



Séminaire Informatique Haute Performance @ Campus Teratec

**Séminaire n°35 du Jeudi 26 Novembre 2015, 10h, Ter@tec.
NABLA, un DSL pour les algorithmes d'analyse numérique**

Jeudi 26 Novembre 2015, Jean-Sylvain Camier, Ingénieur-Chercheur au CEA, nous présentera le DSL Nabra pour les algorithmes d'analyse numérique.

Voici le résumé de cette présentation qui aura lieu dans la salle Paul Gauguin à Ter@tec, à 10h.

NABLA, un DSL pour les algorithmes d'analyse numérique

Addressing the major challenges of software productivity and performance portability becomes necessary to take advantage of emerging computing architectures.

There is a growing demand for new programming environments in order to improve scientific productivity, to ease design and implementation, and to optimize large production codes.

We introduce the numerical analysis specific language Nabra (∇) which is an open-source (nabla-lang.org) Domain Specific Language (DSL) whose purpose is to translate numerical analysis algorithmic sources in order to generate optimized code for different runtimes and architectures. ∇ raises the level of abstraction, following a bottom-up compositional approach that provides a methodology to co-design between applications and underlying software layers for existing middleware or heterogeneous execution models.

One of the key concept is the introduction of the hierarchical logical time within the high-performance computing scientific community. This new dimension to parallelism is explicitly expressed to go beyond the classical single-program multiple-data or bulk-synchronous parallel programming models. Control and data concurrencies can be combined consistently to achieve statically analyzable transformations and efficient code generation. Shifting the complexity to the compiler offers an ease of programming and a more intuitive approach, while reaching the ability to target new hardware and leading to performance portability.
