

Semantic Modelling in Cloud Computing

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Abstract:- Cloud Computing has now become the attention seeker in academic as well as industry. It promises seamlessly unlimited, readily available utility-based computing which was considered difficult in past. Cloud Computing is still evolving, and there is a need to hinder many challenges for faster adoption of cloud. When we see these factors there is a huge requirement of semantic models which can help effectively. In this paper we are fetching various areas where the semantic models can be applied, in functional and non functional definition or quality of service details or data modelling or it may be service description enhancement. Our major focus would be on semantic modelling of data in the cloud.[1]

I. INTRODUCTION

There is an enormous change in the World Wide Web. The abundantly increasing data and large number of users accessing the internet made it a tough nut to crack the relevant information. As the information is written in the natural languages which cannot be understood by machines. Other factor may be the volume of information which makes it difficult to manage data without using infrastructures.[2] Cloud computing has now become attention seeker in academics as well as industry. It promises seamlessly unlimited, readily available utility-based computing which was considered difficult in past. Cloud Computing is still evolving, and there is a need to hinder many challenges for faster adoption of cloud. The main challenge is interoperability. A large number of vendors have introduced paradigms as well as services, making cloud heterogeneous. Infact a lot of effort is made to open doors to standardize important technical cloud aspects, but it is still far from reality from US National Institute Standards and Technology consolidation. . In this two-part article, we discuss how slight small semantics can help to hinder the clouds' main interoperability and portability issues.[3]

II. CHALLENGES IN CLOUD

First the cloud consumers must choose which cloud to use considering factors such as application requirements, legal issues etc. Secondly, the technical aspects of the vendor must be taken into consideration (service interface, scaling configuration, etc.) and workflow.

Third, consumer need to develop and customize application provided by the vendor multitenant. In order to do so, the consumer must consider various technical details like the choice of programming languages and limitations in the application runtime, all of which will be vendor-specific.[4] If the consumers want to change service providers (rarely), then to things need to be considered. First, the consumer has to rewrite or modify the code of the application in accordance with the new provider environment. In IaaS, this is minimal although requires more effort. Secondly, the data collected for application must be transformed. For this purpose, proper modelling in the space is must. Semantic modelling can help a lot in this. [5]

III. LITERATURE SURVEY

In this project we have been looking through various survey papers the kind of advanced challenges in cloud nowadays, is considered through "Security and Privacy challenges in cloud computing environments by Hassan Takabi and James B.D Joshi". The different Data Modelling techniques are mentioned in the paper -" Semantic modelling in cloud computing by Amit Sheth and Ajith Ranabahu". Moreover, we have also referred work of "David G Rosado" on Cloud Interopability. Also we have considered some research work of different cloud scholars such as "Keiko Hashimuze's blog on security issues in cloud computing", "David G Rosado scholarly article on Data interoperability". Also we have referred W3 Semantic Web, Data -W3C'. Other Surveys we have referred are" The Semantic Web, by Tim Berners Lee, James Hendler and Ora Lassila", also "The Semantic Web A guide To The Future of Xml, by Micheal C. Daconta, Leo J. Obrst and Kevin T. Smith".

IV. RELATED WORK

A. Resource Description Framework

The Resource Description Framework (RDF) is a framework for data representation in the semantic web world. Means that semantic Web is expressed by RDF which is encoded in collections of triples. Triples are written in XML (Extensible Markup Language).[6] Each triple consists of three components: Object, Predicate and Object. In RDF each unit (Object) posses some properties (Predicate) with certain values (Object). In a triple the relationship between two things is indicated by few simple facts that are presented as

Predicate, and Subject and Object are the two things. [7]

B. SAP HANA PLATFORM

SAP HANA Cloud offers a modular platform as a service "as an open standard based on Eclipse, the cloud platform is managed by SAP and benefits from the latest advances in cloud standards. SAP HANA Cloud Platform applications can be distributed via OSGi frameworks or via line tools command as a WAR file.[8] Applications run in the Java-based runtime environment and are supported by SAP HANA and can be managed using web- based management tools. For maximize development productivity, SAP HANA Cloud Platform takes advantage of all known open source tools and frameworks.SAP HANA Cloud Platform offers comprehensive and multilevel security measures to protect critical business data and provide industry-standard compliance certifications. Protection includes several levels including strong physical security of data centers, data protection and full reliability of services. [9]

