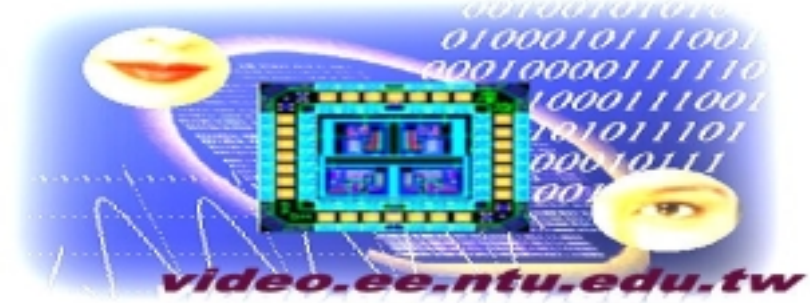
The Trend and Challenge of Multimedia Processing

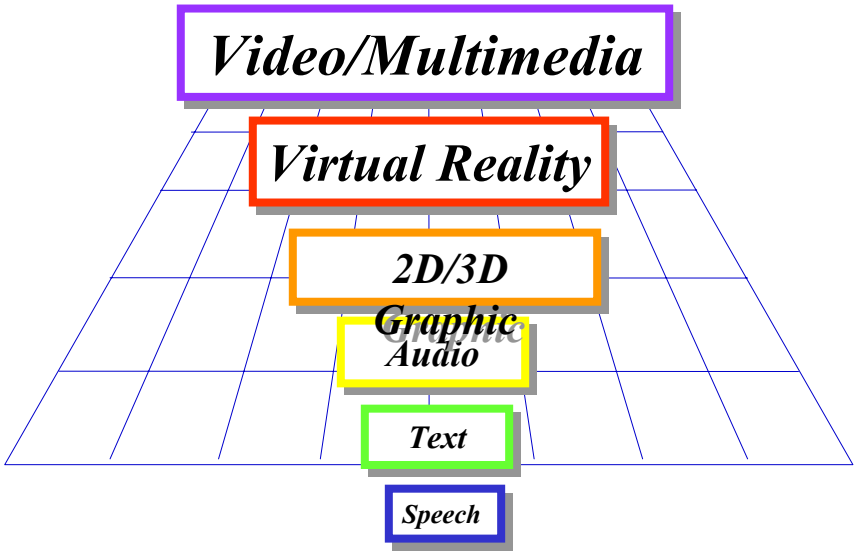


台大電機系
陳良基

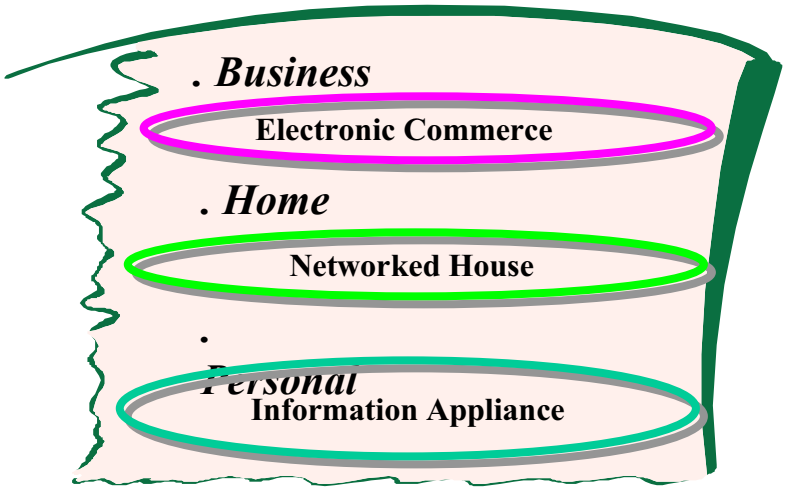
Outline

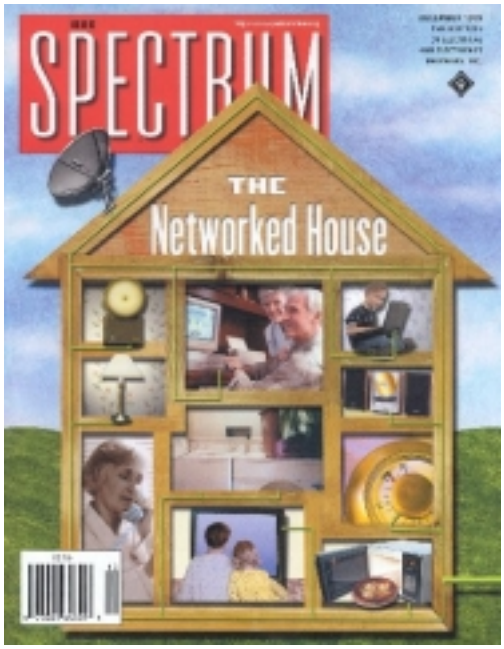
- Introduction
- Infrastructure
- Standard Trend
- Next Generation Multimedia Technology
- Technology Challenge
- Multimedia Processors
- Conclusions

Multimedia ??

