General Report on the BES Software

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Abstract

The Codeman Primary moved to IHEP and starts to run. The BES-II Software under v101 (plus patches) works well in the reconstruction of new R data. The SIMBES can be put into run very soon. Linux port has noteworthy progress. Remained issues are discussed.

1 BES Software Management and its Rule

1.1 Code Maintainance in synch

The BES software are maintained and developed well in synchronization among IHEP and US collaborators for many years since the codeman put into run. Private library in developing BES software would cause disaster and should be avoided. It is requested to move your codes in(out) to(from) BES library via Codeman. Synch mode is essencial for the BES code maintainnance. Developing version is created when production version is frozen. Contribuion to BES software are only allowed to check-in to developing version. It is forbiden to check-in any mods to any production version.

One should mention that compatibility on HP, Linux and Alpha has to be tested before checkin your code.

1.2 Software coordinators

No protection from illeagal checkin(out) is set and no control scheme in the Codeman package is designed to check correctness of modifications. Strict rules followed by contributors are required, and code management system (cvs on HP or Linux) is necessary to keep tracing of library modification records.

Two persons from US and IHEP coordinate software maintainance. Contributions to BES software should be discussed at software meeting at US and IHEP side, and checkin procedure should be coordinated by two coordinators in advance. An agreement on software contribution between US and IHEP should be reached before action is taken.

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1.3 Software Meeting (Monday at IHEP)

IHEP contribution to BES software should be discussed at Monday Software Meeting. Close communications between two coordinators will be made on new contributions and actions. Reliability and reasonability of contributions are evaluated at the meeting. It is emphasized that important contributions have to be discussed and accepted at the meeting.

1.4 One Exception to make patch

However, Patches to production version (for instance, v101 library) are allowed only in an exceptional case, i.e.,

1. data taking started and data processing is under way;
2. v101 library had been frozen as production version;
3. but bugs in software found or some routines have to be changed because of hardware exceptional condition or its failure;

Patches to v101 library, required for temporary ussage, are fully controled by software coordinators and will be checked into v102 developing library.

2 The Codeman

2.1 Primary immigrated

The Primary has been immigrated from SLAC to HP of IHEP. Necessary modifications to Primary and Secondaries are done by Derrick. Manual on how to operate the primary is written by him. Using Primary (hp at IHEP) and Secondaries (hp and Linux at IHEP, Alpha at HU and hp at UTD), test is successfully done. Aidong works on daily management of Codeman server at IHEP.

2.2 Linux secondary at IHEP

Linux secondary at CSU can handle both v88 and v101 checkins according to Yang Wei. Installation of Linux secondary at IHEP Linux, beslx12, was done by Aidong and Shaoqiang. f2c compiler has been replaced by g77 in the Linux environment for both v88 and v101.

Making a standard Linux version, v102, via codeman is necessary. Modifications on both HP and Linux should be included, and patches to v101 are checked into v102. Whether Linux machines on US side are connected to the Codeman and accessing updated lib, can be discussed on the meeting. Response Secondary at IHEP Linux and silent Secondary at US side are suggested. v101(v102) libraries on IHEP Linux is converted from IHEP HP through VAX format.

3 SIMBES

3.1 Status in Nov 1998

A new MC package based on GEANT3 under v100 had put into run last year. Comparisons between data,Sober and SIMBES (Bhabha and di-muon) shows good shape of SIMBES. For instance,

1. Vertex and momentum from MDC
2. TOF and its resolution
3. Muon-counter hit position

are well simulated via SIMBES package.

3.2 Current status

In order to reach a level for physics study, its required to make careful tuning for individual subsystems, detailed comparisons between data and SIMBES simulation, acceptance estimate from SOBER and SIMBES and study on particle ID and kinematic fit using Telesis.

MC realization constants files under v101 for R data is ready (Baoshen). Much careful checks are done (see Ye Suwei's talk). SIMBES supplies good simulation of hadron tracks which is well approaching to real data (see Figure 1).

3.3 SIMBES under Codeman

Both Sober & SIMBES are available under v101 library.

(1) Sober

Sober works still as default setting under v101 but will be hidden under v102. There is no maintainance for Sober any more in future. It is expected that Sober will be removed from v102/v103 when SIMBES is ready.

