Next Generation Video Head-end

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황 성 철
㈜유티어 대표이사

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  - Requirements Change Driven by Nextgen Video Headend
  - Key Challenges
  - Competitive Positioning
- Solutions to Meet the Challenges
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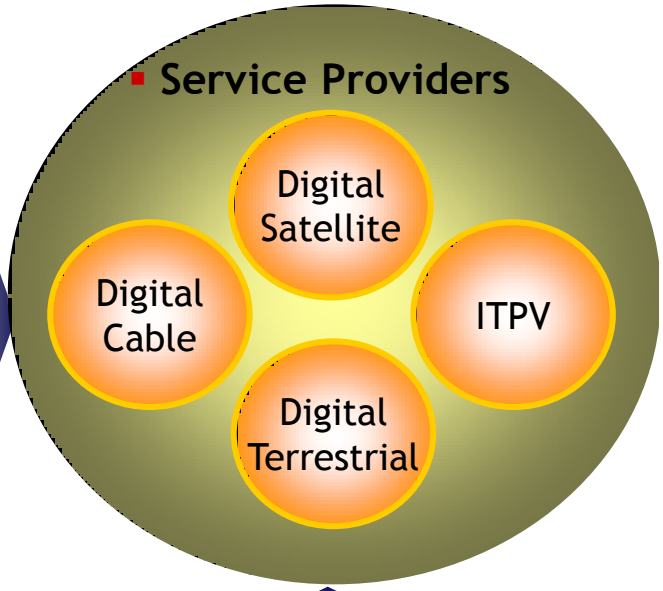
  - Moving Towards an IP Interactive System
  - Telco IPTV Hub Office (Local Ad Insertion)
- Video Headend Products & Roadmaps
  - DCM Multiplexer
  - Encoders Portfolio
  - Modulators and ROSA NMS
- Conclusion

Requirements Change Driven by Next generation Video Headend

- Today headends have multiple services
- Amount is growing every day (slowly growing to 1000)

Digital Broadcast Business Value Chain

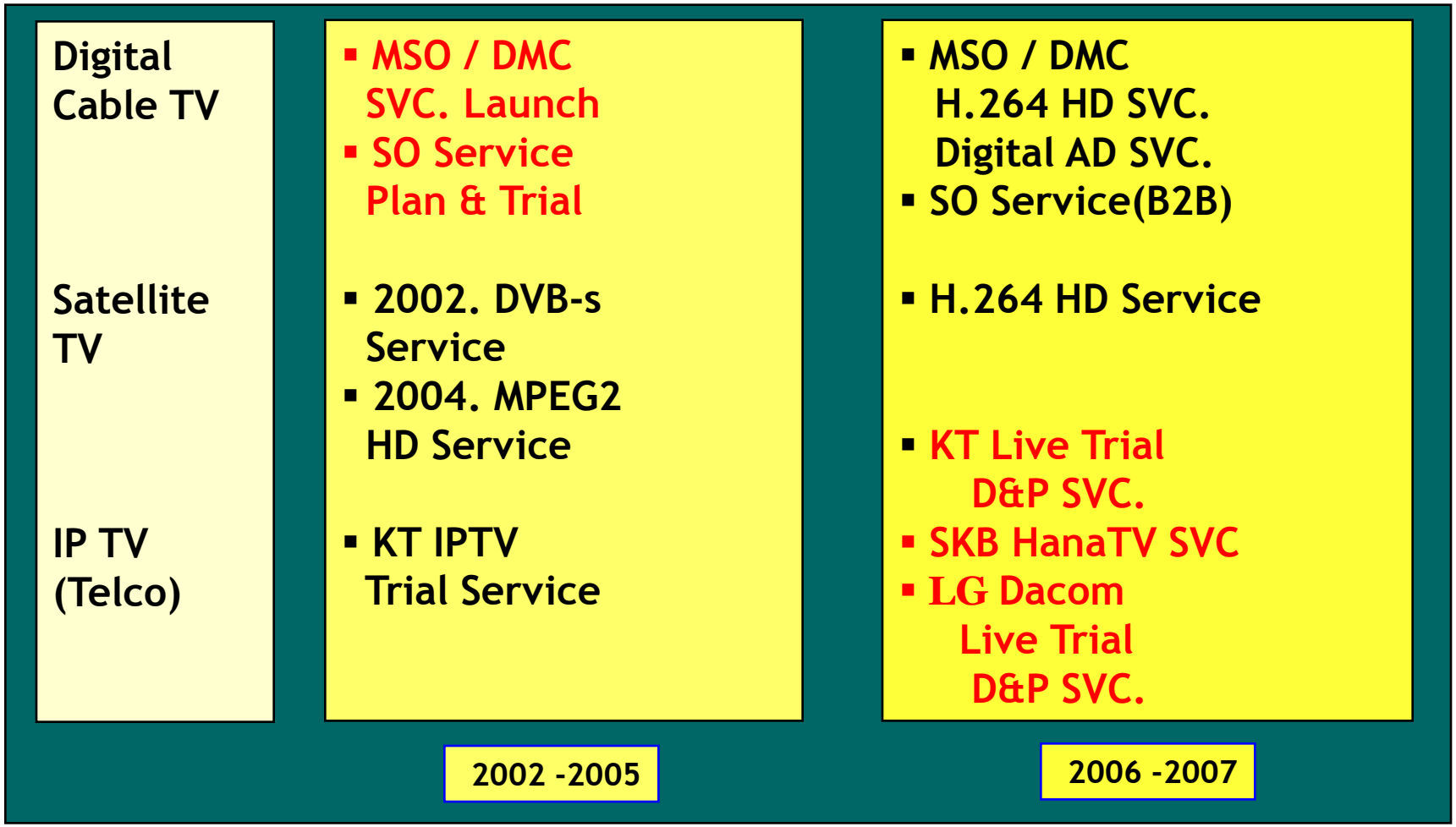
- Cable SP
- Telco SP
- PPs
- NOs
- Enterprise



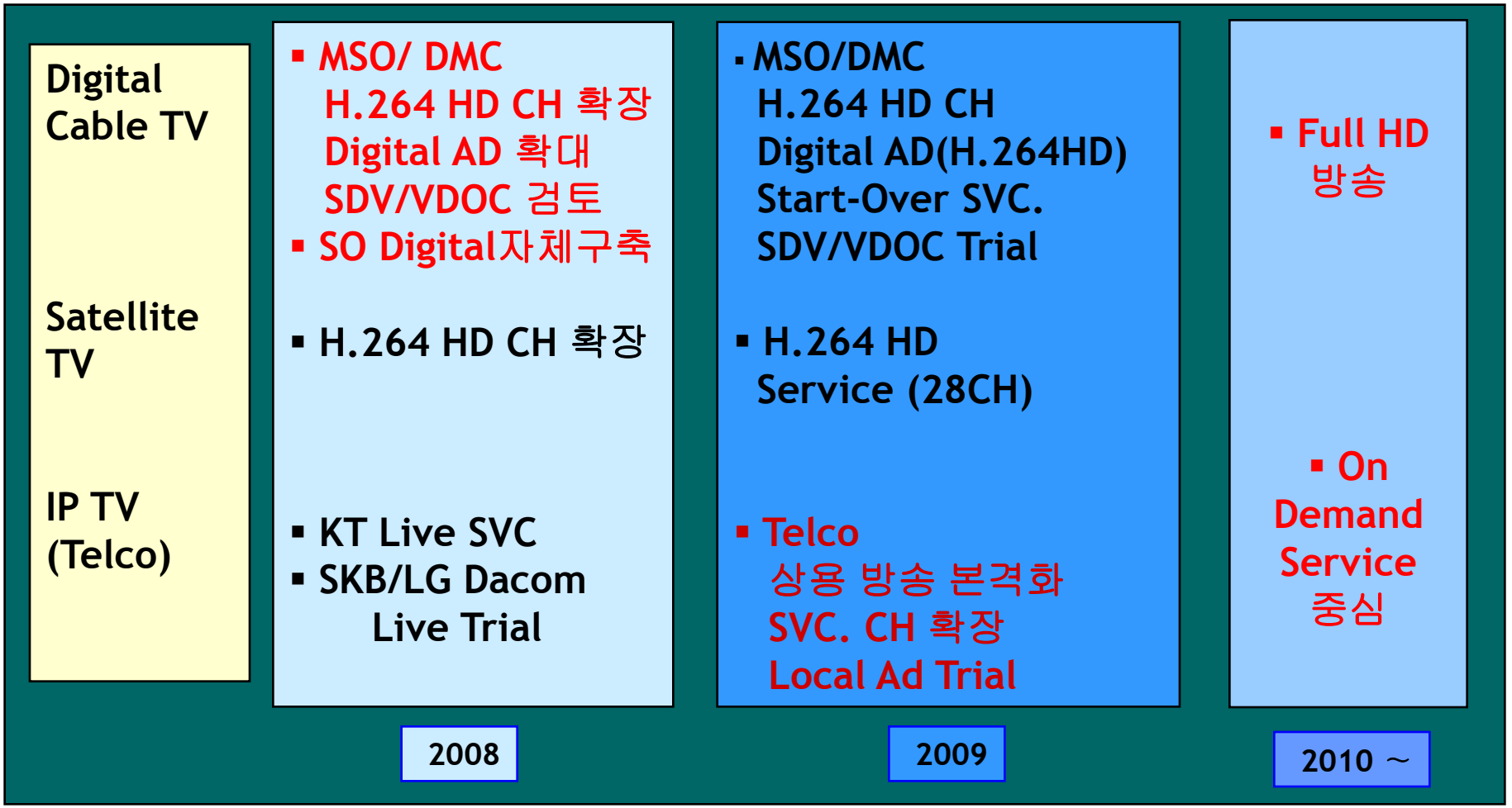
- Digital Cable HE/CDS Solutions
- IPTV HE/VQE/CDS Solution
- H.264 DTH Solution
- SD/HD CODEC NI Solution
- Non-Compression Solution

