

# The CMS BRIL Data Acquisition System

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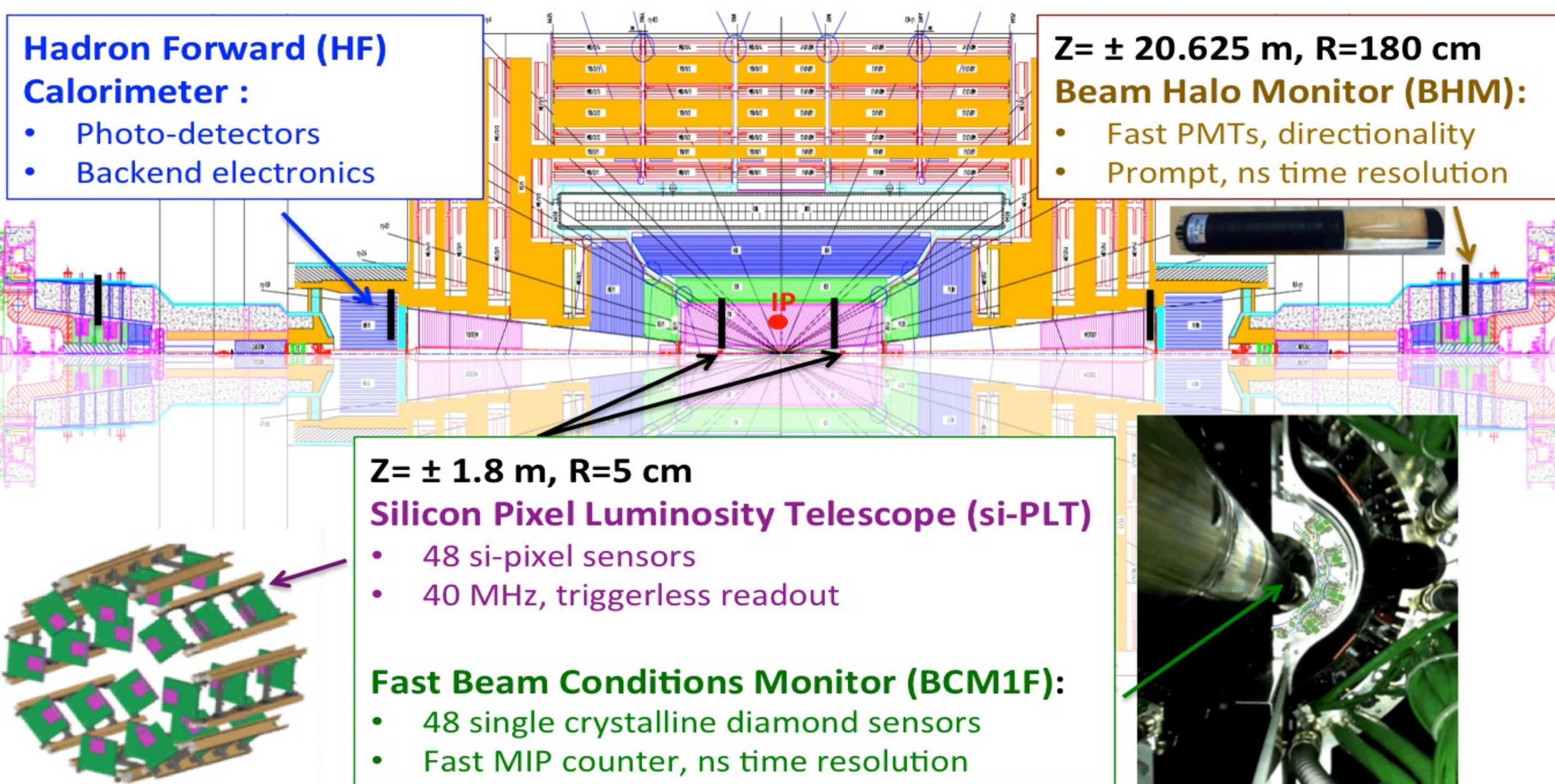
## Introduction

The Beam Radiation Instrumentation and Luminosity (BRIL) project consists of several independent sub-detectors for measuring the luminosity, monitoring the beam conditions, and protecting CMS experiment from serious radiation damage.

The BRIL system operates continuously and it will support a scheme to ensure resistance to potential disruption. The overall reliability must be ensured by the introduction of failover capability by using hot spare components for automatic switching to prevent down time.

