Unit-4

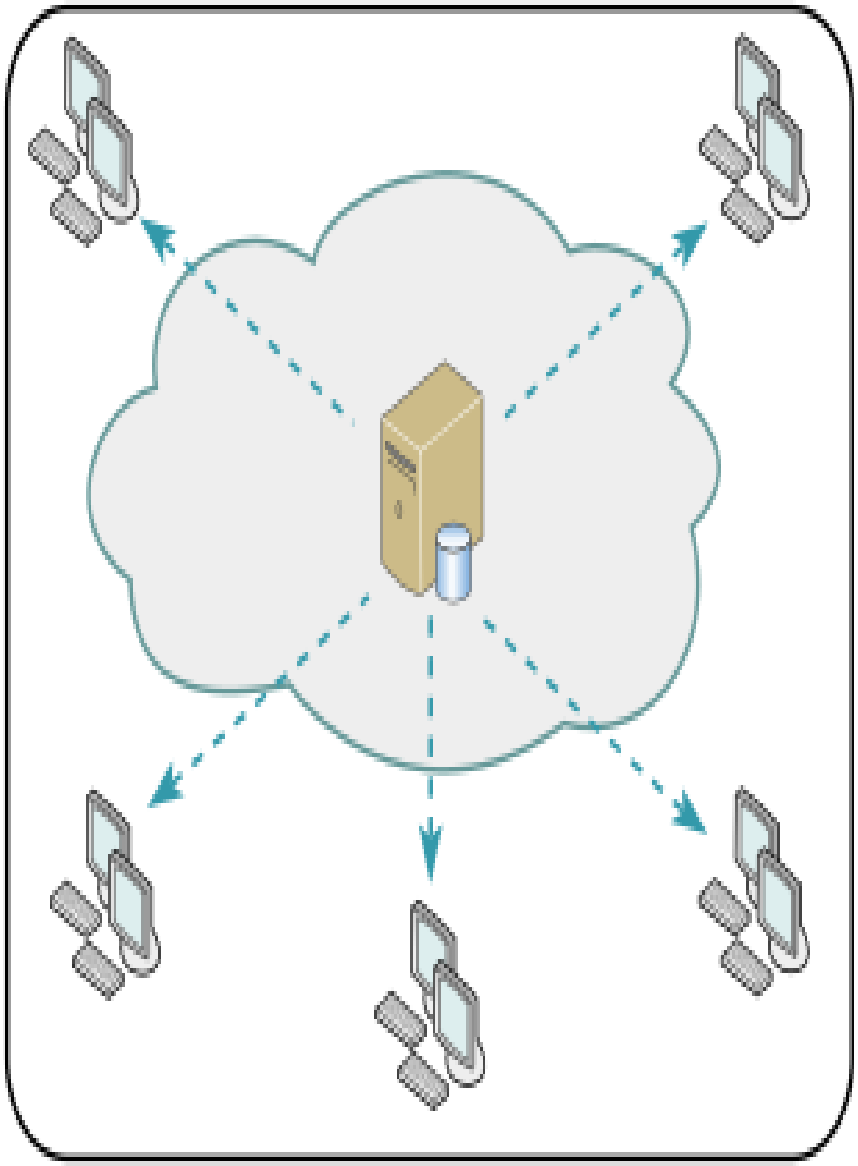
Cloud Computing Technologies and Applications