- Cisco Digital Video Products & Solutions

Digital Broadcast Flow in Korea



Digital Broadcast Flow in Korea



Key Challenges in Video Headend

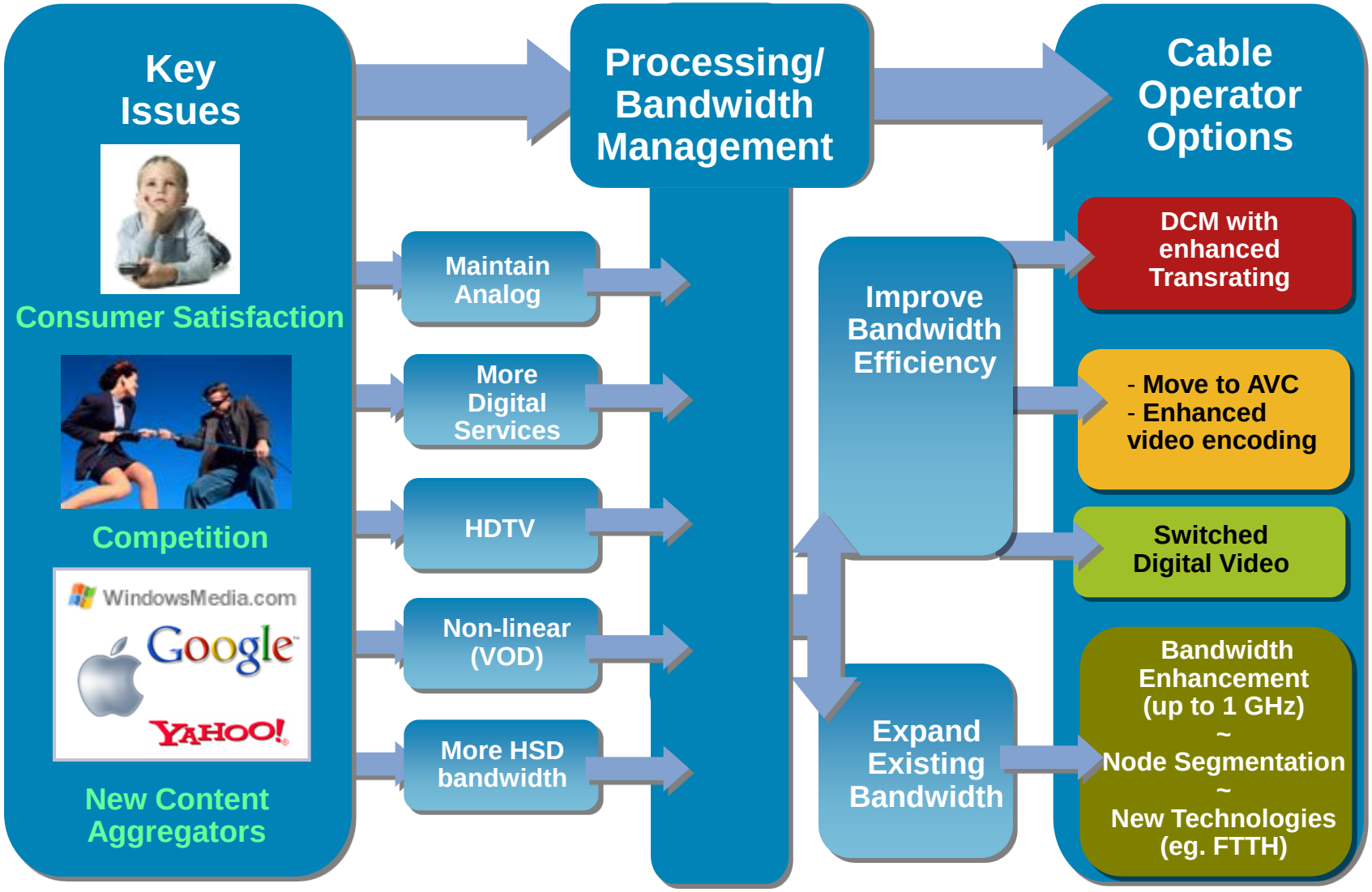
Cable SP

- Freq. Insufficiency of Cable TV → SDV, DCM Stat. Mux
- HD Channel Extension
- Cable IPTV → Hybrid STB (RF + IP) → VDOC
- SimulCrypt → DCM

Telco SP

- Local AD Insertion and Channelizing → DCM
- Simulcrypt / Encryption Capacity → DCM
- Channel Zapping Time → Fast Channel Change of VQE
- Video Quality → Error Recovery of VQE
- Service Monitoring → Monitoring of VQE

Cable Landscape
The Bandwidth Challenge



Telco Landscape
Why Video for Telco Service Providers?

- Cable attacking voice with triple play
- Triple Play Bundle is a worldwide phenomenon
- Consumers demanding more value
- Opportunity for ARPU growth

Video is now an Essential Service for all SP's

Telco Landscape
Competitive Positioning

Telco Challenges

- Channel zapping Time
- Regionalism (Local Ad insertion)
- Video Quality

Cable Challenges

- Enhance "Switched" Services
- Manage Bandwidth
- Migrate To All IP

Telco

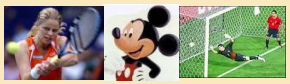
Cable

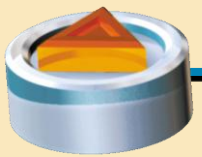
Solutions to Meet the Challenges

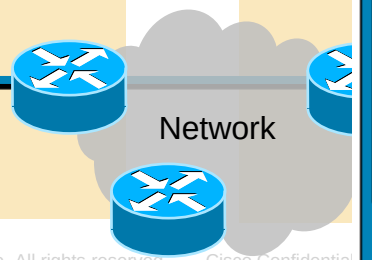
1. Solving the Bandwidth Challenge
2. Moving Towards an IP Interactive System
3. Telco IPTV Hub Office (Local Ad Insertion)

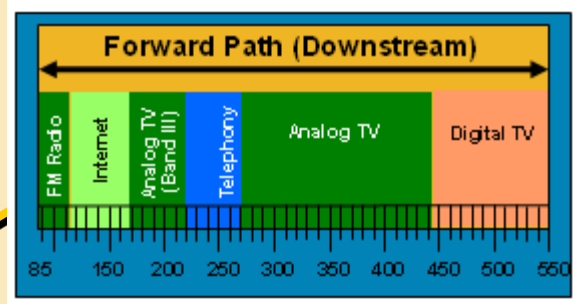
Solving the Bandwidth Challenge

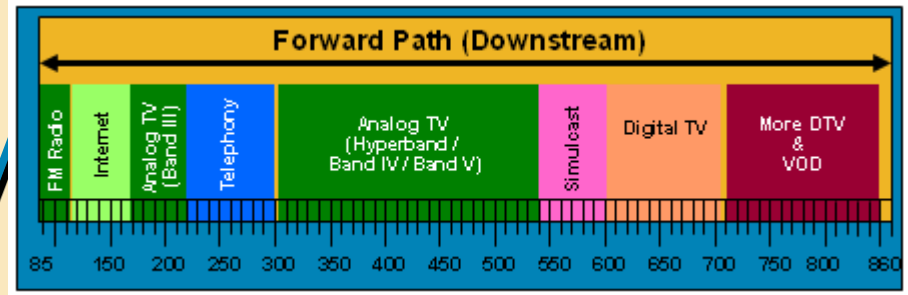
1. **Transrating / Stat-Muxing**
2. **Switched Digital Video & an IP Architecture**
3. **Move to AVC (HD)**
4. **Node Segmentation**
5. **Selective upgrade of the network**

