Network Media Player SDK for Android
Programmer's Guide

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Content

1. Overview

Network Media Player SDK consists of a set of resources for fast and convenient development of mobile applications for viewing various media streams like RTMP, HLS, RTSP, RTP, MMS, WebM, FLV, MP4, TS ,other network video format and playback files with following format : AVI, MOV, MKV,FLV,AVI,3GP,3G2,ASF,WMV,MP4,M4V,TP,TS,MTP,M2T and other. The core of the SDK is a library for application development.

Key Features

Hardware acceleration – a new hardware accelerated decoder for HD video.
Multi-core decoding - support of the multiple processor cores for decoding.
Multi-channel support - simultaneous connection to multiple resources or multiple video channels and simultaneous video decoding.
Video integration with any Activity - based on SurfaceView and can be integrated with any Activity.
Hardware pre and post video processing – hardware de-interlacing and various pre and post video processing using OpenGL shaders.
Custom and standard notifications - notifies application about connection, disconnection and other events, possibility to add custom event.
Smart and online thumbnail – quick and simple API to get a thumbnail for local files and network streams.
Low latency for network stream – special API to control playback latency
Record streams – special API to record streams into mp4 file.
Audio and Subtitle control – special API to control audio and subtitle tracks during playback.
Audio pitch correction on changed rate – correction filter added for correcting the intonation of an audio signal without affecting other aspects on its sound when playback rate has applied.
Audio volume boost and volume detector– special API to increase audio volume above system ability, as well as detection max and mean volume to avoid any audio clipping on raising volume.
Pre-buffering data in paused mode – accumulation of media data in Paused state to avoid clipping on further playback (audio mode only).

2. How to Use

2.1 Android version

The SDK works with Android version 4.0 or newer . (Lower version 4.0 can be customized and provided by request as well).

2.2 Folders and files

The SDK package consists of the following folders.

bin Sample application package
MediaPlayerSDKTest.apk
libs Library files to be linked to the application
mediaplayersdk.jar
librtspplr-xx.so
librtstm-xx.so
libSDL2-xx.so
libxml2-xx.so
libyuv_shared-xx.so
where xx is one of supported platform : ARM general, x86, ARV V7 , ARM V7a.
src Sample project to test Media Player SDK
doc Documentation including this document

2.3 Development tools

Build environment is Eclipse. Please import the project to Eclipse for building the sample application.

2.4 Integration with an application

2.4.1 Integration using a resource file in 2 steps:

Step1: Add to layout xml for your activity as below:

```
<FrameLayout
    android:id="@+id/playerViewLayout"
    android:layout_width="fill_parent"
    android:layout_height="wrap_content" >
```

```
        <veg.mediaplayer.sdk.MediaPlayer
           android:id="@+id/playerView"
           android:layout_width="fill_parent"
           android:layout_height="fill_parent"
           android:layout_gravity="center" />

    </FrameLayout>
```

Step 2: Change main activity
(MainActivity.java)

```
public class MainActivity extends Activity implements
MediaPlayer.MediaPlayerCallback
{
...
    // callback handler
    #override
    public int Status(int arg) {return 0;}

   @Override
   public void onCreate(Bundle savedInstanceState)
   {
    ...
        // Create Player instance
        player = (MediaPlayer)findViewById(R.id.playerView);
// Get player instance
    ...
        // Connect or start playback
        player.Open(ConnectionUrl or File name,
      decoderType,
      rendererType,
      synchroEnable,
      synchroNeedDropVideoFrames,
                  rendererEnableColorVideo,
                  rendererEnableAspectRatio,
     DataReceiveTimeout,
```

```
     decoderNumberOfCpuCores,
      this);
     ...
    }

   @Override
   protected void onDestroy()
   {
          // Destroy and close player
          if (player != null)
          {
                  // Close connection to server
              player.close ();
                  // Desroy player
             player.onDestroy();
}
         super.onDestroy();
    }
   ...
}
```

2.4.2 Integration dynamically (without modifying resources)

Step 1: Change main activity

```
public class MainActivity extends Activity implements
MediaPlayer.MediaPlayerCallback
{
...
     // callback handler
     #override
     public int Status(int arg) {return 0;}

    @Override
    public void onCreate(Bundle savedInstanceState)
    {
```

```
    ...
        // Create instance of Player
        boolean is_use_window = true;
        // boolean is_use_window = false; if audio only is to play in service
        player = new MediaPlayer(this, is_use_window);
//  Set size and position for layout
        FrameLayout.LayoutParams params = new FrameLayout.LayoutParams(250,250,
Gravity.CENTER);
        player.setLayoutParams(params);

//
        // Add Player Instance to layout
        FrameLayout lp = (FrameLayout)findViewById(R.id.playerView);
        lp.addView(player);
    ...
// connect and start playback
        player.Open(   ConnectionUrl,
                       decoderType,
rendererType,
synchroEnable,
synchroNeedDropVideoFrames,
                       rendererEnableColorVideo,
rendererEnableAspectRatio,
DataReceiveTimeout,
decoderNumberOfCpuCores,
this);
    ...
   }

  @Override
  protected void onDestroy()
  {
          // Close  network connection to server
             player.close ();
           // Desroy player
           player.onDestroy();
```

```
        super.onDestroy();
    }
```

