Software

T.Hara (Osaka)

In order to make a strategy

Purpose

- Framework/Computing/Network
  connects each other
- Problems in Simulation/PID/Tracking, etc...

So far, each category has been proceeded indivisually

In order to make a strategy

- We need to know the current problems
- Categorize these problems and set the priority

experts in Belle

Categories

- Computing/Network (Katayama)
- Framework (Itoh)
- Database (Uehara, Adachi + Karim)
- G4 (Hara)
- Fsim (Nakao)
- Tracking (Ozaki)
- PID (Nishida)
- from Detector side (Ushiroda)

Computing : Object Persistency

N.Katayama

▶ Problems of "Panther"

"Panther" is the Belle bank system

- Contents in the tables can not be modified later
  → the backward compatibility will be lost...
- Data size
  "double" can not be saved
  "string" is devided in four-word blocks
- "Object" can not be saved
  e.g. particle class

→ in other words, these are the requirements
e.g. ROOT I/O ?

Computing : Data management

N.Katayama

▶ Data storage

- 10PB will be needed
- What storage is suitable ?

  tape? semiconductor-memory ?
  computing system can be replaced later ?

▶ Data distribution + File system

- many files (raw data, mdst, index, skim,...)
- How to store and book these files ?
- How to distribute ?
- How to produce DST/MC ?

Computing : Computing system

N.Katayama

▶ What kind of Computing system is proper ?

- Current Belle

KEK (4×10^4 CPUs, 1PB disk, ~3.5PB tapes)
[SPEC Cint2000 rate]
other institutes (MC prod., analyses,...)
GRID

- Cloud Computing ?

(Internet-base development/use of software/data)
Database can be treated properly ?
too new (is it available by the Super Belle) ?

- Other technologies ?

Database

S.Uehara

▶ for detector calibration : PntDB

(interface between Postgres and Panther)

- No problem for the larger amount of data (speed ↓)
- Panther has to be kept

multi-server database ?

▶ for data files / run record management : Postgres

- No problem. but there is a room to consider others
- Multi-server database can be used ?

e.g. Oracle ?

▶ for slow monitor : DAQOM

- Panther has to be kept
- Only Uehara san can manage this

Specification of Database should be decided as well as that of Object Persistency

Software Framework

Current problems with BASF

R.Itoh

- **No object persistency**
  - Can not read/write "objects" from/to files using Panther
- **The interface for interactive user analysis is obsolete**
  - "HBOOK4"+CLHEP (for PAW/dis45)
  - Recent HEP community: "ROOT" is the de-facto standard
- **Complicated parallel processing framework**
  - Different implementations in SMP and network cluster
- **Lack of input/output file management**
  - No integrated database management
  - No integrated GRID interface (ad-hoc interface exists, though)

Software Framework

R.Itoh

Requirements for the new Framework

- **Software bus (pipeline) is kept**
  - Compatibility with modules written for BASF
- **Object persistency**
  - ROOT I/O as the persistency core
  - Panther I/O is kept as a legacy interface
- **More versatile parallel/pipeline processing scheme**
  - Transparent implementation which utilizes both SMP CPUs and network clusters
  - Dynamic optimization of resource allocation
  - Module pipelining over network
- **Integrated database/GRID interface for file management**
- **Dynbamic customization of framework**
  - replaceable I/O package, user interface ...

Software Framework

R.Itoh

Why do we stick to our own framework ?

- other candidate (e.g. GAUDI) is too complicated
  - GAUDI has designed to have high functional capability and flexibility, but it is heavy ...
  - GAUDI itself has no parallel processing using the GRID batch system
- Compatibility to the current Belle software is needed
  - Legacy interface is needed (Panther, HBOOK, ...)
- Keep developing the technique for the parallel process.
  - Dynamic resource sharing
  - Parallel pipelining

Software Framework

R.Itoh

One plan

- Prototype called "roobasf" with
  - BASF's module driver
  - ROOT I/O based object persustency
  - Event-by-event parallel processing capability on multi-core CPUs (SMP)
  - Histogram/N-tuple management with ROOT
  - Legacy interface : Panther I/O and HBOOK4

→ Complete development by the time of CHEP'09 (~Mar. 20, 2009)

Software Framework

R.Itoh

Discussion items

- Object persistency core
  - ROOT I/O : as a default
  - BOOST product ?
- Integrated GRID/database interface
  - Catalog level management of input/output files ?
    → POOL, xrootd, ...
  - Parallel processing on GRID ?
    → GRID-MPI, ...
- Data handling : how to manage objects in modules

Object persistency should be decided first.
the requirement for the framework should be clarified.

