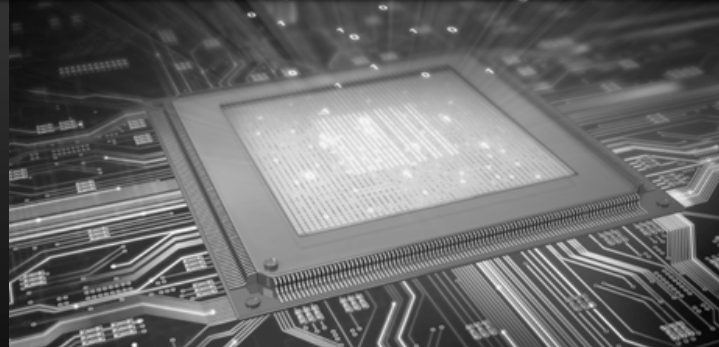


Evaluating Multicore Architectures for Application in High Assurance Systems

Ryan Bradetich, Paul Oman, Jim Alves-Foss, and Theora Rice
Center for Secure and Dependable Systems
University of Idaho

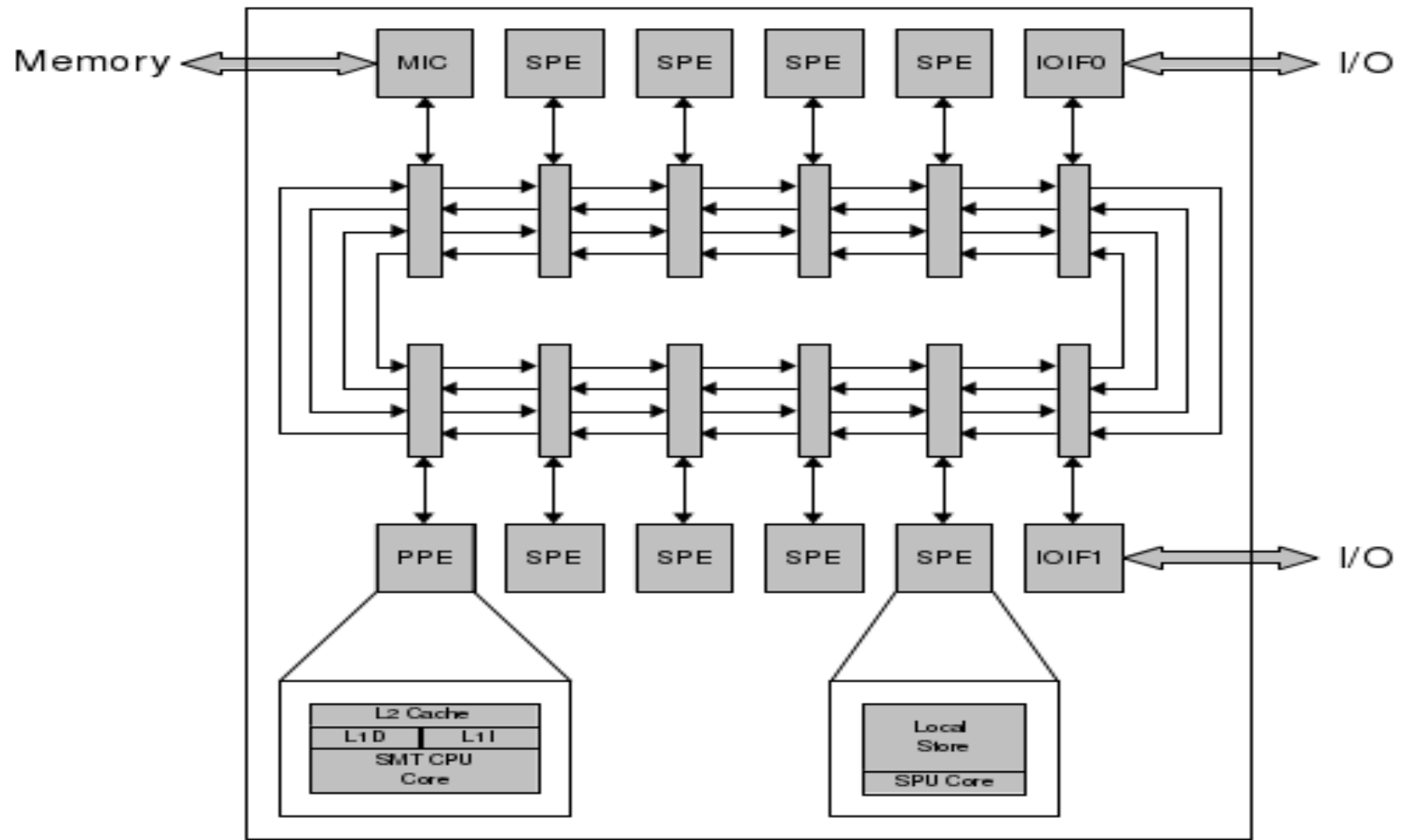


Agenda

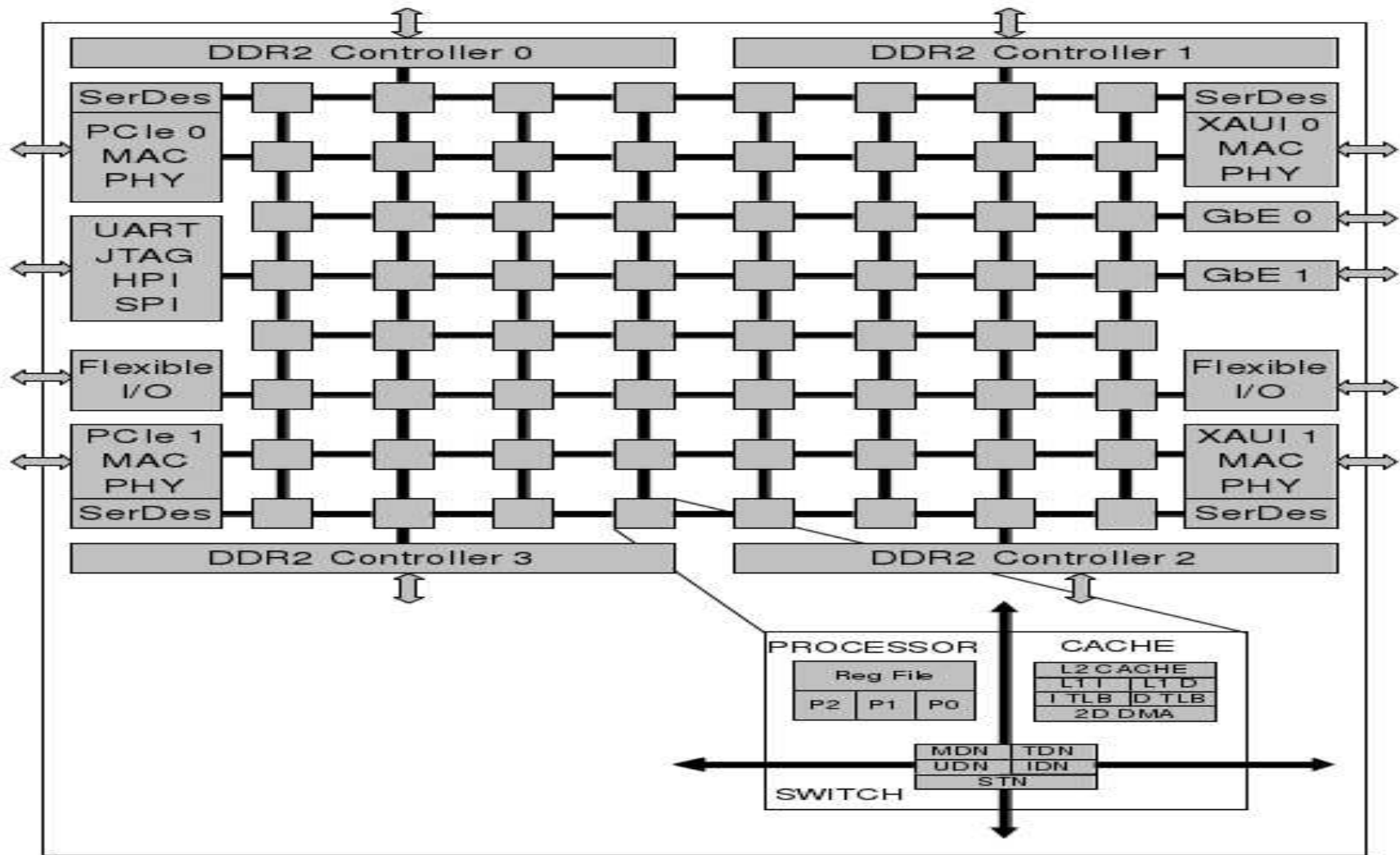


- Complexity of Multicore Architectures
- Framework Introduction
- Apply Framework to P₄₀₈₀ Architecture
 - Introduce Example Security Policy
 - Map Security Policy to P₄₀₈₀ Architecture
- Conclusions
- Question and Answer