2.4.3 Integration with Activity

The SDK is based on SurfaceView and can be integrated with any Activity using the code below:

```
<FrameLayout

        android:id="@+id/playerViewLayout"

        android:layout_width="fill_parent"

        android:layout_height="wrap_content" >

        <veg.mediaplayer.sdk.MediaPlayer

            android:id="@+id/playerView"

            android:layout_width="fill_parent"

            android:layout_height="fill_parent"

            android:layout_gravity="center" />

    </FrameLayout>
```

3. Media Player

3.1 API Reference

There are following API providers in SDK: content provider, decoder provider and render provider:

Provider name	Provider acronym	Description
Pipeline Provider	PLP_	Control pipeline and all components
Content Provider	CP_	Connect to server, download data and control connection
Video Decoder Provider	VDP_	s/w or h/w video decoding
Audio Decoder Provider	ADP_	s/w or h/w video decoding
Video renderer Provider	VRP_	Video renderer
Audio renderer Provider	ARP_	audio renderer

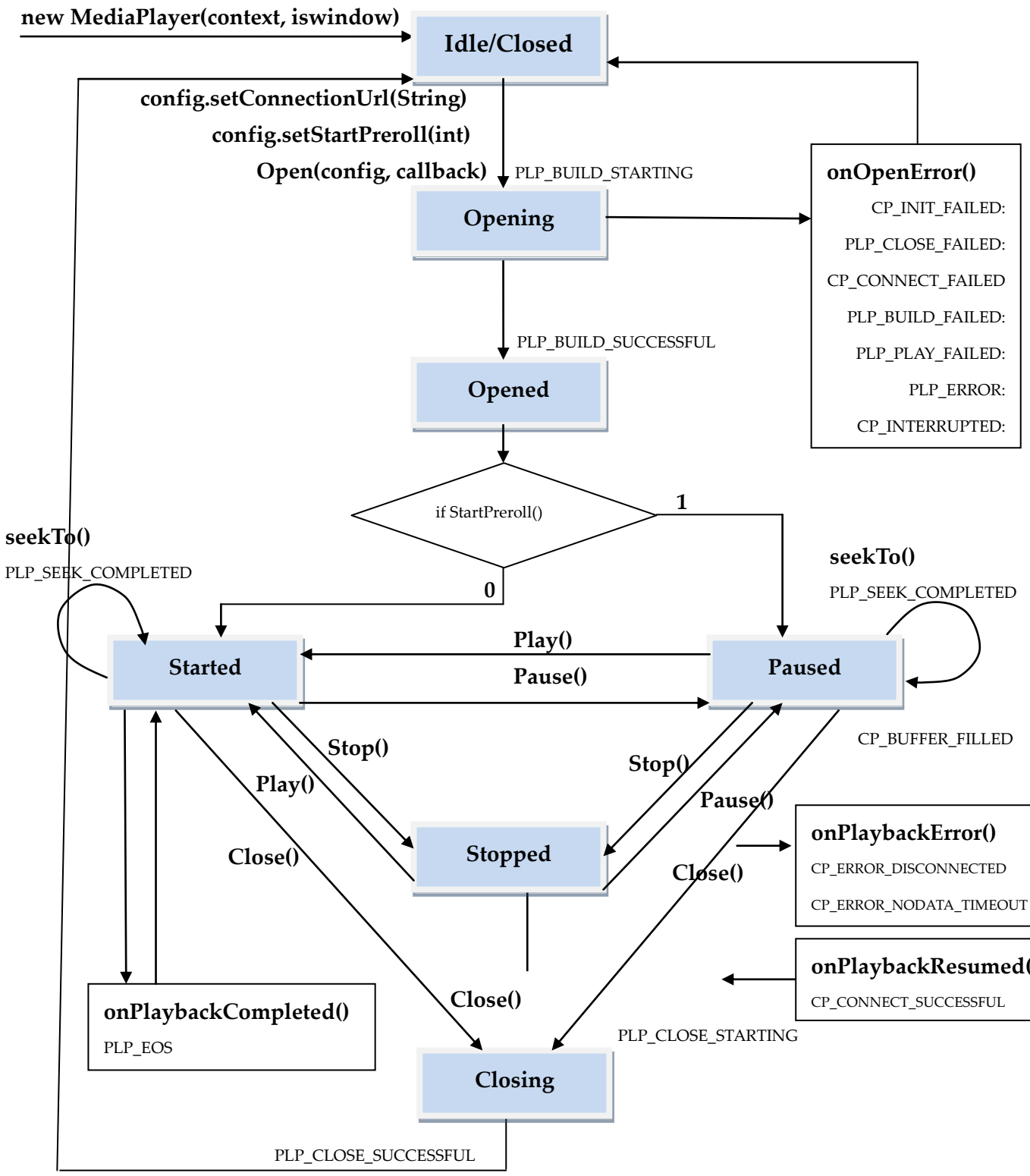
3.2 Notifications

Providers notifies about results, errors and notifications using "MediaPlayerCallback" callback. All messages are synchronous and provider wait until the application handles a message.

