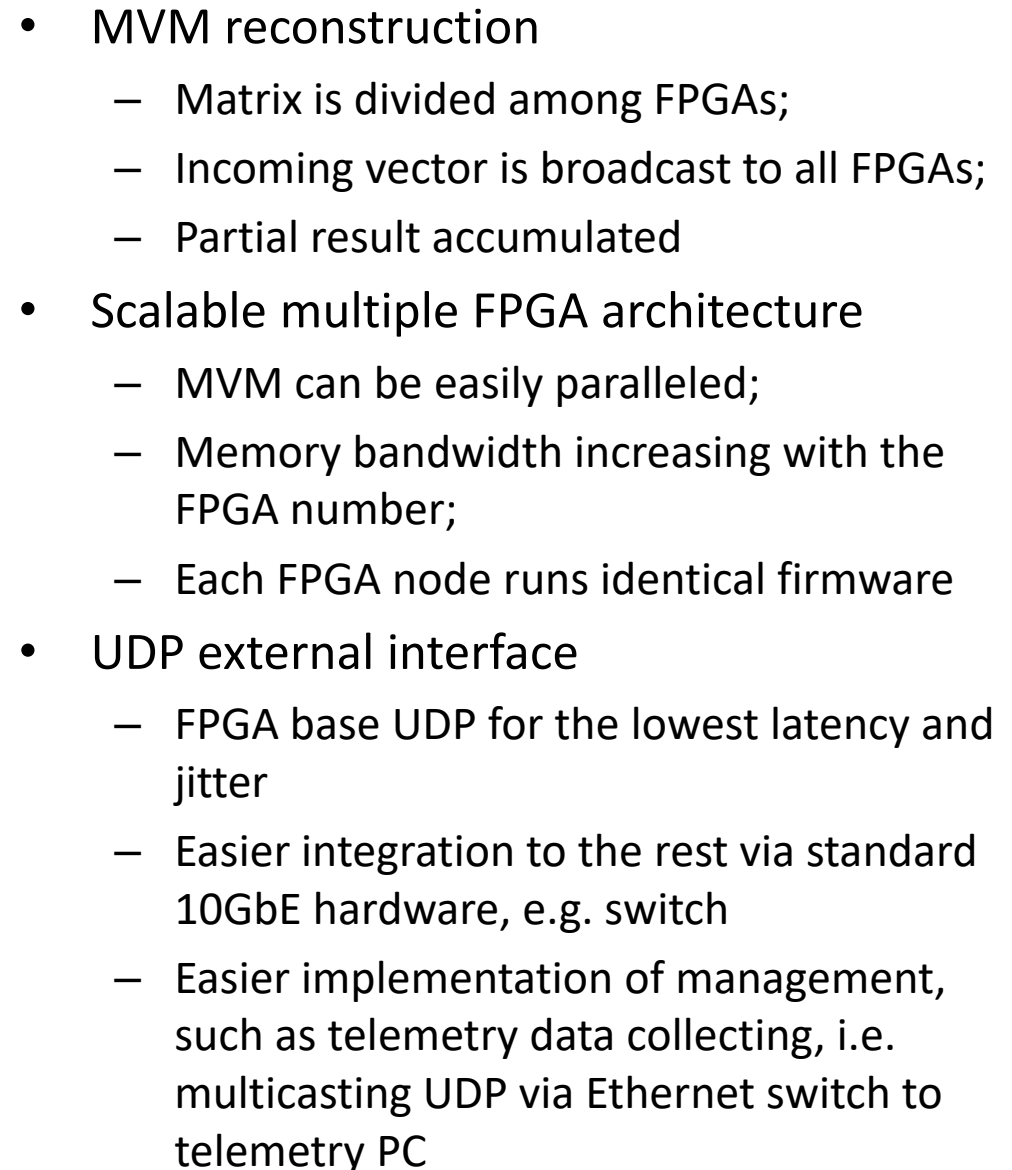
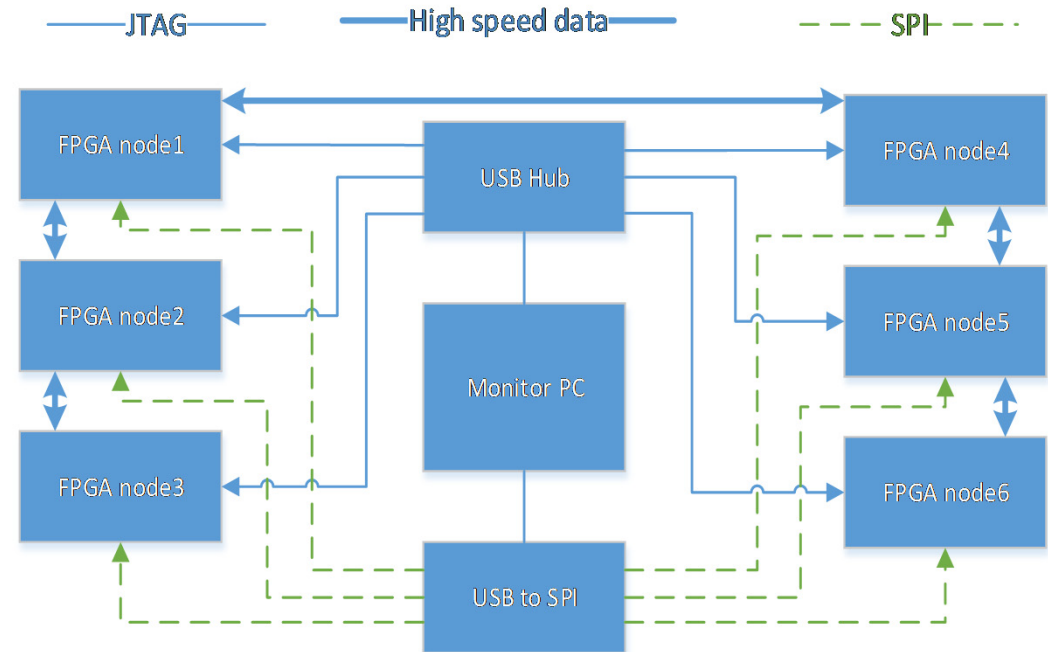






