# ECCE Computing Plan

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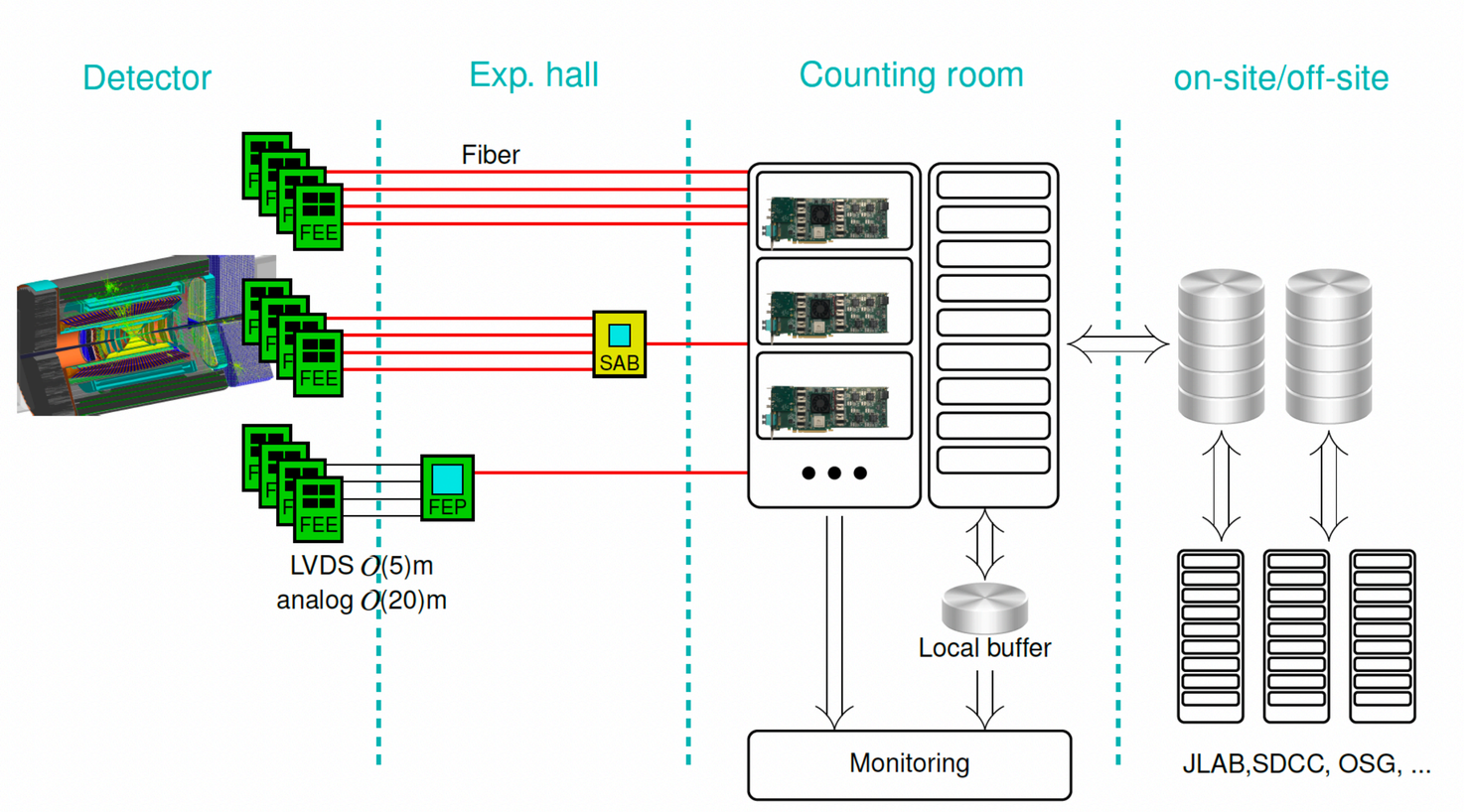
# Overview

- Software and computing team developed a computing plan for ECCE
- Started as an accompanying note to the proposal
  - Has since evolved into a paper to be submitted to rolling NIMA issue
- Covers two topics:
  - What ECCE did for software and computing during the proposal period
  - What ECCE intends to do for software and computing over the next several years and towards data taking

