INNES

Application note

Player synchronization

Version 001A

January 2016

Table des matières

1 Aim of document

The aim of this document is to explain how to configure different players to be synchronized each other. This feature is used generally for a video wall.

2 Pre-requisite

2.1 Minimal versions

- Screen Composer G3 3.11.12
- PlugnCast server 2.50.32
- PlugnCast Studio 2.51.11
- PlugnCast server 3.10.24

2.2 Player family: SM3

Only the players SMA300 support player synchronization. Gekkota version V3.12.26 minimum.

2.3 Local network

The players to be synchronized need to be connected to the same local network.

2.3.1 Local NTP server

In order to avoid any unexpected issue on clock estimation, you must use a local NTP server instead Web NTP server. The synchronization feature could be not enough precise with a web NTP server and not stable.

2.3.2 UDP multicast

The local network has to support UDP multicast because the communication between the players use UDP protocol.

2.3.3 Overload network

An overloaded network will have negative effect on clock estimation error.

3 Player configuration

3.1 WebUI: NTP configuration

The NTP server need to be activated and properly configured in player WebUI (trial number, delay between trials).

When the NTP server is activated, the player clock precision error at boot-up is around 200ms*.

* In case network overload, the clock estimation error can be bigger

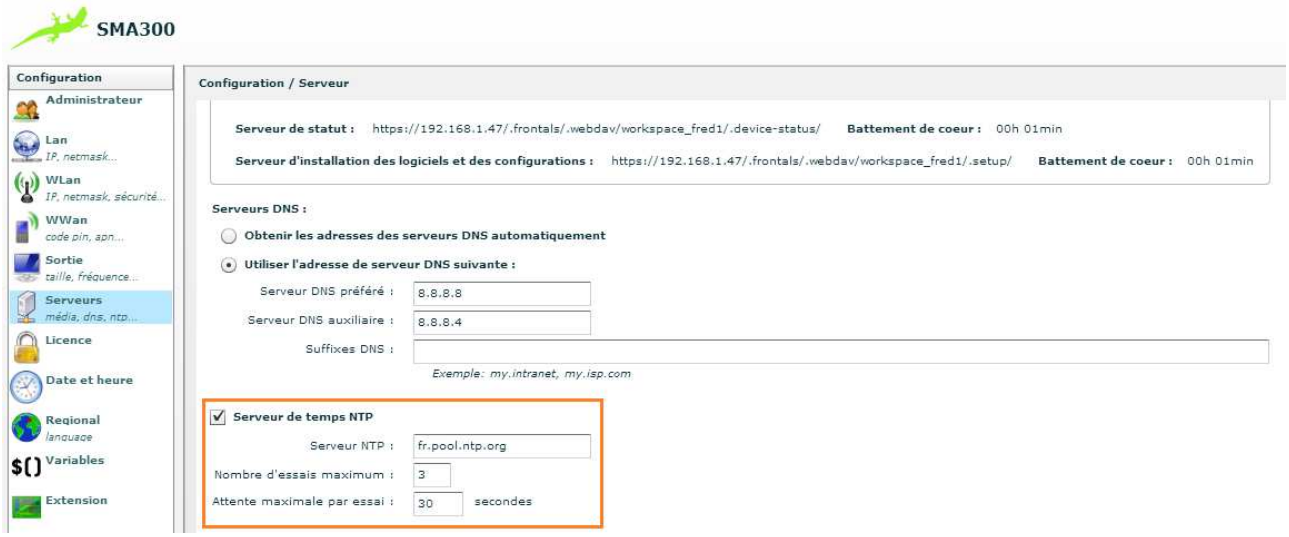
- In case distant NTP server, it is advised to configure
  - 3 trials with 30 sec between each trial
  - 5 trials with 60 sec between each trial (worst network condition)
- Innes recommend to use local NTP server (time & date update most of time by GPS)
  - It permits to reduce much all side effects linked internet network poor quality (problems linked to latency on upload and download requests delay on NTP server)
  - For more information, contact support@innes.pro

In this example, NTP server is configured with URL of distant NTP server

- NTP Server: “fr.pool.ntp.org”

In case a local NTP server is available, enter the URL of your local NTP server according to.

