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## *Practical No:01*

## *Aim:- Import Data in Power BI from*

a. ***Microsoft Excel.***

b. ***SQL Server.***

- ***ForExcel:***

***Step: 01***

- ***Open Power BI desktop app, Click on Get data option***
- ***Select Excel from the options that appear.***
- ***Click Connect.***

***Step No: 02***

- ***Select the Excel file from the storage.***
- ***Click on Open***

***Step No: 03***

- ***Select(check the check box) of the sheet***
- ***Click on Load to load the excel data onto the Power BI workspace to operation operations onto it.***

***Step No:04***

- ***The Data fields appears onto the right side of the screen, Next to it is the Visualizations panel.***
- ***Here user can drag and drop fields, Also can make graphs of all sort.***

## ***For Microsoft Assess Data Base***

- ***Step1:***

  ***Open Power BI***

***Step2:***

- ***Click on Get data option***
- ***Select Access Database from the options that appear.***
- ***Click Connect.***

***Step3:***

- ***Select the tables.***
- ***Click on Load.***

- ***Step4:***

***Data is imported into Power BI***

***For CSV file:***

- ***Step 01:***

***Open Power BI.***

***Click on GET DATA.***

- ***Step 02:***

***Select Text/CSV from the set of options.***

- ***Step:03***

***Browse to the file location from the system and select the file required to be import.***

- ***Step:04***

***Select the file origin, delimiter as comma, Data type detection as first 200 rows***

***Then click on load.***

- ***Step: 05***

***Click on table on the left side panel, the data appears in form of data, further analysis can be performed on this data.***

| description | industry | level | size | line_code | value |
|---|---|---|---|---|---|
| At the end of the last financial year, which of the following types o | Insurance | 2 | total | D0201 | 0 |
| At the end of the last financial year, which of the following types o | Insurance | 2 | total | D0204 | 0 |
| At the end of the last financial year, did this business use any of th | Insurance | Insurance 2 | total | D0301.01 | 0 |
| At the end of the last financial year, did this business use any of th | Insurance | 2 | total | D0302.01 | 0 |
| Over the last financial year, how have this business's existing credi | Insurance | 2 | total | D0401.01 | 0 |
| Over the last financial year, how have this business's existing credi | Insurance | 2 | total | D0401.03 | 0 |
| Over the last financial year, how have this business's existing credi | Insurance | 2 | total | D0402.01 | 0 |
| Over the last financial year, how have this business's existing credi | Insurance | 2 | total | D0403.03 | 0 |
| Over the last financial year, how have this business's existing credi | Insurance | 2 | total | D0404.01 | 0 |
| Over the last financial year, how have this business's existing credi | Insurance | 2 | total | D0404.03 | 0 |
| Why has this business not requested equity finance in the last fina | Insurance | 2 | total | D0602 | 0 |
| Why has this business not requested equity finance in the last fina | Insurance | 2 | total | D0603 | 0 |
| Why has this business not requested equity finance in the last fina | Insurance | 2 | total | D0605 | 0 |
| Why has this business not requested equity finance in the last fina | Insurance | 2 | total | D0606 | 0 |
| Why has this business not requested equity finance in the last fina | Insurance | 2 | total | D0607 | 0 |
| How easy or hard was it to raise the equity finance you requested | Insurance | 2 | total | D0700.01 | 0 |
| How easy or hard was it to raise the equity finance you requested | Insurance | 2 | total | D0700.02 | 0 |
| How easy or hard was it to raise the equity finance you requested | Insurance | 2 | total | D0700.04 | 0 |
| How easy or hard was it to raise the equity finance you requested | Insurance | 2 | total | D0700.06 | 0 |
| For your most recent equity request, how did you intend to use th | Insurance | 2 | total | D0801 | 0 |
| For your most recent equity request, how did you intend to use th | Insurance | 2 | total | D0802 | 0 |
| For your most recent equity request, how did you intend to use th | Insurance | 2 | total | D0803 | 0 |
| For your most recent equity request, how did you intend to use th | Insurance | 2 | total | D0804 | 0 |
| For your most recent equity request, how did you intend to use th | Insurance | 2 | total | D0805 | 0 |

Sign:_____

## *Practical No:02*

## *Aim: Import Data in Power BI from*

*a. Microsoft Excel.*

*b. CSV*

*c. SQL Server.*

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### *a. For Microsoft Excel*

***Steps:***

1. ***Open R Studio, Click on import dataset.***
2. ***Select from excel.***

3. ***Browse the file location and select the desired file.***
4. ***Click on open.***

