CERN openlab Workshop on Data Center Technologies and Infrastructures

Welcome and Introduction

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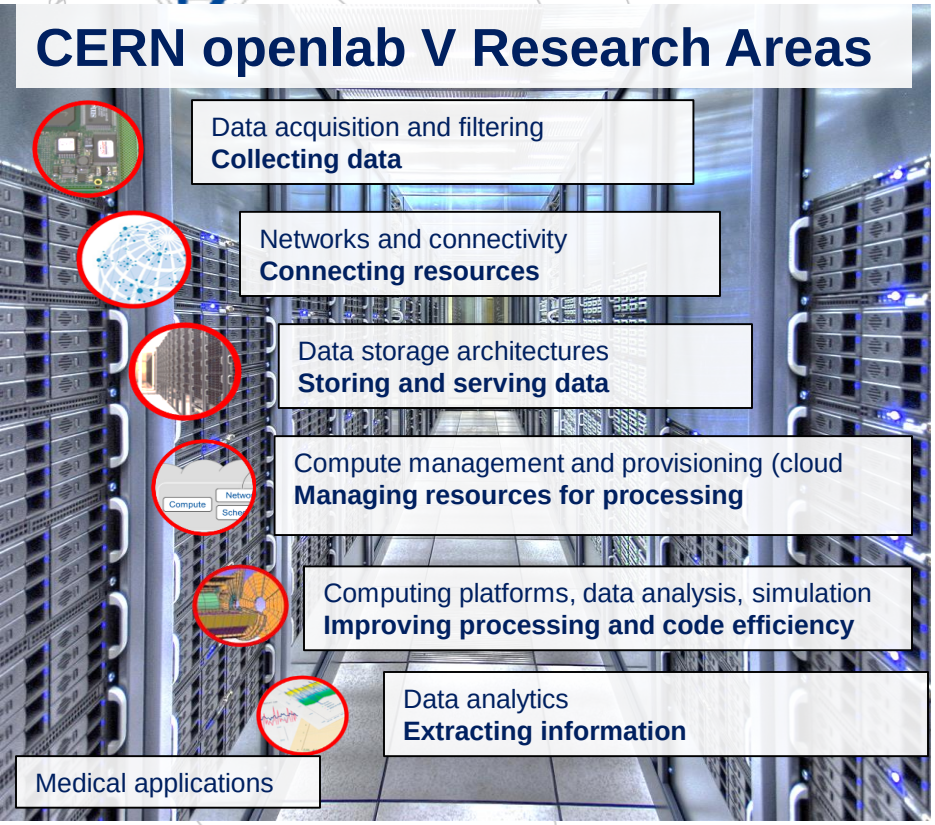
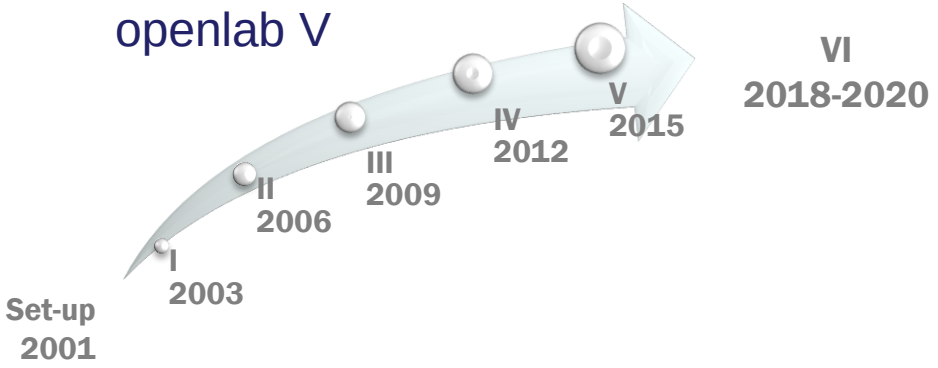
CERN openlab

