envivio®

Presentation

Convergence : Mas alla de IPTV
TV : PC : Mobile

# IPTV Overview

IPTV Overview

IPTV, What is it?

- Wikipedia definition on IPTV

  - IPTV (**Internet Protocol Television**) is a system where a digital television service is delivered using Internet Protocol over a network infrastructure, that is, a broadband connection.

  - A general definition of IPTV is television content that, instead of being delivered through traditional broadcast and cable formats, is received by the viewer through the technologies used for computer networks, all of which employ Internet Protocol.

IPTV Overview
Components

Components of IPTV
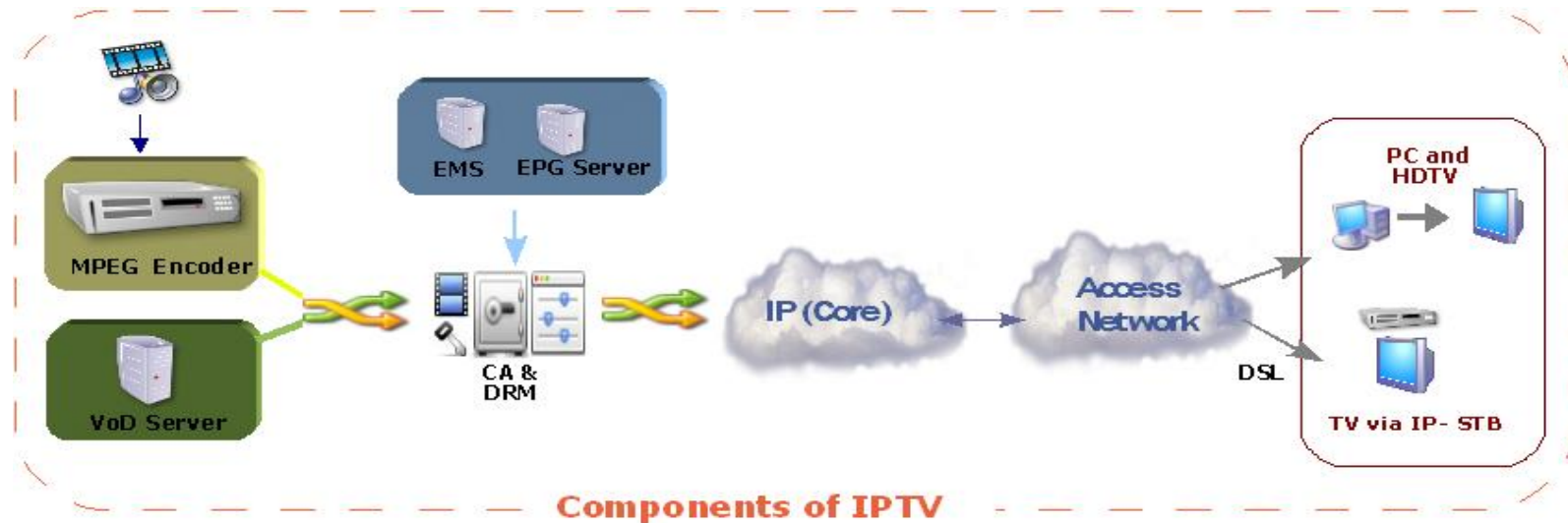
Encoders: An equipment that converts the video source into IP streams.

CA & DRM: Responsible for the content protection

EPG Server: Responsible for the Eletronic Guide Information

IP Core: Responsible to route the IP streams to the Access Network

Access Network: The network responsible to give a broadband connection to the end user. It could be xDSL, Fiber, etc

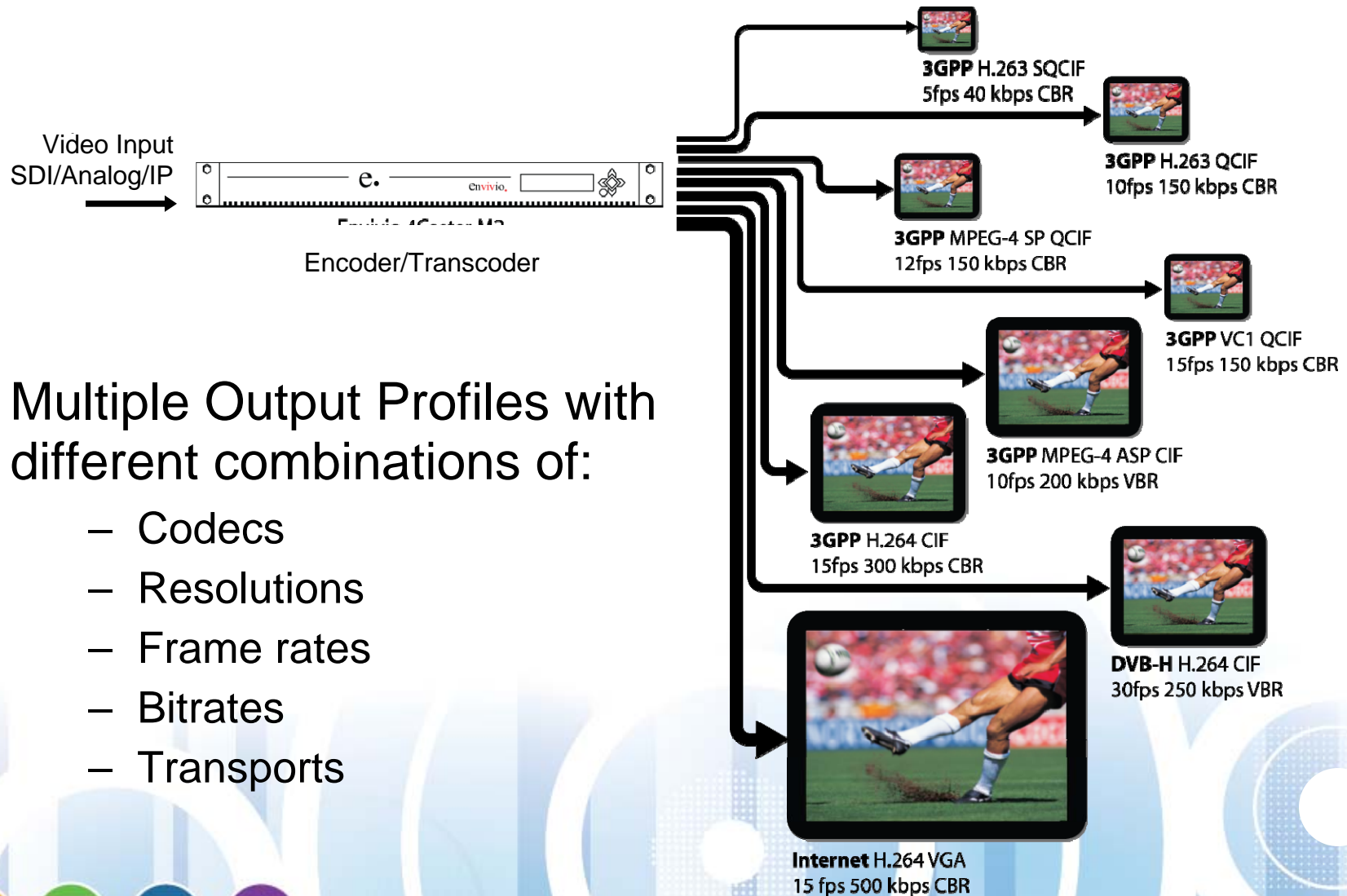**STB:** Responsible to convert the IP stream into video for the TV

IPTV Architecture

Multi Network / Multi Device

Video Input
SDI/Analog/IP

Encoder/Transcoder

Multiple Output Profiles with different combinations of:

