Open Source Technology to Build and Constantly Evolve a Low Code Application Platform

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Presentation Agenda

• Genesis Vision & History
• The Genesis Low Code Application Platform (LCAP)
• Challenges of using Open Source
• Genesis’s Lessons Learned using Open Source
• Examples of Open Source in the Genesis LCAP
Genesis Vision & History

“The Leading Low Code Application Platform Provider in Capital Markets”

Perfect Storm
- Microservices
- Open Source
- Cloud Services
- Industry

Genesis 0.0
Technology R&D

Genesis 1.0
Launch

“Throughout the platform whether tooling, business components or core technology we use open source technology”

No Code / Low Code / Pro Code Platform Tools
Whether it is building new Web UI’s, creating new environments or monitoring the production infrastructure we provide a complete set of tools

Business Component Library
Specific Financial Markets adapters such as FIX, FpML, Pershing, Murex, Calypso, Bloomberg TOMS & SSEOMS, TT, IRESS, Geneva and many more

Microservices Application Infrastructure
Architecture and development building blocks for all highly resilient, performant and scalable Capital Markets applications
In some ways Open Source is “low code” because with Open Source software you need less code

Challenges

With so many Open Source technologies available such as database, network libs, etc... there is a risk in choosing one:

• Choose the wrong technology for the use case

• Better technology comes along afterwards

• If you need to change technology how much time & cost
  e.g. NoSQL Databases have their own specific API which are not trivial to use
Genesis Database - History

FoundationDB
Proprietary Tech

Genesis 0.0
Technology R&D

Genesis 1.0
Launch


https://dbdb.io/db/foundationdb
Genesis Database - History

- **FoundationDB**
  - Proprietary Tech

- **Apple Acquisition**
  - iCloud Infrastructure Storage

- **Genesis 0.0**
  - Technology R&D
  - 2013 - 2014

- **Genesis 1.0**
  - Launch
  - 2016

- **Launch**
  - 2017

- **Launch**
  - 2018 - 2019 - 2020

https://dbdb.io/db/foundationdb
Genesis Database - History

- **2013**: Genesis 0.0 Technology R&D
- **2014**: FoundationDB Proprietary Tech
- **2015**: Apple Acquisition
  - iCloud Infrastructure Storage
- **2016**: Genesis 1.0 Launch
- **2018**: FoundationDB Open Source (Apache)

[https://dbdb.io/db/foundationdb](https://dbdb.io/db/foundationdb)
Genesis Database - Lessons Learned

Proprietary technologies posed high risk

Fortunately we learned early in our journey
e.g. at the time “fortunately” = “unfortunately”

Our platform had to provide an abstraction layer to each core part of the system
Genesis Platform Today – Database Abstraction

Harness the power & efficiency of a particular DB for the specific business use case

**DB Abstraction Layer**

- Aerospike
- FoundationDB
- Postgres
- & Others

Genesis 0.0
Technology R&D

- 2013
- 2014
- 2015

Genesis 1.0
Launch

- 2016
- 2017
- 2018
- 2019
- 2020
Three important examples where we use Open Source:

1. Event Processing
   Reactive Extensions for composing asynchronous & event based observables sequences ([www.reactivex.io](http://www.reactivex.io))

2. Event & Notification Message Bus
   Initially ZeroMQ, then due to challenges in the cloud (multi-cast between servers) we move to Aeron (we also support Solace)

3. Database Layer
   Depending on the use case we support 3 open source databases FoundationDB, Aerospike and Postgres (which supports others)
1. Event Processing – Reactive Extensions (RX)

- **Abstraction**
  RX abstracts concerns around low-level threading, synchronization, thread-safety, concurrent data structures & non-blocking I/O

- **Simplification of Asynchronous Events**
  RX model allows you to treat streams of asynchronous events with the same sort of simple, composable operations that you use for your classic collections of data items

- **Robust & Familiar Library (Microsoft & Netflix)**
  Widely used in software solutions: database APIs (e.g. Couchbase), front-end platforms (e.g. Angular), libraries (e.g. Retrofit).
2. Event & Notification Message Bus - Aeron

- **ZeroMQ**
  Great initial messaging bus within the platform but had downsides within cloud infrastructure, widely used technology

- **Aeron**
  Built for performance with highest throughput & most predictable messaging with Simple Binary Encoding (SBE) also FIX aligned (https://www.fixtrading.org/standards/sbe/)

- **Solace**
  Again in a similar way to databases we also support another messaging technology for Capital Markets & Finance based clients
3. Database Layer (Non-Timeseries Data)

- **FoundationDB**
  Horizontally scalable, multi-record ACID guaranteed transactions, focus on reliability and consistency (CP mode)

- **Aerospike**
  Horizontally scalable, single-record ACID guaranteed transactions, focus on performance and availability (CA mode, CP mode available in Enterprise edition)

- **Postgres**
  Traditional relational database, over 30 years in development, reliable, robust and performant. Also other DB Support as well
The importance of the FINOS community

- **Leveraging Open Source**
  Fundamental to the Genesis LCAP & Solutions

- **Contributing to Open Source**
  We contribute to a variety of cross-industry Open Source initiatives

- **Contributing to FINOS Initiatives**
  FDC3, Financial Objects, Cloud, Data Masking, etc...

THANKS, STAY SAFE & WELL!