MySQL Workbench 6.3
MySQL Labs

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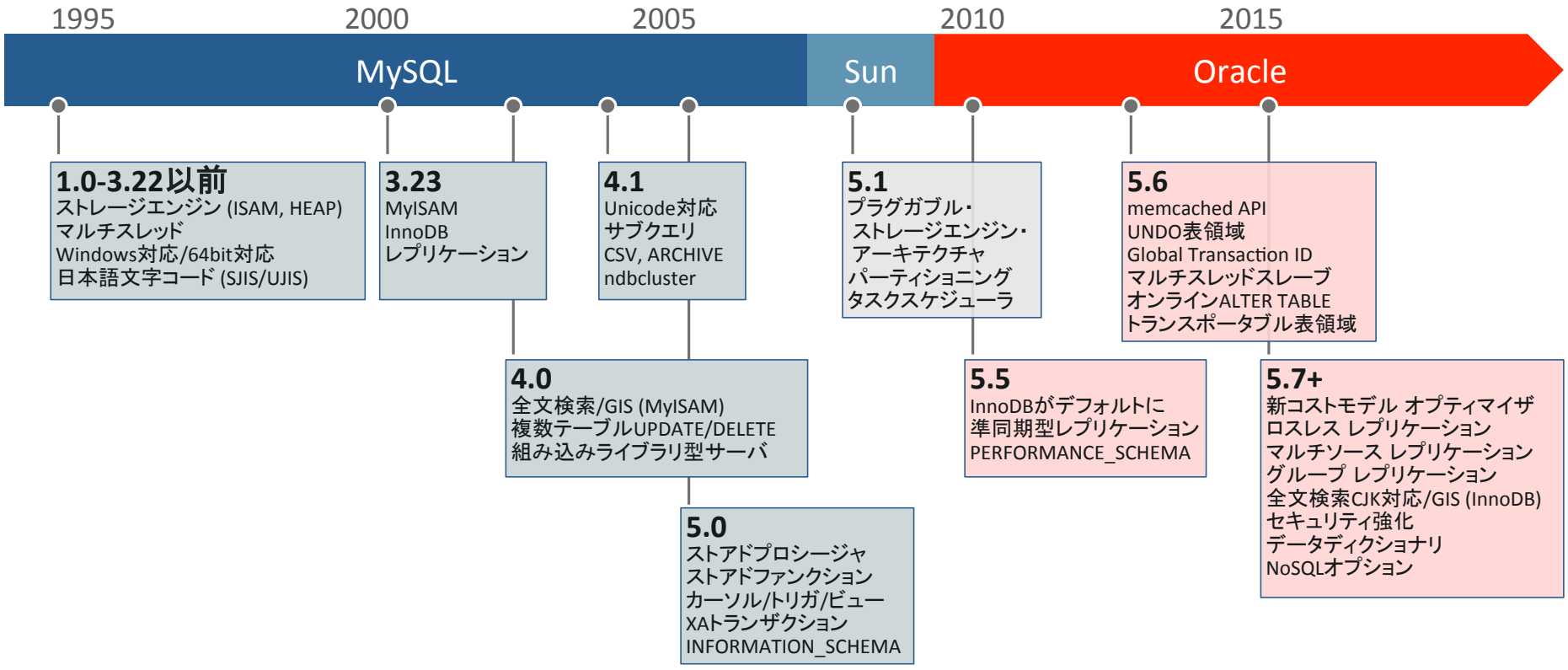
The world's most popular open source database

