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Use Cases of SystemC Deployment in Philips Semiconductors

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Agenda

- Virtual Prototype Environment (VPE)
- Use cases of SystemC Modeling
  - Architecture Exploration (AE)
  - Early Software Development
- Challenges for SystemC

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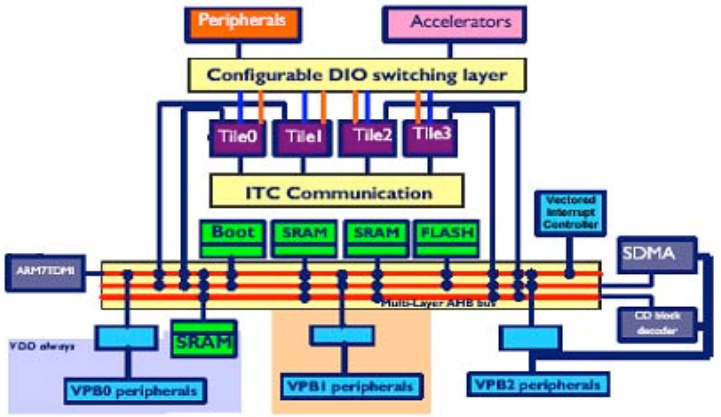
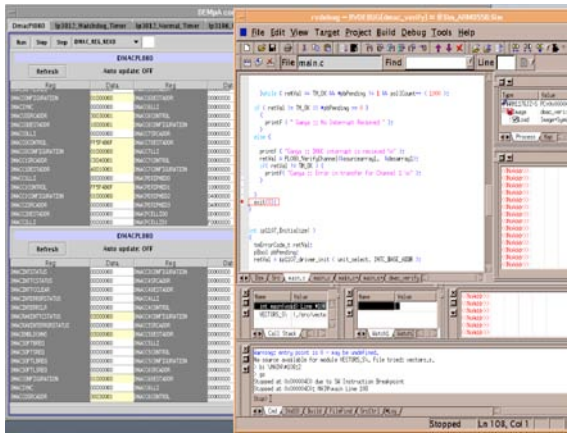
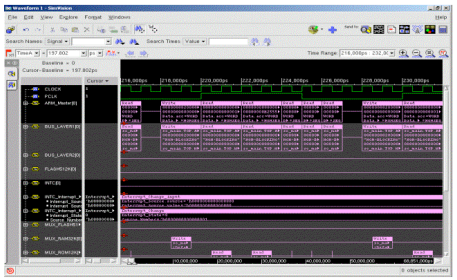
Virtual Prototype Environment

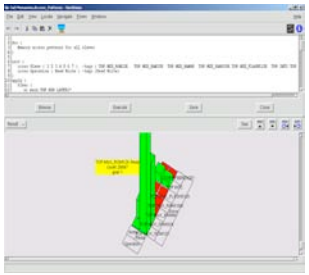


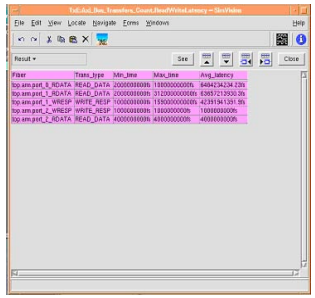


SW Debug



HW Debug





Performance analysis

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Use cases of SystemC Modeling

- Architecture Exploration
  - For Car Infotainment Systems
- Early Software Development
  - Linux Porting on SystemC VPE
  - Mobile devices

