

Transmisión de TVD

ELO-323

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Motivación

Varios estudiantes han trabajado en el Laboratorio de Televisión Digital y a pesar de eso no existe una documentación resumida que señale cómo realizar una transmisión. Por este motivo, se decide realizar una transmisión conjunta de un video y aplicación GINGA, documentando los pasos realizados.



Transmisión TVD - Norma ISDB-T

Características para ISDB-T



HDTV



Imagen y sonidos de alta calidad

Servicios Multi-Canal



Realización del servicio del programa del multi-SDTV en la banda ancha 1ch (6MHz)

Interactiva TV



Servicios ligados de la comunicación con la TV

Transmisión de Datos



Recuperación simple del programa y de la información en cualquier momento

Recepción Móvil



Servicio de recepción de móvil estable

Siempre, en cualquier lugar, servicio de la TV al teléfono celular

Pasos para Transmisión de TVD

1. Codificación de Video
2. Incorporar Video al servidor
3. Crear Servicio
4. Asociar Video a Servicio creado
5. Crear y configurar Transport Stream
6. Asociar Servicios a capas de TS
7. Subir Aplicación
8. Asociar Aplicación a algún servicio del TS

Codificación de Video

Creación de One-Seg con MPEG4

```
ffmpeg -i video_1.mp4 -c:v libx264 -c:a libfdk_aac -profile:a aac_he_v2 -s 256x144  
-aspect 16:9 -streamid 0:170 -streamid 1:171 -b:a 32k -b:v 278k -maxrate 278k  
-minrate 278k bufsize 278k -bsf h264_mp4toannexb video.ts
```

Creación de Video SD en MPEG

```
ffmpeg -i video_1.mp4 -s 720x480 -aspect 16:9 -streamid 0:42 -streamid 1:43 -b:a  
128k -b:v 2298k -maxrate 2298k -minrate 2 298k -bufsize 2298k video_sd.ts
```

Configuración Playout

19/01/2016 12:07
IP 1: 10.2.50.11
IP 2: 192.168.0.2

Services >

A/V >

Applications >

Stream Events >

EPG >

EWBS >

Transport Stream >













Log >

Configuration >

EI! playout Professional

AV Configuration

List Registered AV | **Add New TS** ←

Name	Input	Type	Bitrate	A/V Type	Action
ARWRA-31min	FILE	188	1,258,000 bps	H.264 MPEG-2 audio	   
BeroHD	FILE	188	1,005,000 bps	H.264 AAC	   
BeroHDB	FILE	188	6,417,000 bps	MPEG-2 video MPEG-2 audio	   
BeroOS	FILE	188	359,000 bps	H.264 AAC	   
BeroOSB	FILE	188	731,000 bps	MPEG-2 video MPEG-2 audio	   
BeroSD	FILE	188	692,000 bps	H.264 AAC	   
BeroSDB	FILE	188	2,010,000 bps	MPEG-2 video	   


Incorporación de Video al Servidor (mediainfo)

```
gear_kleinrock@gear4001642: ~/Escritorio
Archivo Editar Ver Buscar Terminal Ayuda
gear_kleinrock@gear4001642: ~/Escritorio$ mediainfo elo323_os.ts
General
ID                                     : 1700 (0x6A4)
Complete name                           : elo323_os.ts
Format                                   : MPEG-TS
File size                                 : 4.63 MiB
Duration                                  : 1mn 48s
Overall bit rate mode                   : Variable
Overall bit rate                         : 357 Kbps

Video
ID                                       : 170 (0xAA)
Menu ID                                  : 1710 (0x6AE)
Format                                    : AVC
Format/Info                              : Advanced Video Codec
Format profile                            : High@L1.2
Format settings, CABAC                   : Yes
Format settings, ReFrames                 : 4 Frames
Codec ID                                  : 27
Duration                                  : 1mn 48s
Bit rate                                  : 308 Kbps
Nominal bit rate                          : 278 Kbps
Width                                     : 256 pixels
Height                                    : 144 pixels
Display aspect ratio                     : 16.9
Frame rate mode                           : Variable
Color space                               : YUV
Chroma subsampling                       : 4:2:0
Bit depth                                  : 8 bits
Scan type                                  : Progressive
Stream size                               : 3.99 MiB (86%)
Writing library                           : x264 core 129
```

```
Audio
ID                                       : 171 (0xAB)
Menu ID                                  : 1710 (0x6AE)
Format                                    : AAC
Format/Info                              : Advanced Audio Codec
Format version                            : Version 4
Format profile                            : HE-AACv2 / HE-AAC / LC
Mixing mode                               : ADTS
Codec ID                                  : 15
Duration                                  : 1mn 48s
Bit rate mode                             : Variable
Bit rate                                  : 31.4 Kbps
Minimum bit rate                          : 27.4 Kbps
Maximum bit rate                          : 88.9 Kbps
Channel(s)                               : 2 channels / 1 channel / 1 channel
Channel positions                         : Front: L R / Front: C / Front: C
Sampling rate                             : 44.1 KHz / 44.1 KHz / 22.05 KHz
Compression mode                          : Lossy
Delay relative to video                   : -137ms
```

