Sling TV Specification - API for Integrating Third-Party Content

Last Updated: 07 Oct 2020

- 1 Change Log
- 2 Description
- 3 Scope
- 4 Definitions
- 5 Implementation Requirements
- 6 REST APIs
  - 6.1 Source API
    - 6.1.1 HTTP Request Format
    - 6.1.2 Error Response Format
    - 6.1.3 Success Response Format
      - 6.1.3.1 Source Response Root Object
      - 6.1.3.2 Source Object
  - 6.2 EPG API
    - 6.2.1 HTTP Request Format
    - 6.2.2 Error Response Format
    - 6.2.3 Success Response Format
      - 6.2.3.1 EPG Response Root Object
      - 6.2.3.2 Schedule Object
  - 6.3 VOD API
    - 6.3.1 HTTP Request Format
    - 6.3.2 Error Response Format
    - 6.3.3 Success Response Format
      - 6.3.3.1 VOD Response Root Object
      - 6.3.3.2 VOD Object
  - 6.4 Stream Authentication API - CORS enabled resource
    - 6.4.1 HTTP Request Format
    - 6.4.2 Error Response Format
    - 6.4.3 Success Response Format
      - 6.4.3.1 Stream Authentication Response Root Object
- 7 Workflows
- 8 Video Streaming in Sling TV
  - 8.1 Streaming Formats
  - 8.2 DRM and Encryption
  - 8.3 Analytics Beaconing through HTTP Redirection
  - 8.4 Video Encoding Parameters
  - 8.5 Closed Captions
  - 8.6 Thumbnail
  - 8.7 Player Authentication
  - 8.8 User Authentication
  - 8.9 User Authorization
- 9 Appendix A - Content Metadata Tables
  - 9.1 Credit Object
  - 9.2 Image Object
  - 9.3 Team Object
  - 9.4 Ratings Object
  - 9.5 Rating Body
  - 9.6 Rating Label Object
  - 9.7 EIDR
  - 9.8 Rovi/Tivo Ids
  - 9.9 ISO-8601 Date times
  - 9.10 Ratings and Rating Bodies
    - 9.10.1 MPAA (Motion Picture Association of America)
    - 9.10.2 TV (TV Parental Guidelines)
    - 9.10.3 CBFC (Central Board of Film Certification)
    - 9.10.4 BBFC (British Board of Film Classification)
    - 9.10.5 DJCTEQ (Departamento de Justiça, Classificação, Títulos e Qualificação)
    - 9.10.6 ACB (Australian Classification Board)
    - 9.10.7 MPAC (Motion Picture Association - Canada)
    - 9.10.8 RC (Régie du Cinéma - Quebec)
  - 9.11 Airing Types
  - 9.12 _next and _prev
- 10 Appendix B - Metadata Response Paging
- 11 Appendix C - Sling TV Cryptographic Signature
- 12 Appendix D - Sling TV Audio/Video Profiles
  - 12.1 Audio Profiles
  - 12.2 Standard Definition 4:3 Source Stream - recommended profiles
  - 12.3 Standard Definition 16:9 source - recommended profiles
  - 12.4 High Definition Source Stream - recommended profiles
  - 12.5 High Definition Source Stream - optional enhanced audio profiles
- 13 Appendix E - CORS enabled resource
- 14 Appendix F - Sub type geneartion

Change Log

Editor	Change log	Version	Date
Rajashekhar	**Extended APIs to support** • **sub_type : sub-categorization of content. Refer to Appendix F for subtype generation.**	**1.5**	**Feb 3, 2021**

JK	• **Extended APIs to support**
	  • **New image types (poster and scene). Refer Image Object Section in Appendix A.**
	  • **Multiple aspect ratios for both poster and scene images. Refer Image Object Section in Appendix A.**
	  • **Support for "Long Description" for both series and program in EPG and VOD API.**
	  • **"extras" program_type**
		1.4	**Oct 7, 2020**

JK	• Updated documentation for the DRM support	1.3	Sep 22, 2020
JK	• Added support for Certificate field that is required for the FairPlay DRM	1.2	July 6, 2020
JK	• Added Appendix E • Added note to maintain the order of query parameters for all the APIs	1.1	Jun 18, 2020
Drake	Initial Draft	1.0	Nov 19, 2019

Description

This document describes a specification that will allow a content provider to make their content available for viewing from within the Sling TV service.

The specification respects current industry trends and standards regarding metadata formatting, video streaming and cryptography. The specification allows full integration with the Sling TV service while requiring minimal work from the integrating provider.

Scope

This specification addresses the following topics:

- Integration of linear schedule data
- Integration of VOD assets
- Player authentication and authorization
- Video stream definitions
- Content encryption
- Closed Caption definitions

The current version of this specification specifically excludes the following:

- Dynamic Ad Insertion by Sling TV
- User authentication
- Encoding services
- Content Distribution Networks

Definitions

These definitions are used throughout this document.

Term	Definition
Analytics	Data emitted by Sling TV applications that describe the user, his device, what he watched, how he navigated the UI, and the quality of his viewing experience. Sling TV provides data for most major third-party analytics companies, including Adobe, Neilsen, and ComScore.
Electronic Programming Guide (EPG)	A digital schedule of assets available for a given linear source. An EPG also contains metadata describing the channel and the individual programs/assets.

Dynamic Ad Insertion	A process where the ads each viewer sees is determined dynamically at playback time.
JSON	JavaScript Object Notation. An industry standard for representing complex data objects as text.
Linear Content	According to many popular online definitions, "linear video" is a single continuous video stream, implying an infinite stream. Because the prototypical implementation of a linear video stream originates from traditional broadcast channels, a linear video stream is sometimes referred to as a "broadcast stream." Linear video streams are typically composed of a sequence of multiple individual assets. Linear video streams have no inherent knowledge of these assets. Individual assets can only be accessed through the use of external metadata, such as an EPG. "Linear content" may refer to either the entire linear stream or to one or more individual assets within the stream.
Sling TV Cryptographic Signature	A cryptographic scheme that assures providers that HTTP requests originate from Sling TV services or applications. See the Appendices for a more complete explanation.
Source	A unique HTTP endpoint where metadata can be obtained that describes available video content. For linear content, a source typically provides EPG listings. Sling TV uses a linear source's EPG to display available content in the Sling TV applications' channel/grid guide. For VOD, a source typically provides a catalog of available titles. Some organizations may refer to the source as a "network" or a "channel."
Subscription Video On Demand (SVOD)	VOD content a user may view by virtue of a subscription to a source (network/channel), i.e. users can subscribe to Showtime as an add-on to subscribing to Sling or as a stand-alone service.
Transaction Video On Demand (TVOD)	VOD content a user may view by virtue of a rental/purchase transaction, i.e. movie rentals.
User Authentication	A process whereby Sling TV applications verify that the user is who he claims to be.
User Authorization	A process whereby Sling TV applications verify that a user is authorized to view a particular asset.
Video On Demand Content (VOD)	Video assets that are not part of a linear video stream. Since the video asset is not part of a linear stream, VOD content can be viewed at any time, or "on demand."

Implementation Requirements

A typical implementation of this specification involves at least the following steps:

1. Create one or more HTTP endpoints that implement the "Source" REST API to identify the different types of content .
2. Create one or more HTTP endpoints that implement the "EPG" REST API.
3. Create one or more HTTP endpoints that implement the "VOD" REST API.
4. Create one or more HTTP endpoints that implement the "Stream Authentication" REST API.
5. Provide on-boarding information to Sling TV

To enable new content within the Sling TV services, Sling requires the following information from each content provider that implements this specification:

Data	Example	Notes
source_url	http://provider.com/sources	The URL of an HTTP service that implements the "Source" API
client_id	"774277"	An identifier that uniquely identifies Sling TV within the provider's ecosystem *This value is NOT considered secret by Sling.*

While this specification explicitly uses HTTP for clarity, it should be understood that Sling TV also supports HTTPS.

REST APIs

This section describes the four REST APIs that form the core of this specification. Three of the APIs address content ingestion: the Source API enumerates available content sources, the EPG API provides linear content scheduling information, and the VOD API lists available on-demand content. The final API, the Stream Authentication API, describes how Sling TV players will authenticate themselves to the provider's media services.

Source API

The Source API enumerates the provider's available content sources. It is called by the Sling TV's Content Management System.

This section describes the Source API request and the expected responses. The Source API must implement the "Metadata Response Paging" mechanism (See Appendix B).

HTTP Request Format

Source API requests from the Sling TV CMS services will have the following elements:

Attribute	Value	Variable	Sample Value	Notes
URL	source_url		http://provider.com/sources	The base URL for the Source API is provided as the "source_url" during the on-boarding process
METHOD	GET			
PARAMETERS		page	1	Part of Sling TV's results paging mechanism. See Appendix B
		results_per_page	100	Part of Sling TV's results paging mechanism. See Appendix B
		client_id	774277	The client_id assigned to Sling TV during the on-boarding process.
		sling_tv_timestamp	1534201996	Part of the Sling TV Cryptographic Signature. See Appendix C
HEADERS		x-sling-tv-signature	(Base64-encoded SHA-256 HASH)	Part of the Sling TV Cryptographic Signature. See Appendix C

Please note the order of Query Parameters has to be maintained in order to create and verify the Sling TV Cryptographic Signature. See Appendix C

Sample request (Omitting headers): http://provider.com/sources?page=1&results_per_page=100&client_id=774277&sling_tv_timestamp=1534201996

Error Response Format

Source API error responses must be in JSON format and have the following attributes:

Attribute	Name	Value	Notes
CODE		403 (Forbidden)	Request was denied because the requestor was not authorized
		404 (Not Found)	If the request is denied due to failure to validate the Sling TV Cryptographic Signature, a 404 response may be returned to obfuscate a cryptographic failure
		non-200	As determined by the partner. Any non-200 response will be interpreted as a request failure by the Sling TV CMS services
HEADER	Content-Type	application/json	Indicates that the response body is in Json format.

The error response's payload data must be in JSON-format, but its precise format and content is left to the discretion of the provider. However, its root object must contain the following fields.

