



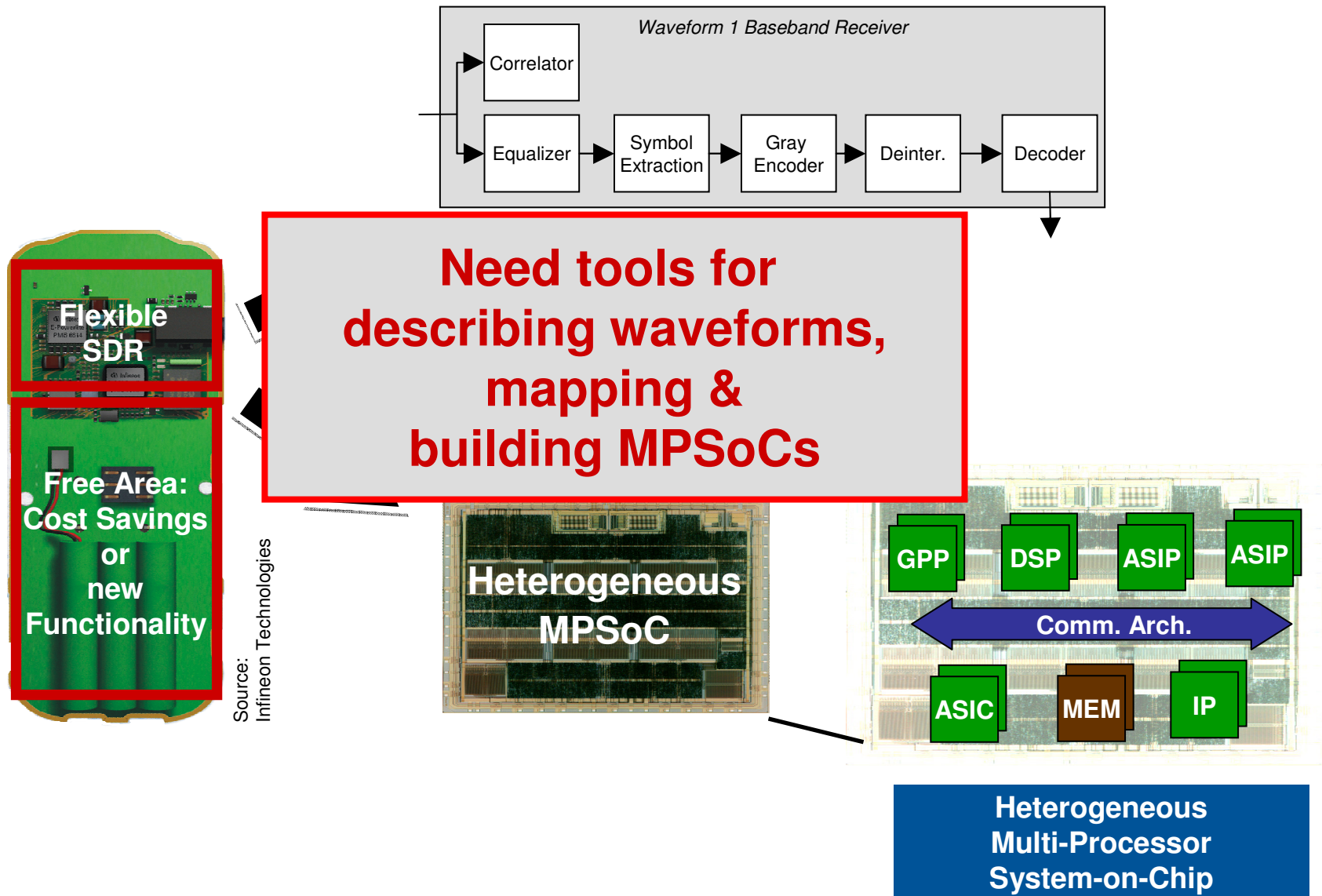
SDR Waveform Development: Towards Tool Assisted Mapping And Evaluation In The Nucleus Concept

