

# Personal Media Player and Communicator

## 支持无线语音和视频通讯功能的PMP

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**Ittiam**

**Minds in Motion**



# Agenda内容概要

- State of China PMP market  
中国PMP市场
- PMP + Communicator: Design issues for portable  
PMP+语音和视频通讯：便携式设计技术要点
- Ittiam TI DSP based solution  
基于TI 达芬奇的产品解决方案

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# State of China PMP market

## 中国PMP市场

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# China PMP Market: Current Landscape

- **New entrants** 欣欣向荣的中国PMP产业
  - A rush of Chinese manufacturers into the emerging market
  - 30+ PMP vendors in China now, including overseas manufacturers from Europe, South Korea, and Taiwan
- **Declining prices, improving feature-sets** 价格不断下降和功能不断丰富
  - Intense price competition among overseas and domestic PMP vendors
  - From low end MPEG4 to full feature multi-format AV media players
  - Manufacturers adding new features to address specific customer segments: navigation, gaming, edutainment
- **Overall market gaining traction** 市场数据
  - Turning point in 2006, as PMP shipments reached 700K units (Source: EE times)
  - Market to reach 1.4M by 2010 (Source: In-Stat)
  - There are market barriers to be overcome

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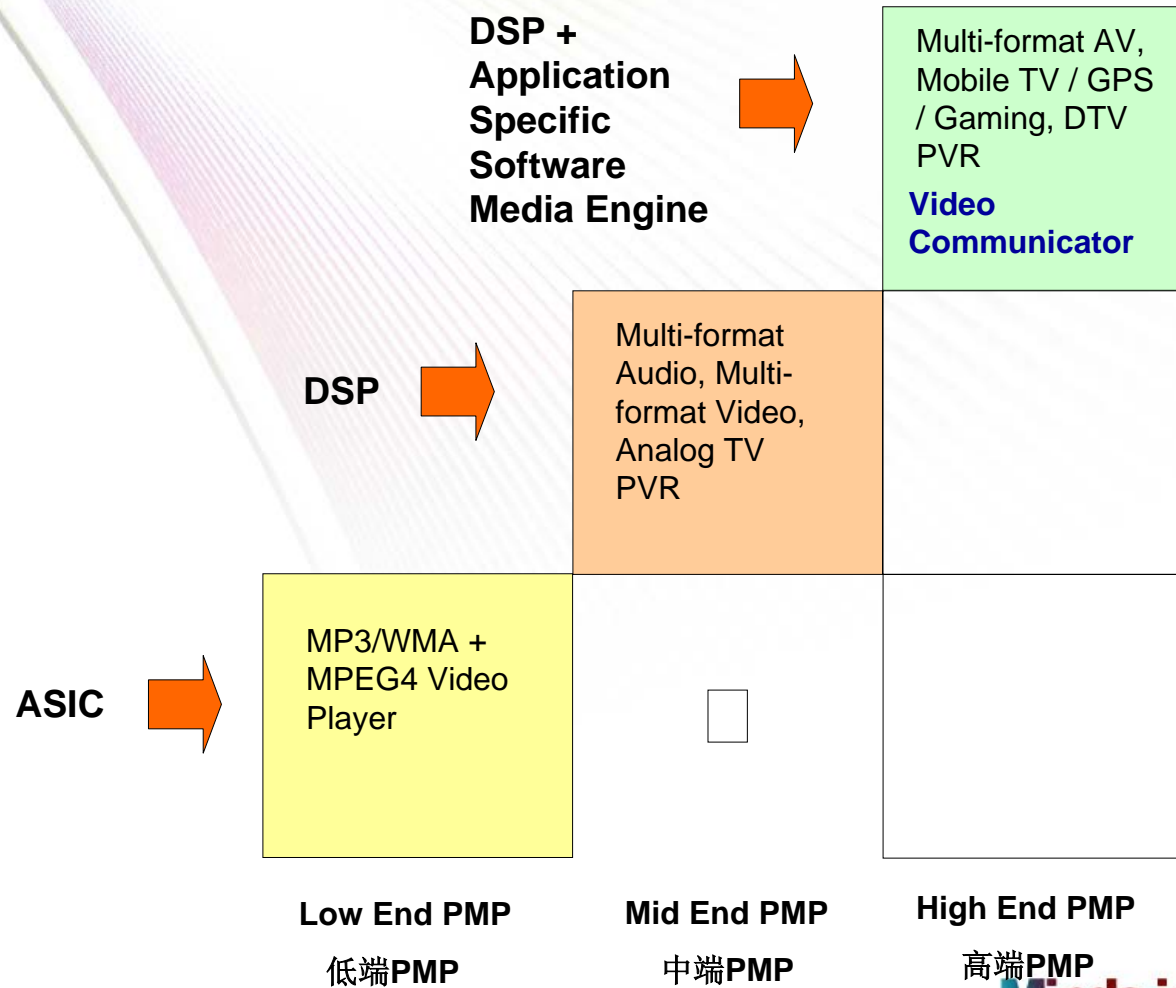
# Drivers and Barriers 市场阻碍和驱动因素