Attribute	Data Type	Required	Notes
error_code	String	Required	Provider-specific error code.
error_msg	String	Required	A human-readable description of the error. This field may contain misleading text in order to hide cryptographic failure.

Sample error response body:

Example Source Error Response

```
{
  "provider_field_1": "something useful",
  "error_code": "234-345.1",
  "error_message": "Database connection failed",
  "session_id": 123432
}
```

Success Response Format

Source API success responses must be in JSON format and have the following attributes:

Attribute	Name	Value	Notes
CODE		200	Request was successful
HEADER	Content-Type	application/json	Indicates that the response body is in Json format.

The success response's payload data must be in JSON-format.

While its precise format and content is left to the discretion of the provider, the tables in the following section describe the recognized format and fields of the data payload of the successful Source responses. Required fields and objects are also described.

Source Response Root Object

The root object of the Source response should include the following fields. Fields marked as "Required" must be included.

Attribute	Data Type	Required	Notes
_next	String	Optional	This attribute is part of Sling TV's results paging mechanism. See Appendix G Must be present if there are one or more subsequent pages of results.
_prev	String	Optional	This attribute is part of Sling TV's results paging mechanism. See Appendix G Must be present if there are one or more previous pages of results.
sources	List of SourceObjects	Required	See description of Source Objects below.

Example Source Response

```
{
  "_next": "http://link/to/the/next/page",
  "_prev": "http://link/to/the/previous/page",
  "sources": [
    ...
  ]
}
```

Source Object

Each source object included in the "sources" list should include the following fields. Fields marked as "Required" must be included. Each source object must include one epg_url and/or one vod_url.

Attribute	Data Type	Required	Description	Example(s)
source_id	String	Required	Unique identifier for source.	"8623450"
network_affiliate	String	Optional	Parent network source is affiliated with.	"ABC"
name	String	Required	Name of the source.	"ABC Los Angeles"
call_letters	String	Optional	Call letters for the source.	"WABC"
country	String	Optional	Country source is based in.	"US"
language	String	Optional	Primary language of source programming.	"English"
image	String	Optional	Image to represent the source.	"http://image.com/source_img.png"

epg_url	String	Optional	URL to an HTTP/HTTPS endpoint that implements the Sling TV EPG API. Each source object must include one epg_url and/or one vod_url.	"https://provider.com/epg/epg_source1"
vod_url	String	Optional	URL to an HTTP/HTTPS endpoint that implements the Sling TV VOD API. Each source object must include one epg_url and/or one vod_url.	"https://provider.com/vod/vod_source1"

Example Source Object

```
{
  "source_id": "8623450",
  "network_affiliate": "ABC",
  "name": "ABC Los Angeles",
  "call_letters": "WABC",
  "country": "United States",
  "language": "English",
  "image": "http://image/location.jpg,
  "epg_url": "https://provider.com/epg/epg_source1",
  "vod_url": "https://provider.com/vod/vod_source1"
}
```

EPG API

The EPG API lists all schedules for a given source for a given day. It is called by the Sling TV's Content Management System.

This section describes the EPG API request and the expected responses. The EPG API must implement the "Metadata Response Paging" mechanism (See Appendix B).

HTTP Request Format

EPG API requests from the Sling TV CMS services will have the following elements:

Attribute	Value	Variable	Sample Value	Notes
URL	"epg_url" field from a "source" API response	epg_url	http://provider.com/epg	Provided in the "epg_url" field of a response from a "source" endpoint.
PATH		source_id	"8623450"	Identifier for the source. The source_id is obtained from previous call to the Source API.
		date	"2019-02-24"	Represents the day for which a schedule is requested. See ISO-8601 Date times for required format.
METHOD	GET			
PARAMETERS		page	1	Part of Sling TV's results paging mechanism. See Appendix B
		results_per_page	100	Part of Sling TV's results paging mechanism. See Appendix B
		client_id	774277	The client_id assigned to Sling TV during the on-boarding process.
		sling_tv_timestamp	1534201996	Part of the Sling TV Cryptographic Signature. See Appendix C
HEADERS		x-sling-tv-signature	(Base64-encoded SHA-256 HASH)	Part of the Sling TV Cryptographic Signature. See Appendix C

Please note the order of Query Parameters has to be maintained in order to create and verify the Sling TV Cryptographic Signature. See Appendix C

Sample request (Omitting headers): http://provider.com/epg/8623450/2019-02-24?page=1&results_per_page=100&client_id=774277&sling_tv_timestamp=1534201996

Error Response Format

EPG API error responses must be in JSON format and have the following attributes:

Attribute	Name	Value	Notes
CODE		403 (Forbidden)	Request was denied because the requestor was not authorized

		404 (Not Found)	If the request is denied due to failure to validate the Sling TV Cryptographic Signature, a 404 response may be returned to obfuscate a cryptographic failure
		non-200	As determined by the partner. Any non-200 response will be interpreted as a request failure by the Sling TV CMS services
HEADER	Content-Type	application/json	Indicates that the response body is in Json format.

The error response's payload data must be in JSON-format, but its precise format and content is left to the discretion of the provider. However, its root object must contain the following fields.

Attribute	Data Type	Required	Notes
error_code	String	Required	Provider-specific error code.
error_msg	String	Required	A human-readable description of the error. This field may contain misleading text in order to hide cryptographic failure.

Sample error response body:

Example Source Error Response

```
{
  "provider_field_1": "something useful",
  "error_code": "234-345.1",
  "error_message": "Database connection failed",
  "session_id": 123432
}
```

Success Response Format

Source API success responses must be in JSON format and have the following attributes:

Attribute	Name	Value	Notes
CODE		200	Request was successful
HEADER	Content-Type	application/json	Indicates that the response body is in Json format.

The success response's payload data must be in JSON-format.

While its precise format and content is left to the discretion of the provider, the tables in the following section describe the recognized format and fields of the data payload of the successful EPG responses. Required fields and objects are also described.

EPG Response Root Object

The root object of the EPG response should include the following fields. Fields marked as "Required" must be included.

Attribute	Data Type	Required	Notes
_next	String	Optional	This attribute is part of Sling TV's results paging mechanism. See Appendix G Must be present if there are one or more subsequent pages of results.
_prev	String	Optional	This attribute is part of Sling TV's results paging mechanism. See Appendix G Must be present if there are one or more previous pages of results.
sources	List of SourceObjects	Required	See description of Schedule Objects below.

Example Schedule Object

```
{
  "_next": "http://link/to/the/next/page",
  "_prev": "http://link/to/the/previous/page",
  "schedules": [
    ...
  ]
}
```

Schedule Object

Each source object included in the "sources" list should include the following fields. Fields marked as "Required" must be included.

Attribute	Data Type	Required	Description	Example
media_url	URL	Required	URL that provides access to the individual asset video stream. This HTTP/HTTPS endpoint must implement the Sling TV Stream Authentication API.	http://provider.com/epg/channel/manifests/asset2
credits	List of credit objects	Optional	Represents actors and directors and others credited to the content. While credits are not required, when a credit is provided there are required fields.	See Credit Object.
eidr_id	String	Optional	See EIDR.	"10.5240/D340-4608-77C2-4316-C515-A"
episode_number	Integer	Required	Sequence number for episode within a season. The 2nd episode in a given season would be 2. May be empty.	22
episode_series_sequence	Integer	Optional	The broadcast sequence of this episode, in the series to date. If season 1 has 4 episodes, the episode_series_sequence for the last episode of season 1 is 4 and the episode_series_sequence of the first episode of season 2 is 5.	2
season_number	Integer	Required	Sequence number for the season. If Season 1a and Season 1b exist, then the season_number would be 1 and 2 respectively.	2
category	List of Strings	Optional	The program category (Movie, Children, Lifestyle, Music, News, Other, Sports, etc.). Either "category" or " genre" must be provided.	["News"]
genre	List of Strings	Optional	Genre(s) associated with program. May be an empty list (i.e., []). Either "category" or " genre" must be provided.	["newscast", "investigative journalism", "current affairs"]
program_type	String	Required	Type of program represented on schedule: movie, sport, episode, **extras** or one time.	"sport"
sub_type	**String**	**Required**	**Sub categorization of content as: movie, extras, episode, sport-game, sport-talkshow, sport-documentary, news, one-time-sport, one-time, sport-league, generic (fallback)** **See Appendix F for subtype generation.**	**"sport-talkshow"**
stop_dt	String	Required	See ISO-8601 Date times.	"2018-02-02T00:30:00Z"
series_id	String	Optional	Unique identifier for series. (Required if content is related to a series)	"3946509771"
series_description	String	Optional	Short Description for the series. **Usually 120 chars.**	"Reports on the day's noteworthy national and international events."
series_long_description	String	Optional	**Long Description for the series. Usually 255 chars.**	
source_id	String	Required	Unique identifier for source.	"123456"
grid_title	String	Optional	Shorter version of the program title, if needed.	"Vice News"
schedule_id	String	Required	Unique identifier for specific schedule slot or airing.	"5693329246"
series_images	List of Image Objects	Optional	See Image Object. **Images with Aspect Ratio 1.77 (16x9), 1.33 (4x3), 2 (2x1) and 0.75 (3x4) are required. We also need both Poster (image which has program title) and Scene (image which does not have program title) images with all the aspect ratios mentioned.**	
program_images	List of Image Objects	Optional	See Image Object. **Images with Aspect Ratio 1.77 (16x9), 1.33 (4x3), 2 (2x1) and 0.75 (3x4) are required. We also need both Poster (image which has program title) and Scene (image which does not have program title) images with all the aspect ratios mentioned.**	
theme	List of Strings	Optional	A featured subject or storyline.	["Ladder to the Top", "Musician's Life", "Tortured Genius", "Rise and Fall Stories", "Inner City Blues", "Police Corruption"]
tone	List of Strings	Optional	Tones qualities and characteristics of the movie chosen by the filmmaker that influence how a viewer may feel about it; together they contribute to the film's general atmosphere.	["Goofy"]
mood	List of Strings	Optional	Moods are similar to Tones but are broader and come from the angle of how a viewer judges the feel of the movie, and so are broader and less formal; may cross genres and sub-genres.	["Triumph of the Spirit"]