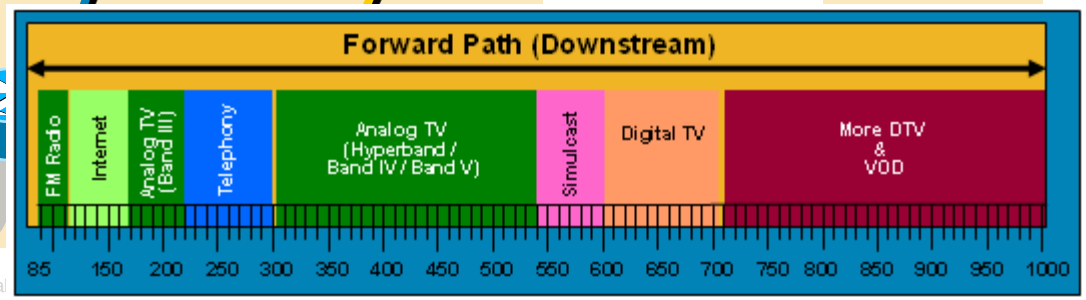




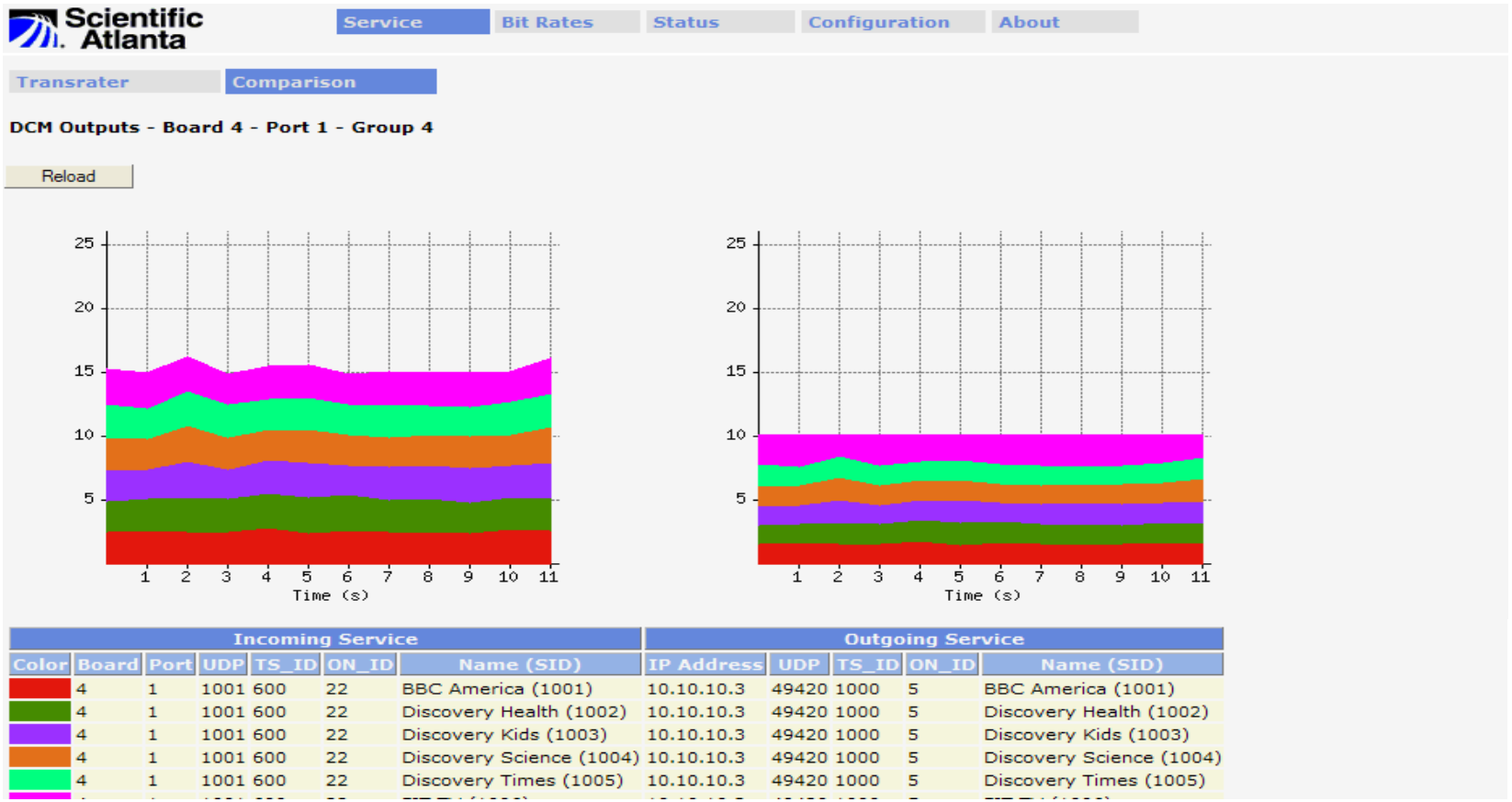






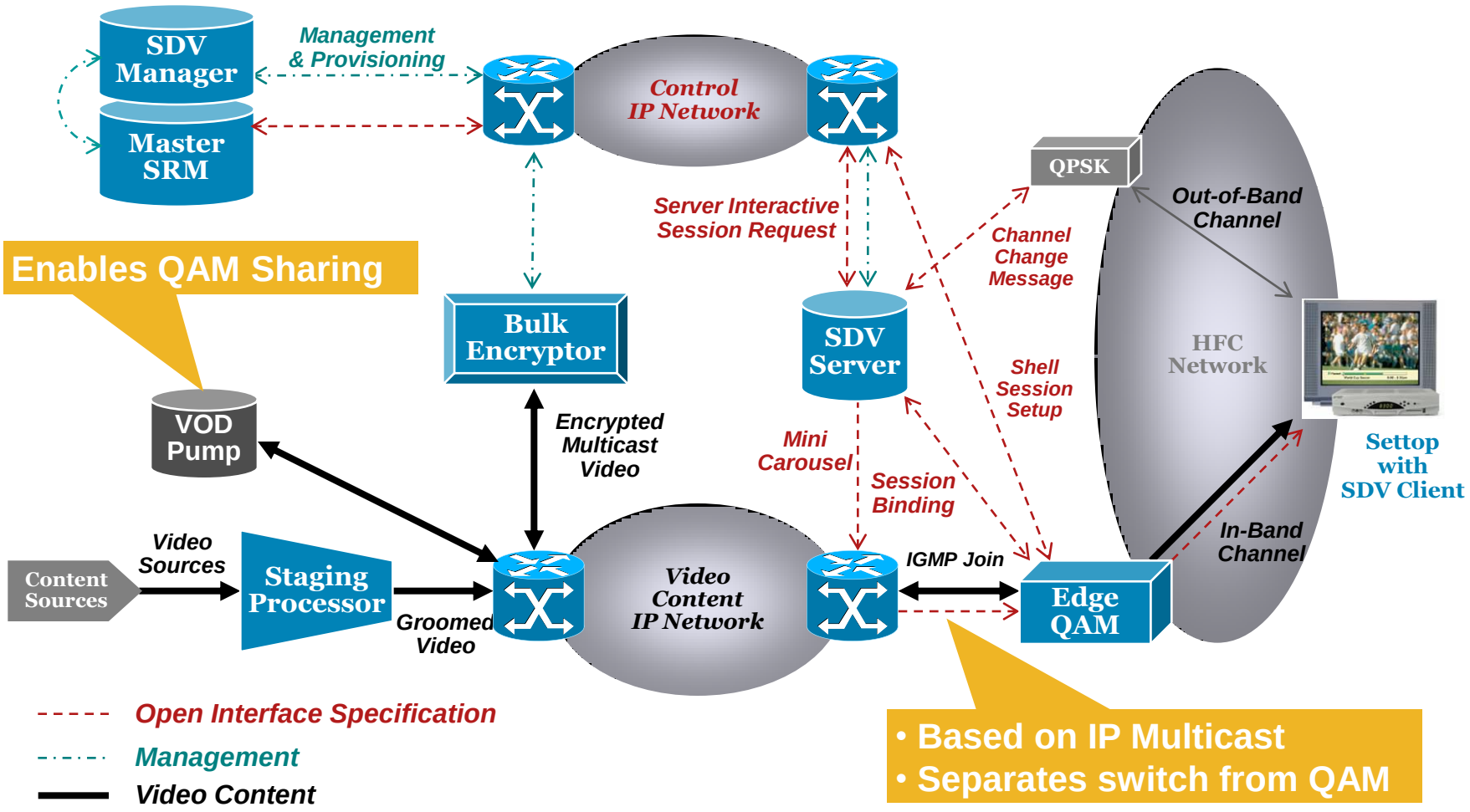


Transrating: Statistical Remultiplexing- DCM Before and after bit rate measurements



Incoming Service							Outgoing Service				
Color	Board	Port	UDP	TS_ID	ON_ID	Name (SID)	IP Address	UDP	TS_ID	ON_ID	Name (SID)
	4	1	1001	600	22	BBC America (1001)	10.10.10.3	49420	1000	5	BBC America (1001)
	4	1	1001	600	22	Discovery Health (1002)	10.10.10.3	49420	1000	5	Discovery Health (1002)
	4	1	1001	600	22	Discovery Kids (1003)	10.10.10.3	49420	1000	5	Discovery Kids (1003)
	4	1	1001	600	22	Discovery Science (1004)	10.10.10.3	49420	1000	5	Discovery Science (1004)
	4	1	1001	600	22	Discovery Times (1005)	10.10.10.3	49420	1000	5	Discovery Times (1005)

Open IP Architecture for SDV



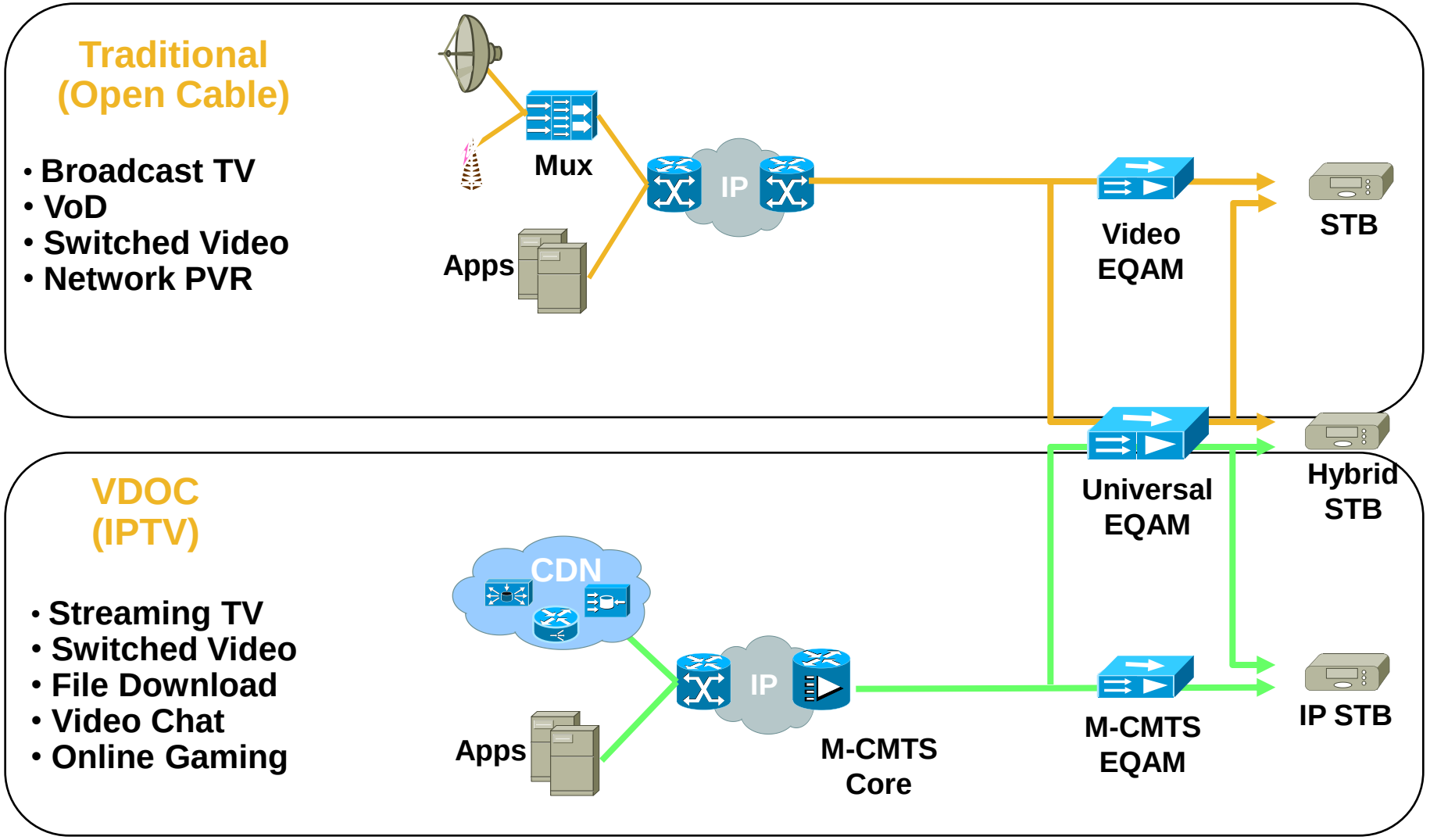
Cable IPTV (VDOC) Define

- Scope : Video delivery to an IP device
- Access : DOCSIS, QAM RF
- Client : PC, IP STB, DOCSIS STB, Mobile
- Video Source
  - Switched Digital Video
  - VOD
  - UCC (User Created Content)

