

Leveraging DaVinci Technology for Creating an IPcam Reference Design

Ruey-cheng Cheng
Apexx Technology Corp.

Minds in Motion



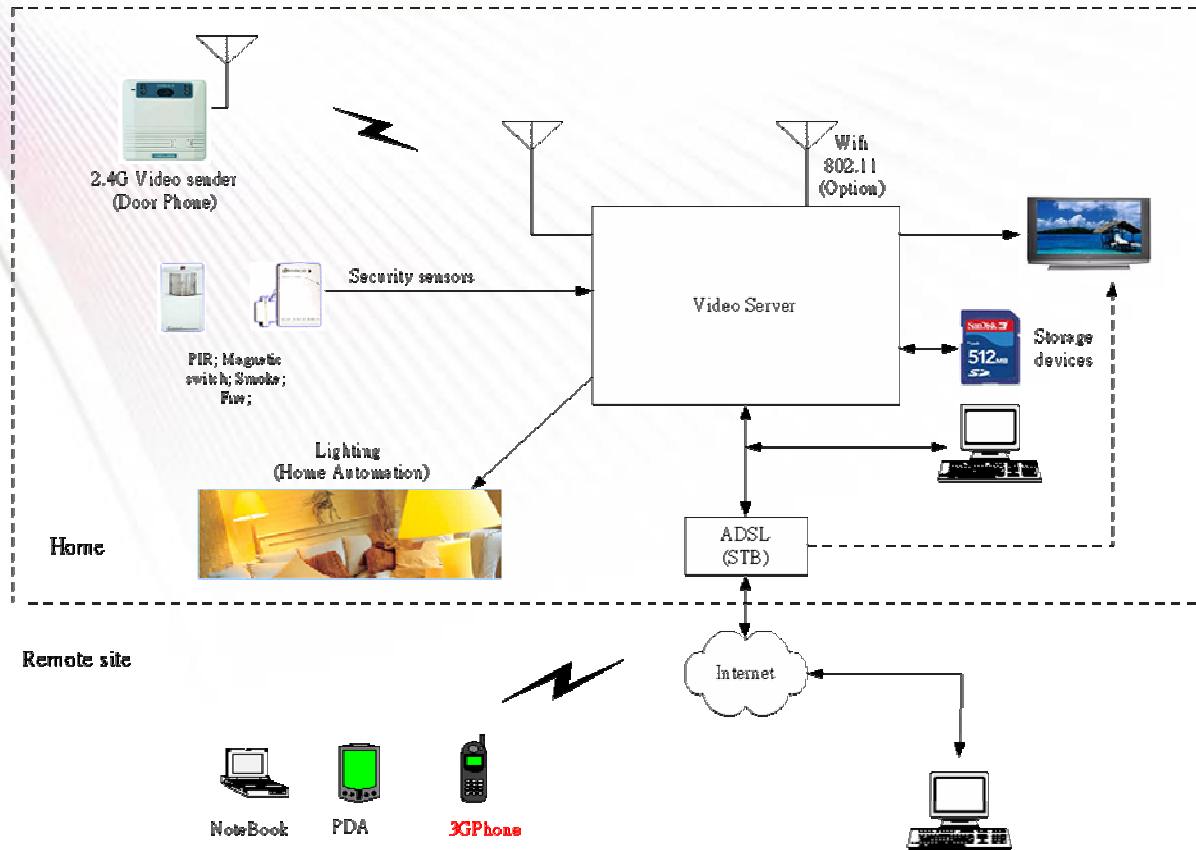
Characteristics of Security

- Anywhere and anytime
 - Real time response
 - Reach to whom are related (good connectivity)
- Distributed/standalone
 - IP based
 - Internet
 - Telecom (Fixed line or Mobile network)
 - Intelligence; Completed solutions
- Programmable to fit different environment and market requirements
 - What is the limitation: cost/ bandwidth/ storage/ sensor

Minds in Motion



Operational scenario of Video Server/ IP Cam



Minds in Motion



Not a Device, but a Service

- Completed solution to end users
- Plug and play
 - Solving the installation issue – by a good service
- Integration with
 - Telecom
 - Internet

Minds in Motion



Security Devices

- Economic devices; (DIY—Home use)
 - Cost effective
- Professional devices: Government/ Enterprise
 - Intelligence: Object detection; tracking; behavior analysis
 - Low false alarm; precise;
- Provide a completed service –
 - Sensor; report (alarm notice); Remote Controls;
 - Multi-channel Management (PC—Home security console);
 - Network Installation: IP input; DDNS; Firewall;
 - Notification: from Alarm to notice & record.
- Who are the service provider?

