Introduction to the BLOB Streaming Project

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- Overview of the BLOB Streaming Project
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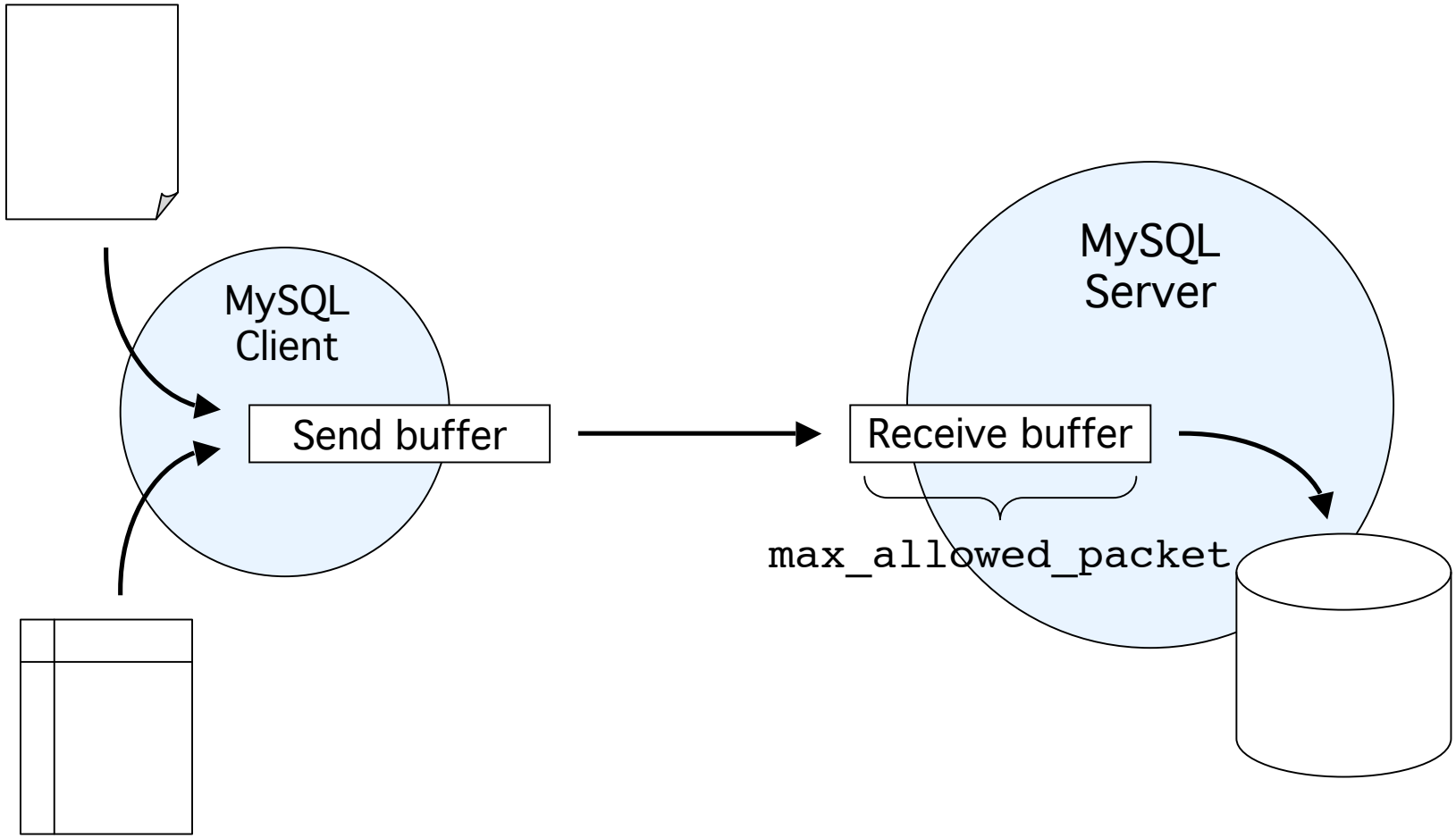
- Database operations: INSERT/SELECT
- Advanced topics: Backup & Replication