***5. Select the data type and make necessary settings.***

***6. Click on import.***

Sign:_____

## *Practical No:03*

## *Aim: Collect the primary data in excel and apply scientific method*

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## *Collect data in Excel.*

### *1. Concatenation operation performed.*

***Steps:***

***Create a separate column for full name.***

***Select a cell, enter the formula: Concatenate (string1, string2)***

***Concatenate (B2, C2)***

***Enter the cell location where the strings are placed, press enter.***

***Drag the cell for all columns.***

## *Operation:02 Statistical*

***Steps:***

***1. Store the data into the excel sheet.***

***2. Select Statistical operations from the function selection panel.***

## *3. Finding Minimum value from the columns*

***Select the cell, enter function: MIN(c2:c21)***

***Press enters.***

## *4. Finding the maximum value from the columns*

***Select the cell, enter the function: MAX(c2:c21)***

***Press enters.***

## *5. Finding the average value from the columns*

***Select the cell, enter the function: AVERAGE(c2:c21)***

***Press enters***

## *6. Finding the percentage of marks of 5 columns.*

***Select the cell, enter =(c2+d2+e2+f2+g2) *100/100***

***Press enters.***

| roll no | name | subject1 | subject2 | subject3 | subject4 | subject5 | percentage | grade |
|---|---|---|---|---|---|---|---|---|
| 1 | A | 10 | 10 | 10 | 15 | 12 | =(c2+d2+e2+f2+g2)*100/100 | |
| 2 | B | 15 | 18 | 17 | 14 | 14 | | |
| 3 | C | 14 | 20 | 10 | 17 | 18 | | |
| 4 | D | 17 | 14 | 17 | 20 | 18 | | |
| 5 | E | 2 | 4 | 7 | 15 | 17 | | |
| 6 | F | 14 | 17 | 12 | 15 | 11 | | |
| 7 | G | 14 | 12 | 12 | 13 | 12 | | |
| 8 | H | 15 | 15 | 15 | 15 | 15 | | |
| 9 | I | 0 | 5 | 1 | 2 | 14 | | |
| 10 | J | 3 | 18 | 6 | 16 | 12 | | |
| 11 | K | 17 | 20 | 20 | 15 | 13 | | |
| 12 | L | 16 | 12 | 13 | 15 | 17 | | |
| 13 | M | 18 | 14 | 17 | 15 | 16 | | |
| 14 | N | 19 | 20 | 20 | 16 | 12 | | |
| 15 | O | 4 | 10 | 9 | 8 | 8 | | |
| 16 | P | 6 | 8 | 5 | 7 | 10 | | |
| 17 | Q | 7 | 7 | 7 | 7 | 7 | | |
| 18 | R | 10 | 12 | 10 | 12 | 10 | | |
| 19 | S | 18 | 16 | 14 | 15 | 20 | | |
| 20 | T | 13 | 12 | 14 | 16 | 12 | | |
| min | | 0 | 4 | 1 | 2 | 7 | | |
| max | | 19 | 20 | 20 | 20 | 20 | | |

***Drag the cell to find the percentages for the whole column.***

| roll no | name | subject1 | subject2 | subject3 | subject4 | subject5 | percentage | grade |
|---|---|---|---|---|---|---|---|---|
| 1 | A | 10 | 10 | 10 | 15 | 12 | 57 | |
| 2 | B | 15 | 18 | 17 | 14 | 14 | 78 | |
| 3 | C | 14 | 20 | 10 | 17 | 18 | 79 | |
| 4 | D | 17 | 14 | 17 | 20 | 18 | 86 | |
| 5 | E | 2 | 4 | 7 | 15 | 17 | 45 | |
| 6 | F | 14 | 17 | 12 | 15 | 11 | 69 | |
| 7 | G | 14 | 12 | 12 | 13 | 12 | 63 | |
| 8 | H | 15 | 15 | 15 | 15 | 15 | 75 | |
| 9 | I | 0 | 5 | 1 | 2 | 14 | 22 | |
| 10 | J | 3 | 18 | 6 | 16 | 12 | 55 | |
| 11 | K | 17 | 20 | 20 | 15 | 13 | 85 | |
| 12 | L | 16 | 12 | 13 | 15 | 17 | 73 | |
| 13 | M | 18 | 14 | 17 | 15 | 16 | 80 | |
| 14 | N | 19 | 20 | 20 | 16 | 12 | 87 | |
| 15 | O | 4 | 10 | 9 | 8 | 8 | 39 | |
| 16 | P | 6 | 8 | 5 | 7 | 10 | 36 | |
| 17 | Q | 7 | 7 | 7 | 7 | 7 | 35 | |
| 18 | R | 10 | 12 | 10 | 12 | 10 | 54 | |
| 19 | S | 18 | 16 | 14 | 15 | 20 | 83 | |
| 20 | T | 13 | 12 | 14 | 16 | 12 | 67 | |
| min | | 0 | 4 | 1 | 2 | 7 | | |
| max | | 19 | 20 | 20 | 20 | 20 | | |

## *7. Finding median from the column data.*

***Select the cell, enter the formula: =median(c2:c21)***

***Press enters.***

***Drag the same for all the column.***

## *Operation:03 Logical*

1. ***Select Logical operations from the set of given lists.***
2. ***Select "IF" from the list of logical operations.***
3. ***Select the cells, write the formula for if condition:***

