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Heterogeneous Systems in Computing Intensive Applications: FPGA – GPU complexes

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The aspects of application development on parallel computing platforms are highly acute today. With the intensive increase in the integration level of silicon devices enabling parallel computing technologies on a single chip the power of supercomputers became available for computing systems of the compact class. Thus, more sophisticated and calculation intensive computing methods have become broadly available for the scientific society and industry. However, the inevitable drawback for this computing boost is often a cardinal change in the application design and development approach.
The present talk addresses two types of compact HPC platforms and their synergy from combinational use in a single computing complex: FPGA-based expansion cards and graphics processing unit coprocessing boards. The characteristic features of FPGA and GPU architectures are discussed to identify the major aspects of the application design for these platforms.
The example applications presented in the talk are MEG, CT reconstruction, and image segmentation.

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