



TARA Systems

# Novaspread Server Use Cases – Server Role

Date: June 10<sup>th</sup> 2015



- Initialization
- Termination
- Tuner Allocation
- Tuner Data Reception
- Changing PIDs
- Transcoding
- CA Usage Rules Reception
- Transcription
- Thread Model



### ■ Description:

- Novaspread Host initializes NovaspreadServer.
- UPnP SAT>IP device detection is started and runs in background.

### ■ Functions:

- NovaspreadServerInit()

### ■ Example:

```
NovaspreadTServerInitParameter initParameter;  
  
memset( &initParameter, 0, sizeof( initParameter ) );  
initParameter.DataPath = "/data/novaspread";  
  
NovaspreadServerInit( &initParameter );
```



### ■ Description:

- Novaspread Host terminates NovaspreadServer.

### ■ Functions:

- NovaspreadServerDone()

### ■ Example:

```
NovaspreadServerDone ( ) ;
```



### ■ Description:

- User selects a TV service for playback at a Multiscreen/SAT>IP Client device.
- This request is sent to the Multiscreen Server via RTSP.
- The NovaspreadServer allocates a tuner at NovaspreadHost.

### ■ Functions to be implemented by Humax:

- NovaspreadHostAllocateTuner()
- NovaspreadHostReleaseTuner()



### ■ TunerAllocationParameter

```
typedef struct NovaspreadTHostTunerAllocationParameter
{
    NovaspreadTTunerParameters    TunerParameters;
    NovaspreadTBoolean            AllocateTranscoder;
    NovaspreadTBoolean            AllocateTranscryptor;
} NovaspreadTHostTunerAllocationParameter;
```

- `TunerParameters` – The parameters of the transponder to which the Tuner shall be tuned to.
- `AllocateTranscoder` – Defines whether a Transcoder is required. If required, a transcoding pipeline must be available for this Tuner. For SD streams no Transcoder is needed.
- `AllocateTranscryptor` – Defines whether a Transcryptor is required. For free-to-air streams no Transcryptor is needed.



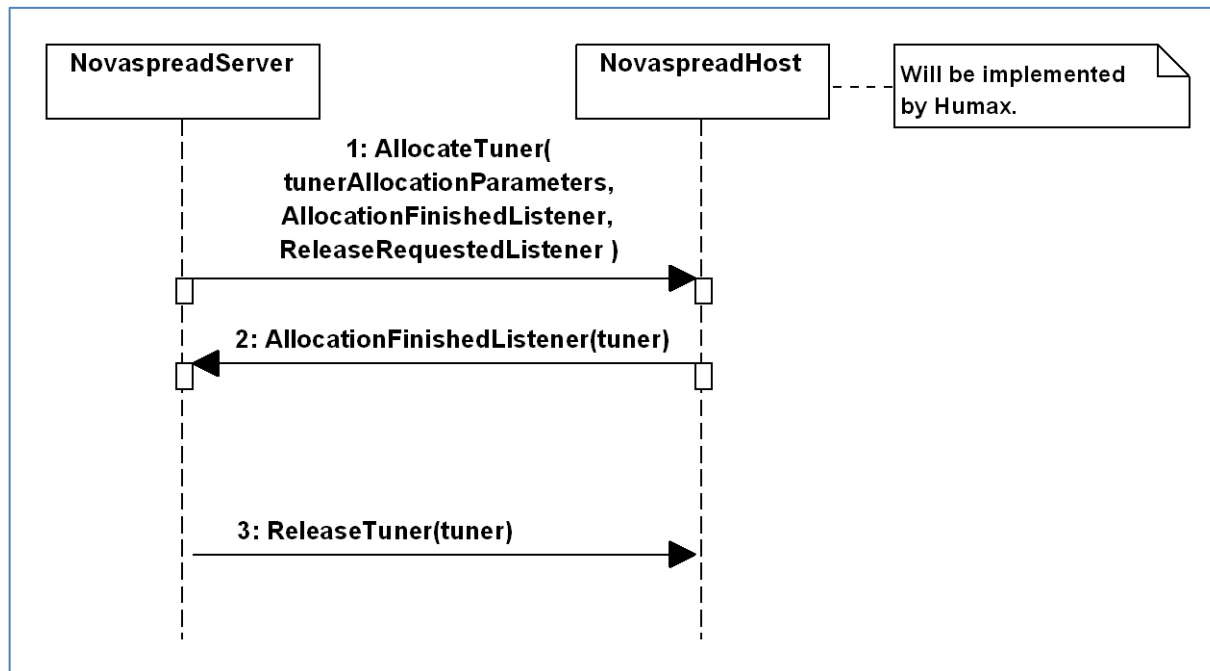
### ■ NovaspreadHostAllocateTuner()

```
PUBLIC void
NovaspreadHostAllocateTuner (
    NovaspreadTHostTunerAllocationParameter *    aTunerAllocationParameter,
    NovaspreadTHostTunerAllocationFinishedListener aAllocationFinishedListener,
    NovaspreadTHostTunerReleaseRequestedListener  aReleaseRequestedListener,
    void *                                         aContext );
```