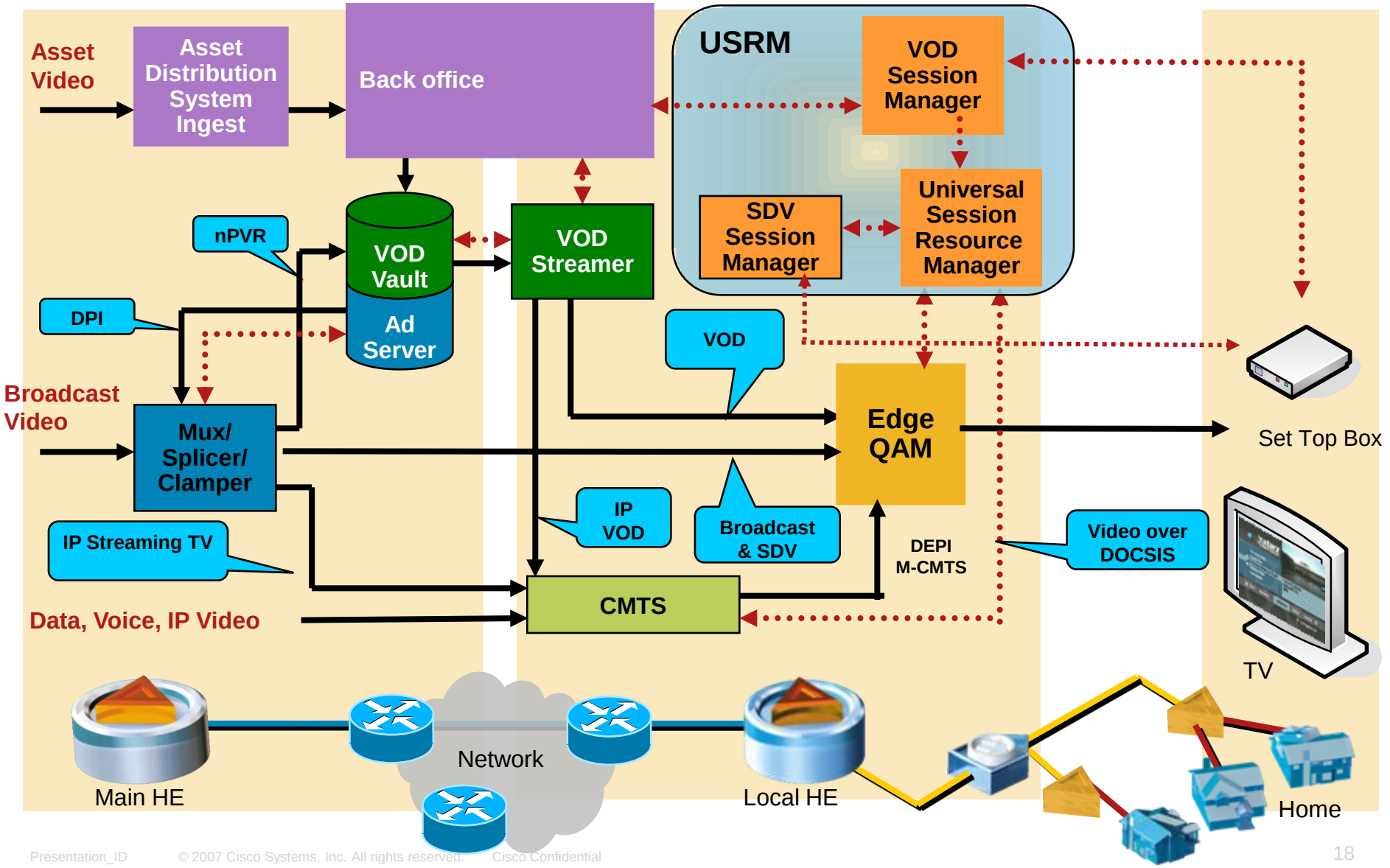
Cable IPTV Delivery Alternatives

- Traditional : I-CMTS (Integrated-QAMs CMTS)
  - Limited upstream/downstream flexibility
  - Optimized for voice and data
- M-CMTS/DOCSIS 3.0
  - Channel bonding, supporting at least 4 downstream QAMs to the Cable-Modem
  - Decouple downstream QAM from the CMTS
  - ✓ Flexible downstream/upstream configuration
  - ✓Low Cost Universal Edge QAM Solution
  - ✓Resource sharing Universal Edge QAM Between Video and data
- VDOC Solution
  - Combining the best of DOCSIS and Digital Video delivery

