.wowza.wms.TuningAuto}</ProcessorCount>
        <IpAddress>*</IpAddress>
        <Port>8083</Port>
      </HostPort>
    </CommandInterface>
    <AdminInterface>
      <!-- Objects exposed through JMX interface: Server, VHost, VHostItem,
Application, ApplicationInstance, MediaCaster, Module, Client, MediaStream,
SharedObject, Acceptor, IdleWorker -->

  <ObjectList>Server,VHost,VHostItem,Application,ApplicationInstance,MediaCast
er,Module,IdleWorker</ObjectList>
    </AdminInterface>
    <Stats>
      <Enable>true</Enable>
    </Stats>
    <!-- JMXUrl:
service:jmx:rmi://localhost:8084/jndi/rmi://localhost:8085/jmxrmi -->
    <JMXRemoteConfiguration>
      <Enable>false</Enable>
```

```
      <IpAddress>localhost</IpAddress>
      <!-- set to localhost or internal ip address if behind NAT -->
      <RMIServerHostName>localhost</RMIServerHostName>
      <!-- set to external ip address or domain name if behind NAT -->
      <RMIConnectionPort>8084</RMIConnectionPort>
      <RMIRegistryPort>8085</RMIRegistryPort>
      <Authenticate>true</Authenticate>

  <PasswordFile>${com.wowza.wms.ConfigHome}/conf/jmxremote.password</PasswordF
ile>

  <AccessFile>${com.wowza.wms.ConfigHome}/conf/jmxremote.access</AccessFile>
      <SSLSecure>false</SSLSecure>
    </JMXRemoteConfiguration>
    <UserAgents>Shockwave Flash|CFNetwork|MacNetwork/1.0
(Macintosh)</UserAgents>
    <Streams>
      <DefaultStreamPrefix>mp4</DefaultStreamPrefix>
    </Streams>
    <ServerListeners>
      <ServerListener>

  <BaseClass>com.wowza.wms.mediacache.impl.MediaCacheServerListener</BaseClass
>
      </ServerListener>
      <ServerListener>

  <BaseClass>com.wowza.wms.plugin.loadbalancer.general.LoadBalancerServer</Bas
eClass>
      </ServerListener>
    </ServerListeners>
    <VHostListeners>
      <!--
      <VHostListener>
        <BaseClass></BaseClass>
      </VHostListener>
      -->
    </VHostListeners>
    <HandlerThreadPool>
      <PoolSize>${com.wowza.wms.TuningAuto}</PoolSize>
    </HandlerThreadPool>
    <TransportThreadPool>
      <PoolSize>${com.wowza.wms.TuningAuto}</PoolSize>
    </TransportThreadPool>
    <RTP>
      <DatagramStartingPort>6970</DatagramStartingPort>
      <DatagramPortSharing>false</DatagramPortSharing>
    </RTP>
    <Manager>
      <!-- Properties defined are used by the Manager -->
      <Properties>
      </Properties>
    </Manager>
    <!-- Properties defined here will be added to the IServer.getProperties()
collection -->
    <Properties>
      <Property>
        <Name>loadbalanceType</Name>
        <Value>Server,Client</Value>
        <Type>String</Type>
```

```
      </Property>
      <Property>
        <Name>loadbalanceKey</Name>
        <Value>123456789012345</Value>
        <Type>String</Type>
      </Property>
      <Property>
        <Name>loadbalanceServerIP</Name>
        <Value>[load-balancer-ip-address (xxx.xxx.x.xxx)]</Value>
        <Type>String</Type>
      </Property>
      <Property>
        <Name>loadbalanceServerPort</Name>
        <Value>1935</Value>
        <Type>String</Type>
      </Property>
      <Property>
        <Name>loadbalanceDecisionOrder</Name>
        <Value>Bandwidth,Connection</Value>
        <Type>String</Type>
      </Property>
      <Property>
        <Name>loadbalanceIgnoreClients</Name>
        <Value>FMLE</Value>
        <Type>String</Type>
      </Property>
      <Property>
        <Name>loadbalanceBandwidthEnable</Name>
        <Value>On</Value>
        <Type>String</Type>
      </Property>
      <Property>
        <Name>loadbalanceBandwidthLimit</Name>
        <Value>50000</Value>
        <Type>String</Type>
      </Property>
      <Property>
        <Name>loadbalanceConnectionEnable</Name>
        <Value>On</Value>
        <Type>String</Type>
      </Property>
      <Property>
        <Name>loadbalanceConnectionLimit</Name>
        <Value>100</Value>
        <Type>String</Type>
      </Property>
    </Properties>
  </Server>
</Root>
```

Example Server.xml file (Server)

