Mobile Multimedia: Trends and Challenges

PRESENTED BY:

Sasken

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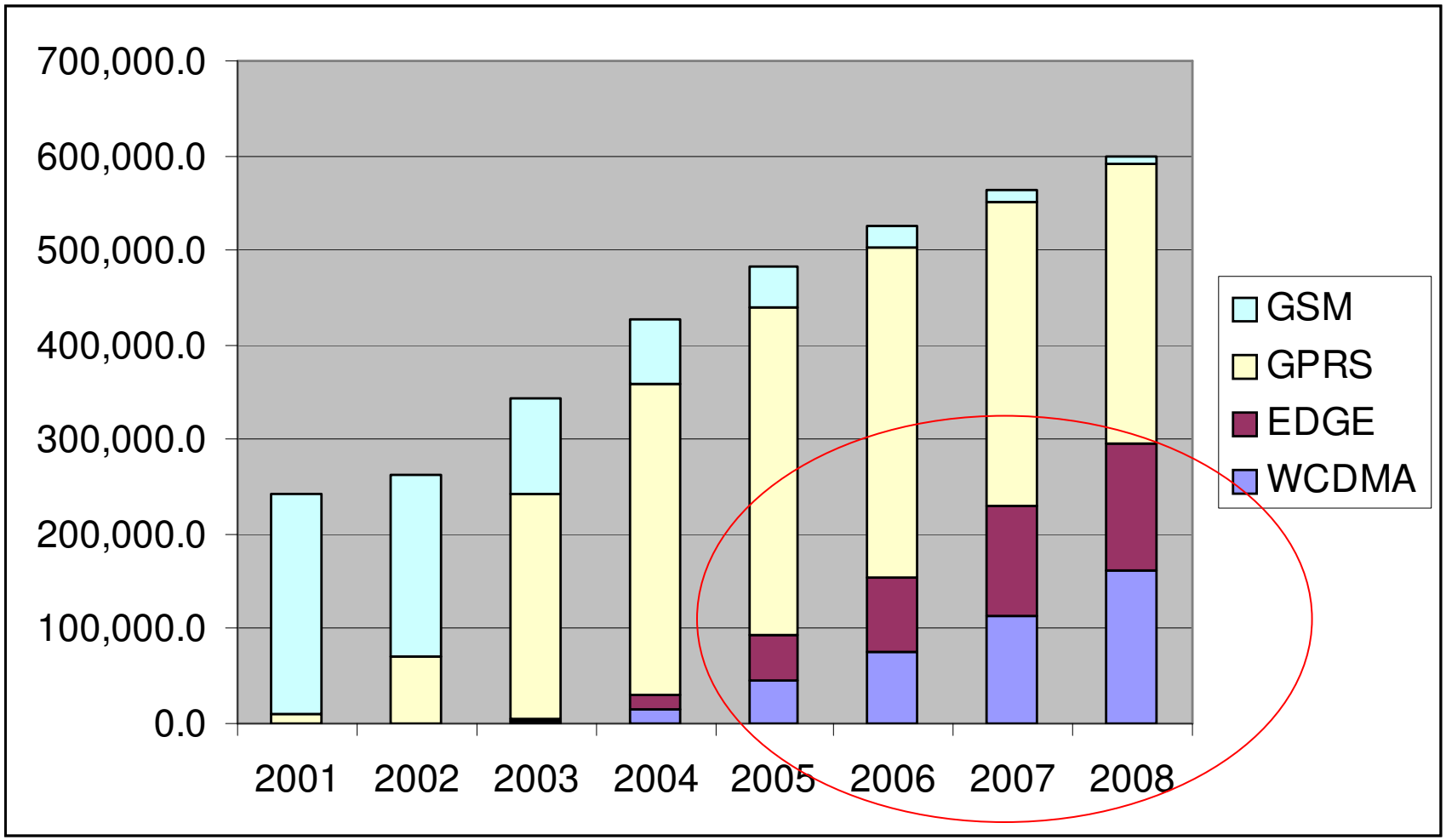
Agenda

