



Wowza nDVR AddOn

User's Guide

Wowza nDVR AddOn: User's Guide



Version: 4.1

<http://www.wowza.com>

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Document History

Version	Description	Date
Doc v4.0	Document for Wowza Streaming Engine 4.0	02-11-2014
Doc v4.1	Document for Wowza Streaming Engine 4.1	09-16-2014

Table of Contents

Introduction	5
Installation	6
Wowza Streaming Engine editions	6
Entering a new or additional license key.....	6
Features	8
Video and audio codecs	8
Protocols and players	9
Recorded file location	9
.m4fa and .m4fv files.....	11
Manifest files.....	12
Recording playback	12
Adaptive bitrate delivery	12
Integrating Wowza nDVR and Wowza Transcoder.....	13
Extending Wowza nDVR	13
Configuration in Wowza Streaming Engine Manager.....	15
Advanced configuration in Wowza Streaming Engine Manager	19
Publishing the stream in Wowza Streaming Engine Manager	22
Configure Wowza nDVR.....	25
Configure live stream repeater (origin/edge)	26
Align audio and video	27
Optimize for performance	27

Introduction

What is Wowza nDVRAddOn?

Wowza nDVR AddOn provides the ability to record a live stream with Wowza Streaming Engine™ software while simultaneously allowing users to play or pause a live stream, rewind to a previously recorded point, or resume viewing at the current live point. Custom configuration allows you to control the archive strategy and availability of your recorded streams.

Setup for client playback of recorded streams is similar to playback of live streams from Wowza Streaming Engine.

For the most up-to-date information, tutorials, and tips, see the **Articles** tab of the [Articles and Forums](#) webpage.

This document is meant to help you specifically with Wowza nDVR AddOn. The [Wowza Streaming Engine User's Guide](#) contains comprehensive information about Wowza Streaming Engine software.

For more information that may be useful for setting up the nDVR application, see:

- [Wowza nDVR Quick Start Guide](#)
- [nDVR AddOn section of articles](#)
- [How to do advanced configuration for Wowza nDVR AddOn](#)
- [How to plan your Wowza nDVR workflow](#)

Installation

What do I need to install and run Wowza nDVRAddOn?

Wowza nDVR AddOn is part of the Wowza Streaming Engine™ software installer and is supported on the same operating systems that are supported by Wowza Streaming Engine. See the [Wowza Streaming Engine User's Guide](#) for more installation information.

Wowza Streaming Engine editions

Wowza Streaming Engine software is available in Subscription or Perpetual editions to accommodate nearly any use case or business need.

Entering a new or additional license key

License keys for all Wowza® Media Systems products, including Wowza Streaming Engine and AddOns, are stored in **[install-dir]/conf/Server.license**.

%WMSCONFIG_HOME%\conf\Server.license	- Windows
/Library/WowzaStreamingEngine/conf/Server.license	- Mac OS X
/usr/local/WowzaStreamingEngine/conf/Server.license	- Linux/Unix

Subscription users can run an unlimited number of server instances and AddOns under a single license key. Perpetual Edition users must enter a separate license key for each server instance and for each AddOn.

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 pane.
2. In the **Server Setup** page, click **Edit**.
3. Enter each new license key on a new line in the **License Keys** box, and then click **Save**.
4. Click **Restart Now** at the top of the **Server Setup** page.

When the standalone server is restarted, the new license(s) will be in effect. The licenses are additive, so when adding additional licenses, be sure to retain the original license information in the **License Keys** box and add each new license key on its own new line. The order in which the keys are listed isn't important. The first and last five digits of the license key are displayed in the **License Keys** box.

License Keys

```
ENGP4-XXXXX-XXXXX-XXXXX-XXXXX-h5t3C  
TRN14-XXXXX-XXXXX-XXXXX-XXXXX-N6fwa  
DVRA4-XXXXX-XXXXX-XXXXX-XXXXX-ahFdF
```


Features

What can I do with the Wowza nDVRAddOn?

Wowza nDVR AddOn provides multiple features to extend your streaming workflow. A live stream that's already configured for your streaming workflow can be modified easily and customized to suit your archiving needs.

Video and audio codecs

Wowza nDVR AddOn supports the following video and audio codecs:

Video

- H.264
- Video-only streams

Audio

- AAC
- MP3
- Audio-only streams

Wowza nDVR is flexible and can be configured to support multiple workflows. Input can be H.264 video with either AAC or MP3 audio. In another instance, you may want to set up a different configuration and feed in and record audio-only or video-only streams.