Value	Name	Type	Description
1	PLP_BUILD_STARTING	NOTIFICATION	PLP notifies that pipeline is started to build
2	PLP_BUILD_SUCCESSFUL	RESULT	Pipeline has been built successfully
3	PLP_BUILD_FAILED	RESULT	Pipeline can not be built
4	PLP_PLAY_STARTING	NOTIFICATION	Pipeline is going to starting
5	PLP_PLAY_SUCCESSFUL	RESULT	Pipeline has been ran successfully after Open (autostart)
6	PLP_PLAY_FAILED	RESULT	Error on pipeline starting
7	PLP_CLOSE_STARTING	NOTIFICATION	Pipeline is going to stopping
8	PLP_CLOSE_SUCCESSFUL	RESULT	Pipeline has been closed successfully
9	PLP_CLOSE_FAILED	RESULT	Error on pipeline closing
10	PLP_ERROR	ERROR	Pipeline is disconnected due inner error
12	PLP_EOS	NOTIFICATION	End-of-stream notification
14	PLP_PLAY_PLAY	NOTIFICATION	Pipeline has been ran successfully
15	PLP_PLAY_PAUSE	NOTIFICATION	Pipeline has been paused successfully

16	PLP_PLAY_STOP	NOTIFICATION	Pipeline has been stopped successfully
17	PLP_SEEK_COMPLETED	NOTIFICATION	Seek operation has been completed
101	CP_CONNECT_STARTING	NOTIFICATION	CP is initialized and is going to start connection
102	CP_CONNECT_SUCCESSFUL	RESULT	CP has been connected successfully
103	CP_CONNECT_FAILED	RESULT	CP notifies that connection is failed
104	CP_ INTERRUPTED	RESULT	CP notifies that connection with server is interrupted by close function
105	CP_ERROR_DISCONNECTED	NOTIFICATION	CP notifies that connection with server is lost
106	CP_STOPPED	NOTIFICATION	CP has been stopped
107	CP _ INIT_FAILED	RESULT	CP notifies that there is error on initialization
108	CP_RECORD_STARTED	NOTIFICATION	CP notifies that recording started and new file has been created. Call *player*.RecordGetFileName(1) to get name of file.
109	CP_RECORD_STOPPED	NOTIFICATION	CP notifies that recording has stopped and the file has been finished. Call *player*.RecordGetFileName(0) to get name of file.
110	CP_RECORD_CLOSED	NOTIFICATION	CP notifies that recording has closed.
111	CP_BUFFER_FILLED	NOTIFICATION	CP notifies about pre-buffering process has completed.
112	CP_ERROR_NODATA_TIMEOUT	NOTIFICATION	CP notifies that no data had came for DataReceiveTimeout period.
201	VDP_ STOPPED	NOTIFICATION	VDP has been stopped
202	VDP_ INIT_FAILED	RESULT	VDP notifies that there is error on initialization
300	VRP_STOPPED	NOTIFICATION	VRP has been stopped
301	VRP_INIT_FAILED	RESULT	VRP notifies that there is error on initialization
302	VRP_NEED_SURFACE	NOTIFICATION	VRP notifies that it is going to allocate surface
400	ADP_STOPPED	RESULT	ADP has been stopped
401	ADP_ INIT_FAILED	RESULT	ADP notifies that there is error on initialization
500	ARP_STOPPED	NOTIFICATION	ARP has been stopped
501	ARP _INIT_FAILED	NOTIFICATION	ARP notifies that there is error on initialization
503	ARP_VOLUME_DETECTED	NOTIFICATION	ARP notifies that volume detector has finished and app can get mean and max estimated audio volume values.

3.3 State diagram



Application registers single **callback** function via **Open(config, callback)** call. State diagram separates notifications into 3 groups:

- **onOpenError()**. Occurs when error has happened on **Open()** function.
- **onPlaybackError()**. Occurs when error has happened in one of **Paused/Started/Stopped** states.
- **onPlaybackCompleted()**. Occurs in Started state only when end-of-stream has reached.

In case **onOpenError()** the closing procedure is processed automatically, i.e. MediaPlayer goes to **Closed** state.

In case **onPlaybackError() / CP_ERROR_DISCONNECTED / CP_ERROR_NODATA_TIMEOUT** notification has received the closing procedure is not processed automatically, pipeline state is not changed, further playback goes on **automatically** when network connection has been restored (**CP_CONNECT_SUCCESSFUL** received).

onPlaybackResumed() / CP_CONNECT_SUCCESSFUL occurs after successful restoring of network connection, playback continues **automatically** pipeline state is not changed.

seekTo() is processed by either **setStreamPosition()** or **setLivePosition()** in Started or Paused states. In case if result of setStreamPosition() or setLivePosition() is equal to 0, the notification **PLP_SEEK_COMPLETED** will be.

In case **onPlaybackCompleted()/PLP_EOS** happened, the state of pipeline is not changed.

CP_BUFFER_FILLED notification received in Paused state indication that pre-buffering has finished. getStreamPrebufferTime() function returns the time position of pre-buffered data. **seekTo()** up to the pre-buffered position doesn't require network connection.

