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NEED/IMPORTANCE OF THE STUDY

STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

CONCLUSIONS

SCOPE FOR FURTHER RESEARCH

ACKNOWLEDGMENTS

REFERENCES

APPENDIX/ANNEXURE

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BOOKS

- Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill, New Delhi.
- Hunker, H.L. and A.J. Wright (1963), "Factors of Industrial Location in Ohio" Ohio State University, Nigeria.

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ONLINE RESOURCES

- Always indicate the date that the source was accessed, as online resources are frequently updated or removed.

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- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 http://epw.in/user/viewabstract.jsp

STUDY LINUX POWER – BY DESIGN AND IMPLEMENTATION OF COMMANDS AS QUERIES FOR READING DATA

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ABSTRACT

In today's scenario data is growing and people need it for personal and professional use. This data reporting helps understand consumer behavior, help build business plans and also other MIS reports for various other reasons. All this is required and with minimal cost. Costing or cost effectiveness, productivity, efficiency all are need of the hour in today's world – both personally and professionally.[1] It can cost up to $40,000 to keep a large proprietary database on your own computer network or servers and to process it with your own software, according to former Sun Microsystems engineer Jignesh Shah (see his former colleague, fellow Sun, and now Oracle engineer, Allan Packer's blog post[2] All working professionals are involved in one type or the other type of report making activity from the raw data, and for this there are many reporting tools and databases in the market by some of the major giants. Obviously there is a lot of license cost one have to bear to use the branded reporting tools plus the training cost to get the work force get trained on the specific tool.[2] It has been observed that people who are into reporting believe in famous and favorite tools rather than fabulous efficient tools or techniques. The idea is to bring into picture the alternative, efficient, accurate, possible cost effective reporting methodology – for many normal, to above average reporting floors, professionals. In this paper, focus is on the demostration of unix and unix based system commands for extraction of data like SQL commands to do the same.

KEYWORDS

Data extraction linux, GNU Tools, Linux, Query Text Data, Text data extraction.

INTRODUCTION

As it is clear that data plays a very vital and important role in our personal and professional life, and its use in the form of report / reporting is essential and beneficial thing, now the focus is on what is the grey problematic area and solution for the same.

PROBLEM STATEMENT

Report making - how?
Cost in terms of money and time?
General-layman's Solution:
Buy a tool from market and start using it, adjust yourself and your needs with the tools capability.
Of course one needs to pay the cost for the tool and training cost as well.

SUGGESTED SOLUTION

Look around for alternative/s.
Minimize the cost in term of money and time.
The suggested solution sounds great but the big question is how?

WHAT IS A DATABASE?

Here we have few solutions to choose from. Many corporate houses already started this trend to use tools like Microsoft excel for reporting, filtration, pivoting, data projection etc.

Not only tools like MS-Excel is easy to learn, but also number of professionals who have knowledge of the same are available easily everywhere, it is cost effective, accurate, and powerful both speed and analytical capability wise. New versions for this kind of tool(s)/software's introduced new features which make them more flexible, versatile and powerful/useful in practical sense.

Almost in every office where there is need for reporting and are using computers one can find use of excel or similar types of tools/software's. This is single handed strong statement / proof of market and scope of small, powerful tools.

Telecom, banking and other industries use data in csv or text format to answer many questions, reporting and/or for data analysis. In this, they need to clean, transform data before doing analysis. Alternate to this, linux / unix commands can be use effectively for data filter and data extraction just like data SQL queries.

A database is combination of data + base that is collection of data at one base central place which is related to a particular topic or purpose. A database management system (DBMS) is a application software / system that manages information /data. It is used to help in organize data according to a required subject or topic.[3][4]

Many Corporate managers and management people possess strong spreadsheet skills, but database designing is different from spreadsheet designing, the rules are entirely different.