**V. Ramakrishnan, T. Kempf,
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R. Leupers, H. Meyr**

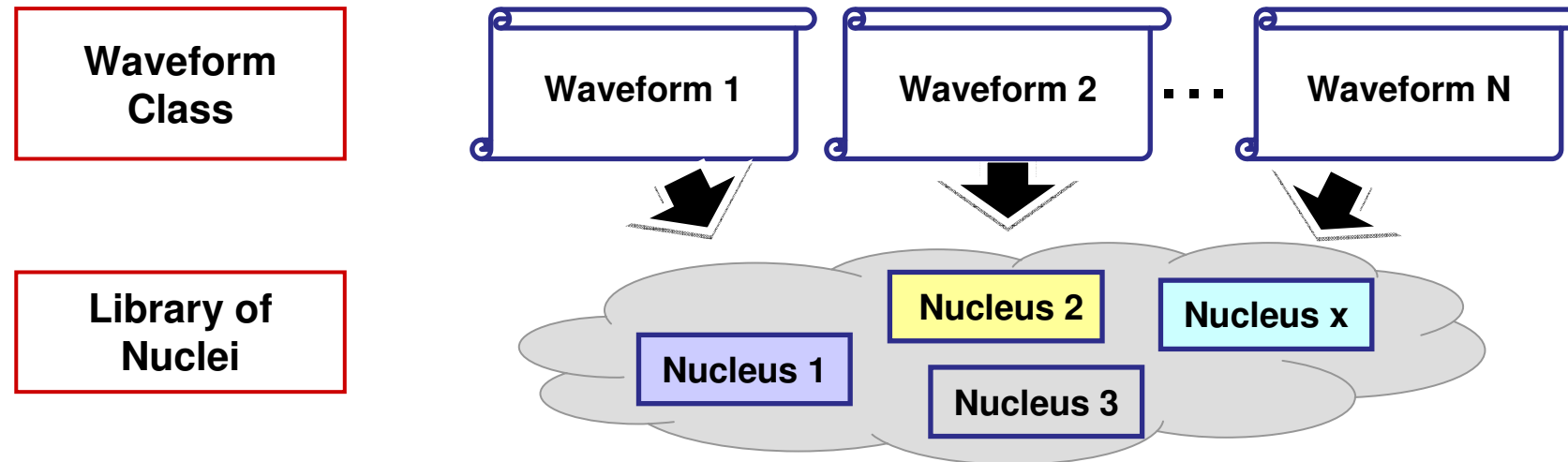
**M. Adrat,
M. Antweiler**



Waveform Application to HW Platform



Nucleus Approach: Concept

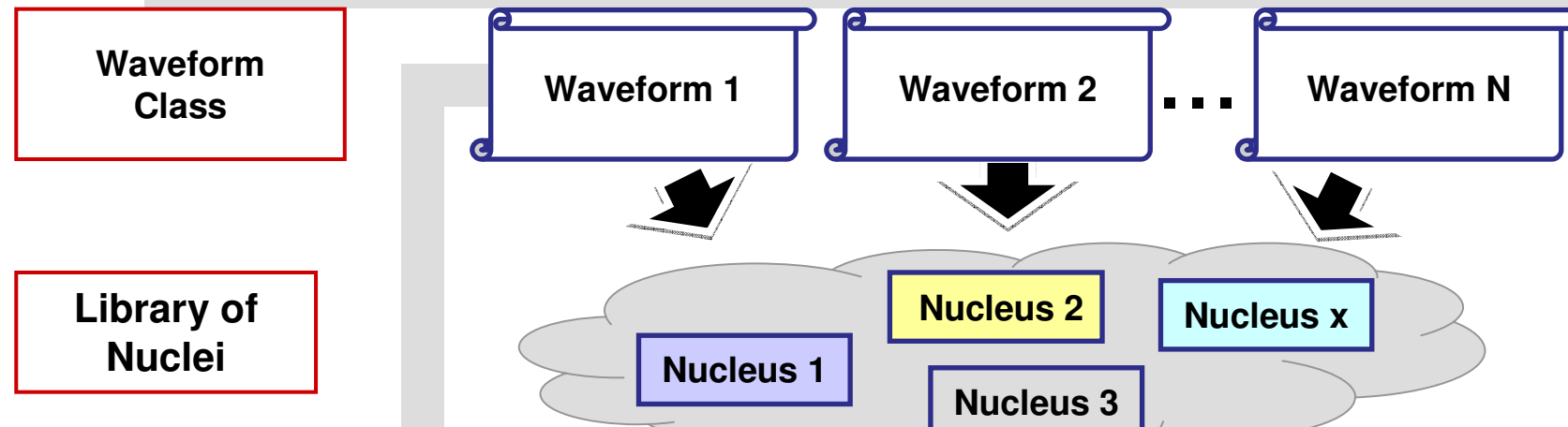


Nucleus

- Critical, demanding, algorithmic kernel
- Captures common kernels among different waveforms
- Not waveform nor hardware specific

V. Ramakrishnan et al.: "Efficient And Portable SDR Waveform Development: The Nucleus Concept", IEEE Milcom Conference 2009

Nucleus Approach: Waveform Development



Goal -> Standardization (Nucleus Library)

- Capture waveform specification using the Nucleus library
- Lead to a waveform development language (WDL)

- **Waveform description composed of**

- Nuclei & Non-Nuclei

- **Advantages**

- Portable and efficient
 - Reusable and interchangeable
 - Fast assembly of new waveform descriptions
 - Interoperability
 - Portability
 - Loadability

Motivation

Mapping and Evaluation Methodology

Tool Assisted Mapping and Evaluation

High-Level Mapping and Evaluation

Conclusions and Future Work

Waveform Development Environment

Waveform
Description

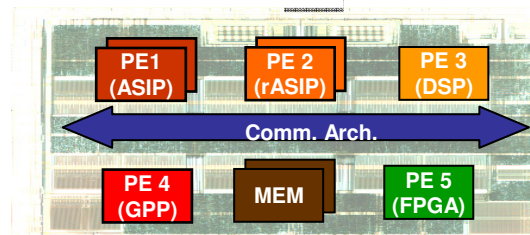
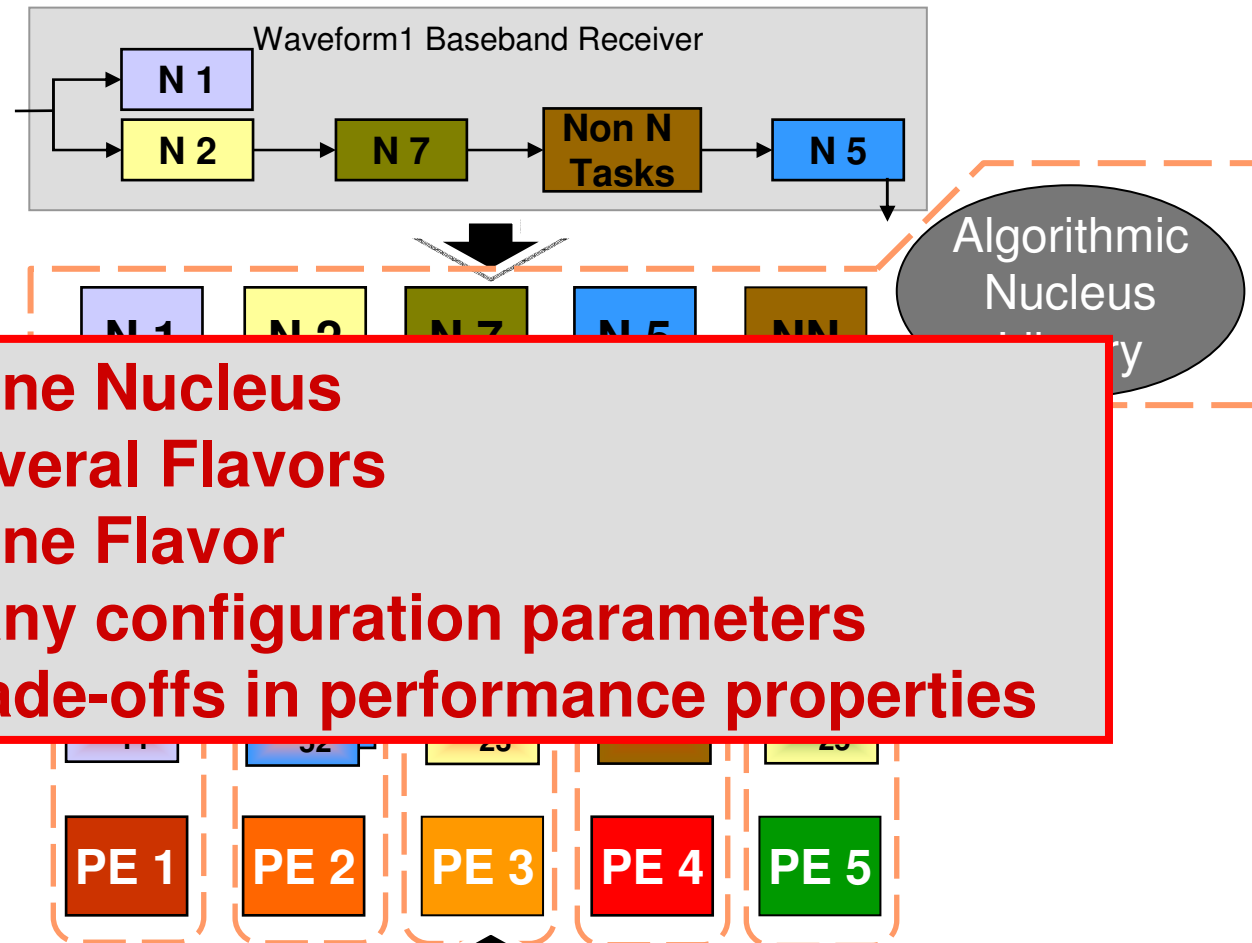
Nuclei

