

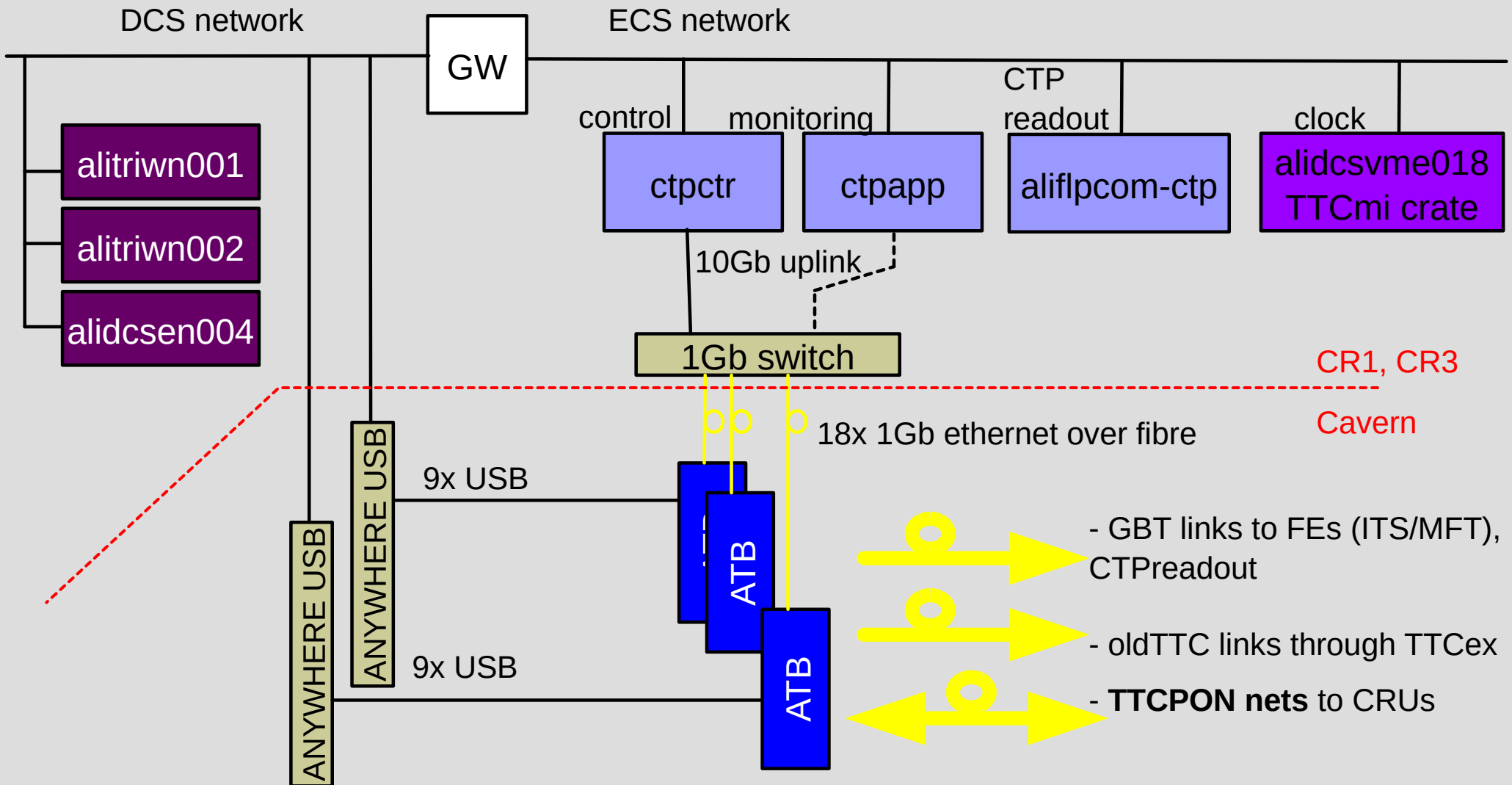


# Run3 trigger online software overview

A. Jusko

- Infrastructure
- External software
- Daemons at P2
- Monitoring

# Infrastructure in P2

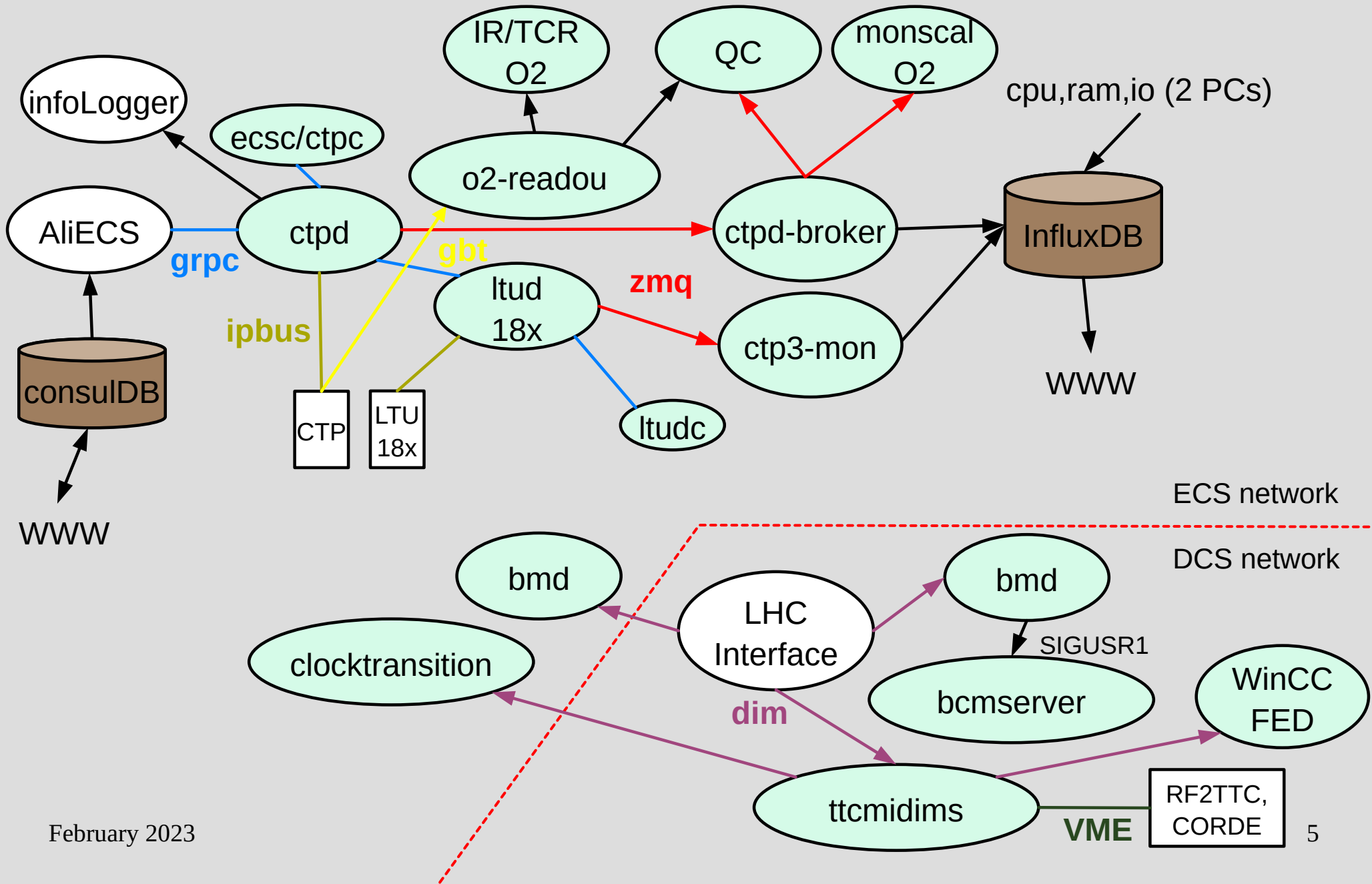


