



Transcoder

User Guide

Transcoder User Guide



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About Transcoder

The Transcoder feature in Wowza Streaming Engine allows an application to ingest a live stream, decode the video and audio, and then re-encode the stream for playback on a variety of screens and devices. Transcoder can:

- Transcode incoming non-H.264/VP8/VP9/H.265 video and non-AAC/Vorbis/Opus audio formatted streams to outgoing H.263, H.264, VP8, VP9, or H.265 video and AAC, Vorbis, or Opus audio renditions with different bitrates. Multiple bitrate renditions can be created from a single input stream.
- Transrate incoming H.264/AAC streams to outgoing renditions with different bitrates.

Bitrate renditions produced by Transcoder have aligned key frames to enable adaptive bitrate delivery from Wowza Streaming Engine for delivery over the HLS, MPEG-DASH, HDS, Smooth Streaming, and RTMP streaming protocols. Single bitrate streaming is supported for all transport protocols, including RTSP/RTP and MPEG-TS.

Transcoder uses a template system to match the incoming stream to an encoding template that you can customize to control the encoding parameters for the transcoded streams. H.264 streams can be delivered over any protocol supported by Wowza Streaming Engine.

Requirements for Transcoder

Transcoder is a part of Wowza Streaming Engine. It runs on Wowza Streaming Engine on 64-bit versions of Windows and Linux. 32-bit operating systems aren't supported. A 64-bit Java runtime is also required.

Transcoder is not available on macOS.

To run Transcoder on a 64-bit version of Windows Server, the following are required: Windows Server 2008 R2 or later, .NET Framework 3.5.1 or later, and Desktop Experience.

Licensing requirements for Transcoder

Perpetual and Subscription licenses for Wowza Streaming Engine enable unlimited use of the Transcoder technology that's integrated with each licensed Wowza Streaming Engine instance. Transcoder can decode an unlimited number of inbound live streams and encode an unlimited number of outbound live renditions, subject to CPU and hardware limitations.

A Perpetual license is best for stable, long-term demand. A Perpetual license key has either an **EPBP4** or **EPBU4** prefix (depending on date of purchase) and can be used with one Wowza Streaming Engine instance with Transcoder technology. A Subscription license is best for variable demand. You can install as many instances of Wowza Streaming Engine as needed using the same license key and enable Transcoder with each instance. A Subscription license key has an **ENGM4** prefix. For details on plans, see [Wowza Streaming Engine Pricing](#).

The license key you enter when you run install Wowza Streaming Engine appears in the **License Keys** box in Wowza Streaming Engine Manager. If you switch your licensing option for the Wowza Streaming Engine instance, you can replace the existing license key with the new license key without reinstalling the software.

All license key values are stored in the `[install-dir]/conf/Server.license` file in the Wowza Streaming Engine installation.

- **Windows** – %WMSCONFIG_HOME%\conf\Server.license
- **Linux/Unix** – /usr/local/WowzaStreamingEngine/conf/Server.license

To add a license key in Wowza Streaming Engine Manager, do the following:

1. Click the **Server** tab, and then click **Server Setup** in the contents panel.
2. On the **Server Setup** page, click **Edit**.
3. In the **License Keys** box, enter your license key for Wowza Streaming Engine.
4. Click **Save**, and then click **Restart Now** at the top of the **Server Setup** page when prompted. The new license take effect after the server is restarted.

After restarting, Wowza Streaming Engine Manager displays only the first and last five digits of the license key that you entered, for security.

Note

If you purchased a license for Wowza Streaming Engine before January 1, 2015, contact sales@wowza.com to learn more about how to license Transcoder.

Configuration files

Transcoder settings are stored in configuration XML files that are read when Wowza Streaming Engine starts. You can configure the XML files manually, but it's typically easier to do it through Wowza Streaming Engine Manager. For information see Chapter 4, [Setting up Transcoder in Wowza Streaming Engine Manager](#).

Transcoder template files

The following sample template files install with Wowza Streaming Engine:

- **transcode.xml** – Use this template when the source stream isn't H.264/VP8/VP9 video (such as MPEG-2) with non-AAC/MP3/Vorbis/Opus audio and you want Transcoder to generate a full set of renditions with different bitrates for adaptive streaming delivery. When using this template, the source stream isn't included in the set of adaptive bitrate renditions available for playback.
- **transrate.xml** – Use this template when the source stream is H.264 video with either AAC or MP3 audio and you want Transcoder to generate lower bitrate renditions of the source stream for adaptive streaming delivery. When using this template, the

source stream is used as the high bitrate rendition and the lower bitrate renditions are keyframe-aligned to it.