– Codecs

– Resolutions

– Frame rates

– Bitrates

– Transports

3GPP H.263 SQCIF
5fps 40 kbps CBR

3GPP H.263 QCIF
10fps 150 kbps CBR

3GPP MPEG-4 SP QCIF
12fps 150 kbps CBR

3GPP VC1 QCIF
15fps 150 kbps CBR

3GPP MPEG-4 ASP CIF
10fps 200 kbps VBR

3GPP H.264 CIF
15fps 300 kbps CBR

DVB-H H.264 CIF
30fps 250 kbps VBR

Internet H.264 VGA
15 fps 500 kbps CBR
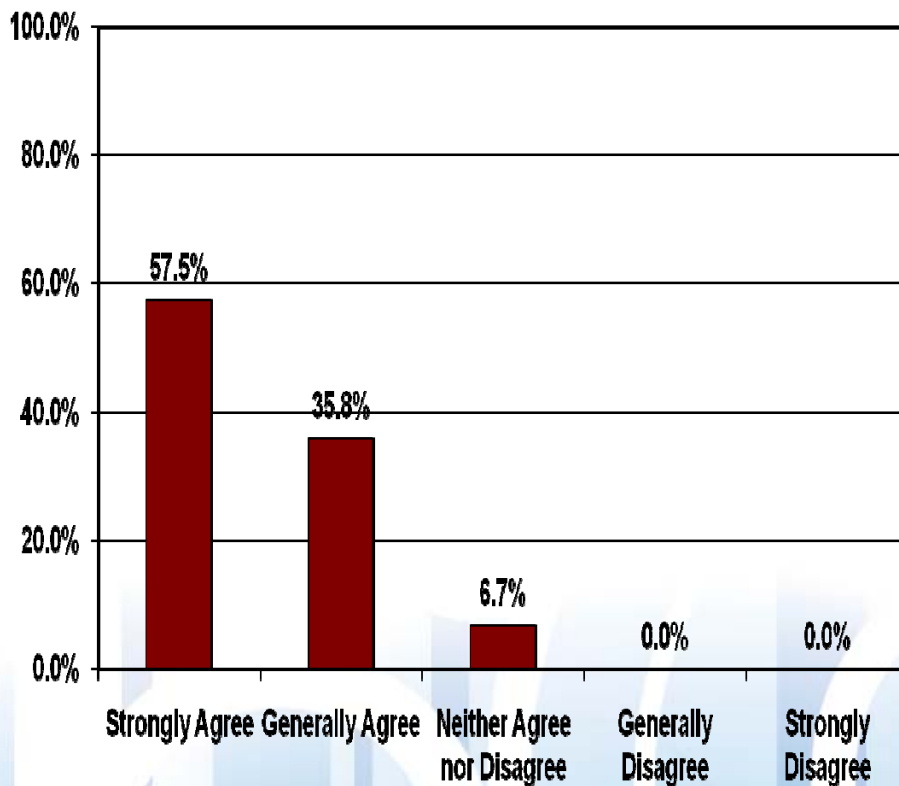
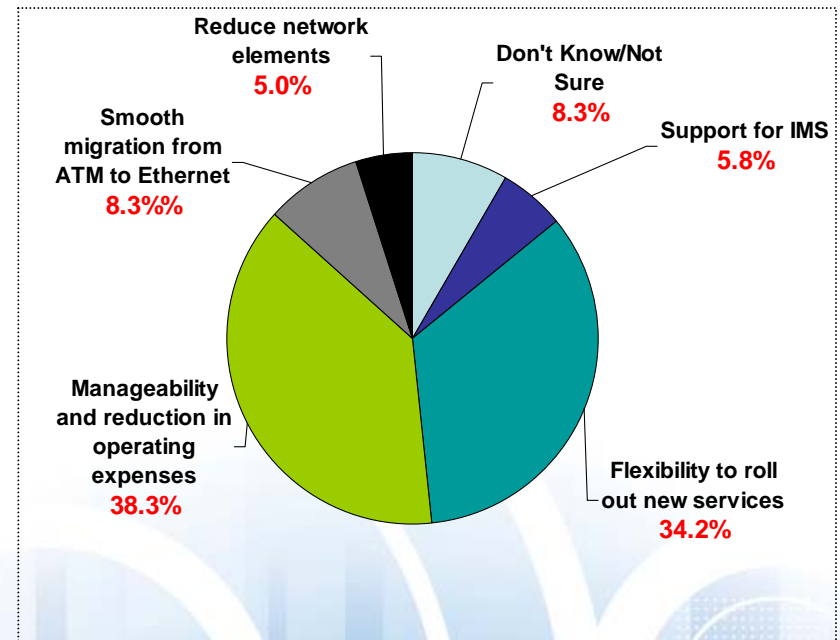**Powering IP Video Convergence From Mobile to HD**

Service Providers Are Enthusiastic About 3-Screen Video, but they know the Challenges

Q: Which of the following best describes your response to the following statement: "Multiplatform video distribution will be an important requirement for your business within the next five years."

The Most Important Consideration For A Service Provider In Terms Of Network Design When Considering Multiplatform Video

Bar chart values:
- Strongly Agree: 57.5%
- Generally Agree: 35.8%
- Neither Agree nor Disagree: 6.7%
- Generally Disagree: 0.0%
- Strongly Disagree: 0.0%

Source: 2008 Heavy Reading Survey, (100+ respondents from a variety of service provider types worldwide)

Pie chart values:
- Reduce network elements 5.0%
- Don't Know/Not Sure 8.3%
- Support for IMS 5.8%
- Smooth migration from ATM to Ethernet 8.3%%
- Flexibility to roll out new services 34.2%
- Manageability and reduction in operating expenses 38.3%
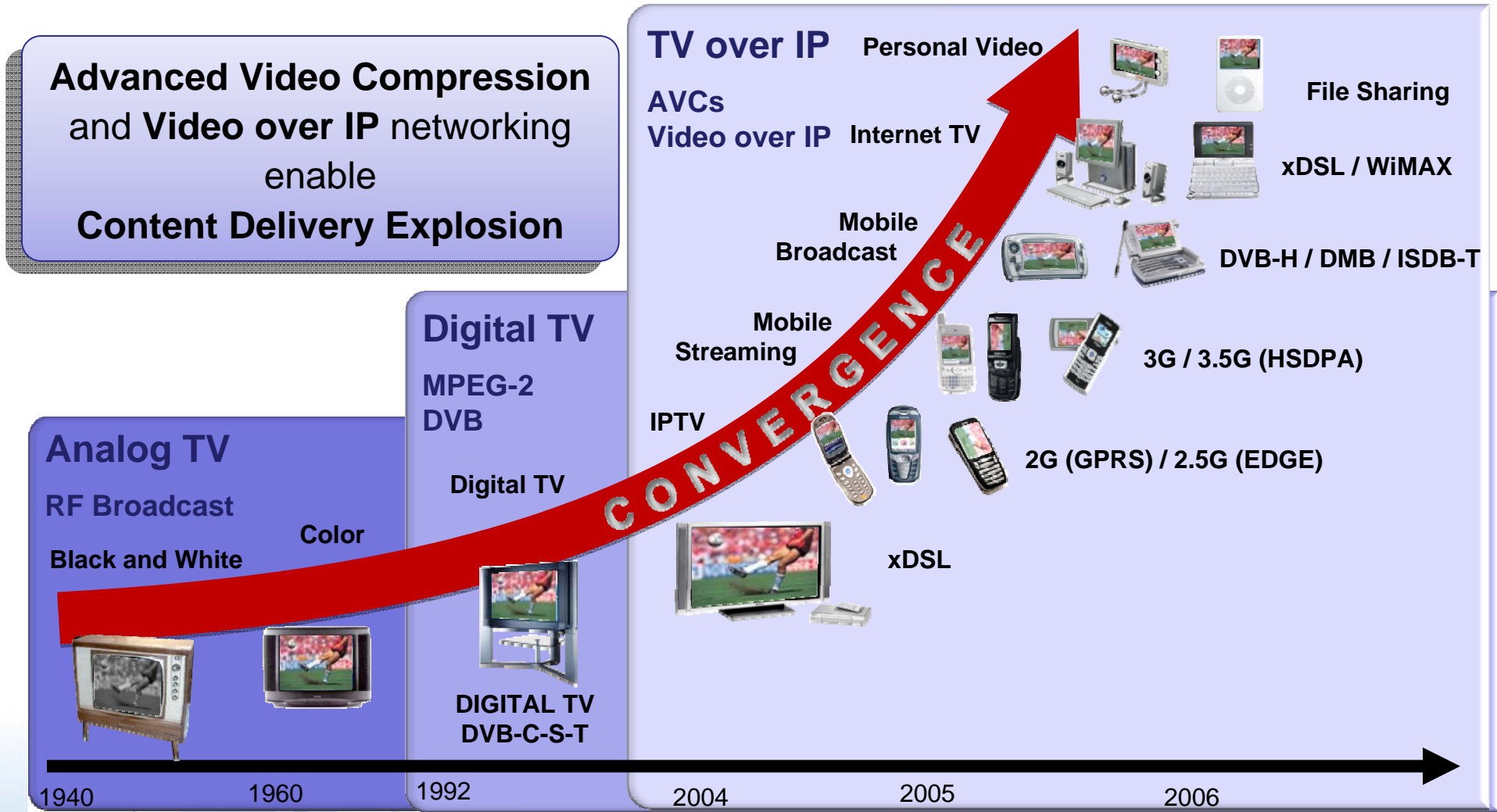
Source: 2008 Heavy Reading Survey