***IF(H2>35," Pass"," Fail")***

4. ***Press enters.***

### *5. Drag the same for column.*

### *Operation: Maths and Trig.*

Sign:_____

## *Practical No:04*

### *Aim: Collect the secondary data in excel and apply scientific method*

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***1. Store the secondary data in Excel.***

***The data stored below in the excel is sheet the data downloaded from the source:***

https://www.fbbva.es/microsite/multivariate-statistics/data.html

***For performing scientific operations.***

| | I | E | HR | BR | RU | D | TR | MA | PE | NG | F | MX | ZA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Italy | 0 | 2 | 5 | 5 | 8 | 7 | 3 | 5 | 6 | 8 | 4 | 5 | 7 |
| Spain | 2 | 0 | 5 | 4 | 9 | 7 | 4 | 7 | 3 | 8 | 4 | 4 | 6 |
| Croatia | 5 | 5 | 0 | 7 | 4 | 3 | 6 | 7 | 7 | 8 | 4 | 6 | 7 |
| Brazil | 5 | 4 | 7 | 0 | 9 | 8 | 3 | 6 | 2 | 7 | 4 | 3 | 5 |
| Russia | 8 | 9 | 4 | 9 | 0 | 4 | 7 | 7 | 8 | 8 | 7 | 7 | 7 |
| Germany | 7 | 7 | 3 | 8 | 4 | 0 | 7 | 8 | 8 | 8 | 4 | 8 | 8 |
| Turkey | 3 | 4 | 6 | 3 | 7 | 7 | 0 | 5 | 4 | 5 | 6 | 4 | 5 |
| Morocco | 5 | 7 | 7 | 6 | 7 | 8 | 5 | 0 | 7 | 4 | 6 | 6 | 4 |
| Peru | 6 | 3 | 7 | 2 | 8 | 8 | 4 | 7 | 0 | 6 | 7 | 2 | 4 |
| Nigeria | 8 | 8 | 8 | 7 | 8 | 8 | 5 | 4 | 6 | 0 | 6 | 3 | 3 |
| France | 4 | 4 | 4 | 4 | 7 | 4 | 6 | 6 | 7 | 6 | 0 | 8 | 7 |
| Mexico | 5 | 4 | 6 | 3 | 7 | 8 | 4 | 6 | 2 | 3 | 8 | 0 | 4 |
| SouthAfrica | 7 | 6 | 7 | 5 | 7 | 8 | 5 | 4 | 4 | 3 | 7 | 4 | 0 |

## 2. *Select the cell.*

## 3. *From the list of functions, select Statistical, from the statistical functional select: Quartile.*

***4. Enter the number of cells as input array, select quartile from 0 to4, Select 1st quartile that gives 25th quartile results:***

***Select the 2nd quartile 3rd quartile, that gives result for 50th and 75th sample.***

***Operation: Aggregate function.***

***Steps:***

1. ***select the cell***
2. ***Select math and trig. From the list of functions.***
3. ***Select the aggregate function from the list.***
4. ***Click ok. Then enter***

***4.fill the necessary details in the dialog box of the function that appears.***

## *Operation: Multinomial function.*

***Steps:***

1. ***select the cell***
2. ***Select math and trig. From the list of functions.***
3. ***Multinomial function from the list.***
4. ***Fill the list of numbers in the array***
5. ***Click ok. Then enter***
6. ***Drag the cell for all columns.***

## *Operation: Standard Variation function.*

***Steps:***

1. ***select the cell***
2. ***Select statistical. From the list of functions.***
3. ***Select the standard deviation function from the list.***
4. ***Click ok. Then enter***
5. ***Select the cells for calculation, press enter.***
6. ***Drag for whole column.***

***Operation: Variance function.***

***Steps:***

1. ***select the cell***
2. ***Select statistical. From the list of functions.***
3. ***Select the variance function from the list.***
4. ***Click ok. Then enter***
5. ***Select the cells for calculation, press enter.***

***Drag for whole column***

Sign:_____

***Practical No:05***

***Design the survey form and collect the suitable data and perform analysis***

## Mobile Phone Usage

According to the survey, in todays world everyone carries with their own mobiles phones. Usage of mobiles goes at the huge extend. Everyone is dealing the new technology application and also aware of latest trends. The usage of mobile is consistently increases at huge extend. Everyone carries with the self owned mobile phones. But the truth is todays world is unaware of proper usage of mobile phones. And according to the survey 88.9% population having their own mobile phones and 11.1 using their colleagues mobile phones.

Large Number of people are busy on call more than 3hours. 33.3% population are busy on mobile phones at huge extend. The survey tells that 22.2% people are busy on calls from 1-2 hours respectively. But very few 22.2% population are using 30min to 1 hour only on daily usage. Then 11.1% population are busy on calls for 1-2 hours maximum time respectively.

<u>In todays world everyone having the 2 mobile phones. From the survey we get know that 88.9% population having 2 cell phones for their daily purpose need. But only 11.1% are not dealing with the usage of 2 mobile phones.</u>

In todays world everyone having the 2 mobile phones. From the survey we get know that 88.9% population having 2 cell phones for their daily purpose need. But only 11.1% are not dealing with the usage of 2 mobile phones.