- NTP trial number: 3
- Delay between retries: 30 seconds
  Note: NTP can be activated also with auto-configuration file. Please refer to Gekkota application note auto-configuration V1.10.19 (or above) for more information



3.2 Slight clock synchronisation with NTP server

The player is getting clock on NTP at player boot-up. After this initial phase, the time must be constantly adjusted to ensure that content play-back will stay synchronized.

To activate clock synchronization with NTP:

- Inject auto-configuration V1.10.19 (or above) with function **setClockSyncEnableNtp** activated
  - Refer to Gekkota application note auto-configuration for more information
- After a reboot, the player is starting quick & coarse clock correction process, and then, continue with low & accurate clock correction process. This clock correction process is quite long. The time duration to compensate clock drift (and reach clock drift error lower than 50 ms) is between 1 hour to 2,5 hour (this duration depends on network context).

3.2.1 Auto-configuration file: setClockSyncEnableNtp

- Download auto-configuration script V1.10.19 (or above) from INNES support site
- Open the configuration script and activate the function:
  - **setClockSyncEnableNtp**()

3.2.1.1 By USB injection

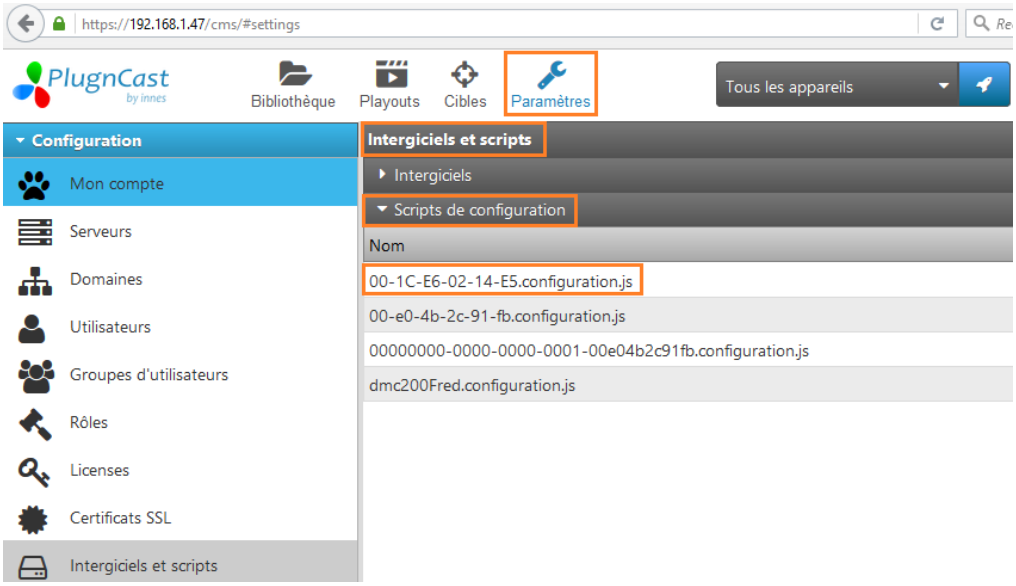
- Save the file into 000000000000.js on USB stick
- Inject it in all SMA300 you want to synchronize

Please refer to Gekkota application note auto-configuration V1.10.19 (or above) for more information

3.2.1.2 By http download (PlugnCast G3)

- Prerequisite: yours players are configured in PlugnCast mode
- Register your players on a PlugnCast G3 server
- Save the file into configuration.js, and import it in settings/configuration scripts

Please refer to Gekkota application note auto-configuration V1.10.19 (or above) for more information



- PlugnCast G3/target: activate all your SMA300
- PlugnCast G3/target/system: click on button deploy configuration script and wait for a while in order the player has time enough to take the script

4 Playout configuration and media behaviour

4.1 Playout

The player synchronization works properly when each player is playing:

- Only one video,
  - With behaviour: “infinitely”
  - With same media features (codec, frame number, frame rate, GOP, duration…)

4.2 Audio of AV stream not played

In case the AV stream contains audio track, the audio track is not played to avoid any unexpected audio-video synchronization issue.

