New Trends in MIS

Whats new in MIS

| CHANGE | BUSINESS IMPACT |
|---|---|
| TECHNOLOGY | |
| Cloud computing platform emerges as a major business area of innovation | A flexible collection of computers on the Internet begins to perform tasks traditionally performed on corporate computers. Major business applications are delivered online as an Internet service (Software as a Service, or SaaS). |
| Big data | Businesses look for insights from huge volumes of data from Web traffic, e-mail messages, social media content, and machines (sensors) that require new data management tools to capture, store, and analyze. |
| A mobile digital platform emerges to compete with the PC as a business system | The Apple iPhone and Android mobile devices are able to download hundreds of thousands of applications to support collaboration, location-based services, and communication with colleagues. Small tablet computers, including the iPad, Google Nexus, and Kindle Fire, challenge conventional laptops as platforms for consumer and corporate computing. |

| | MANAGEMENT | | |
|---|--|---|--|
| | Managers adopt online collaboration and social networking software to improve coordination, collaboration, and knowledge sharing | Google Apps, Google Sites, Microsoft Windows SharePoint Services, and IBM Lotus Connections are used by over 100 million business professionals worldwide to support blogs, project management, online meetings, personal profiles, social bookmarks, and online communities. | |
| / | Business intelligence applications accelerate | More powerful data analytics and interactive dashboards provide real- time performance information to managers to enhance decision making. | |
| | Virtual meetings proliferate | Managers adopt telepresence videoconferencing and Web conferencing technologies to reduce travel time, and cost, while improving collaboration and decision making. | |

ORGANIZATIONS

| Social business | Businesses use social networking platforms, including Facebook, Twitter, and internal corporate social tools, to deepen interactions with employees, customers, and suppliers. Employees use blogs, wikis, e-mail texting, and messaging to interact in online communities. |
|--|---|
| Telework gains momentum in the workplace | The Internet, wireless laptops, smartphones, and tablet computers make it possible for growing numbers of people to work away from the traditional office. Fifty-five percent of U.S. businesses have some form of remote work program. |
| Co-creation of business value | Sources of business value shift from products to solutions and experiences, and from internal sources to networks of suppliers and collaboration with customers. Supply chains and product development become more global and collaborative; customer interactions help firms define new products and services. |

Advancement and application of information technology are ever changing. Some of the trends in the information technology are as follows:

Cloud computing

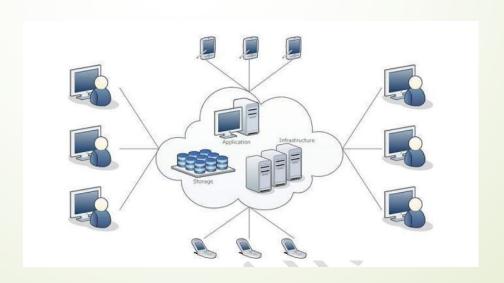
Clouding computing is defined as utilization of computing services, i.e. software as well as hardware as a service over a network. Typically, this network is the internet.

What is Cloud?

The term **Cloud** refers to a **Network** or **Internet**. In other words, we can say that Cloud is something, which is present at remote location. Cloud can provide services over public and private networks, i.e., WAN, LAN or VPN. Applications such as e-mail, web conferencing, customer relationship management (CRM) execute on cloud.

What is Cloud Computing?

Cloud Computing refers to **manipulating**, **configuring**, and **accessing** the hardware and software resources remotely. It offers online data storage, infrastructure, and application.



- Cloud computing offers platform independency, as the software is not required to be installed locally on the PC. Hence, the Cloud Computing is making our business applications mobile and collaborative.
 Cloud computing is a suite of tools which enables companies to lease their digital assets somewhere 'in the cloud'. So unlike the 'on-premise' data centers, the location of computers, applications and databases that employees are using is unknown.
- The point is to free companies from details and 'rent' whatever is needed from the cloud. They don't need to buy and thus the IT expenses are switched from fixed capital to operating expenses.
- Cloud Computing provides us means of accessing the applications as utilities over the Internet. It allows us to create, configure, and customize the applications online.

