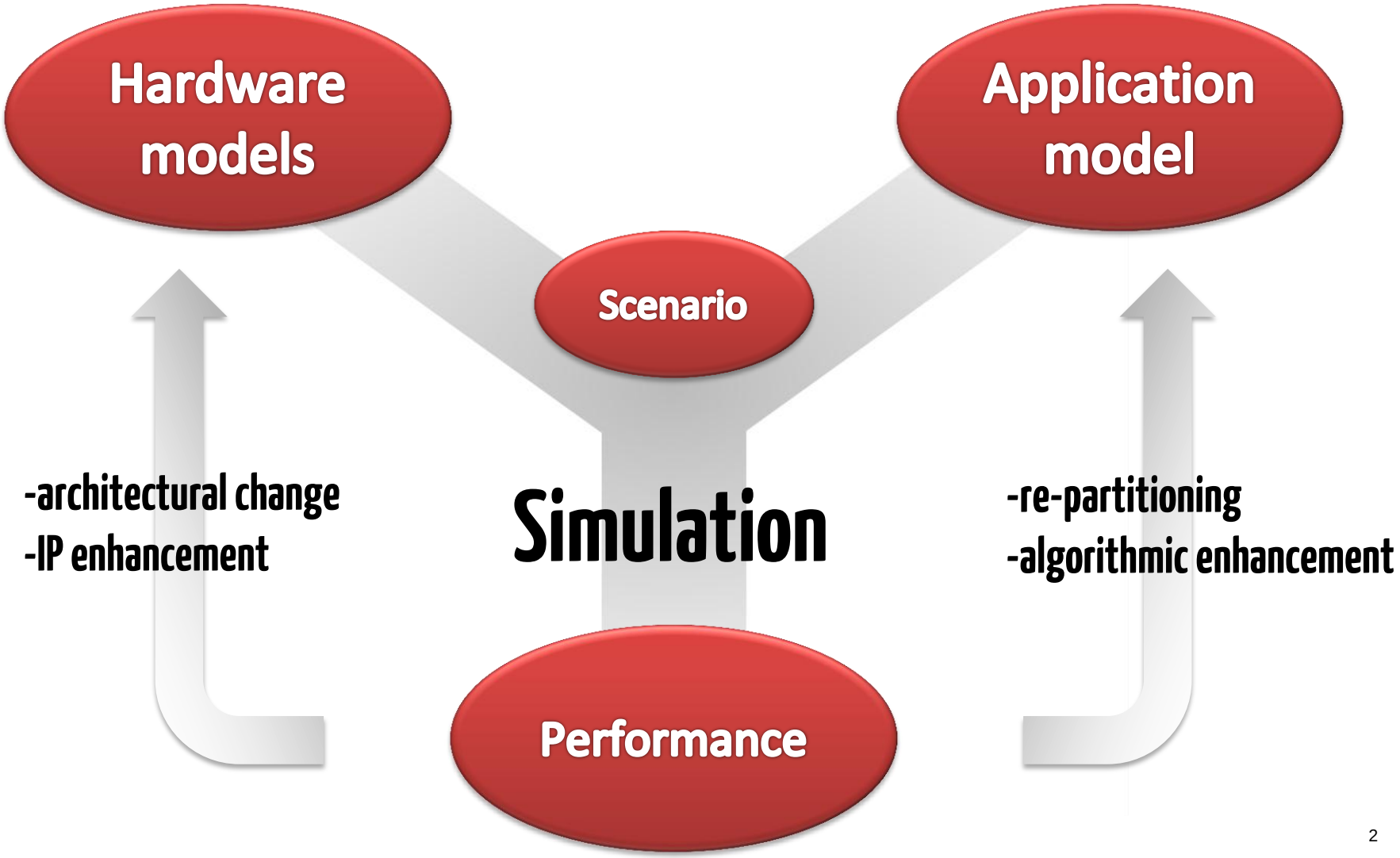
ARM SoC exploration

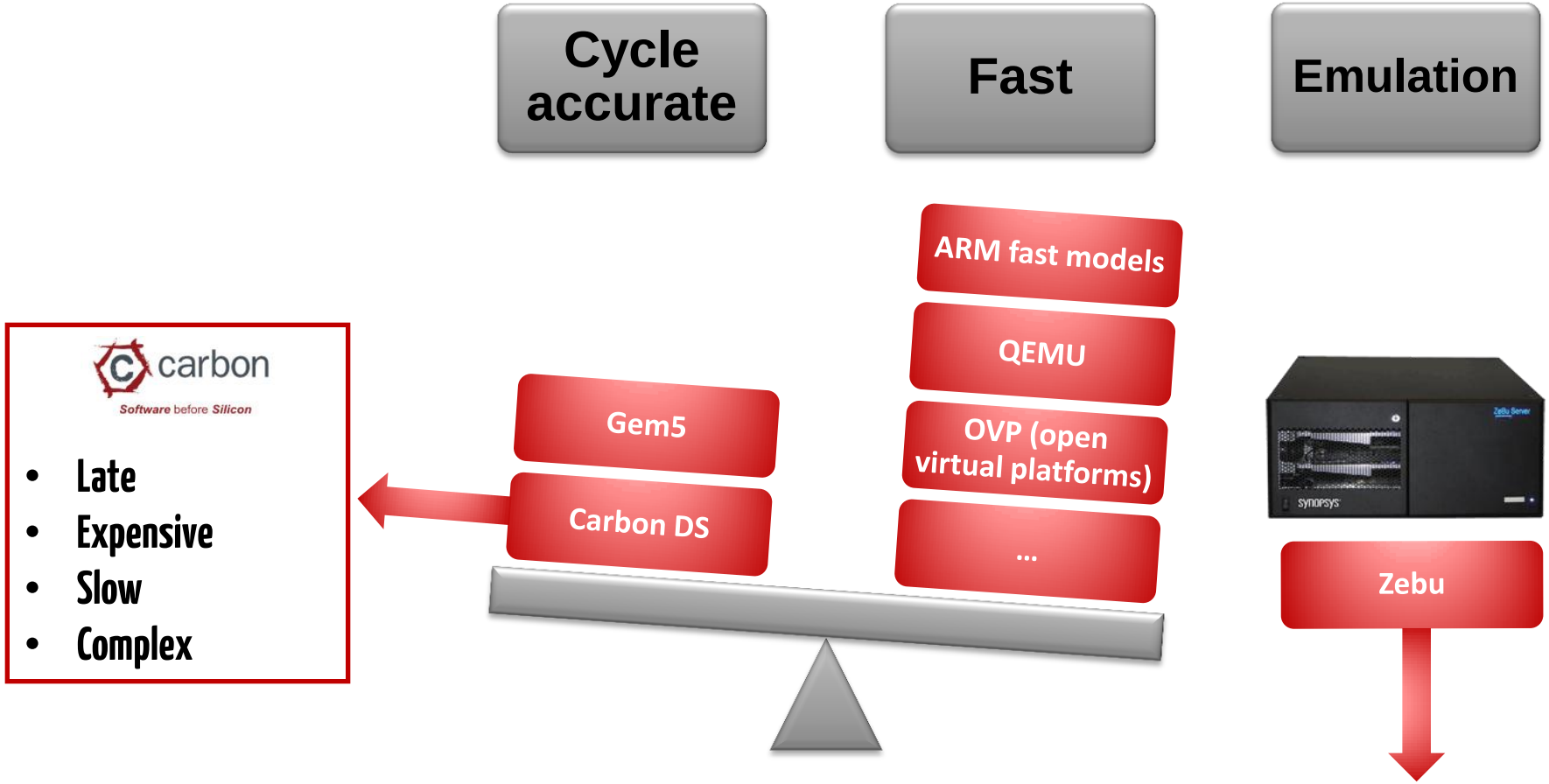
Using gem5 for application specific system-on-chip architecture exploration