3.4 Functions description

Following functions are member of MediaPlayer class . These functions should be used to playback network content and media files.

Open

Connect to network server or open media file, create pipeline and playback media data.

Definition
public void Open(
final String ConnectionUrl,
final int DataReceiveTimeout,
final MediaPlayerCallback callback)

public void Open(final String ConnectionUrl,
final int ConnectionNetworkProtocol,
final int ConnectionDetectionTime,
final int ConnectionBufferingTime,
final int DecoderType,
final int RendererType,
final int SynchroEnable,
final int SynchroNeedDropVideoFrames,
final int EnableColorVideo,
final int EnableAspectRatio,
final int DataReceiveTimeout,
final int NumberOfCPUCores,
final MediaPlayerCallback callback)

public void Open(final MediaPlayerConfig config, final MediaPlayerCallback callback)

Parameters:

ConnectionUrl	URL to network resource (RTSP, HTTP ,RTMP, HLS, UPD and so on) or full path for media file
ConnectionNetworkProtocol	network protocol or RTP or RTSP tunneling (0 – RTP by UDP, 1 – RTP by TCP, 2 – RTSP over http, 3 – RTSP over

	https, -1 - AUTO)
ConnectionDetectionTime	Probing time to detect video and audio format of network stream (in milliseconds)
ConnectionBufferingTime	Buffering on playback start to avoid network jitter (in milliseconds)
DecoderType	select s/w or h/w video decoder
RendererType	select SDL or openGL render
SynchroEnable	enable A/V synchronization 1- synchronization is on, 0 is off
SynchroNeedDropVideoFrames	drop video framer if frame is later 1 is on , 0 is off
EnableColorVideo	Enable grayscaled video
EnableAspectRatio	Set video output mode (0 - stretch, 1 – fit to screen with aspect ratio, 2 - crop, 3 - 100% size, 4 - zoom mode, 5 - move mode)
DataReceiveTimeout	reconnect timeout, SDK does reconnect if there is not received data during some time (milliseconds).
MediaPlayerCallback	notification callback, event is provided over this callback
NumberOfCPUCores	Number of CPU core to decode video, 0 – autodetect and set the number according device capability, positive number sets number according application needs

Return Value

Upon successful completion **Open**() returns 0. Otherwise -1 is returned . All errors are provided in callback status.

Remarks

Connect to network resource or open local media file, create pipeline , allocate resource and start video playback.

Examples

Example N1

```
player.Open(
 "http://example", // correct URL or full path for media file
        2,      // RTSP over http tunneling
        500,    // 500 ms on probing
        500,    // 500 ms buffer on start
        0,      //  Decoder type :  0- S/W 1, - H/W
        1,      // Renderer Type : 0 - SDL, 1 - pure OpenGL
        1,      // A/V synchronization:  1- Enable , 0 - Disable
```

```
        0,      // Drop Video frame if it is late : 1- Enable , 0 – Disable
        1,      // Color / Grayscale video output  : 0 - grayscale, 1 – color
        1,      // Aspect ratio / Full size : 1 – aspect rate
        30000, // Reconnection  timeout  (milliseconds),
        0,      // Number Of Cpu Cores for decoding (1-6), 0-autodetect
        This);
```

Example N2

```
// Create config
 MediaPlayerConfig conf = new MediaPlayerConfig();
conf.setConnectionUrl(http://example);  // correct URL or full path for media file
 conf.setConnectionNetworkProtocol(2);  // RTSP over http tunneling
 conf.setConnectionDetectionTime(500);  // Probing time – 500 ms
 conf.setConnectionBufferingTime(500);  //  Buffering on start – 500 ms
 conf.setDecodingType(1);  // H/W decoder
 conf.setRendererType(1);  // pure OpenGL
 conf.setSynchroEnable(1);  // Audio and Video synchronization is ON

conf.setSynchroNeedDropVideoFrames(0); // Do not drop video if pts is later
 conf.setEnableColorVideo(1); // Set color video
 conf.setEnableAspectRatio(1); // Set  aspect ratio
 conf.setDataReceiveTimeout(30000); // Set timeout of connection , Disconnect event is
sent after(in milliseconds)
 conf.setNumberOfCPUCores(0); // Number Of Cpu Cores for decoding (1-6), 0-
autodetect
conf.setStartPreroll(1); //Start player in Paused mode

//Recording options
Int record_flags =
      PlayerRecordFlags.PP_RECORD_AUTO_START | //auto start open
      PlayerRecordFlags.PP_RECORD_DISABLE_AUDIO | //video only
      PlayerRecordFlags.PP_RECORD_SPLIT_BY_TIME | //split by time
      PlayerRecordFlags.PP_RECORD_SPLIT_BY_SIZE; //split by size
conf.setRecordFlags(record_flags);
conf.setRecordSplitTime(30); //split by 30 sec
conf.setRecordSplitSize(20); //split by 20 megabytes
```

```
conf.setRecordPath("/sdcard/DCIM");
conf.setRecordPrefix("my_rec");
```

```
player.Open(conf, This);
```

OpenAsPreview

Connect to network server or open media file, create pipeline and playback media data in Preview mode. Preview mode differs from normal : s/w decoding only key frames , real time render, no audio stream (only video).

