

I.2: Development of Information Systems at RRCAT

A) Re-vamping and deployment of Project Monitoring Software – On-line Access to project Information System (OASIS), for XII Plan projects on RAC Servers for high availability:

RRCATInfonet and Information Management applications have become very important for RRCAT. Presently information management software packages like Integrated Purchase-Stores-Audit Software, Integrated Accounting Software and Project Monitoring Software - OASIS - are used by large number of users and have associated dependencies. To cater to the needs of such software systems, database servers hosting data should be highly available and scalable. OASIS is deployed on Real Application Cluster (RAC), which offer more reliable services to the end users. Additionally such clustered database also provides server consolidation, database consolidation and improved capacity utilization.

Project Monitoring Software - OASIS - has been re-vamped and deployed on RRCATInfonet for providing project plan-wise details of both XI plan and XII plan projects and to generate various budget monitoring reports related to procurement status for project coordinators and sub-coordinators.

The underlying database tables were re-designed to organize data as per the project plan and information views were created on Oracle 10g RAC for database consolidation and high availability. Complete project plan details of XI plan projects, Integrated Accounting data and IRPSU data were ported on clustered database for production deployment. Re-vamping of existing user interface and re-engineering of code was done and now the software is being used by project coordinators and sub-coordinators for both XI and XII plan projects.

Provision is made to generate schedule of Project Milestones in the form of Gantt chart for monitoring the actual progress of the project with respect to the scheduled month of achievement.

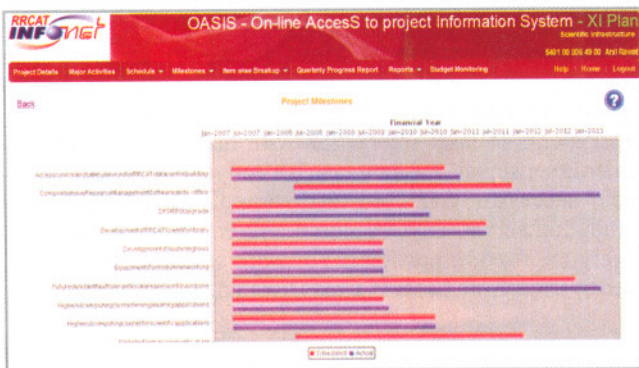


Figure I.2.1: Schedule of Project Milestones

The software has been enhanced to provide graphical representation of financial year-wise Phasing of Plan Expenditure in the form of Pie Chart. Object head-wise drill down information can be viewed for monitoring financial year-wise expenditure details for all types of payments. This is achieved by linking the vouchers to bill details from on-line Integrated Accounting Software.

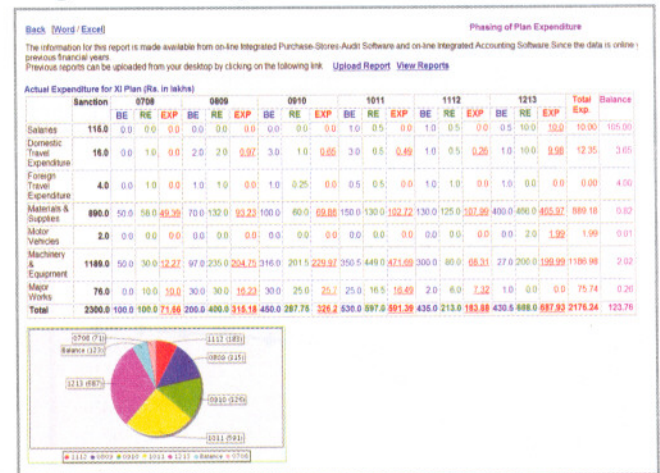


Figure I.2.2: Report for Phasing of Plan Expenditure

Budget monitoring module has also been enhanced to provide graphical representation of consolidated view of 'Total value of procurement in progress' at different stages like Indent stage, Pre-PO stage, PO released & Delivery pending, Items delivered, Payments made and Pending payments. In case of Apex projects with sub projects, procurement related information for each sub project can be viewed.

