MPEG-4 for the Triple Play

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POWERING MPEG-4 AVC APPLICATIONS FROM MOBILE TO HD
Triple Play becomes multi-play

- Video is the most valuable service
  - Broadcast TV services account for highest ARPU
- Main access portal will be the TV
  - Residential services will not be reliant on home PC expertise
- Integrated services will drive differentiation
  - Telephony
  - Gaming
  - On demand services
  - Shopping
  - Gambling
  - Stuff we haven’t thought of yet…
IPTV Services

- Live TV
  - Digital TV
  - Premium TV
  - Pay-Per-View
  - Near Video On Demand
  - Program Guide

- Stored TV
  - Video On Demand
  - Subscription VOD
  - Time Shifting PVR
  - Network PVR

- Communications
  - Residential VoIP portal
  - Instant messaging
  - SMS/MMS messaging
  - Mobile Services Portal
  - Video Conferencing
  - Emergency Alert System

- Entertainment
  - Gaming
  - Gambling
  - Karaoke
  - Internet TV

- Commerce
  - Telecommerce
  - Targeted/Interactive Advertising

- ASP

- Distance Learning
  - Photo galleries
  - Home automation portal
  - Home security portal
  - Converged Services
  - Hospitality
Service Management (Middleware)

- Encoders and video servers do not make a service, they make content.
- The client needs directions to where services are located and any rules applicable (you can’t even change channels without middleware)
- Services are managed at the headend by the operator who can control:
  - Subscribers
  - Assets
  - Metadata
  - Packaging
  - Provisioning
  - Billing
IPTV Service Considerations

• Services (more is better)
  – More services means more differentiation
  – Higher ARPU
  – Improved customer adoption (uptake)
  – Convergence with other services (wireless)

• Standards (open)
  – No single vendor proprietary solutions
  – Shorter development cycles for new services
  – Open development community

• Scalability
  – Content and services must scale with subscribers and infrastructure
  – Services must interoperate with OSS/BSS infrastructure

• Sexy
  – Services must be “appliance like” fast and attractive
Video Compression Standards

Broadcast

Standards Bodies

ISO

JVT

ITU

H.263

Standard

MPEG-4 Part 10

H.264

Trade Organizations

MPEG-4 AVC / H.264
MPEG-4 has adopted three video codecs. H.264 is the ITU name for AVC. AVC = H.264 = MPEG-4 Part 10.

MPEG-4 evolved for IPTV.

- MPEG-4 H.264: Main Profile: Level 3
- MPEG-2: 3.5 Mbps
- Uncompressed: 250 Mbps

- Simple Profile (SP)
  - Cameras & PDAs
  - Video Conferencing
  - Does NOT Support Broadcast Content

- Advanced Simple Profile (ASP)
  - 2 Mbps
  - Supports Broadcast

- Advanced Video Coding (AVC) or H.264
  - 1 Mbps
  - Supports Broadcast
  - Standard Adopted by Broadcast Industry

Non-Standard: WM9 & On2

Non-Standard: WM7 & DivX
MPEG-4 more than just video

- **AVC codec < 2Mbps**
  - Lower bitrate allows services over DSL. Essential for HD services (HDTV @ 8Mbps)

- **AAC+ codec 48Kbps**
  - This really starts to add up with 5.1 audio (150Kbps vs. 600Kbps)

- **System layer**
  - MPEG-4 allows the broadcast of additional binary information which can be used for IPTV client portals
    - Metadata
    - GUI
    - Interactivity
MPEG-4 Systems Principle

- Scene Description Stream
- Object Descriptor Stream
- Visual Stream
- Audio Stream
- Interactive Scene Description

Your preferred stock quotes,…
MPEG-4 Application Capabilities

- Still pictures, video links
- High Quality Graphics overlays synced to video
- Vector Graphics Animations, web links
- Stream Controls
- High Quality, protected video on demand/live
- Video Hot Spots, E-Commerce
- Personalized data
- Your preferred stock quotes, etc.
4Front Service Portal

Now with VoIP
On screen caller ID
Voicemail play back
Integrated Billing
There are traditionally been two kinds of middleware

- Thin Client - HTML Client Browser
- Thick Client – Proprietary Client Application

MPEG-4 System Content (BIFS) enables a 3rd option with many benefits
Pro
• Very flexible client GUI design
• Open standard* (not really, see below)

Con
• Poor browser performance on client (Slow)
• Pull architecture, every screen must be generated by app server
• Does not scale efficiently. Numerous local proxy servers required to serve graphics
• *Not really open standard. HTML needs custom JavaScript to support STB (cursor control etc.)
• No local metadata in the client
• Client cannot operate without network access to the Application Server
• Easy to hack, HTML source is easily repurposed on the client
• Fixed Services designed by Middleware vendor
• Limited control of billing and rating
• Requires 2 way network (cannot operate over 1 way satellite or terrestrial broadcast)
Alternative Middleware

Custom Client App

**Pro**
- Good Client Performance
- Push metadata (if they are smart!!!)

**Con**
- Proprietary client architecture
- Fixed client GUI difficult to customize, not flexible to modification
- Application tied to STB vendor
- Often require multiple client apps including optional browser
- Time consuming/expensive to migrate to new STB
- Proprietary push transport mechanism
- Fixed Services designed by Middleware vendor
- Limited control of billing and rating
MPEG-4 Middleware  CLEVER CONTENT

Pro

- Best Client Performance
- Pixel perfect video/graphics rendering engine built into MPEG-4
- Push metadata
- Push GUI
- GUI independent of client, (STB, PC, mobile)
- Easily customized client interface
- Modular services created with MPEG-4 BIFS and authoring tool
- Services and functionality can be modified “in-service”
- Uses Telco provisioning for service definition (very flexible service creation)
- Integrated Telco billing and settlement interface

Con

- No one else has ever seen this, so it has plenty of vendor skepticism
MPEG-4 Middleware Advantages

• MPEG-4 Client Portal
  – The GUI for the client is entirely MPEG-4 and allows the content to include its own embedded controls
  – Response times are comparable to proprietary GUIs and much faster than HTML or Java
  – Compatibility with any MPEG-4 ISMA 2.0 standard

• RTP Stream Delivery
  – Not reliant on MPEG-2 TS technology or licensing
  – Less packet overhead with more resilient routing
  – Internal stream indexing allows Network PVR

• Modular Services
  – Network operators can choose VOD or EPG services depending on their business
  – Additional services can be created using 4Mation™

• Flexible Packaging and Rating
  – More than any other IPTV solution, service providers can quickly build complex combinations of services into market specific offerings
Deployment (IPTV System)

Client Terminal

- Envivio Player
- Client Application (MP4)
- Local PVR component
- Terminal Access Gateway
- Terminal File System & apps

Headend

- 4Front Server
  - COMM Layer
  - Service Engine
  - BIFS Component
  - NPVR Component
- VOD A/V Stream provider
- Live A/V Stream
- VOD A/V Stream
- Live A/V MP4 Stream provider

Backend

- Backend Component 1
- Backend Component 2
- Backend Component 3
- Backend software
- VOD Repository
- Live source

Transactions

Data flow:
- High BW Data flow
- low BW update flow

Types of data:
- A/V Stream (One way/ single or multi target)
- Data Stream (One way/ single or multi target)
- Applicative request (TCP based) , two-way , single target
- Optional Client Component request. Two-way, local target
- Direct call
- Write Access
- Read Access