DataFlow SuperComputing for ExaScale Applications

Abstract:

The strength of DataFlow computers, compared to ControlFlow ones, is in the fact that they accelerate the data flows and application loops for one or more orders of magnitude; how many orders of magnitude – that depends on the amount of data reusability within the loops. This feature is enabled by compiling down to levels much below the machine code, which brings important effects: much lower execution time, equipment size, and power dissipation.

The presentation's goal is to describe and explain DataFlow programming paradigm:
Rather than writing one program to control the flow of data through the computer, one has to write a program to configure the hardware of the computer, so that input data, when it arrives, can flow through the computer hardware in only one way (the way how the computer hardware has been configured). This is best achieved if the serial part of the application continues to run on the ControlFlow host and the parallel part of the application (BigData crunching and loops) is migrated into a DataFlow accelerator.
The presentation contains a few examples of successful implementations of DataFlow applications.