

**NAME OF CATEGORY- 'EXCELLENCE IN GOVERNMENT PROCESS RE-ENGINEERING'**

**1. Coverage – Geographical and Demographic**

(i) Comprehensiveness of reach of delivery centers,

100%

(ii) Number of delivery centers

Total number of groups in R&DE (E) – 30 groups

(iii) Graphical

(a) National level – No of State covered

(b) State/UT level- No of District covered

(c) District level- No of Blocks covered Please give specific details:-

Whole organization. Some of the systems are being implemented in other DRDO labs too.

(iv) Demographic spread (percentage of population covered)

R & DE (E) has a campus wide local area network (Mayurpankh) on a fibre optic backbone, in an area of 65 acres and 30 groups.

Every employee (100%) of every cadre has authorized access and uses the Mayurpankh Applications extensively.

**2. Situation Before the Initiative (Bottlenecks, Challenges, constraints etc with specific details as to what triggered the Organization to conceptualize this project):**

First constraint was that existing servers had become obsolete, hence we had to decide whether to invest in physical servers or to create a virtual server environment & on which environment Mayurpankh should be hosted.

Next challenge was transferring existing Mayurpankh systems from physical environment to virtualized environment preserving the architecture and the data of the physical systems. It took the effort of whole team to get this job done in required timeframe with minimum downtime.

Another challenge was developing systems with latest technology and with advanced features meeting all our specifications. So we conducted various trainings for developers and got the systems developed **in house**.

Having set up all the systems, our next challenge was to educate employees/users on how to use these systems to build their confidence in using the system.

3. **Extent of Process re-engineered** (Processes that have been re-engineered, services which depend on these processes, analysis/re-design of Process workflows – before (As-Is) and after (To-Be) re-engineering; changes in activities and their sequencing; level of automation (Extent of computerization in terms of number of services computerized, Extent to which steps in each service have been ICT-enabled) #)

Each and every service related to finance, budgeting, HR, material management, administration, project management, product management, visitor management, quality management, knowledge management, product life cycle management have been fully automated.

