The Energy Consumptions for the Betterment of Computing and Social Environments of Cloud Computing

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Abstract - Cloud computing is one of the hottest topics in present world. The Cloud computing is Internet- ("cloud-") based development and use of computer technology ("computing"). Cloud computing describes a new supplement, consumption and delivery model for IT services based on the Internet, and it typically involves the provision of dynamically scalable and often virtualized resources as a service over the Internet. Now the cloud computing is looked on to become mobile so that the power consumption, mobility and ease can increase even more. We in this paper make use of terabyte memory cell phone a new type of memory technology that store a terabyte of information more than hard drives hold today and energy is consumed by more than 99 percent can be reduced greatly.
Keywords: Cloud Computing, Consumption, Virtualized resources, mobility, terabyte.

I. INTRODUCTION

1.1 Cloud Computing

The term cloud is used as a metaphor for the Internet, based on the cloud drawing used to depict the Internet in computer network diagrams as an abstraction of the underlying infrastructure it represents. Typical cloud computing providers deliver common business applications online which are accessed from a web browser, while the software and data are stored on servers. These applications are broadly divided into the following categories that emphasize the notion of "Everything-as-a-Service": Software as a Service (SaaS), Utility Computing, Web Services, Platform as a Service (PaaS), Managed Service Providers (MSP), Service Commerce, and Internet Integration. Cloud computing is one of the hottest topics in mobile — even if many in the space are confused about just what defines the cloud. And as the use of mobile cloud services ramps up, Network operators and others in the wireless space will have to eschew traditional product- and technology-driven business models in favor of more global, service-driven paradigms.

Sophisticated devices such as the iPhone have boosted uptake of mobile data services in a major way in more mature markets, spurring an evolution in the economic engine for mobile telecoms beyond coverage and penetration toward usage. Indeed, 56 percent of U.S. users have accessed the Internet wirelessly, with 32 percent of the population having done so with a handheld device such as a phone, PDA, iPod, Kindle or other connected consumer gadget, Pew Internet and American Life recently reported. That evolution is sure to continue as emerging markets reach maturity and data usage moves beyond novelty apps (which typically are used just a few times) into enterprise-minded offerings and practical tools that enhance the lives of mobile users.

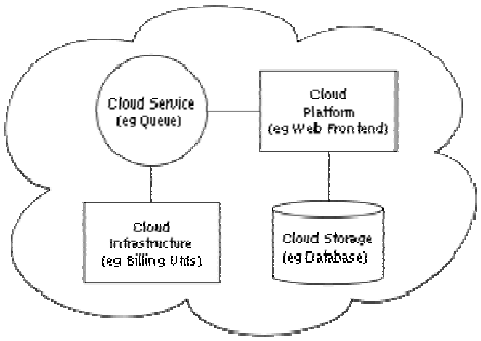


Fig 1.1 Cloud computing architecture

1.2 Layers of Cloud Computing

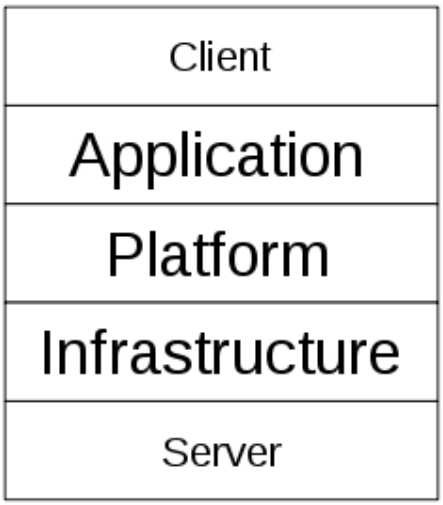


Fig 1.2 Layers in cloud computing

Client

A *cloud client* consists of computer hardware and/or computer software that relies on cloud computing for application delivery, or that is specifically designed for delivery of cloud services and that, in either case, is essentially useless without it. Examples include some computers, phones and other devices, operating systems and browsers.

