

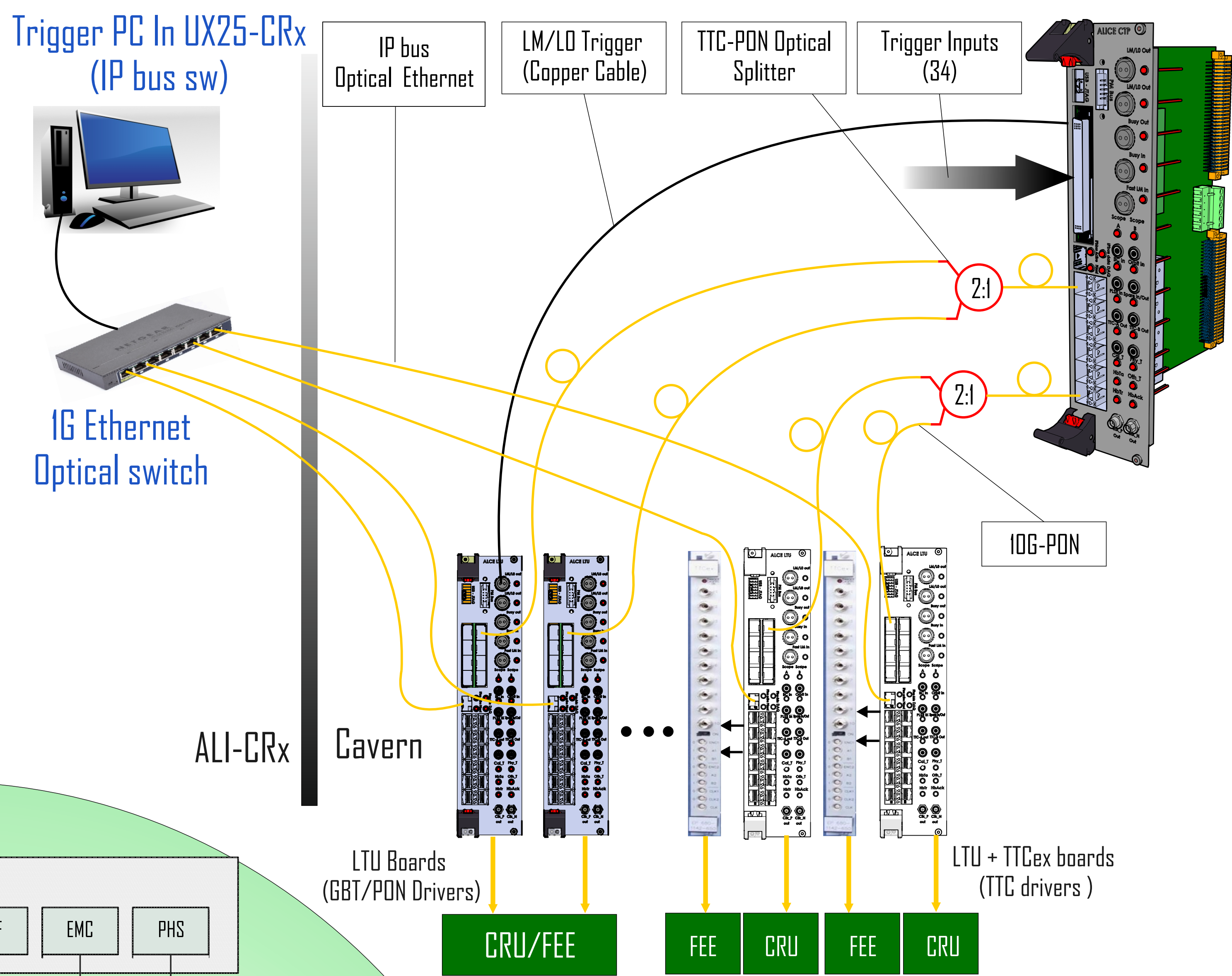
## Abstract:

ALICE (A Large Ion Collider Experiment) is the detector at the CERN LHC dedicated to the study of strongly interacting matter. The ALICE collaboration plans a major upgrade of the detector during long shutdown 2 (2018 - 2020). In Run 3 the interaction rate increases to about 50 kHz for Pb-Pb, and few hundred kHz for pp and p-A. The aim of the ALICE trigger system is to select essentially all of these interactions; the events are then read out and the event records are sent to the HLT farm for further filtering. To achieve this, the combination of continuous readout detectors and a minimum bias trigger based on the new forward detectors is used, with a few additional inputs to allow for cosmic triggers and calorimeter based triggers to enhance rates for some types of events where the minimum bias trigger is inefficient. The overview of the ALICE trigger system is presented.