Minds in Motion



Economic Devices

- Features
 - Home use
 - CMOS
 - Digital PTZ (Pan-Tilt-Zoom)
 - PIR (Thermal sensor)
 - SD card (DVR function)
 - Speaker (Buzzer)
 - Security console (Alarm management)
 - A/V output
 - Remote controller (IR/Wireless) – wireless as option

- GPIO:
 - Magnetic switch
 - Remote PIR

- SIP protocol -- Option
 - VoIP/Video Phone
 - AEC (Acoustic cancellation)

Minds in Motion



Advanced IP Cam -- I

- Multiple streams (Multiple resolutions)
- Dual Codec:
 - Two MPEG4/H.264 streams (two video)
 - MPEG4/H.264+JPEG (one video; one image)
- Two ways audio (AMR)
- Instant alarm: (Mobile phones connection)
(2.5G(JPEG); 3G(MPEG4) Phones)
- Intelligence and reliable identification: Low false alarm;

Minds in Motion



Advanced IP Cam -- II

- Local storage support (SD/HDD) – Event back up.
- IPv6/IPv4 support
- Speaker Phone (Echo cancellation)
- Combination of internet and telecommunication network.

Minds in Motion



Video Content Detection



People Counting



Perimeter Protection



License plate reading

Digital technology with VCA enables
remove the drudgery out of the surveillance task.

