



Applications and importance of SHIM 2.0 in an industrial multicore analysis and optimization tooling

Weihoa Sheng, Silexica Japan KK

sheng@silexica.com

2018-11-14

Agenda

- Introduction of Silexica
- SHIM 2.0 → SLX Platform Model
- Use-cases



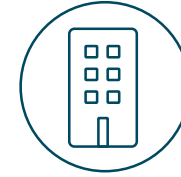
Silexica Facts



Founded in 2014,
Raised \$28 million
in funding



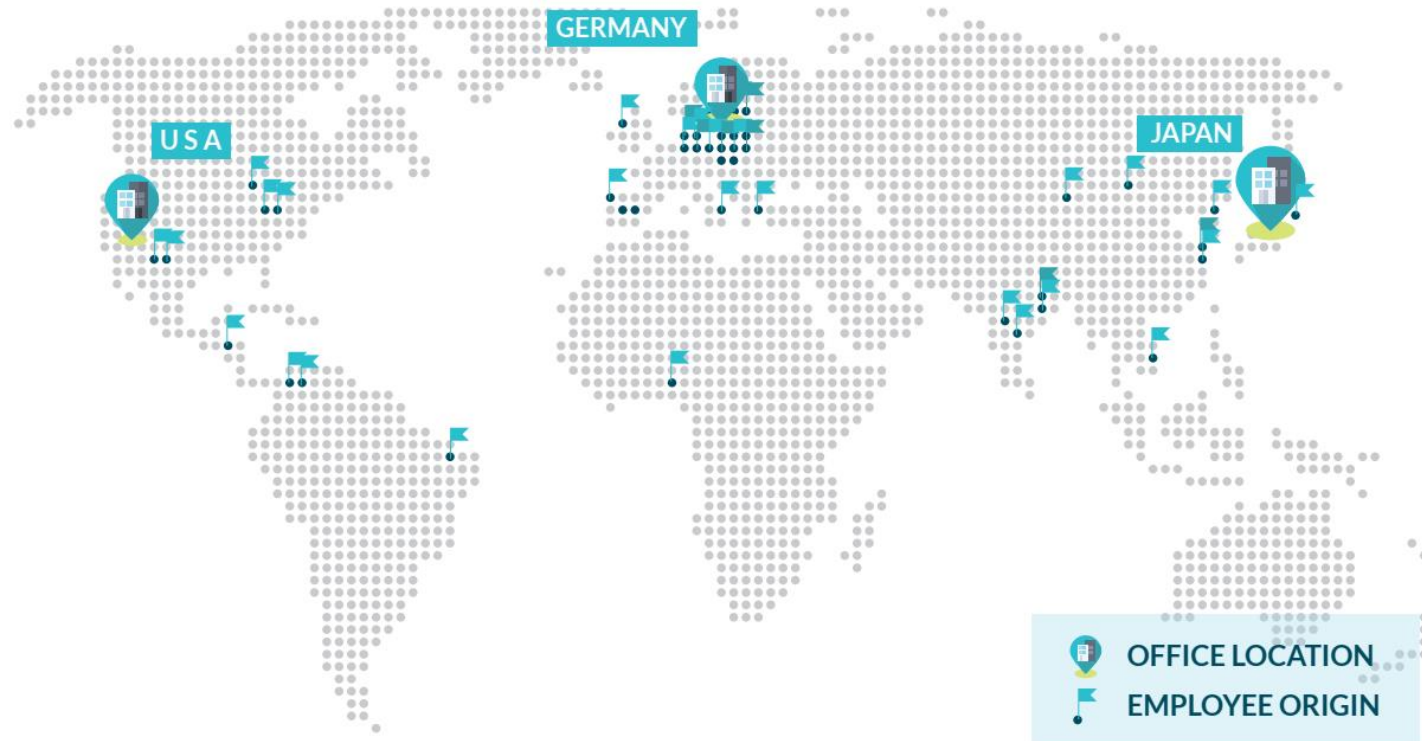
Team of world leading
software and
hardware experts



