Imagination

Multi-Core, Multi-threaded, Multi-standard

Using architecture to maximise IP product scalability

Tony King-Smith, VP Marketing
Imagination Technologies

NMI Embedded Technical Network, 25th June 2009

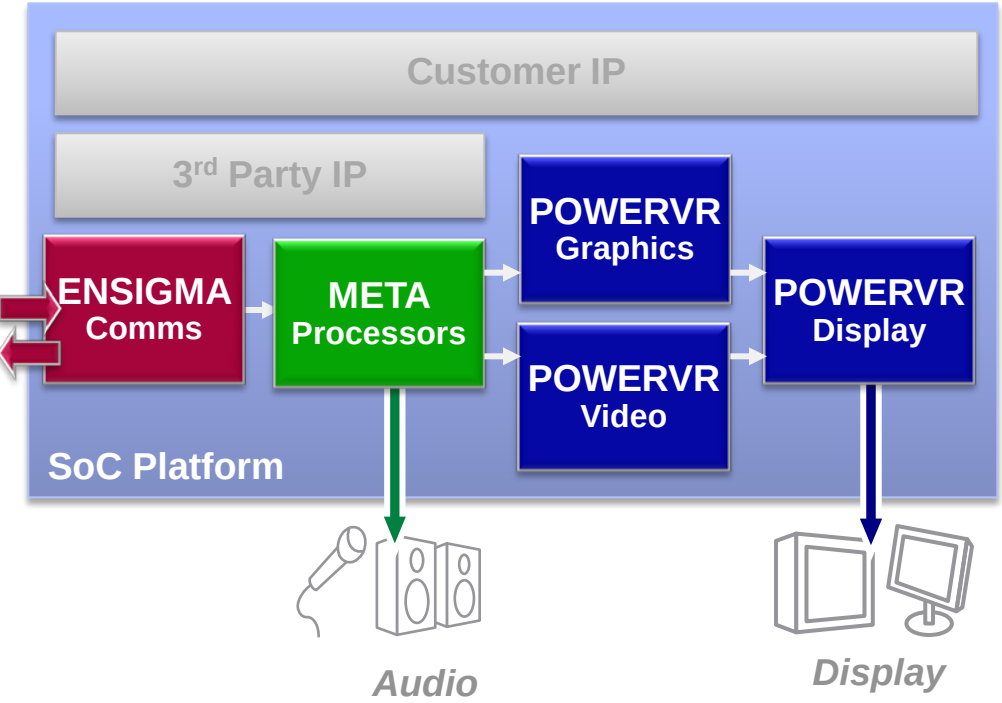
Overview

- **Consumers: What do they know?**
- **Architecture: Making it happen, then making more of it**
- **Business: Why the IP model is working**
- **Expectations: Why consumers will demand performance**
- **Everything, Everwhere: What consumers want**

© 2009 Imagination Technologies Ltd.

Imagination – what we do

SoC Technologies &Solutions:



PURE Digital Consumer Products:

Markets:

Mobile Phone Multimedia

Hand-held Multimedia

Home Consumer & Entertainment

Mobile Computing

In-Car Electronics

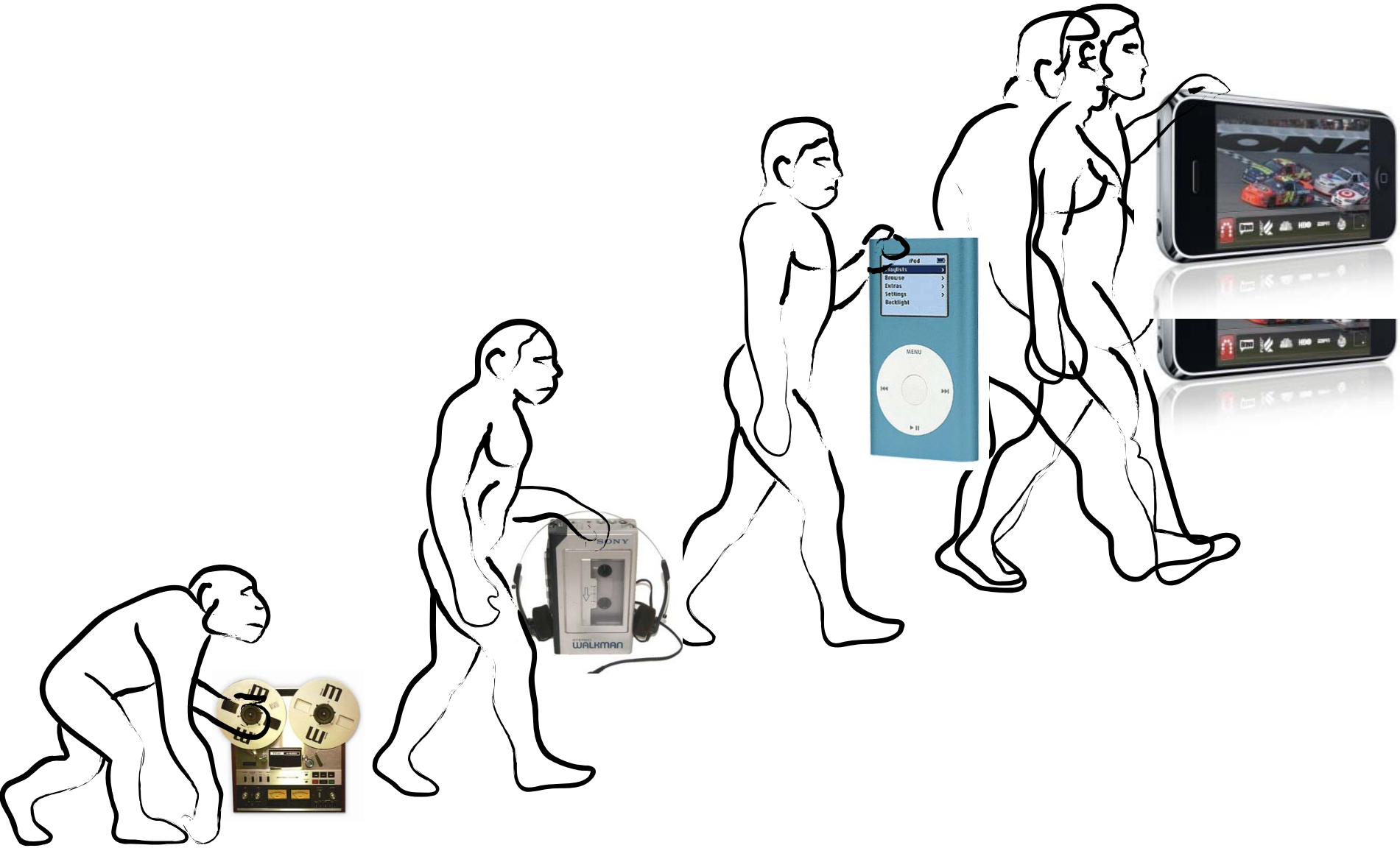
© 2009 Imagination Technologies Ltd.

Our Licensees

Texas Instruments
intel
Renesas
Samsung
NXP
NEC
freescale semiconductor
SiRF
Sharp
SI Electronics, Ltd.
Sunplus
Mavrix
Frontier Silicon
Sigma
toumaz
Wireless Ventures
Marvell

© 2009 Imagination Technologies Ltd.

Consumers Are Evolving…



© 2009 Imagination Technologies Ltd.

Everything, Everywhere

Mobile solutions must deliver your PC, your TV, your music…

Imagination

© 2009 Imagination Technologies Ltd.

visioglobe
Tele Atlas
DONNÉES
IGN

Real Characters

Motion-capture animated characters using hardware skinning in combination with shadow maps.