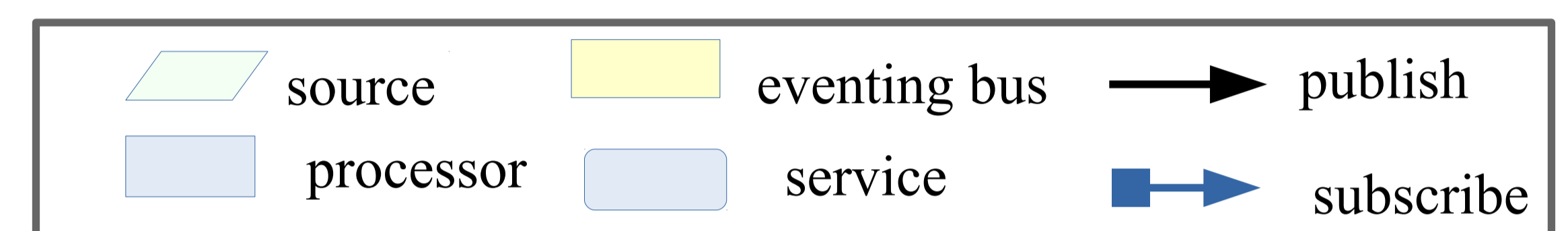
During the first long shutdown of the LHC, the BRIL system is going to be upgraded for operation from 2015 onward and a homogeneous distributed software architecture has been designed and developed.

The universal application connectivity that makes every BRIL application service inter-communication is based on the XDAQ middleware and the RCMS framework for human interaction and control.

