# TITAN Live User Manual

Release Number 4.1.26



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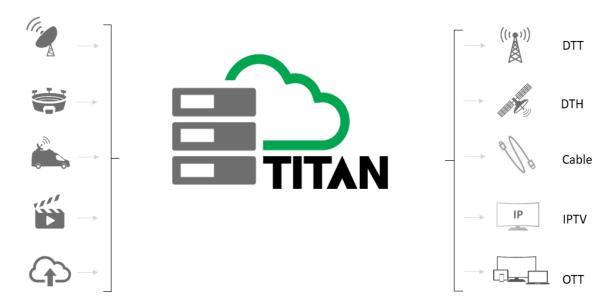
# 2. TITAN Live overview

**TITAN Live** is a high-quality and high-density video processing solution that is designed for Cable, DTH, DTT, IPTV, OTT Live delivery of SD, HD and UHD content. Featuring cutting edge technology, **TITAN Live** can ingest any channel to simultaneously produce multiple streams in real-time and deliver live video compression for the converged head-end.

Based on the 5th generation of the **ATEME** compression engine, **TITAN** Live delivers the highest video quality at minimum bitrates, allowing significant savings on the infrastructure and ensuring premium Quality of Experience for the end-users.

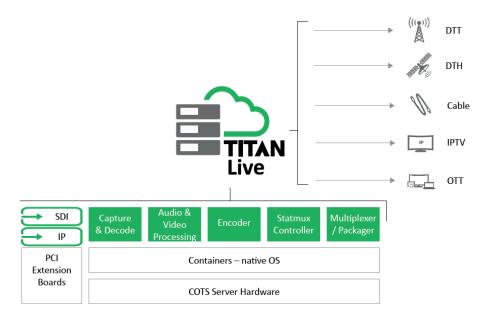
**TITAN Live** is a pure software solution, virtualizable and CPU and hardware agnostic, allowing deployments on and off premises from an appliance-like installation on bare metal to a docker-orchestrated cloud native solution.

Complemented with TITAN Mux and AMS, **TITAN Live** comes with a complete and advanced feature set, a powerful web interface and an extensive set of APIs to easily integrate within any open ecosystem.



# 2.1. Supported features

**TITAN Live** is a real time transcoding software for the converged headend to address OTT, IPTV, Cable, DTH and Terrestrial deliveries.



**TITAN Live** solution provides the following key features:

- Compressed or uncompressed **live signal acquisition** through various interfaces and protocols
- Audio, video and data decoding from industry legacy and state-of-art codecs
- Advanced pre-processing
  - Video
    - Resizing and aspect ratio conversion
    - Frame rate conversion
    - Deinterlacing and denoising
    - Brightness, saturation, contrast and hue adjustments
    - HDR signaling and conversion
    - Support of logo and subtitles
  - Audio
    - Up-mixing and down-mixing
    - Sample rate conversion
    - Loudness control
    - Manual delay
- Video, audio and data encoding into industry legacy and state-of art codecs
  - Support of CBR, VBR and Constant Quality bitrate allocation modes
  - Support of different modes to adjust VQ and latency
  - Comprehensive encoding tools and settings adjustment for interoperability purposes
- Multiplexing and packaging
  - Descriptors and tables edition in TS, PID mapping
  - Support of statistical multiplexing when coupled with TITAN Mux

- Chunking and packaging into legacy and state-of-art OTT formats
- DRM and manifest decoration
- Splicing and/or stream formatting for ad-insertion
- Input and output stream monitoring and redundancy
- Service and system alarming
- Hardware and infrastructure flexibility
  - CPU and form factor agnostic
  - Various software packages to fit all infrastructures from Bare-metal to Cloud

# 2.2. Supported infrastructure

**TITAN Live** is a pure software solution that allows full flexibility on the hardware and infrastructure selection.

<u>CPU type:</u> TITAN Live software is designed and optimized to run both on Intel and AMD CPUs, more specifically:

- TITAN Live runs on all latest generations of dual Intel CPU: From E5-2600v3 as well as v4, Skylake, Cascade Lake (Scalable Xeon v1, v2 and Refresh).
- TITAN Live is also compatible with AMD EPYC Rome Mono CPU.
- You can consult our engineering team for the **exhaustive list of models**. **ATEME** follows CPU manufacturers' roadmaps closely in order to keep supporting state-of-the-art CPU references.
- You can consult our engineering team for other requirements and recommendations about other hardware requirements (such as RAM, storage, power, NIC...) based on your use-case.

#### Server and model factor:

- TITAN Live is agnostic to server model and form factor in the sense that it is compatible with 1/2-RU standalone platforms as well as blade/chassis systems, provided that they meet the minimum requirements for the use-case and have passed ATEME official validation.
- ATEME has validated an extensive list of server models and providers, you can consult our engineering team for recommendations.

#### Infrastructure:

- TITAN Live can support various degrees of virtualization: From an appliance-like installation on bare metal, to a dockerized cloud native solution orchestrated by Kubernetes.
- **TITAN Live** can also support wide range of configurations such as private server, private cloud, public cloud or a mix of different configurations.
- Each TITAN Live version includes various deliverables to address each use-cases:
  - .bin for software update through the GUI.

- .iso bootable image for system installation.
- .tar.gz docker container.
- A **Kubernetes orchestrated version** on **ATEME** public Harbor (*MSv1*).
- TITAN Live versions are also available in Debian, Red Hat and CentOS packages.

# 2.3. Designed user limits of TITAN Live

Refer to the latest Release Notes for limitations.

# 3. Setup and configuration

There are several ways to setup and configure **TITAN Live**:

- On bare-metal server from ISO file
- On Docker
- On a Debian machine
- On CentOS

# 3.1. Configuring TITAN Live on bare-metal server from ISO file

### Before you begin

Go back to Setup and Configuration

#### Context

**TITAN Live** can be installed as a bare-metal server from the ISO file provided. This section explains how to run these setup and configuration.

**Prerequisites**: You need a USB key and to install *Win32DiskImager*. If you have not installed *Win32DiskImager* yet, download the application: <u>Win32DiskImager</u>.

#### **Procedure**

- 1 Insert the USB key into your machine.
- 2 Launch the application Win32DiskImager.
- 3 Choose the TITAN Live ISO file provided.
- 4 Select the USB key as destination and click *Write*.
- 5 You should get a Write successful message. Click OK and then Exit.
- 6 Unplug the USB key and insert the USB key into one of the server USB sockets.
- 7 Perform the following steps through the interactive menu:
  - a ATEME Titan Installer: Select Embedded image installation and click OK.
  - **b** Confirmation: Click Yes to confirm.
  - C Select hard disk to flash: Select /dev/sda sda and click OK.
  - d Network configuration: Click Yes.

Can Note: Configuring the network is not mandatory at this stage. You can still configure network later following the sections Configuring IP network in console mode or Configuring IP network in USB mode, or directly from the TITAN Live user interface.

- e Set a static IP address of eth0 network adapter: Enter the IP address of your interface.
- Set the netmask of eth0 network adapter: Enter the netmask of your interface.
- g Set the gateway of eth0 network adapter: Enter the gateway of your interface.

#### Result

You can now use TITAN Live.

## 3.1.1. Configuring IP network in console mode

#### Before you begin

Go back to Configuring TITAN Live on Bare-Metal Server From ISO File

#### Context

When **TITAN Live** is installed, you might need to configure your IP network. This section will explain how to configure your IP network in console mode.

Prerequisites: Open the SSH console mode.

#### **Procedure**

1 Log on TITAN Live through the console with the following credentials:

Up to version 4.1.19.x:

Profile: titan

Password: titan

From version 4.1.26.0:

Profile: titan

Password: C0ns0le@At3me

Open an interactive network configuration utility by running the following command:

ipconfig

- 3 Choose the interface to configure.
- 4 Choose the mode to use between DHCP or static:

- a When you choose DHCP, the interface address and netmask are filled automatically.
- b When you choose static:
  - 1 Enter the interface address.
  - 2 Enter the interface netmask.
- 5 Optional: Configure a gateway.
  - a Run the command [routeconfig].
  - b Enable the gateway.
  - c Enter the gateway address.

#### Result

You can now use TITAN Live.

## 3.1.2. Configuring IP network in USB mode

# Before you begin

Go back to Configuring TITAN Live on Bare-Metal Server From ISO File

#### Context

When **TITAN Live** is installed, you might need to configure your IP network. This section will explain how to configure your IP network with a specially formatted USB key.

#### **Procedure**

- 1 Format a USB key to FAT32.
- 2 Create a titan-network-interface file containing the network configuration as following:
  - a For Ethernet configuration:

```
iface:eth1
address:10.80.9.99
netmask:255.255.0.0
gateway:10.80.0.1
```

Note: The field iface is optional. If you do not enter an interface for the field iface, TITAN Live chooses a default value. The address and netmask fields are mandatory. Do not forget to replace the address and netmask of the previous example by the address and netmask of your interface. The gateway field is optional.

**b** For NIC bonding configuration:

```
iface:bond0
address:10.128.8.225
netmask:255.255.0.0
bond_mode:active-backup
bond_slaves:eth2,eth3
bond_options:miimon=100,updelay=200,downdelay=200
```

Note: The field iface is optional. If you do not enter an interface for the field iface, TITAN Live chooses a default value. The address and netmask fields are mandatory. Do not forget to replace the address and netmask of the previous example by the address and netmask of your interface. The bond\_mode field can be active-backup, balance-rr, balance-tbl, balance-alb, broadcast, balance-xor or 802.3ad. The supported parameters are miimon, updelay and downdelay. All fields listing several elements must separate elements with a comma.

3 Plug the USB key into the machine running **TITAN** Live and the system assigns you network configuration.

#### Result

How to check if my new configuration has been applied?

- 1 Wait about 5 seconds and unplug the USB key of your machine.
- 2 Plug the USB key into another machine that runs **TITAN Live**.

Two cases can occur:

- In case of success, the titan-network-interface file is renamed titan-network-interface.success.
- In case of failure, the *titan-network-interface* file is renamed *titan-network-interface.failure* and additional information are logged to *titan-network-interface.log*.

# 3.2. Installing TITAN Live Docker edition

## Before you begin

You must install a modern container engine, as recommended by your operating system provider.
 See for example: <u>Install Docker Engine</u>.

- The container storage driver must be overlay2 or equivalent. To check storage drivers with Docker engine, run the command docker info. For more information, refer to: Docker storage drivers.
- If the storage driver is not overlay2 on Docker Engine, do the following instructions: Configure

  Docker with the overlay or overlay2 storage driver.
- You must use version 17.03 or later releases for Docker Engine. Pre-installed Docker CE versions are always outdated.

Note: ATEME does not provide Container engines. Contact your operating system provider for technical support.

#### Context

This page details all necessary steps to achieve a correct **TITAN Live** software installation for the Docker edition.

You can use this procedure for other compatible deployment tools (e.g. Puppet) already in use on the target infrastructure.

## Configuring the network



Note: The firewall configuration depends on the target infrastructure and its management. The following documentation is provided as an example. Refer to your IT service to make sure it complies with your needs. Interface names must be aligned with the target system.

- 2 You can open additional ports, depending on port mounts and features wanted. See <u>Data flow for TITAN Live</u>.
- 3 Change the Sysctl configuration:
  - a Add the following lines to /etc/sysctl.conf:

```
net.ipv4.conf.default.rp_filter = 0
net.ipv4.conf.all.rp_filter = 0
net.ipv4.ip_forward = 1
```

- b You can do additional configuration for kernel optimization.
- Open the firewall for:
  - a Multicast traffic with [iptables]:

```
iptables -A INPUT -s 224.0.0.0/4 -j ACCEPT
iptables -A OUTPUT -s 224.0.0.0/4 -j ACCEPT
iptables -A FORWARD -s 224.0.0.0/4 -j ACCEPT
```

b Multicast traffic with firewalld:

```
firewall-cmd --new-zone=multicast --permanent

firewall-cmd --zone=multicast --add-interface=eno2 --permanent

firewall-cmd --zone=multicast --add-interface=eno3 --permanent

firewall-cmd --zone=multicast --add-source=224.0.0.0/4 --permanent

firewall-cmd --zone=multicast --add-port=5000-5999/udp --permanent

firewall-cmd --reload
```

c HTTP and License server services ports with firewalld:

```
firewall-cmd --permanent --zone=public --add-port=80/tcp

firewall-cmd --permanent --zone=public --add-port=5093/udp

firewall-cmd --permanent --zone=public --add-masquerade

firewall-cmd --reload
```

# **Deploying containers**



Note: The TITAN Live Docker images are available on the <u>ATEME Public Hub</u>. You need an ATEME Hub account to pull images. Ask your ATEME referee.

The TITAN Live container must meet the following requirements:

- a You must grant privileged permissions to the container.
- b You must assign the unless-stopped value to the restart constraint.
- You must have unlimited resources. To configure multiple services with the Podman engine, enter --pids-limit 0.
- d If you start more than one container on the host, you must carefully adjust limits for resource use.
- 6 For streaming services, you must have an efficient network driver:

Note: For more information on network driver efficiency, refer to: <u>Networking</u> overview.

- a If you use only one container, the most efficient driver is host.
- b If you use multiple containers, you can use sriov network configuration.
- c Use macvlan as a fallback.
- 7 You should mount the following points on the host for your Volumes:
  - a /sys/fs/cgroup:ro
  - b /var/opt/ateme/mongodb
  - C /var/opt/ateme/titan\_system\_management
- 8 You do not need to configure ports if the network driver is host.
  - Note: For more information, refer to <u>Data flow for TITAN Live</u>.

#### Result

TITAN Live for Docker is now available.

# 3.3. Docker edition usage examples

# 3.3.1. Starting a container

#### Context

The following commands only apply to Docker Engine use.

For more information, refer to: Docker base command.

#### **Procedure**

1 Create a volume for database storage (if not already created):

```
docker volume inspect titan_db --format "{{.Name}}" 2>/dev/null || docker volume create
titan_db
docker volume inspect titan_conf --format "{{.Name}}" 2>/dev/null || docker volume
create titan_conf
```

2 Create the container:

```
docker run -d \
    --name=titanlive \
    -v /sys/fs/cgroup:/sys/fs/cgroup:ro \
    -v titan_db:/var/opt/ateme/mongodb \
    -v titan_conf:/var/opt/ateme/titan_system_management \
    --network host \
    --privileged \
    --restart unless-stopped \
    hub.ateme.net/titanlive-md/titanlive:4.1.25.0-0
```

3 Check the container status:

Note: The container identifier is a hash value or a name that uniquely identifies an instance of a running image. Examples include id (b07942b85cd5) and name (titanlive). The container identifier is a key to run container commands such as: stop, attach, rm, exec, etc.

## 3.3.2. Upgrading a container

#### Context

The following commands only apply to Docker Engine use. For more information, refer to: <u>Docker base command</u>.

#### **Procedure**

1 Stop and delete the container:

docker stop titanlive

docker rm titanlive

2 Start a new container with the new version (see <u>Starting a container</u>).

# 3.3.3. Improving deployment orchestration with Docker Compose

Here is an example of a **TITAN Live** manifest for Docker Compose.

```
version: "3"
services:
 titanlive:
   image: hub.ateme.net/titanlive-md/titanlive:4.1.25.0-0
   privileged: true
   restart: unless-stopped
   ports:
     - 80:80
     - 443:443
     - 5093:5093
     - 4200:4200
   volumes:
     - /sys/fs/cgroup:/sys/fs/cgroup:ro
     - titan_db:/var/opt/ateme/mongodb
     - titan_assets:/var/opt/ateme/titan_system_management
   networks:
     - management
     - streaming_1
     - streaming_2
   ulimits:
     core:
       soft: 0
       hard: 0
volumes:
 titan_db:
 titan_assets:
networks:
 management:
   driver: bridge
 streaming_1:
   driver: macvlan
```

```
driver_opts:
   parent: ens1
streaming_2:
   driver: macvlan
   driver_opts:
   parent: ens2
```

You can have a similar deployment for TITAN Mux.

For more information on Docker Compose, refer to: Overview of Docker Compose.

# 3.3.4. Improving deployment orchestration with an all-in-one script

You can use the following script to install, restart, upgrade and downgrade a single **TITAN Live** container.

The server expects only one container named <code>titan</code>, with <code>titan\_db</code> and <code>titan\_assets</code> as attached volumes.

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```
#!/usr/bin/env bash
# TITAN wanted version
export TITAN REGISTRY=hub.ateme.net
export TITAN IMAGE=titanlive-md/titanlive
export TITAN VERSION=4.1.26.0.0-0
# Engine in use (docker, podman, ...)
export ENGINE=podman
# Extra
#export STORAGE_DIR=/opt/ateme-docker
#export TMPDIR="${STORAGE DIR}/tmp"
# Login to Ateme Hub
if [ "$TITAN_REGISTRY" = "hub.ateme.net" ]; then
$ENGINE login hub.ateme.net
fi
# Create volume storage if not available
echo '\nCheck volumes'
$ENGINE volume inspect titan_db --format "{{.Name}}" 2>/dev/null || $ENGINE volume create
titan db
$ENGINE volume inspect titan assets --format "{{.Name}}" 2>/dev/null || $ENGINE volume create
titan assets
# Remove old container if available
echo '\nDetect running container'
noCont=$(${ENGINE} inspect titan --format "{{.Id}}" 2>/dev/null)
if [ -n "$noCont" ]; then
 echo ' Running container detected!'
 echo ' Stop container...'
 $ENGINE stop titan
 echo ' Delete container...'
 $ENGINE rm titan
```

```
fi
# Create the container
echo '\nCreate the new container'
$ENGINE run -d \
  --name=titan \
  -v /sys/fs/cgroup:/sys/fs/cgroup:ro \
 -v titan db:/var/opt/ateme/mongodb \
 -v titan_assets:/var/opt/ateme/titan_system_management \
 --network host \
 --privileged \
 --pids-limit 0 \
 --restart unless-stopped \
 ${TITAN REGISTRY}/${TITAN IMAGE}:$TITAN VERSION
# -v "${STORAGE DIR}/titan.conf:/etc/rsyslog.d/titan.conf:ro" \
# -v /var/log/titan/:/var/log/titan/ \
echo '\nTitan deployed!'
```

# 3.4. Configuring TITAN Live on a Debian machine

## Before you begin

Go back to Setup and Configuration

#### Context

This section will explain you how to setup and configure **TITAN Live** on a standard Debian or Ubuntu machine, from the .debs files provided in the warehouse.

You can find the .debs files under the *package/debian* directory of the version you want to setup and configure in the warehouse.

#### **Procedure**



Install the following apt sources to the repository <code>/etc/apt/sources.list</code>:

deb https://nexus-rennes.ateme.net/repository/apt-debian-proxy/ buster main contrib nonfree
deb https://nexus-rennes.ateme.net/repository/apt-debian-proxy/ buster-backports main
contrib non-free

2 Update the repositories by running:

apt update

- 3 Install the following packets with the command [apt install]:
  - 1 sentinelrms\_\*.deb
  - 2 titancommon\_\*.deb
  - 3 titanupdater\_\*.deb
  - 4 titanlivelicenseproxy\_\*.deb
  - 5 titanliveprocessunit\_\*.deb
  - 6 titansystemmanagement\_\*.deb
  - 7 titanliveservicemanagement\_\*.deb
  - 8 titanlivealarmmanagement\_\*.deb
  - 9 titanlivewebgui\_\*.deb
- Drop the following libraries on the server:

/opt/ateme/bin/alog.py
/opt/ateme/lib/libtwolame-0\_4-x64-buster.so

Note: You can copy the libraries from another TITAN Live or retrieve them from the corresponding ap2.

5 Update the libraries cache by running:

ldconfig



Reboot the system.

#### Result

If your mongo library is not completely filled, add the following library:

/usr/bin/apython3.6 /opt/ateme/titan\_live\_service\_management/bin/importTemplates.py

# 3.5. Installing or upgrading TITAN Live on CentOS/RHEL

## Before you begin

This section will explain you how to install or upgrade **TITAN Live** on a CentOS/RHEL operating system.

Make sure you have:

- Version 7.6 of CentOS/RHEL installed.
- The following dependencies for Linux OS:
  - openssh-server
  - shellinabox
  - unzip
  - ipmitool
  - htop
  - ethtool
  - net-tools
  - traceroute
  - iptraf-ng
  - Ishw
  - open-vm-tools
  - curl
  - iq
  - whois
  - gnupg
  - tcpdump
  - vim
  - openssl
  - logrotate
  - ncurses-dev

- mongodb-org
- httpd24-httpd
- httpd24-httpd-devel
- protobuf
- ntp
- nfs-utils
- redhat-lsb-core
- net-snmp
- net-snmp-utils
- binutils
- numactl
- systemd-libs
- stress
- wget
- ipmitool
- sudo
- OpenIPMI
- kernel-tools
- Root permissions.

#### Context

These instructions concern the installation of **TITAN Live** on CentOS/RHEL environments with all the required third-party software dependencies.

With these instructions, you can deploy **TITAN Live** software in some automatic and massive deployment tools such as Puppet.

#### **Procedure**

1 Check your prerequisites at the start of this section before proceeding.

## Preparing server before TITAN Live installation

2 Disable SELinux. This step is required because default Linux security policy is too restrictive for full TITAN Live operations

```
setenforce 0
sed -i -e 's/SELINUX=enforcing/SELINUX=disabled/g' /etc/selinux/configd
```

3 Disable the firewall.

```
systemctl stop firewalld
systemctl disable firewalld
```

Note: You can tweak firewall configuration according to the target infrastructure and its management. Disabling firewall is the easiest path to allow TITAN Live for TITAN Live

Deactivate rp\_filter for the network interface you want to use as input for TITAN Live so that you can receive multicast streams.

```
echo "0" > /proc/sys/net/ipv4/conf/<interface name>/rp_filter
```

5 Update the yum cache.

```
yum update -y
```

6 Add the EPEL repository and install the external packages needed.

```
yum install -y epel-release
```

Note: For RHEL, you might need to enable the EPEL repository with subscription-manager.

Add more packages to be able to build the python libraries that are needed.

```
yum install -y python36-pip wget redhat-lsb numactl shellinabox ipmitool net-snmp-utils
net-snmp glibc.i686

yum install -y httpd-devel gcc python36-devel cifs-utils
```

On RHEL, you might need to manually install the stress and shellinabox package.

```
rpm -ivh https://dl.fedoraproject.org/pub/epel/7/x86_64/Packages/s/
stress-1.0.4-16.el7.x86_64.rpm
rpm -ivh https://dl.fedoraproject.org/pub/epel/7/x86_64/Packages/s/
shellinabox-2.20-5.el7.x86_64.rpm
```

8 Recreate the Python symbolic link.

```
ln -sf /usr/bin/python3.6 /usr/bin/apython3.6
```

Install Python libraries for TITAN Live.

```
pip3 install -r python-requirements.txt
```

CentOS/RHEL.

10 Configure httpd for Apache web server.

```
mod_wsgi-express module-config > /etc/httpd/conf.d/01-wsgi.conf
echo "LoadModule mpm_event_module modules/mod_mpm_event.so" > /etc/httpd/conf.modules.d/
00-mpm.conf
sed -i '/PrivateTmp/d' /usr/lib/systemd/system/httpd.service
```

11 Install MongoDB 3.0 from its repository.

```
cat << EOF > /etc/yum.repos.d/mongodb-org-3_0.repo
[mongodb-org-3.0]
name=MongoDB Repository
baseurl=http://repo.mongodb.org/yum/redhat/\$releasever/mongodb-org/3.0/x86_64/
gpgcheck=0
enabled=1
EOF
yum install -y mongodb-org
```

12 Update sudoers file to get correct rights to run TITAN Live.

```
cat << EOF > /etc/sudoers.d/titan
apache ALL=NOPASSWD: /usr/bin/htpasswd
apache ALL=NOPASSWD: /bin/systemctl daemon-reload
apache ALL=NOPASSWD: /bin/systemctl set-property *
apache ALL=(ALL) NOPASSWD: /usr/bin/python3
Defaults:apache !requiretty
EOF
```

## **Installing TITAN Live**

- 13 Select the following option according to your situation.
  - a Option A: New installation.
  - b Option B: Upgrade an existing release of TITAN Live.

## **Option A: New installation**

- You must install the following rpm packages in the following order by running the yum install command each time:
  - 1 sentinelrms\_\*.rpm
  - 2 titancommon\_\*.rpm
  - 3 titanupdater\_\*.rpm
  - 4 titanlive\_\*.rpm
  - 5 titanlivelicenseproxy\_\*.rpm

- 6 titanliveprocessunit\_\*.rpm
- 7 titansystemmanagement\_\*.rpm
- 8 titanliveservicemanagement\_\*.rpm
- 9 titanlivealarmmanagement\_\*.rpm
- 10 titanlivewebgui\_\*.rpm

Carrote: Make sure that you install the packages in the same order as the list above.

## Option B: Upgrade

- 15 Do the following actions and proceed to checkup and activation
  - You must do a backup of all configured services to a JSON file
  - b You must do a backup of the license file and store the backup in <a href="https://var/opt/ateme/rms/bin/lservrc">/var/opt/ateme/rms/bin/lservrc</a>.
  - You must do the shell command rpm -e for the following RPM packages in the following order.

```
titanlivewebgui

titanlivealarmmanagement

titanliveservicemanagement

titansystemmanagement

titanliveprocessunit

titanlivelicenseproxy

titanlive

sentinelrms
```

You must install the following rpm packages in the following order by running the yum install command each time.

```
titanliveservicemanagement_*.rpm
sentinelrms_*.rpm
titanlivelicenseproxy_*.rpm
titansystemmanagement_*.rpm
titanlivealarmmanagement_*.rpm
titanlivewebgui_*.rpm
titanliveprocessunit_*.rpm
titanliveprocessunit_*.rpm
```

e Update your service configuration files.

```
cd /opt/ateme/titan_live_service_management/bin/ && apython3.6 updateVersions.py
--db && cd -
```

f Copy the license file (lservrc) into (/var/opt/ateme/rms/bin/).

## Checkup and activation

- 16 Do checkup and activation:
  - a Reload services configuration: systemctl daemon-reload
  - b Restart httpd:

```
service httpd restart
systemctl enable httpd
```

c Ensure that directories exist and that permissions are correct.

```
for subdir in fonts logos

do

    mkdir -p /var/opt/ateme/titan_system_management/$subdir
    chown apache:apache /var/opt/ateme/titan_system_management/$subdir

