... in a nutshell

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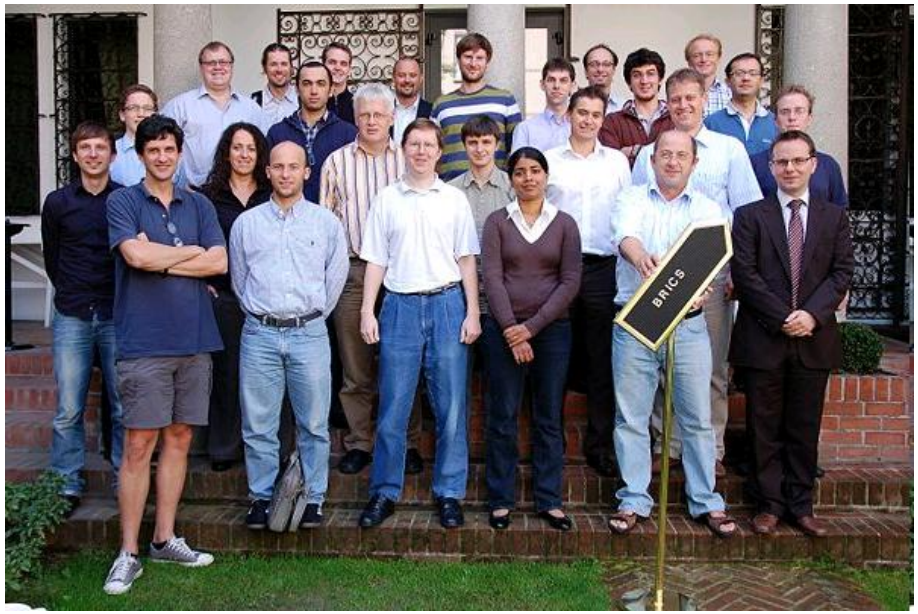
BRICS consortium

KUKA

GPS Gesellschaft für Produktionssysteme

Fraunhofer IPA Institut Produktionstechnik und Automatisierung



KATHOLIEKE UNIVERSITEIT LEUVEN

Universiteit Twente
de ondernemende universiteit

University of Bergamo

University of Applied Sciences Bonn-Rhein-Sieg

Objectives

BRICS wants to achieve a breakthrough in the design of

new robot systems for research, education and industry

by offering design tools and software building blocks,

which allow reducing the development time by a magnitude.

State of the Art

- hardware for robotics research is highly proprietary; few harmonisation attempts to harmonise control interfaces and APIs and to assure interoperability
- interoperability of the software of different robot vendors and research institutes is close to zero, although at the same time there is a lot of very useful functionality available.
- software development
  - code or robot designs are seldom re-used, not even in the many open source projects that exist
  - current commercial IDEs for engineering systems have close to zero support for the functionality and the architectures required for advanced robotics systems
  - no provider of a complete vertically integrated software stack for robot control from the real-time hardware interfacing via the operational and strategic planning-sensing-control levels up to the human-machine interfaces for end-users

BRICS' strategy

Robot application development today is ingenious "artwork"

Topics

Formal concept of development process

- Models
- Interfaces
- Reusable components
- Design patterns
- Architecture & middleware