Powering IP Video Convergence From Mobile to HD

Convergence Headend - Principles

- **Large variety of output video formats**
  - Multiple profiles encoded simultaneously from the same encoder

- **Infrastructure cost reduction**
  - IP input and output interfaces

- **Scalability and flexibility**
  - Encoders can be reconfigured for different applications
  - IP-based architecture make channel or service extension seamless

- **High Service Availability**
  - Redundant network interfaces
  - N+M redundancy

- **Future-proof**
  - Regular firmware upgrade for quality upgrade, new codecs and features

Powering IP Video Convergence From Mobile to HD

Three Screens Content Delivery

Advanced Video Compression and **Video over IP** networking enable **Content Delivery Explosion**

TV over IP
AVCs
Video over IP

Personal Video

Internet TV

Mobile Broadcast

Mobile Streaming

IPTV

CONVERGENCE

File Sharing

xDSL / WiMAX

DVB-H / DMB / ISDB-T

3G / 3.5G (HSDPA)

2G (GPRS) / 2.5G (EDGE)

xDSL

Digital TV
MPEG-2
DVB

Digital TV

DIGITAL TV
DVB-C-S-T

Analog TV
RF Broadcast

Black and White

Color

1940   1960   1992   2004   2005   2006

Powering IP Video Convergence From Mobile to HD

One Encoder for all Three Screens

4Caster C4
Three Screens Encoder

Three Screens Support

- IPTV (SD + HDTV)
- Internet TV (PC)
- Mobile TV (3GPP mobile streaming)

High Density Encoding

- 1 Channel HD IPTV (HD + PiP)
- 2 Channels Extreme™ SD IPTV (SD + PIP)
- 4 Channels Premium™ SD IPTV (SD +PIP)
- 4 Channels Internet TV (VGA + QVGA)
- 4 Channels Mobile TV (up to 32 profiles)

Advanced Compression

- Market leading encoding performance
- Premium & Extreme Compression™ tiers

Advanced Architecture

- Ultra High Availability platform
- Dual IP inputs and outputs
- Software-based Upgradability

Options

- SDI Inputs (4 Channels)
- Composite Inputs (4 Channels)
- SDI + Composite Input (1 Channel)

Powering IP Video Convergence From Mobile to HD

![Envivio logo]

How to Maximize the use of Broadband

Software Architecture : Benefits

Software Architecture (intel)

Flexibility ➲

In House Product Development ➲

Development Speed ➲

Predictable Performance Path ➲

Supplier Stability ➲

Cost / Performance ➲

envivio. Encoding Solution

- ☑ Three Screens Support
- ☑ Tiered Compression Levels
- ☑ Upgradeable Performance
- ☑ Upgradeable Embedded Features
- ☑ Upgradeable Service Offerings
- ☑ Best Compression Performance
- ☑ Best Low Latency Performance
- ☑ First to Market Products
- ☑ Predictable Product Roadmap
- ☑ Market Leading Performance
- ☑ Guaranteed Product Availability
- ☑ Outstanding Price / Performance