**ATB:** Alice Trigger Board serving as CTP (1x) or LTU (18x)

# External software

- G++
- Qt
- Python 3.6 (3.9)
- IPBUS suite
- rarpd
- TTCPON 1.0.1
- GRPC, ZeroMQ
- TSDB: Telegraf/InfluxDB
- VMERCC driver
- WinCC, DIM, MS VS C++
- Fusion Digital Power Designer (TI)

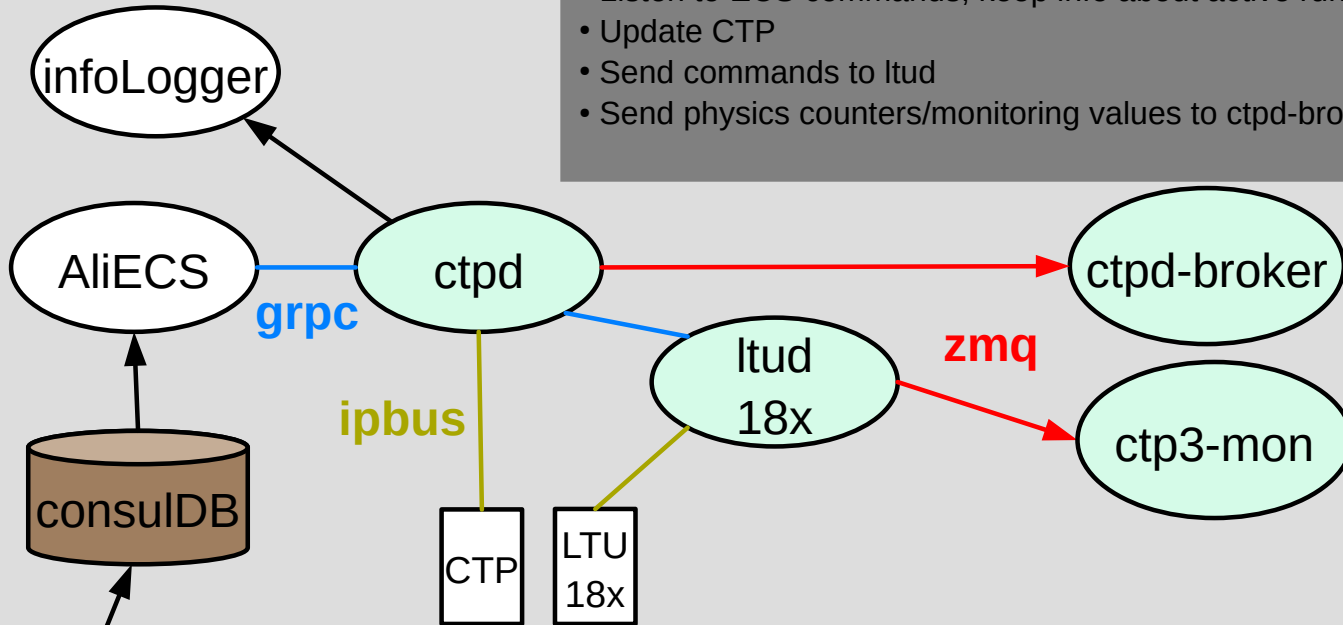
# Overview



# ctpd, ltud

## ctpd

- Listen to ECS commands, keep info about active runs
- Update CTP
- Send commands to ltud
- Send physics counters/monitoring values to ctpd-broker