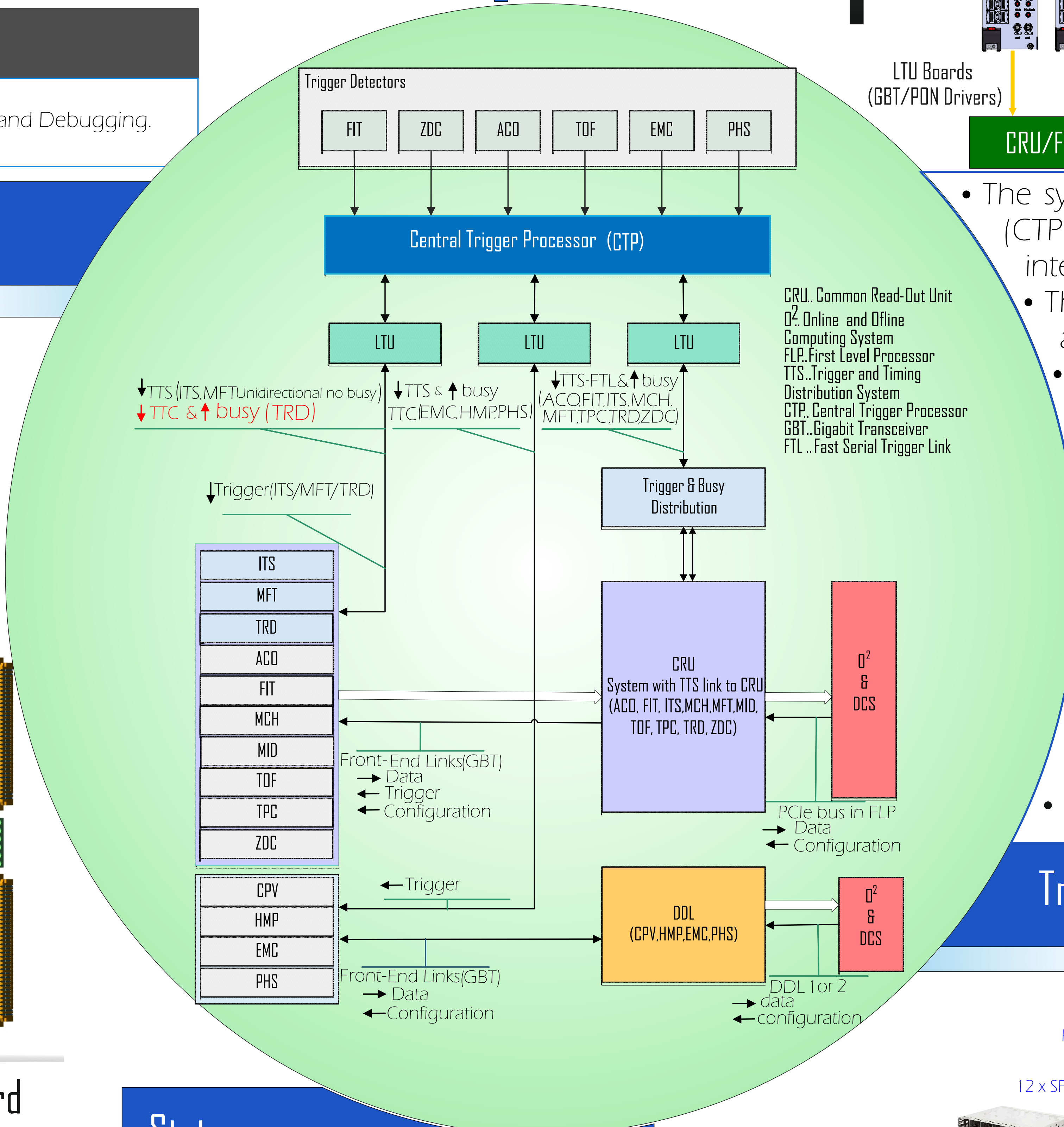