According to the survey, 66.7% using the online application for using internet on mobile phones. But from that 11.1% population use it only for reading and sending the emails.

And 22.2% population are busy in dealing with browser to browse www on the internet through the mobile phone usage.

According to survey of this questionnaire, we came to an conclusion that 88.9% using the internet for downloading the free application only. But 11.1% are ready for spending less than 0.5 total cost for the download of the paid applications.

We came to conclusion that more 10% population are reading some cost to the application which are paid to use, and apart from that 90% population are using the free download applications only according to their need and use also.

Sign:_____

## *Practical No: 06*

## *Aim: Implement the different scales of measurement on data: Nominal and Ordinal*

***Nominal data, also called categorical data, does not have does not have a natural sequence. Instead, the data is typically in named categories or labels without numeric significance.***

***For example, is a survey question below that asks for a favourite beverage, with choices of coffee, tea, water, or milk will generate nominal data in 4 categories as in the bar chart.***

***Steps:***

1. ***Store the data into excel format consisting of customer serial no. and preferred beverage.***

| sr.no | favorite beverage |
|---|---|
| 1 | water |
| 2 | coffee |
| 3 | tea |
| 4 | milk |
| 5 | milk |
| 6 | water |
| 7 | water |
| 8 | water |
| 9 | tea |
| 10 | milk |
| 11 | coffee |
| 12 | coffee |
| 13 | tea |
| 14 | coffee |
| 15 | water |
| 16 | water |
| 17 | tea |
| 18 | tea |
| 19 | milk |
| 20 | tea |

***2. Sort the data by giving label to the selection by using if conditions.***

| value | favorite beverage |
|---|---|
| 1 | water |
| 1 | water |
| 1 | water |
| 1 | water |
| 1 | water |
| 1 | water |
| 2 | coffee |
| 2 | coffee |
| 2 | coffee |
| 2 | coffee |
| 3 | tea |
| 3 | tea |
| 3 | tea |
| 3 | tea |
| 3 | tea |
| 3 | tea |
| 4 | milk |
| 4 | milk |
| 4 | milk |
| 4 | milk |

***3. Represent the data through the help of bar graph presented:***

| value | favorite beverage | count |
|---|---|---|
| 1 | water | 6 |
| 2 | Coffee | 4 |
| 3 | tea | 7 |
| 4 | milk | 3 |

***Ordinal Data:***

***Ordinal data has a distinct order or natural sequence. An example is survey data collected in response to the question like this:***

***How old are you?***

- ***Under 18***
- ***18-20***
- ***21-30***
- ***31-45***
- ***45+***

***The chart above shows how the data can be plotted in an Excel column chart that follows the natural order.***

***4. For Ordinal data, enter the data:***

| Age group | no.of particpants |
|---|---|
| >18 | 45 |
| 18-20 | 90 |
| 20-30 | 78 |
| 30-45 | 81 |
| 45< | 112 |

5. ***Plot the information into percentage pie diagram and bar graph in increasing to decreasing order of the ages.***

| Age group | no.of particpants |
|---|---|
| >18 | 45 |
| 18-20 | 90 |
| 20-30 | 78 |
| 30-45 | 81 |
| 45< | 112 |

| Age group | no.of particpants |
|---|---|
| >18 | 45 |
| 18-20 | 90 |
| 20-30 | 78 |
| 30-45 | 81 |
| 45< | 112 |



Sign:_____

***Practical No:07***

***Aim: Implement the different scales of measurement on data: Ratio and Interval***

***Interval data is like ordinal except we can say the intervals between each value are equally split. The most common example is temperature in degrees Fahrenheit. The difference between 29 and 30 degrees is the same magnitude as the difference between 78 and 79 (although I know I prefer the latter). With attitudinal scales and the Likert questions you usually see on a survey, these are rarely interval, although many points on the scale likely are of equal intervals.***

***Ratio data is interval data with a natural zero point. For example, time is ratio since 0 time is meaningful. Degrees Kelvin has a 0 point (absolute 0) and the steps in both these scales have the same degree of magnitude.***

***Steps:***

1. ***Enter the data of sales months of the year.***
2. ***Represent the data with respect to months, where the difference between each month is equally 1 month on the X axis.***

| Months | No.of Sales (in lakhs) |
|---|---|
| January | 75 |
| February | 80 |
| March | 40 |
| April | 120 |
| May | 70 |
| June | 60 |
| July | 30 |
| August | 100 |
| September | 50 |
| October | 60 |
| November | 40 |
| December | 80 |

***Steps:***

1. ***Enter the data of temperature of the week in Artic circle.***
2. ***Represent the data with respect to week days, where the difference between each day is 24hrs and also the temperature can be absolute zero i.e. 0 Celsius.***

| Days | Temperature(in degrees) |
|---|---|
| Monday | 4 |
| Tuesday | 2 |
| Wednesday | 0 |
| Thursday | 1 |
| Friday | 3 |
| Saturday | 0.5 |
| Sunday | 1.5 |