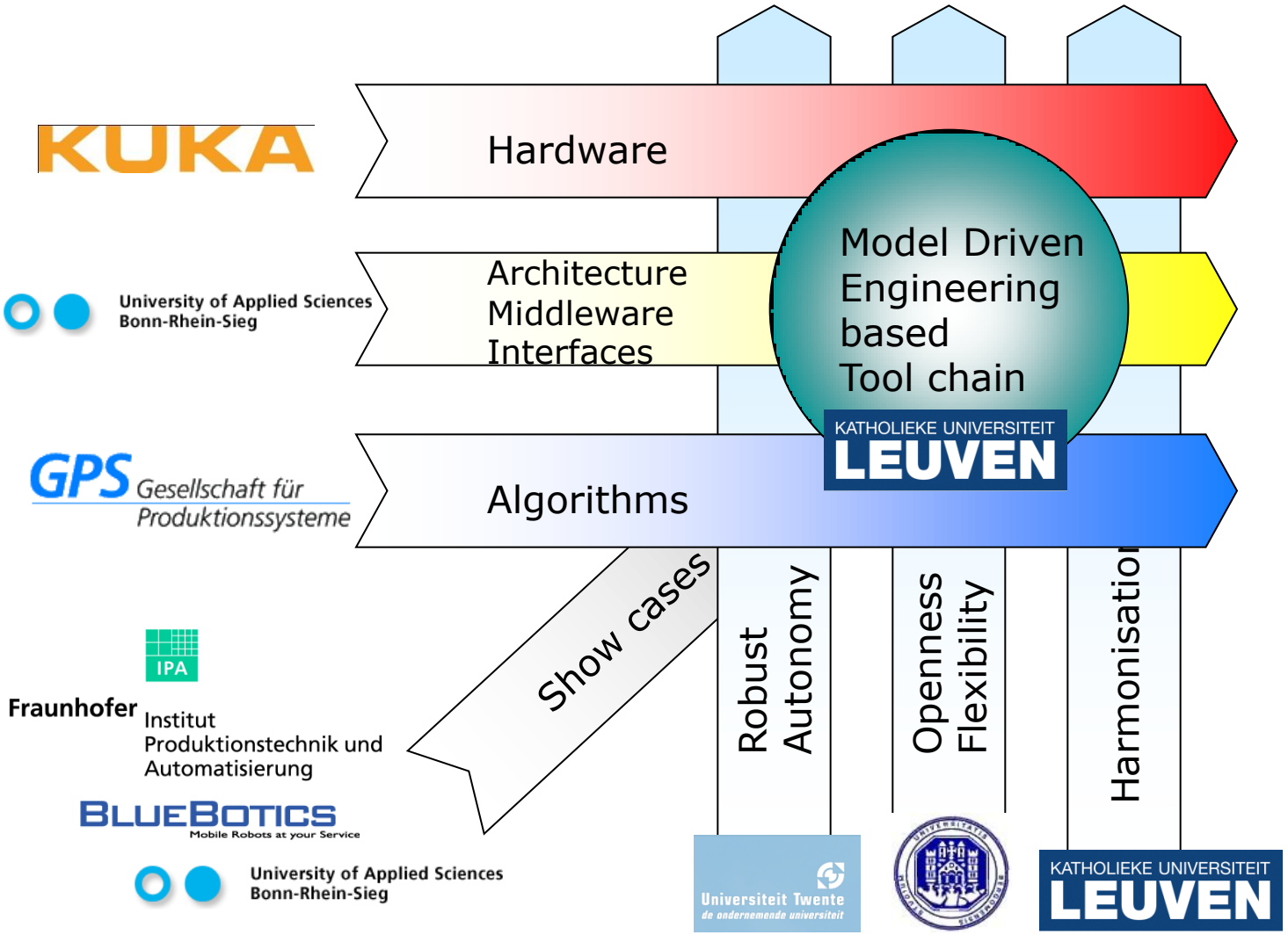
Tools & Development environments

- Metrics
- Performance evaluation & comparison
- Benchmarking

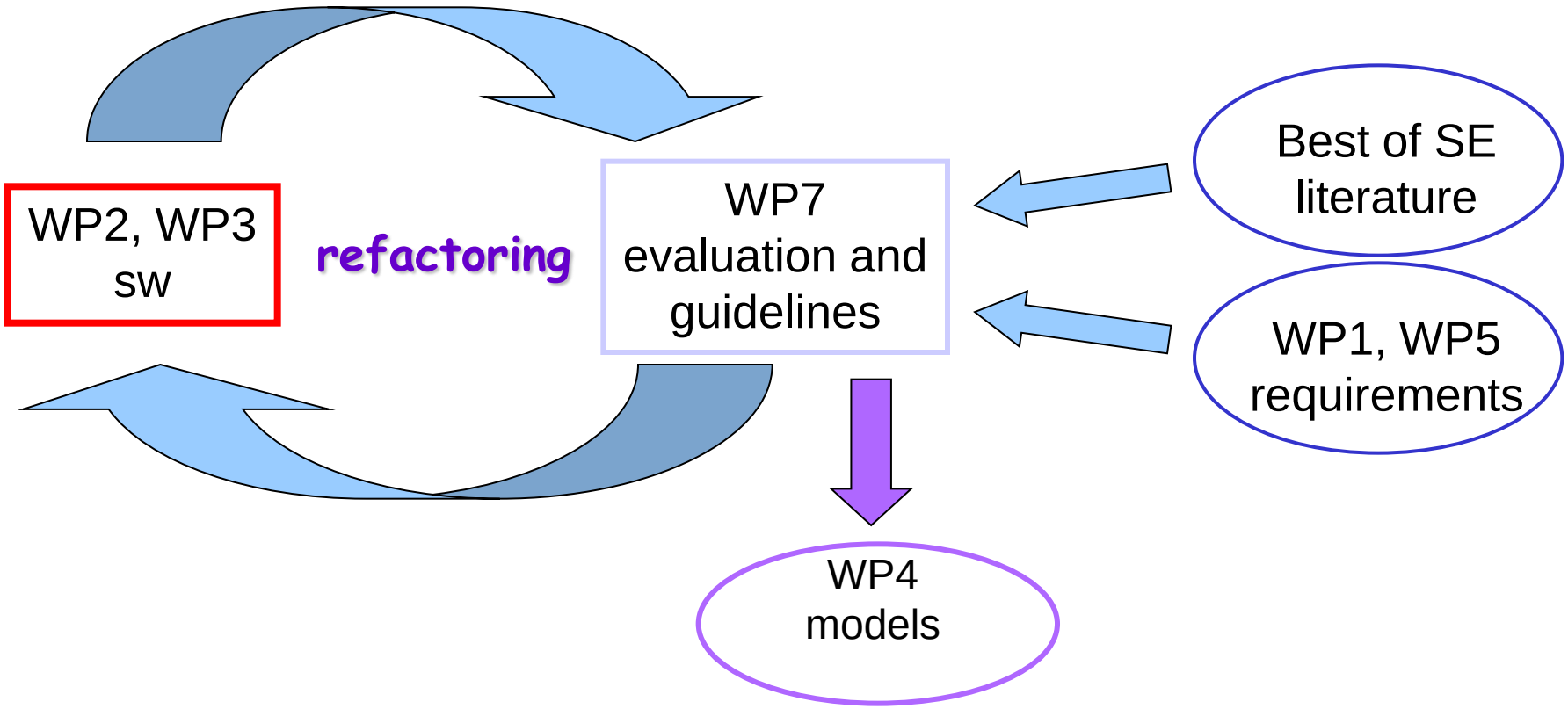
Methodology