In order to not play audio track of audio-video stream:

- Screen Composer:
  - Activate an audio zone with no audio media
- PlugnCast G2:
  - Add an audio channel with no audio media
- PlugnCast G3:
  - Create a video channel, without audio channel

4.3 Delay between reboot time and time when the media need to start

Given that player can takes from 1 hour to 2,5 hours to reach clock accuracy with an clock drift error lower than 50ms*, it is advised to keep consequent delay between reboot time and time when the media begin to play the video perfectly synchronized.

Recommended use case

- make reboot all the players at 00h00 (and play nothing until the time when the media to start perfectly synchronized)
- start video at 8.30 AM

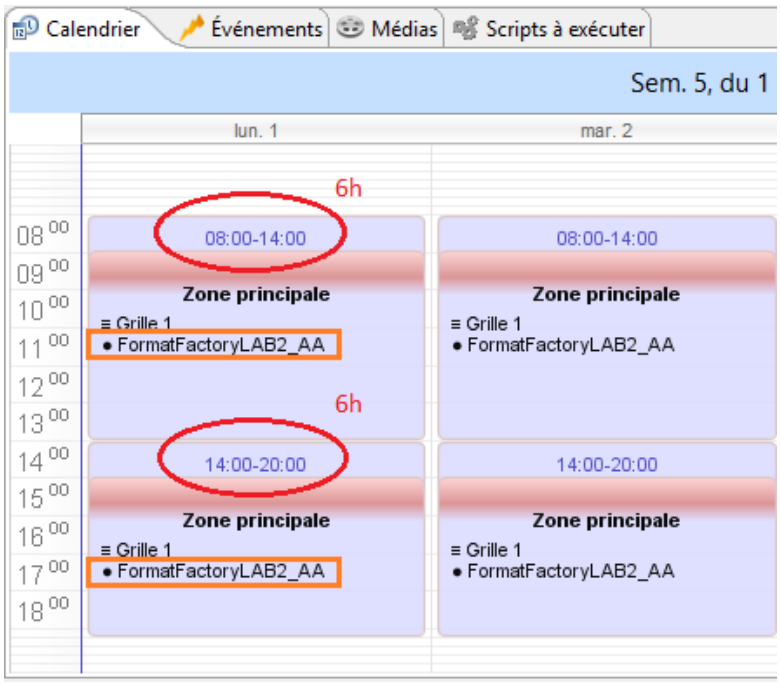
* In case network overload, the clock drift correction can face issue to work properly. So it is advised to keep extra time between reboot and start of the media

4.3.1 Player not completely synchronized after reboot

In case a reboot occurs while the video is currently played, the clock drift correction is forgotten and a new clock drift correction process is starting again. So in such cases, a slight video delay can be noticed. To correct it, publish again to force the player to restart their playout synchronized.

4.4 Sequence of 6 hours max (to reset additional drift in video chain)

An additional disparity of around 150ms every 6 hours could be noticed in SMA300 video chain. To reset this disparity, it is advised to restart sequence every 6 hours maximum:



4.5 Add xpfSyncManager-V1.10.10.js to the playout

To complete the synchronization process, you need to add a script to the playout.

This script forces players to restart their video around 30seconds after a reboot or a publication.

So if a player reboots, it will force all the others to synchronize to its new start.

