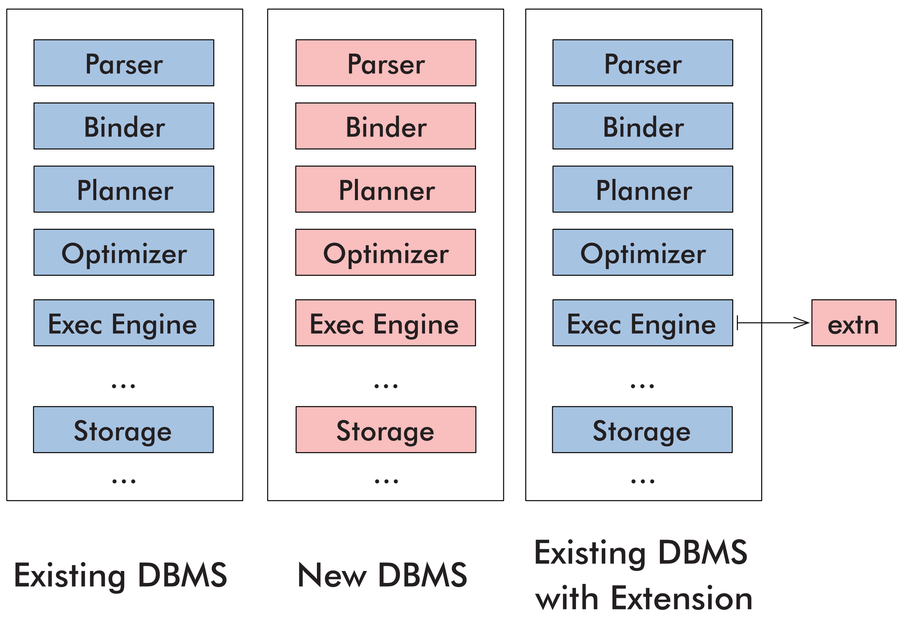
Survey of Database Management System Extensibility

Abigale Kim, Marco Slot (Crunchy Data), David Andersen, Andrew Pavlo

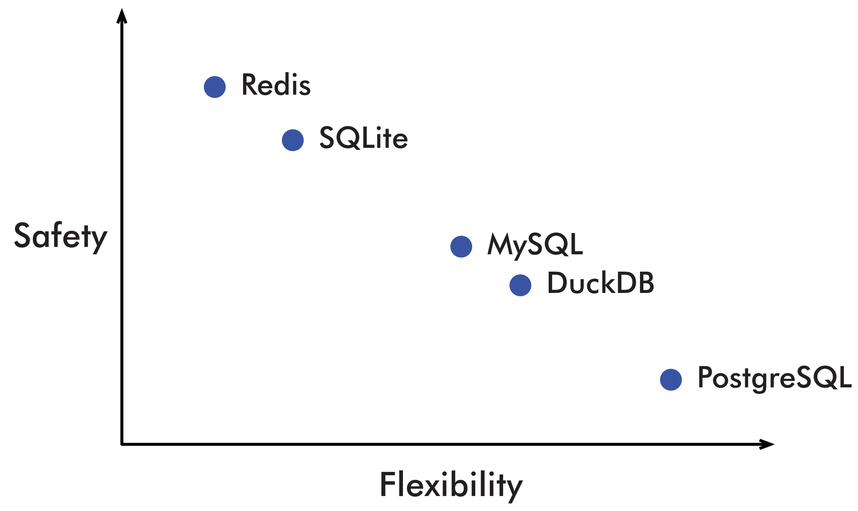
Motivation

- **DBMS Extensibility allows users to add features to a DB system without developing a new DBMS from scratch**
- **Despite this, the field of DBMS extensibility is not well-studied**



