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MOBILE CLOUD COMPUTING: PROBLEMS AND SOLUTION WAY

R.G. Alakbarov, O.R. Alakbarov

Institute of Information Technology, Baku, Azerbaijan

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What is Cloud Computing?

Mobile cloud computing (MCC) is the method of using cloud technology to deliver mobile apps. Complex mobile apps today perform tasks such as authentication, location-aware functions, and providing targeted content and communication for end users.



Problems in Mobile Cloud Computing

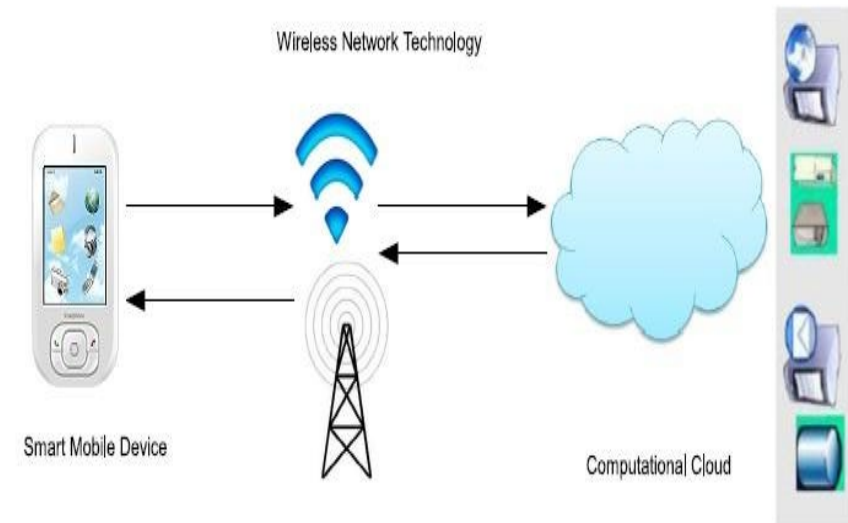
- Limited battery of mobile devices
- Resource shortage of mobile phones
- Network problems



Network Problems in Mobile Cloud Computing

Network problems arising in the use of mobile cloud computing may include:

- Wireless network problems;
- Providing data accessibility;
- Delays in communication channels;
- Lack of fast mobile internet accessibility everywhere;
- Smooth connectivity problems;



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• Wireless network problems

When creating mobile clouds based on wireless networks, certain difficulties and limitations are encountered. Unlike wired networks that use physical connectivity tools and provides fixed coverage, the data transfer environment in mobile computing environment is regularly varying. As the wireless communication channels are used, abundant delays occur, subsequently, network bandwidth decreases. Correspondingly, frequent disruptions (depending on weather, relief, etc.) on wireless networks occur. Given that, cloud servers should be positioned near the base stations near users to tackle these shortcomings.

• Providing data accessibility

Customer data is often stored in different locations or on separate servers in different clouds. In this case, ensuring continuous data accessibility becomes relatively difficult. Moreover, one of the most important requirements for the delivery of cloud services in mobile devices is to provide network accessibility. Mobile users may access the network using a variety of technologies as WiMAX, WLAN, 3G / 4G, GPRS and so forth. Each of these technologies has its own connection schemes, policies, suggestions and restrictions. Since there are different access schemes, the availability of an interrupted connection schemes in the network (to avoid the problems such as disconnection and recovery) is important when moving from one access point to another.

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• Delays in communication channels

Services delivered over the Internet require a robust infrastructure with high bandwidth. Regardless of the architecture used in the creation of mobile cloud computing, the infrastructure developed must be reliable. Produced network must have high bandwidth to be capable of eliminating delays.

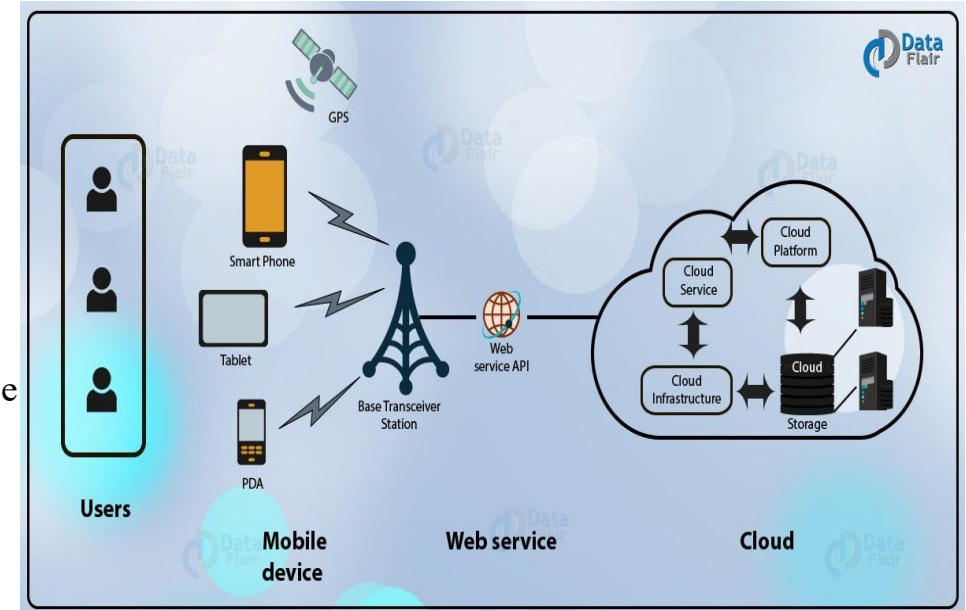
1. Data processing time in data processing center;
2. Data processing time on mobile device;
3. Network delays;
4. Transmission time in communication channel