done
```

d Configure log rotation. You must rotate generated **TITAN Live** logs to save hard drive space according to your internal policy. Here are some logs that you should consider for log rotation:

- /var/logs/httpd/
- /var/log/rms\*
- Other system logs if needed.
- Reboot the server

#### Result

You have now installed **TITAN Live** on your CentOS operating system. If you want to upgrade packages, see <u>Upgrading TITAN Live on CentOS</u>.

# 3.6. Upgrading and downgrading TITAN Live

If you **update** from **TITAN Live** 4.1.19.x (or older) to version 4.1.20.x (or newer):

- The update process resets all GUI and API passwords to their default values.
- If you have customized passwords, after the upgrade you must customize these passwords again.
- The update process does not reset customized SSH passwords.

If you **downgrade** from **TITAN Live** 4.1.20.x (or newer) to version 4.1.19.x (or older):

- The downgrade process resets all GUI, API and SSH passwords.
- If you have customized passwords, after the downgrade you must customize these passwords again.

If your **TITAN Live** instances are managed by **AMS Web Application**, refer to the following upgrading and downgrading procedures:

- For Dataminer-based AMS: <u>Upgrading and downgrading TITAN Live managed by Dataminer-based</u>
   AMS Web Application
- For AMS Web Application: <u>Upgrading and downgrading TITAN Live managed by AMS Web Application</u>

# 3.6.1. Upgrading and downgrading **TITAN Live** managed by Dataminer-based **AMS Web Application**

#### Context

If you plan to upgrade or downgrade **TITAN Live** instances managed by a Dataminer-based AMS, follow this procedure to change your **TITAN Live** passwords on the Dataminer-based AMS side:

## Prior to the upgrade or downgrade

- 1 Set all redundancy groups to manual mode.
- 2 Ensure all primary units are active.

## After the upgrade or downgrade

- 3 If you upgraded every TITAN Live instances: Run the AMS/Dataminer <a tended to the live Setup Credential script with username as Api and password as the new password value.
- 4 If you only upgraded some instances: Change the passwords manually.
- 5 If an AMS Web Application is also interfaced with AMS/Dataminer:
  - a Go to Settings.
  - **b** Go to the **Redundancy** tab.
  - Click **Import** on the **DMA** card, to import the password configuration from AMS/ Dataminer.

#### Result

A resumes API communication with upgraded or downgraded units. All timeout related alarms should be cleared in both AMS/Datamnier and **AMS Web Application**.

# 3.6.2. Upgrading and downgrading **TITAN Live** managed by **AMS**

# Web Application

#### Context

If you plan to upgrade or downgrade **TITAN Live** instances managed by **AMS Web Application**, follow this procedure to change your **TITAN Live** passwords on the **AMS Web Application** side:

## Prior to the upgrade or downgrade

- 1 Set all redundancy groups to manual mode.
- 2 Ensure all primary units are active.

## After the upgrade or downgrade

Manually change the password for each unit in AMS Web Application according to <u>Creating users</u>.

#### Result

AMS resumes API communication with upgraded or downgraded units. Ensure that all timeout related

alarms are cleared in AMS Web Application.

# 4. First steps in TITAN Live

If you are a new user, this section will help you take your first steps with **TITAN Live**. See the section <u>Logging to your account</u> to log into **TITAN Live**. See the section <u>Quick tour of **TITAN Live**</u> to learn how to use the basic settings to begin with.

# 4.1. Logging to your account

#### Go back to For New Users

When you log to your account for the first time, you can use these default profiles and passwords:

Up to version 4.1.19.x			From version 4.1.26.0		
Access	User	Default Password	Access	User	Default Password
	Operator	titan		Operator	TitanLive@At3me
GUI	Monitoring	titan	GUI	Monitoring	TitanLive@At3me
	Administrator	titan		Administrator	TitanLive@At3me
API	api	titan	API	api	TitanAPI@At3me

Note: Your access rights are more or less restricted depending on the type of user you select.

To change the default password, go to **Passwords Management** in the **System** tab. To change profile, click **2+** at the top left corner.

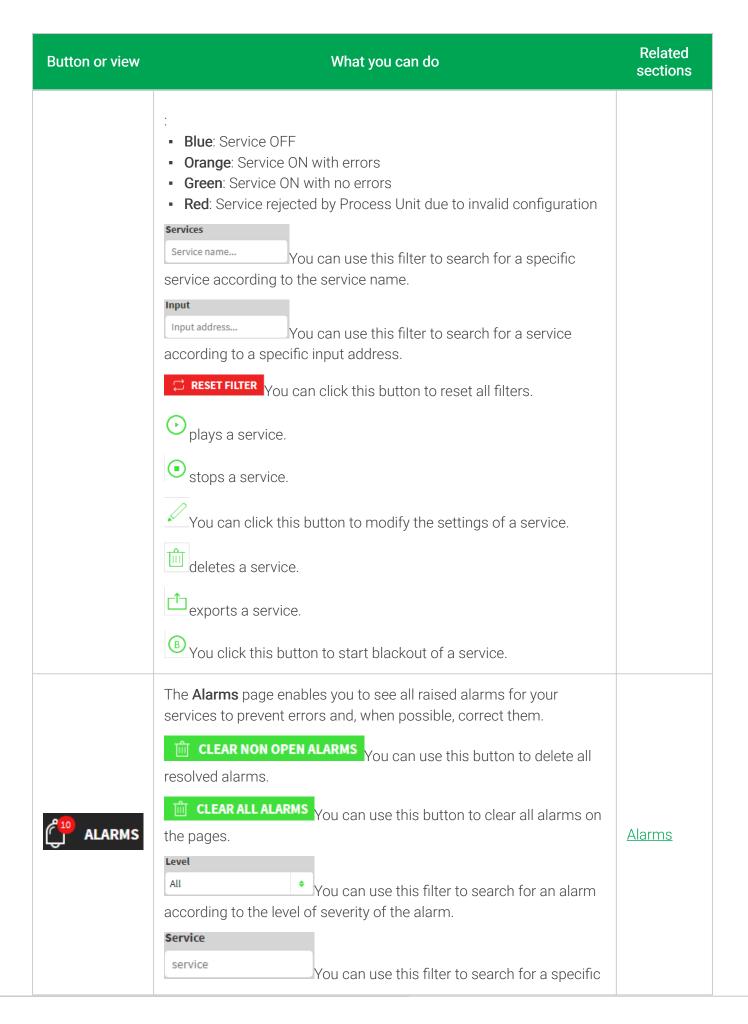
# 4.2. Quick tour of TITAN Live

#### Go back to First steps in TITAN Live

In this section, you will learn how to use **TITAN Live** and the basic settings or buttons of the software. If you want to have more details about a section, click the related section or see the section <u>TITAN Live in More Details</u>.

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Button or view	What you can do	Related sections
<b>TITAN</b> Live	Click the logo to expand or collapse the navigation bar.	
Full administrator profile	Click this button to change profile or disconnect from <b>TITAN Live</b> .	
Search a service	Click this button to search for a specific service.	
	The <b>Services</b> page enables you to monitor all your created services and to create new services.	
	is the default view.  is the default view.  LIST  VIEW  changes the layout of your services into a list.	
	When in list view, you can expand information about your services.  — COLLAPSE When in list view, you can collapse the detailed	
SERVICES	information of your services.  You can select a line to show details about a specific service.	<u>Services</u>
	When in list view, you can click this icon to switch input when you have several inputs.	
	+ NEW SERVICE You can click this button to select all services.  + NEW SERVICE You can click this button to create a new service.	
	You can import services from files of your machine. You can select the JSON file in your library or perform a drag and drop of the JSON file on GUI.	
	You can use this filter to select a monitoring status to display all services of the chosen status. There are 4 status	



Button or view	What you can do	Related sections
	service according to the service name.  Type All You can use this filter to search for an alarm according to the type of the alarm.  Status All You can use this filter to search for an alarm according to the status of the alarm.  RESET FILTER You can use this button to reset all filters.  Start, End, Level, Service, Type You can use one of this button to classify alarms according the date of beginning or ending, the level of severity and the type of alarms, or by service name.	
SUPPORT	The Support page enables you to get documentation about TITAN  Live and to ease issue for the support team. You should not go to this page unless the ATEME support team invites you to.  Documents  displays the list of available API documentation of TITAN  Live.  OPEN TERMINAL  You can click this button to open a terminal.  GENERATE DIAGNOSTIC PACKAGE  You can use this button to generate diagnostic package in case of unexpected error of the unit and upon ATEME request.	Support
→ SYSTEM	The <b>System</b> page enables you to configure your system.	System
	SYSTEM INFORMATION Click this button to see information about your system.	Obtaining System Information
	SYSTEM  MANAGEMENT Click this button to configure the system, licenses, logos, fonts and time.	Managing the System
	SYSTEM UPDATE Click this button to manage update of you firmware.	<u>Updating</u> the System

Button or view	What you can do	Related sections
	NETWORK MANAGEMENT Click this button to create and configure interfaces, VLAN, routes, DNS and statmux.	Managing the Network
	ALARMS MANAGEMENT Click this button to configure services related alarms.	Managing Alarms
	LOGGING CONFIGURATION Click this button to configure connections to a remote server and forward syslog messages.	Configuring Logging
	PASSWORD MANAGEMENT Click this button to configure and modify passwords of the different TITAN Live profiles.	Managing Passwords
	HARDWARE Click this button to manage the monitoring of your system hardware and configure related hardware alarms.	Managing Hardware Monitoring
	FILE SERVERS  MANAGEMENT Click this button to manage file servers of your system.	Managing File Servers
	SSL CONFIGURATION Click this button to manage SSL client and peer certificates.	Configuring SSL Certificates

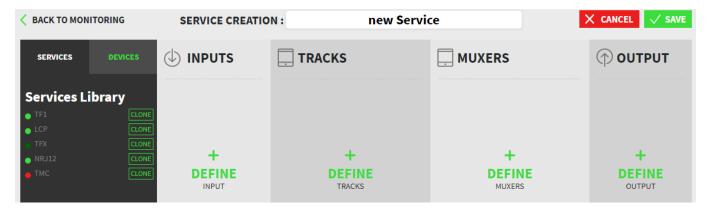
# 5. TITAN Live in more details

In this section, you will find information on all settings available for <u>service edition</u>, <u>alarm monitoring</u>, <u>support</u> and <u>system configuration</u>. If you want to know more about the basic settings to begin with, have a look at the section <u>Quick tour of **TITAN Live**</u>.

## 5.1. Services

#### Go back to TITAN Live in More Details

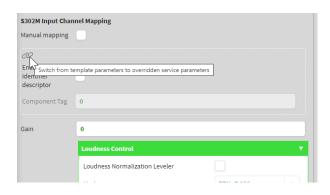
This section is intended for the creation of new services and for the monitoring of services. To create a new service, go to **Services** and click **+** NEW SERVICE. To learn how to monitor your existing services, refer to the section Quick Tour of TITAN Live.



When you create a service:

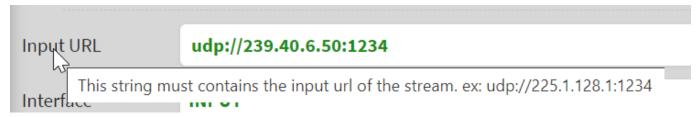
- You must enter the name of your service.
- You can use the <u>Services library</u> to clone an existing service.
- You must select a type of device in the <u>Devices library</u>.
- You must define one or several <u>inputs</u>.
- You can configure your <u>tracks</u>.
- You can configure the <u>muxer settings</u>.
- You must define one or several <u>outputs</u>.
- You must save or cancel the creation of your service.

When you configure the service parameters, you already have many pre-filled settings so that your configuration is automatically valid. You can still modify these parameters with a custom value and replace the default value. You might also see this icon:  $\boldsymbol{\mathscr{O}}$ . You can click on this button so that your parameter configuration overrides the template parameter.



When you finish to configure the settings of one panel, click  $\checkmark$  at the top right to validate your configuration. This button does not save the configuration, but only validates the configuration. To save your service configuration and return to monitoring services, click  $\checkmark$ SAVE. To cancel your service configuration and return to monitoring services, click  $\thickapprox$ CANCEL. When you validate the settings configuration of one panel, an error message might appear. This error message means that one or several parameters are invalid or incomplete.

For more information about a specific parameter, move your cursor over the name of the parameter for additional information.



When you select more than 1 service in the 88 **THUMBNAILS VIEW** or **₹ LIST VIEW**, you can apply the following actions to the selected services:

- PLAY SELECTION.
- STOP SELECTION.
- DELETE SELECTION.
- GROUP SELECTION.
- ¬¬ UNGROUP SELECTION.

# 5.1.1. Services library

#### Go back to Services

To use the **Services Library**, go to  $\blacksquare$  **Services** and click + NEW SERVICE.

With the **Services Library**, you can see all created services and you can clone one service if you want to use this service configuration as a template and reproduce all its parameters when you create a new service.

## 5.1.2. Devices library

### Go back to Services

To use the **Devices library**, go to **Services**, click **NEW SERVICE** and click **Devices**.

With the **Devices library**, you can see and use all created devices. You can expand the list of devices by clicking on the type you need. This list includes:

- Default devices: You can find default devices in the Devices Library list. These devices are preconfigured default devices templates that you can use. To modify a default device template, you need to make your modifications and save the device under a new name in your own library of devices.
- **Devices you created**: You can find the devices you created in *My library of devices*. This list contains all previously created devices. You can modify any device on this list.

You can return to default settings at any moment by choosing the default configuration you want in the **Devices library and clicking Use**. You can also delete devices you created in your library of devices by selecting the device you want to remove and clicking *DEL*.

## 5.1.2.1. Using multi packaged devices

## Go back to Devices Library

The multi packaged devices functionality gathers all default templates of the available devices for OTT streaming. All default templates have similar configurations to enable encoder mutualization.

Multi packaging allows to generate several OTT packaging formats (HLS, DASH, Smooth Streaming, RTMP, Multi TS) from the same tracks by mutualizing the video, audio and data encoding. This means that a multi-packaged track is encoded only once, and later packaged in multiple formats. This functionality translates in resources optimization and density improvements.

The encoder only mutualizes if each parameter, that is Multi Packager Group, input and frame rate, has the same value in all templates.

Cannot modify one of these device settings, be sure to modify every multi packaged device with the same parameter. Otherwise, the encoder cannot mutualize. If the encoder does not mutualize, an alarm is raised in the **Alarms** tab.

## 5.1.3. Defining inputs

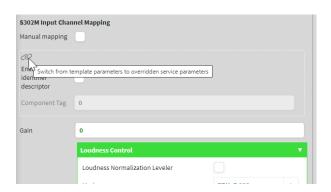
#### Go back to Services

The first step to edit your own service is to define an input. To do so, **TITAN Live** enables you to choose among 10 inputs types. The options change according to the input type you select. To start defining an

input, go to □Services, click +NEW SERVICE and + DEFINE INPUT.

When you define an input, you must choose an input type: <u>IP, SDI, SDI 4K, RTMP</u>, <u>Receiver Demodulator</u>, <u>Zixi, SMPTE 2022-6</u>, <u>SMPTE-2110</u>, <u>HLS</u> or <u>SRT</u>. If you need to define additional inputs in order to manage external data tracks or reference clock, you can also define several inputs by clicking **+ADD INPUT** (to create <u>Input 2</u>, <u>Input 3</u> When you configure the service parameters, you already have many pre-filled settings so that your configuration is automatically valid. You can still modify these parameters with a custom value and replace the default value. You might also see this icon: <u>O.</u> You can click on this button so that your parameter configuration overrides the template parameter, etc.). You can add up to 9 inputs.

Note: You can add up to 8 inputs. When defining several inputs, you cannot use RTMP and you can only configure one SDI input per service. Input with SDI, SDI 4K, Receiver Demodulator, and SMPTE-2110 are not available with **TITAN Live** Kubernetes.



When you define an IP input, it is important to probe the defined multicast address to ensure proper functioning and to obtain the tracks of the stream you are receiving.



To probe your input, click **PROBE**. These tracks are the tracks you need to map when you <u>configure</u> mapping. If an error message appears, that means you are not receiving any tracks and there is a error with your input configuration.

When you finish to configure the settings of one panel, click  $\checkmark$  at the top right to validate your configuration. This button does not save the configuration, but only validates the configuration. To save

your service configuration and return to monitoring services, click **✓ SAVE**. To cancel your service configuration and return to monitoring services, click **★ CANCEL**. When you validate the settings configuration of one panel, an error message might appear. This error message means that one or several parameters are invalid or incomplete.

For more information about a specific parameter, move your cursor over the name of the parameter for additional information.

## Input URL

udp://239.40.6.50:1234

This string must contains the input url of the stream. ex: udp://225.1.128.1:1234

- Click <u>Input 1</u> (or <u>Input 2</u>, or <u>Input 3</u>, etc) to open the input parameters.
- Select the Input Type as IP, SDI, SDI 4K, Receiver Demodulator, Zixi,SMPTE 2022-6, SMPTE-2110, HLS or SRT.
- You can assign a custom Input Label to help you quickly identify your input when you do Mapping Configuration

### IP

This type of input defines a TS encapsulated in UDP packets that are transported over IP. When you select IP, you can configure settings about this type and define one or several multicast addresses.

When you select *IP* as **Input type** you can:

- Enter the name for your service with the Input Label parameter.
- Configure the Input Stream Characteristics.

When you configure the **Input Stream Characteristics**:

- Select the Mode to configure the input stream characteristics as Auto or Manual. If you select Manual:
  - Select the **Codec** of the input video stream.
  - Select the **Frame size** of the input video stream.
  - If you select Custom as value for the input Frame size, enter a value for the Frame width and Frame height of the input video stream.
  - Select the **Frame rate** of the input stream.
  - Enter a numerical value for the **Bitrate** of the input stream in bit/s.
- You can enable **Splicing** to allow **TITAN Live** to interface with a splice server.

When you enable **Splicing**:

Select the SCTE-30 Protocol Version you want to use for your service.

- You must enter a **Channel name**, that is the logical name of the output channel used by the splice server.
- You must enter a **Splicer name**, that is the name you want to give to this splicing device.
- Select a number from 1 to 10 for **Frame Tolerance** that **TITAN Live** accepts in difference between the expected and received number of frames (i.e. missing frame tolerance).
- The following parameters concern the configuration of the Invidi Advatar System for ad insertion: Invidi Dual Registration + Invidi Adapter Name, and Invidi Ad Channel.

Cannot Note: To use Invidi options, you must have a configured Advatar Adapter and activated ad server (ex. SeaChange). You must also create 2 channels that contain user private data to switch between the main stream and the advert stream.

Differences are <u>underlined</u> for your convenience.

Main Stream Channel 1

Name of service: Classic

SCTE-30 Protocol Version: SCTE30 2009

Channel Name: Invidi ServiceSplicer Name: Ateme Classic

• Frame Tolerance: 1

Invidi Dual Registration: <u>Activated</u>
 Invidi Adapter Name: <u>Ateme Invidi</u>

• Invidi Ad Channel not available (due to Invidi Dual Registration activation)

Advert Stream Channel 2

Name of service: Dummy

SCTE-30 Protocol Version: SCTE30 2009

Channel Name: Invidi ServiceSplicer Name: Ateme <u>Invidi</u>

Frame Tolerance: 1

• Invidi Dual Registration: <u>Deactivated</u>

Invidi Ad Channel: Activated

- If you activate **Disable logo and scrolling text**, the logo and/or scrolling text will disappear on the output during splicing.
- You should activate Enable TS input smoothing if the input stream has a high jitter.
- You can change the **Redundancy** selector from the default *None* to *SMPTE 2022-7* to enable seamless protection switching. If you select *SMPTE 2022-7*, you must configure exactly 2 inputs

to specify: (1) Main stream and interface, (2) Back up stream and interface. Otherwise, **TITAN Live** rejects the configuration.

You can configure the ETR 101290 settings/Input failover settings.

When you expand **ETR 101290/Input failover** settings, you can configure the triggers to force a failover to the next input defined in case of issues in the first input. A number of options are available:

- Activate TS sync loss failover to raise a trigger when loss of packets exceeds a defined duration. If activated, enter the TS sync loss timeout in milliseconds before TITAN Live considers loss of packets.
- Activate Sync byte errors failover to raise a trigger when TS sync bytes errors are detected.
- Activate PAT failover to raise a trigger when PAT errors are detected.
- Modify the default Maximum interval allowed between 2 PAT in ms before raising a trigger.
- Activate **PMT failover** to raise a trigger when PMT errors are detected.
- Modify the default Maximum interval between 2 PMT in ms before raising a trigger.
- Activate Continuity Count failover to raise a trigger when continuity count errors are detected. If activated, you can modify the default Continuity count timeframe duration in seconds to define a time window in which the threshold you define in the next parameter is evaluated. You can also modify the default Error continuity count threshold to reach before TITAN Live raises a trigger. If the value equals 1, the timeframe is not significant.
- See the number of continuity errors on the defined timeframe (only visible if the service is started).
- Reset the number of continuity errors (only visible if the service is started).
- Activate **PID errors failover** to raise a trigger when errors with missing PID are detected.
- Enter the Maximum interval between 2 packets of a PID in seconds before raising a trigger.
- Configure a Monitored PID list. Enter the specific PIDs you want to be monitored. If you
  want all PIDs to be monitored, leave blank. You can enter the PIDs to monitor in the
  following pattern as an example: 100-102, 203.
- Activate Auto switch back.
- Configure the **Delay** in seconds before switching back to the main input when this one becomes valid again.

Note: Configuring ETR 101290 triggers disables the individual inputs timeouts. You also need to define at least 2 inputs.

Configure the MULTICAST ADDRESS of you IP input.

### **MULTICAST ADDRESS**

When you configure an IP input, you have to configure at least one multicast address. You cannot add more than 8 multicast addresses. To configure a multicast address:

- You must enter the **Input URL** of the stream you want to receive. The URL must respect the same pattern as the following example: udp://225.1.128.1:1234
- You must select the **Interface** that you use to receive the stream.
- You can activate **IGMPv3 source filtering**. The input stream is only received if the source address matches the field *Source*. This option only works for networks that support IGMPv3.
- If you activate the mode for Activate IGMPv3 Source Filtering, you must enter the IP address of the Source.
- You can enable FEC so that TITAN Live listens on port n+2 and n+4 to look for SMPTE 2022-1
   FEC.

You can click *Show advanced input parameters* to modify the default value in milliseconds for **Timeout** before **TITAN Live** considers the signal lost.

## Go back to Defining Inputs

## SDI



When you select SDI as Input type you can:

- Enter the name for your service with the **Input Label** parameter.
- Configure the Input Stream Characteristics.

When you configure the **Input Stream Characteristics**:

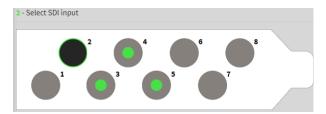
- Select the **Mode** to configure the input stream characteristics as *Auto* or *Manual*. If you select *Manual*:
  - Select the Codec of the input video stream.
  - Select the Frame size of the input video stream.
  - If you select *Custom* as value for the input **Frame size**, enter a value for the **Frame width** and **Frame height** of the input video stream.
  - Select the **Frame rate** of the input stream.
  - Enter a numerical value for the **Bitrate** of the input stream in bit/s.

This input type uses an SDI card to acquire the signal and obtain the input stream and related tracks.

When you choose this SDI type:

1 - Select SDI card: You must Select SDI card name to use.

### 2- Select SDI input:



#### 3 - Create audio Channels:

• You must select the **Audio input type**.

Note: The Number of audio group channel values depends on the audio input type you choose.

 You can activate SMPTE 2020 metadata to enable the recovery of ancillary metadata following SMPTE 2020 normalization.

When you select *PCM for MPEG-H 3D Audio* as **Audio input type**:

- Activate Use control track and select Audio 3D Preset as Default Emission so that the MPEG-H 3D Audio codec automatically detects the layout of the PCM.
- Enter a numerical value for **SDI inputs number**.
- Deactivate SMPTE2020 metadata.
- Under **PCM channel reorder group**, make sure that your Control Track is before the last Channel in your list. **Channel 1** corresponds to the PCM group in the combo box.
- Important: You must remember to select MPEG-H 3D as Codec later when you do Configuring audio tracks settings.

When you select *Dolby E* as an audio input type, additional options are available:

- **Program**: You can enter the program number to use for this action.
- Fallback: You can select a group to enable the switch to a fallback that you define when TITAN Live fails decoding Dolby E (either because there is no Dolby E input or because the decoder fails). In the case of Dolby E to PCM transition on the same audio group channel, the fallback audio group channel must be the same as the audio group channel value.
- If you activate SMPTE2020 metadata, you can modify the default value of 1 for the Ancillary metadata program number.

Note: You can only configure the following parameters if you select PCM mono, PCM stereo or PCM 5.1 as audio input type:

Missing metadata fallback, SMPTE 2020 / Dolby metadata: Monitoring, SMPTE 2020 / Dolby metadata: Fallback, and SMPTE 2020 / Dolby metadata: Custom fallback.

- If you activate SMPTE 2020 metadata, you can activate Missing metadata fallback.
- If you activate **Missing metadata fallback**, you can configure the following expandable monitoring and fallback parameters.

When you expand the **SMPTE 2020 / Dolby metadata monitoring** parameters:

- You can activate DolbyE Complete to trigger complete checks of Dolby E.
- You can activate Dolby Digital Complete with Extended BSI Support to trigger checks on Dolby Digital.
- If you activate Dolby Digital Complete with Extended BSI Support, you can activate Down-Mixing Extension checks and also activate Extended Bitstream Information to enable TITAN Live to trigger extended BSI checks

When you expand the **SMPTE 2020 / Dolby Metadata Fallback** parameters:

- You can enter the minimum number of **Invalid metadata frames** before **TITAN Live** raises an alarm and enables fallback.
- You can select a strategy for Fallback on missing metadata for SMPTE 2020/Dolby as Last valid metadata, Custom metadata, or PCM Stereo. If you select PCM Stereo, you can change the default Fallback PCM Stereo channel as None to a channel group. If you select Custom metadata, you have additional parameters in the next subsection.
- You can activate Auto switch back to the main input when this input becomes valid again after a failure and after a valid frames delay. If activated, you can change the minimum Valid metadata frames count before TITAN Live switches back to the main input after a failure (default 10).

When select **Fallback on missing Metadata** as *Custom metadata* earlier and you expand the **SMPTE 2020 / Dolby Metadata Custom Fallback** parameters:

- You can enter a **Dialog normalization** level in decibels. This value must be less than -1.
- You can select a dynamic range compression preset for the Line mode.
- You can select a heavy dynamic range compression preset for the RF mode.
- You can activate the use of 3 dB Attenuation on all surround channels.
- You can activate the use of **Down-Mixing**.
- You can select a **Stereo Down Mix** method to use when converting from surround to

stereo. TITAN Live does not support the Pro-Logic II mode.

• If you activate **Down-Mixing**: You can select the following nominal down-mix levels (dB) for the following channels:

- Center RT/LT: From left and right channels (EAC3 only). Lt/Rt is a stereo down-mix where the different channels are summed together.
- Surround RT/LT: From left and right channels (EAC3 only).
- Center LO/RO: From left and right channels (EAC3 only). Lo/Ro is a stereo down-mix where the different channels are processed and then summed together.
- Surround LO/RO: From left and right channels (EAC3 only).
- If you activate Extended bitstream information:
  - You can activate or deactivate the **Dolby Surround Mode** for encoding (EAC3 only).
  - You can activate or deactivate the **Dolby Surround EX Mode** for encoding (EAC3 only).
  - You can select a status to define the use mode of the Dolby headphone mode for encoding (EAC3 only).
  - You can select an Analog/Digital Converter mode.

Click + ADD AUDIO CHANNEL to add additional audio channels and follow previous instructions.

#### 4 - Select picture format sources:

- You can click + ADD PICTURE SOURCE to define from where TITAN Live should take aspect ratio and related information. If you do not define a source, TITAN Live uses a default source. You can choose between AFD, Video Id, Video Index and WSS.
- Select Timecode drop mode as Day reset or Continous timecode.

Note: You can only use this parameter for multi-instances synchronization with 29.97 and 59.94 fps, to define how **TITAN Live** should manage the timecode input with drop flag. The day reset option is reset every 24 hours, The continious timecode option makes the timecode drift in real time.

Go back to Defining Inputs

## SDI 4K

When you select SDI 4K as Input type you can:

- Enter the name for your service with the **Input Label** parameter.
- Configure the Input Stream Characteristics.

When you configure the **Input Stream Characteristics**:

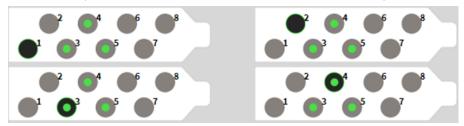
• Select the **Mode** to configure the input stream characteristics as *Auto* or *Manual*. If you select *Manual*:

- Select the **Codec** of the input video stream.
- Select the **Frame size** of the input video stream.
- If you select *Custom* as value for the input **Frame size**, enter a value for the **Frame width** and **Frame height** of the input video stream.
- Select the **Frame rate** of the input stream.
- Enter a numerical value for the **Bitrate** of the input stream in bit/s.

This input type uses an SDI card to acquire the signal and obtain the input stream and related tracks.

When you choose this SDI type:

- 1 Select SDI card: You must Select SDI card name to use.
- **2- Select 4 inputs, each for a quarter of the 4K input**: Select the **SDI 4K input mode** as *Squared* or *Interleaved*:
  - You have to **select SDI inputs**. You can only use the first 4 SDI inputs. You cannot reuse the SDI inputs you use for the SDI 4K for another transcoding job.



You can add an audio channel.

#### 3 - Create Audio Channels

You must select the Audio input type.

Note: The Number of audio group channel values depends on the audio input type you choose.

• You can activate **SMPTE 2020 metadata** to enable the recovery of ancillary metadata following SMPTE 2020 normalization.

When you select *Dolby E* as an audio input type, additional options are available:

- Program: You can enter the program number to use for this action.
- Fallback: You can select a group to enable the switch to a fallback that you define when TITAN Live fails decoding Dolby E (either because there is no Dolby E input or because

the decoder fails). In the case of Dolby E to PCM transition on the same audio group channel, the fallback audio group channel must be the same as the audio group channel value.

You can click **+ ADD AUDIO CHANNEL** to add additional audio channels and follow previous instructions.

#### 4 - Select picture format sources

- You can click + ADD PICTURE SOURCE to define from where TITAN Live should take aspect ratio and related information. If you do not define a source, TITAN Live uses a default source. You can choose between AFD, Video Id, Video Index and WSS.
- Select **Timecode drop mode** as *Day reset* or *Continous timecode*.

Note: You can only use this parameter for multi-instances synchronization with 29.97 and 59.94 fps, to define how **TITAN Live** should manage the timecode input with drop flag. The day reset option is reset every 24 hours, The continious timecode option makes the timecode drift in real time.

## Go back to Defining Inputs

### **RTMP**

When you select *RTMP* as **Input type** you can:

- Enter the name for your service with the **Input Label** parameter.
- Configure the Input Stream Characteristics.

When you configure the **Input Stream Characteristics**:

- Select the **Mode** to configure the input stream characteristics as *Auto* or *Manual*. If you select *Manual*:
  - Select the **Codec** of the input video stream.
  - Select the Frame size of the input video stream.
  - If you select *Custom* as value for the input **Frame size**, enter a value for the **Frame width** and **Frame height** of the input video stream.
  - Select the **Frame rate** of the input stream.
  - Enter a numerical value for the **Bitrate** of the input stream in bit/s.

You can choose between server mode (push) and client mode (pull). When you use this type of input in server mode, **TITAN Live** listens on a specific port, with provided identification parameters.

Select **Mode** as *Server* or *Client* between 2 RTMP input modes:

### **RTMP** Server parameters

Server (push mode)

When you select Server as RTMP input Mode (push mode):

- Enter a numerical value for the **Listening port** to use to receive the stream.
- You must select the Interface that you use to receive the stream.
- Enter the size of the **Input buffer** in milliseconds.
- You must enter the RTMP Stream name you want to receive.
- You should enter the **User name** for RTMP server authentication. If you leave this field empty, there will be no authentication.
- You should enter the Password for RTMP server authentication. If you leave this field empty, there will be no authentication.
- Client (pull mode)

When selecting Client as RTMP input mode (pull mode):

- You must enter the **Url** for the RTMP stream.
- You must select the **Interface** that you use to receive the stream.
- Enter the size of the **Input buffer** in milliseconds.
- You must enter the RTMP Stream name that receives the signal, as this name appears in the URL on the RTMP server.

## Go back to Defining Inputs

## Receiver Demodulator

This input type uses a *Receiver Demodulator* card to acquire the signal that is sent to define the input. Depending on the card, a card can appear as being several cards with only one tuner each, or as a single card with several tuners.

When you select *Receiver Demodulator* as **Input type** you can:

- Enter the name for your service with the **Input Label** parameter.
- Configure the Input Stream Characteristics.

When you configure the **Input Stream Characteristics**:

- Select the **Mode** to configure the input stream characteristics as *Auto* or *Manual*. If you select *Manual*:
  - Select the Codec of the input video stream.
  - Select the **Frame size** of the input video stream.
  - If you select *Custom* as value for the input **Frame size**, enter a value for the **Frame width** and

Frame height of the input video stream.

- Select the **Frame rate** of the input stream.
- Enter a numerical value for the **Bitrate** of the input stream in bit/s.

## Receiver Demodulator

#### 1 - Select card

Select an available Receiver Demodulator Card you want to use as input signal.

#### 2 - Select tuner parameters

- Enter the **Tuner** number to use on the input card.
- You must use ATSC as the method of Delivery.
- Enter the input **Bandwidth** in Hz for the channel.
- You must use 8-VSB as frontend **Modulation**.
- Enter the **Frequency** as 44 Mhz or more for the channel.

#### Go back to Defining Inputs

## Zixi

This input defines a server (with push or pull mode) for Zixi. **TITAN Live** listens on a specific port of the Zixi server, with provided identification parameters and the Zixi server pushes (or pulls) the stream to **TITAN Live**.

When you select Zixi as Input type you can:

- Enter the name for your service with the **Input Label** parameter.
- Configure the Input Stream Characteristics.

## When you configure the **Input Stream Characteristics**:

- Select the **Mode** to configure the input stream characteristics as Auto or Manual. If you select Manual:
  - Select the **Codec** of the input video stream.
  - Select the **Frame size** of the input video stream.
  - If you select *Custom* as value for the input **Frame size**, enter a value for the **Frame width** and **Frame height** of the input video stream.
  - Select the **Frame rate** of the input stream.
  - Enter a numerical value for the **Bitrate** of the input stream in bit/s.
- Select the Zixi input Mode as Push or Pull.
- You can activate Enable TS input smoothing.
- Configure the MULTICAST ADDRESS of your Zixi input.

#### **MULTICAST ADDRESS**

When you configure a Zixi input, you have to configure at least the main multicast address. You cannot add more than 8 multicast addresses.

To configure a multicast address in *Push* mode:

- Enter the **Port** number as 1024 or more to listen to the Zixi input feeder.
- You must select the **Interface** that you use to receive the stream.
- You can modify the default value in milliseconds for Timeout before TITAN Live considers the signal lost.
- You must enter the Password for Zixi server authentication.
- Select an Encryption mode.
- You can enter an **Encryption key**.

To configure a multicast address in *Pull* mode:

- You must enter the **Input URL** of the stream you want to receive. The URL must respect the same pattern as the following example: udp://225.1.128.1:1234
- You must select the **Interface** that you use to receive the stream.
- You can modify the default value in milliseconds for Timeout before TITAN Live considers the signal lost.
- You can define a Channel Name.
- You must enter the **Password** for Zixi server authentication.
- Select an Encryption mode.
- You can enter an Encryption key.
- You can select a FEC Overhead.
- Enter the **Max Latency**.
- Enter the Client ID.

You can click + ADD MULTICAST ADDRESS to add additional entries and repeat instructions.

## Go back to Defining Inputs

### SMPTE 2022-6

This type of input defines an SDI stream encapsulated in UDP packets, that are transported over IP.

Cannote: When you use an SMPTE 2022-6 input, remember to declare the total number of channels and resolutions you want to process with the parameter **Number of 2022-6 inputs**. To declare the number of 2022-6 inputs, go to the **System** tab and click **System Management**. You can find the parameter in the **System configuration** panel. This action ensures that you allocate enough resources for signal acquisition.

When you select SMPTE 2022-6 as Input type you can:

- Enter the name for your service with the **Input Label** parameter.
- Configure the Input Stream Characteristics.

### When you configure the **Input Stream Characteristics**:

- Select the **Mode** to configure the input stream characteristics as *Auto* or *Manual*. If you select
   *Manual*:
  - Select the Codec of the input video stream.
  - Select the **Frame size** of the input video stream.
  - If you select *Custom* as value for the input **Frame size**, enter a value for the **Frame width** and **Frame height** of the input video stream.
  - Select the **Frame rate** of the input stream.
  - Enter a numerical value for the **Bitrate** of the input stream in bit/s.
- Select a **Signal Definition** to define the maximum bitrate allowed for this input.
- Configure the MULTICAST ADDRESS of your SMPTE 2022-6 input.

#### **MULTICAST ADDRESS**

When configuring an SMPTE 2022-6 input, you have to configure at least one multicast address. You cannot add more than 8 multicast addresses. To configure a multicast address:

- You must enter the **Input URL** of the stream you want to receive. The URL must respect the same pattern *as the following example: udp://225.1.128.1:1234*
- You must select the **Interface** that you use to receive the stream.
- You can activate **IGMPv3 source filtering**. The input stream is only received if the source address matches the field *Source*. This option only works for networks that support IGMPv3.
- If you activate the mode for **Activate IGMPv3 Source Filtering**, you must enter the IP address of the **Source**.
- Select a **FEC mode** as *none, column only,* or *column and row.*

When you click **Show advanced input parameters**, you can modify the default value in milliseconds for **Timeout** before **TITAN Live** considers the signal lost.

You can add an audio channel.

#### Create audio Channels

You must select the Audio input type.

Note: The Number of audio group channel values depends on the audio input type you choose.

 You can activate SMPTE 2020 metadata to enable the recovery of ancillary metadata following SMPTE 2020 normalization. If activated, you can modify the default value of 1 for Ancillary Metadata Program Number.

You can click + ADD AUDIO CHANNEL to add additional audio channels.

When you select *Dolby E* as an audio input type, additional options are available:

- **Program**: You can enter the program number to use for this action.
- Fallback: You can select a group to enable the switch to a fallback that you define when TITAN Live fails decoding Dolby E (either because there is no Dolby E input or because the decoder fails). In the case of Dolby E to PCM transition on the same audio group channel, the fallback audio group channel must be the same as the audio group channel value.
- You can click + ADD PICTURE SOURCE to define from where TITAN Live should take aspect ratio
  and related information. If you do not define a source, TITAN Live uses a default source. You can
  choose between AFD, Video Id, Video Index and WSS.

### Go back to Defining Inputs

## **SMPTE-2110**

This type of input defines a stream transporting uncompressed video, audio and ancillary data over IP.

Note: When you use an SMPTE-2110 input, you cannot configure other inputs for the service, you cannot use data tracks and you must use PTP configuration. You can only use one SMPTE-2110 input per service.

When you use a SMPTE-2110 input, you must declare the total of channels and resolutions you want to process with the parameter **Number of 2110 inputs**. To declare the number of 2110 inputs, go to the **System** tab and click **System Management**. You can find the parameter in the System configuration panel. This step ensures that you allocate enough resources for signal acquisition.

When you select *SMPTE-2110* as **Input type** you can:

- Enter the name for your service with the **Input Label** parameter.
- Configure the Input Stream Characteristics.

When you configure the **Input Stream Characteristics**:

• Select the **Mode** to configure the input stream characteristics as *Auto* or *Manual*. If you select *Manual*:

- Select the **Codec** of the input video stream.
- Select the **Frame size** of the input video stream.
- If you select *Custom* as value for the input **Frame size**, enter a value for the **Frame width** and **Frame height** of the input video stream.
- Select the **Frame rate** of the input stream.
- Enter a numerical value for the **Bitrate** of the input stream in bit/s.
- You can edit the automatically generated Device ID.
- Select the Signal definition of the input stream as SD/HD and 4K.
- You can modify the default value in milliseconds for Timeout before TITAN Live considers the signal lost.
- Enter the **Essence latency** as *10000* or less in milliseconds.
- Select **Redundancy** as *None* or *SMPTE 2022-7*. If you select *SMPTE 2022-7*, you must configure an alternate interface for every receiver that you configure in the next steps.
- Enter a name for the Receiver Labels Prefix to add a prefix to all the automatically generated NMOS
  receiver labels.

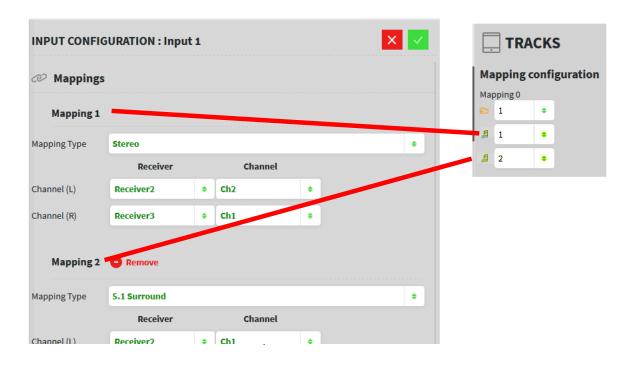


- Automatic NMOS Receiver Labels are generated for the following receivers:
  - v01 for the video receiver.
  - a01 / a02 .. a0N for the audio receivers, with automatic incrementing/decrementing when creating/removing audio receivers.
  - m01 / m02 .. m0N for the metadata receivers, with automatic incrementing/ decrementing when creating/removing data receivers.
- Receiver Labels can be prefixed by using the Receiver Labels Prefix field in the 2110 input.
- The following script shows an example of how you can patch the data receiver with NMOS and a 2110-40 flow that contains ANC timecodes.