世界で最も普及しているオープンソース データベース

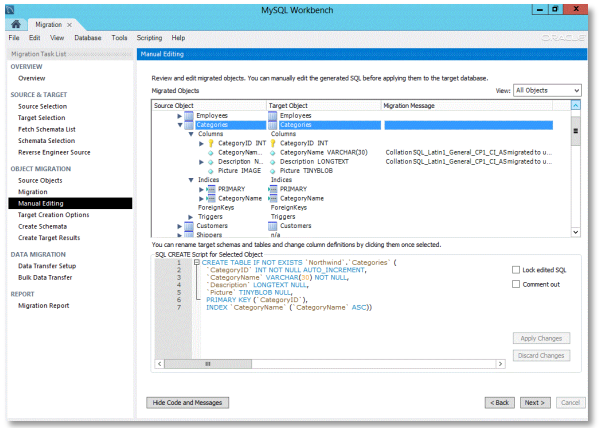
ORACLE



MySQL Workbench 6.3

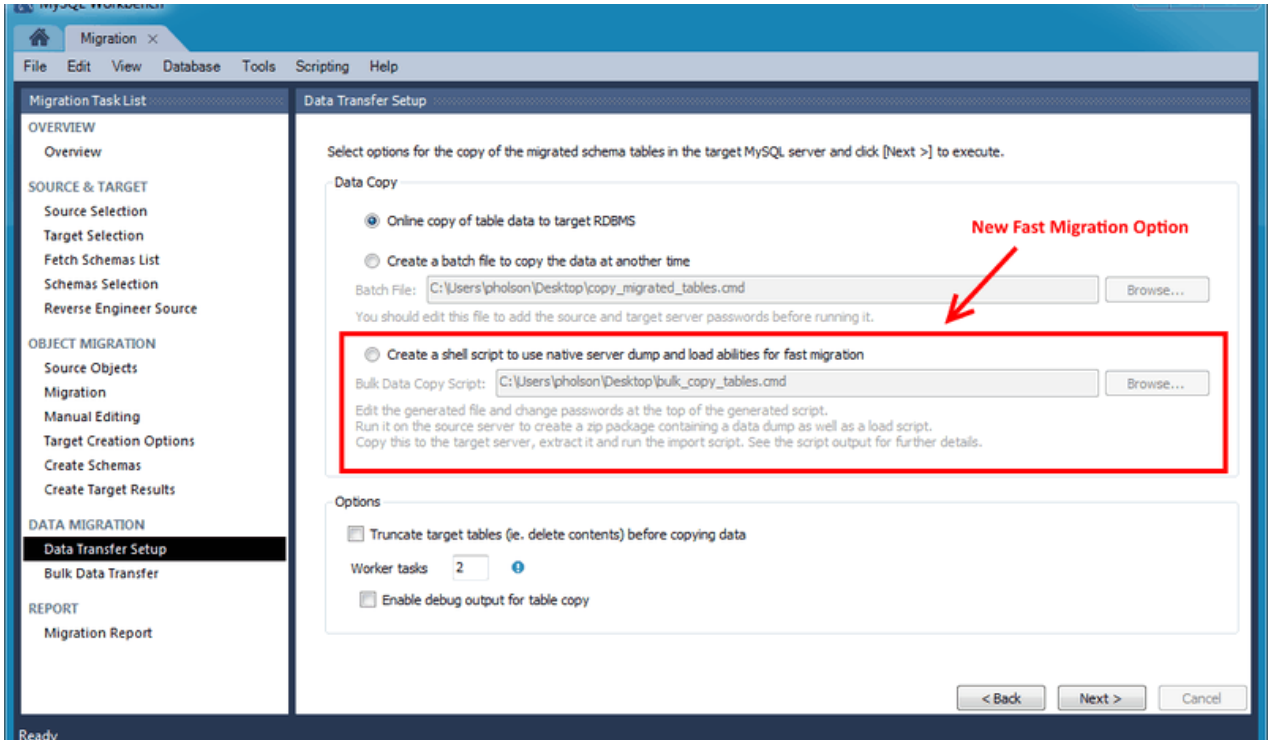
GA

- Fabric
  - Add node, browse, view, connect
- Performance Dashboard
  - Performance Schema Reports & Graphs
- Visual Explain
- GIS Viewer
- Migration
  - New: Microsoft Access
  - Microsoft SQL Server, Sybase, PostgreSQL, SQLite



