# High-speed data processing inside a computer

Vladislav Válek

# Current digital designs are becoming too large and change dynamically.

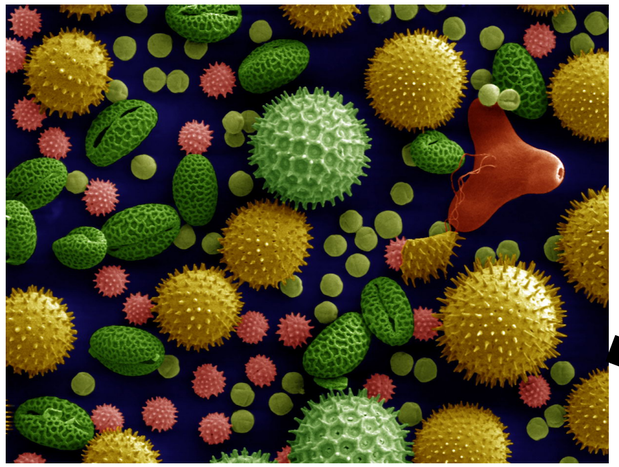
- Custom circuits become expensive to manufacture
- The reconfigurability of cirucuits is needed

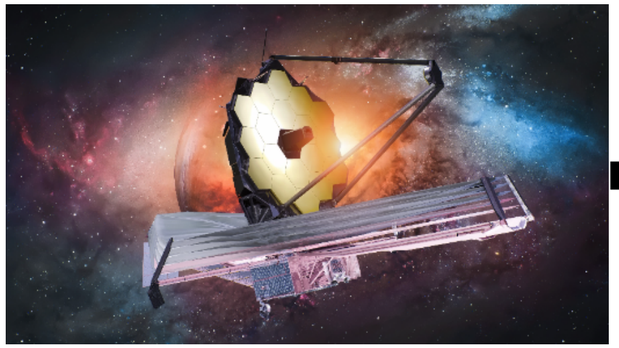
# Processing large volumes of data is cheaper when done in real-time.

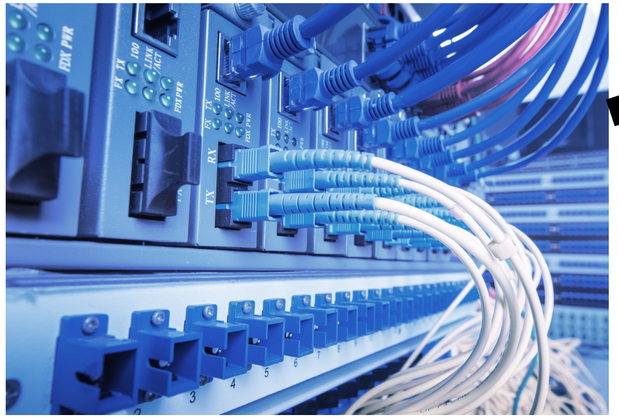
- Limitation of storage capacity
- Data from radars, telescopes, microscopes or internet communication in general

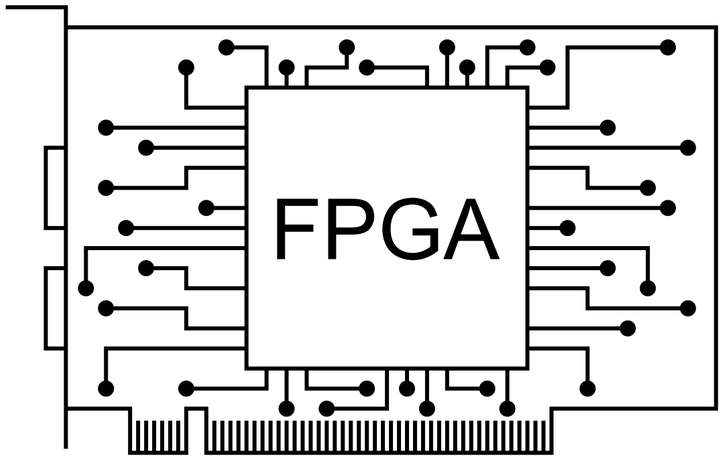
# FPGA Cards

Platforms for developing custom digital designs which can be changed according to current needs.





