Heterogeneous Hardware & Software Alliance (Heterogeneity Alliance)

This is the Frequent Asked questions on Heterogeneity Alliance

What does it mean H-HW&SW?

The H-HW&SW stands for Heterogeneous Hardware & Software

What is the Heterogeneity Alliance?

The alliance will be a formal association (non-profit & non-legal) formed of different organizations (read below) that will be managed by a governance structure, and will pursue a common objective: influence the H-HW&SW market.

The alliance will focus on all phases of applications for H-HW&SW to enable a new wave of development and execution tools for next-generation applications:

- from design time,
- to enhanced execution,
- to parallel programming,
- and to an optimized runtime in a number of dimensions (energy, performance, data locality and security among others)

What is Heterogeneity Alliance goal?

Heterogeneity Alliance goal is to join efforts of organizations interested in the development of future technologies and tools to advance, and take full advantage, of computing and applications using heterogeneous hardware (H-HW&SW).

Its main goal is to create an association in which anyone interested in the following technological areas (listed below) can collaborate pursuing a common objective:

- founding an association with a common purpose of interaction, discussion and collaboration with other entities involved in any technological field related with the full life-cycle of H-HW&SW ,
- supporting the creation of a common and an extendable set of technologies and tools (assets) around development for heterogeneous hardware, shared as open-source, which can be improved for mass adoption utilizing technologies,
- in which all members will collaboratively take charge of promoting, supporting, and enhancing the assets shared by the Alliance,
- and benefiting from the synergies, opportunities, visibility and relevance that the community around H-HW&SW can generate for their own objectives

Who should be interested? Who can join?

Any third party can join the alliance if they wish to become part of the steering committee that will debate and enhance current technologies for H-HW&SW included under the Alliance.

Also, organizations can take a more relevant role by sharing their own technologies and tools that could complement, extend, improve or collaborate on any of the relevant areas of H-HW&SW.

- Research Projects
- Standardization Bodies and other Technology Associations
- Technology Communities
- Open Source Communities
- Companies
- Other Stakeholders

Why should I care?

Organizations in the field of H-HW&SW should care because:

- H-HW&SW is becoming more and more relevant, and the creation of technologies and tools for H-HW&SW is now starting to ramp up. Thus organizations that are in the business of H-HW&SW, should be interested in knowing about State of The Art and trending topics, and interacting with other market players to participate as an active player developing the market from the very beginning.
- The Alliance main goal is to leverage on the idea of creating a common approach which will help other third parties, like your institution, to promote and advance your technologies under a common and stronger branding.

Why should I join the Heterogeneity Alliance?

- I want to be able to participate in an association that influences/shapes the H-HW&SW market as a relevant player.
- My organization provides solutions for some of the most relevant markets and verticals sectors such as HPC, Parallel Programming, IoT and Big Data and could benefit from modern tools and I want to engage with other potential competitors, partners or customers.

What are the benefits for me?

Participating organizations will benefit from:

- Interacting with other organizations involved in the full life-cycle of H-HW&SW
- Gaining visibility of technologies/tools in the area of H-HW&SW
- Leveraging value in collaboration with other complementary technologies or tools shared in the alliance (common APIs, standards, integrated tools, open source toolbox)
- Gather market intelligence by interacting with competitors or potential partners.
- Creating opportunities, visibility and relevance that benefit from a collaborative approach that leverages synergies among all members and the market.
- You want to benefit from a much stronger ecosystem involving a number of stakeholders in the same technological areas.

How is the Heterogeneity Alliance going to work? What do the Alliance expects from my institution ?

Every institution wants to be part of the Alliance must apply as member. The members will be represented in a General Assembly and can be candidate to the Alliance Board. Each member may decide whether to participate in proposing building blocks to the architecture or to map their solutions to the architecture and provide their reference into the Catalogue of solutions.

