

ARCHITECTURE OF SQL AZURE

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ABSTRACT - To utilize the infrastructure capabilities and the technologies, cloud computing is useful. The model is similar to the utility based services; pay for what you use. To implement the IT[1] applications, due to the large subscriber base on the cost one is far lesser than enterprises pay today for the on premise infrastructure and technologies. As part of windows azure platform, SQL Azure is cloud based relational database service. Though built on SQL server platform there are certain changes/differences that one needs to adopt while targeting the SQL Azure platform for deployment and development.

Key Words: Azure, relational, deployment etc...

1. WHAT IS SQL AZURE?

"SQL AZURE is a cloud based relational database platform which enables users to host their data on cloud and use it as a service and pay as per the usage".

SQL Azure[3] is highly scalable, available, and multi-tenant relational database service on the cloud. This can be categorized as PaaS(Platform as a Service) form of cloud computing, since Microsoft takes care of installation of software, patching, and managing servers at platform level. Based on demand without worrying about things like number of licenses, resources like memory/CPU, availability, server maintenance etc, the database can be hosted. With the database and precise version of SQL Server, SQL Azure also offers framework[4] around database sync up across database on cloud. Because of these, there is a very high possibility of customers utilizing the SQL Azure as a database platform on cloud and get the best benefits out of it. Many DBAs and developers are beginning to understand one of the fundamental values of cloud computing flexibility when Microsoft continues to invest heavily in its Windows Azure platform. Microsoft made certain architecture and infrastructure decisions that may be surprising at first,

leading some DBAs and developers to question the readiness of the Microsoft Azure SQL Database platform.

2. SQL AZURE ARCHITECTURE

From an architecture perspective, to provide relational database functionality to the end users, SQL Azure is divided into four layers which work in conjunction[6].

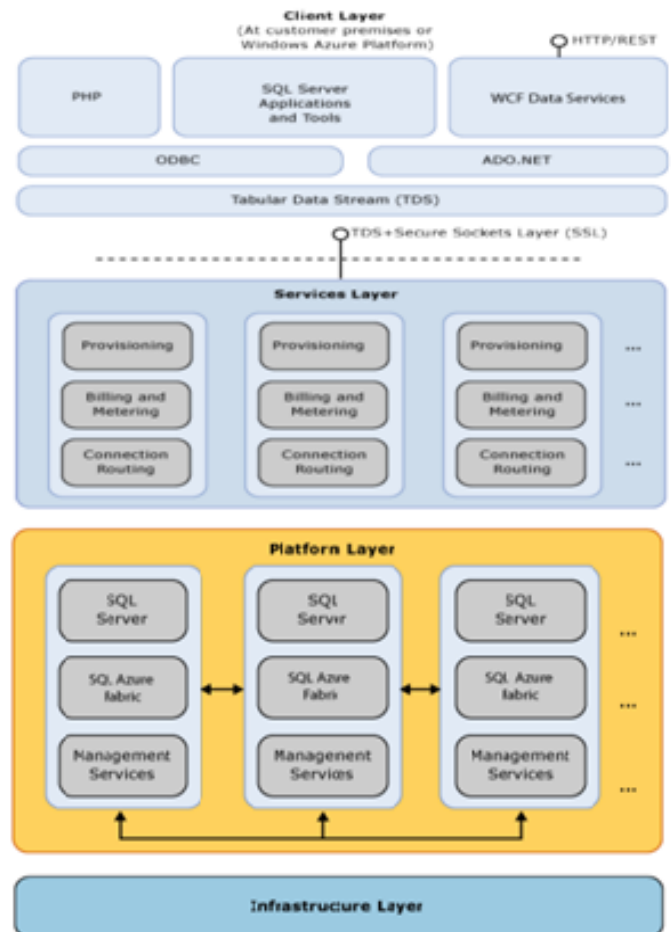


Fig - 1: SQL AZURE Architectural layers

Following are the SQL Azure four architecture layers.

- **Client layer:** To access SQL Azure, this layer acts as an interface for applications. This layer can reside on either on premise or hosted on windows azure. Since SQL Azure provides the same Tabular Data Stream (TDS) interface as SQL Azure, it can be accessed using ADO.Net and ODBC.
- **Service layer:** This layer acts a gateway between the platform layer and the client layer. It performs connection routing, billing/ metering and provisioning. It consists of a group of machines which initially performs authenticates the user, validation of the database[3] request, and establishes the connection between the client and requested server on the platform. The service layer further helps in routing the packets through the established connection, once the session is created.
- **Platform Layer:** This layer consists of systems (referred as data nodes) hosting the actual SQL Server database in the data center. Each SQL Azure database is stored in SQL Server instance on one of the nodes and replicated twice onto instances on other data nodes[1].

