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Its all about Performance and Scalability

MySQL Best Practices

for DBAs and Developers

Volume I

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AGENDA

- Essential MySQL configuration
- MySQL user security
- Improving your SQL
 - Capture
 - Analysis

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AUTHOR

- 2011 All time top blog contributor to Planet MySQL
- 2010 Published Author of Expert PHP & MySQL
- 2010 Oracle ACE Director (first in MySQL)



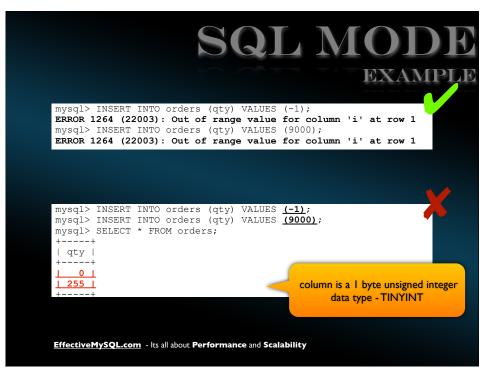
- 2009 MySQL community member of the year
- 22 years of RDBMS experience, 12 years with MySQL
 - MySQL Inc (2006-2008), Oracle Corp (96-99)
- Provide independent consulting/ Available NOW

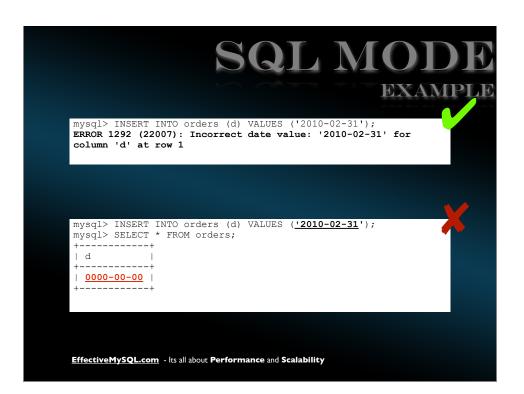




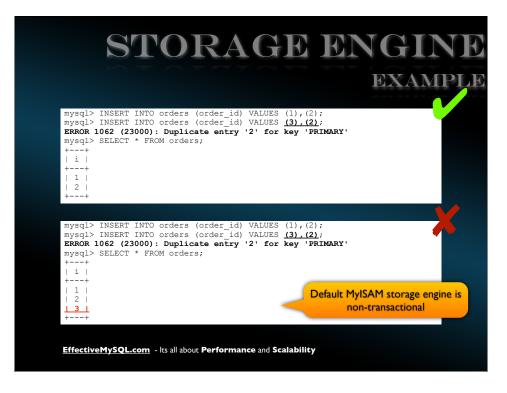


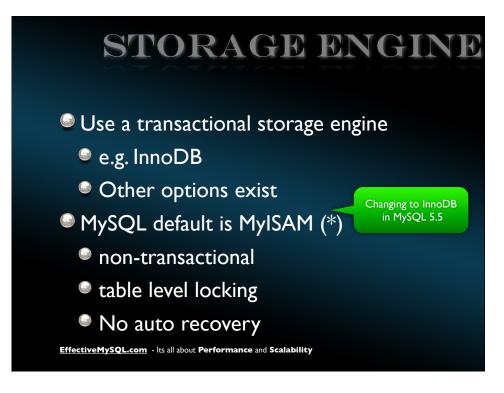














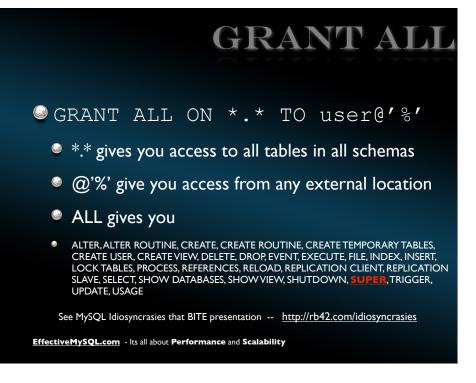


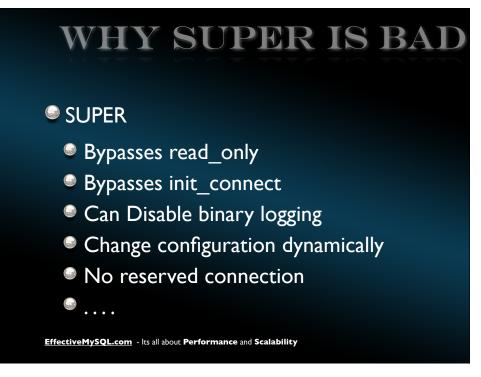


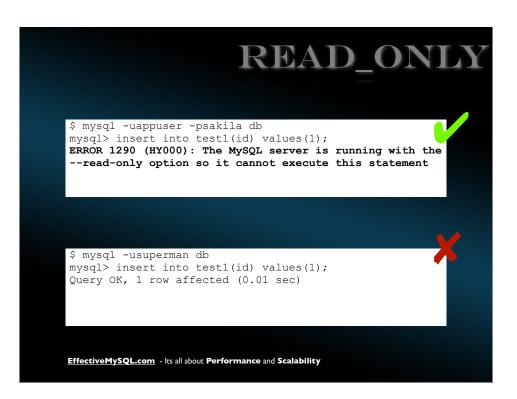


OS DATA SECURITY Software installed by root Separate MySQL permissions for directories chown -R root:root /mysql chown -R mysql:mysql /mysql/{data,log,binlog,etc} chowd 700 /mysql/{data,binlog} chmod 750 /mysql/{etc,log}









APP USER SECURITY Track Data Security Separation of responsibilities Application Viewer (Read Only Access) SELECT Application User (Read/Write Access) INSERT, UPDATE, DELETE, SELECT CREATE TEMPORARY TABLE (if necessary) Application DBA (Schema Access Only) CREATE, DROP, SELECT, INSERT, UPDATE, DELETE CREATE ROUTINE (if necessary)



SQL IDRALS Comment your SQL Format your SQL Future proof your SQL Log your SQL Analyze your SQL Analyze your SQL Always use transactions EffectiveMySQL.com - Its all about Performance and Scalability

SQL COMMENTING

- Identify queries by code function
- Identify OLTP / Batch / Cache queries

DBA/SA can identify code function and purpose quickly

SELECT /* XXX123 */ ...

UPDATE /* YYY999 */ ...

SELECT /* Batch */...

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SQL FORMATTING

- Create single line queries
 - Don't embed newlines
- Enables per line analysis by CLI tools

DBA/SA can use simple CLI tools including grep,awk,cut etc for SQL analysis