```
<?xml version="1.0" encoding="UTF-8"?>
<Root version="2">
  <Server>
    <Name>Wowza Streaming Engine</Name>
    <Description>Wowza Streaming Engine is robust, customizable, and scalable
server software that powers reliable streaming of high-quality video and audio
to any device, anywhere.</Description>
    <RESTInterface>
      <Enable>true</Enable>
      <IPAddress>*</IPAddress>
      <Port>8087</Port>
      <!-- none, basic, digest-->
      <AuthenticationMethod>digest</AuthenticationMethod>
      <DiagnosticURLEnable>true</DiagnosticURLEnable>
      <SSLConfig>
        <Enable>false</Enable>
        <KeyStorePath></KeyStorePath>
        <KeyStorePassword></KeyStorePassword>
        <KeyStoreType>JKS</KeyStoreType>
        <SSLProtocol>TLS</SSLProtocol>
        <Algorithm>SunX509</Algorithm>
        <CipherSuites></CipherSuites>
        <Protocols></Protocols>
      </SSLConfig>
      <IPWhiteList>127.0.0.1</IPWhiteList>
      <IPBlackList></IPBlackList>
      <EnableXMLFile>false</EnableXMLFile>
      <Properties>
      </Properties>
    </RESTInterface>
    <CommandInterface>
      <HostPort>
        <ProcessorCount>${com.wowza.wms.TuningAuto}</ProcessorCount>
        <IpAddress>*</IpAddress>
        <Port>8083</Port>
      </HostPort>
    </CommandInterface>
    <AdminInterface>
      <!-- Objects exposed through JMX interface: Server, VHost, VHostItem,
Application, ApplicationInstance, MediaCaster, Module, Client, MediaStream,
SharedObject, Acceptor, IdleWorker -->

  <ObjectList>Server,VHost,VHostItem,Application,ApplicationInstance,MediaCast
er,Module,IdleWorker</ObjectList>
    </AdminInterface>
    <Stats>
      <Enable>true</Enable>
    </Stats>
    <!-- JMXUrl:
service:jmx:rmi://localhost:8084/jndi/rmi://localhost:8085/jmxrmi -->
    <JMXRemoteConfiguration>
      <Enable>false</Enable>
      <IpAddress>localhost</IpAddress>
      <!-- set to localhost or internal ip address if behind NAT -->
      <RMIServerHostName>localhost</RMIServerHostName>
      <!-- set to external ip address or domain name if behind NAT -->
```

```
      <RMIConnectionPort>8084</RMIConnectionPort>
      <RMIRegistryPort>8085</RMIRegistryPort>
      <Authenticate>true</Authenticate>

  <PasswordFile>${com.wowza.wms.ConfigHome}/conf/jmxremote.password</PasswordF
ile>

  <AccessFile>${com.wowza.wms.ConfigHome}/conf/jmxremote.access</AccessFile>
      <SSLSecure>false</SSLSecure>
    </JMXRemoteConfiguration>
    <UserAgents>Shockwave Flash|CFNetwork|MacNetwork/1.0
(Macintosh)</UserAgents>
    <Streams>
      <DefaultStreamPrefix>mp4</DefaultStreamPrefix>
    </Streams>
    <ServerListeners>
      <ServerListener>

  <BaseClass>com.wowza.wms.mediacache.impl.MediaCacheServerListener</BaseClass
>
      </ServerListener>
      <ServerListener>

  <BaseClass>com.wowza.wms.plugin.loadbalancer.general.LoadBalancerServer</Bas
eClass>
      </ServerListener>
    </ServerListeners>
    <VHostListeners>
      <!--
      <VHostListener>
        <BaseClass></BaseClass>
      </VHostListener>
      -->
    </VHostListeners>
    <HandlerThreadPool>
      <PoolSize>${com.wowza.wms.TuningAuto}</PoolSize>
    </HandlerThreadPool>
    <TransportThreadPool>
      <PoolSize>${com.wowza.wms.TuningAuto}</PoolSize>
    </TransportThreadPool>
    <RTP>
      <DatagramStartingPort>6970</DatagramStartingPort>
      <DatagramPortSharing>false</DatagramPortSharing>
    </RTP>
    <Manager>
      <!-- Properties defined are used by the Manager -->
      <Properties>
      </Properties>
    </Manager>
    <!-- Properties defined here will be added to the IServer.getProperties()
collection -->
    <Properties>
      <Property>
        <Name>loadbalanceType</Name>
        <Value>Client</Value>
        <Type>String</Type>
      </Property>
      <Property>
        <Name>loadbalanceKey</Name>
        <Value>123456789012345</Value>
```

```
        <Type>String</Type>
      </Property>
      <Property>
        <Name>loadbalanceServerIP</Name>
        <Value>[load-balancer-ip-address (xxx.xxx.x.xxx)]</Value>
        <Type>String</Type>
      </Property>
      <Property>
        <Name>loadbalanceServerPort</Name>
        <Value>1935</Value>
        <Type>String</Type>
      </Property>
      <Property>
        <Name>loadbalanceBandwidthEnable</Name>
        <Value>On</Value>
        <Type>String</Type>
      </Property>
      <Property>
        <Name>loadbalanceBandwidthLimit</Name>
        <Value>50000</Value>
        <Type>String</Type>
      </Property>
      <Property>
        <Name>loadbalanceConnectionEnable</Name>
        <Value>On</Value>
        <Type>String</Type>
      </Property>
      <Property>
        <Name>loadbalanceConnectionLimit</Name>
        <Value>100</Value>
        <Type>String</Type>
      </Property>
    </Properties>
  </Server>
</Root>
```

Example VHost.xml file (Load Balancer)