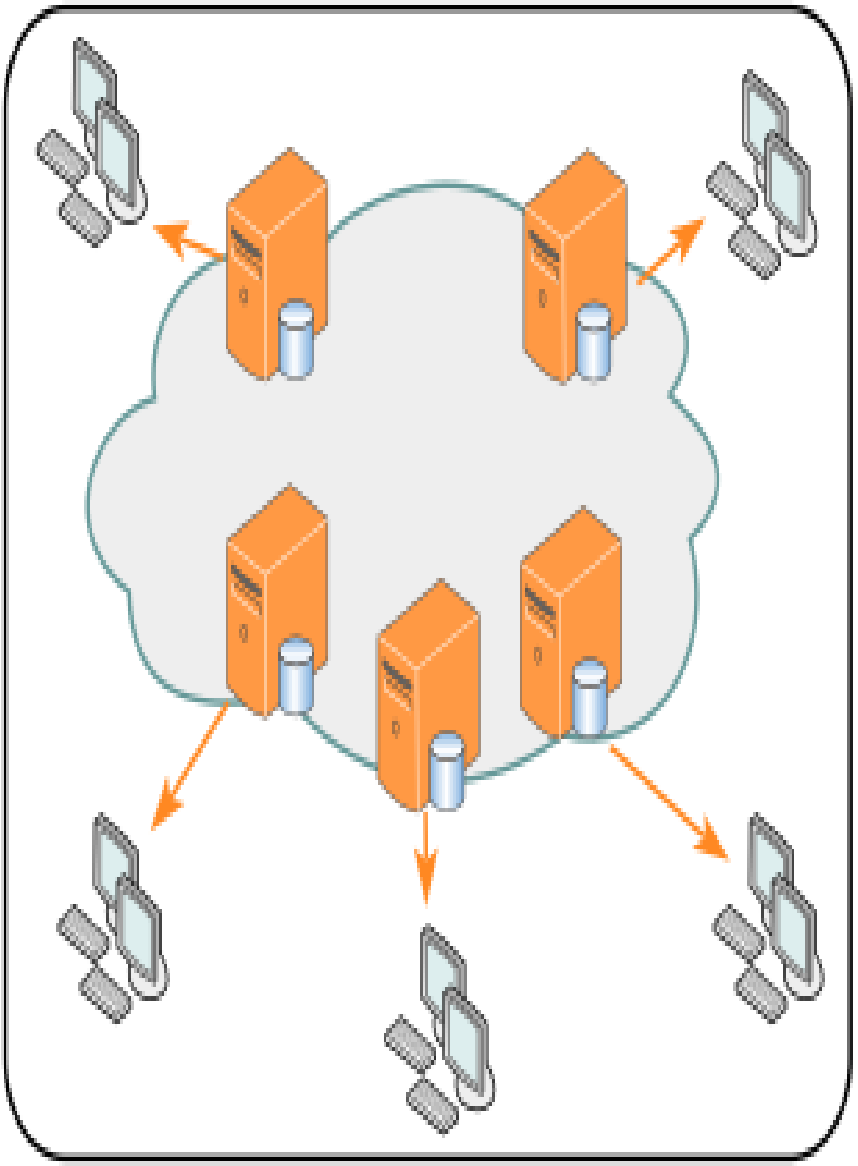
Cloud Content Delivery Network (CDN) Services

Traditionally, content of the websites is served from one main server or central server which is responsible for serving user requests all the time. If target users of any website are restricted to certain geographical regions, then traditional method works well. However, if target users are distributed across different geographical regions, then this method is not relevant.