- This function shall not block.
- A Tuner shall be allocated that fulfills the `aTunerAllocationParameter`.
- `aAllocationFinishedListener` callback shall be called by Humax as soon as the allocation can be fulfilled or is denied. The returned Tuner shall be tuned according to the given `TunerParameters`.
- `aReleaseRequestedListener` allows Humax to request `NovaspreadServer` to release an already allocated Tuner. For example if the Tuner is needed for a high priority task, e.g. for recording.



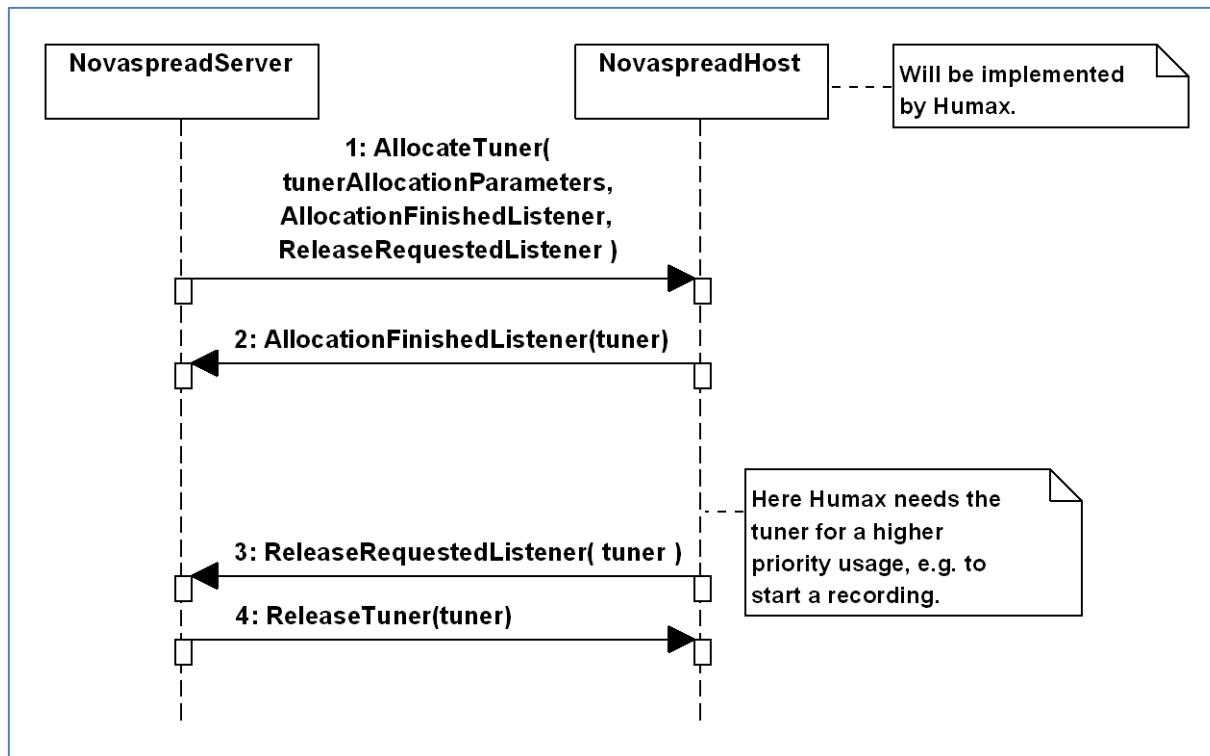
- NovaspreadServer allocates and releases tuner







- Humax needs tuner for higher priority usage





### ■ Description:

- NovaspreadServer sets a DataAvailableListener at the Tuner.
- NovaspreadServer calls NovaspreadTunerStart().

