Mike Chartier
Intel

A Look Back

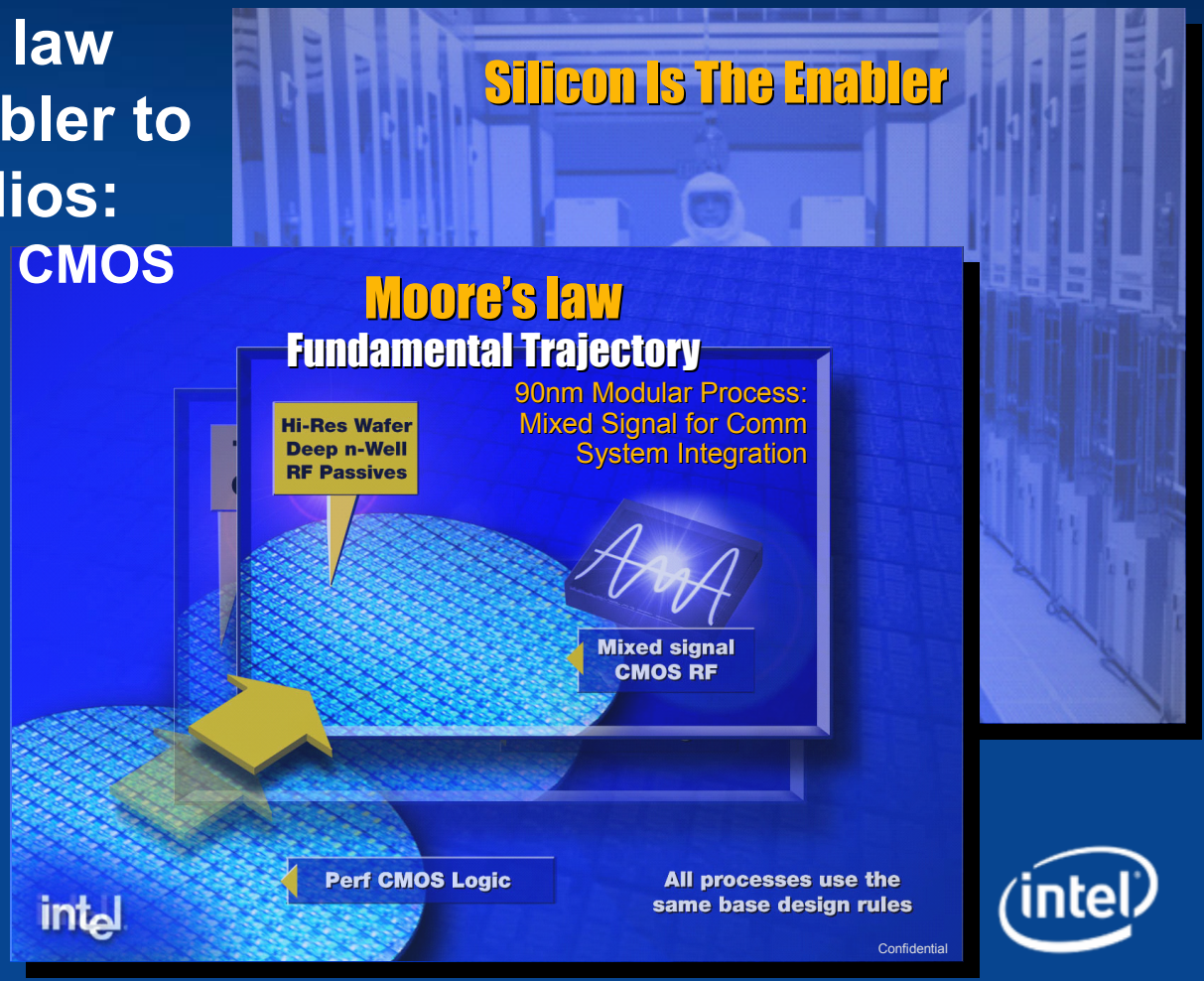
2003 WP8F Workshop
in Edinburgh

"Radio Free Intel"
50 transistors to put all radio interfaces on every chip

A Look Back

Silicon and Moore's law viewed as a key enabler to enabling flexible radios:

- Analog functions in CMOS
- Transistor budget increasing



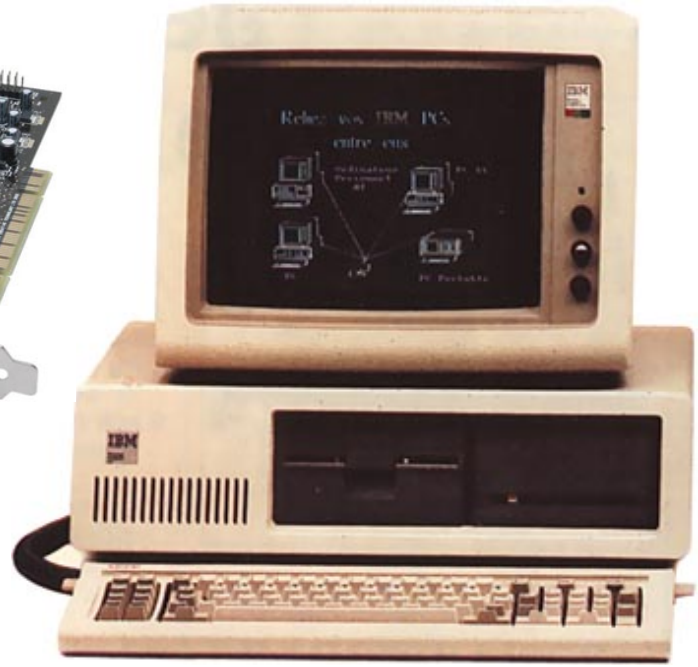
intel

Hardware to Software

