

A Descriptive Comparative Study on Linked Server versus Cloud Computing

Mrs. Indu G¹, Mrs. Anju Mathew Cherian², Mr. Varusai Mohamed³

^{1,2,3}Lecturers in Faculty of Computing Sciences, Gulf College, Muscat, Sultanate of Oman,

Abstract - Linked Server addresses the issue of querying multiple data sources. The data sources can be homogenous or heterogeneous. The linked server can connect databases from two servers in a network or from remote servers. Distributed queries can be invoked in the linked server. The data can be fetched from the local/remote server in a secure manner. The cloud computing offers various services such as IaaS, PaaS and SaaS. The SaaS of Cloud computing provides various software, applications and databases through the internet. The cloud service provider supports to control the various data of enterprise. It is advisable to use the linked server in the Cloud computing to enhance security in a better way.

Keywords –Linked server, Cloud computing, SaaS, PaaS, IaaS, Cloud database.

I. INTRODUCTION TO LINKED SERVER

Linked Server is a concept to address querying of multiple databases. The Linked Server terminology is used in Microsoft SQL Server. The same concept is provided by Oracle, which is named as Database Links (DBLinks).

Linked Server provides connection from one data source to another. The other database can be on the same server or another server or on remote machine. It can also be effectively used to connect two databases of MS SQL Server as a group, by which both the databases can be accessed. By using a linked server, various data sources can be connected by employing transaction, distributed queries and commands.

Linked server offers numerous advantages such as the following:

1. To address diverse data sources identically
2. To access data from outside of SQL Server
3. To issue distributed queries and transactions on heterogeneous data sources across an enterprise [1]
4. To access data from remote server

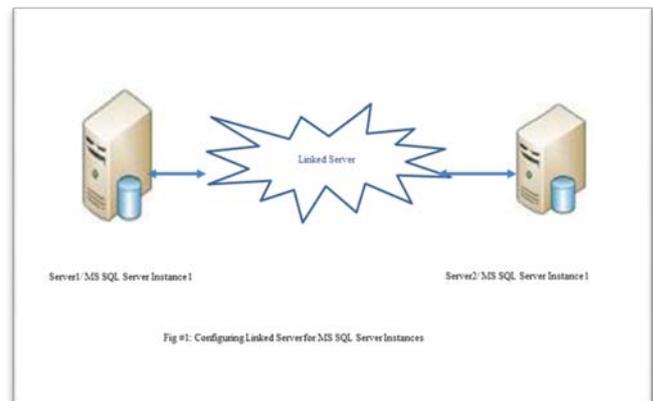
II. ARCHITECTURE OF LINKED SERVER

The Linked Server operates with OLE DB provider and OLE DB data source. OLE DB provider is a DLL that administers a particular data source. OLE DB providers exist additionally for various files and formats such as text

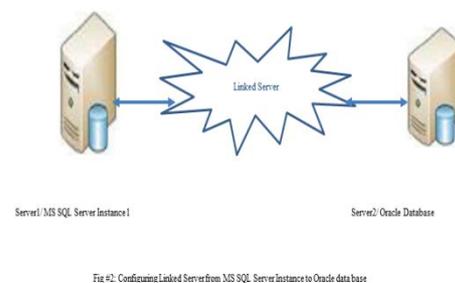
files and spreadsheet data. An OLE DB data source is a distinct data source which can be accessed through OLE DB.

III. CONFIGURING LINKED SERVER AMONG VARIOUS DATA SOURCES

The configuration of linked server varies depending on the target data sources. Both the data sources can be the same type or of different types. The configuration of linked server for distinct data sources are depicted below.



Linked Server can be used to connect two SQL Server instances. The figure #1 depicts two database servers which are connected via linked server. Each server holds an instance of SQL Server database. The data of these databases can be accessed using the linked server.



Also a linked server can be used to connect an SQL Server instance with Oracle database. The figure #2 illustrates the linking of two different database servers which are

connected via linked server. One of them holds an instance of SQL Server database and the other holds an instance of Oracle database. Using the linked server, the data in these different databases can be retrieved.