Alexandre Romaña & Abhilash Nair

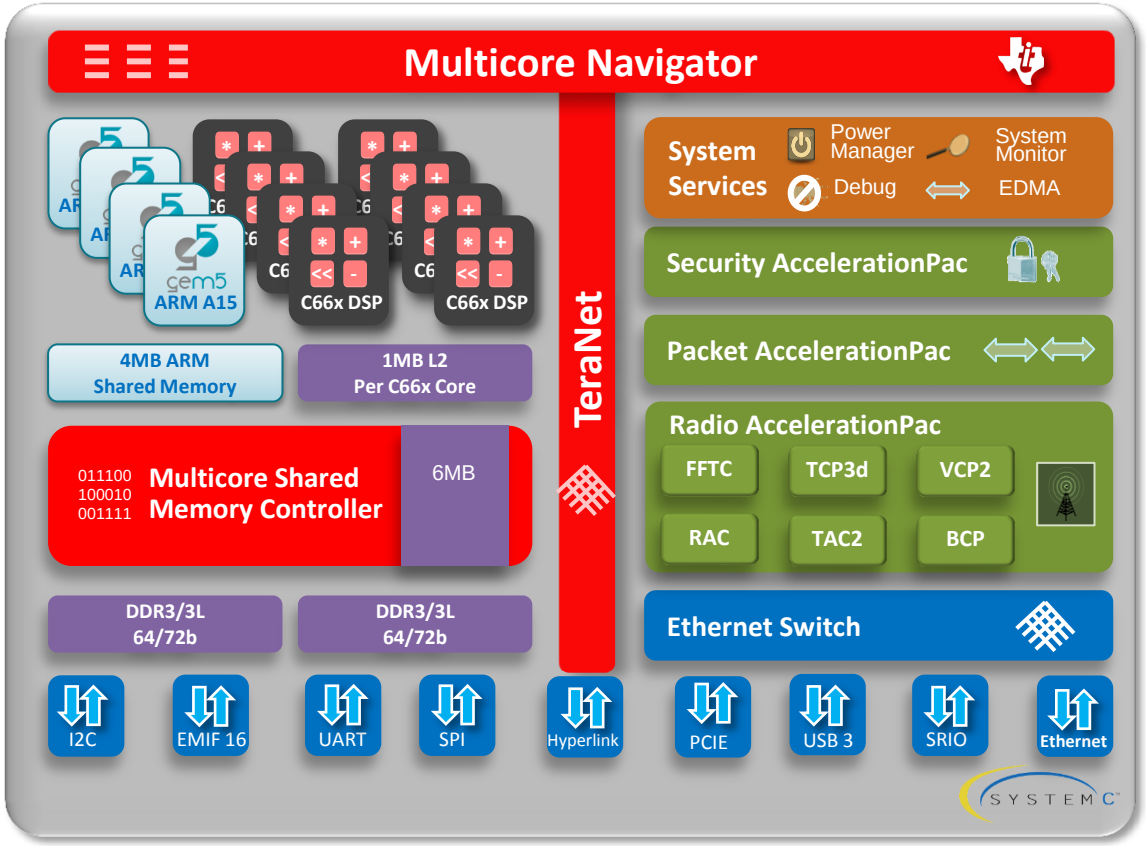
How we do architecture exploration



The Case for gem5



Architecture exploration for TCI6636K2H SoC for Small Cells (High End)

