Picture Archiving & Communication System (PACS) for tertiary care superspeciality Hospitals

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Abstract- *Creating a setup which will have all the records of patient treatment. It reduces the burden on the patient from collecting the reports from different departments. Reports are automatically updated on a separated portal with the name of the patient and with a specific id which is allocated to the patient. In the file all data records of patient are stored, like report analysis, medicine prescribed old result of reports, doctor analysis and future aspects and most important data is stored with great care. It took the test reports from different labs and put it on same desk with full specifications. Data can be opened by different doctors considering the different health issues of the patients X-rays, blood report, ultrasound report etc. is kept secured with LAN wiring to all the department and making a virtual window which will be open by prescribed doctor only as the password is provided to specified doctor and data redundancy is very high in this and data is kept very safe due to the presence of raid technique in hard disk. Due to security reasons file can be opened by doctor only. It is impossible to hack the server as no internet is used in this and no cloud storing of data is done. It will also update about medicine and the timing at which the patient has to take the medicine. And the doctors can consult the treatment process with other doctors too if required. In this we can will make a special workstation connected separated to the main server where we can setup message connectivity by which we can send medicine detail to the patient individual number they don't have to come specially to hospital for getting the medicine detail.*

Keywords- ROUTERS, SWITCH, SERVER' S , STORAGE ,VIRTUAL WINDOW

I. INTRODUCTION

To reduce the burden on the patient for carrying medical investigation reports from different department or collecting reports from different departments.

To reduce the space for storing hard copies of plethora of reports generated in a superspeciality hospital.

II. LITERATURE WORK

In this project the reports are automatically collected on a separated portal with patient's particulars. In this file all data of patient like report analysis, medicine prescribed, previous reports, doctor analysis and future aspects are stored. All this data can be assessed at reception and required hard copy can be printed out. In this project we are going to make a server setup room in which all the data of patient is stored and data collected from different department are stored directly to that server which will be having all information of patient and data can be open by different doctor considering the different health issues of the patient. A folder is setup in which all reports and result are stored. Data is kept secured with LAN wiring to all department and making a virtual window which will be open by prescribed doctor only as the password is provided to specified doctor. Due to security reason the data can be only open by doctor only and its is almost impossible for anyone to hack the server as no internet is used in this and no cloud storing of data is done

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III. COMPONENT

(I) Router

A router is connected to two or more data lines from different networks.[b] When a data packet comes in on one of the lines, the router reads the address information in the packet to determine the ultimate destination. Then, using information in its routing table or routing policy, it directs the packet to the next network on its journey. This creates an overlay internetwork.The most familiar type of routers are home and small office routers that simply pass IP packets between the home computers and the Internet. An example of a router would be the owner's cable or DSL router, which connects to the Internet through an Internet service provider (ISP). More sophisticated routers, such as enterprise routers, connect large business or ISP networks up to the powerful core routers that forward data at high speed along the optical fiber lines of the Internet backbone. Though routers are typically dedicated hardware devices, software-based routers also exist.

(ii) SWITCH-

A switch is a device in a computer network that electrically and logically connects together other devices. Multiple data cables are plugged into a switch to enable

communication between different networked devices. Switches manage the flow of data across a network by transmitting a received message only to the one or more devices for which the message was intended. Each networked device connected to a switch can be identified using a network address, allowing the switch to regulate the flow of traffic. This maximizes the security and efficiency of the network.Essentially, when replacing a repeater hub with an Ethernet switch, the single large collision domain is split up into smaller ones, reducing or eliminating the possibility and scope of collisions and, as a result, increasing the potential throughput. Because broadcasts are still being forwarded to all connected devices, the newly formed network segment continues to be a broadcast domain . A switch may be seen as more intelligent than a repeater hub, which simply retransmits messages out of every port of the hub excepting the port on which the message was received, unable to distinguish different recipients, and achieving an overall lower network efficient

(iii) Virtual window

In computing, a virtual desktop is a term used with respect to user interfaces, usually within the WIMP paradigm, to describe ways in which the virtual space of a computer's desktop environment is expanded beyond the physical limits of the screen's display area through the use of software. This compensates for a limited desktop area and can also be helpful in reducing clutter. There are two major approaches to expanding the virtual area of the screen. Switchable virtual desktops allow the user to make virtual copies of their desktop view-port and switch between them, with open windows existing on single virtual desktops. Another approach is to expand the size of a single virtual screen beyond the size of the physical viewing device. Typically, scrolling/panning a subsection of the virtual desktop into view is used to navigate an oversized virtual desktop.

(vi) Implementation

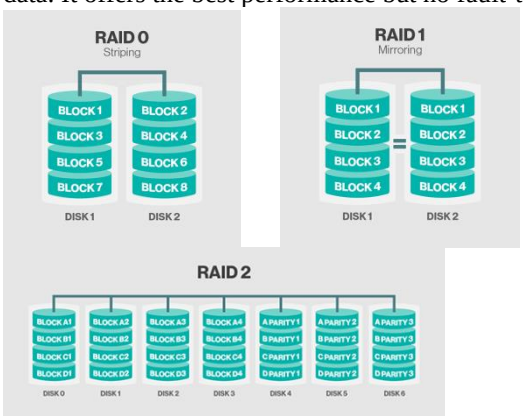
Virtual desktop managers are available for most graphical user interface operating systems and offer various features, such as placing different wallpapers for each virtual desktop and use of hotkeys or other convenient methods to allow the user to switch amongst the different screens.