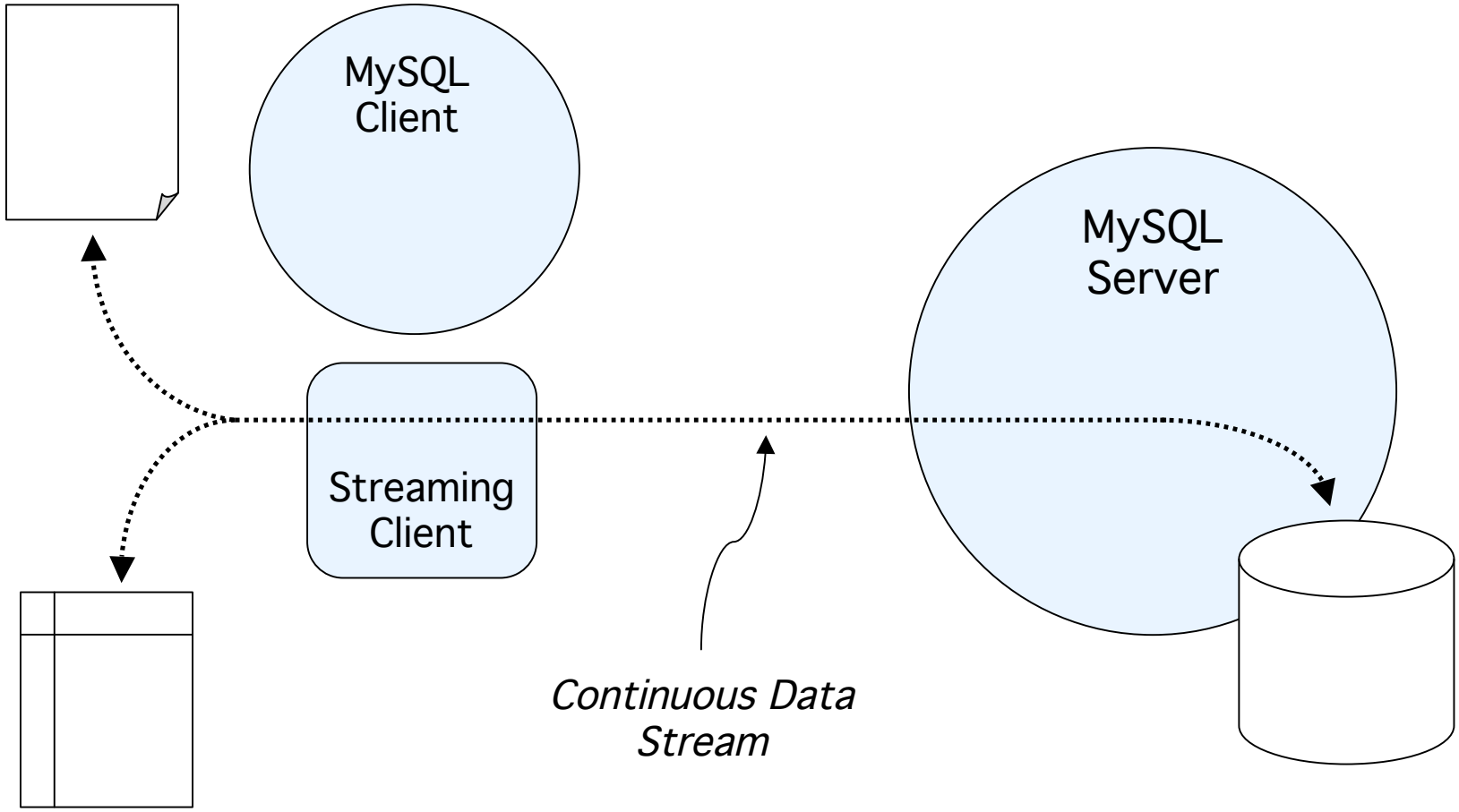
Definition: BLOB

- Invented by Jim Starkey when working for DEC on Rdb, JRD (later InterBase).
- “A blob is the thing that ate Cincinnatti, Cleveland, or whatever” - Jim Starkey
- **B**asic **L**arge **Ob**ject is a “backronym” - Terry McKiever, Apollo Computer Marketing Dept.
- **B**inary **L**arge **Ob**ject - Informix
- Examples: photos, films, MP3 files, PDFs, text files, programs, documents and multimedia.

How MySQL handles BLOBs



Streaming a BLOB…



Goals of BLOB Streaming Project

- Stream BLOB data directly in and out of the database.
- Store BLOBs of any size (> 4GB) in the database.
- Create a scalable back-end that can handle any throughput and storage requirements.
- Provide an open system that can be used by all engines.
- Provide extensions for BLOB streaming to existing MySQL clients (C/C++/PHP/Java, etc).

