



# CERN openlab IT Challenges

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CERNopenlab

# CERN openlab in a nutshell

A science – industry partnership to drive R&D and innovation

Evaluate state-of-the-art technologies in a challenging environment and improve them

Test in a research environment today what will be used in many business sectors tomorrow

Train next generation of engineers/employees

Disseminate results and outreach to new audiences

## PARTNERS



ORACLE

SIEMENS

## CONTRIBUTOR



## ASSOCIATE

Yandex

# LHC Schedule

2009 2010 2011 2011 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 ... 2030?



LHC startup  
900 GeV

Phase-0 Upgrade  
(design energy,  
nominal luminosity)

Phase-1 Upgrade  
(design energy,  
design luminosity)

Phase-2 Upgrade  
(High Luminosity)

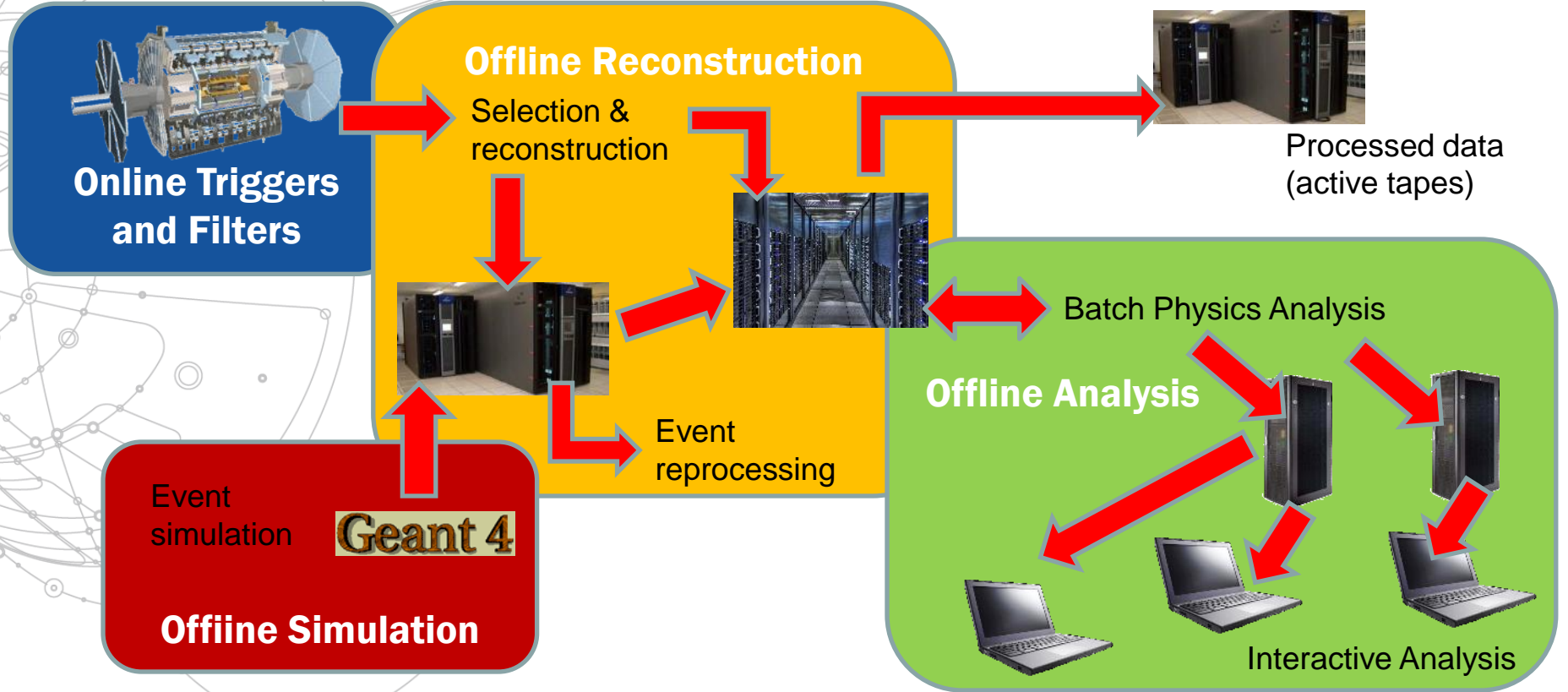
7 TeV  
 $L=6 \times 10^{33} \text{ cm}^{-2}\text{s}^{-2}$   
Bunch spacing = 50 ns