60+ Silexicans from
22 different
countries

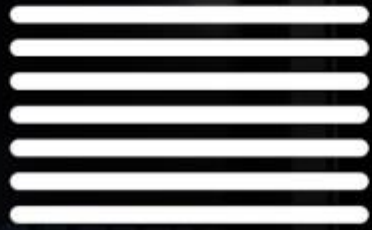


3 offices worldwide
with engineering HQ
in Germany



Silexica Japan (株)
• Started in 2018/8
• Office at 新横浜

1970's – Single cores



2000's – Multi cores



2018 – Computing everywhere

Specialized, heterogeneous processors



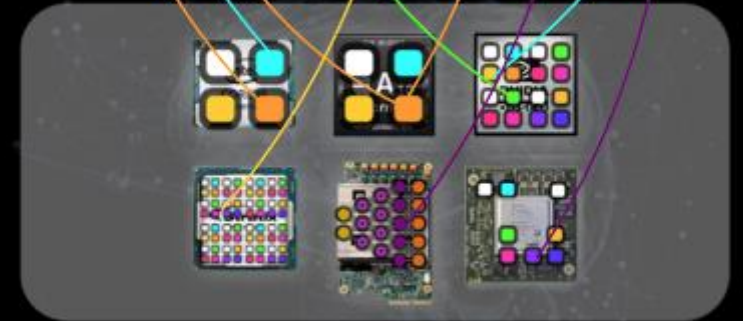
Vendor 1

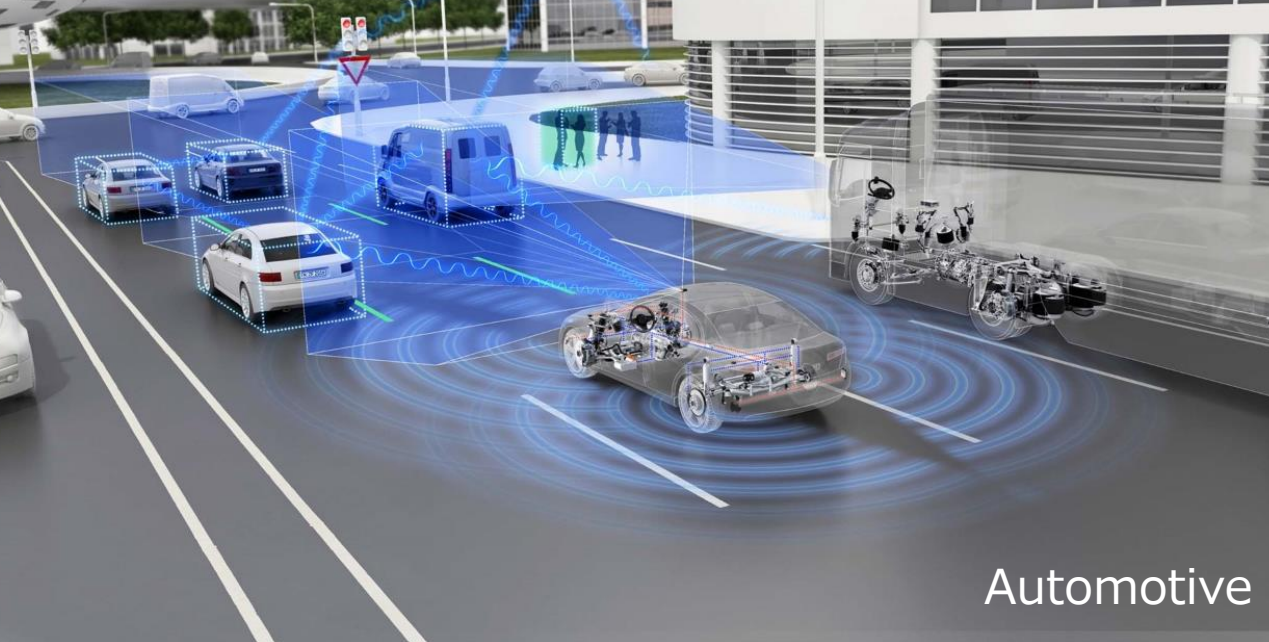
Vendor 2



Vendor 2