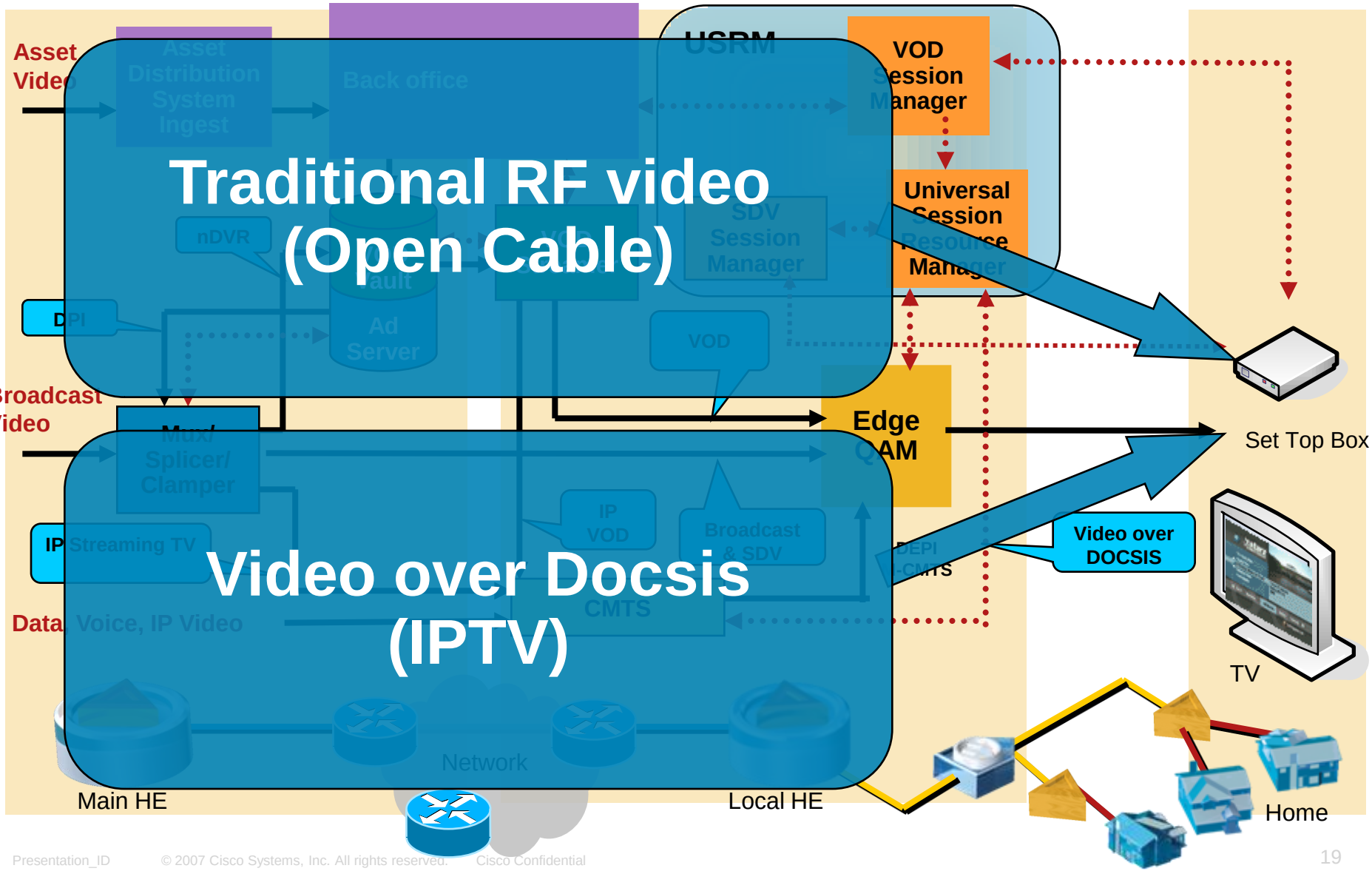
Moving Towards an IP Interactive System



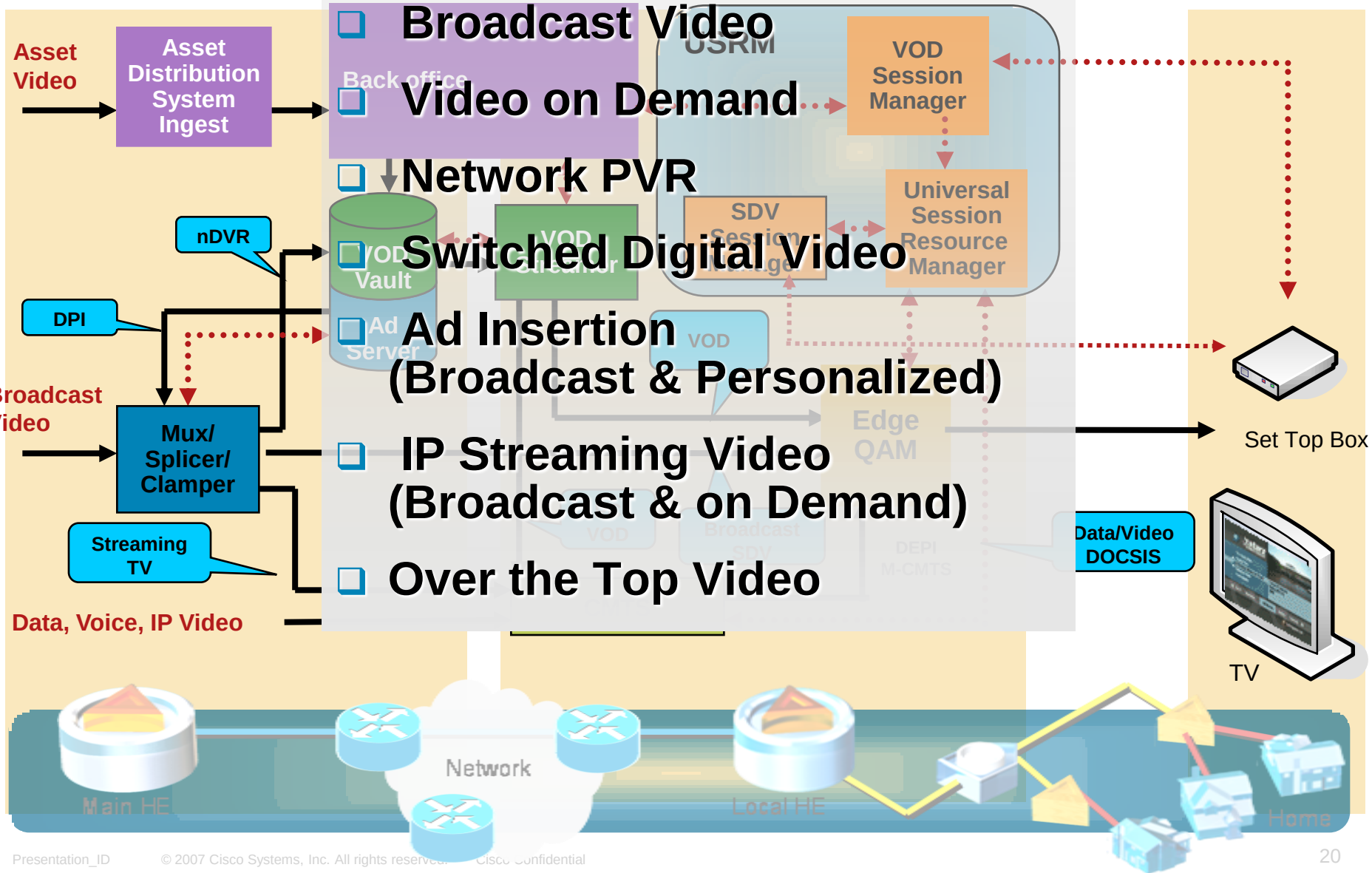
Moving Towards an IP Interactive System



Moving Towards an IP Interactive System

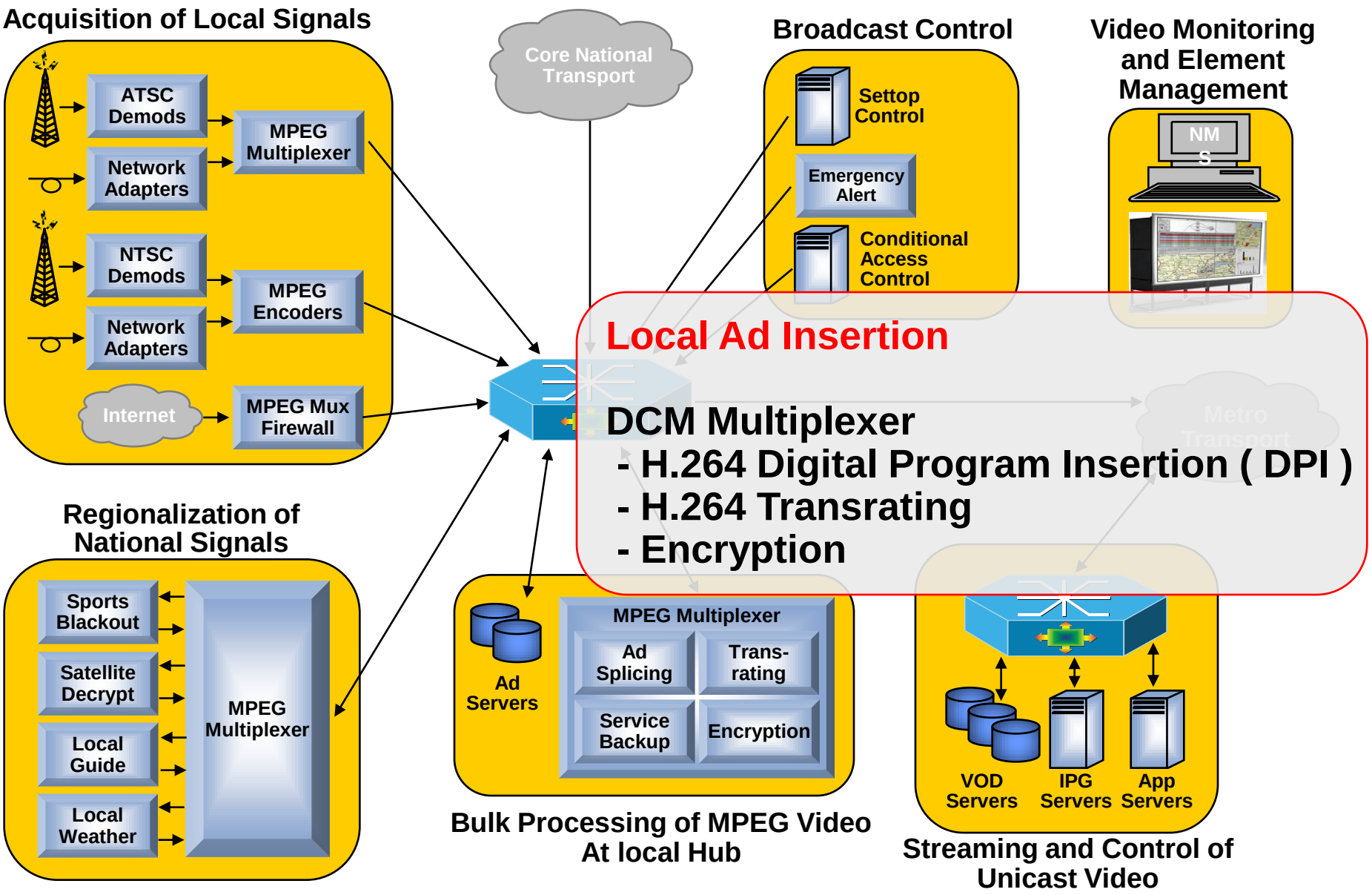


The Move Towards Fully Switched Has Started

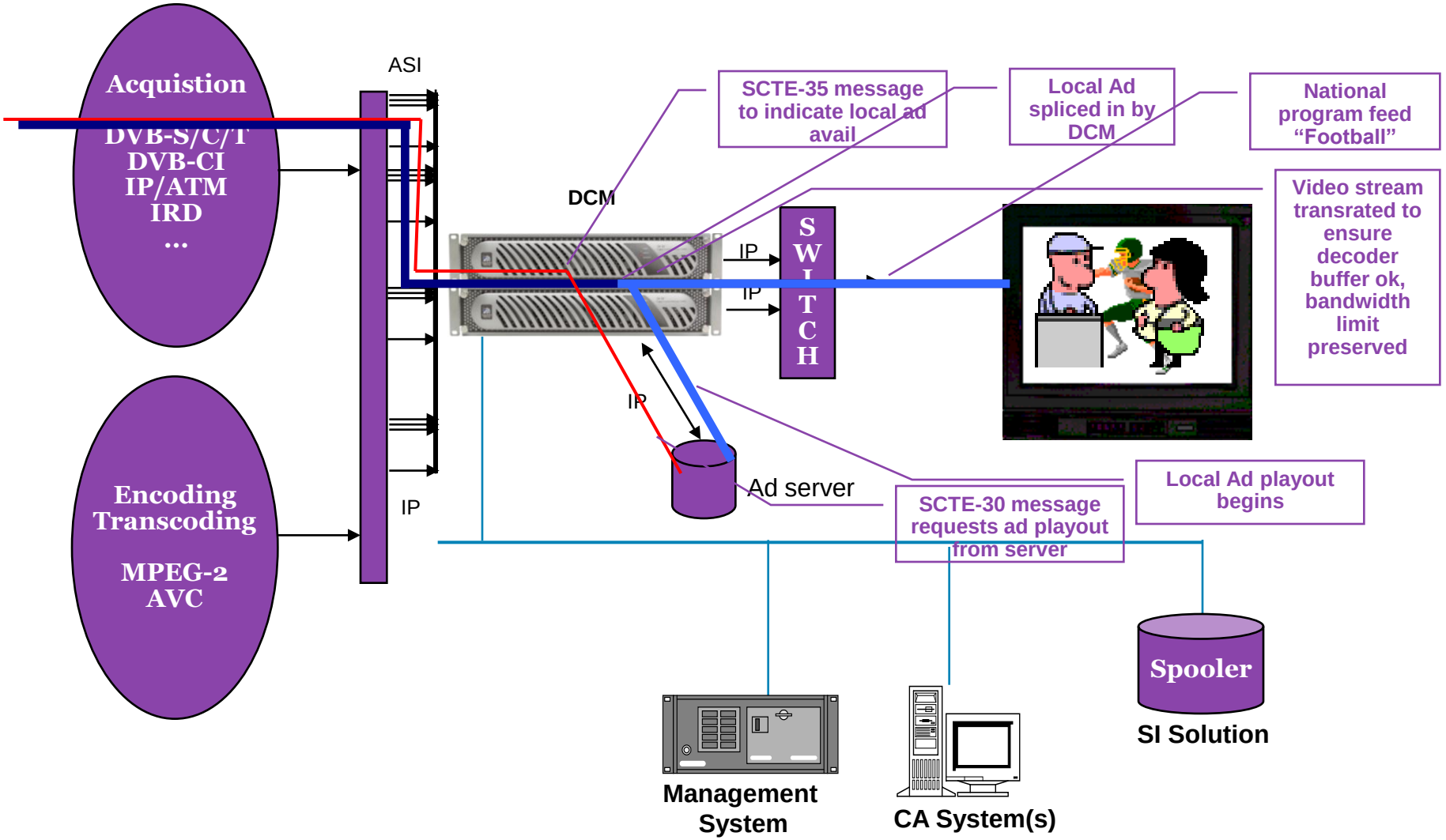


- Broadcast Video
- Video on Demand
- Network PVR
- Switched Digital Video
- Ad Insertion (Broadcast & Personalized)
- IP Streaming Video (Broadcast & on Demand)
- Over the Top Video

Telco IPTV Hub Office (Local Ad Insertion)



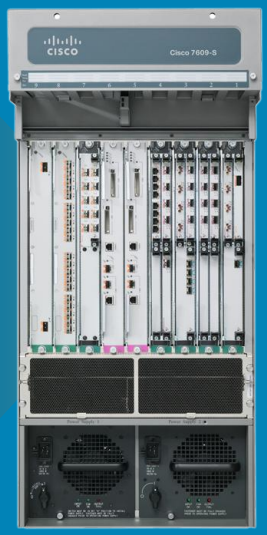
Processing with the DCM
DPI as Ad Insertion



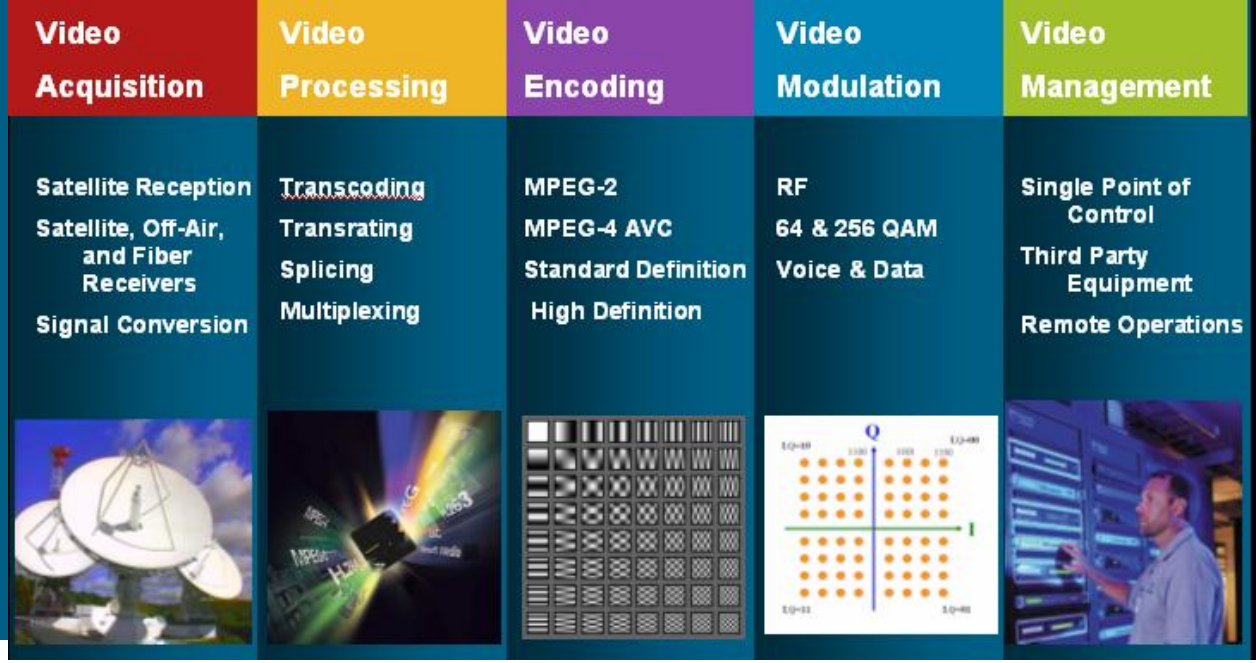
Introducing the Cisco Visual Quality Experience (VQE) Technology