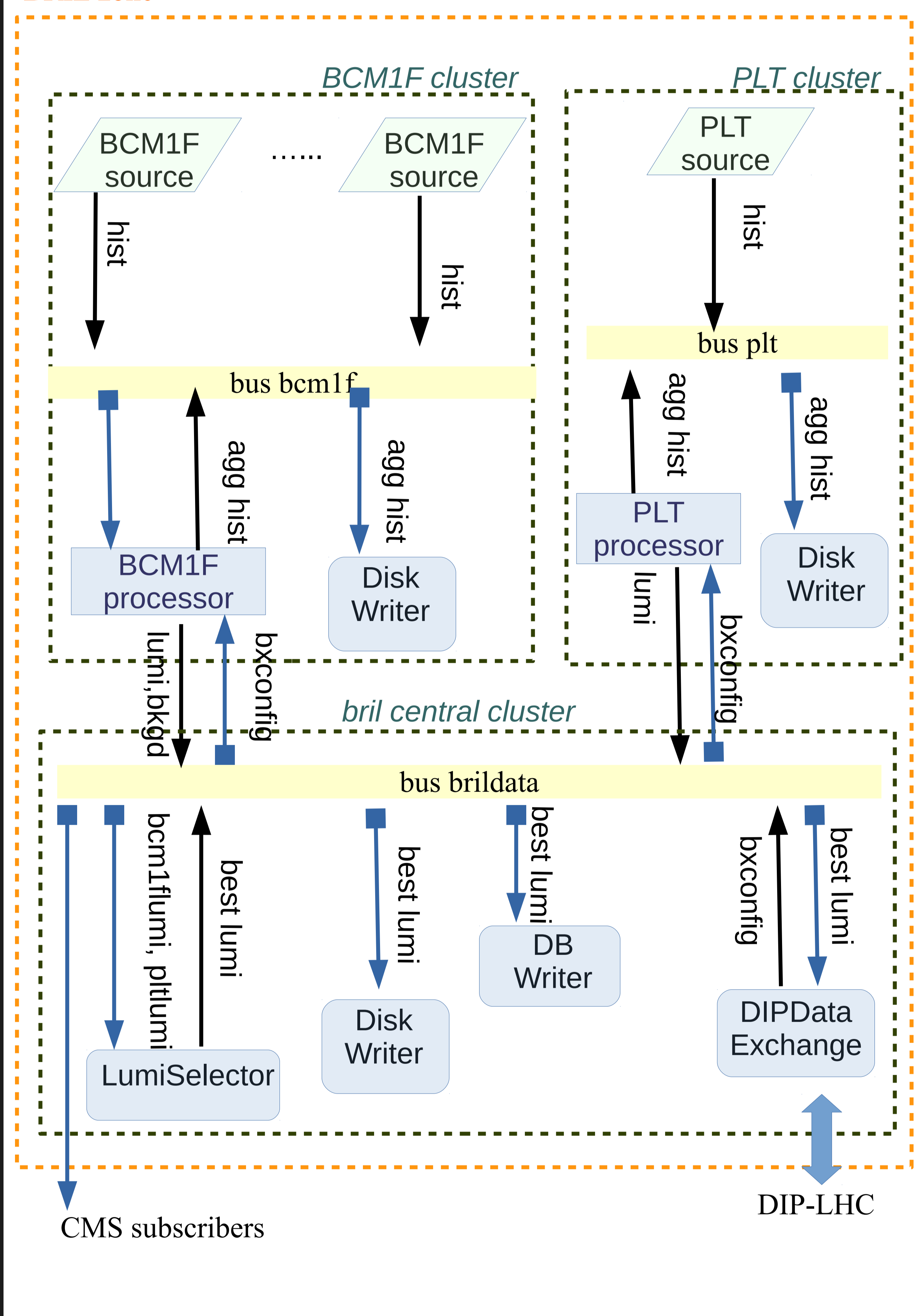


## Data flow

- Three types of communication components cooperate to perform BRIL tasks in computer clusters
- *Data sources* perform the hardware readout and publish histogram data to eventing
- *Data processors* perform local data aggregation, reduction
- *Central services*: luminosity selection, data quality monitoring and storage service, dip data exchange with LHC, etc.

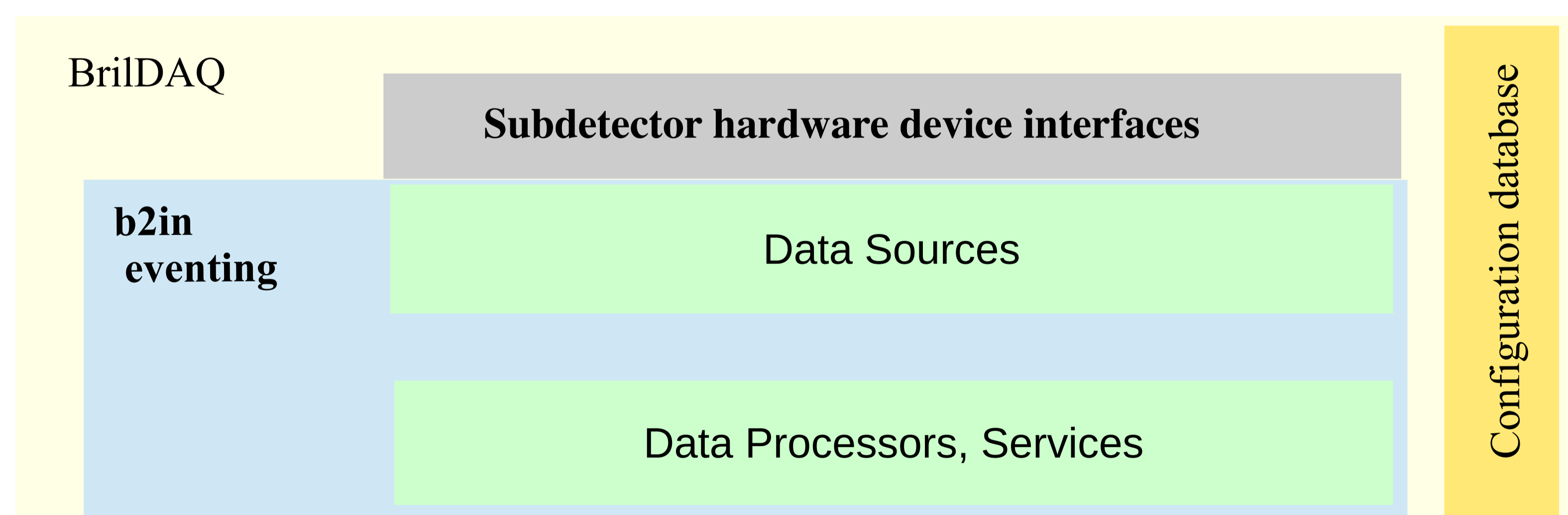


BRIL zone



## Architecture

- Service-Oriented architecture consists of reusable components
- Network connected XDAQ components providing services
- Inter-component messaging is the glue : publisher/subscriber model (eventing) with user defined binary message format (b2in)



## Process control

- Allows human control of XDAQ processes in the BRIL cluster
- Based on CMS RCMS software and database
- Independent instance of run control with longer lifetime than CMS central DAQ
- Applications are started through simple state transition

