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Customer Event Data Streaming

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White Paper

Event Data Streaming Platform

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Abstract

The client which is the largest UK retail and commercial financial services provider with 30+ million customers and a leading digital presence started a strategic programme designed to address resilience and costs issues related to the use of the customer information system (CIS) in mainframes DB2 which is used in (at least) 14 of the Bank's 28 key processes. Requirements were to "Provide a real time copy of data where the content may be accessed by any authorised consumer using the same methods that they would use to access similar data directly from CIS “i.e., near real time replication of customer data into Kafka topics which can be consumed by ‘n’ number of clients.

Early adopter for this programme was one of the new clients where the bank was planning to sign an agreement with one of the countries in Europe to acquire their pensions and savings business.

About the Author

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The author has 10+ years of rich technical experience with TCS working in Banking and Insurance projects. He has considerable experience in designing, coding, testing and implementing solutions in Enterprise Data Streaming platform.

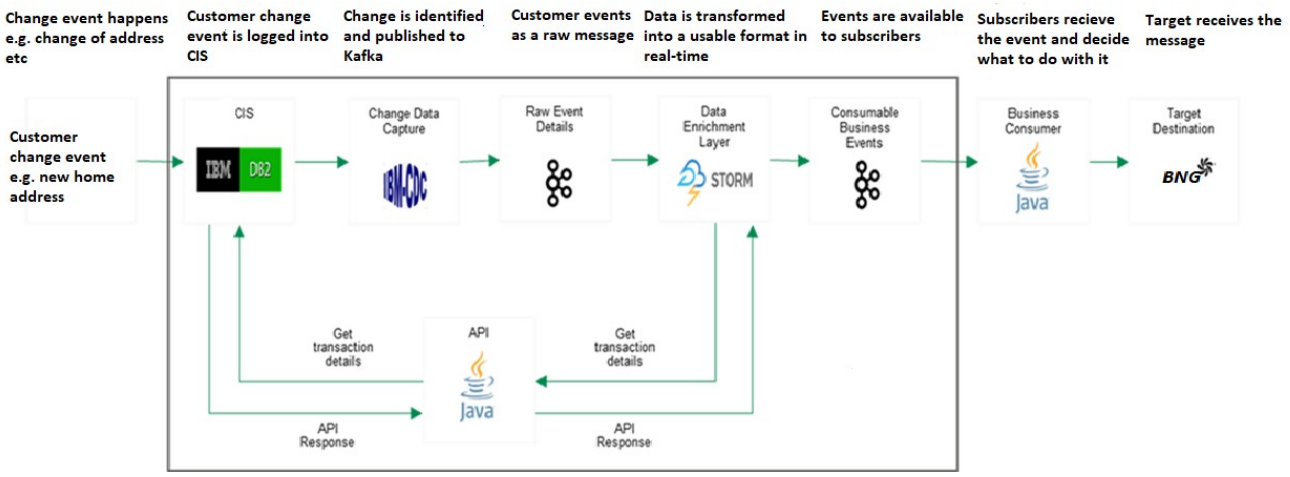
About the Domain

Once an agreement was signed, the client then acquired a pension and savings business that is operated as the Irish Workplace Savings (IWS) where the customer and products data were hosted on the BNG (Financial services company that provides investment solutions to major financial institutions) platform.

There were around 650k IWS customers (scheme members), it was highly likely that a sizeable proportion of these customers already have a relationship with the UK bank.

Given this, business problem was to establish and reconcile (synchronize) the IWS customer records from CIS on BNG to meet regulatory and risk requirements, and to enable a Single Customer view across both the systems i.e., whenever any updates happen on CIS system, these updates should be reflected to BNG system in near real time.

Solution



Flow of the solution is given below:

- Whenever any customer change events like change in address, surname, marital status etc. happen, they all are logged in CIS system.
- CDC detects changes in CIS DB2 tables in near real-time and publishes the data to Kafka topics (Raw Event Details) in JSON format.
- Storm application (written in Java) integrated with Kafka that is running on Cloudera infrastructure is reading the data from Kafka topics (Raw Event Details), applying filters, calling micro service API's (written in Java connecting to CIS DB2 tables to bring out the current copy of customer) via mutual authentication (SSL certificates), applying transformation and publishing transformed data into a curated Kafka topic (Consumable Business Events).
- BNG Push application that is running on ICP (IBM Cloud Private) clusters is reading the data from a curated Kafka topic (Consumable Business Events), applying filters and transformation, and updating BNG database whenever it is required based on the business logic. **This ensures customer data from CIS system is always coordinated between CIS and BNG systems in near real time**.

Technology Stack

Customer Information system (CIS)

CIS is an integral part of the bank's application set. It is the prime source of core customer information (e.g., Name, Address etc) and provides a wide view of a customer's relationship with us (e.g., a single customer record comprising of all relationships held - Banking, Insurance, Mortgage, Credit Card etc). Previously each business unit held a stand-alone view of the customer relationship. With CIS you can see all the customer's links within the group in one place, this is referred to as a Bank Assurance View.

Change Data Capture (CDC)

Change Data Capture (CDC) is a set of software design patterns used to determine and track the data that has changed so that action can be taken using the changed data. It is an approach to data integration that is based on

the identification, capture and delivery of the changes made to enterprise data sources, and it can be utilized in any database or data repository system.

Apache Storm

Apache Storm is a free and open source distributed real-time computation system. Apache Storm makes it easy to reliably process unbounded streams of Data for real-time processing. It is simple, can be used with any programming language.

Apache Kafka

Apache Kafka allows users to subscribe and publish data to any number of systems or real-time applications. For stream processing, Kafka allows writing Java applications that consume data from Kafka topics and write results back to curated data layer which can be accessed in real-time. Two major APIs in Kafka are: Producer API (Permits an application to publish streams of records) and Consumer API (Permits an application to subscribe to topics and processes streams of records).

Conclusion

Program has achieved below benefits -

- **Event Streams** - 12 event streams (real-time applications) were made available from CIS, changes captured published into a curated Kafka topic and updating a destination database within **0.2s**, saving an **estimation of 3 days** if implemented via batch process.

- **Incidents** - No incidents reported and proven to **ingest 1.5 million** events in an hour.

- **Cost Reduction** - No additional mainframe costs required**. 6 months of application performance tuning has resulted in a cost avoidance of £2m in mainframe costs (MIPS).** And hence, this solution has helped bank to achieve real financial benefit by reducing READ load off the mainframe. Each time content is read from CIS, the Bank incurs a financial charge (measured in mainframe "MIPS" (millions of instructions/seconds)).

- **A monitoring and alerting script** for real-time application was implemented for the first time in bank.

- **Mutual authentication via SSL certificates** (keystore and trust store) was established to encrypt the data in transit to enable safe and secure access. This was also a first for the bank.

- **Reusable Data Asset –** This solution is a GENERIC solution in Event Data Streaming Platform. As this framework is highly reusable, it was further leveraged for **Credit Score reporting systems** in production.

Acknowledgements

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Thank You

Contact

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