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SUMMIT 2022
LIVE IN VEGAS
LAS VEGAS

LESSONS LEARNED BUILDING A LOW-LATENCY DATA WAREHOUSE

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Likes: Data, Math, Beer, Probably other things?

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QuoteWizard® by lendingtree®

If only I had insurance for my new car

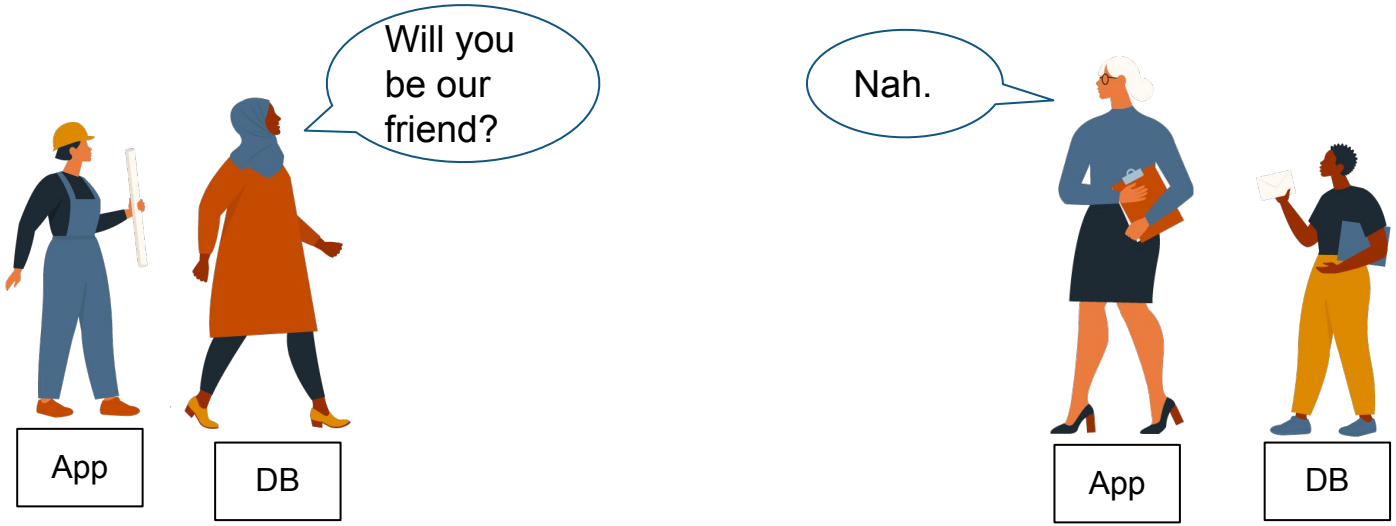
If only I didn't have to cold call for leads

Consumer

Insurance Agent

WHAT WE HAD

- Applications using different standards
- Can’t all talk to each other effectively
- Multiple ways to generate and attribute revenue
- No single report for business-level analytics