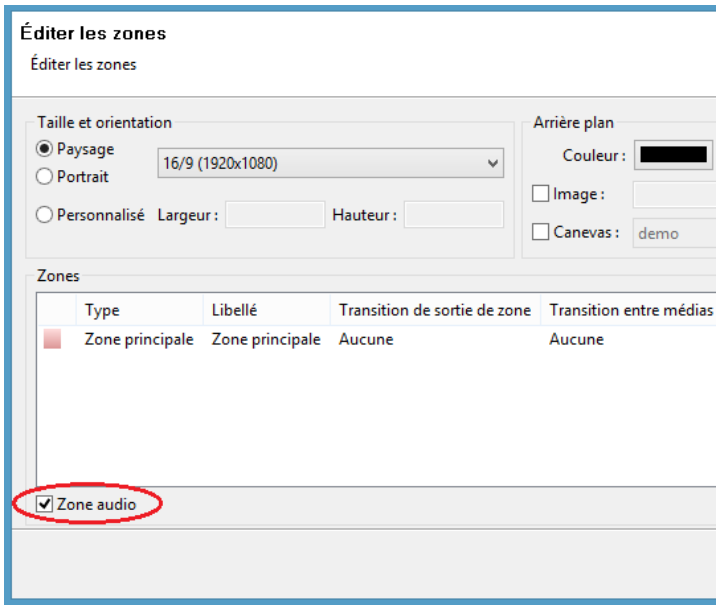
If a publication is done, players are not updated at the same time, so they will be resynchronized too.

The script uses UDP multicast messages for that. The UDP multicast address can me modified inside the script if needed.

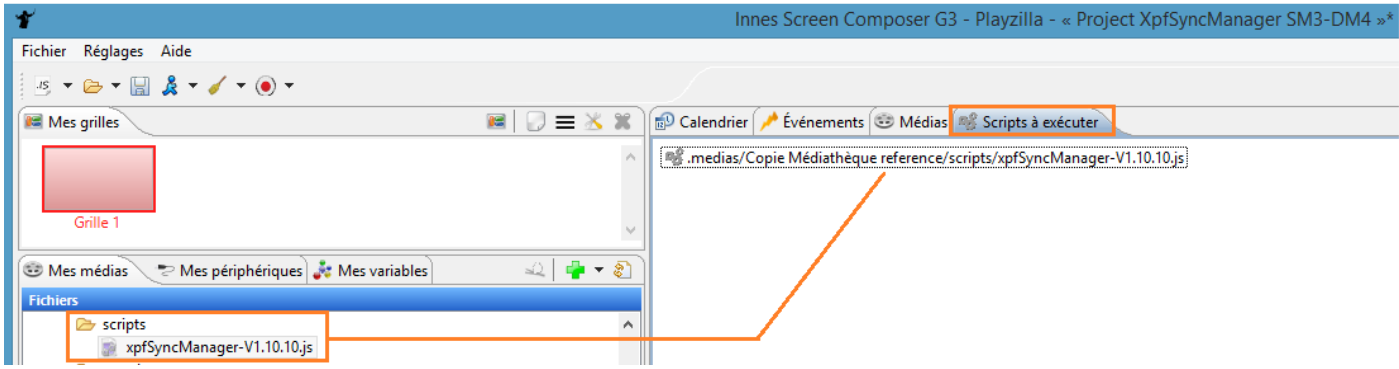
That permit to several player to start to play video at the same time.

4.5.1 Screen Composer

- Create a new project “**playoutSync**” with Screen Composer.
  - Add your players SMA300 to your project and register them
  - Activate “**publishing**”
- Edit the zone of the grid and activate zone audio



- Import a video (ex video_test1.mp4) in the Screen Composer library and
  - Drop it in the calendar view
    - Sequence1 from 8h00 AM to 2h00 PM
    - Sequence2 from 2h00 PM to 8h00 PM
  - Apply a recurrence (planning / every days) for the 2 sequences
  - Apply a media behaviour "**played infinitely**" for the video media for the 2 sequences
- Program a task player reboot every days at 0h00,
  - Ensure that no media is inserted in calendar from 0h00 to 8h00 (letting time for the player to reach accurate clock)
- Import script xpfSyncManager-V1.10.10.js in the Screen Composer library and drop it in tab "**script to execute**"

