

# DRM Integration Framework User Guide



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## Revision History

Revision	Date	Change Description
1.0	10/15/2015	Initial release
1.1	10/29/2015	Added a step to section 3.2 for correcting the system time on the board
1.2	12/4/2015	Added single process mode

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# 1 Introduction

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DRM Integration Framework (DIF) provides APIs that simplifies playback application development with DRM with SAGE/SVP support. Currently it supports Playready and Widevine.

We provide a sample application playback\_dif which is a simple example to utilize the DIF APIs.

This document outlines how to build and run playback\_dif example.

## 2 Building playback\_dif example

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### 2.1 Environment variable settings

1) Define URSR\_TOP to point at the root folder of your URSR sources. This is optional and absolute path can be used to replace \$(URSR\_TOP). It is used in this document for convenience. For example:

```
export URSR_TOP=/projects/stbdev/$USER/repos/URSR_baseline
```

2) Set these platform specific environment variables:

```
export NEXUS_PLATFORM=<Platform_ID>
```

```
export BCHP_VER=<Revision>
```

Below is needed only if your board has a subtype like SV, VMS\_SFF, C, DBS....etc.)

```
export NEXUS_USE_<ChipID>_<BoardSubType>=y
```

3) The following variables need to be set:

```
export NEXUS_MODE=proxy
```

```
export LINUX=<Kernel_path>
```

```
export PATH=<Toolchain_path>:$PATH
```

```
export MS DRM_PRDY_SUPPORT=y
```

```
export MS DRM_PRDY_SDK_VERSION=2.5
```

Below is required if the chip is ARM processor.

```
export B_REFSW_ARCH=arm-linux
```

DIF will be built with SAGE/SVP support using the below setting. If you want to build without SAGE/SVP support, please set it “n”:

```
export SAGE_SUPPORT=y
```

Currently multi-process mode is the default build. If you want to build single process mode, please set NXCLIENT\_SUPPORT to “n”:

```
export NXCLIENT_SUPPORT=n
```

## 2.2 Building DIF library and playback\_dif example

You can build DIF library and playback\_dif example at the same time using the following commands:

```
cd $URSR_TOP/BSEAV/lib/security/dif
make examples
```

An executable file “playback\_dir” will be copied to \$(URSR\_TOP)/obj.\$(NEXUS\_PLATFORM)/nexus/bin together with libdif.so and other required libraries.

**Note:** Under some networks, you may get an error similar to the following (full path will be shown instead of \$(URSR\_TOP)):

```
===== Downloading OPENSLL tarball to
$(URSR_TOP)/obj.97439/BSEAV/lib/protobuf/arm-linux.debug
$(URSR_TOP)/BSEAV/lib/protobuf/protobuf-2.5.0
$(URSR_TOP)/obj.97439/BSEAV/lib/protobuf/arm-linux.debug
--2015-08-20 11:21:59-- https://protobuf.googlecode.com/files/protobuf-
2.5.0.tar.bz2
Resolving protobuf.googlecode.com... 74.125.20.82, 2607:f8b0:400e:c05::52
Connecting to protobuf.googlecode.com|74.125.20.82|:443... connected.
ERROR: cannot verify protobuf.googlecode.com's certificate, issued by
`/C=US/O=Google Inc/CN=Google Internet Authority G2':
Unable to locally verify the issuer's authority.
To connect to protobuf.googlecode.com insecurely, use `--no-check-
certificate'.
Unable to establish SSL connection.
Tarball $(URSR_TOP)/obj.97439/BSEAV/lib/protobuf/arm-linux.debug/protobuf-
2.5.0.tar.bz2 is missing
Makefile:98: recipe for target 'source' failed
make: *** [source] Error 1

make: Leaving directory '$(URSR_TOP)/BSEAV/lib/protobuf'=====
```

As a workaround, you can use curl as follows and then proceed with the build command again.

```
curl https://protobuf.googlecode.com/files/protobuf-2.5.0.tar.bz2 >
$(URSR_ROP)/obj.97439/BSEAV/lib/protobuf/arm-linux.debug/protobuf-
2.5.0.tar.bz2
```

## 3 Runtime environment setup

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### 3.1 Preparing drm.bin and playready.bin

Please prepare appropriate drm.bin and playready.bin for your board, and copy them to the directory where playback\_dif executable exists.

You need version 3.1.0 or higher of the DRM Utility to generate a proper “drm.bin” and “playready.bin” files. drm.bin needs to be generated with a “WIDEVINE\_PLAYBACK” key and playready.bin needs to include Playready key. You can generate a single bin file with both keys and copy it to drm.bin and playready.bin.

Note that these binary files generated with older versions of the DRM utility will not work properly. Also these bin files for SAGE/SVP support cannot be used for a build without SAGE/SVP support.

#### Objaint OTP ID for your board (optional)

If you need to obtain drm.bin for your board, please follow the instructions here, otherwise, jump to the next section. This section describes how to obtain OTP ID for your board which is needed for getting appropriate drm.bin. However, it is assumed that you have instructions on how to obtain the drm.bin.

OTP can be retrieved with 2 steps below

a. Build otpgetchipid – The commands below build Nexus along with the app otpgetchipid.

```
cd nexus/examples/security/otp/nexus
```

```
plat <Platform_ID> <Revision>
```

```
unset SAGE_SUPPORT
```

```
unset NEXUS_SECURITY_SUPPORT
```

b. Run otpgetchipid on your board.