Implementation

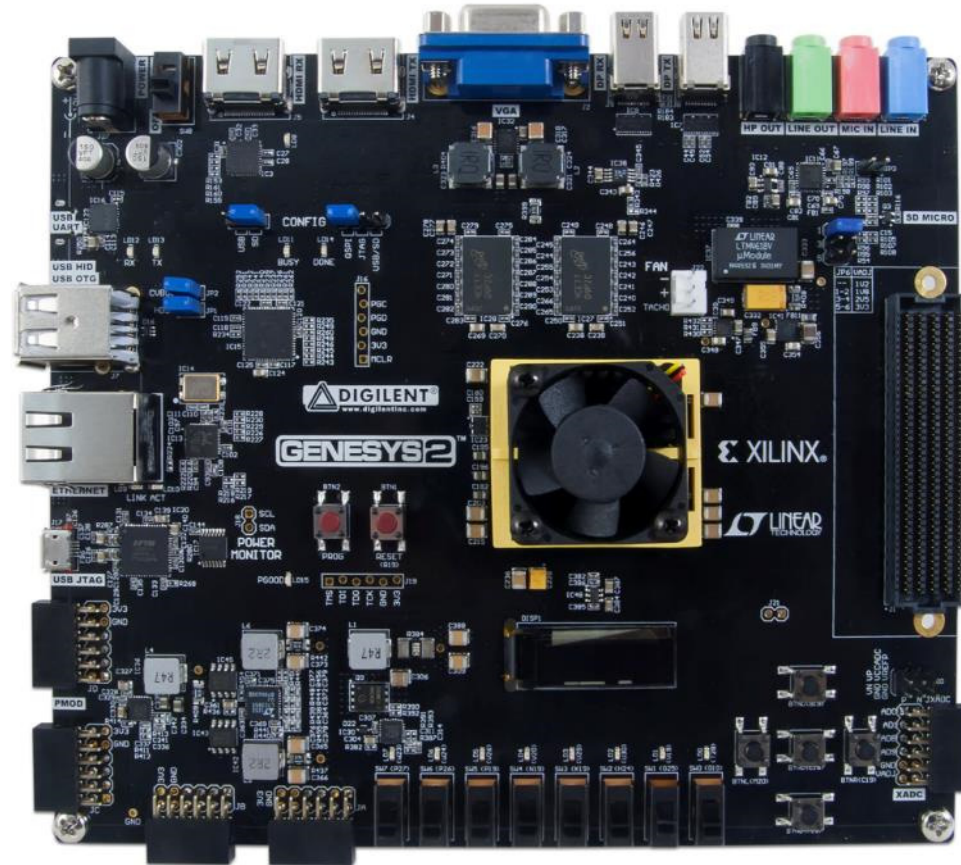
- Based on Digilent Genesys2 FPGA board;
- High speed data connection between FPGA boards;
- Embedded PC inside for monitoring and configuration
- Slow speed data connection between FPGAs and PC(SPI)