Basic Concepts

There are certain services and models working behind the scene making the cloud computing feasible and accessible to end users. Following are the working models for cloud computing:

- Deployment Models
- Service Models

Deployment Models/Types

- Deployment models define the type of access to the cloud, i.e., how the cloud is located? Cloud can have any of the four types of access: Public, Private, Hybrid, and Community
- PUBLIC CLOUD: The public cloud allows systems and services to be easily accessible to the general public. Public cloud may be less secure because of its openness.
- PRIVATE CLOUD: The private cloud allows systems and services to be accessible within an organization. It is more secured because of its private nature.
- COMMUNITY CLOUD: The community cloud allows systems and services to be accessible by a group of organizations.
- HYBRID CLOUD: The hybrid cloud is a mixture of public and private cloud, in which the critical activities are performed using private cloud while the non-critical activities are performed using public cloud.

Service Models

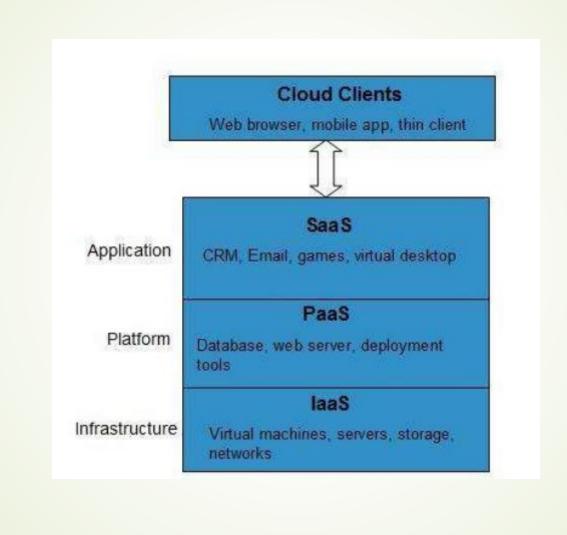
Cloud computing is based on service models. These are categorized into three basic service

models which are -

- Infrastructure-as-a-Service (laas)
- Platform-as-a-Service (PaaS)
- Software-as-a-Service (SaaS)

Anything-as-a-Service (XaaS) is yet another service model, which includes Network-as-aService, Business-as-a-Service, Identity-as-a-Service, Database-as-a-Service or Strategy-as-aService.

The Infrastructure-as-a-Service (laas) is the most basic level of service. Each of the service models inherit the security and management mechanism from the underlying model, as shown in the following diagram:



- The offerings of the cloud can broadly be categorized into the following:
- 1. INFRASTRUCTUR-AS-A-SERVICE (IAAS): This is the simplest form wherein server(s) or a storage capacity is there on cloud. Clients opting for this arrangement are typically IT companies who don't want the hassle of installing or maintaining the space, but want to avail access to their material whenever required.
- 2. PLATFORM-AS-A-SERVICE (PAAS): This platform enables employees to write code, develop applications and integrate with their existing resources. The environment is conducive to development as it comes installed with technologies such as .NET, Java, Ruby on Rails, Python, etc that can prepare code and then host it for sharing
- 3. SOFTWARE-AS-A-SERVICE (SAAS): This is the most mature offering of cloud that comprises of applications residing on the cloud as opposed to the physical database. CRM Salesforce.com was the first to implement this offering all customer relationship management data and analytics on cloud instead of on the hard drive.

How does the Cloud help?

- Apart from doing away with purchasing and installing massive data centers and making information available on web browsers, cloud has several benefits:
- Productivity: Employees can control their own accounts reducing precious time. Consider a non cloud environment such as the FTP server. Usually it is difficult to use and runs out of capacity. The IT department has to perform the repetitive task of creating a folder for each user and granting them the required access. If the folder details are to be shared with anyone else, the requisition has to again be routed via the IT department. In contrast, a cloud environment can enable self administration of accounts.
- Collaboration: Teams and communities can work collectively as all resources are shared online. This proves very useful in a typical IT onsite-offshore arrangement.
- Better Intelligence: Cloud platforms have their own study softwares that can be combined with company specific resources to create unique results. For example, Google Earth Builder, an application pre loaded on cloud, facilitates to companies to upload their own data on Google Earth or Google Maps thereby establishing their presence on these resources