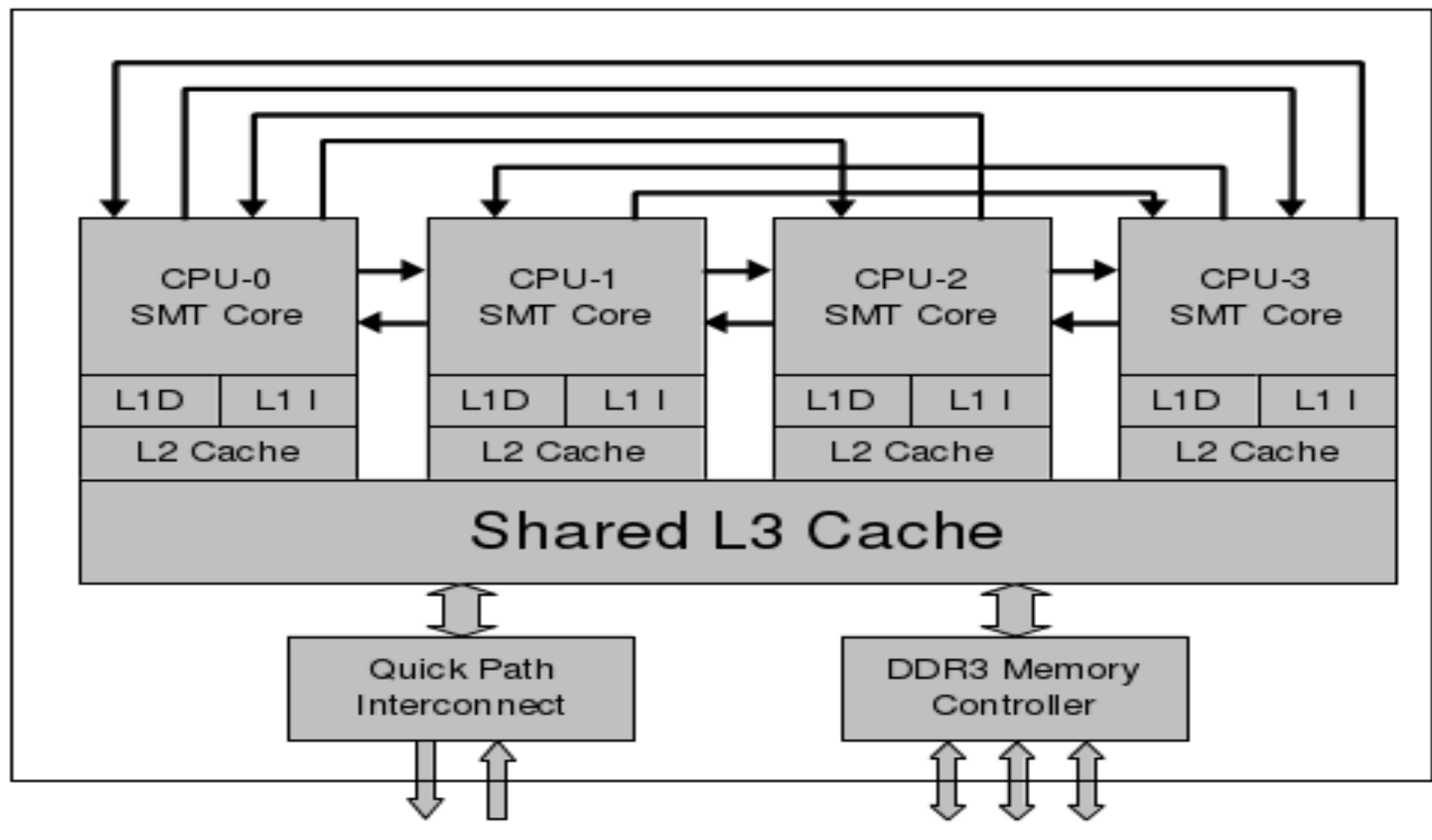
CBEA - 2006



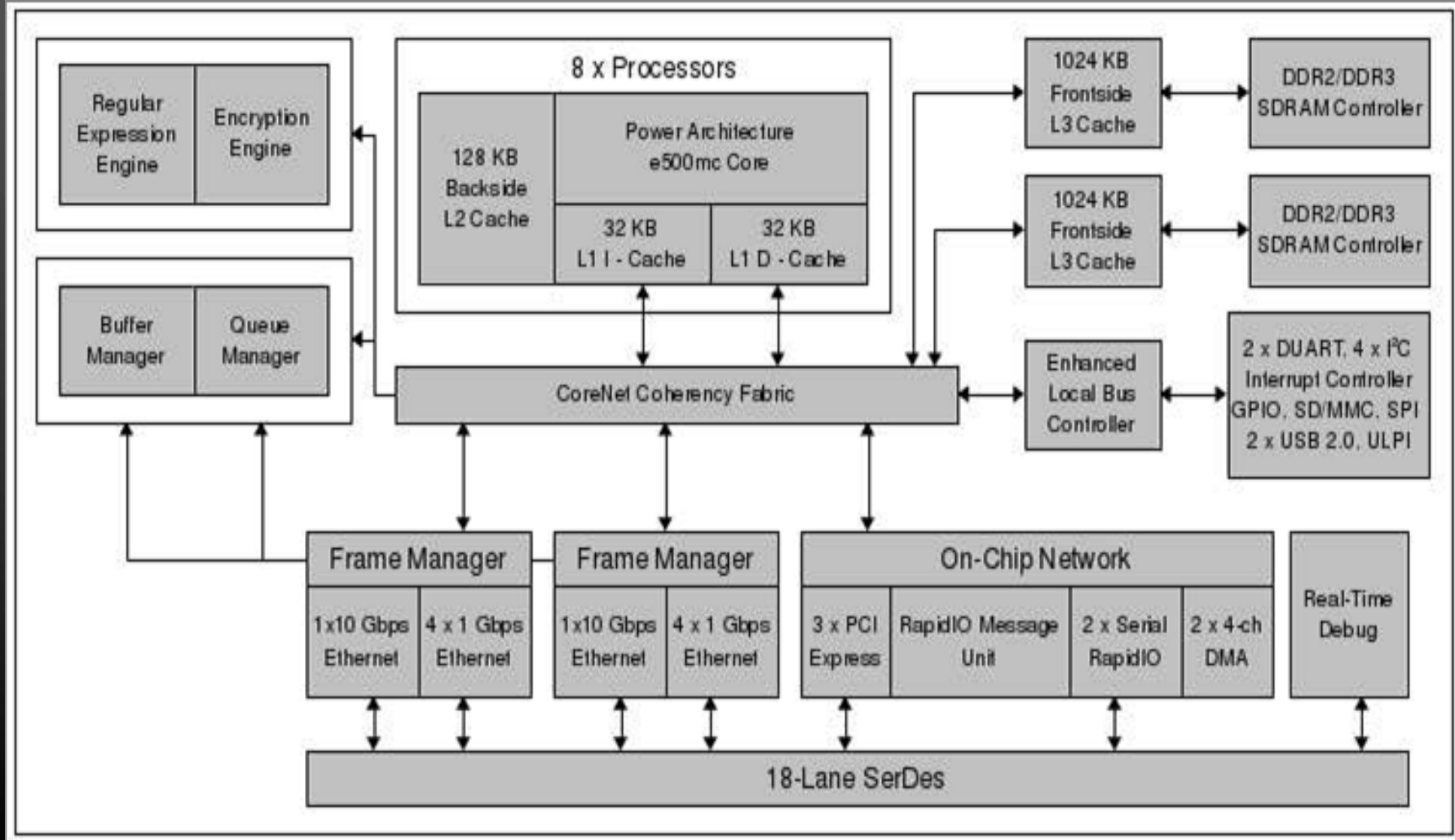
Tilera TILE64 - 2007



Intel Core i - 2007