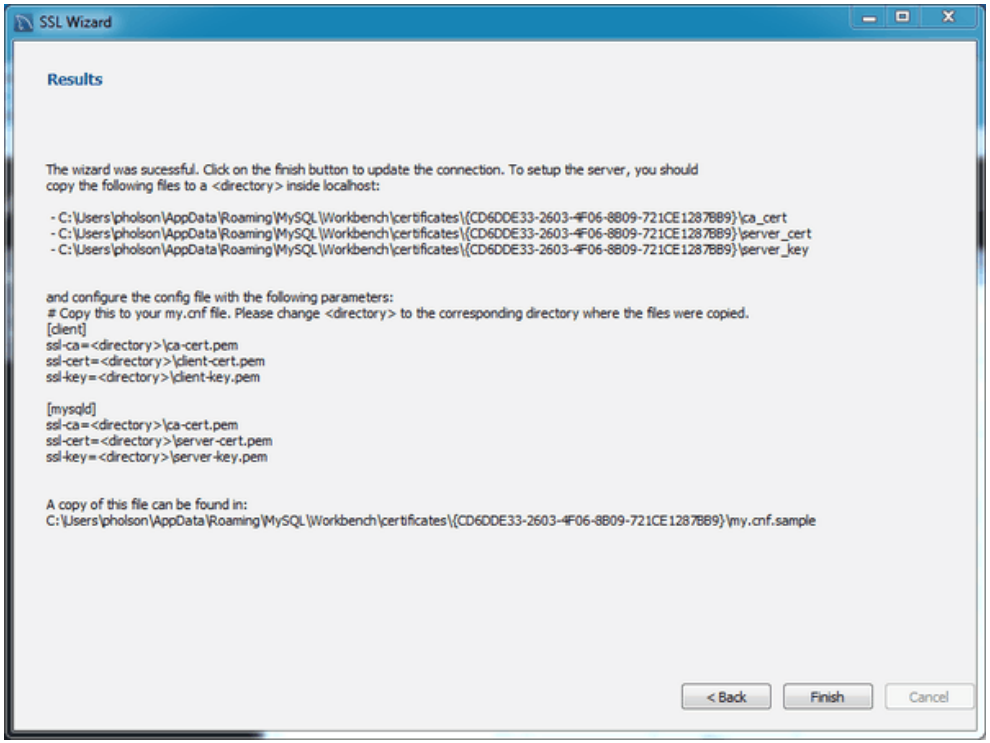
- New Easy to Use Wizards for
  - Fast Data Migration
  - Table<->File Data Import/Export (like Excel)
  - SSL Certificate Creation

MySQL Workbench 6.3: Fast Data Migration



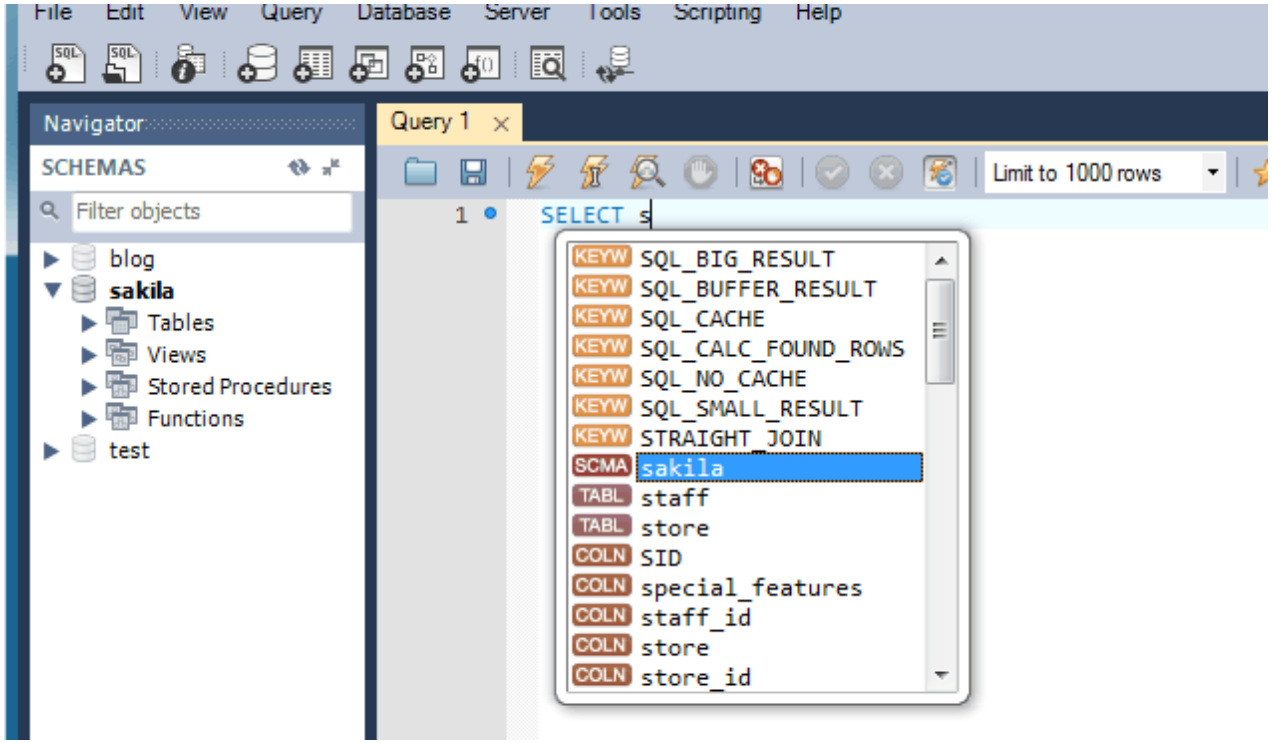
- New Migration Wizard option
- Generated script on the source server to create a self-contained Zip file of dumped data
- To void the need to traffic all data through MySQL Workbench
- No need to have a permanent network connection between source and target servers