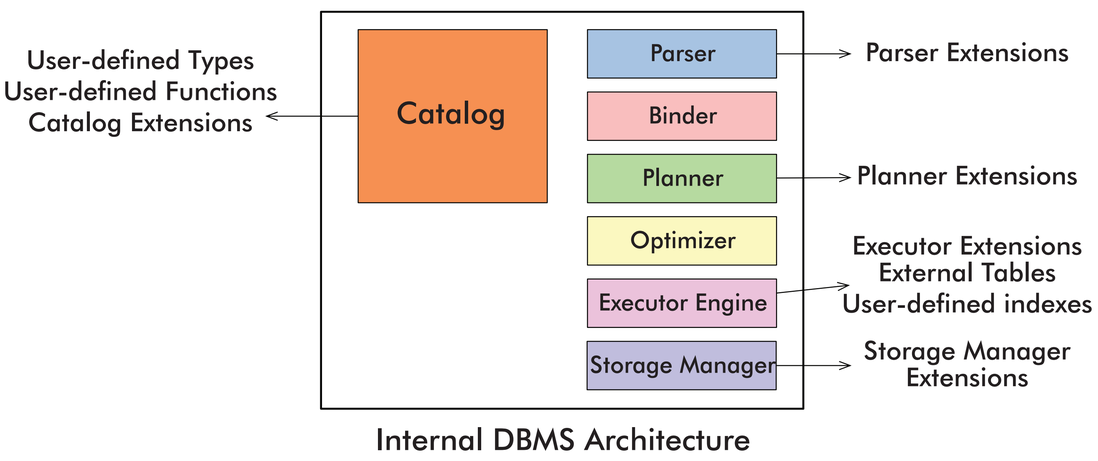
Evaluation of DBMS Extensibility Design

- **Safety: how likely is an extension to cause incorrect results to queries, corrupt data, or mess up core functionality?**
- **Flexibility: how possible is it to implement any kind of extension to the DBMS?**



Extension Categorization

- **Do extensions extend or override the core DBMS?**
- **Do extensions override either the DBMS or DB state?**
- **Do extensions have the potential to modify other extensions' execution or output?**
- **Which component of the DBMS does an extension modify?**

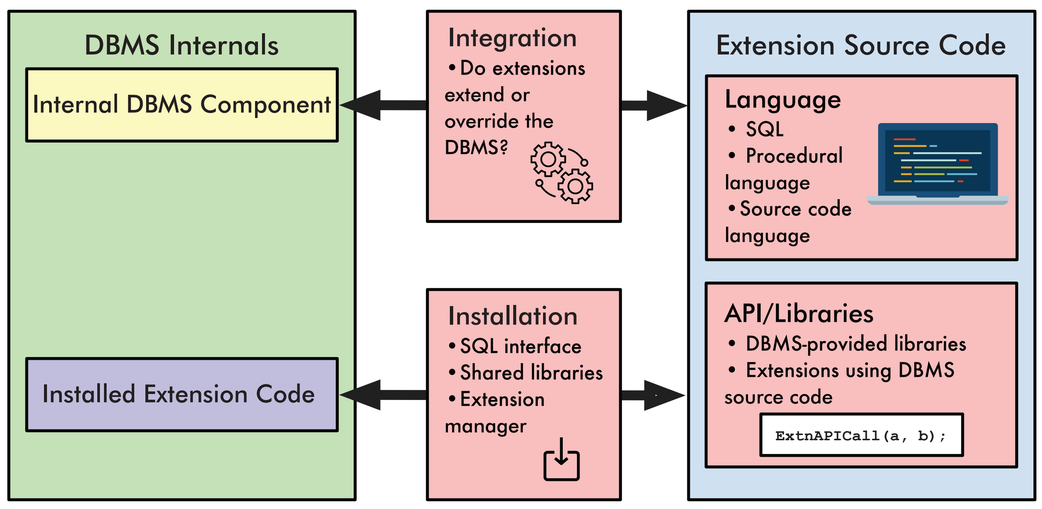


Internal DBMS Architecture

PostgreSQL Extension Compatibility Analysis

- **Compatibility between extensions is important because it allows users to customize their DBMS according to their needs**
- **Since PostgreSQL has the most active open-source extension ecosystem, we chose to analyze extension compatibility**
- **17% of PostgreSQL extensions failed their own unit tests when installed with other extensions**
- **Our findings suggest a substantial systems design problem of extensibility in DBMSs**

Extensibility Design Decisions



Future Work

- **DBMS Extensibility an important and understudied topic**
- **We should explore the design principles of DBMS extensibility**
- **Design DBMS extensibility to be both non-restrictive and safe and emphasize compatibility with other extensions**
- **Use DBMS extensibility to allow developers to customize existing DBMSs so they do not create DBMSs from scratch**

Carnegie Mellon University

crunchy data

Parallel Data Laboratory

PDLR23