Cloud Content Delivery Network (CDN) Services

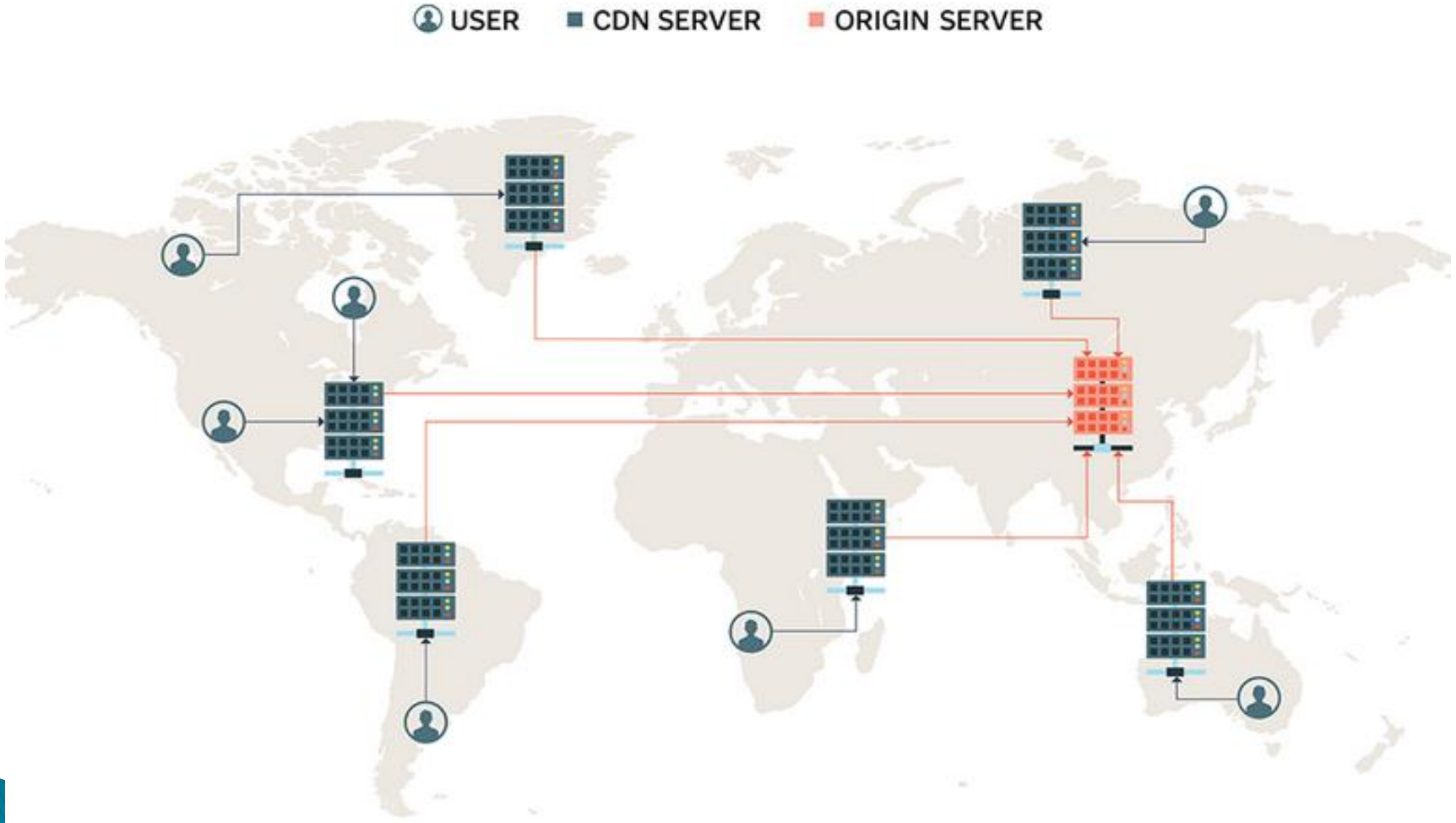
Content delivery network is a software which solves distributed content delivery problems across all geographical regions; for example, AWS CloudFront is one of the popular content delivery service used by AWS business application users.





