

# SMPTE ST 430-10 Implementation Notes

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These notes reflect several years of observations of closed captioning system use of the SMPTE ST 430-10 Auxiliary Content Synchronization Protocol (ACSP). They are open for discussion as to how we can improve the operation of closed captioning systems.

## New Show Load

The below sequence of CSP requests is suggested.

1. Terminate Lease
2. Get New Lease
3. Update Timeline
4. Set RPL Location (one or more)

Some servers do a “rewind” of the current show when it ends and send a Set RPL Location request pointing to the RPL for the “rewound” show. Later, a new scheduled show is loaded and another Set RPL Location is sent. If the Terminate Lease - Get New Lease sequence is not sent when the new show is loaded, the captioning equipment does not know about the abandoned show. The captioning equipment will continue to hold the abandoned content and, if buffer space is not available, hold off on fetching the new content.

While not critical, placing the Update Timeline request before the Set RPL Location allows the captioning equipment to skip fetching reels that will not be played (where the RPL shows a timeline value less than the current timeline).

## Playout Start/Stop

The server should send a Set Output Mode request whenever the server starts or stops playback. Some servers send Set Output Mode only if the content contains closed captioning. Since ST 430-10 can drive devices other than closed captioning systems, it is desirable for such systems to know the status of the server (playing or not). In addition, some closed captioning systems display a “welcome message” when content is not playing. Setting output mode to disabled during non-captioned content results in the welcome message being displayed (instead of a blank screen for uncaptioned content).

# ACSP New Connection Sequence

The following sequence of requests is proposed upon a server receiving a new ACSP connection.

1. Announce request
2. Get New Lease request
3. Update Timeline request
4. Set RPL Location Request(s)
5. Set Output Mode request (reflecting current status, enabled or disabled)

This sequence should be followed on an initial connection or a reconnection by a captioning device. Note that ST 430-10 section 7.2.6.6 requires the Auxiliary Content Server (ACS or captioning system) to continue outputting resources on loss of communications with the server until the lease times out. This allows for recovery from momentary communications interruptions. The suggested new connection sequence does not include a lease terminate. The new connection may arrive before or during playback. Normally, it will arrive before playback starts, but if there is a communications interruption, it may arrive during playback.

If the connection arrives before playback starts, the captioning system will probably have an expired lease and be holding no content. The above sequence would behave the same as loading a new show.

If the connection arrives during playback and the ACS still has a valid lease (there was a communications interruption), the suggested sequence results in captions continuing without interruption. The Update Timeline request keeps the captions in sync. The Set RPL Location is not required on a reconnect if it was a temporary Ethernet issue, but would be required if the ACS power cycled. If there were a temporary Ethernet issue causing the interruption, the ACS would fetch data according to the Set RPL Location request(s) and skip fetching data that already played (based on the Update Timeline request). The ACS may end up with two copies of content for the time after the reconnect, but this does not cause an issue since the extra copy will be discarded when the first copy has finished being played and it is discovered to be stale content.

Some servers do not send Set Output Mode on an ACSP connection. If this is an initial connection by the ACS to the server, the ACS does not know that a show is running. results in no captions for the current show, but captions operate properly for the next show.

## Request Interval vs Lease Interval

ST 430-10 section 7.2.2 has a note suggesting the time between requests be half the lease duration. A few servers seem to be “pushing the limit” and sending status requests just before

the lease expires. Slight timing variations between the server and ACS or slight delays in Ethernet communications can allow the lease to expire in this situation. The interval between requests should be half the lease interval.

## Expired Lease Recovery

If the above request interval is used, we should never have an issue with lease expiration. However, it would be nice if the server responded to a lease expiration (as reported in a status response) by performing the ACSP New Connection Sequence above. This would allow a system to recover from this situation.

## Playout ID Uniqueness

ST 430-10 section 7.2.4.1 requires the Playout ID for each RPL within a lease to be unique. One server sends a Playout ID of zero for each composition in the show that does not have captions. If there are multiple compositions within a show with no captions (such as multiple trailers), several RPLs with non-unique Playout IDs are sent. In addition, the Timeline Update request has several segments with non-unique Playout IDs. This can be confusing to the captioning equipment since it appears the playback has “looped back.”

Systems that use an RPL per show can have an empty ReelResources element for reels that do not have captions or other auxiliary content.

Systems that use an RPL per composition can generate an RPL with empty ReelResources for a composition that does not have captions or other auxiliary content. However, the Playout ID associated with each RPL is to be unique.

## Comments

Please send comments on this document to [Harold Hallikainen](#) .

## Revision History

- 2018-02-20 - Original draft.