It's a common mistake to try to record a live source stream that has an unsupported codec. However, if your source has an unsupported Wowza nDVR codec, but is a supported Wowza Transcoder ingest codec, you can transcode your source stream before recording. This setup can be accomplished with one application and doesn't require a two-step process. For more

information, see the [Integrating Wowza nDVR and Wowza Transcoder](#) section of this document.

Protocols and players

Wowza nDVR supports HTTP playback of recorded streams using the following streaming protocols:

- Adobe HTTP Dynamic Streaming (Adobe HDS/San Jose)
- Apple HTTP Live Streaming (Apple HLS/Cupertino)
- Microsoft Smooth Streaming (Smooth)

This means newly encoded streams can be played back on many popular media players such as Adobe Flash Player, Microsoft Silverlight player, Apple iPhone, iPad and iPod touch and Apple QuickTime player (version 10 or greater), Android smartphones and tablets, and IPTV/OTT set-top boxes, and other players and devices.

Wowza nDVR doesn't support HTTP playback of recorded streams using the MPEG-DASH streaming protocol.

Recorded file location

You can set the location of recorded file and other options in the Manager UI, as shown in the following figure. For more information, see [Configuration in Wowza Streaming Engine Manager](#) in this document.

dvr > nDVR

Live Single Server or Origin

The Wowza nDVR AddOn is enabled, and your account is being charged per your subscription license terms. To stop charges, disable the Wowza nDVR AddOn in all applications.

Setup

Properties

* = Required field

Save

Cancel

DVR Store Directory

{com.wowza.wms.context.VHostConfigHome}/dvr

Streaming Options

☐ DVR streaming only

☒ Live and DVR streaming

Recording Options

☒ Start recording on startup

Archive Method

version

DVR Window Duration

☐ All material available

☒ Use window duration:

2

:

30

:

00

HoursMinutesSeconds

Save

Cancel

As soon as Wowza nDVR AddOn begins recording, a storage directory is created. Inside the storage directory are time-based directories, each containing .m4fa and .m4fv files and a **manifest.txt** file. By default, the location where Wowza nDVR writes to is:

```
[install-dir]/dvr/[app-name]/ definst /[streamName].[n]
```

For example, if the application name is **live** and the stream name is **myStream**, with the default settings, the new directory will be located at:

```
[install-dir]/dvr/live/ definst /myStream.0
```

Directory Structure

The directory naming convention is *HHHH_MM_SS*, where *H* = hours, *M* = minutes, *S* = seconds.

By default, Wowza nDVR creates a new directory every 600 seconds (10 minutes) and the archive strategy will append new audio and video to the archive when the source encoder is

restarted. This value is defined in the **dvrChunkGroupingSeconds** property in the **Application.xml** file.

Each directory contains .m4fa and .m4fv files, which are the resultant chunks. If the incoming stream sends metadata, metadata .m4fm files are created.

The following is an example directory structure for a recorded stream of length 1 hour and 10 minutes:

```
0000_00_00
0000_10_00
0000_20_00
0000_30_00
0000_40_00
0000_50_00
0001_00_00
0001_10_00
manifest.txt
```

Using the folder named **0000_00_00** as an example, the initial contents would be:

```
A-0000_00_00_000.m4fa
dvrManifest_0000_00_00.txt
M-0000_00_00_000.m4fm
V-0000_00_00_000.m4fv
```

The file naming convention is the same as the directory naming with an additional millisecond value represented by mmm: **HH_MM_SS_mmm**.

.m4fa and .m4fv files

Wowza nDVR creates .m4fa and .m4fv files, which are based on the MPEG-4 multimedia container format. An .m4fa file contains audio information and an .m4fv file contains video information. Together, these files represent a chunk of recorded audio and video content that's then used for playback of your recorded stream.

You can't playback these files directly. However, they are required and referenced when you playback your live recorded stream by using Wowza nDVR AddOn. You shouldn't delete or move these files; if you do, playback errors will occur. If your configuration changes and you must move existing recorded files, make sure that the corresponding **DVR/StorageDir** property is updated in your configuration.

Currently, concatenating these recorded files into a single video on demand (VOD) file for later use isn't supported.

Manifest files

Manifest files are for information only and shouldn't be edited, moved, or deleted.