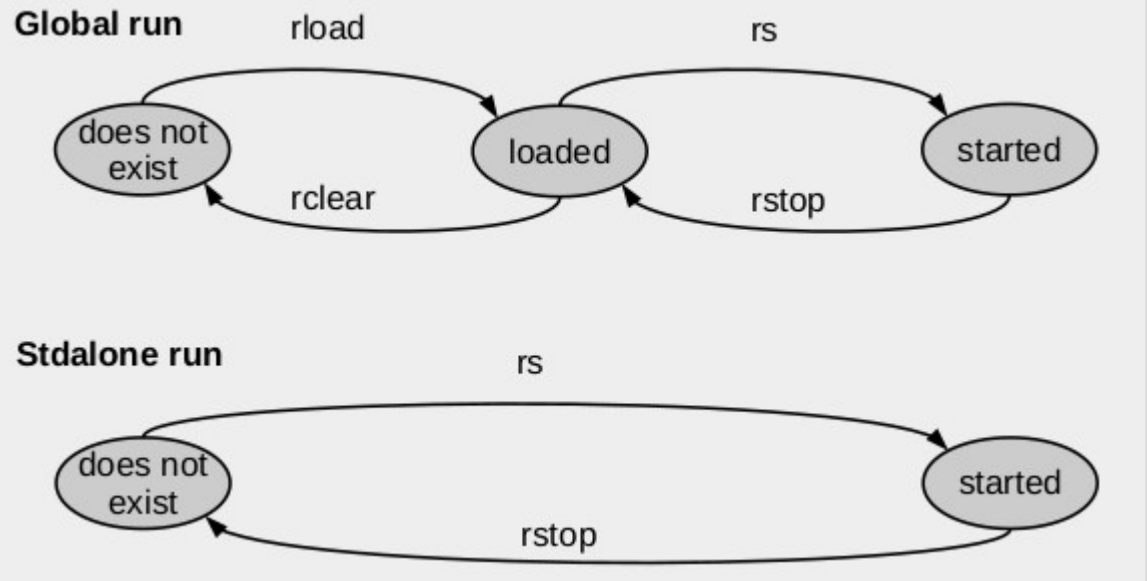


## ltud

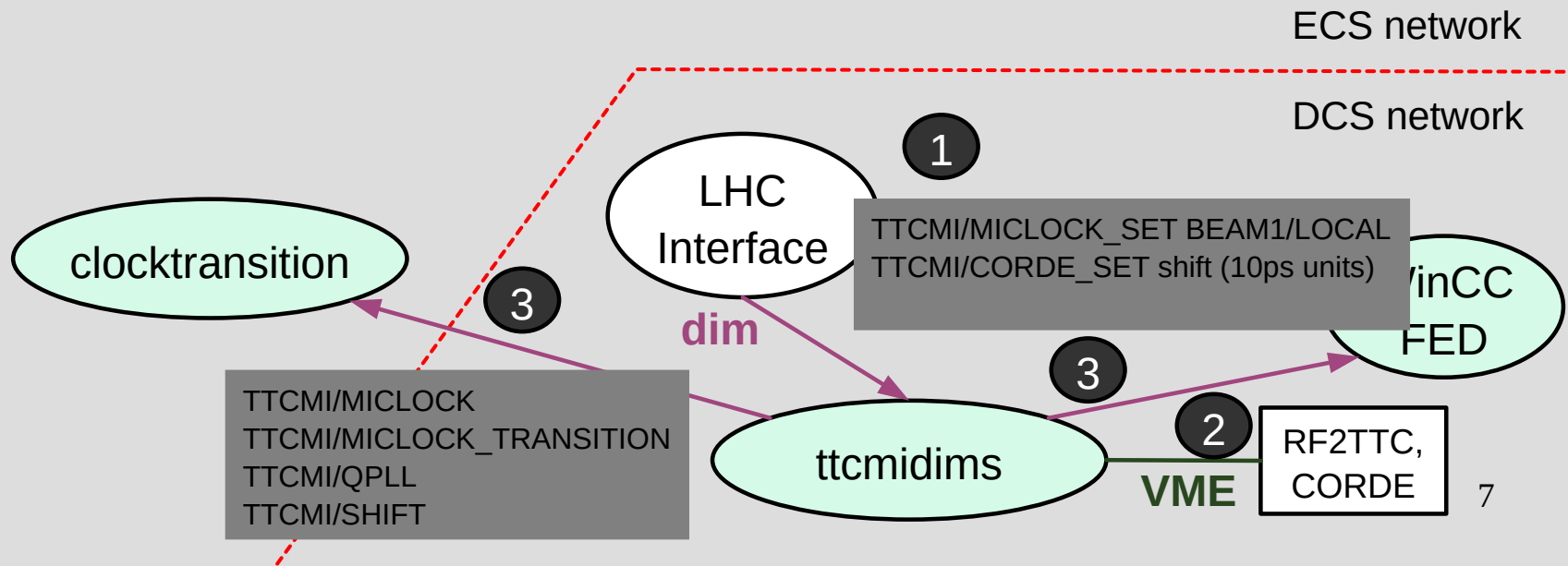
- Listen to ctpd commands
- Update LTU
- Send physics counters/monitoring values to ctp3-mon

```