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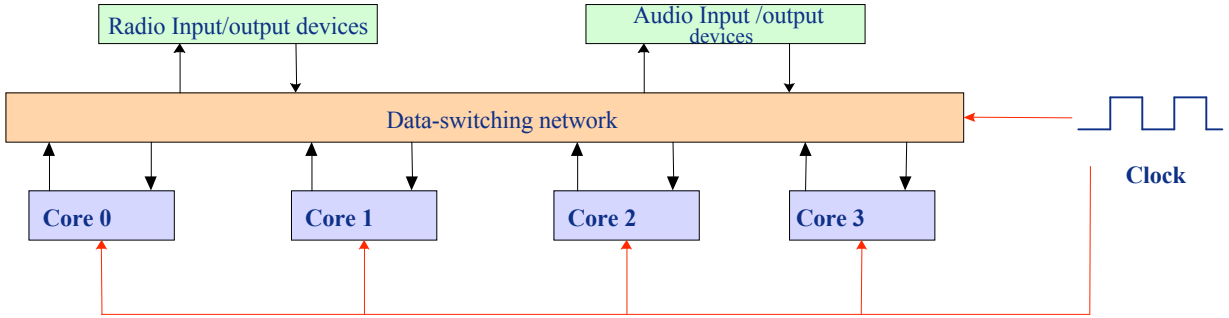
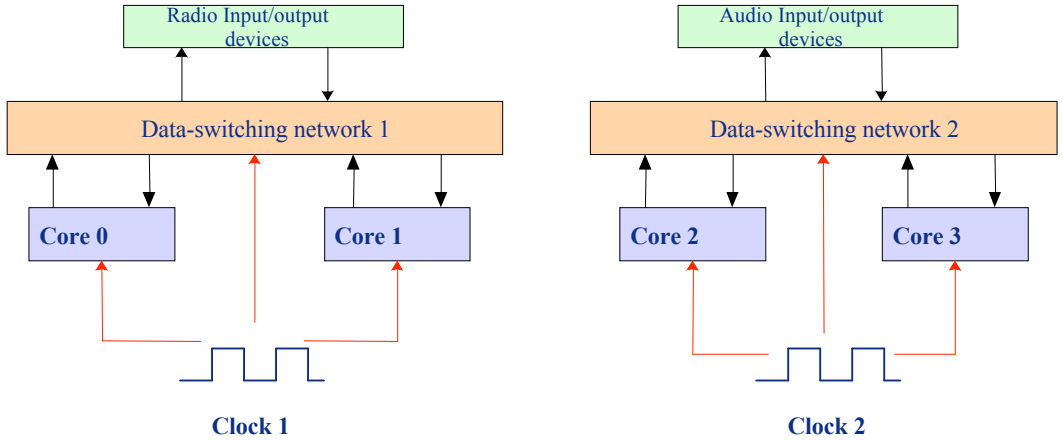
AE1: Splitting of Data-switching network



Both Audio and Radio devices run on the same clock.

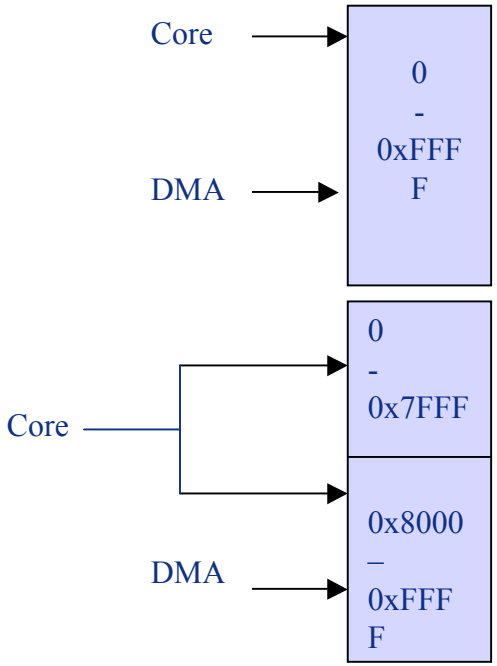


Audio and Radio devices on two different clock domains.

How did VPE add value ?

VPE showed that when the clock period for Audio devices is reduced by half, the application ran twice as fast as before