(2) SIMBES

SIMBES works as default setting under v102 but as side-library during debug phase under v101. For the moment, it is isolated from the Codeman and placed under $\$BESROOT/bess$.

It is expected that SIMBES would be accepted by R and J/Psi physics analysis. A directory scheme is designed for moving SIMBES routines into the Codeman. It deals with SIMBES package in parallel to BES-I and -II libraries. Since tree directories used in SIMBES, it is required to use a logical-link of SIMBES files in the Codeamn, i.e., SIMBES files are stored under physical directory which is facing to the Codeman and logically linked to SIMBES tree directory structure.

3.4 SIMBES at Linux & Alpha

Li Canguo is working on porting of SIMBES to Linux and Alpha. Checks on Alpha from US side are requested. Documents on SIMBES can be found as below.

(1) SIMBES User's Manual (Li Canguo)

(2) Home page for MC Group of D1

(3) Talks at BES98 (Li Canguo) and BES99 (Ye Suwei)

4 Lunix/BES port

4.1 Historical Records

(1) CSU(Walter and Yang Wei) is pioneer to develop first Linux/BES port in early 1996, its result was presented at the BES96 annual meeting. L. Lipert built Linux BES port later in 1996, which was checked in to v88 by Yang Wei and first supported by Codeman.

(2) Zhang Lei copied v88 Linux port from CSU. Further debugs in this version were done by him in 1997. An improved v88 Linux port works in 1997 and distributed to physics groups at IHEP in 1998.

(3) Li Canguo and Chen Jianchuan is working on SIMBES for v100 Linux port.

(4) He Kanglin developed v86 Linux software independently, and Rong Gang's analysis result from v86 Linux was presented last Dec. Kanglin's experiences (machine dependence and byte swap) on Linux software is accepted by Zhang Lei and used in v101.

4.2 Linux support

It is better to use same operating system and utilities on Linux machines. An agreement on using compiler g77/gcc (replacing f2c) is reached.

The IHEP will provide Linux packages of v101 and v102 for all sites. Current Linux v101 library is FTPed and converted from HP v101 lib and placed on beslx12, beslx01, beslxsr under $\$BESROOT/$v101. All patches to v101 are included, but not checked-in via codeman. Standard Linux v101 library should be remade with v101 patches separated from v101 library as done on HP machine. Constant files in v101 on machines, beslxsr, beslx01 and beslx12, are placed under $BESROOT/const2$. Linux v102 will be FTPed and converted from HP v102 library. Of course, patches to v101 are already checkined to the HP v102 library.

4.3 Further checks on v101

Further check on Linux v101 is carried on by Zepu and its Linux group. Significant discrepancies from HP version were found.

4.4 v86 and v88 version

Since checkin to production version is fobbiden, v86 Linux codes will be packaged on PC at IHEP and posted on Web Page (see Rong Gang's talk). Effort on v88 is required to use g77 compiler and have careful checks.

5 BES Software Library

5.1 v101 library

The BES v101 library was frozen on 12 Feb 1999. MDC-VC combined reconstruction codes is included in v101, but not checked yet. Default setting in v101 is to use MDC reconstructed only.

Patches to v101 for REC and DST jobs are collected after v101 frozen, placed under

$\$BESROOT$/share/v101/patch

and will be checked into v102. Bugs found in REC and DST jobs have been fixed. Contact persons for the patches : Guangpei (reconstrcution), Canguo (SIMBES) and Zepu (Linux).

5.2 New features

Couple of new features are added in the new libraries. For instance, version tag explicitly shown in job logging file; no reconstruction if RECVER is not set in SBUSIOR card for v101; Version number are read from drunk command in v102; VC rawdata format in MC is same as in real data; VC dictionary are changed to use ASCII format, VC reconstruction code is machine independent and so on.

Constants are placed under $\$BESROOT/const$ for BES-I and $\$BESROOT/const2$ for BES-II. Contact persons on constants are : Calibration constants (Guangpei), SIMBES geometry (Canguo) and MC realization (Baosen).

5.3 v101 library on Alpha

VAX, OSF and LINUX should use same REC/MC codes and same I/O data format. Zhang Lei has got MDC Rec codes successfuly running for MC events on Alpha(OSF) at IHEP. Careful check of reconstrcution codes is required for real data.