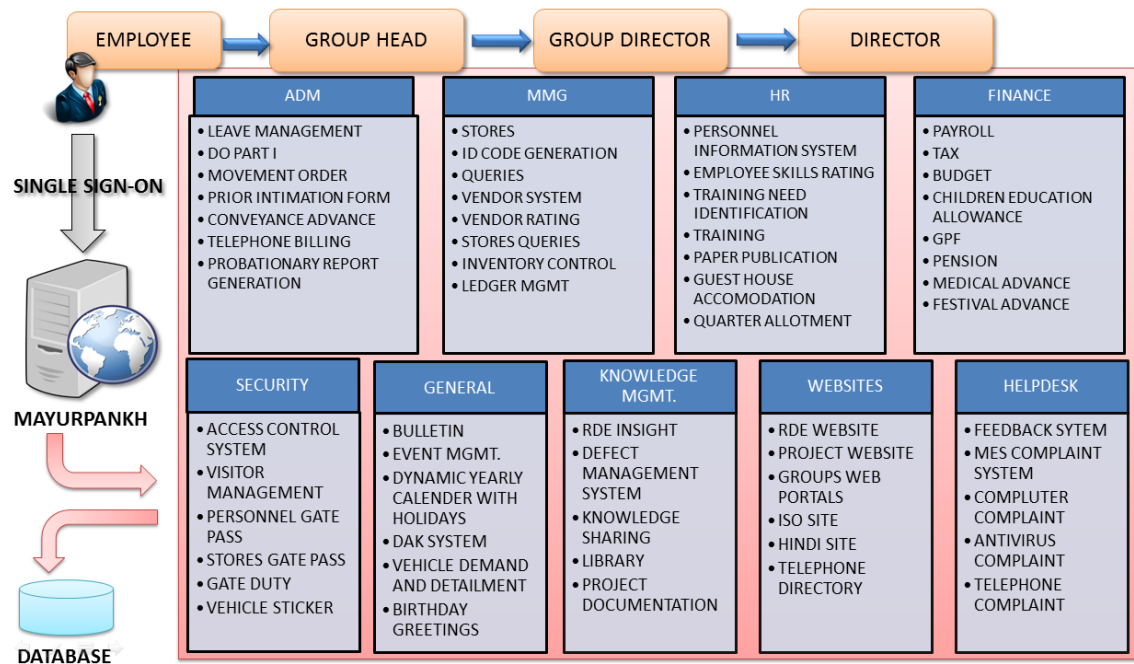


Figure: 1

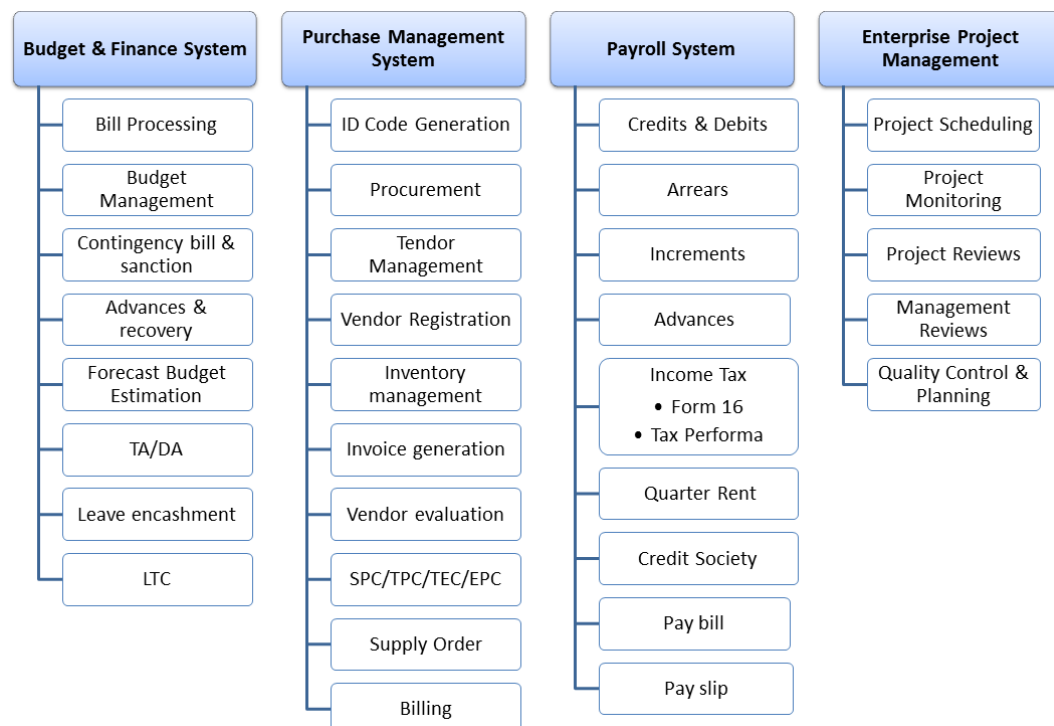


Figure: 2

Figure -1 number of systems/ level of e-governance implemented in our organization.

Figure -2 shows some of the important features implemented in major systems.

Re-engineered the workflow of the older existing systems like Movement Order system, Bulletin System, Leave Mgmt. System, Customer Feedback System and also for new systems like Payroll, PIS, Stores, Stores Query, Vendor Rating, Income Tax etc. which resulted in improvement in outcomes related to service delivery, efficiency and quality.

For all the developed systems, Online submission, modification, cancellation, approval/rejection by respective authorities at various levels, online report generation, queries & status tracking have been implemented for overall effectiveness and supervision of the systems.

One of our major systems, Purchase Management system (Stores System): Figure -3 shows the data flow diagram of the system. Requisition, Approval, Tender, Supply Order, SRN, CRV, billing everything is managed through the system only.

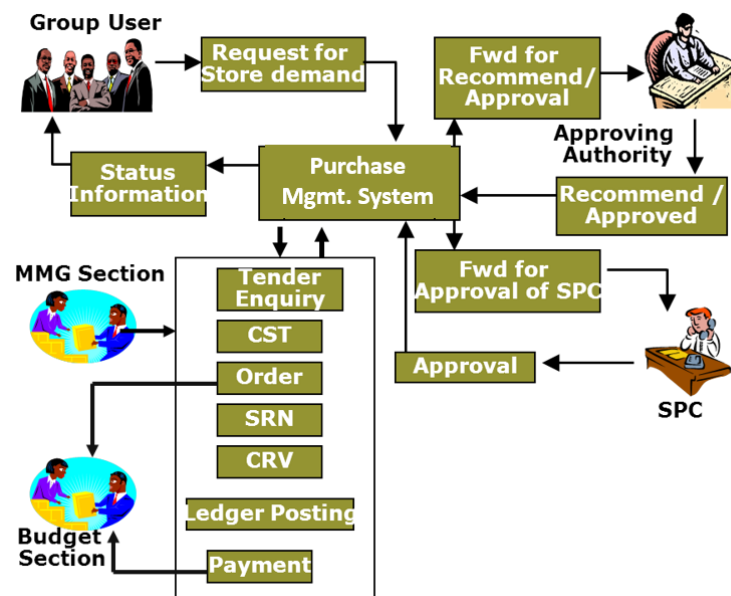


Figure: 3

We have shifted all processes to online rather than paper-based delivery which enhanced the work efficiency. For every communication Mayurpankh is used extensively.

Total numbers of services are more than 60. Most services are almost 95% ICT enabled.

#### 4. Strategy Adopted

(i) Details of base line study done,

- a) Studied the existing systems/manual processes and the drawbacks faced by the user.
- b) Studied the latest technologies for implementation.
- c) Studied virtualized technology options available in the market and identified best suitable option for hardware.

(ii) Problems identified,

- a) **Manual Process:** Handling of files/papers becomes cumbersome task for both user as well as administrative department, time consuming Process
- b) **Flaws in existing systems:** There was no Status tracking/ feedback mechanism, no integration between the existing systems. Deployed systems not in use much as there were lots of workflow problems.
- c) **Security:** Not secured, any user could have accessed higher authority account with little knowledge of hacking.
- d) Multiple authentications for accessing the systems.
- e) **Server setup:** To set up the virtual environment for the deployment of the services. To transfer the physical systems to virtual environment with minimum downtime.

