



# The Worldwide LHC Computing Grid



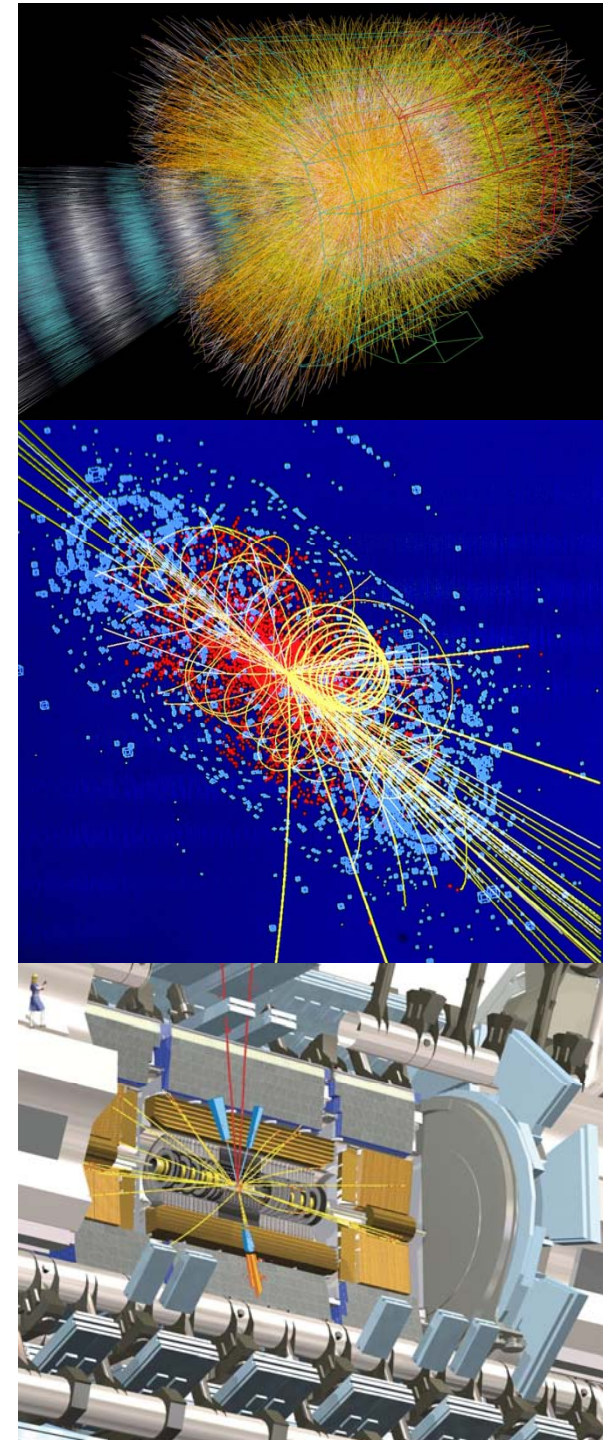
les.robertson @cern.ch



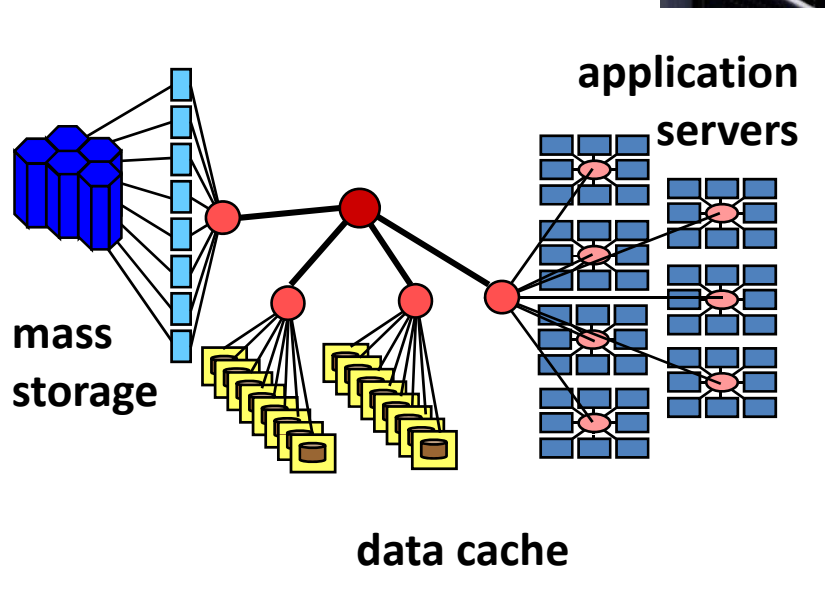
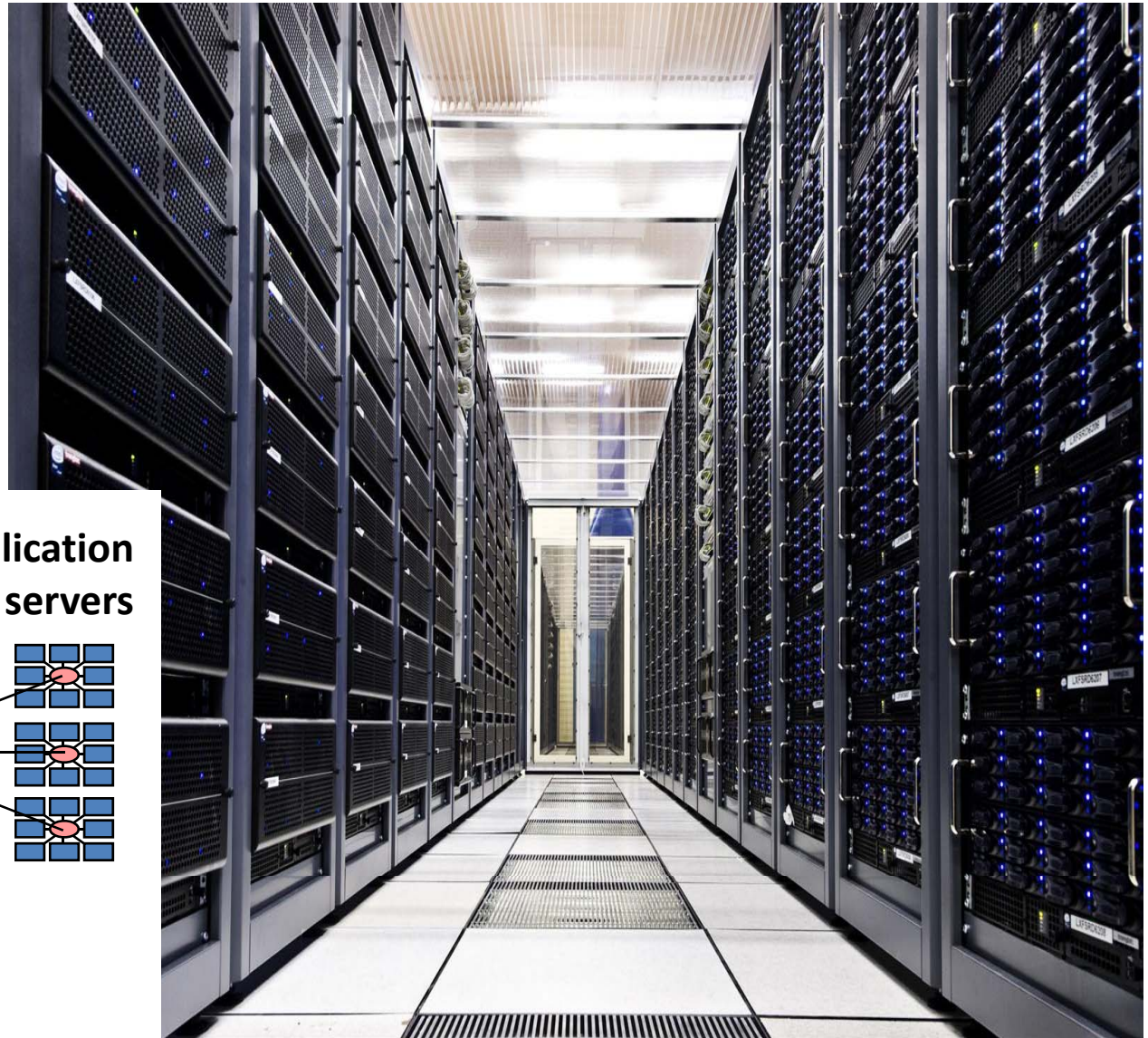


# The LHC Computing Challenge

- The scale and complexity of the data
- The computing capacity to support 7,000 researchers all actively analysing the data
- The way in which the data is accessed will depend on the physics that emerges