**Contents**

# Online

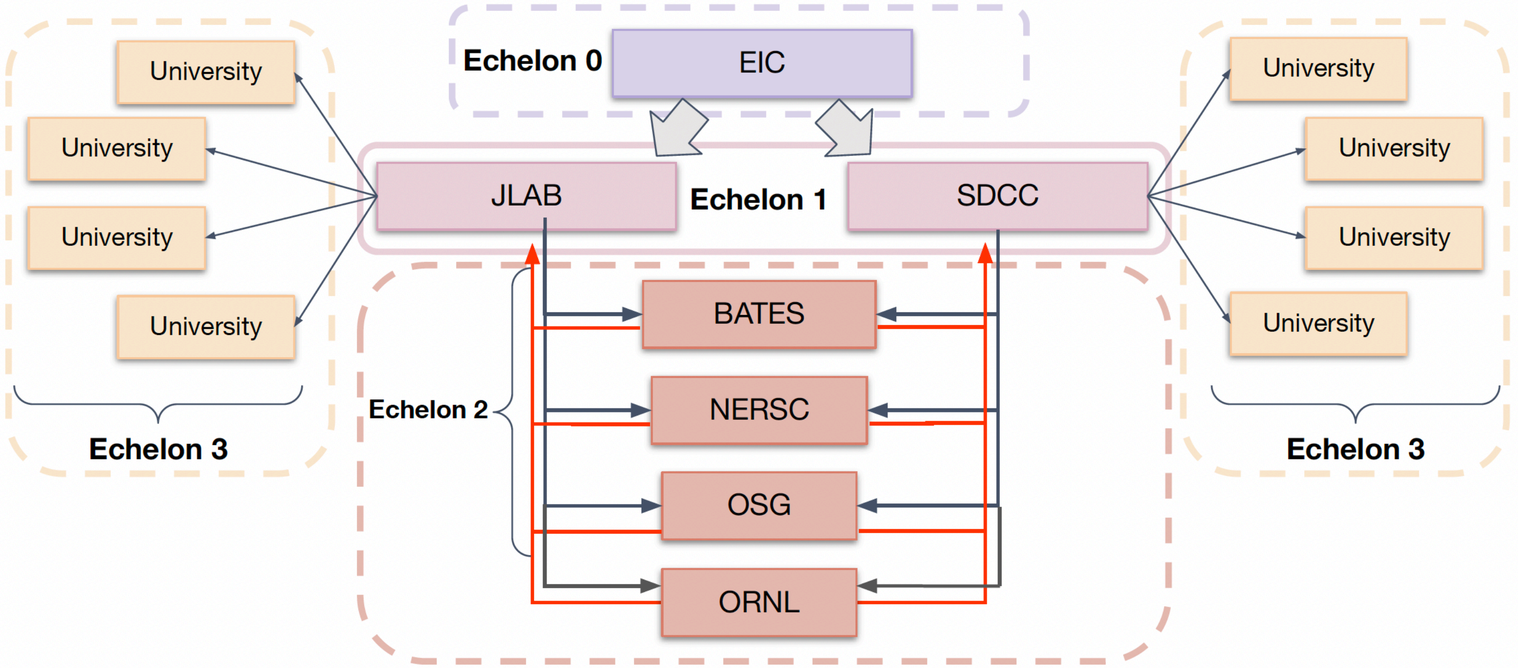



- Online section focuses on plans for data taking
  - DAQ and data readout
  - Online monitoring
  - Risk mitigation
  - AI based triggering
  - Expected rates and reduction steps

# Offline

- Reconstruction
  - Discusses goals for software post-proposal, not current software
- Calibration
  - Tracks, PID, calorimetery, alignment, and database
- Simulation
  - Focuses on description of campaigns run for proposal

# Offsite Processing




- Focused on federated computing plan for EIC, modeled after the Worldwide LHC Computing Grid (WLCG)
  - Discusses our implementation during proposal
- Goal is to reconstruct data for physics analysis within 2-3 weeks of acquisition