• Smooth connectivity problems

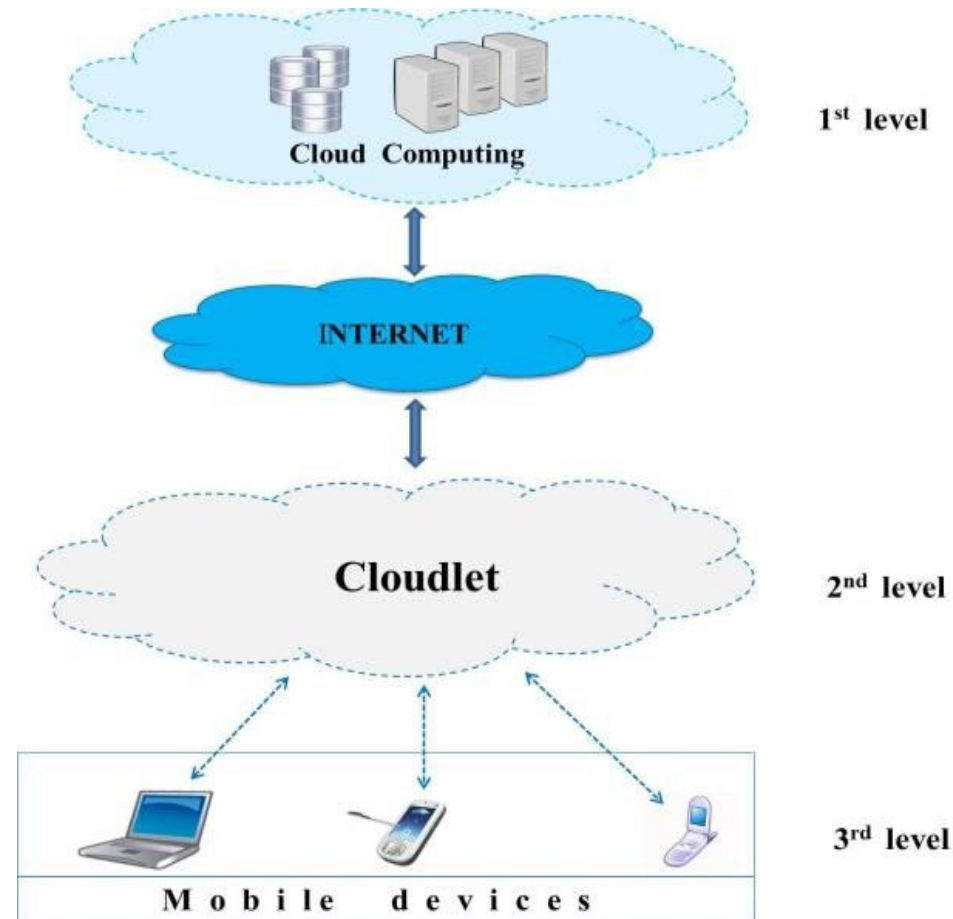
Mobile operators are trying to set up Wi-Fi in the streets to provide data communication using a mobile network. Thus, the problem of mobile traffic overload is eliminated to some extent. In this case, uninterrupted connection between the access networks must be ensured. However, when moving from one network access point to another or from Wi-Fi network to 3G mobile network, the communication may be interrupted or malfunctions or errors may occur. The problem of communication failure can be described as a "broken pipe" problem. Solution of this problem is the use of a zero-window rejection (channel re-clearing and recovery) notification channel. The problem of communication recovery is defined through a connection error and may be resolved by installing TCP port during recovery

Solving Problems in Mobile Cloud Computing

- Using mobile cloud computing systems with hierarchical architecture;
- Creating a cloudlet-based network infrastructure;
- Predicting the deployment of cloudlets at required locations on the network;
- Deploying applications to neighboring cloudlets to minimize delays;
- Using a minimal communication channel between a user and cloudlet;
- Deploying applications with high usage frequency in cloudlet network in advance
- Clustering applications based on the intensity of their use in cloudlets
- and so forth.



Architecture of cloudlet-based mobile computing clouds with a hierarchical structure



Conclusion

The article analyzed the problems arising in the use of cloud-based mobile cloud computing and their solutions. Moreover, shortcomings in various parts of mobile cloud computing were highlighted. A strategy for solving these problems was shown. Cloudlet-based cloud computing with hierarchical structure was proposed for efficient solution of the problems.