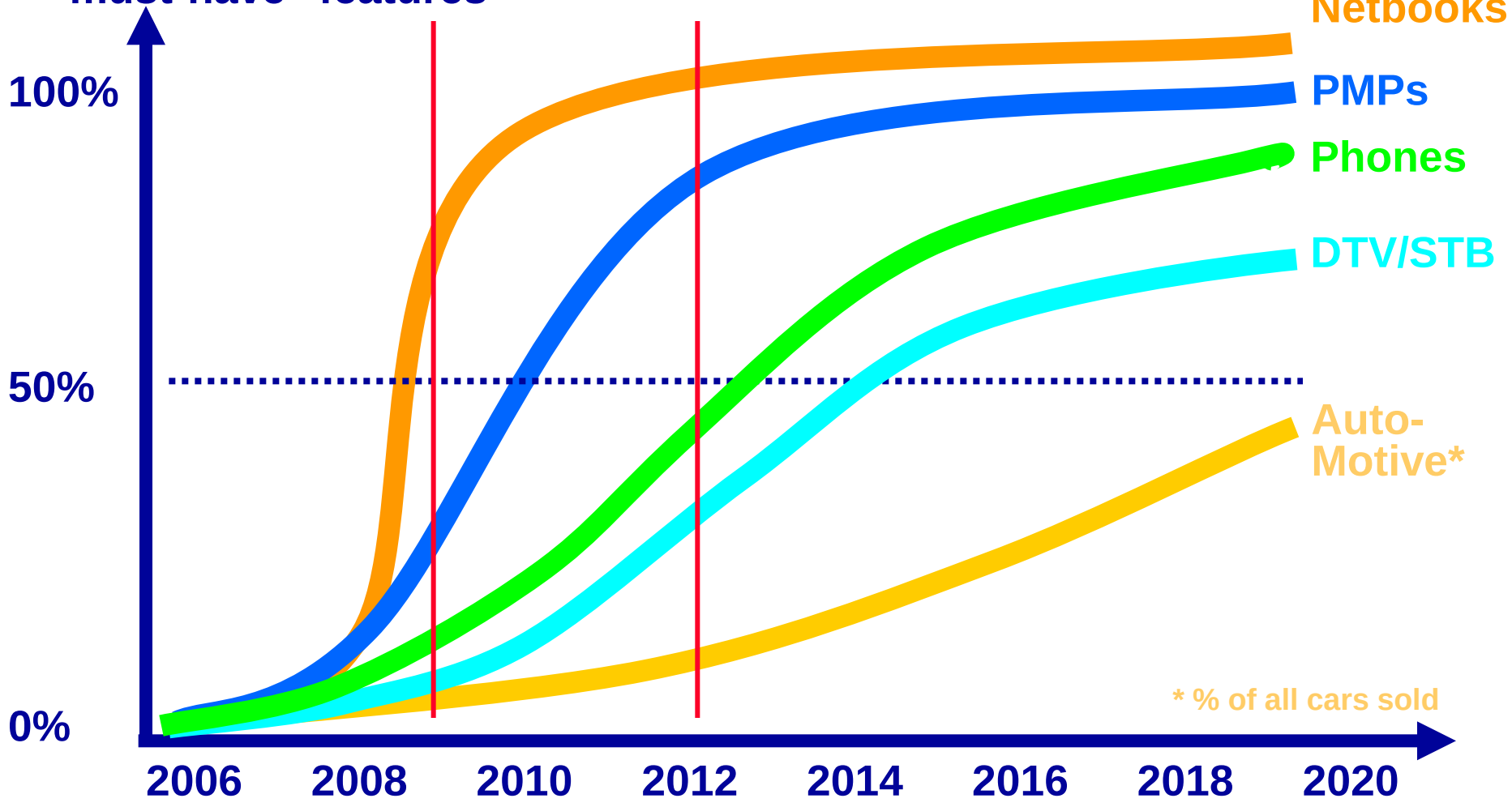
A4 design studio
A4 [2h 43m 19,2s]