- Spreadsheet design have different viewpoint and carries very few rules, so comparatively spreadsheets are easy to create. But not all spreadsheets are clear and most of them lack data integrity. When spreadsheet designs have no clarity or logic, then it is difficult to modify data and formulas, and that leads to erroneous situation.
- Database is more formal and has rules or standards to follow. Errors are less likely to occur with a properly designed database, and it is feasible to extract data for obtaining reports etc.

A TIMELINE OF DATABASE HISTORY[5]

Ancient Times: Manual systems to store data for reference purpose is not new, in the ancient times, starting from old human civilizations till just before the start of computer systems come into lime-light, man has used one or the other means to store data for variety of purposes.
Year 1960s: Computerized database started in the year 1960s.
Year 1970: E.F. Codd introduced and propose the use of a relational database model, which has changed the way people thought about databases.
Year 1976: ERD a new database model was proposed.
Year 1980s: SQL - Structured Query Language, became the standard language for databases and querying.
Year 1990s(starting): New client tools for application development were released, Examples Oracle Developer (D2K), PowerBuilder, VB, etc.
Year 1990s(Mid): Starting of Internet era led to growth of the database industry. Users began to use client-server database systems architecture to access computer systems that contained legacy data.
Year 1990s(Late): Huge investment in online businesses resulted in a rise in demand for Internet database connectors like JSP, ASP CF-tags, Dream Weaver, Java Beans, and Oracle Developer. The use of open source solution to the Internet also been introduced.
Year 2000s: Era of new age - new interactive applications were developed for PDAs, and hand-held devices, and consolidation of vendors. There are few leading database companies in the world are Microsoft, IBM, SAP, and Oracle.

USE A DATABASE IF…

- If the amount of data would become unmanageable and real time scenario exists.
- When real time database is required and you want to maintain records for ongoing usage.
- There are chances of many changes in the existing data.
- Many and complicated reports are based on the information, which is highly scattered.

WHY DO YOU NEED A DATABASE?[6]

Need of Databases can be tested using below mentioned questions which help analysis and understand need for databases usage
1. You find entering the same values of information into multiple spreadsheets / reports / documents?
2. When making changes results in other document to get changed manually?
3. Data is large and becoming larger and unmanageable?
4. When tracking related information in several spreadsheets – such as separate sheets for sales for different departments?
5. When viewing some specific data but in-0turn you need to open the entire set of data records? Or do you have a difficulty to filter specific data with some other details?

FEATURES OF OPERATING SYSTEMS[7]

Every operating system differs from each other in some features while there are some features which are common in all operating systems. ***Few features are listed below:***

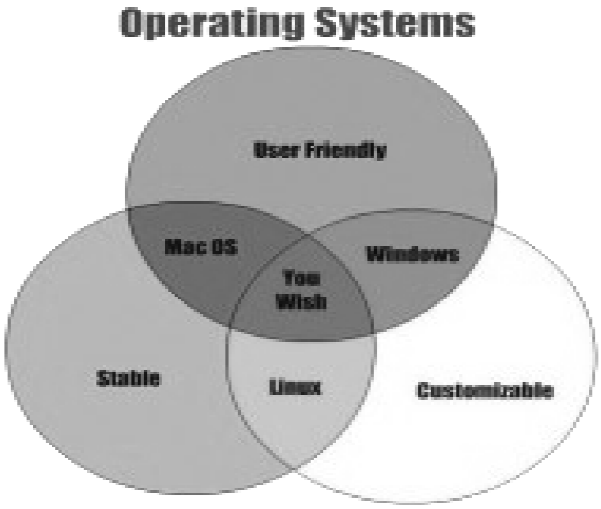
- **Software and hardware management:** Component management and software management is the important job of OS.
- **Consistent API:** Application Program Interface (API) allows different applications that run on a computer to work on other computers as well. But there base OS should be same.
- **Execution of programs:** Programs running in the computer are completely dependent on the operating system. The multitasking and multithreading features of the operating system are dependent upon the type of program execution feature of O.S.
- **Interruptions:** Interruption may happen at any time while using the computers. This is famously referred to as event driven programming in windows which allow and handle many numbers of interrupts/Events.
- **Managing memory:** The operating system provides the memory for the programs that are executed at any moment.
- **Networking:** Interconnection of computers to share resources is the new era computing and the operating system is the one which plays an important role to make it possible.
- **Security:** Security is the important feature in any operating system. Any new age operating system should be well capable to takes care of all security issues.