Vendor 4





Automotive



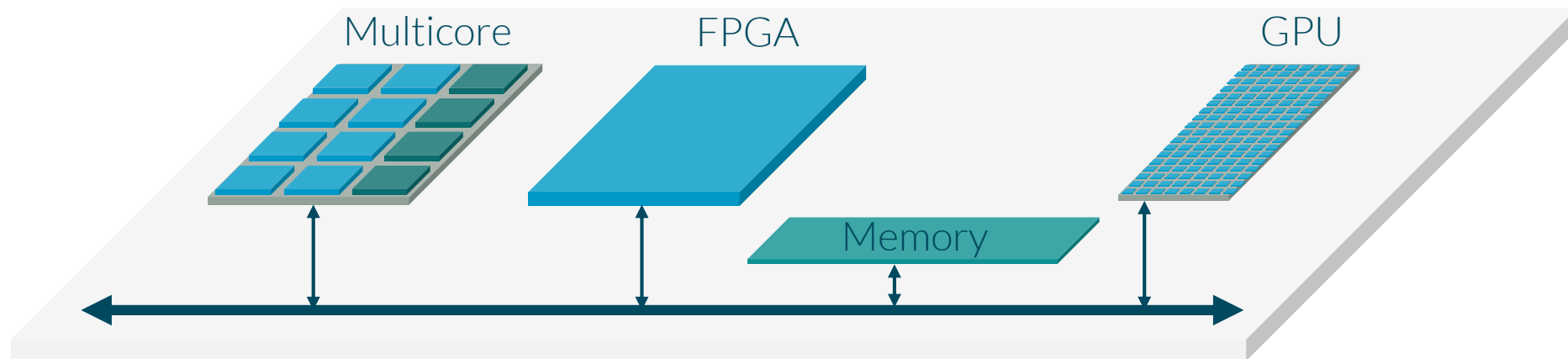
Industrial/Datacenters



Wireless



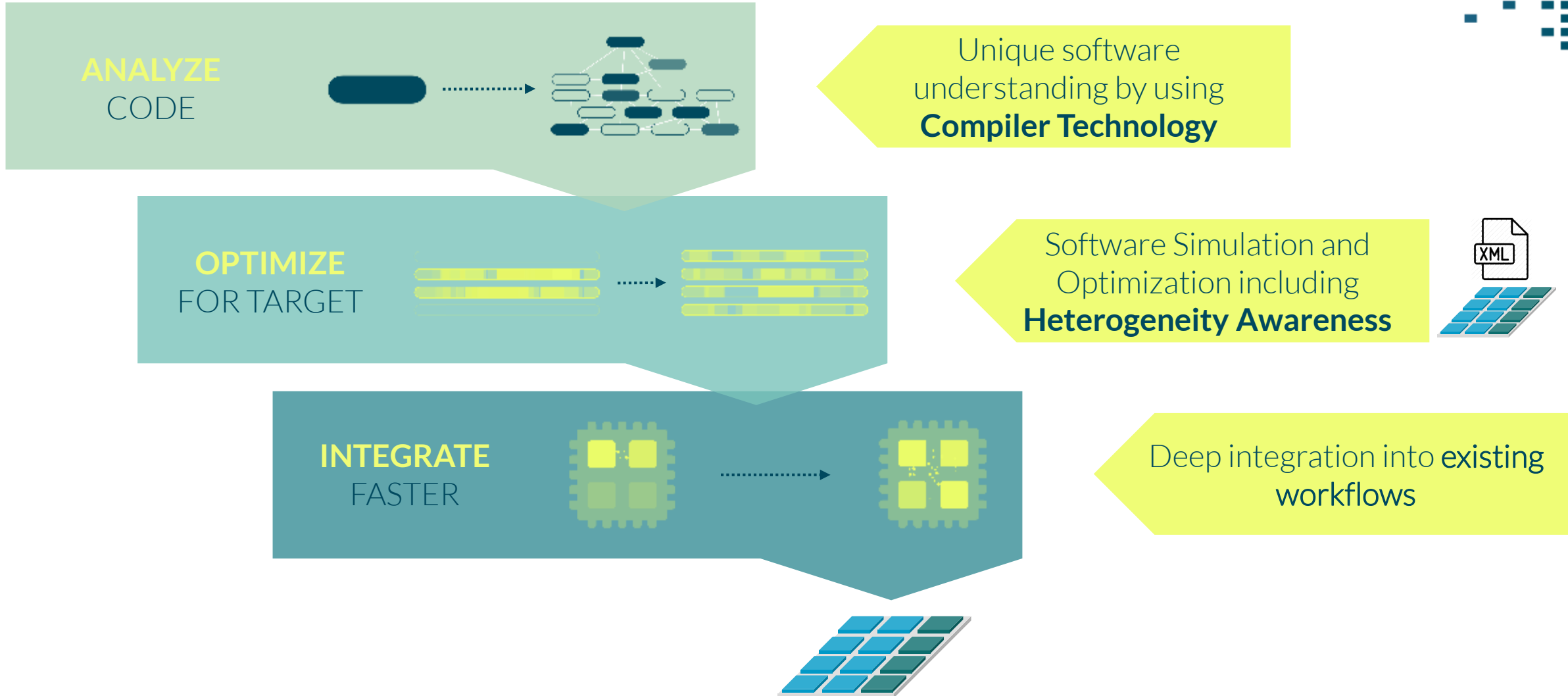
IoT



All future mega trends are enabled by Heterogeneous Supercomputing

SLX Solution

One of a kind combined SW and HW understanding



Agenda

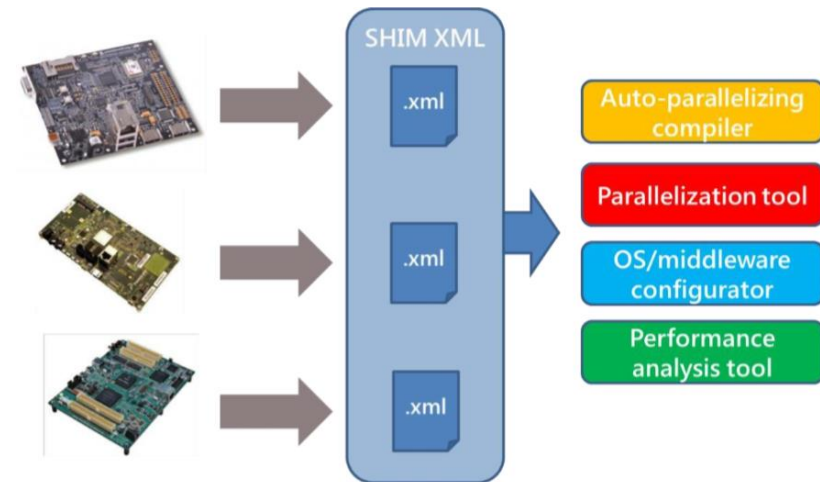
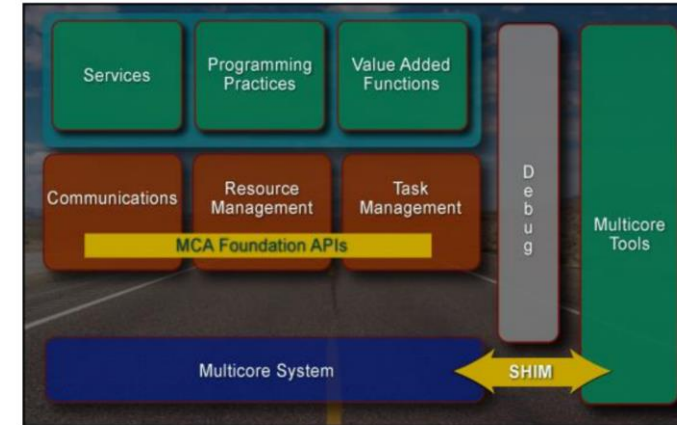
- Introduction of Silexica
- SHIM 2.0 → SLX Platform Model
- Use-cases



SHIM (Software-Hardware Interface for Multi-many-core) Highlights

- Model to standardize the interface between multicore hardware and software tools
- Designed for developing software on multicore
 - HW described with only information relevant to SW
 - Topology
 - Address space
 - Inter-core communication
 - Performance
 - Configuration
- XML schema
- Provides a framework for a richer eco-system for multicore technologies