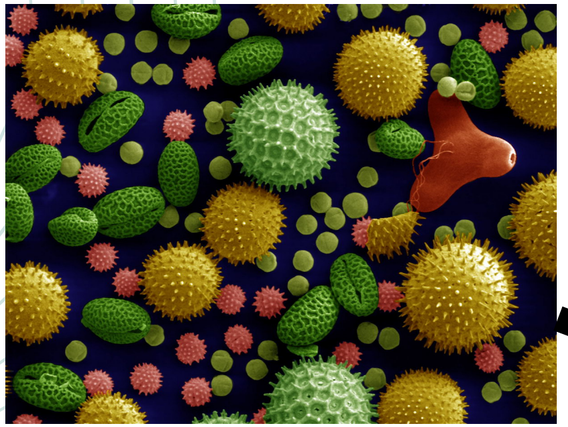


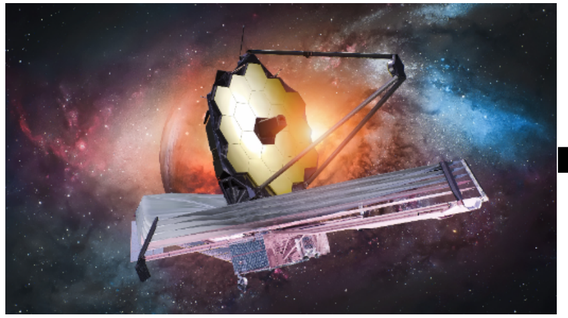

FPGA

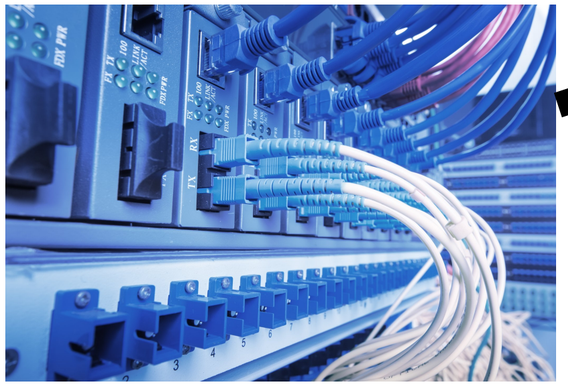
With FPGAs, the reconfigurability is ensured as well as the ability to develop large designs.

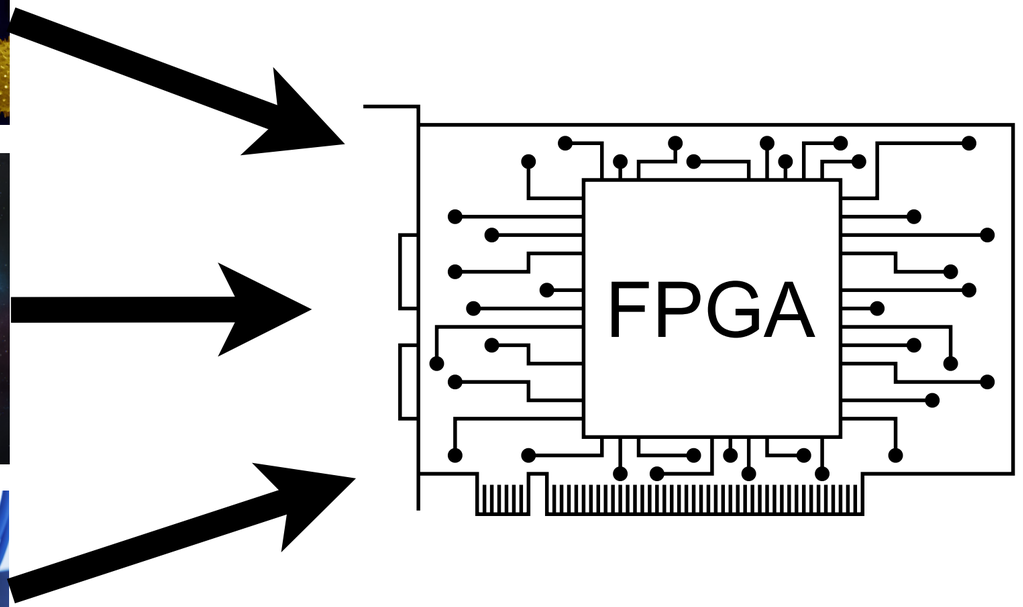
Parallel processing allows to work with data in real time, thus to scale effectively.