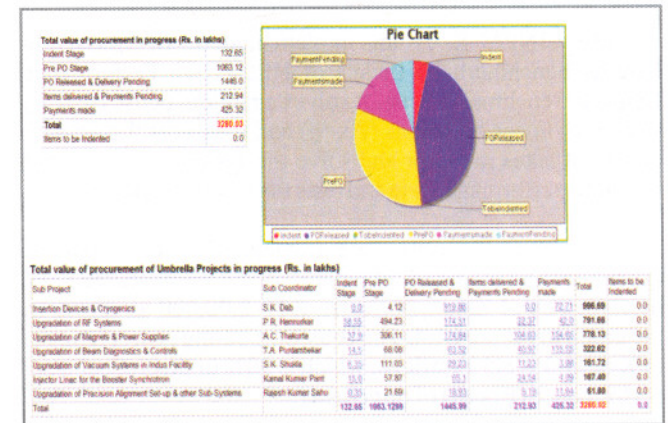


Figure I.2.3: Consolidated Budget Monitoring information for Apex projects along with sub projects

Provision has been made in Monthly Expenditure statement for Project coordinators for providing graphical representation of financial year-wise expenditure incurred with reference to Budget Estimate, Revised Estimate and Final Grant.

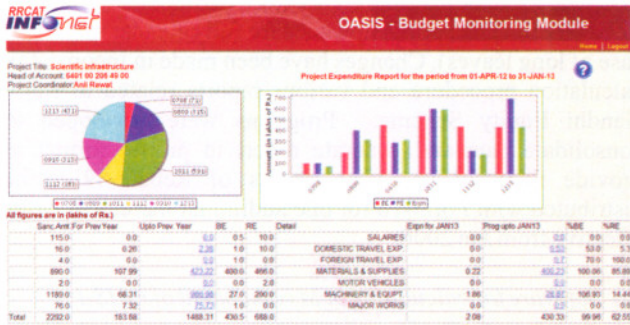


Figure I.2.4: Monthly Expenditure report for Project Coordinators

c-OASIS (consolidated On-line Access to project Information System) for both XI plan and XII plan projects can be accessed on RRCATInfonet by Director, Regional Director IRPSU, JCFA and members of Planning and Coordination Cell for viewing complete plan-wise expenditure details of RRCAT. Budget monitoring information and payment details for all projects or individual project can be used for monitoring the procurement status.

B) Design, modifications and implementation of software feature in RRCAT Information System for maintaining organizational change history:

RRCAT Information System has been enhanced to incorporate new feature for maintaining organizational change history and corresponding employee details. This feature will be utilized for (i) maintaining history of changes in Organizational Structure of RRCAT through Office Orders (ii) Internal transfer of employees in public/ own interest (iii) Generation of Organization and Staff Chart on a particular date (iv) Generation of split APAR in case of internal transfer of employees, transfer to other Units, Superannuation/ transfer of Head of Division/ Independent Section.

Design modifications were carried out in the database tables and software for maintaining details of employee's division/ section as per organizational changes. Programs have been developed for generating information views as required by various systems.

This major design change in database structure has affected many associated systems wherever employee master data is used, e.g. Administration, Accounts, IRPSU, Payroll, Medical Centre etc..

C) Application integration with organizational change history and implementation of CAREER and EAGLE software for APAR 2012-13:

Web based software CAREER- Comprehensive Annual Report Evaluation with Encrypted storage & Retrieval has been enhanced and implemented for the APAR period 2012-13.

The data available in organizational history database is utilized for generation of APAR for the period 2012-13. Appropriate design changes and code modifications have

been done in the software, which now facilitates to file split APARs in cases like internal transfer of employees, transfer to other Units, Superannuation of Head of Division/ Independent Section.

The application software has been enhanced for on-line submission and printing of APAR Part II: 'Status of accomplishments against tasks / targets' and 'Plan of Work for the next year' along with Part II: Self-Appraisal ('Highlights of Work/ Achievements' and 'Brief Description of Work done').



Figure I.2.5: Online Submission of APAR Part II: Self Appraisal

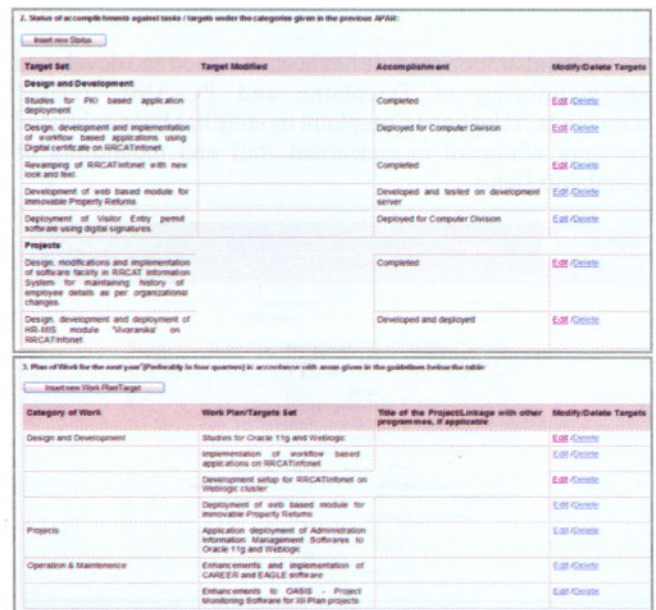


Figure I.2.6: Online Submission of 'Status of accomplishments against tasks / targets' and 'Plan of Work for the next year'

Reporting and Reviewing Officers and Heads of Divisions/ Independent Sections can also view APAR details (Part-I & Part-II) of employees including 'Status of accomplishments against tasks / targets' and 'Plan of Work for the next year' (if submitted online) for whom s/he is Reporting or Reviewing Officer.

