Status of ROOT-based analysis framework

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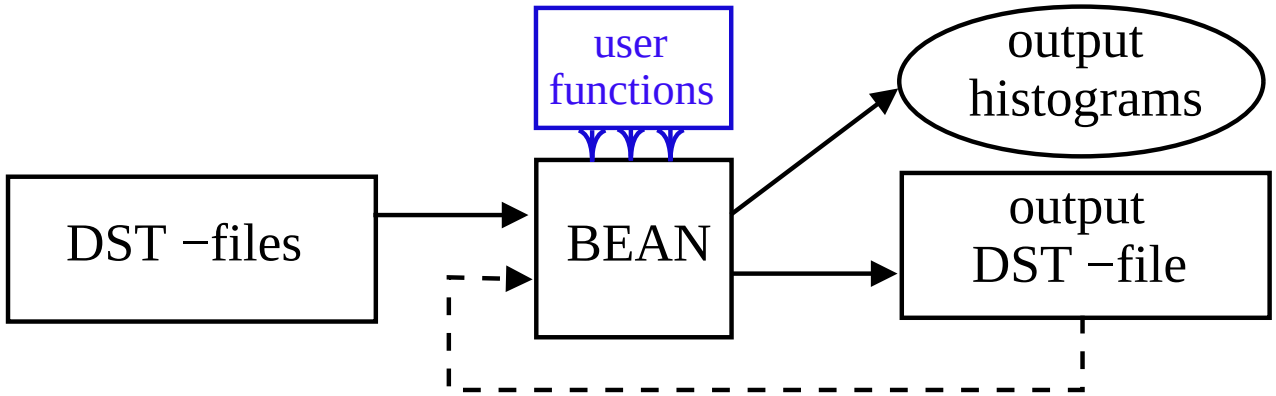
BESIII Collaboration meeting

Main Idea

The main idea is to create simple software infrastructure for:

1. access to reconstructed event's data (DST)
2. event filtration
3. analysis code development

Bean = Bes analysis tool:



Installation of Bean

- Install Bean from subversion repository with a command:

```
> svn checkout http://bes3.jinr.ru/svn/bean
```

- Go to directory, which had been created and compile program:

```
> cd bean
> make
```

- In case of problems:
  - check that you have required external libraries: ROOT, CLHEP
  - read ./README
  - contact me: `Nefedov.Yuri@jinr.ru`

User Functions

- The main user ”working place” is user/ directory. Here you may have a file with user functions for analysis of DST. There are three ”type” of functions:
  - bool UserEvent(. . .) – the function called every event.
    The return value of this function (true) is used to indicate that event must be written in output DST-file.
  - UserStartJob() – the function called before cycle of events.
  - UserEndJob() – the function called after cycle of events.

- File naming convention: functions UserEvent(), UserStartJob() and UserEndJob() must be in User.cxx file.

User Functions (continued)

- You can create several files with different analysis purposes and use them in chain:

```
> ./bean.exe -u User1 -u User2 -u User3 ...
```

- There are two examples: `UserTest.cxx` and `User1.cxx` which supposed to be starting point for new functions.

Running Bean

Run ./bean.exe without arguments to get short information about available options.

```
> ./bean.exe [ -option(s)] dst_file(s)
```

- Input DST files:
  You must specify list of input files.