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SQL COMMENTING EXAMPLE

26 Query SELECT /* 5m cache */
26 Query SELECT /* ViewPost */ t.*, tt.*, tr.object_id FROM
wp_terms AS t INNER JOIN wp_term_taxonomy AS tt ON tt.term_id =
t.term_id INNER JOIN wp_term_relationships AS tr ON
tr.term_taxonomy_id = tt.term_taxonomy_id WHERE tt.taxonomy IN
('category', 'post_tag') AND tr.object_id IN (2849, 2842, 2836,
2824, 2812, 2680, 2813, 2800, 2770, 2784) ORDER BY t.name ASC
26 Query SELECT /* batch */ key, value FROM usermeta WHERE user_id
= 2

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SQL FORMATTING

EXAMPLE

26 Query SELECT FOUND ROWS()

26 Query SELECT post_id,start,end all ay,rpt,IF(end>='2010-06-04' 00:00:00',1,0) AS active

FROM wp ec3 schedule

WHERE post_id IN (2849 2842,2836,2824,2812,2680,2770,2784)

ORDER BY start

26 Query SELECT * FROM wp users WHERE user login = 'ronald'

26 Query SELECT t.*, tt.*, tr.object id FROM wp_terms AS t INNER
JOIN wp_term_taxonomy AS tt ON tt.term_id = t.term_id INNER JOIN
wp_term_relationships AS tr ON tr.term_taxonomy_id =
tt.term_taxonomy_id WHERE tt.taxonomy IN ('category', 'post_tag')
AND tr.object_id IN (2849, 2842, 2836, 2824, 2812, 2680, 2813, 2800,
2770, 2784) ORDER BY t.name ASC

26 Query SELECT meta_key, meta_value FROM wp_usermeta WHERE user_id = 2

SQL FORMATTING EXAMPLE

```
$ cut -c12-80 general.log

SELECT FOUND_ROWS()
SELECT post_id, start, end, allday, rpt, IF (end>='2010-06-04', 1, 0
p_ec3_schedule
post_id IN (2849,2842,2836,2824,2812,2680,2770,2784)
BY start
SELECT * FROM wp_users WHERE user_login = 'ronald'
SELECT t.*, tt.*, tr.object_id FROM wp_terms AS t INNER JOIN ...
SELECT meta_key, meta_value FROM wp_usermeta WHERE user_id = 2
```

FUTURE PROOFING

- Specify INSERT column names
 - INSERT INTO table (a,b,c) VALUES (...)

```
mysql> INSERT INTO example VALUES (10,10,'A');
mysql> ALTER TABLE example ADD d DATE;
mysql> INSERT INTO example VALUES (10,10,'A');
ERROR 1136 (21S01): Column count doesn't match
value count at row 1
```

Reduce likelihood of runtime errors when structural changes to objects

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FUTURE PROOFING

- Always use column aliases in joins
 - SELECT a.coll, b.col2 ...