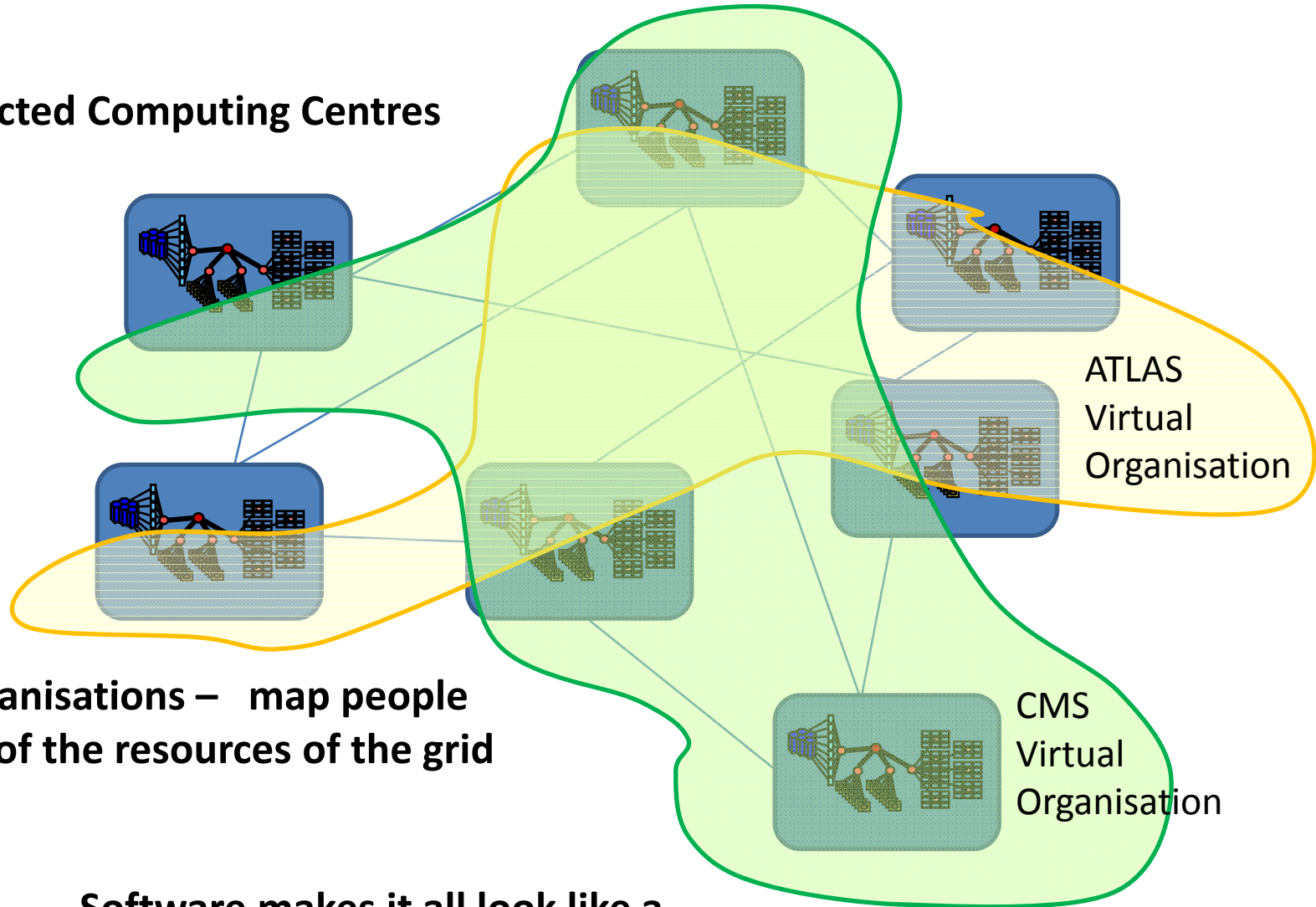


# Scalable Cluster Architecture



# What do we mean by a Computing Grid?

Interconnected Computing Centres



Virtual Organisations – map people to subsets of the resources of the grid

Software makes it all look like a single computing service for each Virtual Organisation

# LHC Computing Service Hierarchy

## Tier 0

initial processing  
long-term data archive



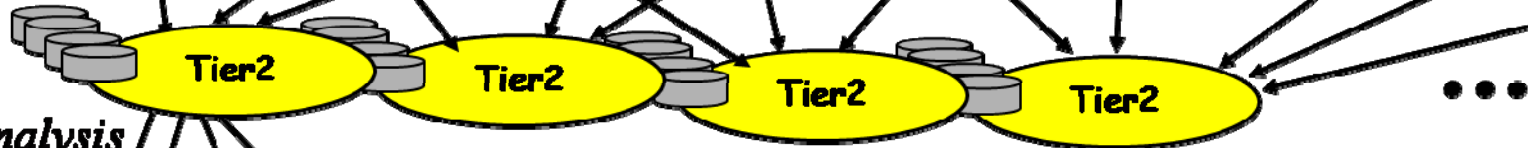
## Tier 1s

data curation  
data-intensive analysis  
national, regional support



## Tier 2s

end-user analysis  
simulation  
~130 centres  
in 33 countries



### The Tier-1 Centres

Canada - Triumf (Vancouver)  
France - IN2P3 (Lyon)  
Germany - Forschungszentrum  
Karlsruhe  
Italy - CNAF (Bologna)  
Netherlands - NIKHEF/SARA  
(Amsterdam)

Nordic countries - distributed  
Tier-1

Spain - PIC (Barcelona)  
Taipei - Academia Sinica  
UK - Rutherford Lab (Oxford)  
US - FermiLab (Illinois)  
- Brookhaven (NY)





# Building and Operating the Worldwide LHC Computing Grid



## A collaboration between:

- The physicists and computing specialists from the LHC experiments
- The projects in Europe and the US that have been developing Grid middleware
- The regional and national computing centres that provide resources for LHC
- The research networks

Researchers

Computer Scientists & Software Engineers

Service Providers



# A Worldwide Computing Grid ready for LHC Data Analysis