- **Barriers 阻碍因素**
  - Lack of legitimate video content  
合法节目内容缺乏
  
- **Drivers 驱动因素**  
( Emerging PMP features )
  - Gaming  
游戏
  - Global Positioning System (GPS)  
GPS导航
  - Mobile TV  
移动电视
  - PMP combined with Video Communicator / Portable Video Phone  
视频通讯和视频电话

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# Generic PMP Product Tiers 产品分类



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# TI | Developer Conference PMP + Communicator Market Opportunity

## 语音和视频通讯--新型PMP产品

- **Market position 市场定位**
  - High end PMP combined with IP video phone 集成IP视频电话的高端PMP
  - Use cases 使用实例
    - Full duplex SIP based video communication over wireless LAN / WAN  
基于无线因特网的SIP视频电话通讯
    - IM chat with video 即时通讯视频聊天
    - Push to talk with video 无线一键通视频对讲
- **Driver: Excellent VOIP market recognition in China 家喻户晓的VOIP应用**
  - IP card services have had a big success, over 1M users 成功的IP电话卡和众多的用户
  - Number of broadband VOIP subscribers served by telecom carriers is on the rise, expected to expand to 10M by end of 2011, up from 720K in 2006 (Source In-stat)  
迅速发展的VOIP宽带电话

*	Beijing	Shanghai	Shenzhen	Wuhan	Chengdu	Kunming	Total
Video-phone	65%	69%	47%	60%	68%	74%	64%
LBS/GPS	51%	70%	32%	36%	25%	66%	44%
Video Conf	59%	61%	31%	45%	28%	59%	46%
Mobile TV	38%	30%	57%	54%	44%	31%	43%

• **Table: Consumption preference of China's 3G Subscribers**  
中国3G用户使用偏好调查结果

Source: Beijing University of Posts and Telecommunications

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# TI|Developer Conference PMP Communicator User Experience— 用户体验

- **User registers device with a SIP proxy server**  
拨打IP电话
  - Automatic/manual registration 登陆SIP服务器
  - Over a wireless IP LAN bearer, e.g. airport WiFi hotspot  
通过无线方式登陆因特网，如机场的WIFI热点
- **User enjoys full-feature multi-format media player**  
高质量的多媒体播放享受
  - Full D1 resolution video with stereo/multi-channel audio  
高画质D1分辨率的视频和立体/多通道高保真音频
  - On their portable LCD screen  
直接在本机LCD上欣赏，走到那里，看到那里
  - Media playback from local storage (HDD/SD/CF) or via a wireless streaming interface  
内容来源：本机HDD/SD/CF存储或者通过无线流媒体方式点播/无线下载
- **User accepts incoming SIP video call**  
随时接听IP视频电话
  - Video communication via on-board camera: high quality H.264 30 fps video  
通过内嵌摄像头传输高质量的画面-- H.264 30 fps video
  - Speech communication via on board speaker or via headset (wired/ blue-tooth)  
通过本机麦克风或者头戴装置（有线/蓝牙方式）传送语音
  - Option for multi-party conference  
提供多方在线会议功能
- **User resumes media player after the call ends**  
打电话与享受多媒体播放自如切换