- Trends in Multimedia
- Issues and Challenges in mobile multimedia software

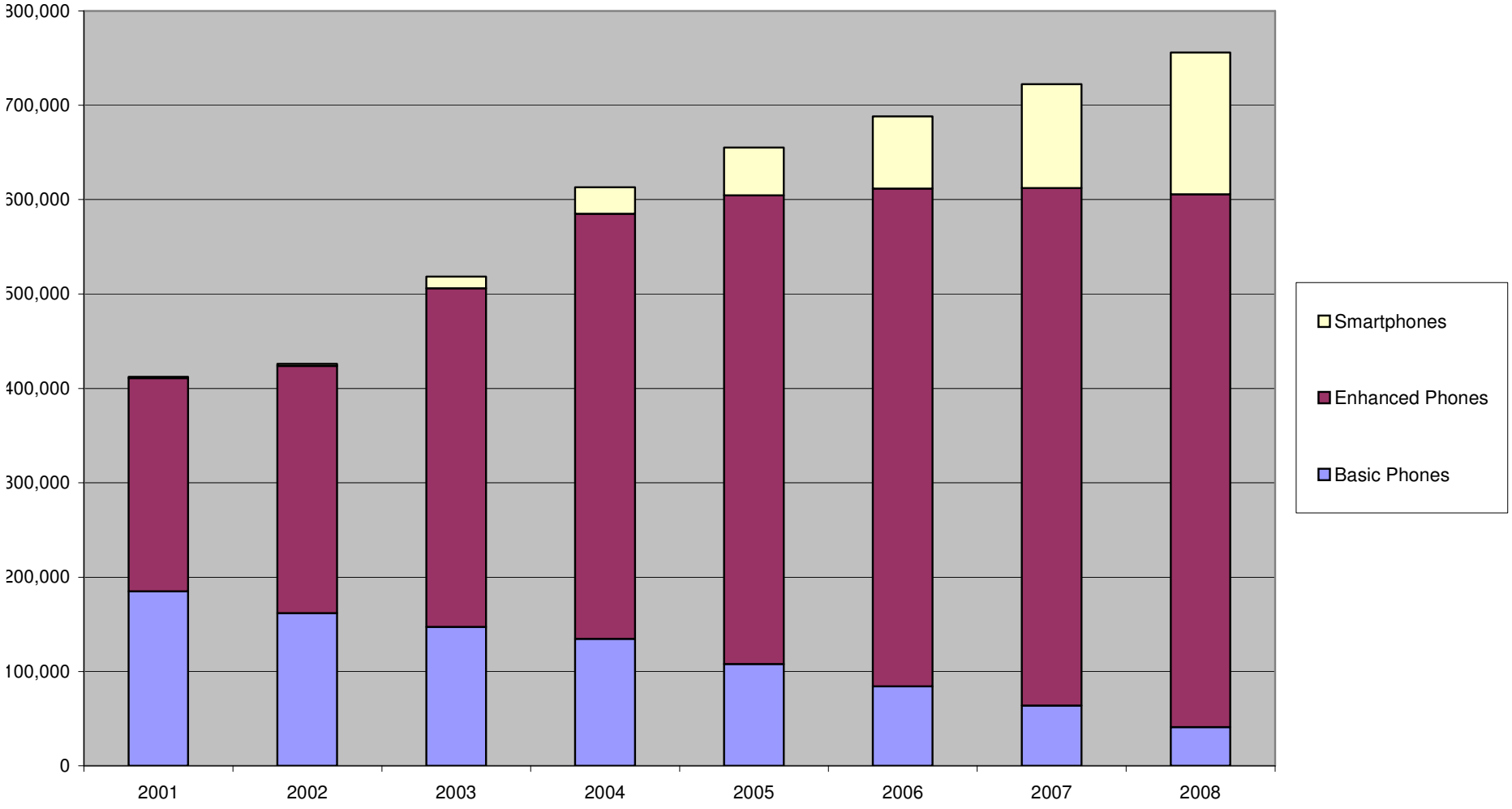
Drivers of Mobile Multimedia

- *Processor capabilities*
- *Display, Camera, Memory on handhelds*
- *Communication Bandwidth*
- *Operator push*
- *User demand for entertainment and lifestyle applications*
- *Convergence of devices*