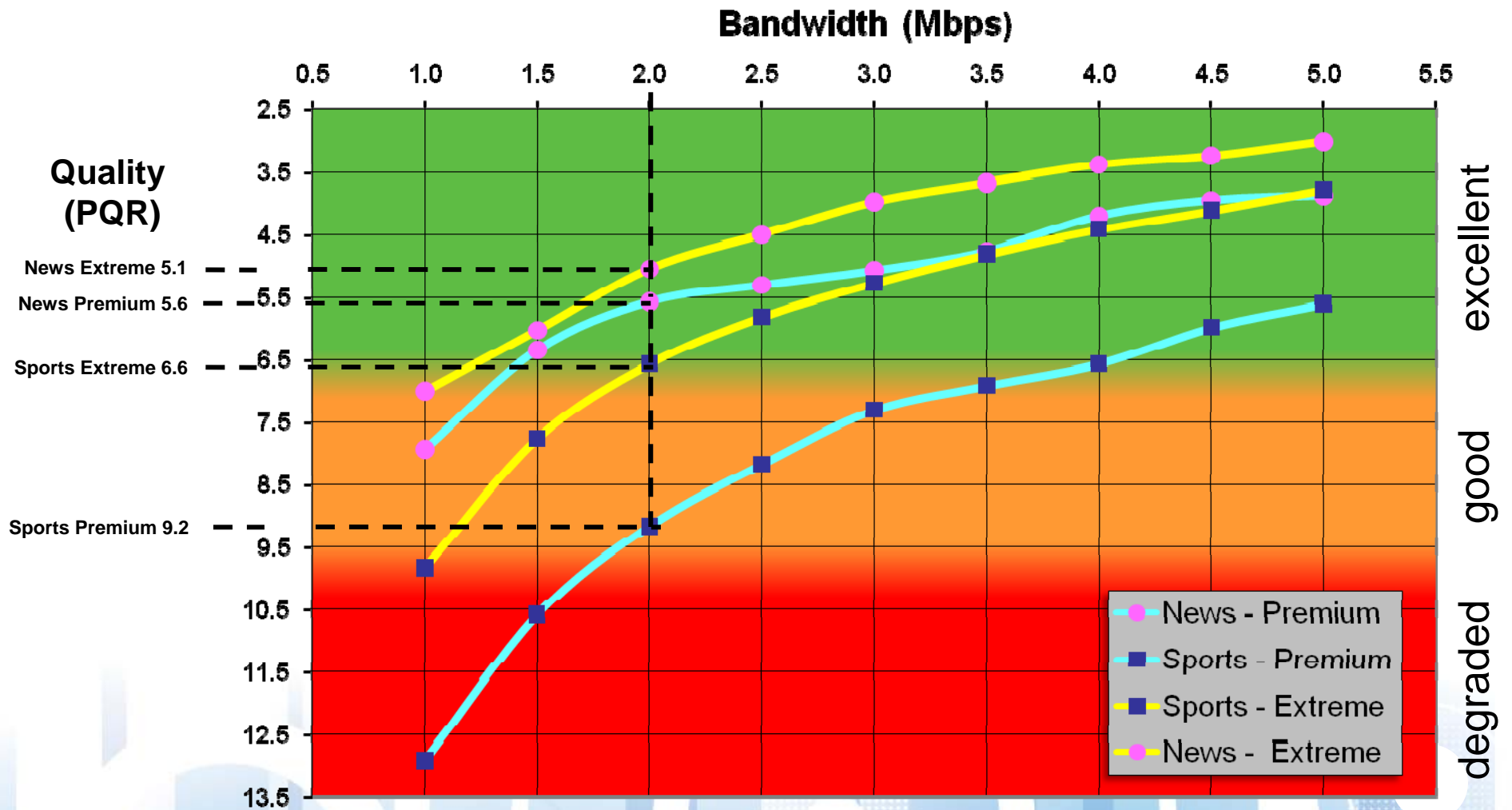**Powering IP Video Convergence From Mobile to HD**
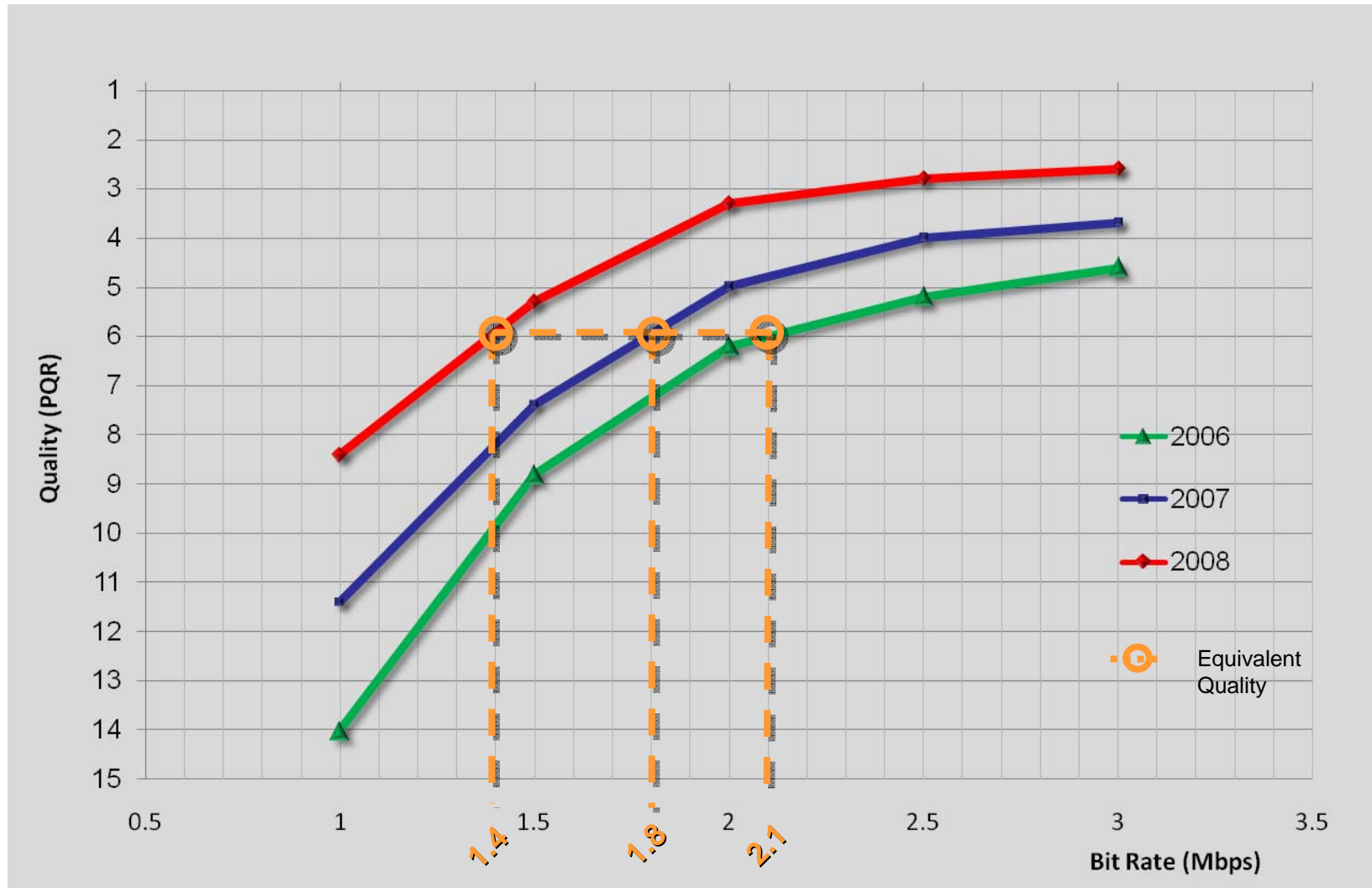
Compression : Network Coverage
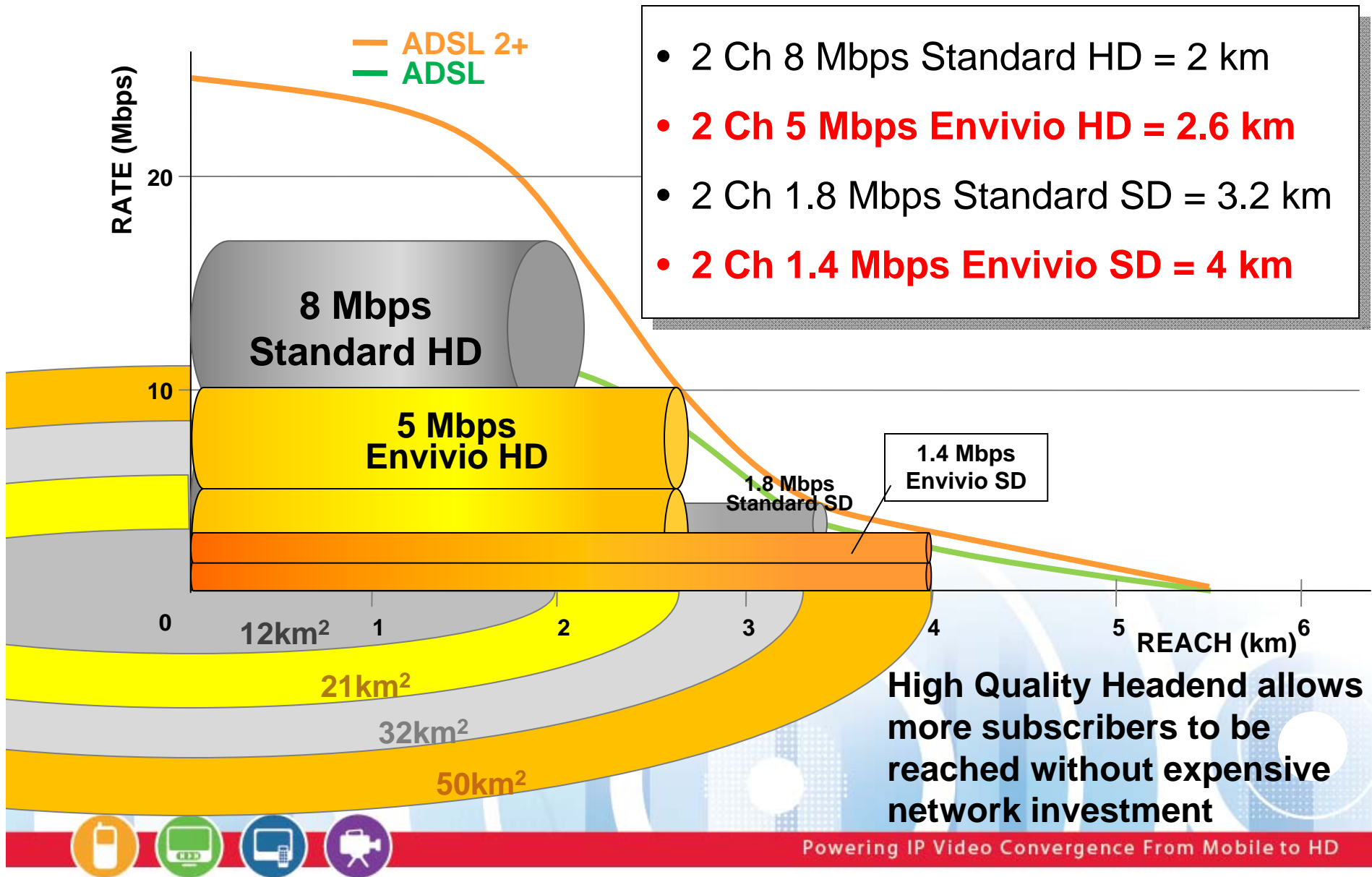
- 2 Ch 8 Mbps Standard HD = 2 km
- **2 Ch 5 Mbps Envivio HD = 2.6 km**
- 2 Ch 1.8 Mbps Standard SD = 3.2 km
- **2 Ch 1.4 Mbps Envivio SD = 4 km**