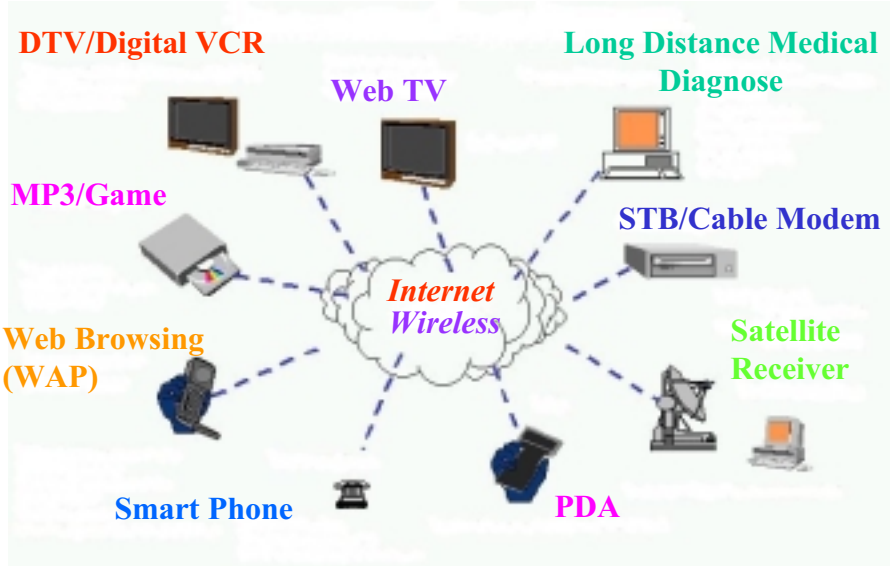


Infrastructure





Information Appliance

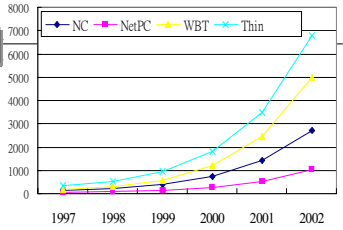


Market Forecast

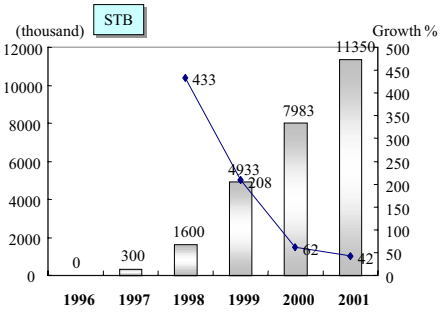
Products

- Business：EC
- Home：STB
- Personal：IA

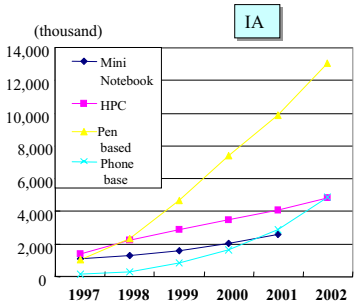
EC



STB



IA



from：In-Stat,IDC ,DataQuest, erso ITIS'98

Standard

Compression Only → **Multiple Function Tools**

Data Format

Unstructured Bitstream → *Structured Information*

Pixel → *Block* → *Object* →

Functions

Low Resolution → *High Definition* → *Scalable, Robust, Content Access … etc*

Standard

MPEG1 → MPEG2 → MPEG4 → MPEG7 → MPEG21 →

→ JPEG → JPEG2000 →

H.261 --> H.263--> H.263+ -->

Standard (conti.)