```
v=0
o=- 1443716955 1443716955 IN IP4 10.81.32.34
s=rd-emsfp-211°-2_1-9-0
t=0 0
m=video 1234 RTP/AVP 100
c=IN IP4 225.0.03.20/64
a=source-filter: inc IN IP4 225.0.3.20 172.26.0.10
a=rtpmap:100 smpte201/90000
a=fmtp:100 VPID_Code=132;
a=mediaclk:direct=0 rate 90000
a=ts-refclk:ptp=IEEE1588-2008:00-02-C5-FF-FE-1B-93-E4:127
```

- Select Audio Mapping Mode as Auto or Manual.
  - Auto mode creates stereo mapping for each receiver with the first 2 audio channels.
  - If you select *Manual* mode, under Mappings, according to your selection of Mapping type, select each Receiver and Channel number for each corresponding channel name.
  - For **Mapping configuration**, you must associate your audio track with the receiver number in *Auto* mode or with the mapping number in *Manual* mode.

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Cannot map PCM channels with compressed AES3 channels. You cannot map channels with different sample rates.



You must configure at least one a receiver.

- You can modify the default Receiver ID.
- You must select the available Receiver Interface.
- Select the **Receiver media type** as audio, or data.

Go back to Defining Inputs

## HLS



Using an HLS input includes the following limitations:

- You can only use 1 HLS input per service and only one input.
- The media playlist must contain 3 target durations of content.
- You can only use the closed captions and SCTE-35 data tracks and only one of each type.
- TITAN Live does not support the clock drift feature with an HLS input.
- The HLS version used is HLS v3 only and you cannot use mapping.
- The failed segments due to download timeout are not consumed and TITAN Live does not retry the segments.
- You cannot use input backups.
- The redundant streams from the master playlist are not used.

When you select HLS as Input Type, you can:

- Enter the name for your service with the Input Label parameter.
- Configure the Input Stream Characteristics.

When you configure the **Input Stream Characteristics**:

- Select the **Mode** to configure the input stream characteristics as *Auto* or *Manual*. If you select Manual:
  - Select the **Codec** of the input video stream.
  - Select the **Frame size** of the input video stream.
  - If you select *Custom* as value for the input **Frame size**, enter a value for the **Frame width** and **Frame height** of the input video stream.
  - Select the Frame rate of the input stream.
  - Enter a numerical value for the **Bitrate** of the input stream in bit/s.
- Enter the **Input URL** of the stream you want to receive. This URL must contain the stream input URL and respect the same pattern as the following example: <a href="https://host/location/playlist.m3u8">https://host/location/playlist.m3u8</a>.
- You must select the **Interface** that you use to receive the stream.

## Go back to Defining Inputs

## SRT

When you select SRT as Input Type, you can:

- Enter the name for your service with the Input Label parameter.
- Configure the Input Stream Characteristics.

#### When you configure the **Input Stream Characteristics**:

 Select the **Mode** to configure the input stream characteristics as *Auto* or *Manual*. If you select Manual:

- Select the **Codec** of the input video stream.
- Select the **Frame size** of the input video stream.
- If you select *Custom* as value for the input **Frame size**, enter a value for the **Frame width** and **Frame height** of the input video stream.
- Select the **Frame rate** of the input stream.
- Enter a numerical value for the **Bitrate** of the input stream in bit/s.
- Select the SRT Mode as Caller or Listener.
- Activate Enable TS input smoothing.
- Configure the MULTICAST ADDRESS of your SRT input.

#### **MULTICAST ADDRESS**

According to the **SRT mode** you select, the parameters of the **MULTICAST ADDRESS** configuration may vary.

If you select **SRT mode** as *Listener*.

- Enter the **port** number as 2088 to access the port used by the SRT *Listener*.
- You must select the Interface that you use to receive the stream.
- You can modify the default value in milliseconds for Timeout before TITAN Live considers the signal lost.
- Configure the maximum authorized latency time in milliseconds.
- Select an Encryption mode.
- If you select *AES 128, AES 192* or *AES 256* as **Encryption mode**, enter the encryption **Password**. This password must have more than 10 characters.

### If you select SRT mode as Caller.

- Enter the **Input URL** of the stream you want to receive. This URL must respect the same pattern as the following example: *srt://225.1.128.1:1234*.
- Enter the **Local Port** number that will enforce the local port. A value of *0* means that the local port is the same port as in the URL.
- You must select the **Interface** that you use to receive the stream.
- Enter the **Connection timeout** value in milliseconds after which **TITAN Live** considers your input lost. You must enter a value more than or equal to 150.
- You can modify the default value in milliseconds for Timeout before TITAN Live considers the signal lost.

- Configure the maximum authorized latency time in milliseconds.
- Select an Encryption mode.
- If you select AES 128, AES 192 or AES 256 as **Encryption mode**, enter the encryption **Password**. This password must have more than 10 characters.

Go back to Defining Inputs

## 5.1.4. Configuring tracks

## Go back to Services

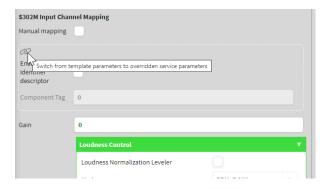
This section is intended for the configuration of the different tracks of your service. To start defining tracks, go to Services, click + NEW SERVICE and select a device to use. You may choose one of the default preconfigured devices from the **Devices Library**. You may also choose to reuse one of your own saved devices in **My Library of Devices**. You can then modify settings in the tracks panel.

When you configure tracks:

- You can configure <u>mapping</u>.
- You can configure global tracks settings.
- You can configure video settings.
- You can configure <u>audio settings</u>.
- You can configure data settings.

To remove a track, click on the track — such as  $\[ lacktriangledown$  MPEG-4 1280x720 - 1.5 Mbps - 50 fps — and click  $\[ lacktriangledown$  . To copy a track to create an additional track, click on the track and click  $\[ lacktriangledown$  and modify the **TRACK CONFIGURATION** if required.

When you configure the service parameters, you already have many pre-filled settings so that your configuration is automatically valid. You can still modify these parameters with a custom value and replace the default value. You might also see this icon: • You can click on this button so that your parameter configuration overrides the template parameter.



When you finish to configure the settings of one panel, click ✓ at the top right to validate your

configuration. This button does not save the configuration, but only validates the configuration. To save your service configuration and return to monitoring services, click **SAVE**. To cancel your service configuration and return to monitoring services, click **SANCEL**. When you validate the settings configuration of one panel, an error message might appear. This error message means that one or several parameters are invalid or incomplete.

For more information about a specific parameter, move your cursor over the name of the parameter for additional information.

Input URL udp://239.40.6.50:1234

This string must contains the input url of the stream. ex: udp://225.1.128.1:1234

## 5.1.4.1. Configuring mapping

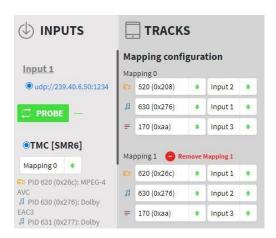
## Go back to Configuring Tracks

To start configuring mapping for a new service, go to **SERVICES**, click **+ NEW SERVICE** and select a device to use in the **Devices Library**. You can then configure mapping in the tracks panel. To start configuring mapping for an existing service:

- In 88 **THUMBNAIL VIEW**: Click 🖉 under the thumbnail of a service.
- In  $\Xi$  LIST VIEW: Select the service where you want to configure mapping and click  $\angle$ .

When you probe your TS/SRT/RTMP/Zixi compressed input, or when you define your uncompressed SDI/SMPTE 2022-6/SMPTE 2110 inputs, you can see a list of all your input tracks under INPUT. To configure the mapping of your stream, you must select the mapping configuration **Mode** as *PID Mapping*, *Auto*, or *Auto Service*.

- *PID Mapping*: With this mode, you must select the video, audio and data track PIDs manually and accordingly to match with the input PIDs.
- Auto: This mode automatically selects the first program to decode in the incoming TS and selects video PID, audio PID and data PID.
- *Auto Service*: With this mode, you must select 2 service IDs of your choice. Then **TITAN Live** selects the audio PID, video PID and data PID.

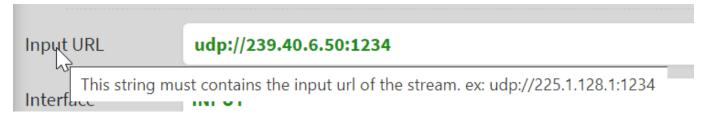


If the mapping configuration does not contain the number of fields needed to map all the tracks of your input stream, you can add and remove tracks in the tracks part below mapping configuration. To remove a track, click on the track — such as  $\[ lacktriangledown$   $\[ la$ 

To add another mapping configuration, click **+ ADD MAPPING**. You must configure at least one mapping. You cannot add more than 2 mapping configurations for the same stream. When you have 2 mapping configurations, you can select the mapping configuration number as  $\bigoplus$  *Mapping 0* or  $\bigoplus$  *Mapping 1*.

When you finish to configure the settings of one panel, click  $\checkmark$  at the top right to validate your configuration. This button does not save the configuration, but only validates the configuration. To save your service configuration and return to monitoring services, click  $\checkmark$ SAVE. To cancel your service configuration and return to monitoring services, click  $\checkmark$ CANCEL. When you validate the settings configuration of one panel, an error message might appear. This error message means that one or several parameters are invalid or incomplete.

For more information about a specific parameter, move your cursor over the name of the parameter for additional information.



## 5.1.4.2. Configuring global tracks settings

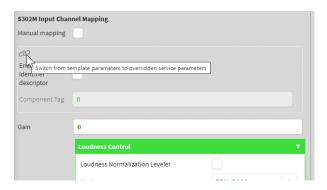
#### Go back to Configuring Tracks

To configure global track settings, go to Services, click NEW SERVICE and select a device to use in the **Devices Library**. Click **Global configuration** in the tracks panel. You can then configure global track settings.

To remove a track, click on the track — such as MPEG-4 1280x720 - 1.5 Mbps - 50 fps — and click — .

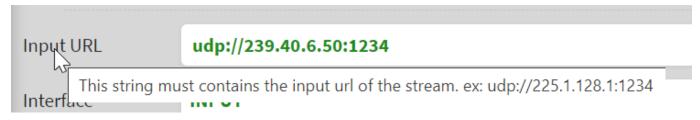
To copy a track to create an additional track, click on the track and click  $\Box$  and modify the **TRACK CONFIGURATION** if required.

When you configure the service parameters, you already have many pre-filled settings so that your configuration is automatically valid. You can still modify these parameters with a custom value and replace the default value. You might also see this icon: • You can click on this button so that your parameter configuration overrides the template parameter.



When you finish to configure the settings of one panel, click  $\checkmark$  at the top right to validate your configuration. This button does not save the configuration, but only validates the configuration. To save your service configuration and return to monitoring services, click  $\checkmark$ SAVE. To cancel your service configuration and return to monitoring services, click  $\thickapprox$ CANCEL. When you validate the settings configuration of one panel, an error message might appear. This error message means that one or several parameters are invalid or incomplete.

For more information about a specific parameter, move your cursor over the name of the parameter for additional information.



When you configure global tracks parameters:

- You can activate Music Channel to encode your track at a very low framerate and freeze current
  activation or deactivation of Relaxed Lipsync. This feature might also result in lipsync issues for your
  output.
- Activate Relaxed Lipsync to increase the tolerance on bad timestamps.
- Select Latency mode selection as Ultra Low Latency, Low Latency, Reduced Latency, High Quality, Best Quality.

Note: This parameter affects the overall picture quality and video encoding structure. The lower your latency, the more this parameter impacts the video quality. Low latency and Ultra low latency are not compatible with trick play tracks.

• Activate *Lower Latency on Preprocessor* to reduce the latency, by adding some restrictions to the video stream such as no interlacing or deinterlacing, no dynamic chunking or no frame rate variation.

- Select a pre-defined Input frame rate restriction to further reduce latency.
   If you select Custom as value for Input frame rate restriction, you can enter a numerical value.
- Enter the **Program delay** from 0 to 2000 milliseconds for the processing service.
- Select the **Master Clock** on which to synchronize the service clock. You can choose the master clock from 4 modes: *Video input, Local clock, Auxiliary input,* and *PTP clock*.
  - Video input. This mode is the default mode. TITAN Live uses the video source as a clock reference.
  - Local clock: System clock changes do not affect the local clock.
  - Auxiliary input. The clock input is distinct from video input. When you select auxiliary input, you
    must select an input.

Note: If you choose Auxiliary input as master clock, you must define at least 2 IP inputs. You can also define a backup stream for the clock input. If you define a backup stream for the input clock, the main stream and backup stream should carry the same PCR.

The maximum PCR drift is one millisecond every second. A higher drift, with PCR delta reaching 250 milliseconds, interrupts the PCR. If the PCR interrupts, the service restarts.

- PTP clock: TITAN Live uses the PTP clock that you define in 

  SYSTEM / SYSTEM MANAGEMENT / Time Configuration.
- If you use specific AMD platforms, you can activate High UHD quality to increase encoding UHD quality.

Can run with your available resources. You can only use 1 High UHD quality service on the same server.

- For **Input and output switching mode**, you can choose one of the following modes for your main input/output and backup input/output:
  - Manual fully disables automatic switching between main and backup
  - Automatic with current settings is the default mode that follows your current configuration and presents usual behavior.
  - Automatic with manual switchback maintains automatic switching from main to backup but stops manual switchback to main.
- You can activate Force Emulation mode. For more information, refer to Emulation mode parameters.

- You can activate Mute all outputs for service outputs.
- You can activate **Enable audio silence threshold** to modify the **Audio silence threshold**. This audio silence threshold redefines the notion of silence that **TITAN Live** uses to raise alarms or trigger actions such as "drop on silence". By default, we consider that the audio is silent when the samples are equal to 0. With this option, the audio is considered silent if the audio level is under this user defined threshold in decibels (dBFS).
- By default, TITAN Live activates Enable all file outputs:
  - To align the frames of MP4 and TS files for the same service.
  - To start file recording when you launch your service.

**SERVICES** /  $\cong$  LIST VIEW and click  $\odot$  under the thumbnail panel as a shortcut to activate or deactivate **Enable all file outputs**..

 You can activate Enable Blackout so that when a service crashes in blackout mode, the same service automatically restarts in blackout mode.

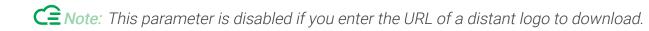


#### Blackout parameters:

- You can activate Mute audio tracks during blackouts.
- You can activate Mute data tracks during blackouts.
- You can enter the Full URL of distant blackout logo to download and to display during blackouts. The URL must follow one of these templates:
  - http://<user>:<password>@serveraddress/directory/logo.png
  - ftp://<user>:<password>@serveraddress/directory/logo.png
  - smb://<user>:<password>@serveraddress/disk/directory/logo.png

Note: The user name and password are optional. This parameter disables the logo file name parameter.

You can enter the blackout logo file name to use.



## Advanced audio configuration

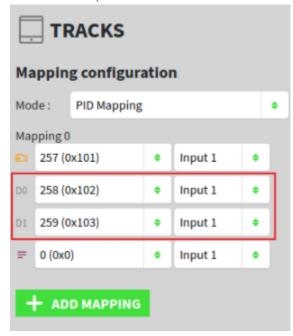


You must add a TL-ADV-AUDIO license to your instance of **TITAN Live** to be able to activate this advanced audio mode. To add the TL-ADV-AUDIO license, go to **■ SYSTEM** / **■ SYSTEM MANAGEMENT** / **□ License Management** and upload a valid license.

Your service must have at least one audio decoder, one reshuffled track, and one audio track with a composition of a reshuffled channel.

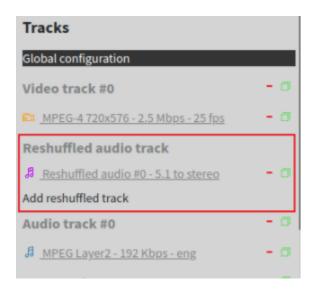
For complete instructions, refer to <u>How to configure advanced audio mode for reshuffled</u> tracks.

- If you activate **Enable** for advanced audio mode:
  - Enter the number of applicable Audio decoders.
  - You must map each reshuffled channel to an audio decoder and an audio decoder channel.



Click Add reshuffled track to open the panel for TRACK CONFIGURATION: Reshuffled #\*.

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## 5.1.4.3. Configuring video tracks settings

## Go back to Configuring Tracks

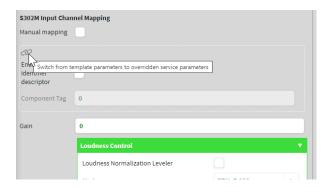
To configure video track settings, go to **Services**, click **+** NEW SERVICE and select a device to use in the **Devices Library**. Click a video track in the track panel. You can then configure video track settings.

To remove a track, click on the track — such as  $\[ lacktriangledown$  MPEG-4 1280x720 - 1.5 Mbps - 50 fps — and click  $\[ lacktriangledown$  . To copy a track to create an additional track, click on the track and click  $\[ lacktriangledown$  and modify the **TRACK CONFIGURATION** if required.

When you configure video track settings, you can configure 3 types of parameters:

- Common video track parameters
- Video track variant parameters
- Advanced video track parameters

When you configure the service parameters, you already have many pre-filled settings so that your configuration is automatically valid. You can still modify these parameters with a custom value and replace the default value. You might also see this icon: • You can click on this button so that your parameter configuration overrides the template parameter.



When you finish to configure the settings of one panel, click  $\checkmark$  at the top right to validate your configuration. This button does not save the configuration, but only validates the configuration. To save your service configuration and return to monitoring services, click  $\checkmark$ SAVE. To cancel your service configuration and return to monitoring services, click  $\thickapprox$ CANCEL. When you validate the settings configuration of one panel, an error message might appear. This error message means that one or several parameters are invalid or incomplete.

For more information about a specific parameter, move your cursor over the name of the parameter for additional information.

Input URL udp://239.40.6.50:1234

This string must contains the input url of the stream. ex: udp://225.1.128.1:1234

## Track Common Video Parameters

- Enter the output track **PID**. **TITAN Live** uses this value only when the output is MPEG TS. **TITAN Live** uses this value as a default value if you activate **Follow input PID** and if you do not receive a source.
- By default TITAN Live displays a PID of 0 (0x0) which means "auto". The auto behavior for video PID is the following: TITAN Live assigns a PID of 1000 for the first video track, and increments the PID value for the following video tracks: 1001, 1002 etc..
- You can activate **Follow input PID** so that the output PID follows the input PID of the audio. If the input PID changes, the output PID is updated. This parameter only works with TS muxers.
- Activate Multi Variant PID so that you can enter a variant PID in the same video track instead of sharing a common PID. Activation of this feature deactivates the field above for the output track PID.
- You can select the Codec to use. You can choose between MPEG-2, MPEG-4, HEVC, JPEG2000, and SHVC.

Note: According to the codec you choose, the parameters change.

AVC-I encoding is supported when you select the **Codec** as MPEG-4 and apply the following settings:

- GOP Size: 1
- Fixed GOP: Activated
- Minimal number of B frames and Maximal number of B Frames: 0

Go back to Configuring Video Tracks Settings

## Video Track # Parameters

When you configure video track settings, you can also configure parameters that apply to a track variant such as: Main, frame size parameters, output display aspect ratio, frame rate parameters, video encoding

parameters, content adaptive streaming, MPEG-4 AVC encoder parameters, B frame configuration, Video squeeze back configuration, and logos Insertions.

Main parameters of a track variant

When you configure the main parameters of a track variant:

- If you activated Multi Variant PID earlier under Track Common Video Parameters, enter the variant PID.
- Select **Still picture detection mode** as *None, Still picture*, or *Video frozen*. to enable the bitrate to fallback to a specified value if the picture stays still during a specified amount of time.
- Enter the **Bitrate** fallback in bps to use when a still picture is detected and the encoder switches to still picture mode.
- Enter a **Delay** of 30 s or more for the time that the video has to stay still before the encoder switches to still picture mode. If you use a delay of less than 30 seconds, you might have false detections. This Delay concerns the number of seconds after which the **Bitrate** fallback occurs and the concerned alarm is triggered.
- Activate **Still picture** to make this video track become a still picture from an upload image file. The bitrate falls back to the specified value if the picture stays still during a specified amount of time.

Note: When you activate Still Picture, you can only configure the main parameters of the track, video squeeze back and logos insertion. Video frozen mode detects frozen video with strictly identical frames. Still picture mode is less strict and will only detect highly similar frames such as the end of a program. Still picture activation is only compatible with HLS TS, HLS FMP4/CMAF, DASH and MMT muxer types.

- Select the Codec to use for this specific video track as MPEG-2, MPEG-4 AVC, HEVC, JPEG2000, and SHVC.
- Frame size parameters

When you configure the **Frame size parameters** of a track variant:

- Select an output **Frame size** configuration.
- If you select Custom as frame size, enter the output frame width and height.
- Output display aspect ratio

Enter the **Aspect ratio** as *Follow input, Custom* or other pre-defined aspect ratios.

Frame rate parameters

When you configure the **Frame rate parameters** of a track variant:

• Select an output **Frame rate** configuration.

• If you select *Custom* as frame rate, enter the frame rate numerator and denominator.

### Video encoding parameters

When you configure the Video encoding parameters of a track variant:

- Configure the **Bitrate** of the track in bits per second. This parameter does not work with VBR statmux. In **Constant Quality** mode, a default average bitrate is configured.
- You can configure a GOP size in number of frames.
- You can activate Fixed GOP.
- Select an output video **Frame type** as *Interlaced* output or *Progressive* (automatic deinterlacing)
- If you select *Interlaced*, select an output video **Field order** to reverse the field order in case the target decoder only supports one type.
- Select an **Encoding mode**. You can choose between *Auto, Field* and *Frame*. If you select MPEG-2 as codec, you can also choose *MBAFF*, *PAFF*, *MBAFF* & *PAFF* and *MBAFF* Field.
- Activate **Trick play** to have only I-frames in the video track.
- If you select JPEG2000 as codec, you can activate Enable Evertz JPEG2000 decoder compatibility.

### Content adaptive streaming

When you configure the **Content Adaptive Streaming** parameters:

- Select the **constant quality mode** as *None, Average Bitrate,* and *Quality Factor*.
- If you select *Average Bitrate*, enter the **Max bitrate** to limit the average bitrate.
- If you select *Quality Factor*, select **Quality** as *High, Medium, Standard*, or *Custom*. Your selection depends on your best tradeoff between your image quality and available resources to support a specific track bitrate.
  - If you select *High, Medium* or *Standard,* **TITAN** Live automatically adjusts the constant quality factor value.
  - If you select *High*, your output bitrate is almost the same as the bitrate you enter in your <u>Video Encoding Parameters</u>.
  - If you select *Custom* as constant quality factor, you must enter the constant quality factor value between 16 (highest quality) and 190 (lowest quality).

### \*Codec\* Encoder parameters

You can configure settings of the encoder according to the codec you selected. When you configure the video encoding parameters of a track variant:

- Select the available Profile of your codec.
- Select the Codec **Level**. The level you select places limits on the encoding parameters in order to limit the computing power that the decoder requires.

• Select the **Entropy** coding mode for the encoder to use. You should only use *CAVLC* if the target decoder is unable to decode *CABAC* properly with an AVC codec. If the codec is HEVC, the entropy coding mode must be *CABAC*.

You can activate Enable AVC video descriptor with the tag value 0x28.

## B frame parameters

When you configure the B frame parameters:

- You can configure the **Minimal number of consecutive B frames** in the video track. The value 0 is recommended by default if you do not have compatibility constraints.
- You can configure the **Maximal number of consecutive B frames** in the video track. The value 7 is recommended by default if you do not have compatibility constraints.
- You can activate Enable hierarchical B frames. Activating hierarchical B frames increases the video quality with the same bitrate.

Note: The option Enable hierarchial B frames is still incompatible with many hardware decoders

## Video squeeze back configuration

Cannote: Video squeeze back is where your output image is reduced in size on the full screen for viewers to allow space for additional viewer information such as banners and logos in the background.

When you activate **Enable** for video squeeze back:

- Enter the video position in pixel units from the **Top** border and **Left** border.
- Enter the video Width and Height in pixels.
- You can enter a **Background color** in hexadecimal RGB.

## Logo insertions

Can Note: The following Logo insertion configuration concerns video tracks where the dynamical insertion feature is possible (not possible for variant logos). If you want to do logo insertion configuration for variant logo insertion, make sure go to the end of the page on the interface (after Video squeeze back configuration).

When you activate Logo insertion configuration:

• Select a **logo type** as *Video logo*, *Background logo* or *PSP logo*. You can only select *Background logo* if you activate **Enable** for Video squeeze back configuration.

- You must enter the **URL of the distant logo** you want to insert. The URL must follow one of these templates:
  - http://<user>:<password>@serveraddress/directory/logo.png
  - ftp://<user>:<password>@serveraddress/directory/logo.png
  - smb://<user>:<password>@serveraddress/disk/directory/logo.png

Note: The user name and password are optional. This parameter disables the logo file name parameter.

• You must select the **Logo file name** without the file path.

Note: This parameter is disabled if you already entered the URL of a distant logo to download.

- If you select *PSP logo* as **Logo type**, you must enter the logo index, that is the logo unique identifier. This value must be under 127.
- Select a Position unit for the Top and Left fields as Permillage or Pixel. The logo position is
  expressed as a permillage of the vertical or horizontal output video resolution, or as a pixel number
  according to the unit you select.
- Enter the position of the logo from the **Top** and **Left** border.
- You can select a **Size reference** to define whether the size of the logo must be expressed in permillage of the output width or as a permillage of the output height.
- Enter the Size of the logo according to the size reference you selected.
- If you select *Video logo* as **Logo type**, you can select the **Speed** of your animated logo.
- If you select *Background logo* as **Logo type**, you can enter the percentage of **Transparency** of the background logo.
- Select an Aspect ratio.
  - If you select *Use original*, you preserve the original aspect of the logo.
  - If you select 16:9 or 3:4, you use this aspect ratio instead of the original aspect ratio.
  - If you select *Custom*, enter the the numerator and denominator values for the aspect ratio of the displayed logo to replace the original aspect ratio of the logo.

Note: You can add as many logos as you want. To add a logo, click ♣ ADD LOGO. To remove a logo, click ●.

## Go back to Configuring Video Tracks Settings

# Show more video parameters

To configure advanced video parameters, click **Show more video parameters**. When you expand advanced video parameters, you can configure:

- Video Delay: Activate to add a delay to a video timestamp from 1 to 2000 ms (no restart after changes).
- Chunking

When you configure chunking of a video track, if you activate Enable Chunking:

- Enter the Chunk period in milliseconds. This duration must be longer than the GOP. In case of
  multi instances synchronization, the chunk period must be the same on all the TITAN Live
  instances that you use.
- Activate **Enable Boundary Chunk Duration**. You can use this parameter to configure a minimum and a maximum chunk duration. For example, you can use this parameter in a splicing use-case, in combination with the program delay setting —through Global Configuration— to ensure that you maintain a minimum and a maximum chunk duration when you activate "splice immediate".
- If you activate **Enable Boundary Chunk Duration**, you can enter the **Minimum Chunk Duration** in milliseconds. This parameter ensures that every chunk duration is superior to the value you enter. This value must be less or equal to the **Chunk period** value.
- If you activate Enable Boundary Chunk Duration, you can enter the Maximum Chunk Duration in milliseconds. This parameter ensures that every chunk duration is inferior to the value you enter. This value must be greater than the Minimum Chunk Duration value and less than twice the Chunk period value.
- You can activate **Allow IDR between chunk boundaries** or splice points. When you deactivate this parameter, any signalization change that would require an IDR is delayed until the next chunk boundary or splice point. This includes changes of aspect ratio and colorimetry for example.
- Multiple instances synchronization

When you configure multiple instances synchronization parameters:

You can activate Enable for Multiple instances synchronization so that TITAN Live can synchronize with other TITAN Live instances in order to split a large set of OTT profiles across several servers. When you activate multi instances synchronization, you must export your service to the others TITAN Live instances and disable the profiles to divide your service.

Can use this option for Geo-redundancy purposes so that there are the same PTS, EBP and/or chunk boundaries on streams that **TITAN Live** generates on different sites. Note that in this case of Geo-redundancy:

- 1 The sources must be the same.
- 2 You must synchronize **TITAN Live** servers on the same NTP/PTP.
- 3 You must select the local clock for your service.
- 4 You must manually adjust the service delay.

Feel free to contact **ATEME** customer service for more information.

 Activate Master playlist so that your instance of TITAN Live becomes the master TITAN Live for playlists creation.

## Input aspect ratio

When you configure the **Input aspect ratio** parameters of a track:

- Select **Mode** as *Preserve*, *Override* or *Fallback*.
  - If you select *Override* or *Fallback* as aspect ratio mode, select the input **Aspect ratio**.
  - If you select *Custom* as **Aspect ratio** value, enter the aspect ratio numerator and denominator.
- Select the **AFD mode**.
  - If you select *Override* or *Fallback* as **AFD mode**, select the **Active format description**.
- You can activate **Ignore Input Bar Data Information** to ignore the Bar Data information to define the region of interest of the input picture.
- Select the **Input frame type** as *Preserve, Progressive, Interlaced Top Field First,* or *Interlaced Bottom Field First.* 
  - When you select *Preserve*, the input frame type is configured according to the input signalization.

## Input Colorimetry

When you configure the **Input colorimetry** parameters of a track:

- Select the **Input Colorimetry Mode** as *Preserve, Override,* or *Fallback*. If you select *Preserve,* the input colorimetry is configured according to the input signalization.
  - If you select *Override* or *Fallback* as the input colorimetry mode, you can **select the override/ fallback input colorimetry range** to use.
    - If you select *BT-2020 (HDR)* as override/fallback input colorimetry range, select one of the **HDR conformance** options.

- Select the **Input overscan** mode as *Auto, Enable,* or *Disable* for resizing HD or SD.
- Select WSS Blanking as Auto, Yes, or No.
  - If you select *Auto*, WSS blanking is only activated in case of SDI input.
  - If you select Yes, this mode forces blanking in all cases. You must go to Video track common parameter set / Optimisations / Advanced parameters ▼ and activate Disable borders optimization so that forced WSS blanking can work.
- Video track common parameter set
- If you activate Enable cropping, for the input sub-picture Cropping Configuration

  , enter the Top position and Left position as well as the Width and Height. All values are in pixels.
- Select the video **Deinterlacer mode** as *Auto* or *Adaptive*
- Select the mode for **Output colorimetry signalling** as *None, BT-601 525, BT-601 625, BT-709, BT-2020 (HDR), Pass-through*, or (default automatic estimation from video settings) *Auto*.
  - If you select BT-2020 (HDR), you can configure the following
     DolbyVision parameters
    - Select **Mode** as *Disabled, Pass-through,* or *Generation*.
    - If you select *Pass-through* or *Generation*, select the Profile as Profile 5, Profile 8.1, or ST 2094-10.
  - Under HDR parameters , select the HDR Conformance as BT2020 SDR, ARIB STD-B67, DVB PQ10, DVB HDR10, DVB HLG, ATSC HDR10, and ATSC HLG.
    - When you select DVB HDR10:
      - Configure the **maximum FALL**.
      - Configure the maximum CLL.
      - You can select a mastering display color volume mode. You can choose DCI P3
         with D65 White or choose custom.
      - If you select Custom as mastering display color volume, configure the values X and Y of the white color. The value must be between 0 and 1.
      - If you select *Custom* as mastering display color volume, configure the values **X** and **Y** of the red color. The value must be between 0 and 1.
      - If you select Custom as mastering display color volume, configure the values X and Y of the green color. The value must be between 0 and 1.
      - If you select Custom as mastering display color volume, configure the values X and Y of the blue color. The value must be between 0 and 1.
      - Enter the values **X** and **Y** of luminance. The value must be between 0 and 1.
    - When you select *ATSC HDR10* 
      - Configure the maximum FALL.

- Configure the maximum CLL.
- You can select a mastering display color volume mode. You can choose DCI P3
   with D65 White or choose custom.
- If you select *Custom* as mastering display color volume, configure the values **X** and **Y** of the white color. The value must be between 0 and 1.
- If you select Custom as mastering display color volume, configure the values X and Y of the red color. The value must be between 0 and 1.
- If you select *Custom* as mastering display color volume, configure the values **X** and **Y** of the green color. The value must be between 0 and 1.
- If you select *Custom* as mastering display color volume, configure the values X and Y of the blue color. The value must be between 0 and 1.
- Enter the values **X** and **Y** of luminance. The value must be between 0 and 1.
- You can activate Disable BBC LUTs during colorimetry conversion.
- You can activate Perform colorimetry conversion to enable the colorimetry to be converted from the input format to the output format.
- If you activate **Perform colorimetry conversion**, you can select an **HDR conversion** method when a conversion from or to HDR is done. You cannot use this parameter if you select *None* or *Pass-through* as Output colorimetry signaling.
- Select the mode for **YUV full range flag** to activate or deactivate the conversion of input limited-range luma and chroma components to full-range luma and chromas components.
- You can activate **Blazing mode** to enable the use of color and contrast corrections.
  - Enter a value between -100 and 100 for **Brightness**, **Contrast**, and **Saturation**.
  - Enter a value between -180 and 180 for Hue.
- Select the **Denoiser** type to use as *None, Regular, Adaptive*, or *Temporal*.
  - When you select Adaptive, under Adaptive denoiser parameters ▼, enter a value between 0 and 100 for Strength and Sensitivity.
  - If you activate high quality mode of the adaptive denoiser, you increase your CPU resource needs.
  - When you select *Temporal*:
    - **TITAN Live** uses more CPU resources than when you select the other denoiser types.
    - Under Temporal denoiser parameters ▼, enter a numerical value for denoiser Strength from 0 to 100.
- Select a **Sharpener** value to sharpen or soften contours from +3 to -3.
- Select **Deblocking** as *None* or *Regular*. Regular deblocking removes block artifacts to improve input video quality.
- You can activate **Follow input resolution** so that the output follows the input in terms of resolution

and framerate.

Cannot Note: These parameters implies constraints on many other parameters.

• You can activate **Enable Stream identifier descriptor** with the tag value 0x52. This Component Tag value must be less than 225 and the same value for the corresponding DVB component descriptor.

• Select the **Optimisations** mode to define the configuration of the psycho-visual setting that optimizes the encoding for various scenarios. You can choose between *Visual Quality, PSNR* and *SSIM*.

Note: The following advanced parameters depend on the codec you select. Some parameters here might not be available with some codecs.

When you expand the list of other **Advanced parameters**:

- Select the **Entropy** coding mode for the encoder to use. You should only use *CAVLC* if the target decoder is unable to decode *CABAC* properly with an AVC codec. If the codec is HEVC, the entropy coding mode must be *CABAC*.
- You should activate Enable multi-references to enable the use of more than one reference during motion prediction. You should only deactivate this parameter for compatibility reasons.
- You should activate Enable weighted prediction to enable the predictions to be weighted during motion prediction. You should only deactivate this parameter for compatibility reasons.
- You can activate Use legacy H.264 decoder. This parameter enables the use of a decoder from a previous generation. This parameter only works with H.264 input streams.
- You can activate Lower decoder latency. The parameter is only available for H.264 or MPEG-2 input streams. If you activate this parameter, you cannot decode HEVC.
- You can activate Enable error concealment to non-normatively conceal corrupted decoding blocks with predicted blocks. When disabled, TITAN Live replaces corrupted decoding blocks with gray pixels according to the codec standard (available only for HEVC and non-legacy H.264).
- You can activate Use Legacy H.265 decoder. This parameter enables the use of a decoder from a previous generation. This parameter only works with H.265 input streams.
- You can activate **Telecine** to enable the picture duplication flags for telecine encoding.
- Enter a numerical value for Intra DC Prevision.
- You can activate Enable HRD to enable the use of HRD packets. Most decoders require

these packets to work properly.

You can activate Enable AFD to enable the use of AFD packets. Some decoders require
these packets to work properly.

- You can activate **Extend DPB Area** to reserve an additional slot for non-reference frames in the DPB and resolve some inter-operability issues with old non compliant STB. This parameter is only available for an H.264 encoder.
- You can activate Force IDR to enable the insertion of IDR pictures at the beginning of a GOP (as opposed to I pictures). This option disables the open GOPs mode.

Note: This parameter have a slight quality impact on the encoding.

- You can activate Enable open GOP to enable the option of the GOP to be in an open or a closed mode.
- You can activate TITAN Live to Use custom matrix.
- You can activate **Use Single PPS/SPS** to enable a maximum number of simultaneously active sequence parameters to be set and picture parameter to be set to 1. This parameter is obligatory for the compatibility of some OTT players.
- Select the **Picture definition** as *Sharp* or *Auto*.
- You can activate Disable borders optimization.
- Select **Slice mode** as *Auto* or *1*. The value 1 forces mono slice mode.
- You can activate Improved 4:2:2 interoperatibility for interoperatibility with specific decoders.
- You can activate High density for statmux to increase the density when you use a statmux.

Cannot increase density for statmux parameter has a impact on Visual Quality. You should only enable this parameter if you observe real time issues and if you cannot increase density on the server.

- You can activate the F\_CODE to configure F code limitations for interoperability issues with specific Set Top Boxes (STB).
- You can activate Disable Default Display Window Flag to prevent HEVC interroperability issues with specific set top boxes relating to the default display window (Video Usability Information - VUI).
- You can activate Enable Adaptive Interlaced Signaling to to prevent HEVC

interroperability issues with specific set top boxes relating to the default display window (Video Usability Information - VUI). For more information, refer to <u>How to detect scan</u> <u>difference and change scan without interruption</u>.

• You can **click + ADD PRESERVE AREA** to configure a preserve area. A preserve area is an area of interest on the screen where **TITAN Live** detects low movement. The coordinate point (0, 0) is at the top left corner of the preserve area. The width and height of the preserve area depends on the resolution of the encoded output stream. You can use the preserve area for logos or scrolling banners. You can add up to 2 PRESERVE AREAS.

When you configure a preserve area:

- Select the **strength** of the preserve area as *None*, *Medium* or *High*.
- If you select *Medium* or *High* as strength:
  - Enter a numerical value for **Top X** of less than 3839.
  - Enter a numerical value for **Top Y** of less than 2159.
  - Enter a numerical value for **Width** of less than 3839.
  - Enter a numerical value for **Height** of less than 2159.

## Emulation mode configuration

When you configure emulation mode parameters:

- Select the **Video emulation mode** to use when the input signal is lost or missing. You can choose between several video emulation modes:
  - Freeze: The last frame freezes.
  - *Mute*: The output stream is not sent.
  - Black. The video is a black screen.
  - *Pattern*: The video is replaced by a defined pattern.

**Calc** Note: The emulation mode starts after 2 seconds. Before this delay, the video freezes. You can configure the emulation mode delay in <u>Alarms Management</u> under the **■ System** tab.

• If you select *Pattern* as video emulation mode, select the pattern file name without the file path.

**System** tab. For more information on overall track settings, refer to Configuring global tracks settings.

Logo Insertions

Note: The following Logo insertion configuration concerns variant tracks where the dynamical insertion feature is not possible (possible for global track logos). If you want to do logo insertion configuration for global track logo insertion, make you click **Show more video parameters** and go to **Logo Insertions** that is just after Emulation mode configuration and before **Scrolling Text Settings**.

## When you activate **Logo insertion configuration**:

- Select a logo type as Video logo, Background logo or PSP logo. You can only select Background logo if you activate Enable for Video squeeze back configuration.
- You must enter the **URL of the distant logo** you want to insert. The URL must follow one of these templates:
  - http://<user>:<password>@serveraddress/directory/logo.png
  - ftp://<user>:<password>@serveraddress/directory/logo.png
  - smb://<user>:<password>@serveraddress/disk/directory/logo.png

Note: The user name and password are optional. This parameter disables the logo file name parameter.

• You must select the **Logo file name** without the file path.

Note: This parameter is disabled if you already entered the URL of a distant logo to download.

- If you select *PSP logo* as **Logo type**, you must enter the logo index, that is the logo unique identifier. This value must be under 127.
- Select a Position unit for the Top and Left fields as Permillage or Pixel. The logo position is
  expressed as a permillage of the vertical or horizontal output video resolution, or as a pixel number
  according to the unit you select.
- Enter the position of the logo from the **Top** and **Left** border.

• You can select a **Size reference** to define whether the size of the logo must be expressed in permillage of the output width or as a permillage of the output height.

- Enter the Size of the logo according to the size reference you selected.
- If you select Video logo as Logo type, you can select the Speed of your animated logo.
- If you select *Background logo* as **Logo type**, you can enter the percentage of **Transparency** of the background logo.
- Select an Aspect ratio.
  - If you select *Use original*, you preserve the original aspect of the logo.
  - If you select 16:9 or 3:4, you use this aspect ratio instead of the original aspect ratio.
  - If you select *Custom*, enter the the numerator and denominator values for the aspect ratio of the displayed logo to replace the original aspect ratio of the logo.

Note: You can add as many logos as you want. To add a logo, click + ADD LOGO. To remove a logo, click ●.

## Scrolling text parameters

To configure scrolling text settings, first click **+** ADD SCROLLING TEXT. When you activate **Display** scrolling text:

- You can activate Emulation only so that your text is only visible in emulation mode.
- Enter the **Text** you want to display over the video.
- Select the file Font file name you want to use to display the text. If the font does not contain all
  characters used by the text, the missing characters are replaced by a placeholder. You can add
  fonts directly from <u>System Management</u> under the 

  System tab.
- Enter the Text height to display as a percentage of the overall box height.
- Enter the **Text color** to display in hexadecimal RGB.
- Enter the **Text transparency** as a percentage of the overall text to display.
- Enter the **Speed** in seconds in function of the time one letter takes to travel across the screen. Enter a value of 0 to stop the text from scrolling.
- Select a scrolling **Direction** for the text.
- Enter the display **Duration** of the text in milliseconds. 0 means the text stays permanently.
- Enter the background **Box height** as a percentage of the overall video height.
- Enter the background **Box width** as a percentage of the overall video width.
- Enter the **Box background color** in hexadecimal RGB format.
- Enter the **Box transparency** as a percentage of the overall background box.

• Enter the **Box vertical position** of the top of the box background as a percentage of the overall screen height.

## Video descriptors

When you configure the video descriptor parameters, you can activate **Enable maximum bitrate descriptor** with the tag value 0x0E. The maximum bitrate indicates an upper bound of the bitrate, including transport overhead.

Component descriptor parameters for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a **Component type** to be identified. This value must be less than 255.
- You must enter a **Component tag**. If the *Component Tag* field is present in the output display aspect ratio parameters in the advanced parameters, this *Component Tag* field and the *Component Tag* field of the stream identifier descriptor must have the same value. This value must be under 225.
- Select the **Language** used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

#### Custom descriptor parameters

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

### Go back to Configuring Video Tracks Settings

# 5.1.4.4. Configuring audio tracks settings

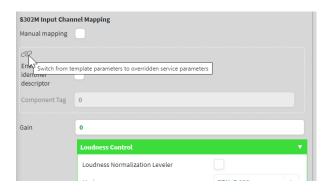
### Go back to Configuring Tracks

To configure global tracks settings, go to Services, click + NEW SERVICE and select a device to use in the **Devices Library**. Click an audio track in the tracks panel. You can then configure audio tracks settings.

To remove a track, click on the track — such as MPEG-4 1280x720 - 1.5 Mbps - 50 fps — and click To copy a track to create an additional track, click on the track and click and modify the **TRACK CONFIGURATION** if required. When you configure audio track settings, you can configure the common tracks parameters, the parameters of a track variant and advanced parameters. You can configure these settings according the codec you select:

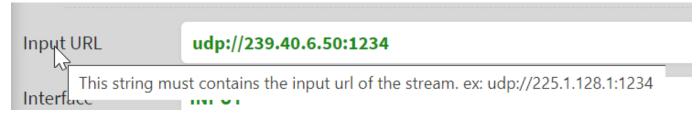
- MPEG LAYER2
- MPEG AAC
- Dolby Digital
- Dolby Digital Plus
- Dolby AC-4
- AES3/SMPTE-302M
- MPEG-H 3D Audio

When you configure the service parameters, you already have many pre-filled settings so that your configuration is automatically valid. You can still modify these parameters with a custom value and replace the default value. You might also see this icon:  $\boldsymbol{\mathscr{O}}$ . You can click on this button so that your parameter configuration overrides the template parameter.