ADSL 2+
ADSL

RATE (Mbps)

20

10

8 Mbps
Standard HD

5 Mbps
Envivio HD

1.8 Mbps
Standard SD

1.4 Mbps
Envivio SD

0   1   2   3   4   5   6   REACH (km)

12km²
21km²
32km²
50km²

High Quality Headend allows more subscribers to be reached without expensive network investment

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Compression : Premium and Extreme

Commercial in Confidence

Powering IP Video Convergence From Mobile to HD

Compression : Upgradable Performance

33% Performance Improvement

Convergence Services

Content Delivery to all Three Screens
Convergence Video Headend

Convergence Headend | IP Network | Three Screens

IP VIDEO HEADEND

Envivio
4Caster C4™
Encoder
Transcoder

Software Configuration for MobileTV

Envivio
4Caster C4™
Encoder
Transcoder

Software Configuration for IPTV

Envivio
4Caster C4™
Encoder
Transcoder

Software Configuration for InternetTV

Envivio
4Manager™
Headend
Management
System

NETWORK

File

Metadata

CONTENT

MobileTV
3GPP
3GPP2
WiMAX

IPTV
SD
HD
PiP

InternetTV
Windows Media
Flash (H.264)
QuickTime

Powering IP Video Convergence From Mobile to HD

Mobile TV : Quality of Experience

Quality of Experience Determines Success

A survey of 22,000 mobile users across Europe commissioned by Tellabs in 2007 revealed that there are **19%** more former users of mobile TV services than current users.

Quality, Reliability and Price were the main issues cited by users as the reason for dropping their subscription to Mobile TV services.

"**If services fall short of user expectations on quality and reliability, it (developing content and services) could be money wasted,**" said Pat Dolan, Tellabs Vice President for Europe, Middle East and Africa.

Operators such as Orange in France who addressed initial service shortcomings have seen a massive improvement in their mobile TV business results

Improving the Quality of Experience

Quality of Experience

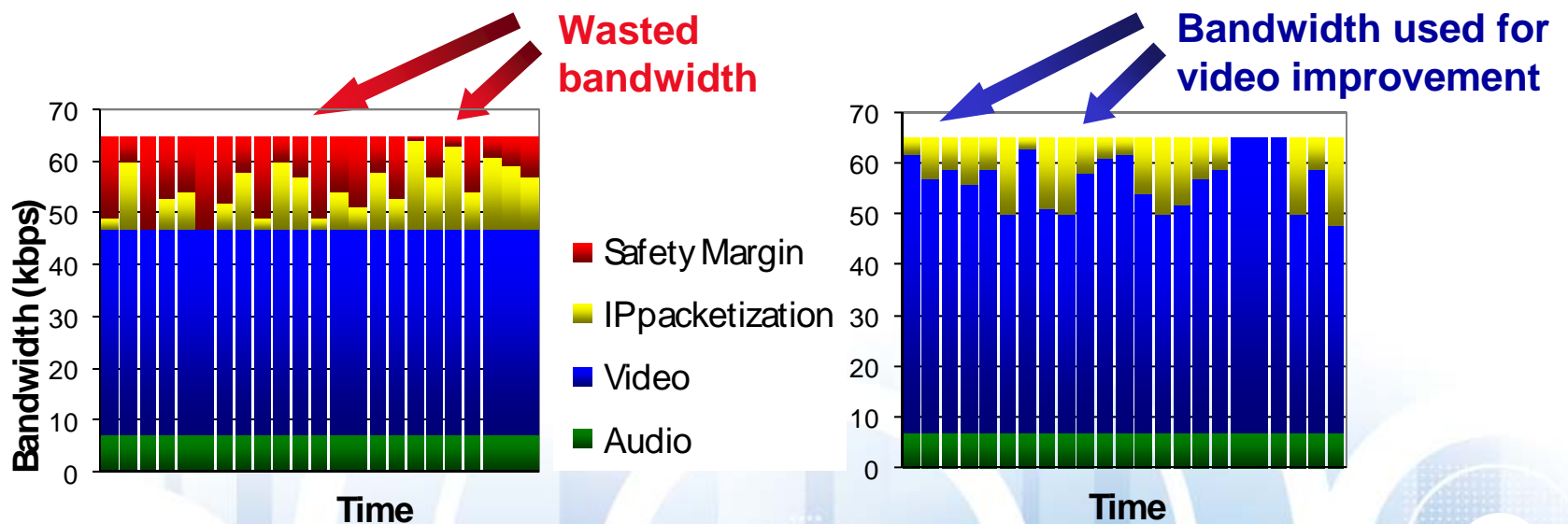| Service Quality	Service Reliability	Pricing Model
Video quality	No rebuffering	Unlimited access
Audio quality	High availability	No data plan
Optimized experience	Universal access	Value for money
Compression	**Content Delivery**	
Multi-Profile	**EcoSystem Interop**	

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Service Quality: Compression

- **Video and Audio Compression:** in-house codec development team specializing in low bit rates and resolutions required for Mobile TV

- **Bit Stream Switching:** graceful switching between different bit rates on an established connection

- **Network Aware Rate Control:** improves compression quality and data delivery reliability

Wasted bandwidth

Bandwidth used for video improvement

Bandwidth (kbps)

Time

Legend:
- Safety Margin
- IP packetization
- Video
- Audio

Streaming with constant payload bit rate

Streaming with network-aware rate control

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Service Quality: Multi-Profile Encoding

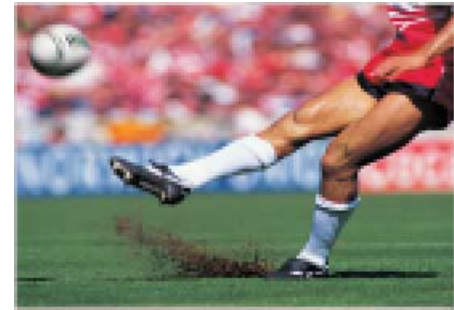**Mobile Device Capability** (vertical axis)