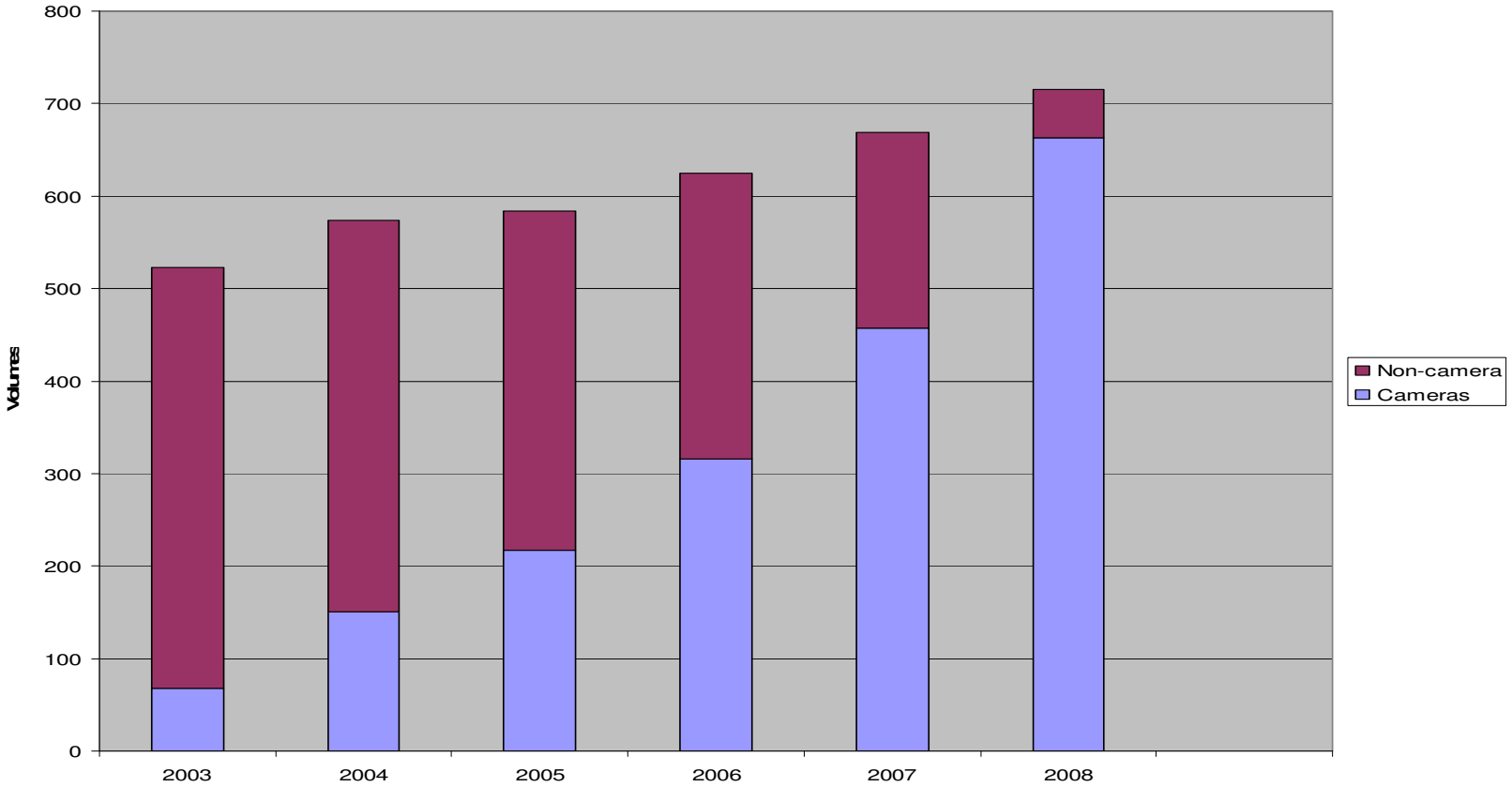
Shipments by technology



Shipment by phone category

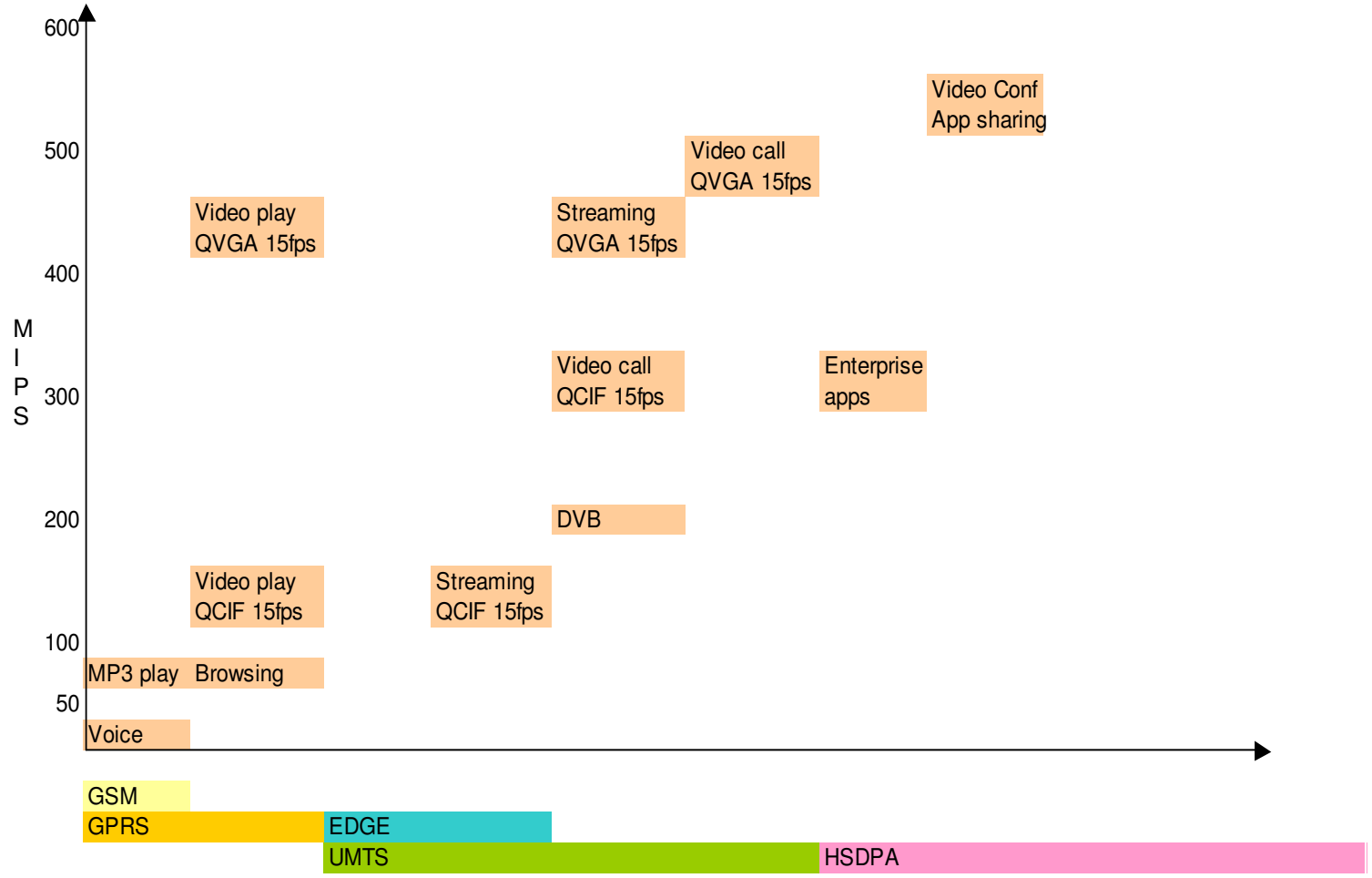


Camera phone shipments



- 1M pixel standard today, 2Mpixel available
- 4M pixel expected late 2005
- 6M pixel: highest consumer digital camera available today