AE2: Splitting of Memory

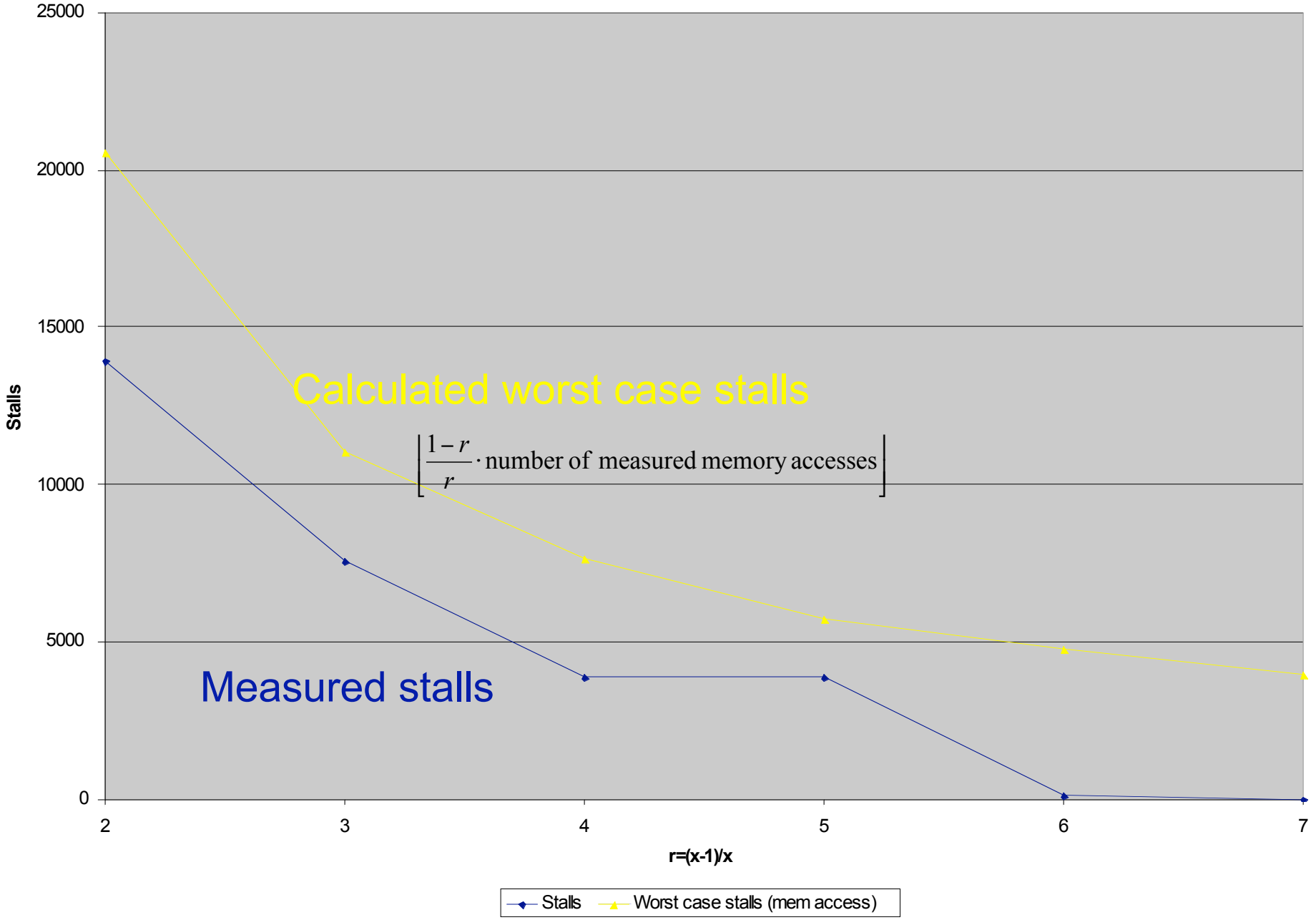


Memory is shared, hence arbitration is needed

Core now has a separate memory and hence will not be stalled

How did VPE add value ?

VPE showed that DMA cannot access first part of memory (address can be configured) and core would not get stalled in first part of memory


25000
20000
15000
10000
5000
0
Stalls
2
3
4
5
6
7
r=(x-1)/x
Calculated worst case stalls
$\left\lfloor \frac{1-r}{r} \cdot \text{number of measured memory accesses} \right\rfloor$
Measured stalls
Stalls
Worst case stalls (mem access)