Graphic Cards

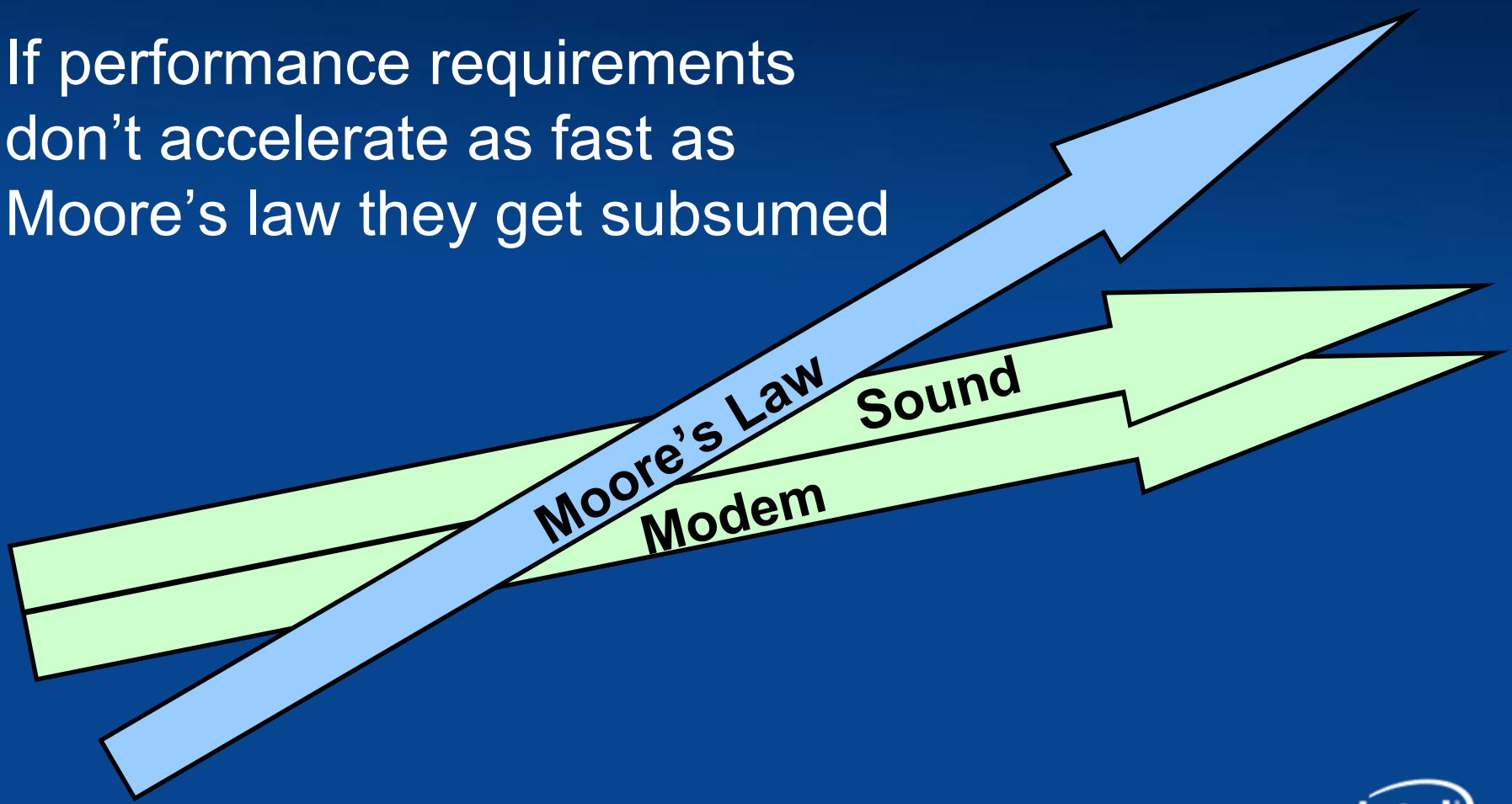
Sound Cards

Modem Cards



Integration Rules

