STATUS OF TWR DATA 2003 AT UCI

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- Status of TWR Data 2003 Processing
- Super Computer Power
- Filter Strategies
- Future plan and UHE analysis

AMANDA meeting in Haus Bommerholz, June 20-24, 2004

HARDWARE COMPONENTS

PREVIOUS PLAN

4U head node

Quantum

stacker

Cancelled too EXPENSIVE
And not so efficient

1U node

Rack with 30 nodes

Plan of $40k

REAL CONFIGURATION

Ext. drive of
1 TERA byte

We could
Manage the problem
With:

SDLT driver

less then $5k !!

To San Diego

OVER
NETWORK!!

PENGUIN desktop !!

ParaSoft Corporation

TeraGrid and the Alliance

COLLABORATION WITH UC SAN DIEGO

http://www.teragrid.org/

- What is SDCD?

SAN DIEGO SUPERCOMPUTER CENTER

  - Research unit of the UC San Diego
  - Primarily funded by NSF
  - SDSC serves as the data-intensive site lead in the NSF-funded TeraGrid

- What is TERAGRID?

TERAGRID

- World's largest computer!
- World's fastest computer!
- 20 TeraFlops!
- 1 Petabyte!
- 40 Gigabits per second

TeraGrid is a multi-year effort to build and deploy the world's largest, fastest, distributed infrastructure for open scientific research

When completed, the TeraGrid will include 20 teraflops of computing power distributed at five sites, facilities capable of managing and storing nearly 1 petabyte of data. (SDCD IS ONE OF THESE SITES!!)

The TERAGRID project is a $98 million NSF funding
As UCI we are planning in applying NSF Grant to join the TeraGrid Alliance

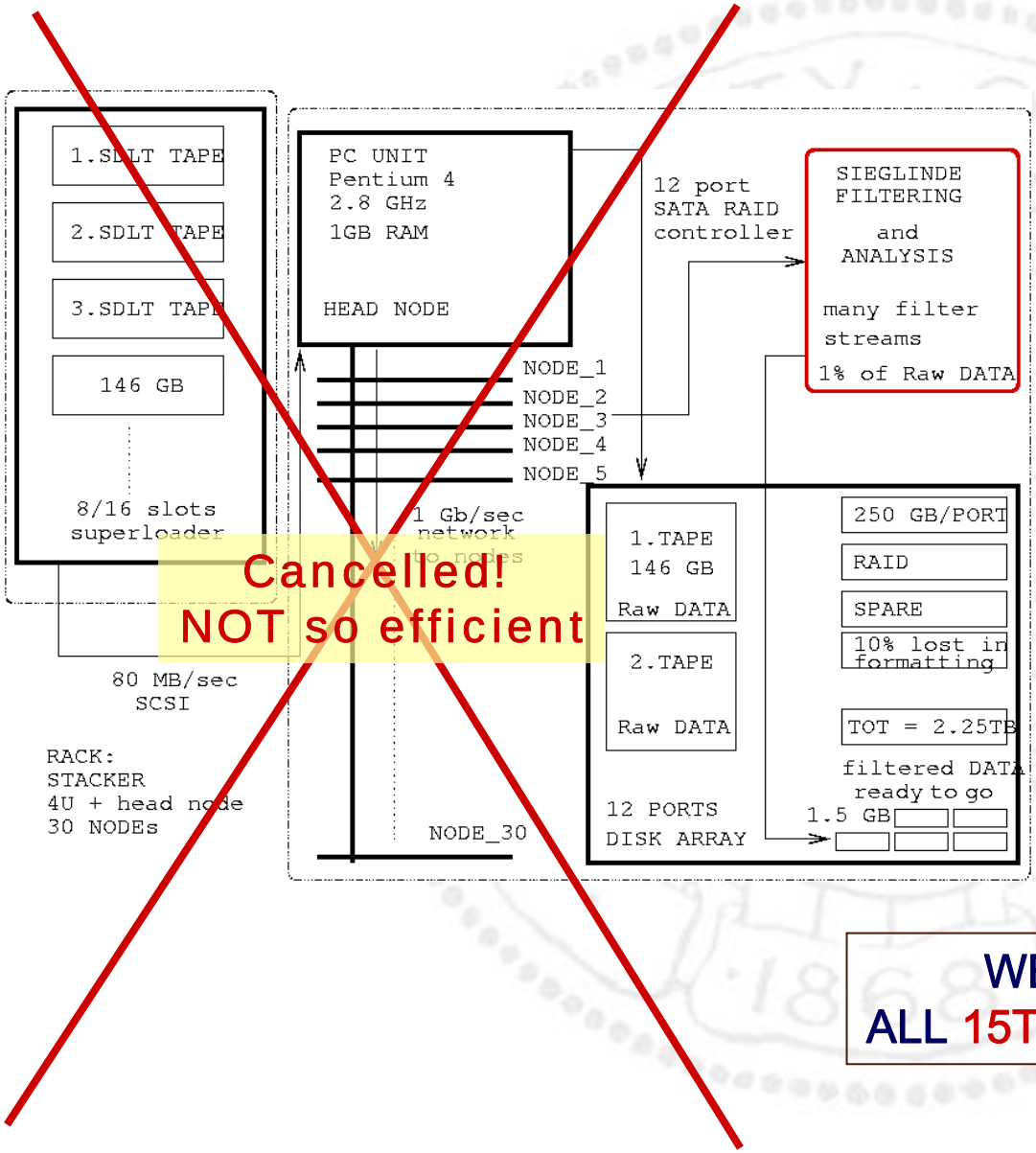
GREAT NEWS: AMANDA CAN AND IS USING THIS GREAT RESOURCE!!!