0 mph
80°F
:34 pm
P
45 mls
000009 007.7
10 min x 1000
mpg

Adoption Curves Now Becoming Clearer

Imagination

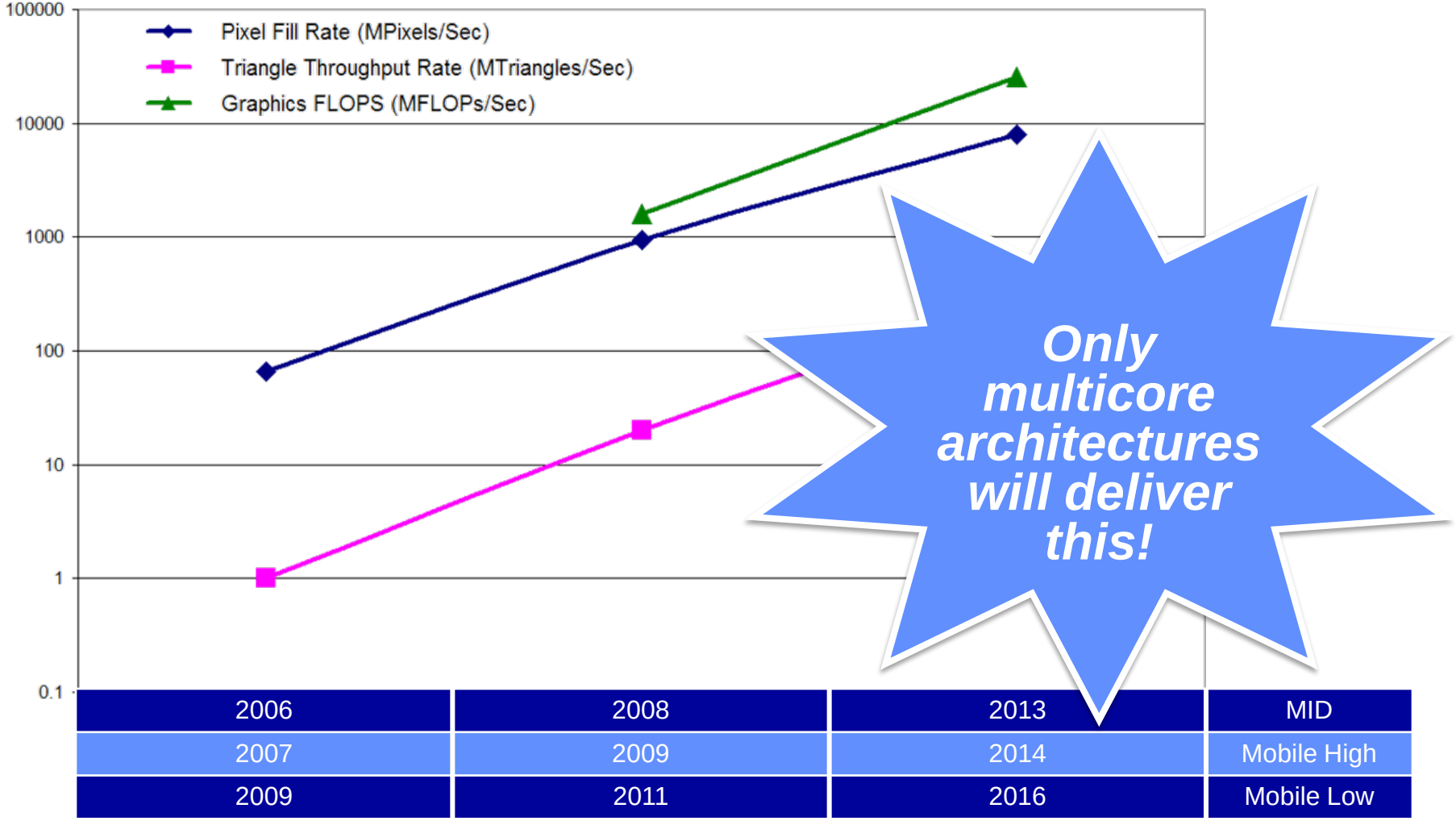
Many markets are now demonstrating an unstoppable trend towards multimedia acceleration and multi-standard communications as "must-have" features



© 2009 Imagination Technologies Ltd.