Digilent Genesys2

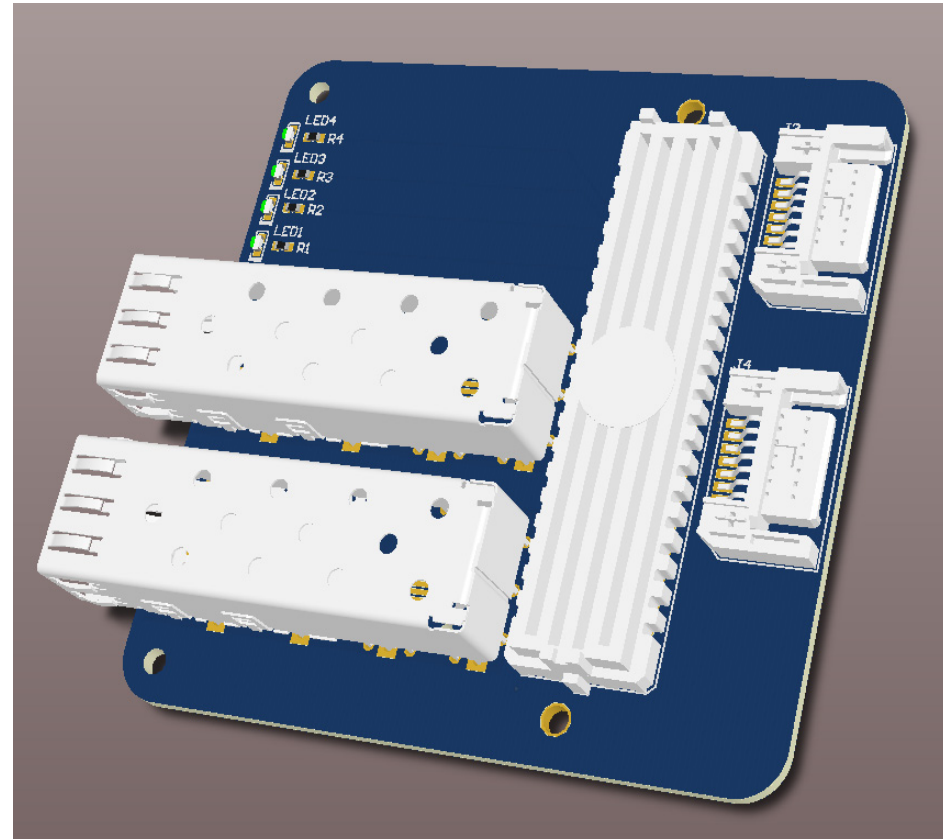
- Xilinx Kintex-7™ FPGA (XC7K325T-2FFG900C)
- 50,950 logic slices (up 7x), each with four 6-input LUTs and 8 flip-flops
- Close to 16 Mbits of fast block RAM (up 7x)
- 840 DSP slices (up 17x)
- Internal clock speeds exceeding 450MHz
- Up to 10.3125Gbps gigabit transceivers
- 1800Mbps DDR3 data rate with 32-bit data width