The alliance will manage a list of open source assets which will be shared with the community. These assets will be promoted thanks to the collaborative effort of all members of the alliance. All assets will remain under the control of their owners, but they will agree to collaborate to decide future extensions or evolutions to meet the vision and interest of the alliance.

The alliance will have an Alliance Board as the main governance body which will be in charge of the supervision of use of the assets shared in the Alliance and related decision making.

- deciding technical strategy and potential roadmaps of technologies and tools shared by the alliance,
- seeking collaboration with new technology areas,
- promotion of the alliance and its assets

The alliance will have periodic meetings in which all members can interact to:

- decide potential evolutions of technologies included,
- decide new fields and areas of interest,
- decide and coordinate promotion and dissemination activities,
- approval of new members

The alliance is in the process of selecting the scope of "Working Groups" that will be responsible for defining the different technical areas of the alliance and the asset catalogue.

An important aspect of the alliance activities will be promotion of its assets to leverage interest and engagement with other communities and potential adopters. This will be carried out by all members, full or associates.

What are the Technical Sinergy Contexts in which members can collaborate with the Alliance?

Potential areas in which stakeholders can have interest for joining the alliance are listed below, but are not limited to the list. Technologies have been grouped in layers to simplify its interaction, but other layers will be added as the scope grows.

- **Layer 1:** includes technologies for designing and creating applications for HWW like Programming Models, design and modeling tools, code optimization tools
- **Layer 2:** includes all middleware technologies including application life-cycle, monitoring and assessment of HWW, scheduling and allocation of tasks, optimization engines, etc.

- **Layer 3:** includes technologies and emulators that deal with different underlying infrastructures of HWW at two levels: Macro level –Clusters, including distributed network and data management; and Micro level –Heterogeneous Parallel Devices (HPDs), including memory hierarchy management.

How can I join the Alliance?

To become a member, you must fill a form in the Alliance web site: http://heterogeneityalliance.eu/node/501 Your request will be validated by the Alliance Board and approved. Your former approval of an agreement is required beforehand you submit your request. Once you were a member you can start to participating in Alliance activities and registering assets in the Catalogue.

Are there any other Associations in the Heterogeneous hardware field?

Yes, there is:

- **HSA (Heterogeneous System Architecture) Foundation -** http://www.hsafoundation.com, which is a not-for-profit consortium for SoC IP vendors, OEMs, Academia, SoC vendors, OSVs and ISVs whose goal is to make it easy to program for parallel computing. But this is mainly for hardware, not for software development lifecycle.
  The main differentiation point is that H-HW&SW does not focuses hardware, but in how heterogeneous hardware in general can be used, in the full programming life-cycle from design, development, operations, and optimization.
- There is also the **The Multicore Association® (MCA)** - http://www.multicore-association.org, founded in 2005, is a member-funded, non-profit, industry association that includes leading-edge companies implementing products that embrace multicore technology; focused on the creation of open standard APIs, specifications, and guidelines that allow system developers and programmers to more readily adopt multicore technology into their applications. Its primary objective is to define and promote open specifications to enable multicore product development. It is responsible for the Open Asymmetric Multi Processing Framework (OpenAMP) and its working group which is standardizing the specification and open source release.

The main differentiation point is that H-HW&SW will focus on not only multi-core, but heterogeneous hardware in general.

Therefore, the main difference is that while the HSA is focused on hardware, and mainly comprised by large vendors. On the other hand, the MCA is focused on software, but it is focused only on the development of multi-core technologies and the definition of n umber of APIs, and the establishment of an industry-supported set of multicore programming practices and services. It also lacks of sharing a catalogue of practical software tools.

Heterogeneity Alliance is focused on a much broader concept:

- Our alliance is focused on the full development lifecycle of Heterogeneous Hardware, which includes, as a subset, multi-core, but it also includes other technologies such as GPUs, FPGAs, DSPs, and their collaboration to provide a holistic approach for solving more demanding context. Also, the Heterogeneity Alliance can include hardware companies.
- The Heterogeneity Alliance provides a Catalogue of ready to use tools and technologies to facilitate the development of H-HW&SW that will be maintained and evolved in the future by the members.
- The Heterogeneity Alliance pretends to be the missing link between industry and with academia. It is our intention to become the means that allow universities and research institutions to gather market insight from the perspective off industry members that allow building and researching on valuable topics for the evolution of the H-HW&SW market. It will also help academia reach to the market with current technologies that could be potentially used by the industry.