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# Personal Media Player and Communicator Design issues for portable

集成无线语音和视频通讯功能的**PMP**设计要点

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# PMP Communicator: Application Requirements

## PMP + Communicator design presents a complex mix of requirements

- **Portable media player design considerations** 多媒体播放设计要点
  - Entertainment grade media processing:
    - MPEG1/2/4, DivX™, H.264 and VC1 video
    - MP3, AAC, WMA, AC3 audio
  - Playback from local storage or streaming interfaces
  - Interoperability with variety of content: file / multiplex formats and DRM
  - Media engine for trick plays, playback control
  - Low power consumption for extended playback time

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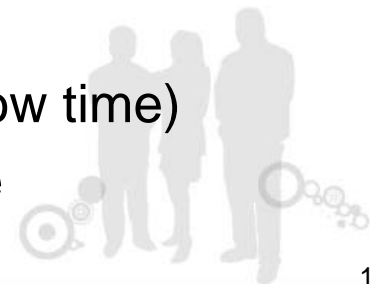
# PMP Communicator: Application Requirements

- **Video phone / Communicator design considerations**

视频电话/通讯设计要点

- Communication grade media processing:
  - MPEG4, H.263, H.264 BP video
  - Wideband / narrowband ITU G.7x speech and other non ITU codecs like iLBC.
- Media streaming over IP networks
- Media engine for low latency communication
- Quality of service delivery with error resilience and error concealment
- Interoperability with other communication end points and market products
- Low power consumption for extended talk time (or show time)
- Low power always-on mode for incoming alerts on the communicator

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# Communicator Design Considerations

Challenges arise due to real-time/interactive nature of voice & video  
实时语音/视频发送和接收的技术挑战

- **Delay introduced by packet networks** 网络传输延迟
  - Round trip delay of less than 300 ms needed for telephony (ITU)
  - Variations in delay (jitter) require *smoothing* of play-out
  - Echo cancellers needed when delay reaches above 30 ms
- **Packet loss in broadband networks** 包丢失
  - Speech: Losing voice traffic over 60 ms duration is disruptive to the user experience, media engine requires to compensate for packet loss
  - Video: Requires spatial and temporal error concealment
- **Out of order packet reception – requires buffering and sequencing** 失序包接收—缓冲和顺序化
  - Buffer size needs to be small for shorter end-to-end delay
  - Size of buffer should exceed the maximum *predicted* delay

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# Communicator Design Considerations (*continued*)

- **QoS: Video 视频服务质量保证**
  - **Error resilience and concealment methods are required to deliver on a certain quality of service**

差错复原和掩盖技术

    - Spatial and temporal error concealment
    - Techniques / toolsets specific to H.264: e.g. slice based encoding, FMO (flexible macro-block ordering), multiple reference frames, adaptive intra refresh for recovery from packet loss
  - **Low delay performance required, e.g. through H.264 ASO (Arbitrary Slice Ordering)**

低延迟传输, 例如采用任意条带顺序(ASO)技术的H.264压缩
  - **Dynamic bit-rate and frame-rate modification required to adapt to network changes**

动态自适应的码流和帧数

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# PMP + Communicator Hardware Considerations

- **PMP + Communicator requires higher integration of media peripherals on the DSP/SoC/ASIC than PMP alone**