Why put BLOBs in the Database?

- BLOB operations are transactional
  - **No invalid references**
- All data in one place - good for testing
- Small BLOBs are handled better by databases
  - Convenient to handle all data identically
- Backups are consistent.
- BLOBs in the DB can be Replicated - become part of the HA solution

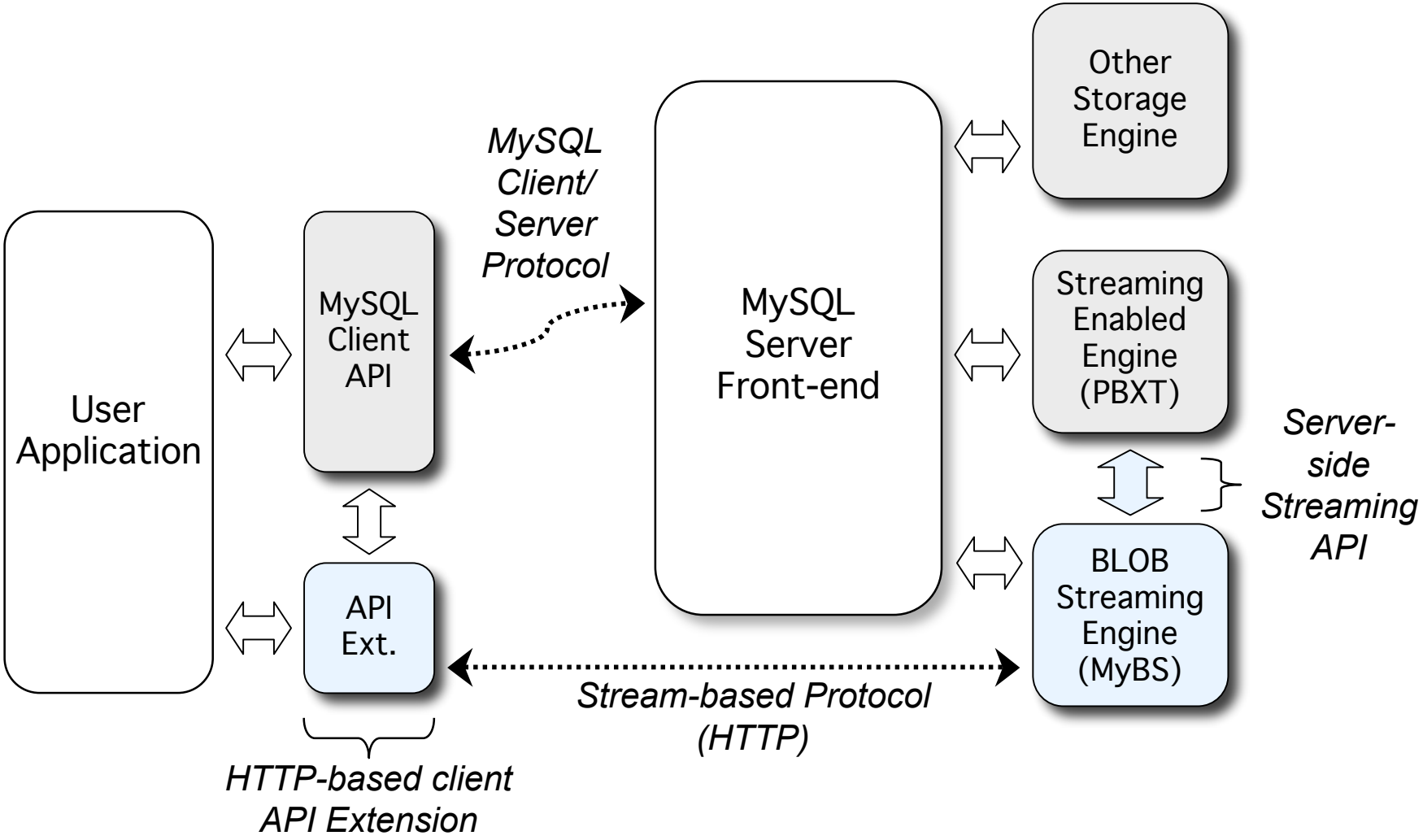
Why "not to BLOB":

- A BLOB column makes a table slow
  - Big rows in memory
  - Sequential scans are not possible
- The database becomes too big
  - Cannot be easily copied
  - Backups become too slow
  - Space not freed on delete
  - The database does not scale well
- Replication is too slow
  - BLOB data must be written to the binary log

