



This research was, in part, funded by the U.S. Government, including DOE. The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the official views or policies, either expressed or implied, of the U.S. Government.

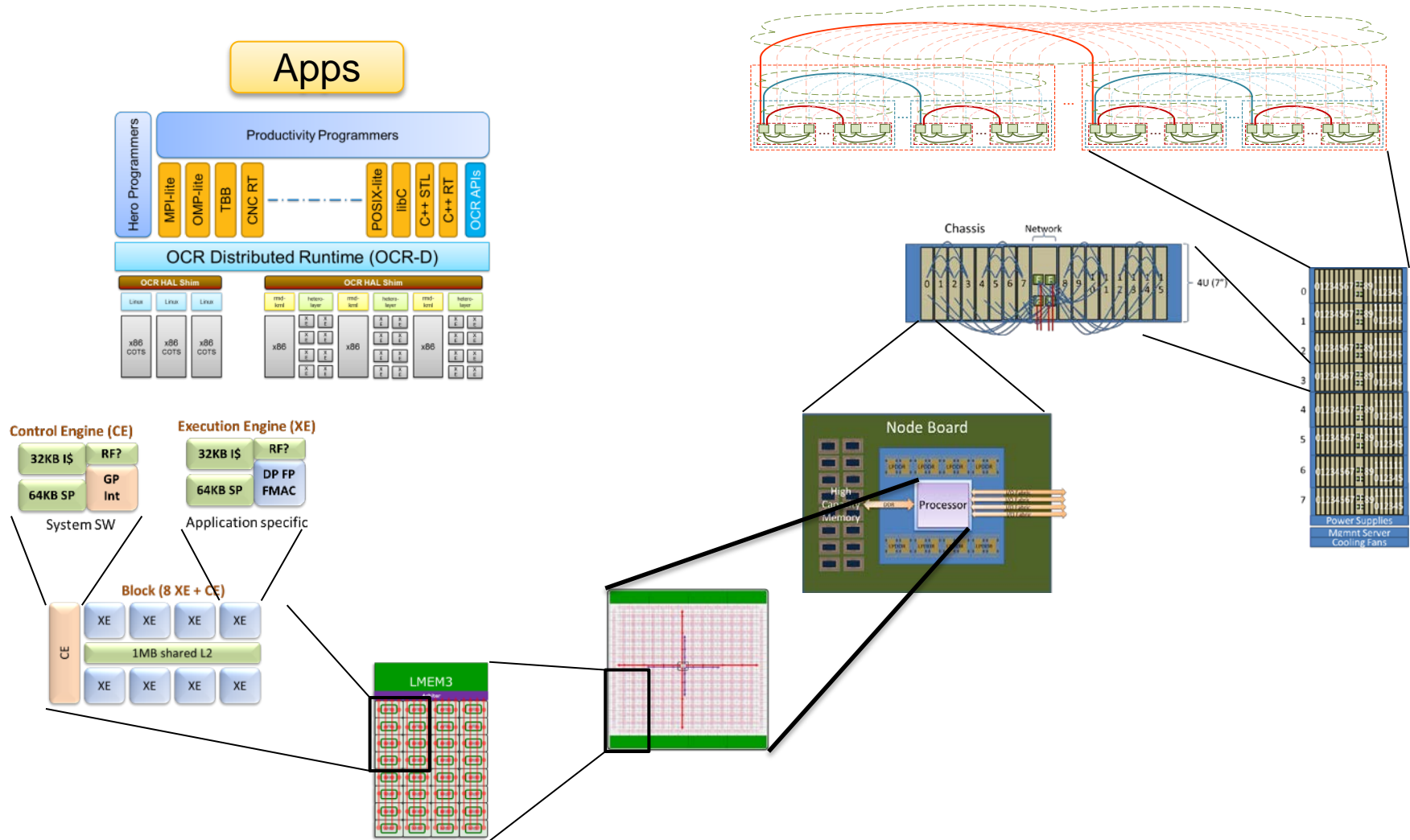
Architectures and Simulators: Research framework for SW & HW