## 更高外周设备集成度的处理器

- Storage interfaces – CF, SD, ATA (HDD)  
存储介质接口 – CF, SD, ATA (HDD)
- High speed USB interface  
高速USB接口
- Digital LCD interface  
数字LCD接口
- Composite / Component TV and Headphone / Line output  
复合/分量视频信号和耳机/线路输出接口
- Interface for WLAN / WiMAX / WiBro chipset – e.g. SDIO, VLYNQ  
与WLAN / WiMAX / WiBro 芯片组的接口, 如SDIO,VLYNQ
- Digital CCD / Camera front end with 3A control  
支持自动曝光, 自动对焦, 自动白平衡功能的CCD/CMOS的数码相机接口
- Video Scaler  
视频转换器
- I2S / I2C interface for speaker and microphone function  
扬声器和麦克风接口I2S / I2C
- GPIO for keypad / remote interface  
键盘和遥控GPIO

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# PMP + Communicator Media Engine Considerations

- **PMP and video phone / communicator have distinct requirements on the media engines** 多媒体处理软件引擎设计的特殊点
  - Although both applications may require common media processing blocks or CODECS
  - PMP requires playback tuned to local storage media, with little or no media errors
  - Video phone requires real-time communication optimized for IP networks, with packet loss and varying packet arrival delays
  - Middleware for PMP consists of file parsers (MP4, AVI) while the communicator media engine requires signaling protocols (SIP).
- **Solution: Run application specific media engine frameworks on a GPU, with media processing software on a DSP, e.g. TMS320DM6441, a TI DaVinci™ technology based digital media system on chip**

**解决方案:** 采用双核的TI达芬奇TMS320DM6441

- With ARM9E HOST and C64xp DSP, optimized for portable applications  
ARM9E处理器加为便携应用优化的C64xp DSP
- SoC integrated with all essential peripherals suitable for PMP + Communicator application  
集成了PMP + Communicator应用所有必须的外围接口

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# Ittiam TI DSP based solution (TMS320DM6441 based)

## 基于TI达芬奇TMS320DM6441的解决方案

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# Ittiam DM6441 based PMP Reference Design

## Reference Design Features 参考设计

- DM6441™ powered media player/recorder
- MPEG1/2/4, DivX™, H.264, VC-1, MP3, AAC, WMA/Pro/Lossless, AC-3
- Media engine for player/recorder with digital AV framework, file parsers/creators, streaming / broadcast receiver stacks and DRM: AVI/ASF/MP4/VOB/MPEG2-TS, HTTP, UPnP, WM-DRM10-PD, MTP
- High Definition Video playback up to 720p 30 fps: MPEG2 MP@HL, MPEG4/DivX ASP, VC-1 MP@HL
- High quality D1 PVR with time-slip: MPEG4 ASP, MPEG2 MP
- **Digital TV playback and record - DVB-T, T-DMB and ONE-SEG ISDB**  
支持数字电视(DVB-T, T-DMB and ONE-SEG ISDB)的播放和录制

## Solution Benefits 方案优点

- Reduces time to market  
节省产品上市时间
- Optimized for portable applications  
为便携式应用特殊优化
- Embedded Linux or Windows CE 6.0 platform OS options  
嵌入式操作系统支持 : Linux or windows CE 6.0
- OS independent media subsystem framework with application SDK  
与操作系统无关的软件系统架构和应用程序开发包