THE TERAGRID CLUSTER WE ARE USING

tg-login.sdsc.teragrid.org

COMPONENT	DESCRIPTION
Architecture	Linux Cluster
Access Nodes	quad-processor ECC SDRAM memory: 8 GB 2 nodes (8 processors)
Compute Nodes	dual-processor ECC SDRAM memory: 4 GB 128 nodes (256 processors)
Processor	Intel® Itanium® 2, 1.3 GHz Integrated 3 MB L3 cache Peak performance 5.2 Gflops
Network Interconnect	Myrinet 2000, Gigabit Ethernet, Fiber Channel
Disk	1.6 TB NFS
Operating System	Linux 2.4.19-SMP (SuSE SLES 8.0)
Compilers	Intel: Fortran77/90/95 C C++ GNU: Fortran77 C C++

CPU POWER AND DATA STORAGE



- Previously we tried to figured out:
  - Where do we store 15TB data?
  - We cannot store them on disk!?

YES! WE CAN!

- **Now we don't have only a huge CLUSTER available but also lots of space:**
  - **Unlimited storage system!!!**

WE WERE ABLE TO STORE
ALL 15TB RAW DATA ON HARD DRIVE

[SRB] UNLIMITED STORAGE SYSTEM

http://www.npaci.edu/DICE/SRB/

- What is SRB?

STORAGE RESOURCE BROKER

  - A network data storage system
- SRB is virtually an unlimited storage system
- Currently more than **4 thousand** users with a total of ~ **130TB**

We are 1 user but we stored already 12% of the current space usage Space equivalent of 500 users!!

We can store our 15 TB of MUON and TWR data For Unlimited time!!!

These components will be tightly integrated and connected through a network that will operate at 40 gigabits per second—the fastest research network on the planet!!!

DATA ON SDLT TAPES

- First 45 TAPEs are bzipped
- Size of each **TAPE ~ 95GB**
- Extraction time ~ 3hr
- BUT lots of CPU time to bunzip them ~ 1day/tape

- Rest of TAPEs are Hardware Compressed **EXCELLENT IDEA!!!**
- Size of each **TAPE ~ 145GB**
- Extraction time ~ 3hr
- No additional CPU time to unzip them -> direct processing