Freescale P4080 - 2008

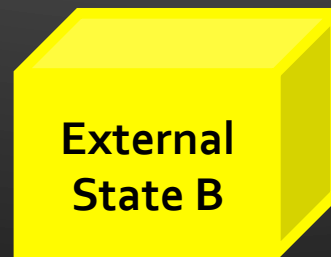
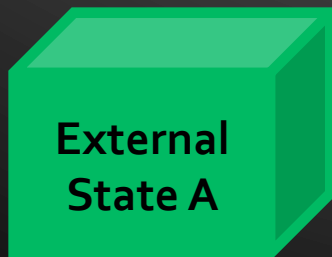
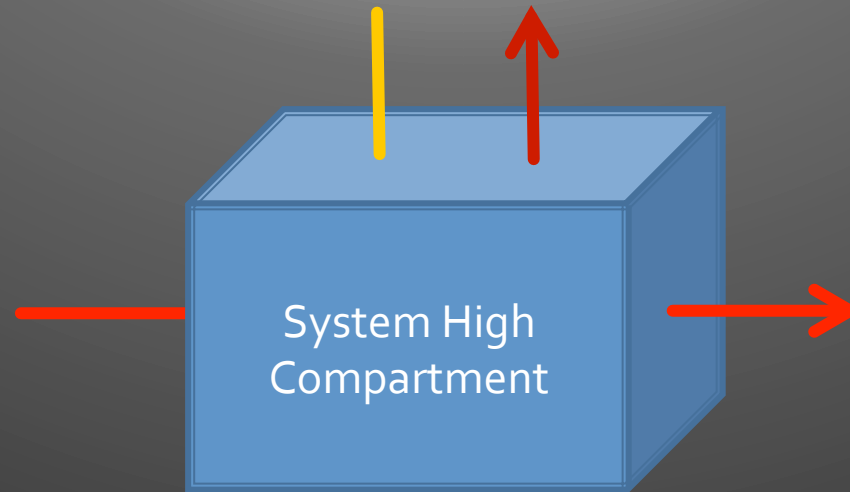