Simulation

M.Nakao

Fsim (=fast simulator) for Super Belle

- Tuning for the helix parameters is incompleted
- Tuning for the PID efficiency is also incompleted

  c.f. Tuning for Belle has been completed well
- relative difference between Belle and Super Belle can be used. Is this useful for Super Belle ?
- it is better to use G4, instead of fsim ?
- still useful for rough estimation of the physics ?

→ unfortunately nobody will work on this.

Simulation

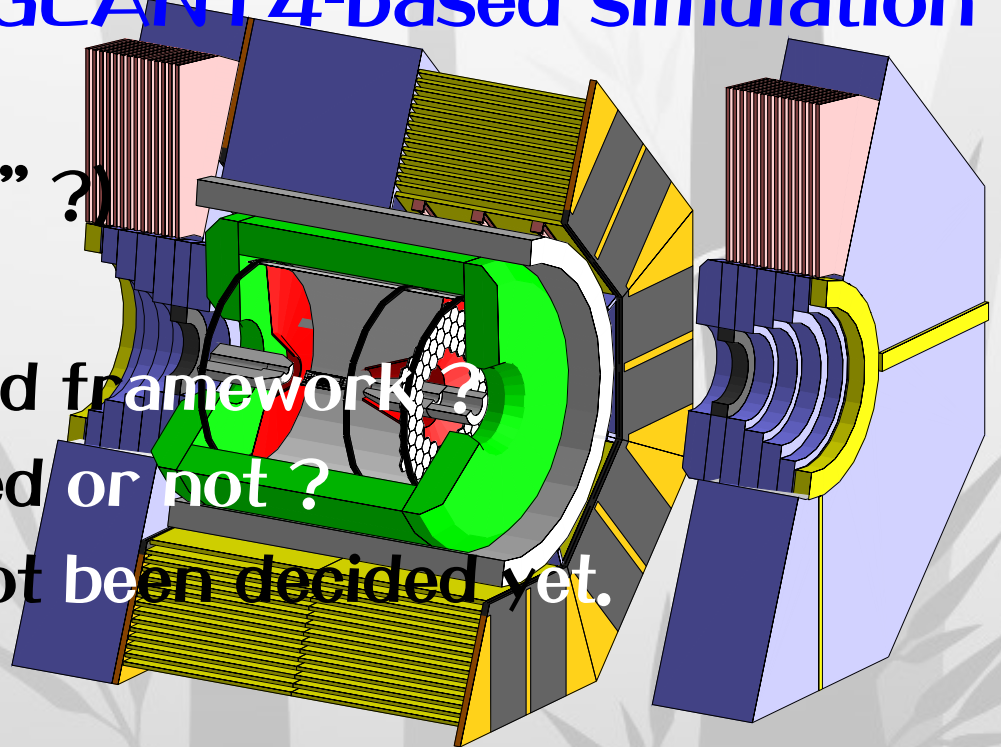
T.Hara

g4superb (=GEANT4-based det. sim.)

- Problems of current "gsim"
  - GEANT3-based simulation — GEANT3 will be extinct.
  - no extensibility (patched for many versions of SVD)

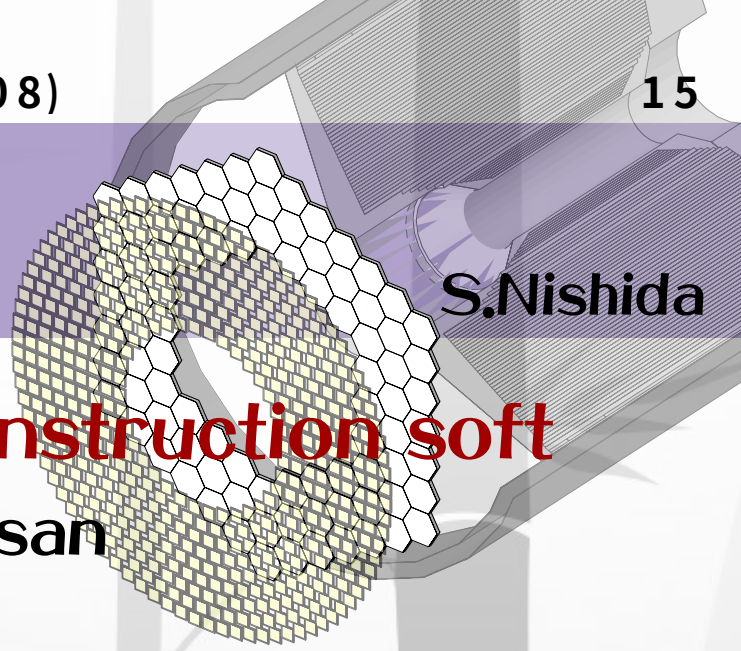
→ we have to move to GEANT4-based simulation

- Problems of "g4"
  - slow (→ problem of "rectop" ?)
  - no g4 expert
  - compatibility between g4 and framework ?
  - Geometry database is needed or not ?
  - IR/SVD/(PXD) design has not been decided yet.