Sign:_____

## *Practical No:08*

## *Aim: Perform t-test on the data.*

---

***Steps:***

1. ***Store the two arrays of data. In excel.***

2. ***Select the cell, enter the function: test (array1, array2, tails, type)***

3. ***Enter for one tailed test:***
   ***=ttest (b2: b11, c2:c11,1,1)***
   ***Press enters.***

4. ***Enter for two tailed test:***
   ***=ttest (b2: b11, c2:c11,1)***
   ***Press enters.***

Sign:_____

## *Practical No:09*

## *Case study*

# A Study of Data Storage Security Issues in Cloud Computing

**ABSTRACT :-**

Cloud computing provides on demand services to its clients. Data storage is among one of the primary services provided by cloud computing. Cloud service provider hosts the data of data owner on their server and user can access their data from these servers. As data, owners and servers are different identities, the paradigm of data storage brings up many security challenges. An independent mechanism is required to make sure that data is correctly hosted in to the cloud storage server. In this paper, we will discuss the different techniques that are used for secure data storage on cloud.

**Keywords :** Cloud computing, Data storage, Cloud storage server.

**INTRODUCTION:-**

Cloud computing is the combination of many pre-existing technologies that have matured at different rates and in different contexts. The goal of cloud computing is to allow users to take benefit from all these technologies. Many organizations are moving into cloud because it allows the users to store their data on clouds and can access at anytime from anywhere. Data breaching is possible in cloud environment, since data from various users and business organizations lie together in cloud. By sending the data to the cloud, the data owners transfer the control of their data to a third person that may raise security problems. Sometimes the Cloud Service Provider(CSP) itself will use/corrupt the data illegally.

Security and privacy stands as major obstacle on cloud computing i.e. preserving confidentiality, integrity and availability of data. A simple solution is to encrypt the data before uploading it onto the cloud. This approach ensures that the data are not visible to external users and cloud administrators but has the limitation that plain text based searching algorithm are not applicable. In this paper, we discuss the security flaws in data storage and the mechanisms to overcome it.

**CLOUD STORAGE**

Cloud storage is one of the primary use of cloud computing. We can define cloud storage as storage of the data online in the cloud. A cloud storage system is considered as a distributed data centres, which typically use cloud-computing technologies and offers some kind of interface for storing and accessing data. When storing data on cloud, it appears as if the data is stored in a particular place with specific name.

**There are four main types of cloud storage:**

**Personal Cloud Storage:**

It is also known as mobile cloud storage. In this type storage, individual's data is stored in the cloud, and he/she may access the data from anywhere.

**Public Cloud Storage:**

In Public cloud storage the enterprise and storage service provider are separate and there aren't any cloud resources stored in the enterprise's data centre. The cloud storage provider fully manages the enterprise's public cloud storage.

**Private Cloud Storage:**

In Private Cloud Storage the enterprise and cloud storage provider are integrated in the enterprise's data centre. In private cloud storage, the storage provider has infrastructure in the enterprise's data centre that is typically managed by the storage provider. Private cloud storage helps resolve the potential for security and performance concerns while still offering the advantages of cloud storage.

**Hybrid cloud storage:**

It is a combination of public and private cloud storage where some critical data resides in the enterprise's private cloud while other data is stored and accessible from a public cloud storage provider.

**CHARACTERISTIC OF CLOUD COMPUTING**

There are five characteristics of cloud computing. The first one is on-demand self-service, where a consumer of services is provided the needed resources without human intervention and interaction with cloud provider. The second characteristic is broad network access, which means resources can be accessed from anywhere through a standard mechanism by thin or thick client platforms such mobile phone, laptop, and desktop computer. Resource pooling is another characteristic, which means the resources are pooled in order for multi tenants to share the resources. In the multi-tenant model, resources are assigned dynamically to a consumer and after the consumer finishes it, it can be assigned to another one to respond to high resource demand. Even if the resources are assigned to customers on demand, they do not know the location of these assigned resources.

Figure. 1: Cloud environment architecture

Sometimes they know the location at a high-level abstraction, such as country, state, and data centre. Storage, processing, memory, and network are the kind of resources that are assigned. Rapid elasticity is another characteristic, which means that resources are dynamically increased when needed and decreased when there is no need. Also, one of characteristics that a consumer needs is measured service in order to know how much is consumed.