```
<?xml version="1.0" encoding="UTF-8"?>
<Root version="2">
  <VHost>
    <Description></Description>
    <HostPortList>
      <HostPort>
        <Name>Default Streaming</Name>
        <Type>Streaming</Type>
        <ProcessorCount>${com.wowza.wms.TuningAuto}</ProcessorCount>
        <IpAddress>*</IpAddress>
        <!-- Separate multiple ports with commas -->
        <!-- 80: HTTP, RTMPT -->
        <!-- 554: RTSP -->
        <Port>1935</Port>
        <HTTPIdent2Response></HTTPIdent2Response>
        <SocketConfiguration>
          <ReuseAddress>true</ReuseAddress>
          <!-- suggested settings for video on demand applications -->
          <ReceiveBufferSize>65000</ReceiveBufferSize>
          <ReadBufferSize>65000</ReadBufferSize>
          <SendBufferSize>65000</SendBufferSize>
          <!-- suggested settings for low latency chat and video recording
applications
          <ReceiveBufferSize>32000</ReceiveBufferSize>
          <ReadBufferSize>32000</ReadBufferSize>
          <SendBufferSize>32000</SendBufferSize>
          -->
          <KeepAlive>true</KeepAlive>
          <!-- <TrafficClass>0</TrafficClass> -->
          <!-- <OobInline>false</OobInline> -->
          <!-- <SoLingerTime>-1</SoLingerTime> -->
          <!-- <TcpNoDelay>false</TcpNoDelay> -->
          <AcceptorBackLog>100</AcceptorBackLog>
        </SocketConfiguration>

  <HTTPStreamerAdapterIDs>cupertinostreaming,smoothstreaming,sanjosestreaming,
dvrchunkstreaming,mpegdashstreaming</HTTPStreamerAdapterIDs>
        <HTTPProviders>
          <HTTPProvider>
            <BaseClass>com.wowza.wms.http.HTTPCrossdomain</BaseClass>
            <RequestFilters>*crossdomain.xml</RequestFilters>
            <AuthenticationMethod>none</AuthenticationMethod>
          </HTTPProvider>
          <HTTPProvider>
            <BaseClass>com.wowza.wms.http.HTTPClientAccessPolicy</BaseClass>
            <RequestFilters>*clientaccesspolicy.xml</RequestFilters>
            <AuthenticationMethod>none</AuthenticationMethod>
          </HTTPProvider>
          <HTTPProvider>
            <BaseClass>com.wowza.wms.http.HTTPProviderMediaList</BaseClass>

  <RequestFilters>*jwplayer.rss|*jwplayer.smil|*medialist.smil|*manifest-
rtmp.f4m</RequestFilters>
            <AuthenticationMethod>none</AuthenticationMethod>
          </HTTPProvider>
          <HTTPProvider>
```

```
  <BaseClass>com.wowza.wms.plugin.loadbalancer.http.LoadBalancerInterface</Bas
eClass>
            <RequestFilters>*loadbalancerInterface</RequestFilters>
            <AuthenticationMethod>none</AuthenticationMethod>
          </HTTPProvider>
          <HTTPProvider>

  <BaseClass>com.wowza.wms.plugin.loadbalancer.http.LoadBalancerInformation</B
aseClass>
            <RequestFilters>*loadbalancerInfo</RequestFilters>
            <AuthenticationMethod>admin-digest</AuthenticationMethod>
          </HTTPProvider>
          <HTTPProvider>

  <BaseClass>com.wowza.wms.plugin.loadbalancer.http.LoadBalancerPublicInterfac
e</BaseClass>
            <RequestFilters>redirect*</RequestFilters>
            <AuthenticationMethod>none</AuthenticationMethod>
          </HTTPProvider>
          <HTTPProvider>

<BaseClass>com.wowza.wms.timedtext.http.HTTPProviderCaptionFile</BaseClass>
              <RequestFilters>*.ttml|*.srt|*.scc|*.vtt</RequestFilters>
              <AuthenticationMethod>none</AuthenticationMethod>
          </HTTPProvider>
          <HTTPProvider>
            <BaseClass>com.wowza.wms.http.HTTPServerVersion</BaseClass>
            <RequestFilters>*</RequestFilters>
            <AuthenticationMethod>none</AuthenticationMethod>
          </HTTPProvider>
        </HTTPProviders>
      </HostPort>