## PMP Product Suite

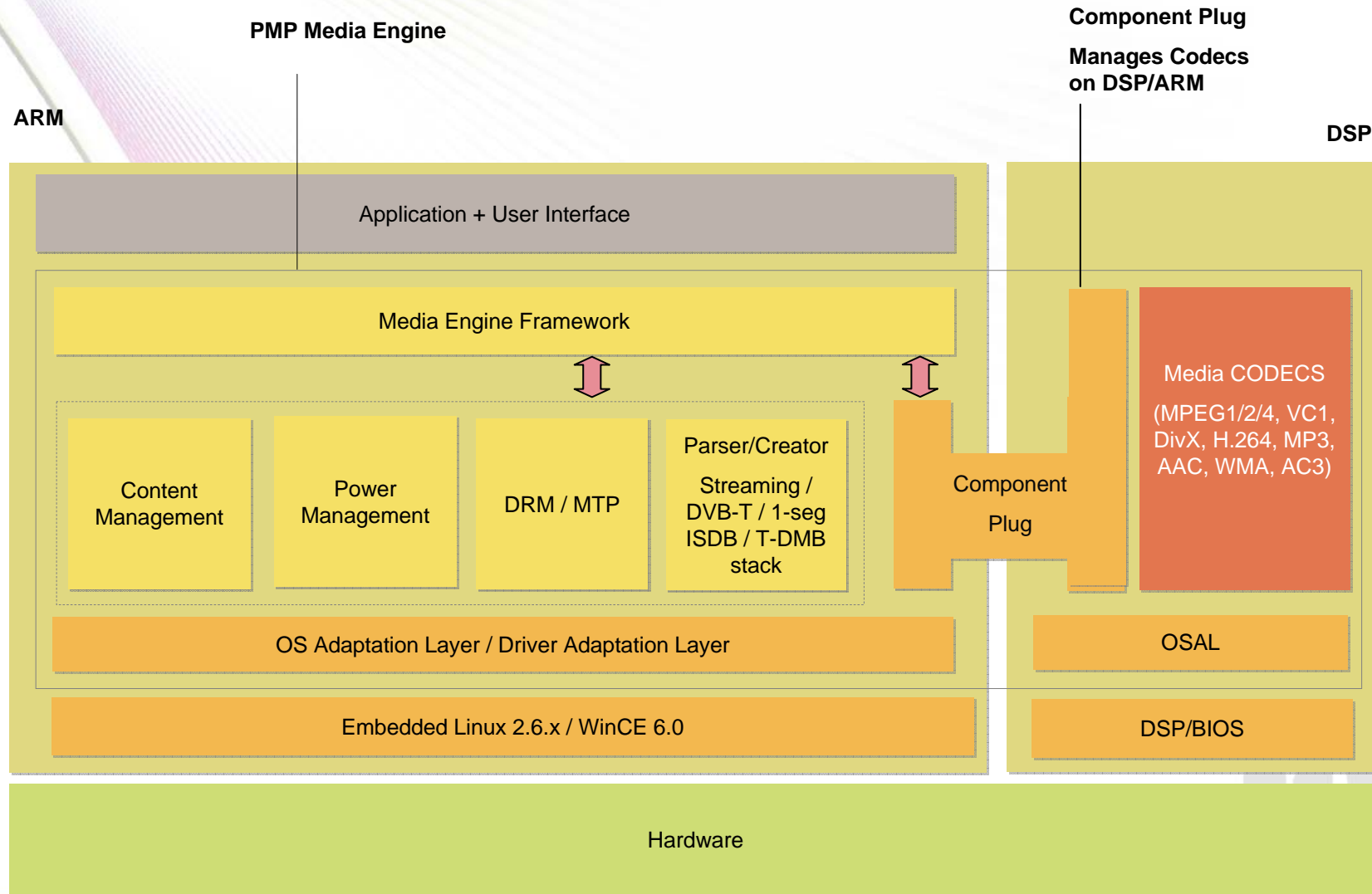
### 套件内容

- Custom PCB with **HDMI**
- BSP for Linux/WinCE
- Codecs
- AV Framework
- Application

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# Ittiam PMP Media Engine PMP 软件架构(支持数字电视)