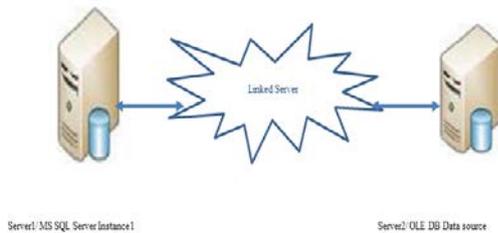


Fig #3: Configuring Linked Server from MS SQL Server Instance to OLE DB data source

Another alternative configuration is depicted in the figure #3. In this case, the linked server is used to connect an SQL Server instance with an OLE DB data source. The OLE DB providers exist for various data sources.

The basic configuration of a linked server is depicted in the following figure.

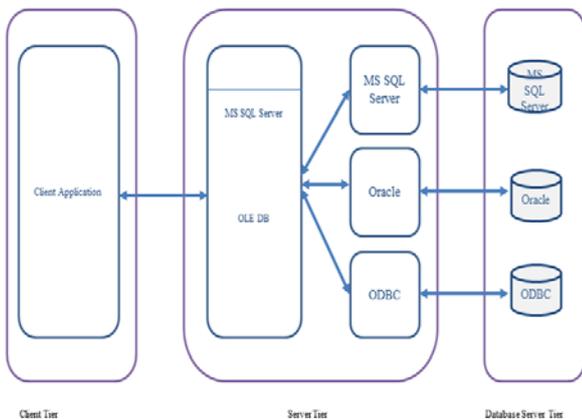


Fig #4: Linked Server Configuration

It works through basically three tiers, namely client tier, server tier and the database server tier, as displayed in the figure #4. The client is connected to the server through linked server. When the application from the client tier executes a distributed query, SQL Server parses the query and directs requests to OLE DB provider. The OLE DB provider, in turn accesses the data from the corresponding data source.

Linked Server can be set up in a real environment by using Transact-SQL or by using Microsoft SQL Server Management Studio. [1] OLE DB providers vary substantially in the type and number of required

parameters. Stored procedures can be used to define linked servers.

IV. LINKED SERVER SECURITY

Linked server assures security of the data which is accessed and queried. SQL Server offers security options to set up a linked server to connect the remote data. With proper login details as specified in the settings only, the data can be accessed. This offers pretty much security for the data as it is all about data that is most important for an enterprise.

V. INTRODUCTION TO CLOUD DATABASE

The cloud computing is the technology which is available in the internet through which anyone can approach the service provider to get the service from them over the internet. Cloud computing stores and accesses data and/or programs through internet in computers devices. The technology enables the companies to store services on the platform of the cloud. This will be helpful in making the computing environment over the internet. Any company in need to have an IT infrastructure will have to depend on the service provider and make agreement with them for making the computing service.

VI. SERVICES OFFERED BY CLOUD COMPUTING

Cloud computing offers mainly three types of services. It offers infrastructure, platform and software as service. The customers can avail the services through internet.

6.1 Platform as a Service (PaaS)

This is a cloud computing model that will deliver application as the service through the internet. This is the service where the customer can get information technology platform where they can use this have the entire infrastructure for the IT needs. This service is mostly consumed by application developers. It spans from the basic hardware and other software service/tools up to the platform needed for the entire operation for the company.

6.2 Infrastructure as a Service (IaaS)

The entire computing resources for any company can be availed from the service provider instead of having the same thing locally in the office. Through the internet the customer can get the entire infrastructure for the information technology frame work. Network architects and system administrators are benefitted with this service.

6.3 Software as the Service (SaaS)

This represents the largest cloud market. The software can be managed by the cloud service provider. Different types software can be delivered such as operating systems, servers, applications and database. The installation and maintenance in each system is eliminated by using this cloud service.

VII. ADVANTAGES OF CLOUD COMPUTING

Cost saving

The main benefit in information technology sector is saving cost. The organizations focus to keep capital and operational expenses to decrease.

Reliability

Cloud computing is reliable and appropriate than in-house IT infrastructure. The availability of the resources is anywhere and anytime.

Manageability

Cloud computing allows to enhance and simplify for management and maintenance capabilities through central administration of resources. The software and the services can be managed without the need for installation.