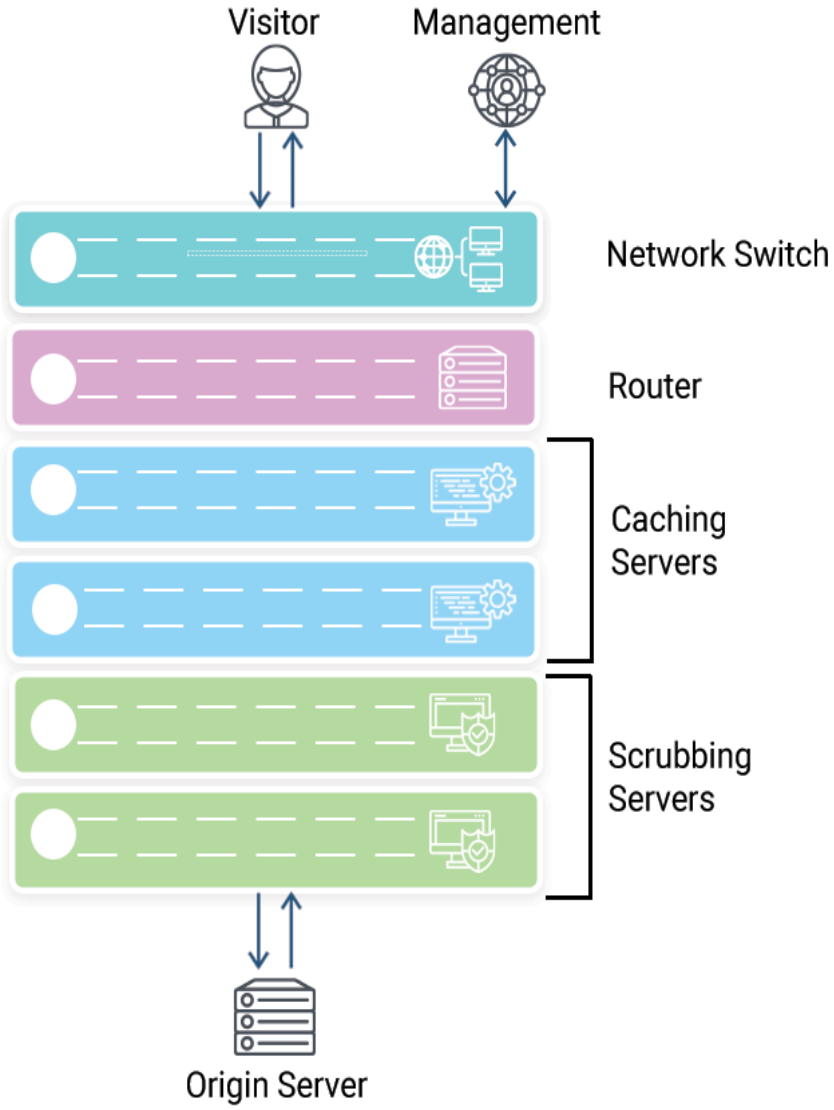
Content delivery network

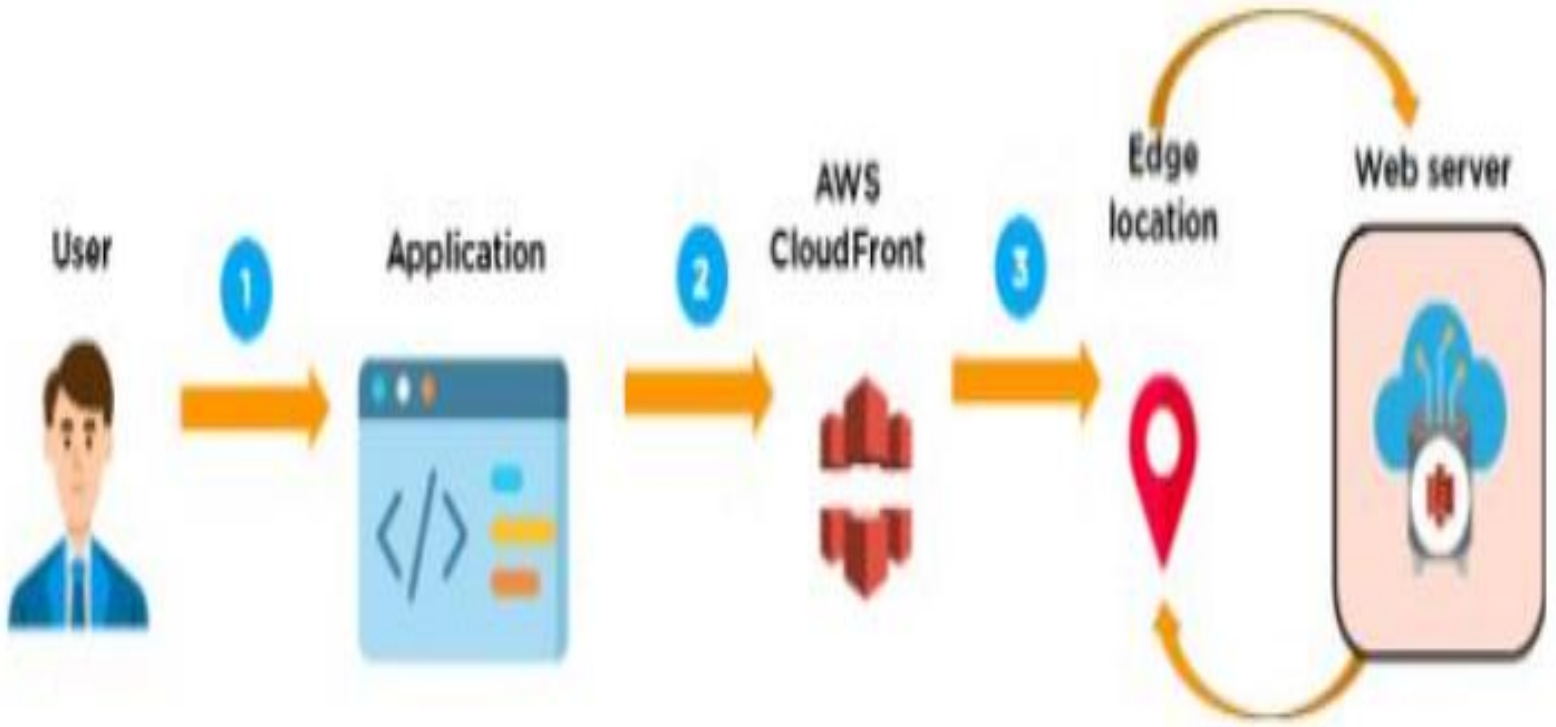
CDNs cache content from the origin server on geographically distributed CDN cache servers to reach users faster.