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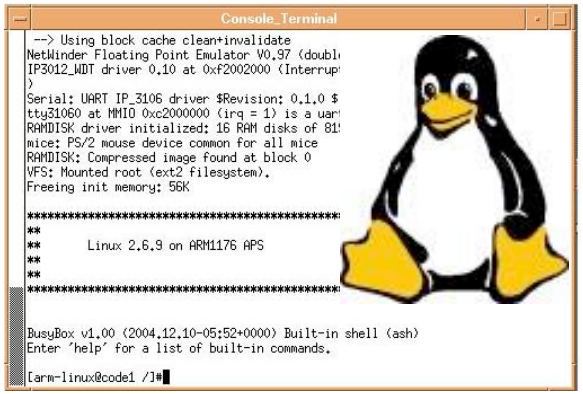
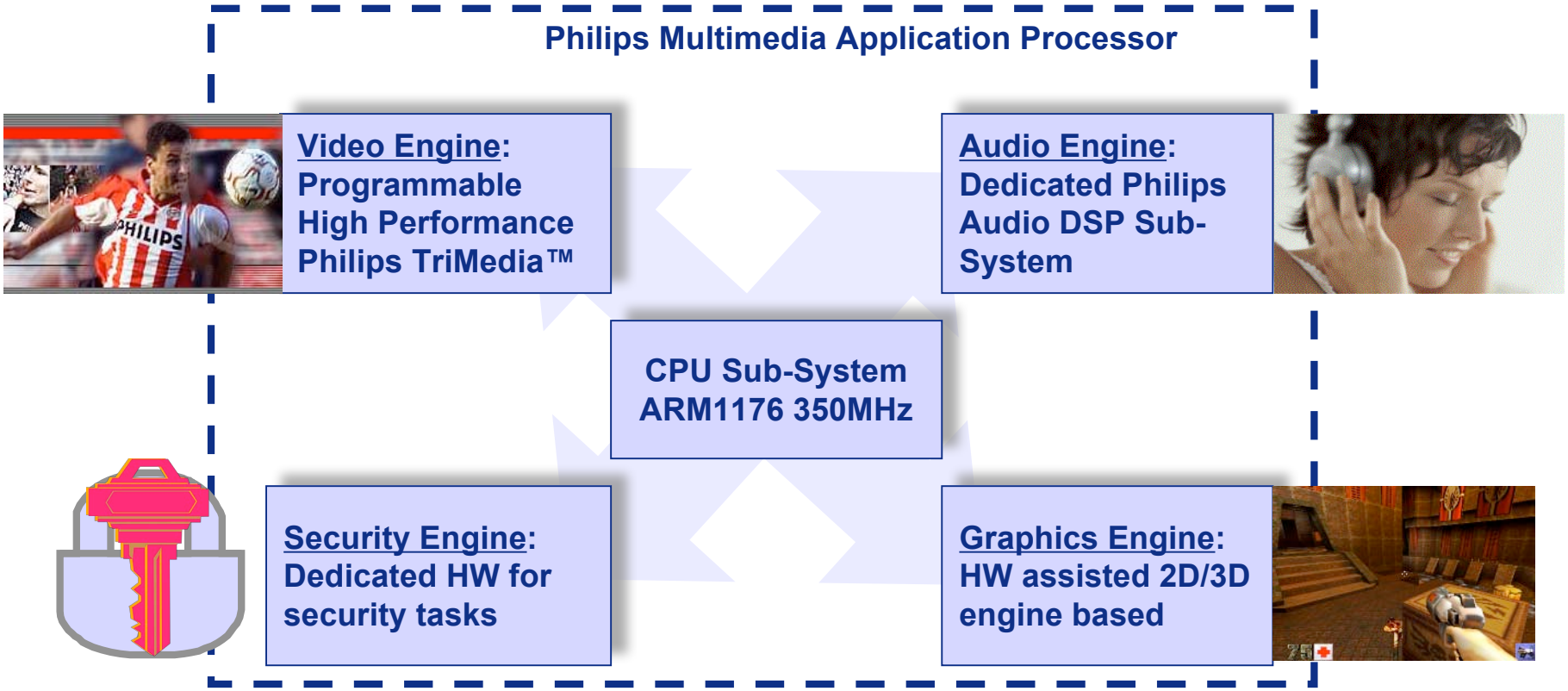
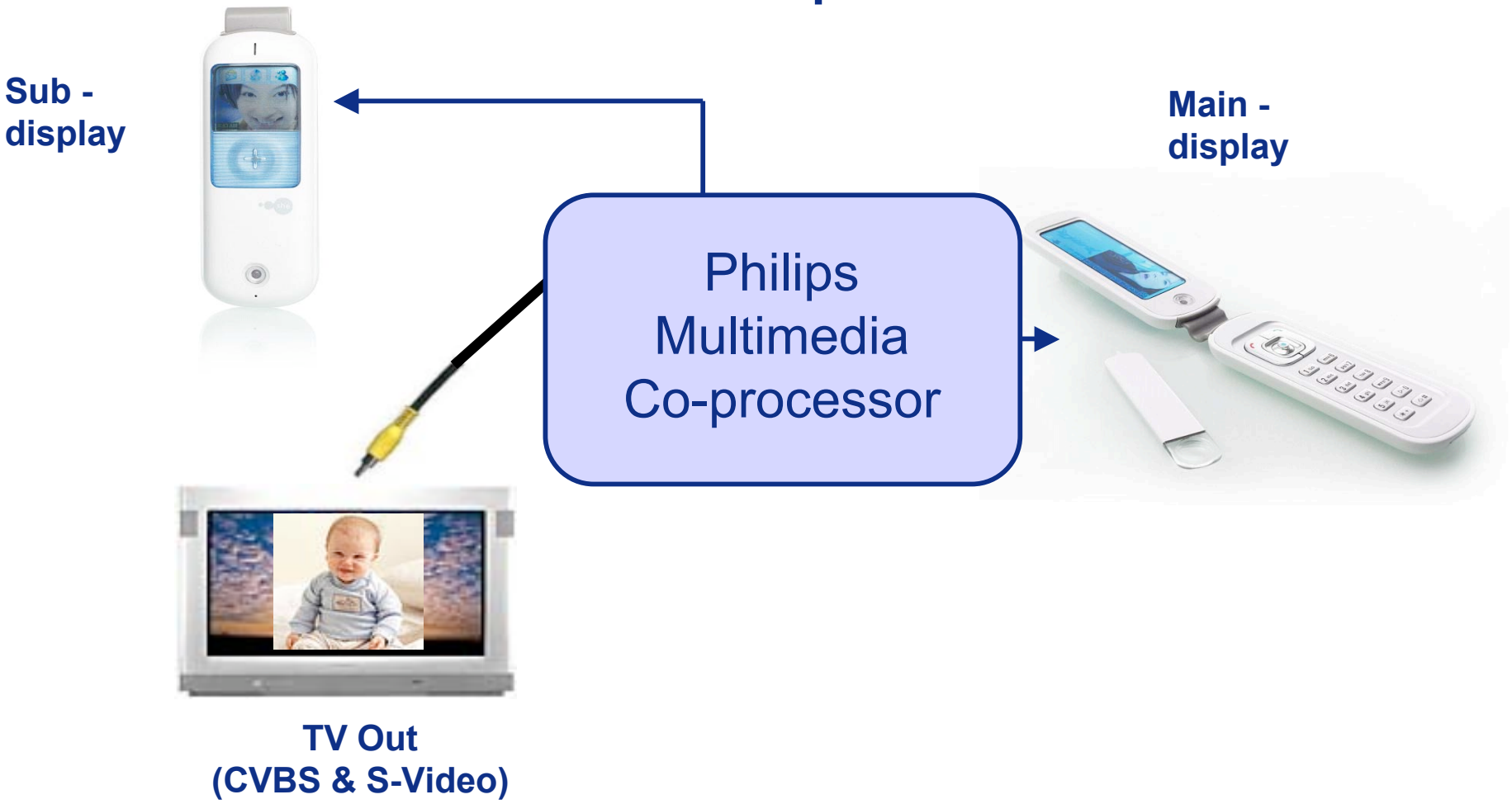
Linux porting on SystemC VPE



Early S/W development for Philips Multimedia Application Processor



Early S/W development for Philips Multimedia Co-processor



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Challenges for SystemC

- Simulation Speed (64-bit Linux machine, 2.2 GHz)
  - 2.3 M cycles/sec One SC_METHOD
  - 1.7 M cycles/sec One SC_THREAD
- VPE speed achieved for loading Linux
  - 60 K cycles/sec in PVT
  - 180 K instructions/sec in PV
- Interoperability of models among different companies

Thank you for the attention

Questions


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