Definition

```
public void OpenAsPreview(
        final String ConnectionUrl,
        final int DataReceiveTimeout,
        final MediaPlayerCallback callback)
```

Parameters

ConnectionUrl	URL to network resource (RTSP,HTTP,RTMP,UPD) or full path for media file
DataReceiveTimeout	reconnect timeout, SDK does reconnect if there is not received data during some time (milliseconds)
MediaPlayerCallback	notification callback, event is provided over this callback

Return Value

Upon successful completion **OpenAsPreview**() returns 0. Otherwise -1 is returned . All errors are provided in callback status.

Remarks

Connect to network resource or open local media file, create pipeline , allocate resource and start playback in Preview mode.

Examples

```
player.OpenAsPreview(
```

"http://example", // correct URL or full path for media file
30000, // Connection timeout (milliseconds),
This);

Play

Resume play if player is in Pause state.

Definition
public void Play()

Parameters
There are no parameters for this call

Return Value
Upon successful completion, **Play()** returns 0. Otherwise -1 is returned . All errors are provided in callback status.

Remarks
Resume play if player is in Pause state. This function can be used with playback from file only.

Examples
player.Play ();

Pause

Change playback state from Play to Pause.

Definition
public void Pause()

Parameters
There are no parameters for this call

Return Value
Upon successful completion, **Pause()** returns 0. Otherwise -1 is returned . All

errors are provided in callback status.

Remarks
Pause playback if player is in Play state. This function can be used with playback from file only.

Examples

```
player.Pause ();
```

GetState

Return player state.

Definition
public PlayerState getState()

Parameters
There are no parameters for this call

Return Value
Following states are provided :
0 - Opening
1 - Opened
2 - Started
3 - Paused
4 - Stopped
5 - Closing
6 - Closed

Remarks
Provide the current state of player.

Examples

```
if (player.getState() == PlayerState.Closing) ;
```

getStreamDuration

Return duration of media file in seconds. This function works only in case file playback.

Definition
public long getStreamDuration()

Parameters
There are no parameters for this call.

Return Value
Upon successful completion, getStreamDurarion**()** returns file duration in seconds . Otherwise -1 is returned . All errors are provided in callback status.

Remarks
Provide the file duration that is played by player.

Examples
int duration = getStreamDuration() ;

getStreamPosition

Get position in played media file. This function works only in case of file playback.

Definition
public long getStreamPosition()

Parameters
There are no parameters for this call.

Return Value
Upon successful completion, getStreamPosition**()** returns current position of played file (in seconds).

Remarks
Provide the file position that is played by player.

Examples

```
int position = getStreamPosition() ;
```

setStreamPosition

Set position of played media file. This function works only in case of file playback.

Definition

public void setStreamPosition(final long lTime)

Parameters

lTime - new position in file (in seconds)

Return Value

Integer value is returned. 0- on successful completion, PLP_SEEK_COMPLETED notification will send on success. Otherwise – error result.

Remarks

Provide the file position of file that is played by player.

Examples

```
long position;
setStreamPosition(position) ;
```

getLiveStreamPosition

Function provides position, first and last position for live stream. This function works only in case of live stream playback (HLS).

Definition

Position getLiveStreamPosition()

Parameters

There are no parameters for this call.

Return Value

Upon successful completion, getLiveStreamPosition returns Position object.

```
public class Position
{
        private long first = 0;
        private long current = 0;
        private long last = 0;
        private long duration = 0;
}
```

first - dts of first segment in m3u8 list.
last - dts of last segment in m3u8 list.
current - dts of last downloaded packet in HLS stream .
Time base is milliseconds.

Remarks
Provide the current , first , last positions in stream that is played by player.

Examples

```
Position pos    =       player.getLiveStreamPosition();
if (pos == null)
{
        long duration = pos.getDuration();
        long first    = pos.getFirst();
        long current  = pos.getCurrent();
        long last     = pos.getLast();
 }
```

setLiveStreamPosition

Change position of played live stream. This function works only in case of live stream.

Definition

```
public void setLiveStreamPosition(final long lTime)
```

Parameters
lTime - new position in live stream (milliseconds)

Return Value
Integer value is returned. 0- on successful completion, PLP_SEEK_COMPLETED notification will send on success. Otherwise – error result.

Remarks
Change the position of life stream that is played by player.

Examples
setStreamPosition(1000000) ;

getStreamPrebufferTime

Get pre-buffering position in played media file. This function works only in case of file playback.

Definition
public long getStreamPrebufferTime()

Parameters
There are no parameters for this call.

Return Value
Upon successful completion, getStreamPrebufferTime**()** returns pre-buffered position of played file/stream (in milliseconds).

Remarks
Provide the pre-buffered position that is played by player.

Examples

```
int position = getStreamPrebufferTime () ;
```

setFFRate

Change speed of playback for local file and network stream.

Definition

public void setFFRate(final int rate)

Parameters

rate - rate value () .

Correct values :

Rate	Value
x0.1	100 – Min Value
x0.2	200
x0.5	500
x0.9	900
x1	1000
x2	2000
x3	3000
x4	4000
…	…
x16	16000 – Max Value

Return Value

No value is returned by function setFFRate.

