DBA Tutorial
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Certification Details

- http://www.mysql.com/certification/
- Registration at Conference
- Closed Book Exams
- Non-Disclosure and Logo Usage Agreements
- 70 multiple-choice questions
- 90 minutes
MySQL Certification Study Guide

- http://www.mysql.com/certification/studyguides
New DBA 5.1 Hands On Exams

- Online real life tasks
- Need to pass 5 out of 5 mandatory tasks
- Need to pass 5 out of 10 optional tasks
Exam Content DBA 1

- MySQL Architecture (10%)
- Starting, Stopping, and Configuring MySQL (20%)
- Client Programs for DBA Work (5%)
- Character Set Support (5%)
- Locking (10%)
- Storage Engines (20%)
- Data (Table) Maintenance (10%)
- The INFORMATION_SCHEMA Database (5%)
- Data Backup and Recovery Methods (15%)
Exam Content DBA 2

- Stored Routines (5%)
- User Management (20%)
- Securing the Server (10%)
- Upgrade-Related Security Issues (5%)
- Optimizing Queries (15%)
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Client/Server Overview

- OS independancy
- C Client Library
- Connectors
Communication Protocols

- Windows Only: Named Pipes, Shared Memory
- --skip-networking
- Unix Sockets vs TCP/IP
SQL Parser & Storage Engines

- Two Tiers
- Storage Engines Independance
How MySQL uses Disk Space

- Data Directory
- InnoDB Table Space
How MySQL Uses Memory

- One Connection = One Thread
- Grant Table Buffer
- Key Buffer Cache
- Table Cache
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Types of MySQL Distributions

- tar & RPM
- Binaries vs self-built
Starting and Stopping, Windows

- Pre-initialized Data Directory
- Multiple mysqld Binaries
- --console Option
- Running mysql command line client
- Install mysqld as a service
Starting and Stopping, Unix

- RPM: user, group, data directory
- Data Directory: /var/lib/mysql
- mysqld, mysqld_safe, mysql.server
- How to stop a MySQL server
- mysqld writes to stdout
Runtime MySQL Configuration

- my.cnf / my.ini
- Option File vs Command Line
- General Startup Options
Log and Status Files

- Problems with Logging
- General Log
- Slow Query Log
- Queries not using indexes
Loading Time Zone Tables

- mysql_tzinfo_to_sql script
Security-Related Configuration

- Passwords
- Filesystem Access
SQL Mode

- Use
- How to configure
Upgrading MySQL

- Manual and Release Notes
- Basic Procedure
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Client Programs

- mysql Command Line Client
- mysqladmin
- mysqlimport
- mysqldump
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Character Set Support

- Performance Issues
- Disk Usage, Disk I/O, Memory Usage
- CHAR vs VARCHAR
Break
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Locking Concepts

- Read vs Write Locks
- Explicit vs Implicit Locks
- Advisory Locks
- Table vs Row Level Locks
- Deadlocks
Explicit Table Locking

- LOCK TABLE
- READ LOCAL
- Releasing Table Locks
- Locking multiple tables
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MySQL Storage Engines

- Things to consider
- Default Engine
- Determine the storage engine
- Required Engines: MyISAM, Memory
The MyISAM Engine

- MERGE, FULLTEXT features
- LOW_PRIORITY, HIGH_PRIORITY
- Out of Disk Space
- No Deadlocks
- Fixed Format
- Compressed Format
The MERGE Engine

- Table Locking
- No Deadlocks
The InnoDB Engine

- Tablespace
- Multiversioning
- Deadlocks
- Auto-Recovery
- Foreign Keys
- Per-Table Tablespace
- Transactions
- SAVEPOINT
- Implicit Commits
- Isolation Levels
The MEMORY Engine

- General Characteristics
- BTREE vs HASH Indexes
The FEDERATED Engine

- Concepts of FEDERATED Engine
- How to define
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SQL Statements

- CHECK TABLE
- REPAIR TABLE
- ANALYZE TABLE
- OPTIMIZE TABLE
- Table Statistics
Client and Utility Programs