Verification that Wowza nDVR-related files are created is a troubleshooting step.

manifest.txt

This manifest file contains information about the recorded stream. It's at the same level as the directories. By default, this location is:

```
[install-dir]/dvr/[app-name]/_definst_[streamName].[n]
```

dvrManifest_[HHHH]_[MM]_[SS].txt

This manifest file is part of every directory that contains .m4fa and .m4fv files and contains information about each recorded chunk. The file name corresponds to the directory's hours, minutes, and seconds description.

Recording playback

Example players are provided for playback of recorded files in Wowza Streaming Engine Manager and the **[install-dir]/examples/LiveDVRStreaming** folder. If the application name is **live** and the stream name is **myStream**:

To play using Apple HTTP Live Streaming (HLS):

```
http://[wowza-ip-address]:1935/live/myStream/playlist.m3u8?DVR
```

To play using Adobe HTTP Dynamic Streaming (HDS):

```
http://[wowza-ip-address]:1935/live/myStream/manifest.f4m?DVR
```

To play using Microsoft Smooth Streaming:

```
http://[wowza-ip-address]:1935/live/myStream/manifest?DVR
```

Adaptive bitrate delivery

Synchronized Multimedia Integration Language (SMIL)

When Wowza nDVR AddOn is added to your live workflow, you can leverage the same SMIL files you may have created for live streaming. The SMIL workflow requires you to have an

encoder that can generate properly key-frame aligned, multiple bitrate streams from the same source.

Playback with SMIL files

The **smil:** prefix is used when playing back a group using SMIL files.

To play using an Apple iOS device (Apple HLS):

```
http://[wowza-ip-address]:1935/live/smil:myStream.smil/playlist.m3u8?DVR
```

To play using Adobe Flash Player (Adobe HDS):

```
http://[wowza-ip-address]:1935/live/smil:myStream.smil/manifest.f4m?DVR
```

To play using Microsoft Silverlight (Microsoft Smooth Streaming):

```
http://[wowza-ip-address]:1935/live/smil:myStream.smil/manifest?DVR
```

For more information about how to create SMIL files, see [Adaptive Bitrate Streaming](#).

Integrating Wowza nDVR and Wowza Transcoder

Wowza nDVR AddOn and Wowza Transcoder AddOn can be coupled together to transrate/transcode and record a live stream at the same time. This can be set up with one application and one configuration. Extra post-processing isn't required. For more information about Wowza Transcoder, see the [Wowza Transcoder AddOn User's Guide](#).

A separate directory structure is created for each resultant stream from Wowza Transcoder that's recorded by using Wowza nDVR. If you're using the sample Wowza Transcoder template named **transrate.xml** with a live stream named **myStream**, then you'll see the following directories created in **[install-dir]/dvr/[app-name]/_definst_[streamName][.n]**:

```
myStream.0
myStream_160p.0
myStream_360p.0
```

Extending Wowza nDVR

Java technology is used to build Wowza Streaming Engine. Because of this, the server and AddOns can be extended by writing custom Java classes that are dynamically loaded at

runtime. The server and AddOns include a rich API to interact with and control the streaming and recording process. For the most up-to-date information, tutorials, and tips, see the **Articles** tab of the [Articles and Forums](#) webpage.

Configuration in Wowza Streaming Engine Manager

How do I set up my Wowza Streaming Engine for Wowza nDVR AddOn?

Configuring Wowza Streaming Engine software for use with Wowza nDVR is easy. All that's required is to configure an application in Wowza Streaming Engine Manager.

This chapter assumes that you're familiar with Streaming Engine software. For more information about how to configure Wowza Streaming Engine, see the [Wowza Streaming Engine User's Guide](#).

This section provides the basic steps for using Streaming Engine Manager to set up an application for live streaming and configuring a DVR application.

1. [Start Wowza Streaming Engine Manager](#).
2. Create a new live application named **dvr**.
3. In the contents pane under **Live Applications**, expand the new application named **dvr**, and then select **nDVR AddOn**.

4. Click **Enable nDVR AddOn**.

Wowza Streaming Engine
MANAGER

Home Server Applications Help

Add Application

SELECTED APPLICATION
dvr ▼

- Monitoring
- Incoming Publishers
- Incoming Streams
- Incoming Security
- Outgoing Security
- Stream Files
- SMIL Files
- nDVR AddOn**
- Transcoder AddOn
- DRM AddOn

LIVE APPLICATIONS

- dvr
- live

VOD APPLICATIONS

- vod

dvr > nDVR

Live Single Server or Origin

The Wowza nDVR AddOn is available with your subscription license. Your account will be charged when you enable the AddOn below and the application is active.