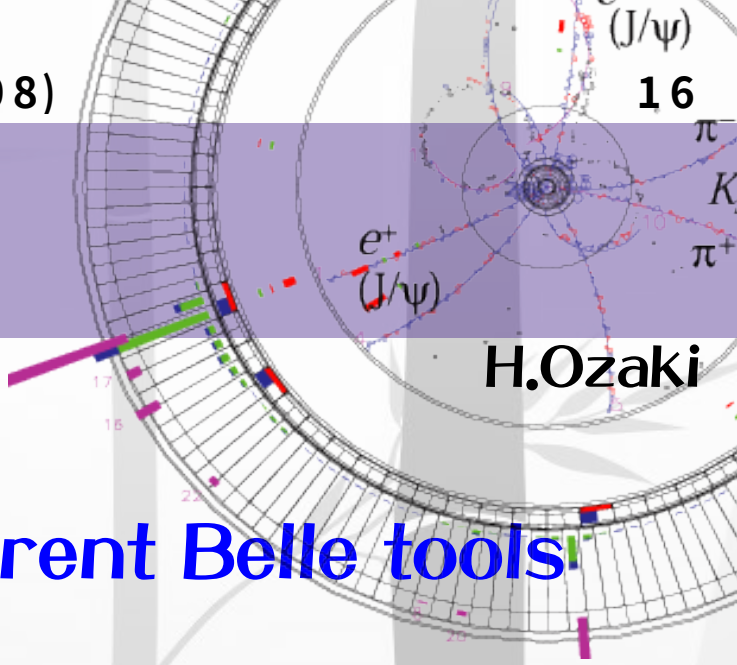
PID

S.Nishida



- TOP/A-RICH need to develop reconstruction soft
  - first version by Inami-san/Pestotnik-san
  - need study for better performance
  - hardware design is not determined
  - ideally we shoud make a feed-back to hardware design, ...
  - man power
- dE/dx, eID, μID
- atc_pid itself shoud work with minor modification
  - unified package for KID, eID, μID
  - better interface with systematic tables

Tracking



H.Ozaki

for TDR (short term)

strategy : make use of the current Belle tools

- TO determination
  - for Belle : using L4 fast tracking + TOF info.
  - for Super Belle : no TOF anymore ...
- CDC tracker (in trasan)
  - usable with g4 simulation data.
- track fitter (in trak)
  - now under checking
- SVD standalone track-finder (in trak)
  - not work at present
- VOfinder : Ks reconstruction
  - depends on trak

another tracking from Alexei

http://kds.kek.jp/getFile.py/access?contribId=15&sessionId=5&resId=0&materialId=slides&confId=2059

Tracking

H.Ozaki

for Super Belle (long term : three-year project)

strategy : make PXD+SVD+CDC track finder from scratch

separate Tracking modules in Belle

track finder in trasan, filtering in trak

it is better to use all available information in PXD/SVD/CDC

→ PXD+SVD+CDC track finder is needed

esp. for low-momentum tracking is important

But well-designed classes are required.

Katayama san activated the tracking meeting.

Dec. 19 (Fri) 13:30- @325

Summary

Computing

Object persistency (ROOT I/O or others)

Computing system

- Data storage
- Batch job system
- Cloud computing or other possible technologies ?

