Information Society Technologies

ARTIST2 – Year 1 Review

Grenoble, October 3rd-4th, 2005

Activity

Platform: Compilers

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Outline of the Presentation

Industrial Needs and Experience

Year 1 Activities

- Achievements & Ongoing Work
- Interaction and Building Excellence Between Partners
- Management Perspective

18 Month Perspective

- Work planned for the next 18 months
- Significant events or achievements expected

Industrial Needs and Experience

- **ARTIST2 Interaction with Industry**
  - 3 out of 7 cluster partners are from industry (STM, ACE, Absint)
  - Industrial compiler system CoSy selected as primary platform
  - Academic partners have tight industry cooperations beyond ARTIST2, e.g.
    - *Aachen – CoWare*
    - *Saarbrücken – Absint*
    - *Dortmund - ICD*

- **Industrial Needs**
  - Compilers are key components in embedded system HW platform design
  - Major players (e.g. Nokia, Infineon, STM) adopting compiler-oriented design methodology
  - Unified compiler platform enables more efficient technology transfer
- **Possible Global Impacts of Research Results**
  - Europe has leading role in embedded systems industry, but not in design tools
  - Europe has a leading role in embedded systems compiler research
  - Potential to build/grow European system-level design tool industry and to support European system and semiconductor houses

Year 1 activities

Achievements & Ongoing Work

- **Brief State of the Art**
  - Currently very fragmented compiler platform landscape (see also HiPEAC)
  - Consequently: fragmented R&D activities in academia and industry, few opportunities for direct technology exchange and transfer
- **Achievements in Year 1**
  - Review of options for common compiler platform (e.g. gcc, CoSy, SUIF, …)
  - Selection of CoSy (ACE) as primary platform suits needs of most partners
  - Special ARTIST2 CoSy research license negotiated with ACE
  - Formation of "mini-clusters" (2-3 partners) focusing on specific platform aspects
- **Ongoing Work**
  - Platform provider ACE gives extensive support and training
  - Formation of new, and strengthening of existing platform cooperations, e.g.
    - *Aachen – ACE: Efficient C compiler generation*
    - *Absint – TU Vienna: Program analysis generators*
    - *ACE – STM: Inter-procedural optimization framework*

Year 1 activities

Interaction & Building Excellence

- **Interaction Between Partners**
  - Get together leading European R&D teams
  - Common review of compiler platform state-of-the-art
  - Two global synchronization meetings (3rd scheduled for Nov 2005)
  - Numerous "mini-cluster" level meetings in year 1
- **Building Excellence**
  - Leverage each other´s results for more efficient R&D
  - Involve industry partners for more efficient results exploitation
  - Intensify contacts to related research communities
    - *E.g. compiler platform activities in HiPEAC Network of Excellence*
  - Teaching activities
    - *E.g. common compiler course at ALARI (Aachen, Dortmund, ACE)*
    - *Embedded system design textbook (Dortmund)*
  - Conference organization
    - *E.g. organization of SCOPES workshop series (Dortmund, Aachen)*

SCOPES 2005

HiPEAC COMPILATION ARCHITECTURE

Università della Svizzera italiana
ALaRI
Advanced Learning and Research Institute
Education for leading-edge information technologies in Embedded Systems Design