Setup Properties

Configure DVR playback of live streams.

Status: ✖ Not Enabled

[Edit](#) [Enable nDVR AddOn](#)

DVR Store Directory
\${com.wowza.wms.context.VHostConfigHome}/dvr

Streaming Options
Live and DVR streaming

Recording Options
✔ Start recording on startup

Archive Method
append

DVR Window Duration
All material available

5. Restart the application.

Wowza nDVR AddOn has been enabled for this application. You must restart the application for changes to take effect.

[Restart Now](#)

- The **Status** field will show **Status: Enabled**. Click **Edit** to continue setup.

Application has been restarted

dvr > nDVR

Live Single Server or Origin

The Wowza nDVR AddOn is available with your subscription license. Your account will be charged when you enable the AddOn below and the application is active.

Setup Properties

Configure DVR playback of live streams.

Status: ✔ Enabled

✎ Edit
Disable nDVR AddOn

DVR Store Directory
 \${com.wowza.wms.context.VHostConfigHome}/dvr

Streaming Options
 Live and DVR streaming

Recording Options
✔ Start recording on startup

Archive Method
 append

DVR Window Duration
 All material available

- Accept the default options. For more information about these options and other advanced options, see [Advanced configuration in Wowza Streaming Engine Manager](#) in this document.

dvr > nDVR

Live Single Server or Origin

The Wowza nDVR AddOn is available with your subscription license. Your account will be charged when you enable the AddOn below and the application is active.

Setup Properties

* = Required field

Save Cancel

DVR Store Directory

Streaming Options

☒ Live and DVR streaming

☐ DVR streaming only

Recording Options

☒ Start recording on startup

Archive Method

DVR Window Duration

☒ All material available

☐ Use window duration:

:

:

Hours Minutes Seconds

Save Cancel

- Click **Save**, and then restart the application.

Saved! You must restart the application for changes to take effect. Restart Now

Advanced configuration in Wowza Streaming Engine Manager

This section introduces a few of the important properties that will help you customize your configuration and control the archive strategy and the availability of your recorded streams. Additional configuration properties are available and are described in the article [How to do advanced configuration for Wowza nDVR AddOn](#).

You can configure the DVR parameters shown in the following figure to affect the behavior of Wowza nDVR.

dvr > nDVR
 Live Single Server or Origin

The Wowza nDVR AddOn is available with your subscription license.
 Your account will be charged when you enable the AddOn below
 and the application is active.

Setup Properties

* = Required field

Save Cancel

DVR Store Directory

`${com.wowza.wms.context.VHostConfigHome}/dvr`

Streaming Options

☒ Live and DVR streaming
☐ DVR streaming only

Recording Options

☒ Start recording on startup

Archive Method

version ▼

DVR Window Duration

☐ All material available
☒ Use window duration:

2 ▼ 30 ▼ 00 ▼
 Hours Minutes Seconds

Save Cancel

- **DVR Store directory** – Specifies the top-level folder where DVR streams are stored. This can contain an environment variable (for example, `${com.wowza.wms.context.VHostConfigHome}`) or an explicit path (for example, `C:/myDvr`).

The following environment variables are supported:

<code>\${com.wowza.wms.AppHome}</code>	Application home directory
<code>\${com.wowza.wms.ConfigHome}</code>	Configuration home directory
<code>\${com.wowza.wms.context.VHost}</code>	Virtual host name
<code>\${com.wowza.wms.context.VHostConfigHome}</code>	Virtual host config directory
<code>\${com.wowza.wms.context.Application}</code>	Application name
<code>\${com.wowza.wms.context.ApplicationInstance}</code>	Application instance name

- **Streaming Options** – Specifies how an incoming live stream can be played by indicating whether the `?DVR` query parameter must be appended to playback URLs.

To specify that a live stream can be played only by using the DVR playback controls in a player, select **DVR streaming only**. This option means that the `?DVR` query parameter must be appended to playback URLs.

To specify that a live stream can be played with or without DVR playback controls, select **Live and DVR streaming**. This option means that the live stream is available for playback with or without the `?DVR` query parameter appended to playback URLs. If `?DVR` isn't appended to the playback URL, the live stream can still be played but DVR playback isn't supported.