**Encrypted Data Storage for Cloud**

Since data in the cloud is placed anywhere, it is important that the data be encrypted. We are using secure co-processor as part of the cloud infrastructure to enable efficient encrypted storage of sensitive data. By embedding a secure co-processor (SCP) into the cloud infrastructure, the system can handle encrypted data efficiently. Parts of the proposed instrument (see Figure 2). Basically, SCP is a tamper-resistant hardware capable of limited general-purpose computation. For example, IBM 4758 Cryptographic Coprocessor (IBM) is a single board computer consisting of a CPU, memory and special-purpose cryptographic hardware contained in a tamper-resistant shell, certified to level 4 under FIPS PUB 140-1. When installed on the server, it is capable of performing local computations that are completely hidden from the server. If tampering is detected, then the secure co-processor clears the internal memory. Since the secure coprocessor is tamper-resistant, one could be tempted to run the entire sensitive data storage server on the secure coprocessor. Pushing the entire data storage functionality into a secure co- processor is not feasible due to many reasons. First of all, due to the tamper-resistant shell, secure co-processors have usually limited memory (only a few megabytes of RAM and a few kilobytes of non-volatile memory) and computational power (Smith, 1999). Performance will improve over time, but problems such as heat dissipation/power use (which must be controlled to avoid disclosing processing) will force a gap between general purposes and secure computing. Another issue is that the software running on

the SCP must be totally trusted and verified. This security requirement implies that the software running on the SCP should be kept as simple as possible. We can encrypt the sensitive data sets using random private keys and to alleviate the risk of key disclosure, we can use tamper-resistant hardware to store some of the encryption/decryption keys (i.e., a master key that encrypts all other keys).

Figure 2. Parts of the proposed instrument

**Security and Privacy Issues in Data Storage**

Cloud Computing allows the users to store their data on the storage location maintained by a third party. Once the data is uploaded into the cloud the user loses its control over the data and the data can be tampered by the attackers. The attacker may be an internal(CSP) or external. Unauthorized access is also a common practice due to weak access control. The protection of information arises the following challenges:

**The security and privacy issues related to data storage are confidentiality, integrity and availability**.

**A. Confidentiality**

The major dispute in cloud computing is confidentiality. Data confidentiality means accessing the data only by authorized users and is strongly related to authentication.In another way confidentiality means keeping users data secret in the cloud systems. As we are storing the data on a remote server and transferring the control over the data to the provider here arises the questions such as:

For ensuring confidentiality, cryptographic encryption algorithms and strong authentication mechanisms can be used. Encryption is the process of converting the data into a form called cipher text that can be understood only by the authorized users. Encryption is an efficient technique for protecting the data but have the obstacle that data will be lost once the encryption key is stealed. algorithms.

Blowfish is a fat and simple encryption algorithm.

Figure 3. Symmetric encryption

The above encryption techniques have the limitation that for searching the data from the file, the entire file has to be decrypted. It is a time consuming process and thus searchable encryption was introduced. Searchable encryption allows build an index for the file containing the keywords and is encrypted and stored along with the file, so that while searching the data only the keywords are decrypted rather than the entire file and search is made on it.

Figure 4. Asymmetric encryption

### B. Integrity

Another serious problem faced by cloud computing is integrity. Integrity of data means to make sure that the data has not been changed by an unauthorized person or in an unauthorized way. It is a method for ensuring that the data is real, accurate and safeguarded from unauthorized users. As cloud computing supports resource sharing, there is a possibility of data being corrupted by unauthorized users. Digital Signatures can be used for preserving the integrity of data. The simple way for providing integrity is using Message Authentication Code(MAC).

Figure 5. Remote auditing mechanism

### C. Availability

Availability refers to being available and accessible to authorized users on demand. The aim of availability in cloud computing systems is to ensure that its users can use them at any place and at any time

**Conclusion :-**

Cloud computing enables users to store their data in remote storage location. But data security is the major threat in cloud computing. Due to this many organizations are not willing to move into cloud environment. To overcome this, confidentiality, integrity, availability should be encapsulated in a CSP's Service- Level Agreement (SLA) to its customers. Otherwise ensure that any sensitive information is not put into a public cloud and if any it is to be stored in encrypted form. Effective auditing mechanisms also can be used for providing data integrity.

Sign:_____

***Practical No:10***

***Research Paper.***

**CLOUD SECURITY: DISTORTION CONTROL AND PRECAUTION TECHNIQUE**

## Abstract

Cloud Computing Security allude to the security implementation, deployment, and the precaution to defend against the security threats. Cloud Security deployment of security tools such as application firewall, controlling the policies and hardening the infrastructure. Though cloud computing is offering lots of services with the flexibility, efficiency, and also find threats in cloud services which is vulnerable. It allows the access to personal and shared resources with minimal management. Perfect example for cloud computing is Amazon Elastic Cloud Compute (EC2), which is highly capable, low cost and flexible. The purpose of this paper is to provide a comprehensive overview of latest advance and existing literature covering varieties of dimensions in cloud security. The paper also includes various attacks faced on cloud services and the methods to overcome on it is also been mention in this paper.

## Keywords

Cloud security, Physical Security, Cloud deployment, Tools for preventing from attacks, Deployment, IT management.

## Introduction

Cloud Computing Technology is nowadays most popular, because of its ability , flexibility and mobile support. Cloud Computing allows the access to the personal and shared resources with minimal management. It often relies on the internet. But there is third party cloud solution available which saves from expanding resources and maintenance. As we know the most trending example for cloud storage is Amazon Elastic Cloud Compute (EC2), which is highly flexible and capable along with low cost.