Strategic Roadmap of the Multicore Association



Source: Masaki Gondo, Chair of SHIM Working Group, Software CTO, eSOL

SLX for C/C++

Deep Code and SW Behavior Understanding

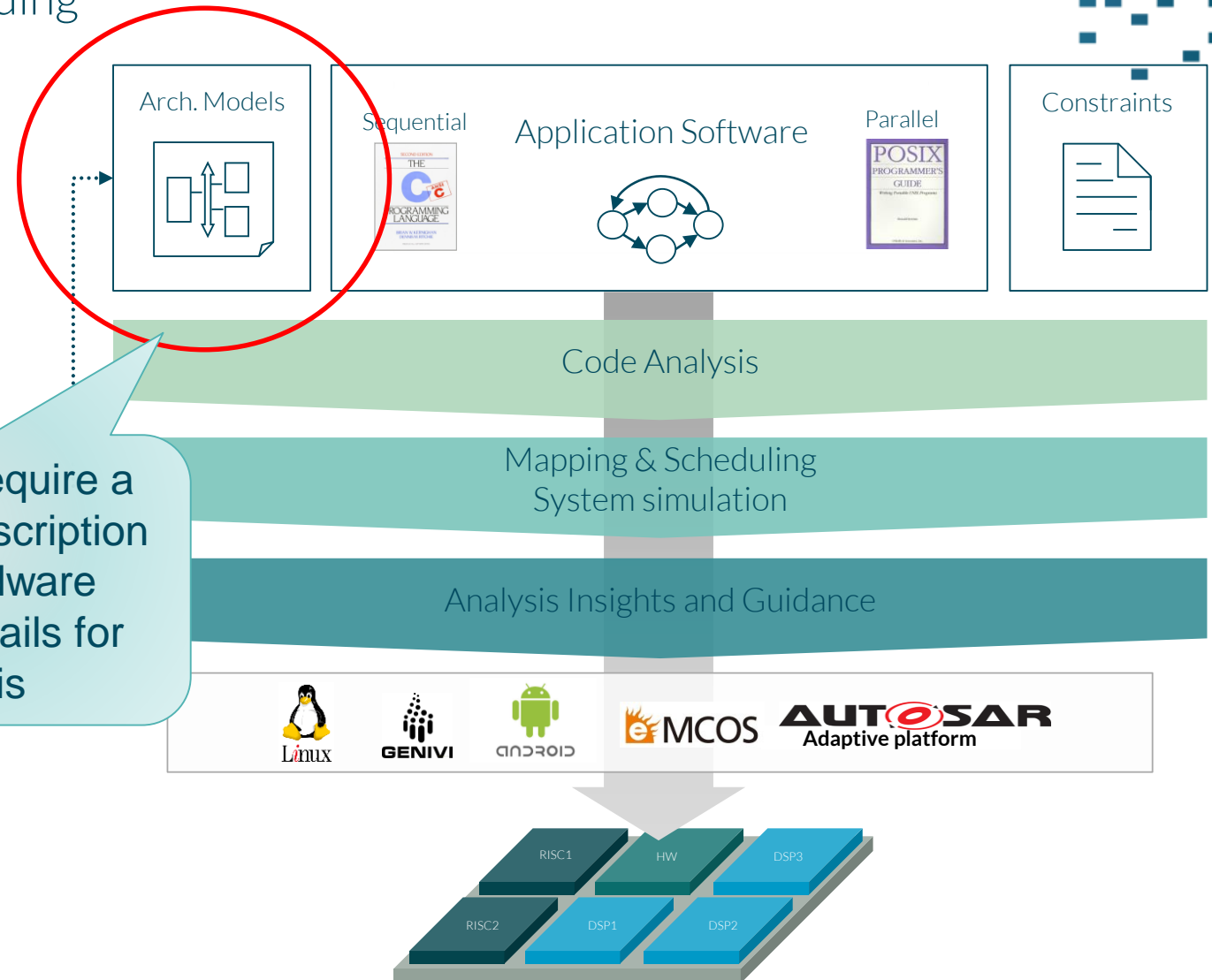
Challenges

- ✓ Code complexity increases
- ✓ Multi-threading adds a new dimension of complexity
- ✓ Code from different sources
- ✓ Problem understanding requires deep source code insight