- Cost Savings: Instead of purchasing and maintaining expensive servers themselves, companies can invest in cloud based platforms which proves out to be a cheaper alternative. This is because cloud providers acquire mammoth quantities of bandwidth, hardware and power to get better price points.
- Reliability: Cloud providers build redundancy to avoid major disruptions. This investment may not be possible for individual companies. To illustrate, as monitored in 2010, Gmail was available 99.984% of the times, with an admirable down time of only 7 minutes per month. As per research, this is 32 times more reliable than a typical company email setup

Benefits

Cloud Computing has numerous advantages. Some of them are listed below -

- 1. One can access applications as utilities, over the Internet.
- 2. One can manipulate and configure the applications online at any time.
- 3. It does not require installing software to access or manipulating cloud application.
- 4. Cloud Computing offers online development and deployment tools, programming runtime
- environment through PaaS model.
- **5.** Cloud resources are available over the network in a manner that provide platform independent access to any type of clients.
- **6.** Cloud Computing offers on-demand self-service. The resources can be used without interaction with cloud service provider.
- 7. Cloud Computing is highly cost effective because it operates at high efficiency with optimum utilization. It just requires an Internet connection
- 8. Cloud Computing offers load balancing that makes it more reliable

Risks related to Cloud Computing

Although cloud Computing is a promising innovation with various benefits in the world of computing, it comes with risks. Some of them are discussed below:

Security and Privacy: It is the biggest concern about cloud computing. Since data

management

and infrastructure management in cloud is provided by third-party, it is always a risk to handover

the sensitive information to cloud service providers.
Although the cloud computing vendors ensure highly secured password protected accounts, ony sign of security breach may result in loss of customers and businesses.

Lock In: It is very difficult for the customers to switch from one Cloud Service Provider (CSP) to

another. It results in dependency on a particular CSP for service.

Isolation Failure: This risk involves the failure of isolation mechanism that separates storage, memory, and routing between the different tenants.

Management Interface Compromise: In case of public cloud provider, the customer management interfaces are accessible through the Internet.

Insecure or Incomplete Data Deletion: It is possible that the data requested for deletion may

not

- get deleted. It happens because either of the following reasons
 Extra copies of data are stored but are not available at the time of deletion
 Disk that stores data of multiple tenants is destroyed.

Features of Cloud Computing:

- 1. High scalability: It means on demand provisioning of resources on a large scale without
 - requiring human interaction with each service provider.
 - 2. High availability and reliability: Availability of servers is more reliable and high because it minimizes the chances of infrastructure failure.
 - 3. Agility: It shares the resources between users and works very quickly.
 - **4. Multi-sharing:** Multiple user and applications work more efficiently with less cost by sharing common infrastructure using cloud computing.
 - **5. Maintenance:** Maintenance of cloud computing applications is easier as they are not required to be install on each computer and can also be accessed from various places, ultimately reducing the cost.
 - **6. Low cost:** It is cost effective because the company no more needs to set its own infrastructure. It pays according to resources it has consumed.
 - **7. Services in pay-per-use mode:** APIs (Application Programming Interfaces) are provided to the users for accessing the services on the cloud and pay according to use of the service.

On Demand Self Service

Cloud Computing allows the users to use web services and resources on demand. One can logon to a website at any time and use them.

Broad Network Access: Since cloud computing is completely web based, it can be accessed from anywhere and at any time.

Resource Pooling: Cloud computing allows multiple tenants to share a pool of resources. One can share single physical instance of hardware, database and basic infrastructure.

Rapid Elasticity: It is very easy to scale the resources vertically or horizontally at any time. Scaling of resources means the ability of resources to deal with increasing or decreasing demand. The resources being used by customers at any given point of time are automatically monitored.

Measured Service: In this service cloud provider controls and monitors all the aspects of cloud service. Resource optimization, billing, and capacity planning etc. depend on it.

Concluding Remarks:

The cloud is still in its infancy stage and hence is an emerging platform. There is a fast increase in the number of cloud vendors; they are trying to be creative and segregate their offerings. In times ahead, there are expected to be transformative changes in this field and wider acceptance of the technology.

Big Data:

Introduction:

Big data is a blanket term for the non-traditional strategies and technologies needed to gather, organize, process, and gather insights from large datasets. While the problem of working with data that exceeds the computing power or storage of a single computer is not new, the pervasiveness, scale, and value of this type of computing has greatly expanded in recent years.