(iii) Roll out/implementation model,

Spiral model for software development.

(iv) Communication and dissemination strategy and approach used.):

- i) Training to users periodically.
- ii) Feedback mechanism in place.

#### 5. Technology Platform used-

(i) Description

- **ASP.net framework 4.5, Visual Studio 2010 IDE, HTML5 and CSS style sheet** used for software coding with advanced security features like encryption, hashing which is used in our systems.
- **ASP.Net Model View Controller (MVC 4) Architecture** which will make source code management easy by separating Business Logic and Presentation Logic. **Object Oriented Programming (OOP)** concept used for Software coding of designed system module that facilitate easy data flow and reuse of source code.

- Mayurpankh systems are hosted on **IIS 7.5 web server**.
- Design of database for proposed system has been done **using SQL Server 2008 R2** which provides Master Data Services (MDS) which has central data gate keeper of core business data.
- **Certificate Authority Server** used for generation of digital certificates for servers for https communication

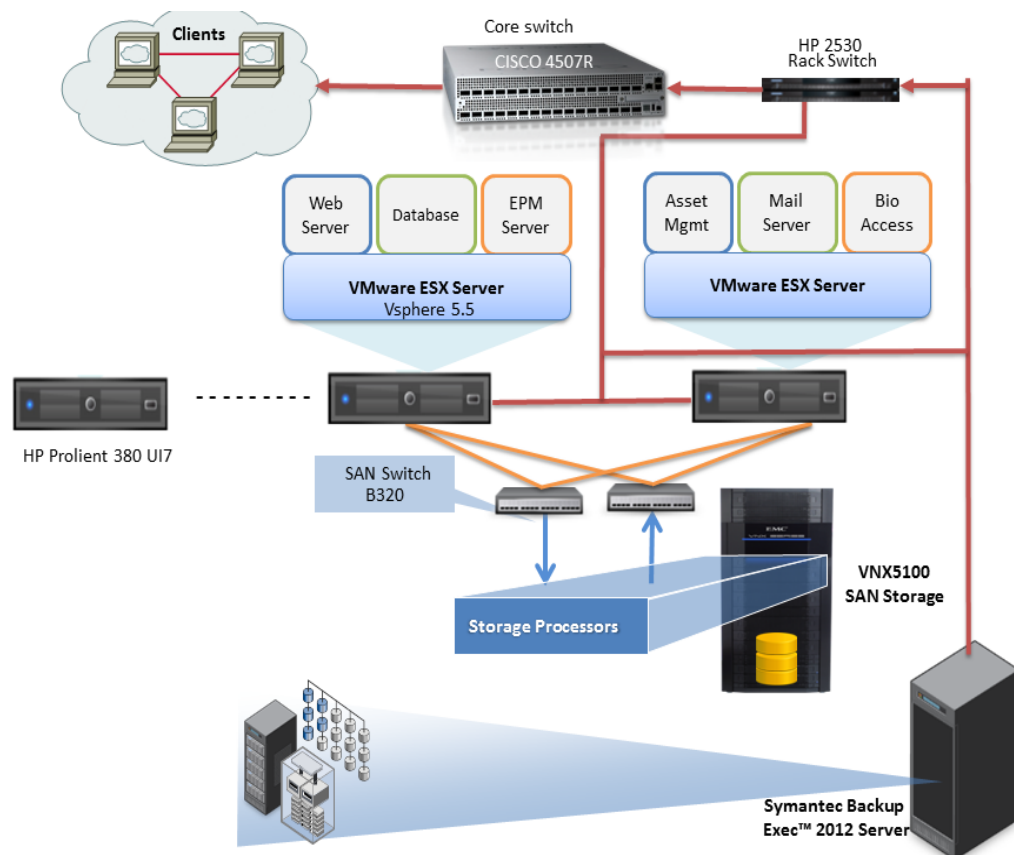


Figure: 4

- These servers reside on a **VMware® virtual servers cluster**. As shown in figure-4 this cluster employs **VNX 5100 SAN Storage** as storage. The cluster is then connected to the heart of the network -Core Switch CISCO-4507R. Clients connect to the Mayurpankh using their machines which are connected to core switch using their respective departmental switches.
- The incoming and outgoing traffic on web server is managed using **VMKernel port** of VMware® virtual servers cluster. The cluster ensures high availability of the web server with minimum downtime.

With the implementation of virtualization, we have successfully achieved increased uptime, saving on energy – less power, less cooling requirements, less hardware, improved disaster recovery, isolation of applications, less space required, test environment created, capacity based provisioning enabled.

## (ii) Interoperability

The systems of Mayurpankh share a common data store which consists of databases of these systems. The databases are so designed that they can interact with each other according to organization rules. The new systems are designed keeping compatibility with older systems in mind. All of the systems are integrated.

As an example: Biometric Access system interacts with employee data, leave data, outstation duty data etc. to report correct attendance.

## (iii) Security concerns

Security of information is of prime concern. To ensure security of the information several measures have been taken.

