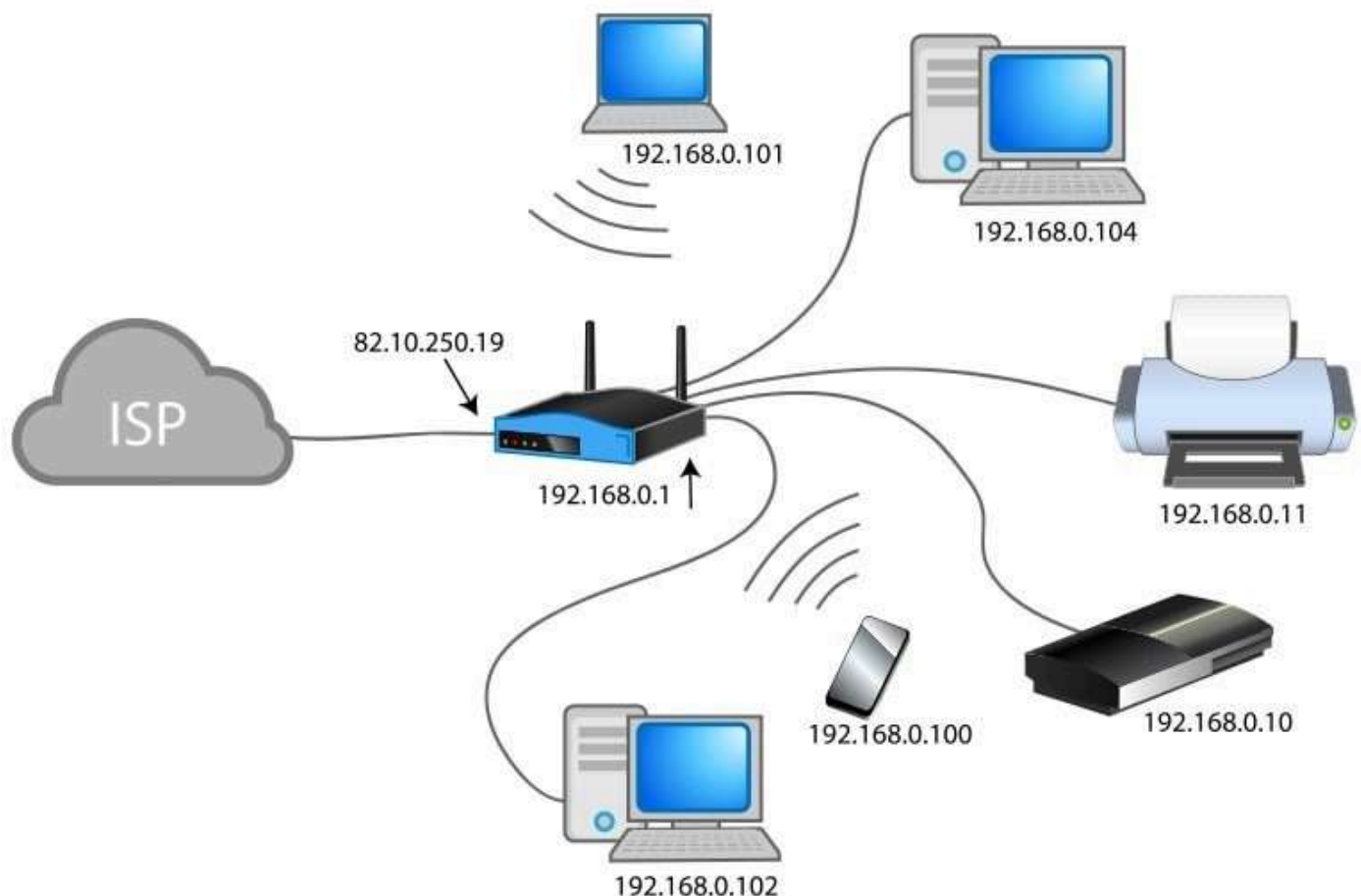


## Cloud computing

**KT2301 Network or internet connection****What is the relationship between internet and network (Network vs. Internet)?**

There are numerous technical terminologies present which confuse people a lot. **Internet and network** are two terminologies that are pegged by non-technical people the same. But, they are two opposite terms with different uses. So, in this post, explain what is the Network and the Internet and what are the **difference between the internet and network** (Network vs. Internet) in a constructive way.