Processor power and bandwidth drive apps



Phone Capabilities: Trends

Convergence is here to Stay

AAC+Extended				Consumer Device	
AAC+				Functionality in Mobile	
OGG	D1, 30 fps	6 M Pixel	D1, 30 fps		
MPEG-4 AAC	VGA, 30 fps	4 M Pixel	VGA, 30 fps		
WMA	QVGA, 30 fps	2 M Pixel	QVGA, 30 fps	App Sharing	
mp3	QVGA, 15 fps	1 M Pixel	QVGA, 15 fps	2 way Video	Digital TV
Radio	qcif, 15fps	VGA	qcif, 15fps	Speech	Analog TV
Audio Players	**Video Players**	**Digital Cameras**	**Digital Camcorders**	**Conferencing**	**TV Reception**

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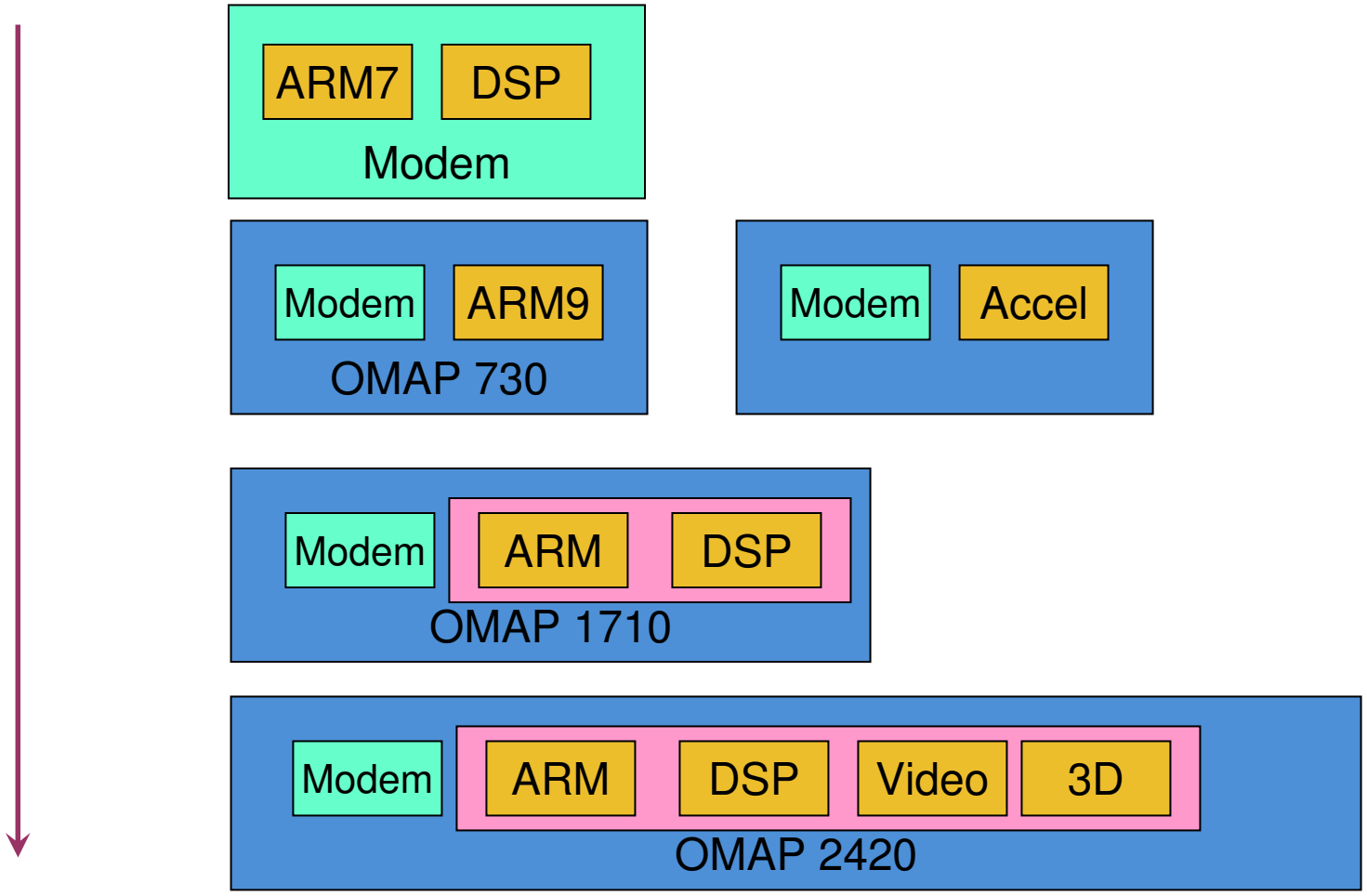
Mobile Terminal Processing Complexity