- **audioonly.xml** – Use this template to ingest an H.264 video/Speex audio stream from Adobe Flash Player and convert the Speex audio format to AAC, Vorbis, or Opus. This makes the stream compatible with additional player technologies.
- **transcode-h265-divx.xml** – Use this template when the source stream isn't H.265 video and you want Transcoder to generate H.265 renditions for MPEG-DASH playback in supported players.

Note

The transcode-h264-divx.xml template can't be modified using Wowza Streaming Engine Manager; It must be edited directly in the .xml file. All other transcoder templates can be modified using Wowza Streaming Engine Manager.

Transcoder feature overview

Transcoder offers multiple ways transcode and transrate incoming streams to outgoing renditions with multiple bitrates that can be delivered over any streaming protocol supported by Wowza Streaming Engine.

Video and audio codecs

Transcoder supports the following video and audio codecs:

Video (decoding)	Video (encoding)
H.264	H.263v2
MPEG-2	H.264
MPEG-4 Part 2	VP8
VP8	VP9
VP9	H.265
H.265	
Audio (decoding)	Audio (encoding)
AAC	AAC
G.711 (μ -law and A-law)	Vorbis
MPEG-1 Layer 1/2	Opus
MPEG-1 Layer 3 (MP3)	
Speex	
Vorbis	
Opus	

Notes

- The non-H.264 video and non-AAC/MP3 audio codecs listed are supported for transcoding only. They aren't available for direct playback.
- Transcoder supports the MP3 sample rates 48000, 44100, and 32000.
- H.263 video output isn't supported when using [hardware acceleration](#).
- Using the VP8 and VP9 video and Vorbis and Opus audio codecs requires Wowza Streaming Engine 4.5 or later. For information on how to use these codecs, see [Transcode live streams to WebM for MPEG-DASH playback with Wowza Streaming Engine](#).
- For instructions on streaming using H.265, see [Stream using HEVC/H.265 with the Transcoder in Wowza Streaming Engine](#).
- Instream CEA-608 closed caption data can be passed through Transcoder for delivery in HLS streams. For more information, see [Configure closed captioning for Wowza Streaming Engine live streams](#).

Hardware acceleration

Transcoder can take advantage of hardware acceleration. Hardware acceleration is recommended but not required. If your configuration doesn't include hardware acceleration, Transcoder uses a built-in software encoder. Transcoder can leverage Intel Quick Sync Video and NVIDIA hardware acceleration.

Intel Quick Sync Video is supported for both accelerated video decoding and encoding. For recommended server hardware specifications and more information, see [Server specifications for Intel Quick Sync acceleration with Wowza Streaming Engine transcoding](#).

NVIDIA NVENC is supported for accelerated video encoding only. NVIDIA CUDA/NVCUVID is supported for accelerated video decoding and GPU video scaling only. For NVENC encoding acceleration, Wowza Streaming Engine 4.2 and later supports H.265/HEVC video renditions. CUDA-based accelerated decoding is compatible with most NVIDIA graphics cards that support the legacy CUDA instruction set. Some newer NVIDIA graphics cards have fixed-function hardware that use NVIDIA CUDA Video Decoder (NVCUVID) video decode APIs for accelerated decoding on NVIDIA GPUs with CUDA. Wowza Streaming Engine 4.8.0 and later supports H.265/HEVC accelerated decoding with NVIDIA NVCUVID-based GPUs. Additionally, Wowza Streaming Engine 4.6 and later supports transcoder video scaling with NVIDIA CUDA-based GPUs. For a list of supported NVIDIA graphics cards and links to configuration instructions, see [Server specifications for NVIDIA NVENC and NVIDIA CUDA acceleration with Wowza Streaming Engine transcoding](#).

Note

NVIDIA CUDA encoding acceleration isn't supported in NVIDIA graphics drivers 340 and later, therefore, CUDA-based accelerated video encoding is *not* supported in Wowza Streaming Engine.

Adaptive bitrate delivery

Transcoder makes live adaptive bitrate streaming easy. It can ingest a single high-bitrate live stream and dynamically create multiple lower-bitrate renditions that are keyframe aligned. Transcoder uses a templating system to group the renditions into logical groups called *Stream Name Groups* for adaptive bitrate delivery. Stream Name Groups serve the same purpose as a Synchronized Multimedia Integration Language (SMIL) file, and either method can be used to play of live adaptive bitrate streams.