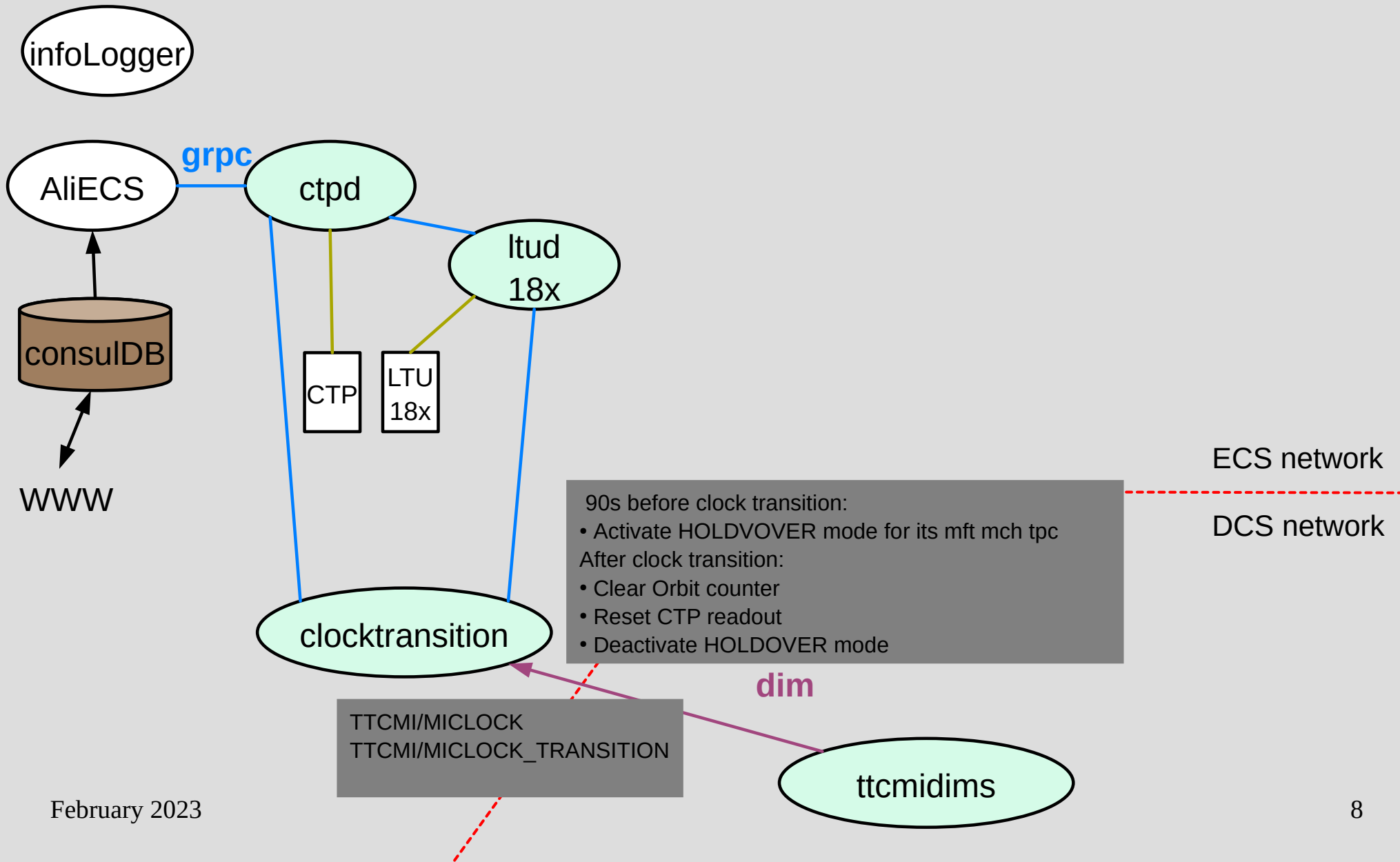
bcm TOF 100 1288 2476
bcd20 1khz
LTG emc
cal ppcal 2953 3012 4000 356399999
LTG ft0
LTG fdd
LTG to
LTG its
ferst 1
LTG mft
ferst 1
cluster cluemc emc
cl_bcd bcd20
    
```