8. DISADVANTAGES OF CLOUD COMPUTING

Security

Security is a vital factor in the IT sector. All programs needs high level of security to protected the data. The data in cloud computing may not be under confidentiality.

Limited control

The services provided by the cloud computing are managed and monitored by the service provider. The customer gets minimum of control for application. All top level of control is with the service provider.

Advantages	Disadvantages
This is the best solution where anyone who wants to have the different service can go to the service and get instantly with the service and start working on this.	This technology is risky as this is provided from the service provider and the company does not have any control over the service.
There is no need to have any kind of hardware or software which can be purchased and installed. Instead, the service	The working depends on the internet and if there is no speedy internet the

can be availed from the service provider.	service will be slow.
This technology is helpful to have any service that will be useful without having the major investment for the enterprise.	To avail this service, the price to pay to the service provider is high.

Table #1: Advantages and Disadvantages of Cloud Computing

VIII. THE USAGE OF LINKED SERVER IN SAAS

One of the main disadvantage of cloud computing is the security. Especially while database is in cloud as a SaaS, the security can be an issue if the data is confidential. A linked server can connect two remote servers in a secure way. So within cloud computing SaaS, linked server can be used to access data from the database with security.

IX. CONCLUSION

This paper concludes a comparative study on linked server versus cloud computing in terms of database and enhancing the data security by using the linked server. In this way, this paper addresses the issues of the cloud computing without using linked server and the advantages of implementing linked server on the cloud SaaS for accessing the database.

REFERENCES

- [1] MSDN, Linked Server, <https://msdn.microsoft.com/en-us/library/ff772782.aspx>, Accessed on 05/02/2017.
- [2] Connecting SQL Server instances via Linked Server, http://mscerts.programming4.us/sql_server/Protecting%20SQL%20Server%20Data%20%20%20SCHEMA%20ARCHITECTURE%20STRATEGIES%20-%20Harnessing%20Linked%20Servers.aspx, Accessed on 05/02/2017.
- [3] Auer, Sören, Volha Bryl, and Sebastian Tramp. Linked Open Data -- Creating Knowledge Out Of Interlinked Data. 1st ed. Springer International Publishing, 2014. Print.
- [4] Chao, Lee. Cloud Database Development And Management. 1st ed. CRC Press, 2014.
- [5] Reese, George. Cloud Application Architectures: Building Applications And Infrastructure In. 1st ed. OREILLY, 2009
- [6] Di Martino, Beniamino, Giuseppina Cretella, and Antonio Esposito. *Cloud Portability And Interoperability: Issues And Current Trends*. 1st ed. SpringerBriefs in Computer Science, 2015.
- [7] Bizer, Christian. "The Emerging Web Of Linked Data". IEEE Computer Society SEPTEMBER/OCTOBER 2009 (2009).
- [8] Hayes, Brian. "Cloud Computing". *News Technology* 51.7 (2008):21 Feb. 2017.

- [9] CloudComputing,
<http://www.salesforce.com/cloudcomputing/> Accessed on
21/05/2016
- [10] <http://www.ijcaonline.org/journal/number13/pxc387446.pdf>
Accessed on 21/05/2016
- [11] Elragal, Ahmed and Malak El Kommos. "In-House Versus
In-Cloud ERP Systems: A Comparative Study". Journal of
Enterprise Resource Planning Studies 3.Issue 10 (October
2013) (2013): 1-13. Web.
- [12] TechNet, Security for Linked Server,
[https://technet.microsoft.com/en-
us/library/ms175537\(v=sql.105\).aspx](https://technet.microsoft.com/en-us/library/ms175537(v=sql.105).aspx) , Accessed on
07/02/2017

AUTHOR'S PROFILE

Mrs. Indu G¹., Lecturer in the Faculty of Computing
Sciences, Gulf College, has received the degree Master of
Computer Applications from Manonmaniam Sundaranar
University and B.Sc. Physics from Kerala University, India.

Mrs. Anju Mathew Cherian² has received Master of
Computer Applications and Bachelor of Information
Technology from Sikkim Manipal University, India.

Mr. Varusai Mohamed³ has received Master of Computer
Applications and Bachelor of Computer Science from
Manonmaniam Sundaranar University, India.