IJCSN International Journal of Computer Science and Network, Volume 6, Issue 3, June 2017
ISSN (Online): 2277-5420
www.IJCSN.org
Impact Factor: 1.5

Semantic Cloud for Mobile: Architecture and Possibilities

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Abstract - The paper emphasizes on the way the two most promising web technologies, semantic web and cloud computing, can blend to form SCM (Semantic Cloud for Mobile), for revolutionizing data access and processing capabilities over mobile platform. In this paper we also suggest the architecture of SCM and exclusive possibilities it may offer.

Keywords - *Semantic Web; Cloud Computing; Semantic Cloud For Mobile; SCM; Mobile Cloud; RDF; Semantic Cloud; CIC; Copy Information To Cloud*

1. Introduction

Semantic web is a vision for the future of the web in which information is given explicit meaning, making it easier for machines to automatically process and integrate information on the web.

It is a mesh of information linked up in a way as to be easily processable by machines on a global scale. Semantic web makes use of URI's to locate content on internet, that can be held in databases or interchanged with www using RDF (Resource Description Framework) syntaxes , i.e. in terms of subject, predicate, and object. Semantic web also makes use of ontologies(by OWL) which enhance the web search, thus making the search program look for compact and more relevant content on web [1] by using fixed or dynamic set of relations between instances searched for and instances stored, in ontology table.[2]

Cloud computing refers to the Internet-based computing, whereby shared resources, software, and information are provided to computers and other devices on demand.[3] It is nothing but the computation done through Internet, i.e. decoupling of data from system hardware and making it accessible on Internet.

Mobile technology has always given the power to access information anywhere and at any point of time. As the mobile phones guarantee portability, transportability, and considerable amount of speed, its use as an information retrieval platform can promise the scope for a huge market. [4]

It occurred to us, the by incorporating the former two technologies, i.e. the SEMANTIC CLOUD on MOBILE platform can offer wide range of possibilities, and resolve prevalent discrepancies in existing areas, by catering the requirement for an efficient logical access to cloud data on mobile. The next section explains the reason for the fusion of these three technologies.

2. Forming a Trinity

1. Recent statistics estimate that the total number of mobile internet users is expected to rise drastically in the coming years [5]. Seeing the pace at which the mobile technology is advancing, the digital world is putting all its focus on development of and for mobile platform.
2. As the next generation mobile technology emerges, there is an urgent requirement for IT support systems to provide mass storage space and fast computing capacity.
3. With amount of data expected to grow further and complexity witnessing a consistent rise, it is better to reduce the dependency on mobile hardware. The decoupling of data storage, processing and management from mobile hardware will enhance performance, scalability and agility. Hosting on cloud also relieves user off the risk of losing important data due to system crash, hardware malfunctioning, virus attack, etc.
4. But, cloud computing faces a number of issues including privacy, data security, and identification of access rights, low information quality, ambiguity and design problems, due to disparity in cloud database

structures [6]. So, it is necessary to have a structure like semantic web for control of cloud usage.
5. The unified RDF can replace the disparate cloud database models. A wide range of security mechanisms that the semantic web provides help resolve the issue of security that has been one of the major roadblocks in the success of cloud computing [7].

Forming a trio of the above three technologies, can hence indoctrinate cloud data access on mobile platform.

We suggest the possible architecture of SCM in Figure 1. When user first enters query on his mobile interface, the query analyzer finds semantics in the searched keywords by performing text mapping using traditional text processing and natural language processing techniques.

At the backend, the crawler gathers data from the Web by traversing the link graph and transforms metadata from HTML documents (e.g. RDF, GRDDL, or Microformats) and metadata embedded in various file formats (e.g. PDF, PNG, MS Office) into RDF.

Multithreading focused crawlers are used to provide crawling services where system uses multi agents to provide parallel annotation of web documents making use of information extraction techniques. Ontology is used to expand user query at search time to provide more enhanced search results. A ranking score is finally assigned to documents, and is calculated, based on a combination of link-based analysis, content-based analysis and a personalization factor (for more personalized results). The ranked results are displayed to the user on his mobile interface.

