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Data Modeling Considerations in GPDB

Pivotal® Greenplum Database

Agenda

- Introduction
- Models & Background
- Pivotal Approach
- Possible Optimizations

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Introduction

- Greenplum database is not limited to specific models as some other database platforms are
- Greenplum supports features that are used in modeling:
  - Uniqueness
  - Constraints
  - Keys
- Greenplum does not support some features that are frequently used in modeling:
  - Foreign keys
  - Relational Integrity checks

Introduction (cont'd.)

- Just because Greenplum supports items like primary keys and constraints does not mean they should be used pervasively
- Also, just because your organization spent years modeling the existing warehouse does not mean it is functional for the **users** of the system
- Bill Inmon and Ralph Kimball practiced and developed their 'schemes' in a world before MPP. Their models and approaches reflect the technical time in which they were developed

Key Modeling Considerations

The following are key modeling considerations:

- Consider the business first
- Model for usability NOT to fit a model
- Do not force data into a model which does not fit the use
- Leave relational integrity checking to the source system
- Iterative and agile modeling is recommended over archaic and inflexible/prescriptive methods
- Legacy models will likely not be optimal*

* Just because you have worked for years on your optimal DW model does not mean it will work for the business or perform well

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Historical Approaches

As mentioned previously, the models from Inmon and Kimball have been subscribed to as "the way to architect a data warehouse". These models:

- Star Schema
- Snowflake Schema

have been used to supplant the classic database pattern:

- 3NF or Third Normal Form
  which is frequently used in OLTP applications

Each model will be detailed at a high-level in the coming slides

Note: Each of the models listed is rigid in it's rules for data relationships and typically takes years to develop

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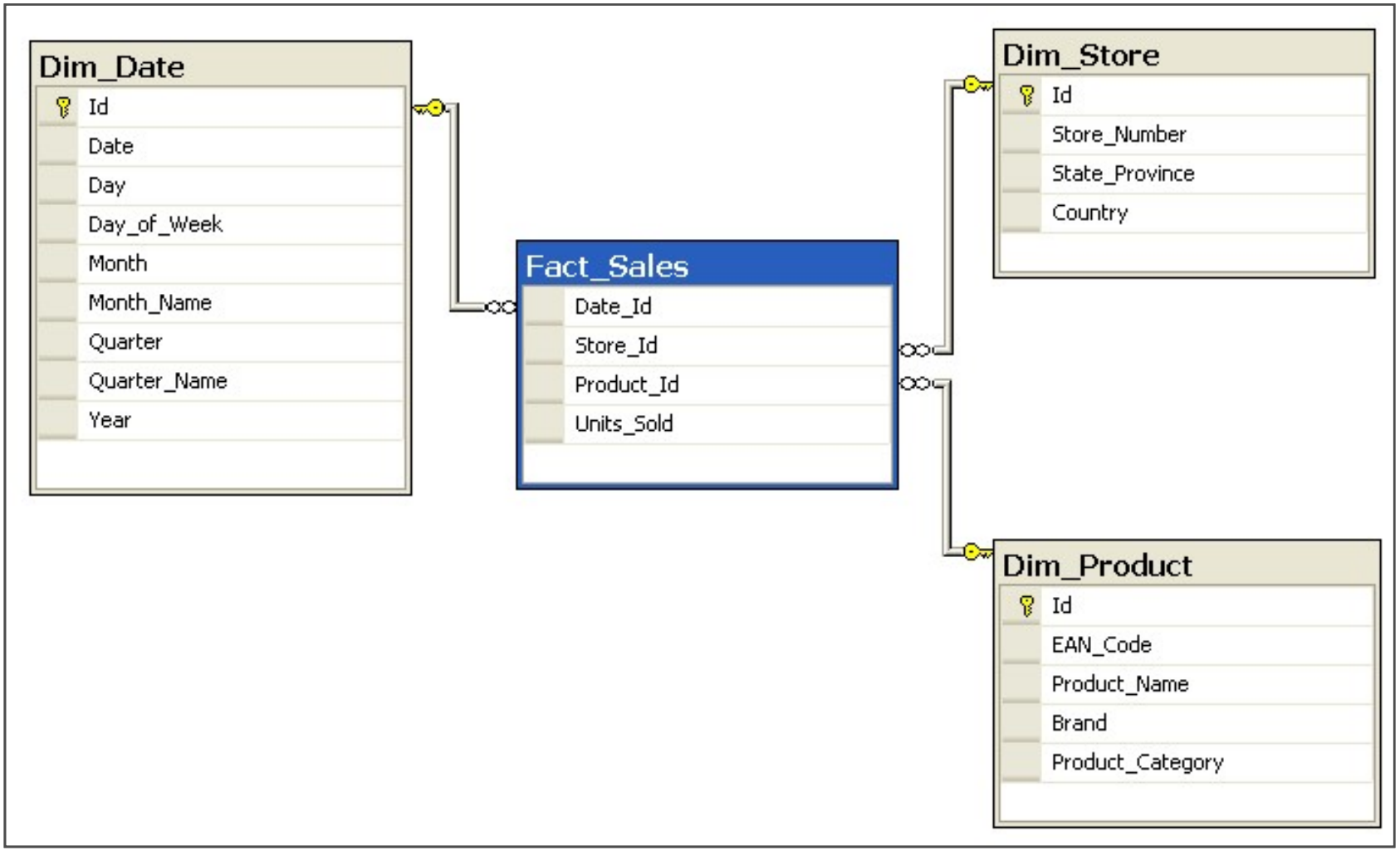
Star Schema Model