Formalized process/ Best practise software/ harmonized interfaces

Concepts and Responsibilities



Highlights – Openness, flexibility



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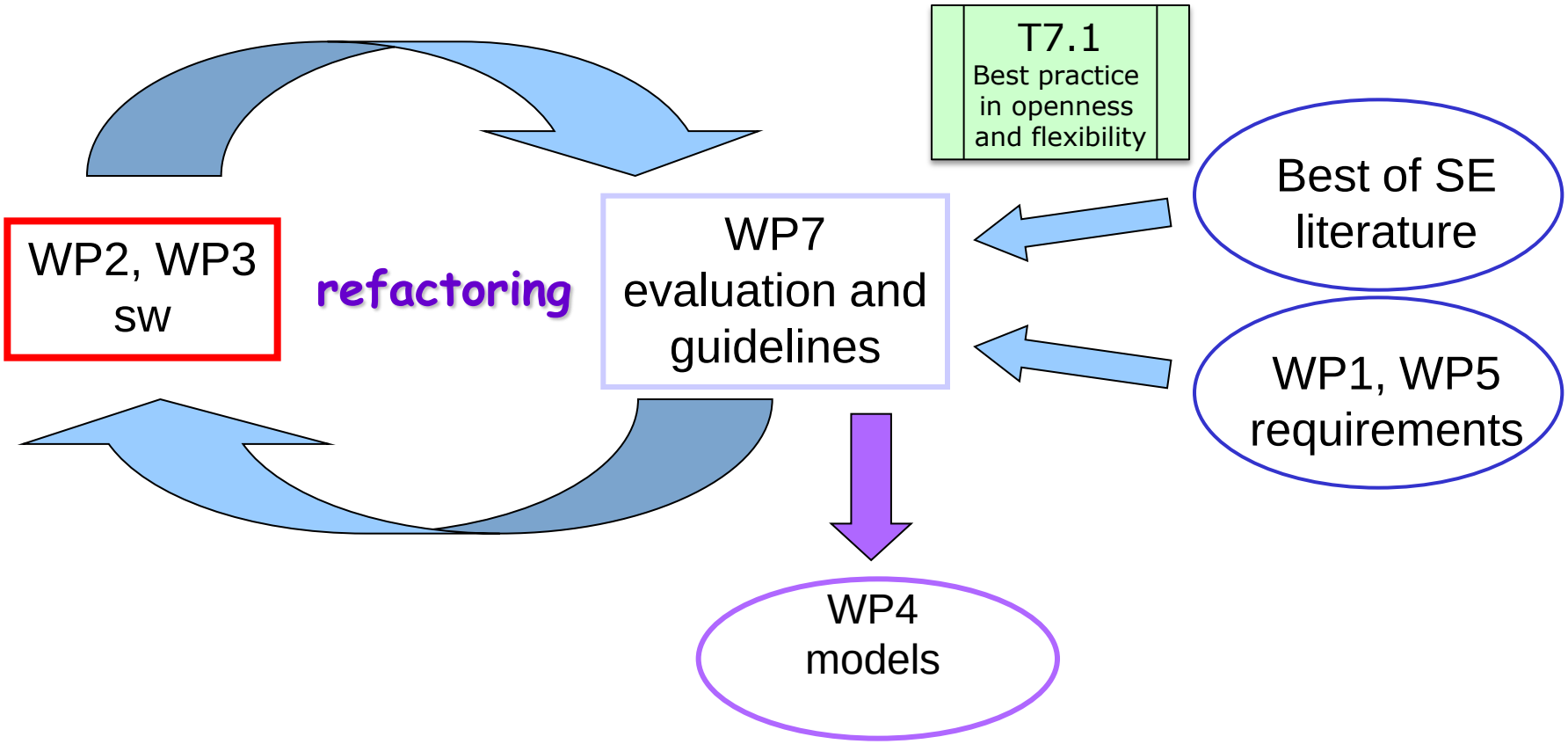