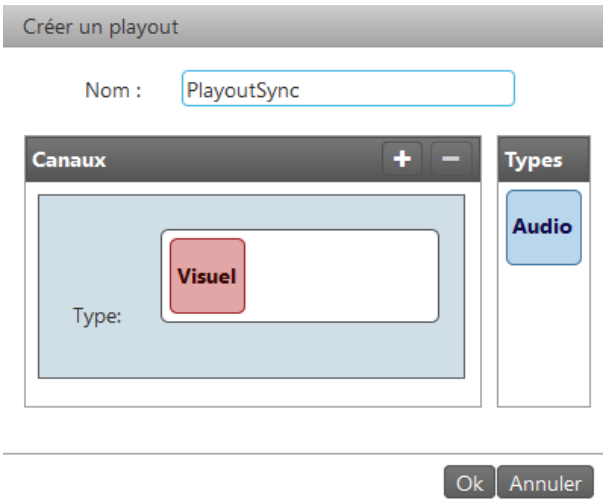


- Publish to all your players SMA300

  Note at each publication, the players will restart their video once or more after a delay of few seconds

4.5.2 PlugnCast G3

- Create a new playout visual "**playoutSync**" in PlugnCast G3.

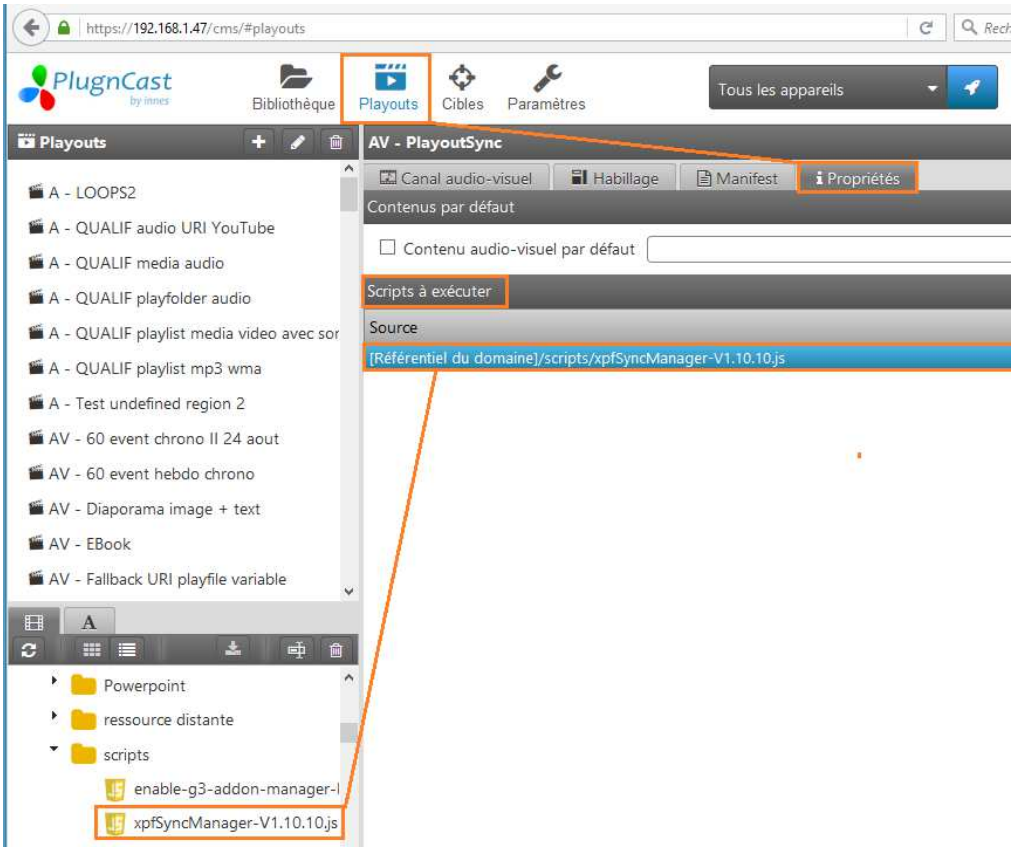


- Register all your players SMA300

o Import a video (ex video_test1.mp4) in the PlugnCast G3 domain repository and
- drop it in the calendar view
  - Sequence1 from 8h00 AM to 2h00 PM
  - Sequence2 from 2h00 PM to 2h00 PM
- Apply a recurrence (planning / every days) for the 2 sequences
- Apply a media behaviour "**played infinitely**" for the video media

o Program a task player reboot every days at 0h00
- Ensure that no media is inserted in calendar from 0h00 to 7h00

o Import script xpfSyncManager-V1.10.10.js in the Screen Composer library and drop it in tab "**script to execute**"