In this article, we will talk about big data on a fundamental level and define common concepts you might come across while researching the subject. We will also take a high-level look at some of the processes and technologies currently being used in this space.

What Is Big Data?

- An exact definition of "big data" is difficult to nail down because projects, vendors, practitioners, and business professionals use it quite differently. With that in mind, generally speaking, big data is:
 - large datasets
 - the category of computing strategies and technologies that are used to handle large datasets In this context, "large dataset" means a dataset too large to reasonably process or store with traditional tooling or on a single computer. This means that the common scale of big datasets is constantly shifting and may vary significantly from organization to organization.

Big Data is a collection of large datasets that cannot be adequately processed using traditional processing techniques. Big data is not only data it has become a complete subject, which involves various tools, techniques and frameworks.

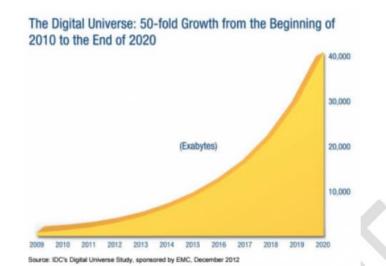
Big data term describes the volume amount of data both structured and unstructured manner that adapted in day-to-day business environment. It's important that what organizations utilize with these with the data that matters.

Big data helps to analyze the in-depth concepts for the better decisions and strategic taken for the development of the organization.

Big Data Characteristics

The five characteristics that define Big Data are: Volume, Velocity, Variety, Veracity and Value.

1. Volume: Volume refers to the 'amount of data', which is growing day by day at a very fast pace. The size of data generated by humans, machines and their interactions on social media itself is massive. Researchers have predicted that 40 Zettabytes (40,000 Exabytes) will be generated by 2020, which is an increase of 300 times from 2005.



- 2. Velocity: Velocity is defined as the pace at which different sources generate the data every day. This flow of data is massive and continuous. There are 1.03 billion Daily Active Users (Facebook DAU) on Mobile as of now, which is an increase of 22% year-over-year.
- This shows how fast the numbers of users are growing on social media and how fast the data is getting generated daily. If you are able to handle the velocity, you will be able to generate insights and take decisions based on real-time data.

■ 3. Variety: As there are many sources which are contributing to Big Data, the type of data they are generating is different. It can be structured, semi-structured or unstructured. Hence, there is a variety of data which is getting generated every day. Earlier, we used to get the data from excel and databases, now the data are coming in the form of images, audios, videos, sensor data etc. as shown in below image. Hence, this variety of unstructured data creates problems in capturing, storage, mining and analyzing the data.

- 4. Veracity: Veracity refers to the data in doubt or uncertainty of data available due to data inconsistency and incompleteness. In the image below, you can see that few values are missing in the table. Also, a few values are hard to accept, for example 15000 minimum values in the 3rd row, it is not possible. This inconsistency and incompleteness is Veracity.
- Data available can sometimes get messy and maybe difficult to trust. With many forms of big data, quality and accuracy are difficult to control like Twitter posts with hashtags, abbreviations, typos and colloquial speech. The volume is often the reason behind for the lack of quality and accuracy in the data.
 - Due to uncertainty of data, 1 in 3 business leaders don't trust the information they use to make decisions.
 - It was found in a survey that 27% of respondents were unsure of how much of their data was inaccurate.
 - Poor data quality costs the US economy around \$3.1 trillion a year.

■ 5. Value: After discussing Volume, Velocity, Variety and Veracity, there is another V that should be taken into account when looking at Big Data i.e. Value. It is all well and good to have access to big data but unless we can turn it into value it is useless. By turning it into value I mean, Is it adding to the benefits of the organizations who are analyzing big data? Is the organization working on Big Data achieving high ROI (Return On Investment)? Unless, it adds to their profits by working on Big Data, it is useless.

Types of Big Data:

Big Data could be of three types:

1. Structured: The data that can be stored and processed in a fixed format is called as Structured Data. Data stored in a relational database management system (RDBMS) is one example of 'structured' data. It is easy to process structured data as it has a fixed schema. Structured Query Language (SQL) is often used to manage such kind of Data.