HOW CONTENT DELIVERY NETWORK FUNCTIONS

TOOLBOX™




User
1
Application
2
AWS
CloudFront
3
Edge
location
Web server

Some other popular CDN services:

- Akamai
- EdgeCast
- Level 3
- Incapsula
- Instart Logic
- Aryaka Network

Multi-CDN

- If your business application needs are purely global and require multiple servers across the globe to give each user a faster website loading experience irrespective of their locations, then the concept of multi-CDN comes into picture.
- There is a company, named MetaCDN (http://www.metacdn.com/), which provides multi-CDN service. It combines existing CDN providers into one huge global network. It dynamically combines and optimizes all major cloud service providers and infrastructure providers to quickly and securely speed up the Web content to users irrespective of their physical location.

Benefits of Cloud Content Delivery Networks

- CDNs can provide a number of benefits to web applications and websites, such as improved performance, increased reliability, and reduced bandwidth costs. CDNs also help to improve website security by providing an extra layer of defense against malicious attacks.

Benefits of Cloud Content Delivery Networks

- CDNs can also help to improve user experience by providing fast, reliable content delivery to users regardless of their location. This can help to reduce latency and improve the overall user experience.

Benefits of Multi CDN

- One of the main benefits of using a multi-CDN approach is improved website performance. By delivering content from the closest server, it reduces latency and improves page load times. This, in turn, leads to better user engagement and higher conversion rates.
- Another benefit is increased reliability. If one CDN fails or experiences downtime, the traffic can be automatically redirected to another CDN, ensuring that the content remains available to users. Multi-CDN also provides better scalability, allowing websites to handle sudden spikes in traffic without affecting performance.

Challenges of Multi CDN

- While multi-CDN offers many benefits, there are also some challenges that need to be addressed. One of the biggest challenges is managing multiple CDNs. This requires a lot of technical expertise and resources, which can be a challenge for small businesses.
- Another challenge is ensuring consistent content delivery across different CDNs. This requires careful configuration and monitoring to ensure that the content is delivered consistently and without any errors.