Protecting IPTV Quality of Experience

- Real-time video error repair
  - Eliminates effects of uncorrelated bit errors on individual DSL lines
  - Local re-transmission of dropped IP packets to STB in Sub-100ms
- Scalable, standard-based fast channel change
  - Maintains consistent user experience
  - Sub-second channel change time
- Diagnoses problem areas
  - Monitoring and reporting of faults per DSL line above threshold



Phase 1: Network Appliance
Phase 2: Integrated into Cisco 7600 Edge Router



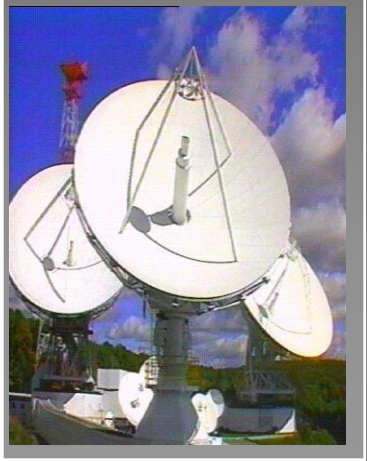
Video Headend Products & Roadmaps

1. Digital Content Manager (DCM Multiplexer)
2. Encoders Portfolio
3. Modulators
4. ROSA NMS

Head End Building Blocks – Cisco Solutions

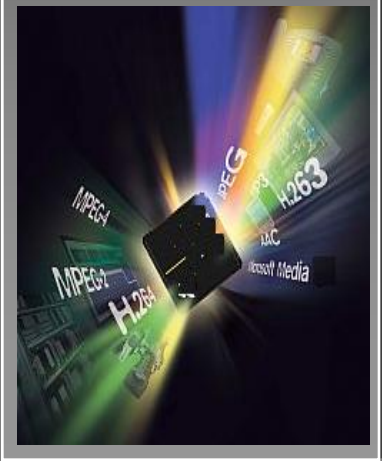
Video Acquisition

- System Design and CA Services



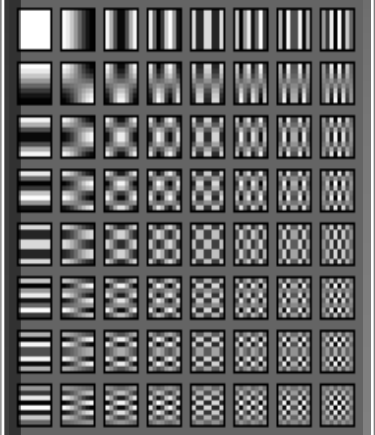
Video Processing

- Digital Content Manager D9900
- Content Distribution System



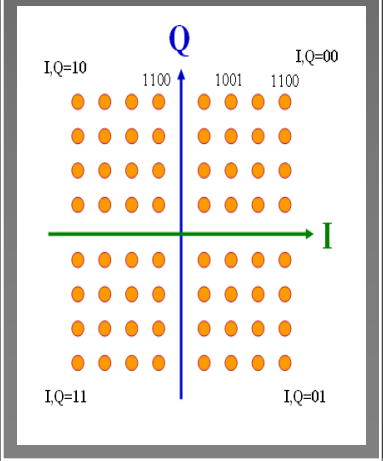
Video Encoding

- D9022.D9032/ D9050 MPEG2 Encoders
- D9034/D9054 H.264 Encoders



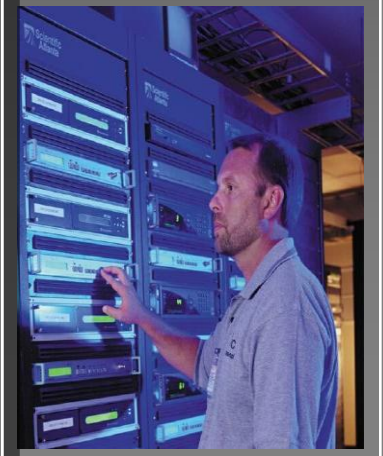
Video Modulation

- XDQA-24
- RF Gateway 1
- RF Gateway 10



Video Management

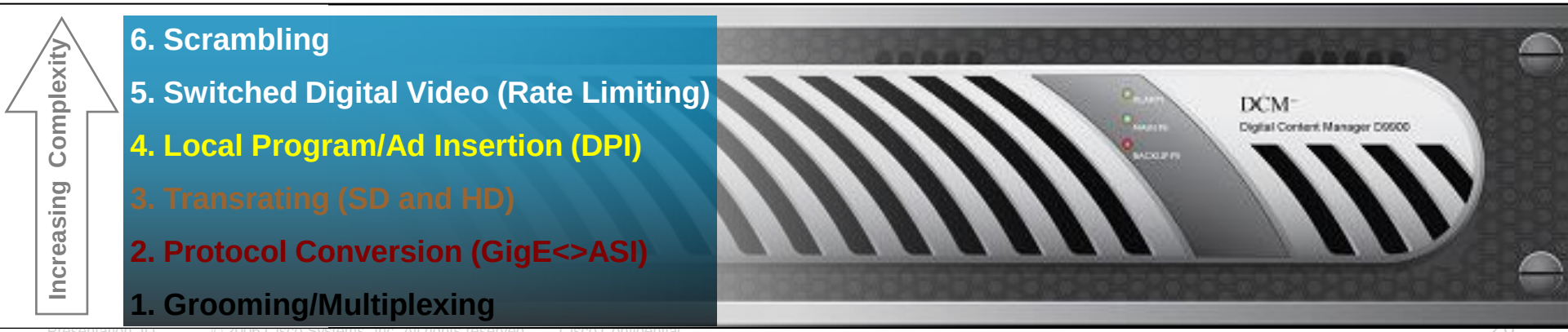
- ROSA



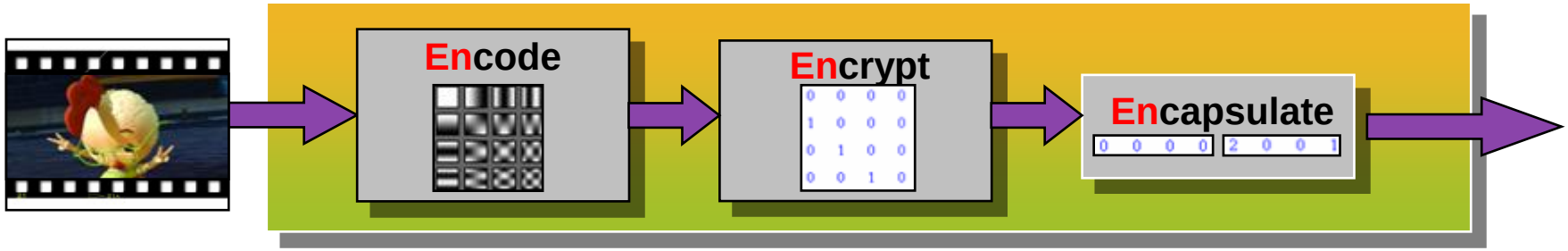
DCM: The Next Generation Multiplexer

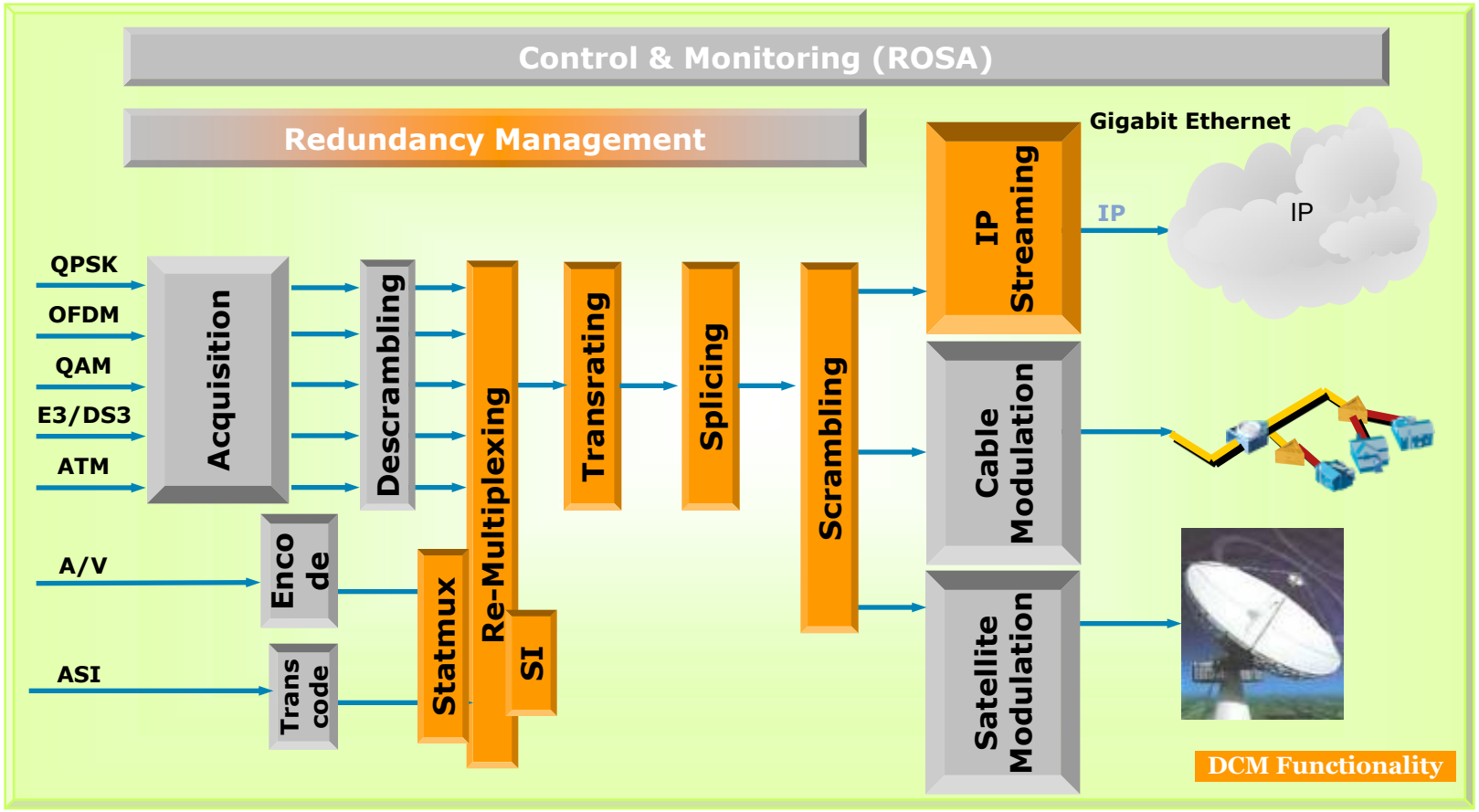
- DCM 9900 is a **service** and **content -aware** video application host
  - –Transrating Multiplexer
  - –Digital Ad Splicer (DPI)
  - –Bulk Encryptor
  - –IP Statmux
  - –Rate Limiter (SDV)
- Supported **delivery** mechanisms
  - –Broadcast
  - –On-demand
  - –Switched applications

- DCM 9900
  - –Unmatched **performance**
  - –True **Headend-in-a-box**
  - –**1,000s** of streams in **2RU** box
- DCM 9900 **flexible** architecture enables
  - –Versatile and independent scaling
  - –Future-proofed against changing system requirements
  - –Variety of redundancy scheme's assuring max system **uptime**
- Install base of over 1000 DCM's!



