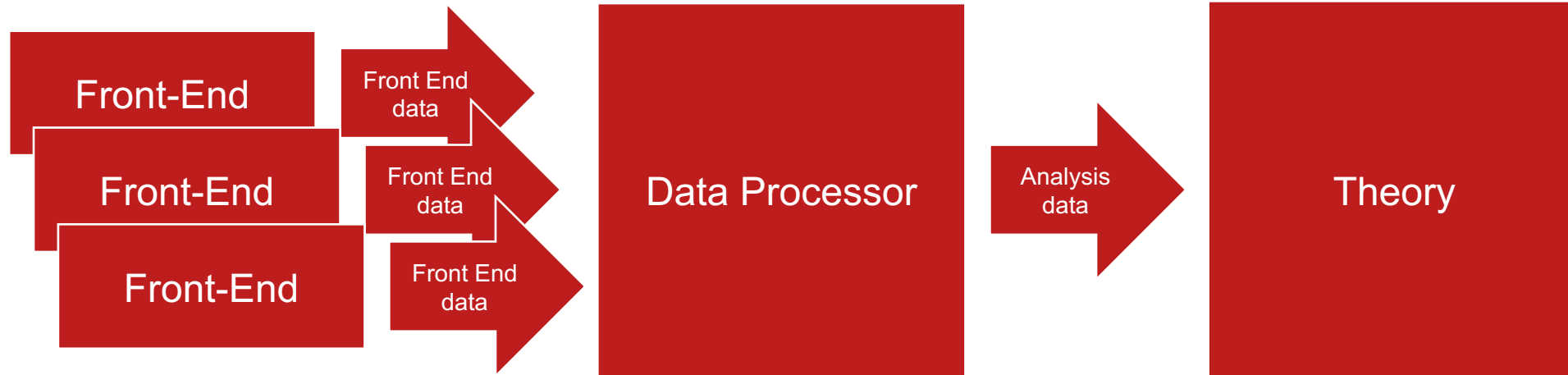


# Streaming Readout from the Perspective of the ePIC Software & Computing Effort

- **Maximize physics reach:** We will take full advantage of **streaming readout**, **AI/ML**, and **heterogeneous computing** for ePIC.
- **Advanced technologies:** The compute-detector integration using streaming readout will be one of the highlights of the ePIC experiment.
- This is reflected in **EIC Software: Statement of Software Principles:**
  - 2 **We will have an unprecedented compute-detector integration:**
    - We will have a common software stack for online and offline software, including the processing of streamed data and its time-ordered structure.
    - We aim for autonomous alignment and calibration.
    - We aim for a rapid, near-real-time turnaround of the raw data to online and offline productions.
- **Priorities for 2023**
  - Streaming readout in the simulations of the detector readout (digitization)
    - This will allow to develop reconstruction algorithms for streaming readout.
  - Choose a computing model for streaming readout and simulate it.
    - Graham Heyes (Jefferson Lab) discusses [Computing Models that Feature Streaming](#).

# Integration of DAQ, analysis and theory to optimize physics reach



## Research model with seamless data processing from DAQ to data analysis

- Building the best detector that fully supports streaming readout and AI/ML:
  - FastML for alignment, calibration, and reconstruction in near real time.
  - AI for intelligent decisions
- For rapid turnaround of data for the physics analysis and to start the work on publications.
- **Holistic view:**
  - We will use the full, detailed information from all detector components to reconstruct events.
    - That will include event building and filtering.
  - Streamline workflows: DAQ, online, and offline experts as part of streaming readout WG.

# ePIC Software & Computing Effort

## Software and Computing Coordinator

- + Deputy Coordinator **Operations**
- + Deputy Coordinator **Development**
- + Deputy Coordinator **Infrastructure**

**Guiding Principles:** Software Principles, DE&I, Sustainability

## Operation WGs:

- Production (CD)
- User Learning
  - Discoverable software and data
- Validation (CD)

## Development WGs (CI):

- Physics and Detector Simulation
- Reconstruction
- Analysis Tools

## Infrastructure WGs:

- **Streaming Readout (DAQ)**
- Multi-Architecture Computing
- Distributed Computing

How to best represent the compute-detector integration in a joint WG?

## Cross-cutting Data and Analysis Preservation WG:

Metadata discussion (configuration files but also FAIR data principles).