Remarks

Change speed of playback for local file and network stream.

Important note : Some data is skipped if rate is less or more than normal playback rate.

Examples

setFFRate(2000); // Set playback rate to x2

getRenderPosition

Function provides last position in played media file. This function works only in case of file playback.

Definition

public long getRenderPosition()

Parameters
There are no parameters for this call.

Return Value
Upon successful completion, getStreamPosition**()** returns PTS of last video frame or audio sample (milliseconds).

Remarks
Provide the PTS of last played video frame or audio sample.

Examples
long position = getRenderPosition() ;

Close

Disconnect from server m destroy pipeline.

Definition
public void Close()

Parameters
There are no parameters for this call

Return Value
Upon successful completion, **Close()** returns 0. Otherwise -1 is returned . All errors are provided in callback status.

Remarks
Disconnect from network server, destroy pipeline, free all resources that were allocated on Open() call.

Examples
player.Close ();

UpdateView

Set video output mode for current player instance.

Definition

public int UpdateView(final boolean isAspectRatioEnabled)

public int UpdateView()

Parameters

isAspectRatioEnabled – set aspect ratio that is set in network stream, 1 – set aspect ratio that is set in network stream, 0 – resize picture on full screen.

Return Value

Upon successful completion, isAspectRatioEnabled **()** returns 0 , otherwise -1 is returned . All errors are provided in callback status.

Remarks

UpdateView(1) sets aspect ratio or full screen mode. This function can be used during playback. UpdateView() function uses settings that are set in player config structure.

Video output mode of output picture

player.getConfig().setAspectRatioMode(VideoOutputMode);

VideoOutputMode can be :

0 – stretch

1 – fit to screen with aspect ratio

2 – crop video

3 - 100% size of pciture

4 - zoom mode

Zoom multiplier of output picture (in percent,25-400%) is set in player config :

player.getConfig().setAspectRatioZoomModePercent(ZoomMultiplier);

5 - move mode

X and Y position is set in player config:

X position of output picture (in percent, 0-100%)

player.getConfig().setAspectRatioMoveModeX(X);

Y position of output picture (in percent, 0-100%)

player.getConfig().setAspectRatioMoveModeY(Y);

// zoom and move modes are experimental function, There can be issue in these modes.

Examples
Example N1
player.UpdateView (0);

Example N2
// Present video : picture size is 100% in center of screen
player.getConfig().setAspectRatioMoveModeX(50); // 50% center of screen
player.getConfig().setAspectRatioMoveModeY(50); // 50% center of screen
player.getConfig().setAspectRatioZoomModePercent(100);//size is 100%
player.getConfig().setAspectRatioMode(5); // Zoom and move mode
player. UpdateView();

backgroundColor
Set background color of player.

Definition
public void backgroundColor(final int clr)

Parameters
clr – color in RGB format (ARGB is not supported).

Return Value
Upon successful completion, backgroundColor **()** returns 0 , otherwise -1 is returned . All errors are provided in callback status.

Remarks
Set background color of player.

Examples
backgroundColor(Color.BLACK);

setVisibility
Set the enabled state of this view

Definition
public void setVisibility(int visibility)

Parameters
visibility – Controls the initial visibility of the view. Value of parameters are described on android documentation.
http://developer.android.com/reference/android/view/View.html#attr_android:visibility

Return Value
No value is returned by function setStreamPosition.

Examples
player. setVisibility (1);

getVideoShot
Capture video picture from video stream.

Definition
public VideoShot getVideoShot(
final int desiredWidth,
final int desiredHeight
)

Parameters
desiredWidth - width picture of returned picture
desiredHeight - height picture of returned picture

Return Value
Upon successful completion, getVideoShot **()** returns VideoShot object.
public class VideoShot
{

```
        public int getWidth();
        public int getHeight();
        public ByteBuffer getData();
}
```

Remarks
Provide the video shot of last render frame in format ARGB_8888. This function works in Preview mode only.

Example
VideoShot vs = player.getVideoShot(width, height);
Bitmap bm = Bitmap.createBitmap(width, height, Bitmap.Config.ARGB_8888);
bm.copyPixelsFromBuffer(vs.getData());

GetStatFPS

Return frame rate of downloaded stream so application can estimate possibility of network for defined stream.

Definition
public int GetStatFPS ()

Parameters
There are no parameters for this call.

Return Value
Upon successful completion, **GetStatFPS()** returns fps of network stream . It is frame rate of stream that is downloaded from network, otherwise -1 is returned . All errors are provided in callback status

Remarks
Provide the frame rate of captured stream (download speed) to estimate if network speed is enough to playback stream in real time.

Example
Int fps = player.GetStatFPS();

GetStatPercFree

Return fullness of inner buffers in pipeline so application can estimate if device can playback data in real time or latency.

Definition
public int GetStatPercFree ()

Parameters
There are no parameters for this call

Return Value
Upon successful completion, **GetStatPerFree()** returns level of capacity for inner buffers , otherwise -1 is returned . All errors are provided in callback status

Remarks
Return fullness of inner buffers in pipeline so application can estimate if device can playback data in real time or latency.