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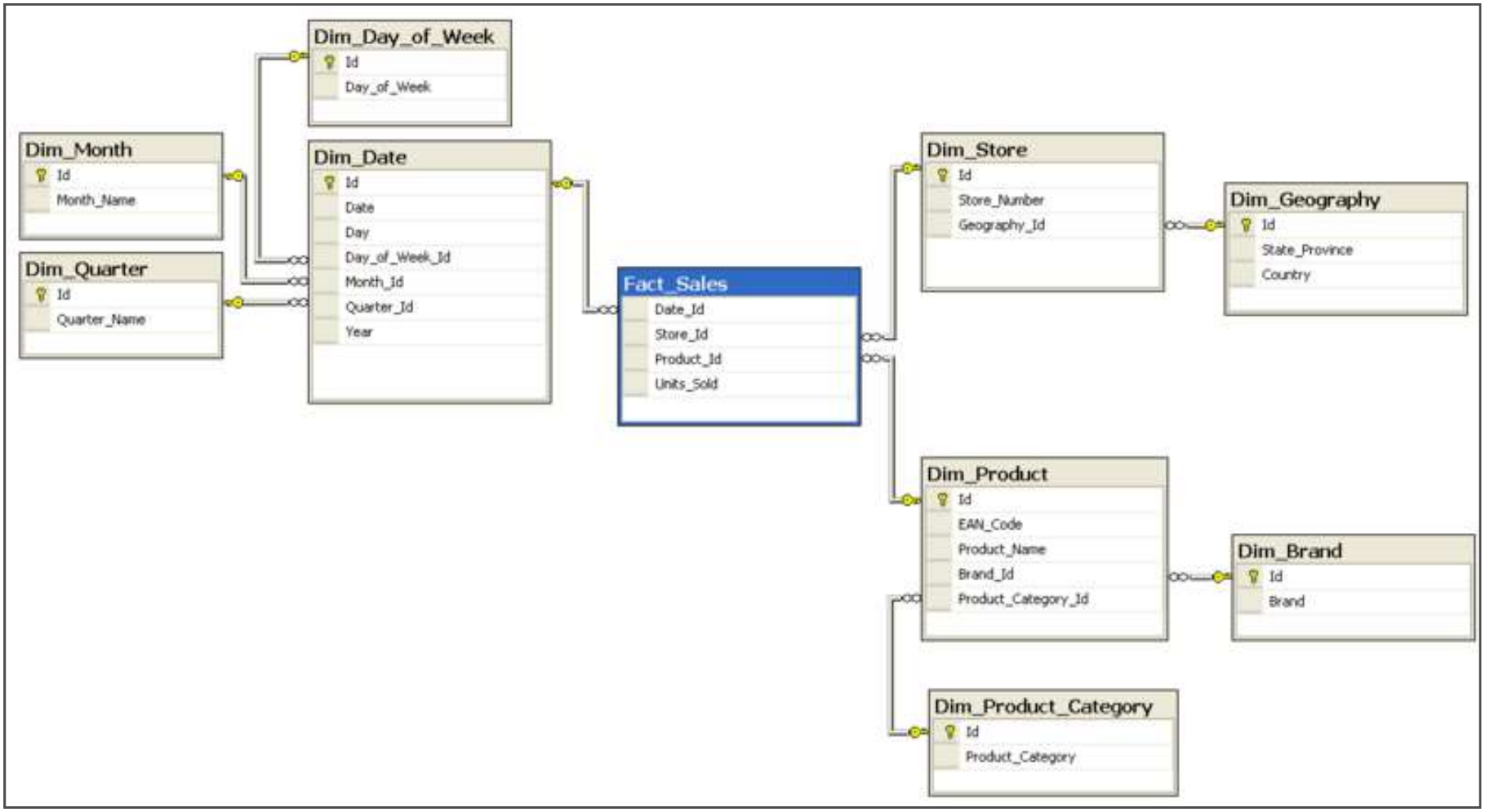