When customizing your template, you should define and successfully play the individual resultant renditions before defining your group.

For adaptive bitrate streaming, you can create renditions to offer the best possible viewing experience given a user's device and bandwidth. For example, you can encode one stream for mobile devices using Baseline Profile Level 3.0, another stream for newer mobile devices using Main Profile Level 3.1, and a third stream for desktops or set-top boxes. For more information, see [Stream adaptive bitrate content with Wowza Streaming Engine](#).

Playback with Stream Name Groups

When an adaptive bitrate stream is delivered, players choose a stream rendition from a Stream Name Group based on the stream metadata. Stream Name Groups are defined in a transcoder template file. In the playback URL, Stream Name Group streams include the `ngrp:` prefix before the stream name. Stream Name Group playback URLs look like this:

HLS

```
http://[wowza-ip-address]:1935/live/ngrp:myStream_all/playlist.m3u8
```

MPEG-DASH

```
http://[wowza-ip-address]:1935/live/ngrp:myStream_all/manifest.mpd
```

HDS

```
http://[wowza-ip-address]:1935/live/ngrp:myStream_all/manifest.f4m
```

Smooth Streaming

```
http://[wowza-ip-address]:1935/live/ngrp:myStream_all/Manifest
```

Overlays

Transcoder supports the application of static and dynamic graphic image overlays on decoded streams and encoded output renditions.

You can apply static JPEG, PNG, and BMP images to streams to achieve image effects such as a watermark on your video. You can customize the placement, size, alignment, and opacity

of a static overlay by setting properties in transcoder template files for decoded streams and encoded output renditions. For information about how to overlay static images onto your video streams, see [Set up and run Transcoder in Wowza Streaming Engine](#).

You can also overlay dynamic images on video by using the Wowza Streaming Engine Java API. Starting with a static GIF, JPEG, PNG, or BMP image file, you can add text and configure animation sequences to achieve effects such as dynamic insertion of advertising, titling, sporting event scores, and so on. Dynamic overlays can be manually configured or pre-programmed based on external events, making them a powerful tool for adding premium TV-like experiences. For information about how to create dynamic overlays, see [Add graphic overlays to transcoded live streams in Wowza Streaming Engine](#).

Note

The dynamic overlay feature supports manipulation of images and text to generate animation sequences. It doesn't support stream manipulation such as picture-in-picture or multi-stream compositing.

Logging

Transcoder messages are logged in `[install-dir]/logs`. Transcoder logging messages look like this:

```
decoder-audio-start    transcoder INFO    200 myStream    {codec: AAC,
objectType: 2, sampleRate: 44100, channels: 2}
decoder-video-start    transcoder INFO    200 myStream    {codec: H264,
profile: 77, level: 31, frameSize: 1280x720, displaySize: 1280x720,
frameRate: 29.97}
encoder-audio-start    transcoder INFO    200 myStream    {name: "360p",
bitrate: 96000, codec: AAC, objectType: 0, sampleRate: 44100, channels: 2}
encoder-video-start    transcoder INFO    200 myStream    {name: "360p",
bitrate: 850000, codec: H264, profile: 77, level: 30, frameSize: 640x360,
displaySize: 640x360, frameRate: 29.97}
decoder-video-stop     transcoder INFO    200 myStream
decoder-audio-stop     transcoder INFO    200 myStream
encoder-video-stop     transcoder INFO    200 myStream    {name: "360p"}
encoder-audio-stop     transcoder INFO    200 myStream    {name: "360p"}
```

Capturing thumbnails of a video frame

Wowza Streaming Engine includes an HTTP provider that you can use to capture a thumbnail image of a video frame in a transcoded live stream. When Transcoder is running, you can use the HTTP provider to extract a JPEG or PNG image of a video frame from the stream. For more information, see [Generate thumbnail images of live streams using the Wowza Streaming Engine Java API](#).

Extending Transcoder

Wowza Streaming Engine can be extended by writing custom Java classes that load dynamically runtime. The server includes a rich Java API to interact with and control the streaming and transcoding process. For information, see our [Wowza Streaming Engine Java API](#) technical articles. Transcoder functionality is included in the `com.wowza.wms.transcoder.*` packages.



Setting up Transcoder in Wowza Streaming Engine Manager

You can use Wowza Streaming Engine Manager to configure a transcoded live streaming application. First, select or create an application and enable Transcoder. Then, configure transcoder templates and the transcoding session for the application.

