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FINANCIAL ARCHITECTURE MANAGEMENT FOR GLOBAL BANKING USING APACHE CASSANDRA

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ABSTRACT

Over decades, Oracle has been the top relational database (RDBMS) use to support key global banking systems. However, today's always online global banking world has bought a substantive change in how banking sectors and IT professionals must manage data and use it to achieve maximum data integrity. This paper looks forward at why NOSQL technology like Apache Cassandra is becoming the first and best database choice over Oracle for online banking application providing guidelines for when a legacy RDBMS like Oracle should be used and when NOSQL is required.

Keywords: Apache Cassandra, Big data, CQL, Graphical Password Authentication, SHA-1

I INTRODUCTION

Literally every IT professional is acquired with Oracle RDBMS for banking sectors. Oracle owns more than 48% of database market.

While Oracle being a solid RDBMS that performs well for which it was designed (ERP and Banking applications) even its strongest supporters admit that it is not architectured to tackle the new wave of big data over online applications developed today. The mainframe to client-server to web/mobile has resulted in the generation of countless application and exploiting data volumes.

Modern banking business sectors today need to manage big/fast data and always online application that necessitate a different set of technologies (NOSQL) that are replacing Oracle in many situations and becoming the first choice for database management. This paper demonstrates the application requirement of yesterday's banking application database with todays and takes a look at difference between Oracle and Cassandra

II PROPOSED SYSTEM

The main aim of proposed system consists of new era of global banking application using Apache Cassandra as database management source. Due to fact that banking applications there is possibility of processing many big data over many online applications. The data integrated over application needs to be secured in many ways .This system uses Graphical Password Authentication as a factor for users security as main perspective. Processing of relational as well as non-relational database accordingly. Real-time data implementation. Multiple entities processing at a time. Perform operations on static/dynamic data.

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2.1 Servlets/JSP

Servlets are most often used to process or store a Java class in Java EE that conforms to the Java Servlet API, a standard for implementing Java classes that respond to requests.

Java Server Pages (JSP) is a technology that helps software developers create dynamically ... JSPs are translated into servlets at runtime, therefore JSP is a Servlet; each JSP servlet is cached and re-used until the original JSP is modified.

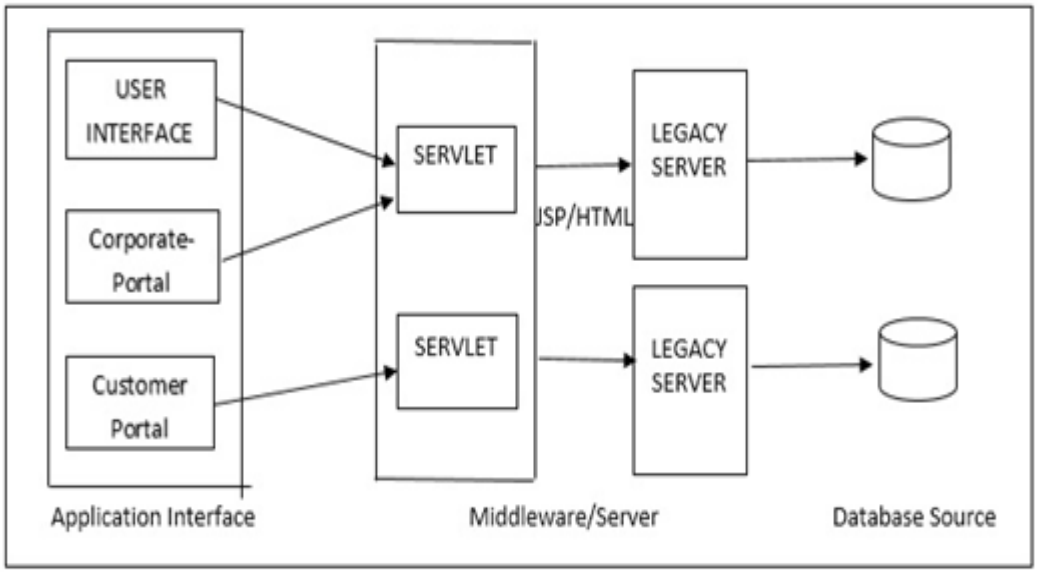

Fig2.1 Showing 3-Tier Structure for Application

2.2 Application Interface as Global Banking Application System

Global Banking and markets provide financial services and products to corporate, government, institution worldwide. With respect to capital growth and financial systems to people and manage their capitals.