# Software Media Engine Add on for Video Phone

## Video Phone Media Engine Add On 视频电话处理引擎

- Advanced media processing for low delay video: H.263 / MPEG4 codec up to D1 30 fps, H.264 BP up to 2CIF 30 fps
- Wide range of speech codecs: narrowband / wideband
  - G.711, G.723.1A, G.729AB, GSM-AMR-NB, iLBC, G.722.1, G.722.2, AAC-LC
- High performance telephony with fine tuned AEC, DTMF/CPT, and VAD/CNG/DTX
- QoS components: Speech/Video Adaptive Jitter Buffer, Packet Loss Concealment, RTCP over RTP
- Support for 3rd party SIP stacks 支持第三方SIP协议栈

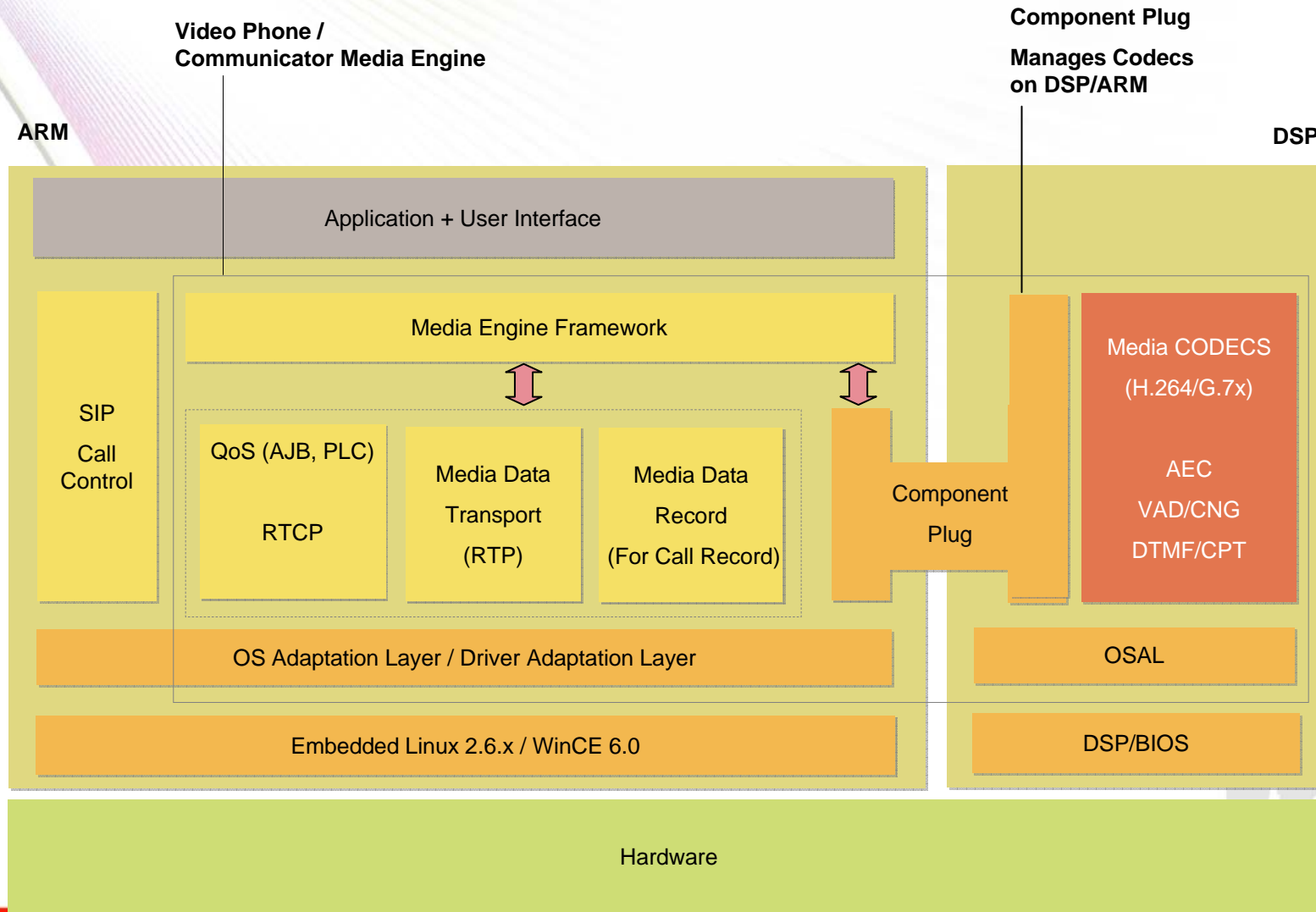
## Solution Benefits 方案优点

- Adapts bit-rate and frame-rate to network conditions
- Improves error resilience and error concealment through spatial and temporal methods, H.264 slice based encoding, AIR and FMO especially useful in wireless environments
- Improves low delay performance through H.264 ASO
- Design scales to multi-way conference with Audio-video bridging (MCU function)
- Rich set of options for call record (local or distant caller) and post call playback

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# Ittiam Video Phone / Communicator Media Engine



# Ittiam PMP-Communicator solution

- Ittiam PMP + Communicator solution
  - Low footprint subsystem (only SIP) for communicator in always active mode  
小印迹SIP子系统
  - On demand swapping of the PMP and Communicator media engines on the GPU  
GPU按需切换PMP和Communicator media 处理引擎
  - On demand swapping of the PMP and Communicator DSP images  
按需切换PMP和Communicator的内存印象
  - On demand swapping achieves minimal overheads for Communicator add-on to PMP in terms of RAM footprint  
最小的系统管理开销——基于内存印象的按需切换技术
- Ittiam Communicator Add-on for non Ittiam solutions  
Ittiam Communicator在非Ittiam解决方案上的应用