When you finish to configure the settings of one panel, click  $\checkmark$  at the top right to validate your configuration. This button does not save the configuration, but only validates the configuration. To save your service configuration and return to monitoring services, click  $\checkmark$ SAVE. To cancel your service configuration and return to monitoring services, click  $\checkmark$ CANCEL. When you validate the settings configuration of one panel, an error message might appear. This error message means that one or several parameters are invalid or incomplete.

For more information about a specific parameter, move your cursor over the name of the parameter for additional information.



TRACK CONFIGURATION: Audio # Variant #

Common audio track parameters

• Enter the output track **PID**. **TITAN Live** uses this value only when the output is MPEG TS. **TITAN Live** uses this value as a default value if you activate **Follow input PID** and if you do not receive a source.

- By default TITAN Live displays a PID of 0 (0x0) which means "auto". The auto behavior for video PID is the following: TITAN Live assigns a PID of 2000 for the first audio track, and increments the PID value for the following audio tracks: 2001, 2002 etc... TITAN Live assigns a PID of 2000 for the first AUDIO track and increments the PID for the next AUDIO tracks
- You can activate **Follow input PID** so that the output PID follows the input PID of the audio. If the input PID changes, the output PID is updated. This parameter only works with TS muxers.
- When you activate **Passthrough** mode, the audio buffers are not decoded and are directly sent to the output. You also cannot configure chunking parameters. You must configure your audio track according to the input.
- Select the Codec as MPEG Layer2, MPEG AAC, Dolby Digital, Dolby Digital Plus, Dolby AC4, or AES3/ SMPTE-302M. The menu changes greatly according to your selection as detailed below.

## MPEG LAYER2

## Track common audio parameters

If you select the Codec as MPEG LAYER2:

- You can activate **Enable ISO 639 language descriptor** insertion with the tag value 0x0A.
- Select the Language used.
  - If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- Select an **Audio type** that reflects the content of the audio stream.
- Under **Chunking**, you can activate **Enable Chunking** to enter a custom value for **Chunk Period**. This option allows to periodically insert EBP on all audio profiles in addition of the EBP inserted on Video. This feature is only compatible with TS and Multi-TS muxers.
- Select the Layout as Stereo, Mono, or Follow Input. Select the output audio Layout as Stereo, Mono, or Follow Input. When the output audio layout has more channels than it has inputs, upmixing is used. When the output audio layout has less channels than it has inputs, down-mixing is used. This parameter enables to configure the general settings of the codec you selected. The general settings of the codec change according to the codec you select. You cannot use this parameter if you activate Passthrough.

### Variant audio # parameters

### MPEG-1 LAYER2

- Select a specific audio Sample Rate for the audio track. You cannot use this parameter if you activate Passthrough.
- If you select *Mono* or *Stereo* as layout in the common track parameters, Select a specific

audio **Bitrate** for the audio track. If you check *Passthrough*, you can enter the maximum bitrate allowed.

- If you select Follow Input as layout in the common track parameters, select the maximum bitrate allowed in case of mono layout. You cannot use this parameter if you activate Passthrough.
- If you select Follow Input as layout in the common track parameters, select the maximum bitrate allowed in case of stereo layout. You cannot use this parameter if you activate Passthrough.
- You can activate Extended Bandwidth to allow encoding bandwidth to increase beyond 14 kHz.

#### **Bitrates**

• If you select **Layout** as *Follow Input* earlier, enter the **Mono** and **Stereo** bitrates.

## Drop pid parameters

- You can activate **Drop on silence** not to output audio packets when the audio input is silent.
- You can activate **Drop on audio descriptor** not to output audio packets for the following: An audio descriptor is present and when the *Fade* parameter is 0, in the supplementary audio descriptor parameters with the mix type *ReceiverMixed*. When you activate Drop on audio descriptor, you activate the following parameters:
  - You can enter the **Timeout** in milliseconds before dropping PID.
  - You can activate Send of keep-alive null packets.
  - If you activate **Keep alive enable**, enter a numerical value in milliseconds for the **Keep alive period**. This activated function sends a null data track packet —or stuffing packet— so that the receiver knows the data track pid is still enabled when no data track packets are sent during the keep alive period.

## Show more audio parameters

When you click **Show more audio parameters**, you can configure the advanced parameters of an MPEG LAYER2 track.

### S302M Input Channel Mapping

- You can activate Manual mapping.
- If you enable **Manual mapping**, you can select an **Audio input type** to use as audio format.
- If you enable Manual mapping, you can select the Channel pairs to use according to the audio input type you selected.

- You can activate **Enable Stream identifier descriptor** with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

• Enter a **Gain** value in millibels (1dB=100mB).

### **Loudness Control**

When you click Loudness Control:

- You can activate Loudness Normalization Leveler.
- If you activate Loudness Normalization Leveler, you can select a loudness normalization leveler Mode.
- If you activate **Loudness Normalization Leveler**, you can enter the **Target (LUFS / LKFS)** value for LUFS and LKFS. The value must be less than -10.
- You can activate the **True peak limiter**.
- If you activate **True Peak Limiter**, enter the **Maximum Permitted Level (dBTP)**. The value must be less than 0.
- Enter the **Audio offset** in milliseconds. The value you enter must be between -500 and 2000 in milliseconds.
- You can activate Enable Custom Stream Type to enable the stream type of the PMT to be overridden with a custom value.
- If you activate Enable Custom Stream Type, enter the Custom stream type value to use in the PMT

## **Audio Encoder parameters**

## MPEG LAYER2 encoder configuration

- You can activate **Copyright Bit** in the output stream. This flag is used for copy-protection with hardware players.
- You can activate **Original Flag** in the output stream.
- You can activate Enable Joint Stereo mode.

## **Audio descriptors**

When you configure the audio descriptors parameters, you can activate **Enable maximum** bitrate descriptor with the tag value 0x0E. The maximum bitrate indicates an upper bound of the bitrate, including transport overhead.

## Supplementary audio descriptor

To configure the supplementary descriptor parameters, you must first activate **Enable audio descriptor** with the tag value 0x7F06. You can only configure a supplementary audio descriptor in the case of TS output.

When you activate **Enable audio description**, you can select a **MixType**. You can choose between:

 BroadcastMixed: This mode is an alternative audio stream that enables the broadcaster to pre-mix the track.

When you select *BroadcastMixed* as mix type:

- You can select an **Editorial classification** to identify the type of audio you use.
- Select the **Language** used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- **ReceiverMixed**: This mode mixes the track in the receiver under the control of signaling provided by you when you configured your service.

When you select ReceiverMixed as mix type:

- You can select an **Editorial classification** to identify the type of audio you use.
- Select the **Language** used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- You can select an audio descriptor mode:
  - Override: TITAN Live uses static values.
  - Fallback: TITAN Live uses input values if the input values are received.
  - Passthrough: TITAN Live uses only input values.
- If you select *Override* or *Fallback*, enter a value for **VersionTextTag** between 0 and 225.
- If you select *Override* or *Fallback*, enter a value for **Fade** from 0 (no fade) to 255 (full fade).
- If you select *Override* or *Fallback*, enter a value for **Pan** for the audio track. A value of 0 means that the audio description is placed at the center front and that there is no pan. Each increment represents a step of 1,40625 degrees in a clockwise direction when looking above the listener (i.e. 360/256=1,40625). The pan value must be between 0 and 255. More information on page 101 of the

<u>implementation guidelines of the use of video and audio coding</u> report of the European Telecommunications Standards Institute (ETSI).

- If you enter a value of 50 for the *VersionTextTag* parameter, Enter:
  - GainCenter to apply to the centre channel.
  - GainFront to apply to the left and right front channel.
  - GainSurround to apply to all surround channels.

## Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the **Language** used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

#### **Custom descriptors**

To configure custom descriptor parameters, click **+ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select Custom as a descriptor type, enter a descriptor Tag value.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

## Dual mono input channel selection

When you configure the dual mono input channel selection parameters, you can select a **Channel** to use on a dual mono input. This parameter is ignored if you do not use a dual mono input.

# Nielsen watermarking parameters

Note: Due to Nielsen Watermarking certification requirements, all Nielsen parameters are automatically erased when you export a configuration. This means that you must manually enter Nielsen parameters each time you upload a configuration during the import/export process.

Activate **Enabled** to make the following watermarking mode settings available.

## Nielsen watermarking Modes

- Click NAES parameters and CBET parameters to see more options. You can activate ✓
   Enable for either or both parameters to access other parameters.
- For **NAES parameters**, select **Distribution Type** as *Program content* or *Final distributor*. Define **SID** and **SID Check** mode.
- For **CBET parameters**, define **CSID** and **CSID Check** mode
- For both parameters, you can change the **Insertion Mode** from the default *Overwrite* to *Step aside*.

## Kantar watermarking parameters

Activate **Enabled** to make the following watermarking mode settings available.

• If you enabled the Kantar watermarking parameters, enter one of your channel names, configured in your Audience License.

### Go back to Configuring Audio Tracks Settings

## MPEG AAC

## Track common audio parameters

If you select the **Codec** as MPEG AAC:

- You can activate **Enable ISO 639 language descriptor** insertion with the tag value 0x0A.
- Select the **Language** used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- Select an **Audio type** that reflects the content of the audio stream.
- Under **Chunking**, you can activate **Enable Chunking** to enter a custom value for **Chunk Period**. This option allows to periodically insert EBP on all audio profiles in addition of the EBP inserted on Video. This feature is only compatible with TS and Multi-TS muxers.
- Select the Layout as Stereo, Mono, or Follow Input. Select the output audio Layout as Stereo,
  Mono, or Follow Input. When the output audio layout has more channels than it has inputs, upmixing is used. When the output audio layout has less channels than it has inputs, down-mixing is

used. This parameter enables to configure the general settings of the codec you selected. The general settings of the codec change according to the codec you select. You cannot use this parameter if you activate **Passthrough**.

### Variant Audio # parameters

#### AAC

- Select a specific audio Sample Rate for the audio track.
- If you select *Mono*, *Stereo*, *Surround 5.1* or *Surround 7.1* as layout in the common track parameters, Select a specific audio **Bitrate** for the audio track. If you check *Passthrough*, you can **configure the maximum bitrate allowed**.
- If you select *Follow Input* as layout in the common track parameters, select the maximum bitrate allowed in case of mono layout.
  - Mono
  - Stereo
  - Surround 5.1
  - Surround 7.1



#### **Bitrates**

 If you select Layout as Follow Input earlier, enter the Mono, Stereo, Surround 5.1, and Surround 7.1 bitrates.

## Drop pid parameters

 You can activate **Drop on silence** not to output audio packets when the audio input is silent.

## Show more audio parameters

When you click **Show more audio parameters**, you can configure the advanced parameters of an MPEG AAC track.

### S302M Input Channel Mapping

- You can activate Manual mapping.
- If you enable Manual mapping, you can select an Audio input type to use as audio format.
- If you enable **Manual mapping**, you can select the **Channel** pairs to use according to the audio

input type you selected.

- You can activate **Enable Stream identifier descriptor** with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.
- Enter a **Gain** value in millibels (1dB=100mB).

#### **Loudness Control**

When you click **Loudness Control**:

- You can activate Loudness Normalization Leveler.
- If you activate Loudness Normalization Leveler, you can select a loudness normalization leveler Mode.
- If you activate **Loudness Normalization Leveler**, you can enter the **Target (LUFS / LKFS)** value for LUFS and LKFS. The value must be less than -10.
- You can activate the **True peak limiter**.
- If you activate **True Peak Limiter**, enter the **Maximum Permitted Level (dBTP)**. The value must be less than 0.
- Enter the **Audio offset** in milliseconds. The value you enter must be between -500 and 2000 in milliseconds.
- You can activate **Enable Custom Stream Type** to enable the stream type of the PMT to be overridden with a custom value.
- If you activate Enable Custom Stream Type, enter the Custom stream type value to use in the PMT.

#### **Audio Encoder Parameters**

## AAC encoder configuration

Select the MPEG AAC Profile.

Can Note: When you select High Efficiency or High Efficiency 2 as MPEG AAC profile, you cannot configure the MPEG AAC audio descriptors parameters. You can only use High Efficiency and High Efficiency 2 profiles at very low bitrates.

- Select an output bit stream **Format**.
- You should activate Temporal Noise Shaping and Mid/Side Stereo optimizations if you
  want to maintain the audio quality.

- Select the method of **Metadata insertion** as *None, MPEG,* or *MPEG+DVB*.
- You can activate TITAN Live to Overwrite AAC basic Metadata values.
- If you activate Overwrite AAC basic metadata values, you can select the Mode as
   Failback or Forced to overwrite these AAC basic metadata values.
- If you activate Overwrite AAC basic metadata values, you can enter a Dialog normalization level in decibels. This value must be less than -1.

## AAC audio descriptors

When you configure the MPEG AAC audio descriptors, you can **enable the insertion of an MPEG-2 AAC audio descriptor** with the tag value 0x2B.

## **Audio descriptors**

When you configure the audio descriptors parameters, you can activate **Enable maximum** bitrate descriptor with the tag value 0x0E. The maximum bitrate indicates an upper bound of the bitrate, including transport overhead.

## Supplementary audio descriptor

To configure the supplementary descriptor parameters, you must first activate **Enable audio descriptor** with the tag value 0x7F06. You can only configure a supplementary audio descriptor in the case of TS output.

When you activate **Enable audio description**, you can select a **MixType**. You can choose between:

 BroadcastMixed: This mode is an alternative audio stream that enables the broadcaster to pre-mix the track.

When you select *BroadcastMixed* as mix type:

- You can select an **Editorial classification** to identify the type of audio you use.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- **ReceiverMixed**: This mode mixes the track in the receiver under the control of signaling provided by you when you configured your service.

When you select ReceiverMixed as mix type:

You can select an Editorial classification to identify the type of audio you use.

- Select the **Language** used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- You can select an audio descriptor mode:
  - Override: TITAN Live uses static values.
  - Fallback: TITAN Live uses input values if the input values are received.
  - Passthrough: TITAN Live uses only input values.
- If you select Override or Fallback, enter a value for VersionTextTag between 0 and 225
- If you select *Override* or *Fallback*, enter a value for **Fade** from 0 (no fade) to 255 (full fade).
- If you select *Override* or *Fallback*, enter a value for **Pan** for the audio track. A value of 0 means that the audio description is placed at the center front and that there is no pan. Each increment represents a step of 1,40625 degrees in a clockwise direction when looking above the listener (i.e. 360/256=1,40625). The pan value must be between 0 and 255. More information on page 101 of the implementation guidelines of the use of video and audio coding report of the European Telecommunications Standards Institute (ETSI).
- If you enter a value of 50 for the *VersionTextTag* parameter, Enter:
  - GainCenter to apply to the centre channel.
  - GainFront to apply to the left and right front channel.
  - GainSurround to apply to all surround channels.

### Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

### **Custom descriptors**

To configure custom descriptor parameters, first click **+ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

## Dual mono input channel selection

When you configure the dual mono input channel selection parameters, you can select a **Channel** to use on a dual mono input. This parameter is ignored if you do not use a dual mono input.

### Nielsen watermarking parameters

Note: Due to Nielsen Watermarking certification requirements, all Nielsen parameters are automatically erased when you export a configuration. This means that you must manually enter Nielsen parameters each time you upload a configuration during the import/export process.

Activate **Enabled** to make the following watermarking mode settings available.

### Nielsen Watermarking Modes

- Click NAES parameters and CBET parameters to see more options. You can activate ✓
   Enable for either or both parameters to access other parameters.
- For **NAES parameters**, select **Distribution Type** as *Program content* or *Final distributor*. Define **SID** and **SID Check** mode.
- For **CBET parameters**, define **CSID** and **CSID Check** mode
- For both parameters, you can change the **Insertion Mode** from the default *Overwrite* to *Step aside*.

### Kantar watermarking parameters

Activate **Enabled** to make the following watermarking mode settings available.

• If you enabled the Kantar watermarking parameters, enter one of your channel names, configured in your Audience License.

Go back to Configuring Audio Tracks Settings

# **Dolby Digital**

## Track common audio parameters

If you select the Codec as Dolby Digital:

- You can activate **Enable ISO 639 language descriptor** insertion with the tag value 0x0A.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- Select an **Audio type** that reflects the content of the audio stream.
- Under Chunking, you can activate Enable Chunking to enter a custom value for Chunk Period. This
  option allows to periodically insert EBP on all audio profiles in addition of the EBP inserted on
  Video. This feature is only compatible with TS and Multi-TS muxers.
- Select the most suitable pre-defined Audio Coding Mode or select Follow Input. This parameter
  controls the number of channels in the output. This parameter enables to configure the general
  settings of the codec you selected. The general settings of the codec change according to the
  codec you select.

## Variant audio # parameters

## **Dolby**

- Select a specific audio **Sample Rate** for the audio track.
- You can select a maximum bitrate allowed for the audio track. You cannot use this
  parameter if you check Follow Input as audio coding mode value. If you check
  Passthrough, you can configure the maximum bitrate allowed.

### **Bitrates**

- If you select **Layout** as *Follow Input* earlier, enter the maximum bitrates for various channel and select **Source of Dolby metadata** as *User* or *Input*.
- You cannot use this parameter if you activate Passthrough.

## Drop pid parameters

- You can activate **Drop on silence** not to output audio packets when the audio input is silent.
- You can activate **Drop on audio descriptor** not to output audio packets for the following: An audio descriptor is present and when the *Fade* parameter is 0, in the supplementary audio descriptor parameters with the mix type *ReceiverMixed*. When you activate Drop on audio descriptor, you activate the following parameters:
  - You can enter the **Timeout** in milliseconds before dropping PID.
  - You can activate Send of keep-alive null packets.

• If you activate **Keep alive enable**, enter a numerical value in milliseconds for the **Keep alive period**. This activated function sends a null data track packet —or stuffing packet— so that the receiver knows the data track pid is still enabled when no data track packets are sent during the keep alive period.

## Show more audio parameters

When you click **Show more audio parameters**, you can configure the advanced parameters of an MPEG AAC track.

### S302M input channel mapping

- You can activate Manual mapping.
- If you enable **Manual mapping**, you can select an **Audio input type** to use as audio format.
- If you enable Manual mapping, you can select the Channel pairs to use according to the audio input type you selected.
  - You can activate **Enable Stream identifier descriptor** with the tag value 0x52.
  - If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.
- Enter a **Gain** value in millibels (1dB=100mB).

#### **Loudness Control**

When you click Loudness Control:

- You can activate Loudness Normalization Leveler.
- If you activate Loudness Normalization Leveler, you can select a loudness normalization leveler Mode.
- If you activate **Loudness Normalization Leveler**, you can enter the **Target (LUFS / LKFS)** value for LUFS and LKFS. The value must be less than -10.
- You can activate the True peak limiter.
- If you activate **True Peak Limiter**, enter the **Maximum Permitted Level (dBTP)**. The value must be less than 0.
- Enter the **Audio offset** in milliseconds. The value you enter must be between -500 and 2000 in milliseconds.
- You can activate Enable Custom Stream Type to enable the stream type of the PMT to be overridden with a custom value.
- If you activate **Enable Custom Stream Type**, enter the **Custom stream type** value to use in the

#### PMT.

## **Audio Encoder parameters**

## **Dolby Encoder parameters**

- Select the **Bit Stream Mode** to flag tracks as *Complete Main, Music & Effects, Visually Impaired, Hearing Impaired, Dialogue, Commentary, Emergency,* or *Karaoke / Voice Over.*
- If you activate 5.1 surround output, you must activate an independent **LFE Channel**.
- You can activate Copyright Bit in the output stream if you want copy-protection with hardware players.
- You can activate Original Flag in the output stream.
- Enter a numerical value for **Dialog Normalization** of -1 or less.

### Advanced parameters

When you click **Advanced parameters** for a Dolby track, you can configure parameters about input filtering, mixing metadata, mix metadata, mix levels, surround channel processing, dynamic range compression, bit stream, and audio production information.

### Input filtering:

- You can select a status to define the use mode of the **Digital De-Emphasis filter**.
   You should only enable this parameter when you know the input went through Pre-Emphasis.
- You can activate the use of a 3 kHz **DC High-Pass filter** on all input channels.
- You can activate the use of a Bandwidth Low-Pass Filter on all input channels, except for LFE.
- You can activate the use of a 120 Hz LFE Low-Pass filter on the LFE channel (AC-3 only).

#### Mixing metadata:

- You can select a Stereo Down Mix method to use when converting from surround to stereo. TITAN Live does not support the Pro-Logic II mode.
- You can activate or deactivate the **Dolby Surround Mode** for encoding (EAC3 only).
- You can activate or deactivate the **Dolby Surround EX Mode** for encoding (EAC3 only).
- You can select a status to define the use mode of the Dolby headphone mode for encoding (EAC3 only).

#### Mix levels:

You can select the following nominal down-mix levels (dB) for the following channels:

- Center RT/LT: From left and right channels (EAC3 only). Lt/Rt is a stereo downmix where the different channels are summed together.
- **Center LO/RO**: From left and right channels (EAC3 only). Lo/Ro is a stereo downmix where the different channels are processed and then summed together.
- Surround RT/LT: From left and right channels (EAC3 only).
- Surround LO/RO: From left and right channels (EAC3 only).

### Surround channel processing:

- You can activate the use of a 90 Degrees Phase Shift filter on all surround channels
- You can activate the use of 3 dB Attenuation on all surround channels.

## Dynamic range compression:

- You can select a dynamic range compression preset for the Line mode.
- You can select a heavy dynamic range compression preset for the RF mode.

#### Bit stream:

- You can select a bit stream Type (EAC3 only).
- Enter a Substream ID from 0 (unassigned) to 7.

### Audio production information:

- You can select an Analog/Digital Converter mode.
- You can enter a value for Peak Mixing level to configure the acoustic sound pressure level to use in the final mixing process (EAC3 only). This value must be less than 111.
- You can select a room type and calibration type to use in the final mix process (EAC3 only).

#### Dolby Digital Plus/Dolby Digital Audio Descriptors

You can activate Enable AC3 descriptor(Dolby Digital).

### Audio descriptors

You can activate Enable max bitrate descriptor.

## Supplementary audio descriptor

To configure the supplementary descriptor parameters, you must first activate **Enable audio** 

**descriptor** with the tag value 0x7F06. You can only configure a supplementary audio descriptor in the case of TS output.

When you activate **Enable audio description**, you can select a **MixType**. You can choose between:

• **BroadcastMixed**: This mode is an alternative audio stream that enables the broadcaster to pre-mix the track.

When you select *BroadcastMixed* as mix type:

- You can select an **Editorial classification** to identify the type of audio you use.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- **ReceiverMixed**: This mode mixes the track in the receiver under the control of signaling provided by you when you configured your service.

When you select ReceiverMixed as mix type:

- You can select an **Editorial classification** to identify the type of audio you use.
- Select the **Language** used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- You can select an audio descriptor mode:
  - Override: TITAN Live uses static values.
  - Fallback: TITAN Live uses input values if the input values are received.
  - Passthrough: TITAN Live uses only input values.
- If you select *Override* or *Fallback*, enter a value for **VersionTextTag** between 0 and 225.
- If you select *Override* or *Fallback*, enter a value for **Fade** from 0 (no fade) to 255 (full fade).
- If you select *Override* or *Fallback*, enter a value for **Pan** for the audio track. A value of 0 means that the audio description is placed at the center front and that there is no pan. Each increment represents a step of 1,40625 degrees in a clockwise direction when looking above the listener (i.e. 360/256=1,40625). The pan value must be between 0 and 255. More information on page 101 of the implementation guidelines of the use of video and audio coding report of the

European Telecommunications Standards Institute (ETSI).

- If you enter a value of 50 for the *VersionTextTag* parameter, Enter:
  - GainCenter to apply to the centre channel.
  - GainFront to apply to the left and right front channel.
  - GainSurround to apply to all surround channels.

### Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: Stream content specifies the type of stream
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

### **Custom descriptor**

To configure custom descriptor parameters, first click **+ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the **Body** to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. *Example: 47 41 E1* 34 2D

## Dual mono input channel selection

When you configure the dual mono input channel selection parameters, you can select a **Channel** to use on a dual mono input. This parameter is ignored if you do not use a dual mono input.

### Nielsen watermarking parameters

Note: Due to Nielsen Watermarking certification requirements, all Nielsen parameters are automatically erased when you export a configuration. This means that you must manually enter Nielsen parameters each time you upload a configuration during the import/export process.

Activate **Enabled** to make the following watermarking mode settings available.

## Nielsen Watermarking Modes

- Click NAES parameters and CBET parameters to see more options. You can activate ✓ Enable for either or both parameters to access other parameters.
- For **NAES parameters**, select **Distribution Type** as *Program content* or *Final distributor*. Define **SID** and **SID Check** mode.
- For **CBET parameters**, define **CSID** and **CSID Check** mode
- For both parameters, you can change the **Insertion Mode** from the default *Overwrite* to *Step aside*.

### Kantar watermarking parameters

Activate **Enabled** to make the following watermarking mode settings available.

• If you enabled the Kantar watermarking parameters, enter one of your channel names, configured in your Audience License.

#### Go back to Configuring Audio Tracks Settings

# **Dolby Digital Plus**

#### Track common audio parameters

If you select the **Codec** as *Dolby Digital Plus*:

- You can activate **Enable ISO 639 language descriptor** insertion with the tag value 0x0A.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- Select an **Audio type** that reflects the content of the audio stream.
- Under Chunking, you can activate Enable Chunking to enter a custom value for Chunk Period. This
  option allows to periodically insert EBP on all audio profiles in addition of the EBP inserted on
  Video. This feature is only compatible with TS and Multi-TS muxers.
- Select the most suitable pre-defined **Audio Coding Mode** or select *Follow Input*. This parameter controls the number of channels in the output. This parameter enables to configure the general

settings of the codec you selected. The general settings of the codec change according to the codec you select.

## Variant audio # parameters

## **Dolby Digital Plus**

- Select a specific audio Sample Rate for the audio track.
- You can select a maximum bitrate allowed for the audio track. You cannot use this
  parameter if you check Follow Input as audio coding mode value. If you check
  Passthrough, enter the Max Bitrate allowed.

### **Bitrates**

- If you select **Layout** as *Follow Input* earlier, enter the maximum bitrates for various channel and select **Source of Dolby metadata** as *User* or *Input*.
- You cannot use this parameter if you activate Passthrough.

## **Drop PID parameters**

- You can activate **Drop on silence** not to output audio packets when the audio input is silent.
- You can activate **Drop on audio descriptor** not to output audio packets for the following: An audio descriptor is present and when the *Fade* parameter is 0, in the supplementary audio descriptor parameters with the mix type *ReceiverMixed*. When you activate Drop on audio descriptor, you activate the following parameters:
  - You can enter the **Timeout** in milliseconds before dropping PID.
  - You can activate Send of keep-alive null packets.
  - If you activate **Keep alive enable**, enter a numerical value in milliseconds for the **Keep alive period**. This activated function sends a null data track packet —or stuffing packet— so that the receiver knows the data track pid is still enabled when no data track packets are sent during the keep alive period.

#### Show more audio parameters

When you click **Show more audio parameters**, you can configure the advanced parameters of a Dolby Digital Plus track.

## S302M Input Channel Mapping

- You can activate Manual mapping.
- If you enable Manual mapping, you can select an Audio input type to use as audio format.
- If you enable Manual mapping, you can select the Channel pairs to use according to the audio input type you selected.

- You can activate Enable Stream identifier descriptor with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

Enter a Gain value in millibels (1dB=100mB).

### **Loudness Control**

When you click Loudness Control:

- You can activate Loudness Normalization Leveler.
- If you activate Loudness Normalization Leveler, you can select a loudness normalization leveler Mode.
- If you activate Loudness Normalization Leveler, you can enter the Target (LUFS / LKFS)
   value for LUFS and LKFS. The value must be less than -10.
- You can activate the True peak limiter.
- If you activate True Peak Limiter, enter the Maximum Permitted Level (dBTP). The value must be less than 0.
- Enter the **Audio offset** in milliseconds. The value you enter must be between -500 and 2000 in milliseconds.
- You can activate **Enable Custom Stream Type** to enable the stream type of the PMT to be overridden with a custom value.
- If you activate Enable Custom Stream Type, enter the Custom stream type value to use in the PMT.

## **Audio Encoder parameters**

## Dolby encoder parameters

- You can select a Dolby Digital Plus bit stream mode (EAC3 only). You can choose between Complete Main, Music and Effects, Visually Impaired, Hearing Impaired, Dialogue, Emergency, Karaoke/Voice Over and Commentary. You can use this parameter to track flag as Commentary for example.
- You can activate the generation of an independent **LFE channel** in the output. You must use this parameter for a 5.1 surround output.
- You can activate Copyright Bit in the output stream. This flag is used for copy-protection with hardware players.
- You can activate **Original Flag** in the output stream.
- You can enter a **Dialog normalization** level in decibels. This value must be less than -1.

## Advanced parameters

When you click **Advanced parameters** for a Dolby track, you can configure parameters about input filtering, mixing metadata, mix metadata, mix levels, surround channel processing, dynamic range compression, bit stream, and audio production information.

## Input filtering:

- You can select a status to define the use mode of the **Digital De-Emphasis filter**.
   You should only enable this parameter when you know the input went through Pre-Emphasis.
- You can activate the use of a 3 kHz DC High-Pass filter on all input channels.
- You can activate the use of a Bandwidth Low-Pass Filter on all input channels, except for LFE.
- You can activate the use of a 120 Hz LFE Low-Pass filter on the LFE channel (AC-3 only).

### Mixing metadata:

- You can select a Stereo Down Mix method to use when converting from surround to stereo. TITAN Live does not support the Pro-Logic II mode.
- You can activate or deactivate the **Dolby Surround Mode** for encoding (EAC3 only).
- You can activate or deactivate the **Dolby Surround EX Mode** for encoding (EAC3 only).
- You can select a status to define the use mode of the Dolby headphone mode for encoding (EAC3 only).

#### Mix levels:

You can select the following nominal down-mix levels (dB) for the following channels:

- **Center RT/LT:** From left and right channels (EAC3 only). Lt/Rt is a stereo downmix where the different channels are summed together.
- Center LO/RO: From left and right channels (EAC3 only). Lo/Ro is a stereo downmix where the different channels are processed and then summed together.
- Surround RT/LT: From left and right channels (EAC3 only).
- Surround LO/RO: From left and right channels (EAC3 only).

### Surround channel processing:

 You can activate the use of a 90 Degrees Phase Shift filter on all surround channels.

• You can activate the use of **3 dB Attenuation** on all surround channels.

## Dynamic range compression:

- You can select a dynamic range compression preset for the Line mode.
- You can select a heavy dynamic range compression preset for the **RF mode**.

#### Bit stream:

- You can select a bit stream Type (EAC3 only).
- Enter a **Substream ID** from 0 (unassigned) to 7.

### Audio production information:

- You can select an Analog/Digital Converter mode.
- You can enter a value for Peak Mixing level to configure the acoustic sound pressure level to use in the final mixing process (EAC3 only). This value must be less than 111.
- You can select a room type and calibration type to use in the final mix process (EAC3 only).

## Dolby Digital/Dolby Digital Plus audio descriptors

When you configure the Dolby Digital/Dolby Digital Plus audio descriptors, you can **enable the insertion of a enhanced AC3 audio descriptor** with the tag value 0x7A.

#### **Audio descriptors**

When you configure the audio descriptors parameters, you can activate **Enable maximum** bitrate descriptor with the tag value 0x0E. The maximum bitrate indicates an upper bound of the bitrate, including transport overhead.

## Supplementary audio descriptor

To configure the supplementary descriptor parameters, you must first activate **Enable audio descriptor** with the tag value 0x7F06. You can only configure a supplementary audio descriptor in the case of TS output.

When you activate **Enable audio description**, you can select a **MixType**. You can choose between:

 BroadcastMixed: This mode is an alternative audio stream that enables the broadcaster to pre-mix the track.

When you select BroadcastMixed as mix type:

- You can select an **Editorial classification** to identify the type of audio you use.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- **ReceiverMixed**: This mode mixes the track in the receiver under the control of signaling provided by you when you configured your service.

When you select ReceiverMixed as mix type:

- You can select an **Editorial classification** to identify the type of audio you use.
- Select the **Language** used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- You can select an audio descriptor mode:
  - Override: TITAN Live uses static values.
  - Fallback: TITAN Live uses input values if the input values are received.
  - Passthrough: TITAN Live uses only input values.
- If you select *Override* or *Fallback*, enter a value for **VersionTextTag** between 0 and 225.
- If you select *Override* or *Fallback*, enter a value for **Fade** from 0 (no fade) to 255 (full fade).
- If you select *Override* or *Fallback*, enter a value for **Pan** for the audio track. A value of 0 means that the audio description is placed at the center front and that there is no pan. Each increment represents a step of 1,40625 degrees in a clockwise direction when looking above the listener (i.e. 360/256=1,40625). The pan value must be between 0 and 255. More information on page 101 of the implementation guidelines of the use of video and audio coding report of the European Telecommunications Standards Institute (ETSI).
- If you enter a value of 50 for the *VersionTextTag* parameter, Enter:
  - GainCenter to apply to the centre channel.
  - GainFront to apply to the left and right front channel.
  - GainSurround to apply to all surround channels.

Component descriptor for DVB

When you activate **Enable component descriptor**:

 Enter a value of 15 or less for the field: Stream content specifies the type of stream.

- You must enter a Component type to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

# **Custom descriptor**

To configure custom descriptor parameters, first click **+ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the **Body** to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. *Example: 47 41 E1* 34 2D

#### Dual mono input channel selection

When you configure the dual mono input channel selection parameters, you can select a **Channel** to use on a dual mono input. This parameter is ignored if you do not use a dual mono input.

# Nielsen watermarking parameters

Note: Due to Nielsen Watermarking certification requirements, all Nielsen parameters are automatically erased when you export a configuration. This means that you must manually enter Nielsen parameters each time you upload a configuration during the import/export process.

Activate **Enabled** to make the following watermarking mode settings available.

#### Nielsen Watermarking Modes

- Click NAES parameters and CBET parameters to see more options. You can activate ✓ Enable for either or both parameters to access other parameters.
- For **NAES parameters**, select **Distribution Type** as *Program content* or *Final distributor*. Define **SID** and **SID Check** mode.
- For CBET parameters, define CSID and CSID Check mode
- For both parameters, you can change the **Insertion Mode** from the default *Overwrite* to *Step aside*.

### Kantar watermarking parameters

Activate **Enabled** to make the following watermarking mode settings available.

• If you enabled the Kantar watermarking parameters, enter one of your channel names, configured in your Audience License.

# Go back to Configuring Audio Tracks Settings

# Dolby AC-4

# Track common audio parameters

If you select the Codec as Dolby AC-4:

- You can activate **Enable ISO 639 language descriptor** insertion with the tag value 0x0A.
- Select the Language used.
  - If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- Select an Audio type that reflects the content of the audio stream.
- You can activate Dolby Atmos mode so that your Audio Coding Mode is 5.1.4 L, R, C, LFE, Ls, Rs, Ltf, Rtf, Ltr, Rtr.
- If you deactivate **Dolby Atmos**, select the audio **Layout** as 1/0 C, 2/0 L R, 3/0 L C R, 2/1 L R S, 3/1 L C R S, 2/2 L R Ls Rs, 3/2 L C R Ls Rs, and Follow Input.
- Select the output audio Layout as Stereo, Mono, or Follow Input. When the output audio layout has more channels than it has inputs, up-mixing is used. When the output audio layout has less channels than it has inputs, down-mixing is used. This parameter enables to configure the general settings of the codec you selected. The general settings of the codec change according to the codec you select. You cannot use this parameter if you activate Passthrough.
- You can select an output audio Frame rate. You cannot use this parameter if you activate Passthrough.
- You can **configure the frame interval between I-frames**. If you enable chunking, the number of I

frames can be higher. You cannot use this parameter if you activate Passthrough.

You can activate Follow Video chunking to chunk the audio according to the video chunking. You cannot use this parameter if you activate Passthrough.

# Variant audio # parameters

## Dolby AC-4

- Select a specific audio Sample Rate for the audio track. You cannot use this parameter if you activate Passthrough.
- If you select *Stereo* ou *Surround 5.1* as layout in the common track parameters, Select a specific audio **Bitrate** for the audio track. If you check *Passthrough*, enter the **Max Bitrate** allowed.
- You can select the **Source of Dolby metadata**. You can choose between *User* and *Input*. You cannot use this parameter if you activate **Passthrough**.

# Drop pid parameters

- You can activate **Drop on silence** not to output audio packets when the audio input is silent.
- You can activate **Drop on audio descriptor** not to output audio packets for the following: An audio descriptor is present and when the *Fade* parameter is 0, in the supplementary audio descriptor parameters with the mix type *ReceiverMixed*. When you activate Drop on audio descriptor, you activate the following parameters:
  - You can enter the **Timeout** in milliseconds before dropping PID.
  - You can activate Send of keep-alive null packets.
  - If you activate **Keep alive enable**, enter a numerical value in milliseconds for the **Keep alive period**. This activated function sends a null data track packet —or stuffing packet— so that the receiver knows the data track pid is still enabled when no data track packets are sent during the keep alive period.

#### Show more audio parameters

When you click **Show more audio parameters**, you can configure the advanced parameters of a Dolby Digital AC-4 track.

# S302M Input Channel Mapping

- You can activate Manual mapping.
- If you enable **Manual mapping**, you can select an **Audio input type** to use as audio format.
- If you enable Manual mapping, you can select the Channel pairs to use according to the audio input type you selected.

- You can activate Enable Stream identifier descriptor with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

• Enter a **Gain** value in millibels (1dB=100mB).

#### **Loudness Control**

When you click Loudness Control:

- You can activate Loudness Normalization Leveler.
- If you activate Loudness Normalization Leveler, you can select a loudness normalization leveler Mode.
- If you activate **Loudness Normalization Leveler**, you can enter the **Target (LUFS / LKFS)** value for LUFS and LKFS. The value must be less than -10.
- You can activate the True peak limiter.
- If you activate True Peak Limiter, enter the Maximum Permitted Level (dBTP). The value must be less than 0.
- Enter the **Audio offset** in milliseconds. The value you enter must be between -500 and 2000 in milliseconds.
- You can activate Enable Custom Stream Type to enable the stream type of the PMT to be overridden with a custom value.
- If you activate Enable Custom Stream Type, enter the Custom stream type value to use in the PMT.

# **Audio Encoder parameters**

### Dolby encoder parameters

- You can select a Dolby Digital Plus bit stream mode (EAC3 only). You can choose between Complete Main, Music and Effects, Visually Impaired, Hearing Impaired, Dialogue, Emergency, Karaoke/Voice Over and Commentary. You can use this parameter to track flag as Commentary for example.
- You can activate the generation of an independent **LFE channel** in the output. You must use this parameter for a 5.1 surround output.
- You can activate **Copyright Bit** in the output stream. This flag is used for copy-protection with hardware players.
- You can activate Original Flag in the output stream.
- You can enter a **Dialog normalization** level in decibels. This value must be less than -1.

# Advanced parameters

When you click **Advanced parameters** for a Dolby track, you can configure parameters about input filtering, mixing metadata, mix metadata, mix levels, surround channel processing, dynamic range compression, bit stream, and audio production informatio

# Input filtering:

- You can select a status to define the use mode of the **Digital Pre-Emphasis** filter.
   You should only enable this parameter when you know the input went through De-Emphasis.
- You can activate the use of a 3 kHz **DC High-Pass filter** on all input channels.
- You can activate the use of a Bandwidth Low-Pass Filter on all input channels, except for LFE.

# Mixing metadata:

- You can select a Stereo Down Mix method to use when converting from surround to stereo. TITAN Live does not support the Pro-Logic II mode.
- You can activate or deactivate the **Dolby Surround Mode** for encoding (EAC3 only).
- You can activate or deactivate the **Dolby Surround EX Mode** for encoding (EAC3 only).
- You can select a status to define the use mode of the Dolby headphone mode for encoding (EAC3 only).

# **Dolby Atmos Trim Levels**

Cannot Note: These trim parameters provide better control of 5.1 and 7.1 encodes when Dolby Atmos content is rendered in a 5.1 or 7.1 playback environment.

- Select **Height trims** as Auto, -3.0 dB, -6.0 dB, -9.0 dB, or -12.0 dB.
- Select **Surround trims** as as *Auto, +0.0 dB, -3.0 dB, -6.0 dB, or -9.0 dB.*

#### Mix levels:

- Center RT/LT: From left and right channels (EAC3 only). Lt/Rt is a stereo downmix where the different channels are summed together.
- **Center LO/RO**: From left and right channels (EAC3 only). Lo/Ro is a stereo downmix where the different channels are processed and then summed together.
- Surround RT/LT: From left and right channels (EAC3 only).

• Surround LO/RO: From left and right channels (EAC3 only).

# Surround channel processing:

- You can activate the use of a 90 Degrees Phase Shift filter on all surround channels.
- You can activate the use of 3 dB Attenuation on all surround channels.

# Dynamic range compression:

- You can select a dynamic range compression preset for the Line mode.
- You can select a heavy dynamic range compression preset for the RF mode.

#### Bitstream:

- You can select a bit stream Type (EAC3 only).
- Enter a **Substream ID** from 0 (unassigned) to 7.

# Audio production information:

- You can select an Analog/Digital Converter mode.
- You can enter a value for Peak Mixing level to configure the acoustic sound pressure level to use in the final mixing process (EAC3 only). This value must be less than 111.
- You can select a room type and calibration type to use in the final mix process (EAC3 only).

#### Dolby Digital Plus/Dolby Digital Audio Descriptors

You can activate Enable AC3 descriptor(Dolby Digital).

### Audio descriptors

You can activate Enable max bitrate descriptor.

### Supplementary audio descriptor

To configure the supplementary descriptor parameters, you must first activate **Enable audio descriptor** with the tag value 0x7F06. You can only configure a supplementary audio descriptor in the case of TS output.

When you activate **Enable audio description**, you can select a **MixType**. You can choose between:

 BroadcastMixed: This mode is an alternative audio stream that enables the broadcaster to pre-mix the track.

When you select *BroadcastMixed* as mix type:

- You can select an Editorial classification to identify the type of audio you use.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- **ReceiverMixed**: This mode mixes the track in the receiver under the control of signaling provided by you when you configured your service.

When you select ReceiverMixed as mix type:

- You can select an **Editorial classification** to identify the type of audio you use.
- Select the **Language** used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- You can select an audio descriptor mode:
  - Override: TITAN Live uses static values.
  - Fallback: TITAN Live uses input values if the input values are received.
  - Passthrough: TITAN Live uses only input values.
- If you select *Override* or *Fallback*, enter a value for **VersionTextTag** between 0 and 225.
