Cloud Computing

One component that improves the success of the Internet of Things is Cloud Computing. Cloud computing enables users to perform computing tasks using services provided over the Internet. The use of the Internet of Things in conjunction with cloud technologies has become a kind of catalyst: the Internet of Things and cloud computing are now related to each other. These are true technologies of the future that will bring many benefits.

Due to the rapid growth of technology, the problem of storing, processing, and accessing large amounts of data has arisen. Great innovation relates to the mutual use of the Internet of Things and cloud technologies. In combination, it will be possible to use powerful processing of sensory data streams and new monitoring services. As an example, sensor data can be uploaded and saved using cloud computing for later use as intelligent monitoring and activation using other devices.

The goal is to transform data into insights and thus drive cost-effective and productive action.

Benefits And Functions of IoT Cloud:

There are many benefits of combining these services –

1. IoT Cloud Computing provides many connectivity options, implying large network access. People use a wide range of devices to gain access to cloud computing resources: mobile devices, tablets, laptops. This is convenient for users but creates the problem of the need for network access points.
2. Developers can use IoT cloud computing on-demand. In other words, it is a web service accessed without special permission or any help. The only requirement is Internet access.
3. Based on the request, users can scale the service according to their needs. Fast and flexible means you can expand storage space, edit software settings, and work with the number of users. Due to this characteristic, it is possible to provide deep computing power and storage.
4. Cloud Computing implies the pooling of resources. It influences increased collaboration and builds close connections between users.
5. As the number of IoT devices and automation in use grows, security concerns emerge. Cloud solutions provide companies with reliable authentication and encryption protocols.
6. Finally, IoT cloud computing is convenient because you get exactly as much from the service as you pay. This means that costs vary depending on use: the provider measures your usage statistics. A growing network of objects with IP addresses is needed to connect to the Internet and exchange data between the components of the network.

It is important to note that cloud architecture must be well-designed since reliability, security, economy, and performance optimization depends upon it. Using well-designed CI/CD pipelines, structured services, and sandboxed environments results in a secure environment and agile development.

Comparison of Internet of Things and Cloud Computing:

Cloud is a centralized system helping to transfer and deliver data and files to data centers over the Internet. A variety of data and programs are easy to access from a centralized cloud system.
The Internet of Things refers to devices connected to the Internet. In the IoT, data is stored in real-time, as well as historical data. The IoT can analyze and instruct devices to make effective decisions, as well as track how certain actions function.

Cloud computing encompasses the delivery of data to data centers over the Internet. IBM divides cloud computing into six different categories:

1. **Platform as a Service (PaaS) –**
   The cloud contains everything you need to build and deliver cloud applications so there is no need to maintain and buy equipment, software, etc.
2. **Software as a Service (SaaS) –**
   In this case, applications run in the cloud and other companies operate devices that connect to users' computers through a web browser.
3. **Infrastructure as a Service (IaaS) –**
   IaaS is an option providing companies with storage, servers, networks and hubs processing data for each use.
4. **Public cloud –**
   Companies manage spaces and provide users with quick access through the public network.
5. **Private cloud –**
   The same as a public cloud, but only one person has access here, which can be an organization, an individual company, or a user.
6. **Hybrid cloud –**
   Based on a private cloud, but provides access to a public cloud.

Now, the Internet of Things refers to connecting devices to the Internet. Everyday devices such as cars and household appliances may have an Internet connection, and with the advancement of the Internet of Things, more and more devices will join this list.

Pairing with edge computing:

Data processing at the network edge or edge computing is used with IoT solutions and enables faster processing and response times. To get a better understanding of how this works, consider a large factory with many implemented IoT sensors. In this situation, it makes sense, before sending data to the cloud for processing, to aggregate it close to the border to prevent cloud overload by reducing direct connections.

Data centers with this approach make data processing much faster. Yet, an approach that is only based on the edge will never provide a complete view of business operations. If there is no cloud solution, then the factory only controls each unit individually. Also, it has no way of imagining how these units work in relation to each other. This is why only the combination of the edge and the cloud will enable businesses to benefit from IoT developments.

The Role of Cloud Computing on the Internet of Things:

Cloud computing works to improve the efficiency of daily tasks in conjunction with the Internet of Things. Cloud computing is about providing a path for data to reach its destination while the Internet of Things generates a huge amount of data.

According to Amazon Web Services, there are four benefits of cloud computing:

1. No need to pre-guess infrastructure capacity needs
2. Saves money, because you only need to pay for those resources that you use, the larger the scale, the more savings
3. In a few minutes, platforms can be deployed around the world
4. Flexibility and speed in providing resources to developers

Thus, the role of cloud computing in IoT is to work together to store IoT data, providing easy access when needed. It's important to note that cloud computing is an easy way to move large data packets across the Internet generated by the IoT.

Conclusion:

In conclusion, cloud computing in combination with the Internet of Things will make fundamental changes to the life of mankind, particularly in how information is managed. The cloud is the only technology that can analyze, store, and access the IoT depending on the deployment model. Because of the nature of on-demand information, cloud computing with an Internet connection is available on any device at any time. As hybrid cloud adoption grows, many companies are realizing its benefits and the need to implement it. Cloud computing will continue to open up new opportunities for the IoT for a long time to come.