- Active directory infrastructure** is used for user authentication as well as organizational unit (OU) level security. (Refer figure 5.1)
- IT asset management solution** to build and track the software and hardware inventory across the network has been deployed. (Refer figure 5.2)
- Enterprise – wide anti-virus and patch management solution** prevents data loss due to virus threat. (Refer figure 5.3)
- Centralized data backup and recovery solution** has been implemented to prevent data loss. Data backup has been taken periodically for accidental recovery of data.

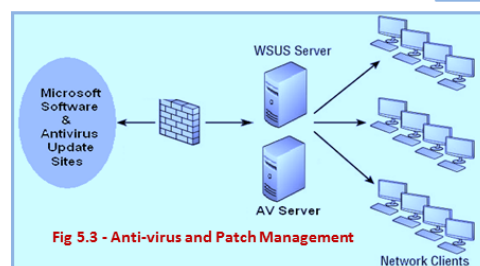
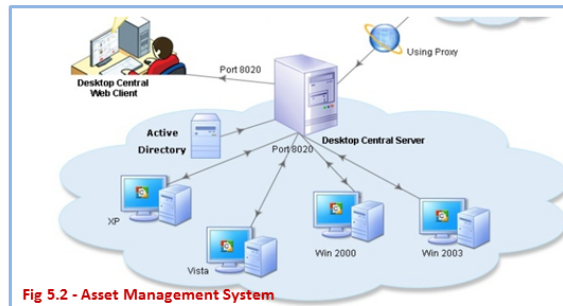
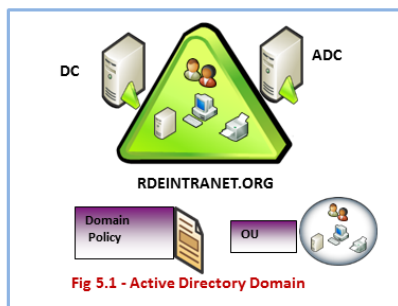


Fig 5.5 -  
Biometric access  
to server  
room

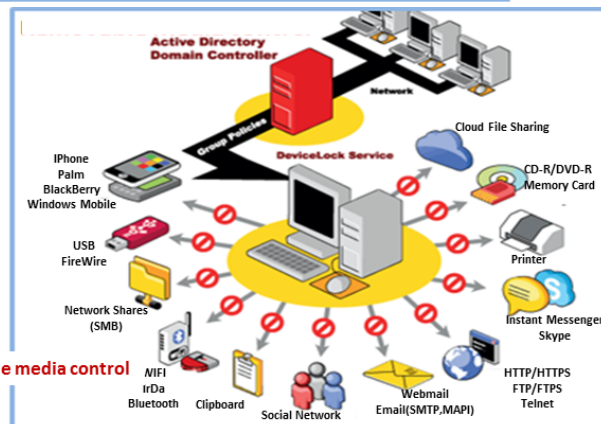


Figure: 5

- DR Site:** Offsite data backup is maintained in DR site for data loss prevention in case of fire and other untowardly incidents.

- f) **Enterprise-wide removable media control solution** has been deployed to control usage of various removable media against data leakage and data loss. (Refer figure 5.4)
- g) **Biometric access control system** has been put in place to control the physical access. (Refer figure 5.5)
- h) **SSL Encryption:** For security of user credentials over network & to secure the network traffic TLS/SSL has been implemented.
- i) **Password encryption** is used to ensure that the passwords of the users are not compromised.
- j) **Sessions:** At system level security of user credentials; Sessions/cookies have been used in all the systems.

**(iv)** Any issue with the technology used

The main issue was the adaptability of the new technology which we tackled with extensive training to developers, system administrators, database administrators as well as users of the systems.

**(v)** Service level Agreements(SLAs) (Give details about presence of SLA, whether documented, whether referred etc. #)

No SLAs

**6. Citizen Centricity** (Give specific details on the following#)

(i) Impact on effort, time and cost incurred by user,

Minimum effort, time and cost of the user incurred to complete the task.

(ii) Feedback/grievance redressal mechanism,

Changes and enhancement in any systems are inevitable to make system more robust and usable. These changes can be raised by any employee to the system by means of online feedback mechanism. Grievances are also received through memos, email etc.



Figure: 6

This feedback is sent to developers of the system and administrator, who then review and consider its suitability for implementation.

(iii) Audit Trails,

Log files for transactions are maintained at server for auditing purpose. Also the details of user sessions like user ID, IP of the machine and date-time are stored on the server for audit to track transactions.

(iv) Interactive platform for service delivery,

Web pages are developed in user friendly manner for better service delivery.

In our systems user sessions in the hash form of user id as well as user password have been maintained for secured communication throughout the service from initiation to the submission and till the user is in active stage.

In our web pages, we have used Ajax controls, calendar view, gridview, datepicker, rich textbox, and Unicode language for Hindi font visibility, validators and many more functionalities for making the user friendly interface.

Webparts have been used to make website dynamic so that user can personalize the site as per his/her own requirement.

(v) Stakeholder consultation

Extensive requirement gathering is done before developing any system and periodic feedback from all concerned is taken after deployment for better service delivery.

7. **User convenience** (Give specific details about the followings #)

(i) Service delivery channels (Web, email, SMS etc.)

Web and internal email facility, Video LAN are used. Large project files are shared through the network.

(ii) Completeness of information provided to the users,

Information is complete and concrete according to the rules, policies of the organization which meets the requirement of the user.