Mapping
&
Evaluation

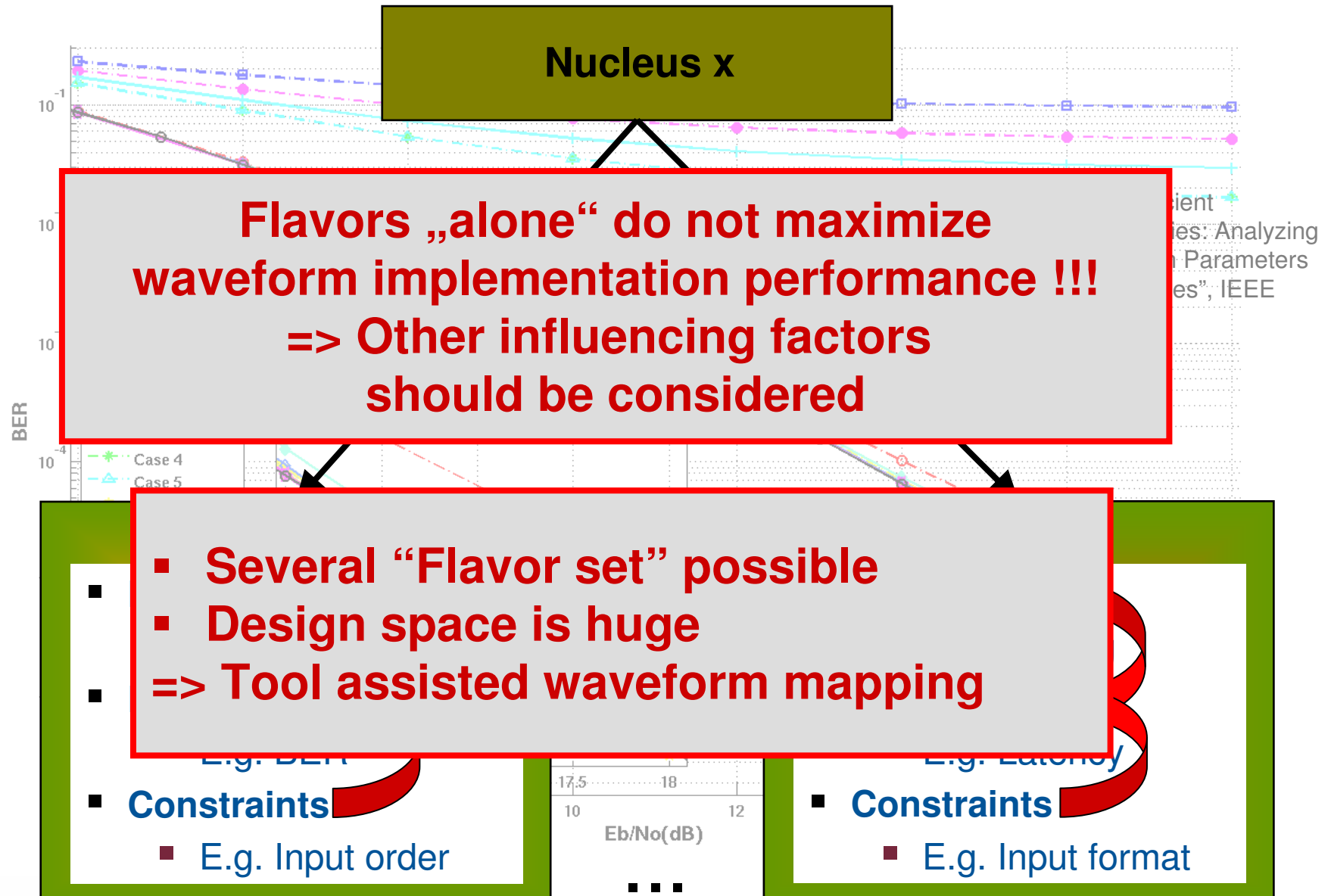
Board
Support
Package

PEs

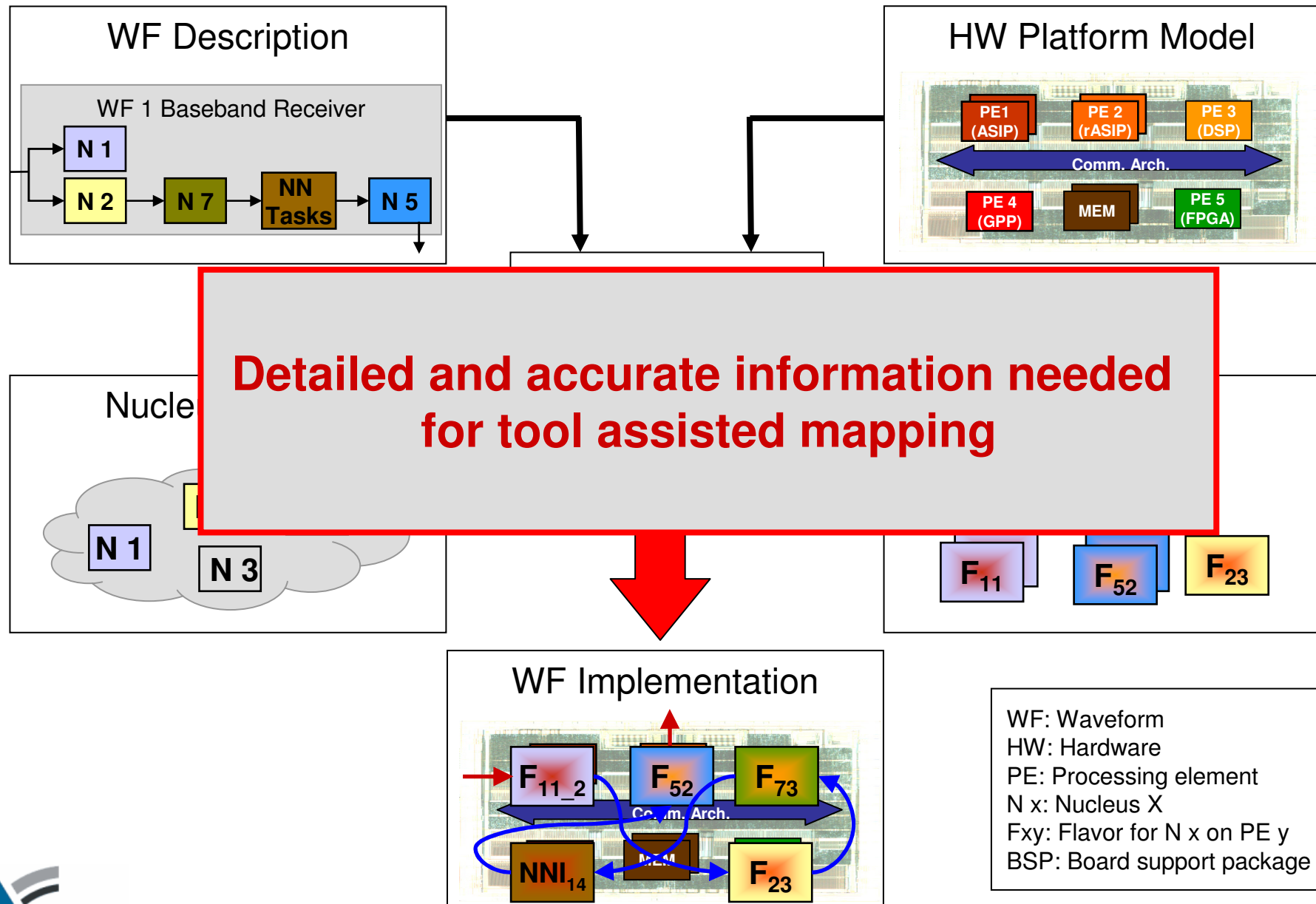
HW
Platform