Hardware/Software Bound Human Requirements

Feature

Storage → *Communication* → *Interactive* → *Intelligence*

Product

Standard

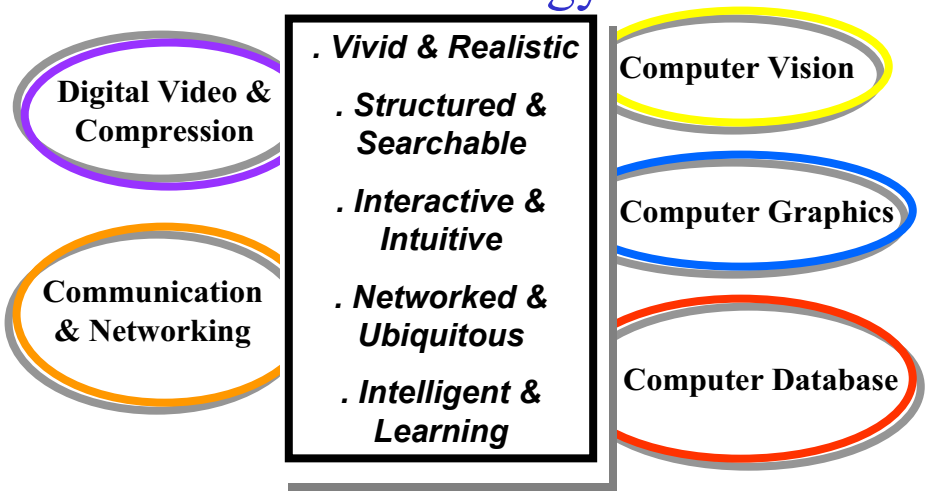
MPEG1 → MPEG2 → MPEG4 → MPEG7 → MPEG21 →