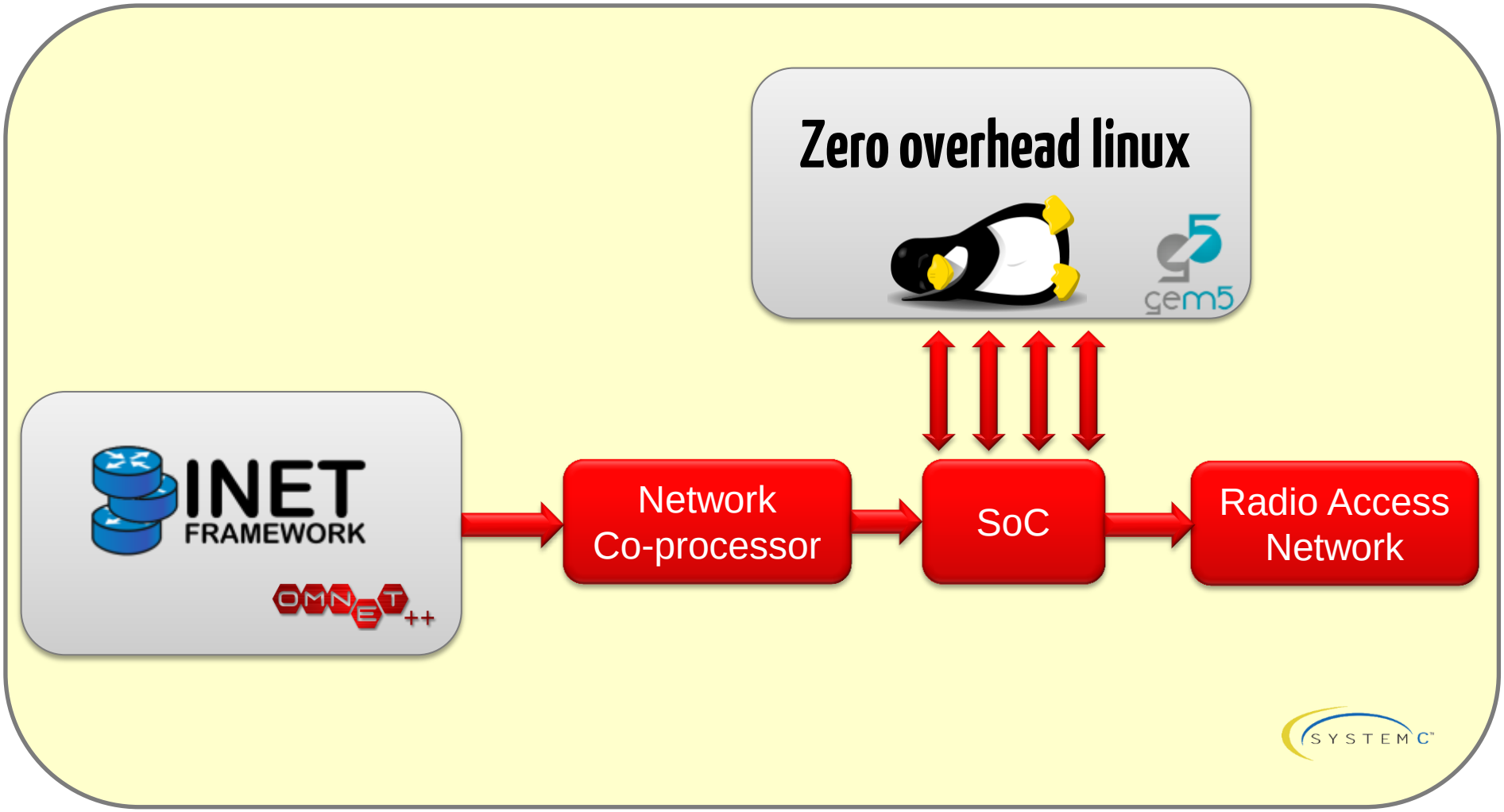


- First chip architected using gem5:
  - SL2$ size
  - MSMC Coherency
  - Arbitration
  - …

System on a Chip components

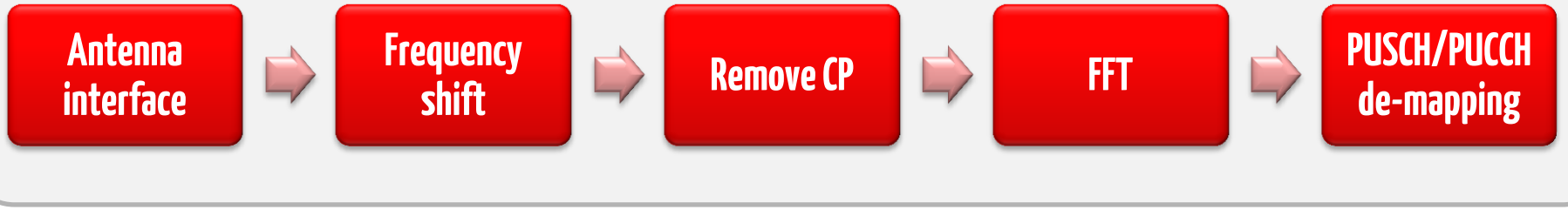
- IPs in a SoC vs what gem5 supports:
  - ARM
  - DSP
  - Caches
  - Memories
  - Core Interconnect
  - Chip Interconnect
  - Hardware accelerators
  - External Interfaces
  - …
- SystemC enabled full system benchmarking