THE POWER OF UNIX / LINUX[8]

Linux / UNIX based operating systems are in and gained a lot of popularity for various reasons. The main difference between linux and unix lies in the fact that Linux falls under general public license and is available freely, but on the other hand, UNIX is the copyrighted name. Mostly it is same. The Linux kernel being Open Source can be modified when required.
The major advantages of Linux / UNIX are as following

- Stability
  - Linux or UNIX operating systems are much more stable than the others.
- Free software
  - Linux kernel is available free of cost and most of the applications are also available freely. Although many application in unix is also free but UNIX is copyrights.
- Portable - Runs on any hardware
  - Linux can run on any machine. In that very sense is portable and it has minimum hardware requirements.
- Security
  - Till date no virus threats have been reported that has affected the Linux or the UNIX kernel.
- Open source software
  - Linux and UNIX are open source software whose code is available to all the users worldwide and you may choose to debug any problem that you may find out or add any module that is necessary to suit your specific needs.
- Portability
  - Websites that you design on a UNIX or a Linux based platform can easily be hosted on other operating systems servers as well but the reverse is not always true.

FIG. 1



BACKGROUND

This trend was started by many people. One of such personality is Larry Wall. Larry is known for PERL, a famous language for reporting and automation based on unix. He developed perl interpreter and language while working for Unisys.

As unix was the platform in Larry's era and he designed and developed PERL for reporting, it gained popularity for the same reason we have discussed above i.e. low cost, automated, accurate, efficient data extraction tool language for reporting.

This language i.e. PERL is dynamic language released in the year 1987 by Larry Wall for reporting and some people call it as "Practical Extraction Reporting Language".

PERL is still programming solution with tedeous syntax and learning curve. Not everyone is interested to go with it.

UNIX/LINUX COMMAND POWER

Unix and linux is treated as consisted, powerful operating system, most of its commands are external utilties. The real power of unix/linux comes with its commands, pipes and filters.

Unix and unix based systems like linux has a philosophy that everything is file and on file basic operations like reading and writing are supported. A file in unix or unix based systems can be named position based (location based) recordable media or can be in memory that is virtual media based file. In that sense unix and unix based systems classify file as standard or regular files, directory files, or special files based on types.

Redirection feature also play a vital role and is one of the undisputed important feature of unix and related systems, in which reading and writing of data stream is possible.

One of the example is as follows:

$ ls –l | sort > new_ls.txt

Text data files can be treated as data table store and in that way linux commands, pipes and filters can used in combination to extract data in the desired fashion. Apart from the commands, filters and pipes other features like support of wild-card and regular expressions also play a vital role for text pattern matching and hence data fetching.

DATA DEALING MEANS SQL AND DATABASE SERVER??

As we know any data driven reporting means a lot of activities which are generally database related activities like selection, projection, joining of data, summarization of data, filter based data, concatenation of data to produce pseudo columns, etc.

SQL queries are the perfect answer to this kind of problems, where these activities are accomplished with minimum efforts as SQL is meant to do these things. The big fuss is money and resource cost and training cost.

If one can perform the same type of stuff done and accomplished by SQL without the use of database server, then we can get rid of resource requirement plus resource cost and special learning curve of SQL.

This is something which can be accomplished through linux/unix commands, one can achieve almost all things / can perform all things that can be done using database queries for lower to middle level data driven floors or offices.

Almost, 60% offices fall in this category, which are not doing reporting on the global or volume data all time.