      <!-- 443 with SSL -->
      <!--
      <HostPort>
        <Name>Default SSL Streaming</Name>
        <Type>Streaming</Type>
        <ProcessorCount>${com.wowza.wms.TuningAuto}</ProcessorCount>
        <IpAddress>*</IpAddress>
        <Port>443</Port>
        <HTTPIdent2Response></HTTPIdent2Response>
        <SSLConfig>

  <KeyStorePath>${com.wowza.wms.context.VHostConfigHome}/conf/keystore.jks</Ke
yStorePath>
          <KeyStorePassword>[password]</KeyStorePassword>
          <KeyStoreType>JKS</KeyStoreType>
          <SSLProtocol>TLS</SSLProtocol>
          <Algorithm>SunX509</Algorithm>
          <CipherSuites></CipherSuites>
          <Protocols></Protocols>
        </SSLConfig>
        <SocketConfiguration>
          <ReuseAddress>true</ReuseAddress>
          <ReceiveBufferSize>65000</ReceiveBufferSize>
          <ReadBufferSize>65000</ReadBufferSize>
          <SendBufferSize>65000</SendBufferSize>
          <KeepAlive>true</KeepAlive>
```

```
          <AcceptorBackLog>100</AcceptorBackLog>
        </SocketConfiguration>

  <HTTPStreamerAdapterIDs>cupertinostreaming,smoothstreaming,sanjosestreaming,
dvrchunkstreaming,mpegdashstreaming</HTTPStreamerAdapterIDs>
        <HTTPProviders>
          <HTTPProvider>
            <BaseClass>com.wowza.wms.http.HTTPCrossdomain</BaseClass>
            <RequestFilters>*crossdomain.xml</RequestFilters>
            <AuthenticationMethod>none</AuthenticationMethod>
          </HTTPProvider>
          <HTTPProvider>
            <BaseClass>com.wowza.wms.http.HTTPClientAccessPolicy</BaseClass>
            <RequestFilters>*clientaccesspolicy.xml</RequestFilters>
            <AuthenticationMethod>none</AuthenticationMethod>
          </HTTPProvider>
          <HTTPProvider>
            <BaseClass>com.wowza.wms.http.HTTPProviderMediaList</BaseClass>

  <RequestFilters>*jwplayer.rss|*jwplayer.smil|*medialist.smil|*manifest-
rtmp.f4m</RequestFilters>
            <AuthenticationMethod>none</AuthenticationMethod>
          </HTTPProvider>
          <HTTPProvider>
            <BaseClass>com.wowza.wms.http.HTTPServerVersion</BaseClass>
            <RequestFilters>*</RequestFilters>
            <AuthenticationMethod>none</AuthenticationMethod>
          </HTTPProvider>
        </HTTPProviders>
      </HostPort>
      -->

      <!-- Admin HostPort -->
      <HostPort>
        <Name>Default Admin</Name>
        <Type>Admin</Type>
        <ProcessorCount>${com.wowza.wms.TuningAuto}</ProcessorCount>
        <IpAddress>*</IpAddress>
        <Port>8086</Port>
        <HTTPIdent2Response></HTTPIdent2Response>
        <SocketConfiguration>
          <ReuseAddress>true</ReuseAddress>
          <ReceiveBufferSize>16000</ReceiveBufferSize>
          <ReadBufferSize>16000</ReadBufferSize>
          <SendBufferSize>16000</SendBufferSize>
          <KeepAlive>true</KeepAlive>
          <AcceptorBackLog>100</AcceptorBackLog>
        </SocketConfiguration>
        <HTTPStreamerAdapterIDs></HTTPStreamerAdapterIDs>
        <HTTPProviders>
          <HTTPProvider>

  <BaseClass>com.wowza.wms.http.streammanager.HTTPStreamManager</BaseClass>
            <RequestFilters>streammanager*</RequestFilters>
            <AuthenticationMethod>admin-digest</AuthenticationMethod>
          </HTTPProvider>
          <HTTPProvider>
            <BaseClass>com.wowza.wms.http.HTTPServerInfoXML</BaseClass>
            <RequestFilters>serverinfo*</RequestFilters>
            <AuthenticationMethod>admin-digest</AuthenticationMethod>
```

```
          </HTTPProvider>
          <HTTPProvider>
            <BaseClass>com.wowza.wms.http.HTTPConnectionInfo</BaseClass>
            <RequestFilters>connectioninfo*</RequestFilters>
            <AuthenticationMethod>admin-digest</AuthenticationMethod>
          </HTTPProvider>
          <HTTPProvider>
            <BaseClass>com.wowza.wms.http.HTTPConnectionCountsXML</BaseClass>
            <RequestFilters>connectioncounts*</RequestFilters>
            <AuthenticationMethod>admin-digest</AuthenticationMethod>
          </HTTPProvider>
          <HTTPProvider>