Example
Int buf_level = player.GetStatPerFree ();

GetDataDelayOnSource

Return delay in milliseconds if input stream comes with some delay in case network bottleneck.

Definition
public int GetDataDelaySource ()

Parameters
There are no parameters for this call

Return Value
Upon successful completion, **GetDataDelayOnSource()** returns between when package is expected and when package comes

Remarks

Example
int delay = player.GetDataDelayOnSource ();

IsHardwareDecoding

Return what decoder(s/w or h/w) is used by player.

Definition
public boolean IsHardwareDecoding ()

Parameters
There are no parameters for this call.

Return Value
Upon successful completion, IsHardwareDecoding returns true if h/w decoder is used and false in case s/w decoder

Remarks
Provide h/w or s/w video decode is used in player.

Example
Boolean hw_decoder = IsHardwareDecoding ();

RecordStart

Start recording.

Definition
public void RecordStart();

Parameters
There are no parameters for this call

RecordStop

Stop recording.

Definition
public void RecordStop();

Parameters
There are no parameters for this call

RecordGetFileName

Retrieves the name of file has been recording.

Definition
public ***String*** RecordGetFileName(**int** param)

Parameters
int param; //0: get last stopped file. 1: get last started file.

Remarks
Notifications CP_RECORD_STARTED and CP_RECORD_STOPPED are received when recording activities took place. In order to ensure what is latest file name has been recorded we'd better call RecordGetFileName(0) at CP_RECORD_STOPPED event, and RecordGetFileName(1) at CP_RECORD_STARTED event happen.

AudioGetCount

Retrieves a count of audio tracks.

Definition
public ***int*** AudioGetCount()

Parameters

none

Return Value

Returns a count of available audio tracks.

Remarks

AudioGetCount() retrieves a number of audio tracks. It can be used when player is in opened state only (PlayerState.Opened) or after notification PlayerNotifyCodes. PLP_BUILD_SUCCESSFUL.

AudioSelect

Select an audio track to play.

Definition

public *int* AudioGetCount(int track_i)

Parameters

track_i – the number of selected track, the value must be in the range of value has been returned by AudioGetCount().

Remarks

AudioSelect(track_i) can be used also before opening of the player. track_i value is saved automatically into MediaPlayerConfig.setSelectedAudio(). This track will actually used after player.Open().

AudioGetSelected

Retrieves a selected audio track.

Definition

public *int* AudioGetSelected()

Parameters

none

Return Value

Returns selected audio track.

Remarks

AudioGetSelected() returns actually selected audio tack. In case player is not Opened state, AudioGetSelected() returns MediaPlayerConfig.getSelectedAudio() value.

startVolumeDetect

Starts audio volume detection process

Definition

public ***void*** startVolumeDetect(final int vd_max_samples)

Parameters

int vd_max_samples – a number of audio samples has to be processed

Return Value

void

Remarks

When startVolumeDetect() has finished ARP_VOLUME_DETECTED sent. Application can retrieve maximum and mean estimated audio volumes through getting the properties getPropInt(PlayerProperties.PP_PROPERTY_AUDIO_VOLUME_MAX) and getPropInt(PlayerProperties.PP_PROPERTY_AUDIO_VOLUME_MEAN).

setVolumeBoost

Gain audio volume

Definition
public *void* setVolumeBoost(final int volume_boost)

Parameters
int volume_boost – value of audio volume gain in range [-30, 30] dB

Return Value
void

Remarks
Application should first retrieve volume statistics through startVolumeDetect() and max_volume = getPropInt(PlayerProperties.PP_PROPERTY_AUDIO_VOLUME_MAX); mean_volume = setPropInt(PlayerProperties.PP_PROPERTY_AUDIO_VOLUME_MEAN). After all, set corresponded value **volume_boost** to avoid audio clipping in raising audio volume.
For instance app obtains mean_volume=-27, max_volume=-4.
It means that:
The mean square energy is approximately -27 dB.
The largest sample is at -4 dB, or more precisely between -4 dB and -5 dB.
In other words, raising the volume by +4 dB (**volume_boost=4**) does not cause any clipping.

SubtitleGetCount

Retrieves a count of subtitle tracks.

Definition
public *int* SubtitleGetCount()

Parameters
none

Return Value

Returns a count of available subtitle tracks.

Remarks
SubtitleGetCount() retrieves a number of subtitle tracks. It can be used when player is in opened state only (PlayerState.Opened) or after notification PlayerNotifyCodes. PLP_BUILD_SUCCESSFUL.

SubtitleSelect

Select an subtitle track to play.

Definition
public *int* SubtitleSelect(int track_i)

Parameters
track_i – the number of selected track, the value must be in the range of value has been returned by SubtitleGetCount().

Remarks
SubtitleSelect(track_i) can be used also before opening of the player. track_i value is saved automatically into MediaPlayerConfig.setSelectedSubtitle(). This track will actually used after player.Open().

SubtitleGetSelected

Retrieves a selected subtitle track.

Definition
public *int* SubtitleGetSelected()

Parameters
none

Return Value
Returns selected subtitle track.