H.264 Video
HE-AAC Audio

MPEG-4 SP Video
AAC Audio
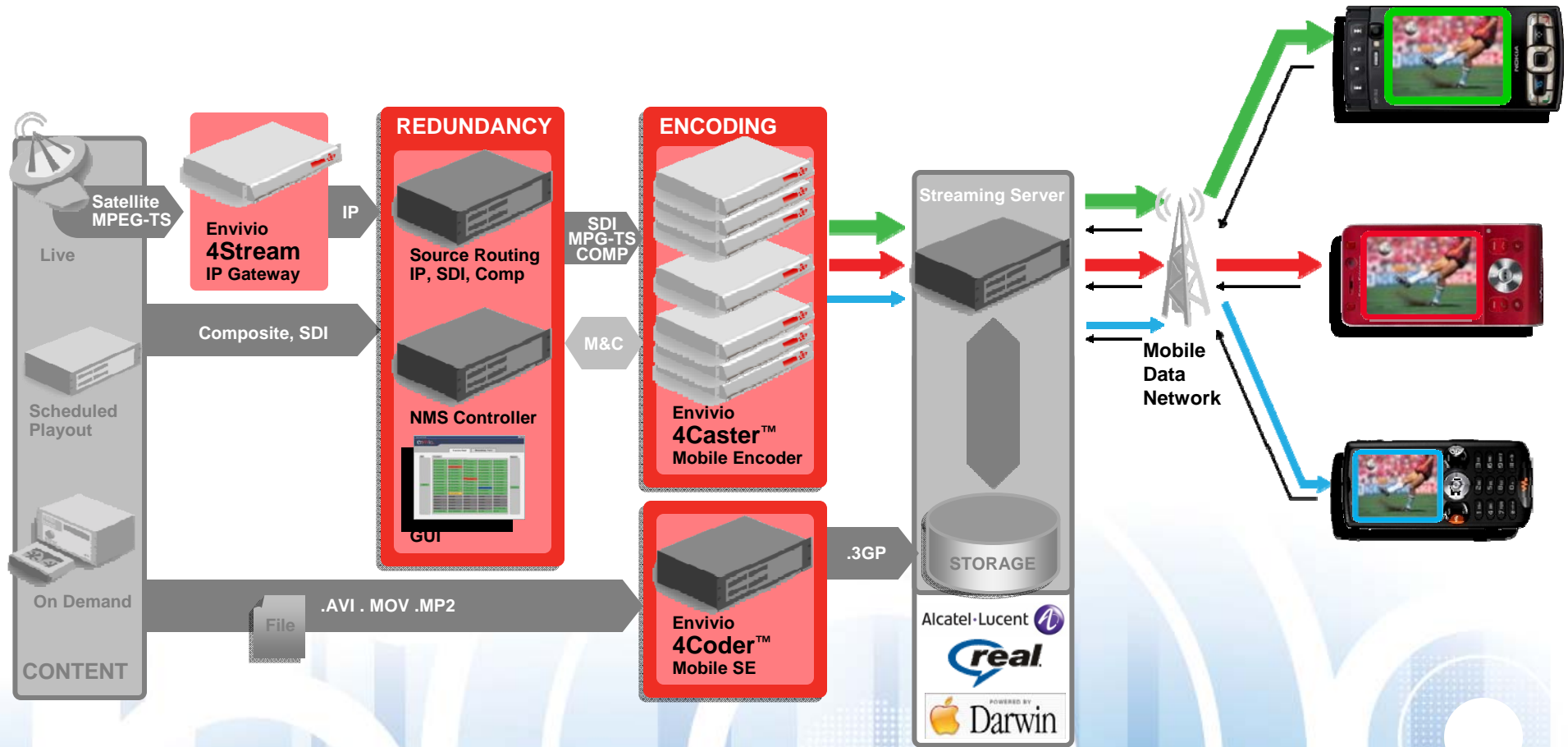
H.263 Video
AMR Audio

EDGE
64 kbps

UMTS
128 kbps

HSDPA
250 kbps

Network Connection Speed

Powering IP Video Convergence From Mobile to HD

Mobile Streaming System Architecture

Commercial in Confidence

Internet TV: Solutions

InternetTV Business Models

Walled Garden (Private Network)

- Live services broadcast / multicast to the PCs of IPTV or Cable TV subscribers within the home
- Delivered to the PC as an alternative to the TV or as an additional screen
- User experience similar to broadcast TV services
- Revenue generation based on a per month service fee

Public Internet (IPTV extension or Over The Top)

- Live services unicast to PCs over the public internet
- Delivers service mobility to existing subscribers; adds new subscribers in new locations; greatly expands content choice
- Revenue generation based on per month / per event service fees, or from advertising

Powering IP Video Convergence From Mobile to HD

Challenges and Envivio Solutions

| Internet TV Challenge	Envivio Internet TV Solution
Content Needs to Look Good on a PC	Encoding techniques specific to PC playback
Deliver High Quality Content to the Maximum Number of Subscribers	Encoder processing that reduces CPU load on players to improve subscriber footprint
Service Reliability	Complete redundant headend infrastructure
Integration with existing IPTV and Cable TV Video Headends	Support for MPEG TS delivery so existing infrastructure can be reused
Integration with standard internet video delivery and playback platforms	Windows Media, Flash and QuickTime EcoSystems supported
Quality of Service over the Public Internet	Multi-Profile encoding delivers best quality for prevailing network conditions
Cost of content delivery	Efficient compression that drives down cost but maintains quality

Powering IP Video Convergence From Mobile to HD

Internet TV: Media Processing and Compression

Encoder-based De-Interlacing

2 x Zoom of Interlaced Source
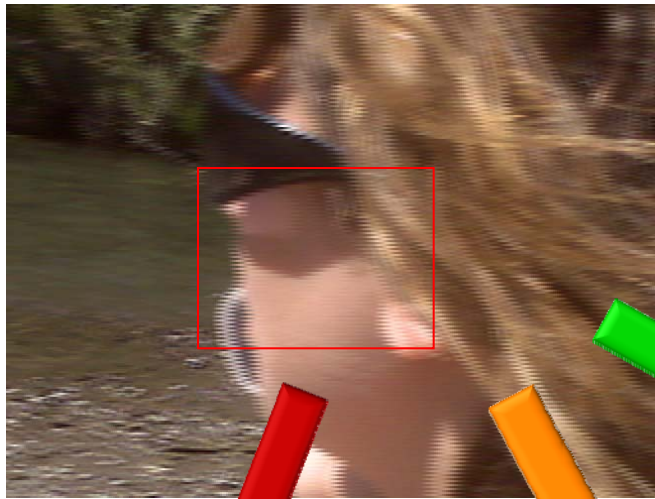
- Encoder optimizes conversion of Interlaced Content to Progressive Content for improved PC playback
- Improved Picture Quality
  Reduced CPU Usage on Client
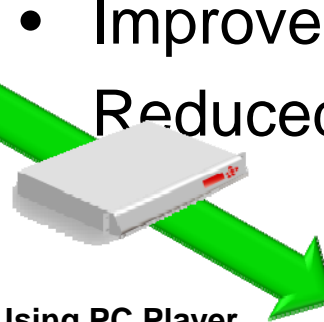
Not De-Interlaced