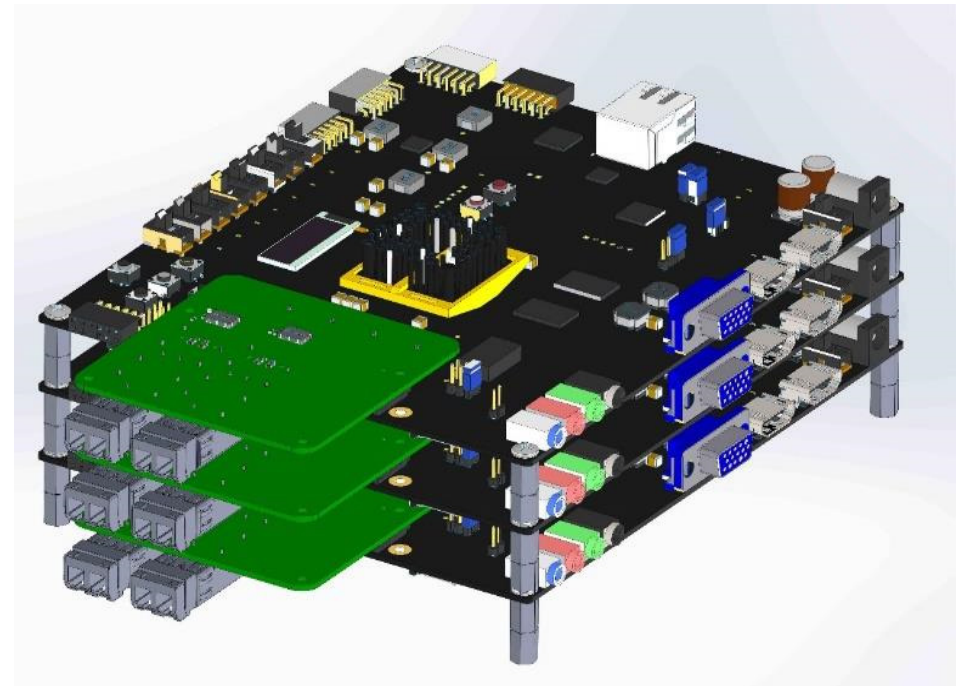
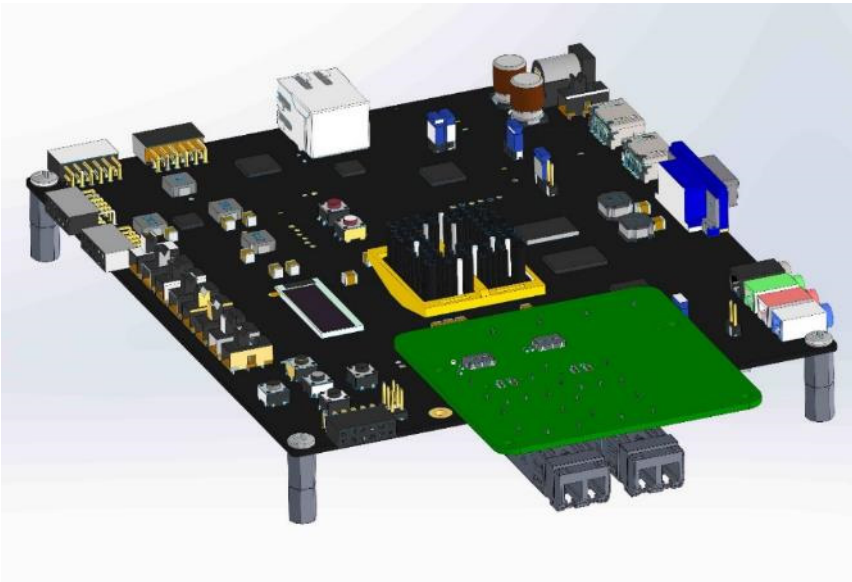
Fibre SFP+ adaptor

- Dual SFP+ ports for external connection like UDP;
- Dual SATA type ports for internal between boards connection;
- FMC connector to the mother board



