Proposal for Global Computing

Frank Wurthwein

UCSD/FNAL-CD

for the CDF Collaboration

- **Recap of Context**
- **Services @ Offsite Centers**
- **Organization of Global Computing**

Context

- **Physics Motivation:**
  - **Max. physics output @ low Lumi**

  --> CSL output rate from 80 to 360Hz by 06
- **Costs: offline short by ~0.5/1.5/1.5 Mill $ in 04/05/06**
- **Accelerate Global Computing plans:**

  50% @ FNAL & 50% outside FNAL by 05
- **Technical review: "Bird Review" 9/11 2003**
- **Fiscal Requests presented at CDF IFC 10/30 2003**

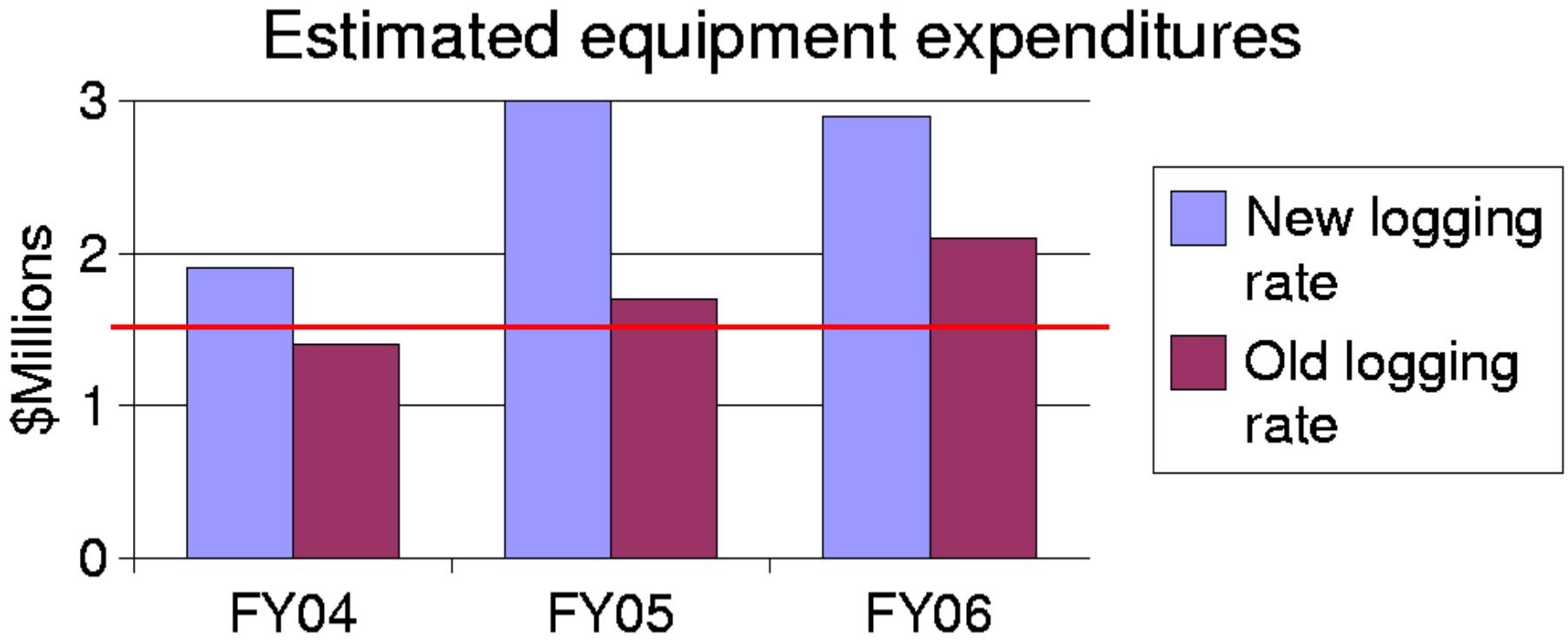
Strong Support from IFC & Bird Review!

Request from IFC

Guarantee proper accounting standards for Consumed Computing resources.

Endorsement by the PAC that the extra bandwidth taken by CDF is well motivated from a physics perspective.