MySQL Workbench 6.3: SSL Certificate Generator



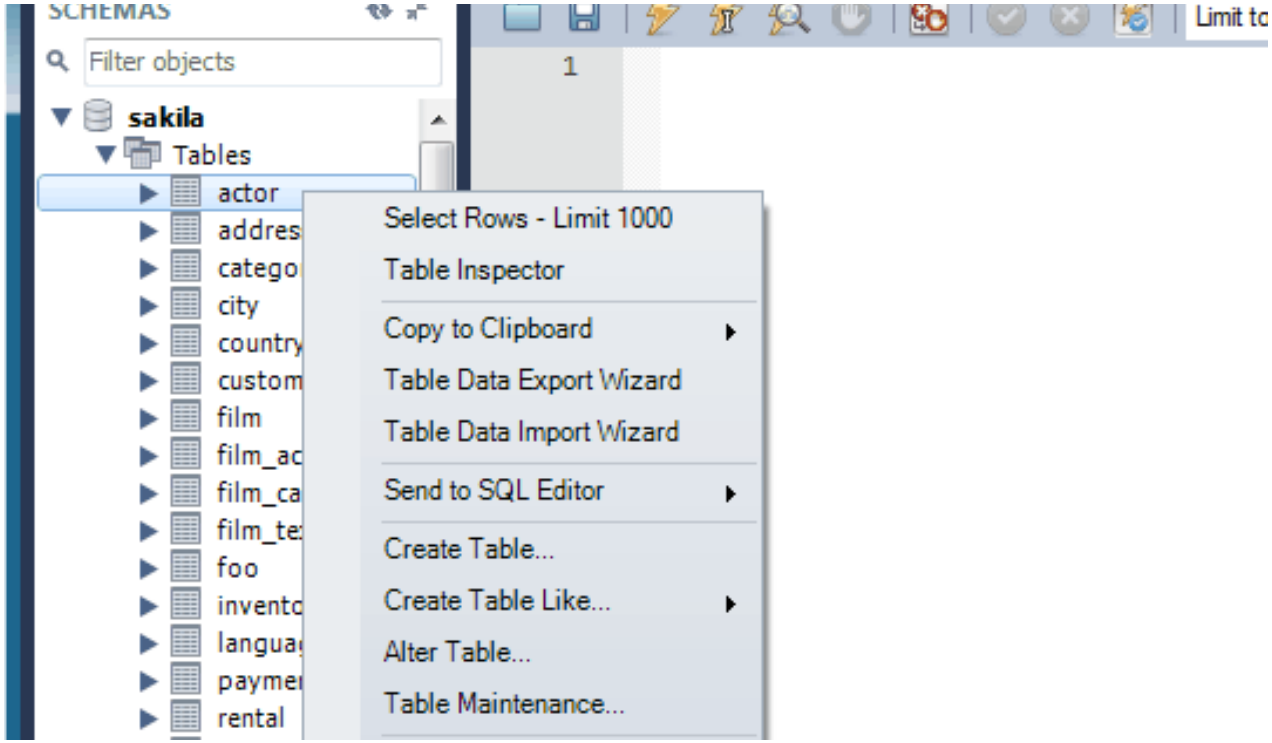
- New SSL certificate generation wizard
- To help create proper SSL certificates for both MySQL clients and MySQL servers
- This wizard requires OpenSSL to create the certificates

