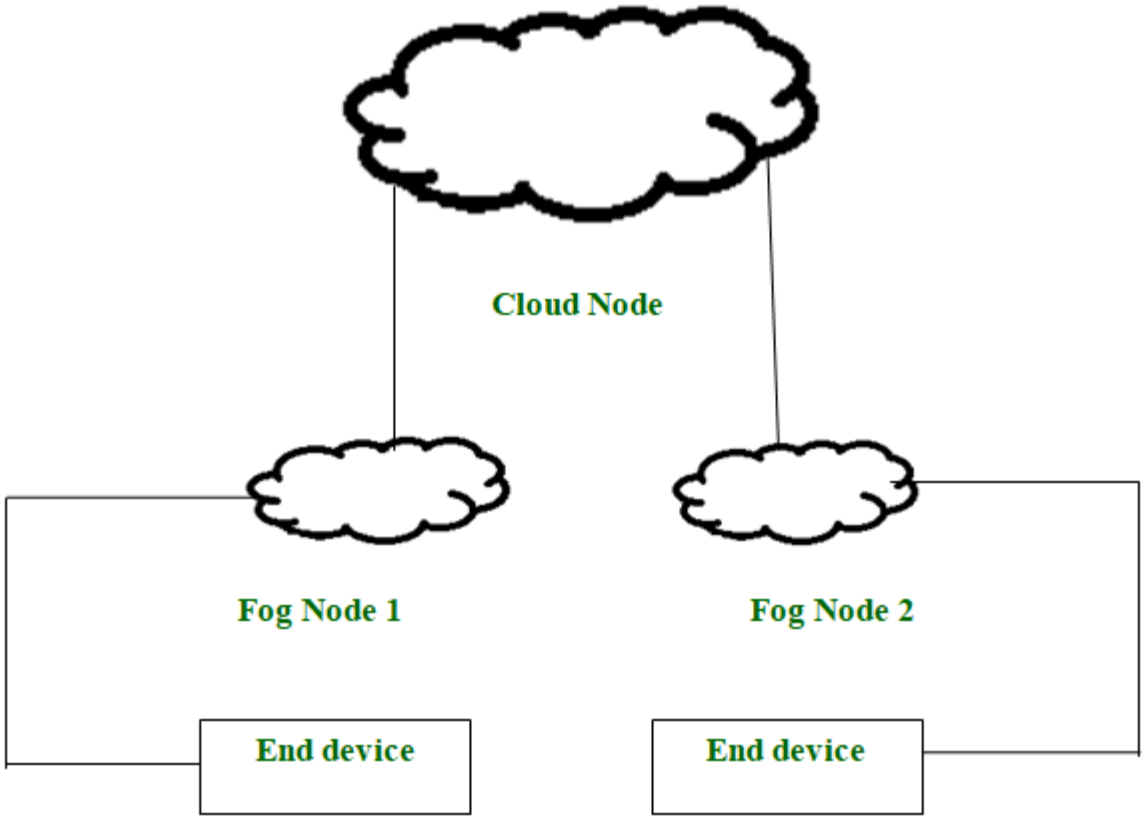
Fog Computing

Fog Computing is the term coined by Cisco that refers to extending cloud computing to an edge of the enterprise's network. Thus, it is also known as Edge Computing or Fogging. It facilitates the operation of computing, storage, and networking services between end devices and computing data centers.



Fog Computing Architecture

1. The devices comprising the fog infrastructure are known as fog nodes.
2. In fog computing, all the storage capabilities, computation capabilities, data along with the applications are placed between the cloud and the physical host.
3. All these functionalities are placed more towards the host. This makes processing faster as it is done almost at the place where data is created.
4. It improves the efficiency of the system and is also used to ensure increased security.

History of fog computing

The term fog computing was coined by Cisco in January 2014. This was because fog is referred to as clouds that are close to the ground in the same way fog computing was related to the nodes which are present near the nodes somewhere in between the host and the cloud. It was intended to bring the computational capabilities of the system close to the host machine. After this gained a little popularity, IBM, in 2015, coined a similar term called “Edge Computing”.

When to use fog computing?

Fog Computing can be used in the following scenarios:

1. It is used when only selected data is required to send to the cloud. This selected data is chosen for long-term storage and is less frequently accessed by the host.
2. It is used when the data should be analyzed within a fraction of seconds i.e Latency should be low.
3. It is used whenever a large number of services need to be provided over a large area at different geographical locations.
4. Devices that are subjected to rigorous computations and processings must use fog computing.
5. Real-world examples where fog computing is used are in IoT devices (eg. Car-to-Car Consortium, Europe), Devices with Sensors, Cameras (IIoT-Industrial Internet of Things), etc.

Advantages of fog computing

- This approach reduces the amount of data that needs to be sent to the cloud.
- Since the distance to be traveled by the data is reduced, it results in saving network bandwidth.
- Reduces the response time of the system.
- It improves the overall security of the system as the data resides close to the host.
- It provides better privacy as industries can perform analysis on their data locally.

Disadvantages of fog computing

- Congestion may occur between the host and the fog node due to increased traffic (heavy data flow).
- Power consumption increases when another layer is placed between the host and the cloud.
- Scheduling tasks between host and fog nodes along with fog nodes and the cloud is difficult.
- Data management becomes tedious as along with the data stored and computed, the transmission of data involves encryption-decryption too which in turn release data.

Applications of fog computing

- It can be used to monitor and analyze the patients' condition. In case of emergency, doctors can be alerted.
- It can be used for real-time rail monitoring as for high-speed trains we want as little latency as possible.
- It can be used for gas and oils pipeline optimization. It generates a huge amount of data and it is inefficient to store all data into the cloud for analysis.