The Solution to these Problems

- The “BLOB repository”:
  - A collection of BLOBs stored outside of the database rows
  - References are stored in the table
- Advantages:
  - Allows for incremental backup
  - Automatic defragmentation and compaction
  - Repository BLOB data not written to the binary log
  - The repository can be scaled-out

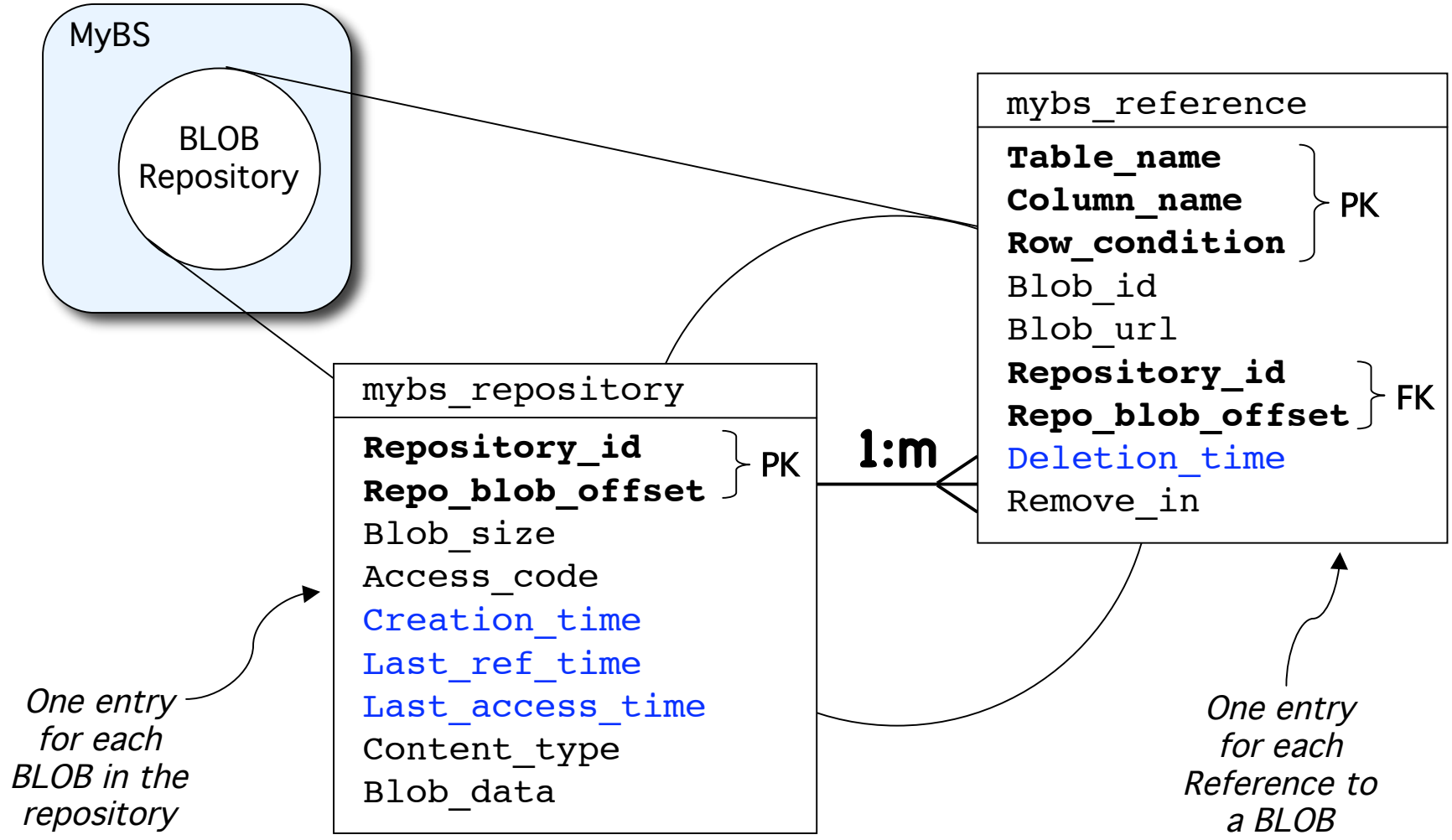
BLOB Streaming Architecture



The BLOB Streaming Engine:

- Does not provide conventional table storage:
  - `CREATE TABLE (…) ENGINE=MyBS` only possible for MyBS system tables.
- Built-in HTTP (Web) server
  - Publishes its own TCP port (8080 by default).
- BLOB Repository
  - BLOBs can be referenced by any table.
- Provides a server-side API for any engine to reference/derefence a BLOB.