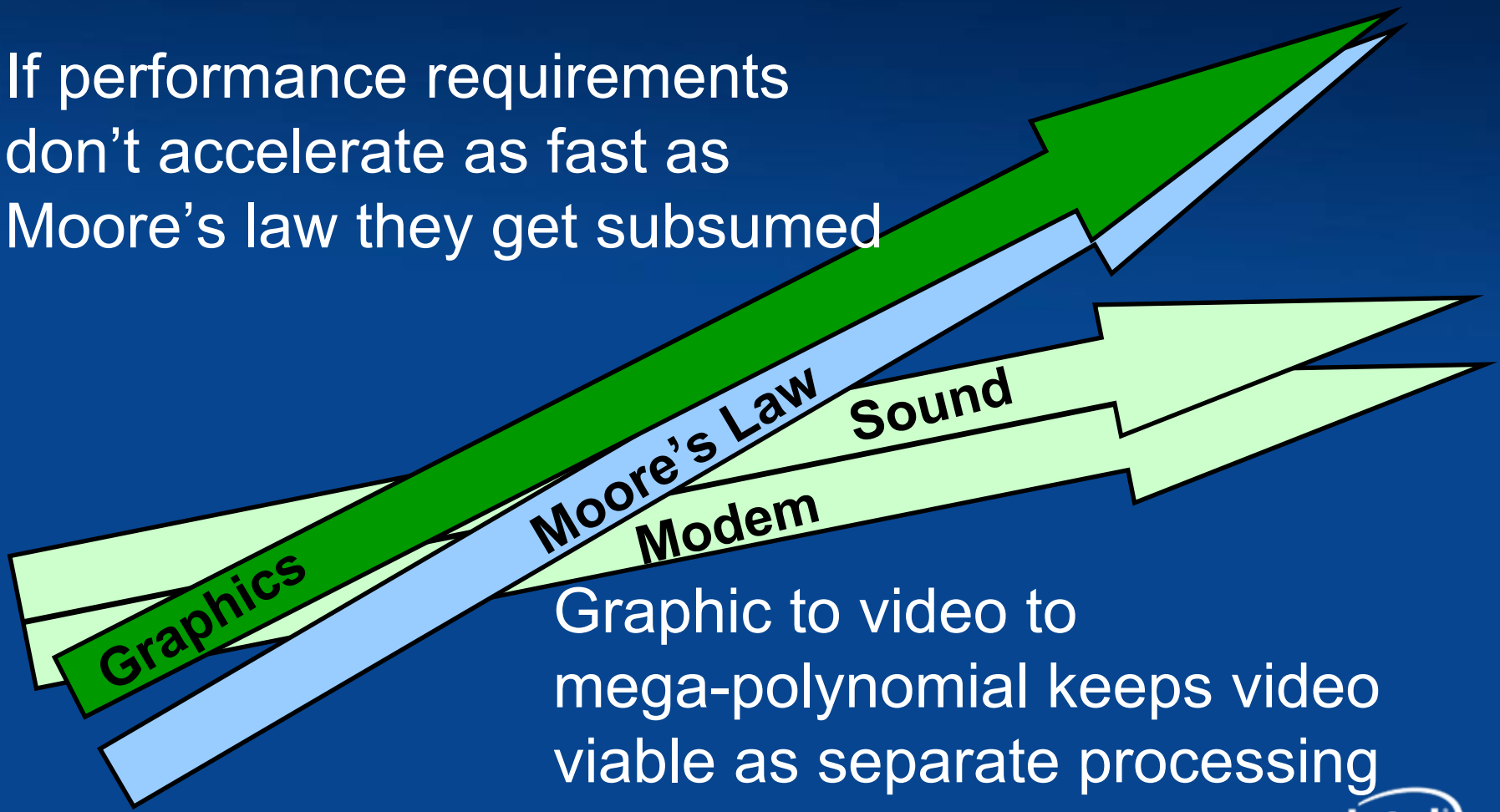
If performance requirements don't accelerate as fast as Moore's law they get subsumed