(iii) Accessibility (Time Window),

The systems are available 24 x 7. The operation is unmanned.

(iv) Distance required to travel to Access Points

Systems are available on the desktop computers of the employee though LAN.



**(v)** Facility for online/offline download and online submission of forms,

Facility for online download and submission available. For every service e.g leave system; online leave feed submission, then followed by online leave approval by Group Head/ Director then generation of DO Part for publication of employee leave. Online status tracking is also made available to the users.

All forms are also available at ISO site for offline download and for reference.

**(vi)** Status tracking

Online status tracking of every form (whether it is an applied leave or bill reimbursement, requisition for move to particular city etc.), documents as well as purchase requisitions is available to the concerned stakeholder.

For all the developed systems; online reports & status tracking have been implemented for overall effectiveness and supervision of the systems.

**8. Efficiency Enhancement** (Give specific details about the following #)

**(i)** Volume of transactions processed

Approximately 10000 transactions are processed every day.

**(ii)** Coping with transaction volume growth

- Load balancing feature is implemented in the web server.
- RAM and space are managed on the virtual servers to meet the requirements.

**(iii)** Time taken to process transactions,

Less than a micro second.

**(iv)** Accuracy of output,

100%

**(v)** Number of delays in service delivery

No delay in service apart from debugging downtime if an error is reported.

**9. Cost effectiveness** (Give details about impact on cost incurred w.r.t. overhead cost, direct and indirect cost, man days/man hour required to do a job etc.)

No additional cost involved for development as it is in-house development. One time cost incurred only for procurement of hardware and software for virtualization and development tools. Only cost of maintenance of hardware incurred annually.

Time required for virtualization and migration of systems from physical environment to virtual environment was 40 man hours with minimum downtime.

10. **Capacity Building and Organizational Sustainability** (Give details about hiring skilled staff, imparting training etc. #)

Periodic trainings are being organized for developers, system administrators and users of the system to adapt to the new technology and make system robust for better utilization.

**Group : ITG with skilled staff of 10**

Training Imparted	
ASP.NET	8
Cryptography	4
Dynamic Web Services	2
VM Ware Certified Professional Course (VCP-5)	1
Information Security	3
Network Management	1

All the team members are capable of handling the developed systems.

11. **Accountability** (Give details about, impact on transparency of process, fixing responsibilities etc. #)

- The tasks and responsibilities of the developer as well as system administration teams are well defined.
- Audit trails of user sessions data such as Username, IP of the machine used to login to system and timestamp are maintained to curb untowardly access of the system.
- Role based access is provided for Employees, Group Heads, Group directors and Director to maintain workflow of the organization as well as to hold individual accountable for various actions.

12. **Innovation** (Give details on the extent to which re-engineered process is unique, compared to other common process re-engineering efforts, impact on number of steps required, identification and removal of bottlenecks/Irrelevant steps etc. #)

**SSO:** Single sign-on (SSO) is a session/user authentication process that permits a user to enter one name and password in order to access multiple applications. The aim is to enable authentication without requiring multiple authentication procedures by the user and also easy management of rights by the administrators. User gets the access to all the e-Services through Single sign-on with password encryption security.

**WEB Services:** use of AJAX controls, calendars, interactive forms for making it user friendly joining different databases for making different information available on single interface for employees to perform task efficiently.

**Personalized web site:** Webparts have been used to make website dynamic so that user can personalize the site as per his/her own requirement.

**SSL Encryption:** For security of user credentials over network & to secure the network traffic TLS/SSL has been implemented.

**Password Encryption:** User Passwords have been stored in hash format in the data base.

**Sessions:** In our systems user sessions in the hash form of user id as well as user password have been maintained for secured communication throughout the service from initiation to the submission and till the user is in active stage.

**Integration of various systems** for transparency of systems which leads to reduced data entry efforts as data is being fetched from the other integrated systems.

**Advanced Query Systems** developed which lead to easy access of information to user with single click

**4-tier architecture** is used to reflect workflow of the organization in the system (Employee -> Group Head -> Group Director-> Director) and also **3-tier architecture** is used to reflect workflow of the organization in the system (Employee -> Group Head ->Director) as per organizational rules.

**Alert mechanism:** A sophisticated alert mechanism is developed which reminds users of various meetings, events, important dates. A mechanism is implemented to remind user of pending tasks so that tasks are not kept pending for long time.

**Single point data entry:** Different data like Pay scales, basic salary, Personal details which is required by various systems is stored only once and used by these systems according to the necessity. This mechanism has reduced redundancy of records.

**Both way communications:** we have made the systems in such a way so that users on both sides have interactive 2-way communication.

13. **Appropriate Delegation** (Give details on whether a team involving employees from all levels has been deployed for the project implementation and maintenance, can employees be held accountable for their actions, etc. #)

Different teams for developers as well as system administrators are defined. Their scope of work is so defined that one can be held accountable for the integrity of the system.

Separate teams are deployed for requirement specification and user interaction, system design & development, coding , database design, testing & debugging within the development team.

Database administrator & system administrator have specific roles defined.

Users of the systems are also made accountable by maintaining the session details of the users.