  <BaseClass>com.wowza.wms.transcoder.httpprovider.HTTPTranscoderThumbnail</Ba
seClass>
            <RequestFilters>transcoderthumbnail*</RequestFilters>
            <AuthenticationMethod>admin-digest</AuthenticationMethod>
          </HTTPProvider>
          <HTTPProvider>
            <BaseClass>com.wowza.wms.http.HTTPProviderMediaList</BaseClass>
            <RequestFilters>medialist*</RequestFilters>
            <AuthenticationMethod>admin-digest</AuthenticationMethod>
          </HTTPProvider>
          <HTTPProvider>

  <BaseClass>com.wowza.wms.livestreamrecord.http.HTTPLiveStreamRecord</BaseCla
ss>
            <RequestFilters>livestreamrecord*</RequestFilters>
            <AuthenticationMethod>admin-digest</AuthenticationMethod>
          </HTTPProvider>
          <HTTPProvider>
            <BaseClass>com.wowza.wms.http.HTTPServerVersion</BaseClass>
            <RequestFilters>*</RequestFilters>
            <AuthenticationMethod>none</AuthenticationMethod>
          </HTTPProvider>
        </HTTPProviders>
      </HostPort>

    </HostPortList>

    <HTTPStreamerAdapters>
      <HTTPStreamerAdapter>
        <ID>smoothstreaming</ID>
        <Name>smoothstreaming</Name>
        <Properties>
        </Properties>
      </HTTPStreamerAdapter>
      <HTTPStreamerAdapter>
        <ID>cupertinostreaming</ID>
        <Name>cupertinostreaming</Name>
        <Properties>
        </Properties>
      </HTTPStreamerAdapter>
      <HTTPStreamerAdapter>
        <ID>sanjosestreaming</ID>
        <Name>sanjosestreaming</Name>
        <Properties>
        </Properties>
      </HTTPStreamerAdapter>
      <HTTPStreamerAdapter>
```

```
      <ID>dvrchunkstreaming</ID>
      <Name>dvrchunkstreaming</Name>
      <Properties>
      </Properties>
    </HTTPStreamerAdapter>
    <HTTPStreamerAdapter>
      <ID>mpegdashstreaming</ID>
      <Name>mpegdashstreaming</Name>
      <Properties>
      </Properties>
    </HTTPStreamerAdapter>
  </HTTPStreamerAdapters>

  <!-- When set to zero, thread pool configuration is done in Server.xml -->
  <HandlerThreadPool>
    <PoolSize>0</PoolSize>
  </HandlerThreadPool>
  <TransportThreadPool>
    <PoolSize>0</PoolSize>
  </TransportThreadPool>
  <IdleWorkers>
    <WorkerCount>${com.wowza.wms.TuningAuto}</WorkerCount>
    <CheckFrequency>50</CheckFrequency>
    <MinimumWaitTime>5</MinimumWaitTime>
  </IdleWorkers>
  <NetConnections>
    <ProcessorCount>${com.wowza.wms.TuningAuto}</ProcessorCount>
    <IdleFrequency>250</IdleFrequency>
    <SocketConfiguration>
      <ReuseAddress>true</ReuseAddress>
      <ReceiveBufferSize>65000</ReceiveBufferSize>
      <ReadBufferSize>65000</ReadBufferSize>
      <SendBufferSize>65000</SendBufferSize>
      <KeepAlive>true</KeepAlive>
      <!-- <TrafficClass>0</TrafficClass> -->
      <!-- <OobInline>false</OobInline> -->
      <!-- <SoLingerTime>-1</SoLingerTime> -->
      <!-- <TcpNoDelay>false</TcpNoDelay> -->
      <AcceptorBackLog>100</AcceptorBackLog>
    </SocketConfiguration>
  </NetConnections>
  <MediaCasters>
    <ProcessorCount>${com.wowza.wms.TuningAuto}</ProcessorCount>
    <SocketConfiguration>
      <ReuseAddress>true</ReuseAddress>
      <ReceiveBufferSize>65000</ReceiveBufferSize>
      <ReadBufferSize>65000</ReadBufferSize>
      <SendBufferSize>65000</SendBufferSize>
      <KeepAlive>true</KeepAlive>
      <!-- <TrafficClass>0</TrafficClass> -->
      <!-- <OobInline>false</OobInline> -->
      <!-- <SoLingerTime>-1</SoLingerTime> -->
      <!-- <TcpNoDelay>false</TcpNoDelay> -->
      <ConnectionTimeout>10000</ConnectionTimeout>
    </SocketConfiguration>
  </MediaCasters>
  <LiveStreamTranscoders>
    <MaximumConcurrentTranscodes>0</MaximumConcurrentTranscodes>
  </LiveStreamTranscoders>
  <HTTPTunnel>
```

