

# HistoryGraph CRDTs for private data sync



**There is no cloud**  
it's just someone else's computer

# About myself

C++ programmer 1999-2014

OscarPOS - point of sale software

Python programmer 2014-2018

Binary Crate learn to code app

# What are CRDTs?

Conflict Free Replicated Data Types sometimes call Convergent RDTs

First discovered in 2007. Largely academic.

Multiple users can change the same variables

Users will always end up the same values (if they wait)

Without CRDTs we can diverge

# Example of file divergence

Editing a text file in two different editors

# What is HistoryGraph?

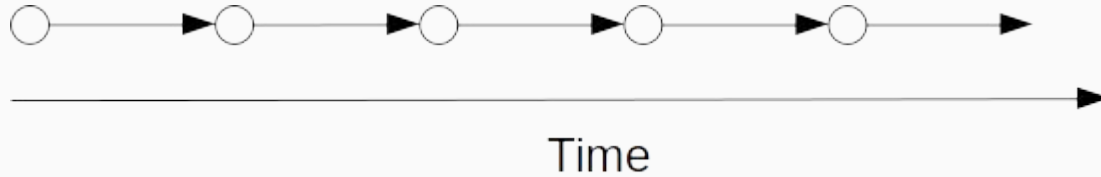
An ORM for CRDTs (conflict free replicated data types)

CRDTs are complex need to simplify.

Until the early 90's many programmers wrote their own databases. Now we use ORM's and SQL.

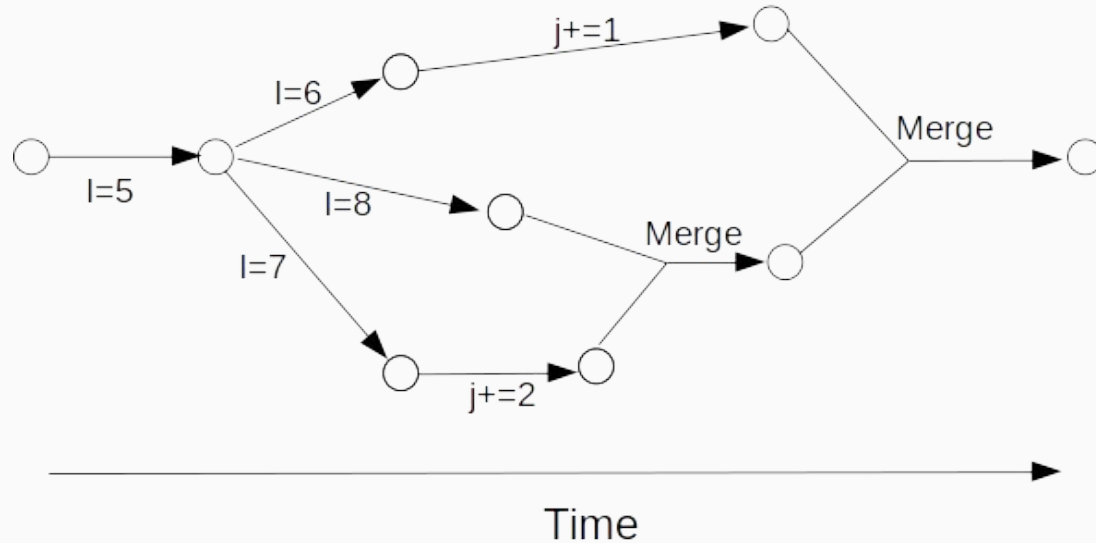
# How does it work?

It's like a block chain



# How does it work? Pt 2

The historygraph can fork and remerge



# Semi lattices

Are functions which are associative commutative and idempotent.

ie it doesn't matter what order the functions are evaluated or if they are evaluated more than once.

Eg Set union



# Complexity of implementation

Look at code for the FieldList and meetup example

# Why not use X other tech?

That does the same thing (allegedly)

PouchDB/CouchDB

Microsoft SQL Server replication

Oracle Database Replication

Dropbox

MongoDB

Slony (Postgres)

MySQL Replication

# They will have conflicts

Microsoft SQL Server replication

If two updates change the same piece of data  
the winner is arbitrary and may require sysadmin  
intervention

Some other projects are using CRDT

Atom - Github (+ VS Code?)

Redis

Riak

# Software demo

!

# Use cases

## Privacy

The change data (the semilattices) can be encrypted

## Ease of use

CRUD type Rest API's can be completely automated away

## Offline Working

Our data is available locally so not problem working while not on the internet

## Performance and Scalability

Our data is available locally so no waiting for the server to answer a query

Help need please see [www.historygraph.io](http://www.historygraph.io)