Application:

Cloud application services or "*Software as a Service (SaaS)*" deliver software as a service over the Internet, eliminating the need to install and run the application on the customer's own computers and simplifying maintenance and support. People tend to use the terms 'SaaS' and 'cloud' interchangeably, when in fact they are two different things. Key characteristics include:

- Network-based access to, and management of, commercially available (i.e., not custom) software
- Activities that are managed from central locations rather than at each customer's site, enabling customers to access applications remotely via the Web
- Application delivery that typically is closer to a one-to-many model (single instance, multi-tenant architecture) than to a one-to-one model, including architecture, pricing, partnering, and management characteristics
- Centralized feature updating, which obviates the need for downloadable patches and upgrades.

Platform:

Cloud platform services or "*Platform as a Service (PaaS)*" deliver a computing platform and/or solution stack as a service, often consuming *cloud infrastructure* and sustaining *cloud applications*. It facilitates deployment of applications without the cost and complexity of buying and managing the underlying hardware and software layers.

Infrastructure:
Cloud infrastructure services, also known as "*Infrastructure as a Service (IaaS)*", delivers computer infrastructure - typically a platform virtualization environment - as a service. Rather than purchasing servers, software, data-center space or network equipment, clients instead buy those resources as a fully outsourced service. Suppliers typically bill such services on a utility computing basis and amount of resources consumed (and therefore the cost) will typically reflect the level of activity. IaaS evolved from virtual private server offerings.

Server:
The *servers'* layer consists of computer hardware and/or computer software products that are specifically designed for the delivery of cloud services, including multi-core processors, cloud-specific operating systems and combined offerings.

II. Current Idea

Recently the talks are going on the development of the mobile cloud computing. These have been under several problems and critics. The current development in the internet accessing of the mobiles have increased the users accessing the internet through the mobiles, but still the use of internet through mobiles are not fully fledged since the higher cost of internet access and the lesser speed in accessing. Mobile application developers today face the challenge of multiple mobile operating systems either they must write for just one OS, or create many versions of the same application.

2.1 Terabyte Memory Cell phones

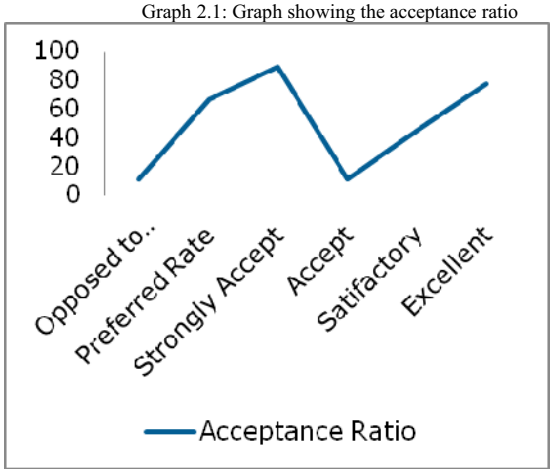
It is a radically new technology, programmable metallization cell technology It's one of a new generation of experimental technologies that are bidding to replace hard drives, the nonvolatile "flash" memory used in portable electronics, which considerably reduces the energy consumption by more than 99% is greatly reduced.
We proposed this concept to replace the usage of hardisks in cloud computing environments by making usage of terabyte cell phones that provide security and privacy too.

Collected Facts
We took a survey regarding the usage of cell phones in today's culture at Jayaram College of Engineering and Technology (JCET) and based on the facts we concluded the concept.
The survey details were plotted by using MS-Excel as:

Table 2.1: Survey regarding the mobile phone usage

Categories	Acceptance Ratio
Opposed	11.1
Preferred Rate	66.7
Strongly Accept	88.8
Accept	11.1
Satisfactory	44.4
Excellent	77.7

Graph 2.1: Graph showing the acceptance ratio



III. THE CONCEPT MOBILE CLOUD COMPUTING:

As mentioned earlier, it is a radically new technology type of memory technology could lead to thumb drives or digital-camera memory cards that store a terabyte of information--more than most hard drives hold today.

