Cisco Digital Headend Solution

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Presentation Outline

- Digital Headend Building Blocks
- Video Content Acquisition / Encoding
- Video Processing / Remultiplexing
- Transcoding Digital Video
- Headend Control and Management
Digital Headend Building Blocks
Contribution and Distribution Network
High-Level Diagram
Digital Headend Building Blocks

**Video Acquisition**
- Satellite Reception
- Satellite, Off-Air, and Fiber Receivers
- Signal Conversion
- Decrypt and Decode

**Video Encoding**
- MPEG2
- MPEG4
- Standard Definition
- High Definition

**Video Processing**
- Transrating
- Splicing
- Multiplexing
- Ad Insertion

**Video Management**
- Single Point of Control
- Third Party Equipment
- Remote Operations
IP Centric Headend Design

Acquisition: IRDs

Encoding MPEG 2

A/V Router

L-Band D/A

Processing: DCM

Modulation
- DVB - C
  - QAM RF
- DVB - S
  - QPSK IF
- DVB - T
  - OFDM RF
- IPTV
  - MPEGoIP

Distribution

Encryption: CAS System

IP Video Router

MPEGoIP

IP Router

MPEGoIP

MPEGoIP

SI Data

Control and Monitoring: NMS

IPTV Distribution
Video Acquisition

Satellite Reception
Satellite, Off-Air, and Fiber Receivers
Signal Conversion
Decrypt and Decode

DVB-S QPSK
DVB-T OFDM
DVB-C QAM
E3 / DS3
ATM
MPEG over IP

ASIMPEG 2/4
MPEG over IP

Titan MK II QPSK Receiver
Atlas MK II OFDM Receiver
Indus MK II: Descrambler
IRD: Cisco D9844 and D9854

Satellite/Off-Air Receivers, IRDs, Descramblers, etc.
# Product overview Receivers / Decoders

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<th>Professional IRD</th>
<th>Input</th>
<th>Decode</th>
<th>Decrypt</th>
<th>Output</th>
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<tr>
<td>D9010 Decoder</td>
<td>ASI</td>
<td>1xMP2 SD</td>
<td>FTA</td>
<td>A/V</td>
</tr>
<tr>
<td>D9850 Program receiver</td>
<td>4xDVB-S, ASI</td>
<td>1xMP2 SD</td>
<td>FTA, PowerVu BISS</td>
<td>ASI, A/V, SDI</td>
</tr>
<tr>
<td>D9844 IRD</td>
<td>DVB-S/DVB-S2 IP FEC, ASI</td>
<td>1or2 MP2 SD 4:2:0</td>
<td>FTA, BISS DVB-CI</td>
<td>IP FEC, ASI SDI, A/V</td>
</tr>
<tr>
<td>D9846 IRD</td>
<td>DVB-S/DVB-S2 IP FEC, ASI</td>
<td>1or2 MP2 SD 4:2:0/2</td>
<td>FTA, BISS DVB-CI</td>
<td>IP FEC, ASI SDI, A/V</td>
</tr>
<tr>
<td>D9887 Modular HDTV Rec.</td>
<td>DVB-S, DVB-S2 DVB-C, DVB-T, 8VSB, ASI, IP FEC</td>
<td>1or2 MP2 SD/HD 4:2:0 MP4 SD/HD 4:2:0</td>
<td>FTA, BISS</td>
<td>IP FEC, ASI SDI, A/V</td>
</tr>
<tr>
<td>D9854 Advance Program Rx</td>
<td>4xDVB-S/DVB-S2 ASI, IP (future)</td>
<td>MP2 SD/HD 4:2:0 MP4 SD/HD 4:2:0</td>
<td>FTA, BISS 2*DVB-CI, PowerVu</td>
<td>IP, ASI SDI, A/V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Advanced Receiver Transcoder</th>
<th>Input</th>
<th>Transcode</th>
<th>Decrypt</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>D9858 Adv. Rx Transcoder</td>
<td>4xDVB-S/DVB-S2 ASI</td>
<td>2 times MP4HD → MP2SD/HD 4:2:0</td>
<td>FTA, PowerVu BISS</td>
<td>MPEG2 SD/HD ASI, IP</td>
</tr>
<tr>
<td>D9858-1 Adv. Rx Transcoder</td>
<td>4xDVB-S/DVB-S2, ASI</td>
<td>1 time MP4HD → MP2SD/HD 4:2:0</td>
<td>FTA, PowerVu BISS</td>
<td>MPEG2 SD/HD ASI, IP</td>
</tr>
</tbody>
</table>
# Product overview Receivers / Decoders