Heterogeneity Alliance vs HiPEAC

The Alliance is being developed in alignment with HIPEAC activities and it has already proposed as Thematic Session within HiPEAC as described in https://www.hipeac.net/about.

Heterogeneity Alliance is an initiative that tries to join efforts of research projects, as a natural evolution of clusters or task forces, in which we want to close the gap between projects, and with industry to influence the market of heterogeneous computing, which is perfectly aligned with HiPEAC vision and objectives as a complementary action line.

Heterogeneity Alliance goal is clear. The initiative tries to join efforts of organizations interested in the development of future technologies and tools to advance, and take full advantage, of computing and applications using heterogeneous hardware (H-HW&SW). Its main goal is to create an association in which anyone interested can collaborate pursuing a common objective in various technological areas (simplification of development and operations, programming models abstractions, optimizations in several dimensions –e.g. power, performance or data locality, among others). We do not pretend to solicit scientific papers. We want to involve and thrive an architecture and a number of tools and technologies, and discuss about common approaches as a technical group focused on our topics of interest. Heterogeneity Alliance interests can be seen as a subset of all topics under HiPEAC radar. However, we want to take the opportunity to meet with the largest possible number of projects in HiPEAC events, and acquire higher visibility by helping HiPEAC with state of the art work and topics.

Therefore, Heterogeneity Alliance has applied to become a permanent thematic session within HiPEAC community.

FAQ

- Where can I contact the Alliance and answer more specific questions?
  - Drop your message in our contact form (http://heterogeneityalliance.eu/contact) and we will contact you as soon as possible.
- Which is the relationship of TANGO project with Alliance?

- o TANGO project has been the promoter of this initiative and it was born from its members. TANGO members will be members of the Alliance, just like any other member participating in the Alliance, seeking the common objectives and taking assigned responsibilities. After the project ends, the implications of the project finish, and start the commitment of all of its members, as individual organizations.
- Are you looking for partners to create an "association", or searching for a set of use case stakeholders for the Alliance Toolbox?
  - o No, the Alliance is not seeking for use case partners. The alliance seeks to fund an association that will be responsible for assuring sustainability and achieving the defined goals for developing the market of HWW together as an association.
- In the case of R&D Projects, should we apply as project or as individual partners?
  - o Both options are viable.
- In the case of joining as a project, what happens after the project finishes?
  - o In the case of joining as a R&D project, the implications mean that there will be some sort of structure and resources that will be in charge of continuing with the participation of the project after its funded period ends, especially to continue with the general promotion activities; and the support, maintenance and evolution of technologies and tools shared via the Alliance. This means, and provides, alignment with projects sustainability plans.
  - o Also, interested organizations can also join as individual organizations as well to promote not only assets constrained by their participation in projects, but all kinds of technologies and assets which they own (used in an R&D project, or not), and want to promote via the alliance.
- Are there financial implications for becoming a member of the Alliance?
  - o There is no fee at this point for organizations participating in the alliance that share technologies via the Alliance Catalogue and commit to the common objective of promoting and collaborating with the Alliance. This commitment implies two main things: Commitment based on a Best Effort Approach & Resources in Kind. This means that, as a non-profit association, every participating member will be responsible for their own costs and will participate and provide resources according to their interest and possibilities. However,
  - o As the alliance grows in members and scope, the Alliance Board may introduce the possibility that the alliance accepts the participation of members that pay a participation fee which will be used to promote the alliance. The alliance is also in the process of evaluating other funding options to be used for promotion, self-running and management costs; and for potential development of assets included in the managed catalogue.