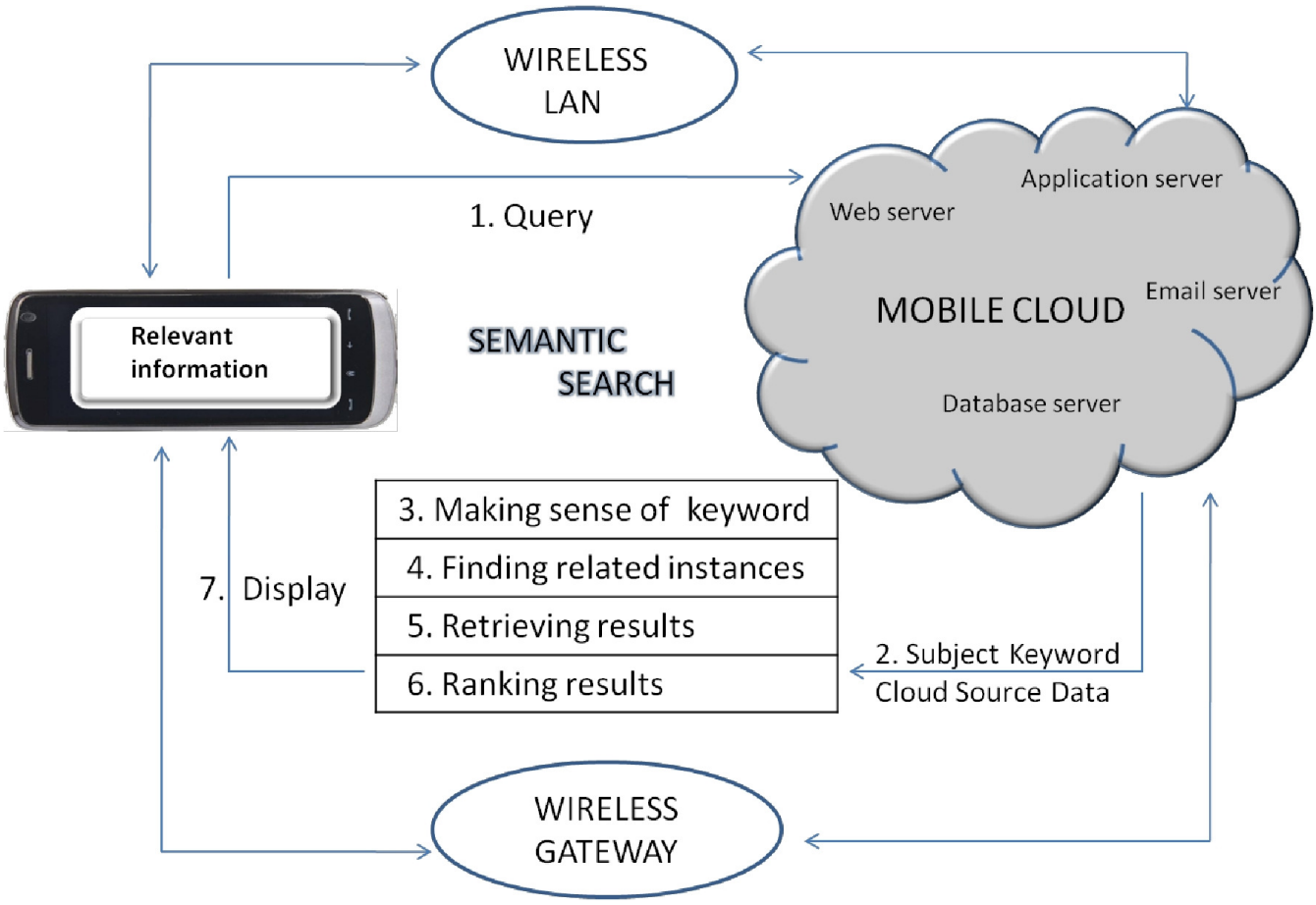

Fig 1 SCM Architecture

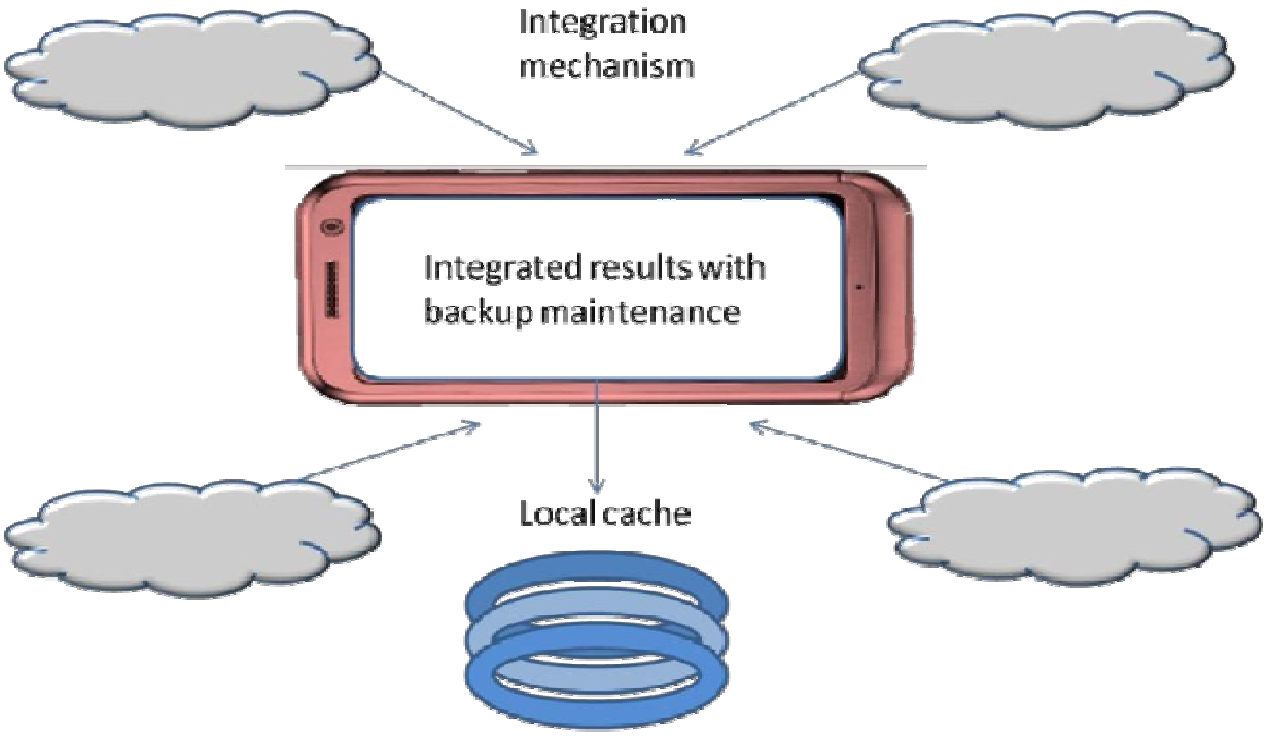

Fig 2 Mobile as a backup

3. Possibilities

3.1 Mobile as a backup

This emphasizes on semantically collecting information on cloud, and maintaining its replica as a backup on the mobile database using local cache. It will enable the users to access web information even in case when Internet connection fails or is unavailable. The suggested architecture for this is shown in Figure 2. A possible application is a *Tourism Search Engine for mobile,* which is explained below.

We visited a famous search engine to look for a complex query like “pilgrimages, festivals, accommodation and restaurants in Delhi”. What we received were some

72000 results with the first one pointing to a website with a list of pilgrimages in India, not just Delhi. All others too contained the links to the respective websites, one for accommodation, other for festivals, and so on.

The current search thus lacks the integration mechanism, which can accumulate and present the entire relevant information at one place.

