

TANGO: Simplify and Optimize Heterogeneity



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New European initiative seeks to “Simplify and Optimize Heterogeneity” of new computing hardware and IT architectures for the upcoming years.

The TANGO initiative, coordinated by Atos, has been launched in January 2016 with the mission to pave the ground for the new world that emerges from the new exploiting possibilities brought by the utilization of new powerful computing hardware offered by customized heterogeneous hardware. The project will follow a path to simplify the way developers approach the development of next-generation applications in the upcoming era of Mobile, Internet of Things (IoT), Cyber Physical Systems (CPS), Wearables, Big Data and High Performance Computing (HPC).

Because the impact of heterogeneity on all computing tasks is rapidly increasing, innovative architectures, algorithms, and specialized programming environments and tools are needed to efficiently use these new and mixed/diversified parallel architectures. The initiative focus is on “Simplification & Optimization of Heterogeneity” to design more flexible software abstractions and improved system architectures to fully exploit the benefits of these heterogeneous platforms, while addressing energy optimization at the same time. TANGO will help controlling and abstracting underlying heterogeneous hardware architectures, configurations and software systems including heterogeneous clusters, chips and programmable logic devices while providing tools (such as FPGA, ASIP, MPSoC, heterogeneous CPU+GPU chips and heterogeneous multi-processor clusters) to optimize various dimensions of software design and operations (energy efficiency, performance, data movement and location, cost, time-criticality, security, dependability on target architectures).

The project will build key novelties such as **reference architecture and its implementation** that will include the results of the research work into different optimizations areas (energy efficiency, performance, data movement and location, cost, time-criticality, security, dependability on target architectures). Moreover, TANGO will include a **programming model** with built-in support for various hardware architectures including heterogeneous clusters, heterogeneous chips and programmable logic devices. TANGO will create a **new cross-layer programming approach for heterogeneous parallel hardware architectures** featuring (semi-)

automatic code generation including software and hardware modeling. Moreover, TANGO will provide mechanisms that allow control of the heterogeneous parallel infrastructures. The most important outcomes of the project will be released as Open Source.

TANGO considers the creation of a Research Alliance in which it will seek complementary efforts of other research projects, initiatives and IT community organizations to nurture a strong research collaboration, integration and effective promotion of the results.

“TANGO will use the Alliance to get in touch with other relevant initiatives and fellow projects and in the scope of EU Research projects, to propose a common approach to grow these novel technologies and take advantage of potential synergies in order to create attractive outcomes for the Open Source Community.”

Clara Pezuela, Project Coordinator, Atos

The initiative is backed by the European Commission and the first stage of the initiative is financed through the Horizon 2020 Programme, running for 36 months with a budget of 3.199.625 Euros. The initiative is being undertaken by global service provider Atos (Spain) and its subsidiary specialized in HPC, Bull (France); the European company Deltatec (Belgium); and researchers from the University of Leeds (UK); the CETIC - Centre d'Excellence en Technologies de l'Information et de la Communication (Belgium); and Barcelona Supercomputing Center (Spain).

For more information on the initiative contact the coordinator Clara Pezuela (clara.pezuela@atos.net), or visit our website TANGO-project.eu. TANGO is funded by the EC under Grant agreement 687584.