time_period	List of Strings	Optional	Indicates a time other than the present day (when the movie is made) when the film's story takes place. May be the time surrounding a specific event like a war, or a more general span of years.	["1990s"]
ratings	List of Rating Objects	Optional	One or more rating bodies with the rating and reasons applied to this content. Inclusive or movie or tv ratings bodies.	[{"mpaa": "PG-13"}, {"cbfc": "UA"}]
characters	List of Strings	Optional	Identifies instantly recognizable patterns of behavior, demonstrates key distinctions between opposing personal value systems and creates the emotional conflicts that actively propels a character through a story.	["Lothario", "Angry Young Men"]
original_airdate	String	Optional	Date for the original airing of the program. Format: {YYYYMMDD}	"20180201"
release_year	Integer	Optional	Year the program/movie was released.	2018
program_id	String	Required	Unique program identifier.	"5693326091"
season_name	String	Optional	Season number and name, if available.	"Season 3: The Funny One"
teams	List of Team Objects	Optional	While team objects are not required, when provided there are required fields.	See Teams Object.
airing_type	String	Optional	See Airing Types.	"new"
series_title	String	Required	Title of a series.	"Vice News Tonight"
start_dt	String	Required	See ISO-8601 Date times.	"2018-02-02T00:30:00Z"
program_description	String	Optional	Short Description of the program. **Usually 120 chars.**	"This electrifying biopic of legendary rapper Tupac Shakur depicts his rise to fame, his political activism, his growth as an artist, his connection to Death Row Records CEO Suge Knight and his untimely death at the age of 25."
program_long_description	**String**	**Optional**	**Long Description for the Program. Usually 255 chars.**	
season_images	List of Image Objects	Optional	See Image Object. **Images with Aspect Ratio 1.77 (16x9), 1.33 (4x3), 2 (2x1) and 0.75 (3x4) are required. We also need both Poster (image which has program title) and Scene (image which does not have program title) images with all the aspect ratios mentioned.**	
program_title	String	Required	Title of the program or episode.	""
rovi_series_id	Integer	Optional	See Rovi/Tivo Ids.	65132
rovi_program_id	Integer	Optional	See Rovi/Tivo Ids.	9847650
duration	integer	Optional	Duration of the schedule time slot in seconds.	3600

Example Schedule Object


```
{
  "credits": [
    {
      "full_name": "Tom Hanks",
      "role": "Actor",
      "credit_id": "8970234",
      "last_name": "Hanks",
      "first_name": "Tom",
      "order": 1
    }
  ],
  "airing_type": "repeat",
  "eidr_id": "10.5240/D340-4608-77C2-4316-C515-A",
  "episode_number": 3,
  "genre": [
    "Comedy",
    "Family"
  ],
  "program_type": "Episode",
  "sub_type": "sport-talkshow",
```

```
  "stop_dt": "2019-04-23T18:00:00Z",
  "series_id": "231547890",
  "series_description": "Series short description here.",
  "series_long_description": "Series long description here.",
  "source_id": "1234978",
  "schedule_id": "907865",
  "series_images": [
                        { "image_url": "http://www.link.com/to/image.png", "ratio": "1.77", "type": "poster" },
                        { "image_url": "http://www.link.com/to/image.png", "ratio": "1.33", "type": "poster" },
                        { "image_url": "http://www.link.com/to/image.png", "ratio": "2", "type": "poster" },
                        { "image_url": "http://www.link.com/to/image.png", "ratio": "0.75", "type": "poster" },
                        { "image_url": "http://www.link.com/to/image.png", "ratio": "1.77", "type": "scene" },
                        { "image_url": "http://www.link.com/to/image.png", "ratio": "1.33", "type": "scene" },
                        { "image_url": "http://www.link.com/to/image.png", "ratio": "2", "type": "scene" },
                        { "image_url": "http://www.link.com/to/image.png", "ratio": "0.75", "type": "scene" }
                ],
"program_images": [
                        { "image_url": "http://www.link.com/to/image.png", "ratio": "1.77", "type": "poster" },
                        { "image_url": "http://www.link.com/to/image.png", "ratio": "1.33", "type": "poster" },
                        { "image_url": "http://www.link.com/to/image.png", "ratio": "2", "type": "poster" },
                        { "image_url": "http://www.link.com/to/image.png", "ratio": "0.75", "type": "poster" },
                        { "image_url": "http://www.link.com/to/image.png", "ratio": "1.77", "type": "scene" },
                        { "image_url": "http://www.link.com/to/image.png", "ratio": "1.33", "type": "scene" },
                        { "image_url": "http://www.link.com/to/image.png", "ratio": "2", "type": "scene" },
                        { "image_url": "http://www.link.com/to/image.png", "ratio": "0.75", "type": "scene" }
        ],
  "theme": [
    "Ladder to the Top",
    "Musician's Life"
  ],
  "tone": [
    "Dark"
  ],
  "mood": [
    "Whimsical"
  ],
  "time_period": [
    "2000s"
  ],
  "ratings": {
    "US": {
      "MPAA": {
        "rating": {
          "label": "PG-13",
          "reasons": [
            "Violence",
            "Language"
          ]
        },
        "TV": {
          "rating": {
            "label": "TV-14",
            "reasons": [
              "VL"
            ]
          }
        }
      }
    },
    "IN": {
      "CBFC": {
        "rating": {
          "label": "UA",
          "reasons": [
            "Violence",
            "Language"
          ]
        }
      }
    }
  },
```

```
  "characters": [
    "Vampires",
    "Cowboys"
  ],
  "original_airdate": "20070323",
  "release_year": 2007,
  "program_id": "3097",
  "season_name": "Season 2",
  "category": [
    "Family"
  ],
  "teams": [],
  "series_title": "Series Title",
  "start_dt": "2019-04-23T17:00:00Z",
  "program_description": "Program short description will go here.",
  "program_long_description": "Program long description will go here.",
  "season_images": [
    {
                  "image_url": "http://www.link.com/to/image.png",
                  "ratio": "1.77",
                  "type": "poster"
    },{
                  "image_url": "http://www.link.com/to/image.png",
                  "ratio": "1.33",
                  "type": "poster"
    },{
                  "image_url": "http://www.link.com/to/image.png",
                  "ratio": "2",
                  "type": "poster"
    },{
                  "image_url": "http://www.link.com/to/image.png",
                  "ratio": "0.75",
                  "type": "poster"
    },         {
                  "image_url": "http://www.link.com/to/image.png",
                  "ratio": "1.77",
                  "type": "scene"
    },{
                  "image_url": "http://www.link.com/to/image.png",
                  "ratio": "1.33",
                  "type": "scene"
    },{
                  "image_url": "http://www.link.com/to/image.png",
                  "ratio": "2",
                  "type": "scene"
    }
  ],
  "program_title": "Program Title",
  "season_number": 2,
  "episode_series_sequence": 45,
  "rovi_series_id": "12345678",
  "rovi_program_id": "500322",
  "media_url": "http://provider.com/epg/channel/manifests/asset2",
  "duration": 3600
}
```


VOD API

The VOD API lists all available VOD content for a given source.

This section describes the VOD API request and the expected responses. The VOD API must implement the "Metadata Results Paging" mechanism. (See Appendix B).

HTTP Request Format

VOD API requests from the Sling TV CMS services will have the following elements:

Attribute	Value	Variable	Sample Value	Notes

URL	"vod_url" field from a "source" API response	vod_url	http://provider.com/vod	Provided in the "vod_url" field of a response from a "source" endpoint.
PATH		source_id	"8623450"	Identifier for the source. The source_id is obtained from previous call to the Source API.
		date	"2019-02-24"	The request should return all VOD content modified since this date. See ISO-8601 Date times for required format.
METHOD	GET			
PARAMETERS		page	1	Part of Sling TV's results paging mechanism. See Appendix B
		results_per_page	100	Part of Sling TV's results paging mechanism. See Appendix B
		client_id	774277	The client_id assigned to Sling TV during the on-boarding process.
		sling_tv_timestamp	1534201996	Part of the Sling TV Cryptographic Signature. See Appendix C
HEADERS		x-sling-tv-signature	(Base64-encoded SHA-256 HASH)	Part of the Sling TV Cryptographic Signature. See Appendix C

Please note the order of Query Parameters has to be maintained in order to create and verify the Sling TV Cryptographic Signature. See Appendix C

Sample request (Omitting headers): http://provider.com/vod/8623450/2019-02-24?page=1&results_per_page=100&client_id=774277&sling_tv_timestamp=1534201996

Error Response Format

EPG API error responses must be in JSON format and have the following attributes:

Attribute	Name	Value	Notes
CODE		403 (Forbidden)	Request was denied because the requestor was not authorized
		404 (Not Found)	If the request is denied due to failure to validate the Sling TV Cryptographic Signature, a 404 response may be returned to obfuscate a cryptographic failure
		non-200	As determined by the partner. Any non-200 response will be interpreted as a request failure by the Sling TV CMS services
HEADER	Content-Type	application/json	Indicates that the response body is in Json format.

The error response's payload data must be in JSON-format, but its precise format and content is left to the discretion of the provider. However, its root object must contain the following fields.

Attribute	Data Type	Required	Notes
error_code	String	Required	Provider-specific error code.
error_msg	String	Required	A human-readable description of the error. This field may contain misleading text in order to hide cryptographic failure.

Sample error response body:

Example Source Error Response

```
{
  "provider_field_1": "something useful",
  "error_code": "234-345.1",
  "error_message": "Database connection failed",
  "session_id": 123432
}
```

Success Response Format

Source API success responses must be in JSON format and have the following attributes:

Attribute	Name	Value	Notes

CODE		200	Request was successful
HEADER	Content-Type	application/json	Indicates that the response body is in Json format.

The success response's payload data must be in JSON-format.

