

# SuperMux

Technical presentation

@

**IN·K**

June 17th 2014

# Definitions



- Platform
  - Is used when referring to everything in the SuperMux project as a whole – and not “just” the compression mux system
- System
  - Is typically used when referring to the main and spare A/V compression statmux systems from this RFI

# TV Service Line-up



- Three main TV services
  - NRK1 (General)
  - NRK2 (News/Documentary/Events)
  - NRK Super / NRK3 (Children / Young adults) Time-shared
- 24/7 Signing Language service
  - NRK Tegnspråk

# Regional Service Line-up



on existing platform

- NRK1 is split into 11
  - NRK1 (General) carries Oslo region
  - 10 remaining regions are either
    - Switched by mux as PMT changes (DTT and DTH)
    - Switched by SDI input router (IPTV)
- Switching is done simultaneously for all 11 regions
- Controlled by external trigger
- SD
  
- All encoding/muxing is done @ central head-end.

# 6 systems (4 main systems + 2 spare systems)



<p><b>Satellite SD</b> (2006) (changed 2010, 2013)</p> <p><b>15 "TV services"</b> NRK1 x11 NRK2 NRK Super / NRK3 NRK1 Tegnspråk <i>NRK1 HD (SAT HD remux)</i></p> <p><b>12 radio services</b> NRK P1 NRK P2 (Nordnytt) NRK P3 NRK Klassisk NRK Sami NRK mP3 NRK Nyheter NRK Folkemusikk NRK Været til sjøs NRK Super NRK P1+ NRK Jazz</p> <p>MPEG-2 video MPEG-1 L2 audio Statistical multiplex PMT switching</p>	<p><b>IPTV</b> (2007) (changed 2008/10/11/12)</p> <p><b>17 "TV services"</b> <b>SD</b> NRK1 x11 NRK2 NRK Super / NRK3 NRK1 Tegnspråk <b>HD</b> NRK1 NRK2 NRK Super / NRK3</p> <p><b>26 radio services</b> NRK P1 x15 NRK P2 NRK P3 NRK Alltid Nyheter NRK mP3 NRK Klassisk NRK Sami Radio NRK Folkemusikk NRK Storting NRK Super NRK P1+ NRK Jazz</p> <p>H.264 video HE-AAC v1 audio Dolby Digital 5.1 Fixed BR SDI Baseband switching</p>	<p><b>Terrestrial (DTT)</b> (2007) (changed 2010,2011,2012)</p> <p><b>14 "TV services"</b> <b>SD</b> NRK1 DK x11 NRK1 Tegnspråk <b>HD</b> NRK1 NRK2 NRK Super / NRK3</p> <p><b>26 radio services</b> NRK P1 x15 NRK P2 NRK P3 NRK Alltid Nyheter NRK mP3 NRK Klassisk NRK Sami Radio NRK Folkemusikk NRK Storting NRK Super NRK P1+ NRK Jazz</p> <p>H.264 video HE-AAC v1 audio HE-AAC 5.1 Statistical multiplex PMT switching</p>	<p><b>Satellite HD</b> (2010)</p> <p><b>3 TV services</b> NRK1 HD NRK2 HD NRK Super / NRK3 HD</p> <p>H.264 video MPEG-1 L2 audio Dolby Digital 5.1 Statistical multiplex</p>
<p><b>Satellite SD Reserve</b> (2010)</p> <p><b>4 TV-services</b> <b>12 radio services</b></p>	<p><b>Terrestrial / Satellite HD Reserve</b> (2008)</p> <p><b>4 TV services(DTT) / 3 TV services (SAT HD)</b> <b>26 radio services</b></p>		

# New Platform Features



## General

- All A/V encoding done by one DVB system
- Shared A/V encoding across distribution networks where applicable
- HD encoding even for regional content
- All encoding/muxing @ central head-end
  
- A new platform shall include a spare DVB system
  - No encoding of regional content
  - Separately installed
  - Separate management system
  - Secure switching between main and spare feeds