A View of the Repository



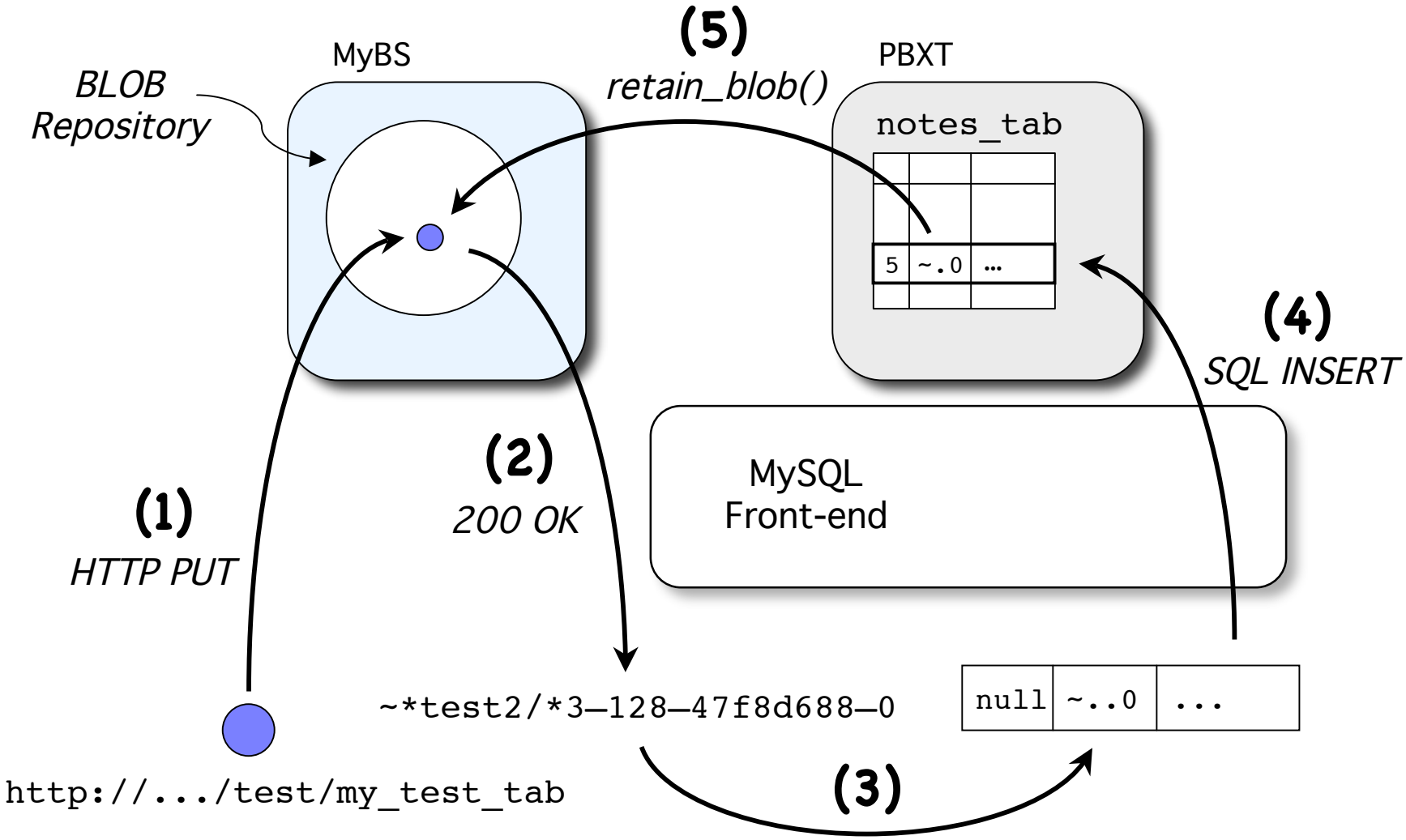
The Temp BLOB Timeout

- BLOBs that are not referenced are deleted from the repository
- Deleted BLOB references are not removed immediately.
- `mybs_temp_blob_timeout` determines delete timeout (in seconds).

