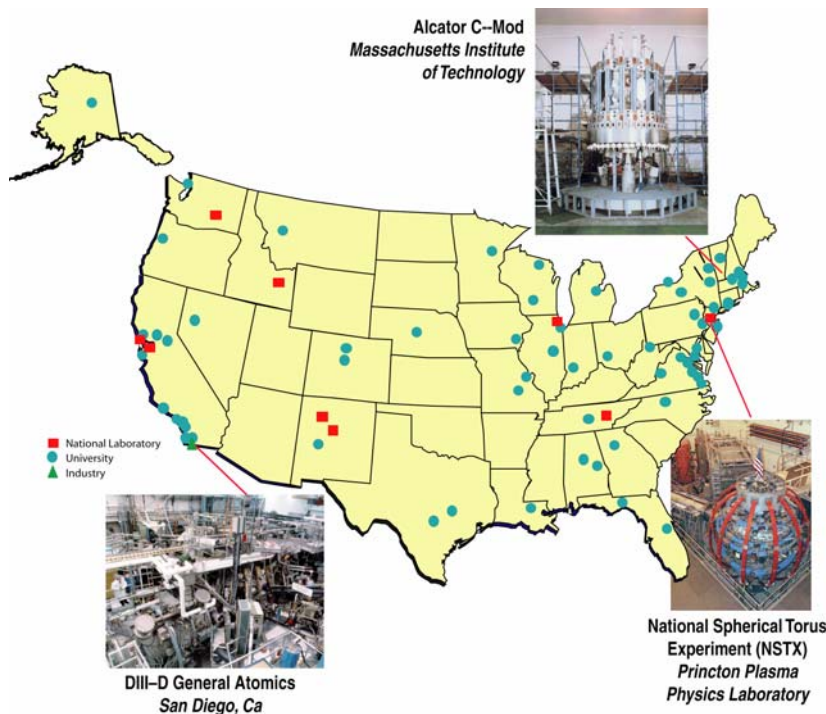


Remote Collaboration at the PSFC and in the Fusion Community



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MIT Plasma Science and Fusion
Center
National Fusion Collaboratory

Collaborations in the Fusion Program



- 3 Large experimental facilities (4th under construction)
- > 40 U.S. fusion research sites in 37 states - Over 1500 scientists
- Significant International collaborations



Overview

- Current Usage
 - Multi-Site meetings
 - Point to Point (person(s) to person(s))
- Accolades and complaints
- The Future
- Other Collaboration Technologies



Multi-site Meetings

- One conference room
 - Ceiling microphones / Sound processor
 - ISDN Codec
 - Computer(s) & video projector(s)
- Audio quality!
- Ease of use
- Slides out of band (meeting place, VNC, ...)
- Streaming Audio and Video
- Moving to H323
- vrvs (LNS-HEP)
 - Scheduler
 - Laptop/desktop connectivity
 - 2-4 hrs/day



Person(s) to Person(s)

- Desktop systems (PC and Linux)
- AccessGRID
 - <http://www.accessgrid.org/>
- vrvs
- Open H323 – Software based codecs
- Closed H323 – Proprietary codecs
- VNC



Accolades and Complaints

- ISDN based system worked well
 - Self service ☺
 - Scheduler awkward ☹
- Streaming locally problematic
 - Codian (88xxx service) great! ☺
- Need floor control
- Out of band slides essential
 - Full screen/Full resolution essential
 - Movies ?
 - Meetingplace fair – No client software installation ☺ - Macintosh support ☹ -Not full screen ☹
 - Using VNC instead – No floor control ☹
- slow ☹



The Future (near)