EAGLE – Electronic Assessment Grade Logger and Editor software was enhanced to ease out the preparation and printing of 'Part-IV: Report by the Reviewing Officer' in PDF format as per applicable format. Provision was made in the software for preparation and printing of 'Part-III: Assessment by the Reporting Officer' in case of Medical Officers.

CAREER and EAGLE software packages immensely helped individual employees, Reporting Officers and Reviewing Officers to complete their task in time bound manner.

D) Enhancements to RRCATInfonet :

The on-line services provided by RRCATInfonet have been enriched by inclusion of one web based module developed and deployed for filling application for Increase/ Decrease in PF Subscription for GPF and CPF account holders in current financial year. Entered data is validated from the information maintained in PF module of Allowance Processing System.

Individual Employees can view calendar year-wise Immovable Property Returns filed by them in PDF format on RRCATInfonet after authentication.

Administration module has been designed and developed for monitoring of Telephone and PC-AMC related complaints. Telephone Complaint module has been enhanced for work allotment to concerned staff and monitoring of complaints status.

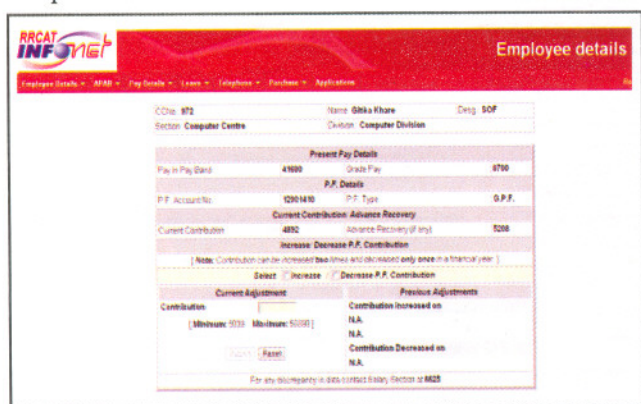


Figure I.2.7: Application for Increase/ Decrease in PF Subscription

E) Enhancements to various Information Management Software Systems:

(i) Allowance Processing System:

The software has been enhanced for arrear calculation and provision of Leave Recovery during increment and Leave

Recovery for Transport Allowance for full calendar month (in case of long leaves). Changes have been made in Income Tax calculation procedure and various reports related to Rajiv Gandhi Equity Scheme. Programs were developed to consolidate data and generate report in proper format to provide financial year-wise details of Rebate-89 to be distributed with Form-16 for one additional increment cases effective from Jan 2006.

(ii) Software for calculation of M component of PRIS-I:

Software for automatic calculation of M component of PRIS-I for scientific and technical staff has been enhanced further to have provision for viewing data for previous PRIS periods and calculation of M component from July 2012 to June 2013. Provision for maintaining history of revisions of PRIS-I increments awarded during the same PRIS year has also been made.

Web based software module on RRCATInfonet was used by PRIS-I sub-committee members and Heads of Division/ Independent Section for viewing year-wise PRIS-I (M) details of all Scientific and Technical staff working with them. After approval by concerned authorities, PRIS increment details are transferred electronically to Payroll Software for payment.

(iii) Integrated Accounting Software:

Enhancements have been carried out in Major Works module for maintaining details and generating Registers for Works Contractor and VAT certificate. Registers for Works can be generated with work order details, contractor details, head of account, budget code, bill details, advance paid and recoveries. This is required for internal and external audit purpose. VAT certificate module maintains the VAT details of contractors with provision to print the VAT certificate, which is issued to the contractor in every quarter. This enhancement minimized the manual preparation of VAT certificates by the staff in Accounts Section.

(iv) Purchase Accounts Software module :

The software has been enhanced with provision for maintaining information related to PBG details of all local orders and generation of related PBG reports.