Incorporación de Video al Servidor

 AV Configuration

[List Registered AV](#) [Add New TS](#)

188 or 204 bytes TS Stream (CBR)

Name:

Source: File IP

File:
(Maximum Size: 1000 MB)
FTP:

IP Interface: Address:
Port:
Protocol: UDP RTP

PID Video:

Video Stream Type:

PID Audio:

Audio Stream Type:

PID PCR:

TOT time decode: Synchronize system time with TOT from this input

Bitrate Video (kbps):

Bitrate Audio (kbps):

Bitrate TS (bps):

Creación de Servicio

19/01/2016 12:51

IP 1: 10.2.50.11

IP 2: 192.168.0.2



Services

List Registered Services

Add New Service



Services >

A/V >

Applications >

Stream Events >

EPG >

EWBS >

Transport Stream >

Log >

Configuration >

Internal ID	Service Name	Provider	Action
4	DanielSN2	DanielSP2	
64	D_SN_01	D_SP_01	
65	D_SN_02	D_SP_02	
2	EITV 1SEG	EITV	
1	EITV HD	EITV	
26	EITV HD2	EITV	
39	BeroService01	FFmpeg	

Creación de Servicio

List Registered Services | Add New Service

General

Name

Provider

Service Type

EIT Schedule Flag

EIT Present Following Flag

H-EIT Flag

M-EIT Flag

L-EIT Flag

Custom

The following parameters only need to be configured if custom values are needed. The value "0" (zero) can be left for defaults.

Program PIDs

Primary Video PID (decimal)

Video Descriptors

Primary Audio PID (decimal)

Audio Descriptors







































































PCR PID (decimal)

Creación de Servicio

19/01/2016 12:51
IP 1: 10.2.50.11
IP 2: 192.168.0.2

Services

List Registered Services | Add New Service

Internal ID	Service Name	Provider	Action
4	DanielSN2	DanielSP2	    
64	D_SN_01	D_SP_01	    
65	D_SN_02	D_SP_02	    
2	EITV 1SEG	EITV	    
1	EITV HD	EITV	    
26	EITV HD2	EITV	    
39	BeroService01	FFmpeg	    
46	BeroService02	FFmpeg	    
47	BeroService03	FFmpeg	    
68	elo323_service_hd	FFmpeg	    
66	elo323_service_os	FFmpeg	    
67	elo323_service_sd	FFmpeg	    
25	pedazo_camara	FFmpeg	    
50	prueba-A	FFmpeg	    

Asociar Video

Asociar Aplicación

Creación de Servicio

19/01/2016 12:45

IP 1: 10.2.50.11

IP 2: 192.168.0.2

Services >

A/V >

Applications >

Stream Events >

EPG >

EWBS >

Transport Stream >

Log >

Configuration >



AV Playlist for Service 'elo323_service_os'

Name	Action
Associate Stream	
Stream <input type="text" value="elo323_os"/>	<input type="button" value="Associate"/>
Back	











































Creación de Transport Stream

19/01/2016 12:52
IP 1: 10.2.50.11
IP 2: 192.168.0.2

Transport Stream

List Available TS | Add New TS | **New** | TS

TS Name	Info	Action
1seg	ISDB-T Modulator 539.14 MHz	   
BeroTS01	ISDB-T Modulator 533.14 MHz	   
DanielINN2	ISDB-T Modulator 539.14 MHz	   
Diego TS	ISDB-T Modulator 539.14 MHz	   
D_TS_01	ISDB-T Modulator 509.14 MHz	   
D_TS_02	ISDB-T Modulator 533.14 MHz	   
EITV Tiago	ISDB-T Modulator 539.14 MHz	   
MZB1	ISDB-T Modulator 539.14 MHz	   
PAT	ISDB-T Modulator 539.14 MHz	   
strcam	ISDB-T Modulator 539.14 MHz	   

Services >
A/V >
Applications >
Stream Events >
EPG >
EWBS >
Transport Stream >
Log >
Configuration >