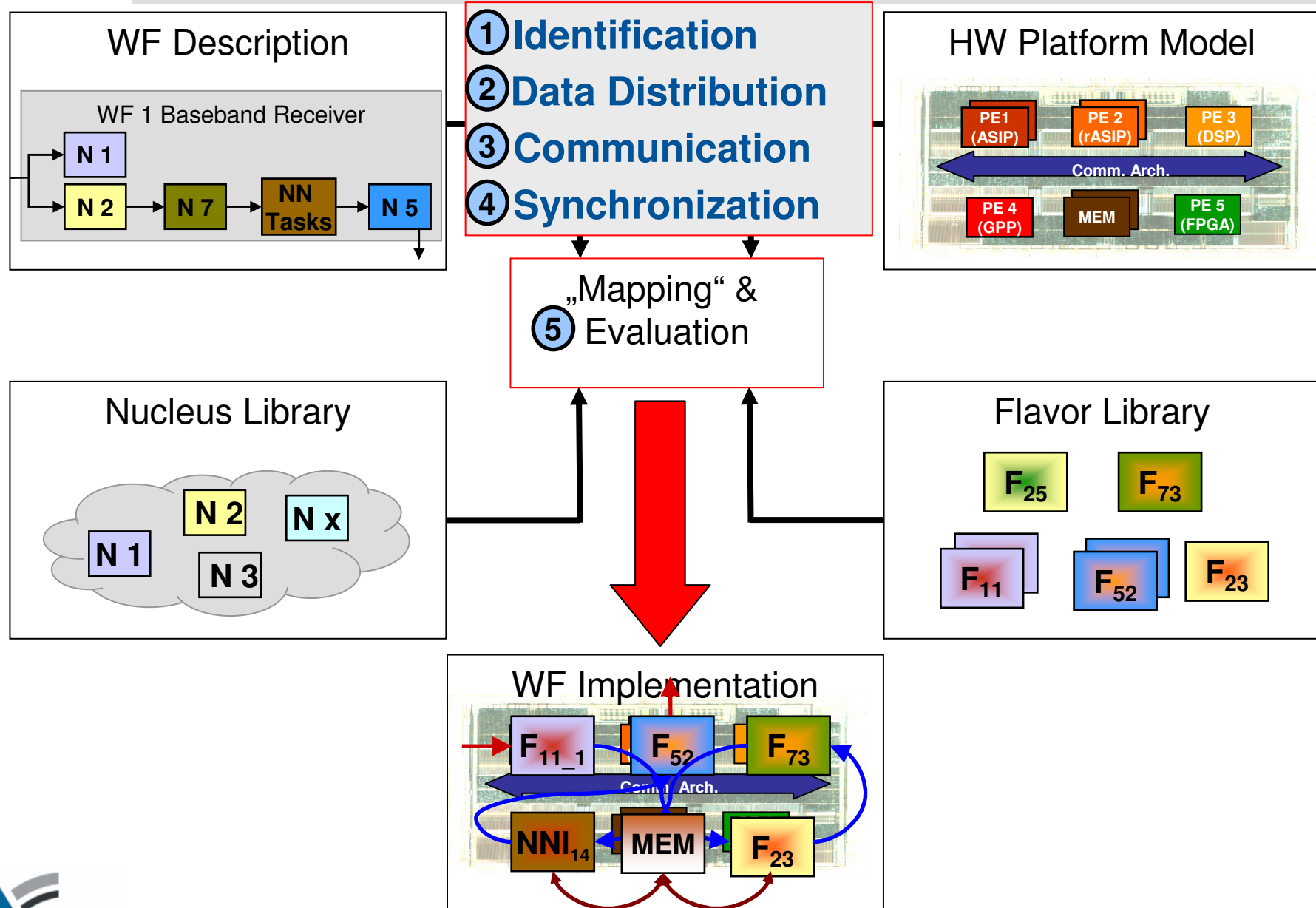
N x: Nucleus X
F_{xy}: Flavor for N x on PE y
NN: Non-Nuclei
NF: Non-Flavor
PE: Processing Element