F) Deployment of software package for on-line submission of applications for Recruitment at RRCAT:

Web based software for on-line submission of applications on Internet for Recruitment at RRCAT was fine tuned and deployed for three more advertisements, one for regular recruitment - Advertisement No 'RRCAT-2/2013' and two for Stipendiary trainees - 'RRCAT-3/2013' and 'RRCAT-4/2013'. This software has reduced data entry work of Recruitment Section and associated manual errors.

G) Enhancements and re-vamping of RRCAT Website:

RRCAT website has been enhanced with new look and feel. The web pages have been re-designed and re-arranged with updated contents. The look and feel has been changed using smart drop down menus and cascading style sheets for easy and quick navigation of the website. The contents for Immovable Property Returns of Group A employees have been deployed in PDF format for the calendar year 2012. The website has been regularly updated by deploying scientific contents of various divisions and documents related to recruitment, tenders, conference/ workshop etc.

A 'Website Update Notification System' with automated voice calls and email alerts has been developed and integrated with website updating mechanism. The automated system generates email alerts for web site administrators, whenever website is updated. The alert contains listing of modified files after every updation of the website. This facility will be very useful to monitor unauthorized website updates, in case the website gets updated or changed by un-authorized persons.

Reported by:

Alpana Rajan (alpana@rrcat.gov.in) and Anil Rawat

I.3: Developments in Networking and Communication at RRCAT

(A) Commissioning of new 10G Ethernet Network Core Switch:

New chassis based core switch (Black Diamond BD8810) has been commissioned in place of the aging core switch in IT building, so as to upgrade RRCATNet backbone and server connectivity from the existing 1 Gbps to 10 Gbps. The new core switch has aggregate switching capacity of 3872 Gbps (full duplex), backplane switching capacity of 1320 Gbps (full duplex) and aggregate throughput of 2840 Mpps. It has 24 nos. of 10Gbps optical fiber ports, 48 nos. of 1Gbps optical fiber ports and 192 nos. of 1 Gbps copper ports.

The new switch has been configured in failover, redundant mode with another core switch in IT Extension building. Critical network services have been configured in load balance and failover mode, for providing uninterrupted services to users, on round the clock basis. All building rings (08 nos.) have been migrated to the new core switch. Firewall and routing configurations have also been migrated from the replaced core switch to the new core switch.

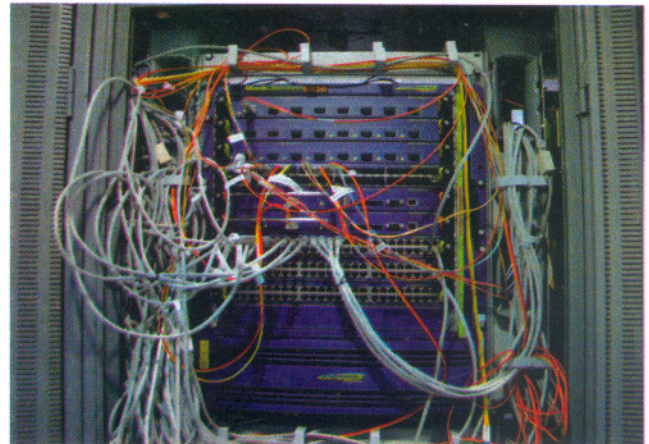


Figure I.3.1: Rack view of newly commissioned core switch BD8810

Figure I.3.1, illustrates rack view of new BD8810 core switch, installed in IT building. The commissioning of the new core switch with zero network downtime was achieved by utilizing the failover configurations of the existing core switches.

(B) Design, Development and Deployment of Network Node Life Cycle Management System (NNLMS):

Network Node Life Cycle Management System is designed, developed and deployed on RRCATNet, to record and manage information related to various network activities performed on various network nodes attached to RRCATNet. Information related to every network node's physical location, connectivity status at different times, details of Internet accesses and email transactions performed from a node, throughout its entire life cycle is managed in this system. This helps in performing forensic analysis of network nodes. The system uses connection logs stored in Network Access Control (NAC) server, Dynamic Host Configuration Protocol (DHCP) server logs, mail server logs and proxy server logs stored in various servers, converts the flat log files into database and provides intuitive interfaces for performing correlational analysis and report generation. The system is developed using PHP, java scripts and MYSQL is used as backend data store.

The system has five major modules – a) *Log file parser module* – In this module parsers have been developed to process huge log files and extract meaningful data, and store it in database for faster analysis. b) *Data updating module* - This module is developed to update the log database automatically on daily basis. c) *Comprehensive report generation module* – In this module user friendly web based application is developed to provide single point access to multiple server logs stored in database format. This module has options for generating reports related to Internet Accesses, Email transactions and network connections made by nodes on network. Query preprocessing and optimization has been