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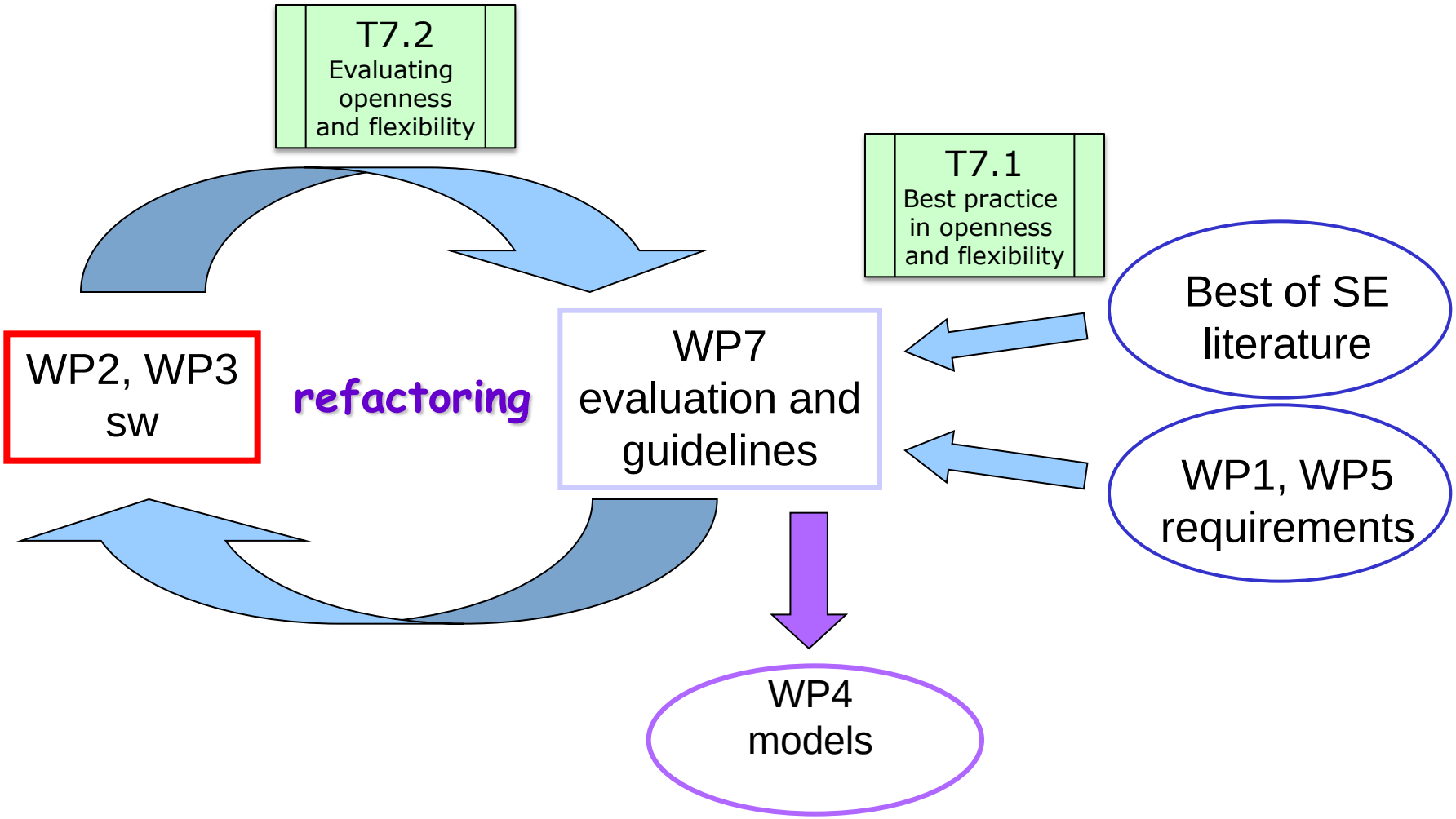