## Digital Turnaround receivers (DTA)

<table>
<thead>
<tr>
<th>Device</th>
<th>Input</th>
<th>Decode</th>
<th>Decrypt</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galaxy</td>
<td>DVB-S, DVB-S2</td>
<td>-</td>
<td>FTA, DVB-CI</td>
<td>ASI</td>
</tr>
<tr>
<td>Dense Acquisition and Decryption</td>
<td>DVB-C, DVB-T E3, DS3, ASI</td>
<td>-</td>
<td>FTA, DVB-CI</td>
<td>ASI</td>
</tr>
<tr>
<td>D9828 Multiple Program Rx</td>
<td>4x DVB-S, ASI</td>
<td>1xMP2 SD</td>
<td>FTA, PowerVu</td>
<td>ASI, A/V</td>
</tr>
<tr>
<td>D9824 Multiple Program Rx</td>
<td>4x DVB-S/DVB-S2 ASI</td>
<td>MP2 SD/HD 4:2:0</td>
<td>FTA, PowerVu</td>
<td>IP, ASI A/V</td>
</tr>
<tr>
<td>D9804 Multiple Transport Rx</td>
<td>4x DVB-S/DVB-S2 ASI</td>
<td>(TS Demux)</td>
<td>FTA, BISS</td>
<td>6xASI Transparent TS for SFN</td>
</tr>
</tbody>
</table>

## Desktop Satellite Rx

<table>
<thead>
<tr>
<th>Device</th>
<th>Input</th>
<th>Decode</th>
<th>Decrypt</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>D9834</td>
<td>DVB-S</td>
<td>1xMP2 SD</td>
<td>FTA, PowerVu</td>
<td>A/V</td>
</tr>
<tr>
<td>D9865</td>
<td>DVB-S/DVB-S2</td>
<td>1xMP2/4 SD/HD</td>
<td>FTA, PowerVu</td>
<td>A/V, HDMI IP (future)</td>
</tr>
</tbody>
</table>
D9854 Advanced Program Receiver

- MPEG-2/4 SD/HD Decoding
- SD/HD-SDI Video Output
- DVB-S/S2 and ASI Input
- MPEGoIP & ASI output
- PowerVu, DVB-CI & BISS-1/E CA
- 2 Stereo Pairs of MPEG/Dolby audio decoding
- Digital Program Mapping
- Feature Licensing

- High Quality decoding for all commercially broadcast video standards
- Ideal for primary distribution, video monitoring or re-encoding applications
- Perfect for migrating networks from DVB-S to DVB-S2 and SD to HD
- Can decrypt the most programs in the world with access to PowerVu and third party CA’s
- Can drop, map or pass programs allowing head-end’s to filter out programs they don’t require
- Cost effective solution allowing head-ends to pay for the features they use
D9854
Advanced Program Receiver