286 386 486 Pentium Multiple Core

Integration Rules

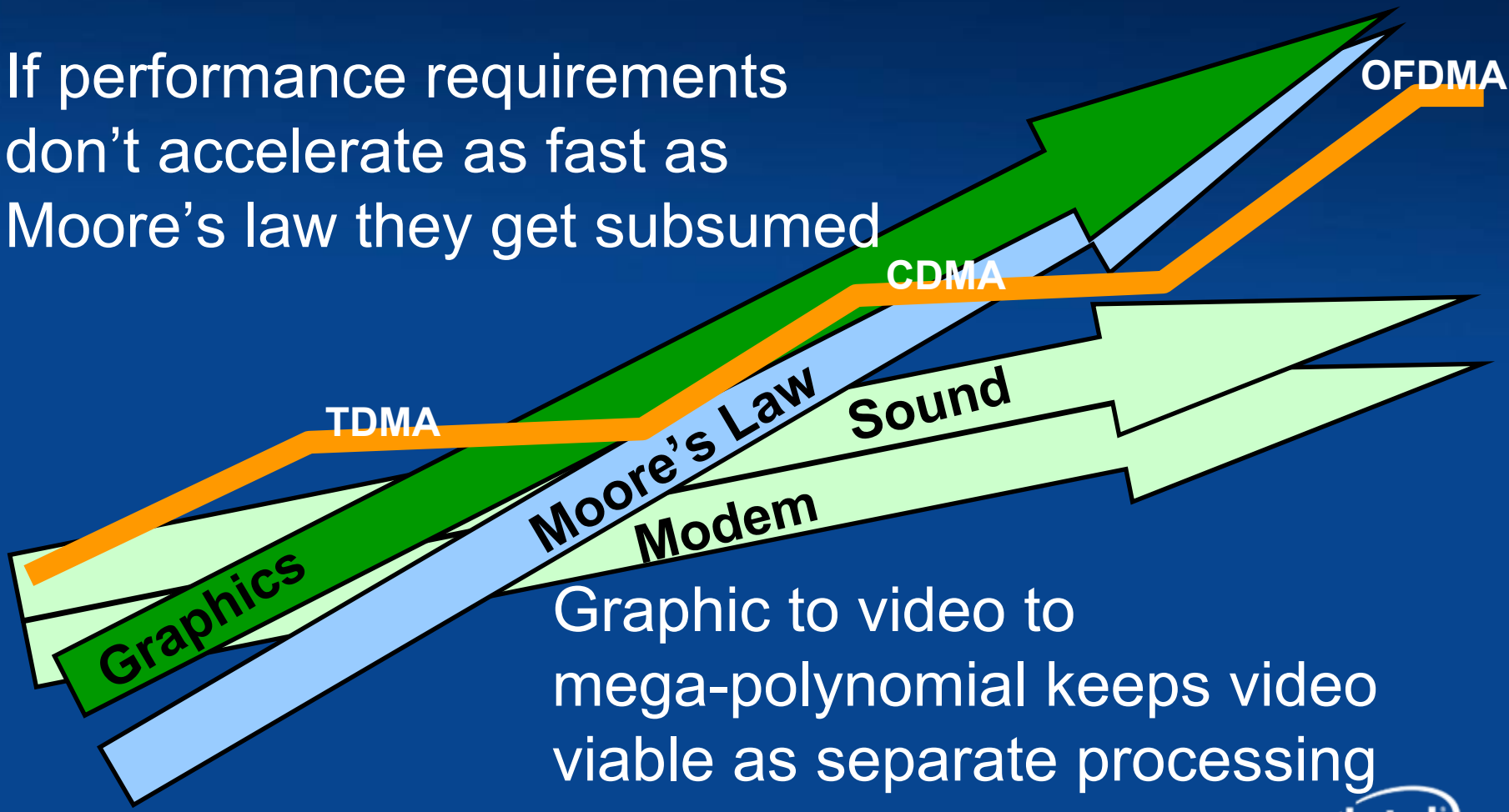
If performance requirements don't accelerate as fast as Moore's law they get subsumed