We then switched over to a specific search engine for India tourism, which contained some restricted set of options to be chosen by the user, like either festivals or accommodation. Besides being deprived of the integration mechanism, this one also lacked the ”search” field, thus disallowing user to search on his own terms. Moreover, lacking of a backup facility like local cache technology as discussed above, the current search processes diverted our interest towards a search engine, based on semantic cloud, which if accessible to tourists worldwide, through their mobile phones, can provide them, with the ability to experience relevant, focussed and fast access to an integrated tourism information across the world, including accommodation, festivals, restaurants, religions, culture, dance forms, native food, forts and monuments, news and media, transportation , public utilities, wildlife etc. with drilled down details as per their choice of search. The local cache will cater the need for a possible backup of the above information to be utilized in case of lost internet connection. A possible interface is shown in Figure 3.

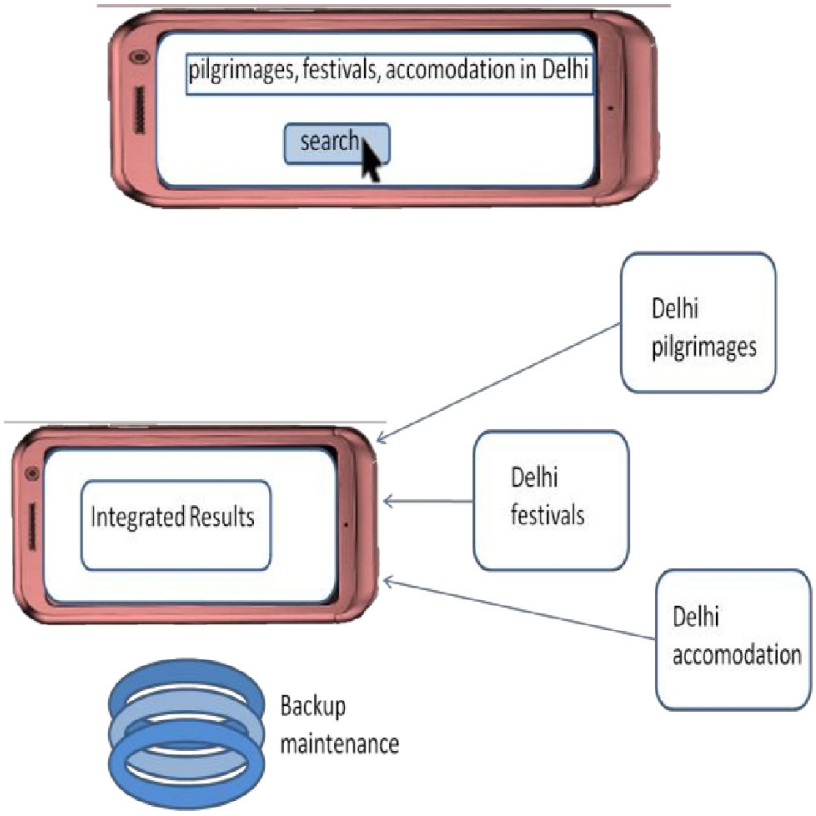

Fig 3 Tourism Search Engine

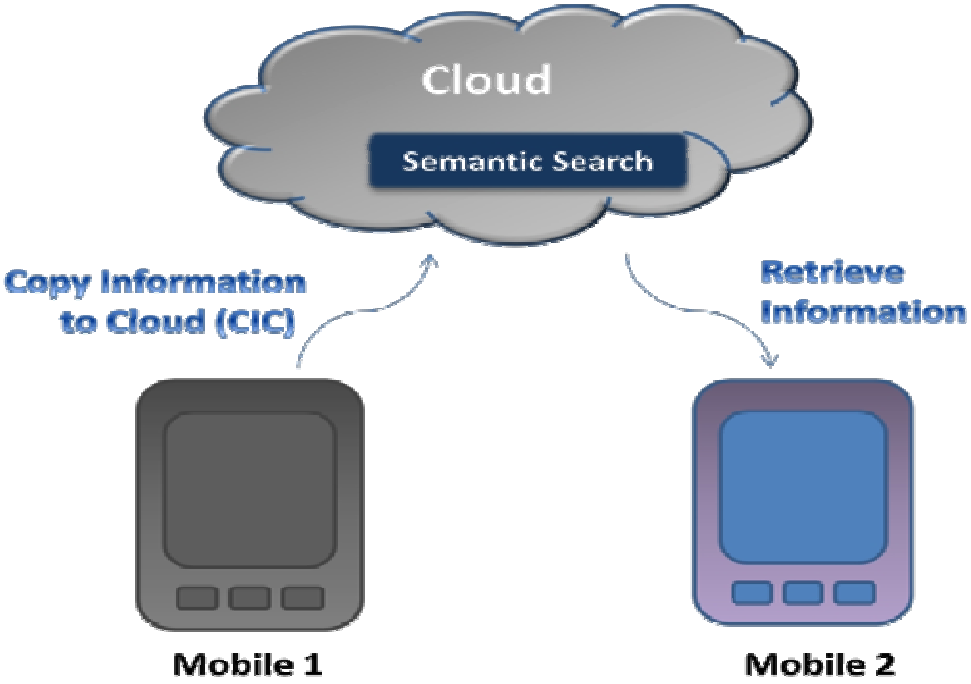

Fig 4 Cloud as backup

3.2 Cloud as a backup

A major problem with the use of mobile phones is the restriction of data to the mobile hardware and its vulnerability in case of virus attack, theft, hardware crash etc. Putting data on cloud may provide an excellent backup and may offer flexible access to mobile content, regardless of where the user is. Figure 4 shows that using cloud as backup for content on mobile allows the user to gain access to that information in the cases stated above.