- DVB-S/S2 Input
  - 4 RF input switched
  - DVB-S QPSK 1-45 MS/s
  - DVB-S2 QPSK, 8PSK 10-30MS/s
  - 1-10MS/s check with factory
- ASI input EN50083-9 188/204 bytes
- ASI output 188 bytes
- MPEGoIP output UDP, RTP
- Video Decoding
  - MPEG-2 4:2:0, MPEG-4 AVC 4:2:0
  - DVB-VBI and DVB-Subtitles (SD resolution)
- Audio Decoding
  - MPEG or Dolby Digital (AC-3)
  - Dolby Digital pass through
- Video Output
  - SD/HD-SDI option (M1/M2 ports)
  - 2xComposite (mirrored)
  - Component HD
- Audio Output
  - 2xBalanced analog stereo pairs
  - 2xAES-3id digital output option
- Switchable SDI/ASI ports option
- PowerVu Cue-Tone/Trigger support
  - PowerVu MPEG-2 SD encoders only
- SCTE-35 DPI with PowerVu Ad-insertion tiers
- Programmable Alarm Contact Closure
Video Encoding

**Video Encoding**

- MPEG2
- MPEG4
- Standard Definition
- High Definition

**Video Encoding**

- COMP. VIDEO
- AUDIO
- SD SDI
- HD SDI
- DATA

**Video Encoding**

- MPEG2 and MPEG4
- Standard and High Definition

**Devices**

- D9022 SD & 9022SD: MPEG2 SD
- D9050 HD: MPEG2 HD
- D9034 SDTV: MPEG 2/4 SD
- D9054 HDTV: MPEG4 HD

**Connections**

- ASI MPEG 2/4
- MPEG over IP
<table>
<thead>
<tr>
<th><strong>Model</strong></th>
<th><strong>Input</strong></th>
<th><strong>Video</strong></th>
<th><strong>Audio</strong></th>
<th><strong>Output</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>D9054 HD AVC Encoder</td>
<td>HD-SDI, Emb. Audio, 4 st. AES Audio</td>
<td>4:2:0 - MP4 CBR / VBR / Statmux 720p, 1080i</td>
<td>Up to 6 stereo, LII, AAC+, AC-3, Linear PT: Dolby-E, AC-3</td>
<td>ASI, IP (Dual 100BT)</td>
</tr>
<tr>
<td>D9034 SD AVC Encoder</td>
<td>SD-SDI, PAL/NTSC, Emb. Audio, 4 st. ana/AES audio</td>
<td>4:2:0 - MP4+PIP VBR / Statmux MP2 (s/w option)</td>
<td>Up to 4 stereo, LII, AAC+, AC-3, Linear PT: Dolby-E, AC-3</td>
<td>ASI, IP (Dual 100BT)</td>
</tr>
<tr>
<td>D9032 SD MP2 Encoder</td>
<td>SD-SDI, PAL/NTSC, Emb. Audio, 4 st. ana/AES audio</td>
<td>4:2:0 / 4:2:2 – MP2 CBR / VBR / Statmux Low delay, BISS-E</td>
<td>Up to 4 stereo, L II, AC-3, Linear PT: Dolby-E, AC-3</td>
<td>ASI, IP (Dual 100BT)</td>
</tr>
<tr>
<td>D9040 SD MP2 Encoder PowerVu</td>
<td>SD-SDI, PAL/NTSC, Emb. Audio, 4 st. ana/AES audio</td>
<td>4:2:0 / 4:2:2 – MP2 PNC Cntrl, Statmux</td>
<td>Up to 4 stereo, L II, AC-3, Linear PT: Dolby-E, AC-3</td>
<td>ASI</td>
</tr>
<tr>
<td>D9050 HD MP2 Encoder</td>
<td>HD-SDI Emb. Audio, 4 AES Audio</td>
<td>4:2:0 / 4:2:2 – MP2 CBR / Statmux 720p, 1080i</td>
<td>Up to 4 stereo, LII, AC-3, Linear PT: Dolby-E, AC-3</td>
<td>ASI</td>
</tr>
<tr>
<td>D9022 SD MP2 Encoder CBR</td>
<td>SD-SDI, PAL/NTSC, Emb. Audio, 2 st. ana/AES audio</td>
<td>4:2:0 – MP2 CBR Lowest cost</td>
<td>2 stereo, LII, AC-3, Linear PT: Dolby-E, AC-3</td>
<td>ASI, IP (Dual 100BT)</td>
</tr>
<tr>
<td>D9093 D9094 D9894 Contribution encoder and decoder</td>
<td>SD/HD-SDI, Emb. Audio, 1 st ana audio</td>
<td>MP4 4:2:0, 4:2:2(fut), 525i/625i, 720p, 1080i, Latency &lt;500msec</td>
<td>Up to 4 stereo, LII and AAC, PT: D-E</td>
<td>IP (10/1001000bT) + FEC Cop-3, ASI</td>
</tr>
<tr>
<td>D9023 Multi Channel Encoder</td>
<td>9 or 4 Composite PAL inputs, analog audio</td>
<td>MPEG-2 SD 4:2:0 MP@ML CBR</td>
<td>One MPEG-1 LII aud per video channel</td>
<td>Dual 10/100/1000bT</td>
</tr>
<tr>
<td>D9036</td>
<td>SDI, HD-SDI, IP (FUT)</td>
<td>MP2, MP4 SD, HD 4:2:0, 4:2:2 (FUT)</td>
<td>32 stereo per module, LII, AC3 and AAC 5.1 PT, DolbyE PT &amp; Dec</td>
<td>IP (10/1000bT) + FEC Cop-3, ASI</td>
</tr>
</tbody>
</table>
D9036 Encoding Platform