- myisamchk
- mysqlcheck
MyISAM Auto-Repair

- --myisam-recover
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INFORMATION_SCHEMA

- List of Tables
- Read-Only
- INFORMATION_SCHEMA vs SHOW
- Limitations
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Introduction

- Recovery = Backup + Binary Log
- Principles of MySQL Backup
- Binary vs Text Backup
Making Binary Backups

- MyISAM Tables
- InnoDB Tables
- Binary Portability
Making Text Backups

- SELECT INTO OUTFILE
- mysqldump
Replication as an Aid to Backup

- Hot Backup
- How to Backup a Slave
Data Recovery

- Load mysqldump File
- Binary Log
- mysqlbinlog
- --start-position
- --stop-position
End of Part 1
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Stored Procedures

- DEFINER/INVOKER
- Check incoming Data
- Restrict incoming Data
- Reduce Amount of Data Exchange
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User Account Management

- Username + Hostname
- Wildcards
- Grant Tables in mysql Database
- Global, Database, Table, Column, Routine Level
- ALL PRIVILEGES
- USAGE Privilege
- Grants Cache
- GRANT/REVOKE
- CREATE/DROP USER
- IDENTIFIED BY
- WITH GRANT OPTION
- SHOW GRANTS
- SET PASSWORD
Client Access Control

- Two Stages
- Wildcards
- Hostnames, then Usernames
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Filesystem Security

- Don‘t run mysql as root
- Log Files should be kept secret
Network Security

- MySQL user names != OS user names
- mysql_secure_installation Script
- mysql Database
- FILE Privilege
- SHOW PROCESSLIST
- SUPER Privilege
- --skip-networking
- --bind-address
FEDERATED Table Security

- Connect String Storage
- Prevent Users from seeing password
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Upgrade-Related Security Issues

- Upgrading Privilege Tables
- Strict SQL Mode
- Error for Division by Zero
- Zero Dates, Null Dates
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Identifying Candidates for Analysis

- Binary Log
- Slow Query Log
- SHOW PROCESSLIST
EXPLAIN

- columns: possible_keys, key, ref, id
- Joins: Multiply row numbers
- Order of Tables
- type: eq_ref, range, const
- Multi-Column Indexes
- STRAIGHT JOIN
MyISAM Index Caching

- Global vs Table Level Key Buffer
- SET, CACHE INDEX, LOAD INDEX INTO
Break
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General Table Optimization

- PROCEDURE ANALYSE()
- Normalization vs Denormalization
MyISAM-Specific Optimizations

- Compressed Tables
- Dynamic vs Fixed Row Format
- Split Table into Dynamic and Fixed Parts
InnoDB-Specific Optimizations

- Size of Primary Keys
- SELECT COUNT(*)
- Group Statements into Transactions
- OPTIMIZE TABLE
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Tuning Memory Parameters

- Table Cache
- Small Default Values
- MyISAM Key Buffer
- InnoDB Buffer Pool
- Disabling InnoDB
- read_buffer_size
- Sort Buffer
- Join Buffer
- max_allowed_packet
Using the Query Cache

- Characteristics
- `query_cache_size`
- `query_cache_limit`
- `SHOW STATUS LIKE „qcache_%“`
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Diagnostics

- Error Log
- long_query_time
- Slow Query Log
- mysqldumpslow
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Memory and Disks

- Memory is important
- Disk Seek Time is important
- RAID
- Separate Log Files and Data Directory
- Using Symlinks
- Filesystem Selection
Network and OS

- Latency and Throughput
- Process Limits
- max_connections
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Using Multiple Servers

- Requirements
- Shared InnoDB tables
Replication

- General Features
- Master-Slave
- MASTER_LOG_FILE, MASTER_LOG_POS
- master.info
- Relay Log
- Binary Log
- IO Thread, SQL Thread
- Unique Server IDs
The preceding is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle’s products remains at the sole discretion of Oracle.
Good Luck!