While its precise format and content is left to the discretion of the provider, the tables in the following section describe the recognized format and fields of the data payload of the successful EPG responses. Required fields and objects are also described.

VOD Response Root Object

The root object of the EPG response should include the following fields. Fields marked as "Required" must be included.

Attribute	Data Type	Required	Notes
_next	String	Optional	This attribute is part of Sling TV's results paging mechanism. See Appendix G Must be present if there are one or more subsequent pages of results.
_prev	String	Optional	This attribute is part of Sling TV's results paging mechanism. See Appendix G Must be present if there are one or more previous pages of results.
vod_objects	List of VOD Objects	Required	See description of VOD Objects below.

Example VOD Root Object

```
{
  "_next": "http://link/to/the/next/page",
  "_prev": "http://link/to/the/previous/page",
  "vod_objects": [
    ...
  ]
}
```

VOD Object

Each source object included in the "vod_objects" list should include the following fields. Fields marked as "Required" must be included.

Attribute	Data Type	Required	Description	Example
media_url	URL	Required	URL that provides access to the individual asset video stream. This HTTP/HTTPS endpoint must implement the Sling TV Stream Authentication API	
credits	List of credit objects	Optional	Represents actors and directors and others credited to the content.. While credits are not required, when a credit is provided there are required fields.	See Credit Object.
eidr_id	String	Optional	See EIDR.	"10.5240/D340-4608-77C2-4316-C515-A"
episode_number	Integer	Required	Sequence number for episode within a season. The 2nd episode in a given season would be 2. May be empty.	22
episode_series_sequence	Integer	Required	The broadcast sequence of this episode, in the series to date. If season 1 has 4 episodes, the episode_series_sequence for the last episode of season 1 is 4 and the episode_series_sequence of the first episode of season 2 is 5.	2
season_number	Integer	Required	Sequence number for the season. If Season 1a and Season 1b exist, then the season_number would be 1 and 2 respectivly.	2
category	List of Strings	Optional	The program category (Movie, Children, Lifestyle, Music, News, Other, Sports, etc.). Either "category" or " genre" must be provided.	["News"]
genre	List of Strings	Optional	Genre(s) associated with program. May be an empty list (i.e., []). Either "category" or " genre" must be provided.	["newscast", "investigative journalism", "current affairs"]
program_type	String	Required	Type of program represented on VOD catalog: movie, sport, episode, **extras** or one time.	"sport"

sub_type	**String**	**Required**	**Sub categorization of content as: movie, extras, episode, sport-game, sport-talkshow, sport-documentary, news, one-time-sport, one-time, sport-league, generic (fallback)** **See Appendix F for subtype generation.**	**"sport-talkshow"**
offer_stop	String	Required	See ISO-8601 Date times. Represents when the item should no longer be visible in the Sling TV application.	"2018-02-02T00:30:00Z"
playback_stop	String	Required	See ISO-8601 Date times. Represents when the item can no longer be playable in the Sling TV Application. Cannot be greater than offer_stop.	"2018-02-02T00:30:00Z"
series_id	String	Optional	Unique identifier for series. (Required if content is related to a series)	"3946509771"
series_description	String	Optional	Short Description for the series. **Usually 120 chars.**	"Reports on the day's noteworthy national and international events."
series_long_description	**String**	**Optional**	**Long Description for the series. Usually 255 chars.**	
source_id	String	Required	Unique identifier for source.	"123456"
vod_id	String	Required	Unique identifier for specific video on demand offering.	"5693329246"
series_images	List of Image Objects	Optional	Images used to identify the series. **Images with Aspect Ratio 1.77 (16x9), 1.33 (4x3), 2 (2x1) and 0.75 (3x4) are required. We also need both Poster (image which has program title) and Scene (image which does not have program title) images with all the aspect ratios mentioned.**	See Image Object.
program_images	List of Image Objects	Optional	Images used to identify the program. **Images with Aspect Ratio 1.77 (16x9), 1.33 (4x3), 2 (2x1) and 0.75 (3x4) are required. We also need both Poster (image which has program title) and Scene (image which does not have program title) images with all the aspect ratios mentioned.**	See Image Object.
theme	String	Optional	A featured subject or storyline.	["Ladder to the Top", "Musician's Life", "Tortured Genius", "Rise and Fall Stories", "Inner City Blues", "Police Corruption"]
tone	String	Optional	Tones qualities and characteristics of the movie chosen by the filmmaker that influence how a viewer may feel about it; together they contribute to the film's general atmosphere.	["Goofy", "Serious"]
mood	List of Strings	Optional	Moods are similar to Tones but are broader and come from the angle of how a viewer judges the feel of the movie, and so are broader and less formal; may cross genres and sub-genres.	["Triumph of the Spirit"]
time_period	List of Strings	Optional	Indicates a time other than the present day (when the movie is made) when the film's story takes place. May be the time surrounding a specific event like a war, or a more general span of years.	["1990s"]
ratings	List of Rating Objects	Optional	One or more rating bodies with the rating and reasons applied to this content. Inclusive or movie or tv ratings bodies.	See Ratings Object.
characters	List of Strings	Optional	Identifies instantly recognizable patterns of behavior, demonstrates key distinctions between opposing personal value systems and creates the emotional conflicts that actively propels a character through a story.	["Lothario", "Angry Young Men"]
release_year	Integer	Optional	Year the program/movie was released.	2018
program_id	String	Required	Unique program identifier.	"5693326091"
season_name	String	Optional	Season number and name, if available.	"Season 3: The Funny One"
teams	List of Team Objects	Optional	While team objects are not required, when provided there are required fields.	See Teams Object.
series_title	String	Optional	Title of a series.	"Vice News Tonight"
offer_start	String	Required	See ISO-8601 Date times. Represents the time at which the item should be visible in the Sling TV Application.	"2018-02-02T00:30:00Z"
playback_start	String	Required	See ISO-8601 Date times. Represents when the item can start being played in the Sling TV Application. Cannot be less than offer_start.	"2018-02-02T00:30:00Z"
program_description	String	Optional	Short Description of the program. **Usually 120 chars.**	"This electrifying biopic of legendary rapper Tupac Shakur depicts his rise to fame, his political activism, his growth as an artist, his connection to Death Row Records CEO Suge Knight and his untimely death at the age of 25."
program_long_description	**String**	**Optional**	**Long Description of the program. Usually 255 chars.**	

season_images	List of Image Objects	Optional	See Image Object. **Images with Aspect Ratio 1.77 (16x9), 1.33 (4x3), 2 (2x1) and 0.75 (3x4) are required. We also need both Poster (image which has program title) and Scene (image which does not have program title) images with all the aspect ratios mentioned.**	
program_title	String	Required	Title of the program or episode.	"Eagles at Giants from the Meadowlands"
rovi_series_id	Integer	Optional	See Rovi/Tivo Ids.	65132
rovi_program_id	Integer	Optional	See Rovi/Tivo Ids.	9847650
duration	integer	Required	Duration of the content in seconds.	3600

Example Vod Object


```
{
  "credits": [
    {
      "full_name": "Tom Hanks",
      "role": "Actor",
      "credit_id": "8970234",
      "last_name": "Hanks",
      "first_name": "Tom",
      "order": 1
    }
  ],
  "eidr_id": "10.5240/D340-4608-77C2-4316-C515-A",
  "episode_number": 3,
  "genre": [
    "Comedy",
    "Family"
  ],
  "program_type": "Episode",
  "sub_type": "sport-talkshow",
  "offer_stop": "2019-04-23T18:00:00Z",
  "playback_stop": "2019-04-23T18:00:00Z",
  "series_id": "231547890",
  "series_description": "Series description here.",
  "series_long_description": "Series long description here.",
  "source_id": "1234978",
  "vod_id": "907865",
  "series_images": [
    {
                "image_url": "http://www.link.com/to/image.png",
                "ratio": "1.77",
                "type": "poster"
    },{
                "image_url": "http://www.link.com/to/image.png",
                "ratio": "1.33",
                "type": "poster"
    },{
                "image_url": "http://www.link.com/to/image.png",
                "ratio": "2",
                "type": "poster"
    },{
                "image_url": "http://www.link.com/to/image.png",
                "ratio": "0.75",
                "type": "poster"
    },          {
                "image_url": "http://www.link.com/to/image.png",
                "ratio": "1.77",
                "type": "scene"
    },{
                "image_url": "http://www.link.com/to/image.png",
                "ratio": "1.33",
                "type": "scene"
    },{
                "image_url": "http://www.link.com/to/image.png",
                "ratio": "2",
                "type": "scene"
```

```
  },{
                "image_url": "http://www.link.com/to/image.png",
                "ratio": "0.75",
                "type": "scene"
  }
],
"program_images": [
  {
                "image_url": "http://www.link.com/to/image.png",
                "ratio": "1.77",
                "type": "poster"
  },{
                "image_url": "http://www.link.com/to/image.png",
                "ratio": "1.33",
                "type": "poster"
  },{
                "image_url": "http://www.link.com/to/image.png",
                "ratio": "2",
                "type": "poster"
  },{
                "image_url": "http://www.link.com/to/image.png",
                "ratio": "0.75",
                "type": "poster"
  },         {
                "image_url": "http://www.link.com/to/image.png",
                "ratio": "1.77",
                "type": "scene"
  },{
                "image_url": "http://www.link.com/to/image.png",
                "ratio": "1.33",
                "type": "scene"
  },{
                "image_url": "http://www.link.com/to/image.png",
                "ratio": "2",
                "type": "scene"
  },{
                "image_url": "http://www.link.com/to/image.png",
                "ratio": "0.75",
                "type": "scene"
  }
],
"theme": [
  "Ladder to the Top",
  "Musician's Life"
],
"tone": [
  "Dark"
],
"mood": [
  "Whimsical"
],
"time_period": [
  "2000s"
],
"ratings": {
  "US": {
    "MPAA": {
      "rating": {
        "label": "PG-13",
        "reasons": [
          "Violence",
          "Language"
        ]
      },
      "TV": {
        "rating": {
          "label": "TV-14",
          "reasons": [
            "VL"
          ]
        }
```

```
        }
      }
    },
    "IN": {
      "CBFC": {
        "rating": {
          "label": "UA",
          "reasons": [
            "Violence",
            "Language"
          ]
        }
      }
    }
  },
  "characters": [
    "Vampires",
    "Cowboys"
  ],
  "release_year": 2007,
  "program_id": "3097",
  "season_name": "Season 2",
  "category": [
    "Family"
  ],
  "teams": [],
  "series_title": "Series Title",
  "offer_start": "2019-04-23T17:00:00Z",
  "playback_start": "2019-04-23T17:00:00Z",
  "program_description": "Program description will go here.",
  "program_long_description": "Program long description will go here.",
  "season_images": [
           {
                  "image_url": "http://www.link.com/to/image.png",
                  "ratio": "1.77",
                  "type": "poster"
    },{
                  "image_url": "http://www.link.com/to/image.png",
                  "ratio": "1.33",
                  "type": "poster"
    },{
                  "image_url": "http://www.link.com/to/image.png",
                  "ratio": "2",
                  "type": "poster"
    },{
                  "image_url": "http://www.link.com/to/image.png",
                  "ratio": "0.75",
                  "type": "poster"
    },         {
                  "image_url": "http://www.link.com/to/image.png",
                  "ratio": "1.77",
                  "type": "scene"
    },{
                  "image_url": "http://www.link.com/to/image.png",
                  "ratio": "1.33",
                  "type": "scene"
    },{
                  "image_url": "http://www.link.com/to/image.png",
                  "ratio": "2",
                  "type": "scene"
    }
  ],
  "program_title": "Program Title",
  "season_number": 2,
  "episode_series_sequence": 45,
  "rovi_series_id": "12345678",
  "rovi_program_id": "500322",
  "media_url": "http://provider.com/vod/manifests/asset2",
  "duration": 3600
}
```