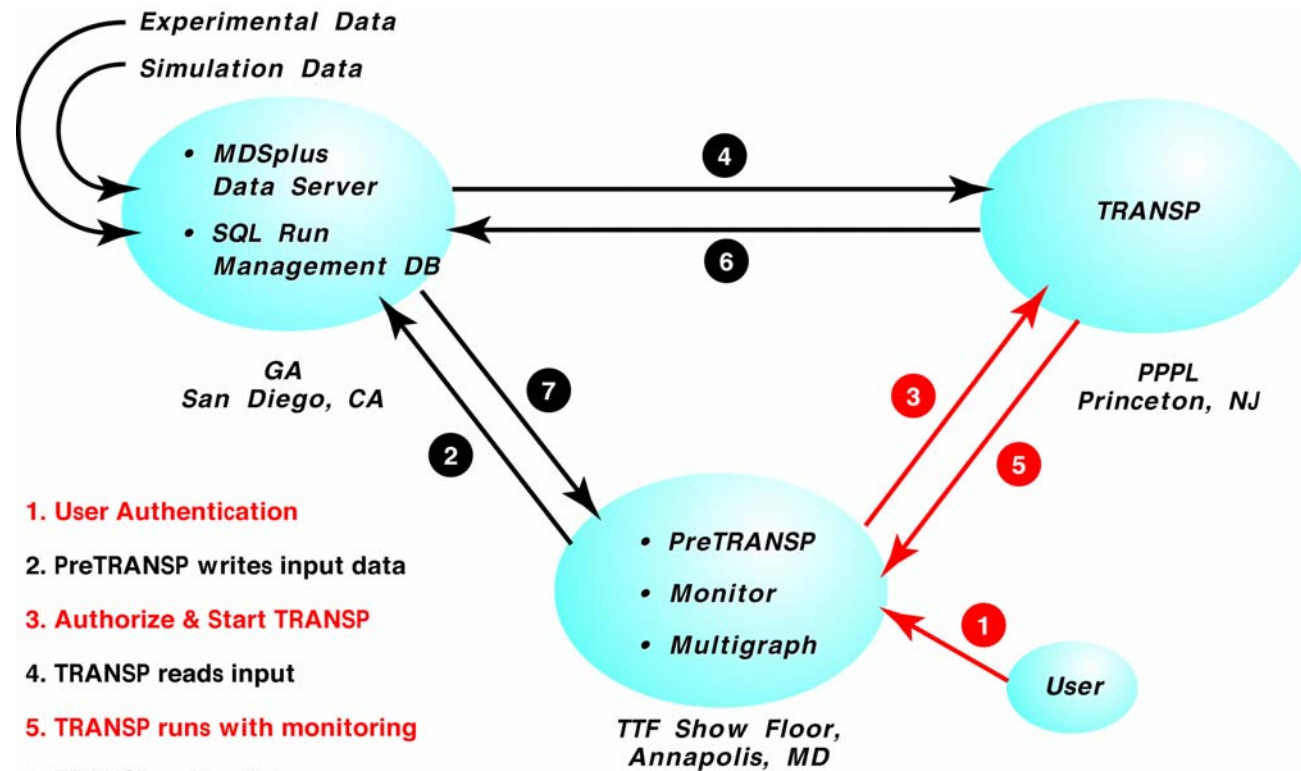
- H323 instead of ISDN
- AD-Hoc instead of scheduled
- Streaming provided by ESnet
- Smaller venues (desktops)
 - H323
 - AccessGrid (bridged)
 - VRVS



Other Technologies

- Transparent remote access to data
 - MDSplus
- SIP based communication
 - Audio
 - Video
 - IM
 - Session Control
 - Find people (VOIP, POTS, CELL, PAGE, ...)
 - PBX like interface
- Shared applications
 - "hey – look at this window"