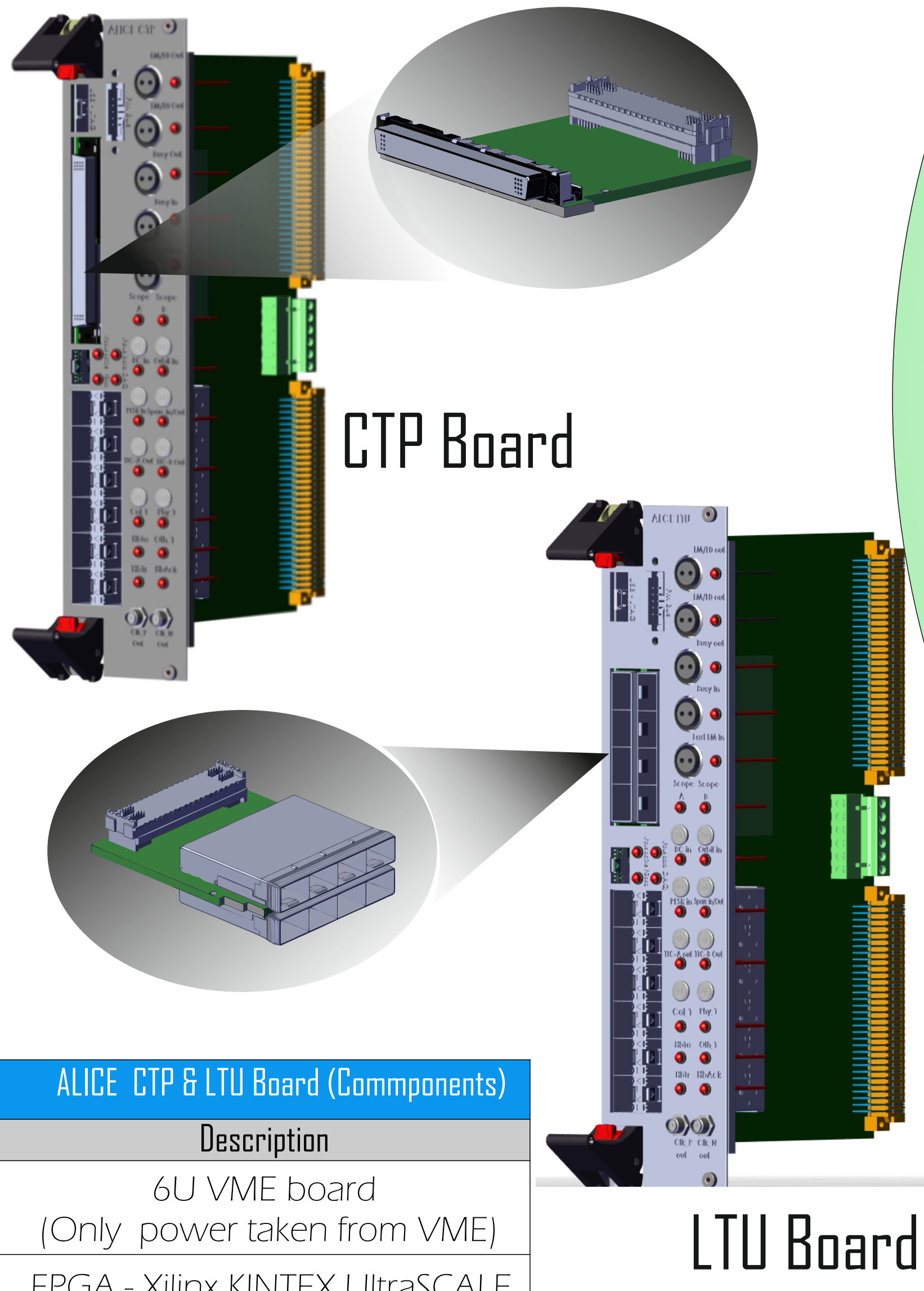
## ALICE Trigger Challenges