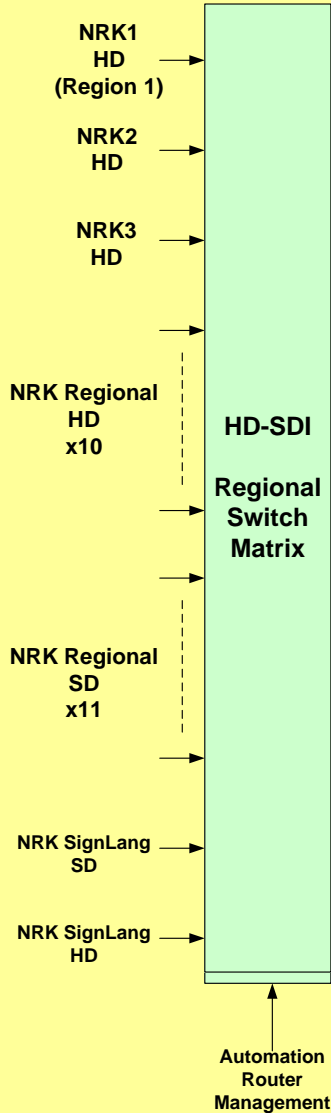
# New Platform Features



## Regional Service Handling

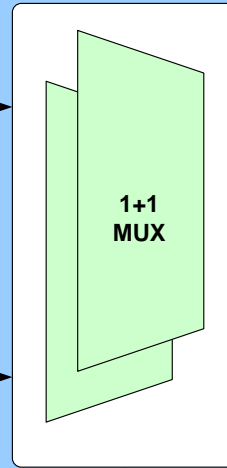
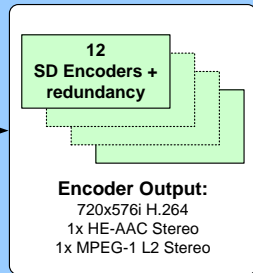
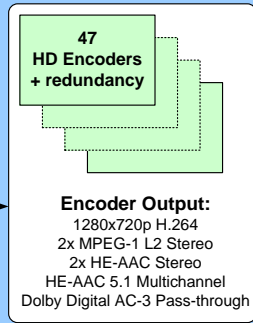
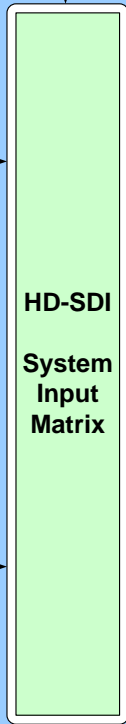
- Regional switching done at baseband level
  - Switching kept separate from A/V compression system
  - HD-SDI 720p/50 video sources as standard
  - “Receiver Friendly”
- Flexibility
  - One or more regions should be able to broadcast independently from the others
- Enable new strategic options
  - Broadcasting of regional content to be supported even on NRK2 and NRK Super/NRK3
- Possibility for last second re-scheduling

## Input Routing Regional Switching



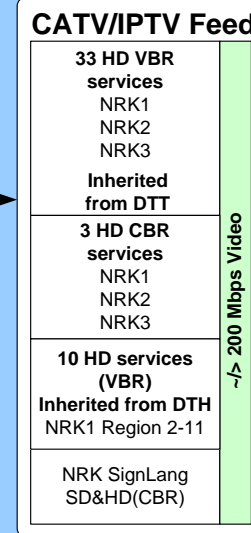
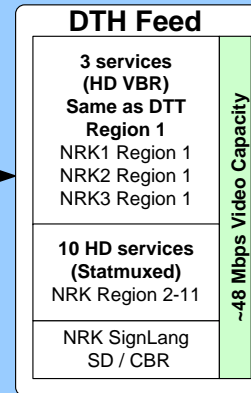
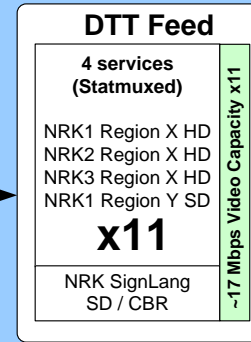
## Compression StatMux System

Input Routing Bypass  
HD-SDI&SD-SDI Feeds

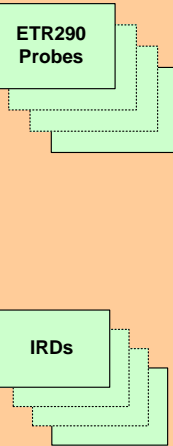


IP / ASI

Radio Services  
DVB Subtitling  
HBBTV DCM-CC  
DVB EIT  
EBU Teletext  
etc.