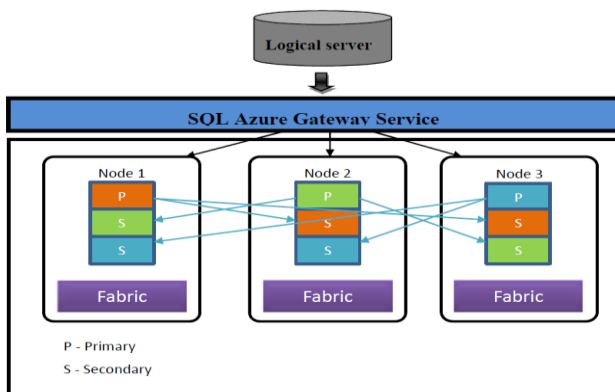


Fig - 2: Nodes of SQL AZURE.

Figure 2 showing three nodes for databases are arranged in SQL Azure. Through the logical server, the client will access the actual databases. The SQL Azure Gateway[4] Service is a set of systems which acts as a boundary for the SQL Server instances on the data nodes (Node 1, Node 2 and so on) and is responsible for login routing and validation requests to the appropriate physical server. Each SQL Azure database has a primary replica on the SQL Server instance of one node and two secondary replicas are stored on different servers (in this case Node 2 and Node 3 for the database highlighted in orange color). Also there is a component called the Fabric present in each of the physical servers which takes care of processes like reconfiguration of replicas, failure[5]

detection of replicas, engine throttling and location resolution etc.

3. BENEFITS OF SQL AZURE

Following are some of the benefits of SQL AZURE:

- Databases hosted[4] on SQL Azure are self – managed.
 - Very is easy to provision and deploy databases on SQL Azure.
 - No administration overhead. All administrative activities are taken care by the service provider.
 - High availability is built in feature of SQL Azure.
 - Procurement of hardware based on database growth is eliminated.
 - Databases hosted on SQL Azure can be accessed from any part of the world.
 - Database instances will be upgraded to the latest version of SQL Server when new SQL Azure service updates are released.

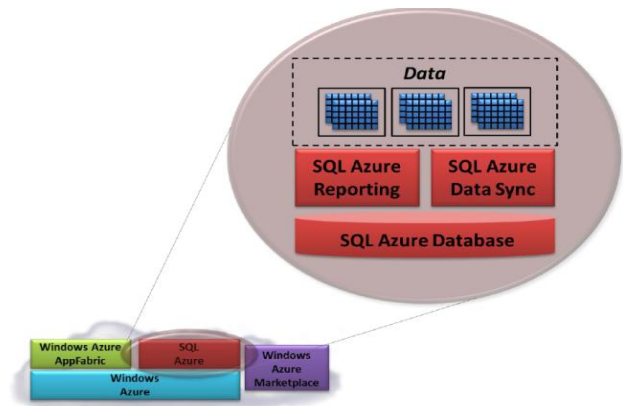


Fig -3: Feature of SQL AZURE

- Scalability of databases[2] hosted on SQL Azure.
 - This is a service based offering. So that, payment of the service, depends on the size of the database, growth/shrink.
 - Stringent SLAs on database availability.
 - Based on the design, SQL Azure has flexibility of load balancing as well.
- Developer's agility.
 - SQL Azure is nothing but an on premise database engine being enabled on cloud.
 - Minimal learning curve for designing applications on SQL Azure.

4. CONCLUSION

Building the cloud computing applications that can scale and leverage the flexibility of cloud computing you have to understand the primary differences between SQL Server and SQL Database. Difference between those platforms gave you an overview of the services that leverage SQL Databases, including SQL Data Sync[6] and SQL Reporting. Many organizations are adopting the cloud computing as their primary computing environment and others find ways to use Windows Azure to enhance their current offerings and create solutions that would otherwise be difficult to achieve.

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BIOGRAPHIES



ARABOLU CHANDRA SEKHAR was born in Nandyal Town, India, in 1973. He received the M.Sc. degree in Information Technology (IT) from the Kuvempu University, Shimoga, India

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He is having 13 years of teaching experience, presently he is working as a professor of Computer Science and Engineering department for G.Pulla Reddy Engineering College (Autonomous), Kurnool City, India. He has a total of 25 publications out of which 13 papers in International and National Journals and 12 papers in National and International Conferences. He is a member of various professional bodies like ISTE, IE, CSI, IAENG, CSTA, and IACSIT.

He received Minor Research Project titled "Developing Disaster Management Applications using Mobile Ad Hoc Network Tested" sanctioned by UGC for a period of 2 years in March 2014.