- Single rack unit
- Baseband encoding 8xSD or 4xHD
- Re-encoding of pre-compressed content (FUTURE)
  - As many as 16xSD or 8xHD
- MPEG-2 and AVC, HD, SD and other resolutions on the same hardware
- IP with FEC and ASI input/output
- Up to 32 stereo encodes per module
- Redundant power supplies
- Field-replaceable modules, power supplies and air filters

- Scalable high density encoding platform
- Easily integrated with DCM and management systems
- Green - Low power consumption
- Flexible, extendable architecture
- Multi-resolution, multi-format video with premium quality
- Easily upgraded through licenses
- Field serviceable modules
## D9036 Modular Encoding Platform

<table>
<thead>
<tr>
<th>Features</th>
<th>D9036 Chassis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to six modules, dual PSU</td>
<td></td>
</tr>
<tr>
<td>Common sync input</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Features</th>
<th>Modular Video Input (MVI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four or eight HD/SD compatible SDI variants</td>
<td></td>
</tr>
<tr>
<td>Embedded audio support</td>
<td></td>
</tr>
<tr>
<td>Routing to multiple video and audio encoding engines</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Features</th>
<th>Modular Video Codec (MVC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two HD or four SD encodes per module</td>
<td></td>
</tr>
<tr>
<td>Future support for re-encoding</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Features</th>
<th>Modular Multi-Audio (MMA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 stereo MPEG-1 LII, AAC, Dolby Digital or 22 Dolby Digital Plus, or 8 multichannel with 8 stereos (6 Dolby Digital Plus)</td>
<td></td>
</tr>
<tr>
<td>Resources shareable between videos</td>
<td></td>
</tr>
<tr>
<td>16 AES audio inputs, Dolby Metadata</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Features</th>
<th>Modular Input/Output (MIO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four 100/1000 BaseT Ethernet connections with FEC, Dual ASI, optional mirroring</td>
<td></td>
</tr>
<tr>
<td>Compressed video and audio input/output</td>
<td></td>
</tr>
</tbody>
</table>

- Flexible hardware supports AVC/MPEG-2 encoding of HD, SD and other formats
- Dense audio encoding platform for multi-language applications in a variety of compression formats
- Modular approach allows HW upgrades without platform replacement
- Technological innovation provides greater density and video quality with lower power consumption
D9036: Flexible Encoding Solution

- Audio Encoding: (32x2.0 or 8x5.1 + 8x2.0) or (22x2.0 or 6x5.1 + 6x2.0 Dolby Digital Plus), 8xDolby E decode
- Dense video input: (4 or 8)
- 2xHD or 4xSD per card
- Mirrored or independent ASI
- 4x100/1000 BaseT with FEC
- Common Chassis Sync
- Dual hot-swappable PSUs
- Management and statmux Ethernet
- Alarm and DPI GPIO
Flexible, programmable technology