Database

No problem at this moment

Framework

Object persistency

roobasf or other frame (ILC?) (completed in Mar.'09)

Simulation

termination of Fsim update...

improvement of G4

PID

study for better performance

Tracking

make use of the current Belle tools (short term)

make new tracking tools (long term)

Summary

Object persistency

Computing system

Database

Framework

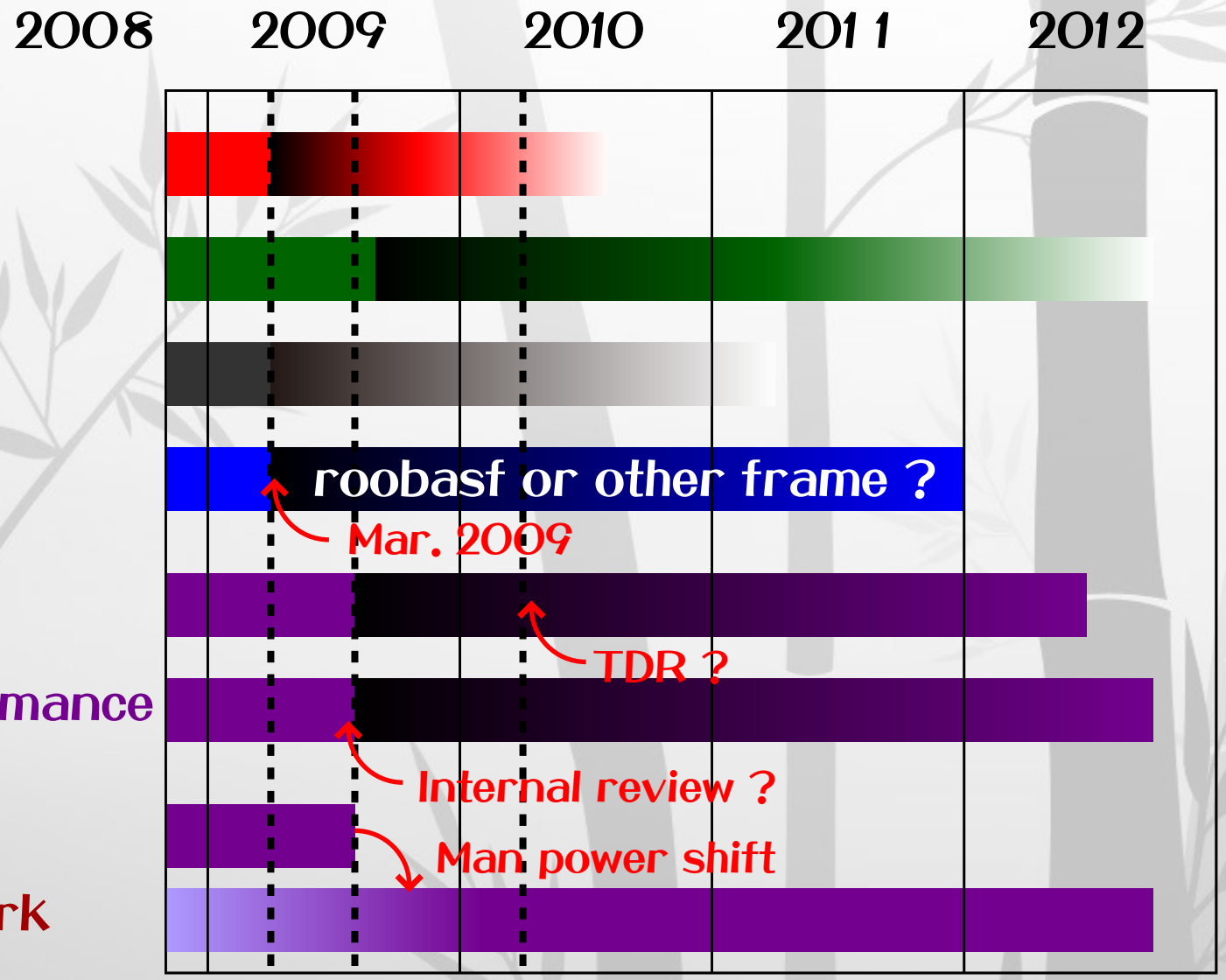
improvement of G4

PID for better performance

Tracking

short term for TDR

long term for new trk



Computing/Network/Software Frame meeting

1st Open Meeting of the SuperKEKB Collaboration SuperBelle
Computing/Network/Framework session

Thursday 11 December 2008
from 09:00 to 11:00
Asia/Tokyo
at 3 gokan 425

Thursday 11 December 2008 |

Thursday 11 December 2008 top

09:00	Introduction (10') (Slides)	T. Hara
09:10	Current GRID system in Belle (20') (Slides)	H. Nakazawa
09:30	General intro./Data Farm Activities in KISTI (20') (Slides)	M.S.Lee
09:50	Computing idea (20') (Paper ; Slides)	M. Sevior
10:10	Software Framework (20') (Slides)	R. Itoh
10:30	Discussion (30')	

- Discussion of Computing, Framework
- monthly meeting, mailing list
- the coordinator of Computing

Please join us !