```
      <KeepAliveTimeout>2000</KeepAliveTimeout>
    </HTTPTunnel>
    <Client>
      <ClientTimeout>90000</ClientTimeout>
      <IdleFrequency>250</IdleFrequency>
    </Client>
    <!-- RTP/Authentication/Methods defined in Authentication.xml. Default
setup includes; none, basic, digest -->
    <RTP>
      <IdleFrequency>75</IdleFrequency>
      <DatagramConfiguration>
        <Incoming>
          <ReuseAddress>true</ReuseAddress>
          <ReceiveBufferSize>1024000</ReceiveBufferSize>
          <SendBufferSize>65000</SendBufferSize>
          <!-- <MulticastBindToAddress>true</MulticastBindToAddress> -->
          <!--
<MulticastInterfaceAddress>192.168.1.22</MulticastInterfaceAddress> -->
          <!-- <TrafficClass>0</TrafficClass> -->
          <MulticastTimeout>50</MulticastTimeout>
          <DatagramMaximumPacketSize>4096</DatagramMaximumPacketSize>
        </Incoming>
        <Outgoing>
          <ReuseAddress>true</ReuseAddress>
          <ReceiveBufferSize>65000</ReceiveBufferSize>
          <SendBufferSize>65000</SendBufferSize>
          <!-- <MulticastBindToAddress>true</MulticastBindToAddress> -->
          <!--
<MulticastInterfaceAddress>192.168.1.22</MulticastInterfaceAddress> -->
          <!-- <TrafficClass>0</TrafficClass> -->
          <MulticastTimeout>50</MulticastTimeout>
          <DatagramMaximumPacketSize>4096</DatagramMaximumPacketSize>
        </Outgoing>
      </DatagramConfiguration>
      <UnicastIncoming>
        <ProcessorCount>${com.wowza.wms.TuningAuto}</ProcessorCount>
      </UnicastIncoming>
      <UnicastOutgoing>
        <ProcessorCount>${com.wowza.wms.TuningAuto}</ProcessorCount>
      </UnicastOutgoing>
      <MulticastIncoming>
        <ProcessorCount>${com.wowza.wms.TuningAuto}</ProcessorCount>
      </MulticastIncoming>
      <MulticastOutgoing>
        <ProcessorCount>${com.wowza.wms.TuningAuto}</ProcessorCount>
      </MulticastOutgoing>
    </RTP>
    <Application>
      <ApplicationTimeout>60000</ApplicationTimeout>
      <PingTimeout>12000</PingTimeout>
      <UnidentifiedSessionTimeout>30000</UnidentifiedSessionTimeout>
      <ValidationFrequency>20000</ValidationFrequency>
      <MaximumPendingWriteBytes>0</MaximumPendingWriteBytes>
      <MaximumSetBufferTime>60000</MaximumSetBufferTime>
    </Application>
    <StartStartupStreams>true</StartStartupStreams>

    <Manager>
      <TestPlayer>
        <IpAddress>${com.wowza.wms.HostPort.IpAddress}</IpAddress>
```

```
        <Port>${com.wowza.wms.HostPort.FirstStreamingPort}</Port>
        <SSLEnable>${com.wowza.wms.HostPort.SSLEnable}</SSLEnable>
      </TestPlayer>
      <!-- Properties defined are used by the Manager -->
      <Properties>
      </Properties>
    </Manager>

    <!-- Properties defined here will be added to the IVHost.getProperties()
collection -->
    <Properties>
    </Properties>
  </VHost>
</Root>
```

Example RTMP/RTSP redirect Application.xml file (Load Balancer)

```
<?xml version="1.0" encoding="UTF-8"?>
<Root version="1">
  <Application>
    <Name>[application-name]</Name>
    <AppType>[application-type (live or vod)]</AppType>
    <Description>[application-description]</Description>
    <!-- Uncomment to set application level timeout values
    <ApplicationTimeout>60000</ApplicationTimeout>
    <PingTimeout>12000</PingTimeout>
    <ValidationFrequency>8000</ValidationFrequency>
    <MaximumPendingWriteBytes>0</MaximumPendingWriteBytes>
    <MaximumSetBufferTime>60000</MaximumSetBufferTime>
    <MaximumStorageDirDepth>25</MaximumStorageDirDepth>
    -->
    <Connections>
      <AutoAccept>true</AutoAccept>
      <AllowDomains></AllowDomains>
    </Connections>
    <!--
      StorageDir path variables

      ${com.wowza.wms.AppHome} - Application home directory
      ${com.wowza.wms.ConfigHome} - Configuration home directory
      ${com.wowza.wms.context.VHost} - Virtual host name
      ${com.wowza.wms.context.VHostConfigHome} - Virtual host config directory
      ${com.wowza.wms.context.Application} - Application name
      ${com.wowza.wms.context.ApplicationInstance} - Application instance name