MySQL Workbench 6.3: SQL Editor Auto-Completion



- now functions with all statement types
- It now minds the MySQL server version
- Additional suggestions are now available, such as system variables, engines, table spaces, logfile groups, and more.

MySQL Workbench 6.3: Data Export and Import Wizard



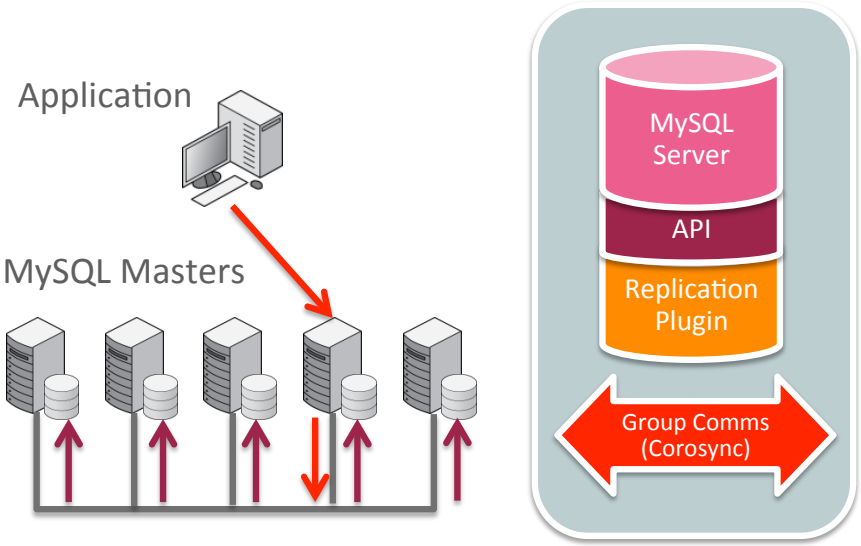
- Supports import and export of CSV and JSON files
- More flexible configuration (separators, column selection, encoding selection, and more)

MySQL Labs

MySQL Labs

- 先進的な機能や実験的な仕様のをいち早く公開
  - コミュニティからのフィードバックをいただく
- 将来的にはMySQLサーバやMySQL Cluster本体への統合を期待
  - MySQL 5.6 memcached API
  - MySQL Cluster 7.2 memcached API
  - MySQL 5.6 Performance Schema
  - MySQL 5.6 Intra-schema Multi Thread Slave
  - MySQL 5.6 Online Alter Table
  - MySQL 5.7 Multi Source Replication
  - MySQL 5.7 New Optimizer Cost Model