2. Semi-Structured: Semi-Structured Data is a type of data which does not have a formal structure of a data model, i.e. a table definition in a relational DBMS, but nevertheless it has

2. Semi-Structured: Semi-Structured Data is a type of data which does not have a formal structure of a data model, i.e. a table definition in a relational DBMS, but nevertheless it has some organizational properties like tags and other markers to separate semantic elements that makes it easier to analyze. XML files or JSON documents are examples of semi-structured data.

3. Unstructured: The data which have unknown form and cannot be stored in RDBMS and cannot be analyzed unless it is transformed into a structured format is called as unstructured data. Text Files and multimedia contents like images, audios, videos are example of unstructured data. The unstructured data is growing quicker than others, experts say that 80 percent of the data in an organization are unstructured.

Examples of Big Data

- Daily we upload millions of bytes of data. 90 % of the world's data has been created in last two years.
 - Walmart handles more than 1 million customer transactions every hour.
 - Facebook stores, accesses, and analyzes 30+ Petabytes of user generated data.
 - 230+ millions of tweets are created every day.
 - More than **5 billion** people are calling, texting, tweeting and browsing on mobile phones worldwide.
 - YouTube users upload 48 hours of new video every minute of the day.
 - Amazon handles 15 million customer click stream user data per day to recommend products.
 - 294 billion emails are sent every day. Services analyses this data to find the spams.
 - Modern cars have close to **100 sensors** which monitors fuel level, tire pressure etc., each vehicle generates a lot of sensor data.

Applications of Big Data:

- We cannot talk about data without talking about the people, people who are getting benefited by Big Data applications. Almost all the industries today are leveraging Big Data applications in one or the other way.
- Smarter Healthcare: Making use of the petabytes of patient's data, the organization can
 extract meaningful information and then build applications that can predict the patient's
 deteriorating condition in advance.
 - **Telecom**: Telecom sectors collects information, analyzes it and provide solutions to different problems. By using Big Data applications, telecom companies have been able to significantly reduce data packet loss, which occurs when networks are overloaded, and thus, providing a seamless connection to their customers.
 - **Retail**: Retail has some of the tightest margins, and is one of the greatest beneficiaries of big data. The beauty of using big data in retail is to understand consumer behavior. Amazon's recommendation engine provides suggestion based on the browsing history of the consumer.
 - **Traffic control**: Traffic congestion is a major challenge for many cities globally. Effective use of data and sensors will be key to managing traffic better as cities become increasingly densely populated.
 - Manufacturing: Analyzing big data in the manufacturing industry can reduce component defects, improve product quality, increase efficiency, and save time and money.
 Search Quality: Every time we are extracting information from google, we are
 - Search Quality: Every time we are extracting information from google, we are simultaneously generating data for it. Google stores this data and uses it to improve its search quality

Benefits of Big Data:

- Using the information kept in the social network like Facebook, the marketing agencies are learning about the response for their campaigns, promotions, and other advertising mediums.
 - Using the information in the social media like preferences and product perception of their consumers, product companies and retail organizations are planning their production.
- Using the data regarding the previous medical history of patients, hospitals are providing better and quick service.

Challenges with Big Data

Let me tell you few challenges which come along with Big Data:

1. Data Quality: The problem here is the 4th V i.e. Veracity. The data here is very messy, inconsistent and incomplete. Dirty data cost \$600 billion to the companies every year in the United States.

2. Discovery: Finding insights on Big Data is like finding a needle in a haystack. Analyzing petabytes of data using extremely powerful algorithms to find patterns and insights are very difficult.

3. Storage: The more data an organization has, the more complex the problems of managing it can become. The question that arises here is "Where to store it?". We need a storage system which can easily scale up or down on-demand.

4. Analytics: In the case of Big Data, most of the time we are unaware of the kind of data we are dealing with, so analyzing that data is even more difficult.

5. Security: Since the data is huge in size, keeping it secure is another challenge. It includes user authentication, restricting access based on a user, recording data access histories, proper use of data encryption etc.

6. Lack of Talent: There are a lot of Big Data projects in major organizations, but a sophisticated team of developers, data scientists and analysts who also have sufficient amount of domain knowledge is still a challenge.

7. Capturing data

8. Curation

9. Storage

10. Searching

11. Sharing

12. Transfer

13. Analysis

14. Presentation