    -->
    <Streams>
      <StreamType>[stream-type (live or default)]</StreamType>

  <StorageDir>${com.wowza.wms.context.VHostConfigHome}/content</StorageDir>
      <KeyDir>${com.wowza.wms.context.VHostConfigHome}/keys</KeyDir>
      <!-- LiveStreamPacketizers (separate with commas):
cupertinostreamingpacketizer, smoothstreamingpacketizer,
sanjosestreamingpacketizer, mpegdashstreamingpacketizer,
cupertinostreamingrepeater, smoothstreamingrepeater, sanjosestreamingrepeater,
mpegdashstreamingrepeater -->
      <LiveStreamPacketizers>[live-stream-packetizers]</LiveStreamPacketizers>

      <!-- Properties defined here will override any properties defined in
conf/Streams.xml for any streams types loaded by this application -->
      <Properties>
      </Properties>
    </Streams>
    <Transcoder>
      <!-- To turn on transcoder set to: transcoder -->
      <LiveStreamTranscoder></LiveStreamTranscoder>
      <!-- [templatename].xml or ${SourceStreamName}.xml -->
      <Templates>${SourceStreamName}.xml,transrate.xml</Templates>

  <ProfileDir>${com.wowza.wms.context.VHostConfigHome}/transcoder/profiles</Pr
ofileDir>
```

```
  <TemplateDir>${com.wowza.wms.context.VHostConfigHome}/transcoder/templates</
TemplateDir>
      <Properties>
      </Properties>
    </Transcoder>

    <DVR>
      <!-- As a single server or as an origin, use dvrstreamingpacketizer in
LiveStreamPacketizers above -->
      <!-- Or, in an origin-edge configuration, edges use dvrstreamingrepeater
in LiveStreamPacketizers above -->
      <!-- As an origin, also add dvrchunkstreaming to HTTPStreamers below -->

      <!-- If this is a dvrstreamingrepeater, define
Application/Repeater/OriginURL to point back to the origin -->

      <!-- To turn on DVR recording set Recorders to dvrrecorder.  This works
with dvrstreamingpacketizer  -->
      <Recorders></Recorders>

      <!-- As a single server or as an origin, set the Store to
dvrfilestorage-->
      <!-- edges should have this empty -->
      <Store></Store>

      <!--  Window Duration is length of live DVR window in seconds.  0 means
the window is never trimmed. -->
      <WindowDuration>0</WindowDuration>

      <!-- Storage Directory is top level location where dvr is stored.  e.g.
c:/temp/dvr -->
      <StorageDir>${com.wowza.wms.context.VHostConfigHome}/dvr</StorageDir>

      <!-- valid ArchiveStrategy values are append, version, delete -->
      <ArchiveStrategy>append</ArchiveStrategy>

      <!-- Properties for DVR -->
      <Properties>
      </Properties>
    </DVR>

    <TimedText>
      <!-- VOD caption providers (separate with commas):
vodcaptionprovidermp4_3gpp, vodcaptionproviderttml, vodcaptionproviderwebvtt,
vodcaptionprovidersrt, vodcaptionproviderscc -->

  <VODTimedTextProviders>vodcaptionprovidermp4_3gpp</VODTimedTextProviders>

      <!-- Properties for TimedText -->
      <Properties>
      </Properties>
    </TimedText>

    <!-- HTTPStreamers (separate with commas): cupertinostreaming,
smoothstreaming, sanjosestreaming, mpegdashstreaming, dvrchunkstreaming -->

  <HTTPStreamers>cupertinostreaming,smoothstreaming,sanjosestreaming,mpegdashs
treaming</HTTPStreamers>
    <MediaCache>
```

```
      <MediaCacheSourceList></MediaCacheSourceList>
    </MediaCache>
    <SharedObjects>

  <StorageDir>${com.wowza.wms.context.VHostConfigHome}/applications/${com.wowz
a.wms.context.Application}/sharedobjects/${com.wowza.wms.context.ApplicationIn
stance}</StorageDir>
    </SharedObjects>
    <Client>
      <IdleFrequency>-1</IdleFrequency>
      <Access>
        <StreamReadAccess>*</StreamReadAccess>
        <StreamWriteAccess>*</StreamWriteAccess>
        <StreamAudioSampleAccess></StreamAudioSampleAccess>
        <StreamVideoSampleAccess></StreamVideoSampleAccess>
        <SharedObjectReadAccess>*</SharedObjectReadAccess>
        <SharedObjectWriteAccess>*</SharedObjectWriteAccess>
      </Access>
    </Client>
    <RTP>
      <!-- RTP/Authentication/[type]Methods defined in Authentication.xml.
Default setup includes; none, basic, digest -->
      <Authentication>
        <PublishMethod>[publish-method]</PublishMethod>
        <PlayMethod>none</PlayMethod>
      </Authentication>
      <!-- RTP/AVSyncMethod. Valid values are: senderreport, systemclock,
rtptimecode -->
      <AVSyncMethod>senderreport</AVSyncMethod>
      <MaxRTCPWaitTime>12000</MaxRTCPWaitTime>
      <IdleFrequency>75</IdleFrequency>
      <RTSPSessionTimeout>90000</RTSPSessionTimeout>
      <RTSPMaximumPendingWriteBytes>0</RTSPMaximumPendingWriteBytes>
      <RTSPBindIpAddress></RTSPBindIpAddress>
      <RTSPConnectionIpAddress>0.0.0.0</RTSPConnectionIpAddress>
      <RTSPOriginIpAddress>127.0.0.1</RTSPOriginIpAddress>
      <IncomingDatagramPortRanges>*</IncomingDatagramPortRanges>
      <!-- Properties defined here will override any properties defined in
conf/RTP.xml for any depacketizers loaded by this application -->
      <Properties>
      </Properties>
    </RTP>
    <MediaCaster>
      <RTP>
        <RTSP>
          <!-- udp, interleave -->
          <RTPTransportMode>interleave</RTPTransportMode>
        </RTSP>
      </RTP>
      <StreamValidator>
        <Enable>true</Enable>
        <ResetNameGroups>true</ResetNameGroups>
        <StreamStartTimeout>20000</StreamStartTimeout>
        <StreamTimeout>12000</StreamTimeout>
        <VideoStartTimeout>0</VideoStartTimeout>
        <VideoTimeout>0</VideoTimeout>
        <AudioStartTimeout>0</AudioStartTimeout>
        <AudioTimeout>0</AudioTimeout>
        <VideoTCToleranceEnable>false</VideoTCToleranceEnable>
        <VideoTCPosTolerance>3000</VideoTCPosTolerance>
```