Graphics Performance Forecast

Graphics Performance Trends in the Embedded Market

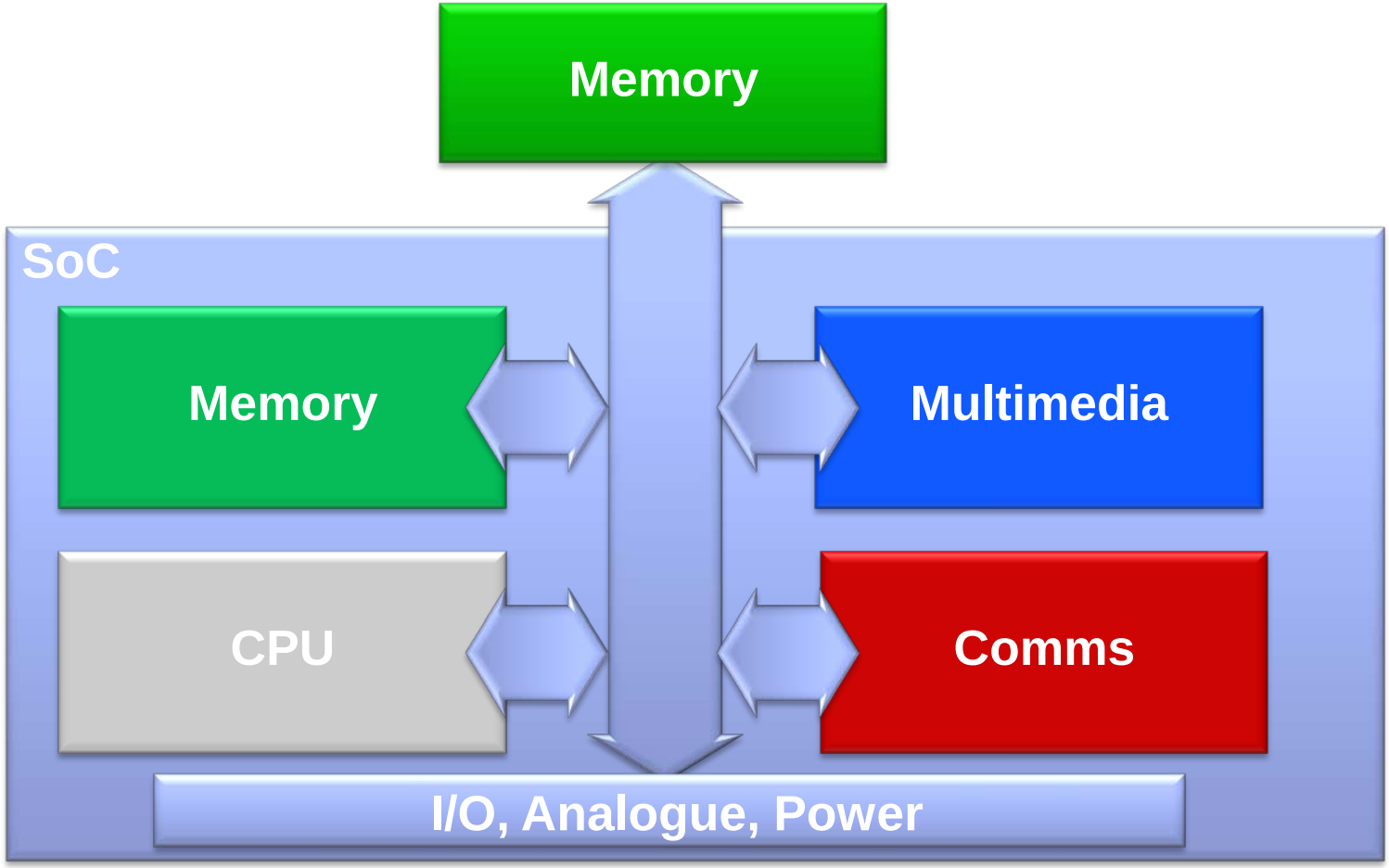


1. Forecast data consolidated by IMG from industry analysts, 3rd parties and customers
2. The data above relates to real SoC performance targets and are not theoretical numbers as sometime quoted by IMG's competition
3. The data is positioned on a log scale for ease of representation

© 2008 Imagination Technologies Ltd.