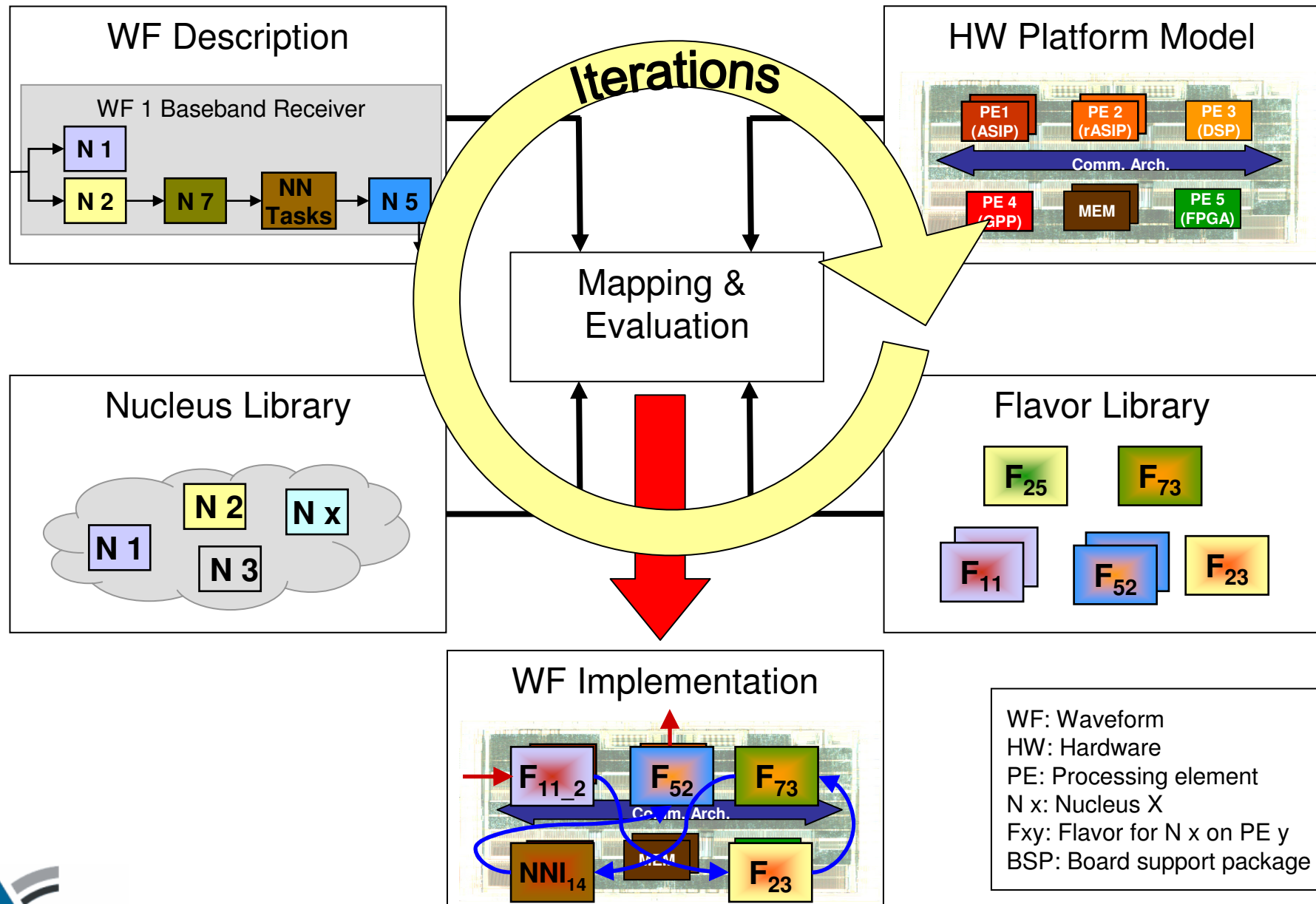
Mapping-Goal and Key Information Sources