14 TeV  
 $L=1 \times 10^{34} \text{ cm}^{-2}\text{s}^{-2}$   
Bunch spacing = 25 ns

14 TeV  
 $L=2 \times 10^{34} \text{ cm}^{-2}\text{s}^{-2}$   
Bunch spacing = 25 ns

14 TeV  
 $L=1 \times 10^{35} \text{ cm}^{-2}\text{s}^{-2}$   
Spacing = 12.5 ns

# Data Handling and Computation



# CERN IT Infrastructure

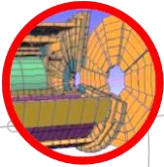


# Challenges

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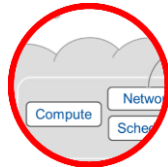
Online triggers and DAQ



Offline simulation and processing



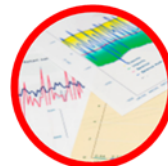
Data storage architectures



Resource management and provisioning



Networks and connectivity

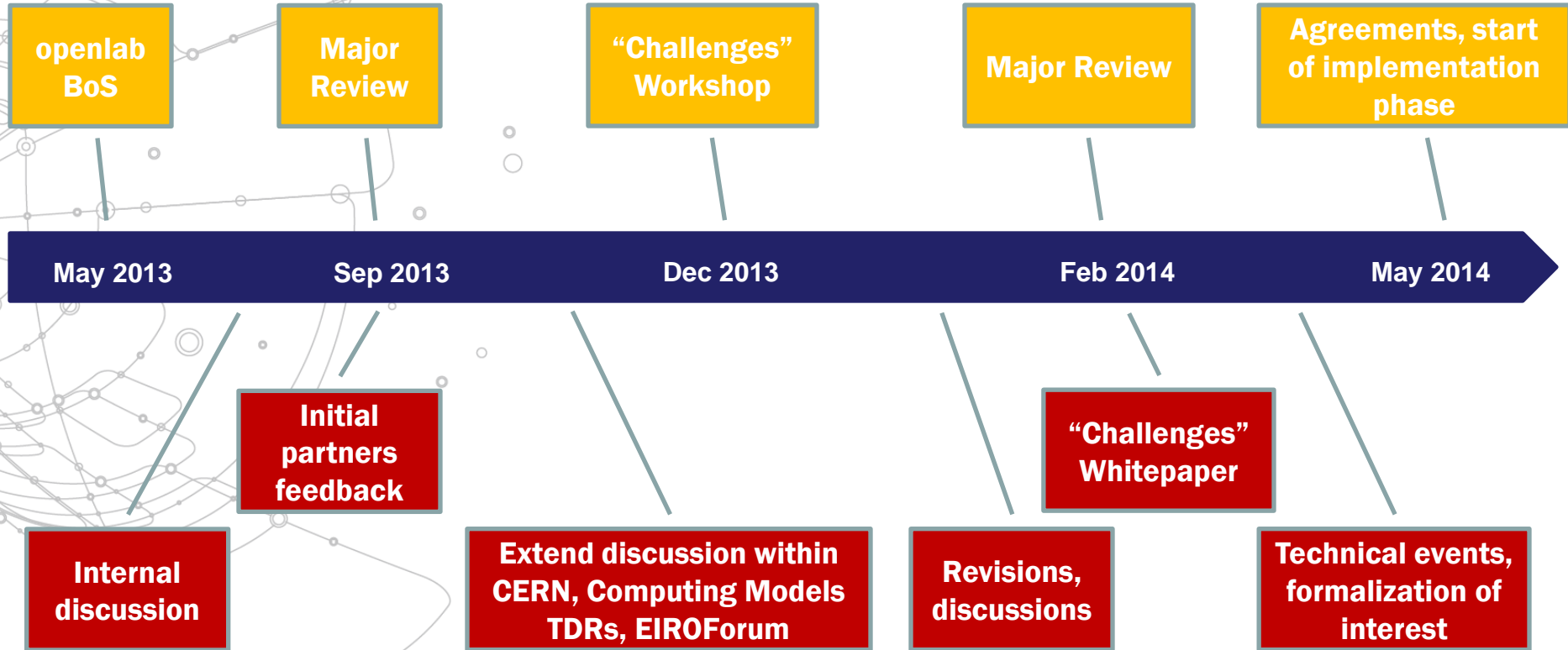


Data analytics

# Technical Challenges and Use Cases

- A set of ambitious challenges with a 5-year time scope
- A practical set of use cases for each challenge
- Based on LHC and experiment requirements, but open to general needs of other research organizations in terms of large-scale computing and data services

# Towards openlab Phase 5







## GET IN TOUCH [www.cern.ch/openlab](http://www.cern.ch/openlab)

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