Choosing the Right Multi CDN Approach

- There are different approaches to implementing multi-CDN, and choosing the right one depends on various factors such as budget, technical expertise, and business needs. One approach is to use a managed multi-CDN service, which provides a single point of contact for all CDNs and takes care of the technical details.
- Another approach is to build a custom multi-CDN solution, which provides more flexibility and control but requires more technical expertise and resources. Ultimately, the choice depends on the specific needs and goals of the business.

Conclusion

- Cloud Content Delivery Networks can provide a number of benefits to web applications and websites, such as improved performance, increased reliability, and reduced bandwidth costs. It is important to choose a CDN service that is reliable, secure, and scalable.
- CDNs can also help to improve website security and user experience by providing fast, reliable content delivery to users regardless of their location. This can help to reduce latency and improve the overall user experience.

Features of MetaCDN

1. **Global presence**: The business application of any user gets massive amount of CDN locations which is not possible with one single CDN provider.
2. **Fastest content delivery**: MetaCDN always selects the best optimal server for individual users. If there are multiple CDN providers in one region, users will always get the content from the fastest one within that region.
3. **Always uptime**: MetaCDN gives guarantee of 100% service uptime; because if one CDN network goes down, MetaCDN immediately routes the traffic through another provider.

Mobile Cloud Computing (MCC)

- Mobile Cloud Computing (MCC) is a concept related to cloud computing and it brings services such as on demand access and no on-premise software.
- Mobile cloud computing uses network capabilities alone to deliver the desired service to customers and charges for their use. It cloud permit the user to reserve network bandwidth, thus confirming timely delivery of information.

Mobile Cloud Computing (MCC)

Mobile Cloud Computing (MCC) is a new paradigm for mobile applications where data processing and storage are moved from the mobile device to cloud. The mobile world is dependent on two factors: a) network stability, b) handset availability

Because mobile phones do not have adequate processing power to support huge amounts of data, cloud computing seems to be the ideal solution for these mobile phone users. Cloud computing allows these mobile phone users to have the same amount of data access as ‘smart’ phone users, and have their data stored into phone.