6 Data Processing in 1999

6.1 Contributions

Thanks for Data Production Group's efficient works (Huaimin's talk) and Data Calibration Group's noteworthy contributions (Guangpei's talk). Processing of all new R data have been finished. Several tasks with urgent time schedule are completed.

(1) Quick check for first R paper is done for $E_{cm} = 2.8$ and 3.0 GeV by means of fast calibration within v100 library.

(2) Quick calibration and reconstrcution of 0.8M J/ψ events under v100 library and fine calibration of the J/ψ data under v101 are finished.

(3) 200 runs of new R data are reconstructed within 3 days for debuging of v101 library.

(4) 850 runs are re-processed due to unexpected effect on dEdx correction.

6.2 Compressed DST data for BES-II

Shaoqiang has updated routines for making compressed DST data. Memo on compressed DST format for BES-II is posted on BES home page.

6.3 Debuging and Improving of v101 library

During the data processing, both software groups work hard to fix bugs in software or modify codes to fit new data condition. It is noticed that

(1) VC reconstrction code are improved

(2) VC-ESC match is provided

(3) Bugs fixed in reconstrction code (patches for MDC)

(4) Code changed due to hardware failure (TOF,MDC)

(5) MDC-VC combined reconstruction included but not well tested

(6) Linux port for BES-II

(7) First version of BES-II library runs on Alpha

6.4 Powerful Workstation

Speed up of production jobs are benifited from new hpws8 and enlarged disk space. Thanks Zepu, who is in charge of setting up the system and BES software environment. Also thanks system managers at Computer Center, who have made excellent work for maintaining HP systems.

7 Remained issues in the BES software

7.1 MDC dictionary & reconstruction on Alpha(OSF)

Though MDC dictionary works for Alpha(OSF) and same dictionary are accepted at all plateforms, but it still uses binary format. Format change from binary to ASCII is suggested.

7.2 Combined reconstruction code using MDC & VC hits

This part of codes are installed in v101 and v102 libraries. MDC tracks are interpolated to VC in the tracking procedures of MDC and VC combined reconstruction. Careful check on the codes are required

7.3 Reconstruction and SIMBES on Alpha & Linux

Though BES-II reconstruction codes run for MC on Alpha, but much works need done to study how it works for data on Alpha. How SIMBES works on Alpha and Linux is also in question.

7.4 Resolution in Z for Muon counter

One has found that position resolution in z direction is 7.5 cm for BES-II which is much worse than 5 cm for BES-I.

7.5 VAX support at IHEP

VMS FORTRAN version of BES codes still work as Codeman standard even though VMS machines may not be supported by codeman. It is used to trace the BES library using historical records of CMS/VMS. So far no CVS run on Linux, HP or Alpha and no historical record for code management will be written if VAX at IHEP is retired. Therefore, it is expected that One should keep Secondary running on VAX/IHEP till cvs works on HP or Linux.

7.6 Codeman efficiency

From 19 Jan 99 to 10 Feb 99, 300 checkin(out) requests are operated by the Codeman and the traffic of the codeman was very crowded. It gets stuck due to following reasons.

(1) Network failure at any site of the BES Codeman

(2) Any machine linked to the BES Codeman crashs. It means that more machines linked to Codeman, less efficiency. It might be more efficient to have only Linux/IHEP linked to the Codeman and any other Linux from US or Korea work in FTPed mode.

(3) Checkin cycle should be 25 min around, but would be extremely long if email system through network gets stuck.

(4) Checkin routines via one-by-one mode is quite time consumed. Routines packed in one file are chekined in group mode would save processing time largely by Codeman.

(5) Repeated checkins due to unexpected bugs of developed routines. It is better to compile their new code on HP, Alpha and Linux before submiting checkin.

7.7 Next software coordinator from US

Derrick plays important role as software coordinator from US side. It is expected that his successor will be nominated sometime later.

7.8 Garbige code

There are some routines and include files in the BES library are called by none. Removing them from BES library is a tough task.

7.9 Equivalence Statement

Many of equivalence statements are used for integer or half-length integer definition, and become a source of machine-dependent. One should avoid to use this kind of statements in their modifications.