(v)Working-

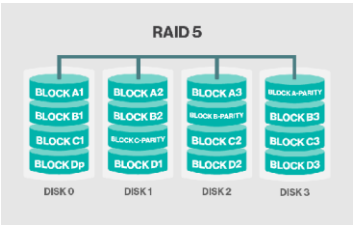
Raid - RAID (redundant array of independent disks; originally redundant array of inexpensive disks) provides a way of storing the same data in different places on multiple hard disks redundancy.. RAID arrays appear to the operating system (OS) as a single logical hard disk. RAID employs the technique of disk mirroring or disk striping, which involves partitioning each drive's storage space into units ranging from a sector (512 bytes) up to several megabytes. The stripes of all the disks are interleaved and addressed in order In a single-user system where large records, such as medical or other scientific images, are stored, the stripes are typically set up to be small (perhaps 512 bytes) so that a single record spans all disks and can be accessed quickly by reading all disks at the same time.

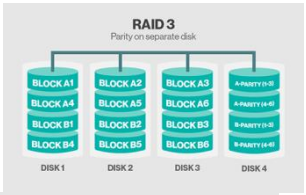
In a multi-user system, better performance requires stablishing a stripe wide enough to hold the typical or maximum size record. This allows overlapped disk I/O across

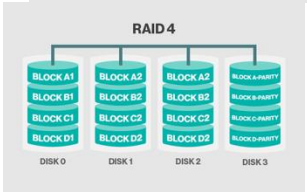
RAID 0: This configuration has striping but no redundancy of data. It offers the best performance but no fault-tolerance.



RAID 1: Also known as disk mirroring, this configuration consists of at least two drives that duplicate the storage of data. There is no striping.







RAID 2: This configuration uses striping across disks with some disks storing error checking and correcting (ECC) information. It has no advantage over RAID 3 and is no longer used.

RAID 3: This technique uses striping and dedicates one drive to storing parity information. The embedded ECC information is used to detect errors. Data recovery is accomplished by calculating the exclusive OR (XOR) of the information recorded on the other drives.

RAID 4: This level uses large stripes, which means you can read records from any single drive. This allows you to use overlapped I/O for read operations.

RAID 5: This level is based on block-level striping with parity. The parity information is striped across each drive, allowing the array to function even if one drive were to fail. RAID 5 requires at least three disks, but it is often recommended to use at least five disks for performance reasons.

(vi)LAN

LAN is a computer network that interconnects computers within a limited area such as a residence, school, laboratory, university campus or office building and has its network equipment and interconnects locally managed. By contrast, a wide area network (WAN), not only covers a larger geographic distance, but also generally involves leased telecommunication circuits or Internet links. An even greater contrast is the Internet, which is a system of globally connected business and personal computers. Early LAN cabling had generally been based on various grades of coaxial cable. Shielded twisted pair was used in IBM's Token Ring LAN implementation, but in 1984, StarLAN showed the potential of simple unshielded twisted pair by using Cat3 cable—the same simple cable used for telephone systems. This led to the development of 10BASE-T (and its successors) and structured cabling which is still the basis of most commercial LANs today.

(vii)Mobile instant messaging (server messaging)

Awareness is key to solving any problem — especially when it comes to the performance of your hosted servers. Personally, I go so far as to have my servers send me SMS (small message service) text messages to my mobile phone when something's amiss. Based on scripts I set up, I get reports on events such as:

When my hosted server have updated list of medicine to be send When a file system has refreshed new reports.

The best part: Setting up alerts is easy. Many gateways between SMS and email are already available under a variety of terms, and some are completely free for use.

(viii)Digital Imaging and Communications in Medicine (DICOM)

DICOM is a network protocol used in hospitals. The emergence of this protocol marks the beginning of digital evolution of medical imaging industry. The DICOM standard facilitates interoperability among medical imaging devices from different vendors. This standard defines the network communication layer for message exchange, the syntax and semantics of commands and associated information, and the file storage format. This protocol is widely used by diagnostic devices and PACS for exchanging images and associated patient information.

(ix)Radiology Information System (RIS)

RIS is used in the radiology department for tracking and managing patients, films, and supplies. When a physician requests the technologist to perform a scan on a patient, the scheduled procedures will be ordered through RIS. The procedures and the patient demographic information are immediately sent to PACS in electronic form. This information is also sent to the modality upon the request from the scanner. Through RIS,patient demographic information can be reconciled and updates are automatically propagated to PACS and modalities. RIS enables the administration and clinical workflow in the radiology department to be performed in a more efficient manner.

IV. CONCLUSION

After presenting the basic PACS technology and current PACS solutions there are two questions remaining to complete this state of the art report: What are the benefits of PACS? Why are there still film-based hospitals and medical practices existing? In this conclusion these questions are answered and a prospect in future PACS developments is given. Some benefits of a PACS are directly derivable, such as the reduction of costs. PACS eliminates the cost for the film roles, bigrooms and administrative employees needed for the administration of film based archives. Moreover, the usage of PACS is increasing the productivity of an imaging department in a hospital or medical practice, through acceleration of the image workflow. In film-based hospitals the images have to be distributed to the various stations after the acquisition process. In contrast, PACS make it possible to access the studies immediately after acquisition. Consequently the report turnaround time is reduced.

Owing to ordered data and search functions in a PACS, the physicians do not longer have to search for images. As a consequence, the waiting time of patients can be reduced which entails a higher customer satisfaction. Finally, PACS are providing better tools and functionalities at the workstation, improving the job satisfaction of radiologists. Despite these advantages, there still exist plenty of film-based imaging centers and radiological practices. The obvious question is why these managers did not decide to implement a PACS yet. Firstly, implementing a PACS is an expensive project, Another reason might be the change in workflow that could be frightening for conservative radiologists and physicians. Most

of the staff will need an introduction and additional trainings to work with the PACS software.

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