- **Recording Options** – Select **Start recording on startup** to automatically begin recording a live stream that's published to the application for DVR when the application starts.
- **Archive Method** – By setting these options you can specify that the DVR recording appends new content to a single file in storage.

The **Append** option is the default and is the best option to use to handle disruptions in the live stream such as if the encoder restarts.

The **Delete** option starts a new recording and deletes the previous file.

The **Version** option starts a new recording in a new folder for each new stream.

- **DVR Window Duration** – These settings specify the amount of recorded material in the DVR store that's available for DVR playback.

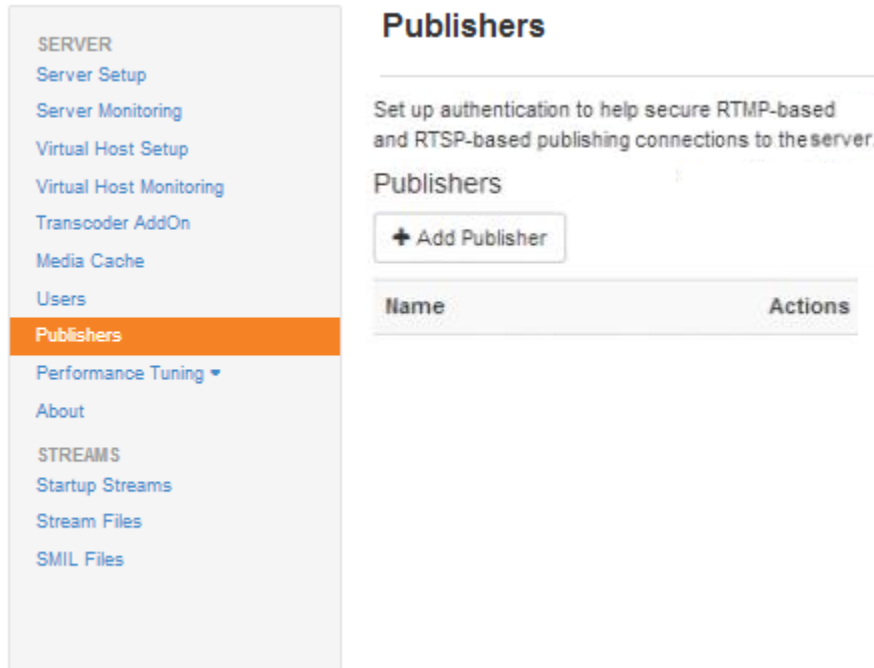
To make the entire recording available for playback, select **All material available**. This option enables viewers who join the live stream in-progress to rewind and watch the stream from the beginning. This option also preserves the live stream recording after the stream ends.

To make only part of the live stream available for playback, select **Use window duration** and then specify the duration in **Hours:Minutes:Seconds**. The minimum supported duration value is 60 seconds. This option enables viewers who join the live stream in progress to rewind the stream for the duration that you specify and watch from that point forward. The duration window is a "floating window" that always ends at the current live point. Recorded data that falls outside this window is purged from the DVR store.

You can record up to 30 hours of material for DVR playback; however, you may encounter performance and playback issues if you make longer durations of material available for playback. For best practices guidance, see [Recording Length](#).

Publishing the stream in Wowza Streaming Engine Manager

1. Under **Server** in the contents pane, click **Publishers**. Click **Add Publisher**.



2. When the **Publishers > [new]** dialog box opens, enter the publisher name and password to enable authentication from the encoder that will publish a live stream to the **dvr** application created in earlier steps.

Publishers > [new]

[← Return to Publishers](#)

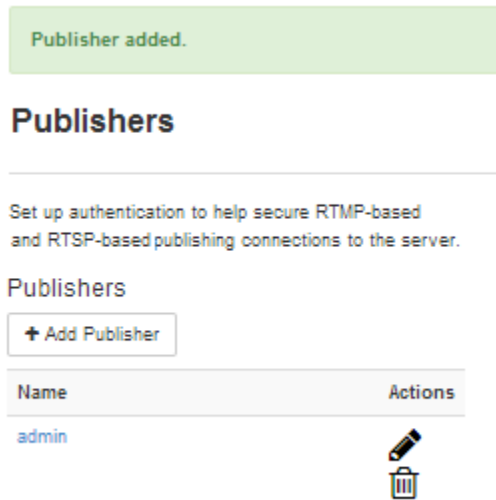
* = Required field

Publisher Name *

Password *

Confirm Password *

3. Click **Add**.
4. The new publisher's credentials are now available to be used or edited.



5. Publish the live stream, for example, from an encoder to the **dvr** application on the server.

If you selected **Start recording on startup** as described above, the **dvr** application will automatically record the stream when the encoder begins sending it, and users can seek to earlier segments of the live stream. If not, to get DVR functionality, complete the following steps.