- If you select *Override* or *Fallback*, enter a value for **Fade** from 0 (no fade) to 255 (full fade).
- If you select *Override* or *Fallback*, enter a value for **Pan** for the audio track. A value of 0 means that the audio description is placed at the center front and that there is no pan. Each increment represents a step of 1,40625 degrees in a clockwise direction when looking above the listener (i.e. 360/256=1,40625). The pan value must be between 0 and 255. More information on page 101 of the implementation guidelines of the use of video and audio coding report of the European Telecommunications Standards Institute (ETSI).
- If you enter a value of 50 for the *VersionTextTag* parameter, Enter:
  - GainCenter to apply to the centre channel.
  - GainFront to apply to the left and right front channel.
  - GainSurround to apply to all surround channels.

#### **Custom descriptors**

To configure custom descriptor parameters, first click **+ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

# Dual mono input channel selection

When you configure the dual mono input channel selection parameters, you can select a **Channel** to use on a dual mono input. This parameter is ignored if you do not use a dual mono input.

#### Nielsen watermarking parameters

Note: Due to Nielsen Watermarking certification requirements, all Nielsen parameters are automatically erased when you export a configuration. This means that you must manually enter Nielsen parameters each time you upload a configuration during the import/export process.

Activate **Enabled** to make the following watermarking mode settings available.

#### **Nielsen Watermarking Modes**

- Click NAES parameters and CBET parameters to see more options. You can activate ✓
   Enable for either or both parameters to access other parameters.
- For **NAES parameters**, select **Distribution Type** as *Program content* or *Final distributor*. Define **SID** and **SID Check** mode.
- For **CBET parameters**, define **CSID** and **CSID Check** mode
- For both parameters, you can change the **Insertion Mode** from the default *Overwrite* to *Step aside*.

### Kantar watermarking parameters

Activate **Enabled** to make the following watermarking mode settings available.

• If you enabled the Kantar watermarking parameters, enter one of your channel names, configured in your Audience License.

Go back to Configuring Audio Tracks Settings

# AES3/SMPTE-302M

# Track common audio parameters

If you select the Codec as AES3/SMPTE-302M:

- You can activate Enable ISO 639 language descriptor insertion with the tag value 0x0A.
- Select the Language used.
  - If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- Select an **Audio type** that reflects the content of the audio stream.
- Under **Chunking**, you can activate **Enable Chunking** to enter a custom value for **Chunk Period**. This option allows to periodically insert EBP on all audio profiles in addition of the EBP inserted on Video. This feature is only compatible with TS and Multi-TS muxers.
- Select the output audio **Layout** as *Stereo, Mono,* or *Follow Input*. When the output audio layout has more channels than it has inputs, up-mixing is used. When the output audio layout has less channels than it has inputs, down-mixing is used. This parameter enables to configure the general settings of the codec you selected. The general settings of the codec change according to the codec you select. You cannot use this parameter if you activate **Passthrough**. Select the **Layout** as *Stereo, Mono,* or *Follow Input*.

#### Variant audio # parameters

#### S302M Parameters

- If you selected *PCM 5.1* as **Layout**, select the audio **Channel** to use for each Pair. You cannot use this parameter if you activate **Passthrough**.
- If you activate Passthrough:
  - Enter a value for Nb pairs, the number of AES3 pairs.
  - You can activate Pairs filtering.
- If you activate Passthrough and Pairs filtering, you can select the pairs to keep in the output.
- You can enter a predefined value of Bits per sample for the audio track. If you activate
   Passthrough, you can enter a specific value of Bits per sample.
- Enter the **Input frame rate** to use for your audio track. This value should be identical to the video input frame rate to comply with the standard.
- If you deactivate Passthrough, you enter a value for the **Channel identification**.
- If you activate Passthrough earlier, you must activate Override channel identification for the S302 header field to enter a value for the Channel identification. You can also activate Enable Evertz audio decoder compatibility.

# Drop pid parameters

 You can activate **Drop on silence** not to output audio packets when the audio input is silent.

- You can activate **Drop on audio descriptor** not to output audio packets for the following: An audio descriptor is present and when the *Fade* parameter is 0, in the supplementary audio descriptor parameters with the mix type *ReceiverMixed*. When you activate Drop on audio descriptor, you activate the following parameters:
  - You can enter the **Timeout** in milliseconds before dropping PID.
  - You can activate Send of keep-alive null packets.
  - If you activate **Keep alive enable**, enter a numerical value in milliseconds for the **Keep alive period**. This activated function sends a null data track packet —or stuffing packet— so that the receiver knows the data track pid is still enabled when no data track packets are sent during the keep alive period.

## Show more audio parameters

When you click **Show more audio parameters**, you can configure the advanced parameters of an AES3/SMPTE-302M.

# S302M input channel mapping

- You can activate Manual mapping.
- If you enable **Manual mapping**, you can select an **Audio input type** to use as audio format.
- If you enable **Manual mapping**, you can select the **Channel** pairs to use according to the audio input type you selected.
  - You can activate **Enable Stream identifier descriptor** with the tag value 0x52.
  - If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.
- Enter a Gain value in millibels (1dB=100mB).

#### **Loudness Control**

- You can activate Loudness Normalization Leveler.
- If you activate Loudness Normalization Leveler, you can select a loudness normalization leveler Mode.
- If you activate Loudness Normalization Leveler, you can enter the Target (LUFS / LKFS)
   value for LUFS and LKFS. The value must be less than -10.
- You can activate the True peak limiter.

- If you activate True Peak Limiter, enter the Maximum Permitted Level (dBTP). The value must be less than 0.
- Enter the **Audio offset** in milliseconds. The value you enter must be between -500 and 2000 in milliseconds.
- You can activate Enable Custom Stream Type to enable the stream type of the PMT to be overridden with a custom value.
- If you activate Enable Custom Stream Type, enter the Custom stream type value to use in the PMT.

#### **Audio Encoder parameters**

# **Audio descriptors**

When you configure the audio descriptors parameters, you can activate **Enable maximum** bitrate descriptor with the tag value 0x0E. The maximum bitrate indicates an upper bound of the bitrate, including transport overhead.

# Supplementary audio descriptor

To configure the supplementary descriptor parameters, you must first activate **Enable audio descriptor** with the tag value 0x7F06. You can only configure a supplementary audio descriptor in the case of TS output.

When you activate **Enable audio description**, you can select a **MixType**. You can choose between:

• **BroadcastMixed**: This mode is an alternative audio stream that enables the broadcaster to pre-mix the track.

When you select *BroadcastMixed* as mix type:

- You can select an **Editorial classification** to identify the type of audio you use.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- **ReceiverMixed**: This mode mixes the track in the receiver under the control of signaling provided by you when you configured your service.

When you select ReceiverMixed as mix type:

• You can select an **Editorial classification** to identify the type of audio you use.

- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- You can select an audio descriptor mode:
  - Override: TITAN Live uses static values.
  - Fallback: TITAN Live uses input values if the input values are received.
  - Passthrough: TITAN Live uses only input values.
- If you select Override or Fallback, enter a value for VersionTextTag between 0 and 225
- If you select *Override* or *Fallback*, enter a value for **Fade** from 0 (no fade) to 255 (full fade).
- If you select *Override* or *Fallback*, enter a value for **Pan** for the audio track. A value of 0 means that the audio description is placed at the center front and that there is no pan. Each increment represents a step of 1,40625 degrees in a clockwise direction when looking above the listener (i.e. 360/256=1,40625). The pan value must be between 0 and 255. More information on page 101 of the implementation guidelines of the use of video and audio coding report of the European Telecommunications Standards Institute (ETSI).
- If you enter a value of 50 for the *VersionTextTag* parameter, Enter:
  - GainCenter to apply to the centre channel.
  - GainFront to apply to the left and right front channel.
  - GainSurround to apply to all surround channels.

### Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

# **Custom descriptors**

To configure custom descriptor parameters, first click **+ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

# Dual mono input channel selection

When you configure the dual mono input channel selection parameters, you can select a **Channel** to use on a dual mono input. This parameter is ignored if you do not use a dual mono input.

# Nielsen watermarking parameters

Note: Due to Nielsen Watermarking certification requirements, all Nielsen parameters are automatically erased when you export a configuration. This means that you must manually enter Nielsen parameters each time you upload a configuration during the import/export process.

Activate **Enabled** to make the following watermarking mode settings available.

#### Nielsen Watermarking Modes

- Click NAES parameters and CBET parameters to see more options. You can activate ✓
   Enable for either or both parameters to access other parameters.
- For **NAES parameters**, select **Distribution Type** as *Program content* or *Final distributor*. Define **SID** and **SID Check** mode.
- For **CBET parameters**, define **CSID** and **CSID Check** mode
- For both parameters, you can change the **Insertion Mode** from the default *Overwrite* to *Step aside*.

### Kantar watermarking parameters

Activate **Enabled** to make the following watermarking mode settings available.

• If you enabled the Kantar watermarking parameters, enter one of your channel names, configured in your Audience License.

Go back to Configuring Audio Tracks Settings

# MPEG-H 3D Audio

To activate this option, you must use a SDI input and select *PCM for MPEG-H 3D Audio* as **Audio input type** in **INPUTS**.

### Track common audio parameters

If you select the **Codec** as MPEG-H 3D Audio:

- You can activate **Enable ISO 639 language descriptor** insertion with the tag value 0x0A.
- Select the Language used.
  - If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- Select an **Audio type** that reflects the content of the audio stream.
- Under **Chunking**, you can activate **Enable Chunking** to enter a custom value for **Chunk Period**. This option allows to periodically insert EBP on all audio profiles in addition of the EBP inserted on Video. This feature is only compatible with TS and Multi-TS muxers.

# Variant audio # parameters

#### MPEG-H 3D Audio

- Enter a Bitrate for your audio track in bits per second.
- Enter the RAP Frame Interval in seconds between inserted RAP frames.

Note: In applications supporting random access (RA), The RA Points (RAP) divide a video into a number of RA segments (RAS), and different RAS are coded independently to improve coding efficiency.

### Drop pid parameters

- You can activate **Drop on silence** not to output audio packets when the audio input is silent
- You can activate **Drop on audio descriptor** not to output audio packets for the following: An audio descriptor is present and when the *Fade* parameter is 0, in the supplementary audio descriptor parameters with the mix type *ReceiverMixed*. When you activate Drop on audio descriptor, you activate the following parameters:
  - You can enter the **Timeout** in milliseconds before dropping PID.
  - You can activate Send of keep-alive null packets.
  - If you activate Keep alive enable, enter a numerical value in milliseconds for the Keep alive period. This activated function sends a null data track packet —or

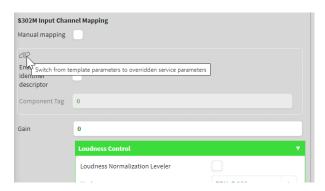
stuffing packet— so that the receiver knows the data track pid is still enabled when no data track packets are sent during the keep alive period.

# 5.1.4.5. Configuring data tracks settings

# Go back to Configuring Tracks

To configure global tracks settings, go to Services, click + NEW SERVICE and select a device to use in the **Devices Library**. Click a data track in the tracks panel. You can then configure data tracks settings.

When you configure the service parameters, you already have many pre-filled settings so that your configuration is automatically valid. You can still modify these parameters with a custom value and replace the default value. You might also see this icon: • You can click on this button so that your parameter configuration overrides the template parameter.



When you finish to configure the settings of one panel, click  $\checkmark$  at the top right to validate your configuration. This button does not save the configuration, but only validates the configuration. To save your service configuration and return to monitoring services, click  $\checkmark$ SAVE. To cancel your service configuration and return to monitoring services, click  $\checkmark$ CANCEL. When you validate the settings configuration of one panel, an error message might appear. This error message means that one or several parameters are invalid or incomplete.

For more information about a specific parameter, move your cursor over the name of the parameter for additional information.

# Input URL udp://239.40.6.50:1234 This string must contains the input url of the stream. ex: udp://225.1.128.1:1234

You can click on **Show more data parameters** to do advance configurations.

#### TRACK CONFIGURATION: Data # variant #

- For most of the Data types: Enter the output track **PID**. **TITAN Live** uses this value only when the output is MPEG TS. **TITAN Live** uses this value as a default value if you activate **Follow input PID** and if you do not receive a source.
  - By default TITAN Live displays a PID of 0 (0x0) which means "auto". The auto behavior for video PID is the following: TITAN Live assigns a PID of 3000 for the first data track, and increments the PID value for the following data tracks: 3001, 3002, etc.
- For most of the Data types: You can activate **Follow input PID** so that the output PID follows the input PID of the audio. If the input PID changes, the output PID is updated. This parameter only works with TS muxers.
- For some of the Data types that you select later, you can activate **Enable ISO 639 language** descriptor: Select the **Language** used.
  - If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- Select the applicable **Data type** as one of the following:
  - DVB Subtitles
  - Teletext
  - Closed Captions
  - SCTE-35 Passthrough
  - TEMI
  - Burned subtitles
  - Teletext to Burned subtitles
  - Teletext to DVB-TTML
  - DVB-TTML Passthrough
  - Nielsen Watermarking
  - Nielsen Watermarking Passthrough
  - AIT
  - Web VTT
  - SCTE-27 Passthrough
  - DVB Sub to SCTE-27

- Ancillary in SMPTE-2038
- Timecode in SEI
- Timecode EVTZLTC
- Thumbnail generated in ID3 track
- Thumbnail
- PES Passthrough
- PID Passthrough
- ID3
- TTML

# **DVB** Subtitles

When you configure DVB Subtitles as data track settings, select the **Input Type** as *ARIB-B24*, *DVB Subtitles* (default), *SCTE-27* or *Teletext*.

# Teletext to DVD Subtitles parameters (ARIB-B24)

When you select ARIB-B24 as Input Type:

- You can enter the **Max Bitrate** for the data track stream. All data beyond this limit are dropped. If you select the value 0, **TITAN Live** selects a minimum bitrate needed in order to work.
- Select the **Definition** as *HD* or *SD*.
- Select an available Font file name.
- You can change the **Text Color** from *Auto* to *Custom* to activate the variable field for **Text Color** Value.
- Enter a percentage value for Text Transparency.
- You can change the Box Color of the subtitles from Black to Auto or Custom with a Box Color Value.
- Enter a percentage value for Box Transparency.
- Enter a numerical value in pixels for the **Outline Width**.
- You can change the Outline Color Value from the automatic 000000 value to another color value
- Enter a percentage value for Outline Transparency.
- You can change the numerical values for the following fields:
  - Background size.
  - Text size.
  - · Left margin.
  - Right margin.
  - Rendering area height.

- Rendering area vertical offset.
- You can activate Keep teletext alignment so that TITAN Live maintains correct alignment of subtitles with generalized subtitles.
- Enable Anti-Aliasing to increase color gradients of subtitles.
- Enter a numerical value in seconds for Auto Remove Delay.
- You can activate Always insert Display Definition Segment even for Standard Definition. If you
  activate Keep alive enable, enter a numerical value in milliseconds for the Keep alive period. This
  activated function sends a null data track packet —or stuffing packet— so that the receiver knows
  the data track pid is still enabled when no data track packets are sent during the keep alive period.

### Show more data parameters

- You can activate **Enable Stream identifier descriptor** with the tag value 0x52.
- If you activated Enable Stream identifier descriptor, enter a value for the Component Tag that must be less than 255.

### Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
  - If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

# **Custom descriptors**

To configure custom descriptor parameters, click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
  - If you select Custom as a descriptor type, enter a descriptor Tag value.
- You can use the **Body** to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. *Example: 47 41 E1* 34 2D
- You can add as many descriptors as you want.

#### **DVB Subtitles descriptors**

When you configure the subtitling descriptors parameters, you can activate **Enable subtitling descriptor** with the tag value 0x52.

## **DVB Subtitles parameters** (DVB Subtitles)

When you select the default *DVB Subtitles* as **Input Type**:

- You can enter the **Max Bitrate** for the data track stream. All data beyond this limit are dropped. If you select the value 0, **TITAN Live** selects a minimum bitrate needed in order to work. 0 means **TITAN Live** uses the default value.
- Enter a percentage value for the **Horizontal offset** of the screen width. When you use horizontal offset, you can change the positions of DVB Sub regions, depending on whether you enabled *Display Segment* or not. This value must be under 100.
- Enter a percentage value for the **Vertical offset** of the screen height. When you use vertical offset, you can change the positions of DVB Sub regions, depending on whether you enabled *Display Segment* or not. This value must be under 100.
- You can select a **Resolution** for the output subtitle track.
- You can enter the subtitle **Time shift** in milliseconds. This value must be under 500.
- If you activate **Keep alive enable**, enter a numerical value in milliseconds for the **Keep alive period**. This activated function sends a null data track packet —or stuffing packet— so that the receiver knows the data track pid is still enabled when no data track packets are sent during the keep alive period.

### Show more data parameters

- You can activate **Enable Stream identifier descriptor** with the tag value 0x52.
- If you activated Enable Stream identifier descriptor, enter a value for the Component Tag that must be less than 255.

#### Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
  - If you select *Custom* as language, you can enter the three-letter code of the

language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

# **Custom descriptors**

To configure custom descriptor parameters, click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
  - If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the **Body** to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. *Example: 47 41 E1* 34 2D
- You can add as many descriptors as you want.

# **DVB Subtitles descriptors**

When you configure the subtitling descriptors parameters, you can activate **Enable subtitling descriptor** with the tag value 0x52.

### **DVB Subtitles parameters** (SCTE-27)

When you select SCTE-27 as Input Type:

- You can enter the **Max Bitrate** for the data track stream. All data beyond this limit are dropped. If you select the value 0, **TITAN Live** selects a minimum bitrate needed in order to work.
- Enter a value of 2 or 4 for Color Depth.
- If you activate **Keep alive enable**, enter a numerical value in milliseconds for the **Keep alive period**. This activated function sends a null data track packet —or stuffing packet— so that the receiver knows the data track pid is still enabled when no data track packets are sent during the keep alive period.

#### Show more data parameters

# DVB subtitles advanced parameters

- Enter numerical values for the following parameters:
  - Page Id start number.
  - Region Id start number.
  - Clut Id start number.
- Enter a numerical value in milliseconds for the Minimum PTS/PCR interval.

- You can activate **Enable Stream identifier descriptor** with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

# Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: Stream content specifies the type of stream.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
  - If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

# **Custom descriptors**

To configure custom descriptor parameters, click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
  - If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the **Body** to add parameters to the descriptor. You must enter bytes
  in hexadecimal format. You can use upper and lower cases. *Example: 47 41 E1*34 2D
- You can add as many descriptors as you want.

# **DVB Subtitles descriptors**

When you configure the subtitling descriptors parameters, you can activate **Enable subtitling descriptor** with the tag value 0x52.

### **Teletext to DVD Subtitles parameters** (Teletext)

When you select *Teletext* as Input Type:

- You can enter the Max Bitrate for the data track stream. All data beyond this limit are dropped. If you select the value 0, TITAN Live selects a minimum bitrate needed in order to work.
- Enter the teletext Page to decode.
- Select the **Definition** as *HD* or *SD*.

- Select an available Font file name.
- You can change the **Text Color** from *Auto* to *Custom* to activate the variable field for **Text Color** Value.
- Enter a percentage value for **Text Transparency**.
- You can change the Box Color of the subtitles from Black to Auto or Custom with a Box Color Value.
- Enter a percentage value for Box Transparency.
- Enter a numerical value in pixels for the **Outline Width**.
- You can change the **Outline Color Value** from the automatic 000000 value to another color value.
- Enter a percentage value for Outline Transparency.
- You can change the numerical values for the following fields:
  - Background size.
  - Text size.
  - Left margin.
  - Right margin.
  - Rendering area height.
  - Rendering area vertical offset.
- You can activate Keep teletext alignment so that TITAN Live maintains correct alignment of subtitles with generalized subtitles.
- Enable Anti-Aliasing to increase color gradients of subtitles.
- Enter a numerical value in seconds for **Auto Remove Delay**.
- You can activate Always insert Display Definition Segment even for Standard Definition.
- You can activate Keep alive enable so that you can enter a numerical value in seconds for the Keep alive period.
- You can activate Alpha black as EOL to solve compatibility issues of some players with alpha black characters.

### Go back to Configuring Data Tracks Settings

# **Teletext**

When you configure Teletext as data track settings, select the **Input Type** as *Teletext, DVB Subtitles* (default), *SCTE-27*.

When you select *Teletext* as **Input type**:

You can enter the Max Bitrate for the data track stream. All data beyond this limit are dropped. If
you select the value 0, TITAN Live selects a minimum bitrate needed in order to work. 0 means
TITAN Live uses the default value.

• You can activate *Teletext emulation* to enable the generation of output stuffing teletext when teletext is missing from the input.

- You can activate Full passthrough mode to deactivate the Fields Filtering and the Teletext Descriptor configurations are not available.
- You can configure **Fields Filtering**. With this parameter, you can indicate the lines you want to see in the output. You should use the following pattern: *4-26, 28*.
- You can activate the use of a Teletext Descriptor.

When you activate a **Teletext Descriptor**:

- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- Enter the Teletext **Page** number to encode to.
- Enter the type of **Description** page you want to use.

When you select *DVB Subtitles* or *SCTE-27* as **Input type**:

Can Note: When you select the Input type as DVB Subtitles or SCTE-27, you can only configure OCR languages.

- You can enter the Max Bitrate for the data track stream. All data beyond this limit are dropped. If
  you select the value 0, TITAN Live selects a minimum bitrate needed in order to work. 0 means
  TITAN Live uses the default value.
- Enter the Teletext Page number to encode to.
- Enter the **Teletext alignment** as *Left, Center* or *Right*.

# Show more parameters

- You can activate **Enable Stream identifier descriptor** with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

#### Component descriptor parameters for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag*

field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.

- Select the Language used.
  - If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

# **Custom descriptors**

To configure custom descriptor parameters, click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

### Go back to Configuring Data Tracks Settings

# **Closed Captions**

You do not have all language options such as ISO 639 language descriptor and ISO language code for Closed Captions data type.

#### **Closed Captions parameters**

When you configure the general parameters of the Closed Captions data type, select **Closed captions source** as *Video input, SMPTE-2038 data input track*, or *Disable*. When you select *Video input* or *SMPTE-2038 data input track*, you can share your closed captions on one input with multiple video outputs according to your Mapping configuration.

# Input compatibility

- You can activate **Ignore ATSC** so that **TITAN Live** ignores ATSC closed caption tracks. This parameter can be used to avoid bad closed captions tracks.
- You can activate Ignore Divicom so that TITAN Live ignore Divicom closed caption tracks.
- You can activate Ignore NADBS Line 21 so that TITAN Live ignores NADBS Line 21 closed caption tracks.
- You can activate Ignore SCTE-20 so that TITAN Live ignores SCTE-20 closed caption tracks.

# **Output format**

- You can activate the following closed captions types:
  - EIA-608 (default and most supported variant).

• **CEA-708:** If you enable *CEA-708*, you can select a status to enable the use of EIA-608 from the input to generate CEA-708. If CEA-708 is already present in the input, CEA-708 is overwritten.

- SCTE-20.
- Divicom.
- You can enter a numerical value in ms between -700 and 2000 for Closed Captions delay.

# Go back to Configuring Data Tracks Settings

# SCTE-35 Passthrough

#### SCTE35

- You can enter the **Max Bitrate** for the data track stream. All data beyond this limit are dropped. If you select the value 0, **TITAN Live** selects a minimum bitrate needed in order to work.
- If you enable **Output splice null**, enter the time **Splice null interval** between 2 splice null commands in milliseconds.
  - If you activate Output splice null, activate Cross stream/ID to add a URL in the Segmentation\_upid.
  - If you activate Cross stream/ID
    - You can define a **Splice null event id** for the Segmentation\_event\_id of the splice\_null to insert.
    - If you activate Cross stream/ID, you can define the Splice null URL value for Segmentation\_upid of the splice\_null to insert. Segmentation\_upid\_type becomes the URL.
- Select **Stream Conditioning** as *Disabled*, *On SCTE35 splice points*, or *On ESAM conditioning*.
- You can configure a **Default splice duration** in seconds if SCTE-35 commands provide no duration.
   This duration must be less than 3600.
- You can configure a **Trigger offset** to SCTE-35 in milliseconds.
- You can activate TITAN Live to Increase SCTE35 arm time.
- You can enable Use Splice Insert to Detect Program Boundaries so that when TITAN Live receives
  two back-to-back Splice insert IN markers, TITAN Live converts the second Splice insert IN marker
  to a time signal in order to identify program boundaries.
- If you disable **Use Splice Insert to Detect Program Boundaries**, **TITAN Live** ignores the second Splice insert IN marker. Therefore, the second Splice insert IN marker is not present in the output. This feature is compatible with TS and multi-TS muxers only

#### SCTE104 input

To forward SCTE-104 messages:

 Complete the following fields Authorized AS indexes, Authorized DPI-PID indexes, DID, and SDID.

You can activate PSP.

Note: You can use PSP (Playout Service Provider) to start and stop logo insertion via a trigger based on SCTE-104 in-band messaging. The triggering system is based on the PSP metadata from incoming SCTE-104 message according to the BBC whitepaper WHP 296.

When you activate this option, you also must do **Logo insertion configuration** with the **Logo type** as PSP logo according to instructions in <u>Configuring video</u> <u>tracks settings</u>.

Note: Your SCTE-104 messages must respect the following restrictions when you use the SCTE-104 messages to generate SCTE-35:

- Use the multiple\_operation\_message() format. TITAN Live discards all single\_operation\_message().
- Your messages contain only 1 operation per multiple\_operation\_message().
   TITAN Live discards all additional operations in the same multiple\_operation\_message().
- You can only use the following operations. TITAN Live discards all other operations.
  - splice\_null\_request\_data.
  - splice\_request\_data.
  - time\_signal\_request\_data.
  - insert\_avail\_descriptor\_request\_data.
  - insert\_dtmf\_descriptor\_request\_data.
  - insert\_segmentation\_descriptor\_request\_data.
  - proprietary\_command\_request\_data (but no conversion to SCTE-35;
     TITAN Live discards all messages).
  - insert\_tier\_data insert\_time\_descriptor.

This note only applies to SCTE-104 over SDI messages and does not apply to SCTE-104 over IP messages. **ATEME** will provide SCTE-104 over IP and Admsart in a future release of **TITAN Live**.

#### SCTE35 recording trigger

Activate **Enable SCTE-35 Recording Trigger** to enable **TITAN Live** to use SCTE-35 messages to trigger a recording of the output stream.

SCTE35 blackout insertion

When you activate Enable SCTE35 Blackout Insertion:

- You can activate Mute audio tracks during blackouts.
- You can activate Mute data tracks during blackouts.
- You can enter the **Full URL of distant blackout logo** to download and to display during blackouts. The URL must follow one of these templates:
  - http://<user>:<password>@serveraddress/directory/logo.png
  - ftp://<user>:<password>@serveraddress/directory/logo.png
  - smb://<user>:<password>@serveraddress/disk/directory/logo.png

Note: The user name and password are optional. This parameter disables the logo file name parameter.

• You can enter the **blackout logo** file name to use.

Note: This parameter is disabled if you enter the URL of a distant logo to download.

- You can change the **Timeout** in seconds after which the blackout stops, even without receiving SCTE-35 messages. The default value of 0 means no timeout.
- You can activate Splice Insert Command Trigger to enable the blackout insertion to only trigger on the splice insert command.

## SCTE-35 filtering parameters

# **Command Filter**

- You can activate the following modes:
- **Splice Null**: To prevent the splice null commands 0x00 from passing through.
- **Splice Schedule**: To prevent the splice schedule commands 0x04 from passing through.
- **Splice Insert**: To prevent the splice insert commands 0x05 from passing through.
- **Time Signal**: To prevent the time signal commands 0x06 from passing through.
- **Bandwidth Reservation**: To prevent the bandwidth reservation commands 0x07 from passing through.
- Other Commands: To prevent all the other commands from passing through.

# **ESAM**

When you activate ESAM:

Define the Listening port that TITAN Livelistens to in order to get asynchronous out of band ESAM requests. The URL you use to post requests must be according to the following syntax: /scc/signal.

- You can define an Acquisition point ID to use to communicate with the POIS.
- You can define a **Zone ID** to filter alternate content.
- Enter the **Placement Opportunity Information System (POIS) address** to use when communicating with the POIS.
- Define the **POIS port** to communicate with. This value must be under 65535.
- Enter the specific Signal confirmation and conditioning (SCC) URL on the POIS for transcoder requests.
- Enter the specific Manifest confirmation and conditioning (MCC) URL on the POIS for packager requests.
- Enter the delta time in milliseconds for **UtcPoint add time** when receiving immediate requests. This value must be over 3000.
- You can click + ADD ALTERNATE CONTENT to add up to 16 Alternate Content variants.

#### **Alternate Content**

- Define an **ID** for your alternate content.
- You can enter the full URL of distant logo to download and display during alternate content.
  - http://<user>:<password>@serveraddress/directory/logo.png
  - ftp://<user>:<password>@serveraddress/directory/logo.png
  - smb://<user>:<password>@serveraddress/disk/directory/logo.png

Note: The user name and password are optional. This parameter disables the logo file name parameter.

• Select the alternate content **Logo** file name to use.

Note: This parameter is disabled if you enter the URL of a distant logo to download.

- You can activate Mute Audio and/or Mute Data tracks during alternate content.
- You can enter the **Timeout** in seconds after which alternate content stops and switches to live stream. The timeout value must be under 3600 seconds.

#### Show more data parameters

- You can activate Enable Stream identifier descriptor with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

# Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

#### **Custom descriptors**

Click + ADD DESCRIPTOR to configure custom descriptor parameters. When you activate Enable descriptor:

- Select the **Type** of descriptor you want to use.
- If you select Custom as a descriptor type, enter a descriptor Tag value.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

### Go back to Configuring Data Tracks Settings

### TEMI

Canote: For more detailed instructions on configuring TEMI, refer to <u>How to add TEMI</u> support for regionalization.

#### TEMI

- Select **Insertion mode** as *VANC* or *Frame* to determine the unit of insertion frequency.
- Enter a numerical value for the **Insertion frequency**.
- If you have preexisting TEMI data, you can activate **Enable free-running detection**, and change the **Free-running timeout (seconds)** from the default value of *10*. The free running mode is a fallback option that interpolates/extrapolates TEMI data on the ouput in case of input TEMI data are stopped

• Enter the **URL** address of the incoming stream.

# Show more data parameters

- You can activate **Enable Stream identifier descriptor** with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

# Component descriptor parameters for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: Stream content specifies the type of stream.
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

# **Custom descriptors**

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you check **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select Custom as a descriptor type, enter a descriptor Tag value.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

# **DVB Subtitles descriptors**

When you configure the subtitling descriptors parameters, you can activate **Enable subtitling descriptor** with the tag value 0x52.

# **Burned subtitles**

You have only 2 parameters that you can modify for a single Burned subtitles track:

- You can activate **Override Subtitles Position** so that burned subtitles are automatically placed at a specified position, regardless of their initial position.
- If you check *Override Subtitle Position*, you can **configure the subtitles position from the top** of the video, as a percentage of the overall video height.

Go back to Configuring Data Tracks Settings

# Teletext to Burned subtitles

# Teletext to burned subtitles parameters

- You can enter the teletext Page number to decode.
- You can select a **Definition** to use for the generated subtitles.
- You must select a font file name to use.
- Choose the Text Color as Auto or Custom. When you choose Auto, TITAN Live uses the same color as configured for teletext.
- If you select *Custom* as text color, enter the **Text Color Value** in hexadecimal RGB.
- You can enter the percentage **Text Transparency**, as a percentage of the overall video.
- Select the **Box Color** as *Auto, Black,* or *Custom.*
- If you select Custom as subtitle background Box Color, enter the Box Color Value in hexadecimal RGB.
- Enter the **Box Transparency** of the subtitles background, as a percentage of the overall video.
- Enter the **Outline Width** size of the subtitles in pixels. This value must be less than 10.
- Enter the Outline Color Value in hexadecimal RGB.
- Enter the percentage **Outline Transparency**. This value must be less than 100.
- Enter the **Background Size** as a percentage of the overall subtitles background. This value must be less than 200. A value of 100 means that the background size uses the same value as the original teletext.
- Enter the **Text size** of the subtitles. This value must be less than 130. A value of 100 means that the text size uses the same value as the background size.
- Enter the **Left margin** in percentage of the position your subtitles from the left part of the screen. This value must be less than 100.
- Enter the **Right margin** in percentage of the position your subtitles from the right part of the screen. This value must be less than 100.
- Enter the **Rendering area height** of the subtitles as per thousand of the screen height. This value must be between 500 and 1000. The default value is 900.
- Enter the **Rendering area vertical offset** of the subtitles as per thousand of the screen height. This value must be between -250 and 250. The default value is 87.
- You can activate TITAN Live to detect text alignment in the teletext and to Keep teletext alignment in the generated subtitles.
- Enter the time for **Auto Remove Delay** in seconds after which the subtitles are removed. You can use this parameter when the remove message is lost.
- You can activate Alpha black as EOL to solve compatibility issues of some players with alpha black characters.

#### Show more data parameters

- You can activate Enable Stream identifier descriptor with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

## Component descriptor parameters for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

# **Custom descriptors**

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you check **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

# **DVB Subtitles descriptors**

When you configure the subtitling descriptors parameters, you can activate **Enable subtitling descriptor** with the tag value 0x52.

# Go back to Configuring Data Tracks Settings

# Teletext to DVB-TTML

#### Teletext to DVB-TTML parameters

- You can enter the **Max Bitrate** for the data track stream. All data beyond this limit are dropped. If you select the value 0, **TITAN Live** selects a minimum bitrate needed in order to work. 0 means **TITAN Live** uses the default value.
- You can enter the teletext Page number to decode.
- You can select a Subtitle purpose that describes best your data track from the following list.
  - Same language dialogue.

- Other language dialogue.
- All languages dialogue.
- Same languages for the hearing impaired.
- Other language for the hearing impaired.
- Audio description.
- Commentary.
- You can select a status for the Text to speech suitability from the default Unknown to Unsuitable
  or Suitable.
- If you activate Qualifier enabled:
  - Select the Subtitle size and subtitle Cadence.
  - Activate Monochrome flag to enable monochrome subtitles.
  - Activate Accessibility contrast flag to authorize corresponding subtitle streams with color combinations that are designed to meet with accessibility requirements.
- If you activate **Keep alive enable**, enter a numerical value in milliseconds for the **Keep alive period**. This activated function sends a null data track packet —or stuffing packet— so that the receiver knows the data track pid is still enabled when no data track packets are sent during the keep alive period.
- You can activate Alpha black as EOL to solve compatibility issues of some players with alpha black characters.

#### Show more data parameters

- You can activate **Enable Stream identifier descriptor** with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

# Component descriptor parameters for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

# **Custom descriptor**

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

# Go back to Configuring Data Tracks Settings

# **DVB-TTML** Passthrough

# DVB-TTML passthrough parameters

- You can enter the Max Bitrate for the data track stream. All data beyond this limit are dropped. If you select the value 0, TITAN Live selects a minimum bitrate needed in order to work.
- If you activate **Keep alive enable**, enter a numerical value in milliseconds for the **Keep alive period**. This activated function sends a null data track packet —or stuffing packet— so that the receiver knows the data track pid is still enabled when no data track packets are sent during the keep alive period.

#### Show more data parameters

- You can activate Enable Stream identifier descriptor with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

### Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: Stream content specifies the type of stream.
- You must enter a Component type to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

#### Custom descriptor

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you check **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

# Go back to Configuring Data Tracks Settings

# Nielsen Watermarking

# Nielsen Watermarking parameters

- Enter the corresponding **Distributor ID**.
- Select a Breakout Code from the following options:
  - Custom (with numerical custom value for the breakout code).
  - Live content with same TV ads.
  - Live content without same TV ads.
  - VOD content without same TV ads & No Digital Ads.
  - VOD content with same TV ads for 3 days.
  - VOD content with same TV ads for 7 days.
  - VOD content with same TV ads.
  - Live content without same TV ads & Digital Ads.
  - Live Digital Ads only (no TV Ads).
  - VOD with same TV Ads for 3 days & Digital Ads.
  - VOD with same TV Ads for 7 days & Digital Ads.

# Show more data parameters

- You can activate **Enable Stream identifier descriptor** with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

#### Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a Component type to be identified. This value must be less than 255.

• Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.

- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

# **Custom descriptor**

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

### Go back to Configuring Data Tracks Settings

# Nielsen Watermarking Passthrough

# Show more data parameters

- You can activate **Enable Stream identifier descriptor** with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

### Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the **Language** used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

### **Custom descriptor**

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

## Go back to Configuring Data Tracks Settings

## **AIT**

#### AIT

You can enter the Max Bitrate for the data track stream. All data beyond this limit are dropped. If you select the value 0, TITAN Live selects a minimum bitrate needed in order to work. 0 means TITAN Live uses the default value.

## Show more data parameters

- You can activate **Enable Stream identifier descriptor** with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

## Component descriptor parameters for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a Component type to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

#### **Custom descriptors**

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select Custom as a descriptor type, enter a descriptor Tag value.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

Go back to Configuring Data Tracks Settings

## Web VTT

## Web VTT parameters

- Select the input **Source** of the data track as *Cavena STU P31, Closed Captions*, or *Teletext (default)*.
- If you select *Cavena STU P31*, enter the **Language** and the **Offset** in ms to synchronize the timing of the video and subtitles (+/- 500 ms)
- If you select *Teletext*, enter the 3-digit **Page** number to access subtitles (888 by default).
  - You can activate Alpha black as EOL to solve compatibility issues of some players with alpha black characters
- For Closed Captions, refer to Closed captions parameters and Input Compatibility below.

## Closed captions parameters

- For **Closed Captions source**, you can only choose *Video input for the moment*.
- For **Closed Captions type**, select the applicable CEA standard as 608 or 708.

## Input Compatibility

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.
- You can activate Ignore ATSC so that TITAN Live ignores ATSC closed caption tracks. This
  parameter can be used to avoid bad closed captions tracks.
- You can activate **Ignore Divicom** so that **TITAN Live** ignore Divicom closed caption tracks.
- You can activate Ignore NADBS Line 21 so that TITAN Live ignores NADBS Line 21 closed caption tracks.
- You can activate **Ignore SCTE-20** so that **TITAN Live** ignores SCTE-20 closed caption tracks.

## Show more data parameters

- You can activate Enable Stream identifier descriptor with the tag value 0x52.
- If you activated Enable Stream identifier descriptor, enter a value for the Component Tag
  that must be less than 255.

## Component descriptor parameters for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: Stream content specifies the type of stream.
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

## **Custom descriptors**

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

## Go back to Configuring Data Tracks Settings

# SCTE-27 Passthrough

## Show more data parameters

- You can activate Enable Stream identifier descriptor with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

## Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a Component type to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

#### **Custom descriptors**

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

## Go back to Configuring Data Tracks Settings

## DVB Sub to SCTE-27

## Show more data parameters

- You can activate **Enable Stream identifier descriptor** with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

### Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

#### **Custom descriptors**

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select Custom as a descriptor type, enter a descriptor Tag value.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

## Go back to Configuring Data Tracks Settings

# Ancillary in SMPTE-2038

#### Ancillary in Smpte-2038 properties

You can enter the Max Bitrate for the data track stream. All data beyond this limit are dropped. If you select the value 0, TITAN Live selects a minimum bitrate needed in order to work.

## Closed captions / Timecode / Other ancillaries

- Select an **Ancillary source** as *Video input, Smpte-2038 input data track*, or *Disable*.
- You can activate **Pass-through** to enable the data track to be full passthrough from input to output.

## **Input Compatibility**

- You can activate Ignore ATSC so that TITAN Live ignores ATSC closed caption tracks. This
  parameter can be used to avoid bad closed captions tracks.
- You can activate **Ignore Divicom** so that **TITAN Live** ignore Divicom closed caption tracks.
- You can activate Ignore NADBS Line 21 so that TITAN Live ignores NADBS Line 21 closed caption tracks.
- You can activate Ignore SCTE-20 so that TITAN Live ignores SCTE-20 closed caption tracks.

## Show more data parameters

- You can activate **Enable Stream identifier descriptor** with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

#### Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a Component type to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

## **Custom descriptors**

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the **Body** to add parameters to the descriptor. You must enter bytes in hexadecimal

format. You can use upper and lower cases. Example: 47 41 E1 34 2D

## Go back to Configuring Data Tracks Settings

## Timecode in SEI

Note: When you use this feature, **TITAN Live** inserts timecodes into the GOP header when encoding in MPEG-2, or inserts timecodes into the SEI at each frame when encoding in H264 or H265 (pic\_timing type for H264 or time\_code type for H265).

When you configure the parameters of a single Timecode in SEI track:

- Select the **Timecode source** of ancillary data as *Video input, Smpte-2028 input data track, Disable,* or *Generated from system clock*.
  - If you select *Generated from system clock*, enter the interval **Insertion period** in frames.

Note: If you want to patch the data receiver with NMOS and a 2110-40 flow that contains ANC timecodes, here is an example:

```
v=0
o=- 1443716955 1443716955 IN IP4 10.81.32.34
s=rd-emsfp-211°-2_1-9-0
t=0 0
m=video 1234 RTP/AVP 100
c=IN IP4 225.0.03.20/64
a=source-filter: inc IN IP4 225.0.3.20 172.26.0.10
a=rtpmap:100 smpte201/90000
a=fmtp:100 VPID_Code=132;
a=mediaclk:direct=0 rate 90000
a=ts-refclk:ptp=IEEE1588-2008:00-02-C5-FF-FE-1B-93-E4:127
```

## Go back to Configuring Data Tracks Settings

## Timecode EVTZLTC

When you select **Timecode EVTZLTC** (Evertz Timecodes), there are no additional settings to configure.

Go back to Configuring Data Tracks Settings

# Thumbnail generated in an ID3 track

## Thumbnail properties

- You must configure the thumbnail Width and Height. Both values must be over 16.
   For full HD, enter 1920 for Width and 1080 for Height as maximum supported resolution for thumbnails.
- Enter the generation **Period** between 2 thumbnails in seconds.

### Show more data parameters

- You can activate Enable Stream identifier descriptor with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

### Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

## **Custom descriptor**

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

## Go back to Configuring Data Tracks Settings

## Thumbnail

- Select an **Output Type** for the thumbnail as *File server* or *Http*.
  - If you select File server, select a file server for Targets a FileServer and full File Name and

extension for the thumbnail in order to resolve the absolute output path.

• If you select *HTTP*, specify output **Url** and select **Interface** as *INPUT*, *OUTPUT*, or *ens192*.

Canote: When you enter the output URL for the thumbnail, you must follow this pattern to format local time: Date:<conversion specifier characters>\$ Examples:

- To display epoch time: \$Date:%s\$
- To display 10-24-2019-12-21-49: \$Date:%m-%d-%Y-%H-%M-%S\$
- To generate thumbnails count number: \$Counter\$
- You must configure the thumbnail **Width** and **Height**. Both values must be over 16.
- You can select a thumbnail pushing Interval as Period, Every key frame, or Every IDR.



Every key frame: Thumbnails are sent every key frame.

Every IDR: Thumbnails are sent every IDR.

Period: Thumbnails are sent according to your specified period.

• If you select *Period*: Enter the generation **Period** between 2 thumbnails in seconds.

## Go back to Configuring Data Tracks Settings

# PES Passthrough

## PID and PES pass-through properties

- Enter the **Time offset** in milliseconds. This parameter only changes the mux time, not the PTS values.
- You can enter the Max bitrate for the private data. All data beyond this limit are dropped.
- If your input packets are synchronized with video frames of the same presentation timestamp, activate **Sync with video frames**.

### Show more data parameters

- You can activate Enable Stream identifier descriptor with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

## Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: Stream content specifies the type of stream.
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

## **Custom descriptor**

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

## Go back to Configuring Data Tracks Settings

# PID Passthrough

You can activate **Drop on splicing** to drop PID pass-through on splicing.

## PID and PES pass-through properties

- Enter the **Time offset** in milliseconds. This parameter only changes the mux time, not the PTS values.
- You can enter the Max bitrate for the private data. All data beyond this limit are dropped.

#### Show more data parameters

- You can activate Enable Stream identifier descriptor with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

## Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: Stream content specifies the type of stream.
- You must enter a **Component type** to be identified. This value must be less than 255.

• Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.

- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

## **Custom descriptors**

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

## Go back to Configuring Data Tracks Settings

## ID3

When you select ID3 data track settings, you deactivate options for **Follow input PID, Enable ISO 639 language descriptor,** and **Language**.

#### **ID3** properties

You can enter the Max Bitrate for the data track stream. All data beyond this limit are dropped. If you select the value 0, TITAN Live selects a minimum bitrate needed in order to work. 0 means TITAN Live uses the default value.

Click + ADD ID3 TAG to add additional ID3 track variants (up to 16).

## ID3 Tag #:

- Select a Frame tag to insert as AENC, APIC, COM, COMR, ENCR, EQUA, ETCO, GEOB, GRID... Custom.
- Select Value Type as Timestamp or Custom (+ enter Value).
- Enter the **Periodicity** to define a minimum interval in seconds to insert ID3 tags.
- Activate Unitary delete to protect from the clear all method. When activated, you can only
  delete this frame tag when you specifically select the frame and click delete.

## Show more data parameters

- You can activate Enable Stream identifier descriptor with the tag value 0x52.
- If you activated **Enable Stream identifier descriptor**, enter a value for the **Component Tag** that must be less than 255.

## Component descriptor parameters for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the Language used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

### Custom descriptor

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you activated **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the **Body** to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. *Example: 47 41 E1 34 2D*

## Go back to Configuring Data Tracks Settings

## TTML

- Select **Input type** as *Teletext, DVB Sub,* and *Closed Captions*.
- Select the available data output Profile (changes with input type selection).
  - Teletext: SMPTE-TT, EBU-TT, IMSC1.
  - DVB Sub: SMPTE-TT.
  - Closed Captions: *EBU-TT, IMSC1*.
- Select Time base as Pts, Program date time, Chunk, or Base media decode time.



**AST based**: This time base mode represents the time since AST. This mode is only available for DASH.

**PTS**: This time base mode is based on PCR and perform a loop-back after 95443 seconds. This mode is only available for HLS.

**Program date time**: This time base mode is based on the service start date. This mode is only available for HLS.

**Chunk**: This time base mode is based on the chunk start date. This mode is only available for HI S.

• Select **Embed as** as *TTML External XML* or *TTML over ID3* to select the mode to embed SMPTE-TT in the output.

## **Teletext to TTML parameters** (if you select input type as )

- You can enter the teletext Page number to decode.
- Choose the Text Color as Auto or Custom. When you choose Auto, TITAN Live uses the same color as configured for teletext.
- If you select *Custom* as text color, enter the **Text Color Value** in hexadecimal RGB.
- You can enter the percentage **Text Transparency**, as a percentage of the overall video.
- Select the **Box Color** as *Auto, Black,* or *Custom.*
- If you select *Custom* as subtitle background Box Color, enter the **Box Color Value** in hexadecimal RGB.
- Enter the **Box Transparency** of the subtitles background, as a percentage of the overall video.
- You can activate Alpha black as EOL to solve compatibility issues of some players with alpha black characters.

## **DvbSub to SMPTE-TT parameters** (if you select input type as *DVB Sub*)

- You can enter the Max Bitrate for the data track stream. All data beyond this limit are dropped. If you select the value 0, TITAN Live selects a minimum bitrate needed in order to work.
- Activate **Use p in div** to enable the generation of p hierarchy when using div.
- Activate Full region so that the subtitle image size becomes the same as the input video size.
- Activate Without sharp so that the image references do not include a leading sharp character.
- Activate Enables OCR to integrate Tesseract OCR in TITAN Live so that image subtitles convert into text subtitles.

## **Closed captions parameters** (if you select input type as *Closed Captions*)

- For Closed Captions source, you can only choose Video input for the moment.
- Enter the **Closed Caption Type**. Choose between Closed Captions standard CEA-608 and CEA-708.

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Select your input content channel or service.

You can activate Ignore ATSC so that TITAN Live ignores ATSC closed caption tracks. This
parameter can be used to avoid bad closed captions tracks.

- You can activate **Ignore Divicom** so that **TITAN Live** ignore Divicom closed caption tracks.
- You can activate Ignore NADBS Line 21 so that TITAN Live ignores NADBS Line 21 closed caption tracks.
- You can activate **Ignore SCTE-20** so that **TITAN Live** ignores SCTE-20 closed caption tracks.

## Show more data parameters

- You can activate **Enable Stream identifier descriptor** with the tag value 0x52.
- If you activated Enable Stream identifier descriptor, enter a value for the Component Tag
  that must be less than 255.

## Component descriptor for DVB

When you activate **Enable component descriptor**:

- Enter a value of 15 or less for the field: **Stream content specifies the type of stream**.
- You must enter a **Component type** to be identified. This value must be less than 255.
- Enter a **Component Tag** value. This value must be the same as the value of the *Component Tag* field in the stream identifier descriptor if you are using a stream identifier descriptor. This value must be less than 255.
- Select the **Language** used.
- If you select *Custom* as language, you can enter the three-letter code of the language according to ISO 639. By default the language is auto-detected if the selected value is not *Custom*.

## **Custom descriptor**

To configure custom descriptor parameters, first click **+ ADD DESCRIPTOR**. When you activate **Enable descriptor**:

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

Go back to Configuring Data Tracks Settings

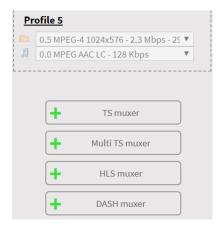
# 5.1.5. Configuring muxers

## Go back to Services

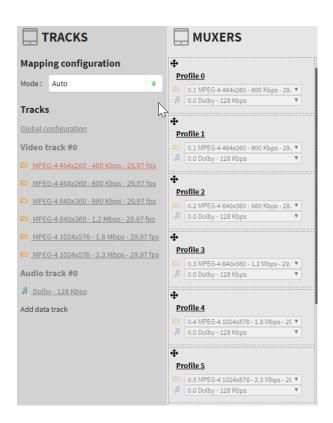
This section is intended for the configuration of the muxers you use for your service. To start configuring muxers settings, go to Services, click + NEW SERVICE and select a device to use in the Devices Library. You can then modify settings in the MUXERS panel.

According to the type of device you choose, your muxer(s) can display one or several profiles. If there is only one profile, click  $\underline{Tracks}$  to configure the muxer settings. If there are several profiles, click the name of a profile of which you want to configure the muxer settings. To remove a track, click on the track — such as  $\underline{MPEG-4\ 1280x720-1.5\ Mbps-50\ fps}$  — and click  $\underline{\hspace{-0.1cm}}$  . To copy a track to create an additional track, click on the track and click  $\underline{\hspace{-0.1cm}}$  and modify the  $\underline{TRACK\ CONFIGURATION}$  if required.

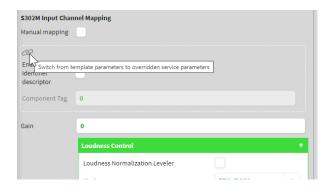
When you configure muxers settings of a muxer type that has different profiles, you can click , hold and move to reorder profiles as desired. If you choose a type of device with only one muxer type to configure, you can still add and configure muxers of a different type at the end of the list of your muxer profiles:



When you configure the muxers of a type that has several profiles, you need to assign at least a video and a audio tracks to each profile. If you do not assign a track in any profiles, the track appears in red and you cannot save your muxer configuration.



When you configure the service parameters, you already have many pre-filled settings so that your configuration is automatically valid. You can still modify these parameters with a custom value and replace the default value. You might also see this icon: • You can click on this button so that your parameter configuration overrides the template parameter.



When you finish to configure the settings of one panel, click  $\checkmark$  at the top right to validate your configuration. This button does not save the configuration, but only validates the configuration. To save your service configuration and return to monitoring services, click  $\checkmark$ SAVE. To cancel your service configuration and return to monitoring services, click  $\checkmark$ CANCEL. When you validate the settings configuration of one panel, an error message might appear. This error message means that one or several parameters are invalid or incomplete.

For more information about a specific parameter, move your cursor over the name of the parameter for additional information.

# Input URL

## udp://239.40.6.50:1234

This string must contains the input url of the stream. ex: udp://225.1.128.1:1234

You can then configure various muxer types: <u>TS</u>, <u>Multi TS</u>, <u>HLS TS</u>, <u>DASH</u>, <u>Smooth Streaming</u>, <u>RTMP</u>, HLS <u>FMP4/CMAF</u> and <u>MMT</u>. After changes, **TITAN Live** restarts the corresponding services.

## TS muxer

For more information on Multi TS output configuration, refer to <u>TS and Multi TS in the Defining Outputs</u> section.

## MPEG TS muxer parameter

Activate Enable VBR Statmux to allow TITAN Mux to control Video ES bitrate.

When you activate Enable VBR Statmux:

- Activate Automatic Channel Id for TITAN Live to automatically get the statmux channel ID. Deactivate Automatic Channel Id to enter a statmux channel ID. This ID must be different for every service.
- Enter the Channel Name. This channel name becomes a description that appears on the GUI of TITAN Mux.
- Select the Statmux Pool to use. You can configure a statmux in the section Network management.
- You can activate Remote statmux when at least one of the statmux pool encoders is remotely located. You should only use this option if the round trip time between the statmux and the encoder is up to 10 milliseconds, because this delay has an impact on latency.

Note: When you enable the use of a VBR statmux, Enable TS bitrate is automatically enabled and you cannot configure the options Use Video ES bitrate and Null Packet Minimum Bitrate.

- You can activate VBR reservation to maximize the video bitrate according to the measured bitrate
  of non-video ES.
- You can activate **Enable TS bitrate** so that the TS stream runs at the bitrate you configure and then compute the video bitrate according to this TS bitrate. The remaining bitrate is used and computed as tracks are added. If you do not configure a TS bitrate, you must configure a video ES bitrate.
- Enter a **Default TS Bitrate Value** in bits per second to use as a fallback. Use this bitrate value when the communication between the statmux is lost or not yet established. The real output bitrate

does not depend on this value. The real output bitrate depends on the TS bitrate value and the addition of null TS packets in the output stream. The fallback video derives from the fallback TS bitrate and from audio and data tracks bitrates.

- If you activated **TS bitrate**, you can enter a **TS Bitrate Value** per second at which your TS stream runs.
- If you deactivate Enable VBR Statmux, deactivate Enable VBR Reservation, and you activate
   Enable TS bitrate, you can activate Use Video ES Bitrate to use the bitrate value defined in the
   video track.
- If you deactivate Enable VBR Statmux and deactivate Use Video ES Bitrate: You can enter the Null Packet Minimum Bitrate for the output stream.
- Select a Conformance for TS as MPEG, DVB, and ATSC.

MPEG conformance does not have any additional parameters to configure. DVB and ATSC have additional parameters to configure below.

## **DVB Settings** (DVB conformance only)

- You can define a Network ID from NIT.
- You can define the Network Name from NIT.
- You can enter the **Service Provider** from SDT.
- You can enter the Service Name from SDT.
- Activate UTF-8 String Encoding to enable the Service Provider and Service
   Name fields to be encoded in UTF-8.
- Activate Remove NIT to enable the muxer to filter NIT into the TS.
- Enter the NIT period of transmission in milliseconds. 0 means TITAN Live uses the default value. You cannot configure the NIT period if you activate Remove NIT.
- Activate **Remove TDT** to enable the muxer to filter TDT into the TS.
- Enter the **TDT period** of transmission in milliseconds. 0 means **TITAN Live** uses the default value. You cannot enter the TDT period if you activate **Remove TDT**.
- Activate Remove SDT to enable the muxer to filter SDT into the TS.
- You can enter the SDT period of transmission in milliseconds. 0 means TITAN
   Live uses the default value. You cannot enter the SDT period if you activate
   Remove SDT.
- Activate **Follow input for EIT** to enable the muxer to insert EIT into the TS. This parameter only works for TS inputs.
- You can enter the EIT Max bitrate.

**ATSC Settings** (ATSC conformance only)

- Select **Delivery** mode as *Cable* or *Terrestrial*.
- You can enter Channel Name.
- You can enter the Channel Major Number.
- You can enter the Channel Minor Number.
- Select the channel RF Modulation mode as Analog, SCTE-1, SCTE-2, 8-VSB, 16-VSB, or User Mode.
- Enter the **MGT period** of transmission in milliseconds.
- Enter the **STT Period** of transmission in milliseconds.
- Enter **VCT Period** of transmission in milliseconds.
- Activate Follow input for EIT to enable the muxer to insert EIT into the TS. This
  parameter only works for TS inputs.
- You can enter the EIT Max bitrate.
- Activate the Add SDT to add a Service Description Table. If activated, you can also:
  - enter the **SDT period** of transmission in milliseconds.
  - enter the **Service Provider** from SDT.
  - enter the **Service Name** from SDT.
- Activate UTF-8 String Encoding to enable the Service Provider and Service
   Name fields to be encoded in UTF-8.
- If you have enabled multiple instances synchronization, you can enter a list of **Disabled profiles** as numbers separated by commas. Each profile number corresponds to the position of the track in the list of video tracks.

## Show more TS muxer parameters

Enter the **Transport ID**. 0 means **TITAN Live** uses the default value.

Enter the **Program Number**, (also called service ID). 0 means **TITAN Live** uses the default value.

- You can enter the PAT Period for transmission in milliseconds. 0 means TITAN Live uses the
  default value. The PAT declares every stream present in the muxer output.
- You can enter the PMT Period for transmission in milliseconds. 0 means TITAN Live uses the
  default value
- You can enter the **PMT PID**. This value is not hexadecimal. 0 means **TITAN Live** uses the default value.
- You can select a PCR PID mode.

• If you select *Custom* as PCR PID mode, enter the custom **PCR PID value**. This value can be decimal or hexadecimal.

- Select the **PCR Period** in milliseconds as 10, 15, 25, or 35.
- You can activate Remove padding to allow the muxer to remove null packets from the output stream. For example, if the TS bitrate at 10Mbps, when you deactivate Remove Padding, you will always be at 10Mbps. Now let's imagine you are using the statmux and the video bitrate signal varies between 5 Mbps and 8 Mbps (and assume there is no audio/data to keep this example simple). If you remove padding and keep the Minimum bitrate allowed, the TS will follow the video and vary between approximately 5 and 8 Mbps (with little extra overhead). If you increase Minimum bitrate allowed to 6Mbps, the TS bitrate will never be less than 6 Mbps, thus varying between 8 and 6 Mbps. Therefore you will still have padding even when the video is at 5 Mbps (to reach a target TS of 6 Mbps). Therefore, when you remove the empty NULL packets, avoid being less than the Minimum bitrate allowed. This bitrate must be under the TS bitrate if specified. A value of 0 means any bitrate is allowed.
- If you activate **Remove padding**, enter the **Minimum bitrate allowed** to be more than or equal to a suitable value depending on your setup.
- You can activate **SMPTE 2022-4** to add SMPTE 2022-4 data at the end of every ES packet when removing padding.
- You can activate Remove Conformance Tables to enable auxiliary tables from DVB, ATSC or ISDB to be removed from the output stream. You must disable this option for full DVB, ATSC, ISDB compliance.
- Enter the **Remove empty Adaptation Fields** to enable the muxer to remove empty adaptation fields from the output stream. You must activate this option for CableLabs compliance.
- You can activate **Insert PCR on PES** to enable the insertion of PCR on every PES packet. You must activate this option for CableLabs compliance. By default, PCR are inserted every 25 milliseconds.
- You can activate Align Audio on PES to enable the audio content to be aligned on every PES packet. You must activate this option for CableLabs compliance.
- If you activate Align Audio on PES, you can enter the Number of audio frames per PES packet.
- You can activate Insert RAI on audio PES.
- You can activate Insert video ES\_rate on PES to enable the insertion of ES rate information on every PES packet (ITU-T Recommendation H.222).
- You can activate **Insert audio ES\_rate on PES** to enable the insertion of ES rate information on every PES packet (ITU-T Recommendation H.222).
- You can activate **Insert data ES\_rate on PES** to enable the insertion of ES rate information on every PES packet (ITU-T Recommendation H.222).
- You can activate the muxer to **Use unconstrained PES**. When PES packets are unconstrained, the PES packet length is always 0 and the size is indicated in the TS. If you disable this option, the size of PES is limited to 65535 bytes.

You can activate Insert DVB AU packets to provide more information about video tracks. You may
enable this option in order for some decoders to operate properly.

## **Custom Descriptors**

You can click + ADD DESCRIPTOR.

- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

## Go back to Muxers Settings

## Multi TS muxer

For more information on Multi TS output configuration, refer to <u>TS and Multi TS in the Defining Outputs</u> section.

### MPEG TS muxer parameter

When you configure the main parameters of a Multi TS muxer:

- You can activate VBR reservation to maximize the video bitrate according to the measured bitrate
  of non-video ES.
- Select a **Conformance** for TS as *MPEG, DVB*, and *ATSC*.

Activate Enable VBR Statmux to allow TITAN Mux to control Video ES bitrate.

When you activate **Enable VBR Statmux**:

- Activate Automatic Channel Id for TITAN Live to automatically get the statmux channel ID. Deactivate Automatic Channel Id to enter a statmux channel ID. This ID must be different for every service.
- Enter the Channel Name. This channel name becomes a description that appears on the GUI of TITAN Mux.
- Select the Statmux Pool to use. You can configure a statmux in the section Network management.
- You can activate Remote statmux when at least one of the statmux pool encoders is remotely located. You should only use this option if the round trip time between the statmux and the encoder is up to 10 milliseconds, because this delay has an impact on latency.

Note: When you enable the use of a VBR statmux, Enable TS bitrate is automatically enabled and you cannot configure the options Use Video ES bitrate and Null Packet Minimum Bitrate.

- You can activate VBR reservation to maximize the video bitrate according to the measured bitrate of non-video ES.
- You can activate **Enable TS bitrate** so that the TS stream runs at the bitrate you configure and then compute the video bitrate according to this TS bitrate. The remaining bitrate is used and computed as tracks are added. If you do not configure a TS bitrate, you must configure a video ES bitrate.
- Enter a **Default TS Bitrate Value** in bits per second to use as a fallback. Use this bitrate value when the communication between the statmux is lost or not yet established. The real output bitrate does not depend on this value. The real output bitrate depends on the TS bitrate value and the addition of null TS packets in the output stream. The fallback video derives from the fallback TS bitrate and from audio and data tracks bitrates.
- If you activated TS bitrate, you can enter a TS Bitrate Value per second at which your TS stream runs.
- If you deactivate Enable VBR Statmux, deactivate Enable VBR Reservation, and you
  activate Enable TS bitrate, you can activate Use Video ES Bitrate to use the bitrate value
  defined in the video track.
- If you deactivate **Enable VBR Statmux** and deactivate **Use Video ES Bitrate**: You can enter the **Null Packet Minimum Bitrate** for the output stream.
- Select a **Conformance** for TS as *MPEG, DVB,* and *ATSC*.

MPEG conformance does not have any additional parameters to configure. DVB and ATSC have additional parameters to configure below.

## **DVB Settings** (DVB conformance only)

- You can define a Network ID from NIT.
- You can define the **Network Name** from NIT.
- You can enter the **Service Provider** from SDT.
- You can enter the Service Name from SDT.
- Activate UTF-8 String Encoding to enable the Service Provider and Service Name fields to be encoded in UTF-8.
- Activate **Remove NIT** to enable the muxer to filter NIT into the TS.

- Enter the NIT period of transmission in milliseconds. 0 means TITAN
   Live uses the default value. You cannot configure the NIT period if you
   activate Remove NIT.
- Activate Remove TDT to enable the muxer to filter TDT into the TS.
- Enter the TDT period of transmission in milliseconds. 0 means TITAN
   Live uses the default value. You cannot enter the TDT period if you activate Remove TDT.
- Activate Remove SDT to enable the muxer to filter SDT into the TS.
- You can enter the SDT period of transmission in milliseconds. 0 means
   TITAN Live uses the default value. You cannot enter the SDT period if you activate Remove SDT.
- Activate Follow input for EIT to enable the muxer to insert EIT into the TS. This parameter only works for TS inputs.
- You can enter the EIT Max bitrate.

## **ATSC Settings** (ATSC conformance only)

- Select **Delivery** mode as *Cable* or *Terrestrial*.
- You can enter Channel Name.
- You can enter the Channel Major Number.
- You can enter the Channel Minor Number.
- Select the channel RF Modulation mode as Analog, SCTE-1, SCTE-2, 8-VSB, 16-VSB, or User Mode.
- Enter the **MGT period** of transmission in milliseconds.
- Enter the STT Period of transmission in milliseconds.
- Enter **VCT Period** of transmission in milliseconds.
- Activate Follow input for EIT to enable the muxer to insert EIT into the TS. This parameter only works for TS inputs.
- You can enter the EIT Max bitrate.
- Activate the Add SDT to add a Service Description Table. If activated, you can also:
  - enter the **SDT period** of transmission in milliseconds.
  - enter the **Service Provider** from SDT.
  - enter the Service Name from SDT.

 Activate UTF-8 String Encoding to enable the Service Provider and Service Name fields to be encoded in UTF-8.

• If you have enabled multiple instances synchronization, you can enter a list of **Disabled profiles** as numbers separated by commas. Each profile number corresponds to the position of the track in the list of video tracks.

## Show more Multi TS muxer parameters

Enter the **Transport ID**. 0 means **TITAN Live** uses the default value.

Enter the **Program Number**, (also called service ID). 0 means **TITAN Live** uses the default value.

- You can enter the **PAT Period** for transmission in milliseconds. 0 means **TITAN Live** uses the default value. The PAT declares every stream present in the muxer output.
- You can enter the **PMT Period** for transmission in milliseconds. 0 means **TITAN Live** uses the default value.
- You can enter the PMT PID. This value is not hexadecimal. 0 means TITAN Live uses the default value.
- You can select a PCR PID mode.
- If you select *Custom* as PCR PID mode, enter the custom **PCR PID value**. This value can be decimal or hexadecimal.
- Select the **PCR Period** in milliseconds as 10, 15, 25, or 35.
- You can activate Remove padding to allow the muxer to remove null packets from the output stream. For example, if the TS bitrate at 10Mbps, when you deactivate Remove Padding, you will always be at 10Mbps. Now let's imagine you are using the statmux and the video bitrate signal varies between 5 Mbps and 8 Mbps (and assume there is no audio/data to keep this example simple). If you remove padding and keep the Minimum bitrate allowed, the TS will follow the video and vary between approximately 5 and 8 Mbps (with little extra overhead). If you increase Minimum bitrate allowed to 6Mbps, the TS bitrate will never be less than 6 Mbps, thus varying between 8 and 6 Mbps. Therefore you will still have padding even when the video is at 5 Mbps (to reach a target TS of 6 Mbps). Therefore, when you remove the empty NULL packets, avoid being less than the Minimum bitrate allowed. This bitrate must be under the TS bitrate if specified. A value of 0 means any bitrate is allowed.
- If you activate Remove padding, enter the Minimum bitrate allowed to be more than or equal to
- You can activate **SMPTE 2022-4** to add SMPTE 2022-4 data at the end of every ES packet when removing padding.

 You can activate Remove Conformance Tables to enable auxiliary tables from DVB, ATSC or ISDB to be removed from the output stream. You must disable this option for full DVB, ATSC, ISDB compliance.

- Enter the **Remove empty Adaptation Fields** to enable the muxer to remove empty adaptation fields from the output stream. You must activate this option for CableLabs compliance.
- You can activate **Insert PCR on PES** to enable the insertion of PCR on every PES packet. You must activate this option for CableLabs compliance. By default, PCR are inserted every 25 milliseconds.
- You can activate Align Audio on PES to enable the audio content to be aligned on every PES packet. You must activate this option for CableLabs compliance.
- If you activate *Align Audio on PES*, you can enter the **Number of audio frames per PES packet**.
- You can activate Insert RAI on audio PES.
- You can activate **Insert video ES\_rate on PES** to enable the insertion of ES rate information on every PES packet (ITU-T Recommendation H.222).
- You can activate Insert audio ES\_rate on PES to enable the insertion of ES rate information on every PES packet (ITU-T Recommendation H.222).
- You can activate **Insert data ES\_rate on PES** to enable the insertion of ES rate information on every PES packet (ITU-T Recommendation H.222).
- You can activate the muxer to Use unconstrained PES. When PES packets are unconstrained, the PES packet length is always 0 and the size is indicated in the TS. If you disable this option, the size of PES is limited to 65535 bytes.
- You can activate **Insert DVB AU packets** to provide more information about video tracks. You may enable this option in order for some decoders to operate properly.

**Encoder Boundary Point (EBP) insertion** 

Note: You can do the following instructions so that you can allow EBP to correct the alignment between audio and video and thus enhance compatibility with some packagers.

- Go to  $\square$  Services and click + NEW SERVICE or click  $\square$  to edit an existing service.
- 2 Go to TRACKS
- 3 Click on the video track name (ex. <u>MPEG-4 1024x576 2.3 Mbps 25 fps</u>).
- 4 Under **TRACK CONFIGURATION**: **Video #\_ variant #\_**, click Show more video parameters.
- 5 Under **Chunking**, activate **Enable Chunking** and enter the **Chunk Period** in ms.
- 6 Click to confirm your changes to your video track.
- 7 Click on the audio track name (ex. MPEG AAC LC 128 kbps).
- 8 Under **Chunking**, activate **Enable Chunking** and enter the **Chunk Period** in ms.
- 9 Click do confirm your changes to your audio track.
- You can activate EBP insertion on SCTE35/SCTE-104 for SCTE-35 cues (from TS) or SCTE-104 messages (from SDI).
- You can activate EBP insertion on chunk boundary.

#### **Custom descriptors**

You can click + ADD DESCRIPTOR.

- You must enable **TITAN Live** to add the descriptor.
- Select the **Type** of descriptor you want to use.
- If you select *Custom* as a descriptor type, enter a descriptor **Tag value**.
- You can use the Body to add parameters to the descriptor. You must enter bytes in hexadecimal format. You can use upper and lower cases. Example: 47 41 E1 34 2D

#### Profile 0 / 1 / 2 / 3 / 4 / 5

When you click a profile number (ex. **Profile 0**):

- You can activate **Disable Profile** / **Reverse muxer** to disable all Multi TS profiles.
- You can activate **Enable TS bitrate** so that the TS stream runs at the bitrate you configure and then compute the video bitrate according to this TS bitrate. The remaining bitrate is used and computed as tracks are added. If you do not configure a TS bitrate, you must configure a video ES bitrate.
- You can enter a **TS Bitrate Value** per second at which your TS stream runs.
- You can enter the Null Packet Minimum Bitrate for the output stream.

## Go back to Muxers Settings

## **HLS** muxer

For more information on HLS TS output configuration, refer to <u>HLS TS in the Defining Outputs</u> section. **HTTP Live Streaming Configuration** 

- Enter the **Segment duration**. The value you enter as a segment duration must be a multiple of the chunk period you defined in the video tracks.
- You can specify the number of audio AUs per Audio PES packet to optimize the TS overhead. 0
  means TITAN Live uses the default value.
- You can activate **Remove padding** to allow the muxer to remove null packets from the output stream. For example, if the TS bitrate at 10Mbps, when you deactivate **Remove Padding**, you will always be at 10Mbps. Now let's imagine you are using the statmux and the video bitrate signal varies between 5 Mbps and 8 Mbps (and assume there is no audio/data to keep this example simple). If you remove padding and keep the **Minimum bitrate allowed**, the TS will follow the video and vary between approximately 5 and 8 Mbps (with little extra overhead). If you increase **Minimum bitrate allowed** to 6Mbps, the TS bitrate will never be less than 6 Mbps, thus varying between 8 and 6 Mbps. Therefore you will still have padding even when the video is at 5 Mbps (to reach a target TS of 6 Mbps). Therefore, when you remove the empty NULL packets, avoid being less than the **Minimum bitrate allowed**. This bitrate must be under the TS bitrate if specified. A value of 0 means any bitrate is allowed. Padding is mandatory for full CBR compliance.
- If you activate **Remove padding**, enter the **Minimum bitrate allowed** to be more than or equal to
- Activate **Directory Rollover** to enable the activation of the automatic directory rollover option.
- If you enable Directory Rollover, you can enter the Number of segment per directory. 0 means TITAN
  Live uses the default value. In automatic mode, the number of segments per directory correspond to
  an hour of streaming.
- Activate **Start At One** to enable the naming of chunks and rollover directories to start at one.
- If you activate **Enable bitrate limitation** for segment transmission, you can **configure the bitrate limitation percentage**. This percentage has to be over 100.
  - Example: if the percentage is 200% for a segment period of 10 seconds, it means that the data are transmitted in 5 seconds.
- You can activate TITAN Live to Encapsulate audio in TS.
- You can activate TITAN Liveto Merge SMPTE-TT over ID3 tracks in the PID of the first track.

Note: You can create rendition groups to manage subtitles, closed captions, and audio. For more details, go to **Profile 0 / 1 / 2 / 3 / 4 / 5...** further on in this section.

• If you have enabled multiple instances synchronization, you can enter a list of **Disabled profiles** as numbers separated by commas. Each profile number corresponds to the position of the track in the list of video tracks.

### **HLS DRM Configuration**

 Select DRM of an HLS TS muxer as None, Verimatrix, InternalKeyGeneration, PlayReady, NSTV, Fairplay.

- If you select Verimatrix, InternalKeyGeneration, PlayReady, or NSTV: Select the Initialization Vector Size as 16 Bytes or 8 Bytes.
- If you select Verimatrix, InternalKeyGeneration, PlayReady, NSTV, or Fairplay.
  - You can activate Repeat EXT-X-KEY for each segment. If you deactivate Repeat EXT-X-KEY for each segment, the EXT-X-KEY tag is inserted close to the beginning of the m3u8 playlist and every time the key is renewed.
  - The following DRM settings change greatly according to your choice of DRM.

## Verimatrix Settings

- You can activate Use CPIX API.
- You can enter the Scrambler Key Server URL or key management server. The format should be http://<ADDRESS>:<port>/CAB/keyfile. You cannot use this parameter if you check Use CPIX API.
- Select the Cipher Mode to use as AES-128-CBC (default) or SAMPLE-AES.
- Enter the **Public Key Server URL**. The format should be http://<ADDRESS>/CAB/keyfile.
- If you activated **Use CPIX API**, you can enter the **Key ID** to use with CPIX API. You should only configure this parameter if the DRM server requires a specific value.
- You can enter the Verimatrix Resource ID associated with this content.
- You can enter the **Key Duration** to configure time before changing the key used. If the number of key generated is not sufficient, the encoder cycles through them again.

## Ssl client certificate

If you activate Use SSL Certificate: Select the SSL certificate name to use.

#### Ssl peer certificate

- If you activate Verify peer Ssl certificate for a remote server:
  - Select the SSL Peer certificate file name to use.
  - Select the **SSL authority certificate** to use to identify the remote server. You must choose an authority to verify the authenticity of a peer certificate. If you do not select an authority, a default authority is automatically selected.

## **Internal Key Generation Settings** (Internal Key Generation)

- You can enter the **Key Duration** to configure time before changing the key used. If the number of key generated is not sufficient, the encoder cycles through them again.
- Activate Auto Delete to automatically delete the keys from the server.
- Select the Cipher Mode to use as AES-128-CBC (default), AES-128-CTR, or SAMPLE-AES.
- If you select AES-128-CBC, activate **Display IV** to configure the IV in the media playlist.

- You can enter a Static Key to always use for encryption.
- You can specify a **Key Extension** to add a suffix at the end of the key file. This parameter is not available if you enabled **Akamai Compatibility** earlier.

### PlayReady configuration

When you select a **Tag Type**, you can choose between *Specific H* and *Specific Z*. These 2 tag types have parameters in common:

- You can enter the Scrambler Key Server URL or key management server. The format should be http://<ADDRESS>:<port>/CAB/keyfile.
- Enter the **Content ID**, that is the resource ID of the live channel to encrypt.
- You can enter the **Key Duration** to configure time before changing the key used. If the number of key generated is not sufficient, the encoder cycles through them again.

When you choose Specific Z, you need to define a few more parameters:

- You must enter the LA URL for the license acquisition Web service.
- You can enter the LUI URL for a non-silent license acquisition Web page.
- Enter the Domain Service ID.

## Ssl peer certificate

- If you activate **Verify peer Ssl certificate** for a remote server:
  - Select the SSL Peer certificate file name to use.
  - Select the SSL authority certificate to use to identify the remote server. You must choose an
    authority to verify the authenticity of a peer certificate. If you do not select an authority, a
    default authority is automatically selected.

## **NSTV Settings**

- You can enter the Scrambler Key Server URL or key management server. The format should be http://<ADDRESS>:<port>/CAB/keyfile.
- Enter the **Content ID**, that is the resource ID of the live channel to encrypt.
- You can enter the **Key Duration** to configure time before changing the key used. If the number of key generated is not sufficient, the encoder cycles through them again.

## Ssl client certificate

If you activate Use SSL Certificate: Select the SSL certificate name to use.

#### Ssl peer certificate

- If you activate Verify peer Ssl certificate for a remote server:
  - Select the SSL **Peer certificate** file name to use.
  - Select the **SSL authority certificate** to use to identify the remote server. You must choose an authority to verify the authenticity of a peer certificate. If you do not select an authority, a

default authority is automatically selected.

## **Key management server configuration** (Fairplay)

- Select the key management **Server type** to use as *HKMS, Irdeto CPIX*, or *Standard CPIX*.
- Enter the **Server URL** for the key management server.
- Enter the **Content ID**, that is the resource ID of the live channel to encrypt.
- If you select *Irdeto CPIX* as server type, you must enter the **Account ID** to communicate with the CPIX server.
- If you select Standard CPIX or Irdeto CPIX: You must enter the Key ID to use.
- You can enter the **Key Duration** to configure time before changing the key used. If the number of key generated is not sufficient, the encoder cycles through them again.

## Credentials (Irdeto CPIX only)

• If you select *Irdeto CPIX* as server type, you must enter the **Login** and **Password** to communicate with the CPIX server.

### Ssl client certificate

• If you activate **Use SSL Certificate**: Select the **SSL certificate name** to use.

## Ssl peer certificate

- If you activate Verify peer Ssl certificate for a remote server:
- Select the SSL Peer certificate file name to use.
- Select the SSL authority certificate to use to identify the remote server. You must choose an
  authority to verify the authenticity of a peer certificate. If you do not select an authority, a default
  authority is automatically selected.

#### Profile 0 / 1 / 2 / 3 / 4 / 5...

When you click on a profile number (ex. **Profile 0**):

- You can activate **Disable profile** / **Reverse muxer** to disable all HLS profiles.
- Select **Profile type** as *Standard, Rendition group*, or *Closed captions*. When you make your choice, your profile number title changes to the name of your choice.

#### When you select Standard:

- Select the Audio rendition group to use for this profile.
- Select the **Subtitle rendition group** to use for this profile.

When you select Rendition group:

### Rendition group properties

- Enter the value of **Group id** for this rendition group.
- Select the name of the **Default track** to use for this rendition group.

## Track 0.0 Dolby Digital - 192 Kbps - eng

Note: When you finish configuring the tracks you want in your rendition group, you can give each rendition group a different name (**Track name** parameter such as Audio track 1, Audio track 2, etc.). Then the **Default track** drop down list will allow you to select the different track names you define.

When you created one or more rendition groups, remember to use the groups with your standard profiles by configuring the fields **Audio rendition group** and/or **Subtitle rendition group**.

- Enter the **Track name** to use if you did not specify a track to play.
- Activate Autoselect track to enable the use of this track if you did not specify a track to play.

When you select *Closed captions*:

## Closed captions properties

- Enter the value of **Group id** for this rendition group.
- Select the name of the **Default track** to use for this rendition group.

## **HLS layout** (*Rendition group* or *Closed Captions* only)

- Enter the **Sub-directory Path** to specify where to write the profile playlist and chunks. This path must be relative to the HLS output directory. By default, the profile playlist and chunks are written in the same directory as the master playlist. This parameter might accept *%output%* tag. *%output%* tag is replaced with the radix of the file name without file extension.
- Enter the **Playlist Name**.
- Specify the **Media Files Name** as a base name for the chunks. This name is added by the chunk number. *Example: 400kbps-1.ts*. The default configuration uses the same name as the profile playlist. This parameter might accept *%output%* tag. If you do not enter a value for *Media Files Name*, a default naming is applied. *Example: The default media file name for video chunks should be n\_m.ts, with n=profile index and m=chunk index. The default media file name for still pictures should be still\_m.aac, with m=chunk index.*
- Specify Media Files Extension, that is a suffix to add at the end of chunk names, replacing

the file extension. Extensions do not apply to playlists file name.

## Go back to Muxers Settings

## DASH muxer

For more information on DASH output configuration, refer to <u>DASH in the Defining Outputs</u> section.

## **DASH Configuration**

- Enter the **Segment duration**. The value you enter as a segment duration must be a multiple of the chunk period you defined in the video tracks.
- If your equipment has compatibility issues, you can activate **Align Audio Timescale on Video** to force the same timescale of 1000000 for your audio and video. You should avoid this option if you can so that you keep the default audio timescale as the sample rate (DASH-IF recommendations).
- Activate **Start At One** to enable the naming of chunks and rollover directories to start at one.
- If you disable **Start At One** and activate **Manual AST** to configure a custom AST, the date and time you configure must be older than the current date and time.
- If you have enabled multiple instances synchronization, you can enter a list of **Disabled profiles** as numbers separated by commas. Each profile number corresponds to the position of the track in the list of video tracks.

### **DRM** Configuration

- Select DRM as None, Widevine, Playready, or Multi-DRM. If you select None, you can skip to Video
  Tracks without further configuration.
- Select the **Initialization Vector Size** as 16 Bytes or 8 Bytes.
- You can activate or deactivate Use Key Management Server.
- You can activate TITAN Live to Write Key in PSSH and MDP.

#### Key Settings OR Key Management Parameter

When you activate **Use Key Management Server**, you can configure **Key Management Parameters**:

- You can select a server Type. You can choose between Idreto CPIX, Standard CPIX, Playready, Verimatrix, and Widevine.
- You can enter the **Scrambler Key Server URL** or key management server. The format should be http://<ADDRESS>:<port>/CAB/keyfile.
- Enter the **Content ID**, that is the resource ID of the live channel to encrypt.
- If you select Irdeto CPIX as server type, you must enter the Account ID to communicate with the CPIX server.
- You must enter the Key ID to use. If you select Standard CPIX or Irdeto CPIX

• If you select *Irdeto CPIX* as server type, you must enter the **Login** and **Password** to communicate with the CPIX server.

- If you activate **Use SSL Certificate**: Select the **SSL certificate name** to use.
- If you activate Verify peer Ssl certificate for a remote server:
  - Select the SSL Peer certificate file name to use.
  - Select the **SSL authority certificate** to use to identify the remote server. You must choose an authority to verify the authenticity of a peer certificate. If you do not select an authority, a default authority is automatically selected.

When you disable Use Key Management Server, you can configure Key Settings:

- You must define the **Key ID**. The key ID must be a 128 bites key identifier written as a hexadecimal string.
- You can enter a Content Encryption key encoded in base64.
- You can specify PSSH data, and PSSH boxes, that is DRM specific data provided by the license server and that is encoded in base64.
- You must enter the LA URL for the license acquisition Web service.
- You can enter the **Scheme Value** for the ContentProtection element.

#### Video tracks

#### Video Track 0:

- Enter the upload **Track path** template for all the profiles of that track. When video, audio or data tracks use "\$Time\$" in the **Track path** template, "\$Time\$" is automatically replaced by the chunk age in ms in order to keep unique names for each chunk.
- Specify the **File init extension** to add.
- Enter the **Track RepresentationID** template for all the profiles of that track.

Cannot Note: The following patterns are automatically substituted:

- \$Bandwidth\$ is replaced by the ES profile bandwidth of the chunk.
- \$RepresentationIS\$ is replaced by the representation identifier of the chunk.
- \$Time\$ is replaced by the age of the chunk in milliseconds.
- \$Number\$ is replaced by the segment number of the chunk
- \$TrackIdx\$ is replaced by the track index
- \$ProfileIdx\$ is replaced by the ES profile index

## **Manifest Closed Captions Signaling**

Click + ADD CC SIGNALING to configure the following parameters.

• Select the **Service type** as *CEA-608* or *CEA-708*. Enter a numerical value for the **Service ID** and the ISO 639-1 **Language** Code.

• If you select CEA-708, you can activate or deactivate Easy Reader service

#### Audio tracks

## Audio track 0: Dolby Digital

- Enter the upload **Track path** template for all the profiles of that track. When video, audio or data tracks use "\$Time\$" in the **Track path** template, "\$Time\$" is automatically replaced by the chunk age in ms in order to keep unique names for each chunk.
- Specify the **File init extension** to add.
- Enter the **Track RepresentationID** template for all the profiles of that track.

Cannot Note: The following patterns are automatically substituted:

- \$Bandwidth\$ is replaced by the ES profile bandwidth of the chunk.
- \$RepresentationIS\$ is replaced by the representation identifier of the chunk.
- \$Time\$ is replaced by the age of the chunk in milliseconds.
- \$Number\$ is replaced by the segment number of the chunk
- \$TrackIdx\$ is replaced by the track index
- \$ProfileIdx\$ is replaced by the ES profile index

## **Custom descriptors**

Click + ADD DESCRIPTOR to configure as many additional descriptors as you want.

- Select the **Type** of descriptor you want to use.
- You can configure a **Scheme ID** for the custom descriptor.
- You can manually change the default **Value** from *main* for the custom descriptor.
- You can define an **ID** for the descriptor.

#### Data tracks

- Enter the upload **Track path** template for all the profiles of that track. When video, audio or data tracks use "\$Time\$" in the **Track path** template, "\$Time\$" is automatically replaced by the chunk age in ms in order to keep unique names for each chunk.
- Specify the **File init extension** to add.
- Enter the **Track RepresentationID** template for all the profiles of that track.

**Canada** Note: The following patterns are automatically substituted:

- \$Bandwidth\$\$ is replaced by the ES profile bandwidth of the chunk.
- \$RepresentationIS\$ is replaced by the representation identifier of the chunk.
- \$Time\$ is replaced by the age of the chunk in milliseconds.
- \$Number\$ is replaced by the segment number of the chunk
- \$TrackIdx\$ is replaced by the track index
- \$ProfileIdx\$ is replaced by the ES profile index

### Go back to Muxers Settings

# **Smooth Streaming muxer**

## **Smooth Streaming Configuration**

- Enter the **Segment duration**. The value you enter as a segment duration must be a multiple of the chunk period you defined in the video tracks.
- Select the Timestamp Configuration as Internal or UTC.
- You can configure Smooth Streaming DRM settings.

## **Smooth Streaming DRM Configuration**

Select **DRM** as *None* or *Playready*.

## PlayReady configuration

- Select Key Type as Content or Seed.
- You must define the **Key ID**. The key ID must be a 128 bites key identifier written as a hexadecimal string.
- If you select Seed as a key type, enter Key Seed.
- If you select *Content* as a key type, enter **Key Content**.
- You can enter the **License URL** for the player to get.
- You can enter the Service ID in the form of a 128 bit value as a hexadecimal string.
- If you have enabled multiple instances synchronization, you can enter a list of **Disabled profiles** as numbers separated by commas. Each profile number corresponds to the position of the track in the list of video tracks.

## Go back to Muxers Settings

## RTMP muxer

When you choose RTMP as a device type in the **Devices Library**, you do not have to configure anything here. For more details, refer to RTMP under the section RTMP.

## Go back to Muxers Settings

# FMP4 muxer (CMAF)

For more information on FMP4 output configuration, refer to <u>HLS FMP4/CMAF in the Defining Outputs section</u>.

## Fragmented MP4 Configuration

- Enter the **Segment duration**. The value you enter as a segment duration must be a multiple of the chunk period you defined in the video tracks.
- If your equipment has compatibility issues, you can activate **Align Audio Timescale on Video** to force the same timescale of 1000000 for your audio and video. You should avoid this option if you can so that you keep the default audio timescale as the sample rate.
- Activate **Start At One** to enable the naming of chunks and rollover directories to start at one.
- Select CMAF chunk generation mode as Segment or Low Latency.
  - If you select *Low Latency*, enter the **Low latency chunk duration** in milliseconds. This value must be less than the Segment Duration value.

## **CMAF Ingest**

- Activate Enable output for interface 1 to change the muxer type from FMP4 (non-CMAF) to CMAF.
- If you activate **Enable output for interface 1**, enter the audio parameters for the **Track template video**, **Track template audio**, and **Track template data**.



Cannot in Note: If you want to support SCTE-35 data tracks on your CMAF ingest output:

## Scenario 1: No splice command on input

When there is no splicing, the system periodically sends the CMAF ingest data track on the output in the form of an empty emsg box if there are no error messages. In the following diagram, the video fragment duration and emsg duration are always 2 seconds.

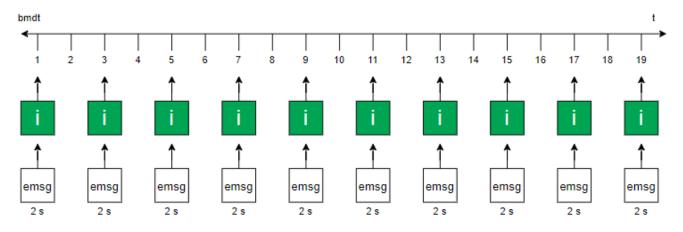
💶 i-frame (video fragment)



non-empty emsa box

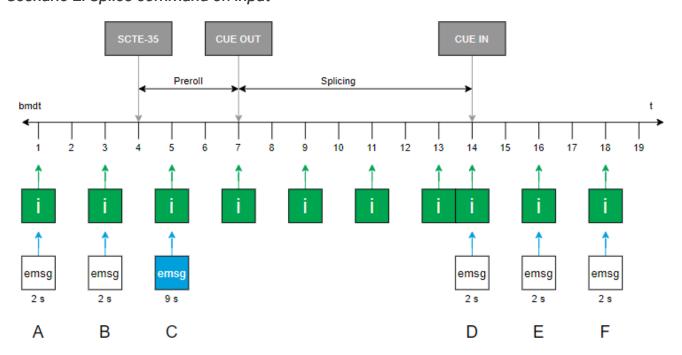
bsmg = base media decode time

t = time in seconds



However in the in the case of splicing, the video fragment duration and esmg duration are not regular.

Scenario 2: Splice command on input



Here is an explanation of the above scenario

#### A to B:

The system periodically sends 2 empty emsg boxes (A & B) every 2 seconds like Scenario
 1.

#### B to C

- SCTE35 command/buffer is received at t=4.
  - The system must wait until t=5 to send the next emsg box.
  - The emsg at t=5 contains a duration of 9 seconds that equals the remaining preroll time (2 s) and splicing duration (7s).

#### C to D

- The system sends video fragments (i-frames) every 2 seconds until the end splicing period at t=13.
- At CUE IN or the end of splicing, the system sends another i-frame and emsg that are synchronized at t=14.

#### After D

- Immediately after the end of the splice period (t=14), the system sends a new i-frame with IDR synchronized and an empty emsg.
- The system goes back to sending i-frames and empty emsg boxes every 2 seconds like for Scenario 1.

### **DRM Configuration**

- Select DRM as None, Widevine, Playready, or Multi-DRM. If you select None, you can skip to Video Tracks without further configuration.
- If you select Widevine, Playready, or Multi-DRM:
  - Select the Initialization Vector Size as 16 Bytes or 8 Bytes.
  - You can activate or deactivate Use Key Management Server.
  - You can activate TITAN Live to Write Key in PSSH and MDP.

### Key Settings OR Key Management Parameter

When you activate **Use Key Management Server**, you can configure **Key Management Parameters**:

- You can select a server **Type**. You can choose between Idreto CPIX, Standard CPIX, *Playready, Verimatrix*, and *Widevine*.
- You can enter the Scrambler Key Server URL or key management server. The format should be http://<ADDRESS>:<port>/CAB/keyfile.
- Enter the **Content ID**, that is the resource ID of the live channel to encrypt.
- If you select *Irdeto CPIX* as server type, you must enter the **Account ID** to communicate with the CPIX server.

- You must enter the Key ID to use. If you select Standard CPIX or Irdeto CPIX
- If you select *Irdeto CPIX* as server type, you must enter the **Login** and **Password** to communicate with the CPIX server.
- If you activate **Use SSL Certificate**: Select the **SSL certificate name** to use.
- If you activate Verify peer Ssl certificate for a remote server:
  - Select the SSL Peer certificate file name to use.
  - Select the **SSL authority certificate** to use to identify the remote server. You must choose an authority to verify the authenticity of a peer certificate. If you do not select an authority, a default authority is automatically selected.

When you disable **Use Key Management Server**, you can configure **Key Settings**:

- You must define the **Key ID**. The key ID must be a 128 bites key identifier written as a hexadecimal string.
- You can enter a Content Encryption key encoded in base64.
- You can specify **PSSH data**, and **PSSH boxes**, that is DRM specific data provided by the license server and that is encoded in base64.
- You must enter the **LA URL** for the license acquisition Web service.
- You can enter the **Scheme Value** for the ContentProtection element.



The following parameters apply for "non-CMAF" FMP4 device configurations. To access these parameters, you must deactivate **Enable output for interface 1** under **CMAF Ingest**.

#### Video tracks

#### Video Track 0:

- Enter the upload **Track path** template for all the profiles of that track. When video, audio or data tracks use "\$Time\$" in the **Track path** template, "\$Time\$" is automatically replaced by the chunk age in ms in order to keep unique names for each chunk.
- Specify the **File init extension** to add.
- Enter the **Track RepresentationID** template for all the profiles of that track.

Cannot Note: The following patterns are automatically substituted:

- \$Bandwidth\$ is replaced by the ES profile bandwidth of the chunk.
- \$RepresentationIS\$ is replaced by the representation identifier of the chunk.
- \$Time\$ is replaced by the age of the chunk in milliseconds.
- \$Number\$ is replaced by the segment number of the chunk
- \$TrackIdx\$ is replaced by the track index
- \$ProfileIdx\$ is replaced by the ES profile index

#### Audio tracks

### Audio track 0: Dolby Digital

- Enter the upload **Track path** template for all the profiles of that track. When video, audio or data tracks use "\$Time\$" in the **Track path** template, "\$Time\$" is automatically replaced by the chunk age in ms in order to keep unique names for each chunk.
- Specify the File init extension to add.
- Enter the **Track RepresentationID** template for all the profiles of that track.

Cannot Note: The following patterns are automatically substituted:

- \$Bandwidth\$ is replaced by the ES profile bandwidth of the chunk.
- \$RepresentationIS\$ is replaced by the representation identifier of the chunk.
- \$Time\$ is replaced by the age of the chunk in milliseconds.
- \$Number\$ is replaced by the segment number of the chunk
- \$TrackIdx\$ is replaced by the track index
- \$ProfileIdx\$ is replaced by the ES profile index

#### **Custom Descriptors**

Click + ADD DESCRIPTOR to configure as many additional descriptors as you want to the audio tracks of a Dash service.

Note: Before Release 4.1.21, **TITAN Live** automatically inserted a single descriptor with the type as "Role", the value as "main" for the first audio track and "alternate" for the other tracks. Now, you can configure many different descriptor types such as "Role", "Accessibility", "Rating", or "Viewpoint".

Select the **Type** of descriptor you want to use.

- You can configure a Scheme ID for the custom descriptor.
- You can manually change the default **Value** from *main* for the custom descriptor.
- You can define an **ID** for the descriptor or leave the field empty.

• If you have enabled multiple instances synchronization, you can enter a list of **Disabled profiles** as numbers separated by commas. Each profile number corresponds to the position of the track in the list of video tracks.

### Go back to Muxers Settings

### **MMT**

For more information on MMT output configuration, refer to MMT in the Defining Outputs section.

## **MMT Configuration**

- Enter the **Segment duration**. The value you enter as a segment duration must be a multiple of the chunk period you defined in the video tracks.
- If your equipment has compatibility issues, you can activate **Align Audio Timescale on Video** to force the same timescale of 1000000 for your audio and video. You should avoid this option if you can so that you keep the default audio timescale as the sample rate.
- Activate Start At One to enable the naming of chunks and rollover directories to start at one.
- If you disable **Start At One** and activate **Manual AST** to configure a custom AST, the date and time you configure must be older than the current date and time.

## **DRM Configuration**

- Select DRM as None, Widevine, Playready, or Multi-DRM. If you select None, you can skip to Video
  Tracks without further configuration.
- Select the **Initialization Vector Size** as *16 Bytes* or *8 Bytes*.
- You can activate or deactivate Use Key Management Server.
- You can activate TITAN Live to Write Key in PSSH and MDP.

### Key Settings OR Key Management Parameter

When you activate Use Key Management Server, you can configure Key Management Parameters:

- You can select a server Type. You can choose between Idreto CPIX, Standard CPIX, Playready, Verimatrix, and Widevine.
- You can enter the Scrambler Key Server URL or key management server. The format should be http://<ADDRESS>:<port>/CAB/keyfile.
- Enter the **Content ID**, that is the resource ID of the live channel to encrypt.
- If you select *Irdeto CPIX* as server type, you must enter the **Account ID** to communicate with the CPIX server.

- You must enter the Key ID to use. If you select Standard CPIX or Irdeto CPIX
- If you select *Irdeto CPIX* as server type, you must enter the **Login** and **Password** to communicate with the CPIX server.
- If you activate **Use SSL Certificate**: Select the **SSL certificate name** to use.
- If you activate Verify peer Ssl certificate for a remote server:
  - Select the SSL Peer certificate file name to use.
  - Select the **SSL authority certificate** to use to identify the remote server. You must choose an authority to verify the authenticity of a peer certificate. If you do not select an authority, a default authority is automatically selected.

### When you disable Use Key Management Server, you can configure Key Settings:

- You must define the **Key ID**. The key ID must be a 128 bites key identifier written as a hexadecimal string.
- You can enter a Content Encryption key encoded in base64.
- You can specify **PSSH data**, and **PSSH boxes**, that is DRM specific data provided by the license server and that is encoded in base64.
- You must enter the LA URL for the license acquisition Web service.
- You can enter the Scheme Value for the ContentProtection element.

## Show more MMT muxer parameters

#### Interoperability

 If you activate enable AST shift to offset the Available Start Time, enter the Number of segments to shift AST.

#### Advanced

- Select **Advanced muxer modes** as *In order* or *Out of order. In order* means that you insert the moof before mfus. *Out of order* means that you insert the moof after mfus.
- You can activate Insert a timestamp descriptor to insert an misd box to transport pts.
- Select the tfdt/bmdt configuration for the base media decode time as No, Force Zero, Version 0 -32 bits, or Version 1 - 64 bits.
  - No: Deactivated
  - Force Zero: The force base media decode time is 0.
  - Version 0 32 bits: Uses tfdt version 0, the base media decode time is coded on 32 bits.
  - Version 1 64 bits: Uses tfdt version 1, the base media decode time is coded on 64 bits.

#### Video tracks

#### Video track 0:

Enter the upload Track path template for all the profiles of that track. When video, audio or data

tracks use "\$Time\$" in the **Track path** template, "\$Time\$" is automatically replaced by the chunk age in ms in order to keep unique names for each chunk.

• Enter the **Track RepresentationID** template for all the profiles of that track.

Cannot Note: The following patterns are automatically substituted:

- \$Bandwidth\$ is replaced by the ES profile bandwidth of the chunk.
- \$RepresentationIS\$ is replaced by the representation identifier of the chunk.
- \$Time\$ is replaced by the age of the chunk in milliseconds.
- \$Number\$ is replaced by the segment number of the chunk
- \$TrackIdx\$ is replaced by the track index
- \$ProfileIdx\$ is replaced by the ES profile index

### Audio tracks settings

- Enter the upload **Track path** template for all the profiles of that track. When video, audio or data tracks use "\$Time\$" in the **Track path** template, "\$Time\$" is automatically replaced by the chunk age in ms in order to keep unique names for each chunk.
- Enter the MMT Track RepresentationID for all profiles of that track.

**Can Note:** The following patterns are automatically substituted:

- \$Bandwidth\$ is replaced by the ES profile bandwidth of the chunk.
- \$RepresentationIS\$ is replaced by the representation identifier of the chunk.
- \$Time\$ is replaced by the age of the chunk in milliseconds.
- \$Number\$ is replaced by the segment number of the chunk
- \$TrackIdx\$ is replaced by the track index
- \$ProfileIdx\$ is replaced by the ES profile index
- If you have enabled multiple instances synchronization, you can enter a list of **Disabled profiles** as numbers separated by commas. Each profile number corresponds to the position of the track in the list of video tracks.

Go back to Muxers Settings

## 5.1.6. Defining outputs

#### Go back to Services

You can select several outputs for every service you edit, TITAN Live sends the same stream to each output. To define your first output, click + DEFINE OUTPUT.

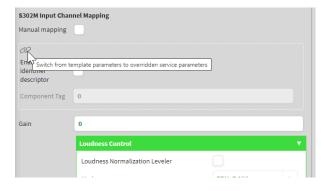
Cannot Note: To define an output you must first select a device to configure.

The type of output to configure for your service depends on the type of device you select in the **Device** Library. When you use multi packaged as device type in the Devices Library, you must configure at least one output for each type of device. If you want to add an output of a different type than the type defined, you must first add and configure the muxer of the type you want, to allow the service to configure the output of the type you selected. More information on the section Configuring Muxers Settings.

For each type of output, you can configure different parameters. The types of outputs are:

- TS and Multi TS
- **HLS TS**
- DASH
- RTMP
- Smooth Streaming
- FMP4
- MMT

When you configure the service parameters, you already have many pre-filled settings so that your configuration is automatically valid. You can still modify these parameters with a custom value and replace the default value. You might also see this icon:  $oldsymbol{\mathscr{O}}$  . You can click on this button so that your parameter configuration overrides the template parameter.



When you finish to configure the settings of one panel, click ✓ at the top right to validate your configuration. This button does not save the configuration, but only validates the configuration. To save your service configuration and return to monitoring services, click **SAVE**. To cancel your service configuration and return to monitoring services, click X CANCEL. When you validate the settings configuration of one panel, an error message might appear. This error message means that one or several

parameters are invalid or incomplete.

For more information about a specific parameter, move your cursor over the name of the parameter for additional information.



This string must contains the input url of the stream. ex: udp://225.1.128.1:1234

## TS and Multi TS (TS)

### **Device Output**

- You must select the **Redundancy mode** as *Active/Active* or *Active/Passive*.
  - Active/Active: All outputs are active at the same time.
  - Active/Passive: Only one output is active. If the network interface of the first output goes down, the system activates the next output.
- If you select Active/Passive, You can activate **Auto switch-back** so that **TITAN Live** switches back to the main output when the main output interface starts again after a failure.

Note: When you select Active/Passive, you must configure at least 2 outputs. Each output must have a distinct network interface and you can only use outputs of the type Live. If the last output interface goes down, you cannot use the service.

• Select the **maximum TS packets per IP packet** to be delivered as 1, 4, or 7. The value is ignored if you configured a Zixi IP output.

#### Main

- Activate **Enable** to configure main parameters.
- You must select the Output type as Live (default) or File.

When you select Live:

- You must enter the output **URL**. The URL must follow one of these templates:
  - (1) udp://225.1.128.1:1234
  - (2) rtp://225.1.128.1:1234
  - (3) srt://your.domain.name:1234
- You must select the **Interface** as *INPUT, OUTPUT*, or *ens192*.
- Activate Override source address to enable the use of a source address instead of the original IP address. If activated, you can enter the Source address to use.
- Enter the TTL of the output packet.

- You can enter the DSCP (TOS) value on the corresponding socket.
- You can activate FEC (RTP output only). If you activate FEC, you can select Schemes and enter the number of columns, rows, and steps.

Cannot enable SRT and ZIXI at the same time.

- When you enable **Zixi** feeder output (only available for TS):
  - You must enter a Channel Name.
  - You can configure the **Maximum Latency** of the Zixi server.
  - You can select a FEC overhead bitrate configuration.
  - You can select an Encryption Mode to choose the number of bits for AES.
  - You can enter an Encryption Key to use.
- When you enable SRT (only available for TS):
  - Enter a numerical value for **Connection timeout** in ms.
  - Enter a numerical value for Time out in ms.
  - Enter a numerical value for Latency in ms.
  - You can activate 
     ✓ Packet drop to drop packets that TITAN Live cannot deliver on time.
  - Select the most appropriate and available Encryption Mode.
  - If you have administration access, you can change the Password.

#### When you select File:

- You must select a FileServer from the available list in order to resolve the absolute output path for **Targets a FileServer**.
- You must enter the **Relative Path** to use to target the output file directory. The final output path is resolved through the FileServerID/UID. To add or configure a File Server, see the section <u>File servers management</u>.
- You can select a value for the option **Control by** to define or not a trigger to start and stop the recording. If you do not specify a value for this field, the default value is *None*.
- You can activate **Disable File Chunking** to enable the creation of a single output file.
- Enter the Chunk duration in seconds of each chunk of the output file. If you want the chunk duration to be precise, you must enable chunking with the same duration in the video parameters.
- Activate MP4 format to generate an MP4 output live to file recording of your stream.

Note: If you activate file chunking, you should use the pattern \$Number\$ in the Relative Path field to add a chunk index in the generated file name. Ex: filename\_\$Number\$.mp4

### Go back to Defining Outputs

## **HLS TS**

#### **Device Output**

- You can activate Ignore SSL errors for TITAN Live to accept all certificates even when the URLspecific certificate of the publishing server is invalid.
- Activate Merge master playlist to enable the master playlist of your configured output muxer to merge all tracks from the other muxers of your service. The system uses identical tracks as redundant streams. The rendition group in different muxers must use a different group ID.
- Activate **Directory Creation** to enable WebDAV protocol to create a directory on origin server.
- Activate **Segment Auto Delete** to keep a rolling window of [(2 x number of manifest segments) + 1] segments on the server. This function helps to avoid storage issues if no other cleaning method is available.

### **Playlists Configuration**

- Enter the **Number of segments in Playlist** to keep. The value you enter corresponds to the last segments described in the playlist. For example, If you enter a value of 3, only the 3 last segments are described in the playlist.
- Enter a value for **Master playlist update period**, the number of segments before an update period periodically begins.

### **HLS Playlists Configuration**

- If you enable **Tag Program Date Time**, select **Program date time location** as *Before every segment* or *Before first segment*.
- Select the SCTE-35 manifest decoration mode number from Mode 1 to Mode 7:

#### Mode 1:

• CUE-SPAN: This tag indicated the duration of each Media Segment.

#### Mode 2:

- SCTE-35: This tag contains the base 64 encoded raw bytes of the original SCTE-35 ad avail message.
- CUE-OUT-CONT: This tag contains the elapsed time of the avail and the duration declared in the

original SCTE-35 message.

#### Mode 3:

 OATCLS-SCTE-35: This tag contains the base 64 encoded raw bytes of the original SCTE-35 ad avail message.

- The CUE-OUT-CONT contains:
  - The elapsed time of the avail and the duration declared in the original SCTE-35 message.
  - SCTE-35: This tag contains the base 64 encoded raw bytes of the original SCTE-35 ad avail message.
- CUE-IN: This tag indicates the end of the avail.

#### Mode 4:

- The EXT-X-DATERANGE contains:
  - SCTE-35: This tag contains the hexadecimal encoded raw bytes of the original SCTE-35 ad avail message.
  - START-DATE or END-DATE with respectively a PLANNED-DURATION and DURATION.

Mode 5: This mode is a combination of mode 3 and mode 4.

Mode 6: This mode is a combination of mode 3 and OATCLS-SCTE-35 tag for splice IN.

- You can activate the following modes:
  - Tag version.
  - Generation of *I-Frames Playlists*.
  - Add FRAME-RATE.
  - Use relative URLs in media Playlist. Enables ULRs in media playlists to be relative to the master playlist URL, even if you configure a playback URL. If you use **Internal Key Generation** and if the key URL has the same location as the playback URL, the system uses a relative URL in the media playlist EXT-X-KEY tag.

### Main

- Activate **Enable** to configure main parameters.
- You must select the **Output type** as *Live (default)* or *File*.

When you select Live:

- You must enter the output **URL**. The URL must follow one of these patterns (optional user name and password):
  - (1) http://:@serveraddress/playlist.m3u8
  - (2) https://<user>:<password>@serveraddress/playlist.m3u8
- Click + ADD HLS MASTER PLAYLIST for each extra master playlist:

- You must enter the Name for your master playlist according to the following pattern: [playlist\_name].m3u8
- Enter values for Profiles Filtering for profiles to keep in the master playlist (ex. 2, 4-6).
- Click + ADD PLAYBACK URL(s) for additional playback playlists in the same format as the master playlists.
- You must select the **Interface** as *INPUT*, *OUTPUT*, or *ens192*.
- If you activate Enable backup interface, select the Backup interface as INPUT, OUTPUT, or ens192.
- Activate Override source address to enable the use of a source address instead of the original IP address. If activated, you can enter the Source address to use.
- Enter the **TTL** of the output packet.
- Enter the **Connection timeout** in milliseconds. If you leave the value 0, **TITAN Live** uses the default value of 4s.

### When you select File:

- Click + ADD HLS MASTER PLAYLIST for each extra master playlist:
  - You must enter the Name for your master playlist according to the following pattern: [playlist\_name].m3u8
  - Enter values for **Profiles Filtering** for profiles to keep in the master playlist (ex. 2, 4-6).
  - Click + ADD PLAYBACK URL(s) for additional playback playlists in the same format as the master playlists.
- You must select a FileServer from the available list in order to resolve the absolute output path for **Targets a FileServer**.
- You must enter the **Relative Path** to use to target the output file directory. The final output path is resolved through the FileServerID/UID. To add or configure a File Server, see the section <u>File servers management</u>.
- You can select a value for the option **Control by** to define or not a trigger to start and stop the recording. If you do not specify a value for this field, the default value is *None*.
  - Can use the following supported patterns in the Relative path:
    - \$Date:<%Y%m%d%H%M%S>.
    - \$Bandwidth\$ (video bitrate).
    - \$ProfileIndex\$ (starting from 0).

### Go back to Defining Outputs

## DASH

#### **Device Output**

- You can activate Ignore SSL errors for TITAN Live to accept all certificates even when the URLspecific certificate of the publishing server is invalid.
- Activate **Directory Creation** to enable WebDAV protocol to create a directory on origin server.
- Activate Segment Auto Delete to keep a rolling window of [(2 x number of manifest segments) + 1] segments on the server. This function helps to avoid storage issues if no other cleaning method is available.

## **Playlists Configuration**

- Enter the **Number of segments in Playlist** to keep. The value you enter corresponds to the last segments described in the playlist. For example, If you enter a value of 3, only the 3 last segments are described in the playlist.
- Enter a value for **Master playlist update period**, the number of segments before an update period periodically begins.

## **DASH Playlists Configuration**

- You can activate Insert BaseURL element to enable the addition of a location for segments and other resources.
- Select an available **UTC Timing** scheme. You can add a custom profile name for your choice.
- Select an available DASH Profile.
- You can activate Enable Dynamic Ad Insertion based on your DASH profile to insert SCTE-35 events from your Ad server at your SCTE cue-in and cue-out period..
- If you activate Enable **Dynamic Ad Insertion**, you can also activate **Allow Multi-period** to force your system to open a new DASH period when your system detects SCTE-35 or SCTE-104 markers..

#### Main

- Activate Enable to configure main parameters.
- You must enter the output **URL**. The URL must follow one of these patterns (optional user name and password):
  - (1) http://<user>:<password>@serveraddress/manifest.mpd
  - (2) https://<user>:<password>@serveraddress/manifest.mpd
- You can define a BaseUrl to include in the MDP file. If you do not specify a base URL, TITAN Live
  uses a default value. You can only insert this element if you activate *Insert BaseUrl element* in the
  muxer settings.
- You must select the **Interface** as *INPUT, OUTPUT*, or *ens192*.
- You can activate Enable backup interface to select the Backup interface to use. To add another

interface, see Network management.

 Activate Override source address to enable the use of a source address instead of the original IP address. If activated, you can enter the Source address to use.

- Enter the TTL of the output packet.
- Enter the **Connection timeout** in milliseconds. If you leave the value 0, **TITAN Live** uses the default value of 4s.

## Go back to Defining Outputs

## **Smooth Streaming**

#### Main

- Activate **Enable** to configure main parameters.
- You must enter the output URL. The URL must follow this pattern (optional user name and password):
  - http://<user>:<password>@serveraddress/manifest.isml
- You must select the **Interface** as *INPUT*, *OUTPUT*, or *ens192*.
- You can activate Enable backup interface to select the Backup interface to use. To add another interface, see <u>Network management</u>.
- Activate Override source address to enable the use of a source address instead of the original IP address. If activated, you can enter the Source address to use.
- Enter the TTL of the output packet.

### Go back to Defining Outputs

### **RTMP**

#### Main

- Activate **Enable** to configure main parameters.
- You must enter the output **URL**. The URL must follow one of these patterns (optional user name and password):
  - (1) rtmp://<user>:<password>@serveraddress/entrypoint
  - (2) rtmps://<user>:<password>@serveraddress/entrypoint
- When you specify a RTMP output URL to start by "rtmps://", TITAN Live enables specific SSL fields:
  - **Validate SSL certificate signature**: checks that **TITAN Live** can validate the server SSL certificate against the specified Certificate Authority unless this feature is disabled.
  - SSL authority certificate
    - Default authority: Uses the system CA.

- Https authority: The system CA configuration is in System→SSL configuration→ Authority SSL
- Expect specific server SSL certificate checks that the Expected server SSL certificate matches the specified PEM file unless you disable this feature.
- Use a client SSL certificate allows TITAN Live to send a Client SSL certificate to the server to authenticate itself unless you disable this feature.
- You can enter your Stream Name here instead of in your URL.
- You must select the **Interface** as *INPUT, OUTPUT*, or *ens192*.
- You can activate Enable backup interface to select the Backup interface to use. To add another
  interface, see <u>Network management</u>.
- Activate Override source address to enable the use of a source address instead of the original IP address. If activated, you can enter the Source address to use.
- Enter the TTL of the output packet.

### Go back to Defining Outputs

### FMP4

#### **Device Output**

- You can activate Ignore SSL errors for TITAN Live to accept all certificates even when the URLspecific certificate of the publishing server is invalid.
- Activate **Directory Creation** to enable WebDAV protocol to create a directory on origin server.
- Activate Segment Auto Delete to keep a rolling window of [(2 x number of manifest segments) + 1] segments on the server. This function helps to avoid storage issues if no other cleaning method is available.

### **Playlists Configuration**

- Enter the **Number of segments in Playlist** to keep. The value you enter corresponds to the last segments described in the playlist. For example, If you enter a value of 3, only the 3 last segments are described in the playlist.
- Enter a value for **Master playlist update period**, the number of segments before an update period periodically begins.

## **DASH Playlists Configuration**

- You can activate Insert BaseURL element to enable the addition of a location for segments and other resources.
- Select an available UTC Timing scheme. You can add a custom profile name for your choice.
- Select an available **DASH Profile** as *ISO Base media file format live profile, ISO Base media file format broadcast TV profile*, or *HbbTV 2.0 profile*.

 You can activate Enable Dynamic Ad Insertion based on your DASH profile to insert SCTE-35 events from your Ad server at your SCTE cue-in and cue-out period..

• If you activate Enable **Dynamic Ad Insertion**, you can also activate **Allow Multi-period** to force your system to open a new DASH period when your system detects SCTE-35 or SCTE-104 markers..

#### Main

- Activate Enable to configure main parameters.
- You must enter the output URL. The URL must follow one of these patterns (optional user name and password):
  - If FMP4
    - (1) http://<user>:<password>@serveraddress/playlist.m3u8
    - (2) https://<user>:<password>@serveraddress/playlist.m3u8
  - If CMAF
    - (1) http://<user>:<password>@serveraddress/manifest.mpd
    - (2) https://<user>:<password>@serveraddress/manifest.mpd
- Click + ADD HLS MASTER PLAYLIST to add the HLS FMP4 Playlist.
  - You must enter the Name for your master playlist according to the following pattern: [playlist\_name].m3u8
  - Enter values for Profiles Filtering for profiles to keep in the master playlist (ex. 2, 4-6).
  - Click + ADD PLAYBACK URL(s) for additional playback playlists in the same format as the master playlists.
- You can define a BaseUrl to include in the MDP file. If you do not specify a base URL, TITAN Live
  uses a default value. You can only insert this element if you activate *Insert BaseUrl element* in the
  muxer settings.
- You must select the **Interface** as *INPUT, OUTPUT*, or *ens192*.
- You can activate Enable backup interface to select the Backup interface to use. To add another
  interface, see <u>Network management</u>.
- Activate Override source address to enable the use of a source address instead of the original IP address. If activated, you can enter the Source address to use.
- Enter the TTL of the output packet.
- Enter the **Connection timeout** in milliseconds. If you leave the value 0, **TITAN Live** uses the default value of 4s.

### Go back to Defining Outputs

## **MMT**

### **Device Output**

 You can activate Ignore SSL errors for TITAN Live to accept all certificates even when the URLspecific certificate of the publishing server is invalid.

Activate Directory Creation to enable WebDAV protocol to create a directory on origin server.

Activate Segment Auto Delete to keep a rolling window of [(2 x number of manifest segments) + 1] segments on the server. This function helps to avoid storage issues if no other cleaning method is available.

### **Playlists Configuration**

- Enter the **Number of segments in Playlist** to keep. The value you enter corresponds to the last segments described in the playlist. For example, If you enter a value of 3, only the 3 last segments are described in the playlist.
- Enter a value for **Master playlist update period**, the number of segments before an update period periodically begins.
- You can activate Insert BaseURL element to enable the addition of a location for segments and other resources.

#### **DASH Playlists Configuration**

- You can activate Insert BaseURL element to enable the addition of a location for segments and other resources.
- Select an available **UTC Timing** scheme. You can add a custom profile name for your choice.
- Select an available **DASH Profile** as *ISO Base media file format live profile, ISO Base media file format broadcast TV profile*, or *HbbTV 2.0 profile*.
- You can activate Enable Dynamic Ad Insertion based on your DASH profile to insert SCTE-35 events from your Ad server at your SCTE cue-in and cue-out period..
- If you activate Enable **Dynamic Ad Insertion**, you can also activate **Allow Multi-period** to force your system to open a new DASH period when your system detects SCTE-35 or SCTE-104 markers..

#### Main

- Activate **Enable** to configure main parameters.
- You must enter the output **URL**. The URL must follow one of these patterns (optional user name and password):
  - (1) http://<user>:<password>@serveraddress/manifest.mpd
  - (2) https://<user>:<password>@serveraddress/manifest.mpd
- You can define a BaseUrl to include in the MDP file. If you do not specify a base URL, TITAN Live
  uses a default value. You can only insert this element if you activate *Insert BaseUrl element* in the
  muxer settings.
- You must select the **Interface** as *INPUT, OUTPUT*, or *ens192*.
- You can activate Enable backup interface to select the Backup interface to use. To add another interface, see <u>Network management</u>.
- Activate Override source address to enable the use of a source address instead of the original IP address. If activated, you can enter the Source address to use.

- Enter the TTL of the output packet.
- Enter the **Connection timeout** in milliseconds. If you leave the value 0, **TITAN Live** uses the default value of 4s.

Go back to Defining Outputs

# 5.2. Alarms

#### Go back to TITAN Live in More Details

To go to the **Alarms** tab, click **Alarms** on the **Menu**.

This section is intended for the monitoring of alarms that may occur in **TITAN Live**. When a problem occurs, **TITAN Live** creates an alarm on this page and makes a description of the error indicating the date and time, the level of severity, the service involved, the type of error and provides an explanation. There are two types of alarms:

- Open alarms: The encoder is facing the issue and try to resolve the occurring error.
- Non-open alarms: **TITAN Live** resolved the issue and closed the alarm.

You can use the 4 filters at the top of the page to filter and search for alarms, or delete non-open or all alarms.



# 5.3. Support

#### Go back to TITAN Live in More Details

The **Support** tab is intended to ease troubleshooting of the support team. On this page, you can download API documentation, use the terminal or generate diagnostic packages. You should not use the terminal or generate diagnostic packages unless the **ATEME** technical or support teams invites you to. To go to the **Support** tab, click **Support** on the **Menu**.

### API documentation

On the **Support** tab, you can have access to the full API documentation. Refer to this documentation for integration with an external tool.

## Using the terminal

**TITAN Live** enables you to log on the unit file system with a terminal from the **Support** tab, in case of advanced troubleshooting of the unit. You should only use this terminal if the **ATEME** technical or support teams ask you to.

When you use the terminal, you can access the unit through 2 user profiles (*titan* and *support*). You can also capture streams.

When you use the *titan* profile, you have access to all non-privileged **Linux** commands, as a normal **Linux** user. You can use the following commands:

• To reboot **TITAN Live**, run:

```
sudo systemctl reboot
```

To stop a service, run:

```
sudo systemctl stop [service name]
```

To start a service, run:

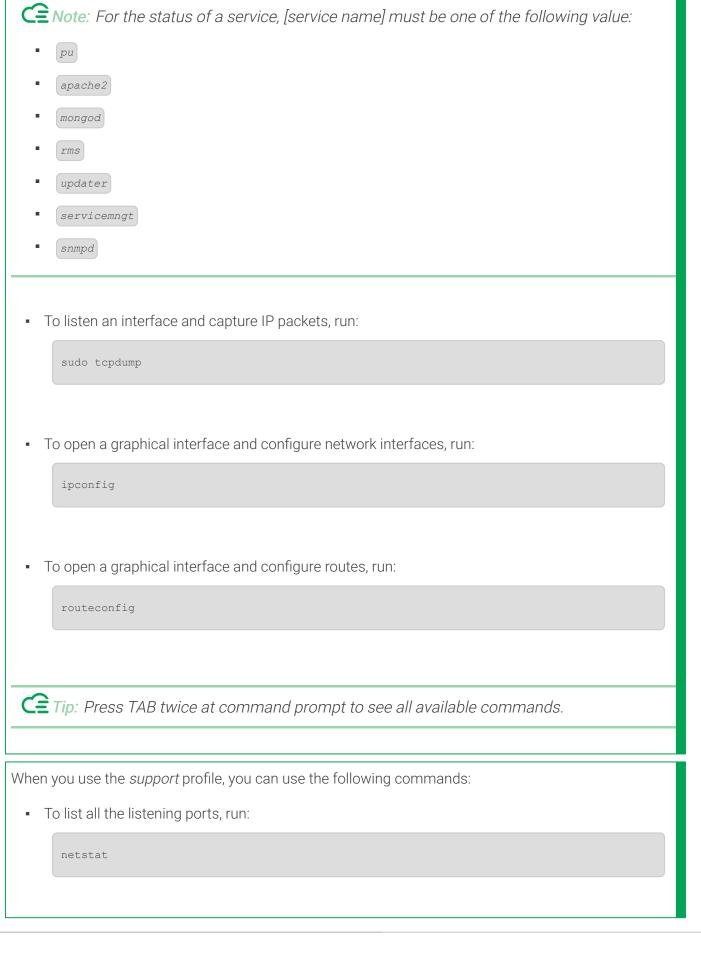
```
sudo systemctl start [service name]
```

To restart a service, run:

```
sudo systemctl restart [service name]
```

• To display the status of a service, run:

```
sudo systemctl status [service name]
```



• To test a connection, run:

ping

• To extract detailed information on the hardware configuration, run:

lshw

Here is an example of how to capture streams with the terminal:

- 1 Log as titan.
- 2 Enter cd /home/titan.

3

Write the following code:

sudo tcpdump -w asset.pcap -i <interface\_name> dst <destination\_ip> and dst port
<destination\_port>

Note: For more information, read tcpdump.

- 4 To stop the capture, press CTRL+C.
- 5 To retrieve the capture, connect to the **TITAN Live** FTP (with FileZilla for example).
- 6 Browse to /home/titan.
- 7 Download the capture.

If your network interface is out of service after a reboot, you can force activation of the network interface with the following command:

ifup --force <interface>

Example of <interface> could be eno2.

## Diagnostic package

On this panel, you can generate diagnostic packages upon **ATEME** request in case of unexpected error of the unit. These packages contain all the necessary information for the investigation and the resolution of the occurring issue by the **ATEME** technical team. You can only generate and download one diagnostic package at a time. You cannot download previous packages.

# 5.4. System

#### Go back to TITAN Live in More Details

This section is intended for the management of system options and information. To go to the **System** tab, click  $\Xi$  System on the Menu.

On the **System** tab, you can:

- Obtain information on the system
- Manage the system
- Update the system
- Manage network configuration
- Manage alarms
- Configure logging
- Manage passwords
- Manage hardware monitoring
- Manage file servers
- Configure SSL certificates

## 5.4.1. System information

#### Go back to System

This page enables you to get information about the system, the health of the hardware. To obtain system information, go to **≒System** and click **System Information**.

## System information

With this panel, you can have information on:

- Product name
- Server time: If you use an NTP server, TITAN Live reports the synchronization status.
- CPUs: In case of virtualization, the information on the CPUs may be incorrect.
- Possible detection of virtualization: If virtualization is detected, the hypervisor will be reported.

• **CPU frequency**: In case of multi core system, the frequency of only one CPU is reported.

- Number of cores (per CPU)
- **CPU (real)**: The CPU real usage is scaled to 100% and the value appearing here always changes. When you have a CPU near 100% does not mean that the system is overloaded or that you cannot add another service. This CPU real usage must be very carefully analyzed by the **ATEME** support team before drawing any conclusion.
- **CPU (estimate)**: Static usage depending on the configuration of **TITAN Live**. Above 100%, the system may not be able to maintain the desired level of video quality. **ATEME** recommends a limit of 85%.
- RAM detected on the machine used
- Memory in use
- Possible presence of a SDI: If several cards are detected, click on the card name to display the card details.
- Last version of TITAN Live

## Hardware monitoring

With this panel, you can have information on:

- Detected fan
- CPU temperature
- Status of the Power Supply Unit

Note: You can configure an alarm in the Hardware Monitoring panel for each fan. If the fan speed reaches 0 with high CPU temperature, the PSU is in failure.

## Receiver demodulator

With this panel, if your system is equipped with a Receiver Demodulator card, you can have information on:

- Board index
- Number of tuners

# 5.4.2. System management

## Go back to System

This page enables you to manage and configure the system, licenses, logos, fonts and time. To manage the system, go to **\(\sumsymbol{\Sigma}\)** System Management.

## System configuration

This panel concerns CPU consumption. TITAN Live has a unique and patented algorithm to maximize the

CPU cycles meant for video encoding. As a result, the CPU usage is always maximized and the usage of the servers is more efficient. You can then:

- Activate Use CPU Locked for Services Management to limit the number of services launched simultaneously, based on the estimated capabilities of the CPU and its consumption.
- Activate Premium Mode to lower the number of services launched simultaneously so that more CPU is dedicated to each service.
- Activate Enable automatic captures to help troubleshoot issues.
- Activate Enable audio VU meter.
- Activate Confirm service save or Confirm service stop to ask for a confirmation before saving or stopping a service in operation.
- Activate Enable the system to mute all your services when booting TITAN Live
- Enter the number of 2022-6 SD, HD and 3G inputs
- Enter the overload threshold of your system
- Rename tabs

Note: Only the support team can analyze the Premium Mode checkbox because of the allocation of the dynamic CPU.

Enabling automatic captures significantly degrades performance.

## License management

**TITAN Live** comes with software licenses. These licenses must be activated by the **ATEME** support team. The license management relies on a server that can be either:

- Local: TITAN Live is the license server.
- Remote: TITAN Live acts like a server distributing tokens.

With this panel you can:

Activate Use a remote server and/or redundant servers

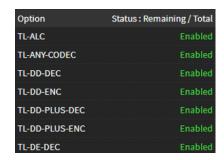
Note: When you check the option Use remote sever and/or redundant servers, TITAN Live queries tokens from a remote server and/or redundant local license servers. To define those servers, you have to enter their addresses, the first address being the address of the main license server and the other(s) being the address(es) of the redundant license server(s). You can refer to this image as an example:



The main server is the active server to which all tokens requests are addressed. If this server goes down, token requests are redirected to the first redundant server you defined and this redundant server becomes active. The main license server is declared non-eligible. All servers in non-eligible state are back in eligible state one hour after the server status changed. When the main server becomes eligible again and so active, all servers return to original function.

Upload licenses generated by the ATEME support team.

When a license is missing, **TITAN Live** enables the use of the associated function for 2 hours and raises an alarm. This so called grace period guarantees the functioning of the server in case it is lost. When the 2 hours expire, the associated function stops working.



- Export a report file with a list of the license features.
- Activate Upload Rivermax License to enable Rivermax SDK on Mellanox ConnectX5 network adapters. You must have the Rivermax license and the Mellanox board to receive SMPTE-2110 inputs.
- Configure Kantar license settings:
  - Click Download Authorization Code to download a text file containing the code to send to Kantar. You also need to provide Kantar the services name of which you want to get audience measurements. When you provide all the information Kantar needs, you receive two license files.
  - Upload Kantar License.
  - Upload Kantar Audience License.

## Logos configuration

With this panel, you can insert static or animated logos in the video pipeline. **TITAN Live** inserts logos before the encoding stage and after the resizing and cropping. When you upload logos in this page, you

can reference logos in the service configuration and overlay logos to the video.

Note: JPG, PNG and GIF are supported. The resolution of the inserted graphics must be less than 3840x2160 resolution. The file size must be less than 10 MB.

## Fonts configuration

With this panel you can insert a chosen font in your video for teletext and subtitles. You can preview the font when you upload it. When you upload fonts in this page, you can use fonts in the service configuration. If no font is uploaded, the **TITAN Live** default font is used.

## Time configuration

Select Configuration mode as Manual, NTP, or PTP.

If you select Manual:

- Select the **timezone**.
- Select the Time and Date.

Note: You can also click on NOW to automatically enter the exact time of you machine

If you select NTP:

- Select the **timezone**.
- Enter the NTP server address to use

If you select PTP:

- Select the **timezone**.
- You must select the Interface
- Select the Backup Interface.
- Select Delay mechanism or mode to use.
- Enter the PTP domain number.
- Select the IP transmission mode as Multicast, Unicast, or Hybrid.
  - If you select *Hybrid*, the mode uses multicast for sync and announce, and uses unicast for delay request and response.

## System configuration package

When you import a system package, the imported system package overwrites your current system configuration. If you decide to export/import Network configuration, you might lose access to your

instance. Therefore, you should take extreme caution and plan in advance within your organization in order to minimize service disruption.

- 1 Click **GENERATE** to create a system configuration package.
- 2 Click **EXPORT** and export a zip folder of your package to a file path that your other instance can access.
- 3 On the other instance of **TITAN Live**, click **IMPORT** and activate the configuration features that you want to import from the package.
- 4 Click **APPLY** to confirm your selection of the imported package.

# Emergency alarm system configuration

You can use Emergency Alert System (EAS) to insert scrolling text & audio warnings in services when specific events happen (like a hurricane for instance). You can activate EAS SCTE-18 messages over IP and audio alerts over SDI for all your channels. You can also adjust the font and the dimensions of the text box. You can also adjust the direction and speed of the scrolling text. If you enter 0 for speed, the text does not move along the screen. Click SAVE CONFIGURATION to validate your configuration changes but with a restart of all services.

## 5.4.3. System update

## Go back to System

This page is intended for the updates of **TITAN Live**. To update **TITAN Live**, go to  $\equiv$  **System update**.

**TITAN Live** can be upgraded with update packages. To import a BIN upgrade package, click on the green button *Import* or drag and drop the BIN file. You can upload these packages from the left panel. You can store up to 8 packages to ease back and forth between different versions of **TITAN Live**, however **ATEME** recommends not to add more than 6 packages for hard disk overload reasons. When the update is uploaded, you can install the update.



The state of installation is reported on the right panel. You can also restore your old firmware of **TITAN Live**. If you have any issue, contact the **ATEME** support team.

Carron Note: Be aware that installing an update requires a full power cycle and interrupts the running services.

## 5.4.4. Network management

This page in intended for the management of the network. You can then manage and create physical interfaces, NIC bonding interfaces, Virtual LAN, create routes and configure DSN and statmux. To manage the network, go to **≒System** and click **<\text{Network Management**</sub>.

**IMPORTANT**: If you change the network configuration (IP addresses, VLANs etc), Apache might restart and you might lose access to the **TITAN Live** web interface for a short period. If you use the **ATEME** AMS software or another NMS software to monitor the timeout, either software might raise an alarm or trigger redundancy. For these reasons, you must only do network adjustments during maintenance periods.

## Go back to System

## Physical interfaces

All the physical interfaces detected on **TITAN Live** system are listed here. You can add as many physical interfaces as you want but at least one is needed in order for the system to be functional. For each physical interface, you can find information on:

- Interface: If an interface contains a \* after the name, TITAN Live generates the fingerprint from this
  interface so that you can have your valid TITAN Live license. If you change any configuration on this
  type of interface, you risk losing your licenses and disrupting normal operation of your services. Also,
  if you shut this starred interface down, the fingerprint disappears and your TITAN Live license
  becomes invalid.
- MAC address
- IGMP
- Negociated speed
- State of the interface

You can also configure:

- Method: Static or DHCP
- Address
- Netmask
- Logical name: When you configure redundancy of an interface, you must be sure that the redundant interface you configure have the same logical name as the main interface.
- Link speed

You must activate **Management** for Physical Interfaces if you want authorization of HTTP, SNMP and SSH protocols to have access to **TITAN Live**. You must keep at least 1 Management interface enabled at all times. Otherwise, you lose access to **TITAN Live**.

## NIC bonding

**TITAN Live** allows you to configure NIC Bonding. NIC bonding is a process of combing several network interfaces together into a single interface, offering performance improvements and redundancy by

increasing the network bandwidth. If one interface is down or unplugged, the other interface can work. When bonded, the interfaces form a unique device and have the same MAC address. NIC bonding is also called NIC Teaming. For more information on this subject, see <u>Linux Ethernet Bonding Driver</u>.

When you configure NIC bonding:

- You can see the Interface used.
- You can choose a Mode to bond the interfaces.

Here are some bonding modes that **TITAN Live** supports:

- active-backup
- balance-rr
- balance-xor
- broadcast
- 802.3ad
- balance-tbl
- balance-alb

Some bonding modes, balance-rr in particular, require a dedicated switch in order to work. More information on <u>Understanding NIC Bonding With Linux</u>.

- Select Slaves (interfaces) to bond.
- Select Primary interface as the main default interface when both selected Slaves are working.
- You can configure the MiiMonFrequency.
- You can configure the DownDelay.
- You can configure the UpDelay.

Note: To avoid issue when you remove a VLAN on a bonded interface, remove the VLAN before the bonded interface

### Virtual LAN

VLANs are used to secure you physical interface creating independent virtual sub-networks based on parts your physical interface, without additional equipment. You can add as many VLAN as you want. You can use Virtual interfaces exactly like the physical interfaces for receiving or sending IP transport stream.

When you configure a VLAN on TITAN Live:

- You must select the **Interface** to secure.
- You must select the Vlan Number or VLAN ID following the IEE 802.1Q standard.
- You can select the **State** of the VLAN as *Up* or *Down*.
- Select a Method as Static or DHCP to acquire the address and the netmask of the VLAN.

- When you select *Static*, you need to enter the IP **address** and the **Netmask** of the VLAN.
- When you select DHCP, TITAN Live connects to a DHCP server to obtain the IP address and the VLAN netmask.
- You must enter a Logical Name for your VLAN.

You must activate **Management** for your VLANs if you want authorization of HTTP, SNMP and SSH protocols to have access to **TITAN Live**. You must keep at least 1 Management VLAN enabled at all times. Otherwise, you lose access to **TITAN Live**.

### Routes

All the **TITAN Live** interfaces can have routes. When you configure a route, all the outgoing traffic is routed according to the rule defined here. You can tie the route to a host or a whole network. You can route all the traffic matching the entered rule to the defined gateway.

When you configure a route:

- You must select an interface.
- You must select a route type.

There are several route type available:

- Default
- Host

When you select *Host* as a route type:

- You must enter a **Destination**
- Net

When you select *Net* as a route type:

- You must enter a **Destination**
- You must enter a netmask.
- You must enter a gateway.
- You can add IP rules.

For more information, contact the administrator of your system or the **ATEME** support team.

# DNS configuration

To ease TCP based services such as RTMP and HLS, you can configure a primary and a secondary DNS address.

## Statmux pool configuration

Here you can configure multiple statmux, identified by the field *Pool-Id*. You can choose a statmux pool in

the device configuration in **Services** when you create a new service, but only if you check *Enable VBR* Statmux.

The communication between the services running on **TITAN Live** and a statistical multiplexer (**TITAN Mux**) is done through a multicast group. All the messages going from **TITAN Mux** to **TITAN Live** use that multicast group.

For redundancy purposes, you can define a primary and a secondary interface. Both interfaces receive the messages. If primary and secondary interface are identical, **TITAN Live** assumes that no redundancy is needed. **TITAN Live** only takes the first line of source address into account .

When you configure a statmux:

- You must enter a Pool ID. This pool ID must be the same as when you configure TITAN Mux.
- You must enter a Multicast address. You can only use one single multicast address per group or per communication between TITAN Live and TITAN Mux or another statistical multiplexer.
- You must enter the applicable **Port** number. You must use this port when you create a service and when you wan to use the statmux communication you create.
- You must select Interfaces: TITAN Live sends messages to TITAN Mux or another statistical
  multiplexer through that interface. The first interface should be the same as the primary streaming
  interface.
- You can enter Address 1 and Address 2 which are IP addresses of the source corresponding to each interface. You can only enter addresses if you check Source Filtering.
- You can activate IGMPv3 source filtering. The input stream is only received if the source address
  matches the field Source. This option only works for networks that support IGMPv3.

You can also enable or disable statmux communication.

## NMOS configuration

In this section, you can configure your network settings for IS-04 Discovery and Registration. The Networked Media Open Specifications (*NMOS*) exists for use in IP-based infrastructures to provide a control and management layer in addition to the SMPTE ST2110 transport layer.

When you configure your NMOS parameters:

- Enter the **Registry address** for the NMOS IS-04 Registration API endpoint address.
- Enter the **Port** number for the NMOS IS-04 Registration API endpoint port.
- Enter the **Registry interface** to reach the NMOS IS-04 Registration API endpoint.
- Enter the **Management interface** to reach TITAN Live NMOS IS-04 Node API endpoint (port 80 only).

# 5.4.5. Alarm management

Go back to System

This page is intended for the management of SNMP and alarms. You can configure Hardware related alarms in the dedicated page <u>Hardware monitoring</u>. To manage alarms, go to **System** and click **Alarms Management**.

## SNMP configuration

TITAN Live enables to change the SNMP community strings:

- Read-Only (default string: Public)
- Read/Write (default string: Private)

You can *enable traps* and then configure the emission of traps individually in the right panel. You can also download MIB.

Note: TITAN Live automatically selects the appropriate combination of interface and/or route to reach the recipients defined here.

## Alarm configuration

The right panel enables you to configure alarms individually. An alarm raised on the **Alarm** tab can trigger the emission of a trap if the option is enabled. Here, you can enable or disable traps individually and configure timeout in milliseconds for some issue type, before the issue triggers the alarm on the **Alarm** tab.

# 5.4.6. Logging configuration

### Go back to System

This page is intended for the configuration of a connection to a remote client and to forward syslog messages. To configure logging, go to  $\equiv$  System and click  $\square$  Logging Configuration.

On this panel you can:

- Enable syslog forwarding to a remote client
- Select the protocol used for syslog connection with a remote client
- Enter the IP address of a remote syslog client
- Enter the port of a syslog remote client

You can use this panel to store unit logs remotely.

## 5.4.7. Password management

## Go back to System

**TITAN Live** has 2 authentication modes. The internal mode is the default mode that is managed locally. The LDAP mode is a remote user management working with openLDAP or Active Directory server. To manage passwords, go to **≒System** and click **△Password Management**.

## Internal

Here you can change passwords of the different logging profiles of TITAN Live. These logging profiles are:

- Administrator: With the administrator profile, you are granted a full access of TITAN Live. You can
  then modify all parameters, including service configuration, system configuration, network and
  passwords of other profiles.
- **Operator**: With the operator profile, you can edit all the service parameters for encoding configuration, but you cannot modify system parameters that would possibly make the unit unusable.
- **Monitoring**: With the monitoring profile, you can monitor the system but cannot make any modification.
- **API**: With the API profile, you are granted a full access of **TITAN Live**. You can modify all parameters, including service configuration, system configuration, network and passwords of other profiles.

## LDAP

**TITAN Live** connects to a LDAP server to validate the user's credentials and access rights and supports open LDAP or Active Directory server. You can still use the local Administrator account in case of trouble. In this mode:

- You have to define the DNS name or IP address of the LDAP server and its port: Default port value is 389 if it is not specified. The DNS server must be configured if a DNS name is specified.
- You can specify the sub node of the LDAP base where to start searching for users.
- You can change the default user filter used to determine the query to be run to identify the user record. Ex for AD: sAMAccountName.
- You can change the group filter used to determine the query to be run to identify the group field. Ex
  for AD: memberOf.
- You can customize the Administration group name. Ex for AD: CN=administrator\_group,CN=Users,DC=testIdap,DC=org.
- You can customize the Operator group name. Ex for AD: CN=operator\_group,CN=Users,DC=testIdap,DC=org.
- You can customize the Monitoring group name. Ex for AD: CN=monitoring\_group,CN=Users,DC=testIdap,DC=org.
- You can **enter the login of the binding account** that has the rights for searching in the LDAP annuary. Leave empty for anonymous binding.

 You can enter the password of the binding account that has the rights for searching in the LDAP annuary. Leave empty for anonymous binding.

 You can activate TLS to enable the communication secure mode with the remote server: Only the TLSv1.2 protocol is supported.

# 5.4.8. Hardware monitoring

### Go back to System

This page is intended for the management of hardware monitoring and related alarms. To manage and monitor the hardware, go to **\sum System** and click **\sim Hardware Monitoring**.

## Hardware monitoring

In this panel, you can configure alarms related to the hardware on which **TITAN Live** is running. You can then configure alarms for:

CPU temperature according to the thresholds that you define

Note: The temperature thresholds you configure change depending on the processor you have.

- Invalid or non spinning-fan
- PSU failure

Mote: Depending on the hardware configuration, some fans and the secondary PSU may not be installed and this can raise invalid alarms. You can disable these alarms through the **User Interface**.

Being hardware agnostic, the content of this panel is subject to change depending on the host and the IPMI capabilities.

## SDI cards

This panel displays the list of available SDI cards. You can change the name of an SDI card.

## 5.4.9. File servers management

Go back to System

In **TITAN Live**, you can to choose the output of a type file when you transcode streams. To manage file servers, go to **System** and click **File Server Management**.

## Adding a file server

With this panel, you can configure the file servers to use to receive the resulting output files. You must have the following information:

- Type: AWS S3, NFS, SMB v1.0, SMB v2.0, SMB v2.1, SMB v3.0 and CIFS
- URL of the server
- Domain: Optional
- Login
- Password

Canote: Samba and CIFS have the same syntax. The "URI" —with i, not "URL— must follow a specific format such as the 2 following examples:

- (1) ip:/directory for NFS //ip/directory for CIFS and SMB
- (2) https://s3.eu-west-3.amazonaws.com for AWS S3

When you select **Type** as AWS S3, the directory is always created as if the **Directory Creation** parameter is activated.

## Managing file servers

This panel displays the list of all file servers previously added. You can remove file servers from this list.

## 5.4.10. SSL configuration

### Go back to System

This page is intended for the configuration of HTTPS and management of SSL certificates. To configure SSL certificates, go to  $\rightleftharpoons$  System and click  $\nearrow$  SSL Configuration.

## HTTPS configuration

HTTPS configuration enables a more secure connection for API and GUI when you connect to **TITAN Live**. The Administrator can manage the web server certificate, enable https, disable http and make the web server reject connections when the connections are not verified with an authority certificate. All certificate files are in PEM format and configuration changes might take more than 10 seconds to become active.

- Click + UPLOAD to upload web server certificates consisting of a PEM file (certificate + RSA private key).
- Click EXPORT to export web server certificates.
- You can add an + AUTHORITY certificate for client verification.

- You can add a + REVOCATION list.
- Click REVOCATION to delete any existing revocation lists.
- Activate Enable https for web server access to the API and GUI, with the web server certificate and deactivate http.
- Activate **Disable http** to access an redirect to HTTPS.
- Activate **Reject not verified connections** if an authority certificate do not verify these connections.

## SSL client certificates

You can use SSL client certificates as HTTP client certificates when you establish a connection from a remote server to **TITAN Live** with a stronger client validation process when you connect to the GUI or Rest API. You should generate these certificates with the authority certificate pushed in Authority SSL Certificate.

- Under HTTP Configuration, you should activate Reject not verified connections.
- Click + UPLOAD to upload the SSL client certificate.
- Click **REMOVE** to remove the SSL client certificate.



## SSL peers certificates

You can use SSL peers certificates to verify the identity of a remote server when you establish a connection from a remote server to **TITAN Live**.

- Click + UPLOAD to upload the SSL peer certificate.
- Click **REMOVE** to remove the SSL peer certificate.

## 6. Use cases

In this section you will find the most typical use cases that a **TITAN Live** user can encounter when configuring a service. These use cases are given as examples only. You can modify and adapt them as you wish.

In the use cases section, you can find instructions on:

- How to create TS IPTV services?
- How to create OTT services?
- How to create UHD services?
- How to create services using a statmux?
- How to configure dynamic ad insertion (DAI) in DASH?

## 6.1. How to create TS IPTV services?

### Before you begin

Go back to Use Cases

#### Context

This use case is about the configuration of a standard IPTV service. Here the content provider delivers an MPEG TS over IP. You receive this HD channel and stream the content in HD TS with 2 audios and in PiP TS. You can refer to the following profiles to configure you service:

	HD		PiP
Video	H.264 - 1920x1080i - 25 fps - 8 Mbps	Video	H.264 - 192x192 - 25 fps - 300 Kbps
Audio 1	MPEG Layer 2 - 128 Kbps - Stereo	Audio	MPEG Layer 2 - 128 Kbps - Stereo
Audio 2	Dolby Digital AC-3 - 384 Kbps - 5.1		

#### **Procedure**

- Go to Services and click + NEW SERVICE
- 2 Go to the Devices Library, click TS and choose the template DVB H.264 HD 1080i.

Note: This template is the most similar template to the configuration you want to achieve.

3 In the input panel, configure the input.

- a Click + DEFINE INPUT to configure your input stream.
- Select IP as input type.
- Enter the URL of the input stream. The URL must follow this pattern: udp://225.1.128.1:1234.
- d Select the interface where you receive the input stream.
- e Optional: Activate the parameter for Activate IGMPv3 Source Filtering to only receive the stream if the source address and the field Source match.
- Optional: If you activate Activate IGMPv3 Source Filtering, enter the IP address of the source.

Note: If you want to configure another type of input, see the section <u>Defining</u> inputs.

- Glick ✓ at the top right to save your configuration.
- h Click **CPROBE** to obtain all tracks of the input stream you are receiving.



4 In the tracks panel, configure the TS video track.

Cannot Note: There are 4 important parameters for video tracks:

- Codec
- Frame size
- Frame rate
- Bitrate

The template you select is similar to the configuration you want to obtain. The TS HD tracks is already configured and you only need to configure the PiP video track according to the profile in the table at the beginning of the topic.

- a Click the video track.
- b Add a video track.

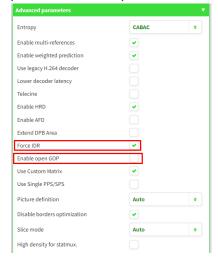
Note: To remove a track, click on the track — such as MPEG-4 1280x720 - 1.5 Mbps - 50 fps — and click — . To copy a track to create an additional track, click on the track and click □ and modify the TRACK CONFIGURATION if required. Click on the green button and a new track appears.

- C Select Custom as Frame size.
- d Enter 192 as value for both frame width and frame height.
- e Change the bitrate to 300000.
- f

Note: In this example, the IPTV STB has to extract I-frames for fast forward and rewind functions in recorded services. You need to configure some additional interoperability parameters to ensure compatibility with this process and to avoid broken images in the extracted I-frames. These interoperability adjustments depend entirely on the device you use. This advanced configuration is just an example. You should not use this configuration in all services you create.

Check Fixed GOP.

- g Select *Progressive* as frame type.
- h Click Show more parameters to expand the advanced video parameters.
- In the output display aspect ratio parameters in the advanced parameters, click *Advanced* parameters to expand more advanced parameters.



- Check Force IDR to stabilize fast forward and rewind of the STB.
- When you use fast forward and rewind.

Note: To configure video tracks in more details, see <u>Configuring video tracks</u> <u>settings</u>.

- ☐ Click ✓ at the top right to save your configuration.
- 5 In the tracks panel, configure the audio tracks.

Note: There are 4 important parameters for audio tracks:

- Codec
- Language
- Layout (audio coding mode)
- Bitrate

The template you select is similar to the configuration you want to obtain. You need to change the codec, select the language and the bitrate according to the 2 different profiles in the table <u>at the beginning of the topic</u>.

- a Click the first audio track to configure.
- b Change the codec from Dolby Digital to MPEG Layer 2.
- C Select the language for the audio track.
- d Select 128 Kbit/s as bitrate.
- e Add another audio track.

Note: To remove a track, click on the track — such as MPEG-4 1280x720 - 1.5 Mbps - 50 fps — and click ■. To copy a track to create an additional track, click on the track and click □ and modify the TRACK CONFIGURATION if required. Click on the green button next to Audio track #0 and a new track appears.

- Click the second audio track to configure.
- g Select the language for the audio track.
- h Select 3/2 L C R Ls Rs as audio coding mode.

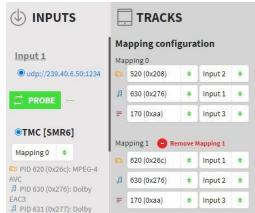
- Select 384 Kbit/s as bitrate.
- Click Show more audio parameters to expand the advanced parameters.
- Check LFE Channel in the audio encoder parameters.

Note: To configure audio tracks in more details, see <u>Configuring audio tracks</u> settings.

- ☐ Click ✓ at the top right to save your configuration.
- 6 Optional: In the tracks panel, configure the data tracks.
  - a Click Add data tracks.
  - **b** Select a data type.
  - © Select the language for the data track.

Note: To configure data tracks in more details, see <u>Configuring data tracks</u> <u>settings</u>.

- d Click ✓ at the top right to save your configuration.
- 7 In the tracks panel, configure mapping.
  - a Select the video, audio and data track PIDs accordingly to match the track PIDs of the input stream.



enough fields or have too many fields to map tracks in the mapping configuration, you must add or remove tracks. To remove a track, click on the track — such as № MPEG-4 1280x720 - 1.5 Mbps - 50 fps — and click — . To copy a track to create an additional track, click on the track and click — and modify the TRACK CONFIGURATION if required. The mapping configuration updates according to what you add or remove. The order of the track PIDs you map is the same order as the tracks to configure. Make sure that the PIDs are in the right order.

- 8 In the muxers panel, you just have one TS muxer because of the TS type you selected in the Devices Library. As you want to output your stream for 2 different TS devices, you need to add another muxer of the type TS.
  - a In the muxers panel, scroll down and click + TS muxer.

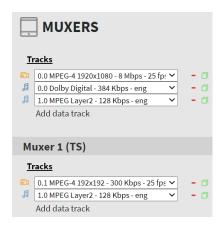


b Click the first TS muxer and associate the video, audio and data tracks to the different profiles as in the table at the beginning of the topic.

Conte: You might need to add tracks to your muxers. To remove a track, click on the track — such as MPEG-4 1280x720 - 1.5 Mbps - 50 fps — and click □. To copy a track to create an additional track, click on the track and click □ and modify the TRACK CONFIGURATION if required.

Click the second TS muxer and associate the video, audio and data tracks to the different profiles as in the table at the beginning of the topic.

You should get a result similar to this:



Cannot Note: To configure muxers in more details, see Configuring muxers.

d Click ✓ at the top right to save your configuration.

Note: Before you save your muxers configuration, make sure that you assigned all the tracks you configure at least one time. If you do not use a track, the tracks appears in red and TITAN Live do not let you save your muxer configuration.

9 Configure the outputs.

Note: You must activate and configure at least one output for each type of device you use.

- a Click the profile you want to configure the output.
- **b** Activate Enable.
- c Enter the URL where you want to output the stream.
- d Select the interface where to output the stream.
- e Configure the other TS output.

Carrier Note: To configure outputs in more details, see <u>Defining outputs</u>.

- f Click ✓ at the top right to save your configuration.
- 10 Define a name to your service.



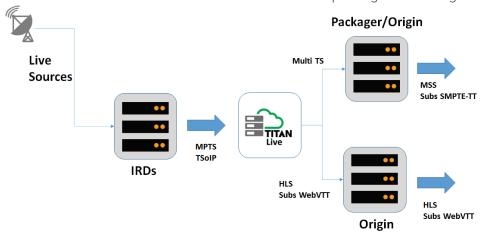
## 6.2. How to create OTT services?

## Before you begin

Go back to Use Cases

#### Context

This use case is about the configuration of an OTT service. Here, the content provider delivers an MPEG TS over IP. You receive this HD channel and stream the content into 2 different formats. For this example, you stream content in Multi TS and HLS for an external packager or an Origin server.



As both Multi TS and HLS contain several profiles, you use the HD input and edit five H.264 profiles in HD. For SD, you use the SD input and edit four H.264 profiles in SD. You can refer to the following profiles to configure you service:

		Multi TS HD			HLS SD
Profile 1	Video	MPEG-4 - 1920x1080p - 29.97 - 4.5 Mbps	Profile 1	Video	MPEG-4 - 768x432p - 29.97 - 2.0 Mbps
	Audio 1	MPEG AAC LC - 128 Kbps - spa		Audio 1	MPEG AAC LC - 128 Kbps - spa
	Audio 2	MPEG AAC HE - 256 Kbps - eng		Audio 2	MPEG AAC HE - 256 Kbps - eng
	Audio 3	MPEG AAC LC - 128 Kbps - eng		Audio 3	MPEG AAC LC - 128 Kbps - eng
	Data	DVB Sub Passthrough spa		Data	DVB Sub Passthrough spa
Profile 2	Video	MPEG-4 - 1280x720p - 29.97 - 2.2 Mbps	Profile 2	Video	MPEG-4 - 640x360p - 29.97 - 1.5 Mbps
	Audio 1	MPEG AAC LC - 128 Kbps - spa		Audio 1	MPEG AAC LC - 128 Kbps - spa
	Audio 2	MPEG AAC HE - 256 Kbps - eng		Audio 2	MPEG AAC HE - 256 Kbps - eng
	Audio 3	MPEG AAC LC - 128 Kbps - eng		Audio 3	MPEG AAC LC - 128 Kbps - eng
	Data	DVB Sub Passthrough spa		Data	DVB Sub Passthrough spa
Profile 3	Video	MPEG-4 - 1280x720p - 29.97 - 1.5 Mbps	Profile 3	Video	MPEG-4 - 512x288p - 29.97 - 0.8 Mbps
	Audio 1	MPEG AAC LC - 128 Kbps - spa		Audio 1	MPEG AAC LC - 128 Kbps - spa
	Audio 2	MPEG AAC HE - 256 Kbps - eng		Audio 2	MPEG AAC HE - 256 Kbps - eng
	Audio 3	MPEG AAC LC - 128 Kbps - eng		Audio 3	MPEG AAC LC - 128 Kbps - eng
	Data	DVB Sub Passthrough spa		Data	DVB Sub Passthrough spa

		Multi TS HD			HLS SD
Profile 4	Video	MPEG-4 - 768x430p - 29.97 - 1.2 Mbps	Profile 4	Video	MPEG-4 - 384x216p - 29.97 - 0.5 Mbps
	Audio 1	MPEG AAC LC - 128 Kbps - spa		Audio 1	MPEG AAC LC - 128 Kbps - spa
	Audio 2	MPEG AAC HE - 256 Kbps - eng		Audio 2	MPEG AAC HE - 256 Kbps - eng
	Audio 3	MPEG AAC LC - 128 Kbps - eng		Audio 3	MPEG AAC LC - 128 Kbps - eng
	Data	DVB Sub Passthrough spa		Data	DVB Sub Passthrough spa
			I		
Profile 5	Video	MPEG-4 - 640x360p - 29.97 - 0.8 Mbps			
	Audio 1	MPEG AAC LC - 128 Kbps - spa			
	Audio 2	MPEG AAC HE - 256 Kbps - eng			
	Audio 3	MPEG AAC LC - 128 Kbps - eng			
	Data	DVB Sub Passthrough spa			

### **Procedure**

- 1 Go to

  Services and click +NEW SERVICE
- 2 Go to the Devices Library, click *Multi TS* and choose the template *TS MBR p29.97*.

Note: This template is the most similar template to the configuration you want to achieve.

- 3 In the input panel, configure the input.
  - a Click + DEFINE INPUT to configure your input stream.

- Select IP as input type.
- Enter the URL of the input stream. The URL must follow this pattern: udp://225.1.128.1:1234.
- d Select the interface where you receive the input stream.
- e Optional: Activate the parameter for Activate IGMPv3 Source Filtering to only receive the stream if the source address and the field Source match.
- Optional: If you activate Activate IGMPv3 Source Filtering, enter the IP address of the source.

Note: If you want to configure another type of input, see the section <u>Defining</u> inputs.

- Glick ✓ at the top right to save your configuration.
- h Click **CPROBE** to obtain all tracks of the input stream you are receiving.



4 In the tracks panel, configure the Multi TS and HLS video tracks.

Note: There are 4 important parameters for video tracks:

- Codec
- Frame size
- Frame rate
- Bitrate

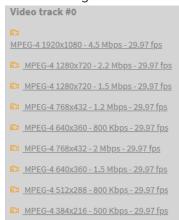
The template you select is similar to the configuration you want to obtain. You only need to change the frame size and the bitrate according to the different profiles in the table at the beginning of the topic and for all video tracks.

a Click the first video track to configure.

- Select 1920x1080 as frame rate.
- Configure the bitrate to 4500000.
- d Configure the 4 Multi TS video tracks left and the 4 HLS video tracks according to the different profiles in the table <u>at the beginning of the topic.</u>

Note: You might need to add video tracks to configure all the video tracks you need. To remove a track, click on the track — such as MPEG-4 1280x720 - 1.5 Mbps - 50 fps — and click — . To copy a track to create an additional track, click on the track and click □ and modify the TRACK CONFIGURATION if required. When you click on the green button, a new track appears.

You should get this as a result:



Note: To configure video tracks in more details, see <u>Configuring video tracks</u> settings.

- e Click ✓ at the top right to save your configuration.
- 5 In the tracks panel, configure the audio tracks.
  - Cannot Note: There are 4 important parameters for audio tracks:
    - Codec
    - Language
    - Layout (audio coding mode)
    - Bitrate

The template you select is similar to the configuration you want to obtain. You only need to change the codec, select the language and the bitrate for Audio 2 according to the different profiles in the table <u>at the beginning of the topic</u> and for all audio tracks.

- a Click the first audio track to configure.
- b Change the codec from Dolby Digital Plus to MPEG AAC.
- C Select the language for the audio track. For the first audio track select *Spanish*.
- d Add 2 other audio tracks.

Note: To remove a track, click on the track — such as  $\[ \]$  MPEG-4 1280x720 - 1.5 Mbps - 50 fps — and click  $\[ \]$  . To copy a track to create an additional track, click on the track and click  $\[ \]$  and modify the TRACK CONFIGURATION if required. Click on the green button next to Audio track #0 and a new track appears.

- e Configure the 2 other audio tracks according to the table at the beginning of the topic.
- For *Audio 2* in the table, change the bitrate from *128000* to *256000*. You should get this as a result:



Note: To configure audio tracks in more details, see <u>Configuring audio tracks</u> settings.

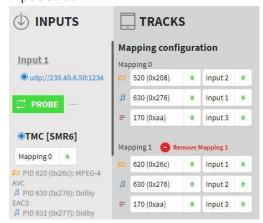
- G Click ✓ at the top right to save your configuration.
- 6 Optional: In the tracks panel, configure the data tracks.
  - a Click Add data tracks.
  - b Select a data type.
  - C Select the language for the data track.
  - d Add another data track if you want.

    You should get a result similar to this:



Note: To configure data tracks in more details, see <u>Configuring data tracks</u> <u>settings</u>.

- e Click ✓ at the top right to save your configuration.
- 7 In the tracks panel, configure mapping.
  - a Select the video, audio and data track PIDs accordingly to match the track PIDs of the input stream.



C≥ Note: Make sure to map all tracks of the input stream. If you do not have enough fields or have too many fields to map tracks in the mapping configuration, you must add or remove tracks. To remove a track, click on the track — such as MPEG-4 1280x720 - 1.5 Mbps - 50 fps — and click — . To copy a track to create an additional track, click on the track and click □ and modify the TRACK CONFIGURATION if required. The mapping configuration updates according to what you add or remove. The order of the track PIDs you map is the same order as the tracks to configure. Make sure that the PIDs are in the right order.

- 8 In the muxers panel, you just have one Multi TS muxer because of the Multi TS type you selected in the **Devices Library**. As you want to output your stream for 2 different types of devices, you need to add another muxer of the type HLS.
  - a In the muxers panel, scroll down and click + HLS muxer.



b Click the Multi TS muxer and associate the video, audio and data tracks to the different profiles as in the table at the beginning of the topic.

Carrow Note: You might need to add tracks to your muxers. To remove a track, click on the track — such as MPEG-4 1280x720 - 1.5 Mbps - 50 fps — and click □. To copy a track to create an additional track, click on the track and click □ and modify the TRACK CONFIGURATION if required.

c Click the HLS muxer and associate the video, audio and data tracks to the different profiles as in the table at the beginning of the topic.



Can Note: To configure muxers in more details, see Configuring muxers.

d Click ✓ at the top right to save your configuration.

Note: Before you save your muxers configuration, make sure that you assigned all the tracks you configure at least one time. If you do not use a track, the tracks appears in red and TITAN Live do not let you save your muxer configuration.

9 Configure the outputs.

Note: You must activate and configure at least one output for each type of device you use.

- a Click the profile you want to configure the output.
- **b** Activate Enable.
- Enter the URL where you want to output the stream.
- Select the interface where to output the stream.
- e Configure the outputs of the 4 Multi TS and 4 HLS remaining profiles.

Note: To configure outputs in more details, see <u>Defining outputs</u>.

- f Click ✓ at the top right to save your configuration.
- Define a name to your service.

  SERVICE MODIFICATION: My OTT service
- 11 Click SAVE.

## 6.3. How to create UHD services?

## Before you begin

Go back to Use Cases

#### Context

This use case is about the configuration of a UHD service. Here, the content provider delivers a UHD stream over SDI. You receive this UHD channel and stream the content in HEVC for IPTV delivery in TS, with four 4 3G SDI inputs. You can refer to the following profile to configure your service:

TS HEVC		
Video	HEVC - 3840x2160 - 50 fps - 20 Mbps	
Audio 1	Dolby Digital Plus E AC-3 - 192 Kbps - 5.1	
Audio 2	Dolby Digital Plus E AC-3 - 96 Kbps - 2.0	

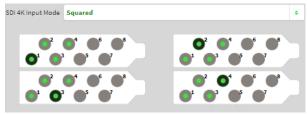
#### **Procedure**

- 1 Go to

  □
  Services and click + NEW SERVICE
- 2 Go to the Devices Library, click TS and choose the template DVB HEVC UHD 2160p25.

Note: This template is the most similar template to the configuration you want to achieve

- 3 In the input panel, configure the input.
  - a Select SDI 4K as input type.
  - **b** Select the SDI card to use.
  - © Select the 4 SDI inputs per quadrant for the 4K SDI input.



- d Click + ADD AUDIO CHANNEL.
- e Select *PCM 5.1* as audio input type.
- Apply the following configuration for the 6 channels:



- g Click + ADD AUDIO CHANNEL.
- h Select *PCM Stereo* as audio input type.
- Apply the following configuration for the 2 channels:



Note: If you want to configure another type of input, see the section <u>Defining</u> inputs.

- Click ✓ at the top right to save your configuration.
- Click **CPROBE** to obtain all tracks of the input stream you are receiving.



- 4 In the tracks panel, configure the global tracks settings.
  - a Click Global configuration.
  - b Check High UHD quality.

Note: In this use case, you have an AMD server. As you want to get the best UHD quality, you use this option. This parameter only works with AMD platforms. High UHD quality reduces the number of channels you can run as it increases the quality of these channels.

5 In the tracks panel, configure the TS video track.

Cannot Note: There are 4 important parameters for video tracks:

- Codec
- Frame size
- Frame rate
- Bitrate

The selected template is similar to the configuration you want to obtain and you only need to configure HDR.

a Click the video track to configure.

- b Click Show more parameters to expand the advanced video parameters.
- In the output display aspect ratio parameters, select *BT-2020 (HDR)* as output colorimetry signalling to increase the range of color to use.
- 6 In the tracks panel, configure the audio tracks.
  - Cannot Note: There are 4 important parameters for audio tracks:
    - Codec
    - Language
    - Layout (audio coding mode)
    - Bitrate

The template is similar to the configuration you want to obtain. You need to change the codec, select the language and the audio coding mode according to the profile in the table <u>at the beginning of the topic</u>.

- a Click the first audio track to configure.
- b Change the codec from Dolby Digital to Dolby Digital Plus.
- Select the language for the audio track.
- d Select 3/2 L C R Ls Rs as audio coding mode.
- e Click Show more audio parameters to expand the advanced parameters.
- **f** Check *LFE Channel* in the audio encoder parameters.
- g Add another audio track.

Note: To remove a track, click on the track — such as  $\bowtie$  MPEG-4 1280x720 - 1.5 Mbps - 50 fps — and click — . To copy a track to create an additional track, click on the track and click  $\square$  and modify the TRACK CONFIGURATION if required. Click on the green button next to Audio track #0 and a new track appears.

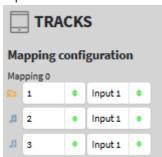
- h Click the second audio track to configure.
- Select the language for the audio track.
- Select 2/0 L R as audio coding mode.
- Relect 96 Kbit/s as bitrate.

Note: To configure audio tracks in more details, see <u>Configuring audio tracks</u> settings.

- Click ✓ at the top right to save your configuration.
- Optional: In the tracks panel, configure the data tracks.

Note: To configure data tracks in more details, see <u>Configuring data tracks</u> <u>settings</u>.

- 8 In the tracks panel, configure mapping.
  - a Select the video, audio and data track PIDs accordingly to match the track PIDs of the input stream.



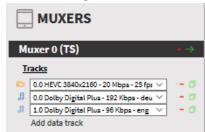
Carbon Note: Make sure to map all tracks of the input stream. If you do not have enough fields or have too many fields to map tracks in the mapping configuration, you must add or remove tracks. To remove a track, click on the track — such as MPEG-4 1280x720 - 1.5 Mbps - 50 fps — and click □. To copy a track to create an additional track, click on the track and click □ and modify the TRACK CONFIGURATION if required. The mapping configuration updates according to what you add or remove. The order of the track PIDs you map is the same order as the tracks to configure. Make sure that the PIDs are in the right order.

- 9 In the muxers panel, configure the TS muxer.
  - a Click the TS muxer and associate the video, audio and data tracks to the different profiles as in the table at the beginning of the topic.

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Carrow Note: You might need to add tracks to your muxers. To remove a track, click on the track — such as MPEG-4 1280x720 - 1.5 Mbps - 50 fps — and click ☐. To copy a track to create an additional track, click on the track and click ☐ and modify the TRACK CONFIGURATION if required.

You should get this as a result:



Cannot Note: To configure muxers in more details, see Configuring muxers.

10 Configure the outputs.

Note: You must activate and configure at least one output for each type of device you use.

- a Click the profile you want to configure the output.
- **b** Activate Enable.
- Enter the URL where you want to output the stream.
- d Select the interface where to output the stream.

Note: To configure outputs in more details, see <u>Defining outputs</u>.

- e Click ✓ at the top right to save your configuration.
- 11 Define a name to your service.



12 Click ✓SAVE.

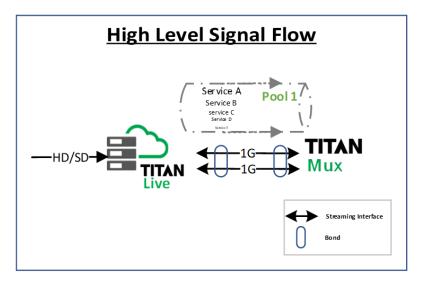
## 6.4. How to create services using a statmux?

## Before you begin

Go back to Use Cases

#### Context

In this use case, you use a statmux (ex: **TITAN Mux**) to configure a TS service for Cable delivery. Here, the content provider delivers an MPEG TS over IP. You receive this SD channel and stream the content in HD TS with 2 audios, with a variable bitrate. Then, you statistically multiplex the content with your other channels, at the maximum bitrate you define for all your channels.



You can refer to the following profile to configure you service:

TS HD		
Video	MPEG-2 - 1920x1080 - 8 Mbps - 29.97	
Audio 1	Dolby Digital - 320 Kbps - eng	
Audio 2	Dolby Digital - 192 Kbps - spa	
Data 1 (optional)	SCTE-35 Passthrough - eng	
Data 2 (optional)	Closed Captions - spa	

#### **Procedure**



a Go to ≡System and click **<**Network Management.

b Scroll down to statmux pool configuration and click + ADD.



- Enter a pool ID. This pool ID must be the same as when you configure TITAN Mux.
- d Enter the multicast address to use for TITAN Live and TITAN Mux to communicate. This multicast address must be the same as when you configure TITAN Mux. You must also only use this multicast address for this specific communication between TITAN Live and TITAN Mux.
- e Enter the TITAN Mux port number on which TITAN Live should listen to in order to establish the communication between the 2 instances.
- Select the interfaces to use. You need to select 2 interfaces. If you select 2 different interfaces, the first interface you select is the interface you use as primary interface and the second interface you select is the interface you use as backup interface for redundancy. If you select the same interface in both fields, TITAN Live assumes that there is no need for redundancy and only uses the primary interface.

Note: For this use case, you select the interface bond0. This interface is a bonding between 2 physical interfaces. These 2 interfaces are linked together and appear as a single logical interface in order to ensure interface and network redundancy.

- g Activate Source Filtering.
- h Enter the address(es) of the TITAN Mux to communicate with.

Note: Here, you use 2 TITAN Mux. The first address is the main statistical multiplexer to use. The second address is is the address of the backup TITAN Mux used to ensure communication even when the first TITAN Mux is down.

- 2 Go to

  □Services and click + NEW SERVICE
- 3 Go to the Devices Library, click TS and choose the template IPTV ATSC H.264 SD.

Note: This template is the most similar template to the configuration you want to achieve.

4 In the input panel, configure the input.

- a Click + DEFINE INPUT to configure your input stream.
- b Select IP as input type.
- Enter the URL of the input stream. The URL must follow this pattern: udp://225.1.128.1:1234.
- Select the interface where you receive the input stream.
- e Optional: Activate the parameter for Activate IGMPv3 Source Filtering to only receive the stream if the source address and the field Source match.
- Optional: If you activate Activate IGMPv3 Source Filtering, enter the IP address of the source.

Note: If you want to configure another type of input, see the section <u>Defining</u> inputs.

- Glick ✓ at the top right to save your configuration.
- h Click **CPROBE** to obtain all tracks of the input stream you are receiving.



5 In the tracks panel, configure the TS video track.

Cannot Note: There are 4 important parameters for video tracks:

- Codec
- Frame size
- Frame rate
- Bitrate

The template you select is similar to the configuration you want to obtain. You only need to change the codec, the frame size and the bitrate according to the profile in the table at the beginning of the topic.

- a Click the video track.
- b Change the codec from MPEG-4 to MPEG-2.
- C Select 1920x1080 as frame size.
- d Configure the bitrate to 8000000.

Note: To configure video tracks in more details, see <u>Configuring video tracks</u> <u>settings</u>.

- e Click ✓ at the top right to save your configuration.
- 6 In the tracks panel, configure the audio tracks.

Cannote: There are 4 important parameters for audio tracks:

- Codec
- Language
- Layout (audio coding mode)
- Ritrate

The template you select is similar to the configuration you want to obtain. You only need to change select the language and the bitrate according to the profiles in the table at the beginning of the topic.

- a Click the first audio track to configure.
- **b** Select the language for the audio track. Here, you can select *English*.
- Select 320 Kbit/s as bitrate.
- d Add another audio track.

Note: To remove a track, click on the track — such as  $\[ egin{align*} & \underline{MPEG-4\ 1280x720-1.5\ Mbps-50\ fps \end{align*} — and click <math>\[ egin{align*} & \underline{ } \ \end{array} \]$ . To copy a track to create an additional track, click on the track and click  $\[ egin{align*} & \underline{ } \ \end{array} \]$  and modify the TRACK CONFIGURATION if required. Click on the green button next to Audio track #0 and a new track appears.

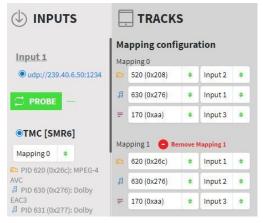
- e Click the second audio track to configure.
- Select the language for the audio track. Here, you can select Spanish.
- g Select 192 Kbit/s as bitrate.

Note: To configure audio tracks in more details, see <u>Configuring audio tracks</u> <u>settings</u>.

- h Click ✓ at the top right to save your configuration.
- Optional: In the tracks panel, configure the data tracks.
  - a Click the data track to configure.
  - b Select a data type.
  - C Select the language for the data track.
  - d Add another data track if you want.

Note: To configure data tracks in more details, see <u>Configuring data tracks</u> <u>settings</u>.

- e Click ✓ at the top right to save your configuration.
- 8 In the tracks panel, configure mapping.
  - Select the video, audio and data track PIDs accordingly to match the track PIDs of the input stream.



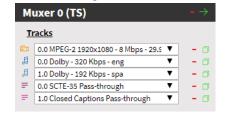
Carbon Note: Make sure to map all tracks of the input stream. If you do not have enough fields or have too many fields to map tracks in the mapping configuration, you must add or remove tracks. To remove a track, click on the track — such as MPEG-4 1280x720 - 1.5 Mbps - 50 fps — and click ☐. To copy a track to create an additional track, click on the track and click ☐ and modify the TRACK CONFIGURATION if required. The mapping configuration updates according to what you add or remove. The order of the track PIDs you map is the same order as the tracks to configure. Make sure that the PIDs are in the right order.

- 9 In the muxers panel, configure the TS muxer.
  - a Click the TS muxer and associate the video, audio and data tracks to the different profiles as in the table at the beginning of the topic.
  - h Check Enable VBR Statmux.
  - Check Automatic Channel ID.
  - d Enter a channel name. This name appears on the TITAN Mux interface.
  - e Select the statmux pool to use as defined in the **System** tab at step 1. This pool must be the same pool as for **TITAN Mux**.
  - Configure the default TS bitrate value to 7500000.

Note: This value is only used when the communication between TITAN Live and TITAN Mux is lost.

g Configure the TS bitrate value to 10000000. The TS bitrate value must be higher than the default TS bitrate value.

You should get a result similar to this:



Can Note: To configure muxers in more details, see Configuring muxers.

h Click ✓ at the top right to save your configuration.

- 10 Configure the outputs.
  - a Click the profile you want to configure the output.
  - b Activate Enable.
  - Enter the URL where you want to output the stream.
  - d Select the interface where to output the stream.

Note: To configure outputs in more details, see <u>Defining outputs</u>.

- e Click ✓ at the top right to save your configuration.
- Define a name to your service.

  SERVICE CREATION: IPTV\_Channel\_1
- 12 Click SAVE.

# 6.5. How to configure dynamic ad insertion (DAI) in DASH?

#### Context

With Dynamic Ad insertion, you can add SCTE-35 decorations from splice events in the DASH manifest. You can use multi periods to create a new period "Px" on SCTE35 Event. This feature also works with ESAM POIS. SCTE-35 decoration works with CUE OUT events (not CUE IN events).

## Creating the Muxer Output with SCTE-35 Pass-through data track

- 1 Create a new service or edit an existing service.
- 2 Go to TRACKS.
- 3 Click Add data track.
- 4 Click on <u>DVB Subtitles</u> to open TRACK CONFIGURATION: Data #\_ variant #\_.
- 5 Change the **Data type** from the default *DVB Subtitles* to *SCTE-35 Pass-through*. You can enter **Default splice duration** as *60* seconds.
- 6 Click to validate your data track.
- Add this data track to an existing DASH muxer or click + DASH muxer to create a new DASH muxer. You should see 0.0 SCTE-35 Pass-through as your data track name in the DASH muxer.

- 8 Click the muxer header —ex. Muxer 1 (DASH)— to open DEVICE CONFIGURATION.
- 9 For every Track path that you see, replace \$Number\$ with \$Time\$ so that each chunk has a unique name related to its time frame so that you can use timeline mode.
- 10 Click to validate your muxer configuration.
- Under your muxer header, click Muxer Output to open OUTPUT CONFIGURATION Muxer \_ (DASH).

Note: Master playlist update period is not available. The manifest will update for each segment.

- 12 Activate Enable Dynamic Ad Insertion.
- 13 You can activate Allow Multi-period if needed.

Note: For ATSC 3.0 compatibility, you should activate Allow Multi-period and Dynamic Content Replacement.

#### In the DASH manifest

Go to the DASH manifest.

Carrow Note: In the timeline mode, all time varies according to the timescale.

- d: Segment duration.
- t: Segment presentation time according to the Availability start time that replaces the \$Time\$ value for the segment name.
- r: Segment repetition; if a segment follows another segment of the same duration, instead of adding a new line in the timeline, TITAN Live adds r=1 (or r=n for N+1 segments) in the timeline.

## Applying SCTE decoration

- 15 At the splice date in the SCTE-35 event, end the current segment.
- Publish this segment even if the segment is shorter than expected. If the segment is shorter than the minimum chunk duration, a bigger segment is automatically created.

- Publish the next segment with the normally expected duration. In the case of CUE OUT, the manifest is decorated as an EventStream with the following information:
  - Event Duration.
  - Event ID.
  - Presentation time according to the Availablity start time.
  - SCTE-35 structure in base64 format.

- Note: For ATSC 3.0:
  - Insert a xlink in Ads DASH period from the SCTE-35/104 CUE OUT event.
  - Remove unwanted the SCTE-35/104 CUE OUT event from DASH manifest.
  - Enter a custom xlink url for the a specific SCTE-35/104 CUE OUT event.
  - Replace the following xlink parameters at runtime:
    - \$ATSCTAG\$: tag:atsc.org,2016:xlink.
    - \$FRAMERATE\$: Video framerates of 25, 50, 2997, and 5994.
    - \$RANDOMINT\$: Random number to make unique links.
    - \$SPLICEID\$: Splice identifier of the SCTE-35/104 CUE OUT event.
    - \$EVENTID\$, \$NEXTEVENTID\$, \$UPID\$, \$NEXTUPID\$: Elements from the SCTE-35/104 CUE OUT event.

#### Result

If you deactivated **Allow Multi-period** in TITAN Live, the manifest file always uses the first period P0.

If you activated **Allow Multi-period** in TITAN Live:

- Each SCTE-35 Event finishes the current period and starts a new period P++.
- If the event has a duration, the duration is set in the period.
- At the end of the duration a new period is automatically created.

Note: For ASTC 3.0, you can identify the Custom Ad period with the Px id, where the x value is more than 0. For this Custom Ad period, you should see the following xlinks in the Manifest file.

- xlink:actuate.
- xlink:show.
- xlink:href resolved.
- xmlns:xlink.

# 6.6. How to add TEMI support for regionalization

## Before you begin

You must have previously existing TEMI data for free-running detection mode.

#### Context

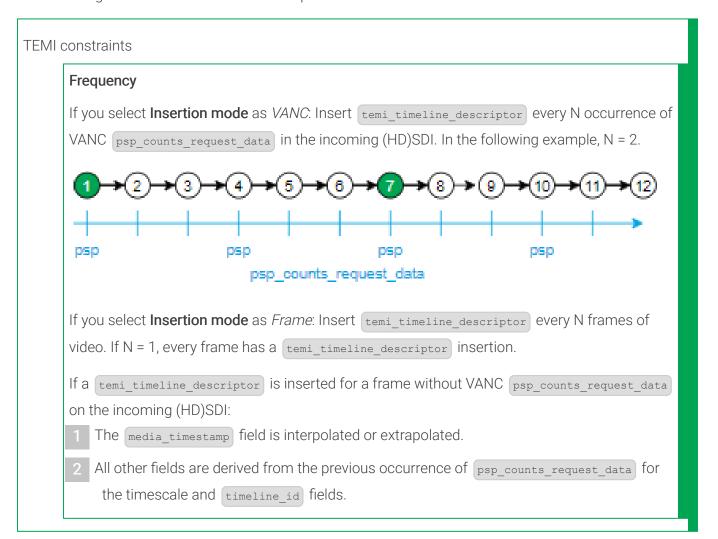
In this use case, the OTT/DASH stream replaces the linear stream in the STB at a given point.

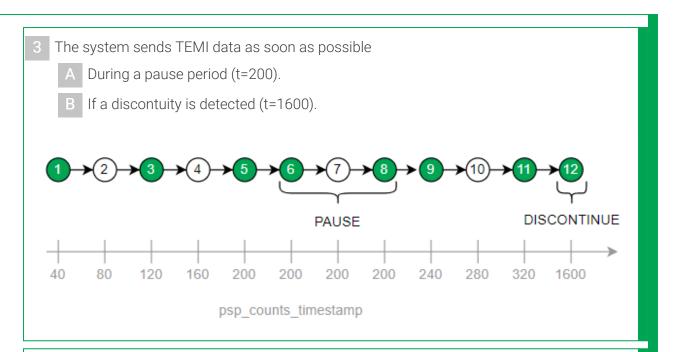
#### **Showing Broadcast**



With this use case, you can enhance a broadcast channel with customised or personalised content. For example:

- Instead of watching standard trailers and adverts between programmes, viewers could watch trailers and adverts that better match viewer interests. A link to your companion device could convey your preferences.
- Viewers could watch different programmes, or programme segments instead of the main broadcast at fixed slots in the broadcast schedule. For example, a news programme could be personalised by allowing the viewers to select news for particular interests or local areas.





#### Free running mode

Free-running mode emulates TEMI data according to TEMI data history.

If psp\_counts\_request\_data does not occur in the incoming video, continue to insert temi\_timeline\_descriptor. Prepare the corresponding code according to the last occurring psp\_counts\_request\_data. Extrapolate this free-run to determine the value of the media\_timestamp and other field values. You can also configure a free-running timeout (free-running stops with potential fault condition). You can configurable to between 1 second and a maximum of at least 24 hours.

#### **Procedure**

- 1 Configure a service with:
  - a SDI or SMPTE 2022-6 input according to <u>Declaring an input</u>.
  - b TS over IP output according to <u>Declaring an Output</u>.
- Add a data track and set the data track to TEMI according to instructions in <u>Configuring data tracks settings</u>.
- 3 Add this data track to to the output TS muxer.

# 6.7. How to configure advanced audio mode for reshuffled tracks

## Before you begin

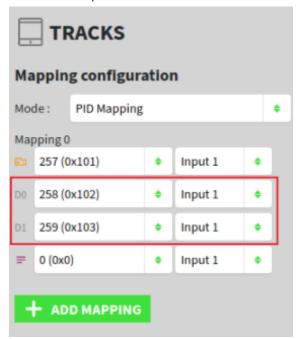
You must add a TL-ADV-AUDIO license to your instance of **TITAN Live** to be able to activate this advanced audio mode. To add the TL-ADV-AUDIO license, go to **SYSTEM MANAGEMENT** / Street License Management and upload a valid license.

#### Context

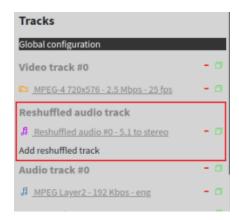
This use case involves activating advanced audio mode. In this mode, you can apply the following configurations for audio channels: Upmixing, downmixing, reshuffling, composing audio channels. Your service must have at least one audio decoder, one reshuffled track, and one audio track with a composition of a reshuffled channel.

## Adding audio decoder

- Go to □ SERVICES / □ TRACKS.
- Under Tracks, Click Global Configuration.
- Under Advanced audio configuration, activate Enable for advanced audio mode or modify the following API flag: Device.Template.GlobalConfiguration.AdvancedAudioConfiguration.Enabled
- 4 Enter the number of applicable Audio decoders.
- 5 You must map each reshuffled channel to an audio decoder and an audio decoder channel.



6 Click Add reshuffled track to open the panel for TRACK CONFIGURATION: Reshuffled #\*.



- 7 Enter a unique Track name.
- 8 Select the Output layout and Source Layout as Mono, Stereo, or 5.1.

Note: Changing layouts (different source and output layout) induces reshuffled track upmixing or downmixing.

- Select the Sample Rate in kHZ.
- You can reconfigure the default settings for Loudness Control ▼ according to Configuring audio tracks settings.
- 11 Under Channels / Channel #0:
  - a Enter a numerical value for the Source decoder.
  - b Select the Source channel position and Position in the reshuffled track from the available options according to the input layout.
  - c Enter a numerical value for the Delay in ms.
  - d Enter a numerical value for the Gain in ms.
  - e You can activate Invert audio signal.
  - Repeat step a to for other channel numbers.
- 12 Click to save your configuration for your reshuffled track.

## Adding audio track with composition of reshuffled channel



Note: A track in advanced audio mode is potentially composed of channels from multiple reshuffled audio tracks. Each channel must specify its source reshuffled track and its source position and its output position.

Create an audio track or select an existing audio track.

- 14 Navigate to Track advanced composition / Channel #0:
  - a Select the **Position in the output track** from the available options.
  - b You can activate Mute channel to suppress the track if needed.
  - Under Source #0 for Channel #0, select the Source track and Source channel. You can modify the default value of 0 for Delay and Gain without any interruption to your channel.
  - d Click + ADD SOURCE TO CHANNEL for additional sources for your channel and repeat step c.
  - © Click + ADD CHANNEL for additional channels and repeat step a to .
- 15 Click to save your configuration for your composed audio track.

### Result

f you activate Passthrough on the corresponding composed audio tracks, you lose advanced audio mode on the passthough audio track. Therefore, with no composition, there is no upmixing, no downmixing, and no reshuffling. In this case, you must set individual audio mapping.

When you change the advanced audio configuration, you restart your service (not seamless).

# 6.8. How to dynamically change PIDs without TS interruption

### Context

Normally, when you change PIDs, the corresponding services undergo a restart. When you dynamically change these PIDs, the change is never 100% smooth. To minimize the visual impact, you can freeze the video of the previous video input until the new targeted video input is ready. This use case only applies to existing inputs (no dynamic creation of new inputs).

#### **Procedure**

- 1 Create a service with several TS inputs according to all sections under <u>Services</u>.
- 2 Go to Global Configuration and select Master clock as Local clock.

- 3 Click to save your configuration.
- 4 Map all your audio and video PIDs for Input #1.
- 6 Click ✓ SAVE to confirm.
- 6 Click on the service you want to start.
- 7 Click on the same service you started.
- 8 Go to TRACKS / Mapping configuration.
- 9 Change Input 1 for Input 2 and Input 2 for Input 1.

### Result

The screen freezes for approximately 1 second but the service does not restart.

# 6.9. How to detect scan difference and change scan without interruption

### Before you begin

You set up the following 3 input formats:

- 1080psf25:
  - The video is encoded as 1080p25.
  - The detected video is declared as progressive scan with "pic\_struct=0" in the picture timing SEI message of MPEG4-AVC.
- **1**080i25:
  - The video is encoded as 1080p25.
  - The detected video is declared as progressive scan with "pic\_struct=0" in the picture timing SEI message of the MPEG4-AVC.
- **1**080i25:
  - The video is encoded as 1080i25.
  - The detected video is declared as interlaced scan (current behaviour).

### Context

In this use case, you maintain progressive scan. When the input has interlaced scan, you configure the system to seamlessly switch to progressive scan.

### **Procedure**



Go to 

□ SERVICES.

- 2 Click + ADD INPUT.
- 3 Select Input type as SDI and assign your input format configuration.
- 4 Go to TRACKS.
- 5 Select your video track (ex. MPEG-4 1920x1080 5 Mbps 25 fps) or click Add video track.
- 6 Click Show more video parameters.
- 7 Navigate to Video track common parameter set just before Enable Mode Configuration.
- 8 Select Optimisations as Visual quality.
- Olick Advanced parameters ▼.
- 10 Activate Adaptive Interlaced Signaling.
- 11 Select an existing data track or click Add data track.
- 12 Select Data type as Timecode in SEI.
- 13 Go to MUXERS.
- 14 Under <u>Tracks</u>, add your video track to and add your data track to ■.
- 15 Repeat the procedure for the 2 other input formats.

### Result

When you switch from interlaced to progressive scan, the interruption to your service should be minimal.

# 7. Need help?

Do you have a question to ask ATEME? Please contact ATEME customer care on support@ateme.com.

# 8. Appendix

## 8.1. Subtitles support

### Subtitles by output format

	MPEG-2 TS	HLS TS	HLS FMP4	DASH	CMAF	CMAF CTE	MMT	RTMP	MSS
DVB teletext	yes	yes	no	no	no	<u>no</u>	no	no	no
DVB subtitles	yes	no	no	no	no	no	no	no	no
SCTE-27	yes	no	no	<u>no</u>	no	<u>no</u>	no	no	no
Closed captions	yes <sup>[1]</sup>	yes	no	yes	no	no	no	yes <sup>[2]</sup>	no
DVB-TTML	yes	no	no	no	no	no	no	no	no
WEB VTT	no	yes	yes	yes	yes	no	no	no	no
SMPTE-TT	no	yes	yes	yes	yes	<u>no</u>	yes	no	yes
EBU-TT / EMSC1	no	no	yes	yes	yes	no	yes	no	no
Burned subtitles	Yes	yes	yes	yes	yes	yes	yes	yes	yes

<sup>1.</sup> including SCTE20

<sup>2.</sup> sei only

### Subtitles conversions

Output:	DVB teletext	DVB subtitles	SCTE-27	Closed caption	DVB- TTML	Web VTT	SMPTE- TT	EBU- TT-D	EBU- TT / IMSC1	Burned subtitle
DVB teletext <sup>[1]</sup>	yes	yes	no	no	yes	yes	yes	<u>no</u>	yes	yes
DVB subtitles	yes	yes	yes	no	no	yes	yes	no	no	yes
SCTE-27	yes	yes	yes	no	no	yes	no	<u>no</u>	<u>no</u>	yes
Closed captions <sup>[2]</sup>	no	no	no	yes <sup>[1]</sup>	no	yes <sup>[3]</sup>	no	no	yes	no
DVB- TTML	no	no	no	no	yes	no	no	no	no	no
DVB- TTML (EBU-TT- D)	no	no	no	no	yes	no	no	yes	no	no
SMPTE- TT	no	no	no	no	no	no	yes	no	no	no
Cavena p31	no	no	no	no	no	yes	no	no	no	no
ARIB B24	<u>no</u>	yes	<u>no</u>	no	no	no	no	no	<u>no</u>	no

### 8.2. DRM support

This page summarizes the DRM support in **TITAN Live** by output type.

<sup>1.</sup> including OP47 & ST2110-40 & SMPTE-2031

**<sup>2.</sup>** including in ST2110-40

**<sup>3.</sup>** not in 2110-40

### **HLS TS**

DRM	Key exchange protocol	Encryption algorithm
Verimatrix	Verimatrix v3 CPIX	aes-128-cbc
Novel Super-TV	Verimatrix v3 / NSTV	aes-128-cbc
Fairplay	HKMS CPIX Intertrust ExpressPlay	aes-sample
Playready	HKMS	aes-128-ctr
Internal Key Generation (HLS Pantos)	Not applicable	aes-128-cbc aes-128-ctr aes-sample

### **DASH**

DRM	Key exchange protocol	Encryption	
Widewine	HKMS		
	CPIX	CENC	
Playready	Widevine		
	HKMS		
Multi-DRM	CPIX		
IVIUILITURIVI	Widevine		
	Intertrust ExpressPlay		
Static Key (Widevine, Playready or Multi-DRM)	Not applicable		

### **MSS**

DRM	Key exchange protocol	Encryption		
Static Key (Playready)	Not applicable	aes-128-ctr		

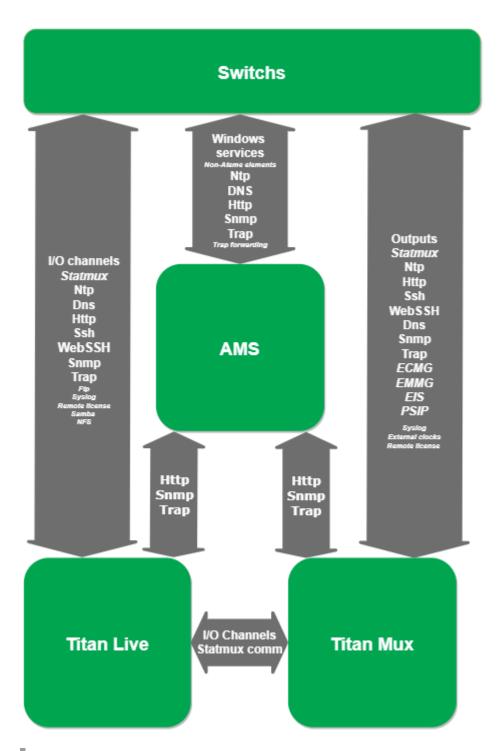
### 8.3. List of seamless parameters

Seamless parameters are parameters that do not require restarting the service.

- Force emulation mode
- Emulation mode
- Input switch (from main to backup to main)
- TSID
- Program number
- All TS descriptors
- DVB parameters (network ID, network name, service provider, service name)
- ATSC parameters (delivery, modulation, channel name, channel minor/major number)
- Logo insertion
- Scrolling text insertion
- Loudness control
- TS outputs
- Mute output
- Squeeze back
- Audio delay and gain

### 8.4. Data flow for TITAN Live

The following services (in grey) need network communication. Please note that TITAN Live, TITAN Mux and AMS are **ATEME** products.



### I/O channels

User-defined port; UDP or TCP.

Every port used for inputs (RTMP, SDIoIP) & outputs (TS, and OTT). Remember to define FEC ports if used.

### TITAN Live to TITAN Mux (if used)

User-defined port; UDP only.

A port is open for statmux communication between Titan Live and Titan Mux, for each statmux pool.

Base port is 48454. For Statmux pool Uid N, port (48454 + N\*Uid) is open.

Typically, if you create 2 statmux pools on the Mux (1 dynamic and 1 static for stuffing), ports 48454 and 48456 are open.

### Statmux TITAN Mux to TITAN Live (if used)

User-defined port; UDP only.

A port is used for each statmux pool. Statmux sends bitrate orders to TITAN Live via multicast.

This port is defined in the configuration of each statmux pool

#### NTP (Network Time Protocol)

Port 123; UDP only.

### DNS (Domain Name System)

Port 53; UDP and TCP.

#### HTTP/HTTPS

Port 80/443; TCP only.

### SSH (Secure Shell for remote connection)

Port 22; TCP only.

### WebSsh (A SSH client over HTTP)

Port 4200; TCP only.

### Snmp (Simple Network Message Protocol)

Port 161; UDP only.

### SnmpTrap (Asynchronous notification from agent to manager)

Port 162; UDP and TCP.

### Ftp/ftps (logo if used; File Transfer Protocol)

Port 20, 21/990; TCP only.

### Syslog (if used)

User-defined port 514; UDP only.

### License (if remote license is used for TITAN product license server)

Port 5093; UDP only.

### Samba/CIFS (if used for mounted repositories)

Port 139/445; TCP only.

NFS (if used for mounted repositories)

Port 2049; UDP and TCP.

## 9. Acronyms

In this index you can find all the acronyms used in the **TITAN Live** User Manual and other **ATEME** products.

AC3: Audio Coding 3

ACG: Access Crtieria Generator

**ADTS**: Audio Data Transport Stream

**AES**: Advanced Encryption Standard

AFD: Active Format Descriptor

AMD: Advanced Micro Devices

API: Application Programming Interface

ARIB: Association of Radio Industries and

Businesses

**AST**: Availability Start Time

ATS: Adaptive Transport Stream

**ATSC**: Advanced Television Systems Committee

AU: Access Unit

AVC: Advanced Video Codec

AWS: Amazon Web Services

AWS STS: Security Token Service

**BAT**: Bouquet Association Table

BIOS: Basic Input Output System

BMDT: Base Media Decode Time

BSI: BitStream Information

**CA**: Certificate Authority

CAT: Conditional Access Table

CABAC: Context-Adaptive Binary Arithmetic Coding

**CAVLC**: Context Adaptive Variable Length Coding

**CBR**: Constant BitRate

CIFS: Common Internet File System

**CLL**: Content Light Level

**CPSIG**: Customer Program Specific Information

Generator

**CPIX**: Content Protection Information Exchange

Format

CPU: Central Processing Unit

CRC: Cyclic Redundancy Check

CSIG: Customer Service Information Generator

**CQR**: Constant Quality Rate

CWG: Custom Word Generator

**DASH**: Dynamic Adaptive Streaming over HTTP

**DHCP**: Dynamic Host Configuration Protocol

**DBP**: Decoded Picture Buffer

**DRM**: Digital Rights Management

**DSCP**: Differentiated Services Code Point

**DSN**: Data Source Name

**DTH**: Direct To Home

**DTT**: Digital Terrestrial Television

**DVB**: Digital Video Broadcasting

EAC3: Enhanced Audio Coding 3

**EAS**: Emergency Alert System

EBP: Encoder Boundary Point

**ECMG**: Entitlement Control Message Generator

**EIS**: Event Information Scheduler

EIT: Event Information Table

**EMMG**: Entitlement Management Message

Generator

EPEL: Extra Packages for Entreprise Linux

ES: Elementary Stream

**ESAM**: Event Signaling And Management

**ETR 101290**: ETSI Technical Report 101290

ETSI: European Telecommunications Standards

Institute

**ETT**: Extended Text Table

FALL: Frame Average Light Level

FEC: Forward Error Correction

FMP4: Fragmented MP4

FTP: File Transfer Protocol

GOP: Group Of Pictures

**GPU**: Graphics Process Unit

GUI: Graphical User Interface

**HEVC**: High Efficiency Video Coding

**HD**: High Definition

HDR: High Dynamic Range

**HLS**: HTTP Live Streaming

**HLG**: Hybrid Log-Gamma

**HRD**: Hypothetical Reference Decoder

**HTTP**: Hyper Text Transfert Protocol

**HTTPD**: Hyper Text Transfert Protocol deamon

HTTPS: Hyper Text Transfert Protocol Secure

**ID**: IDentifier

IDR: Instant Decoding Refresh

**IGMP**: Internet Group Management Protocol

IP: Internet Protocol

IPMI: Intelligent Platform Management Interface

**IPTV**: Internet Protocol Television

**ISDB**: Integrated Services Digital Broadcasting

JPEG: Joint Photographic Experts Group

LAN: Local Area Network

LDAP: Lightweight Directory Access Protocol

**LFE**: Low Frequency Effect

**LKFS**: Loudness K-weighted relative to Full Scale

**Lo**: Left only

Lt: Left total

LUFS: Loudness Units relative to Full Scale

MAC: Media Access Control

MBAFF: MacroBlock-Adaptive Frame-Field

MCC: Manifest Confirmation and Conditioning

**MDP**: Molecular Dynamic Parameter

MGT: Master Guide Table

MIB: Management Information Base

MMT: MPEG Media Transport

MP4: MPEG LAYER 4

MPD: MPEG-DASH Media Presentation Description

**MPEG**: Moving Picture Experts Group

**NFS**: Network File System

NIC: Network Interface Card

NIT: Network Interface Table

NMS: Network Management System

NSTV: Novel-Super TeleVision

NTP: Network Time Protocol

**OTT**: Over The Top

**PAFF**: Picture Adaptive Field Frame

PAT: Program Association Table

PCM: Pulse-Code Modulation

**PCR**: Program Clock Reference

PDG: Private Data Generator

PEM: Privacy Enhanced Mail

PES: Packetized Elementary Stream

PID: Packet IDentifier

PiP: Picture in Picture

PMT: Program Mapping Table

**POIS**: Placement Opportunity Information System

**PPS**: Picture Parameter Set

PSI: Program Specific Information

PSIG: Program Specific Information Generator

**PSP**: Playout Service Provider (metadata)

**PSU**: Power Supply Unit

**PSSH**: Protection System Specific Header

PTP: Precision Time Protocol

PTS: Presentation Time Stamp

**QAM**: Quadrature Amplitude Modulation

RAI: Random Access Indicator

RAP: Random Access Point

**RF**: Radio Frequency

RGB: Red, Green, Blue

RHEL: Red Hat Entreprise Linux

Ro: Right only

**RRT**: Rating Region Table

RSA: Ronald Rivest-Shamir-Adleman

Rt: Right total

RTMP: Real Time Messaging Protocol

RTP: Real-time Transport Protocol

SCC: Signal Confirmation and Conditioning

SCG: Scrambling Control Group

SCS: Simulcrypt Synchroniser

**SCTE**: Society of Cable Telecommunications

Engineers

SD: Standard Definition

SDI: Serial Digital Interface

SDR: Standard Dynamic Range

SDT: Service Description Table

**SEI**: Supplemental Enhancement Information

SI: Service Information

SIG: Service Information Generator

**SIMF**: SimulCrypt Integrated Management

Framework

SMB: Server Message Block

**SMPTE**: Society of Motion Picture and Television

Engineers

**SNMP**: Simple Network Management Protocol

**SPS**: Sequence Parameter Set

**SRT**: Secure Reliable Transport (protocol)

SSH: Secure Socket Shell

SSL: Secure Sockets Layer

**STB**: Set-Top Box

**STT**: System Time Table

TCP: Transmission Control Protocol

TDT: Time and Date Table

**TEMI**: Timed External Media Information

**TLS**: Transport Layer Security

TNS: Temporal Noise Shaping

**TOS**: Type of Service

TOT: Time Offset Table

TS: Transport Stream

TTL: Time To Live

**UDP**: User Datagram Protocol

**UHD**: Ultra High Definition

**UID**: Unique IDentifier

**URI**: Uniform Resource Identifier

**URL**: Uniform Resource Locator

**UTC**: Coordinated Universal Time

**VBR**: Variable Bit Rate

**VCT**: Virtual Channel Table

**VLAN**: Virtual Local Area Network

**VQ**: Video Quality

**VU**: Volume Unit

WSS: Wide Screen Signaling

8-VSB: 8-level Vestigial SideBand