Tool Benefits

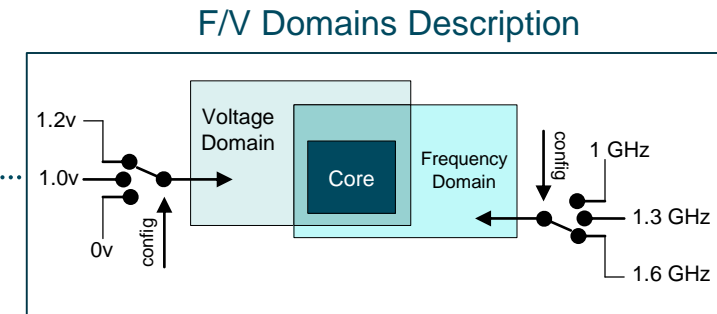
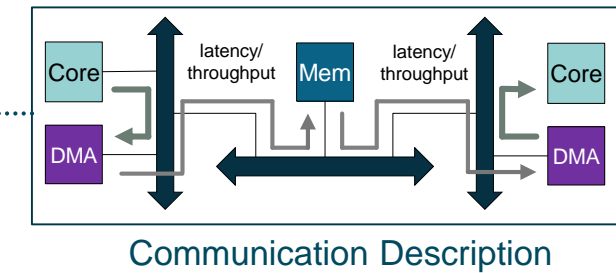
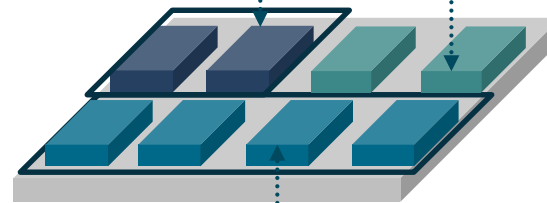
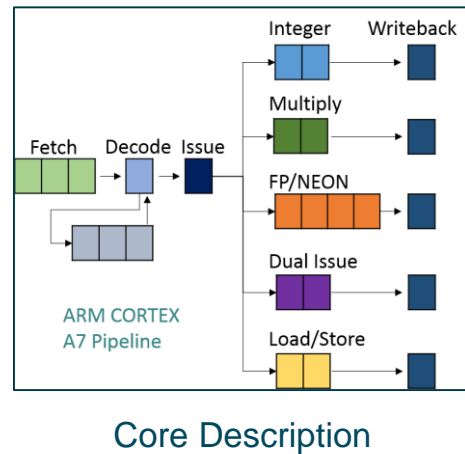
- ✓ Deep code understanding
- ✓ Configurable visualizations
- ✓ Transformation hints
- ✓ Increased efficiency

SLX Tools require a high-level description of the hardware platform details for analysis



SLX Platform Model (SHIM-based)

- Description of processing elements, memory hierarchy, communication fabric, accelerators, voltage/frequency domains, power models...
- Multicore Association SHIM 2 standard



Agenda

- Introduction of Silexica
- SHIM 2.0 → SLX Platform Model
- Use-cases

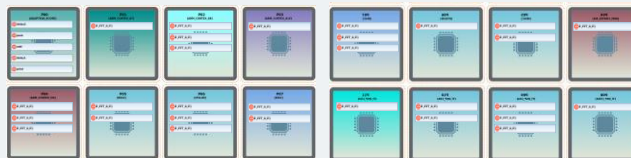


SLX System-behavioral Simulation

Execution Analysis after Platform, Mapping & Scheduling decisions

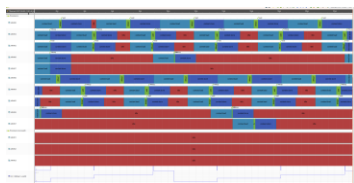
Powered by SLX
Platform model!

Suggested Mapping

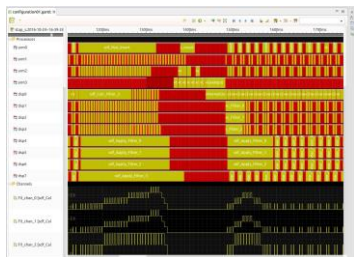


Application Insights

Gantt chart

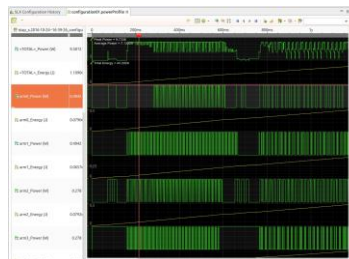


Task states

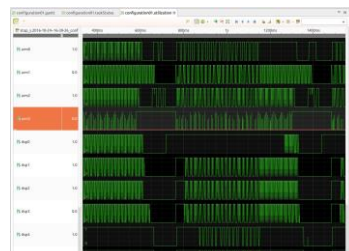


Power Analysis Insights

DVFS Frequencies

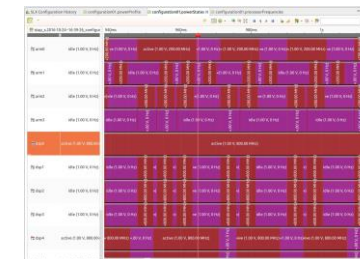


Power chart

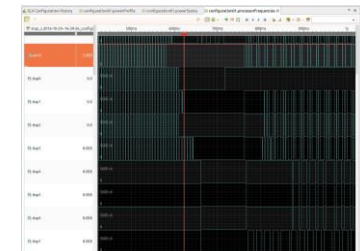


Platform Insights

Comm. Link Utilization



Cores utilization





*The software development platform taking intelligent products
from concept to mainstream*