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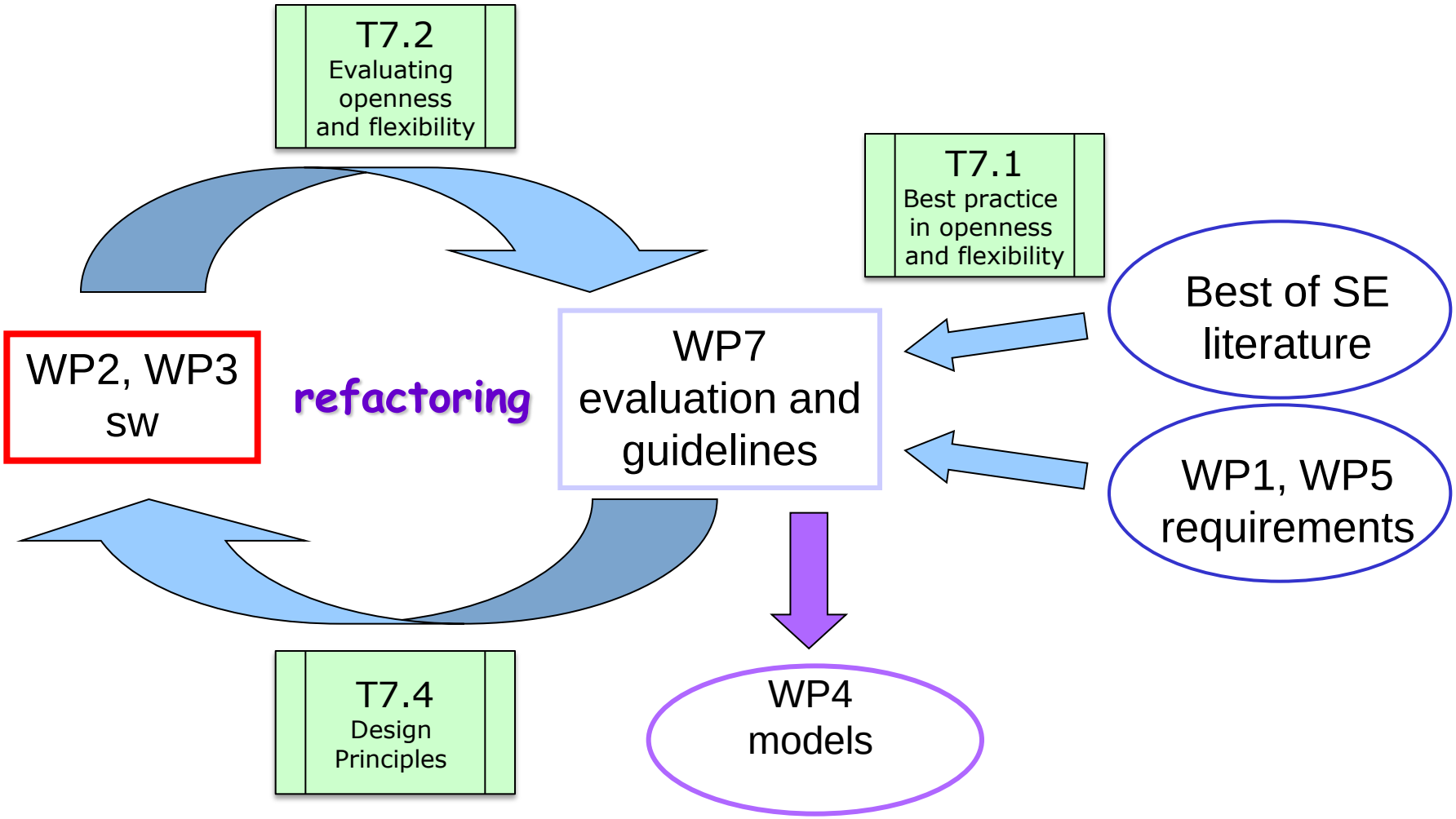