**What is a Computer Network?**

The network is a connection between two computer devices to share resources like internet connection, printer, apps, etc.,. It is a collection of computers or other devices that are connected with wireless technology or transmission media. The network provides connectivity between two devices present within the restricted range where one person is only authorized to manage the entire system. The network can be distinguished into different types such as –

Local Area Network aka LAN is the network that connects the small number of devices present in the close geographical location such as nearby buildings or a floor up/down.

Metropolitan Area Network aka MAN is a communication network that is available in large cities.

Wide Area Network aka WAN is a network that connects two local area networks over a long distance. The operational area of WAN is vast like across countries or states.

### What is the Internet?



The internet (short for inter-network) is a global system that uses [TCP/IP protocol](#) suite to connect various electronic devices. It is a huge collection of interconnecting devices with speed around the globe. Internet is the network of the network which is compressed of different networks like public, private, academic, government and others. It is a type of network which connects different devices.

What is the difference between a network and the Internet?

In simple words, the network is a collection of devices that can communicate with each other on the other hand the Internet is a collection of networks that can communicate with each other.

The network is a structure when two or more than two computers are connected to exchange data and information. On the other hand, the internet is a type of network and networks of the network, that can connect.

The working range of the network is limited whereas the area of operation for the internet is the whole world.

A network connecting with the three of four devices can be very affordable, but with the internet internetworking is required which can be pretty costly.

The network is interactive over are face to face connections. The internet won't always allow the face to face interaction.

There are different types of networks available such as – LAN, MAN, WAN, Campus Area Network and Home Area Network. However, there's only one type of internet presence that is the world wide web.

The network aims to connect and complete work at a fast pace. On the contrary, the internet has soul purpose to get access to the latest news and information.

	<b>Network</b>	<b>Internet</b>
Definition	A group of two or more computer systems are linked together.	Several networks of working that are linked together.
Location	Present within a restricted geographical area such as an institute or home.	It ranges from one country to another.
Connection	Get to interact with each other from face to face.	Do not always get to interact with each other face to face.
Types	Local Area Network, Wide Area Network, Campus Area Network and Home Area Network.	World Wide Web.
Aim	To get connected and complete work at fast rates.	To get access to news and information.
	A computer network can have 100% private IP addresses.	The Internet requires public IP addresses
	A computer network can exist entirely within a host and be 100% virtual.	The Internet cannot exist with only virtual devices, it includes the host.
	A computer network can exist in a single location.	The Internet is geographically diverse

## **KT2302 Manipulate, collate, configure, and access applications online**

### **Data Manipulation: Definition, Importance**

Data manipulation means to organize or arrange the kind of structured data that is read by computer programs so that it's easier to interpret. Performing this process effectively can improve the quality of your data and analysis.

### **How is data manipulation performed?**

Data manipulation typically requires the use of data manipulation language (DML). DML is a coding language that allows you to reorganize data by modifying it within its database program.

What is structured query language (SQL)?

Communicating with the database program to make these adjustments may require the use of structured query language (SQL) to ensure none of the data gets lost in the database when it's being organized.

Here are some common SQL commands used in the data manipulation process:

**Select:** This command allows you to select the data you want to manipulate from the database. Specifically, it tells the database what data to select and where to find the data.

**Update:** This command allows you to update existing data within the database. Specifically, it can communicate with the database to tell it what data needs to be updated, where the new data should be input and whether it should add the data records one at a time or together.

**Insert:** This command allows you to relocate data within the database. Specifically, it tells the database where the data is currently located and where the data needs to be moved.

**Delete:** This command allows you to remove data from the database. Specifically, it tells the database what data to delete and where it can find the data.

Related: [What Is a Data Scientist?](#)

Why is data manipulation important?