But the issue of security in cloud computing is hampering the mass usage of cloud for the purpose stated.This is resolvable by a wide range of security mechanisms that the semantic web provides, ranging from XML Key Management System to validate certificates and signatures, to XML signature and XML encryption, which provide rules for encrypting or signing of business documents, to WS security feature for protection of SOAP (Simple Access Object Protocol) messages between mobile web services [8]. Hence, cloud may prove to be a perfect warehouse of mobile content backup, while semantic web can facilitate efficient mining of the content.

4. Conclusion

Usability of SCM application on any mobile device, with a suitable browser, independent of its hardware configuration, promises a huge market and revenue. The concept of integration mechanism guarantees an efficient, revolutionized search capability. The use of local caches to turn mobile into a backup for cloud content can solve user hardships in case of lost internet connection. Also, cloud as a medium for mobile information backup has a long way to go as the percentage of mobile Internet users seems to escalate with time.

References

[1] Graham Klyne," Semantic Web Applications" ww.ninebynine.net/Papers/SemanticWebAppl ications.pdf

[2] A. M. Riad,Hamdy K. Elminir, Mohamed Abu ElSoud, Sahar Sabbeh,"An Architecture For A Personalized Semantic Search Engine" http://www.aicit.org/aiss/ppl/9.pdf

[3] Srinivasa Rao V, Nageswara Rao N K, E Kusuma Kumari."Cloud Computing: An Overview", http://www.jatit.org/volumes/research-papers/Vol9No1/10Vol9No1.pdf

[4] "Mobile Internet has high potential in India", http://www.ciol.com/News/News-Reports/Mobile-Internet-has-high-potential-in-India/21709122569/0/

[5] "Mobile Internet Users to Reach 134 Million by 2013", http://www.circleid.com/posts/mobile_internet_users_to_ reach_134_mi llion_by_2013/

[6] Cloud computing, Wikipedia http:/ /en.wikipedia.org /wiki/ Cloud_computing
IBM Point of View: Security And Cloud Computing
Cloud Computing, White Paper November 2009

[8] Abbie Barbir,"Web Services Security: An Enabler of Semantic Web Services

[9] Tim Berners Lee, James Hendler, Ora Lassila,"The Semantic Web", http://www.jeckle.de/files/tblSW.pdf

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