Editar

Agregar Servicios

Play

Creación de Transport Stream

19/01/2016 14:17
IP 1: 10.2.50.11
IP 2: 192.168.0.2

Services >
A/V >
Applications >
Stream Events >
EPG >
EWBS >
Transport Stream >
Log >
Configuration >

Transmission Configuration

Transport Stream: **Proy_elo323_2015**

Configuration | DVB-C | DVB-T | DVB-S | ISDB-T

Transmission Mode: Terrestrial Delivery System (ISDB-T) ▾

Out Interface: Modulator ▾

Network ID: 1

Network Name: Proy_elo323_2015

Transport Stream ID: 1

Original Network ID: 1

Broadcast Information Table (BIT)

Affiliation ID: 0

1st Descriptors Loop: (tag:length:byte:tag:length:byte ...)

Save

Creación de Transport Stream

IP 2: 192.168.0.2

Transport Stream: **Proy_elo323_2015**

Configuration | DVB-C | DVB-T | DVB-S | ISDB-T

Services >

A/V >

Applications >

Stream Events >

EPG >

EWBS >

Transport Stream >

Log >

Configuration >

Broadcast type 13-segment TV Broadcast

Frequency Channel 24 533142857 Hz

Area Code 17

Virtual Channel (Remote Control Key ID) 17

TS Name EITV Playback

Transmission Mode Mode 3: 8k

Guard Interval 1/16

Partial Reception Enabled partial reception in the Layer A (implies in Layer A with only 1 segment)

Emergency Enabled emergency flag

Hierarchical Layers

	Layer A	Layer B	Layer C
Segments	1	6	6
Modulation	QPSK	64-QAM	16-QAM
Convolutional Rate	2/3	3/4	3/4
Time Interleaving Length	4	4	4
Bitrate (bps)	440560	8921400	5947560
Total Bitrate (bps)	15309520		

Save

Creación de Transport Stream

19/01/2016 14:21

IP 1: 10.2.50.11

IP 2: 192.168.0.2

Services >

A/V >

Applications >

Stream Events >

EPG >

EWBS >

Transport Stream >

Log >

Configuration >



Services Layers Classification

Linked Services

Service ID	Service Name	Actions
32	[FFmpeg] elo323_service_os [Layer A]	
33	[FFmpeg] elo323_service_sd [Layer B]	

TS Service Association

Service

Layer A B C

Service ID Suggested value [34]

Associate









Incorporación de Aplicación GINGA-NCL

19/01/2016 19:05
IP 1: 10.2.50.11
IP 2: 192.168.0.2

Services >
A/V >
Applications >
Stream Events >
EPG >
EWBS >
Transport Stream >
Log >
Configuration >

Applications

List New Ginga App **New** EM App Log

Internal ID	Application ID	Application Name	Application Type	Bitrate	Action
21	50	Aplicacion_TVDigital	GINGA-NCL	10000 bps	   
16	1	APP_01_br	GINGA-NCL	1000000 bps	   
17	1	APP_02_br	GINGA-NCL	1000000 bps	   
8	7	A_Shared_Culture	GINGA-NCL	1000000 bps	   
10	9	cocineros	GINGA-NCL	1000000 bps	   
19	1	DanielCardenas	GINGA-NCL	500000 bps	   
13	12	DEMO_01	GINGA-NCL	1000000 bps	   

Incorporación de Aplicación GINGA-NCL

19/01/2016 19:18
IP 1: 10.2.50.11
IP 2: 192.168.0.2

Services >
A/V >
Applications >
Stream Events >
EPG >
EWBS >
Transport Stream >
Log >
Configuration >

Applications

List New Ginga App New ASI App New GEM App Log

Add new GINGA application

Application Data

Examinar... elo323_app.zip
File: elo323_app.zip (45 KB)
Upload

Application Type: GINGA-NCL

Application Name: elo323_app

Application ID: 1

Initial Class and Base Directory

main.ncl
Base Directory:
InitialClass:

Document Resolution: [0x00] Multiple sizes and resolutions

Control Code: [0x01] AUTOSTART

Application Profile: Full-SEG B (FSB_09) (v1.0.0)

Bitrate: 100000

Advanced Options: Show/Hide

Incorporación de Aplicación GINGA-NCL

Application Configuration for Service 'elo323_service_sd'

Default | **Schedule**

No linked Carousel has been found.

Application Associate

Back

Application Configuration for Service 'elo323_service_sd'

Default | **Schedule**

Carousel	Action
elo323_app	

Application Associate

Back

Resultados Experimentales

Video