Framework Introduction

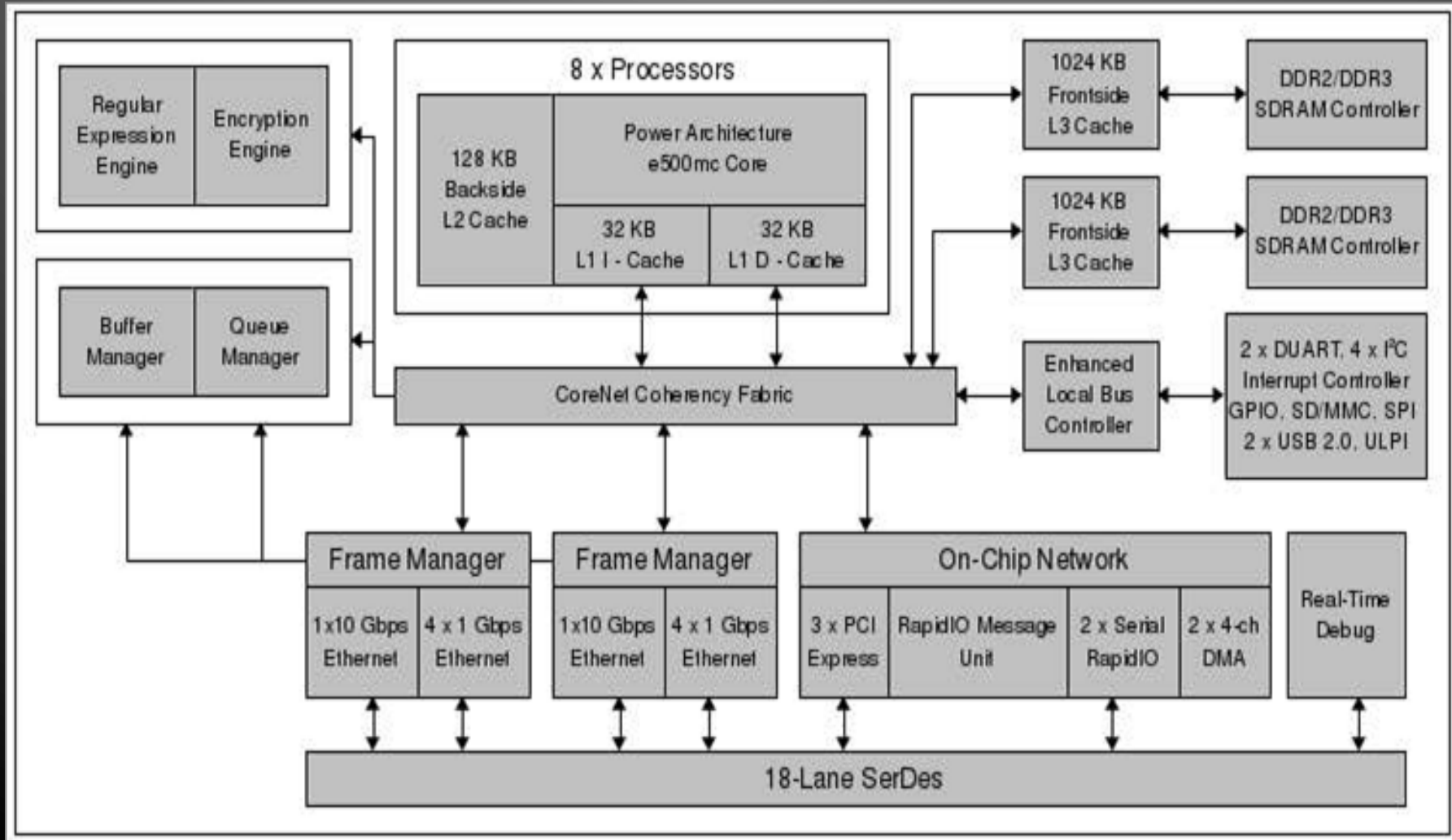
A decorative graphic in the top right corner of the slide, consisting of a stylized circuit board pattern with various lines, nodes, and circular components, rendered in a light blue color against the dark background.

1. Hardware component identification.
2. Information flows, safeguards, and component state analysis.
3. Security policy mapping.