Stream Authentication API - CORS enabled resource

The Stream Authentication API is used by Sling TV players to obtain playable video manifests.

The API allows content providers to verify that requests for video stream manifests originate from authentic Sling TV players before returning the video manifest URL. Sling TV expects that the content provider issues the video manifest URL with the following expectations:

- It is intended for a single use by the requesting player only.
- It will be decorated with security tokens, but is playable without modification.
- It will expire within a relatively short period of time.

While the exact security measures used in the URL are left to the discretion of each content provider, the URL returned by the API must be playable without modification. Please note that the Sling TV Cryptographic signature will NOT be included in requests for video manifests or segments.

HTTP Request Format

Stream Authentication API requests from Sling TV players will have the following elements:

Attribute	Value	Variable	Sample Value	Notes
URL	media_url	media_url	http://provider.com/content/vod/manifests?asset_id=45678	This is the url originally supplied to Sling TV CMS services in the "media_url" field of either the "schedule" or "vod" objects. This URL should be unique to the specific video and should not change.
METHOD	GET			
PARAMETERS		sling_tv_timestamp	1534201996	Part of the Sling TV Cryptographic Signature. See Appendix C
		client_id	774277	The client_id assigned to Sling TV during the on-boarding process.
		sling_tv_user_hash	54342341124123	Part of the Sling TV Cryptographic Signature. See Appendix C Optional. Provided as a courtesy
		device_type	roku	Identifies client device type. Optional. Provided as a courtesy.
		device_id	21344322	Identifies a specific device. Optional. Provided as a courtesy.
HEADERS		x-sling-tv-signature	(Base64-encoded SHA-256 HASH)	Part of the Sling TV Cryptographic Signature. See Appendix XX
		x-sling-tv-accepted-stream-formats	hls,dash	Specifies the streaming formats supported by the requesting device
		x-sling-tv-accepted-container-formats	ts,cmaf	Specifies the container formats accepted by the requesting device: - ts: MPEG-2 Transport Stream files - cmaf: Common Media Format. (Fragmented MP4 files may generally be used here)
		x-sling-tv-accepted-drms	hls,hls-aes,widevine	Specifies the DRMs supported by the requesting client. Supported values are: - hls: unencrypted hls - hls-aes: hls with AES-128 encryption - widevine - play-ready - fair-play

Please note the order of Query Parameters has to be maintained in order to create and verify the Sling TV Cryptographic Signature. See Appendix C

Sample request (Omitting headers): http://provider.com/content/vod/manifests?asset_id=45678&sling_tv_timestamp=1534201996&client_id=774277&sling_tv_user_hash=54342341124123&device_type=android_tv&device_id=21344322

*For Javascript Sling Clients, as the Stream Authentication API requires custom headers like "**x-sling-tv-signature**", "**x-sling-tv-accepted-stream-formats**", "**x-sling-tv-accepted-container-formats**" and "**x-sling-tv-accepted-drms**", JS clients intend to send the **Pre-Flight OPTIONS request** to check whether the custom headers are accepted by the Content Provider Servers. See Appendix E*

Error Response Format

Stream Authentication API error responses must be in JSON format and have the following attributes:

Attribute	Name	Value	Notes

CODE		403 (Forbidden)	Request was denied because the requestor was not authorized
		404 (Not Found)	If the request is denied due to failure to validate the Sling TV Cryptographic Signature, a 404 response may be returned to obfuscate a cryptographic failure
		non-200	As determined by the partner. Any non-200 response will be interpreted as a request failure by the Sling TV CMS services
HEADER	Content-Type	application /json	Indicates that the response body is in Json format.

The error response's payload data must be in JSON-format, but its precise format and content is left to the discretion of the provider. However, its root object must contain the following fields.

Attribute	Data Type	Required	Notes
error_code	String	Required	Provider-specific error code.
error_msg	String	Required	A human-readable description of the error. This field may contain misleading text in order to hide cryptographic failure.

Sample error response body:

Example Stream Authentication Fail Message

```
{
  "provider_field_1": "something useful",
  "error_code": "404",
  "error_message": "Some human-readable error message",
    ...
}
```

Success Response Format

Stream Authentication API success responses must be in JSON format and have the following attributes:

Attribute	Name	Value	Notes
CODE		200	Request was successful
HEADER	Content-Type	application/json	Indicates that the response body is in Json format.

The success response's payload data must be in JSON-format.

Stream Authentication Response Root Object

The root object of the Stream Authentication response should include the following fields. Fields marked as "Required" must be included. Programmers may include other fields and data for their own purposes at their own discretion.

Attribute	Data Type	Sample Value	Required	Notes
format	String	hls	Required	Describes the streaming format used. Only "hls" and "dash" are supported.
manifest_url	String	https://provider.com/content/vod/manifests /this_title.m3u8?token=base64String	Required	Manifest for requested stream. Manifest will be passed to players unchanged, including all query parameters.
drm_type	String	hls-aes	Required	Identifies the drm used in the video stream. Must be one of the values listed in "x-Sling TV-accepted-drms" header of the request.
drm_la_url	String	http://provider.com/widevine/la_url/this_title	Optional	LA URL required by some DRM schemes
drm_cert	String	nRpZmljY+D5gLdqXpOFI2XsoAipuxW6NKnnlA=	Optional	Certificate that may be required to play FairPlay DRM.