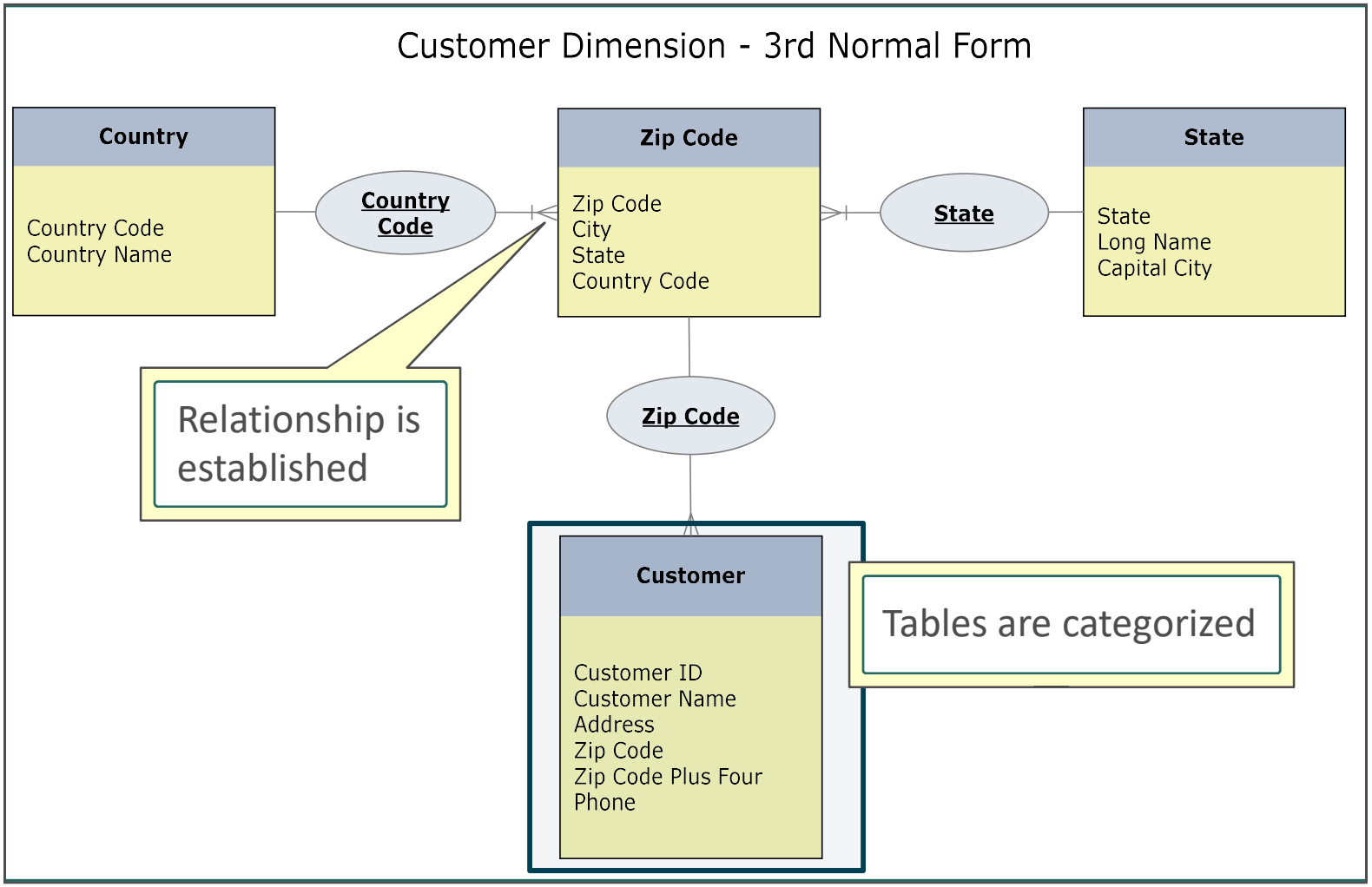
Snowflake Schema Model