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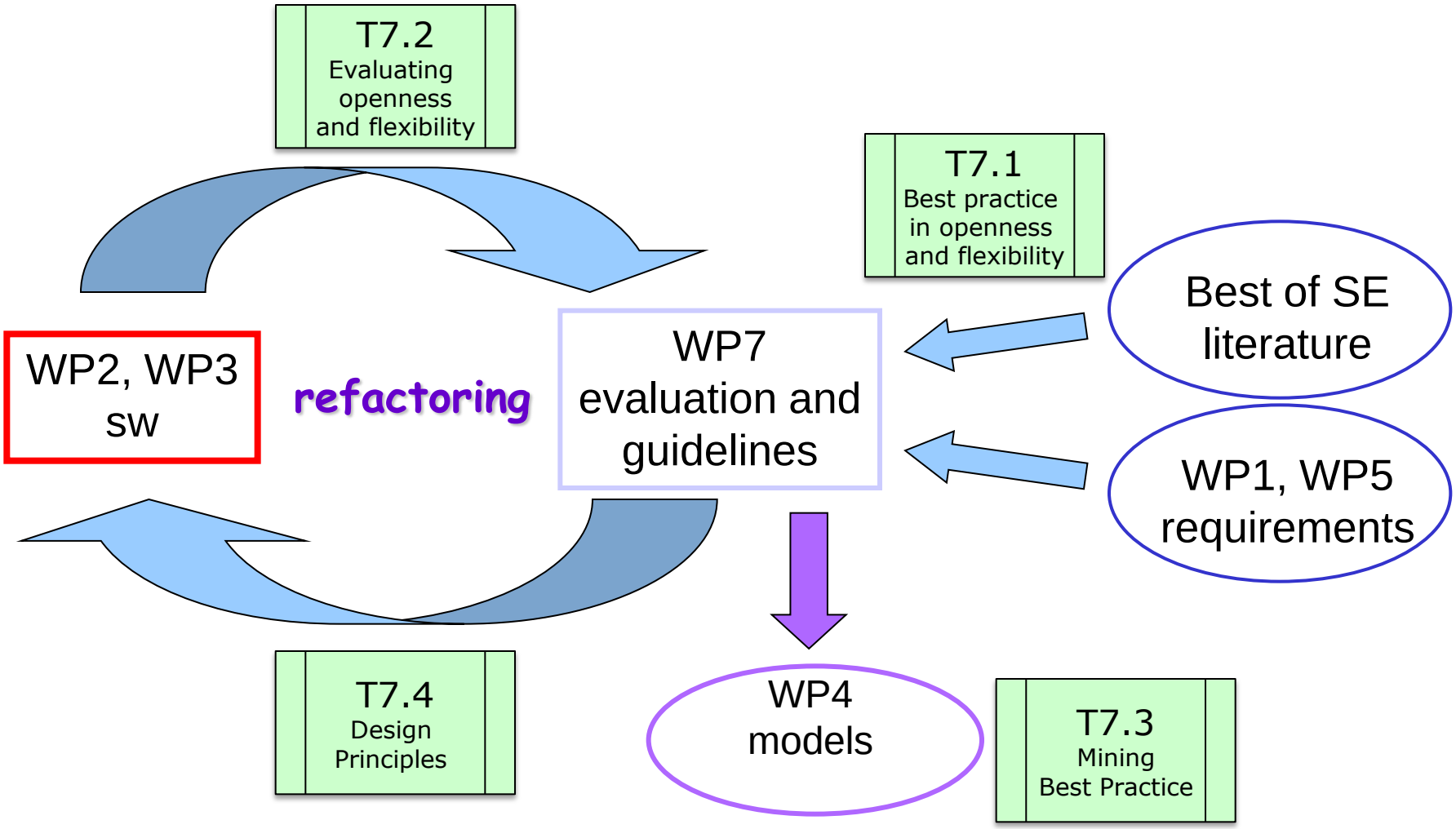