V. CHALLENGES IN CLOUD INTEROPERABILITY

Many of these problems don't have easy solutions, especially because it continues to lack agreement between major cloud vendors on a standardized approach to designing and managing their data centers resource. So, before considering migrate applications to combinations public and private cloud, application architects and CIOs must be serious consider the following challenges.[10]

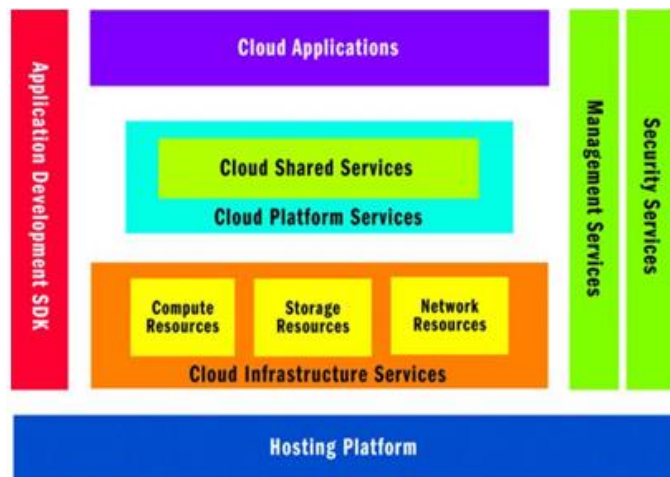


Fig 1:- Layered architecture of cloud computing

A. Vertical Heterogeneity-

This is a type of single silos, this can be handled by using middleware to homogenize the API and, at times, strengthening standardization. For example, OVF (open virtualization format) is an emerging standard that allows the migration of virtual machines, snapshots through the IaaS cloud.

B. Horizontal Heterogeneity-

This is through the silos, the overcoming of this is fundamentally more difficult. Each silo provides different levels and abstraction services. High level modeling Pays off, especially when it is necessary to move an Application and code horizontally across these silos. [11]

VI. DATA MODELLING

Modelling RDF data is another emerging opportunity for semantic modules. The major problem that prevent the adoption of cloud computing is data locking-i.e., the inability to port data horizontally. There are many vendors who design data storage without schema and remain distributed with a relaxed consistency model just to provide high availability and elasticity in accordance with the cloud requirements.[12] Besides, exploiting this data storage needs substantial redesign of many data-driven applications and often makes moving data to traditional relational databases very difficult. Nowadays it is addressed case-by-case transitions. A way better approach is modelling data in RDF and makes specific target representations. This approach can form transformations from one representation to another using a drop-lift mechanism. Semantic references for WSDL and XML Schemes hints the use of this mechanism for data mediation. [13] Light modelling in forms of DSL also applies here. For example, the Web service community has used the XML Schema definition as a platform- agnostic data definition for a very long time. The schema definition used as an input tool for code construction that generates platform-dependent data definitions. Most of the data modelling is valid during application development while considering semantic type as well as software life stage.[14]

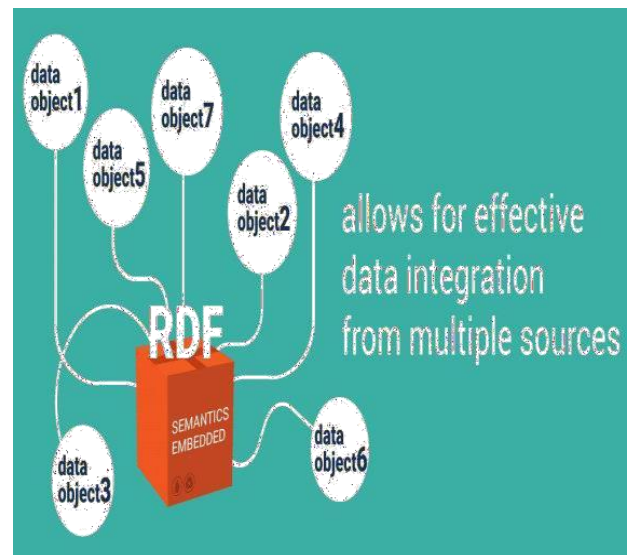


Fig 2:- RDF (Resource Description Framework)