Graphic to video to mega-polynomial keeps video viable as separate processing

Integration Rules

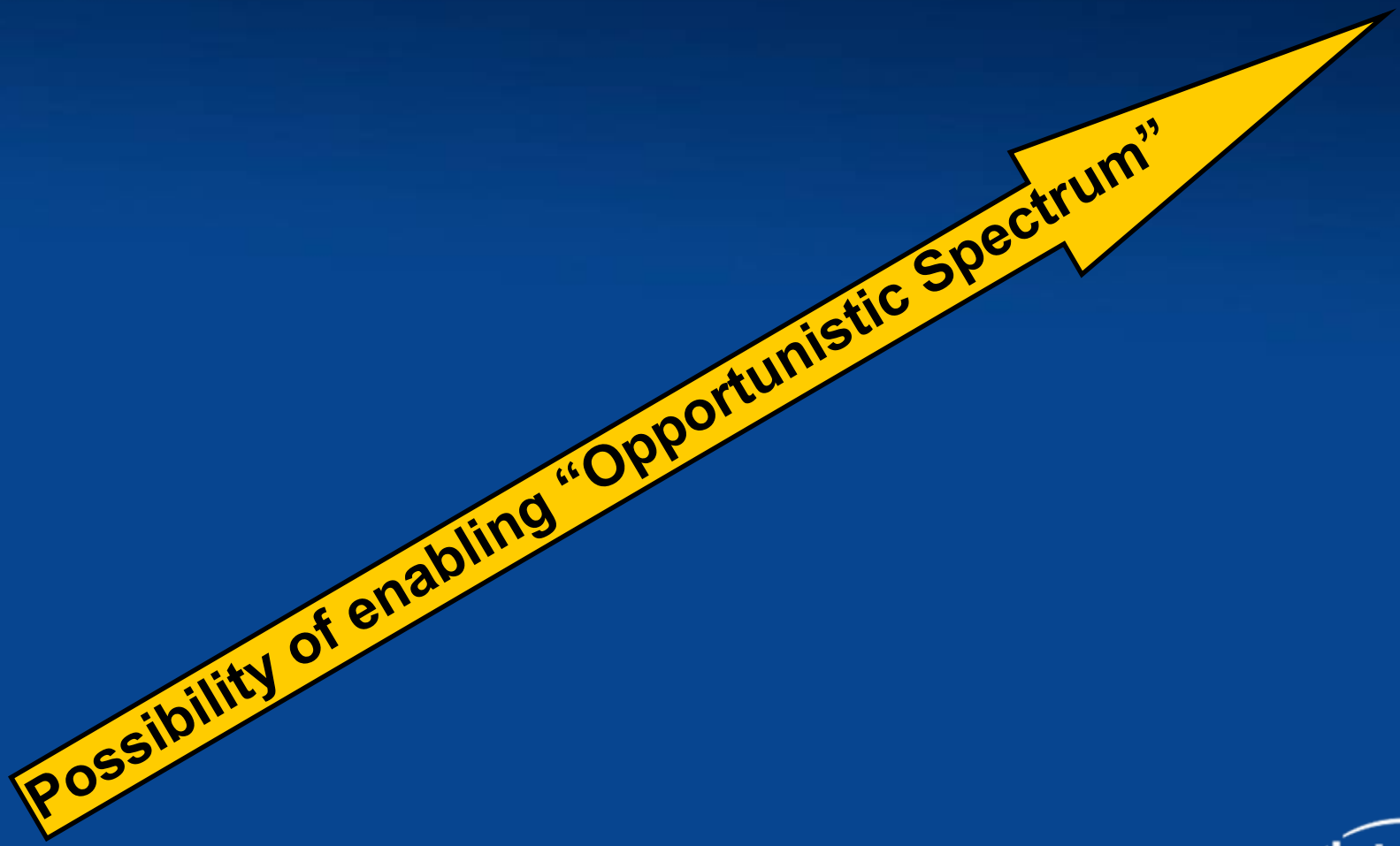
If performance requirements don't accelerate as fast as Moore's law they get subsumed