Use case example: Leveraging open source for linux fast path benchmarking



The need for task partitioning

LTE PUCCH decoding **taskflow**



1000s of tasks

PREESM

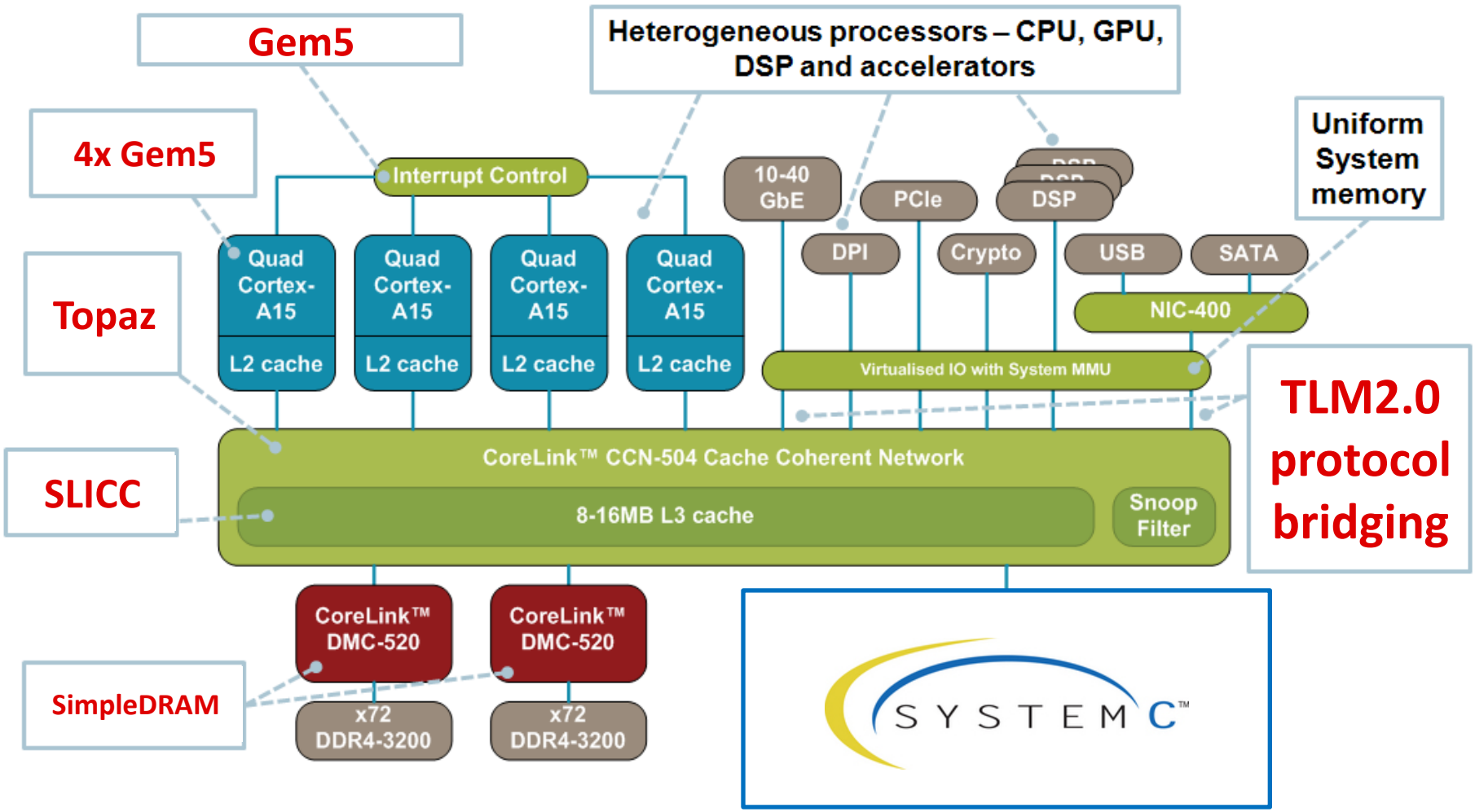
Automated static mapping

or Runtime load balancing

Leveraging checkpointing

Useful for both bare metal and linux

Modeling today's architectures
ARM CCN-504



Source: http://www.arm.com/images/CoreLink_CCN-504_system_large.png

Thank You!

Questions?