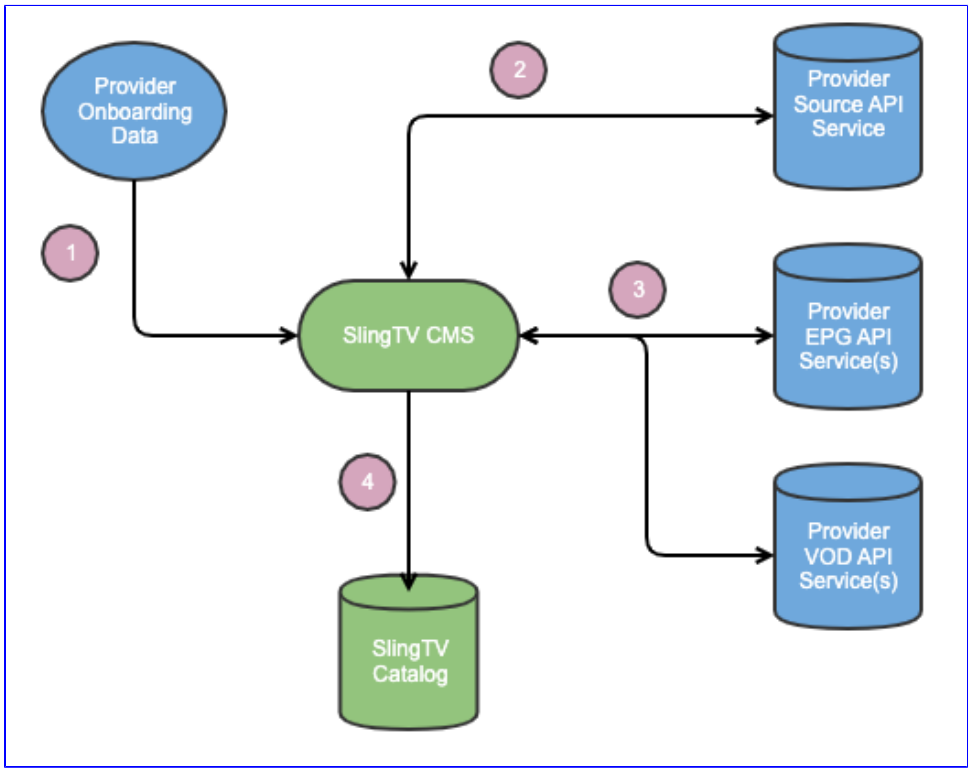
Sample

Example Stream Authentication Fail Message

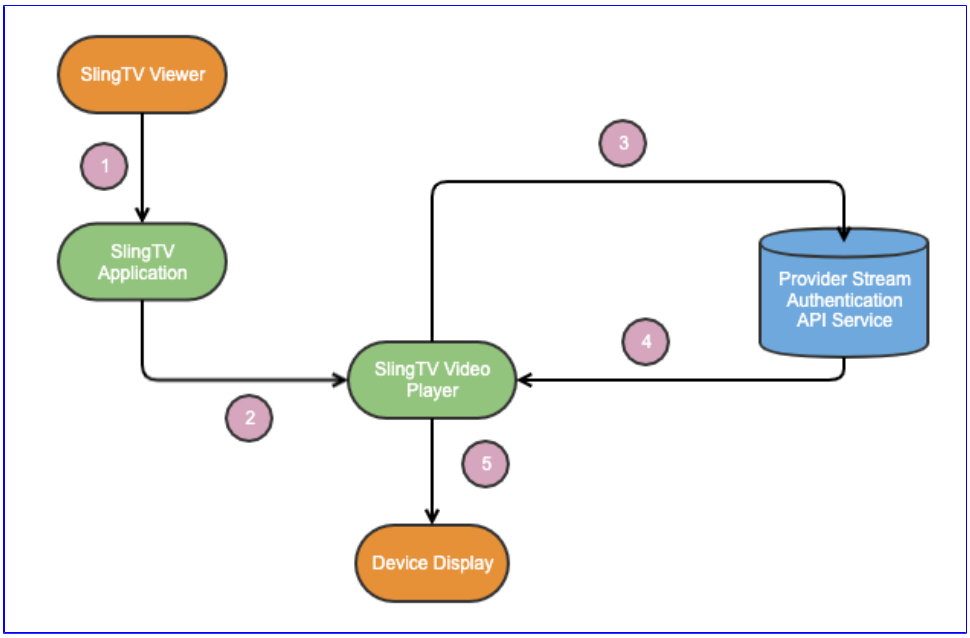
```
{
  "format": "hls",
  "manifest_url": "https://provider.com/content/vod/manifests/this_title.m3u8?token=base64String",
  "drm_type": "hls-aes",
  "drm_la_url": "http://provider.com/widevine/la_url/this_title",
  "drm_cert": "nRpZmljY+D5gLdqXpOFI2XsoAipuxW6NKnnlA=",
  "provider_field_1": "something useful",
  "error_code": "200",
  "error_message": "Success",
    ...
}
```

Workflows

The following diagrams describe the major workflows of this specification.



1. The "source_url" is provided to Sling TV as part of the on-boarding process.
2. Sling TV CMS requests list of sources from provider's Source API Service.
3. Sling TV iterates through sources, requesting content metadata from provider's EPG and VOD API services
4. Sling TV CMS publishes provider content in Sling TV's content catalog.


SlingTV Viewer
1
SlingTV Application
2
SlingTV Video Player
3
Provider Stream Authentication API Service
4
5
Device Display

Video Streaming in Sling TV

This section discusses various issues related to streaming video in the Sling TV system. While not all the guidelines presented in this section are intended to be requirements, adherence will ensure that a programmer's content can successfully play on all Sling TV-supported devices.

Streaming Formats

Programmer content must be available via HLS, although some of Sling TV's platforms also support DASH.

HLS manifests (m3u8 files) must be version 3 or higher. Please note that not all Sling TV-supported platforms support HLS' alternative rendition feature, which was introduced in version 7.

Audio/Video segments may be packaged in either fragmented MPEG-4 files, or MPEG-2 Transport Stream files (tsFiles).

Since most Sling TV player applications use the media players supplied by the platform manufacturers, programmers are referred to the manufacturer's documentation for specifics on supported/suggested audio, video, and streaming formats.

Use of multi-period DASH manifests is not recommended at this time due to variations in quality of support from the platform manufacturers.

See the table in the 'Encryption' section for information on which streaming format is supported on which platforms.

DRM and Encryption

At the programmer's discretion, content may or may not be protected by cryptography or a DRM solution.

Only HLS with AES-128 encryption is supported at this time. Full support for Widevine, PlayReady, and FairPlay DRMs are scheduled for future updates of this specification.

For specifics on the supported combinations of streaming format on each Sling TV-supported platform, programmers are referred to the platform manufacturer's documentation.

Analytics Beaconing through HTTP Redirection

Some programmers choose to implement a scheme in their HLS manifests where video segment requests are periodically directed to a tracking service, then redirected (via HTTP 30x codes) to the URL of the required video segment. Under these schemes, the original request acts like a "beacon" to provide the publisher information regarding each user's playback position and progress.

While there are no specific guidelines around the frequency of beaconing segments, programmers are warned that too frequent beaconing may have an adverse affect on the quality of content delivered to the viewer.

Video Encoding Parameters

Content must be encoded to the following standards:

- **Segment size**. With the exception of the final segment of a clip, all segments should be the same standard size (as measured in seconds of content).
    - Suggested standard sizes are 2, 4, or 6 seconds. (Ideally 2048 msecs, 4096 msecs, or 6144 msecs.)
    - The final segment of a clip should be at least 500Msecs, but no more than standard size + 500 msecs.
- **A/V Overhang**. The starting PTS values for audio and video streams within a single segment should not vary by more than 100msecs.

Closed Captions

Closed captions should use the CEA-608/CEA-708 standard.

Thumbnail

Sling TV does not currently support the use of thumbnail images in externally encoded content.

Player Authentication

Player authentication is established through the use of the Sling TV Cryptographic Signature in the Stream Authentication API.

User Authentication

User authentication is done by the Sling TV players. Programmers may assume that all content requests from authenticated players are from authenticated users.

A full discussion of user authentication is outside the scope of this document.

User Authorization

User authorization is done by the Sling TV players. Programmers may assume that all content requests from authenticated players are fully authorized. However, programmers are free to implement their own authorization schemes in the services that implement the Stream Authentication API, or anywhere else within the bounds of this specification.

A full discussion of user authentication and authorization is outside the scope of this document.

Appendix A - Content Metadata Tables

Credit Object

Specification for the credit object. A credit represents an actor, director, While credits are not required, when a credit is provided there are required fields.

Attribute	Data Type	Description	Example
last_name	String	Last name for credit.	"John"
first_name	String	First name for credit.	"Wayne"
full_name	String	**REQUIRED.** Full name for credit. Usually the first_name and last_name put together with a space between them.	"John Wayne"
role	String	**REQUIRED.** Role for credit.	"Actor"
credit_id	String	**REQUIRED.** Unique identifier for credit.	"12345"
credit_role_id	String	Unique identifier for the credit and this specific role.	"31343"
images	List of Image Objects	List of different images for the credit.	See Image Object.
order	integer	List the order the credits should be listed.	1

Example Credit Object

```
{
  "credit_id": "8970234",
  "credit_role_id": "31343",
  "first_name": "Tom",
  "full_name": "Tom Hanks",
  "images": [
    {
      "image_url": "http://www.link.com/to/image.png",
      "ratio": "1x2"
    }
  ],
  "last_name": "Hanks",
  "order": 1,
  "role": "Actor"
}
```

Image Object

Specification for the Image object. Images with Aspect Ratio 1.77 (16x9), 1.33 (4x3), 2 (2x1) and 0.75 (3x4) are required. We also need both Poster (image which has program title) and Scene (image which does not have program title) images with all the aspect ratios mentioned. **The minimum dimension of these images should be 1920px wide thereby maintaining its aspect ratio.**

Attribute	Data Type	Description	Example
image_url	String	**REQUIRED.** Url for the image.	
width	Integer	Width in pixels of the image.	1600
height	Integer	Height in pixels of the image.	900
ratio	string	**REQUIRED.** Represents the ratio of the image.	"1.77", "1.33", "2", "0.75"
type	String	**REQUIRED.** Type of image. poster - An image which has program title. scene - An image or typically a background scene which does not have program title.	"poster" or "scene"

Example Image Object showing required fields

```
{
  "image_url": "http://www.link.com/to/image.png",
  "ratio": "1.77",
  "type": "poster"
}
```

Team Object

Specification for the team object. While team objects are not required, when provided there are required fields.

Attribute	Data Type	Description	Example
nickname	String	The second half of the team?s full name, the primary nickname by which the team is branded.	"Cougars"
league	String	**REQUIRED.** Name of the league the team is a member of.	"NFL"
full_team_name	String	**REQUIRED.** The team?s full name joining of ?Name? and ?Nickname?.	"Brigham Young Cougars"
representing_team	String	The city, region or organization that the team represents.	"Brigham Young"
home_away	String	Home, away or neutral status of team.	"Home"
sports_type	String	**REQUIRED.** Sport team is playing.	"Basketball"
conference	String	Conference in the league.	"NFC"
division	String	Division of the conference.	"West"
team_id	String	**REQUIRED.** Unique Id for team (i.e., ?Brigham Young Men?s Basketball?)	"6266"

gender	String	**REQUIRED.** Gender of which the team is represented.	"female", "female", "both"

Example Team Object

```
{
  "nickname": "Cougars",
  "league": "NCAAF",
  "full_team_name": "Brigham Young Cougars",
  "representing_team": "Brigham Young",
  "home_away": "Home",
  "sports_type": "Football",
  "conference": "Independent",
  "division": null,
  "team_id": "289734",
  "gender": "Male"
}
```

Ratings Object

The ratings object allows for multiple film rating systems recognized by different countries to be specified.

Attribute	Data Type	Description	Example
rating_country	String	**REQUIRED.** The country of origin for the ratings body.	"US"
rating_body	Object	**REQUIRED.** The ratings body and its specific labels.	

In the example below, "US" represents the rating_country. "MPAA" represents the rating_body.

Example Ratings Object

```
{
  "ratings": {
    "US": {
      "MPAA": {
        "rating": {
          "label": "PG-13",
          "reasons": ["Violence", "Language"]
        },
      "TV": {
        "rating": {
          "label": "TV-14",
          "reasons": ["VL"]
        }
      }
    },
    "IN": {
      "CBFC": {
        "rating": {
          "label": "UA",
          "reasons": ["Violence", "Language"]
        }
      }
    }
  }
}
```

Rating Body

The ratings body applies specific labels with meanings.

Attribute	Data Type	Description	Example

rating_body	String	**REQUIRED.** The name of the ratings body.	"MPAA"
rating_label	Object	**REQUIRED.** Rating and reasons for the rating.	