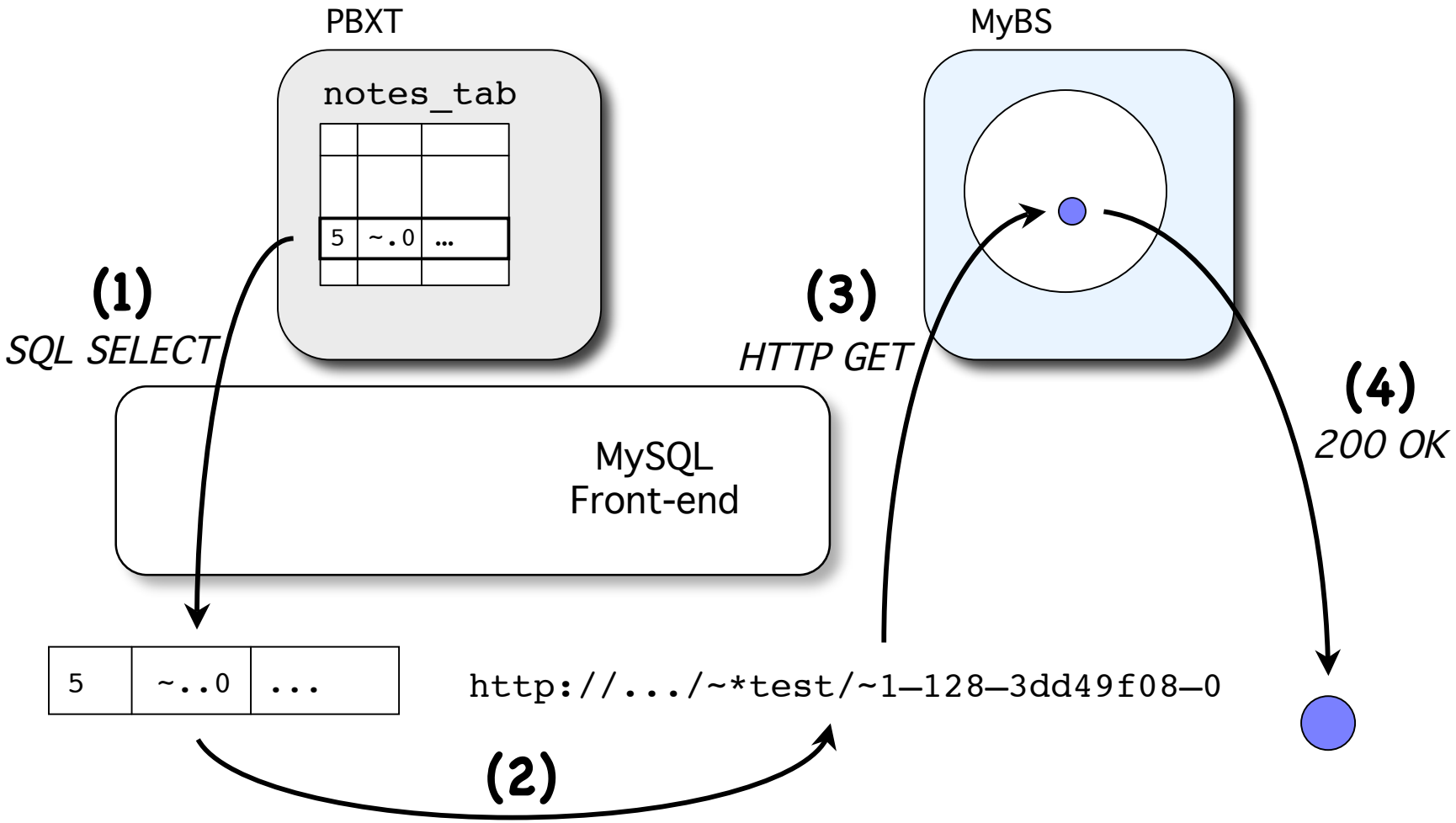
MyBS Repository Demo

- Create a table
- Upload a BLOB for the table to the repository
- View the result in a browser
- Upload a text BLOB for the table to the repository
- Examine the repository using the system tables

INSERTING a BLOB…



SELECTING a BLOB…



INSERT & SELECT Demo

- Upload a BLOB
- INSERT the BLOB URL (reference)
- View the BLOB Repository
- SELECT the BLOB URL from the table.
- Use the URL to retrieve the BLOB.