Task forces

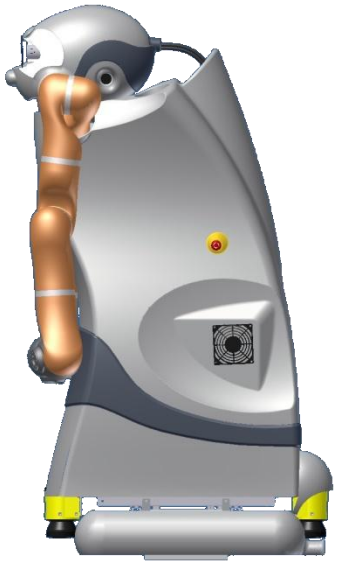
- BRICS Component Model
  - Objective:
    Develop a meta component model, which subsumes existing component models of other frameworks and offers translators/mappers to the component models

- Mobile Manipulation
  - Objective:
    Extend BRICS-MM library to a full vertical software stack including dynamics and control aspects and generate examples and show-cases for research camp.

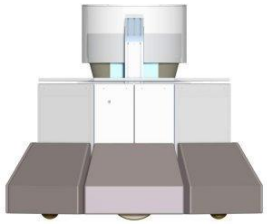
BRICS' experimental platforms

KUKA eduBot

DESIRE
Research Platform



KUKA omniRob



Bluebotics
mobile base

IPA Care-O-Bot 3

BRICS Reach-out instrument: Research Camps

- Choose a topic for identifying best practice algorithms, e.g. Mobile Manipulation, 3D Perception and Modeling, Robust Navigation
- Invite best Ph.D. students AND PostDocs from all over the world to an inspiring location
- We will provide
  - an inspiring working environment
  - travel grants to get to this inspiring working environment (1250 EUR for European students, 2000 EUR for international students)
  - the latest and coolest pieces of robot hardware in mobile manipulation
    table top mobile manipulators designed and manufactured by a European robot manufacturer especially for education and research in mobile manipulation
  - a DVD with best practice software for mobile manipulation and 3D perception and modelling
  - a fast Internet access if the software on the DVD is insufficient
  - two typical mobile manipulation tasks
- We expect in return
  - a competitive solution to the given tasks either using the provided or self-developed algorithms for mobile manipulation demonstrated in two competitions on the last day of the research camp
  - critical feedback and revisions of the provided hardware and software

DVD “Best Practice in Robotics”

Thank you for your attention!

Questions?