Horizontal interlace artifacts

De-Interlaced Using PC Player

Artifacts removed – image blurred
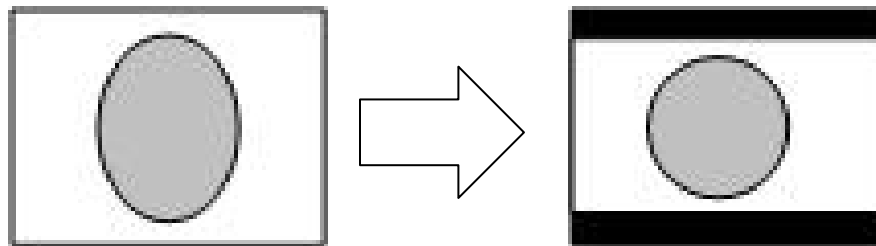
De-Interlaced Using Envivio Encoder

Crisp image - no interlace artifacts

Automatic Aspect Ratio Processing

Adaptation to 4:3 or 16:9 content

- Detects source aspect ratio

- Automatic letterboxing

- Stream is correctly formatted and is player independent

- Multiple automatic transform processes

Anamorphic Scaling to 16:9

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Video Input Scaling

- Scaling for native PC (VGA) rather than TV (D1) resolutions
- Square pixel format with two dimensional scaling
- Delivers more uniform quality at ultra low bitrates by optimizing trade off between picture sharpness and macro-block minimization – ideal for PC delivery

D1   ¾ D1   ⅔ D1   ½ D1   D1   VGA $^9/_{16}$VGA   QVGA
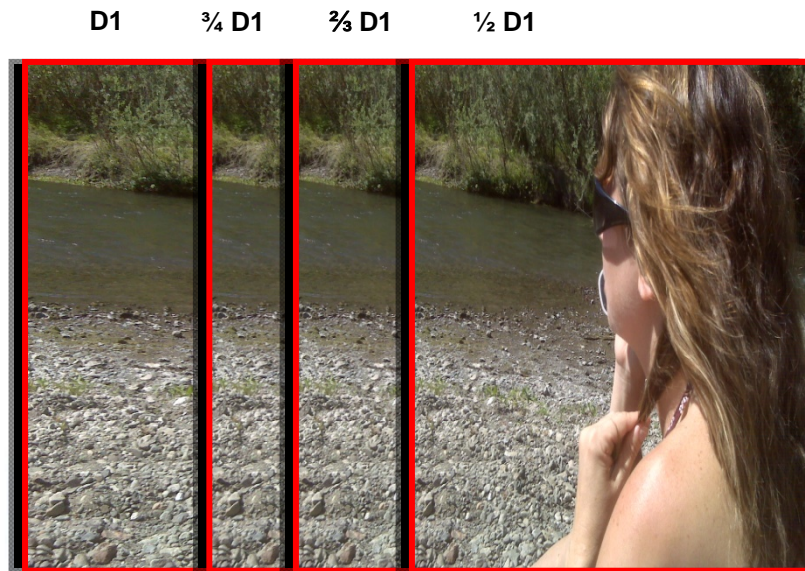
TV Playback
Non-Square Pixels - One-Dimensional Scaling
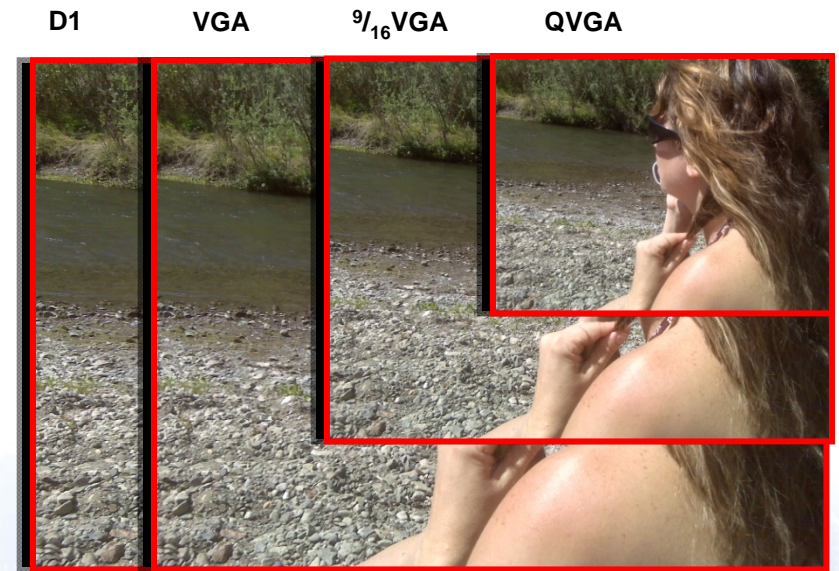
PC Playback
Square Pixels - Two Dimensional Scaling

Powering IP Video Convergence From Mobile to HD

Walled Garden EcoSystem

SDI

Satellite MPEG-2

Envivio
4Stream
IP Gateway

IP

ENCODING

Envivio
4Caster™ C4
Encoder

M&C

M&C

HEADEND MANAGEMENT SYSTEM

GUI

Envivio
4Manager
NMS Controller

Multicast H.264

NDS
verimatrix
WiDEVINE TECHNOLOGIES
SecureMedia

Key Management

Encryption

VOD Server

Middleware

NDS
verimatrix
WiDEVINE TECHNOLOGIES
SecureMedia

Authentication

Key Exchange

Encrypted Live Streams

VOD Streams

Transactions

EPG Metadata

PC Player

Powering IP Video Convergence From Mobile to HD

Public Internet EcoSystem

ENCODING

SDI

Satellite MPEG-2

Envivio 4Stream IP Gateway

IP

M&C

HEADEND MANAGEMENT SYSTEM

GUI

Envivio 4Manager NMS Controller

Envivio 4Caster C4™ Encoder

M&C

H.264 Video AAC Audio

WMV WMA

H.264 Video AAC Audio

Control Delivery Platform

Adobe Flash Media Server

Microsoft Windows Server 2008 with Windows Media Services 2008

Apple QuickTime Streaming Server or Darwin Streaming Server

<HTML> **HTML**

Adobe Flash

Microsoft **Silverlight** **Microsoft Silverlight**

Internet CDN

RTMP

WMS

RTP / RTSP

Akamai

Limelight NETWORKS

CONVIVA EXPERIENCE LIVE

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Case Study

Orange France | Mobile TV and Internet TV

Orange | **Corporate Overview**

- **France Telecom** is Europe's number three mobile operator and the number one provider of broadband internet services

- **Orange** is the **single brand** for France Telecom's internet, television and mobile services in the majority of countries where the company operates

- France Telecom has **177 Million customers** in **38 countries** over **5 continents** and **2/3 are Orange customers**

- 2007 Sales of €**52.9 Billion**

- 117.6 Million mobile subscribers (**Ranked 9 Globally**)

- 12 Million broadband internet subscribers (ADSL)

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Orange | **Three Screen Media Strategy**

Orange France - World Leader in New Media Distribution

- **World's largest Mobile TV** over cellular network: over 1.3M subscribers
- **World's largest IPTV** operator: over 1.5M subscribers
- Launched **satellite TV** offering in August 2008
- Launched **Internet TV** in November 2008
- **www.orange.fr** ranks as the **3rd most visited website** in France (after Google and MSN)

Unique Content

- Share the **French Soccer** distribution rights with Canal+
- Acquired **movie and TV series** catalogs
- Created its **own TV channels** with a team of media professionals: Orange Foot, Orange Cinema

Unique Experience

- Negotiated distribution rights across all **Three Screens**: Mobile, PC and TV
- **Live TV is the main audience driver** complemented by on demand services

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Orange Mobile TV Service Upgrade