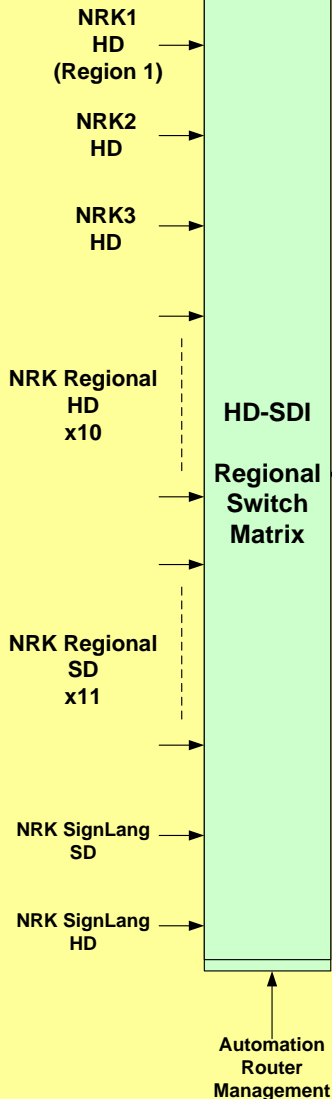
## Monitoring



**NRK**  
SuperMux

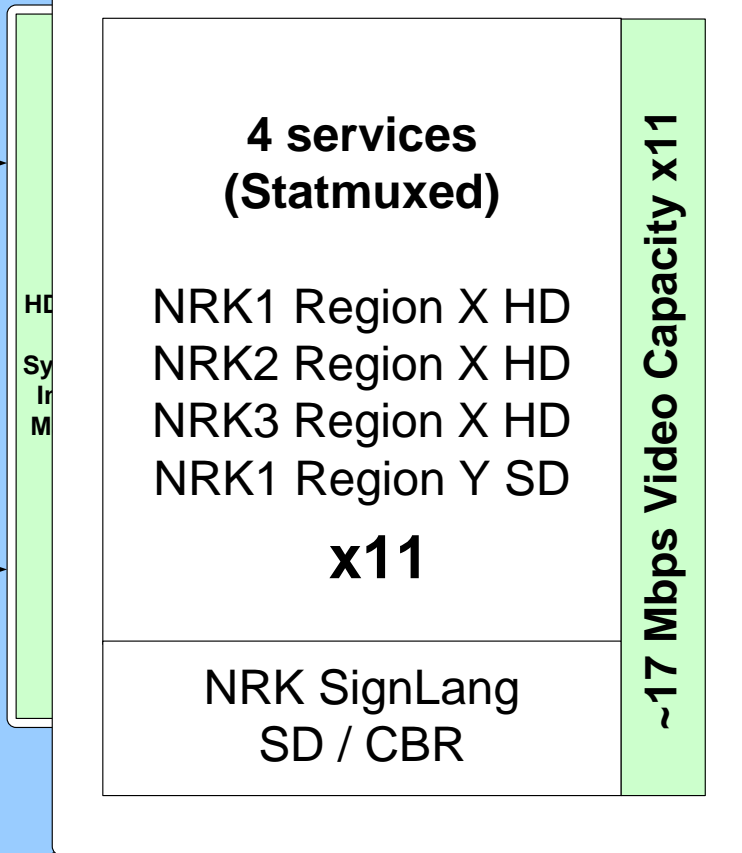


## Input Routing Regional Switching

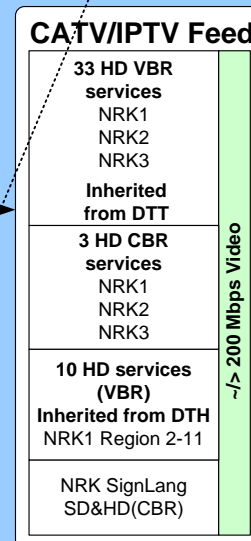
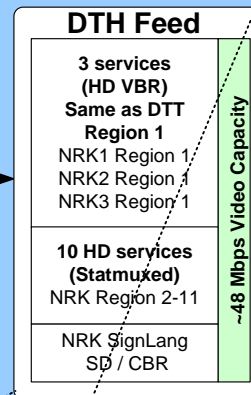
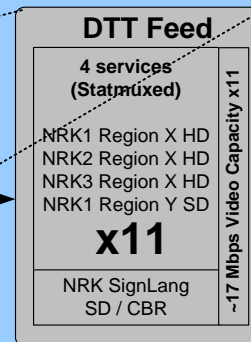


## Compression StatMux System

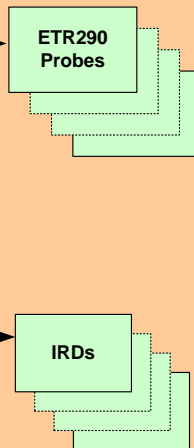
Input Routing Bypass  
HD-SDI & M



EBU Teletext etc.