JPEG → JPEG2000 →

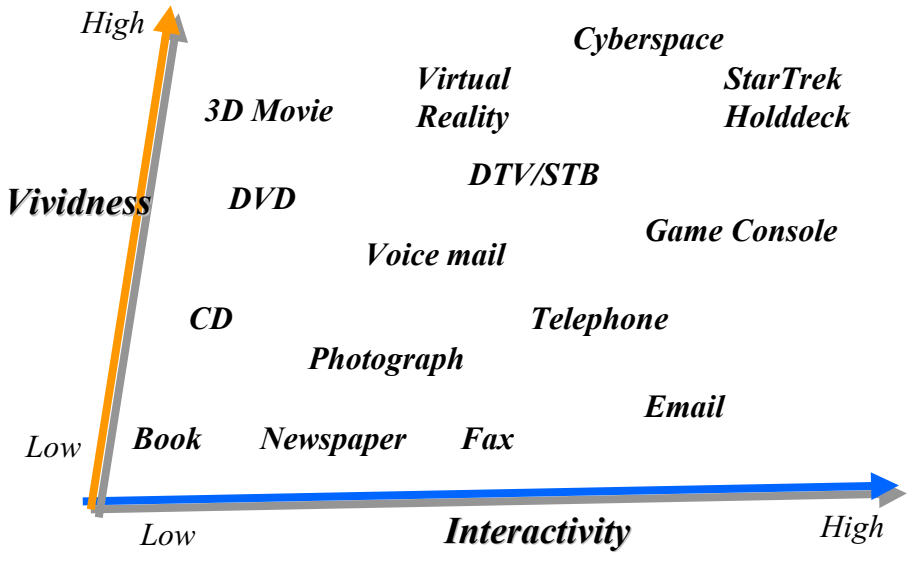
H.261 --> H.263--> H.263+ -->

MPEG4 Sequence

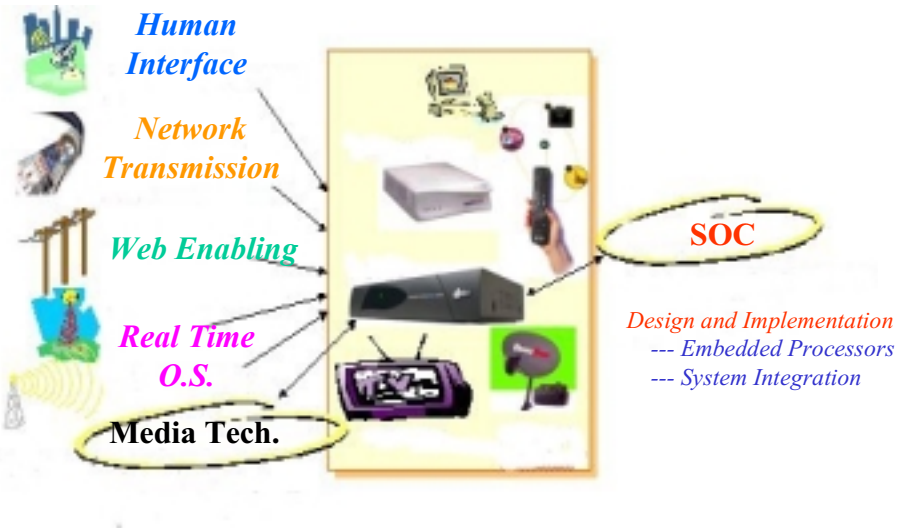
Next Generation Multimedia Technology



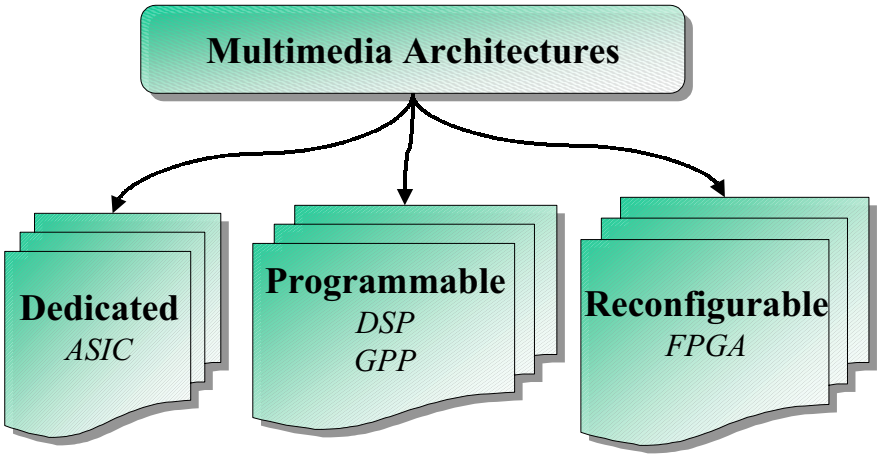
Feature Category Applications



Technology Challenge



Multimedia Architectures

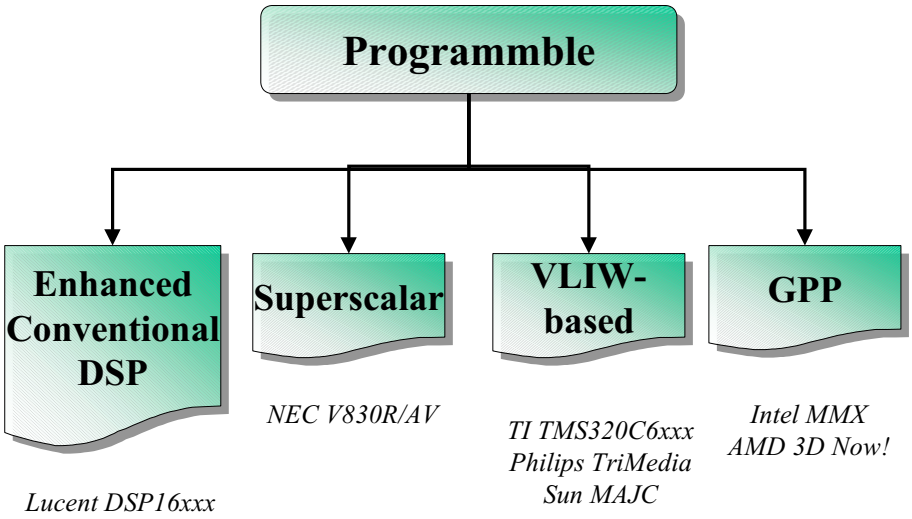


Today's Programmable Processors

- Intel 8051
- Motorola 68HC11
- Motorola Coldfire
- Motorola MCORE
- Intel x86, i960
- IBM Power PC
- MIPS
- ARM, Thumb
- Intel Strong ARM
- TI TMS320C10, C60
- Hitachi SH2, SH3
- SHARC DSP
- Fujitsu FR-V
- Sun Ultra-Sparc
- National Geode SC1400
- DSP Group Teak, Oak
- SandCraft SR1-GX
- TransMeta CRUSOE