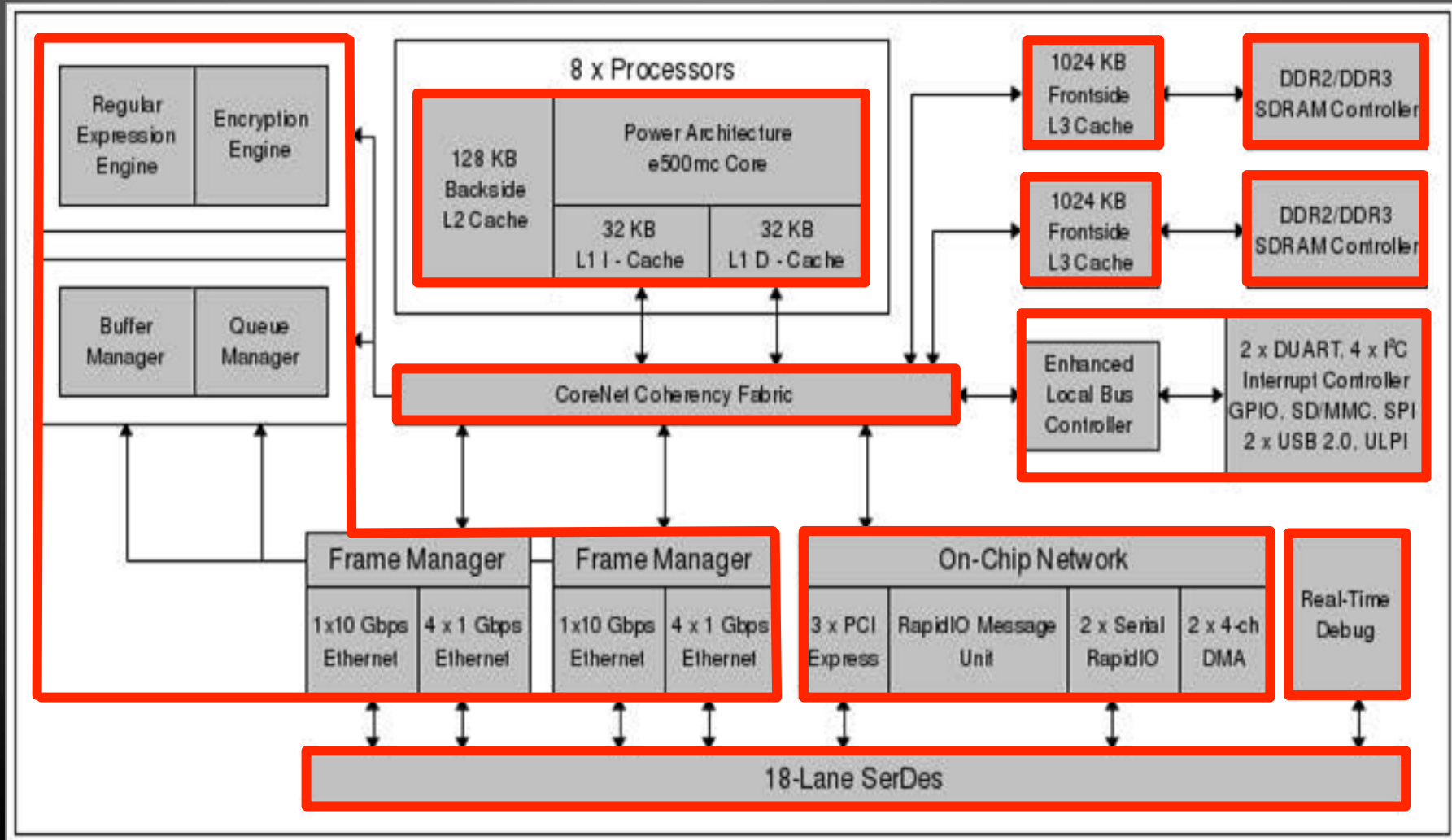
Polyhedron Abstraction



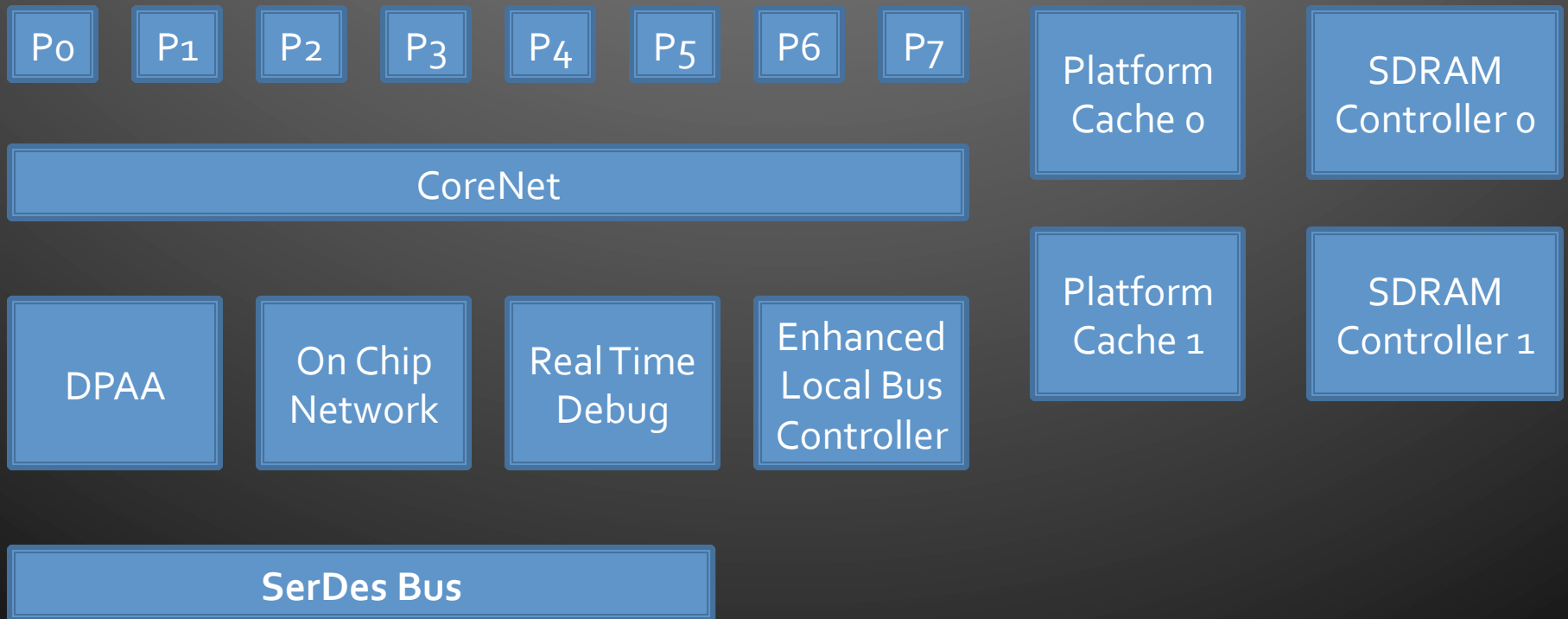
Apply Framework to P4080



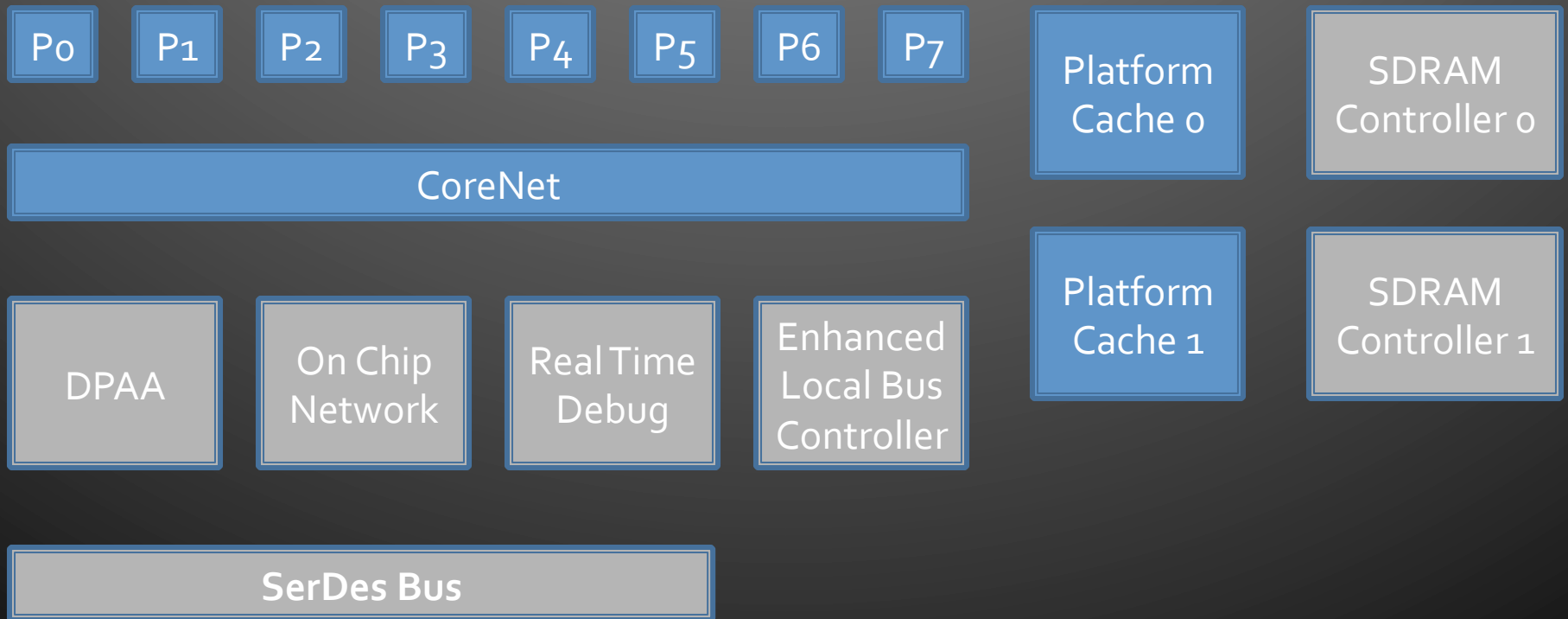
Identify Hardware Components



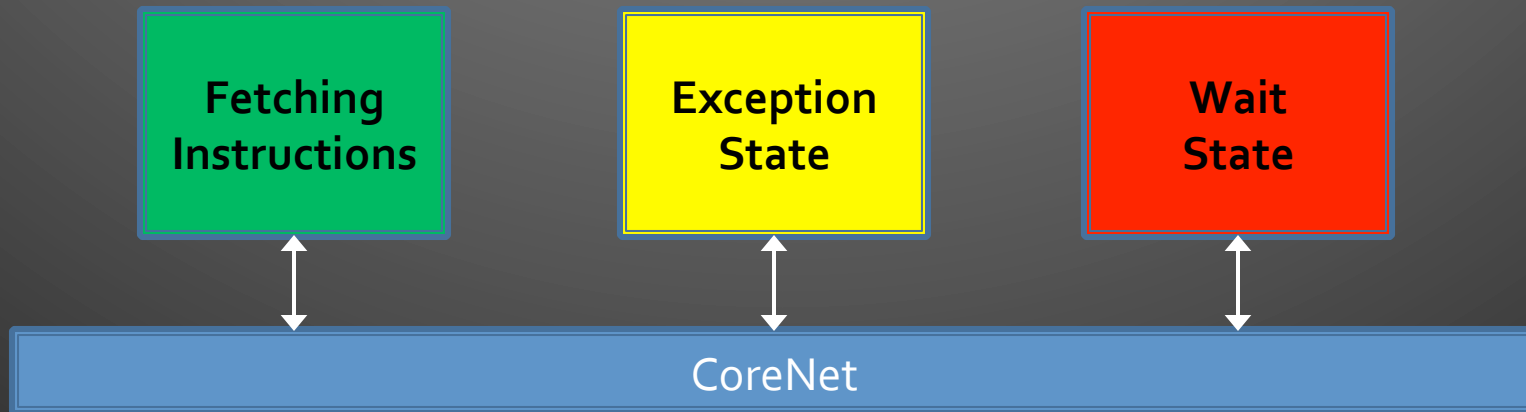