  - Communicator add-on based on very flexible GPU architecture and standard peripheral usage interfaces  
基于可变的GPU结构和标准外周应用接口设计的Communicator
  - DSP sharing based on TI DSP usage architecture for easy swapping of DSP images across several applications  
基于TI DSP软件应用架构设计的DSP软件，提供方便的DSP印象切换

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# Ittiam Communicator and other applications

- Ittiam PMP design recap (TMS320DM6441 based)  
Ittiam PMP 设计总结（基于达芬奇TMS320DM6441）
  - Readily available broadband access, significant amount of storage, good resolution video display  
方便的宽带网络支持，大容量存储，高质量的视频播放显示
  - Powerful GPU for generic applications  
强大的应用处理器，支持丰富的应用软件
  - Powerful DSP for multi-format media encode/decode processing  
强大的DSP，支持多格式的媒体编码和解码
- Independent add-ons for PMP 独立的附加软件
  - Web browser, Flash etc  
Web浏览器，Flash播放等
  - IM Chat 即时通讯

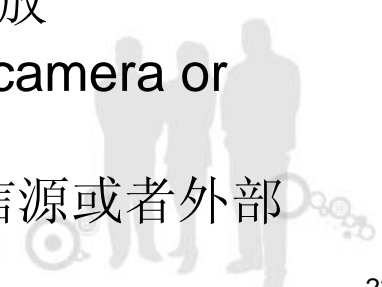
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# Ittiam Communicator and other applications

- Streaming add-ons for PMP 流媒体应用软件
  - PMP as streaming server of stored content sharing  
PMP作为共享内容流媒体服务器
  - PMP as streaming client for web-based streaming and IPTV applications  
PMP作为一个流媒体播放终端，支持基于web的流媒体播放和IPTV应用
- Communicator add-on applications  
无线语音和视频通讯应用软件
  - Multi-party conferencing 多方会议
  - Video call recording and playback 视频电话录制和回放
  - Communicator as live streaming server for on-device camera or external source  
Communicator作为流媒体视频服务器传输内置摄像头信源或者外部信源

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# Ittiam PMP Market Products



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# Ittiam Video Phone/Conferencing Market Products



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# TI Developer Conference

19 - 26 June 2007 • Beijing • Shanghai • Shenzhen • Taipei

# Thanks!

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