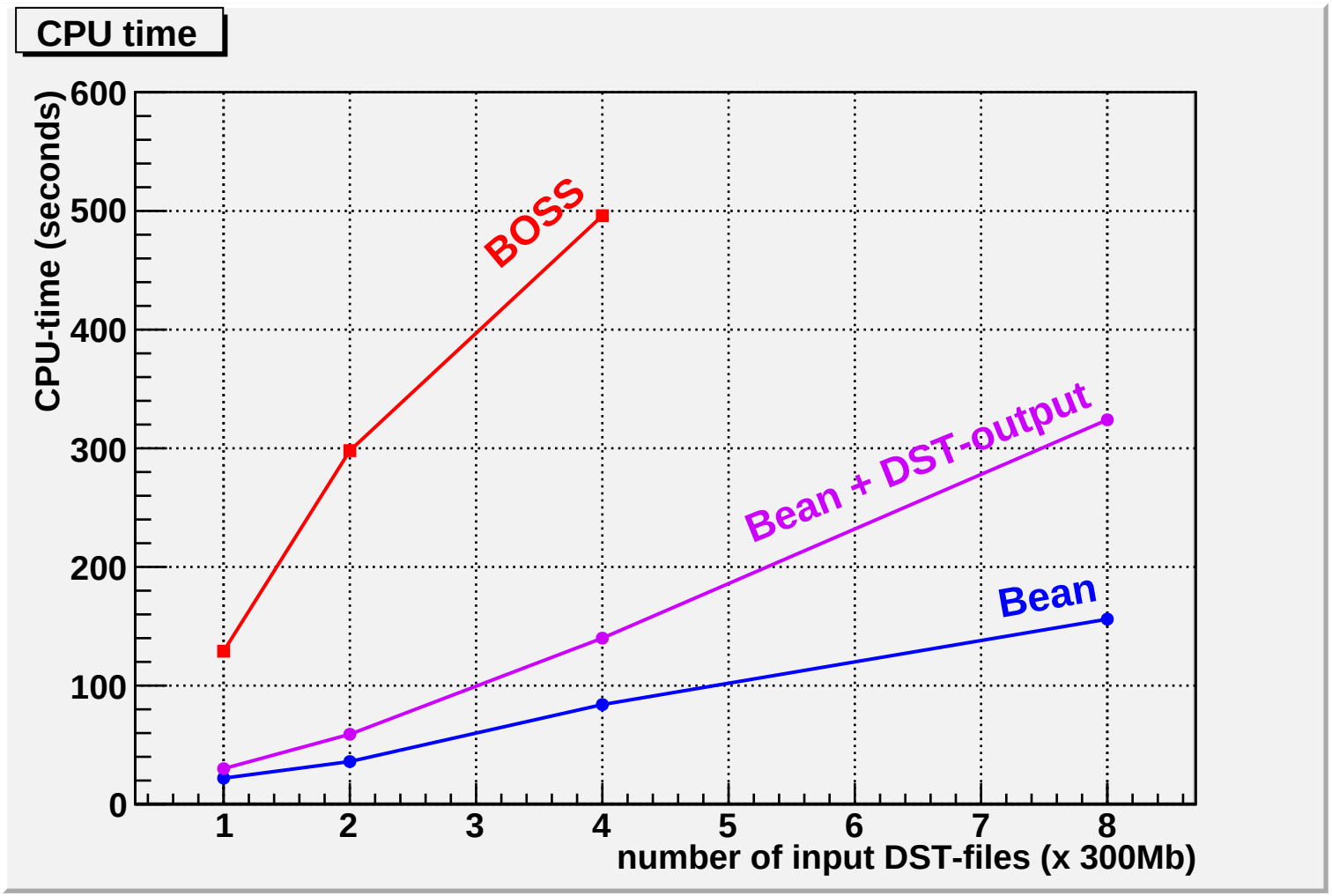
- Output options:
  - -h hst_file – change default file name for histograms.
    Default: `bean_histo.root`
  - -o out_file – define output DST file name.
    Default: no output is written

Running Bean (continued)

- User functions:
  - -u Uname – add user functions from file user/Uname.cxx.
    This option could be specified more than once.
- Simple interactivity:
  - You can enter CRTL-C at any time to terminate cycle of events and normally create all histogram and output root files.
  - The second CRTL-C will immediately kill the job.
- Debug options:
  - -v – set verbosity on. Causes Bean to print debugging messages about its progress.
  - -D – detailed printout of content of each DST event.
  - -N num – process first "num" events.

Performance

CPU-time usage on IHEP cluster (lxslc18):



(/besfs/offline/data/650-1/dst/090526/run_0009613_All_file001_SFO-1.dst . . .)

ToDo

- Adopt the analysis tools from BOSS software:
  - Particle ID: it almost done. It needs more testing.
  - Kinematic Fit
  - Vertex Fit
- Study a possibility to use PROOF/XROOTD.
- Documentation. README files. Should we use doxygen?
- The new ideas about functionality, interactivity and so on are welcome!

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Thank you!