Architecture Has Profound Consequences

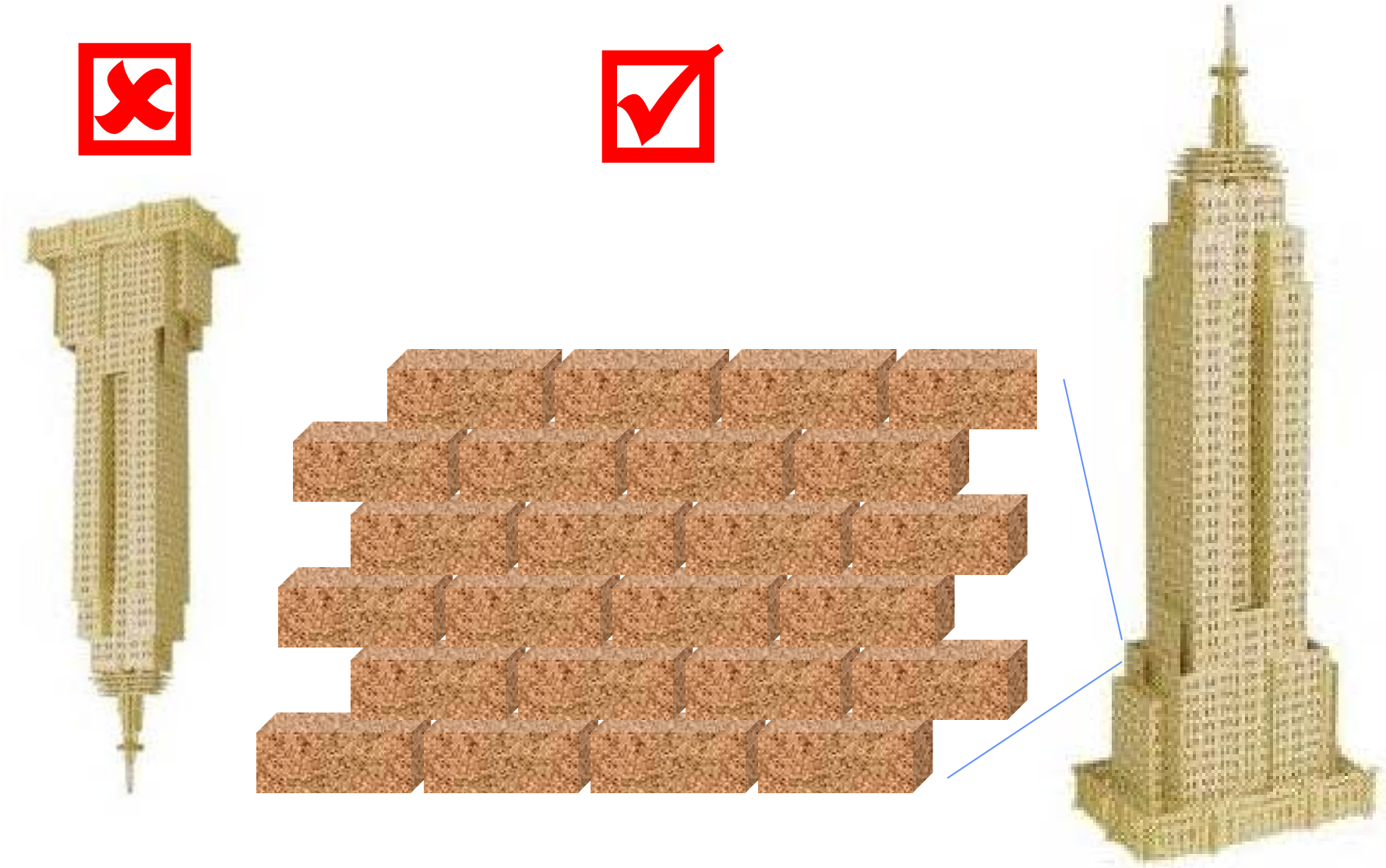
- Multimedia and communications high volume applications rely on standards – so use multi-standard dedicated engines
- Executing high data rate, complex standards on a general purpose CPU architecture is very inefficient – and always will be



© 2009 Imagination Technologies Ltd.