Data manipulation is important because it allows you to easily access the information that's critical to your specific business and goals. This process can be tailored to identify different data sets as your company grows or makes adjustments due to market demand. Data manipulation is also a valuable tool in identifying and correcting data redundancies in reporting.

Related: [How Analyzing Data Can Improve Decision-Making](#)

Reasons why companies use data manipulation

Companies may manipulate data to transform it into useful insights that they can use for stakeholder presentations, project or financial decisions and trend or success measurements. Here are four reasons companies may choose to implement data manipulation:

#### 1. Consistent and organized data

Companies may manipulate their data because it can provide them with well-organized databases. Categorization can allow companies to group similar data, which may make it easier to search for information. For example, a company may choose to alphabetize data. Depending on their needs, businesses can categorize data in a variety of different ways.

#### 2. Insightful project data access

Another reason companies might manipulate their data is that it can allow them to archive project data and access it later if they want to use it as a reference while working on a new project or setting business goals. Businesses may also reference their previous data when examining finances and whether profits are increasing.

#### 3. More valuable data

Companies that choose to manipulate their data can tailor their results to provide specific insights. For example, if a business were interested in learning more about its website traffic and wanted to track the number of visitors over a certain period of time, they might manipulate their website traffic data to provide those results. Then, they can use this data to help make informed decisions about when to post new content.

#### 4. Reduces unnecessary data points

Companies that choose to manipulate their data might also avoid generating unnecessary data. Sometimes, the data received might not provide useful insights or may be inaccurate. With data manipulation, companies can remove non-useful data insights and clean inaccurate data to provide accurate results.

### How to use data manipulation effectively

Strategies for effectively using data manipulation can incorporate the use of multiple steps. Here are some common strategic steps you may use when manipulating data:

#### 1. Create a database with information from different sources

A common initial strategic step is to create a database with information and data from different sources. This might be a database you create or an automated software you choose to use. If you choose to create a database yourself, you may use tools like Microsoft Excel or Google Analytics and Data Studio.

Related: [Advanced Excel Skills: Definition and Examples](#)

#### 2. Restructure and cleanse data content

Another common strategic step is restructuring and cleansing data content to ensure it's accurate and organized. If you use automated software, it may complete this process for you. This can include making sure you properly link all data and analytics in organized patterns.

#### 3. Combine information and remove redundancies

Once you've organized your data in the database, the next strategic step usually includes combining your information to check for redundancies. This can help you remove overlapping data and further organize your database. This might also include the combination of data in formulas to provide extensive niche data to meet business needs.

#### 4. Analyze the data to find useful information

Typically, the final strategic step is to analyze the comprehensive data results to find useful information. This useful information may include consumer purchasing trends, profit insights or digital brand engagement. Depending on an individual company's needs, the useful information they find and analyze can vary.

Related: [7 Effective Methods of Analyzing Data](#)

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## Tips for using data manipulation

Here are some helpful tips for using data manipulation:

Understand your needs and focuses before beginning this process.

Determine the specific data you need for your specific business focuses.

Research different manipulation tools.

Use resources to help guide you through this process.

Consider taking advantage of automation tools.

Understand mathematical functions and how they can help you combine data.

Use different formulas to help you gain more niche results to meet your needs.

Filter your data to find specific results.

Implement autofill functions for commonly used formulas or equations.

Update your manipulation as needed to address your business focuses.

Use visualization data tools to present or represent your manipulated data.

## **KT2303 Providing support infrastructure, applications, and data storage**

Storage infrastructure in IT refers to the overall set of hardware and software components needed to facilitate storage for a system. This is often applied to cloud computing, where cloud storage infrastructure is composed of hardware elements like servers, as well as software elements like operating systems and proprietary delivery applications.

They are majorly hardware and software framework that supports the computing requirements of a private or public cloud storage service. Both public and private cloud storage infrastructures are known for their elasticity, scalability and flexibility.

The three major areas of management are capacity, performance, and availability. These three areas can be easily summarized as good storage management, which is about making sure that the storage is always available, always has enough space, and is fast in terms of performance. Good storage management requires solid processes, policies, and tools.