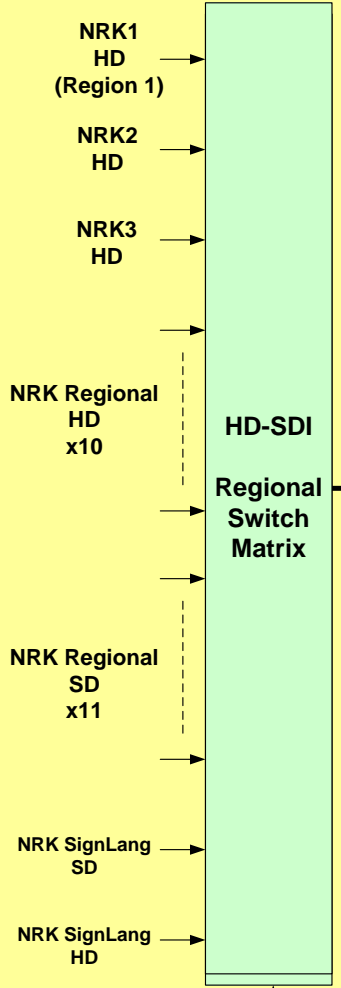


## Monitoring



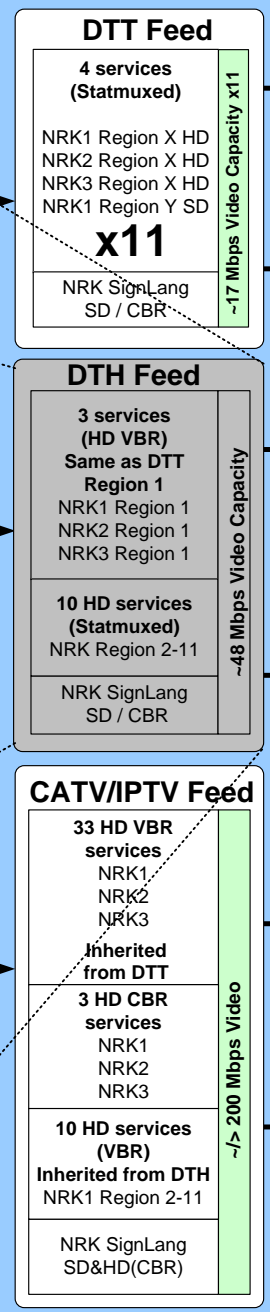
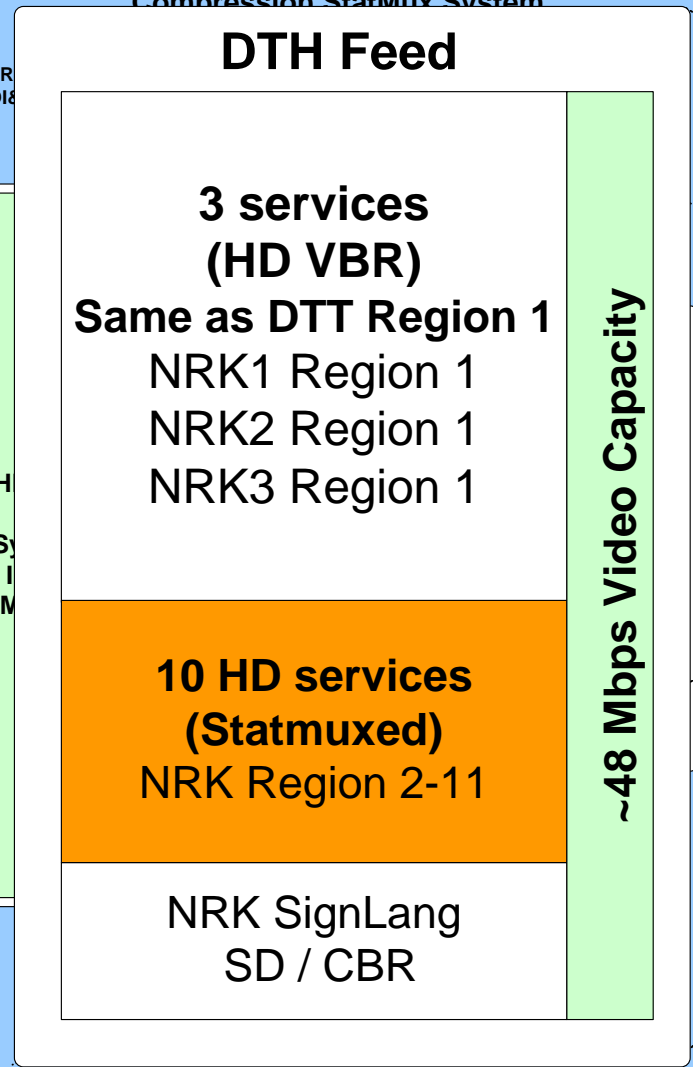
**NRK**  
SuperMux