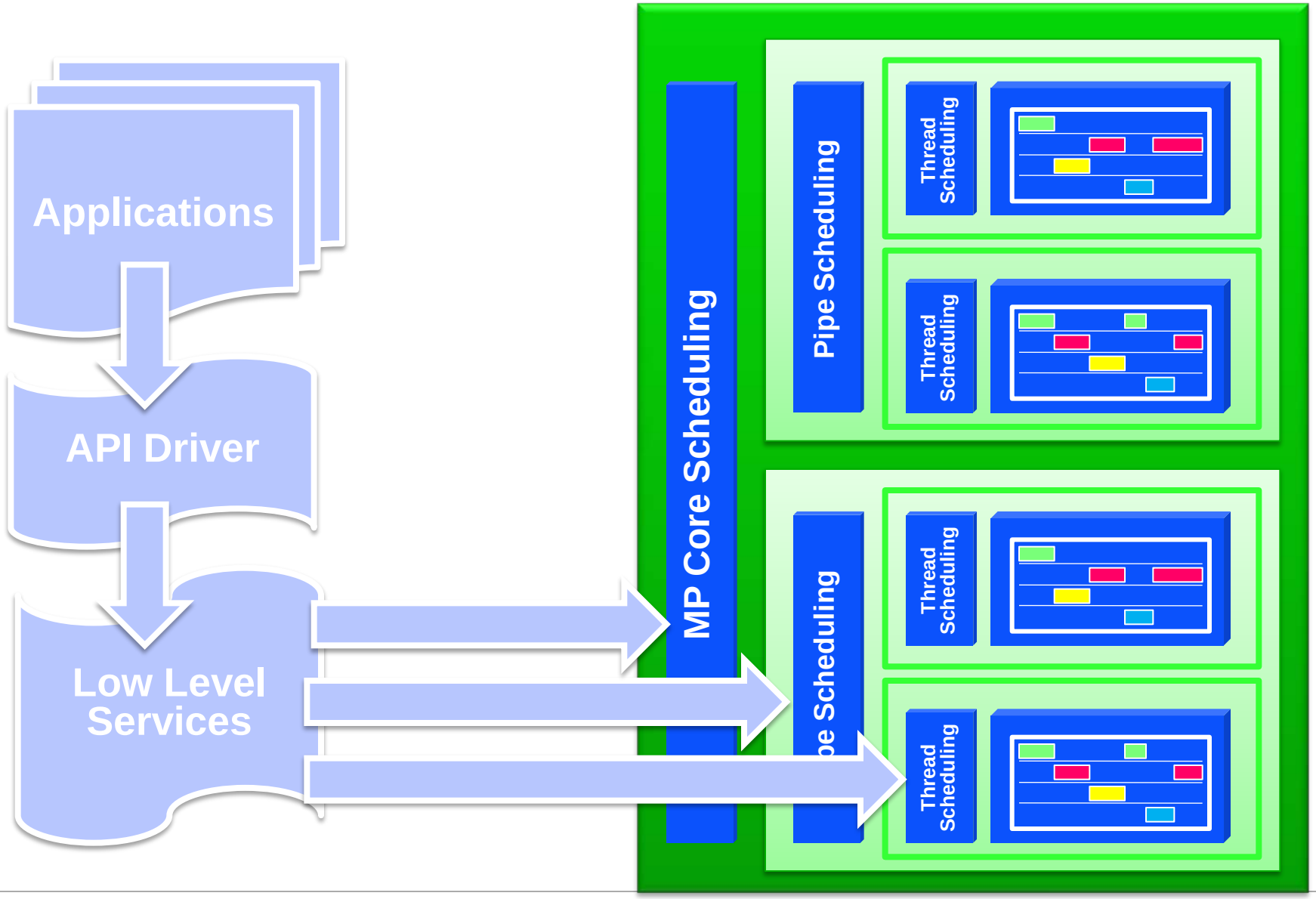
Architecture

Great designs come from strong fundamentals



© 2009 Imagination Technologies Ltd.