Today's DSP Landscape

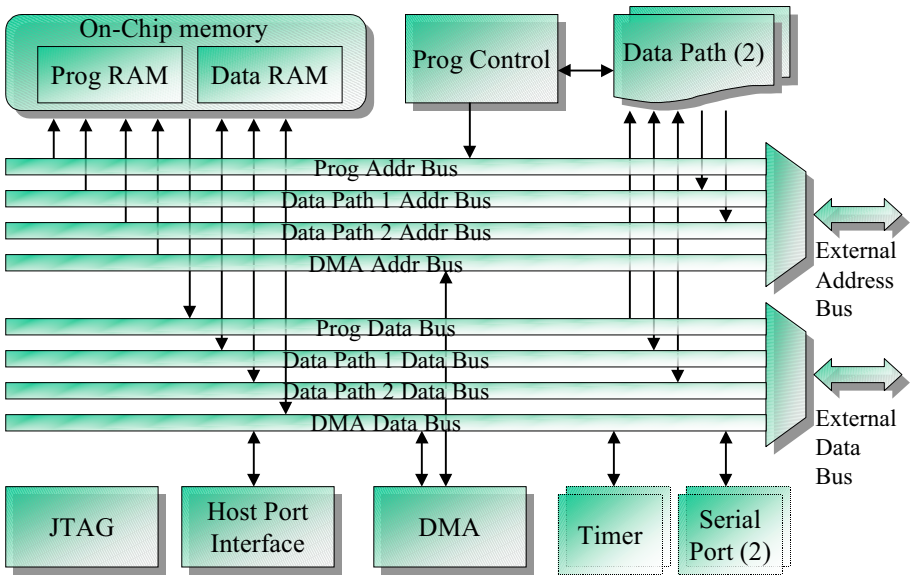
- Low-cost workhorses: 20-50 MIPS
  - ADSP-21xx, TMS320C2xx, Motorola's DSP560xx families
- Low-power midrange: 100-120 MIPS
  - Lucent's DSP 16xx, TMS320C54x
  - increased clock, deeper pipelines
- Diversified high-end: ~1000 MIPS
  - Enhanced conventional DSP processors: more parallel units
  - Multiple instruction issue: mostly VLIW



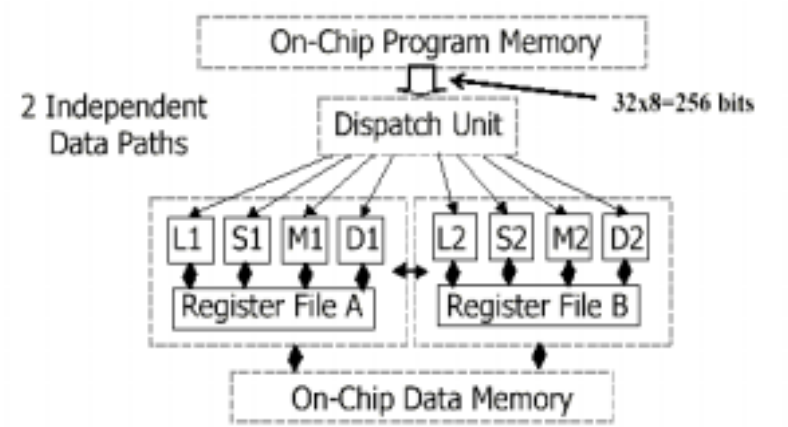
Some Examples of Multimedia Programmable Processors

- TI's TMS320C62xx/7xx
- Philips's TriMedia TM-1300
- Sun Microelectronics's MAJC

