

### September 10-12, 2007

Los Angeles Convention Center Los Angeles, California

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## Designing Software for Mobile VoIP and Video

Fred Wydler VP VoIP Products SPIRIT DSP



## Company background



### SPIRIT is voice and telecom experience

- 10 years in global voice software business
- 200+ first-class customers, largest OEMs
- 100+ million embedded voice channels powered
- SPIRIT DSP is a member of major voice-related developer communities and partnerships
  - Preferred audio/voice software partner for ARM
  - Intel, TI, Radvision, etc.





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## Converged device



- > 1.2B Units of various mobile phones in 2010
  - Fancy gadgets <\$300</li>
  - VoIP: no international cell roaming fees
  - Rich user experience
  - Inter-operable with PCs
  - Video
  - Single pocket device (cordless + cell phone + PMP)
- Engines to be integrated into a converged device:
  - Voice (VoIP)
  - Video



# New approach to V20IP enabling



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### Converged platform

- Target: video telephony, IP-STB, media centers, PMP and more
- Convergence of different applications into one product
- Complete ecosystem (H/W reference designs, frameworks and drivers, software for DSP and media processing)







## Complete converged platform



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SPIRIT voice and video engine completes a converged platform

- Application-friendly API: easy integration
- Complete media processing functionality: only GUI needed
- Pre-integrated solution: faster time to market
- IMS-ready solution







## **Application enabling**





## **Technical challenges**



- High quality voice and video
  - Voice enhancement
  - Seamless video
- Resource efficiency
  - System resource management
  - Hardware accelerators for reasonable video framerate
- Stable performance in wireless networks
  - Network optimization tools to handle WiFi-specific network impairments

## Complete voice and video engine



### Components

• SPIRIT proprietary speech codec

TERNET.

- Multiple codec standards supported
- Clear echo- and noise-free voice

### Engine features

- Robustness to poor networks
- System resource optimization
- Network payload optimization
- Seamless and smooth video
- Different call scenarios
- Support for external codecs

#### Solution Components:

Voice and Video codecs - all standard G.xx, H.xx codecs, plus IP-optimized wideband speech codec IP-MR<sup>™</sup> RealDuplex<sup>™</sup> - sophisticated speech enhancement solution with AEC and noise suppressor NetJet<sup>™</sup> - Network payload management with adaptive jitter buffer and error correction mechanism





## Why engine



### Only engine can...

- manage CPU load
- run all components together
- optimize channel workload
- handle packet losses
- synchronize voice and video
- minimize resource consumption





## Voice enhancement



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"... the quality of user experience acts as a key differentiator and an important tool to attract and retain customers."

Manjula Talreja, Voice Technology Group, Cisco



- Wideband AEC and voice enhancements
- Wideband IP-optimized speech codec (scalable, robust, with smart multiplexing)
- Wideband adapted algorithms





Codec only compresses video with plenty of modes and options

It should be managed correctly









### Issues

- Packet losses
- Narrow bandwidth
- Limited system resources

### Video degradation

- Frame drops
- Lost blocks
- Lost sync
- Low frame rate

### Solutions

- Redundancy control
- Video PLC
- Automatic rate selection

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- Lip sync
- CPU load control

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## Hardware accelerators for video



- Standard integration (OpenMAX<sup>™</sup>)
- Custom integration

Already deployed by:



Core Logic





## Network optimization



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### Issues

- Delays
- Jitter
- Packet loss
- Congestion
- Synchronization losses

### Solutions

- WiFi adaptation
- Adaptive jitter buffer
- Packet loss concealment
- Automatic rate selection
- Lip-sync





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### Think of SPIRIT as your solution vendor!



### Checklist items

- Delay time <170ms</li>
- Voice quality MOS-LQO 4.21
- WiFi adaptation

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