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Increasing complexity of terminal:

Issues & solutions

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Software complexity

- Share of software on a mobile phone is increasing
- Processor architectures
  - Multiple cores
    - Communication/coordination between cores
  - Constant changes
  - Need for designs that support migration/porting
- OS/App frameworks not standardized
  - Integrated solutions
    - Nucleus/RTOS
  - Open OS
    - No clear winner
    - Still evolving
  - Need to keep designs open

Software complexity…

- Complexity of apps
  - Multiple codecs
    - Video: H.263, MPEG-4, H.264, RealVideo, Windows Media
  - Multiple protocols
    - Voice call, PoC, Videophone, Video streaming, VoIP, Application sharing etc
  - Dealing with multiple peripherals
    - LCD, Keypad, Microphone, Speakers (Stereo), Headsets, Cameras
    - 2 to 3 camera are found in high end phones
- Interaction between apps
  - Complex use cases
  - Convergence of devices lead to complex industrial design

Testing complexity

- Complexity of apps
  - Multiple levels of component integration
- Concurrent apps
  - Difficulty in testing for correctness and performance
  - Inter-app dependencies
- Network dependence
  - Interop requirements
- Operator specific requirements
  - Need to generate variants
- Localization requirements

System level testing of apps on a 3G phone involves over 10,000 test cases

Technology Adoption Cycles

- Newer applications are required to justify
  - Additional network bandwidth being created
  - Additional processing power available on the handset
- Customers looking to upgrade phones at shorter frequency
- Shorter cycles from silicon availability to device launch

Seen a reduction from 24 months 3 years back to 15-18 months currently

Time to develop vs. Time to market

- Increased Software on phones
  - Software needs time to mature
  - Additional software is being added in each generation
- Newer processor architectures
  - Large parts of Software is new
- Multimedia Applications have turned out to be one class of killer applications
  - Possibilities are nearly unlimited
  - Still large portions of convergence needs to be covered
- Software development and maturity is on the critical path for phone deployment

Is there way out of this dilemma? Is Software re-use a possible solution?

Increasing Software – Shorter Device introduction cycles

- Platform approach
  - Multiple phone models based on the same platform
  - Adding in newer features into later models?
- New category of phones being developed:
- Open phones
  - Application OS based phones a.k.a smart phones
  - Native Applications can be downloaded on to the phones after device launch
  - Secondary market for applications ala PCs
- Closed phones
  - Based on RTOS
  - No native applications after device launch (except Java™ applications)

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Open OS Phones

- Open OS based phones seem to provide a solution
  - Symbian – Series 60, 80 & 90, UIQ
  - Linux
  - Windows Mobile
  - Palm OS
- Issues with open OS based phones
  - Development of Multimedia Applications
  - Parts of Multimedia Applications running on different cores – Synchronization?
    - Multimedia Accelerators
    - DSP cores
    - Specialised cores

Need for software frameworks to reuse large components of software

Software Frameworks for Multimedia Applications

- Symbian
  - MMF for application components
  - MDF for accessing codecs
- Linux
  - Different Solutions are available
- Windows Mobile
  - DirectShow framework
- Palm OS
  - Import of a framework from BeOS in Palm OS 6
- Industry Initiative
  - OPEN MAX under Khronos group

Summary

- Increased complexity of phone is a given – as is the need for shorter deployment cycles
- Software is on the critical path for reducing Time to Market
- Move towards frameworks and Open OS
  - Separation of modem from apps
  - Expectation of increased software re-use
- Importance of customization, integration and testing phases
  - Need to generate differentiated models
  - Complex use cases

Thank You