# What if I want to display the data?








FPGA

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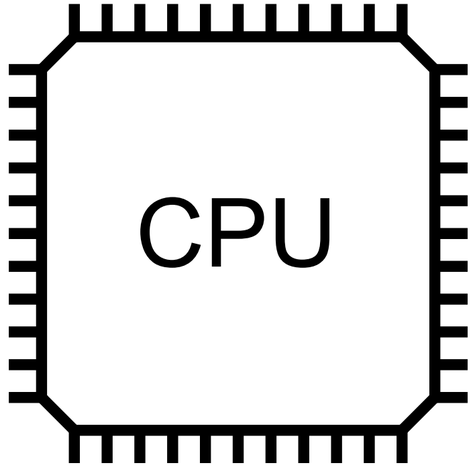
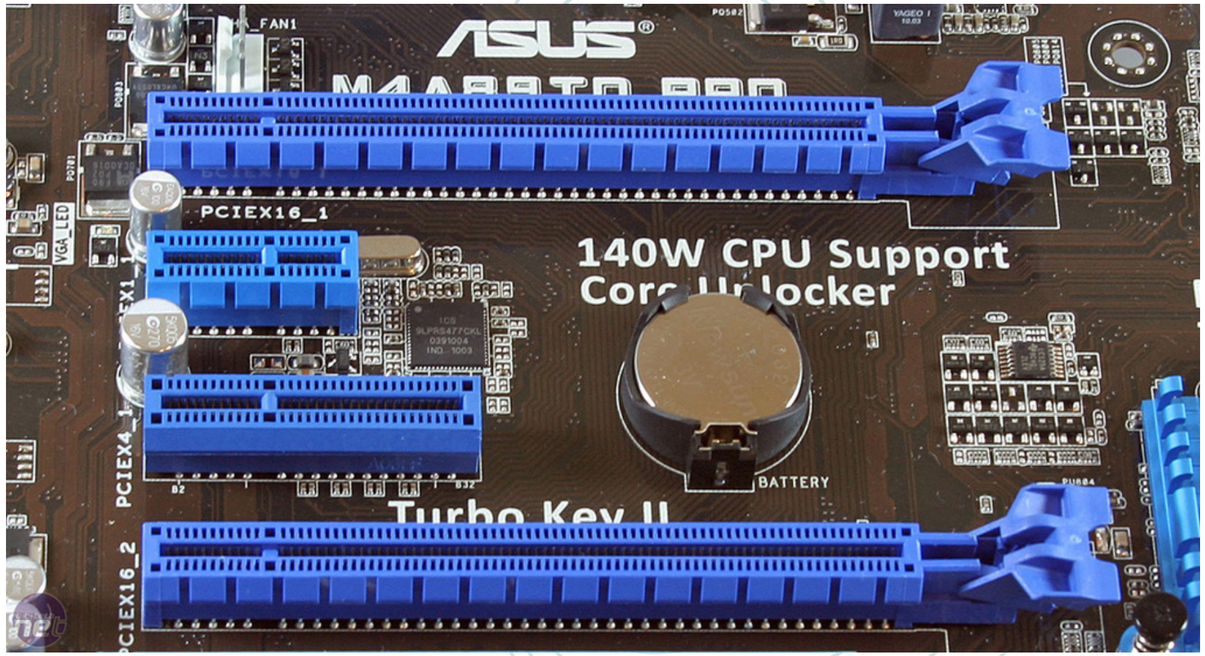