Remarks
SubtitleGetSelected() returns actually selected subtitle tack. In case player is not Opened state, SubtitleGetSelected() returns MediaPlayerConfig.getSelectedSubtitle() value.

SubtitleSourceAdd

Add an external subtitle source

Definition
public ***int*** SubtitleSourceAdd(String path2)

Parameters
String path2 – path to subtitle source

Return Value
0 - OK. Otherwise error.

Remarks
SubtitleSourceAdd(String path2) adds a path to subtitle source. Application can set up multiple external subtitle sources. After adding subtitle source, the player will increase the count of subtitle tracks (SubtitleGetSelected()) and select required track by SubtitleSelect() call. SubtitleSourceAdd() can be called in both before and after Open() call. Also these paths to external sources can be added through MediaPlayerConfig. subtitlePaths string list.

SubtitleSourceRemove

Removes an external subtitle source has been added by SubtitleSourceAdd() function.

Definition
public ***int*** SubtitleSourceRemove(String path2)

Parameters

String path2 – path to subtitle source

Return Value

0 - OK. Otherwise error.

4. Thumbnailer

Thumbnailer is Class that provides the functionality to make thumbnails and stream information for local files and network streams. Smart searching is used to make Thumbnail with maximum informativity.

4.1 Functions description

Following functions are member of Thumbnailer class . These functions should be used to get a thumbnail for file or network stream.

Open

Connect to network server or open local media file.

Definition
public Object Open(final String ConnectionUrl)
public Object Open(final ThumbnailerConfig config)

Parameters

ConnectionUrl	URL of network resource (RTSP, HLS, RTMP, MMS, UDP and so on) or full path of local media file.

Class ThumbnailerConfig provides additional setting to open Thunbnailer.

```
public ThumbnailerConfig( String connectionUrl,
                          int connectionNetworkProtocol,
                          int dataReceiveTimeout,
                          int numberOfCPUCores,
                          float bogoMIPS )
```

connectionUrl	URL of network resource (RTSP, HLS, RTMP, MMS, UDP and so on) or full path of local media file
connectionNetworkProtocol	Protocol for RTP or RTSP tunneling, 0 – RTP by UDP, 1 – RTP by TCP, 2 – RTSP and HTTP tunneling , -1 – AUTO mode
dataReceiveTimeout	reconnect timeout, SDK does reconnect if there is not received data during some time (milliseconds)

numberOfCPUCores	Number of CPU core to decode video, 0 – autodetect and set the number according device capability, positive number sets number according application needs

Return Value
Upon successful completion **Open**() returns 0. Otherwise -ERROR is returned .

Remarks
Connect to network resource or open local media file, create pipeline , allocate resource. This function should be called before get Frame.

Example N1
thumbnailer.Open("http://example.com");
Example N2
thumbnailer.Open(ThumbnailerConfig);

getFrame

Capture thumbnail frame.

Definition
public ThumbnailFrame getFrame()

Parameters
There are no parameters for this call.

Return Value
Upon successful completion, getFrame returns ThumbnailFrame object.

```
public class ThumbnailFrame
{
        public int getWidth() ;
        public int getHeight() ;
         public ByteBuffer getData();
}
```

Remarks

Provide the thumbnail for local file or stream in format ARGB_8888.

Example

```
ThumbnailFrame frame = thumbnailer.getFrame();
shot.getData().rewind();
Bitmap bmp = Bitmap.createBitmap(shot.getWidth(), shot.getHeight(),
Bitmap.Config.ARGB_8888);
bmp.copyPixelsFromBuffer(shot.getData());
```

getInfo

Function returns the information about media file or network stream.

Definition

```
public String getInfo()
```

Parameters

There are no parameters for this call.

Return Value

Type – String, Format - xml.

Remarks

Provide the information about media file or network stream.

String is xml format like below :

```
<?xml version=1.0?>
<StreamInfo name="AVFileFormat" version="1.0">
<name          value="test.mp4" />
<duration      value="100" />
        <VideoStreams>
                <VideoStream id=0 >
                        <format        value="h264" />
                        <duration      value="100"    />
                        <width         value="1920" />
                        <height        value="1080" />
                        <fps           value="30"   />
```

```
            </VideoStream>
        </VideoStreams>
        <AudioStreams>
            "<AudioStream id=1 >
                <format      value="aac"    />
                <duration    value="100"    />
                <samplerate  value="48000" />
                <channels    value="2"      />
            </AudioStream>
        </AudioStreams>
</StreamInfo>
```

Examples

String info = thumbnailer.getInfo();

GetState

Return thumbnailer state : .

Definition

public ThumbnailerState getState()

Parameters

There are no parameters for this call

Return Value

Following states are provided :

0 - Opening,

1 - Opened,

2 - Closing,

3 - Closed;

Remarks

Provide the current state of Thumbnailer.

Example

```
if (thumbnailer.getState() == ThumbnailerState.Opened) ;
```

Close

Disconnect from server or close file and destroy all resources.

Definition
public void Close()

Parameters
There are no parameters for this call

Return Value
Upon successful completion, **Close()** returns 0. Otherwise –ERROR is returned .

Remarks
Disconnect from network server, destroy pipeline, free all resources that were allocated on Open() call.

Example
thumbnailer.Close ();