### Some of the major features of cloud computing includes:-

- Automated Management
- Virtualization
- On-demand self-service
- Rapid Elasticity
- Measured services
- Distributed Storage

### Types of Cloud Computing Services:-

- Infrastructure as a service (IaaS)
- Platform as a Service (PaaS)
- Software as a Service (SaaS)

- ***Infrastructure as a Service (SaaS):-*** It is been used for accessing, managing process and monitoring. This infrastructure services (IaaS) also known as Cloud infrastructure service basically a self-service model. We can take an example like, Instead of purchasing additional hardware such as networking device, firewall, server and spending money on management, maintenance, deployment, IaaS model

offers cloud based infrastructure to deploy the remote data center. Most common and popular examples of IaaS are AMAZON (EC2), Microsoft Azure, Google Compute Engine (GCE), Cisco Metapod.

- ***Platform as a Service (PaaS):-*** It allows the users to develop, run and manage the applications. PaaS offers Development Tools, Deployment platform, Configuration management, and migrate the app to the hybrid models. It basically helps us to develop and customize applications, manages OSes, virtualization, storage and networking, etc. Examples for PaaS are Intel Mash Maker, Google app Engine, Microsoft Azure, etc.
- ***Software as a Service (SaaS):-*** SaaS is the one of the most common type of cloud which is been used in cloud computing is widely than other services. On demand Software is centrally hosted accessible by user using client through browsers. An example for SaaS is office software such as office 365, Cisco WebEx, Citrix GoToMeeting, Google Apps, DBMS, ERP, CAD, HRM, messaging software, etc.

**Cloud Deployment Models for Cloud Services are as follow:-**

1. Public Cloud- Public Cloud are hosted by the third party which offers them different types of cloud computing services.
2. Private Cloud- Private Cloud are hosted personally & individually. Corporate companies usually have their own private clouds services due to their security policies.
3. Hybrid Cloud- Hybrid Clouds are combination of both private and public cloud respectively. Private cloud is used to enhance their sensitive and public cloud capabilities and services.
4. Community Cloud- They are accessed by the multiple parties having common goals and shared resources.

**Benefits for Cloud Computing:-**

- ***Increased speed-*** Cloud Computing environment has dramatically reduced the time and cost of new IT services the increase speed for the organizations to access the IT resources.
- ***Low Latency-*** In the using of cloud computing, the customers have the facility of implementing their applications with just few clicks, so they can do their task easily at minimal costs, i.e., not more time consumed as well as minimal latency is been produced.
- ***Security-*** In the terms of security, cloud computing is always been very efficient. Highly recommended advantages include less investment over security with the effective patch management and security updates. Disaster recovery, dynamically scaling defensive resources and other security services also provides with the protection against cloud computing threats.
- ***Less Economic Expense-*** This is the major advantage in cloud computing. No need to purchase any kind of external hardware for particular function. Data Centre, Networking, and other services can be easily virtualized over cloud saving the cost of purchasing any hardware, configuration and management complexity and less maintenance cost.

## Working

Cloud computing consists of some activities that have been taken for the service provider end as well as the action that should be taken under the user end.

Cloud Security working under some control layers, which have been discussed below:-

### ✔ Application Layer:-

There are some security mechanisms, devices and the policies that provide support at different cloud security control layers. In the application layer, Web application firewall are deployed to filter the traffic and observe the behavior of the traffic. Likely, Software Development Life Cycle (SDLC), Binary Code Analysis, Transactional Security provides the security for online transactions, etc.

In cloud computing , to provide confidentiality and integrity of information that is being communicated between client and server, different policies are configured to monitor any kind of data loss. These policies includes Data Loss Prevention (DLP) and the content management framework. DLP is the feature which generally offers to prevent the leakage of information to the outside network. Traditionally this information may include company or organizations confidential data, proprietary, financial and other secret information. DLP also features ensure the enforcement of compliances with the rules and regulations using Data Loss Prevention policies to prevent the user from intentionally or unintentionally sending this confidential information.

Security of Cloud Computing regarding management is performed by different ways to approaches the Governance, Risk Management, and Compliance (Grc), Identity and Access Management (IAM), Patch and Configuration Management. These approaches helps us to control the secure access t the resources ad manage them.

### ✔ Network Layer:

The next generation of intrusion prevention systems, known as NGIPS, is one of the efficiently active components in integrated threat protection solutions. NIIPS provide a robust security layer with deep visibility, enhanced security intelligence, and enhanced security against emerging threats to secure the network's complex infrastructure. The CISCO NGIPS solution provides deep network visibility automation, security intelligence and next level security.

It uses the most advanced and effective intrusion prevention capabilities to reach emerging sophisticated network attacks. It continuously collects all the information regarding the network, including the operating system, files and applications information, users and device information. This information helps NGIPS to determine network maps and host profiles which lead to contextual information to make better decisions about intrusive enhancements.