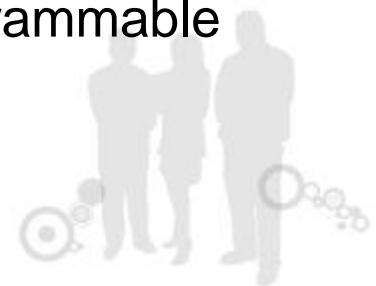
Minds in Motion



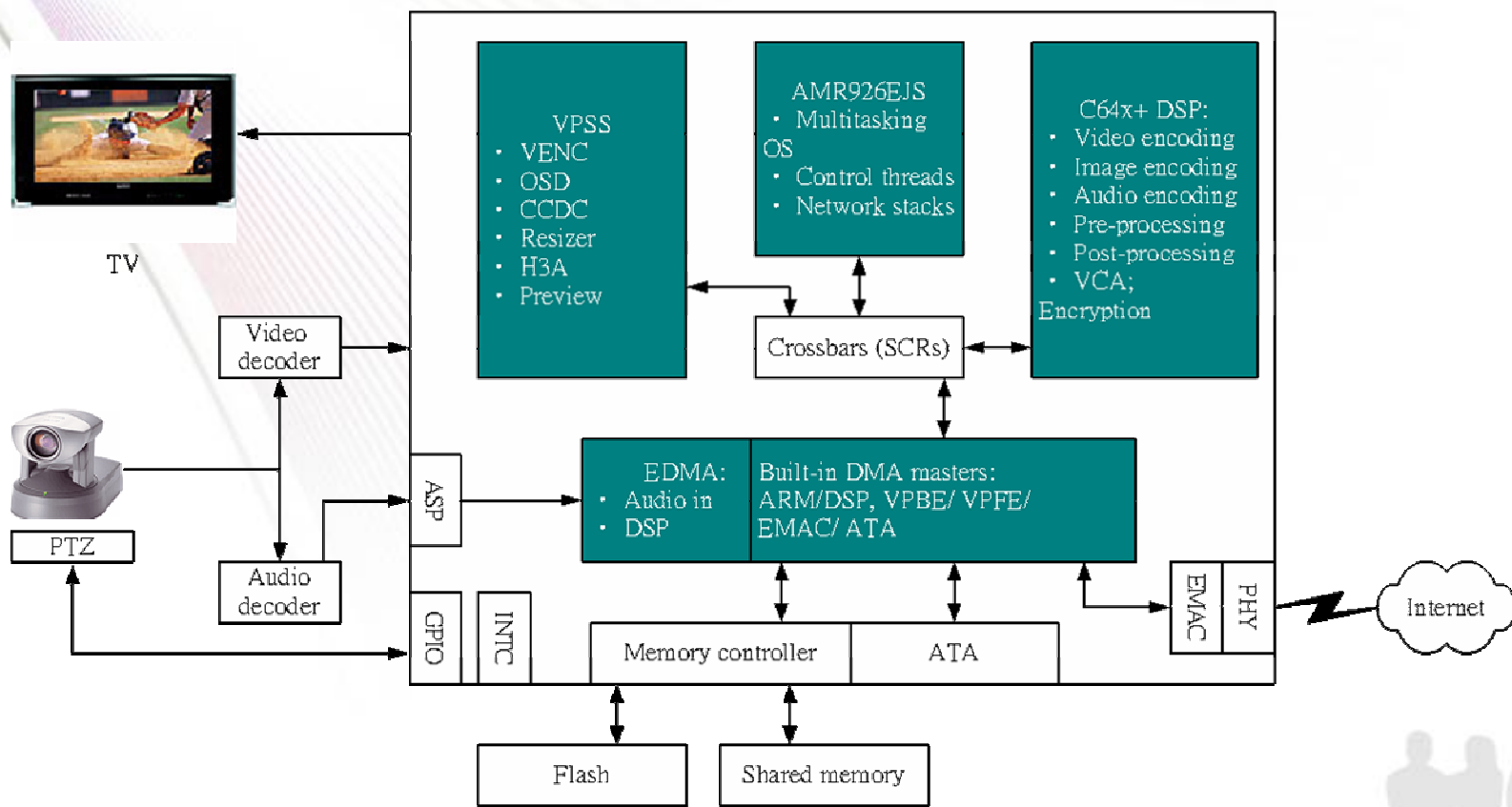
Types of IPcam

- Differences in camera sensor & lens type, level of intelligence, and robustness of features (PTZ, local storage, video quality and resolution, security, etc.)
- Intelligence include different types of *Video Content Analysis* techniques such as motion detection (e.g. used in Intrusion Detection), object recognition (e.g. counting applications), object tracking, face recognition (e.g. security screening).
- An *http web server* is usually included for remote control and administration and/ or video streaming.
- Video streaming can range from simple MJPEG to MPEG4 or H.264 *video compression* over various *IP protocols* such as TCP/IP, FTP, HTTP, RTP and RTSP at different resolutions and number of streams.
- To meet challenges of IP networks, IPcam needs a programmable processor to constantly adapt to changing conditions.