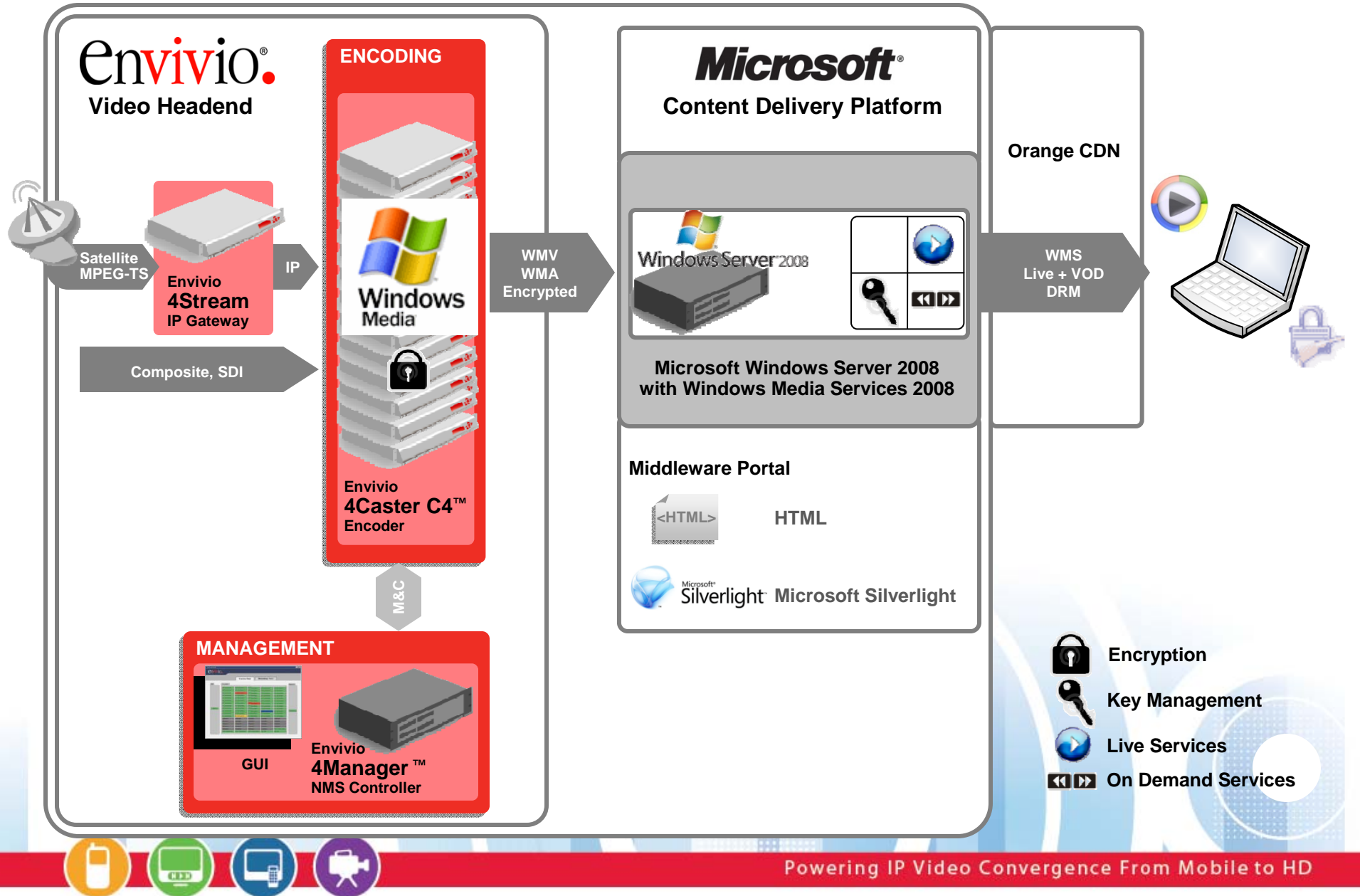| Quality and Reliability	Pricing Model	Results
Replaced software encoders with Envivio Mobile Series hardware encoders	Removed requirement for unlimited data plan	Increased uptake
Improved video and audio encoding quality	Added HD Mobile TV offering with higher picture quality	1.0M Mobile TV subscribers
Added support for MPEG-4 SP and H.264 encoding	Introduced flat rate pricing	400k HD Mobile TV subscribers since Nov 07
Increased number of profiles per channel from 2 to 6	6 € per month ($10) for 20 channels	Reduced churn
	10 € per month ($16) for 50 channels	> €100M Direct Mobile TV Revenues per Year
Added M:N automated redundancy system to improve service reliability	12 € per month ($20) for 50 channels of HD Mobile TV	Significant customer migration to Orange from other French MNOs
	9 € per month ($14) for additional sports content	Orange mobile revenues up €1.3B in 2007 from 2006

Powering IP Video Convergence From Mobile to HD

Internet TV

Internet TV | **Solution Architecture**

Video Headend

ENCODING

Satellite MPEG-TS

Envivio **4Stream** IP Gateway

IP

Composite, SDI

Windows Media

Envivio **4Caster C4™** Encoder

M&C

MANAGEMENT

GUI

Envivio **4Manager ™** NMS Controller

WMV WMA Encrypted

Content Delivery Platform

Orange CDN

Windows Server 2008

Microsoft Windows Server 2008 with Windows Media Services 2008

Middleware Portal

<HTML>   **HTML**

Silverlight **Microsoft Silverlight**

WMS Live + VOD DRM

Encryption

Key Management

Live Services

On Demand Services

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Internet TV | **Service Offering**

- **Service Offered across Different Networks**
  - **WiFi Hotspots**: **500 kbps** streams available on public WiFi hotspots
  - **ADSL**: **1 Mbps** streams available to
    - Users not capable of receiving IPTV (too far from DSLAM)
    - IPTV subscribers using their PC as a Set-Top-Box – only available in the home
  - **FTTH** (future service): **2 Mbps** or more available to receive "HD-like" video

- **Live TV | Driving Audiences**
  - Live events, and particular sports events, are driving the audience
  - Orange has witnessed a 10x traffic increase on popular events
  - Other services include:
    - VOD
    - Catch-up TV

- **Subscription**
  - Basic service offered to broadband subscribers at home
  - Additional channels subject to subscription fee
  - Considering proposing the subscription to non-broadband subscribers

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Internet TV | **Strategy (Why Do It?)**

- **Corporate Strategy** | addresses 3 of the 5 Orange corporate growth objectives
  - **Fixed Line** | Increases attractiveness of Orange fixed line network
  - **Media** | Completes the Three Screens strategy
  - **Internet** | Higher internet audiences drive up advertising revenue

- **Competition** | puts Orange in a high-value position compared to its competitors

- **New Revenue Streams** | this service allows Orange to generate revenues directly from subscribers not on its own network

- **Content Rights** | the ability to distribute media to the Three Screens helped Orange secure the rights to French soccer from the French Soccer Organization

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Internet TV | **Pricing**

- **Internet + Telephone + IPTV + Internet TV**
- **39.90€/ month on 1 Year Contract** (29.90€ for 3 months)
- **Internet** | up to **18 Mbps**
- **Internet Telephony | unlimited calls** to land lines within mainland France
- **IPTV** | 60 Channels included
- **Internet TV** | 31 Channels currently included – more to come
- **Additional TV Packages** | delivered to both TV and PC
  - **Orange Cinema** (5 channels for 12€/ month on 1 Year contract)
  - **Orange Sport** (4 channels for 6€/ month on 1 Year contract)
  - **Bouquet Thématique** (19 channels for 9.90€/ month on 1 Year contract)

Powering IP Video Convergence From Mobile to HD

Q&A

Thank You

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