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Consortium Aims to Standardize Chiplet Interconnect

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RECENT DEVELOPMENT

Seeking to establish a die-to-die interconnect standard and foster an open chiplet ecosystem, a strong collection of major chip makers and users recently announced the formation of the UCIe (Universal Chiplet Interconnect Express) industry consortium. The consortium has published version 1.0 of the UCIe specification, covering the die-to-die I/O physical layer, die-to-die protocols, and software stack. Promoter members of the consortium are Advanced Semiconductor Engineering, Inc. (ASE), AMD, Arm, Google Cloud, Intel Corporation, Meta, Microsoft Corporation, Qualcomm Incorporated, Samsung, and Taiwan Semiconductor Manufacturing Company (TSMC).

ANALYST COMMENT

Chiplets are individual and distinct integrated circuits, such as CPUs, GPUs, and memory, that can be combined into a single package. Although meant to support a wide range of use cases, such as for PCs and smartphones, such a standardized chiplet interface presents several benefits and architectural possibilities for the HPC community:

- Integrating functionality designed and previously delivered across different semiconductor design nodes (e.g., 20nm, 7nm, 5nm) could eliminate the need for substantial investments to port each functional chiplet block to the most recent design node.
- Supporting chiplets produced by different foundries in a single package could reduce fab lock-in and prevent each vendor from the costs of maintaining its own connection technology.
- Creating new architectures to tightly couple heterogeneous computing capabilities could increase performance across diverse workloads. Partitioning designs to localize functionality on-package could also enable new levels of optimized application performance.

The most successful standards are those with broad support across an entire ecosystem. The founding members of initial promoters represent an impressive list of contributors across a broad range of technology design and manufacturing areas, including the HPC ecosystem. That said, a number of major organizations have not as yet joined including Apple, AWS, Broadcom, IBM, NVIDIA, other silicon foundries, and memory vendors. Establishing commitment from these organizations could accelerate the adoption and success of UCIe and deliver on its aspirational benefits for the HPC vendor and user community.

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