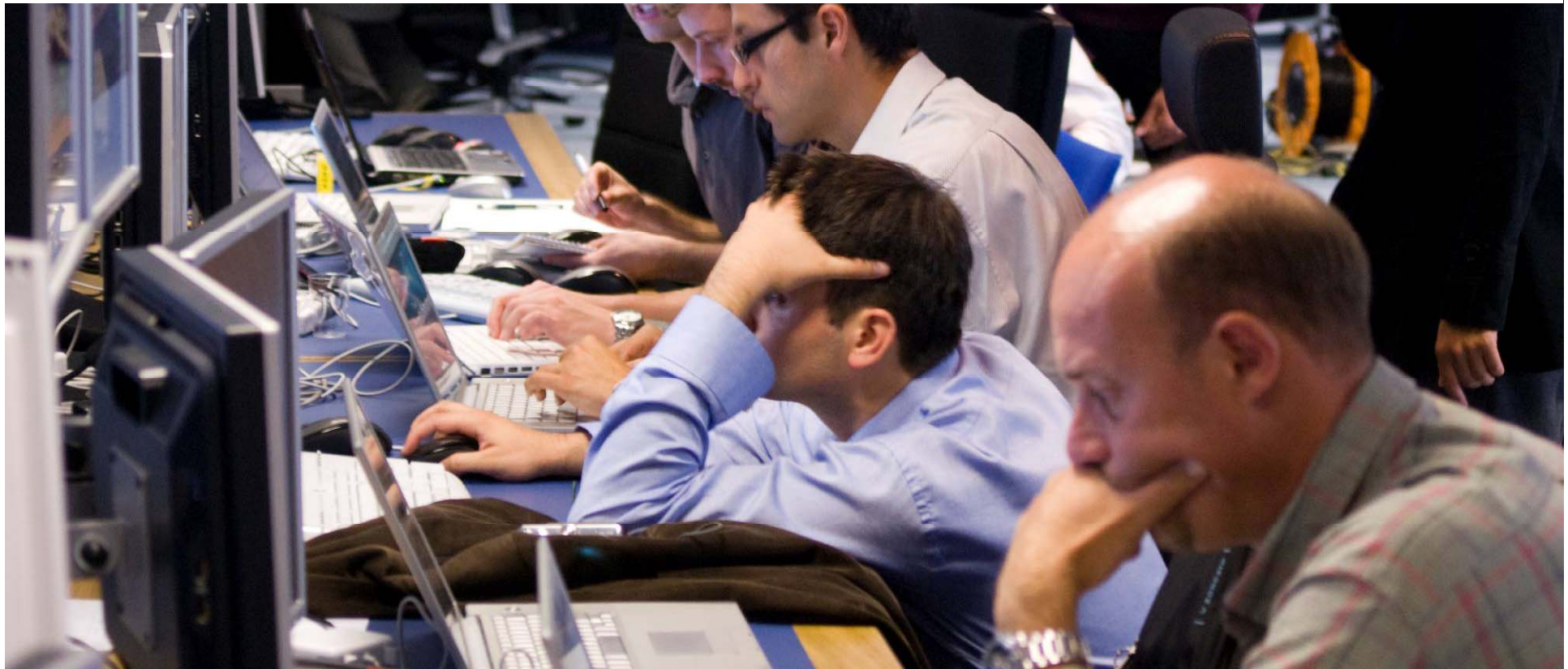


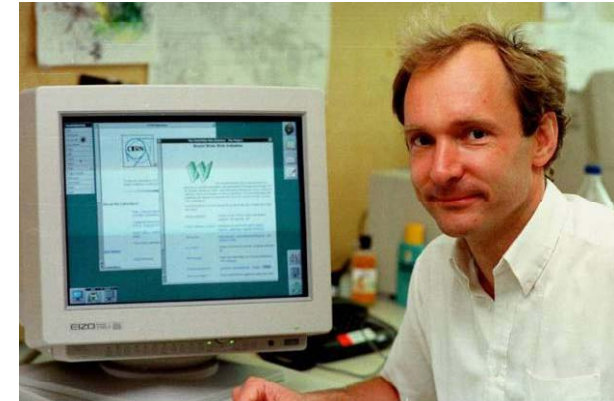
# Collaborating at a Distance

Lucas Taylor ▪ LHC Grid Fest ▪ 3 Oct 2008 ▪ CERN



- On-demand documents
  - Web invented at CERN
- On-demand Computer storage and processing
  - Grid
- On-demand people
  - Need to harness global physics expertise for LHC physics