Minds in Motion



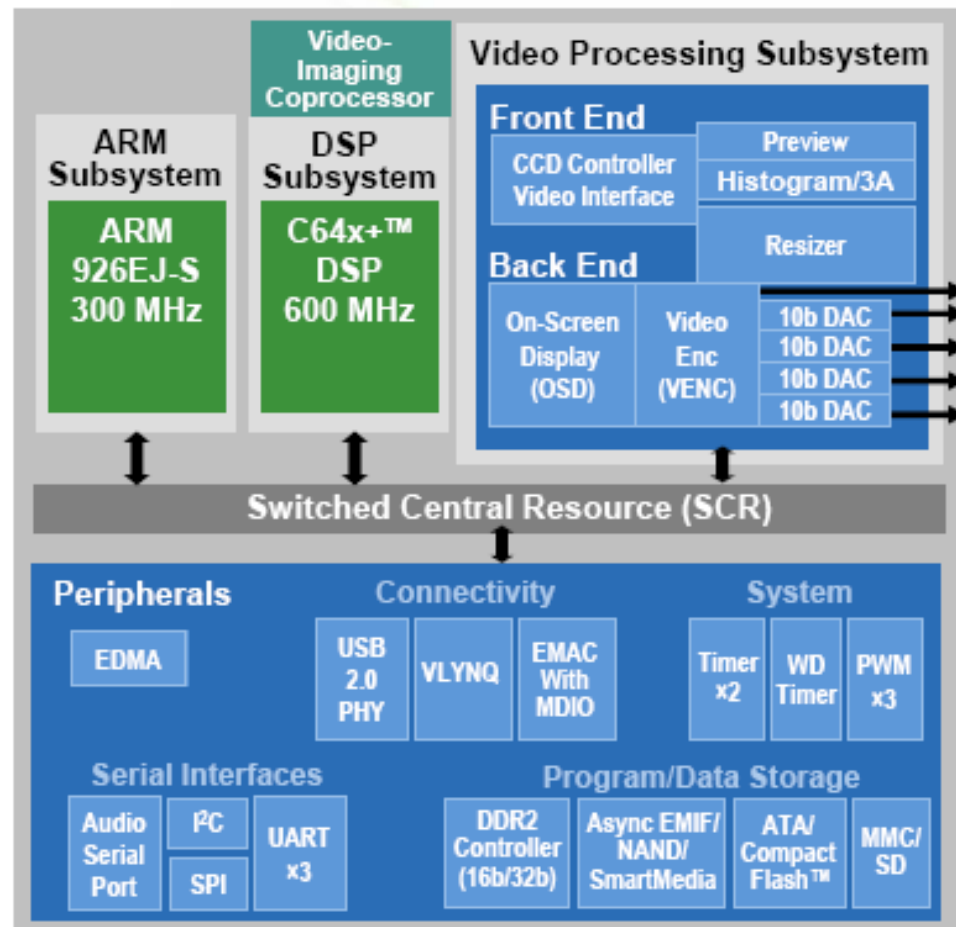
DM6446-based IPcam



Minds in Motion



DM6446 fit for IPCam



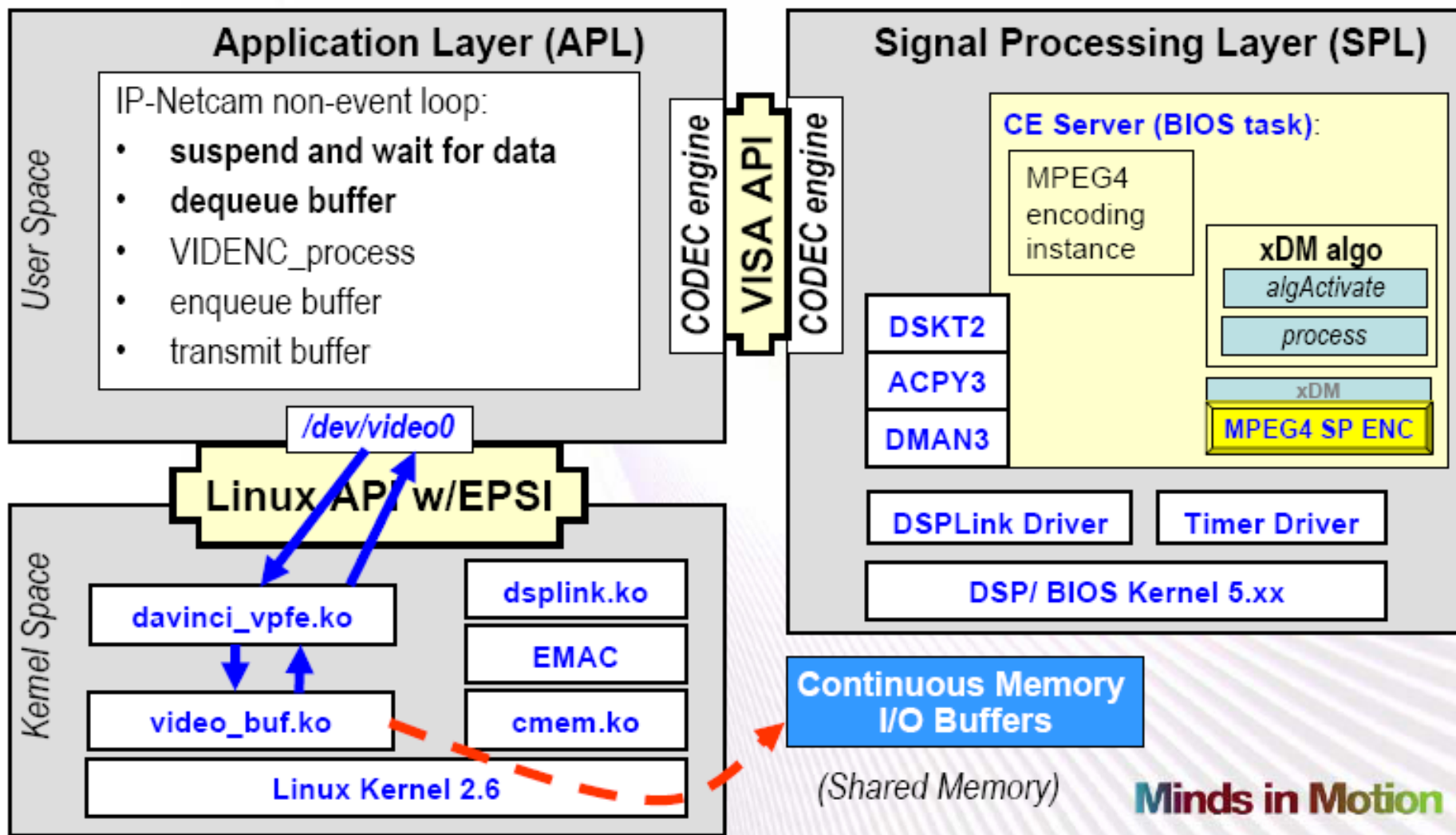
Key Applicable Features:

- 300MHz ARM926EJS for control threads and networking stacks
- 600MHz c64x+ DSP core for compression and analytics
- H/W VICP accelerator
- 64-Channel EDMA
- Video Processing Sub-system with built-in NTSC/PAL encoder and On-Screen Display (OSD)
- Built-in I/Os
- High-speed internal busses
- DDR2 controller
- NOR/ NAND memory I/F
- Small BGA 16x16mm package

Minds in Motion

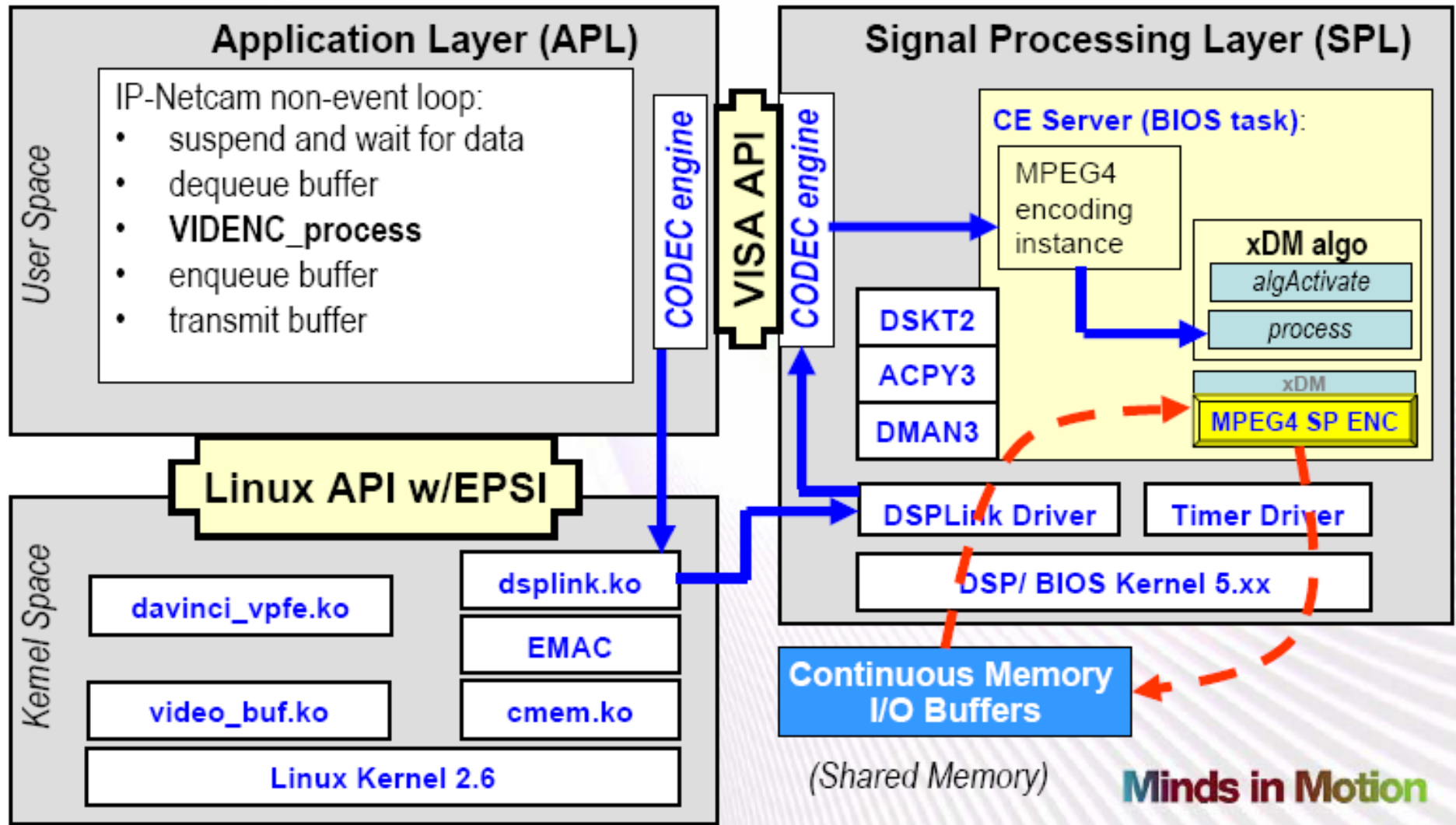