Traditional storage infrastructure management is component specific. The management tools only enable monitoring and management of specific components. This may cause management complexity and system interoperability issues in a large environment that includes many multi-vendor components residing in world-wide locations.



In the cloud environment, more value is given to the software-defined infrastructure management over the traditional physical component-specific management. Management functions are increasingly becoming decoupled from the physical infrastructure and moving to external software controller. As a result of this shift, the infrastructure components are managed through the software controller. The controller usually has a native management tool for configuring components and creating services. Administrators may also use independent management tools for managing the storage infrastructure. Management tools interact with the controller commonly through the application programming interfaces (APIs).

The key storage infrastructure components are Servers, storage systems, and storage area networks (SANs). These components could be physical or virtual and are used to provide services to the users. The storage infrastructure management includes all the storage infrastructure-related functions that are necessary for the management of the infrastructure components and services, and for the maintenance of data throughout its lifecycle. These functions help IT organizations to align their storage operations and services to their strategic business goal and service level requirements. They ensure that the storage infrastructure is operated optimally by using as few resources as needed. They also ensure better utilization of existing components, thereby limiting the need for excessive ongoing investment on infrastructure.

## **KT2304 Benefits and risks to cloud computing as well as cloud characteristics**

### **Benefits And Risks Of Cloud Computing**

Various aspects of Cloud Computing, its major characteristics, and a comparative analysis between different cloud computing platforms were discussed in the articles [Major Characteristics of Cloud Computing](#) and [Comparative Analysis of Cloud Platforms](#) respectively. In this article, we'll learn about the plethora of benefits cloud computing provides as well as the risk aspects of its usage. Each of the pros and cons is described in detail.

#### **Benefits**

Cost Saving and Reduced Investment

Increase in Scalability

High Availability and Reliability

Efficient Collaboration

Automatic Updates

#### **Cost Saving and Reduced Investment**

Cloud Computing has significant hands-on reducing the costs proportionally to the usage of the services and reducing the initial investment for the computing resources. Cloud computing often has a pay-as-you-go model which costs a fraction of the charges and limits the possible excessive cost. The automated cloud capacity is extremely elastic in terms of wisely allocating resources as per the growth or decrease in the customer demand without ever wasting the capacity nor ever having a crisis of insufficient resources. Moreover, the automated cloud capacity will always meet the demand of the customers without wasting the capacity thus providing cost savings. This cost reduction regarded as one of the primary benefits of cloud computing has driven business prospects for this technology adopted by uncountable business enterprises and personal userbases parallelly. Also, not having to invest a huge chunk on servers and computing resources in the initial phase supports the growth for companies that would stay as fixed assets that cannot be dispensed elsewhere for years. Reducing this initial investment is a significant benefit cloud computing has provided in the most accessible way.

### **Increase in Scalability**

The increase in scalability is one of the important benefits of cloud computing. This can be easily illustrated with the ever-changing as elastic customer demand being met by cloud computing technology. The rapid elasticity and automatic triggers that are provided by cloud computing have enabled consumers on assuring that the cloud capacity exceeds the customer demands by a respectable margin in a way it neither leads to the occurrence of hefty billing at the end of the month nor ever slack to meet the consumer demand with resources supply.

When Instagram was bought by Facebook for \$1B with only 13 people building and running the company, the world was shaken to witness the value that had been created by such a small group of people. If we dive deeper, the automated features of cloud computing have played a huge role to achieve that feat. Meeting the customer demand for the ever-changing resources need, and with the minimized wasting of capacity and also reducing the need for the expenditure of company resources to predict the customer demand, capacity planning for the business was a monumental feat. This has saved huge charges that would have incurred on the company for unused resources and instead benefitted the increased scalability which has been the driving force for businesses adopting cloud computing.

### **High Availability and Reliability**

As we have discussed Business Continuity in the previous article, [Business Continuity and Disaster Recovery](#), availability and reliability are critical for businesses. Henceforth, the increase in availability and reliability offered by cloud computing has driven its adoption by organizations. We know that availability and reliability can also be offered by the traditional approach to infrastructures. But with Cloud computing, comes in a package with all other characteristics of cloud computing as we've discussed in the last article, [Major Characteristics of Cloud Computing](#). Moreover, cloud providers guarantee the associated availability and reliability of the services in the service level agreement (SLA). Companies can adapt and evolve to better respond to the changes of the customer demand as



well as mitigate risk for precarious situations that may arise in the future through the availability and reliability provided by cloud computing.