8 Summary

Codeman will continue to run for BES-II after moved to IHEP. BES-II codes runs well with v101 + patches. SIMBES can be put into run soon. Data processing (both reconstruction and calibration) in 1999 is efficient and satisfied. Linux port has noteworthy progress for reconstruction, MC simulation and physics analysis jobs. Much hard work on remained issues are expected in future.

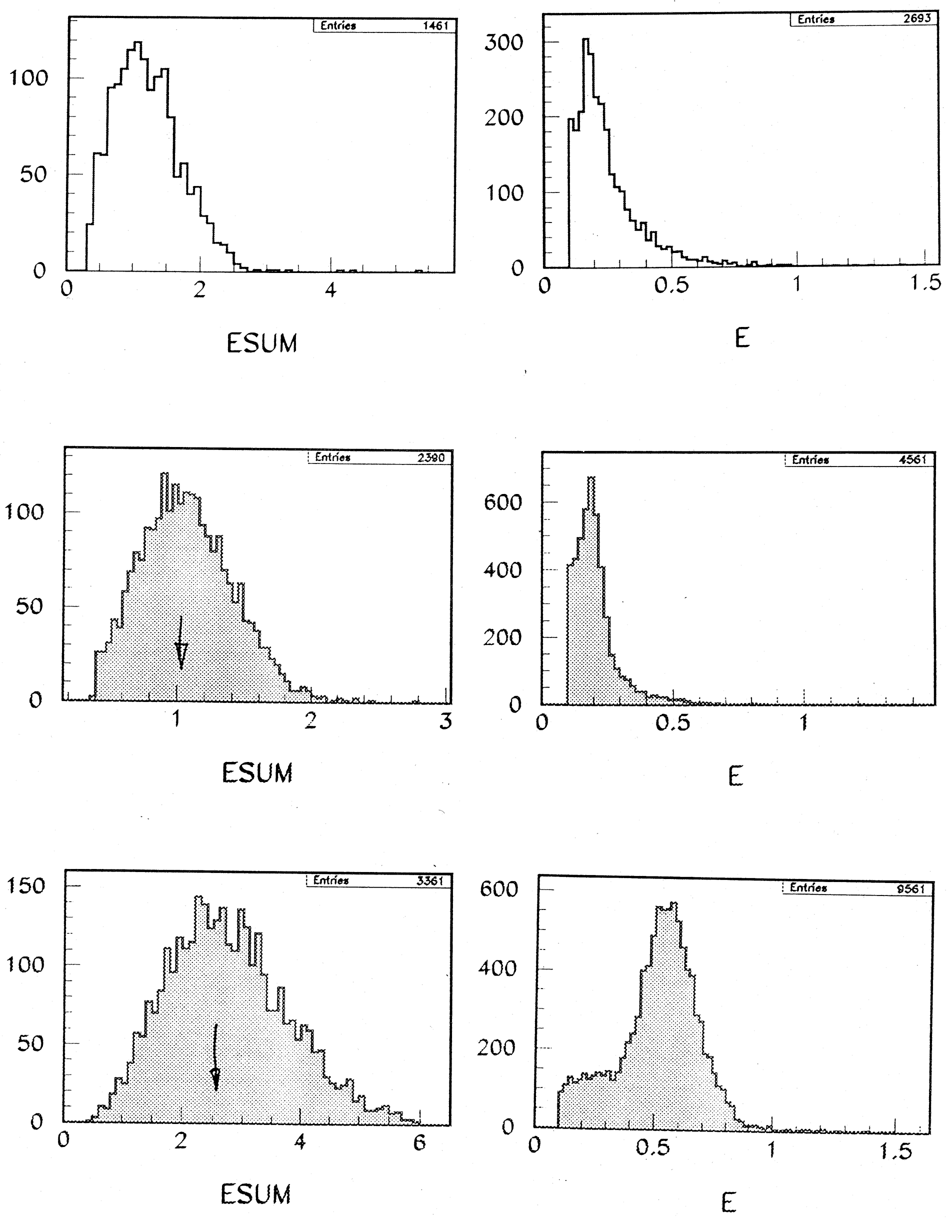

Figure 1: Energy distribution of hadron tracks in BSC (right plot) and total energy of hadron events in BSC (left plot) for data, SIMBES and Sober (from top to bottom plot).