- Encoding technology is highly programmable, allowing for further advances in video quality
- The technology is capable of addressing encoding and decoding for H.264, MPEG-2 and potentially other formats in the future
- Common redundant encoders for various video encoders
- Down-conversion from HD to SD for encoding
D9036 Modular Encoding Platform - Applications

**Primary Distribution**
- High-Quality Encoding of Baseband Video
- Secondary Distribution (future release)
- Re-Encoding of Pre-Compressed Video for Premium Content
Video Processing

**Video Processing**
- Transrating
- Splicing
- Multiplexing
- Ad Insertion
- Transcoding

**Video Processing**
- MPEG 2 ASI
- MPEG 4 ASI
- MPEG over IP
- SI DATA
- CAS DATA

Grooming, Transrating, Multiplexing, Splicing, Content Insertion, Transcoding:
MPEG-2 -> MPEG-4

ASI MPTS
MPEG over IP
SPTS / MPTS

DCM: Cisco Digital Content Manager D9900
DCM Video Processing

- Transrating Multiplexer
- Digital Ad Splicing
- Bulk Encryptor
- Statmux Controller
- ASI<>IP Interface Conversion
- PSI/SI/PSIP Processor
- Input Error Monitoring
- Advanced Redundancy Schemes
- Application Platform

- Unmatched Performance
- Highest Transrating/DPI Capacity
- Low Power Consumption
- Flexible Modular Configuration
- Future Proof Against Changing System Requirements
- Maximized Up Time
- Seamless IP Video Networks Integration
- Excellent Transrated Video Quality
DCM Video Processing

Feature Overview

- **Grooming & Re-multiplexing**
  - ASI → GbE → ASI conversion for IP video transport between HE / Hub facilities
  - Multiplexer/demultiplexer separating, duplicating, recombining digital program streams
  - PID filtering, PID and service ID remapping
  - PID Synchronisation of PCR referenced metadata
  - Dynamic PSI/SI/PSIP Processor

- **Input error Monitoring and bit rate measurements**

- **Advanced MPEG Processor**
  - Open loop statistical multiplexing of SD and HD programs
  - Transrating of SD and HD programs:
    - VBR to VBR,
    - CBR to CBR,
    - VBR to CBR (clamped VBR)
  - Splicing enabling insertion of advertisements or local program insertion, including enhanced TV support
  - Built-in scrambler allowing easy integration with several CA systems

- **Seamless integration with IP video network**
  - Supporting UDP/RTP Streaming, VLAN, IGMP & QOS
  - COP3 FEC hardware/software option

- **Application Platform**
  - Bandwidth management of encoder pools using IP-based closed loop statistical multiplexing
  - Digital Transport Formatter transparently combining multiple incoming transport streams are combined into single transport stream
  - Operating in SFN networks including MIP insertion

- **Designed for high reliability networks**
  - Hot swappable and redundant power supplies
  - 1:1 configuration to support maximum up time with minimum switch-over interruption
  - Maximize service availability with port, TS and service redundancy

- **Management**
  - SNMP Support on the devices
  - Intuitive web GUI & ROSA Integration
  - Dual management interfacing allowing IPSEC
## DCM Overview
### MPEG Video Processing Capacity