MySQL 5.7: グループレプリケーション



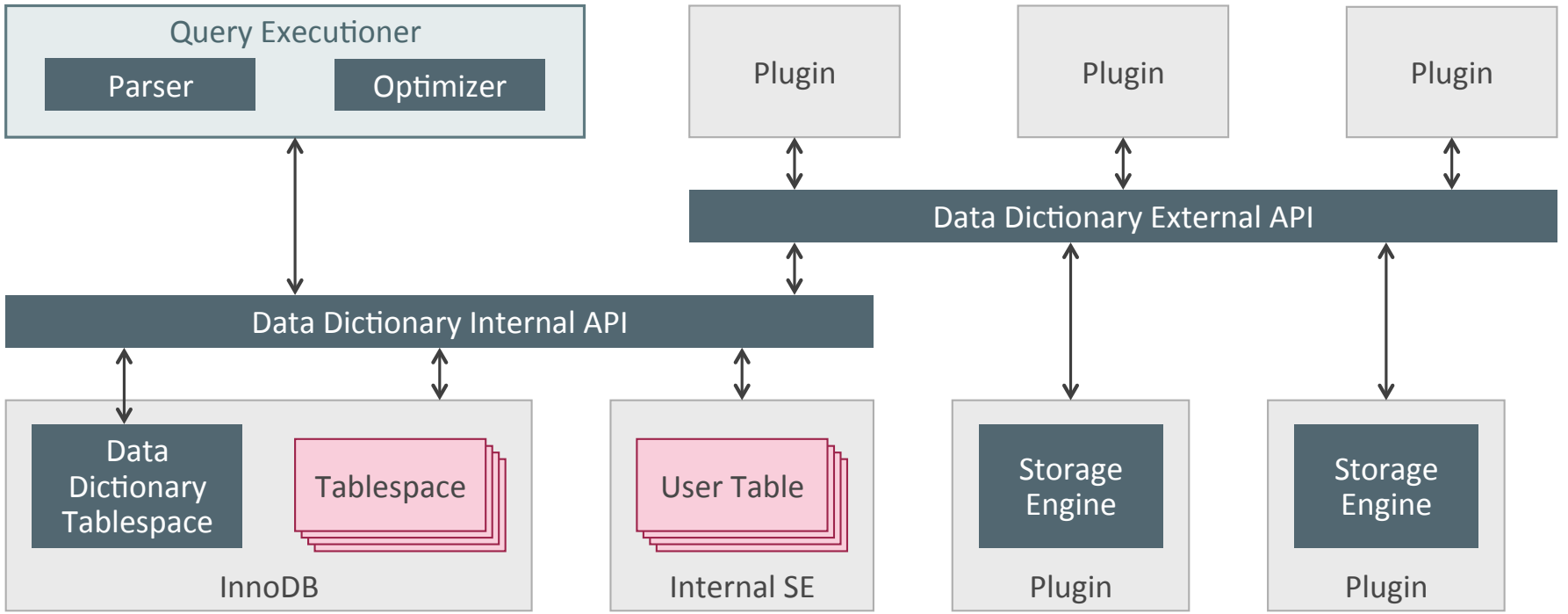
- シェアード・ナッシング型”疑似”同期レプリケーション
- 更新はマルチ・マスタ型でどこでも可能
  - 矛盾の検知と解決(トランザクションのロールバック
  - “Optimistic State Machine” レプリケーション
- グループメンバーの管理と障害検知を自動化
  - サーバのフェールオーバー不要
  - 構成の拡張/縮小の柔軟性
  - 単一障害点無し
  - 自動再構成
- 既存構成との統合
  - InnoDB
  - GTIDベースのレプリケーション
  - PERFORMANCE_SCHEMA

Early Access Feature (EAF): Data Dictionary

Replacing the FRMs

- A single repository for database object metadata
  - InnoDB tables replace .frm, .trg, .trn, .par files
- Atomic & crash-safe operations today
  - Transactional in the future
- Makes adding new features much easier
- Eliminates complexity, resolves bugs
- Improves performance
- Leverages InnoDB strengths

New Data Dictionary: Architecture



EAF: InnoDB Compression

Thank you, SanDisk Fusion-io

- ページレベルでの透過的圧縮
  - バックグラウンドスレッドにより自動的に圧縮
  - IOレイヤにて管理
  - スパースファイルを使用。サポート済みOSカーネルおよびファイルシステムが必要
- IO削減
  - MySQLの性能向上
  - ストレージ利用効率向上
  - 書き込みサイクル削減、SSDのライフサイクルを維持
- 全てのInnoDBのデータ、システム表領域、UNDOログが対象

HTTP Plugin for MySQL

- MySQLサーバへのHTTP(S)エンドポイントを提供するプラグイン
- 結果をUTF8でエンコードされたJSONフォーマットにシリアライズ
- 3種類のユーザエンドポイント
  - SQL
  - CRUD - Key-Value
  - JSON - Document

- For more details;
  http://www.slideshare.net/nixnutz/http-plugin-for-mysql-39598656