14. **Result Achieved/ Value Delivered** to the beneficiary of the project-(share the results, matrices, key learning's, feedback and stakeholders statements that show a positive difference is being made etc):

**(i) To organization**

- Almost paperless office, less time spent by scientists on office procedures.
- Effortless generation of various reports

Following graphs shows the number of reports generated online from some specific important systems.

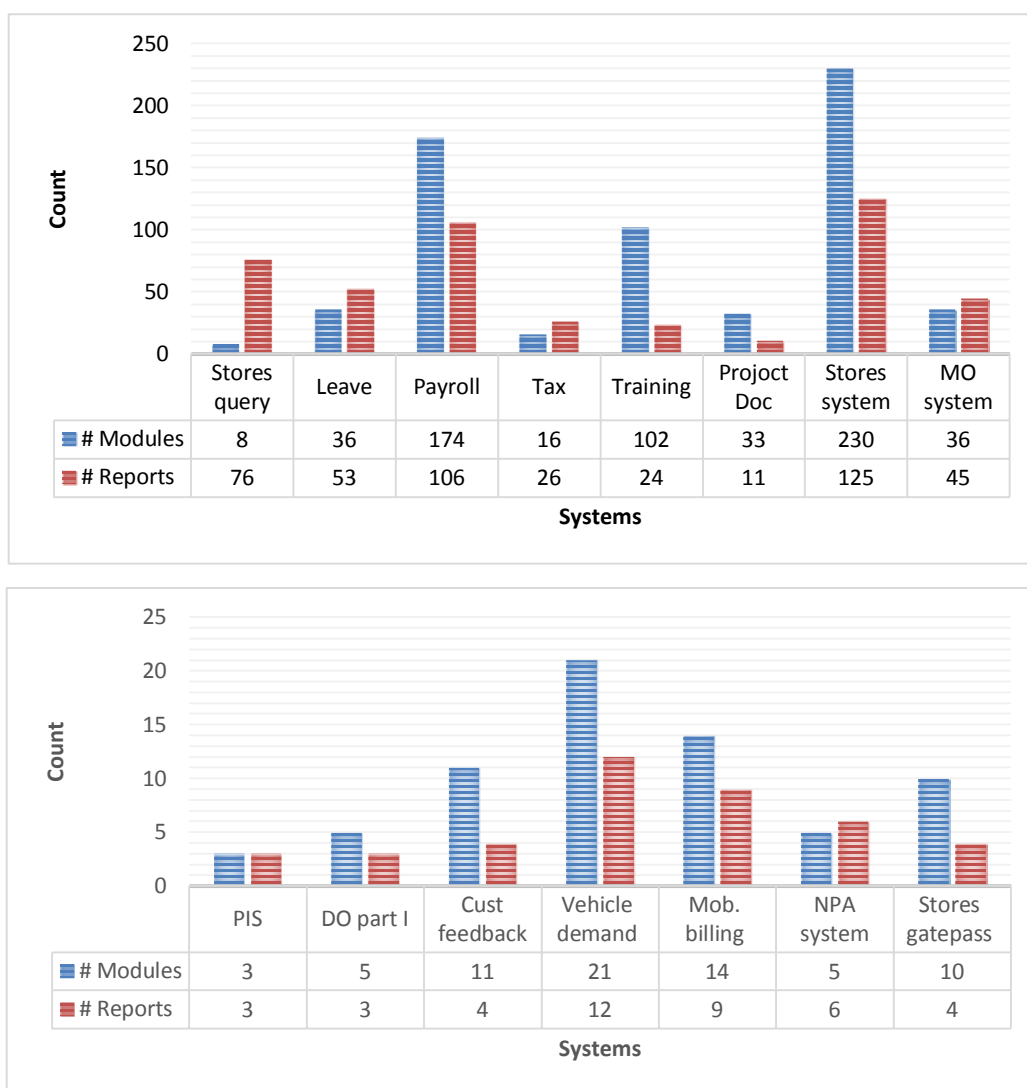


Figure: 7

**Report of Utilization of Mayurpankh:**

Following graph (figure - 8) shows the utilization of Mayurpankh web service has grown over the years. Users are using the system for their day to day administration, personal, financial, daily information, stores procurement, e-mailing within organization etc.

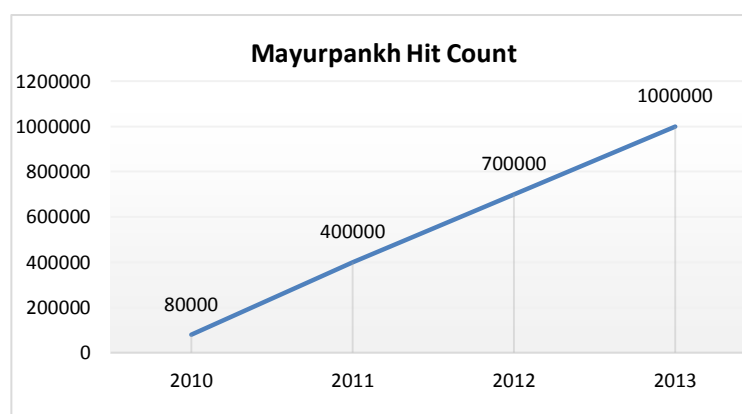


Figure: 8

X-axis in graph shows year and y-axis shows hit count of Mayurpankh web service.