VII. METHODOLOGY

A. Register for SAP HANA Account and Sign up for a SAP developer account which offers access to the HANA cloud without any time limitation and free of cost.

B. Configuration Eclipse IDE with SAP HANA Cloud Tools.
 SAP HANA Cloud platform SDK should be downloaded and installed. The location of the installation directory is set with in Eclipse. [15]

C. Creating Dynamic Web Project including Servlet.
 Being able to distribute SAP HANA in the cloud environment, it must be created as a web application. To create a web application with in Eclipse IDE you need to choose "Dynamic Web Project" as the type of Project. [16]

D. Distribution of the Project in the Cloud via the Eclipse IDE
 Configuration of SAP HANA Server as a run time environment within the Eclipse IDE, SAP HANA thus runs on the server and the distribution would be completed. [17]

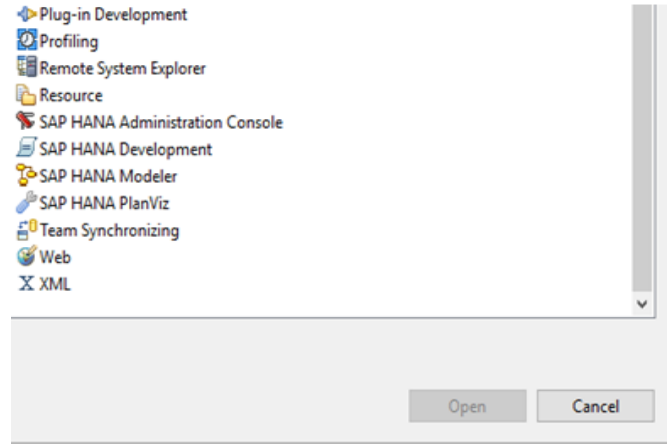


Fig 4:- SAP HANA in ECLIPSE IDE

IX. CONCLUSION

Semantic modelling in cloud has benefited the cloud community very much. As we have shown in our paper how semantic models are used in different cloud. It has overcome the challenges like data modelling, functional and non-functional dependencies like interoperability and service description enhancement. Through SAP HANA and RDF we have provided how these semantics have benefited in the cloud by configuring them into our system.

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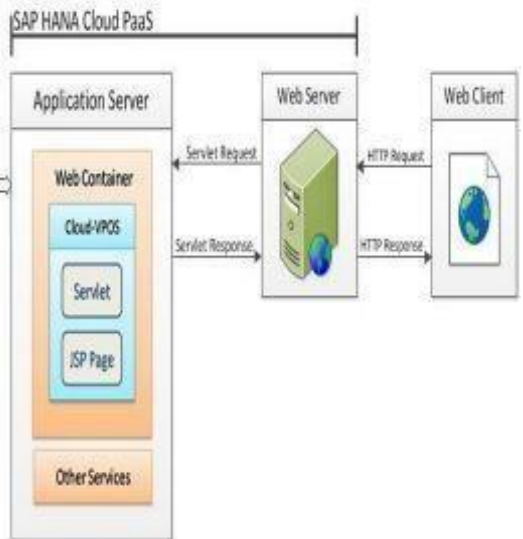


Fig 3:- SAP HANA Platform

VIII. RESULT

An overview of the implementation is made in this paper. The paper aim to implement semantic modelling over cloud infrastructure enabling users to access methodology using web and internet.[18]SAP HANA and RDF as final production of this paper allows users to access the sub-methodology associated to their context using the web interface of application. There are several advantages of cloud based semantic modelling which are reviewed.

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