Towards CERN openlab VI

CERN openlab V Research Areas

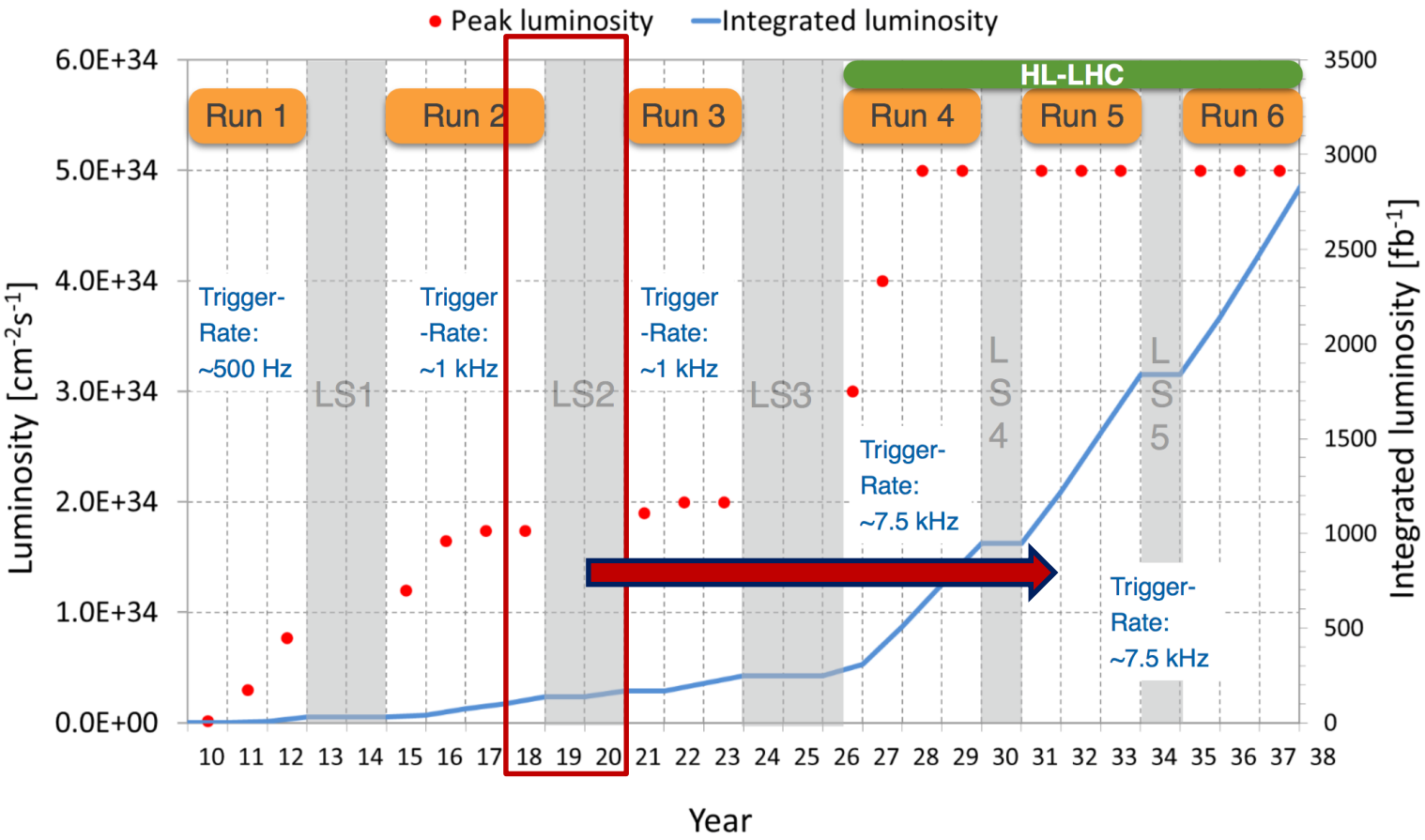


- We are at Q1 of year 3 of CERN openlab V

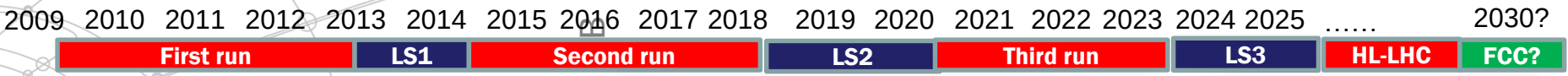


- This year is key for the preparation of phase VI
  - engaging the community to gather requirements and needs for Run3 and Run4
  - Identify with industry and research partners use cases and challenges of mutual benefit