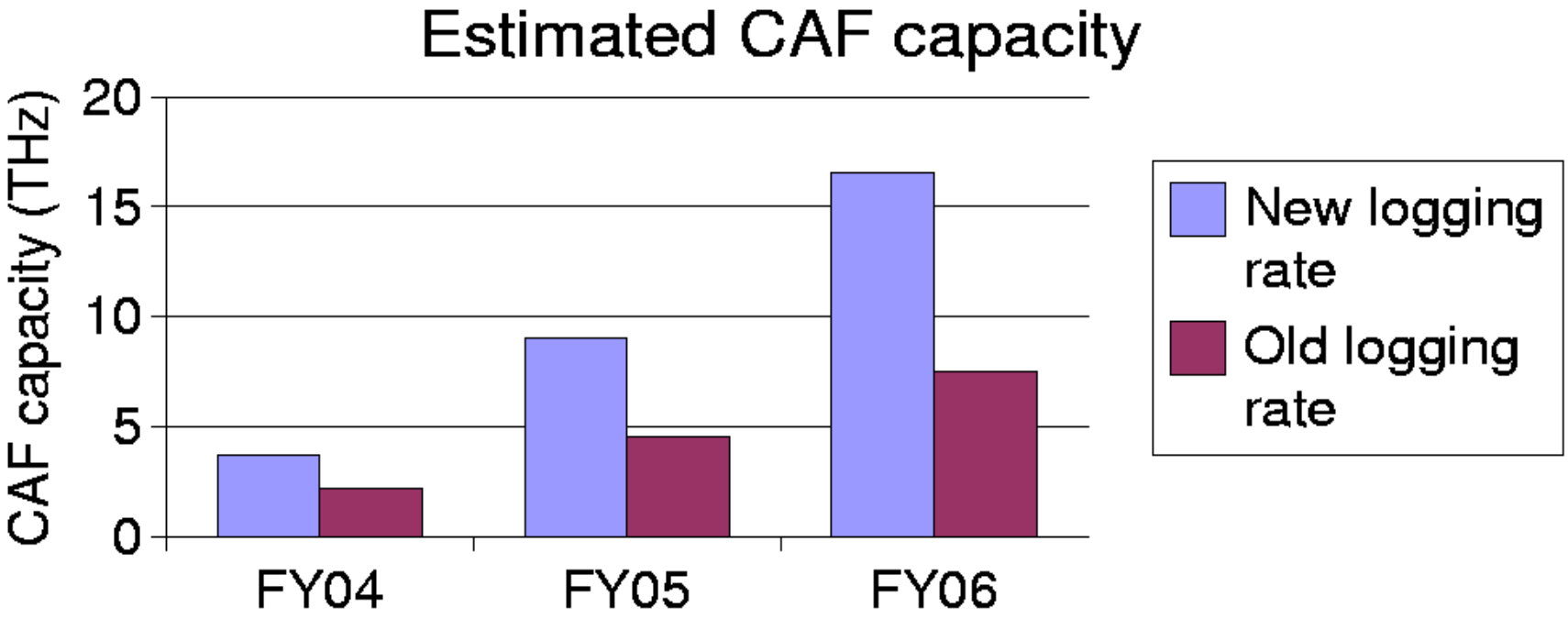
Budget Situation



Red line = FNAL budget target

User Analysis CPU = Cost Driver

Fiscal year	02	03	04	05	06
CSL rate (MB/sec)	20	20	20	40	60
Raw data compression	No	No	Yes	Yes	Yes
Implied peak event rate (Hz)	80	80	120	240	360
CPU in $M	0.4	0.3	0.8	1.2	1.0



Scale of Offsite Computing

	Thz	%offsite	CPU speed	#duals to deploy
FY04	3.7	25%	3GHz	~150
FY05	9.0	50%	5GHz	+360
FY06	16.5	50%	8GHz	+220

This is 6-7 sites with ~100 Duals each by 2006.

+ ~700 Duals @ FNAL

3 Levels of Service

"Official" Monte Carlo Production

User level MC Production

- **All users have access**
- **No data on site -> DH write but not read**

User level data analysis

- **All users have access**
- **Selected samples on site -> full DH support**

Service provided as MOU.

Includes user support for jobs run @ site.