CPU

# PCI Express

## High-speed communication protocol

- Standardized
- Throughput up to 15GB/s
- Supported by both CPU and FPGAs

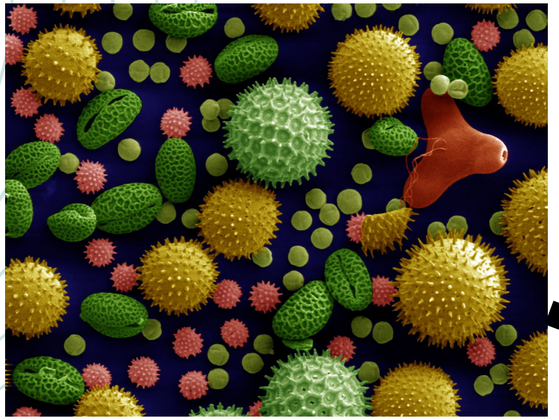


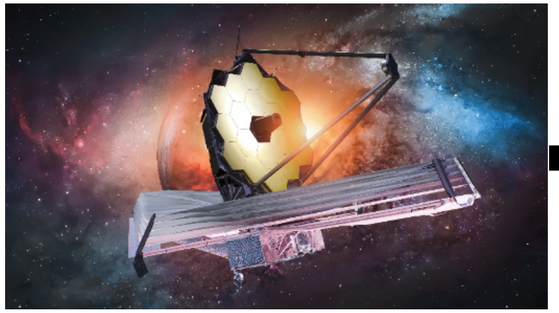
During development in recent years, the PCI Express protocol became too bloated!

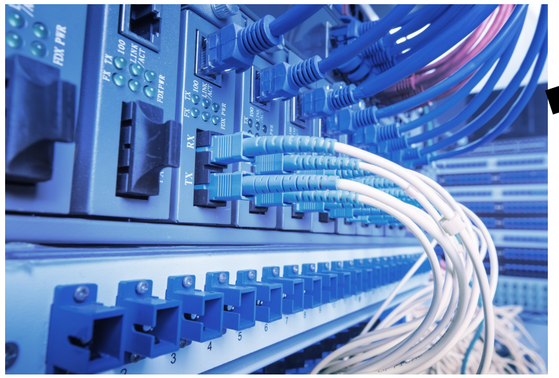
# JetStream 2.0

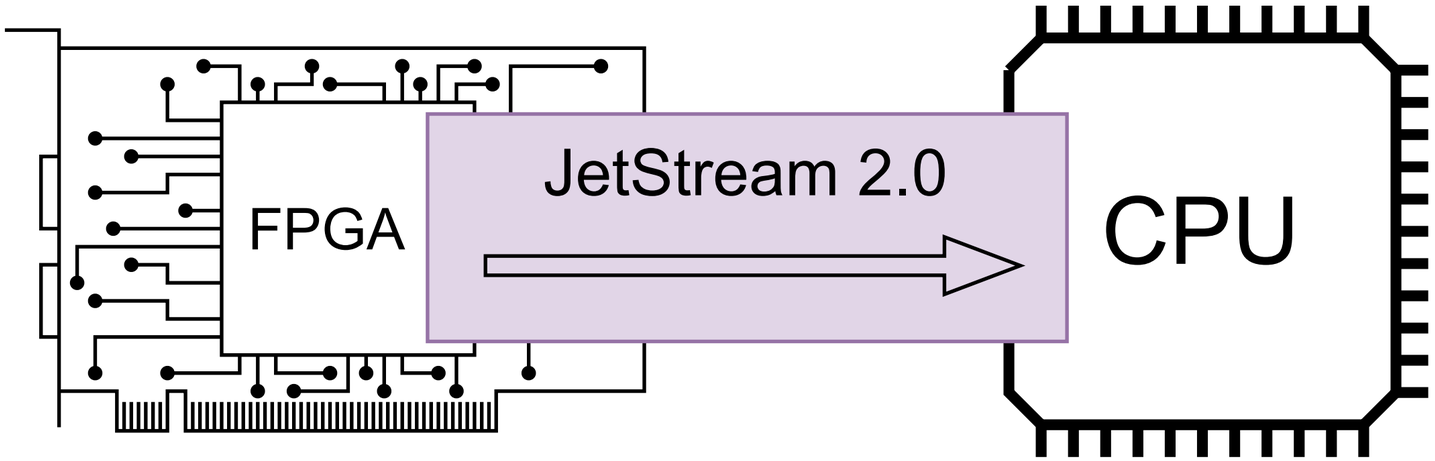
**A library for communication between a FPGA and a CPU.**

Data are transmitted to the CPU using DMA transactions.