### ■ Functions to be implemented by Humax:

- NovaspreadTunerSetDataAvailableListener()
- NovaspreadTunerStart()

### ■ Example:

```
NovaspreadTunerSetDataAvailableListener( tuner, DataAvailableListener, context );  
NovaspreadTunerStart( tuner );
```



### ■ Description:

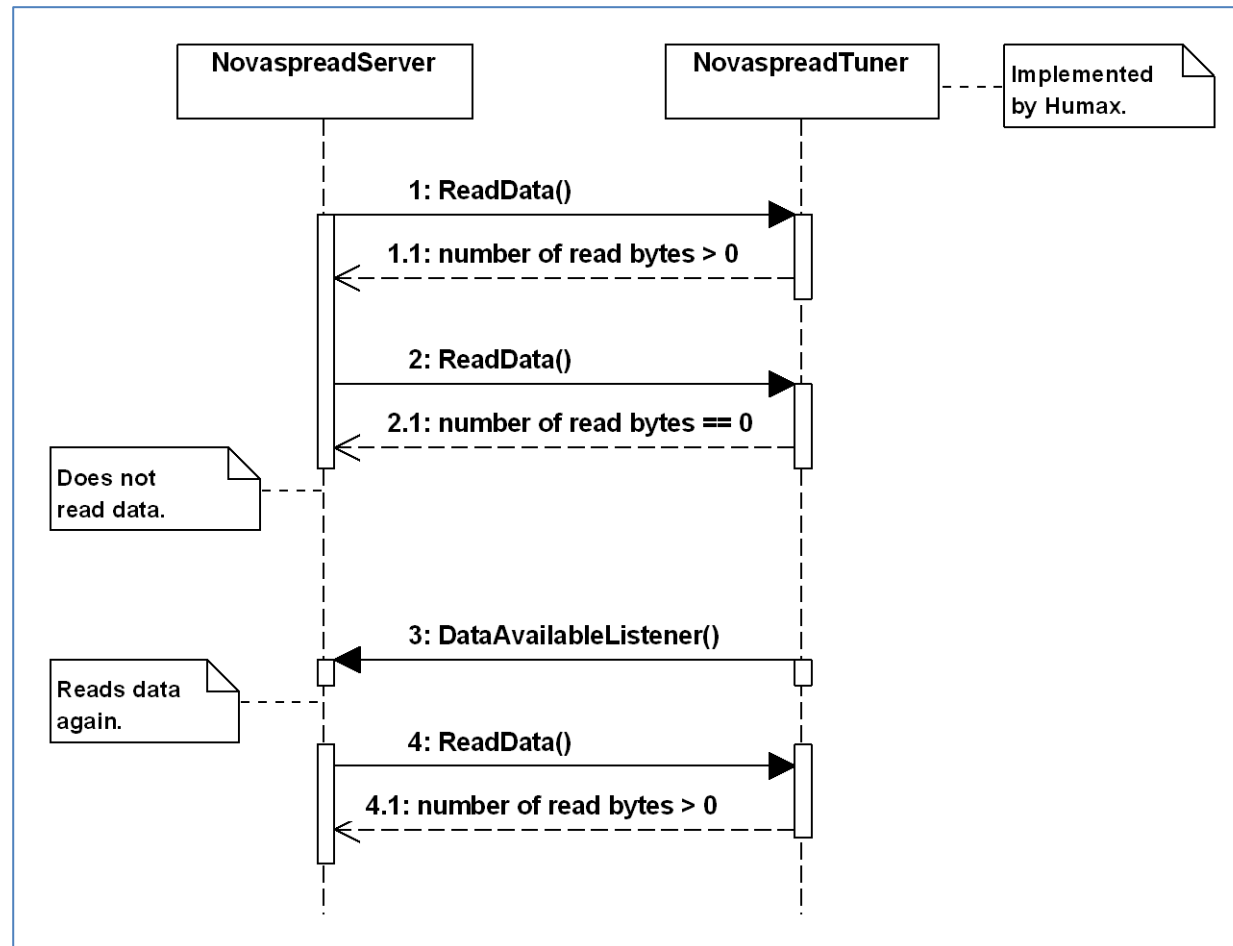
- The NovaspreadServer calls NovaspreadTunerReadData() to receive transport stream packets.
- If ReadData() returns 0 bytes, NovaspreadServer waits until the DataAvailableListener is called, before calling ReadData() again.