### **Efficient Collaboration**

Beyond the approach of traditional methods, with cloud computing and cloud environment businesses will have the ability to collaborate, communicate and share more easily. With the world becoming a global village with every passing year, the office has become an ideology. With numerous employees working from across the borders, when projects are being worked on employees, contractors and third parties will have the capability to share and access the files required through cloud computing. The possibility of efficient collaboration has become a reality today, a major contribution of cloud computing.

### **Automatic Updates**

In legacy systems working on traditional infrastructures, companies were responsible to take care of the hardware as well as software. On contrary with cloud computing, the frequent updates in software aren't a hassle anymore with the cloud computing service provider taking care of it easily. While installing an operating system, one only has to choose the image of the latest software and the system will do it all by itself. The tedious tasks of updating each and every new update have become history. This is one amazing advantage that cloud computing provides.

### **Risks and Challenges**

Security Vulnerabilities

Minimized Governance Control

Portability in between cloud providers

Compliance and Legal Issues

### **Security Vulnerabilities**

The cases of Data Breaches, DDOS Attacks, Data Losses, Hijacking of accounts are front-line news today. While the cloud service utilizes resource pooling as discussed in the previous article, [Major characteristics of cloud computing](#), there are chances the consumer is accessing it through shared cloud resources rather than the physically isolated resource. This can lead to huge security vulnerabilities with cloud computing if measures are not taken. In comparison to the traditional infrastructure which would have a direct connection to the on-premise infrastructure with the isolated resources, it is not the same with various functionalities of cloud computing. Thus, however, Cloud Computing can be adjusted to mitigate such risks with careless administration of resource

allocation and usage, it can also become equally vulnerable. Thus, skilled manpower is of extreme importance while handling critical data and resources in cloud computing.

### **Minimized Governance Control**

Cloud Computing comes with the risk of minimized operational control of governance. Since the cloud providers operate the infrastructures and external connections are essential for the communication between the customers and the provider, there is a lack of control. For an instance, a corrupt cloud provider might guarantee SLA but would fail to honor those agreements making the consumer ever more vulnerable and susceptible to risks without even their recognition. Also, the physical location for these servers and data centers might be located further away from the customer thus increasing the probabilities of high latency and bandwidth issues. Hence, it is consequential that only respected and trustworthy cloud providers be used to handle such important data.

### **Portability in between cloud providers**

Each of the cloud providers is discrete and can be observed to be shielded from each other. This increases the chances of limited portability between the cloud providers. Since there is no such industry standard that would allow the diffuse of customer dependency, each of these cloud providers is more of a vault. Similar to the Photo Stream provided by Apple, anyone outside of the ecosystem isn't that welcome to share their photos. Thus, though not impossible to move between these cloud providers, it becomes extremely difficult to switch in between then down the path. Some features might be provided by one provider and the other doesn't and vice versa.

### **KT2305 Cloud storage**

Cloud storage delivers a cost-effective, scalable alternative to storing files to on-premise hard drives or storage networks. Cloud service providers allow you to save data and files in an off-site location that you access through the public internet or a dedicated private network connection. The provider hosts, secures, manages, and maintains the servers and associated infrastructure and ensures you have access to the data whenever you need it.

### **Hybrid cloud storage**

Hybrid cloud storage combines private and public cloud elements. With hybrid cloud storage, organizations can choose which cloud to store data. For instance, highly regulated data subject to strict archiving and replication requirements is usually more suited to a private cloud environment. Whereas less sensitive data can be stored in the public cloud. Some organizations use hybrid clouds to supplement their internal storage networks with public cloud storage.

### ***Internal Assessment Criteria and Weight***

- IAC2301 Cloud computing functionality, benefits and risks are identified and described

**(Weight 5%)**

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