2.3 Database sources as Apache Cassandra

Apache Cassandra is a leading transaction, scalable, and highly available distributed database.

The wide adoption of Cassandra in big data application is attributed to among other things.

2.4 HTML/CSS/JavaScript

HTML/CSS/JavaScript is used to develop user interface. HTML is used for creating web pages and web applications. With Cascading Style Sheets (CSS) and JavaScript it forms a triad of cornerstone technologies for the World Wide Web.

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III RELATED WORK

3.1 Big data

Big data is a term for data sets that are so large or complex that traditional data processing application software's are inadequate to deal with them. Challenges include capture, storage, analysis, data curation, search, sharing, transfer, visualization, querying, updating and information privacy.

3.2 CQL

Cassandra Query Language (CQL) is a query language for the Cassandra database. The Cassandra Query Language (CQL) is the primary language for communicating with the Cassandra database. The most basic way to interact with Cassandra is using the CQL shell, cqlsh.

3.3 Graphical Password Authentication

An authentication system that works by works by having the user select from images, in a specific order, presented in a graphical user interface (GUI). The graphical password approach is sometimes called graphical user authentication. It is used as a security purpose for users in application.

3.4 SHA-1

In cryptography, SHA-1 (Secure Hash Algorithm 1) is a cryptographic hash function which produces a 160-bit (20-byte) hash value known as a message digest. A SHA-1 hash value is typically rendered as a hexadecimal number, 40 digits long. It is used to secure the password of various users operating in application.

IV CONSIDERATIONS AND FEATURES

4.1 Business Considerations

The question business leaders should ask when it comes to deciding whether a NoSQL database like Cassandra is suited for a particular application/use case over a traditional database like Oracle are the following

- Do you need to keep the application always online and serving customers?
- Do you need to serve customers with multiple interfaces ad in multiple locations?
- Do you need to consume and deliver lots of data very quickly?
- Do you need to easily add database capacity to handle increasing customers?
- Do you need to manage different type of data?

If the application being considered delivers multiple affirmatives , the NoSQL should be considered for all/part of solution.

4.2 Technical Considerations

The technical considerations for determining whether NoSQL should be used for an application reflect the business questions:

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- Do you need continuous availability with redundancy in both data and function across one or more locations?
- Do you need a database that runs over multiple data centers/ cloud availability zones?
- Do you need to handle high velocity data coming in via sensors, mobile devices and the like and have extremely right speed and low latency query speed?
- Do you need to run different workloads (e.g. online, analytics, search) on the same data?
- Do you need to manage a widely distributed system with minimal staff?

4.3 Apache Cassandra Features

- Massively scalable architecture – a master less design where all nodes are the same.
- Linear scale performance – online node additions produce predictable increases in performance.
- Continuous availability – redundancy of both data and function mean no single point of failure.
- Transparent fault detection and recovery – easy failed node recovery.
- Flexible, dynamic schema data modeling – easily supports structured, semi-structured, and unstructured data.
- Guaranteed data safety – commit log design ensures no data loss.
- Active everywhere design – all nodes may be written to and read from.
- Tunable data consistency – support for strong or eventual data consistency.
- Multi-data center replication – cross data center and multi-cloud availability zone support for writes/reads built in.
- Data compression – data compressed up to 80% without performance overhead.
- CQL (Cassandra Query Language) – an SQL – like language that makes moving from an RDBMS very easy.

V ALGORITHMS

5.1 Graphical Password Authentication

5.1.1 Recognition Based System

In this category, users will select images, icons or symbols from a collection of images. At the time of authentication, the users need to recognize their images, symbols or icons which are selected at the time of registration among a set of images. Researches were done to find the memorability of these passwords and it shows that the users can remember their passwords even after 45 days. Recognition-based systems are also known as cognometric systems. These systems generally require that users must memorize the portfolio of images during the process of password creation, and when logged in, the users must recognize their images from decoys. Exceptional ability of humans to recognize images previously seen made the recognition based algorithms more popular. Various recognition based systems have been proposed using different types of images, mostly like faces, icons, everyday objects, random arts, etc.