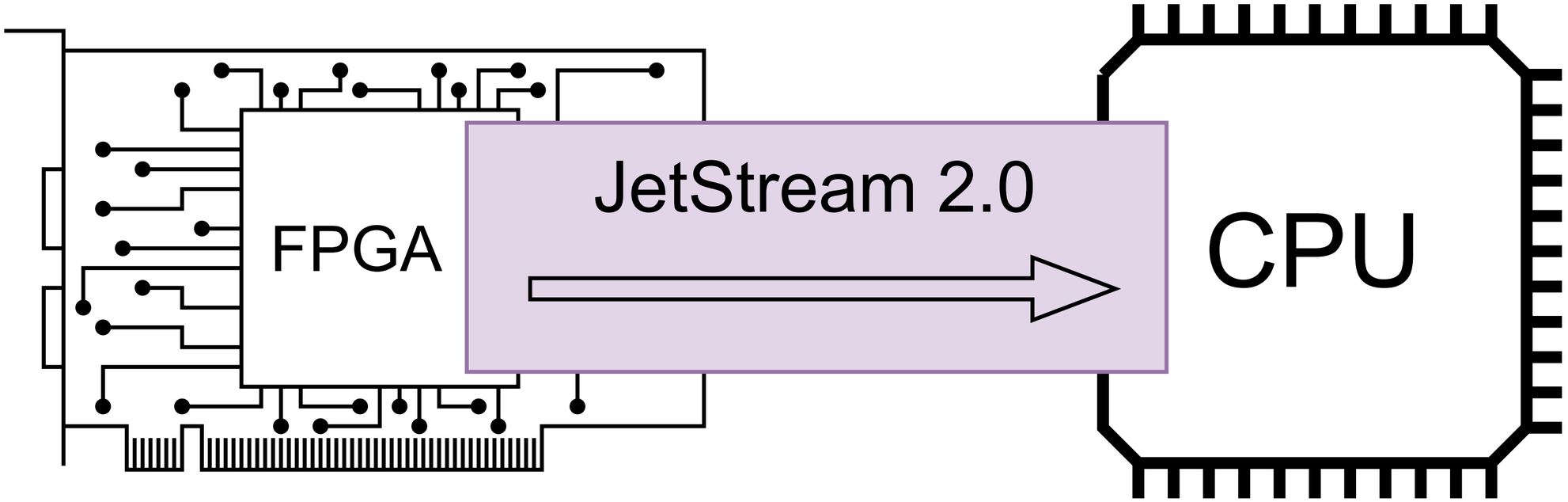







FPGA
JetStream 2.0
CPU

There is much more!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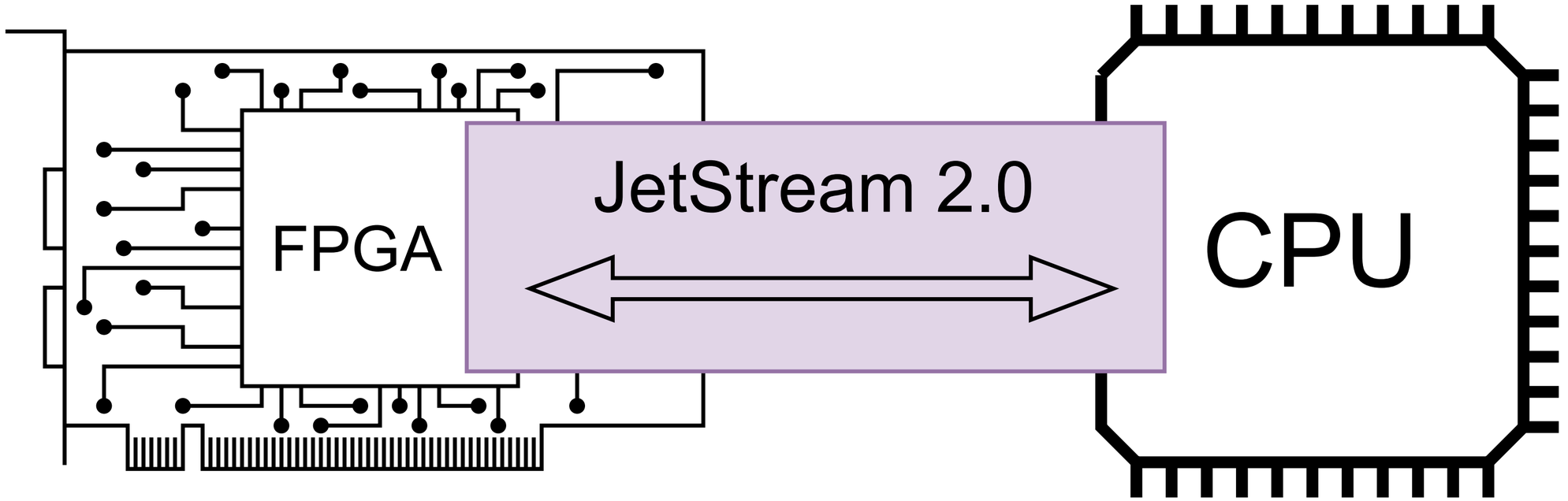
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