Presentation Polyhedrons



Presentation Polyhedrons

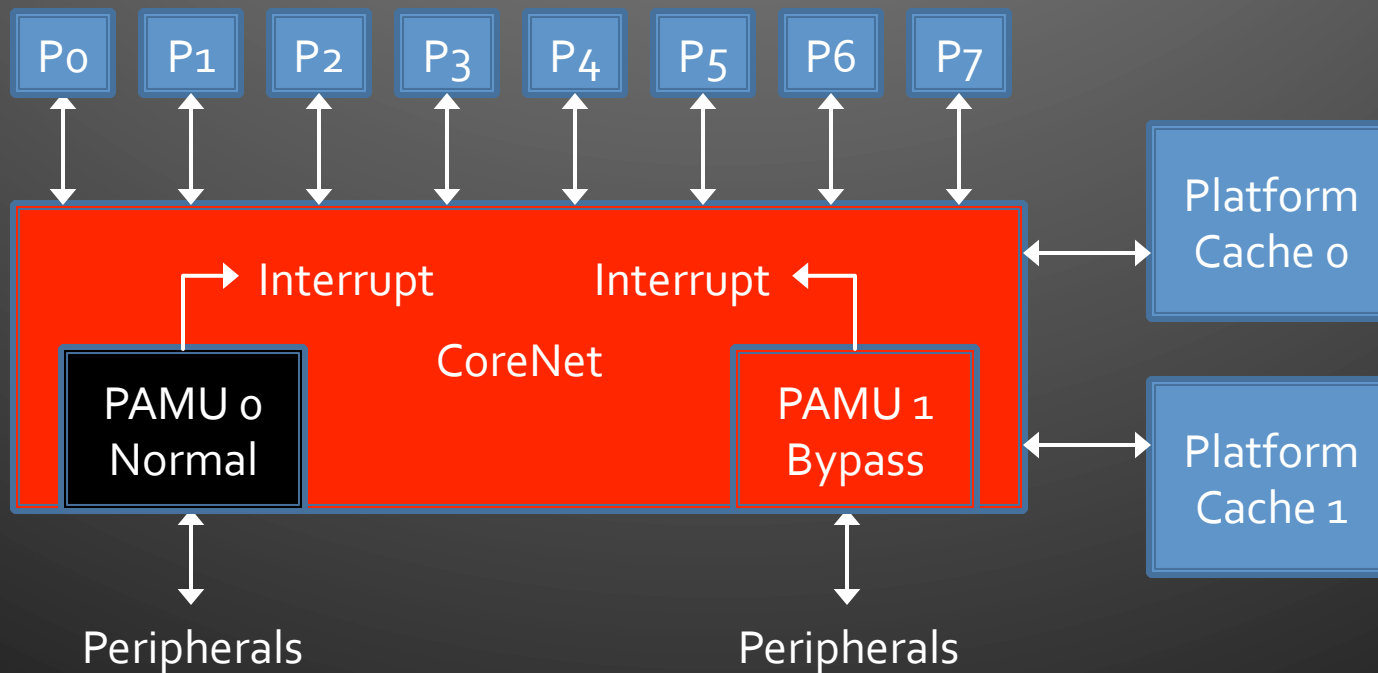


Framework - Processors



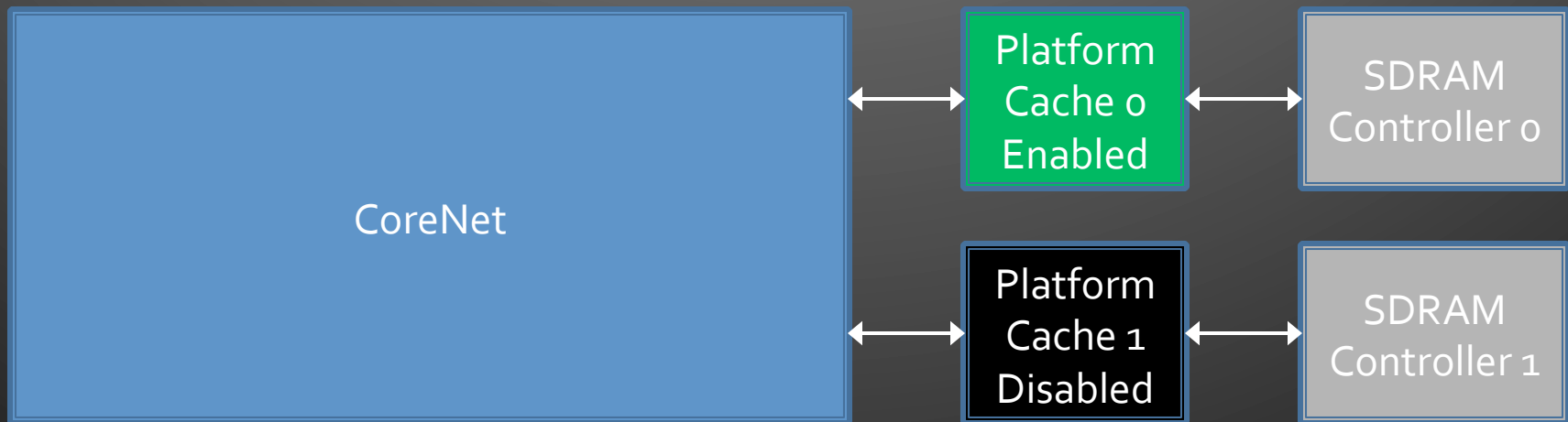
Safeguard: MMU

CoreNet Coherency Fabric



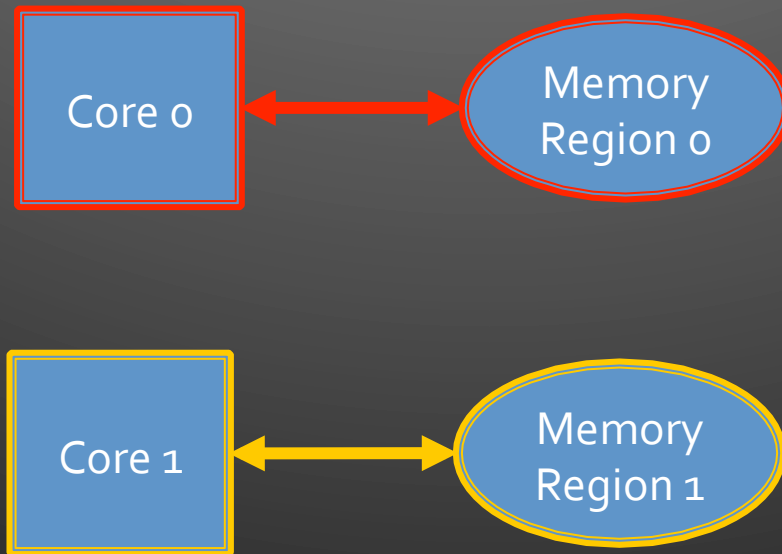