Following graph (figure - 9) shows incremental usage of web services. Specific to the some important systems, utilization is shown in below graph over last five years.

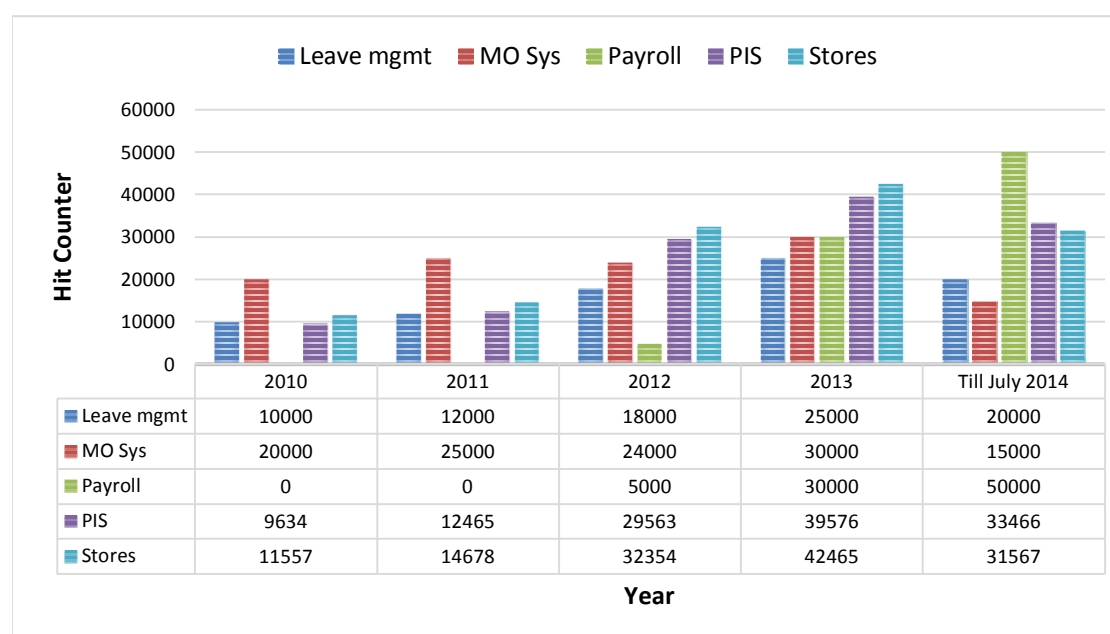


Figure: 9

## (ii) To citizen

Better use of public money.

## (iii) Other stakeholders

Today, each and every employee of R & DE (ENGRS) uses one or more of these systems to contribute to the output of the organization.

15. Extent to which the Objective of the Project is fulfilled-(benefit to the target audience i.e.G2G, G2C, G2B, G2E or any other, size and category of population/stakeholder benefited etc):

The whole organization is benefitted by this as a result minimized time and effort requirement in day to day work. Feedback of stakeholders on a scale of 1 to 10 is presented below.

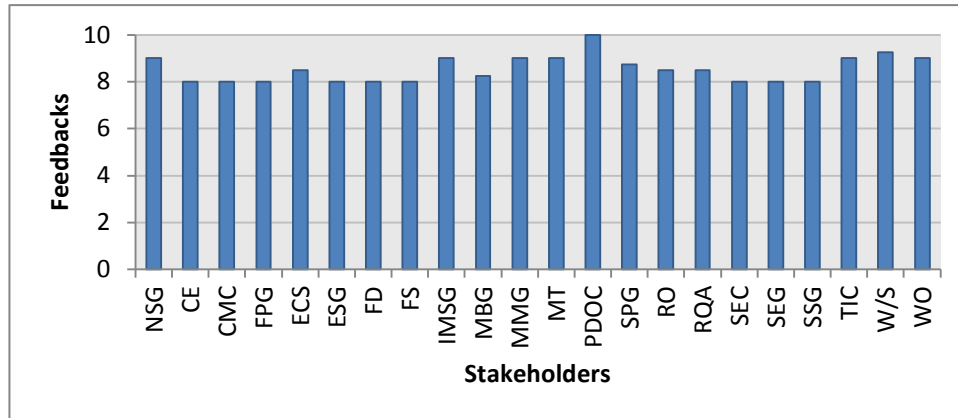


Figure: 10

## 16. Adaptability Analysis

### (i) Measures to ensure adaptability and scalability

Adaptability ensured by training to users and systems are scalable according to when new requirement of the users arise.

For e.g. for income tax module of payroll system has been so designed that it can adapt to yearly changes in budget. Similarly stores system is easily adaptable to all changes in policies, rules, financial powers etc.

Systems are also scalable. For e.g. inventory system designed for single group was scaled up to cover inventory of organization.