Mobile Learning
Mobile Email
Multimedia Sharing
Mobile Sensing
Applications
Mobile Commerce
Mobile Healthcare
Mobile Social Networking
Mobile Gaming
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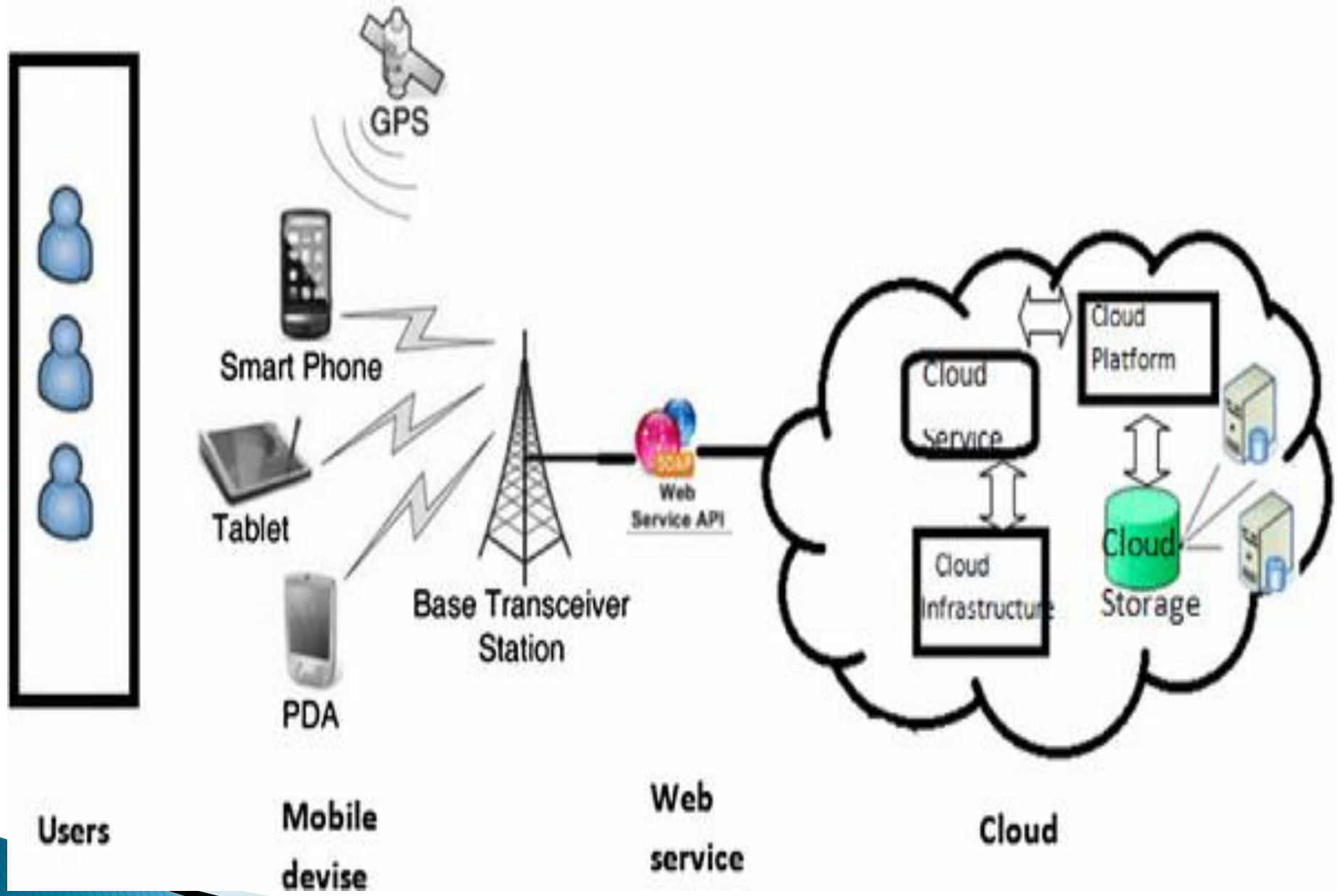
GPS
Smart Phone
Tablet
PDA
Base Transceiver Station
Web Service API
Cloud Platform
Cloud service
Cloud Infrastructure
Cloud Storage
Users
Mobile devise
Web service
Cloud

Why mobile Cloud computing?

1. **Limited processing**: Mobile phones do not have adequate processing power or memory to support huge amounts of data.
2. **Loss of connection**: Due to the mobility of the clients and the wireless network setup, mobile clients can be removed temporarily from the previous connected network and may enter another network; therefore, service requests or responses may fail to be delivered to their destination.
3. **Bandwidth / Latency**: Cell networks have inadequate bandwidth and are often billed on the basis of the amount of data transferred.

InterCloud Issues: A Grid of Clouds

- InterCloud is a global “cloud of clouds” which describes a service pattern and agreement among cloud providers to build interconnected cloud services for providing flexibility and enhanced experience to users. The situation when more cloud providers work and operate together is called a grid of clouds.
- The key benefit of InterCloud is that it solves cloud interoperability issues. The vendor lock-in problem, where a user becomes dependent only on a single cloud service provider, can be solved with the help of interCloud.

Cloud providers face some specific challenges when trying to implement InterCloud. InterCloud can be implemented successfully once the following challenges are solved:

1. **Lack of standards**: Because cloud computing standards are evolving, and research is ongoing on various developing standards, cloud resources such as virtual machine provisioning, object and block storage cannot be standardized for all cloud providers in InterCloud. Some common naming conventions, addressing, messaging and identity management are required to solve this.
2. **API translation**: There should be common interface for all cloud providers that are part of InterCloud. This common interface should be responsible for API or other service request translation between two providers.
3. **Security**: following are some possible security-related threats when InterCloud starts working:
   - Task and services migration from one cloud provider to another provider.
   - The question about who should monitor the common administration among all clouds.
   - Managing public key infrastructure of InterCloud.
   - Agreement on common encryption and decryption protocol for all cloud providers.