Safeguard: PAMU

CoreNet Platform Cache

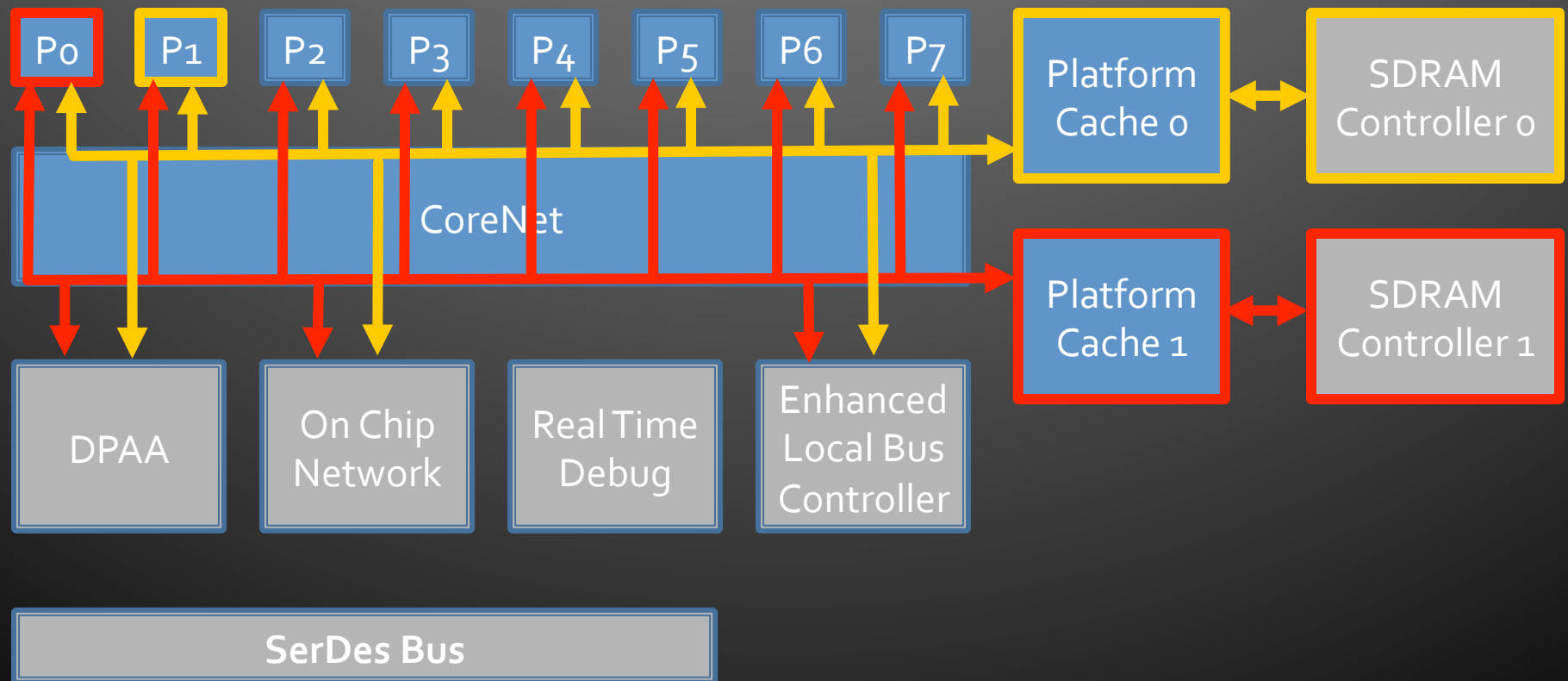


Safeguard: None

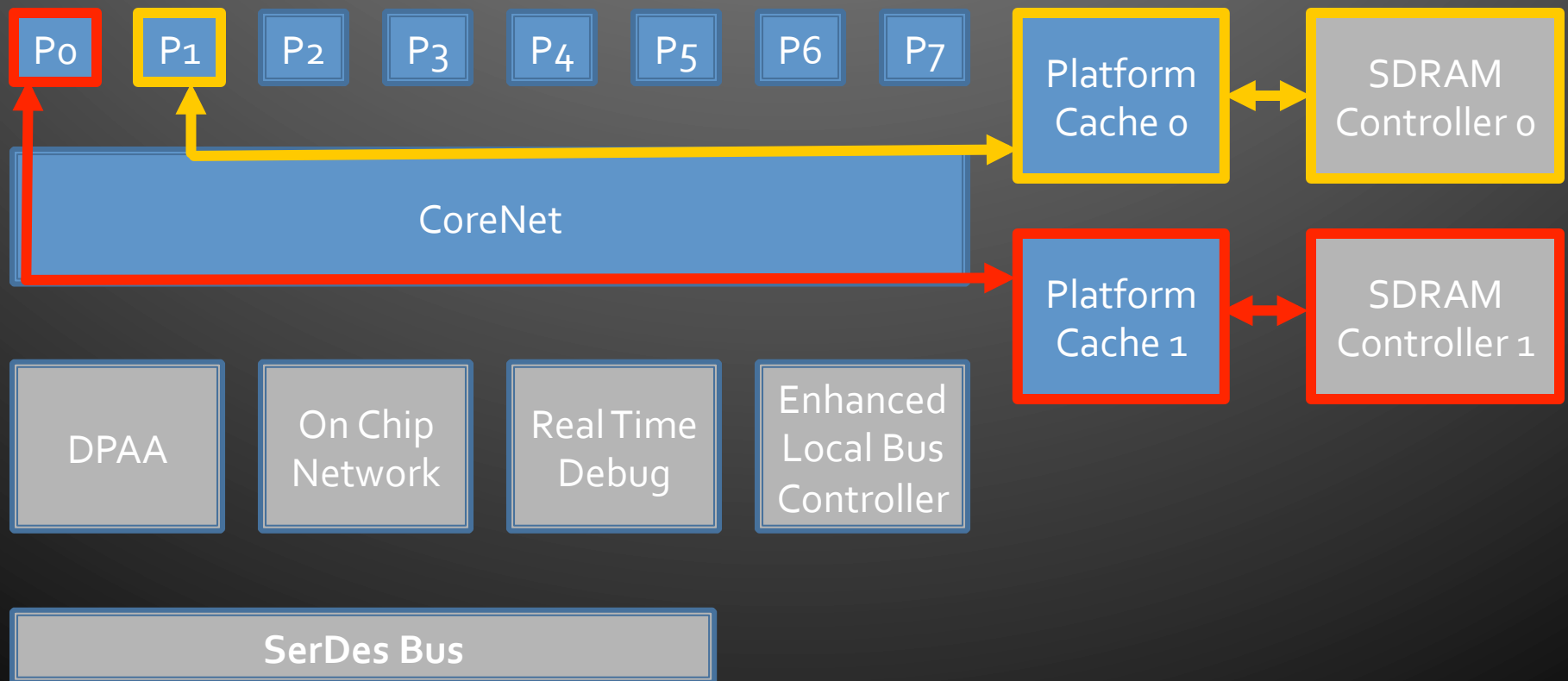
Example Security Policy



Map Security Policy



Apply Safeguards



Conclusions



- Information flows and safeguards represent hardware
- Information flows without safeguards
 - Select a different multicore architecture
 - Software safeguard (e.g. Hypervisor, Trusted Component, Etc.)

Question and Answer



Questions?