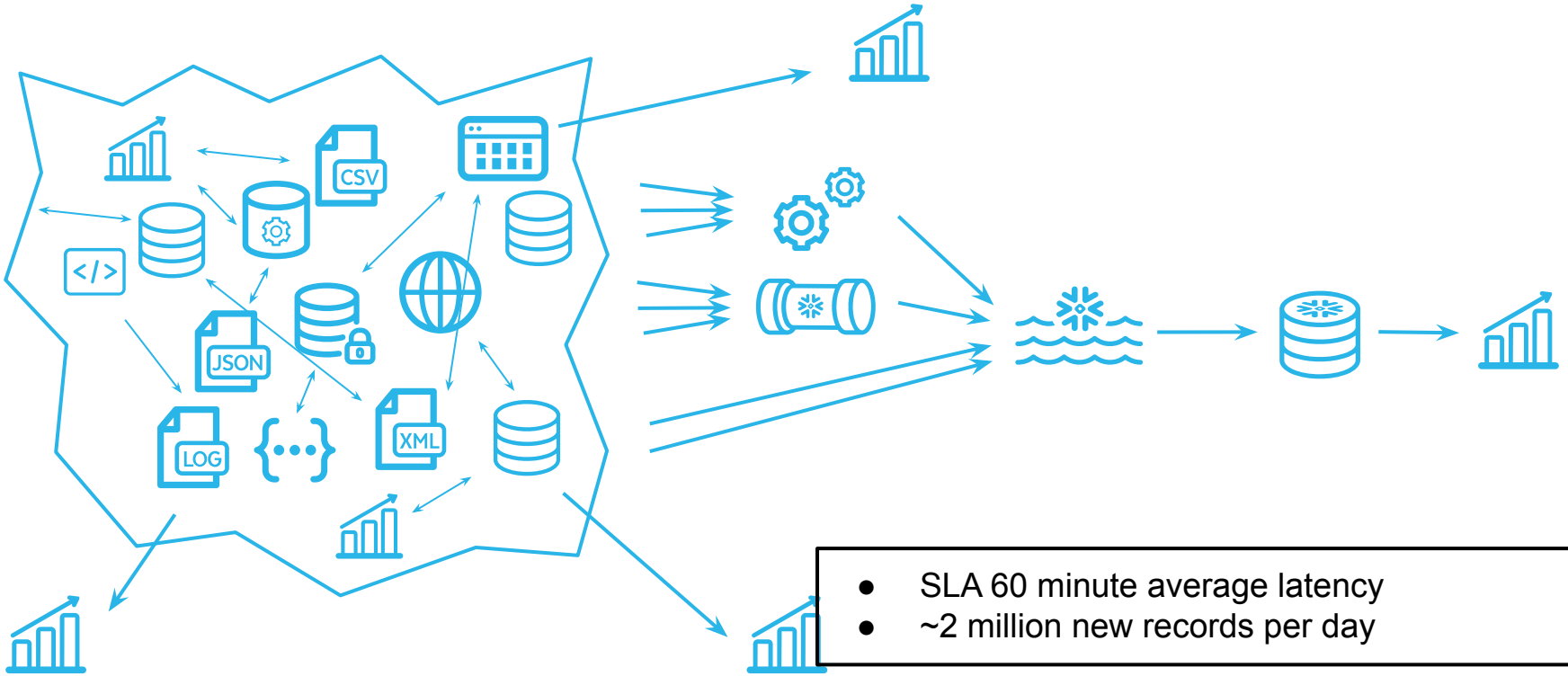
WHAT WE NEEDED

- A single reporting system built on a “source of truth”
- Combined data from across sources

The Number one demand from marketing/analysts/business:

- Up-to-date data
- Willing to sacrifice query speed, report features, historical data

WHERE WE ARE NOW



- SLA 60 minute average latency
- ~2 million new records per day

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CUSTOM PIPELINES

- Most pipelines into Snowflake have the same basic pieces
- When I started this, Streams didn't exist
- So I built the whole pipeline myself

Lessons:

- Streams are great!
- Many tools do provide incremental loading. It's worth looking at and asking about
- Make extensive use of logging

LOG TABLE IN SNOWFLAKE

- Started with 10 tables. Worked great.
- Slowly built up to 120 tables

A **Compute warehouse queueing**

B **Too many concurrent connections to log table**

C **Snowflake connector throttling**

LOG TABLE IN SNOWFLAKE

- Started with 10 tables. Worked great.
- Slowly built up to 120 tables
- Started getting contention on log inserts
- Snowflake is built for batches (100MB)
- Needed to move logging to a different DBMS

Lessons:

- Use a tool how it's supposed to be used
- Take some time to learn about the boundaries, and why they're there, before pushing on them

SEMI-STRUCTURED DATA

- Tables with a single column of JSON (plus metadata)
- Querying semi-structured data directly worked great
- Added views directly on those tables
- We had performance issues with some queries, and not others

A	**Queries using Date Filters**
B	**Queries that SELECT all columns**
C	**Queries using ORDER BY**

SEMI-STRUCTURED DATA

- Tables with a single column of JSON (plus metadata)
- Querying semi-structured data directly worked great
- Added views directly on those tables
- We had performance issues with some queries, and not others
- “2022-01-01” and “10” aren’t native data types for JSON
- “Columnize” - Parsing into a separate column

Lesson:

- Semi-structured data is great, but sometimes it’s worth columnarizing
- Bonus tip: don’t parse JSON in Data Masks

DASHBOARD SOURCES

- Query a view that does business logic

Vs.

- Builds a set of staging tables
- Builds another table using the staging tables, which handles business logic and clustering
- Query the final table

Lesson:

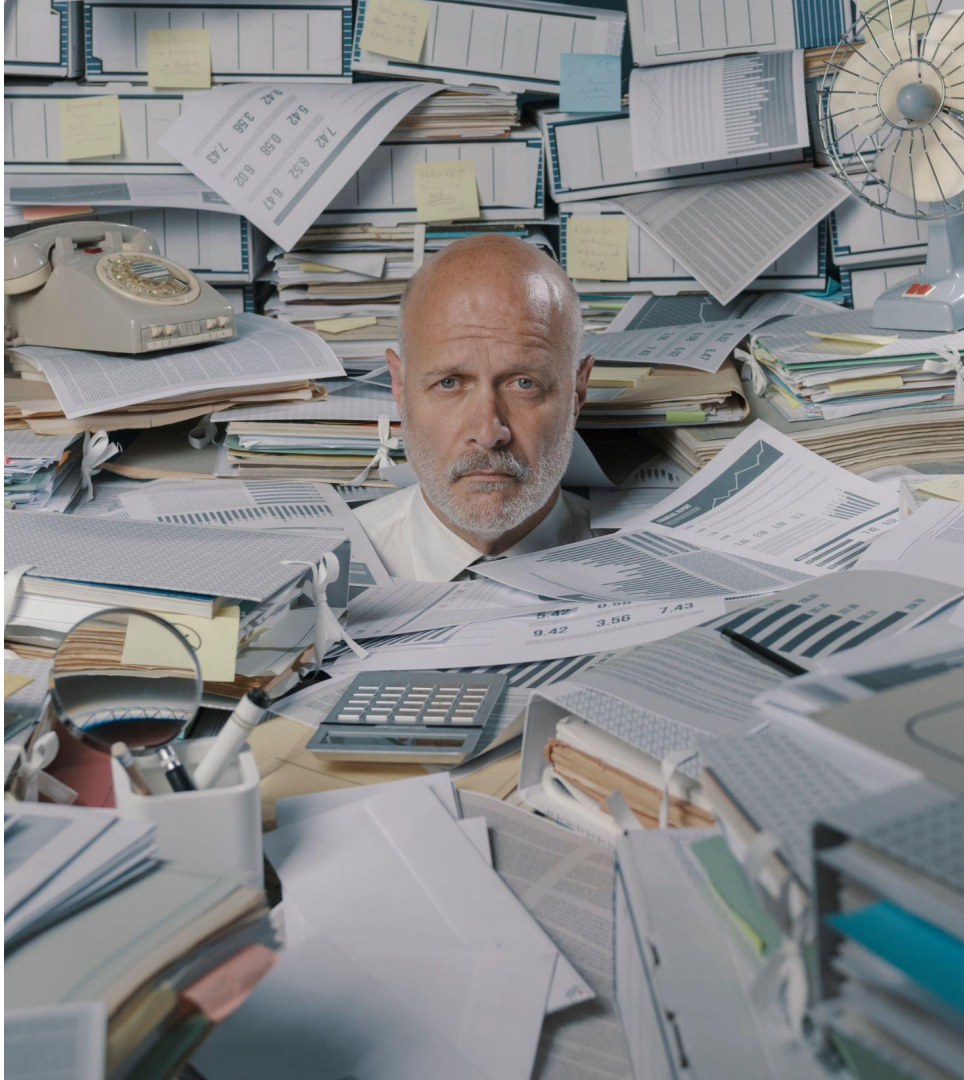
- Experiment with Queries vs. Views vs. Tables
- DBT is really good for experimenting quickly

LOTS OF SNOWPIPES

- Snowflake best practice: Use a single “Notification Integration”
- A new test environment queue with lots of messages, but no Snowpipe was set up
- The Integration quickly backed up and stopped receiving messages for **ALL pipes**
- Paused the flow, integration cleared up
- Ran **ALTER PIPE REFRESH** on all pipes

Lessons:

- “Best practices” are a good place to start. They are not always rigid
- Notification Integrations can handle a lot (when they’re wired up correctly)
- ALTER PIPE REFRESH



LESSON LEARNED?

- Created a separate notification integration for our test database
- Pointed it at the same Azure storage queue
- ALL messages started going to the new integration, and **ALL pipes** stopped again
- Had to recreate our integration and all of our pipes

Lessons:

- Be careful with things that affect your system at an account level
- Test in a separate account if possible

ALL GOOD NOW, RIGHT?

- Pipes back up and running with a new shiny integration for test environment
- The pipes had been down for a while and needed to get caught up
- Ran **ALTER PIPE REFRESH** on all pipes.
  (The exact same script from before)

ALTER PIPE REFRESH

What happened?

A

The pipes/tables refreshed normally

B

Nothing

C

Created a bunch of duplicate records

D

Test records went to Production tables

DUPLICATES

- All of our pipes reloaded 14 days of data and created a TON of duplicates
- Had to do manual data cleanup, but at least the pipes were working again

Lessons Learned:

- Include metadata in your Snowpipe tables (FILENAME, FILE_ROW_NUMBER, CURRENT_TIMESTAMP)
- Recreating objects tends to mess with things like copy history
- ALTER PIPE REFRESH does have parameters to prevent this issue
- Spare some extra time for testing, even if people are watching you

THE END?

FAST, FLEXIBLE

- 5-15 minute delay on everything in our data lake
- 30-60 minute delay for data warehouse
- Queries are fast
- We slow it down in the evenings to conserve on cost (mostly ADF cost)
- Snowflake cost: a lot less than the old system

RECAP

- Be aware of how a tool is supposed to be used
  - Read the documentation
  - Try to follow best practices (most of the time)
- Parse dates and important columns out of semi-structured data
- Use a separate account for testing account-level changes
- Streams are cool
- ALTER PIPE REFRESH is cool – Be careful with it
- Let Snowflake do the heavy lifting for report logic

ASSORTED LESSONS

- Read the documentation
- Don’t treat all data the same
  - Full reloads vs. incremental
  - Semi-structured vs. columnarized
  - Clustered index vs. natural clustering
- Cloning does weird things with pipes, masks, and future grants
- Use a generic XS warehouse for all the little jobs and pipelines. Isolate/scale as needed
- Why’d my table disappear? Because of ownership or usage grants, probably
- Is my Pipe/Task working? Look at the Copy/Task History
- Snowflake Quality of Life features: QUALIFY, DIV0, EQUAL_NULL
- (**Windows + V**) - the superior form of (**Ctrl + V**)
- Slides and Code Snippets: github.com/**DavidGarrison**/SnowflakeSummit

QUESTIONS

Please take a moment to rate your experience during this session.

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THANK YOU.