HTTP Plugin for MySQL

The SQL endpoint and JSON

```
shell> curl --user basic_auth_user:basic_auth_passwd
 --url "http://127.0.0.1:8080/sql/db/SELECT+1"
[
  {
  "meta":[
    {"type":8,"catalog":"def","database":"","table":"",
    "org_table":"","column":"1","org_column":"","charset":63,
    "length":1,"flags":129,"decimals":0}
  ],
  "data":[
    ["1"]
  ],
  "status":[{"server_status":2,"warning_count":0}]
  }
]
```

HTTP Plugin for MySQL - Initial version

- HTTP Basic Authentication for SSL and Non-SSL
- No query cache support
- No commercial thread pool plugin support
- Not all MySQL pluggable auth methods supported
- Unlimited: all SQL statements
- Unlimited: everything the server returns

```
shell> curl --user basic_auth_user:basic_auth_passwd
    --url "http://.../sql/db/SELECT+col_float+FROM+sql_types"
```

HTTP Plugin for MySQL

GET = SELECT

```
shell> curl ... --url "http://../crud/db/sql_types/1"
{
  "id"                : "1",
  "col_char"          : "CHAR(127)" ,
  "col_null"          : null,
  "col_date"          : "2014-12-23",
  "col_decimal"       : "123.45",
  "col_float"         : "0.9999",
  "col_bigint"        : "92233720368547758O7"
}

shell> curl ... --url 'http://../crud/db/simple/'
{
  "errno" : 2000,
  "error" : "The request URL must include a primary key value"
}
```

MySQL Binlog Events

Formerly known as Binlog API

- C++ library for reading Binary log
- Can read binary log from server or from file
  - One transport for each kind of source
  - Currently have file and mysql transport
- Decode binary log events
  - Contain code to decode the events
- Event Driven API

MySQL 5.7: JSON

- Optimized for read intensive workload
- Native JSON data types
  - Native internal binary format for efficient processing & storage
- Built-in JSON functions
  - Allowing you to efficiently store, search, update, and manipulate Documents
- JSON Comparator
  - Allows for easy integration of Document data within your SQL queries
- Indexing of Documents using Generated Columns
  - InnoDB supports indexes on both stored and virtual Generated Columns
  - New expression analyzer automatically uses the best “functional” index available

MySQL 5.7: JSON

```
mysql> CREATE TABLE employees (data JSON);
Query OK, 0 rows affected (0,01 sec)

mysql> INSERT INTO employees VALUES ('{"id": 1, "name": "Jane"}');
Query OK, 1 row affected (0,00 sec)

mysql> INSERT INTO employees VALUES ('{"id": 2, "name": "Joe"}');
Query OK, 1 row affected (0,00 sec)

mysql> select * from employees;
+---------------------------+
| data                      |
+---------------------------+
| {"id": 1, "name": "Jane"} |
| {"id": 2, "name": "Joe"}  |
+---------------------------+
2 rows in set (0,00 sec)
```

MySQL 5.7: JSON

- Document Validation
  - on insert only

```
mysql> INSERT INTO employees VALUES ('some random text');
ERROR 3130 (22032): Invalid JSON text: "Expect a value here." at position 0 in
value (or column) 'some random text'.
```

- Efficient Access

```
mysql> select jsn_extract(data, '$.name') from employees;
+-----------------------------+
| jsn_extract(data, '$.name') |
+-----------------------------+
| "Jane"                      |
| "Joe"                       |
+-----------------------------+
2 rows in set (0,00 sec)
```

JSON Functions for Creating & Manipulating JSON Documents

- **`jsn_array()`**
  - Build a JSON array from list of expressions
- **`jsn_object()`**
  - Builds JSON objects from a variable length list of key/value pairs
- **`jsn_insert()`**
  - Adds 'missing' data to JSON documents
- **`jsn_remove()`**
  - Removes attributes from existing JSON documents
- **`jsn_set()`**
  - Sets attributes within JSON documents
- **`jsn_replace()`**
  - Replaces (but doesn't add) attributes within JSON documents
- **`jsn_append()`**
  - Adds a value to the end of an array
- **`jsn_merge()`**
  - Merges two arrays
- **`jsn_extract()`**
  - Returns a value nested inside of a JSON document

