

Welcome to the DØRACE Workshop

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Why remote analysis?

- Demographics
- Technological evolution



Demographics

- The DØ collaboration is more distributed, more international than ever before



- We have 77 active institutions in 17 countries
- 585 collaborators of whom only 216 are resident at Fermilab
- I know that at least some U.S. institutions plan to reduce the fraction of time their graduate students spend at Fermilab during the later stages of the run



Technological evolution

- Ian Foster in Physics Today, February 2002:

*“A useful metric for the rate of technological change is the average **period during which speed or capacity doubles** or, more or less equivalently, halves in price. For storage, networks, and computing power, these periods are around **12, 9, and 18 months**, respectively. The different time constants associated with these three exponentials have significant implications.*

The annual doubling of data storage capacity, as measured in bits per unit area, has already reduced the cost of a terabyte (10^{12} bytes) disk farm to less than \$10 000. Anticipating that the trend will continue, the designers of major physics experiments are planning petabyte data archives.”

(that's us, by the way)



Ian Foster, continued ...

*“Such large data volumes demand more from our analysis capabilities. Dramatic improvements in microprocessor performance mean that the lowly desktop or laptop is now a powerful computational engine. Nevertheless, computer power is falling behind storage. By doubling "only" every 18 months or so, computer power takes five years to increase by a single order of magnitude. **Assembling the computational resources needed for large-scale analysis at a single location is becoming infeasible.***

***The solution to these problems lies in dramatic changes taking place in networking.** Spurred by [...] innovations [...] and by the demands of the Internet economy, the performance of wide area networks doubles every nine months or so; every five years it increases by two orders of magnitude.“*

- The message for us is clear



Remote analysis

- We have a responsibility to the collaboration to fully support and facilitate remote physics analysis
- We have a self-interest in doing so: it will maximize the physics output from the experiment
- In the longer term, a growing reliance on remote resources is almost certain to be critical if we are to provide adequate computing for DØ (not just for analysis)
- What I would like to see come out of this workshop
 - Establish a direction for remote physics analysis in 2002
 - Input to the upcoming review on DØ computing needs for “Greater Run 2” (2003-7)