### (ii) Measures to ensure replicability

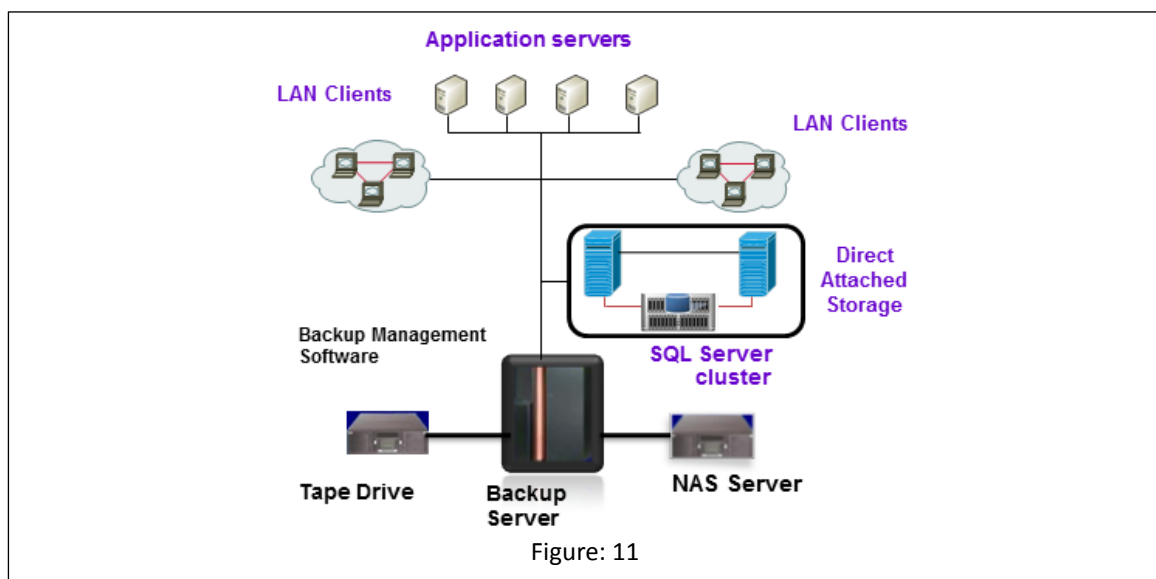


Figure: 11

Scheduled online backups of the systems, database and the servers along with a disaster recovery site are kept to replicate systems in event of crash to restore systems with minimum downtime.

Figure - 11 shows our backup management setup.

**(iii) Restrictions, if any, in replication and or scalability**

NIL

**(iv) Risk Analysis**

Periodic monitoring of the network to assess the vulnerabilities and risks is carried out.

**17. Comparative Analysis of earlier Vs new system with respect to the BPR, Change Management, Outcome/benefit, change in legal system, rules and regulations**

A well-defined change management system is in place. This takes care of any delay that may arise due to change in rules, policies etc.

**18. Other distinctive features/ accomplishments of the project:**

R & DE (E) is pioneer in paperless office initiative in DRDO. In a move to make day to day office work paperless and efficient, R & DE (E) uses **in-house** developed office automation systems hosted on virtualized network infrastructure.

It automates the process of reforming the way organization works, sharing information, delivering service to external and internal users for the benefit of the organization.

It makes administration more transparent, speedy and accountable which reduces cost in terms of printing documents, resource distribution etc.

It is a single point entry for accessing all the services which makes the hassle free access to all the systems under one roof.

Automatic data capture, single sign on, audit trails, triggers. High end CAE tools are also deployed which help project teams in collaborative designs.

EPM has been implemented for project monitoring and decision making by management.

Some of the systems are being implemented in other DRDO labs too.

#This is just an indicative list of indicators. Applicant can add on more information based on suitability of the project nominated.

दूरभाष: 011-23007212

फैक्स : 011-23014576

011-23013369

भारत सरकार रक्षा मंत्रालय

रक्षा अनुसंधान एवं विकास संगठन

कार्मिक निदेशालय

डी आर डी ओ भवन

नई दिल्ली-110011



Telephone: 011-23007212

Fax : 011-23014576, 011-23013369

Government of India,

Ministry of Defence

Defence Research & Development  
Orgn.

Dte of Pers/Pers (Coord)

DRDO Bhawan, New Delhi – 110011

DOP/02/25009/MA/02/14/M/01

26. Aug 2014

Secy

Ministry of Personnel, Pension and

Public Grievances, Deptt of Adm Reforms and

Public Grievances e-Governance Division

5<sup>th</sup> Floor, Sardar Patel Bhavan, Sansad Marg,

New Delhi-110001

**NATIONAL AWARDS FOR e-GOVERNANCE 2014-15**

1. Please refer to your letter No.N-13015/2/2014-e-Gov (B) dt 27 Jun 2014.
2. The nominations for National Awards for e-Governance during the National Conference for the year 2014-15 in respect of the following officers are forwarded herewith as desired:-

Sr No.	Name	Designation	Lab/Estt
1.	Dr.P.Sivakumar (Team Leader)	Outstanding Scientist	CVRDE, Chennai
2.	Mrs Shobha Aralikatti (Team Leader)	Scientist 'F'	R&DE (E), Pune
3.	Shri Gautham Mahapatra (Team Leader)	Scientist 'F'	RCI, Hyderabad

3. You are requested to process the same for National Awards for e-Governance.
4. This has the approval of Competent Authority of this HQ.

*Dhan Singh*  
(Dhan Singh)

Asstt Dir (Pers)

For Dir Gen Res & Dev Org

Encl: As above