The new type of memory, called programmable-metallization-cell (PMC) memory, or nano-ionic memory. It's one of a new generation of experimental technologies that are bidding to replace hard drives, the nonvolatile "flash" memory used in portable electronics. But recently, researchers have demonstrated that materials structured at the nanoscale could yield ionic-memory devices that are much faster. The memory could also prove easy to make,that could make it easier to integrate with existing technologies .These attractions are largely the result of a new mechanism for storing information. Flash memory stores bits of information as electrical charge, but the smaller the memory cells that hold the bits, the less charge they can hold, and the less reliable they become. The new memory stores information by rearranging atoms to form stable, and potentially extremely small, memory cells. Each memory cell consists of a solid electrolyte sandwiched between two metal electrodes. The electrolyte is a glasslike material that contains metal ions. Ordinarily, the electrolyte resists the flow of electrons. But when a voltage is applied to the electrodes, electrons bind to the metal ions, forming metal atoms that cluster together. These atoms form a virus-sized filament that bridges the electrodes, providing a path along which electrical current can flow. Reversing the voltage causes the wire to "dissolve". The highly resistive state of the electrolyte and the other, low-resistance, state can be used to represent zeroes and ones. Because the metal filament stays in place until it's erased, nano-ionic memory is nonvolatile, meaning that it doesn't require energy to hold on to information, just to read it or write it. These include MRAM, which stores information using magnetic fields, and phase-change memory, which stores information in a way similar to that used to store bits on DVDs. But MRAM may also prove better for high-speed memory applications than as a replacement for flash, so it may not compete directly with nano-ionic memory.

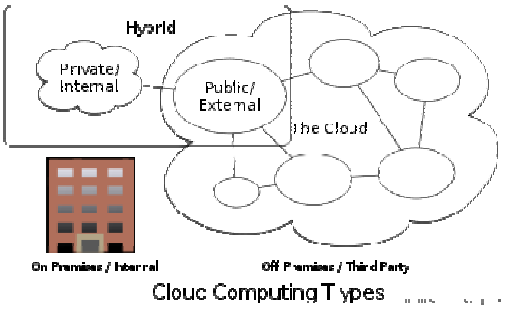


Fig 3: Architecture of mobile cloud computing.

IV. OVERCOMING THE PROBLEM IN OUR IDEA

4.1. Overcoming the Network security and hacking problems:

Now comes the problem of hacking and interfering in the data transmission and other attacks, so lets us see what can be done to prevent this and avoid this. End-to-end security can be given using the Secure Sockets Layer (SSL) system. Security Standards for Web Services (WS) can be given using the following systems and

methods XML Encryption [W3C], XML Signature [W3C], WSSE (WS-Security Standard), and SAML (Security Assertion Markup Language). Message-level security can be given using the following methods Bouncy Castle Lightweight cryptographic API, Upgraded KSoap2, MIDP2.0 (Mobile Information Device Profile). The strategies that can be implemented for this are Symmetric key encryption of message, Asymmetric key exchange of key and signing the message.MAC can even be used for the encryption of the message.
They can be highly secure and better performance by using these techniques AES-256 Symmetric key encryption, RSA 1024 bit key exchange and RSAwithSHA1 signature. In Application level security - Ensuring end-point security can be achieved by the use of the single sign-on (SSO) system, Liberty Alliance ID-FF protocols, Identity provider & Third party identity validator and SourceID Liberty 2.0 Beta. Semantics-Based Access Control can be achieved by the usage of the SBAC encompasses administration and enforcement of access control policies for semantic web services, OWL (Web Ontology Language) ontology's for resources, operations, privilege, prohibitions etc and Prototyped using Jena.

4.2. Overcoming the speed problem

One of the other main problems is the slower speed of internet access, this has lead to the lowering of the internet user through mobiles since they consume a lot of time for even an ordinary data transfer itself. The current development in the 3G technology in India and the evolution of the 4G technology worldwide can increase the speed of net access. The user can browse the internet at a very higher speed than the current technology.
The 3G technology can give a speed of about data rate of 2 Mbit/s for stationary or walking users, and 348 Kbit/s in a moving vehicle. Now comes the problem of the compatibility of the applications in the mobiles. Can the mobiles support some of the softwares that are essential for the mobile cloud computing? Yes, this is a good question, but with growing technology this problem can we resolved easily. The current mobile OS like the Windows 3.5 and some of the basic Unix OS can be a handful when using and accessing the internet.
3G provides accelerated data speeds and simultaneous voice and data capabilities for an amazing wireless voice and data experience.

- Access CV for faster on-demand viewing of high quality video clips from your favorite TV shows, news, sport and weather
- Surf the wireless Internet faster and significantly lower your wait for page loads
- Download files and access email faster from favorite providers like Yahoo!, MSN, and AOL.
- Multi-task while you are on a call—search for movies times, look up directions, or send messages.
- Get more done with faster access to email and internet. AT&T Laptop Connect gives you the power of the AT&T network while you're on the go.