- Select different physics**
  - >> Different trigger detectors
    - (ACO, FIT, EMC, PHOS TOF, ZDC)
- Optimize for different running scenarios**
  - >> pp, pA, AA collisions, with different interaction rates
- Optimize use of detectors with**
  - >> Continuous readout
  - >> Widely different busy times
  - >> Different latency times
  - >> Different technologies (TTC, GBT, TTC-PON)
- Special triggers**
  - >> Calibration, Control, and Debugging.

## ALICE System Block Diagram for LHC Run 3

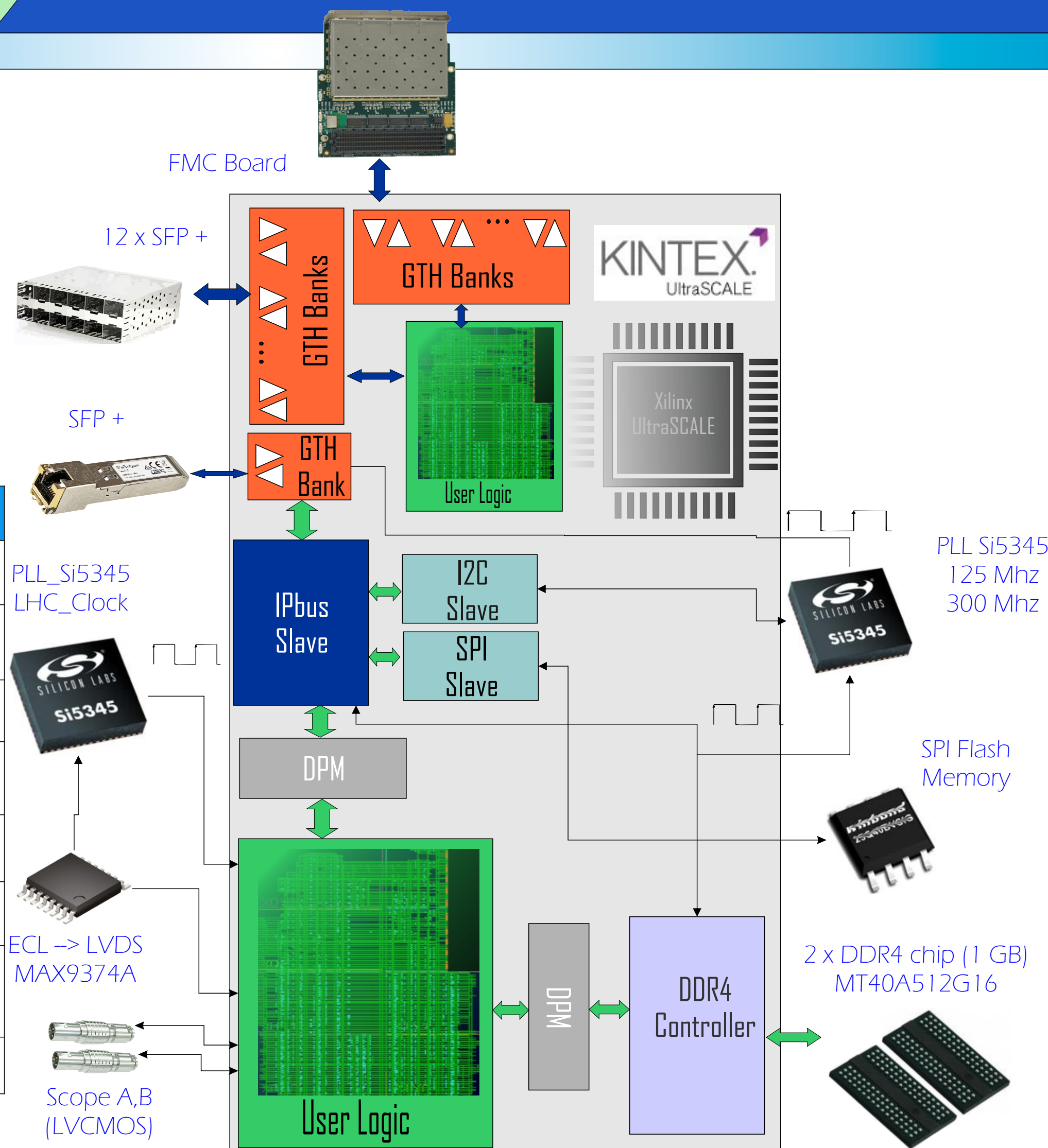


## Universal Trigger Board



- The system consists of a Central Trigger Processor (CTP) and Local Trigger Units (LTUs) as detector interfaces.
- The CTP receives signals from trigger detectors and decides which events are to be read-out.
- The corresponding signals are then sent to each detector.
- In a **Global Run**, the LTU serves as a "transparent link" between the CTP and the FEE of its detector.
- In the **Stand-Alone** mode of operation, the LTU fully emulates the CTP protocol and enables detectors to carry out development, test and calibration tasks **independently of the CTP**.
- Monitoring and control** of the CTP and LTU boards are via IPbus.
- The CTP-ReadOut is over a GBT link.

## Trigger Board (Interfaces)



## Status

- Electronics Design Review (EDR) completed and approved.
- Schematic capture completed.
- Prototype to be delivered by **November 2016**
- LTU firmware in progress.
  - Testing of interfaces with evaluation boards in progress

## Interfaces

TTC - PON
GBT (LAT-OPT)
TTC
IP-bus
I2C
SPI
DDR4 Controller
USB - JTAG

## Portable LTU



## Portable version of LTU

- LTU board inside standalone box (ELMAGuardbox33 → case 3)
- Internal power supply + fan for cooling