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Query and Search JSON Functions

- **`jsn_search()`**
  - Search for values within JSON documents and return their locations
- **`jsn_contains()`**
  - Checks for a specific element and value
- **`jsn_contains_path()`**
  - Determine if a specific element is present in a document in a specific position
- **`jsn_valid()`**
  - Check if document is a valid JSON document
- **`jsn_type()`**
  - Find the type of a value within a document
- **`jsn_keys()`**
  - Returns arrays of the key names for the JSON documents
- **`jsn_length()`**
  - Number of elements in JSON document
- **`jsn_depth()`**
  - Level of nesting in JSON document
- **`jsn_unquote()`**
  - Helps move from JSON to other MySQL types
- **`jsn_quote()`**
  - Helps move from other MySQL types to JSON

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Generated Columns

Digging into your Documents

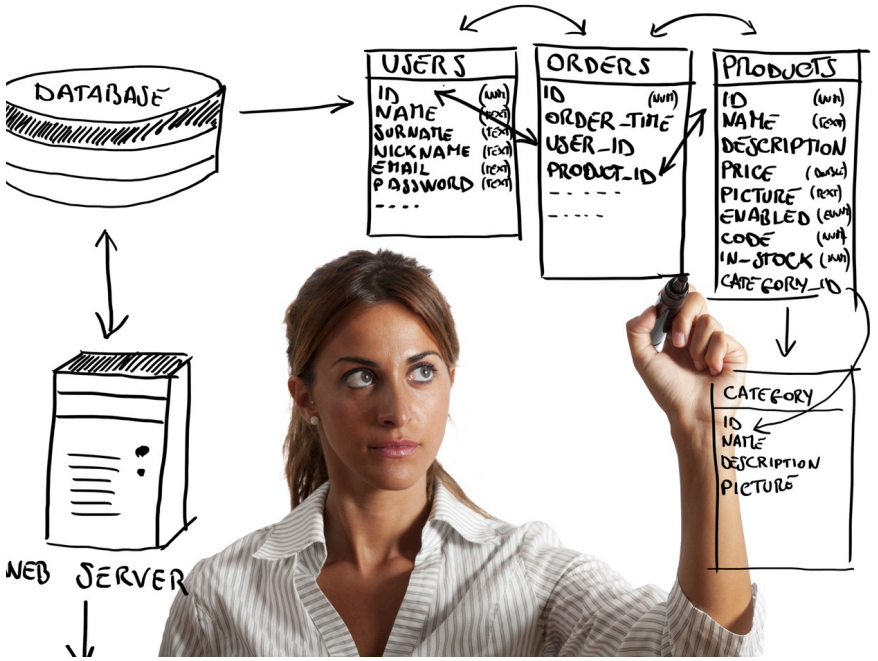
- Virtual Generated Column
  - Generated on the fly when the column is read
  - Can be indexed
- Stored Generated Column
  - Generated when the referenced column is written to
  - Can be indexed

```
mysql> ALTER TABLE employees ADD name VARCHAR(100)
GENERATED ALWAYS AS(jsn_extract(info, '$.name')) VIRTUAL;
mysql> ALTER TABLE employees ADD INDEX(name);
```

http://mysqlserverteam.com/

So Just Another Document Store?

- Save memory/storage and simplify application
  - Joins between Documents
    - Normalize data where it makes sense
  - Foreign Keys between Documents
  - Update multiple Documents in a single atomic transaction
- Leverage all of your data
  - Read/write Document and relational data in a single query/transaction
- 20 years of product maturity



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5.6

MySQL Server – GA

InnoDBの改良やオプティマイザの刷新による性能&拡張性向上
レプリケーションの可用性向上 & NoSQLインタフェース追加

5.7

MySQL Server – RC

リファクタリング & 各機能のプラグイン化による性能と信頼性の向上
JSONやGroup Replicationなどクラウド環境での要件への対応

7.4

MySQL Cluster - GA

秒間2億件のNoSQL処理、秒間200万件のSQL処理
リカバリや再起動時間の短縮

ORACLE

The world's most popular open source database

世界で最も普及しているオープンソース データベース

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