Client-side Extensions

- JDBC - Connector/J SE 5.0.7:
  - Supports transparent streaming of BLOB data to and from the MyBS BLOB Repository: using `get/setBinaryStream()` and `get/setBlob()`
- Google Summer of Code 2008
  - Extension to Connector/PHP
- Still to be done:
  - mysqlclient library - simple extension to do HTTP GET and PUT.
  - ODBC - Support using existing functions: `SQLGetData()` and `SQLPutData()`
  - Other Languages (Perl, Ruby, etc)

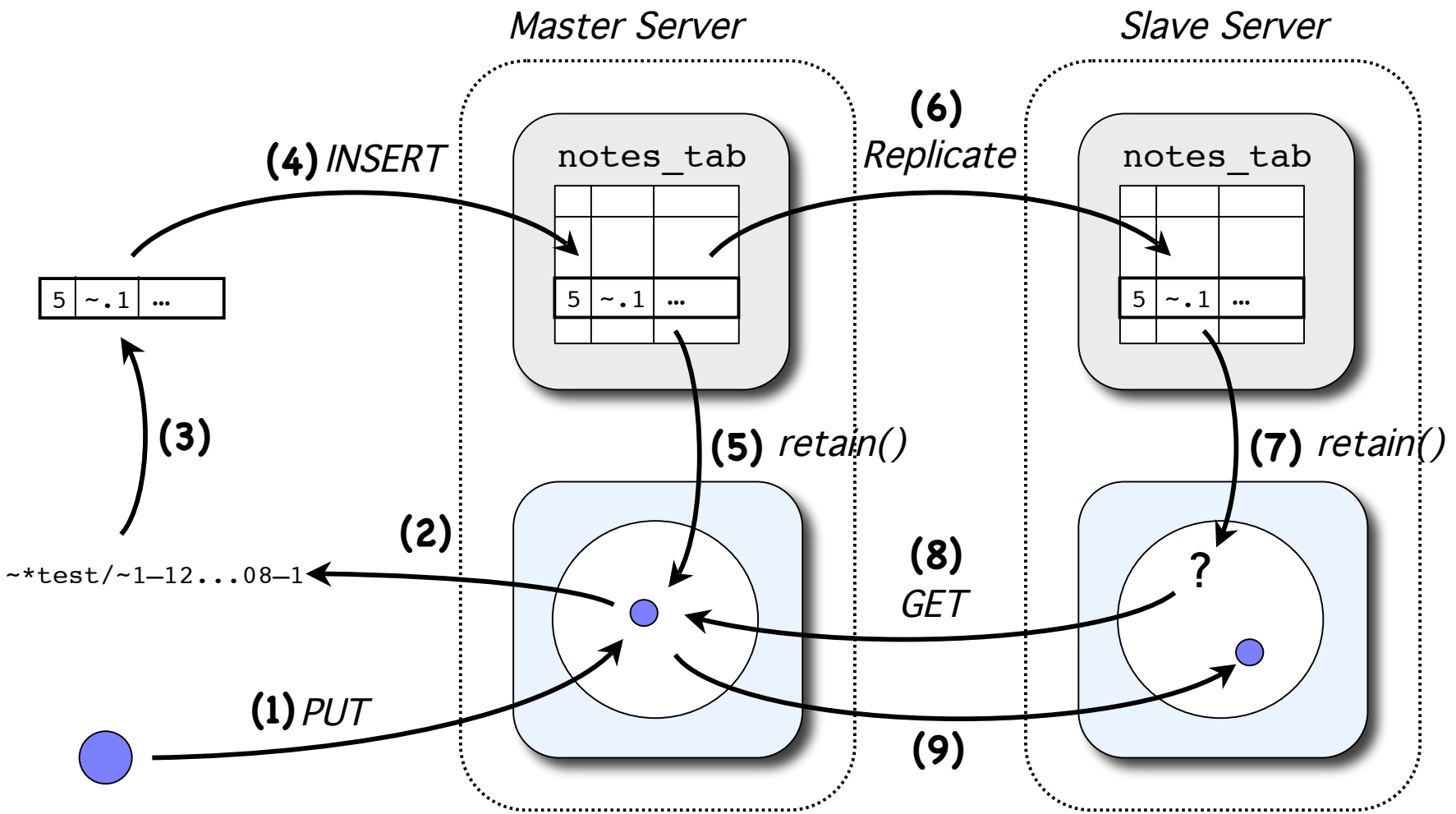
How will BACKUP work?

- How does `mysqldump` work if `SELECT` returns a reference, not the data?

