D)   Enhancements to Integrated Accounting Software:

For better information management, new features have been incorporated in the Integrated Accounting Software. To avoid any misclassification, the head of account and budget master tables were updated according to generic coding scheme and provided in all modules like receipt, payment, cheque and budget compilation. Provision is made to maintain financial year wise details of Budget Estimate, Revised Estimate, Final Grant for complete five year project plans. To strictly monitor expenditure against sanctions, all payments are checked against these entries. Commitments with respect to purchase orders and works files are checked at pre-audit stage to stop over commitments. Provision to fulfill statutory requirement of Form-16, VAT statement and RRCAT financial statement required by Ministry of Finance has been made in the software. All these reports can be generated by the software. Now the expenditure statement (sent to the project coordinators) showing financial year-wise expenditure and progressive expenditure is generated through the software.

E)   CORAL database copy tools for LHC:

Under DAE-CERN collaboration, Computer Centre completed the project to develop a set of CORAL database copy tools for LHC users. The CoralTools package was designed and developed to provide a set of export tools for CORAL (Common Object Relational Access Layer) framework to simplify deployment of CORAL based applications. The package provides facility for copying either individual tables or complete schemas between existing databases and technologies. The tools support schema and data copy between Oracle, MySQL and SQLite relational databases.

The CoralTools package was developed in Python and it is an implementation of PyCoral interface developed using the Python C API. The set of CoralTools were tested and implemented on CERN servers. Programs were written for unit testing, integration testing and stress testing (performance analysis was carried out on databases containing upto 5,00,000 records). This module has been released to users in CERN.

I.2 : Developments in networking and communication at RRCAT

A)   RRCATNet planning, expansion and upgradation:

Under phase IV of OFC networking, Internal CAT5E based networking of two buildings namely LCW Extension and Beam Alignment Lab, along with their backbone connectivity to RRCATNet was completed. The Internal networking was also completed in Training School Building and DSL based RRCATNet connectivity was provided. Network in Purchase building was augmented by 24 nodes, making it 96 nodes network. In all, 100 nodes were added to RRCATNet during the period of Jan-June 2007.

B)   Email and Internet access setup enhancements:

A new, secondary email server with spam and virus filtering solutions has been commissioned. This works in tandem with the primary email server to distribute the load of incoming emails. In addition, it has been programmed to maintain one day old copy of the user areas thus providing a hot standby email server ready for use in case of the primary server failure. The SPAM control sub-system, was also reconfigured with latest updates to follow latest SPAM control procedures.

A hot standby proxy server setup was converted to an automatic failover and load balanced proxy server setup, thus enhancing the existing internet access setup. One monitoring software for graphical visualization of internet access logs on per user basis has also been installed (see Fig.I.2.1).

| Time	Site	Minutes	Pages	Downloads	Size
09:28 - 17:22	www.cern.ch	0:17	5	5	3615 bytes
09:28 - 17:31	www.nasa.gov	1:56	5	7	9 kbytes
09:28 - 17:30	www.google.co.in	20:28	30	34	72 kbytes
09:31 - 09:31	www.wikipedia.com	0:02	2	3	5 kbytes
09:31 - 09:42	www.fnal.gov	37:34	1	15	129 kbytes
09:31 - 09:31	www.iitk.ac.in	0:20	1	24	68 kbytes
09:31 - 09:36	www.iitb.ac.in	5:48	1	31	106 kbytes
09:31 - 09:39	www.altavista.com	17:28		11	84 kbytes
09:32 - 17:19	www.barc.gov.in	1:41	9	9	226 kbytes
09:32 - 09:41	www.cdac.in	23:51		7	68 kbytes
09:36 - 09:44	www.iisc.ernet.in	9:23		18	607 kbytes
09:48 - 11:17	www.bsnl.co.in	1:31	4	47	747 kbytes
09:48 - 09:48	www.mit.edu	0:09	1	5	343 kbytes
09:49 - 09:49	www.dst.gov.in	0:05	2	2	3004 bytes
09:52 - 11:30	www.tifr.res.in	0:53	5	17	163 kbytes
09:52 - 10:17	www.iop.ernet.in	1:25	6	28	1471 kbytes
09:52 - 09:52	www.igcar.ernet.in	0:03	1	1	4 kbytes
10:00 - 10:02	www.yahoo.com	1:27	3	32	598 kbytes
10:32 - 17:30	www.gmail.com	0:02	2	2	1236 bytes
10:32 - 17:30	www.cat.ernet.in	392:35	208	370	215 kbytes
10:32 - 17:29	www.howstuffworks.com	0:05		7	28 kbytes

Fig. I.2.1: Snapshot of internet access details for a user.