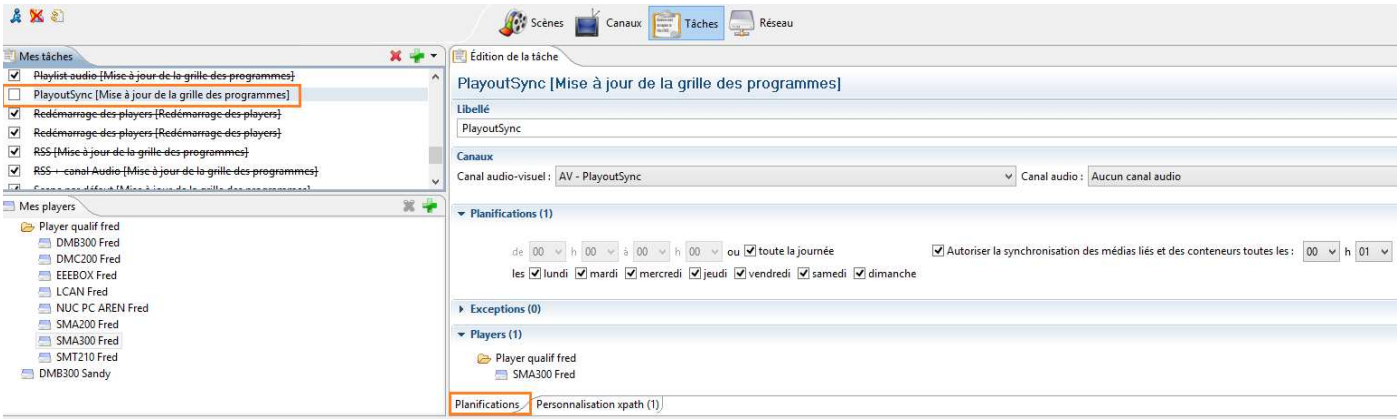


o Publish the all the SMA300 players
- At each publication, the players will restart their video once or more after a delay of few seconds

4.5.3 PlugnCast G2

o Create a new scene "**playoutSync**" in PlugnCast G2.

- Import a video (ex video_test1.mp4) in the PlugnCast G2 library and drop it in the scene
- Import script xpfSyncManager-V1.10.10.js in the PlugnCast library
  - For example in : Script/xpfSyncManager-V1.10.10.js
- Create a new video channel “playoutSync” and
  - Add the scene “playoutSync”.
    - Sequence1 from 8h00 AM to 2h00 PM
    - Sequence2 from 2h00 PM to 2h00 PM
  - Add a Apply a media behaviour “played infinitely” for the video media
- Create a new audio channel “AudioPlayoutSync”
  - Add nothing in the channel
- Create a task “player reboot” every days at 0h00,
  - Ensure that no media is inserted in calendar from 0h00 to 8h00 (letting time for the player to reach accurate clock)
  - Add all your players SMA300
- Create a new task “upgrade content” to upgrade player with
  - Video channel “playoutSync”
  - Audio channel “AudioPlayoutSync”
  - Apply a recurrence (planning / every day)
  - Add all your players SMA300



- In tab “personalization xpath”,
  - add a new “**personalization xpath**” permitting to execute the script when it is joined to your playout (adjust the path according to)

```
//xpf:player
```

```
<script src=".medias/Script/xpfSyncManager-V1.10.10.js" xmlns="http://www.innes.fr/2007/XPF10/Language"/>
```

Attention: do use " character (and not MS Windows one “) for Javascript