As linux is free and used as operating System its knowledge and learning is not a big issue, same applies to its availability and cost, one cannot raise eye-brows on the security, performance and stability of linux/unix, which makes it further a number one choice.

The only thing is to focus on attitude to use it like a tool or rather say query tool to query and report data. Its efficiency and performance is unquestionable.

METHODOLOGY

How commands can act as SQL queries?

All the people who interact with data have to deal with retrieval of data which can be done using select command of any database SQL language, it is so common and important in day to activities, this can be achieved in linux using cat command.

So the comparable commands are as follows:

SQL:	select * from tablename;
Linux:	cat filename

All people at all time don't need all columns or fields in the output, so the database SQL command for the above requirement can fulfilled using the following commands in SQL and linux;

Assumption:	assuming there are 5 fields but user wants to retrieve only first 2.
SQL:	select col1, col2 from tablename;
Linux:	cut–d " " f1,f2 filename

Common scenario in SQL is to count the total number to rows in a table, this can be accomplished using the following commands;

SQL:	select count(*) from tablename;
Linux:	wc –l filename

Data appears in the result as it is available in the original order, but Sorting data can change the order, to achieve this we can use various forms of the linux command like;

SQL: select col1, col2 from tablename order by col1;
Linux: sort filename

For reverse order use

SQL: select col1, col2 from tablename order by col1 desc;
Linux: sort –r filename

Let see a table with utilities and intended work done on data files:[9]

UTILTIY	MEANING / WORKING
cat	To display contents of file
cut	Extract desired columns, or data
head	Extraction of few top lines from text file
less	Display specified lines from file
join	Fields from first and second file on the basis of some common value
more	Similar to less
ls	List files in directory
nl	Adds file number to a file
od	Demo files
paste	Merge lines of files
pr	Breaks files to pages
sed / awk	Special utilities for data extraction and manipulation
grep	Filter lines on the basis of criteria
sort	Sorting of data
uniq	Non redundant data
wc	Counting of words, lines and characters from file or data

Above commands of unix and unix based systems along with pipes and filters can do all things that SQL commands can on tables in there respective systems. Pipes of unix and related systems act as or can be used as subqueries.

Redirectional operators can cause new table formation equivalent. Inner and outer joins are also possible with the help of join command (different operator like –a –v -1 etc)

LIMITATION OF WORK/SOLUTION

Although, the unix and unix based commands are well capable of doing data extraction as been done using SQL but in no way it is an attempt to replace the same. This is not possible because of multiple resons like

- Concurrency control
- Multi-langual support
- ACID properties implementation
- Volumn of data handling
- Backup and restore
- Recovery mechanism
- Replication
- Performance (to some extent – in cases), etc

Unix and unix based systems can't comment on performance factor, otherwise accuracy is fine, feasibility is also questionable for non unix based professionals.

CONCLUSION

It is clear that data stores, data-marts, reports, analyais, etc are day to day activities and is integral part of job for anyone. The cost, complexity to perform the job plays vital role for the profitability of the organisation. Altough, there are so much of advancement and research devleopment going on on modern day databases's but at the same time it is also a fact that tools and techniques like unix and unix based commands, Excel, etc can do the job in fantastic manner. It not only make job simple, and cost effective but proves that these kind of belief on old and existing technologies can prove fantastic, fabulous with more awareness it will for sure become famous as well.

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FURTHER SUGGESTED READING

- http://en.wikipedia.org/wiki/Comparison_of_database_tools
- http://en.wikipedia.org/wiki/List_of_relational_database_management_systems
- http://en.wikipedia.org/wiki/Database
- http://abacus.bates.edu/wmarchive/INTRO_papers.html
- http://comjnl.oxfordjournals.org/content/35/4/322.full.pdf
- http://www.linux.org/
- http://www.thegeekstuff.com/2010/11/50-linux-commands/
- http://en.wikipedia.org/wiki/Operating_system

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