1. Go back to the **Applications** tab, then, under the **dvr** application, click **Incoming Streams**.

dvr > Incoming Streams
Live Single Server or Origin

Active Streams Streams available for recording via this application.

[Refresh](#) [View by Stream](#) [View by Group](#)

Default Instance (_definst_)

Stream	Status	Actions
→ myStream rtmp://127.0.0.1:64967	Active	

2. Click the red button under **Actions** to begin recording **dvr/myStream**.

dvr > Streams
Live Single Server or Origin

Active Streams Streams available for recording via this application.

[Refresh](#) [View by Stream](#) [View by Group](#)

Default Instance (_definst_)

Stream	Status	Actions
→ myStream rtmp://127.0.0.1:64967	Active	

- When the **Recording** options dialog box appears, name the storage file, set the location for storage, set output file format, and then select **Record data** or **Start-on key frame**.

Recording myStream X

Recording Segmentation

File Name
myStream.mp4

Path
ram Files (x86)/Wowza Media Systems/Wowza Streaming Engine 4.0.0/content

Recorded files are stored in the Wowza Streaming Engine content directory by default. Path values that you enter must specify the location of existing directories.

Output File Format
☒ MP4
☐ FLV

Recording Options
☐ Record data
☒ Start on key frame

Cancel Record

- Click **Record**.

Configure Wowza nDVR

Custom recordings

How to customize your recording, how to enable Wowza nDVR, and the required Wowza nDVR configuration are described in [How to set-up and run Wowza nDVR for live streaming](#). Properties for advanced configuration are described in [How to do advanced configuration for Wowza nDVR AddOn](#).

We recommend that you start with the default **append** [archive strategy](#) and test with your live stream before making more advanced customizations.

Flexible recording output

By default, Wowza nDVR AddOn records the source stream as ingested, provided that it's a supported codec format. The audio and video streams are passed through to the resultant recorded stream. Wowza nDVR accommodates different workflows and gives you the flexibility to record the video-only or the audio-only portion of your source stream.

Archive strategy

There are three archive strategies available: **append**, **delete**, and **version**. The strategy is controlled by the **ArchiveStrategy** property in **Application.xml**.

append

Each time a new stream with the same name is recorded, Wowza nDVR will append to the existing recording. This is the default setting.

delete

If a stream is disconnected and then restarted, the previous recording is deleted and replaced with a new recording.

version

If the stream is disconnected and then restarted, a new directory is created. If the stream name is **myStream**, the first recording is written to **[install-dir]/dvr/[application-name]/myStream.0**, the second recording is written to a directory named **myStream.1**, and this pattern continues. Whenever there's a recording of the same stream name, the previous recording is preserved and is not deleted or overwritten.

Configure live stream repeater (origin/edge)

Wowza nDVR AddOn supports origin/edge configuration. It's easy to add Wowza nDVR to a new or existing origin/edge configuration. For more information, see [How to set up live stream repeater for use with Wowza nDVR AddOn \(origin/edge\)](#).

Align audio and video

Wowza nDVR AddOn expects incoming audio and video to be in alignment. It relies on this timecode information to create chunks where the video key frames occur. If audio and video become out of alignment, Wowza nDVR tries to compensate for this problem, but it can't always resolve it.

Out-of-alignment issues start before Wowza nDVR starts recording. These kinds of alignment issues begin in the encoding process or originate as an issue with the live source. Typically, you can modify the encoder settings to address the issue. It's recommended to fix audio and video alignment issues upstream from Wowza Streaming Engine.

If out-of-alignment issues are pronounced, Wowza nDVR discards chunks and unexpected behavior can occur in time-based customized configurations. Logging messages from Wowza nDVR will alert you to out-of-alignment issues while recording. If the alignment problem can't be fixed at the source or encoder, you can use the **dvrPacketSortTime** property to add a packet sorter before the audio and video packets get to Wowza nDVR. Note that this property adds additional latency equal to its value. For more information about this and other properties, see [How to do advanced configuration for Wowza nDVR AddOn](#).

Optimize for performance

Wowza nDVR AddOn performance is dependent on disk I/O; therefore, a fast disk is critical for best performance.