### ■ Functions to be implemented by Humax:

- NovaspreadTunerReadData()
- Call registered DataAvailableListener.



### ■ NovaspreadServer's data reader thread





### ■ Description:

- The NovaspreadServer sets PIDs to be streamed at a Tuner.
- NovaspreadTuner filters transport stream according to these PIDs.

### ■ Functions to be implemented by Humax:

- NovaspreadTunerSetPids()

### ■ Example:

```
NovaspreadTUInt16 pids[ 2 ];  
  
pids[ 0 ] = 0x00;  
pids[ 1 ] = 0x12;  
  
NovaspreadTunerSetPids( tuner, pids, 2 );
```



### ■ Description:

- NovaspreadServer sets transcoding parameters at the NovaspreadTuner.
- NovaspreadTuner performs transcoding (Humax).

### ■ Functions to be implemented by Humax:

- NovaspreadTunerSetTranscoding()

# Transcoding - Example



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```
// NovaspreadServer sets the transcoding parameters at the Tuner.

NovaspreadTTranscoding transcoding;

transcoding.Input.AudioPid    = 0x101;
transcoding.Input.AudioCodec = NOVASPREAD_AUDIO_CODEC_AC3;
transcoding.Input.VideoPid    = 0x102;
transcoding.Input.VideoCodec = NOVASPREAD_VIDEO_CODEC_AVC;
transcoding.Input.PcrPid      = 0x101;

transcoding.Output.AudioCodec    = NOVASPREAD_AUDIO_CODEC_AAC;
transcoding.Output.AudioBitrate  = 100;
transcoding.Output.VideoCodec    = NOVASPREAD_VIDEO_CODEC_AVC;
transcoding.Output.VideoResolution = NOVASPREAD_VIDEO_RESOLUTION_1280_720P;
transcoding.Output.VideBitrate   = 10000;