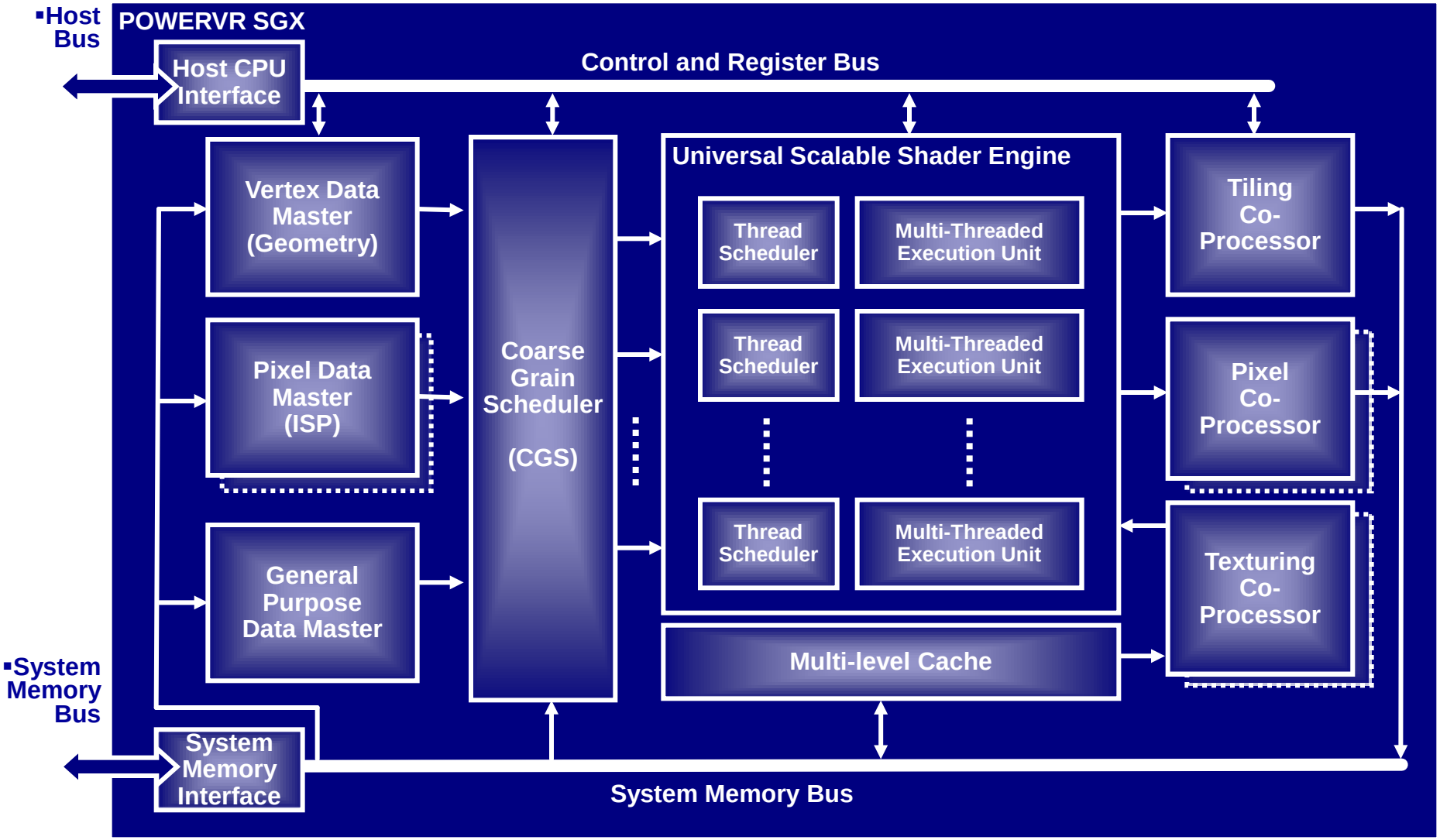
Imagination's Approach



© 2009 Imagination Technologies Ltd.

POWERVR SGX Block Diagram

Architecture & Data Flow Overview



© 2009 Imagination Technologies Ltd.

Other Key Issues: Engineering

- **SoC key parameters**
  - Cost & area
  - Power consumption & power management strategies
  - Clock speed
  - System architecture
- **Fast occasionally or slow but continuous – what's best?**
- **Solutions – it doesn't stop at the chip**
  - Drivers
  - Applications
  - Application architecture
  - Artistic content
  - Data delivery
  - Billing

© 2009 Imagination Technologies Ltd.

Other Key Issues: Ecosystems

Communities of teams focused on what each does best

© 2009 Imagination Technologies Ltd.

Performance, then more – and more…
A major consequence of Everything, Everywhere

- **As convergence fuels consumers' expectations, they will expect high performance "user experiences" to work equally well:**
  - on their PCs and laptops
  - on their games consoles
  - on small, low power devices
- **…but only if the underlying platform was designed for the job…**

© 2009 Imagination Technologies Ltd.

Conclusions

- Consumers will drive demands for performance, as they demand "everything everywhere"
- Multicore hierarchical parallelism delivers scalable solutions across SoC performance & application space
- In-depth analysis is essential to scope each level of hierarchy
- Ecosystems will be vital to connect advanced technologies to consumers
- New technology for consumer applications is useless unless you can relate each and every feature to a clear consumer benefit
- Multimedia is an ideal opportunity for making engineering cool!

© 2009 Imagination Technologies Ltd.

Imagination

Multi-Core, Multi-threaded, Multi-standard

Using architecture to maximise IP product scalability

Tony King-Smith, VP Marketing
Imagination Technologies

NMI Embedded Technical Network, 25th June 2009