4.3. Overcoming the security problems

Since we are making usage of terabyte powered cell phones in mobile cloud computing we are replacing the personnel computers in the computing environment so that it can greatly reduces the intruders from outside and peepers which can throttle security but making use of the handheld device in the today's culture can effectively provide great level of privacy as depicted from the survey.

4.4. Features regarding the idea

- **Agility** improves with users' ability to rapidly and inexpensively re-provision technological infrastructure resources.
- **API** accessibility to software that enables machines to interact with cloud software in the same way the user interface facilitates interaction between humans and computers. Cloud Computing systems typically use REST based APIs.
- **Cost** is claimed to be greatly reduced and capital expenditure is converted to operational expenditure. This ostensibly lowers barriers to entry, as infrastructure is typically provided by a third-party and does not need to be purchased for one-time or infrequent intensive computing tasks. Pricing on a utility computing basis is fine-grained with usage-based options and fewer IT skills are required for implementation (in-house).

- **Device and location independence** enable users to access systems using a web browser regardless of their location or what device they are using (e.g., PC, mobile). As infrastructure is off-site (typically provided by a third-party) and accessed via the Internet, users can connect from anywhere.

- **Multi-tenancy** enables sharing of resources and costs across a large pool of users thus allowing for:

    - **Centralization** of infrastructure in locations with lower costs (such as real estate, electricity, etc.)

    - **Peak-load capacity** increases (users need not engineer for highest possible load-levels)

    - **Utilization and efficiency** improvements for systems that are often only 10–20% utilized.

- **Reliability** is improved if multiple redundant sites are used, which makes well designed cloud computing suitable for business continuity and disaster recovery. Nonetheless, many major cloud computing services have suffered outages, and IT and business managers can at times do little when they are affected.

- **Scalability** via dynamic ("on-demand") provisioning of resources on a fine-grained, self-service basis near real-time, without users having to engineer for peak loads. Performance is monitored and consistent and loosely coupled architectures are constructed using web services as the system interface. One of the most important new methods for overcoming performance bottlenecks for a large class of applications is data parallel programming on a distributed data grid.

- **Security** could improve due to centralization of data, increased security-focused resources, etc., but concerns can persist about loss of control over certain sensitive data, and the lack of security for stored kernels. Security is often as good as or better than under traditional systems, in part because providers are able to devote resources to solving security issues that many customers cannot afford. Providers typically log accesses, but accessing the audit logs themselves can be difficult or impossible. Furthermore, the complexity of security is greatly increased when data is distributed over a wider area and / or number of devices.

- **Maintenance** of cloud computing applications is easier, since they don't have to be installed on each user's computer. They are easier to support and to improve since the changes reach the clients instantly.

- **Metering** means that cloud computing resources usage should be measurable and should be metered per client and application on a daily, weekly, monthly, and yearly basis.

V. ADVANTAGES

- ✓ Privacy
- ✓ Compliance
- ✓ Legal
- ✓ Open Source
- ✓ Open Standards
- ✓ Security

VI. RESULTS AND CONCLUSIONS

We have implemented these concepts at our college in Jayaram College of Engineering and Technology (JCET) and further implementation has been on working for better results. The level of improvement has been plotted in stages and as:

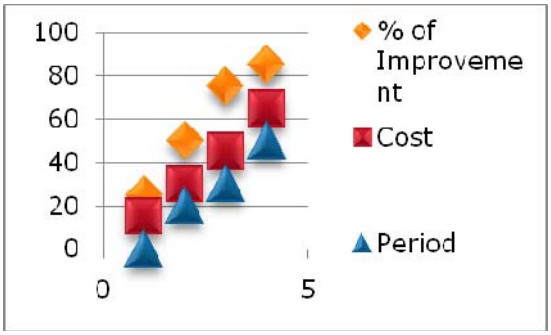


Fig 5.1. Stages of Improvement

VII. CONCLUSIONS

We here have proposed a concept of mobile based cloud computing that makes effective usage of a new technology called terabyte storage cell phones that replaces the usage of hard disks and the energy consumptions for the betterment of computing and social environments.

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