### Input Routing Regional Switching

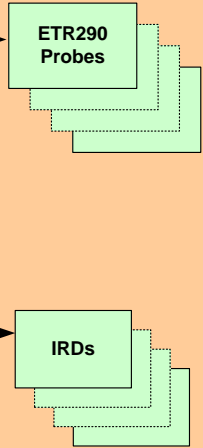


Automation Router Management

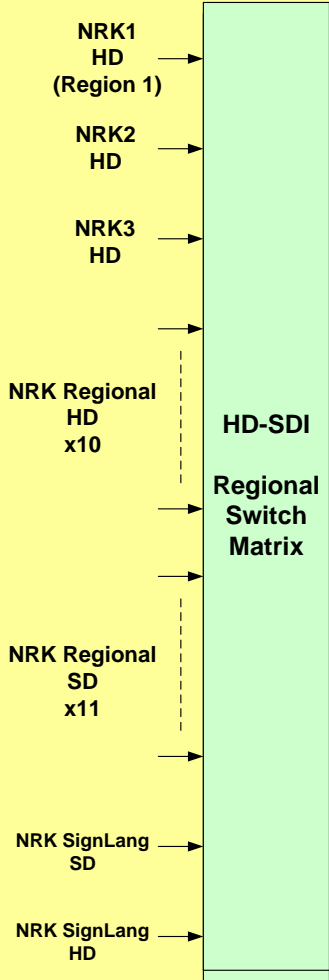
### Compression StatMux System



### Monitoring

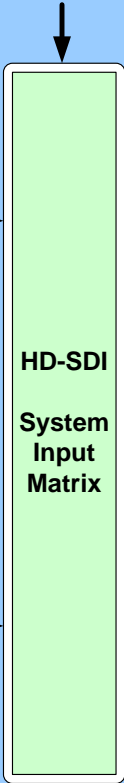


### Input Routing Regional Switching



Automation Router Management

Input Routing Bypass  
HD-SDI&SD-SDI Feeds



### CATV/IPTV Feed

33 HD VBR services  
NRK1  
NRK2  
NRK3

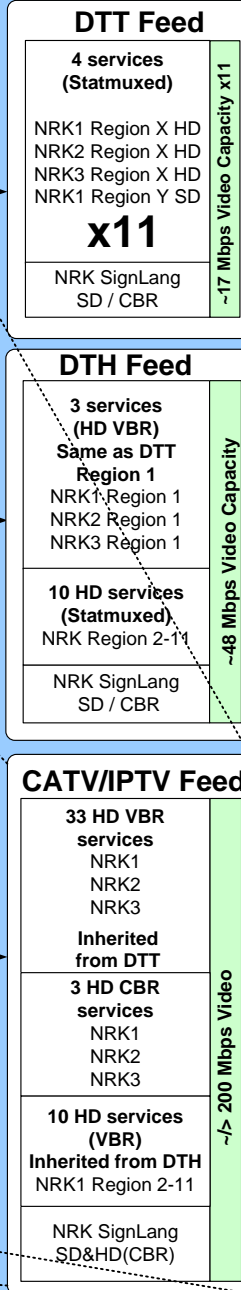
Inherited from DTT

3 HD CBR services  
NRK1  
NRK2  
NRK3

10 HD services (VBR)  
Inherited from DTH  
NRK1 Region 2-11

NRK SignLang  
SD&HD(CBR)

~> 200 Mbps Video



IP

IP

IP

Feed 1

Feed 2

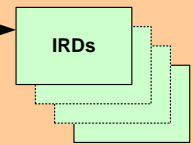
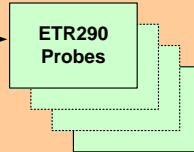
Feed 1