Communications



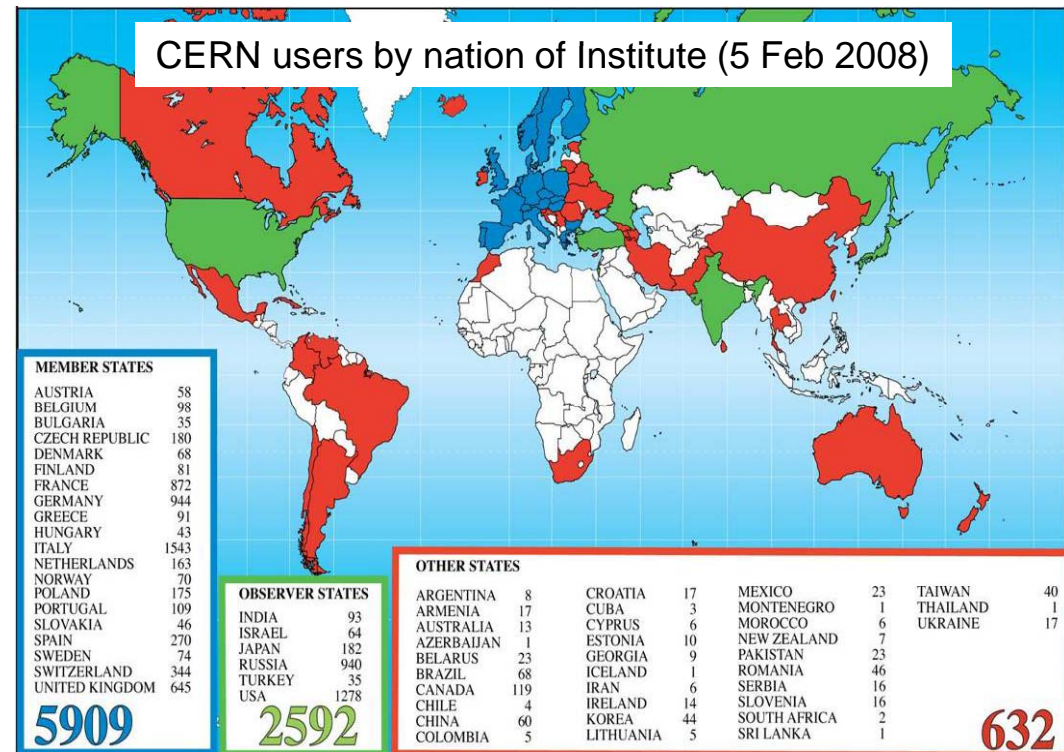
Tim Berners Lee



## LHC : Competitive Collaboration

- **Competitive**
  - Be first and best
- **Collaboration**
  - Common physics goals
  - Share technical solutions
- **Teams are globally distributed at all levels**
  - Detector builders
  - Software developers
  - Computing operators
  - Physics analysis teams
  - Management, funding
- **Matrix organizations**

**Communications**



Example: ATLAS collaboration

37 Countries  
169 Institutions  
2500 Scientific authors

# Communications Systems

## ■ Text

- Email (too much), SMS (not much)
- Instant messaging (especially youth)
- News / discussion groups

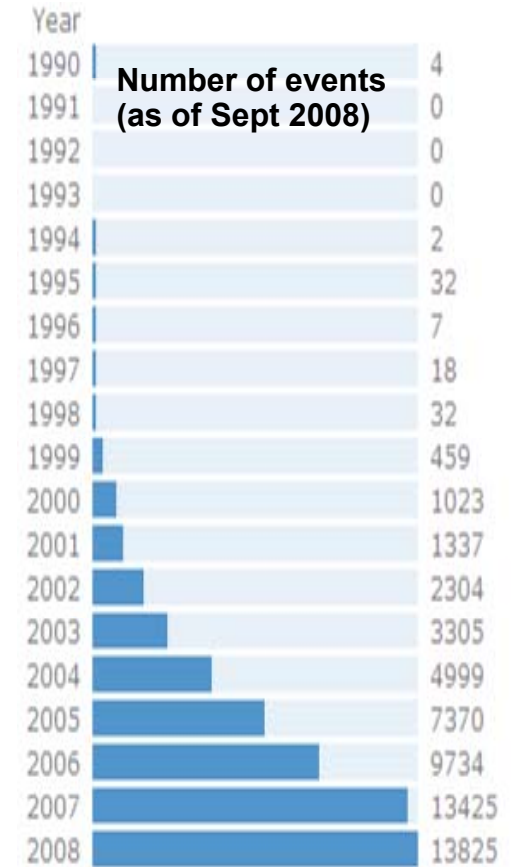
## ■ Voice

- Phone (especially mobile)
- Phone-conferencing (small discussions)

## ■ Video-conferencing

- EVO system (Caltech/HEP)
- High quality commercial systems (H323)