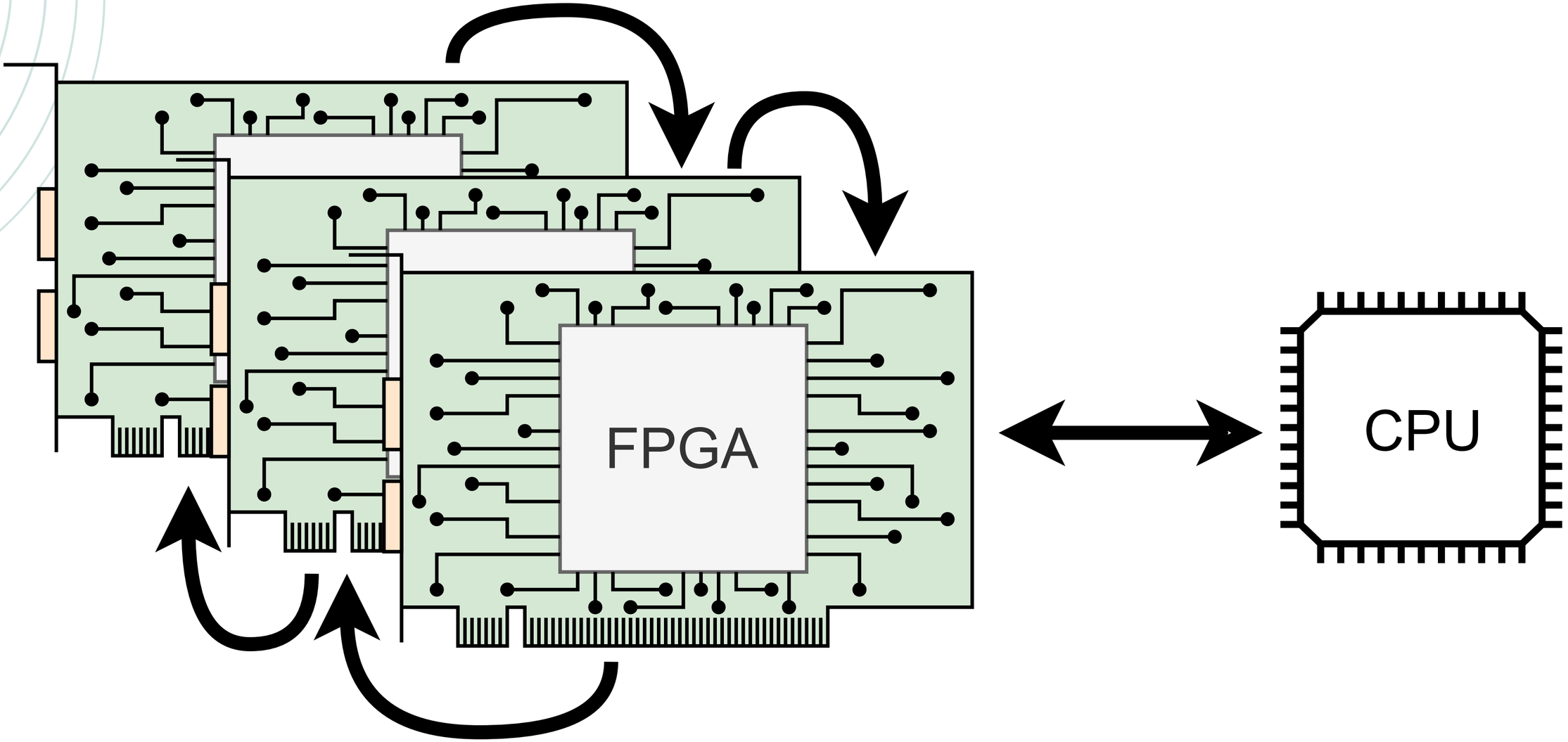
FPGA
CPU

This design has a massive impact on the way we do data science today.

# Want to know more?
# Contact me.

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