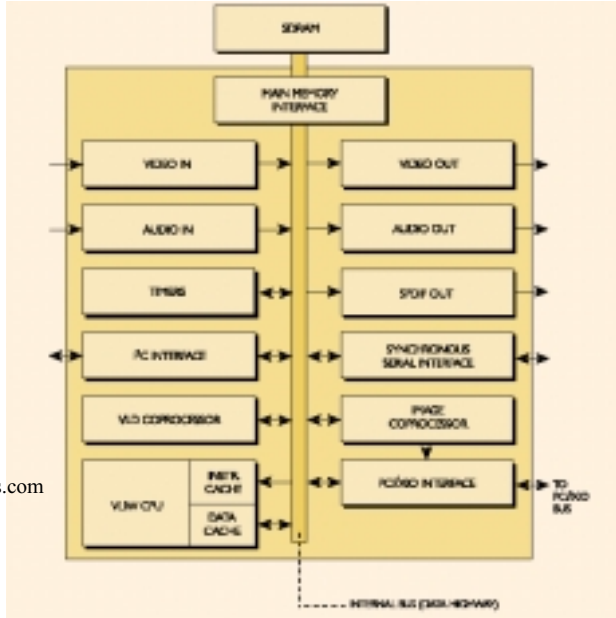
TI's TMS320C62xx/7xx



VLIW data path of C62xx

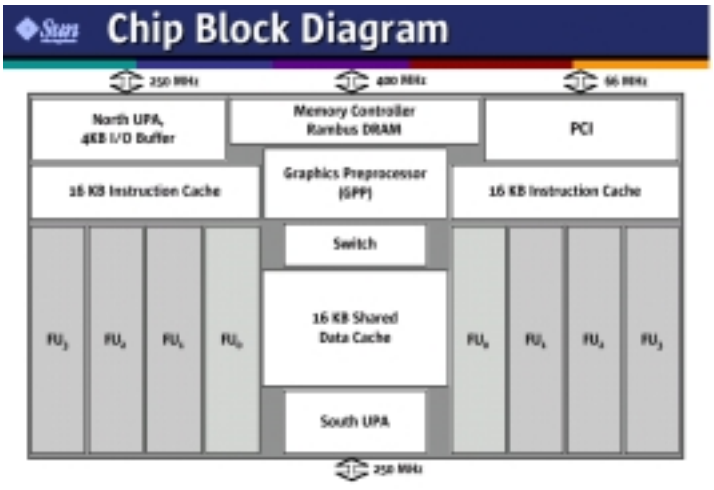


Philips's TriMedia TM-1300



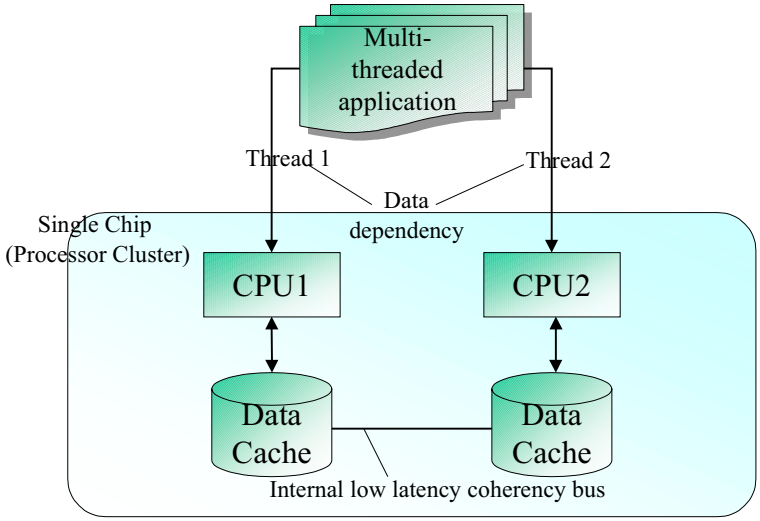
Ref.
www.semiconductors.philips.com

Sun's MAJC

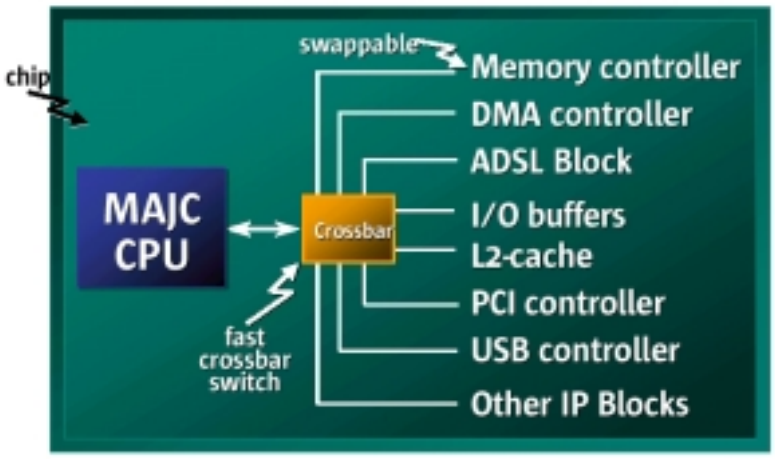


Ref. www.sun.com/sunmicroelectronics

Multi-processor on a chip of MAJC



SOC? Challenge?



Ref. www.sun.com/sunmicroelectronics

Conclusions

- Multimedia processing will provide a novel future with unlimited space.
- Consumer will be the driving force of the Next generation multimedia processing.
  - Interactive follows Metcalfe's N_2 Law
- DSPs will permeate our lives getting further embedded into countless applications as we move ahead.