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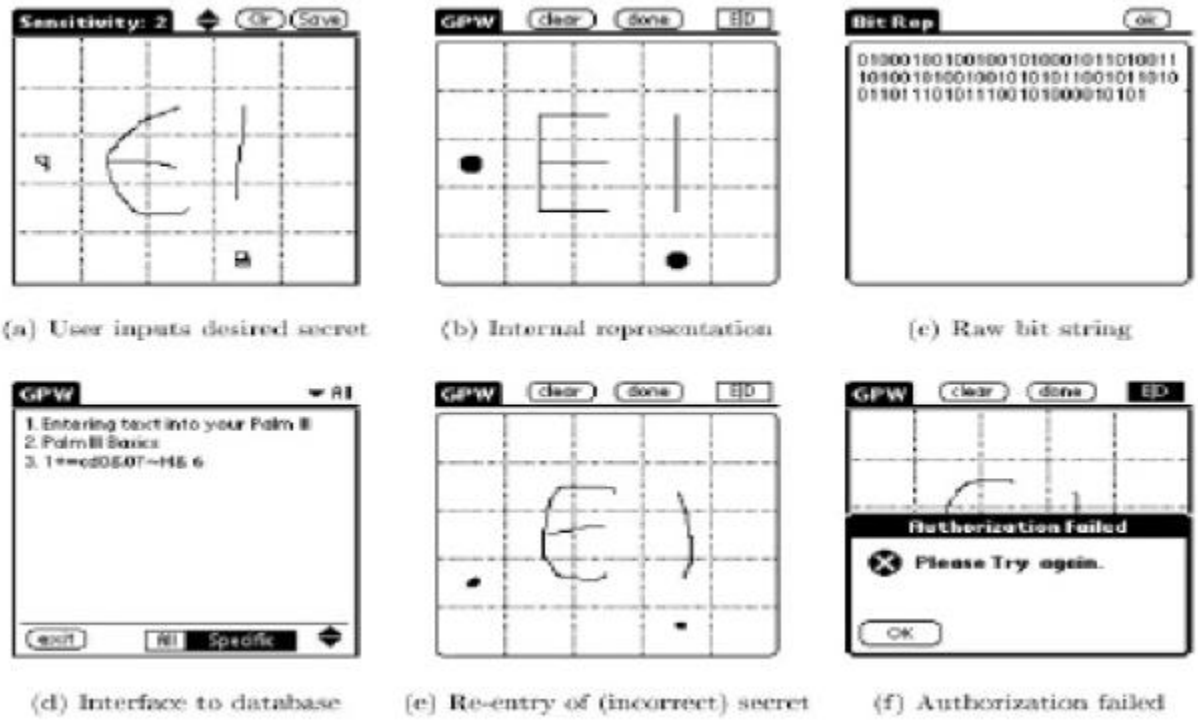
5.1.2 Cued-Recall Based System

Cued-recall systems are also known as locimetric systems as it related to identifying specific locations. These systems typically require the users to remember and click on specific locations within an image. This increases the memorability as it is easier to memorize than pure recall based systems. This is a different memory task than simply recognizing an image as a whole. In these types of schemes, users are provided with an image so that they can choose points arbitrarily by clicking in the presented image as a password. For successful login, the user has to click on right click points in the correct order. Main advantages are, people find images easier to remember than alphanumeric strings and such password schemes provides more security than text based passwords.



(a) User inputs desired secret (b) Internal representation (c) Raw bit string

(d) Interface to database (e) Re-entry of (incorrect) secret (f) Authorization failed

Fig 5.1 Authentication Progress

VI CONCLUSION

There is no argument that for global banking systems Oracle is a strong DBMS that well serves the use cases for which it was originally designed. But for IT professionals who are either planning new big/fast data applications have existing Oracle system that have begun to breakdown under big data workloads a more to Cassandra makes both business and technical sense. Switching to a modern, big data platform like Apache Cassandra will future proof any application and provide confidence that system will scale and perform well now and into demanding future.

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