The Big Picture – The LHC Schedule

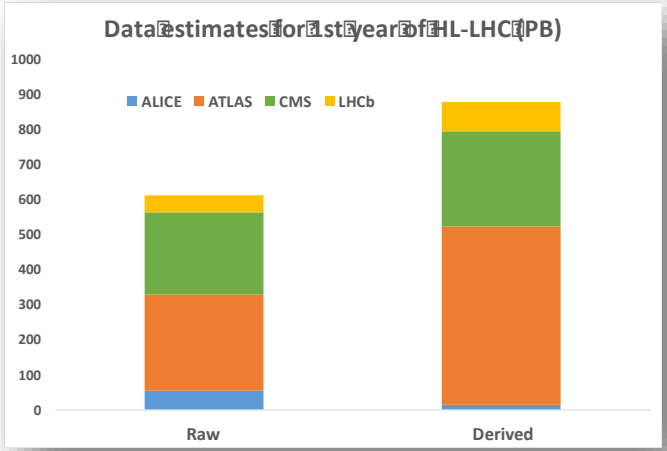


LHC Run3 and Run4 Scale and Challenges

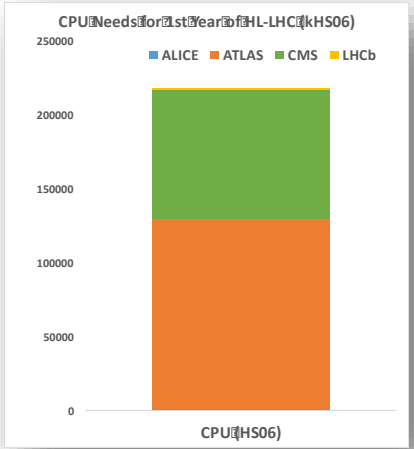


- Raw data volume for LHC increases exponentially and with it processing and analysis load
- Technology at ~20%/year will bring x6-10 in 10-11 years
- Estimates of resource needs at HL-LHC x10 above what is realistic to expect from technology with reasonably constant cost

Technology revolutions are needed



Data:
- Raw 2016: 50 PB → 2027: 600 PB
- Derived (1 copy): 2016: 80 PB → 2027: 900 PB



CPU:
- x60 from 2016

Courtesy of I. Bird

Three Broad Areas of R&D

- **Data Center Technologies and Infrastructures**
  - Networks
  - Cloud Computing
  - Storage and databases
  - Data Center Architectures (disaggregation)
- **Computing Platforms and Software**
  - Architectures
  - Software modernization/acceleration
- **Data Analytics and Machine Learning**
  - Physics
  - Engineering (Control systems, infrastructure optimization)
  - Great interest from other communities

Three Topical Workshops

- Data Center Technologies and Infrastructures: March 1st
- Computing Platforms and Software: March 23rd
- Data Analytics and Machine Learning: April 27th

- **Whitepaper on Computing Challenges,** September 2017

- Q4 2017: renewal of FA and finalization of projects
- Jan 2018: start of Phase VI

Today's Agenda

5 Brainstorming Sessions

Data Center Technologies		9:15-10:30
Coffee Break		**10:30 – 11:00**
Storage Technologies		11:00-12:00
Lunch Break		12:00 – 13:00
Clouds		13:00-14:00
Databases 14:00-15:00	Networks 14:00-15:00	
Coffee Break		15:00 – 15:30
Reports from the brainstorming sessions 15:30-16:30		

Goals

- Collect requirements and needs from the community towards HL-LHC
- Discuss innovative technologies and challenges from industry
- At the end of the day, discuss and pin-down some possible use cases for phase VI projects