## ■ CERN meeting management system (Indico)



## Example: EVO video-conferencing

### Statistics

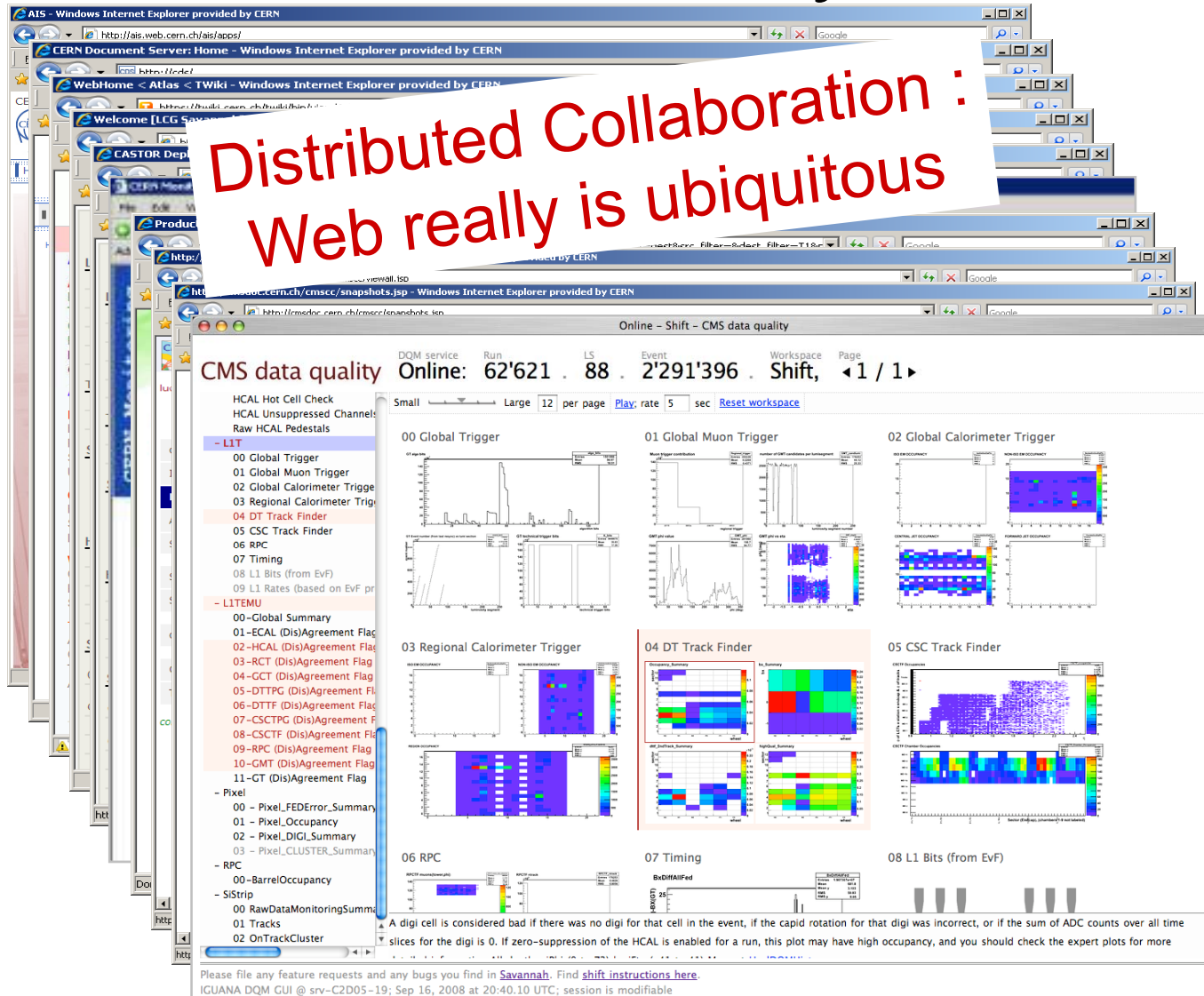
- 18,900 registered users
- 600 users (unique) per day
- Around 160 meetings per day
- Around 3,000 meetings per month
- Up to 280 users in the same meeting



## Collaborative Systems : examples

**Distributed Collaboration :  
Web really is ubiquitous**

- Finance, HR, admin
- Document servers
- Wikis, e-learning ...
- Software development
- Task / bug tracker
- Computing operations
- Services monitoring
- Operations centres
- Shift operations
- Physics data quality



# Distributed Operations Centres

CMS Remote Operations Centre at Fermilab

CMS Experiment Control Room



High definition permanently-running video links  
between operations centres

CMS Centre at CERN: monitoring, computing operations, analysis

# Distributed Collaboration

- It works! Web is central to everything
- Particle physics community develops new tools as-needed
  - Web, Grid, (what next ...?)
  - ...and uses numerous commodity systems
- Distributed Collaboration is crucial to the success of the exciting physics analysis phase of the LHC

... next talk ...





Thank you