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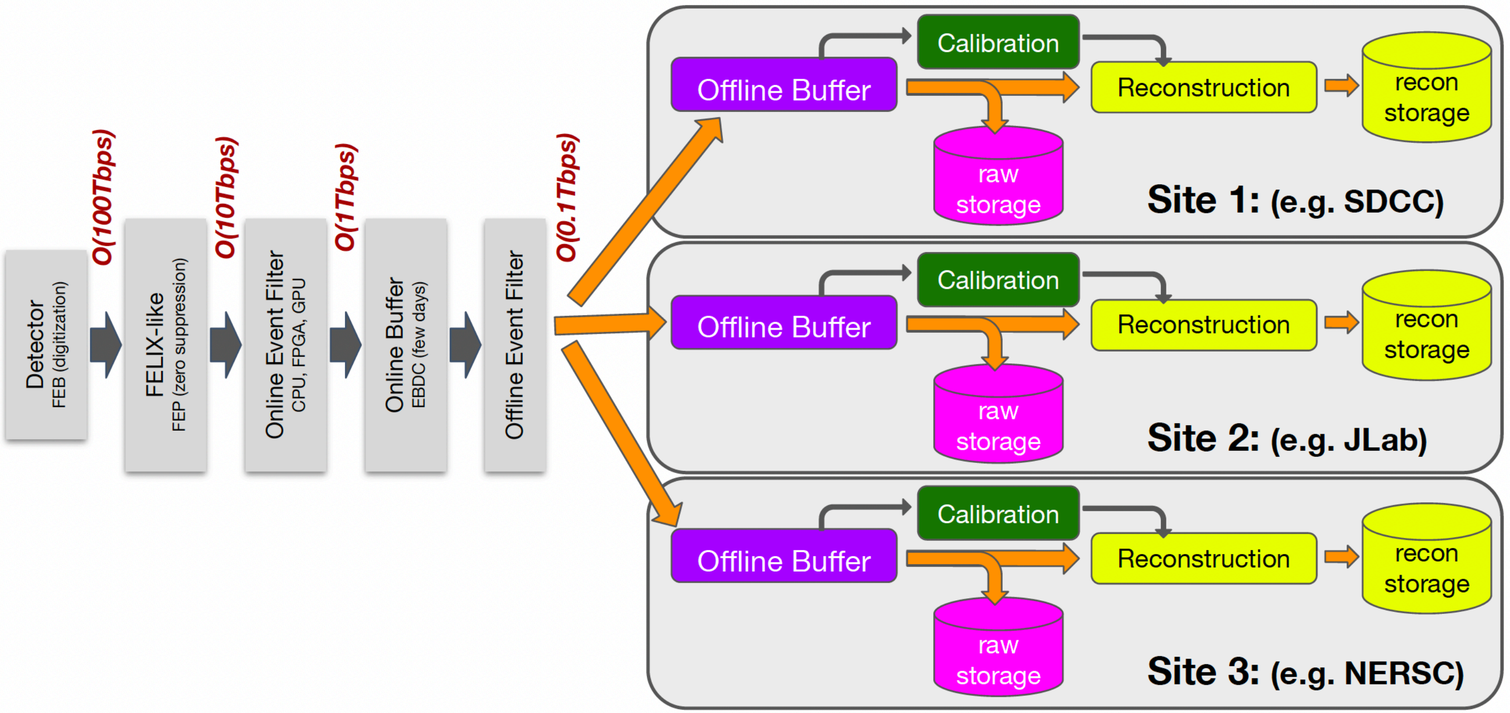


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# Resource Requirements

| **ECCE Runs** | year-1 | year-2 | year-3 |
|---|---|---|---|
| Luminosity | $10^{33}\text{cm}^{-2}\text{s}^{-1}$ | $2 \times 10^{33}\text{cm}^{-2}\text{s}^{-1}$ | $10^{34}\text{cm}^{-2}\text{s}^{-1}$ |
| Weeks of Running | 10 | 20 | 30 |
| Operational efficiency | 40% | 50% | 60% |
| Disk (temporary) | 1.2PB | 3.0PB | 18.1PB |
| Disk (permanent) | 0.4PB | 2.4PB | 20.6PB |
| Data Rate to Storage | 6.7Gbps | 16.7Gbps | 100Gbps |
| Raw Data Storage (no duplicates) | 4PB | 20PB | 181PB |
| Recon process time/core | 5.4s/ev | 5.4s/ev | 5.4s/ev |
| Streaming-unpacked event size | 33kB | 33kB | 33kB |
| Number of events produced | 121 billion | 605 billion | 5,443 billion |
| Recon Storage | 0.4PB | 2PB | 18PB |
| CPU-core hours (recon+calib) | 191Mcore-hrs | 953Mcore-hrs | 8,573Mcore-hrs |
| 2020-cores needed to process in 30 weeks | 38k | 189k | 1,701k |

- Final section (and summary) focus on resource requirement estimates for first 3 years of data taking
- Estimates are based off of experience from proposal
- Note - still large uncertainties to these numbers!
  - Landscape can (and will) change
  - Reflects our current best estimates

# Summary

- ECCE computing plan has evolved into an article to be submitted to rolling edition of NIM
- The paper discusses
  - Future plans for ECCE online and offline data processing
  - Simulation campaigns from proposal-period and resource estimates based off this experience
- Would like to submit ASAP - computing changes quickly!