ModSim 2015 Workshop

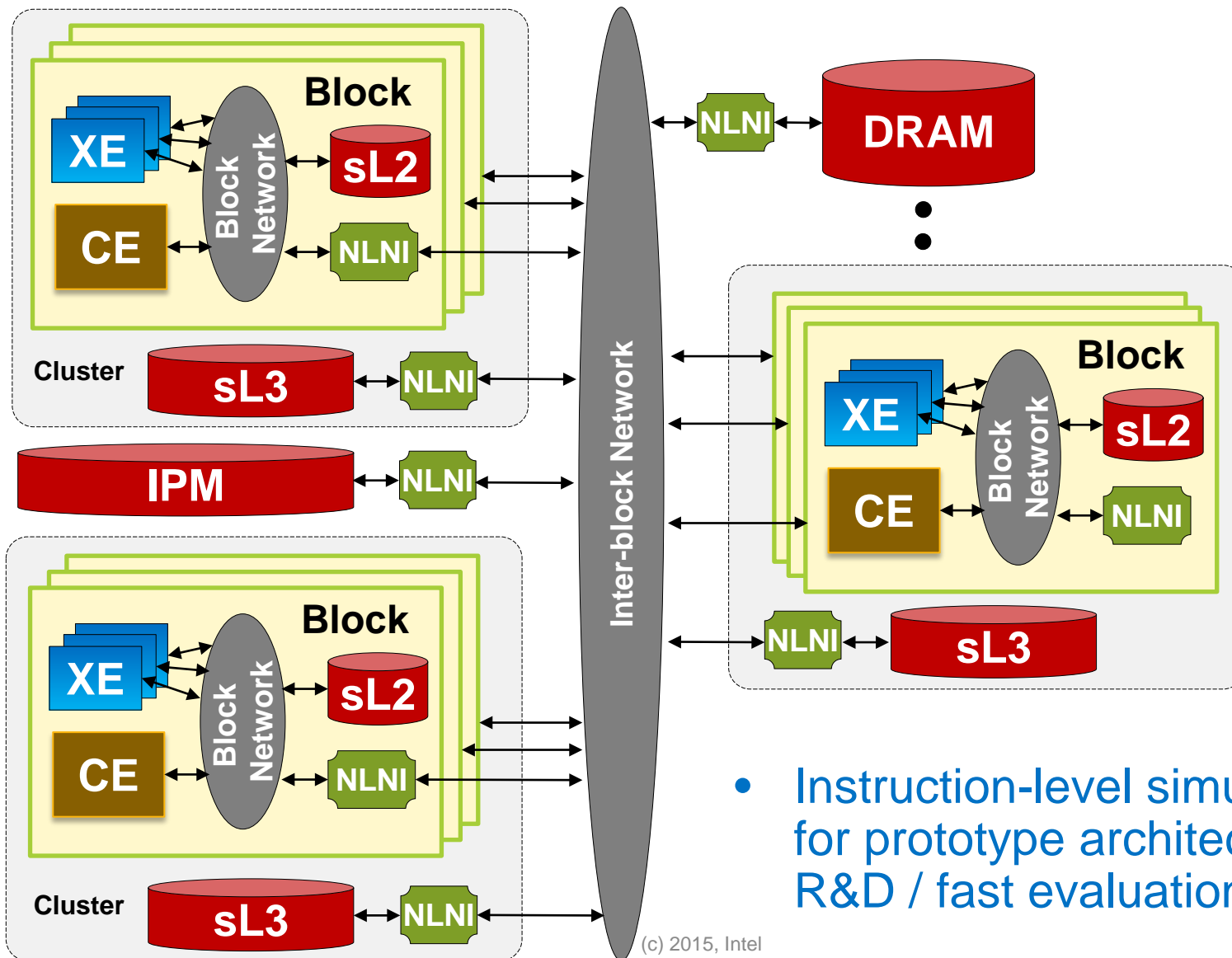
Josh Fryman, System Architect

Extreme Scale Architecture Pathfinding, Datacenter and Communications Group

Extreme Scale System Vision



FSim Snapshots Architecture Model



- Instruction-level simulator for prototype architecture R&D / fast evaluations

(c) 2015, Intel

Status and Opportunities

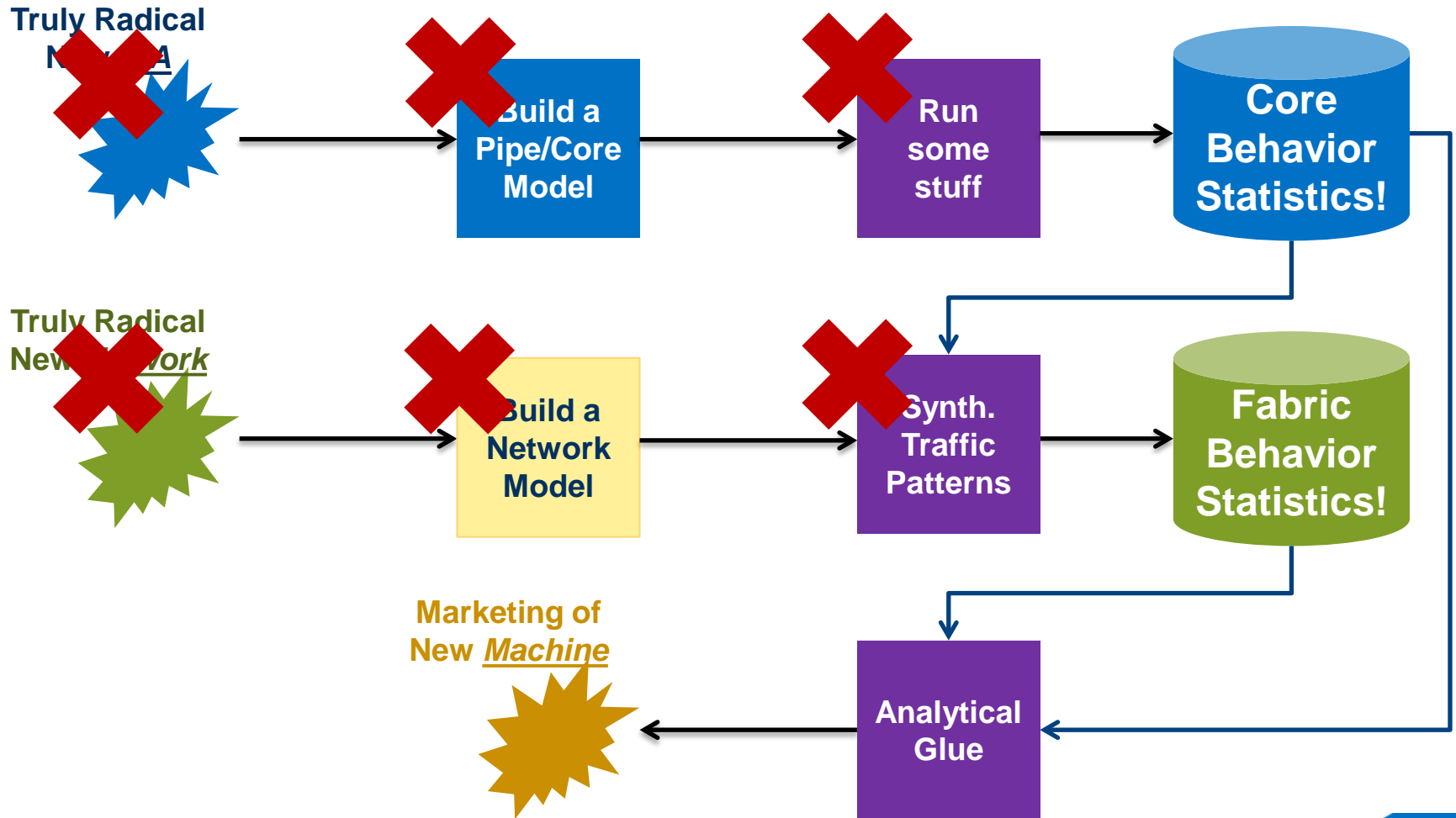
- All Open Source – available to all for use or modification
 - Full release of Fsim and all associated pieces by August 31, 2015
 - Patches and enhancements welcome, support only for FF program
 - Re-use {modules, ISA, energy model, ..} in other tools/environments
- FSim scales to 1,152 cores using 64 dual-socket nodes