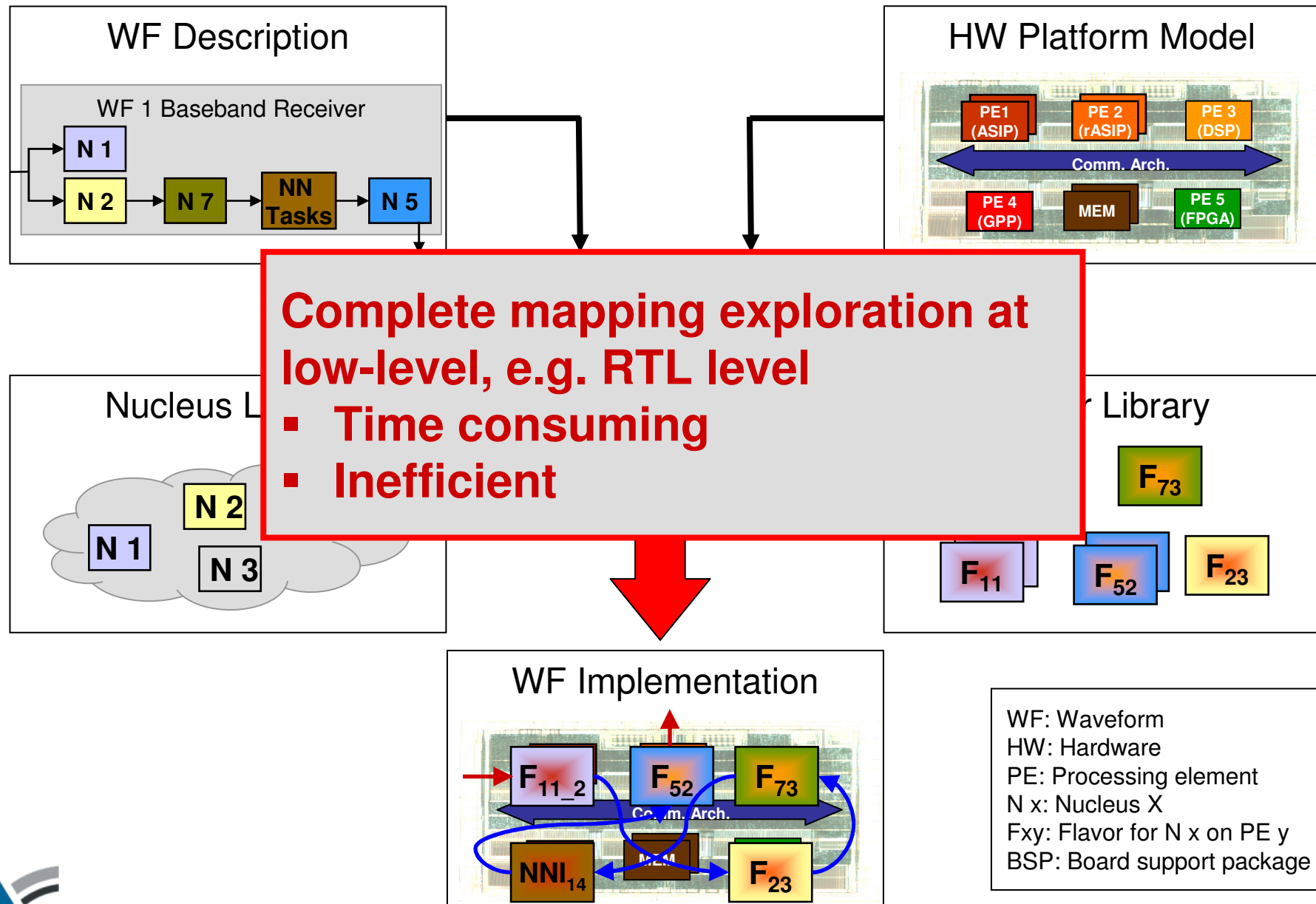
„Mapping“ and Evaluation



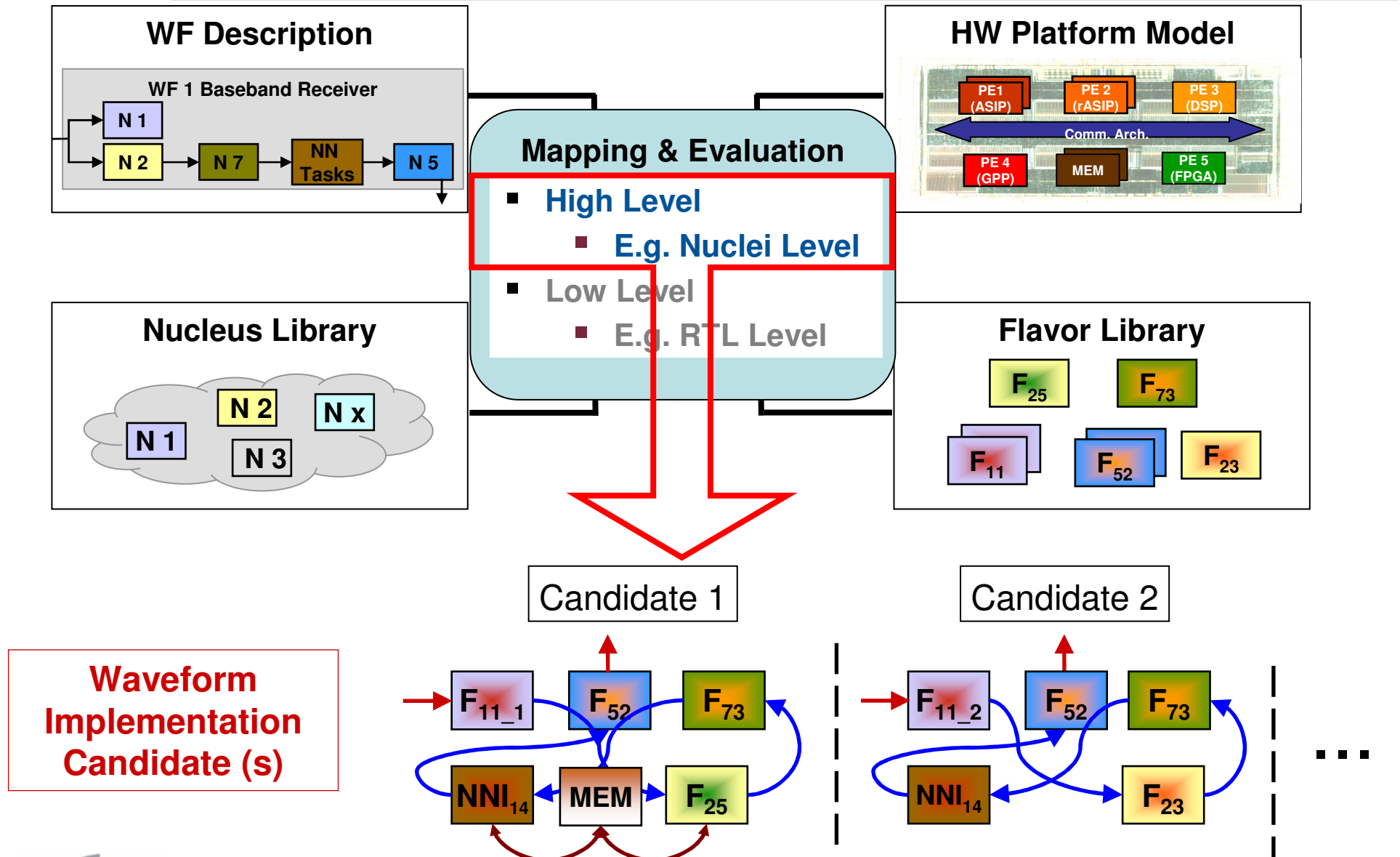
Mapping and Evaluation Overview



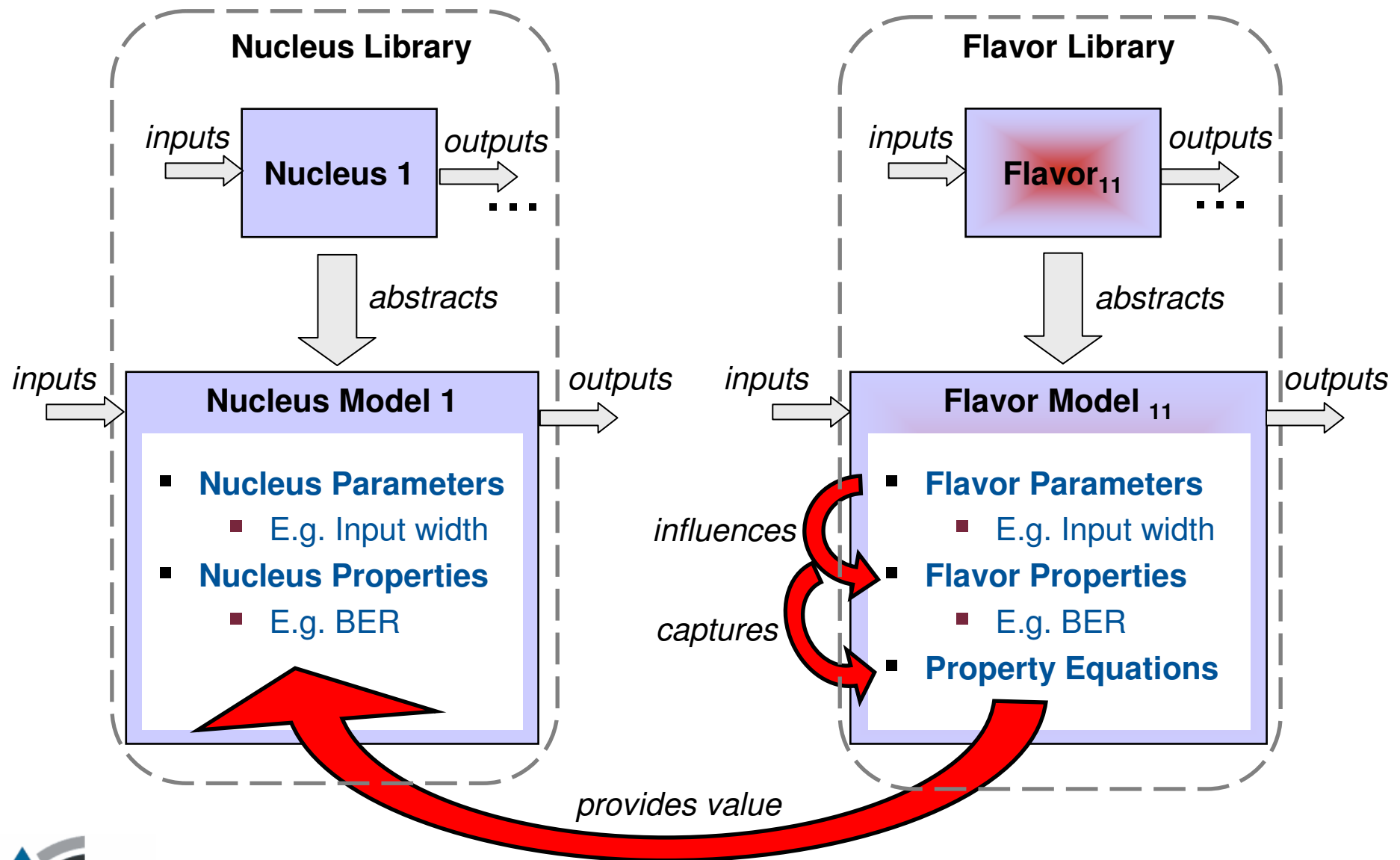
Mapping and Evaluation Overview

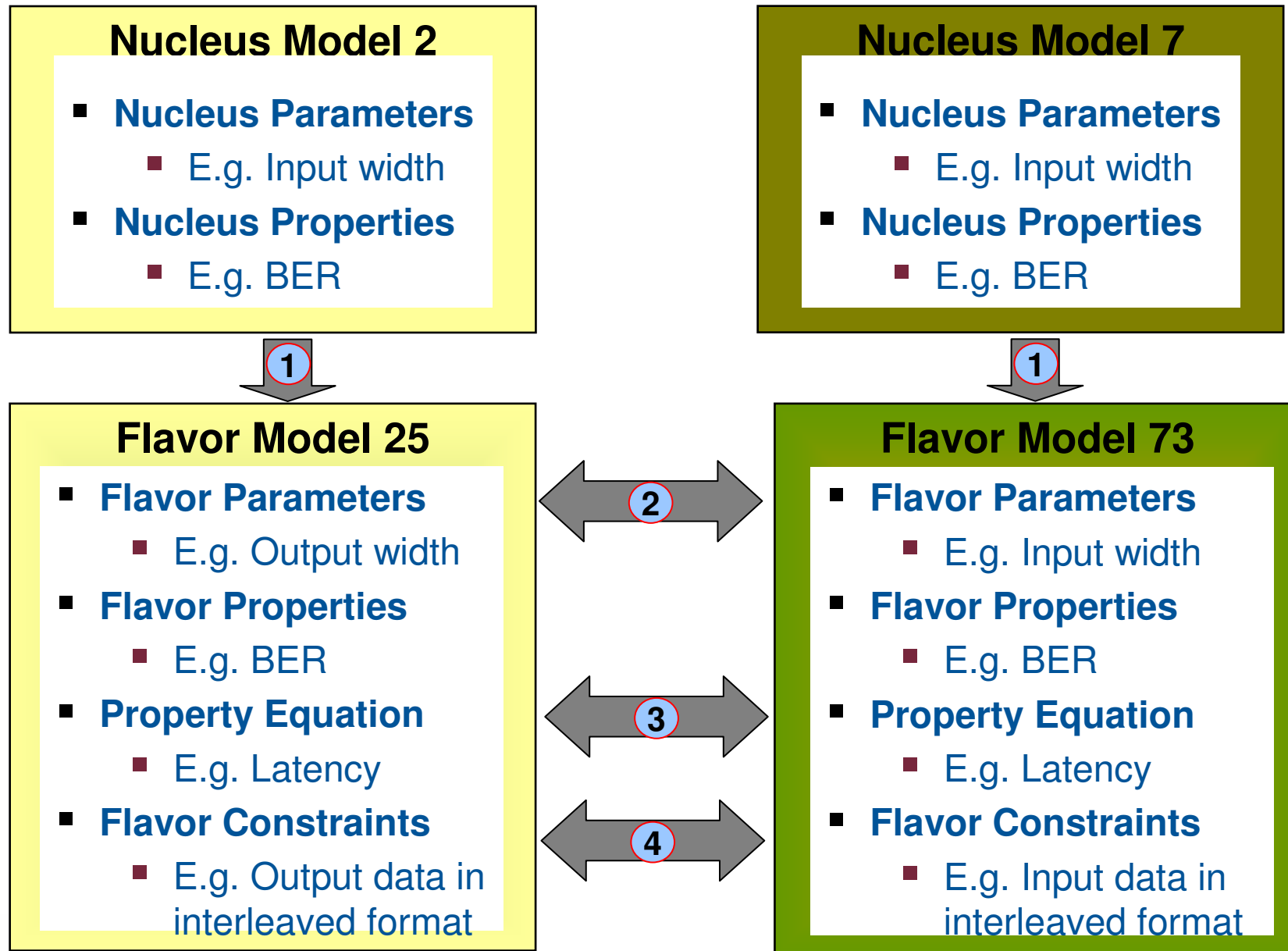


High Level Mapping and Evaluation

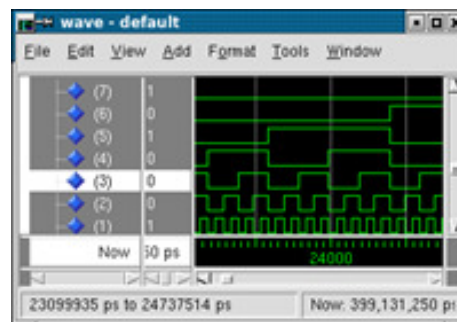