CDF Computing Model

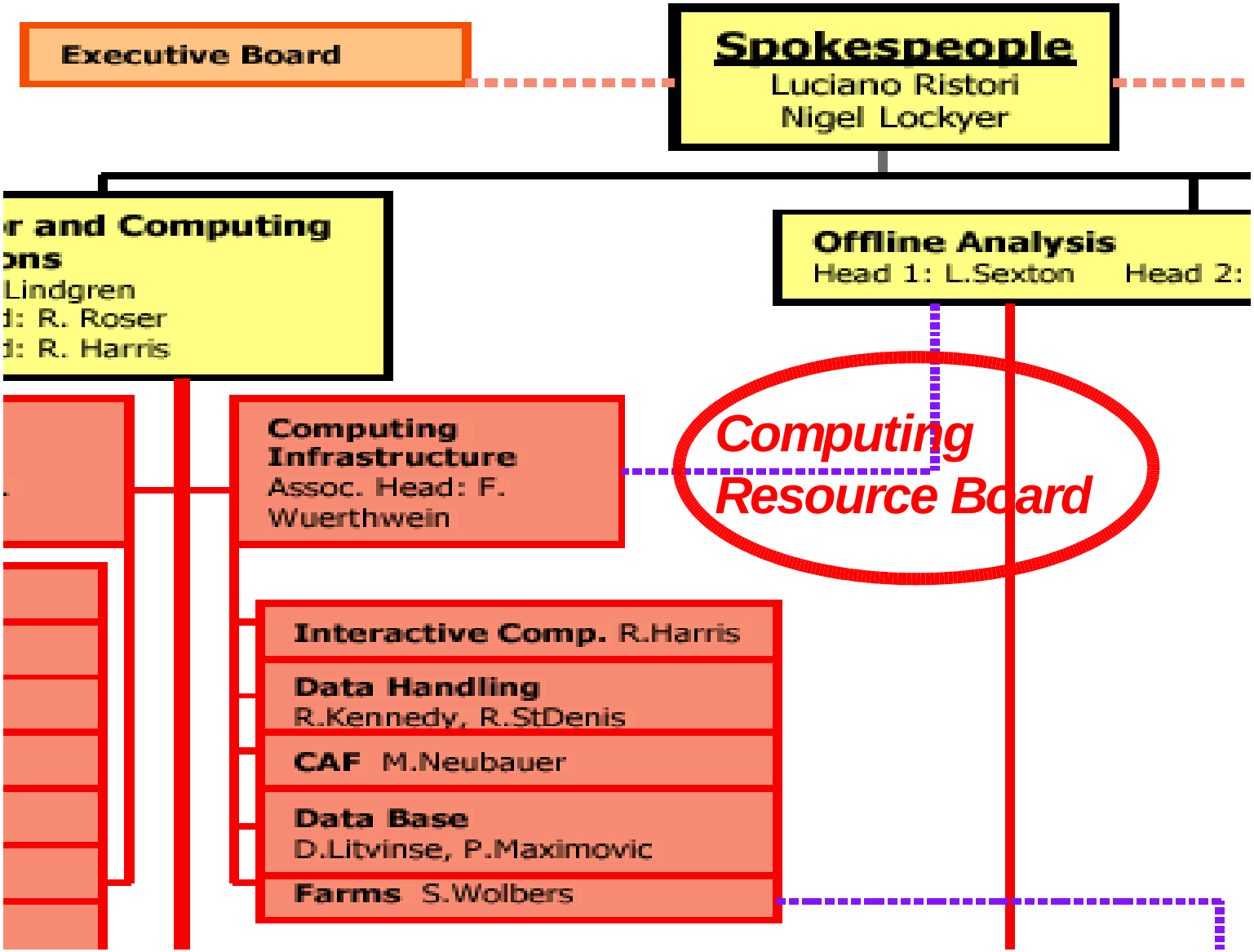
- Develop Analysis on desktop:
  - Access to all CDF data from anywhere.
- Large Scale processing on batch cluster(s):
  - Submision from laptop/desktop anywhere.
  - “interactive” tools: ls, top, head/tail/cat, gdb
  - Retrieve output to scratch space or desk/laptop

Computing Needs Model

200 "typical" users each analyze "typical" dataset in 1 day.
(scales with integrated luminosity)

15 users analyze "dynamic prescale dataset" in 25 days.
(scales with running time)
Think of this as "Level4 Trigger"

Proposed Organization



Computing Resource Board

Members :

Assoc. Head. Of Comp. Infrastructure
One of the 2 Offline Heads
CD-CDF Department Head
One Rep. for each site

Purpose of CRB:

- **Collective Assessment of computing needs**
- **Resolution of interoperability details**
- **Negotiation of service commitments**
  - **Short term allocations**
  - **Long term procurement planning**
  - **Assessment of delivered service**

Timeline

Installation workshop : Jan. 20-22nd Florida

CRB Meetings 04: January/April/August/December

Prototype User MC sites: Early 2004

First Production Quality Sites: April 2004

Participants @ 1st workshop

Canada (Toronto)
Germany (Karlsruhe)
Italy (CNAF)
Japan
Korea
MIT
Taiwan
UCSD
UK (Liverpool/Glasgow)

Don't expect all to come through in FY04!

Summary & Conclusions

Offsite contributions are necessary to maximally exploit detector capabilities, especially @ low luminosity.

Need 6-7 sites of 100 Duals each by 2006.

Request PAC to endorse the extra bandwidth proposal.

Example: (Small) User MC Site

MC production: ~15GHz sec / 150kB event

=> 200 GHz site needs 2+2 MB/sec WAN connect.

Example Shopping List 1/1/2004:

30 Dual 3GHz compute nodes	*$60k*
1 head node	*$5k*
1 code server	*$5k*
LAN & console server	*$5k*
20% contingency	*$15k*
	--------
	roughly $90k for hardware

This system has ~1 Million evts/day capability

E.g.: (Large) User Analysis Site

Site that hosts one or more datasets for all CDF users.

Data stays @ site "permanently" (several months).

E.g. 10MB/sec WAN allows 10TB in ~2 weeks

Example Shopping List 1/1/2004:

100 Dual 3GHz compute nodes	*$200k*
1 head node	*$5k*
1 code server	*$5k*
2 DH infrastructure nodes	*$10k*
3 x 6TB fileserver	*$30k*
LAN & console server	*$20k*
20% contingency	*$50k*
	--------
	roughly $320k for hardware