Graphic to video to mega-polynomial keeps video viable as separate processing

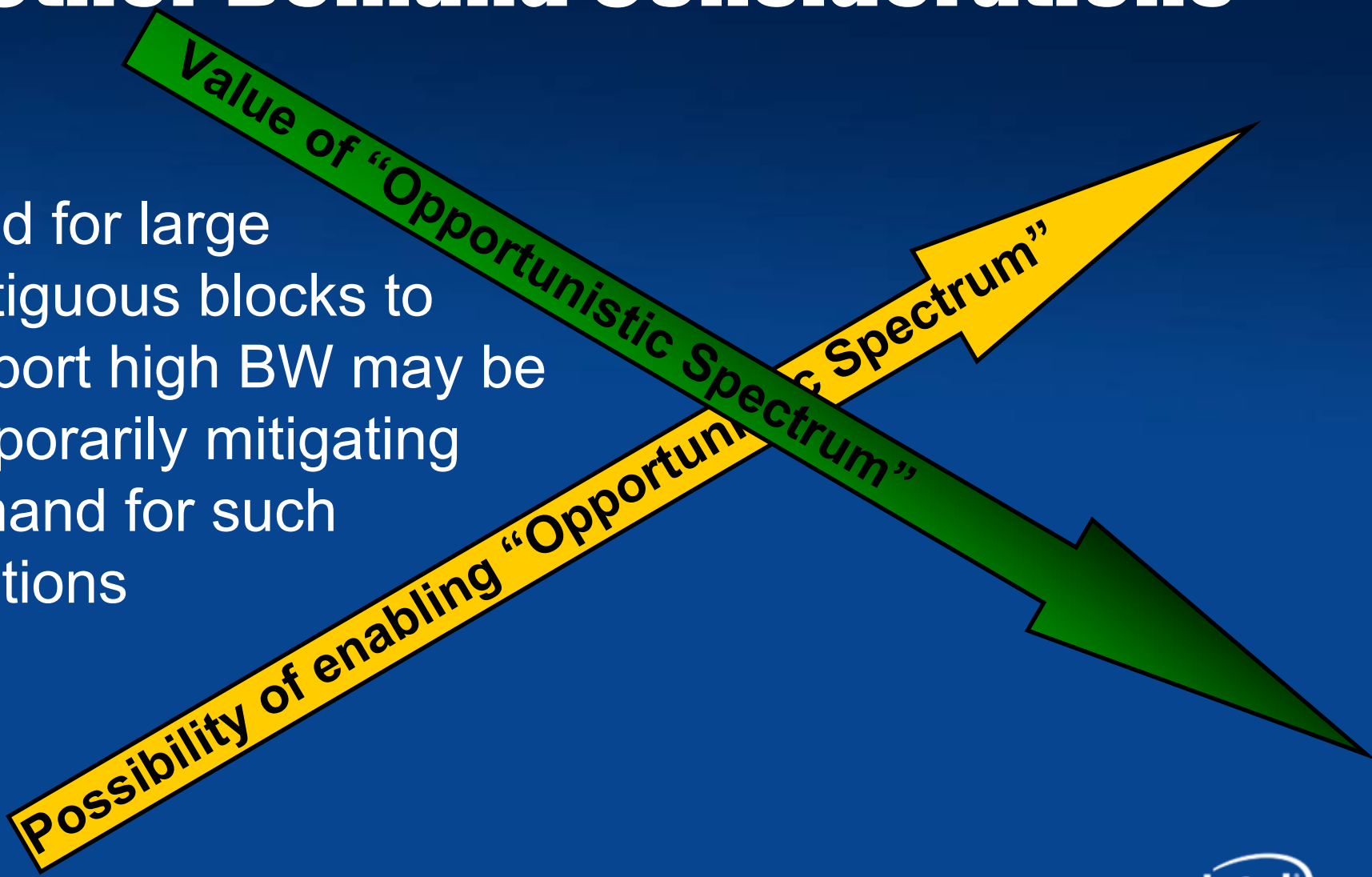
286 386 486 Pentium Multiple Core

Other Demand Considerations



Other Demand Considerations

Need for large contiguous blocks to support high BW may be temporarily mitigating demand for such solutions



Business interests

- General Market
  - Operators focus on technology families
    - Generations last 10 years +

Business interests

- General Market
  - Operators focus on technology families
    - Generations last 10 years +

January 30, 2008

NXP to demonstrate the world's first programmable multi-mode LTE modem at the Mobile World Congress 2008

Software programmable vector processor enables multi-mode capability for evolving mobile network standards

NXP Semiconductors, the independent semiconductor company founded by Philips, today announced it will demonstrate the world's first LTE/HSPA/UMTS/EDGE/GPRS/GSM multi-mode baseband platform which forms the basis of a next-generation Software Defined Radio (SDR) system solution at the Mobile World Congress in Barcelona. Powered by NXP's Embedded Vector Processor (EVP), a powerful new Digital Signal Processing core, the solution is capable of achieving data transfer rates of 150 Mbits downlink and 50 Mbits uplink and supports multi-mode capability to cope with evolving mobile standards, particularly challenging for the next generation of mobile terminal manufacturers.