Feed 2

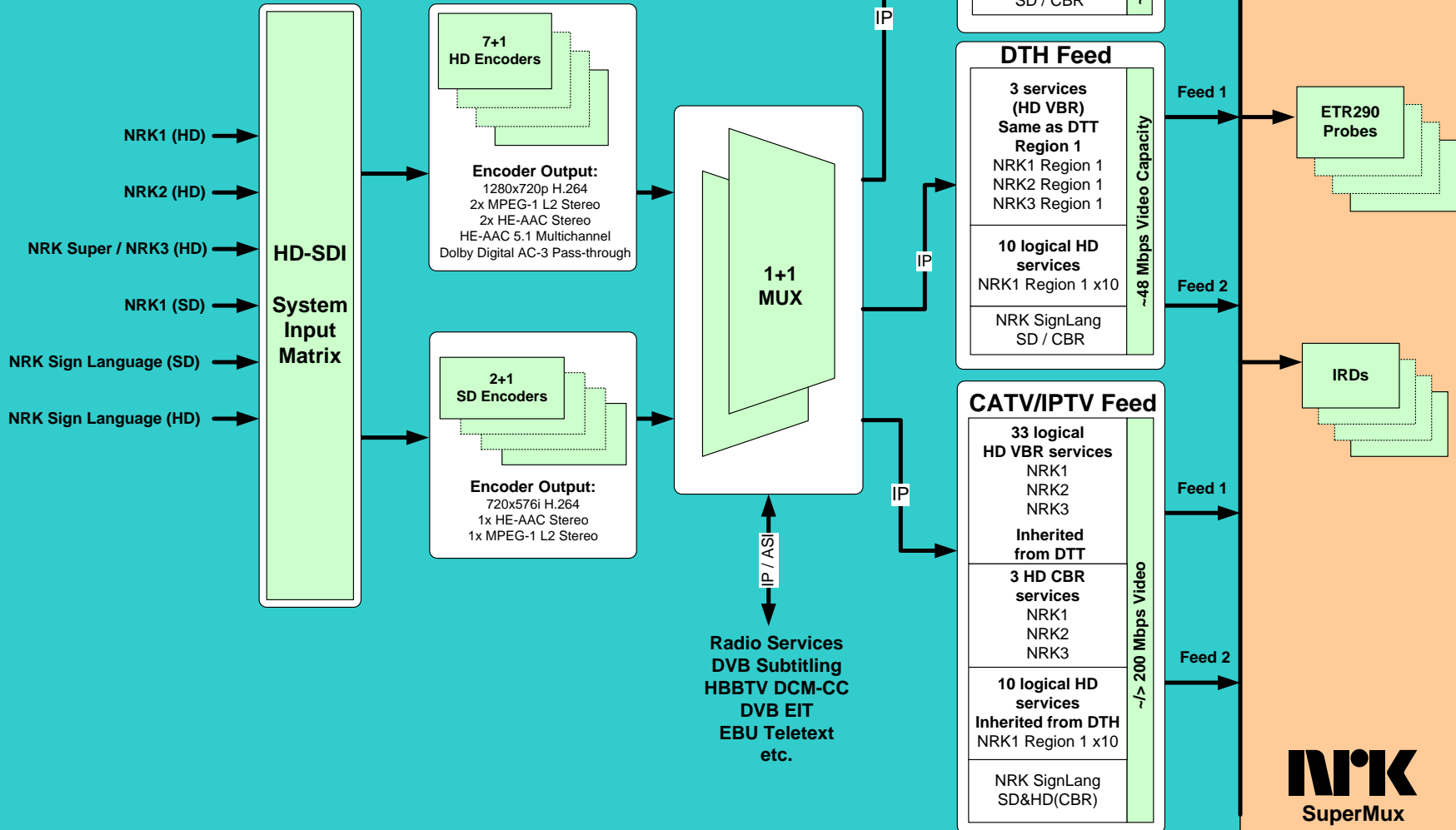
Feed 1

Feed 2

### Monitoring



# Compression StatMux Spare System



# Additional Information



- DVB Subtitling components shall be shared across output feeds in the same way as A/V components, but even across regional services. Those should therefore be referred to a common PCR PID.
- All HD services will in general have 1 stereo and 1 multichannel audio component
- SD services will have one stereo audio component