Create the application and enable Transcoder

1. In Wowza Streaming Engine Manager, click the **Applications** tab and then click **live** in the contents panel to configure the installed **live** application.
2. On the **Setup** tab, click **Edit**.
3. Select all of the **Playback Types**, and then click **Save**.

- In the contents panel, click **Transcoder**, and then click **Enable Transcoder**.

The screenshot shows the Wowza Streaming Engine Manager interface. The top navigation bar includes 'Home', 'Server', and 'Applications'. The left sidebar shows a tree view with 'Transcoder' selected under the 'live' application. The main content area is titled 'live > Transcoder' and shows the status as 'Not Enabled'. A red box highlights the 'Enable Transcoder' button. Below the button, there are sections for 'Template Directory', 'Transcoder Options' (with a checked option 'Match source stream name to template name'), and 'Fallback Template' (set to 'Transrate (Default)').

- Click **Restart Now** to apply the changes.

Configure templates for transcoding or transrating

Transcoder templates allow you to customize video and audio encoding parameters to target multiple playback devices with the encoded output renditions. The encoded bitrate streams are keyframe-aligned to enable adaptive bitrate delivery from Wowza Streaming Engine for HLS, MPEG-DASH, HDS, Smooth Streaming, and RTMP playback.

Encoding presets define the parameters of the transcoded or transrated output renditions. Each preset represents an encoded bitrate rendition. Based on your needs, you can have a single template with multiple presets or you can have multiple templates. Be sure to consider your configuration and available bandwidth when determining how many presets you use. For more information, see Chapter 5, [Optimizing Transcoder performance](#).

Start with the sample templates using the default encoding implementation before using accelerated hardware or customizing your template. The template configuration is described in detail in the technical article [Set up and run Transcoder in Wowza Streaming Engine](#).

You can configure transcoder templates in Wowza Streaming Engine Manager by setting the active transcoder stream names and bitrates. The following task shows how to activate streams in transcode, transrate, or audio-only templates.

Note

Make a backup of the file `[install-dir]/transcoder/templates/transrate.xml` before modifying it in this task.

1. Under **Transcoder Templates**, select the **Transrate (Default)** template.

live > Transcoder

Live Single Server or Origin

Transcoder is enabled. Depending on your subscription license terms, your account might incur additional charges while the application is active. To stop charges for this application instance, disable Transcoder. To stop all Transcoder-related charges, disable Transcoder in all applications.

Configure transcoding of live streams.

Status: ✔ Enabled

[Edit](#) [Disable Transcoder](#)

Template Directory

S{com.wowza.wms.context.VHostConfigHome}/transcoder/templates

Transcoder Options

✔ Match incoming stream name to template name

Fallback Template

Transrate (Default)

Transcoder Templates

[Copy Template](#) [Add Template](#)

Name
Audio Only (Default)
Transcode (Default)
Transcode H265 DivX (Default)
Transrate (Default)

- In the **Presets** list, click the **Edit** icon for the **240p** preset.

live > Transcoder > Transrate (Default)

Live Single Server or Origin

[Return to Transcoder Templates](#)

Encoding Presets Decoding Preset Stream Name Groups

An encoding preset represents one resultant encoded bitrate in the output streams from the Transcoder. An adaptive bitrate stream has multiple presets.

[+ Add Preset](#)

Presets

Enabled	Preset	Stream Name	Actions
<input checked="" type="checkbox"/>	source	mp4:\${SourceStreamName}_source	
<input type="checkbox"/>	720p	mp4:\${SourceStreamName}_720p	
<input checked="" type="checkbox"/>	360p	mp4:\${SourceStreamName}_360p	
<input type="checkbox"/>	240p	mp4:\${SourceStreamName}_240p	Edit this preset
<input checked="" type="checkbox"/>	160p	mp4:\${SourceStreamName}_160p	
<input type="checkbox"/>	h263	mp4:\${SourceStreamName}_h263	

Now, specify and enable a preset that creates a 240000 bit-per-second (bps) encoded output rendition. (For details about the encoding preset options, see [Template details](#) in the technical article "Set up and run Transcoder in Wowza Streaming Engine.")