Year 1 activities

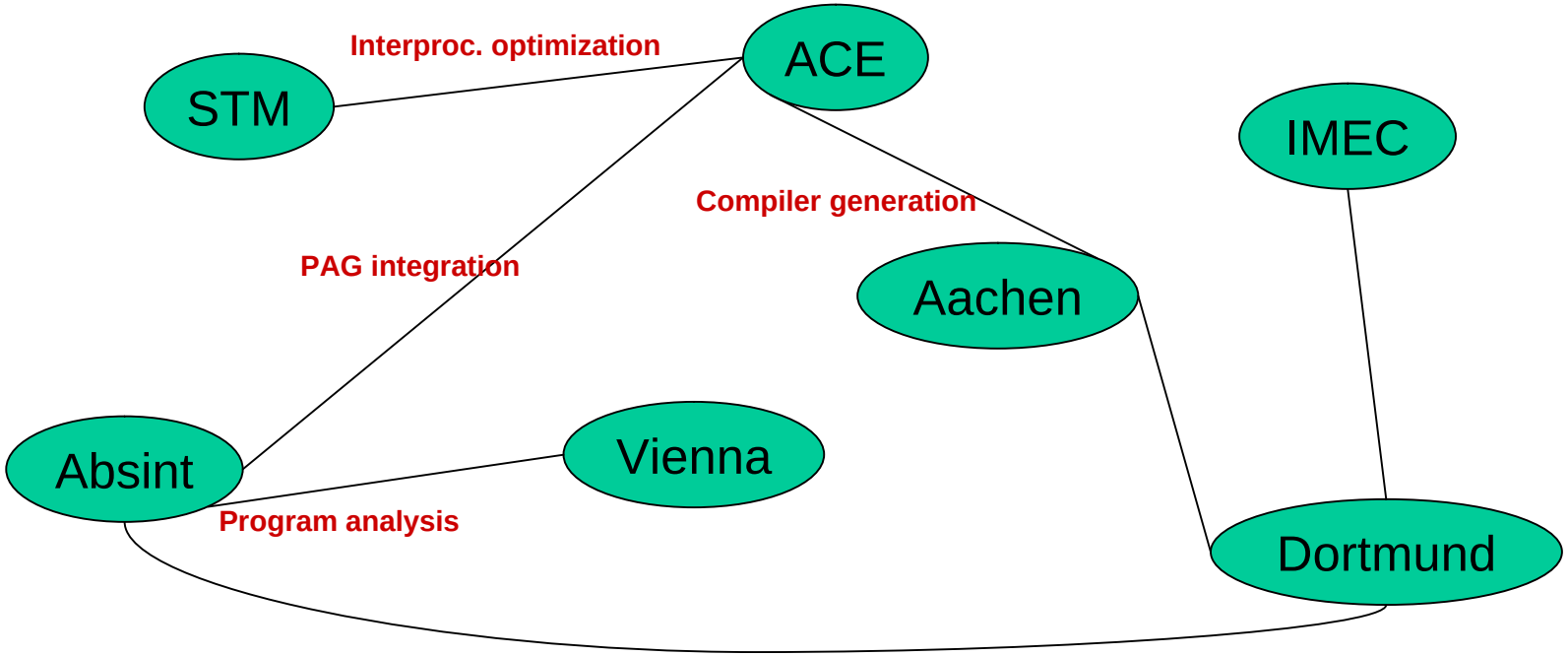
Management Perspectives

- **What worked well**
  - Cluster team structure (core and affiliate) established quickly
  - Good academia/industry balance avoids “blue-sky” research
  - Cluster meetings permit regular synchronization and information exchange
  - “Mini-Cluster” formation enables meaningful, effective day-to-day cooperations
- **Difficulties encountered**
  - Some late drop-outs and no-shows (e.g. IAR)
  - Difficult initial discussions about primary compiler platform due to different preferences
  - General: too much bureaucratic overhead (reporting/financials) for the level of NoE funding provided
- **Structural changes in the activity**
  - Promote ACE to a core partner of the compiler cluster to enable higher commitment to ARTIST2
  - Look out for more affiliate partners with complementary research activities to cover broader spectrum, e.g. interest signaled by:
    - *S. Glesner, TU Berlin, compiler verification*

18 Month Perspective

Work Planned for the next 18 months

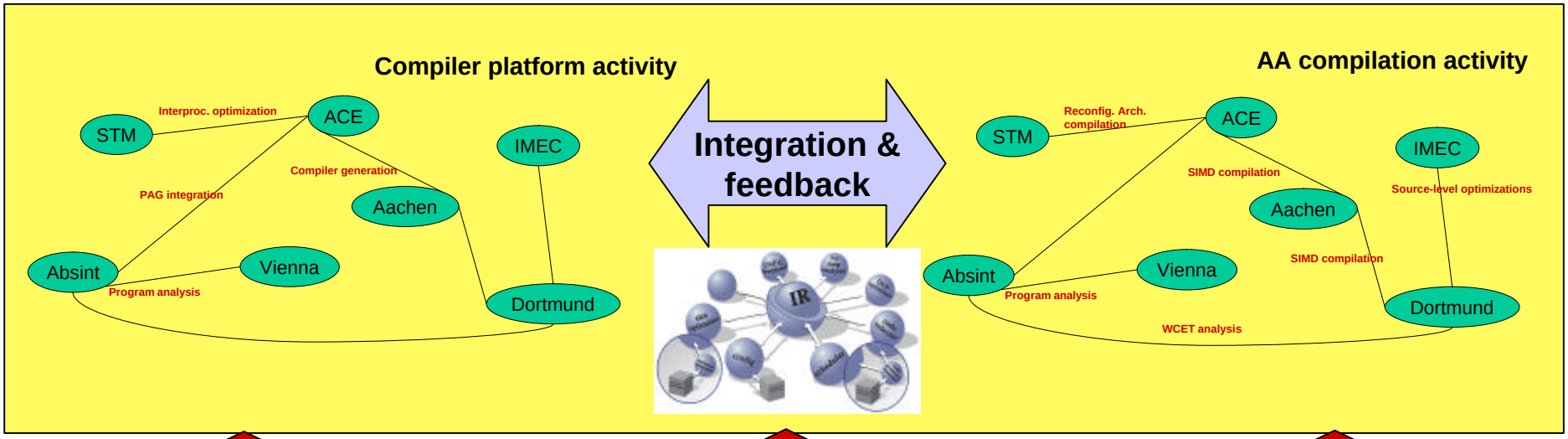
- **Continuation of mini-cluster cooperations**
  - Retain loose coupling, yet a connected graph (see below)
- **Continuation of building excellence**
  - E.g. common compiler course at EPFL, Oct 6 (Aachen, Dortmund)
- **Review of potential new partners´ activities**
- **Next global cluster meeting**
  - Nov 8, 2005 @ ACE, Amsterdam



18 Month Perspective

Significant Events or Achievements Expected

- **Towards Compiler Platform and Architecture Aware Compilation "Ecosystem"**



Inter-cluster cooperations within ARTIST2 (Exec. Platforms)

Dissemination (joint teaching, publications, ...)

Industry cooperations outside ARTIST2