 - 128 simulated blocks, $O(10\text{MHz})$ sim rate depending on comms rate
 - Runs on raw TCP/IP sockets or IBverbs (latency sensitive)
 - Architecture model has clear interfaces in network model
- Coming later this year . . .
 - Port to NERSC machine infrastructure, $O(1)$ Exascale rack @ $O(10\text{MHz})$
 - Updated clock and energy models

Which kind of simulator . . . ?

“There are three kinds of
lies: **cycle**, **functional**, and
analytical.”

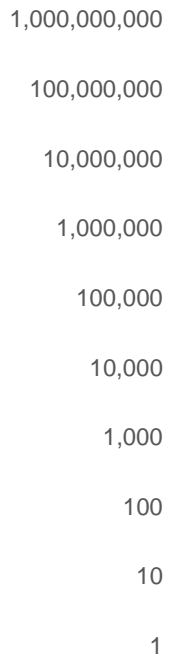
(Mark Twain, 1906)

Do You Need A Simulator for <X>?

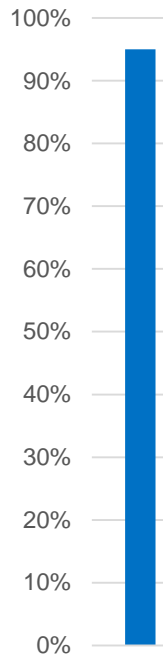


Simulators: Trade-offs by themselves

Speed of Simulation for O(1) Petascale



Simulator "Accuracy" for Performance



Hardware Cost for O(1) Petascale Evaluation