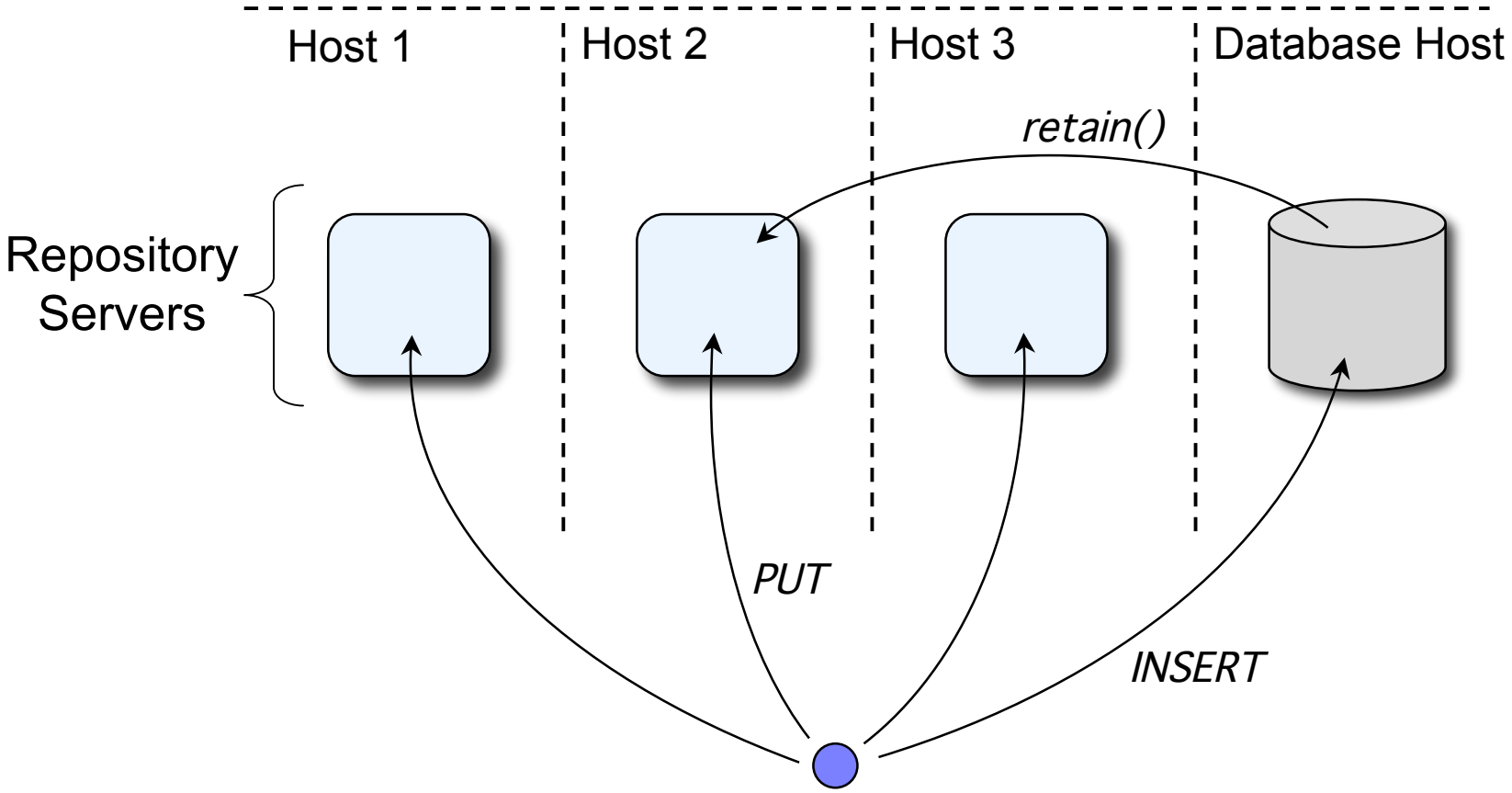
```
mysql> select * from my_test_tab;
+------+--------------------------+
| n_id | n_text                   |
+------+--------------------------+
|    1 | ~*test/~2-128-1680fce2-0 |
+------+--------------------------+
1 row in set (0.00 sec)
```

- `mysqldump` will also dump `mybs_repository` and `mybs_reference`.
- For import of dump, MyBS system tables must be writeable.

Replication Mechanism



Distributed Repository



Q&A

Thanks for Listening!

http://www.blobstreaming.org

http://sourceforge.net/projects/mybs

http://pbxt.blogspot.com