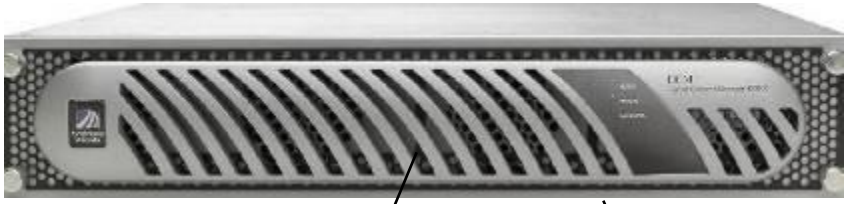
DCM Functionality





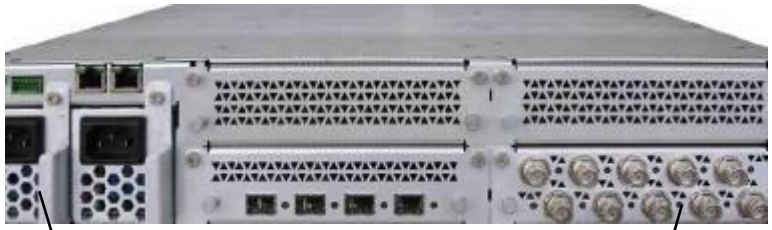
DCM Platform Detail

DCM Front



- Front to back air flow with optional air filters
- Compact 2 RU form factor

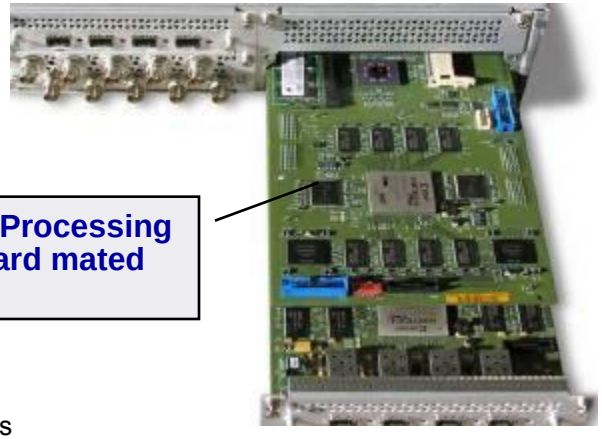
DCM Back



- Redundant AC or DC power supplies
- Hot swappable

Four I/O cards
- 10 Port ASI cards
- 4 Port GbE cards

- Fans hot swappable



- Optional Co-Processing daughter board mated to I/O card

* Based on DCM's configured with 4 ASI cards

** Based on DCM's configured with 4 GbE cards

Current Encoders Portfolio & Classifications

Product Classification	MPEG-2 SD	MPEG-2 HD	AVC SD	AVC HD
	 D9022	 D9050	 D9034	 D9054
	 D9032			
	 D9040			
Markets	CATV Broadcast Telco Contribution Programmers	CATV Broadcast Contribution Programmers	Broadcast Telco Programmers	Broadcast Telco Programmers
Customers	Comcast T-Systems Time Warner Turner, RAI KT, LG Powercomm MBC, SBS, 아리랑TV 영서방송, 제주방송	Turner SCB, Win TV T-Systems EBU KT, LG Powercomm 영서방송	AT&T, SES T-Systems Alcatel SK Broadband 한화	AT&T Bell South MBC

SA/Cisco Edge QAM Roadmap

M-CMTS

SDV

RFGW-10
480 QAM /
13RU

Increasing Functionality

DOCSIS 3.0
channel bonding

RFGW-1-D
48 QAM / RU

Broadcast

VOD

eXtra Dense
QAM Array - 24
24 QAM / RU

Increasing Density

Dense QAM
Array
16 QAM / 3RU

eXtra Dense
QAM Array
12 QAM / RU

2002 2003 2004 2005 2006 2007 2008 2009

The Cisco RF Gateway Series

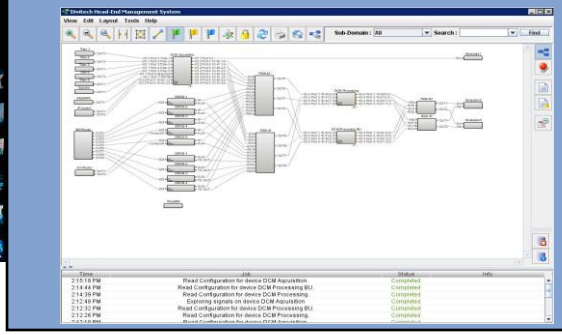
Fully featured product family of Universal QAM Modulators, supporting Digital Broadcast, SDV, VOD and DOCSIS solutions, with leading performance, density, availability, power consumption and scale.

RFGW-1-D	RFGW-10
48 QAMs in 1 RU @ ~7W/QAM	480 QAMs in 13 RU (upgradeable to 3840 QAMs) @ ~5.5W/QAM
Power, WAN and Timing HA	Power, WAN, Timing, GE Switching and N+1 EQAM linecard HA (Upgradeable to ISSU & NSF SSO)
Up to 2048 Steams	Up to 10,000 Streams
D-RFI to 1Ghz	D-RFI to 860Mhz (DS48 LC).
SDV, VoD, HDTV, NGOD, Broadcast, DOCSIS 3.0, M-CMTS, Annex A, B, C	