### ✔ Trusted Computing :-

The Root of Trust (RoT) is established by validating each components of hardware and software from the end entities up to the root certificate. It makes ensure that only trusted software and hardware can used while still retaining the facilities and also retaining the flexibility.

### ✔ Computer and Storage:-

Computer and Storage in cloud Computing can be secured by implementing Host-Based Intrusion Detection or prevention system HIDS/HIPS. Configuring Integrity Check, File system Monitoring and log file analysis, connection analysis, Encrypting the storage, Kernel Level Detection, etc.

Host Based IPS/IDS is normally made for the protection of specific host machine, and it works closely with operating system Kernel of the host machine. It creates the filtering layer and some kind of filters which make them to purify any malicious application call to the OS.

## ✔ Physical Security:-

Physical Security is always been the required priority to secure anything. It also the first layer OSI model, if devices is not physically secured, any sort of security configuration will not be effective. Physical security includes protection against man-made attacks such as damage, thefts, unauthorized physical access as well as environmental impact such as dust, rain, fire, power, failure, etc.

# Experiments

In clouds computing the most common attacks that are being used by an attacker to exploit or extract sensitive information such as gaining an unauthorized access. The attacks are as follow-

- ## Service Hijacking using Social Engineering Attacks-

As we know about the social engineering attacks. Using social engineering techniques, an attack can be attempted to guess the password. Social engineering attacks occur when unauthorized access to uncover sensitive information according to the compromised user's privilege level.

- ## SQL Injection Attack

SQL injection attacks allow attackers to lose identity, cause damage to existing data, and also causes counter attack. Issues such as transactions or changing balances allow full disclosure of all data on systems, destroying data or otherwise being unavailable, and becoming administrators of database servers.

- ## Domain Name System (DNS) Attack

Domain Name System (DNS) attack include DNS Poisoning, Cybersquatting, Domain hijacking and Domain Snipping. An attacker may attempt to spoil the DNS server or cache by poisoning it to gain internal users' credentials. Domain Hijacking mainly involves in stealing cloud services domain name. Similarly, through Phishing scams, users can be redirected to a fake website

- ## Session Hijacking using XSS Attack

By launching Cross-Site (XSS), the attacker can steal cookies by injecting malicious code into the website.

- ## Cryptanalysis

Cryptanalysis is the science of encoding and decoding codes. It is used more benignly, to find and correct weaknesses in encryption algorithms, to violate authentication schemes, and to break cryptographic protocols.

- ## Dos/DDoS Attacks

DOS / DDOS attacks are being done to create a machine or network. Temporarily unavailable and indefinitely interrupted service of host network to connect to server

- ## Session Hijacking using Session Riding-

It is been use to intend for session hijacking. An attacker may exploit it by attempting cross-site request forgery. The attacker uses currently active session and rides on it by executing the request such as modification of data, erasing data, online transactions and password change by tracking the user to click on malicious link.

- ## Service Hijacking using Network Sniffing

Using Packet Sniffing tools by placing them in the network, then attacker can capture sensitive information such as password, session ID, cookies, and another web service related information such as UDDI, SOAP, and WSDL.

## Tools used to detect & prevent those attacks are as follow-

- **Core Cloud Inspect**

Core security Technologies offers "Core CloudInspect", A cloud Security testing solutions for the Amazon Web services (AWS). This tool has been helping to make the profits from the core Impact and core Insight Technologies to offer penetration-testing as a service from Amazon Web Services for EC2 users.

- ### CloudPassage Halo

CloudPassage Halo provides a broad range of security controls. It is focused Cloud Security solution which prevents attacks and detect the indication of compromise. Cloud Passage Halo operates under ISO-27002 security standards and is audited annually against PCI level 1 and SOC 2 standards. Cloud Passage Halo is the only workload security automation platform that provides speed and scale to on-demand delivery of security control speeds across data centers, private or public cloud, virtual machines, and containers. Unlike traditionally security systems, Halo and its secure APIs integrate with popular CI / CD toolchains and processes, providing periodic feedback to fix vulnerabilities in the development life cycle. This allows DevOps teams to perform security teams by providing the validation they need. Halo integrates easily with popular infrastructure automation and orchestration platforms allowing Halo to be easily deployed to continuously monitor workload security and compliance posture.

Fig: CloudPassage Halo

## Conclusion:-

In Research studies, there should be a bond of trust and privacy between the service provider and the client. Security must be seen as a continuous process to meet the changing needs of a highly volatile computing environment. There is a need to have a holistic view of cloud computing security methodology, which can be used in any service model in general, as long as the customer is not using the service. There should also be self-awareness from the client about self-protection. In view of these observations, this study provided a detailed review of the existing literature and offered several research areas based on existing research work where future work is required. The paper can provide an important aid for obtaining research areas where further work is required, especially for entry-level researchers. The responsibilities provided by the service provider should be consisted of web application firewall, secure web gateway, load balancer, application security and virtual private network. Cloud service clients should be aware of public key infrastructure, firewall, encryption, security development life cycle (SDLC), and others.

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