Modeling Codes as Fusion Grid services



EXPERIMENTAL SCIENCES PLACES A LARGE PREMIUM ON RAPID DATA ANALYSIS IN NEAR-REAL-TIME

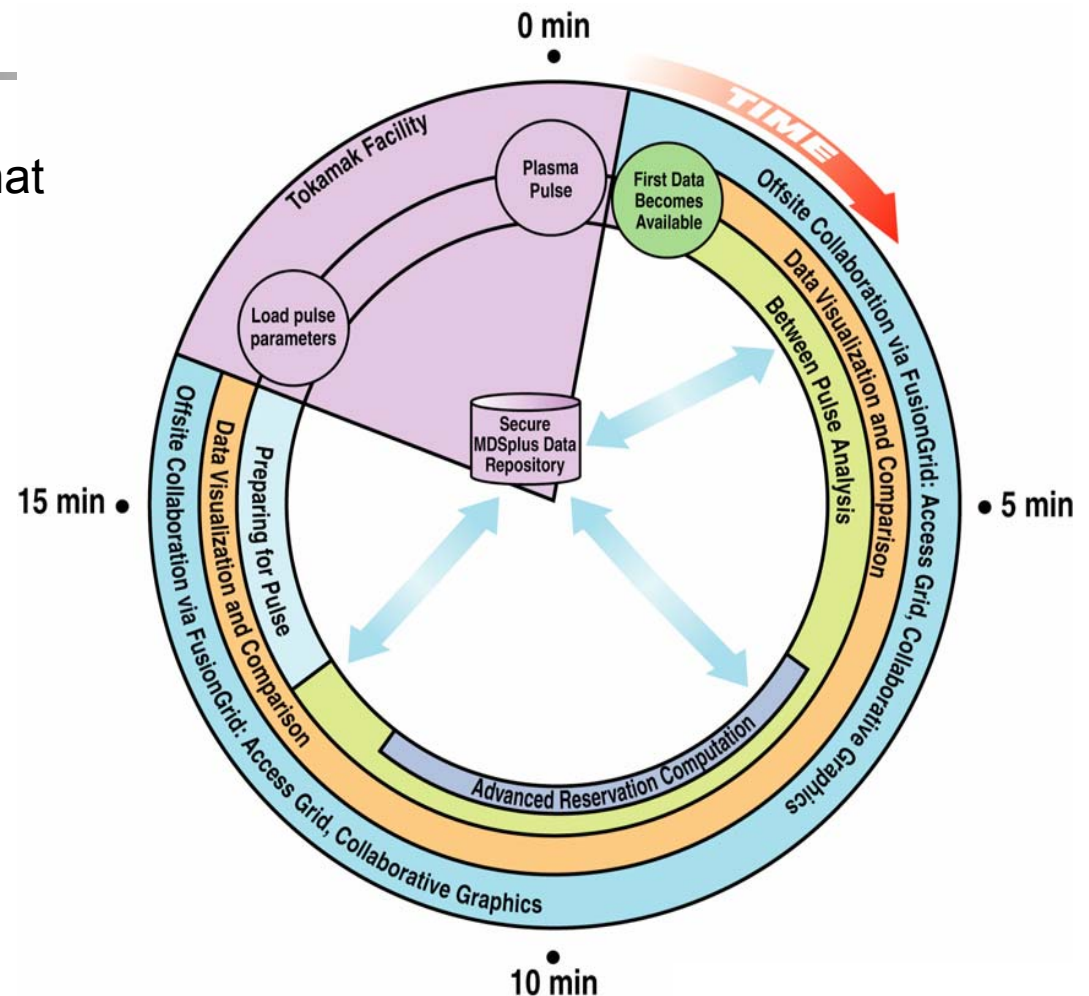


- Pulsed experiments
 - 10s duration plasma every 20 minutes
- 20-40 people in control room
 - More from remote locations
- 10,000 separate measurements/plasma
 - kHz to MHz sample rates
 - Between pulse analysis
- Not batch analysis and not a needle in a haystack problem
 - Rapid “real-time” analysis of many measurements
- More informed decisions result in better experiments
 - The collaborative control room

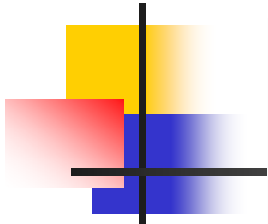
THE COLLABORATIVE CONTROL ROOM IS FUNDAMENTAL TO ADVANCING FUSION SCIENCE



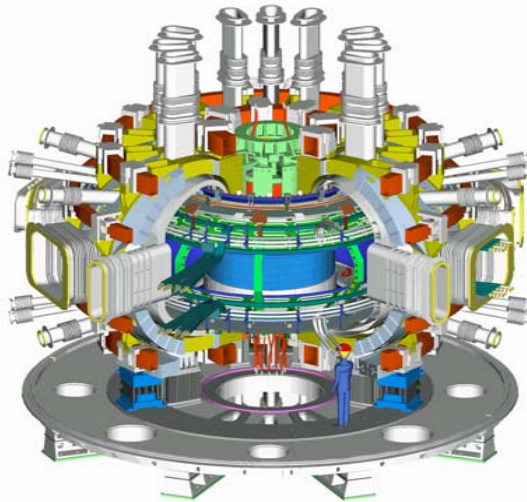
- Secure computational resources that can be scheduled as required
- Rapidly compare experimental data to simulation results
- Share individual results with the group via shared displays
- Fully engaged remote scientists via audio, video, shared displays



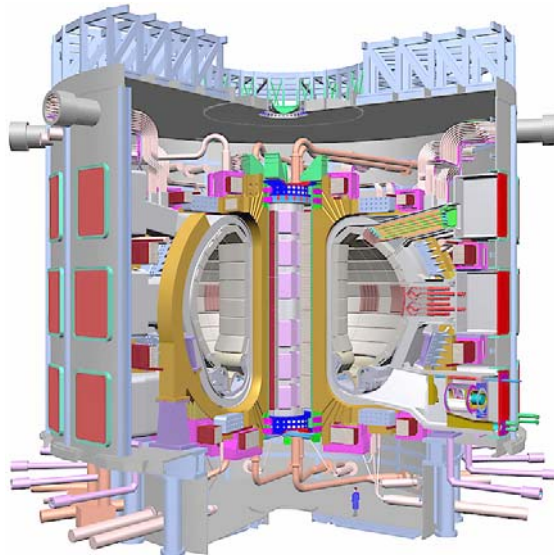
RP TECHNOLOGIES SCALE TO THE NEXT DEVICE



KSTAR



ITER



- One physical location
 - International collaboration
- Pulsed experiment with simulations
 - ~TBs of data in 30 minutes
- Successful operation requires
 - Large simulations, shared visualization, decisions back to the control room
 - Remote Collaboration via FusionGrid
- RP technologies critical to the success of these programs
 - Including construction phase



Conclusions

- Keep up the good work
- Commercial Standards based tools
 - Especially VOIP / SIP
- Better tools for sharing presentation materials
- Room audio quality critical
- ESNNet's role in FusionGrid activities ?