# tccmidims

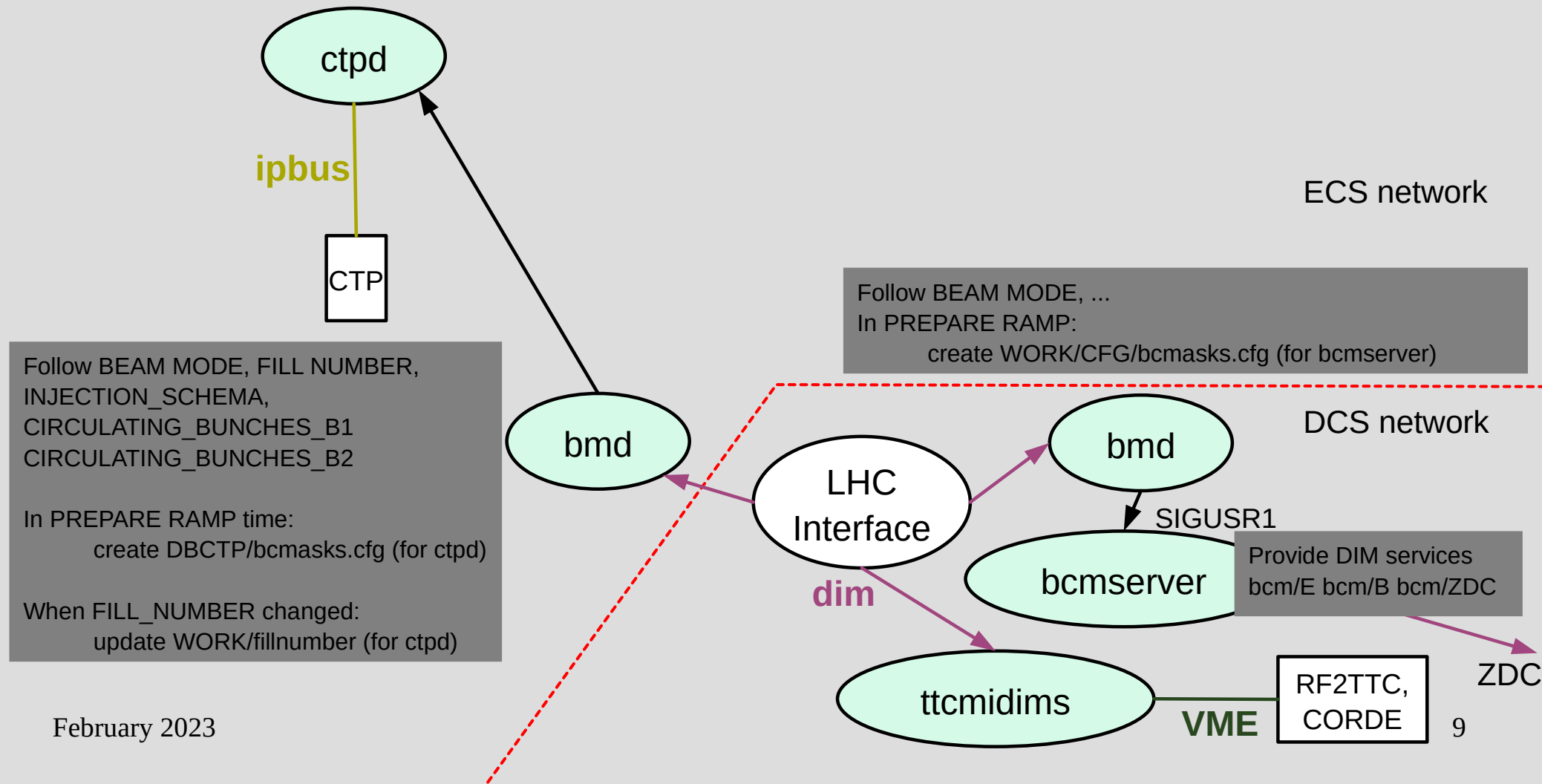


# clocktransition





# bmd (2x), bcmserver



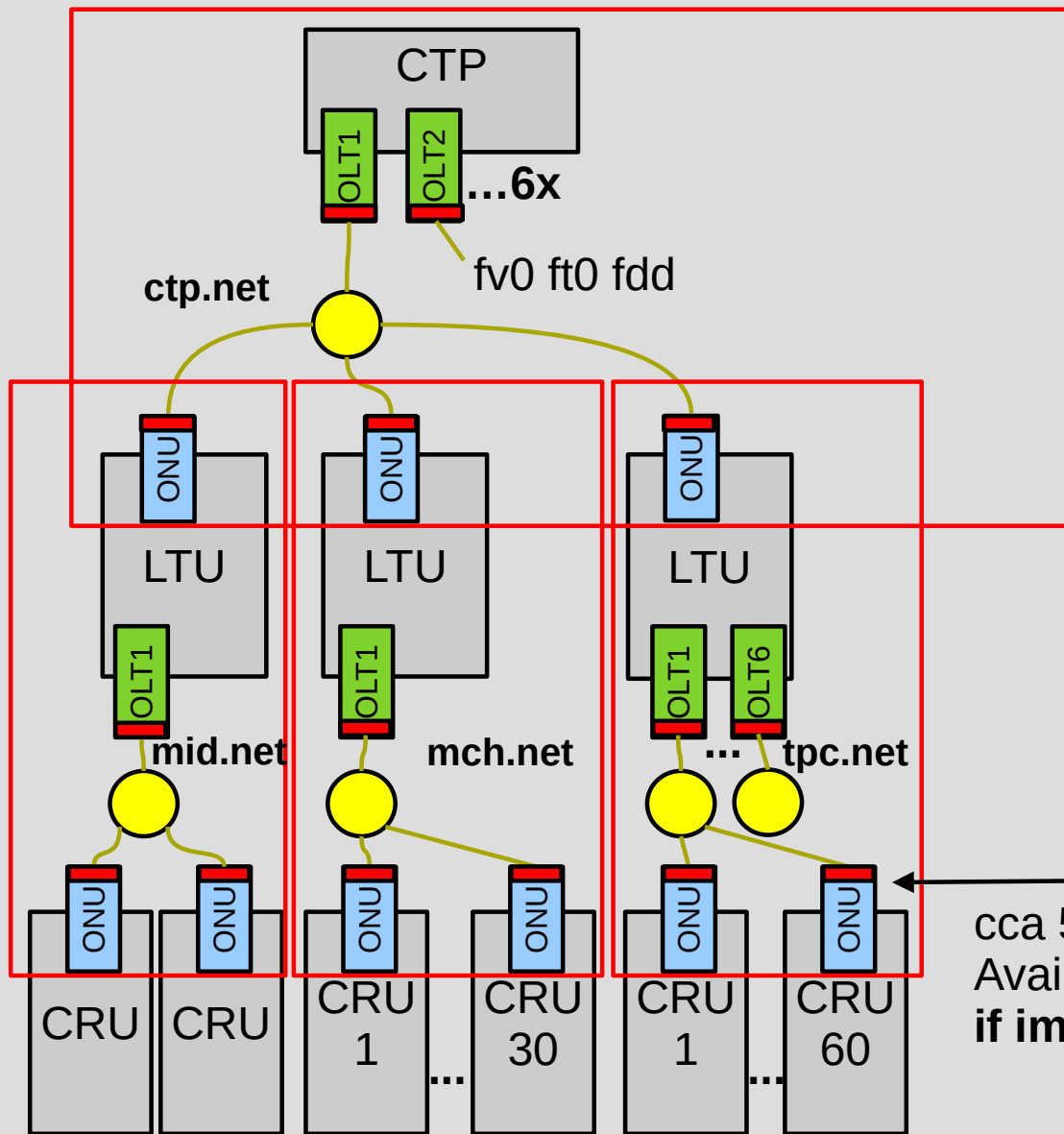
# Monitoring

- 1) Physics scalars, read from ATBs over ipbus
- 2) U, I, T for each ATB available over PMbus/USB (WinCC project).  
U, T (different source) for each board available also over ipbus.
- 3) U, T, optical power for all SFPs (OLTs, ONUs, GBTs) over ipbus
- 4) OLTs/ONUs Counters and Sticky bits catching the status of all ttcpon nets
- 5) Remote ONUs in CRUs (if upstream implemented in CRU)

Values archived, time trends available

Not archived, history not available

# ttcpon health monitoring



OLT, ONU:  
optical rx/tx power, U, T, 5 sticky bits

ONU:  
forward error corrections (single, double)  
SLC errors detected

OLTs: cca 30, ONUs: 18  