DM6446 IPCam Software Architecture

Calling Sequence – Capture

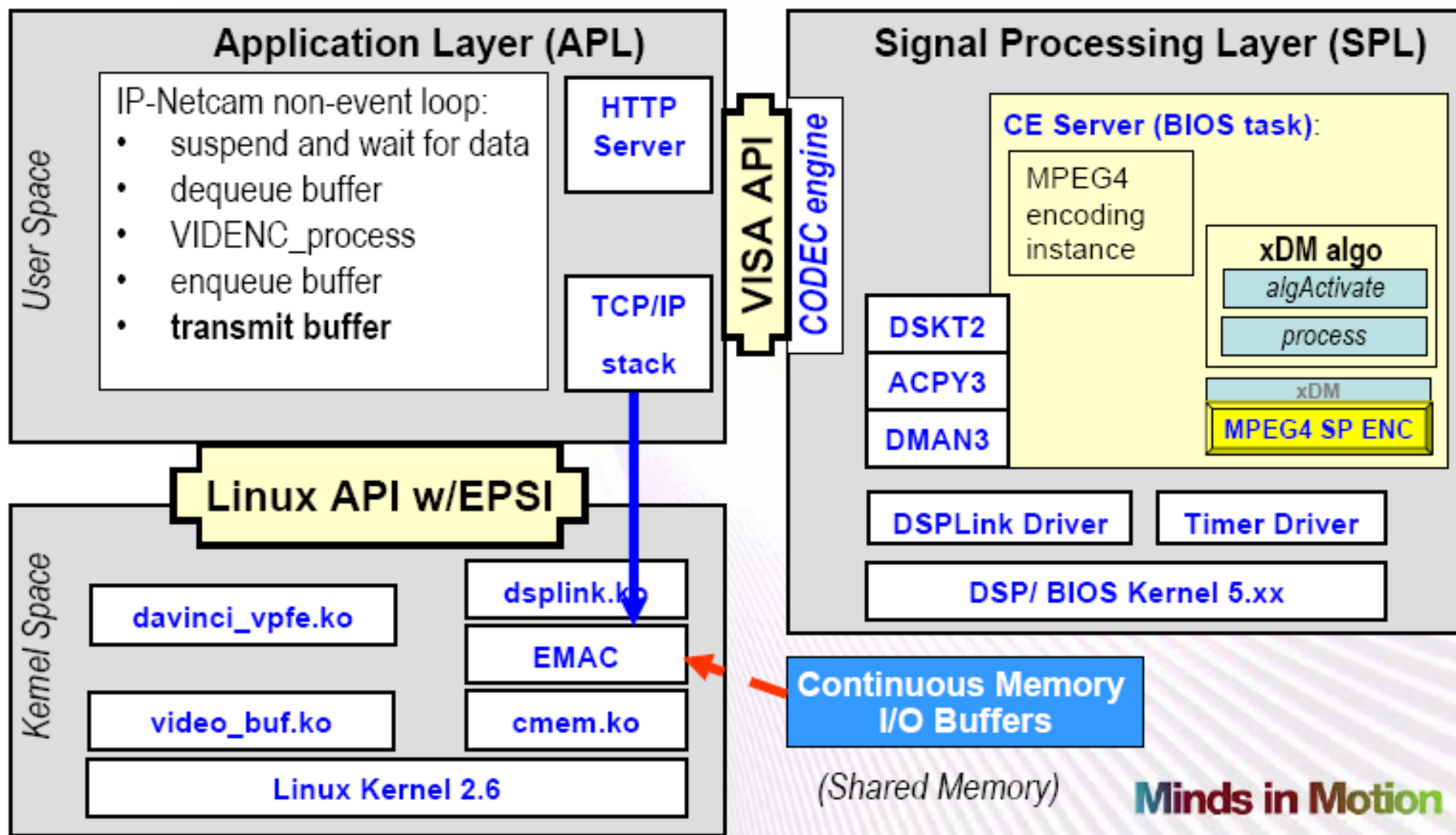


TI Developer Conference DM6446 IPCam Software Architecture

Calling Sequence – Encode



Calling Sequence – Transmit



TI Developer Conference

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

Thanks!

Minds in Motion



Technology for Innovators™

 TEXAS INSTRUMENTS