Cloud Computing For Mobile Users: Can

Offloading Computation Save Energy?

**ABSTRACT**

The cloud heralds a new era of computing where application services are provided through the Internet. Cloud computing can enhance the computing capability of mobile systems, but is it the ultimate solution for extending such systems' battery lifetimes? Cloud computing1 is a new paradigm in which computing resources such as processing, memory, and storage are not physically pres­ent at the user’s location. Instead, a service provider owns and manages these resources, and users access them via the Internet. For example, Amazon Web Services lets users store personal data via its Simple Storage Service (S3) and perform computations on stored data using the Elastic Compute Cloud (EC2). This type of computing provides many advantages for businesses—including low initial capital investment, shorter start-up time for new services, lower maintenance and operation costs, higher utilization through virtual­ization, and easier disaster recovery—that make cloud computing an attractive option. Reports suggest that there are several benefits in shifting computing from the desktop to the cloud.1,2 What about cloud computing for mobile users? The primary constraints for mobile computing are limited energy and wireless bandwidth. Cloud computing can provide energy savings as a service to mobile users, though it also poses some unique challenges.

**EXISTING SYSTEM:**

Energy efficiency is a fundamental consideration for mobile devices. Cloud computing has the potential to save mobile client energy but the savings from offloading the computation need to exceed the energy cost of the additional communication. Existing studies thus focus on determining whether to offload computation by predicting the relationships among these three factors. The computa­tion offloading depends on the wireless bandwidth *B*, the amount of computation to be performed *C*, and the amount of data to be transmitted *D*.

**PROPOSED SYSTEM:**

A service provider owns and manages resources (such as processing, memory, storage), and users access them via the Internet.

For example, Amazon Web Services

Simple Storage Service (S3): let users store personal data

Elastic Compute Cloud (EC2): perform computations on stored data

* There are several benefits in shifting computing from the desktop to the cloud.
* The primary constraints for **mobile computing** are limited energy and wireless bandwidth.

**Advantages**

* Low initial capital investment
* Shorter start-up time for new services
* Lower maintenance and operation costs
* Higher utilization through virtualization
* Easier disaster recovery
* 4

**MODULE DESCRIPTION:**

# **Number of Modules**

After careful analysis the system has been identified to have the following modules:

1. **Saving Energy For Mobile Systems Module.**
2. **Offloading Computation To Save Energy Module.**
3. **Making Computation Offloading More Attractive Module.**
4. **Challenges And Possible Solution Module.**

**1. Saving energy For Mobile System Module:**

**Mobile systems**

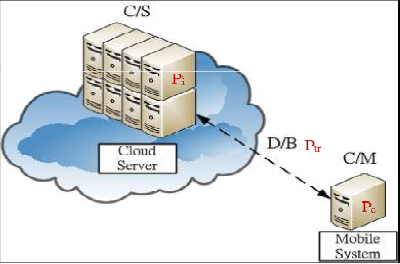
* Various studies have identified longer **battery lifetime** as the most desired feature of such systems.
* Many applications are too computation intensive to perform on a mobile system. If a mobile user wants to use such applications, the computation must be performed in the cloud.
* Other applications can run on a mobile system. However, they consume significant amounts of energy, such as Image retrieval, voice recognition, gaming, and navigation.
* Eliminate computation all together.

The mobile system does not perform the computation.

Instead, computation is performed somewhere else.

**2. Offloading Computation To Save Energy Module:**

* **Client-server computing:** service providers managing programs running on servers
* **Cloud computing:** Allows cloud vendors to run arbitrary applications from different customers on virtual machines.
* Cloud vendors thus provide computing cycles, and users can use these cycles to reduce the amounts of computation on mobile systems and save energy.
* Cloud computing can save energy for mobile users through **computation offloading**
* **Virtualization:** Lets applications from different customers run on different virtual machines, thereby providing separation and protection.
* **Energy analysis for computation offloading:**



**3. Making Computation Offloading More Attractive Module:**

* Energy saved by computation offloading through wireless bandwidth, amount of computation to be performed, amount of data to be transmitted.
* **Client-Server Model:** Because the server does not already contain the data, all the data must be sent to the service provider.
* **Cloud Computing:** The cloud stores data and performs computation on it. Google’s Picasa, Amazon S3, Amazon EC2.

**4. Challenges And Possible Solution Module:**

* Privacy and Security
  + Because the data is stored and managed in the cloud, security and privacy settings depend on the IT (information technology) management of the cloud provides.
  + Some types of data cannot be stored in the cloud without considering these privacy and security implications.
  + One possible solution is to encrypt data before storage
* Reliability
  + A mobile user performing computation in the cloud depends on the wireless network and cloud service.
* Real Time data

**SOFTWARE REQUIREMENTS**:

Operating System : Windows

Technology : Java and J2EE

Web Technologies : Html, JavaScript, CSS

IDE : My Eclipse

Web Server : Tomcat

Tool kit : Android Phone

Database : My SQL

Java Version : J2SDK1.5

**HARDWARE REQUIREMENTS**:

Hardware : Pentium

Speed : 1.1 GHz

RAM : 1GB

Hard Disk : 20 GB

Floppy Drive : 1.44 MB

Key Board : Standard Windows Keyboard

Mouse : Two or Three Button Mouse

Monitor : SVGA