Rating Label Object

Film rating labeling specific to the ratings body

Attribute	Data Type	Description	Example
rating	String	**REQUIRED.** The rating label.	"PG-13"
rating_reasons	List of Strings	One or more reasons for the rating.	["Violence", "Language"]

EIDR

The program EIDR (Entertainment Identifier Registry) file contains information about EIDR IDs and their corresponding program IDs. EIDR IDs are unique digital object identifiers (DOIs) used to note unique audio-visual assets (i.e., every possible version of a given work can have its own ID, whether for technical, creative, or other reasons). For example, the original form of the movie ?The Godfather? could have one ID, the French translation has another, and a digitally compressed version has another.

The EIDR ID contains an EIDR-specific prefix (registered with the International DOI Foundation) followed by a hexadecimal string. For example, ?The Godfather? record has an ID of 10.5240/843E-C238-7F61- DDFC-F427-9, where 10.5240 is the prefix, the ID follows the slash, and the 9 at the end is a check digit. Numbers and letters can appear anywhere in the string.

Rovi/Tivo Ids

Series Id: Unique identifier for a series as defined by Rovi/Tivo.

Program Id: Unique identifier for a program as defined by Rovi/Tivo.

ISO-8601 Date times

Where specified date-times requiring ISO-8601 compliance should adhere directly to the standard set forth.

1. Times are expressed in UTC (Coordinated Universal Time), with a special UTC designator ("Z").
2. Times are expressed in local time, together with a time zone offset in hours and minutes. A time zone offset of "+hh:mm" indicates that the date /time uses a local time zone which is "hh" hours and "mm" minutes ahead of UTC. A time zone offset of "-hh:mm" indicates that the date/time uses a local time zone which is "hh" hours and "mm" minutes behind UTC.

String	Time Represented
"1994-11-05T08:15:30-05:00"	November 5, 1994, 8:15:30 am, US Eastern Standard Time
"1994-11-05T13:15:30Z"	November 5, 1994, 1:15:30 pm, UTC

For more detailed information see https://www.w3.org/TR/NOTE-datetime.

Ratings and Rating Bodies

- United States of America (USA)
    - **MPAA (Motion Picture Association of America)**

      https://en.wikipedia.org/wiki/Motion_Picture_Association_of_America

Rating	Description
NC-17	Clearly adult. Children are not admitted.
R	Children Under 17 Require Accompanying Parent or Adult Guardian.
PG-13	Some Material May Be Inappropriate for Children Under 13.
PG	Some Material May Not Be Suitable for Children.
G	All Ages Admitted.
NR	Has not been submitted to the MPAA for a rating or rating not provided.

      Rating Reasons

      Accepted rating reasons are free form strings delivered in a list.

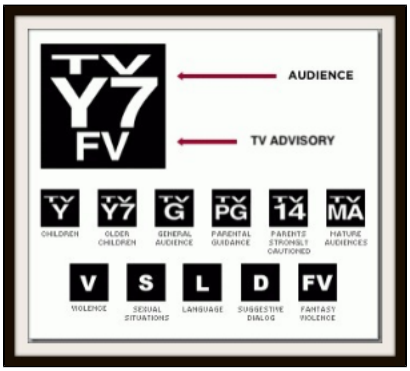
- **TV (TV Parental Guidelines)**

  https://en.wikipedia.org/wiki/TV_Parental_Guidelines

Rating	Description
TV-Y	Designed to be appropriate for all children.
TV-Y7	Designed for children age 7 and above.
TV-G	Most parents would find this program suitable for all ages.?
TV-PG	Contains material that parents may find unsuitable for younger children.
TV-14	Contains some material that many parents would find unsuitable for children under 14 years of age.
TV-MA	Specifically designed to be viewed by adults and therefore may be unsuitable for children under 17.

Rating Reasons

Tv Advisories are unique from all other rating reason lists. TV rating reasons should be a list of one string. The custom is that they are delivered as a string representing a concatenated list of the individual TV Advisories with no spaces. This is the same as the icon you see on TV when TV ratings with Advisories are given. For example, "DLS" is valid for communicating Dialog, Language, and Sexual Situations in the TV Advisories.



TV Advisory	Description
D	Suggestive Dialog
FV	Fantasy Violence
L	Strong, Coarse Language
S	Explicit Sexual Situations
V	Violence

- India
  - **CBFC (Central Board of Film Certification)**

    https://en.wikipedia.org/wiki/Central_Board_of_Film_Certification

Rating	Description
U	Unrestricted Public Exhibition.
U/A	Parental Guidance for children below the age of 12 years.
A	Restricted to adults.
S	Restricted to any special class of persons.
V/U	Video Release Unrestricted Public Exhibition.
V/UA	Video Release Parental Guidance for children below the age of 12 years.
V/A	Video Release Restricted to adults.

Rating Reasons

Accepted rating reasons are free form strings delivered in a list.

- Great Britain
  - **BBFC (British Board of Film Classification)**

    https://en.wikipedia.org/wiki/British_Board_of_Film_Classification

Rating	Description
U	Universal ? Suitable for all.
PG	Parental Guidance.
12A	Suitable for 12 years and over. No one younger than 12 may see a 12A film in a cinema unless accompanied by an adult.
12	Suitable for 12 years and over.
15	Suitable only for 15 years and over.
18	Suitable only for adults.
R18	To be shown only in specially licensed cinemas, or supplied to adults only.
A	Restricted to adults.

Rating Reasons

Accepted rating reasons are free form strings delivered in a list.

- Brazil
  - **DJCTEQ (Departamento de Justiça, Classificação, Títulos e Qualificação)**

    https://en.wikipedia.org/wiki/Brazilian_advisory_rating_system

Rating	Description
L	Livre. General Audiences.
10	Não recomendado para menores de dez anos. Not recommended for minors under ten.
12	Não recomendado para menores de doze anos. Not recommended for minors under twelve.
14	Não recomendado para menores de catorze anos. Not recommended for minors under fourteen.
16	Não recomendado para menores de dezesseis anos. Not recommended for minors under sixteen.
18	Não recomendado para menores de dezoito anos. Not recommended for minors under eighteen.
ER	Especialmente recomendado para crianças e adolescentes. Especially recommended for children and teenagers.

Rating Reasons

Accepted rating reasons may or may not be from the following list. However, the list below is a strongly recommended list of DJCTEQ rating reasons. The Portuguese or English version may be used.

Suggested Rating Reasons
Violência (Violence).
Violência Extrema (Extreme Violence).
Conteúdo Sexual (Sexual Content).
Nudez (Nudity).
Sexo (Sex).
Sexo Explícito (Explicit Sex).
Drogas (Drugs).
Drogas Lícitas (Legal Drugs).
Drogas Ilícitas (Illegal Drugs).

Linguagem Imprópria (Inappropriate Language).
Atos Criminosos (Criminal Acts).
Conteúdo Impactante (Shocking Content).

- Australia
  - **ACB (Australian Classification Board)**

    https://en.wikipedia.org/wiki/Australian_Classification_Board

Rating	Description
E	Exempt from classification. Only very specific types of material (including educational material and artistic performances) can be exempt from classification, and the material cannot contain anything that exceeds the constraints of the PG classification.
G	General.
PG	Parental guidance recommended.
M	Mature. Recommended for mature audiences.
MA15+	Mature Accompanied. Contains material that is considered unsuitable for exhibition by persons under the age of 15.
R18+	Restricted. Contains material that is considered unsuitable for exhibition to persons under the age of 18.
X18+	Restricted. Contains material that is pornographic in nature.
RC	Refused Classification. Contains material that is considered offensive to the standards of morality, decency and propriety generally accepted by a 'reasonable adult' to the extent that it should not be classified.

Rating Reasons

Accepted rating reasons may or may not be from the following list. However, the list below is a strongly recommended list of ACB rating reasons.

Suggested Rating Reasons
Violence.
Sexual activity.
Coarse language.
Drug use.
Nudity.
Moderate violence.
Realistic violence.
Strong violence.
Sexual violence.
Frightening or intense scenes.
Aggressive and very strong coarse language.

- Canada
  - **MPAC (Motion Picture Association - Canada)**

    https://en.wikipedia.org/wiki/Canadian_Home_Video_Rating_System

Rating	Description
G	Suitable for viewing by all ages.
PG	Parental guidance recommended.
14A	Suitable for people 14 years of age or older.
18A	Suitable for people 18 years of age or older.
R	Restricted to 18 years and older.

A	Adult content.
E	Exempt.

Rating Reasons

Accepted rating reasons may or may not be from the following list. However, the list below is a strongly recommended list of MPAC rating reasons.

Suggested Rating Reasons
Frightening Scenes
Mature Theme.
Coarse Language.
Crude Content.
Nudity.
Sexual Content.
Violence
Disturbing Content.
Substance Abuse.
Gory Scenes.
Explicit Sexual Content.
Brutal Violence.
Sexual Violence.
Offensive Language.

- **RC (Régie du Cinéma - Quebec)**

  https://en.wikipedia.org/wiki/Régie_du_cinéma_(Quebec)

Rating	Description
G	Visa général. General Rating.
13+	13 ans et plus. 13 years and over.
16+	16 ans et plus. 16 years and over.
18+	18 ans et plus. 18 years and over.

Rating Reasons

Accepted rating reasons are free form strings delivered in a list.

Airing Types

Type	Description
new	Airing has not been previously aired.
live	Airing represents live programming.
repeat	Aired previously and is airing again.

_next and _prev

_next	Url to the next page. Required if not representing the last page. Not present if the current page represents the last page.
_prev	Url to the previous page. Required if not representing the first page. Not present if the current page represents the first page.

Appendix B - Metadata Response Paging

The provider's HTTP endpoints must provide the entire set of available objects (sources, schedules, vod assets, etc). However, if a large number of objects are returned in a single response, the performance and scalability of Sling TV CMS services can be adversely affected. Therefore, a paging mechanism has been designed that allows the Sling TV to request metadata objects in manageable batches.