- Under **Video Settings**, for **Video Bitrate**, enter **240000**.
- Click **Save**.
- In the **Presets** list, select **240p** and then click **Enable Preset**.

live > Transcoder > Transrate (Default) > 240p

Live Single Server or Origin

[Return to Transcoder Template](#)

Status: Not Enabled

Encoding Preset

[Edit](#) [Enable Preset](#)

Outgoing Stream Name
mp4:\${SourceStreamName}_240p

Description
-Not Set-

Configure transcoding session for the application

All transcoding sessions can use the same transcoder template. This is the default configuration. To configure all transcoding sessions for an application to use the same transcoder template, do the following:

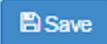
1. In the contents panel for the **live** application, click **Transcoder**, and then click **Edit**.
2. Under **Transcoder Options**, clear the **Match incoming stream name to template name** check box, and then click **Save**.

live > Transcoder

Live Single Server or Origin

Transcoder is enabled. Depending on your subscription license terms, your account might incur additional charges while the application is active. To stop charges for this application instance, disable Transcoder. To stop all Transcoder-related charges, disable Transcoder in all applications.

* = Required field

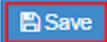
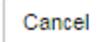
 

Template Directory

Transcoder Options

Match incoming stream name to template name

Fallback Template

If the check box is cleared, all incoming streams will use the same template.

The active transcoder template can also be based on the stream name. To configure all transcoding sessions for a particular stream to use the same transcoder template:

1. Under **Transcoder Options**, select the **Match incoming stream name to template name** check box, click **Save**, and then restart the application.

live > Transcoder

Live Single Server or Origin

Transcoder is enabled. Depending on your subscription license terms, your account might incur additional charges while the application is active. To stop charges for this application instance, disable Transcoder. To stop all Transcoder-related charges, disable Transcoder in all applications.

* = Required field

Template Directory

S{com.wowza.wms.context.VHostConfigHome}/transcoder/templates

Transcoder Options

Match incoming stream name to template name

Fallback Template

Transrate (Default) ▼

- Under **Transcoder Templates**, click **Copy Template**.

live > Transcoder

Live Single Server or Origin

Transcoder is enabled. Depending on your subscription license terms, your account might incur additional charges while the application is active. To stop charges for this application instance, disable Transcoder. To stop all Transcoder-related charges, disable Transcoder in all applications.

Configure transcoding of live streams.

Status: ✔ Enabled

Template Directory

S{com.wowza.wms.context.VHostConfigHome}/transcoder/templates

Transcoder Options

✔ Match incoming stream name to template name

Fallback Template

Transrate (Default)

Transcoder Templates

Name	Actions
Audio Only (Default)	
Transcode (Default)	
Transcode H265 DivX (Default)	
Transrate (Default)	

- In the **Copy Transcoder Template** dialog box, select **Transcode (Default)**. Name the template (for example, **myStream**.) and then click **OK**.

Copy Transcoder Template X

This will copy all settings from the selected transcoder template to a new template.

Enter a name for the copied transcoder template:

If this template will be used to transcode a specific stream, enter the stream name.

4. Edit the encoding preset options or add new presets for the copied template.

Transcoder Template copied.

live > Transcoder > myStream

Live Single Server or Origin
[← Return to Transcoder Templates](#)

Encoding Presets Decoding Preset Stream Name Groups

An encoding preset represents one resultant encoded bitrate in the output streams from the Transcoder. An adaptive bitrate stream has multiple presets.

[+ Add Preset](#)

Presets

Enabled	Preset	Stream Name	Actions
<input type="checkbox"/>	720p	mp4:\${SourceStreamName}_720p	  
<input checked="" type="checkbox"/>	360p	mp4:\${SourceStreamName}_360p	  
<input type="checkbox"/>	240p	mp4:\${SourceStreamName}_240p	  
<input checked="" type="checkbox"/>	160p	mp4:\${SourceStreamName}_160p	  
<input type="checkbox"/>	h263	mp4:\${SourceStreamName}_h263	  

This will become the transcoding template for the stream named **myStream**. Other incoming streams to this application can have a template with a corresponding name for transcoding or transrating; otherwise, they will use the **Fallback** template.

For information about playback using transcoded or transrated streams, see the technical articles [Stream adaptive bitrate content with Wowza Streaming Engine](#) or [Create and play SMIL files with transcoded streams in Wowza Streaming Engine](#).

Using passthrough

If your source stream is encoded with H.264 video and AAC audio and you don't want to make any changes to the stream, you don't need to decode and re-encode the source file for playback. Instead, set the **Video Codec** and/or **Audio Codec** setting to **Passthrough**. The video or audio stream is passed through to the output renditions without making any changes. You can pass through the video, the audio, or both.