Available in ctpd/ltud over ipbus.

cca 500 ONUs  
Available over ttcpon SLC in ltud  
**if implemented in CRU**

# Practical example

When LTU in global mode, we sometimes observe triggers even if they are not sent from CTP. The spurious triggers are seen usually only in one LTU, although 3 LTUs share one ttcon splitter.

The FEC (Forward Error Correction) counters in corresponding LTUs also detect errors, which is an indication the problem is not in LTU itself but in the upstream connection to the CTP.

Seems the problem happens only after ctp.net ttcon calibration (after power up or fw modification of CTP/LTU), i.e. we check it always after such intervention.

The fix: reinitialise ONU, sometimes repeatedly.

Plan: arrange the FEC archival (also CRU values if available) in TSDB and alarms.

# Summary

## Development

- Seems we were able to follow the Alice needs during 1st year of run3
- Update of firmware+sw to the new ttcpon 1.0.1 done before run3 started
- TTCPON monitoring (mainly ttcpon) should be given more attention

## Runtime

- control/monitoring daemons running all the time in P2.

We appreciate activities of Košice group and help from our students, mainly with:

- Firmware development for RORC and CTP readout (Jakub, Simone) and GBT interface (Luis)
- Luminosity calculation published to LHC (Ivan)
- QC -trigger specific interface (Marek)
- DCS -WinCC project (Ishaan)
- Manufacturing/repair of ATBs (Dodo).
- Monitoring -(Martin) takes care about TSDB and its presentation, also maintaining semi-automatic update of our software in P2

# Backup

2019 trigger meeting in Danišovce: <https://indico.cern.ch/event/810823/>