The paging mechanism is implemented through a series of URL parameters:

Parameter	Sample Value	Notes
results_per_page	100	Indicates the number of objects that should be included in each response
page	1	Indicates which objects should be included in the initial response. Valid values start at "1"

These values work together to describe which objects should be returned. If "results_per_page" is set to 100, and "page" is set to 2, then the response should return the first 100 objects.

The provider uses the "_next" and "_prev" fields of the response's root object to indicate whether additional objects are available and how they can be obtained. If present, "_prev" is a URL that will return the previous page of objects, and "_next" is a URL that will return the next page of objects. If the current page is the first page of objects, the "_prev" URL should not be included in the response. Similarly, if the current page is the last page of objects, then the "_next" URL should not be included in the response.

For example, if the provider has a total of 150 objects, and Sling TV CMS requested the first 100, the response's root object would NOT include a "_prev" field, but it would NOT include a "_next" field.

The following scenarios demonstrate how this mechanism works.

Total Sources	"page" Value in request	"results_per_page" Value	Objects Returned	_next	_prev
42	1	100	42	(field omitted)	(field omitted)
142	1	100	100 (1 - 100)	URL that will return objects 101-142	(field omitted)
237	2	100	100 (101 - 200)	URL that will return objects 201-237	URL that will return objects 1 - 100

Sling TV CMS services will not add "page" or "results_per_page" parameters to the URLS in "_prev" and "_next."

Sling TV CMS services will add Sling TV Cryptographic signature parameters and headers to the URLs.

Appendix C - Sling TV Cryptographic Signature

HTTP/HTTPS requests from Sling TV players and services include additional HTTP elements that allow programmers to authenticate these requests. Collectively, these additions are referred to as the "Sling TV Cryptographic Signature". The Sling TV Cryptographic Signature allows programmers to authenticate and validate that:

- the request originated from Sling TV
- the request was created recently
- the request has not been altered since it left Sling TV

The Sling TV Cryptographic Signature adds the following elements to HTTP requests:

Element	Element Type	Required	Note
sling_tv_user_hash	URL query parameter	Optional	When provided, this will be a hash that can be used to identify unique users. It is not enough information to determine a specific user, but will be enough to allow the programmer to distinguish between individual users. This value is typically provided only in requests from Sling TV player applications, not from back-end services. For security purposes, the seed value for this hash is periodically changed.
sling_tv_timestamp	URL query parameter	Required	The UTC time (in seconds) when the request was generated. Allows programmer to verify that the request is recent, and not a cached request.
x-sling-tv-signature	HTTP header	Required	A base64-encoded, RSA signature of the entire (url-encoded) URL, including all parameters. This signature is generated using Sling TV's Private key. Programmers can use Sling TV's Public Key to validate that the signature was created by Sling TV and that it has not been altered.

The Sling TV Cryptographic Signature is designed to be optional in nature. On requests where the programmer may not have security concerns, it may safely be ignored.

Sling TV's public key and sample signatures will be provided as part of the on-boarding process.

Appendix D - Sling TV Audio/Video Profiles

Sling TV has developed a set of audio/video profiles (bitrate ladders) that are playable on all supported devices. They are included here for informational purposes only. However, by encoding and publishing content in conformance with these profiles, programmers can ensure that their content will provide a quality viewer experience on all Sling TV-supported devices.

The recommended profiles depend on the quality of the video source. The tables in this appendix list the recommended profiles by source quality. Please note that optional profile sets specify additional audio options and must be included in their entirety.

Audio Profiles

All tables reference the audio profiles described here:

Name	Bitrate (Kbps)	Codec	Channels
stereo_128	128	AAC	2
stereo_128	128	AAC	2
stereo_160	160	AAC	2
stereo_192	192	AAC	2
dolby20_96	96	EAC3	2
dolby51_192	192	EAC3	6
dolby71_384	384	EAC3	8

Standard Definition 4:3 Source Stream - recommended profiles

Source	Audio Profile	Codec	Video Bitrate (Kbps)	Resolution	Frames/sec	AVC Profile	AVC Level	Notes
Standard Definition - 4:3	stereo_128	h264	80	256x192	1	Main	31	I-frame only variant; not playable.
Standard Definition - 4:3	stereo_128	h264	312	256x192	29.970	Main	31	
Standard Definition - 4:3	stereo_128	h264	800	384x288	29.970	Main	31	
Standard Definition - 4:3	stereo_160	h264	1500	640x480	29.970	Main	31	
Standard Definition - 4:3	stereo_160	h264	2000	640x480	29.970	Main	31	

All profiles are encoded using "constant bitrate" settings.

Standard Definition 16:9 source - recommended profiles

Source	Audio Profile	Codec	Video Bitrate (Kbps)	Resolution	Frames /sec	AVC Profile	AVC Level	Notes
Standard Definition - 16:9	stereo_128	h264	80	256x144	1	Main	31	I-frame only variant; not playable.
Standard Definition - 16:9	stereo_128	h264	312	256x144	29.970	Main	31	
Standard Definition - 16:9	stereo_128	h264	800	384x216	29.970	Main	31	
Standard Definition - 16:9	stereo_160	h264	1500	640x360	29.970	Main	31	
Standard Definition - 16:9	stereo_160	h264	2000	640x360	29.970	Main	31	

All profiles are encoded using "constant bitrate" settings.

High Definition Source Stream - recommended profiles

Source	Audio Profile	Codec	Video Bitrate (Kbps)	Resolution	Frames /sec	AVC Profile	AVC Level	Notes

HD 720p or 1080p	stereo_128	h264	80	512x288	1	Main	31	I-frame only variant; not playable.
HD 720p or 1080p	stereo_128	h264	312	512x288	25 / 29.970	Main	31	
HD 720p or 1080p	stereo_128	h264	800	768x432	25 / 29.970	Main	31	
HD 720p or 1080p	stereo_160	h264	1500	768x432	25 / 29.970	Main	31	
HD 720p or 1080p	stereo_160	h264	2800	1280x720	25 / 29.970	High	40	
HD 720p or 1080p	stereo_192	h264	4200	1280x720	25 / 29.970	High	40	
HD 720p or 1080p	stereo_192	h264	4700	1280x720	50 / 59.940	High	40	Optional for 60fps sources; considered the top profile for 720p60 streams.
HD 1080p	stereo_192	h264	5500	1920x1080	25 / 29.970	High	40	

All profiles are encoded using "constant bitrate" settings.

High Definition Source Stream - optional enhanced audio profiles

Required when source is...	Audio Profile	Codec	Video Bitrate (Kbps)	Resolution	Frames /sec	AVC Profile	AVC Level	Notes
HD 720p or 1080p	dolby20_96	h264	80	512x288	1	Main	31	I-frame only variant; not playable.
HD 720p or 1080p	dolby20_96	h264	312	512x288	25 / 29.970	Main	31	
HD 720p or 1080p	dolby51_192	h264	800	768x432	25 / 29.970	Main	31	
HD 720p or 1080p	dolby51_192	h264	1500	768x432	25 / 29.970	Main	31	
HD 720p or 1080p	dolby51_192	h264	2800	1280x720	25 / 29.970	High	40	
HD 720p or 1080p	dolby51_192	h264	4200	1280x720	25 / 29.970	High	40	
HD 720p or 1080p	dolby51_192	h264	4700	1280x720	50 / 59.940	High	40	Optional for 60fps sources; considered the top profile for 720p60 streams.
HD 1080p	dolby51_192	h264	5500	1920x1080	25 / 29.970	High	40	

All profiles are encoded using "constant bitrate" settings.

Appendix E - CORS enabled resource

Cross-origin resource sharing (**CORS**) is a mechanism that allows restricted resources on a web page to be requested from another domain outside the domain from which the first resource was served. SlingTV Javascript Clients require CORS to access the Stream Authentication API.

As the Stream Authentication API requires custom headers like "**x-sling-tv-signature**", "**x-sling-tv-accepted-stream-formats**", "**x-sling-tv-accepted-container-formats**" and "**x-sling-tv-accepted-drms**", JS clients intend to send the **Pre-Flight OPTIONS request** to check whether the custom headers are accepted by the Content Provider Servers.

Resource	HTTP Method	Response Header	Value
Stream Authentication API	GET	access-control-allow-origin	*
Stream Authentication API	OPTIONS	access-control-allow-headers	x-sling-tv-signature, x-sling-tv-accepted-stream-formats, x-sling-tv-accepted-container-formats, x-sling-tv-accepted-drms

Appendix F - Sub type geneartion

```
# Values of sub_type can be movie, extras, episode, sport-game, sport-talkshow, sport-documentary,
news, one-time-sport, one-time, sport-league, generic (fallback).


#SM - Series Master, SE - Series Episode, MO - Movie, OT - One Time

if show_type == 'MO'
    sub_type = 'movie'
else if show_type == 'OT'
    if category == 'sport'
        sub_type = 'one-time-sport'
    else
        sub_type = 'one-time
else if show_type == 'SM'
    if category == 'sport'
        if sports_subtitle == ''
            sub_type = 'sport-league'
        else if genre in ('documentary' & ( 'sports stuff' | 'profile' | 'retrospective'))
            sub_type = 'sport-documentary'
        else if genre in ('sports stuff' | 'talk' | 'newscast' | 'magazine' | 'preview')
            sub_type = 'sport-talkshow'
        else
                        sub_type = 'generic'
    else if category == 'news'
        sub_type = 'news'
    else
                sub_type = 'generic'
else if show_type == 'SE'
    if category == 'sport'
        if sports_subtitle != ''
            sub_type = 'sport-game'
        else if genre in ('documentary' & ( 'sports stuff' | 'profile' | 'retrospective'))
            sub_type = 'sport-documentary'
        else if genre in ('sports stuff' | 'talk' | 'newscast' | 'magazine' | 'preview')
            sub_type = 'sport-talkshow
                else
                        sub_type = 'generic'
    else if category == 'news'
        sub_type = 'news'
    else # for regular episodes and extras
        if season_program_id is not null && episode_number is not null
            sub_type = 'episode'
        else
            sub_type = 'extras'
else
        sub_type = 'generic'
```