NovaspreadTunerSetTranscoding( tuner, &transcoding );
```



### ■ Description:

- NovaspreadServer interprets CA Usage Rules.
- NovaspreadHost receives and provides the Usage Rules.
- There are Usage Rules for services and for the platform.

### ■ Functions to be implemented by Humax:

- NovaspreadCaSetPlatformUsageRulesReceivedListener()
- NovaspreadCaSetServiceUsageRulesReceivedListener()

### ■ Proceeding:

- TARA Systems provides an example implementation of these functions, which access NAGRA DVL.
- Humax implements and tests these functions.





### ■ Description:

- NovaspreadTuner performs decryption of the transport stream.
- NovaspreadServer starts the re-encryption of the transport stream at the NovaspreadHost.
- The Host returns the current hardware license.
- This license will be transmitted to the NovaspreadClient.

### ■ Functions to be implemented by Humax:

- NovaspreadCaSetDvbld()
- NovaspreadDrmStart()
- NovaspreadDrmStop()

### ■ Proceeding:

- TARA Systems provides an example implementation of these functions, which access NAGRA CAK.
- Humax implements and tests these functions.



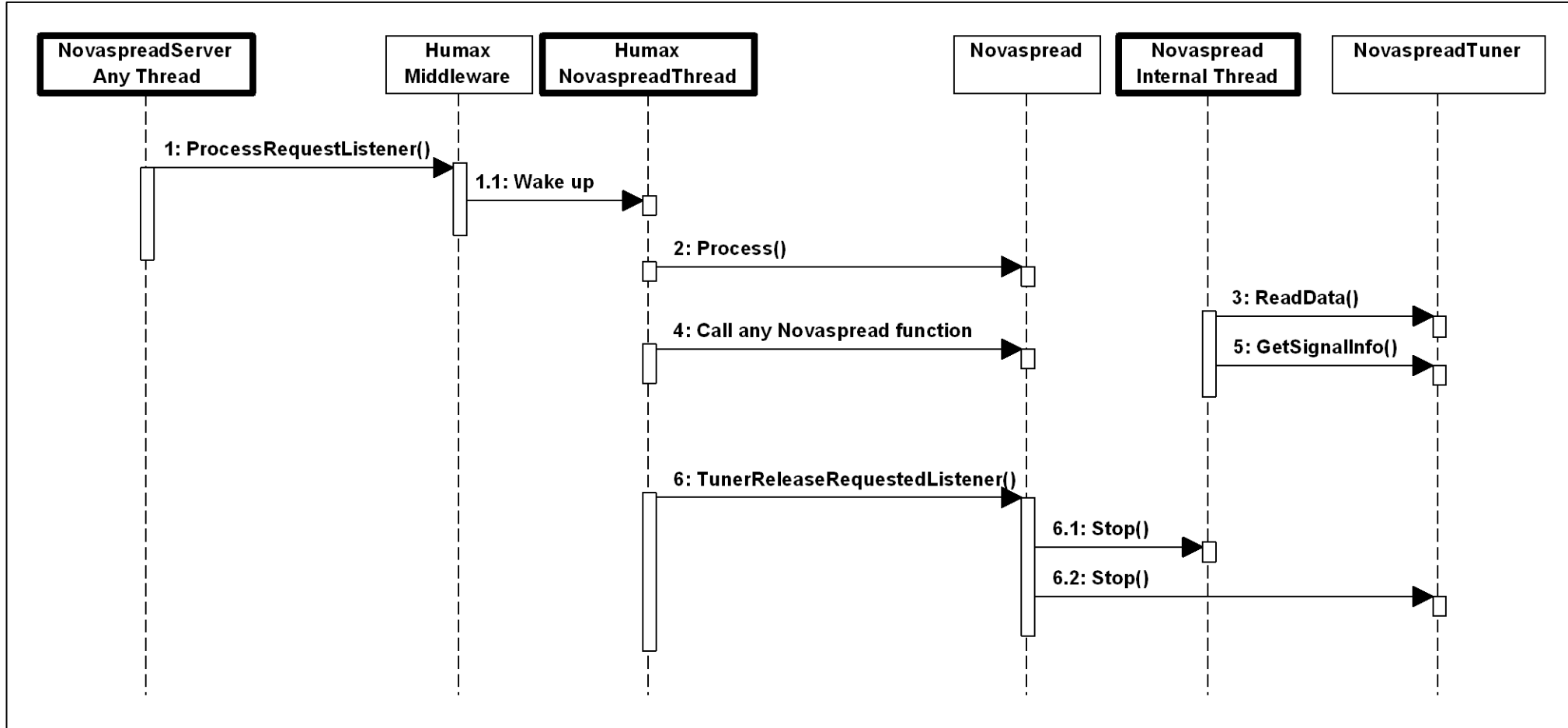
### ■ Single threaded library

- For simplicity all functions of NovaspreadServer library must be called from the same thread.
- NovaspreadServerProcess() function is provided, from which functions of the required API are called.

### ■ Data reception

- NovaspreadServer uses a thread to read data from a NovaspreadTuner.
  - NovaspreadTunerReadData()
  - NovaspreadTunerGetSignalInfo()
- The DataAvailableListener set at the NovaspreadTuner may be called from any thread.
- The same model is used for data reception from a NovaspreadSatIpTuner.

# Thread Model – Detail





- UPnP device detection
- Client authentication at server
- Licence management for playback of encrypted streams
- Reception of transport stream (via RTP) from SAT>IP server
- Sending transport stream (via RTP) to SAT>IP client



## THANK YOU!

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