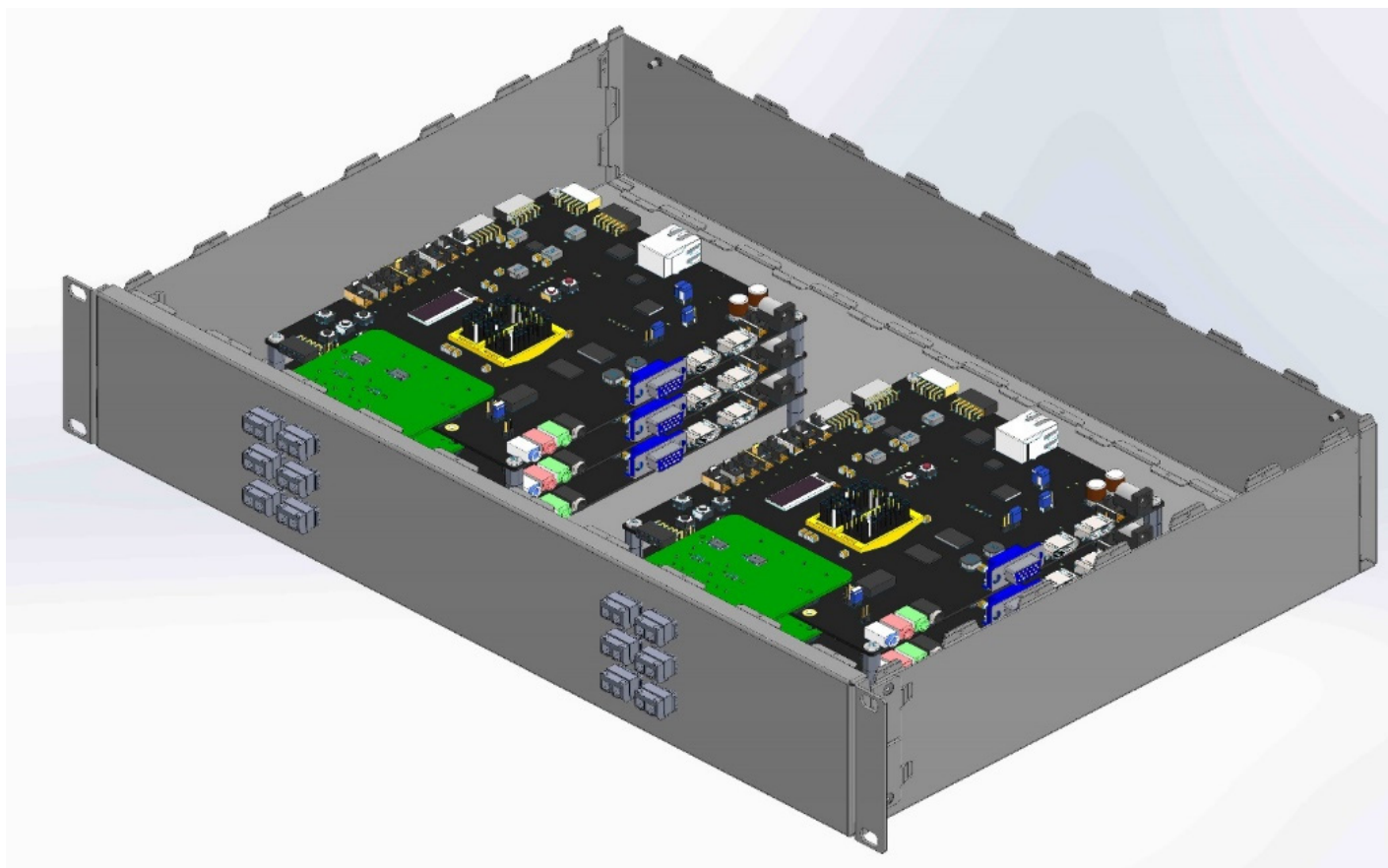


FPGA node



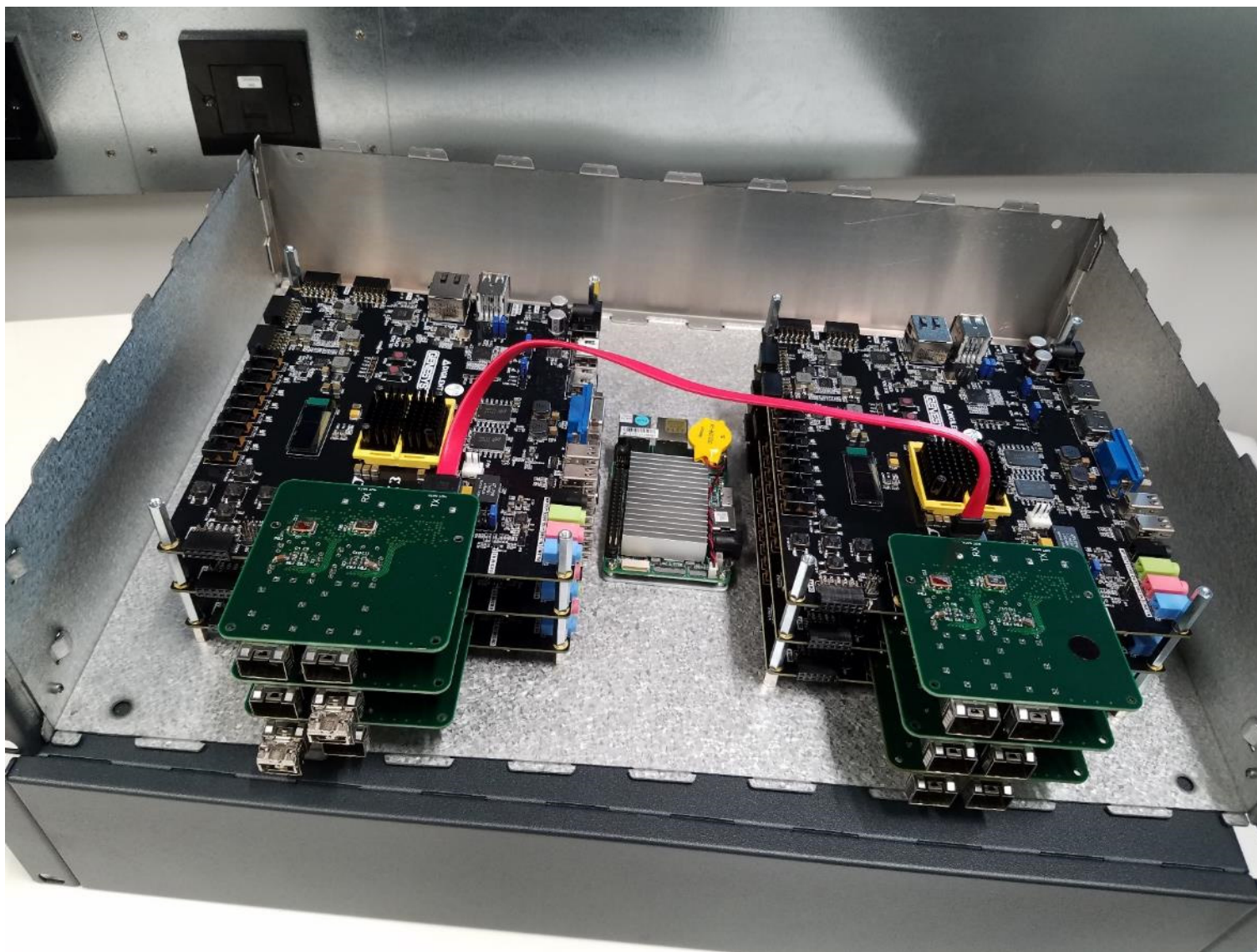


FPGA Cluster





FPGA Cluster Real





FPGA Cluster Example

FPGA Cluster

Digilent Gensys 2	G2 boards x6	Other hardware	Cluster cost	Cluster performance
1102 EUR	6612 EUR	2388 EUR	9000 EUR	7.56GFLOPS (70%)

FPGA Cost

	HARMONI	MAORY/ MICADO	METIS SCAO	METIS LTAO	MOSIAC	HIRES	EPICS
Cluster No.	27	61	1	49	186	38	1462
Cost (kEUR)	243	549	9	441	1674	342	13158

- With custom build FPGA cluster, the cost can be as low as 36EUR for 1GFLOPS, which will bring down the cost to 398kEUR(pure FPGA cost) for EPICS, for example.



Summary

- Clusters of cheap FPGAs can provide an ELT solution
- Large numbers required
- Not competitive compared with MIC or GPU technologies in the domain of COTS components