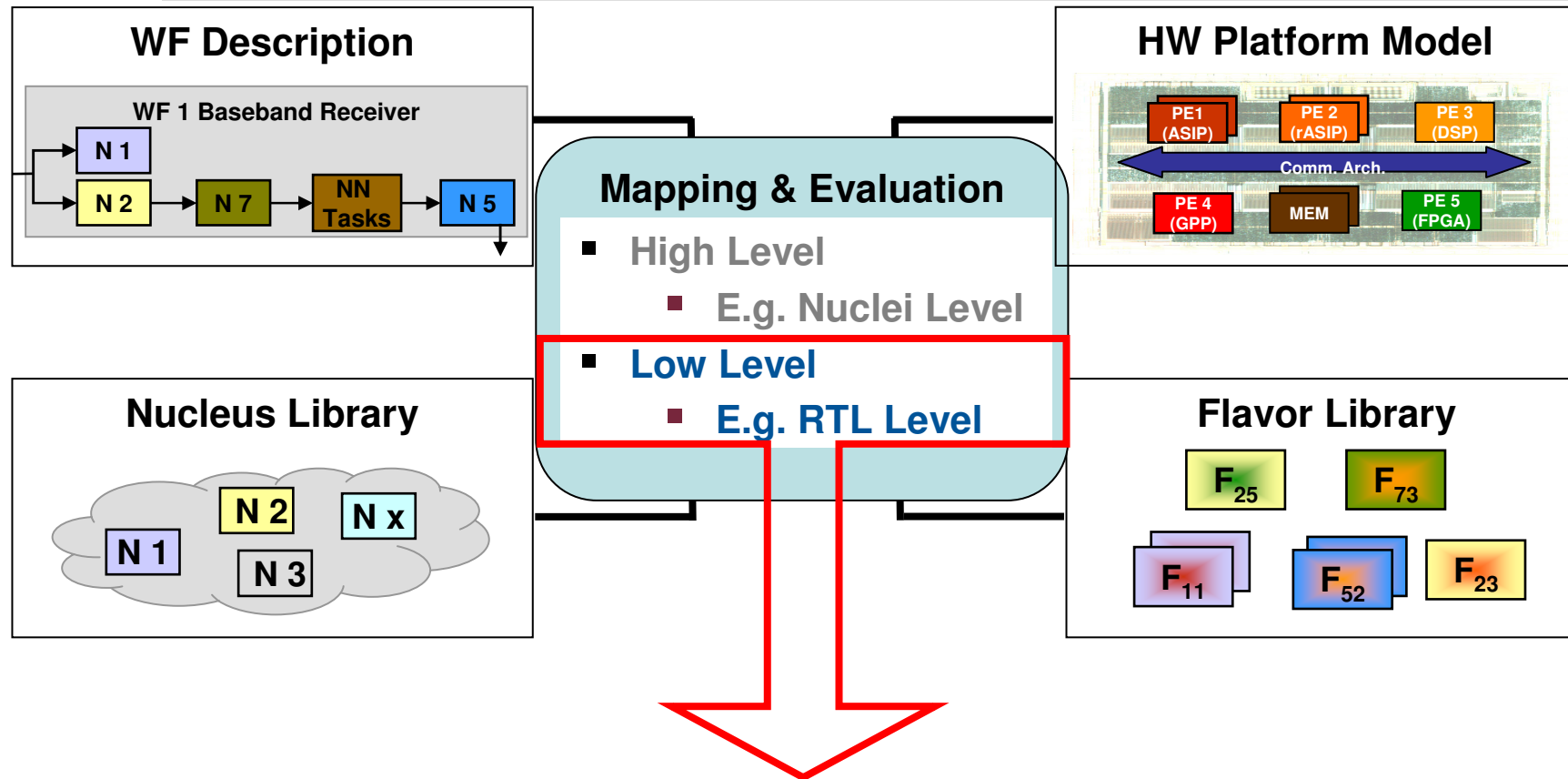


Relation: Nucleus Model and Flavor Model

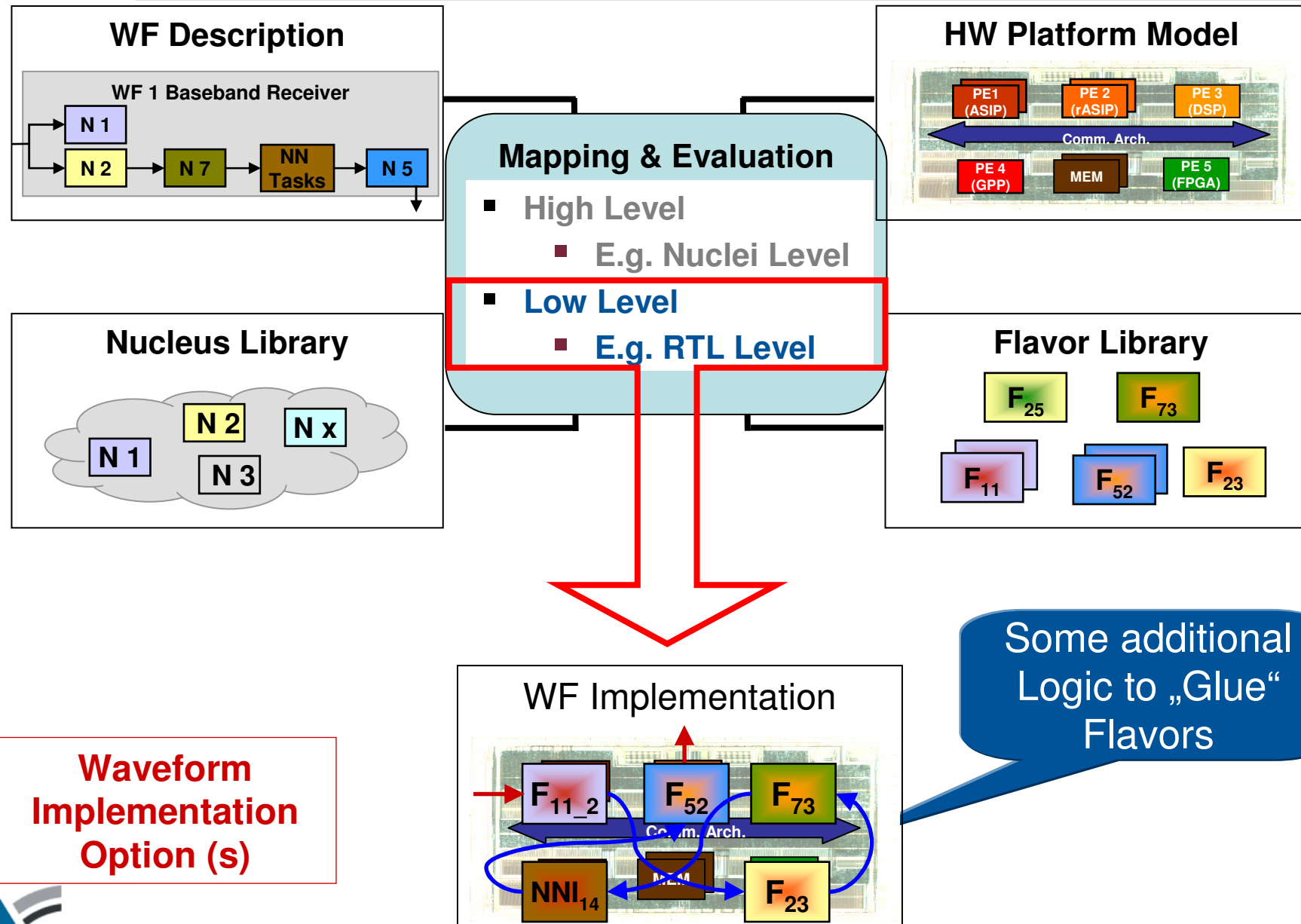




Low Level Mapping and Evaluation



Low Level Mapping and Evaluation



- **Conclusions**

- Mapping and evaluation methodology
- Information sources for tool assisted mapping and evaluation
- High-level mapping and evaluation

- **In Paper**

- Details on the information sources for a tool
- An example for each information source
- Structured assembly of information for input to tool, e.g. XML

- **Work-in-progress**

- A mapping and evaluation tool for the Nucleus project

Questions?

Thank you