```
        <VideoTCNegTolerance>-500</VideoTCNegTolerance>
        <AudioTCToleranceEnable>false</AudioTCToleranceEnable>
        <AudioTCPosTolerance>3000</AudioTCPosTolerance>
        <AudioTCNegTolerance>-500</AudioTCNegTolerance>
        <DataTCToleranceEnable>false</DataTCToleranceEnable>
        <DataTCPosTolerance>3000</DataTCPosTolerance>
        <DataTCNegTolerance>-500</DataTCNegTolerance>
        <AVSyncToleranceEnable>false</AVSyncToleranceEnable>
        <AVSyncTolerance>1500</AVSyncTolerance>
        <DebugLog>false</DebugLog>
      </StreamValidator>
      <!-- Properties defined here will override any properties defined in
conf/MediaCasters.xml for any MediaCasters loaded by this applications -->
      <Properties>
      </Properties>
    </MediaCaster>
    <MediaReader>
      <!-- Properties defined here will override any properties defined in
conf/MediaReaders.xml for any MediaReaders loaded by this applications -->
      <Properties>
      </Properties>
    </MediaReader>
    <MediaWriter>
      <!-- Properties defined here will override any properties defined in
conf/MediaWriter.xml for any MediaWriter loaded by this applications -->
      <Properties>
      </Properties>
    </MediaWriter>
    <LiveStreamPacketizer>
      <!-- Properties defined here will override any properties defined in
conf/LiveStreamPacketizers.xml for any LiveStreamPacketizers loaded by this
applications -->
      <Properties>
      </Properties>
    </LiveStreamPacketizer>
    <HTTPStreamer>
      <!-- Properties defined here will override any properties defined in
conf/HTTPStreamers.xml for any HTTPStreamer loaded by this applications -->
      <Properties>
      </Properties>
    </HTTPStreamer>
    <Manager>
      <!-- Properties defined are used by the Manager -->
      <Properties>
      </Properties>
    </Manager>
    <Repeater>
      <OriginURL></OriginURL>
      <QueryString><![CDATA[]]></QueryString>
    </Repeater>
    <StreamRecorder>
      <Properties>
      </Properties>
    </StreamRecorder>
    <Modules>
      <Module>
        <Name>base</Name>
        <Description>Base</Description>
        <Class>com.wowza.wms.module.ModuleCore</Class>
      </Module>
```

```
      <Module>
        <Name>logging</Name>
        <Description>Client Logging</Description>
        <Class>com.wowza.wms.module.ModuleClientLogging</Class>
      </Module>
      <Module>
        <Name>flvplayback</Name>
        <Description>FLVPlayback</Description>
        <Class>com.wowza.wms.module.ModuleFLVPlayback</Class>
      </Module>
      <Module>
        <Name>ModuleCoreSecurity</Name>
        <Description>Core Security Module for Applications</Description>
        <Class>com.wowza.wms.security.ModuleCoreSecurity</Class>
      </Module>
      <Module>
        <Name>Redirect</Name>
        <Description>Redirect</Description>

  <Class>com.wowza.wms.plugin.loadbalancer.redirect.ClientConnections</Class>
      </Module>
    </Modules>
    <!-- Properties defined here will be added to the
IApplication.getProperties() and IApplicationInstance.getProperties()
collections -->
    <Properties>
      <Property>
        <Name>securityPublishRequirePassword</Name>
        <Value>true</Value>
        <Type>Boolean</Type>
      </Property>
    </Properties>
  </Application>
</Root>
```