3NF Model



A Pivotal Approach

Consider the following when modeling for Greenplum:

- Primary keys are essential for OLTP and as such their "primary-ness" should be established prior to loading
- Business users look at the data based on how they use it – Model to reflect this "use" pattern
- Don't blindly follow a pattern espoused by experts unless it fits the usage of the data
- Data reorganization within a greenplum system is exceedingly fast, so iterate over models until one resonates with the users
- Storage on MPP is not usually as constrained as on other systems so it may be appropriate and useful to have multiple copies of a data set to support different uses

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A Pivotal Approach (cont'd.)

Other considerations when modeling for Greenplum:

- Avoid over-modeling which can result in large numbers of joins that tend to not be as performant
- Flattening is okay and encouraged in Greenplum and it has the side effect of making more sense to business users…
- Model, test, iterate – be agile and figure out what works best for the determined use
- It is possible and can be very functional to leave data outside the database, accessing it as needed via the powerful external table mechanism in Greenplum*

* Data can be filesystem based or can live in hadoop

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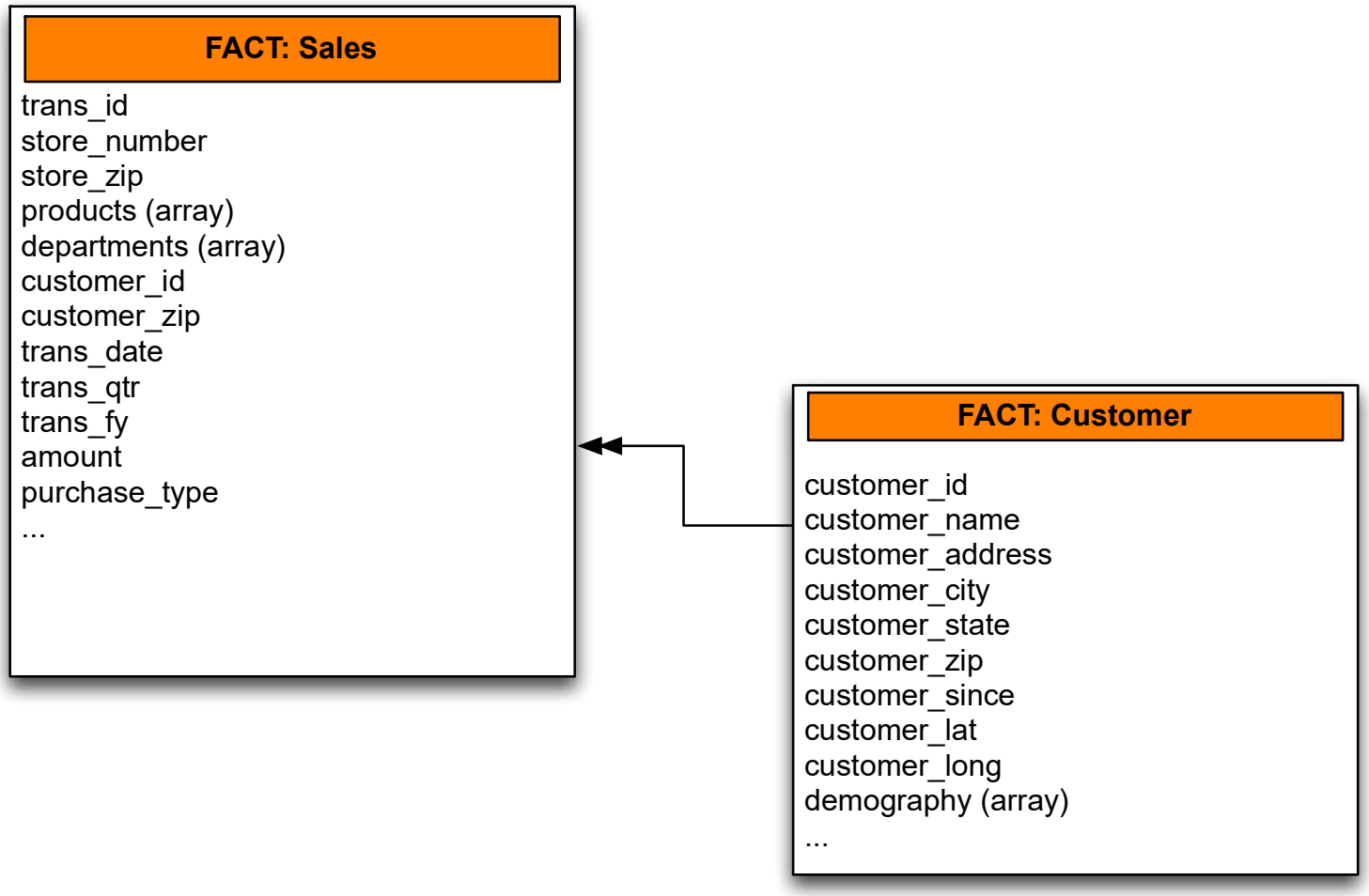
Pivotal Approach Example



Pivotal Approach Example Explained

As suggested it can be very effective to create a flattened view of data:

- More closely fits with a business view of the data
- Easier to query
- Faster to query
- Can still join to information not flattened into the fact
  - e.g.
    Customer demographics
    Customer geo information
- Minimizes in-memory data structures

Pivotal Approach Possible Optimizations

- Don’t over-think it
- Use the power of the system to evaluate and test different approaches
- Don’t force data sets into a certain model
- Relax -- it is just data and can be reorganized into most any “shape” that is desired
- Utilize the right tool for the right job
  e.g. don’t use GPDB to enforce RI; don’t use your OLTP database for analytics
- Don’t forget the powerful capabilities of GPDB to ingest and utilize data that may be outside of the database
- Greenplum includes many features to improve performance: compression, columnar, partitions, etc.

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Review

- Models & Background
- Pivotal Approach
- Possible Optimizations


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