If the source stream is encoded with H.264 video and you want to create a different bitrate, profile, resolution, or make any other change, then set the **Video Codec** setting to **H.264**, not **Passthrough**.

The default **Transrate** template has several sample encoding presets in which the **Audio Codec** setting is set to **Passthrough** because the source audio is already AAC, a supported

playback audio codec for Wowza Streaming Engine. The **Video Codec** setting is set to **H.264** because other properties are set to customize the resultant stream.

H.263 encoding

Transcoder supports H.263 encoding so that you can produce live streams for older devices. To transcode source streams to a rendition that uses the H.263v2 video codec, set the **Video Codec** setting for the rendition to **H.263**.

Note

Hardware acceleration doesn't support H.263 output. If you set the **Encode Implementation** setting for a preset to one of the accelerated encoding options (**QuickSync** or **NVENC**), the setting is ignored and the default MainConcept encoder is used to generate the H263-encoded video.

Required settings

You must configure the **Video Codec** and the **Audio Bitrate** settings when transcoding. If you forget to assign a value for **Audio Bitrate**, a default value is assigned so that the encoding of the resultant stream won't fail.

Selecting profiles

For adaptive bitrate delivery, create stream renditions that offer the best possible playback experience for a viewer's device and bandwidth. For example, you can encode one stream for older mobile devices, a second stream for newer mobile devices, and a third stream for desktop or set-top boxes. Under **Video Settings**, set the **Profile** option to **Baseline** to create output renditions for older mobile devices. Set the **Profile** option to **Main** for streaming to:

- Newer iOS devices (iPhone 4 and iPad 2 or later)
- Desktop players
- Set-top boxes

Note

Transcoder supports bi-directional frame (B-frame) encoding when **Encode Implementation** is set to **Default** and **Profile** is set to **Main**. B-frame encoding isn't supported when using hardware acceleration. For more information, see [Configure B-frame support for the Transcoder in Wowza Streaming Engine](#).



Optimizing Transcoder performance

It's important that Wowza Streaming Engine and the hardware it runs on are tuned properly so that the server software can take best advantage of available hardware resources. The default tuning of the server is sufficient for application development, but it's not ideal for production use. Without proper tuning, the server under medium or heavy load may run out of resources and stop working properly. This chapter describes performance tuning considerations for Transcoder.

Template settings for bitrate and resolution

Determining the ideal settings for your configuration is a balancing act based on multiple factors. Increasing the target bitrate will increase the quality. When you make this kind of change, keep in mind that clients must have enough bandwidth available to play the higher bitrate stream. In addition to client bandwidth and how the resultant stream is played—the playback device, content type, and purpose should be considered. For example, security camera settings for streaming a video of a busy street where audio isn't important would be different from settings for streaming an interview where there's little movement but audio quality is critical. Experimentation is usually required to determine the right balance of settings.

Your checklist should include the following items:

- Make sure that your deployed server that's running Wowza Streaming Engine is tuned properly. For more information, see [Tune Wowza Streaming Engine for optimal performance](#).
- Turn off TCP auto-tuning on Windows 7, Server 2003, and Server 2008. For more information, see [How to disable Windows Vista TCP/IP auto-tuning](#).
- Determine available server-to-client bandwidth by using our bandwidth checker tool. See [Test server-to-client bandwidth for RTMP clients](#).

Number of transcoder templates

Whether you have multiple encoding presets in one template or multiple templates, performance isn't affected given the same number of incoming live streams and the same number of encoded output renditions.

Hardware

Hardware acceleration is recommended but not required for transcoding. When Wowza Streaming Engine starts, it checks to see if hardware acceleration resources are available and records the results in Wowza Streaming Engine logs. You can check the log files and then modify transcoder template files to either use a supported hardware acceleration technology or use the default MainConcept encoder if your configuration doesn't include hardware acceleration. For more information, see [Verify how Transcoder is running in Wowza Streaming Engine](#).

Performance benchmarks

As a guideline for estimating transcoding performance for your Transcoder configuration, see the technical article [Wowza Streaming Engine Transcoder performance benchmark](#). This article presents performance benchmark numbers captured for software (default) encoding, Intel Quick Sync accelerated encoding, and NVIDIA NVENC accelerated encoding. Wowza provides these benchmark numbers only as general guidance. Results may vary depending on network traffic, source file composition, configuration, overall operating system overhead, and other factors.

For more information about how to configure and tune Wowza Streaming Engine in general, see the [Wowza Streaming Engine User Guide](#) and [Wowza Streaming Engine Configuration Reference](#).