<table>
<thead>
<tr>
<th>Model</th>
<th>I/O</th>
<th>Scrambling (*)</th>
<th>Splicing (*)</th>
<th>Transrating (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D9901 DCM Series 1RU</td>
<td>Up to 4 GbE</td>
<td>DVB-CSA</td>
<td>Up to 160 SD MP2</td>
<td>Up to 800 SD MP2</td>
</tr>
<tr>
<td></td>
<td>Up to 20 ASI</td>
<td></td>
<td>Up to 80 HD MP2</td>
<td>Up to 200 HD MP2</td>
</tr>
<tr>
<td></td>
<td>1000 streams</td>
<td></td>
<td>Future: MP4</td>
<td>NTSC : 700/175</td>
</tr>
<tr>
<td>D9900 DCM Series 2RU</td>
<td>Up to 8 GbE</td>
<td>DVB-CSA</td>
<td>Up to 320 SD MP2</td>
<td>Up to 1600 SD MP2</td>
</tr>
<tr>
<td></td>
<td>Up to 80 ASI</td>
<td></td>
<td>Up to 160 HD MP2</td>
<td>Up to 400 HD MP2</td>
</tr>
<tr>
<td></td>
<td>2000 streams</td>
<td></td>
<td>MP4 Concept</td>
<td>NTSC : 1400/350</td>
</tr>
</tbody>
</table>

- **Functionality provided by Coprocessor Plug-on modules**
  - MPEG-2 SD/HD transrating, CBR/VBR
  - MPEG-2 SD/HD Splicing, AVC POC
  - DVB CSA & BISS-1 scrambling
  - PID Sync & Delay

- **Processing capacity of 500 processing units per module, as shared resource between different features**

(*) Shared resources in the platform
DCM Video Processing
Front & Rear

DCM 2RU
- Alarm & PSU LEDs
- Mgmt IP1 (1GbE)
- GPI I/O
- PSU Slot1 (AC or DC)
- PSU Slot2 (AC or DC)
- GbE Port1 (GbE Port2 = BU Port)
- 10 ASI Ports (configurable I/O)

DCM 1RU
- Alarm & PSU LEDs
- Mgmt IP2 (10/100BT)
- GPI I/O
- PSU Slot1
- PSU Slot2
- GbE Port1 (GbE Port2 = BU Port)
- GbE Port3
- 10 ASI Ports (configurable I/O)
- DCM remultiplexes multiple services from incoming TS together to build a new outgoing MPTS – this example target is a QAM channel.
- The DCM applies a re-statmux (transrating) algorithm to ensure the new line fits the QAM channel – protect from bitrate overflow.
**DCM Bandwidth Management**

**IP Statmux Controller**

**IP Architecture**
- IP-based compressed transport
- IP-based encoder statistical multiplex control
- IP-based management

**Benefits**
- Cost savings as IP is more cost efficient than ASI
- Easy reconfiguration
- Share backup encoders across multiple pools
- Well suited for networking

**Features**
- Up to 20 pools with up to 60 encoders per pool managed on separate GbE I/O card in DCM
- Default target bit rate, min/max bit rate allocation, priority and quality limit per channel
- Integrated with ROSA SPM
- Redundant solution
DCM Bandwidth Management

Combined Statmux Pools

- Phase 1
  - MPEG-2 SD IP Statmuxing
  - AVC SD IP Statmuxing
  - AVC HD IP Statmuxing

- Phase 2
  - Combined AVC SD&HD
  - Combined MPEG-2 SD & AVC HD
  - Remote MPEG-2 statmux

- Phase 3 (current)
  - Combined MPEG-2 SD & AVC SD
  - Remote AVC IP Statmuxing
With up to 40ms round trip delay, frame accurate bit rate adjustments for every frame can be maintained
- Minimal losses ~4%

With larger delays ⇒ expect significant losses.
- > 15% beyond 40ms.

All encoders are limited by the biggest delay time
**DCM Video Transcoding**

**Transcoding Resource Handling**

<table>
<thead>
<tr>
<th>Model</th>
<th>I/O</th>
<th>Video (†)</th>
<th>Audio (†)</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>D9901 DCM Series Transcoder 1RU</td>
<td>Up to 2 GbE</td>
<td>MP2 → MP4 8 SD MP4 + PIP 3 HD MP4 + PIP</td>
<td>Up to 16p (‡) AC3 or LII → HE-ACC or PT</td>
<td>Closed Caption</td>
</tr>
<tr>
<td>D9900 DCM Series Transcoder 2RU</td>
<td>Up to 2 GbE</td>
<td>MP2 → MP4 24 SD MP4 + PIP 9 HD MP4 + PIP</td>
<td>Up to 3*16p (‡) AC3 or LII → HE-ACC or PT</td>
<td>Closed Caption</td>
</tr>
</tbody>
</table>