C) Enhancements to RRCAT data center:

Single sign-on facility using LDAP was further upgraded to use a dual writable, replication mechanism, thus increasing the reliability of authentication service. The authentication service is used by a number of intranet and scientific applications. Thus, users of all those applications are benefited. Windows based internet name server has also been installed to facilitate windows based resource sharing among inter laboratory building users, which was not possible earlier.

D) Anunet and DAEGrid setup:

Anunet is being augmented by high speed links to support bandwidth demanding voice, video and data applications. The DAEGrid has been set up (Fig.I.2.2) using point to point leased lines between RRCAT-BARC (4 MB), RRCAT-IGCAR (2 MB) and RRCAT-VECC (2 MB). DAEGrid will facilitate scientific users to use high performance clusters located in BARC, IGCAR, RRCAT and VECC seamlessly from any of these units.
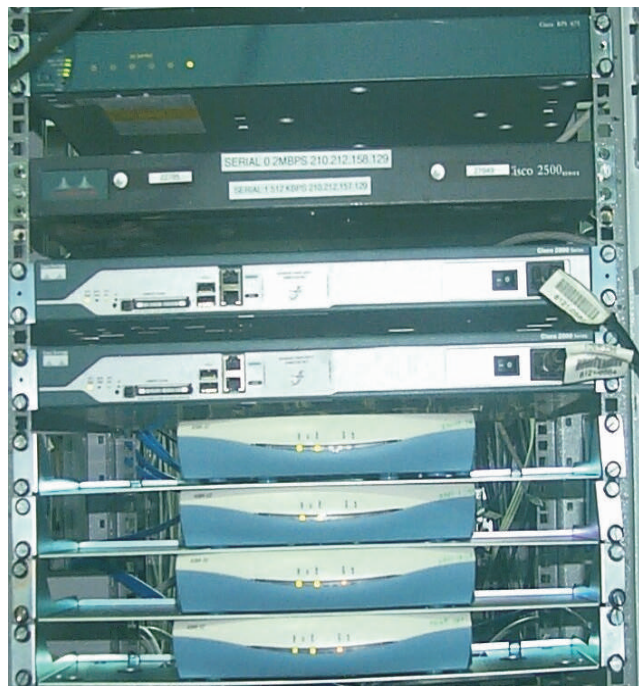
Fig. I.2.2: The DAEGrid leased link infrastructure.

E) Expansion of telecommunication network:

Telecommunication facilities were extended to new D type quarters and the LCW building extension. Mobile facilities were enabled on 60 extensions and 36 new telephone connections were installed inside the RRCAT campus. One MDF of 1500 nodes capacity, has been installed in the laboratory area exchange to take care of the future expansion.

F) Inter DAE video conferencing setup:

A video conferencing setup connecting BARC, IGCAR and VECC has been commissioned in the Interview room of the Administration building (Fig.I.2.3) to facilitate remote conduction of interviews at RRCAT for RRCAT employees. The setup has been built using multiple DAEGrid backbones of 2 Mbps, connecting each of the major units in a mesh fashion. A general purpose video conferencing setup using ISDN lines has also been created to facilitate video conferencing with other DAE units.

Fig.I.2.3: The video conferencing setup at Interview Room.

G) Revamping of user hall at IT building:

User hall at the IT building is used by RRCAT employees for conducting training programmes and for executing various Windows based applications. The setup has been revamped (Fig.I.2.4) with Windows 2003 based server and 22 PCs as clients. LDAP based centralized authentication has been implemented which facilitates single sign-on, even for user hall facilities.

Fig. I.2.4: The revamped User Hall at the IT building.