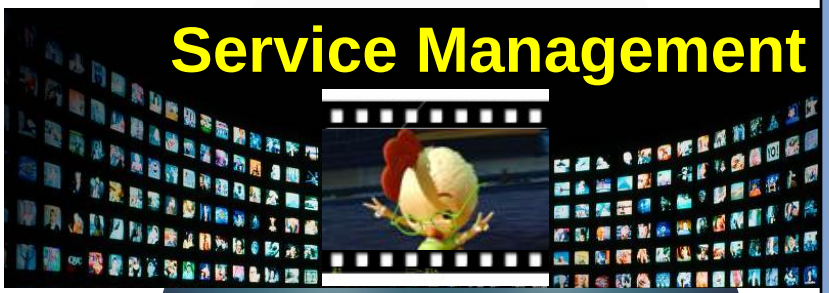
ROSA Service Management

Service Oriented

ROSA Service Management



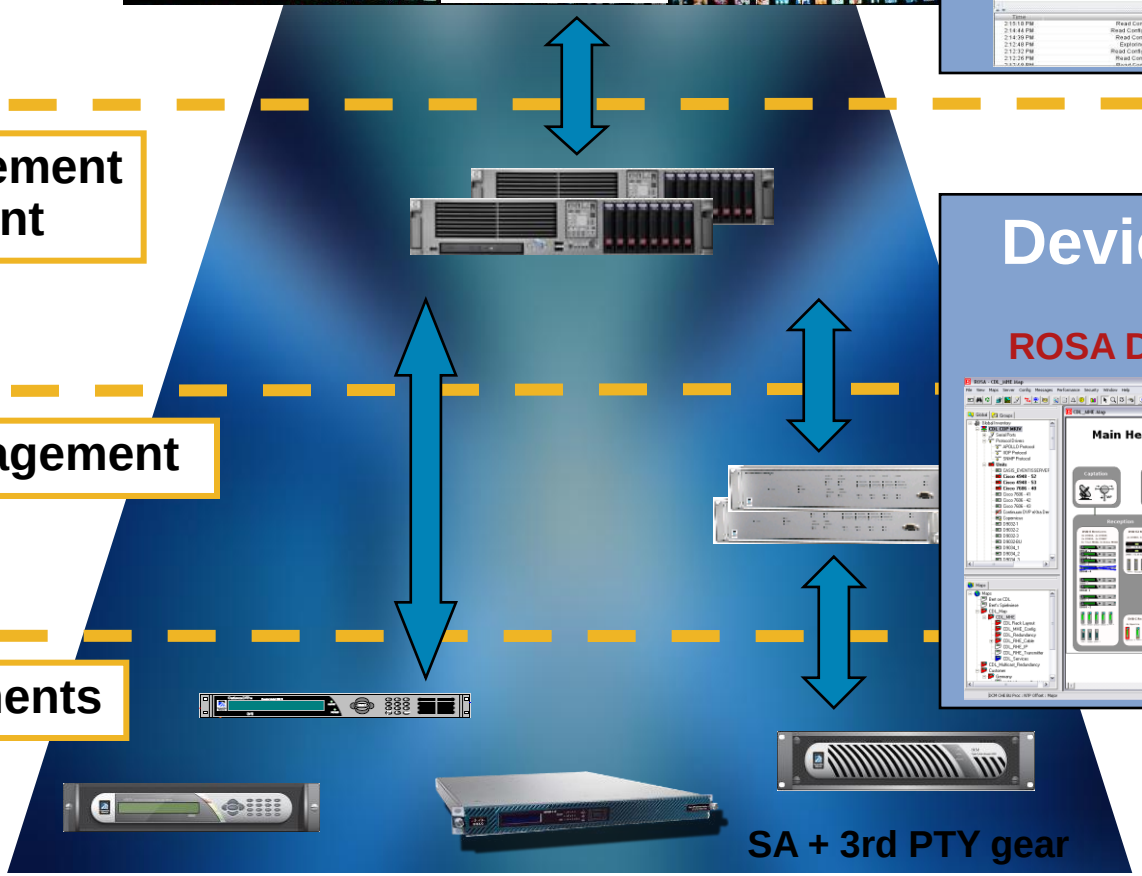
Service Management



Network & Element Management

Element Management

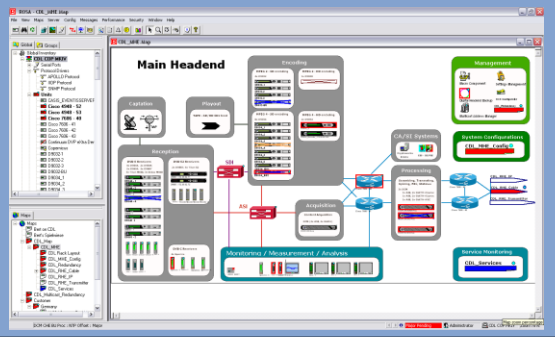
Network Elements



SA + 3rd PTY gear

Device Oriented

ROSA Device Management



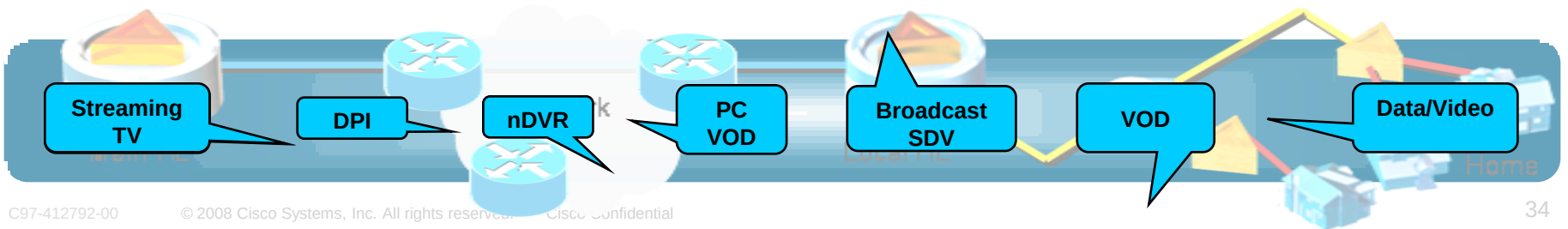
Conclusions

End – To – End Integration

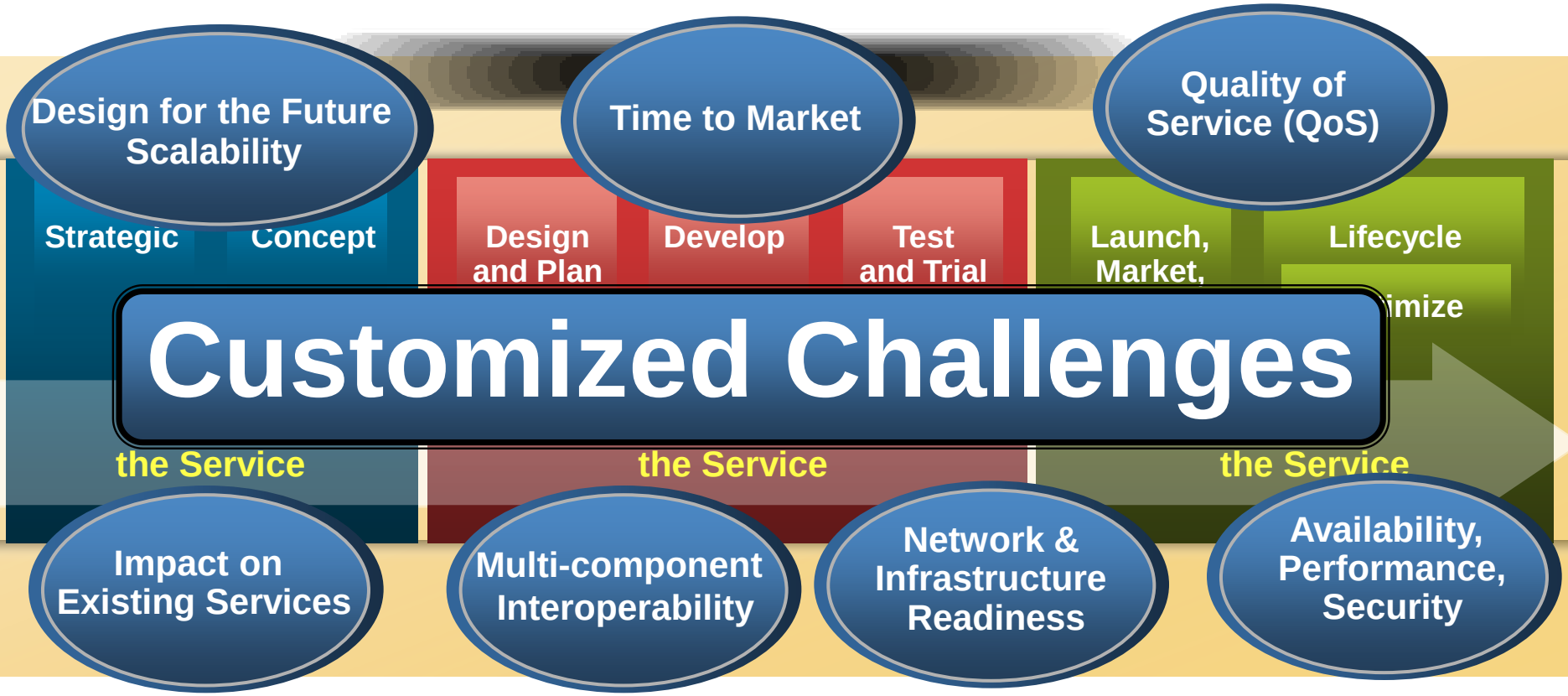
Envision the Service

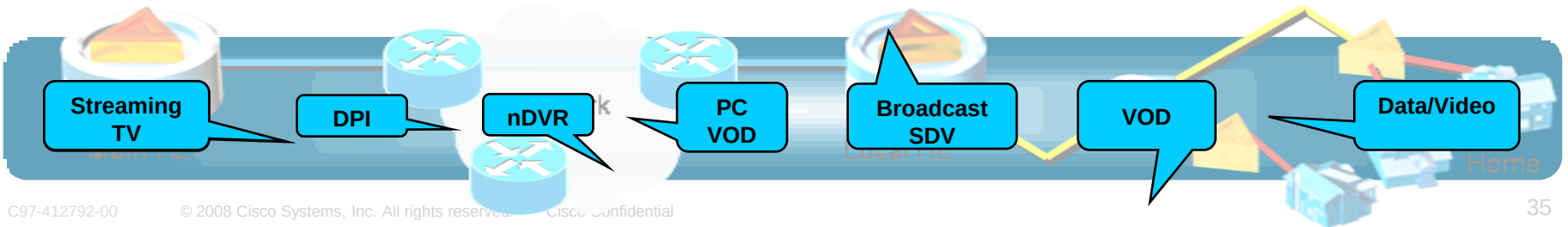
Build the Service

Operate the Service

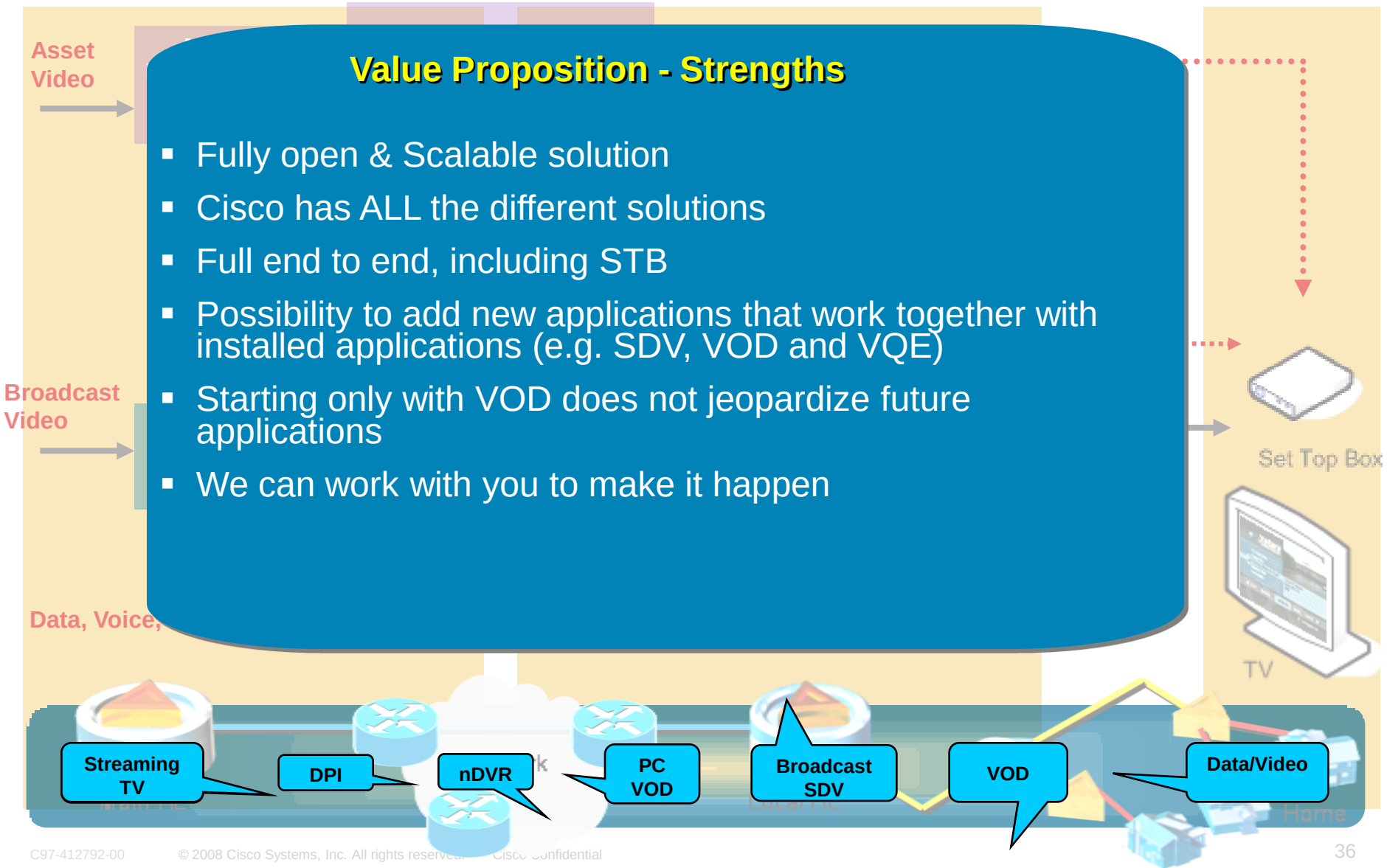


End – To – End Integration





Overall Value Proposition of Cisco - SA



Cisco's Video H/E System Advantages

What do we bring?

- Unequalled knowledge of video, IP, and the convergence of both
- A comprehensive suite of products and services including:
  - Video acquisition, processing, Modulations, and management (Head ends/Hubs)
  - Video optimized transport and routing
  - Open IP Architecture for SDV
  - MPEG 2/4 DPI (Digital Program Insertion)
  - Visual Quality of Experience for IPTV
- The ability to engage Service Providers at any stage of their deployment
- Scalability roadmaps for size, performance and feature growth

Superior Partner for SP Success