- **Options for SD MPEG-2 → AVC transcoding per card**

<table>
<thead>
<tr>
<th>SD Transcode Options per card</th>
<th>#SD Video</th>
<th>#Audio</th>
<th>#Video</th>
<th>#Audio</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 SD</td>
<td>16</td>
<td>16 SD</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>6 SD</td>
<td>20</td>
<td>14 SD</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>4 SD</td>
<td>24</td>
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DCM Video Transcoding

Transcoding Resource Handling

- Options including HD MPEG-2→AVC transcoding per card

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<th>#SD</th>
<th>#Audio</th>
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</table>

- For all video transcodes, max. one PIP can be supported
Headend Control and Management

Video Management

- Single Point of Control
- Third Party Equipment
- Remote Operations

RS 232 / RS 485
SNMP
RCDS
IIOP
APOLLO

Video Management

- Single point of control
- Lights – out Operation

ALARMS
MESSAGES
REPORTS
LOGS

ROSA: Management

ROSA: Reports

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ROSA Video Service Management Suite

Service and EPG Management

Network & Element Management

VSM

SIM

NMS

EM
**ROSA VSM Suite**

**Overview – Deployment 4.0**

- **Presentation (PC Clients)**
  - ROSA NMS GUI
  - ROSA VSM GUI
  - ROSA SIM GUI

- **Service and EPG Management**
  - Separate Server
  - ROSA SIM - Central Server
  - ROSA SIM –Spooler (OPTIONAL)

- **Network & Element Management**
  - ROSA EM
  - ROSA EM

- **Devices**
  - ROSA NMS
  - ROSA VSM
1. Service Profiling & Behaving
   - Topology Manager
   - Service Profile Manager
   - Service Alarm & Status Manager
   - Schedule Manager
   - Inventory Manager

2. Enhanced Service Configuration and Monitoring
   - Service Bandwidth Manager
   - EIS
   - CA Profile Manager
   - Service Inspection Manager

3. External Service Interface
   - External Control Interface
   - External Alarm Interface
VSM - Video Service Manager

Functional Overview – VSM V4.0

VSM Features

**Topology Manager**
- Complete Network Overview
- Service Flow over topology
- Easy and User friendly topology creation

**Service Profile Manager**
- Configuration of Services
- Uniform presentation of Settings
- Off-line creation and modification
- Easy activation

**Service Alarm and Status Manager**
- Service Alarm Log
- Service Status Dashboard
- Immediate Service Status reporting
- DCM service alarm support

**Scheduler Manager**
- Schedule Service Configurations
- Time based activation
- Time Based Scrambling
- Time Shared Service

**Inventory Manager**
- Management of Statmux Pools
- Offline preparation of Configuration
- Integration with the ROSA NM/SEM environment
- Easy association of VSM/NM/EM inventory

**Service Bandwidth Manager**
- Standards based conditional access solution
- DVB Simulcript EIS-SCS compliant
- Full DCM support

**EIS**
- Definition of CA profiles for EIS
- Multiple CA on multiple Services
- Parameterized support for BVDL
- Intuitive User Interface

**CA Profile Manager**
- Route Signals and Services for Inspection to Probes / Analyser
- Each Service can be inspected by routing it back to the Analyzer

**Service Inspection Manager**
- Trigger interface for Service Configuration and CA
- Schedule interface for Scheduler manager

**External Control Interface**
- Northbound Service Alarming

**External Alarm Interfaces**

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ROSA VSM 4.0
Topology example
ROSA VSM 4.0
Topography example
Registrujte se za Cisco Networkers
28-31. mart 2010. Bahrein