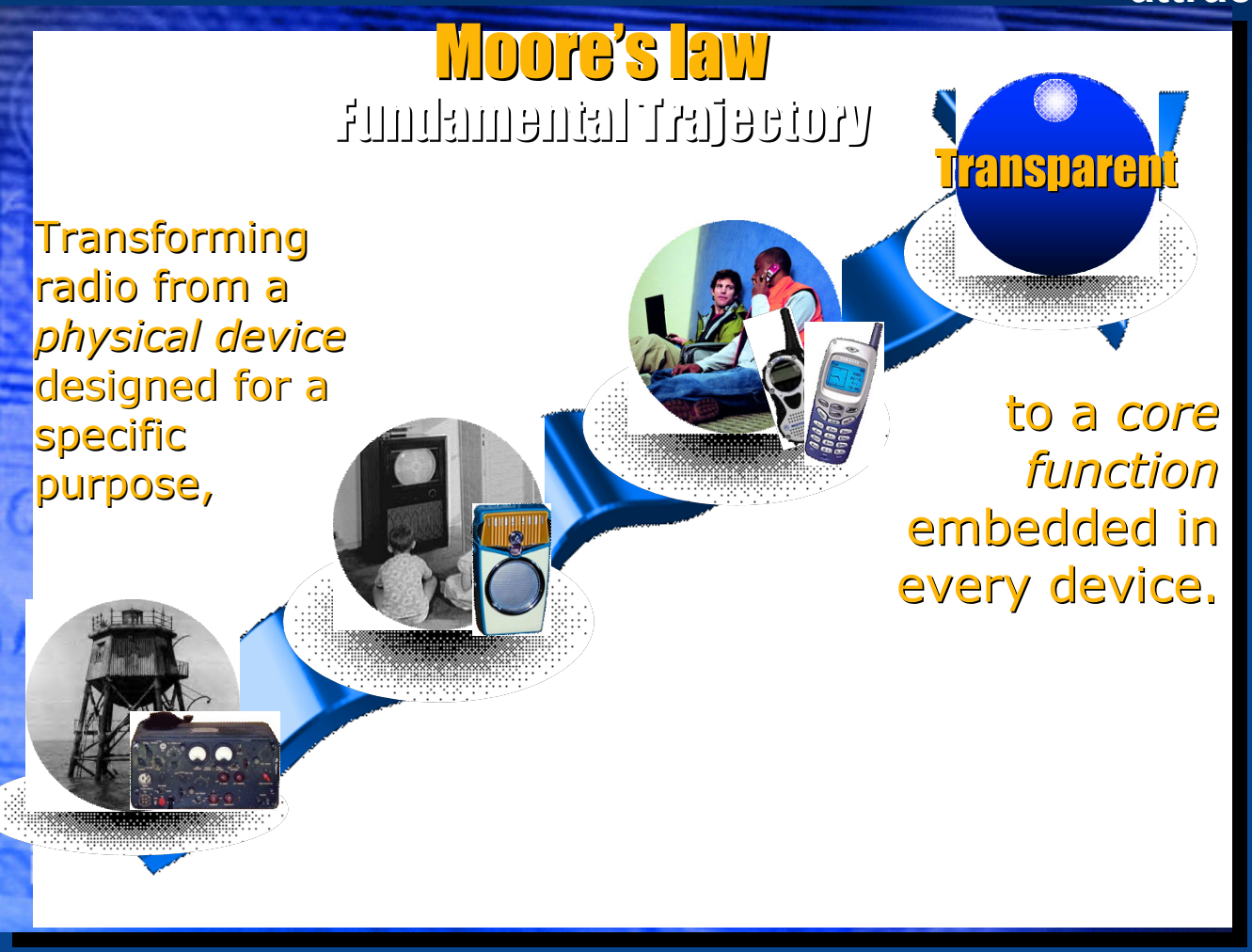
Business interests

- General Market
  - Operators focus on technology families
    - Generations last 10 years +
  - M&A build footprints, less roaming necessary
  - Flexibility is attractive, no animosity to SDR
  - Price competitive environment means simple cost equation
    - Flexibility, TTM, less important
- Special Cases
  - Enables infrastructure sharing

Business interests

A Look Back

Embedding many functions
Into a single device is
attractive if you're the device



Business interests

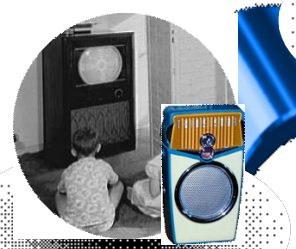
Selling multiple devices makes more money than selling a software upgrade

Mod

Fundamental Trajectory

Transpa

Transforming radio from a *physical device* designed for a specific purpose,



to a *core function* embedded in every device.

Environment Repercussions

- No “Third party” industry emerging
  - SDR suppliers need vertical solutions
    - Operators supply their own updates
    - WLAN vendors supply their own updates
  - Why give away an upgrade business?
- Falling Demand for New Regulations
  - But is it chicken and egg?

Lessons Learned

- Technology is Here, but Business Trumps Technology