CURRENT STATUS OF PROCESSING

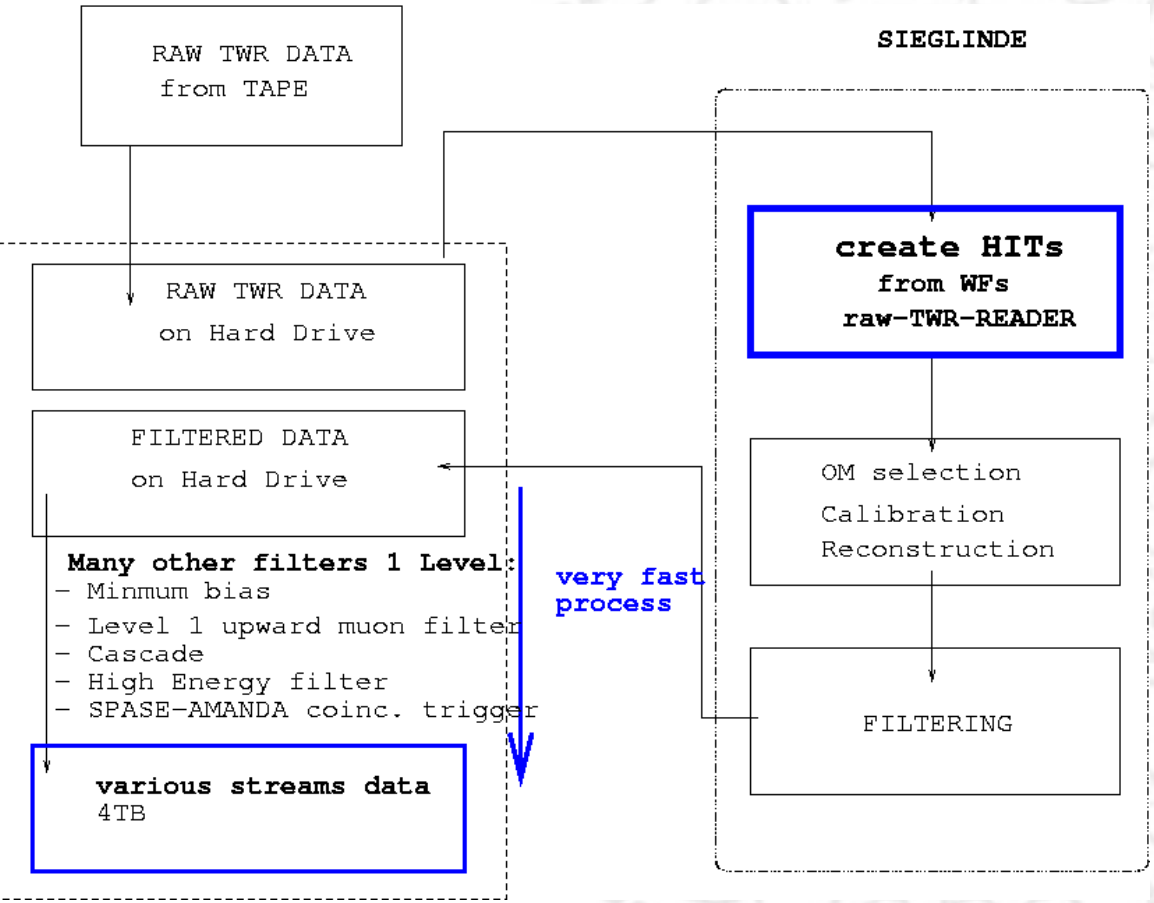
- We have used just 1 SDLT driver to extract all data;
  - **We transferred all data in 4 weeks**
- Currently **ALL DATA 2003** [TWR, Muon, SN, RICE and SPASE data] are on the 'VIRTUAL' DISK of the SRB system
- We have installed locally all software needed for filtering:
  - **ROOT**
  - **SIEGLINDE**
  - **RDMC**
  - **MYSQL**
- We have tested the standard L1 filters
- We expect using all 256 processors to filter the full data set of TWR data 2003 in **one week CPU time!** **[based on local machine penguin 3.2GHz]**
- **We can run full time with full cluster power!**
- Currently we have **100.000 hr** CPU availability for [256 CPU] ~ 17 days.

WE SENT OVER NETWORK 15TB IN 4 WEEKS

WE ARE USING THE 'STATE OF THE ART' OF COMPUTING AND NETWORK TECHNOLOGY

POSSIBLE FILTER STRATEGIES

Soon filtered data 2003 available for the AMANADA collaboration



- We don't need to upload and download TAPEs any more
- We can run in parallel many filter configurations:
  - **Minimum Bias**
  - **Level 1 upward muon**
  - **Cascade filter**
  - **High Energy filter**
  - **SPASE-AMANDA coinc. Trigger**
  - **Other filters**
- We can send the filtered data over Network[~150GB]
- We can have a copy on SDLT tape as well

Currently Network speed 10MB/sec if ATM network ~ 1GB/sec

UPCOMING UHE ANALYSIS AT UCI

- **OUR GOAL**:
  - Precise testing of filters to be adopted
  - After Level1 we can keep the entire WF for more complicated analysis
  - Implementation of After-Pulse info for more accurate Energy reconstruction
  - Run blindly UHE analysis over 20% data
  - Compare DATA and MC
  - Get results, hopefully ready by the next collaboration meeting

WE CAN RUN MC AS WELL!

- **OUR GOAL**:
  - ✓Tune up AMASIM for current WF data description
  - ✓Generate lots of MC data using TERAGRID
  - ✓Data would be available in a time scale of a couple of weeks
  - ✓Definitely off-line AMANDA analyses will gain a lot in time!

UCI DATA MANAGEMENT MANPOWER

- STEVE: Our Boss
- ANDREA: Manage of data, Sieglinde Testing + Filter Evaluation
- JIWOO: Sieglinde Testing + Filter Evaluation
- JED: System Manager
- BAYAN: Setup of website interface + summary statistics

SUMMARY - WHAT NEXT & CONCLUSION

- ☑ **AMANDA** can use one of the most powerful computing resource of the **planet!**
- ☑ We sent over NETWORK all our data set 2003 [for all means: **TWR, Muon, SN, RICE and SPASE data**]
- ☑ All TRW data 2003 ready to be processed by the super cluster TERAGRID (1 filter ~ 1 week)
- ☑ Plans to run entire MC production on the TERAGRID as well
- ☑ It looks promising for the **upcoming UCI UHE** analysis: good and quick results.