Boot the board up to the shell prompt.

```
mount -t nfs NFS_SERVER_IP:/<path-to-built-nexus-and-otpgetchipid>
/mnt/nfs
```

```
./nexus otpgetchipid
```

Note the OTP id Displayed on the console.

drm.bin can then be requested as per the OTP ID and board type.

## 3.2 Mounting the build and setting up runtime environment

Copy the build (contents of \$(URSR\_TOP)/obj.\$(NEXUS\_PLATFORM)/nexus/bin) to your NFS server and mount it from your board using the following example. The example below assumes that it is mounted under /mnt/nfs on the device (Here '#' is a command prompt on the terminal of the board).

```
#mount -o nolock NFS_SERVER_IP:/<path-to-built-nexus-bin> /mnt/nfs
```

Make sure that the directory <path-to-built-nexus-bin> containing Nexus, required libs (such as libdif.so, libwvcdm.so, libplayreadypk\_host.so, libcmndrm\*.so, etc.) and playback\_dif is mounted using nfs from the device. Also the permissions of these files must be properly set for the runtime user's access. The <path-to-built-nexus-bin> directory must be writable to the runtime user.

Make sure that drm.bin and playready.bin are present with at least read permission for the runtime user in the current directory.

```
#cd /mnt/nfs

#ls -l drm.bin playready.bin

-r--r--r--    1 15176    20          19488 Oct  7 19:02 drm.bin
-r--r--r--    1 15176    20          19488 Oct  7 19:05 playready.bin
```

If not running playback\_dif from /mnt/nfs, set up your PATH to include the directory where playback\_dif exists.

```
# PATH=$PATH:/mnt/nfs

# which playback_dif

/mnt/nfs/playback_dif
```

Make sure the system time is correct. The below example shows a wrong system time.

```
# date

Thu Jan  1 00:04:34 UTC 1970
```

An easy way to set the correct time is to run ntpd command for example:

```
# ntpd -p uk.pool.ntp.org
```

But the above command only runs the ntpd daemon and the system time is not updated immediately. Please wait for a few seconds and then confirm the system time gets synchronized.

For multi process mode, start Nexus server. This step is not required for single process mode.

```
#cd /mnt/nfs  
  
#./nexus nxserver -svp &
```

## 4 Running playback\_dif example

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Make sure that Environment is setup according to [section 3](#).

### 4.1 Play CENC media

1. From host machine, visit <http://dash-mse-test.appspot.com/media.html> from browser.
2. Scroll down to “OOPS\_CENC” section and download a CENC media file such as oops\_cenc-20121114-142.mp4 and copy it to the directory in your NFS server where playback\_dif exists. Make sure the read permission is set for the runtime user.

The first 6 files (numbering from 142 to 146) include only video data and the following 3 files (numbering from 148 to 150) include only audio data. oops\_cenc-20121114-161.mp4 is video only.

The playback\_dif example only takes one file as input, so it can play only video or audio.

3. Run playback\_dif with Playready DRM

Multi-process mode:

```
# ./nexus.client playback_dif oops_cenc-20121114-145.mp4 -pr
```

Single process mode:

```
# ./nexus playback_dif oops_cenc-20121114-145.mp4 -pr
```

4. Run playback\_dif with Widevine DRM

Multi-process mode:

```
# ./nexus.client playback_dif oops_cenc-20121114-145.mp4 -wv
```

Single process mode:

```
# ./nexus playback_dif oops_cenc-20121114-145.mp4 -wv
```



5. Run `playback_dif` without DRM option. This will select a DRM that is found in the first PSSH box in the media file (below results in Widevine DRM).

Multi-processmode:

```
# ./nexus.client playback_dif oops_cenc-20121114-145.mp4
```

Single processmode:

```
# ./nexus playback_dif oops_cenc-20121114-145.mp4
```

## 4.2 Play PIFF media

1. From host machine, visit <http://playready.directtaps.net/smoothstreaming>.
2. Scroll down to “SSW 720p H264 PLAYREADY (SuperSpeedWay, 720p, H264 AAC, with encryption)” section and download an ISMV file such as `SSWSS720H264PR/SuperSpeedway_720_2962.ismv` and copy it to the directory in your NFS server where `playback_dif` exists. Make sure the read permission is set for the runtime user.

Those files include both audio and video data and `playback_dif` can play the video with audio.

3. Run `playback_dif` with Playready DRM

Multi-process mode:

```
# ./nexus.client playback_dif SuperSpeedway_720_2962_enc.ismv -pr
```

Single process mode:

```
# ./nexus playback_dif SuperSpeedway_720_2962_enc.ismv -pr
```

4. Following command will result in Playready DRM (same as above)

Multi-process mode:

```
# ./nexus.client playback_dif SuperSpeedway_720_2962_enc.ismv
```

Single process mode:

```
# ./nexus playback_dif SuperSpeedway_720_2962_enc.ismv
```

5. If you specify a DRM that is not supported in the media, `playback_dif` will ask if you want to continue with the default DRM (=Playready). You can enter ‘y’ or ‘n’.

```
# ./nexus.client playback_dif SuperSpeedway_720_2962_enc.ismv -wv
```

\*\*\* 00:00:00.015 playback\_dif: PiffParser was initialized for  
SuperSpeedway\_720\_2962\_enc.ismv

### 00:00:00.015 playback\_dif: DRM Type: 2 was not found in the stream.

### 00:00:00.015 playback\_dif: Do you want to play it with its default DRM  
type: 3? [y/n]