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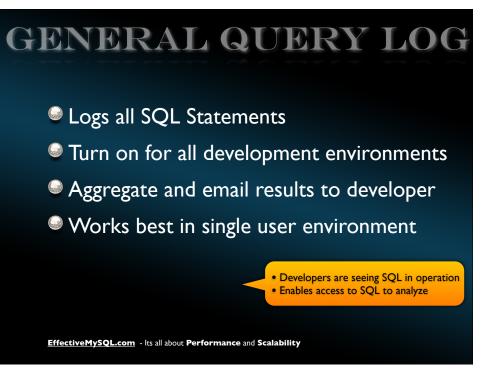
FUTURE PROOFING

- SELECT * is generally bad
 - What columns are actually used in code
 - TEXT/BLOB can cause extra disk I/O
 - New columns can change performance

FANCY CONSTRUCTS DELAYED IGNORE LOW PRIORITY REPLACE Changes ACID and statement precedence May have additional performance overhead

Use '2010-06-21' instead of CURDATE() Same for NOW() Don't Use ORDER BY RAND() Leverage Query Cache (if enabled)

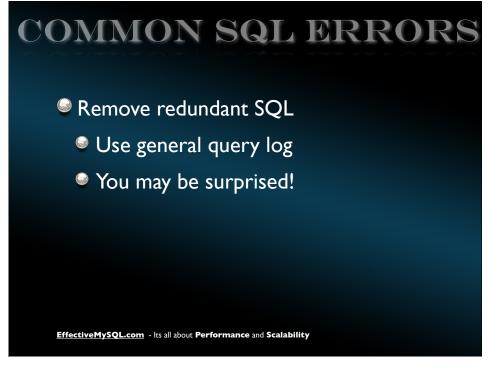


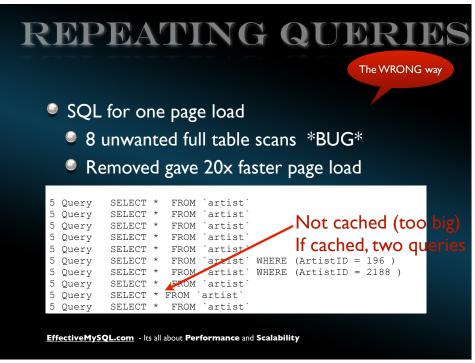


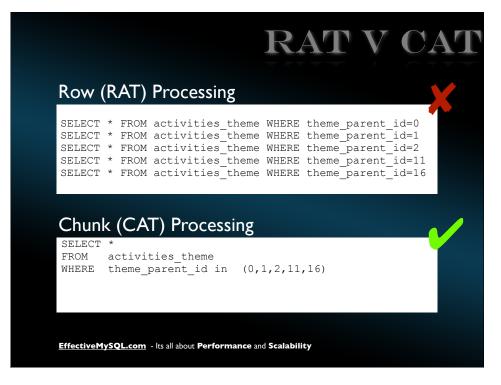
GENERAL QUERY LOG For single user development environment In SQL Session mysql> SELECT 'Function X Start'; In Application Run Function/Process In SQL Session mysql> SELECT 'Function X End'; EffectiveMySQL.com - Its all about Performance and Scalability

SQL ANALYSIS ■ Bulk trending analysis ■ Volume of SQL statements ■ Query Execution Plan (QEP) ■ Online v Batch/Cache SQL via commenting ■ Identify bottlenecks ASAP without load ■ Iterative Design feedback EffectiveMySQL.com - Its all about Performance and Scalability











In a highly tuned system the greatest time in a query is network overhead

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CODING ERRORS

- Remove duplicate code
- Affects Query Cache (if applicable)

- Less code to maintain
- Remove chance of human errors

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DB CONNECTION

The WRONG way

```
cd public html
 grep "mysql* connect" * */* */*/*
db-disp.php:$cid = mysql connect("localhost", "museum", "*****") or die ('I
cannot connect to the database because: ' . mysql error());
test.php:$cid = mysql_connect("localhost", "museum", "*****");
PMCollection/connection.php: $dbcnx = mysql_connect("$sqlhost", "$sqluser",
"$sqlpass");
PMCollection/connection_live.php: $dbcnx = mysql_connect("$sqlhost",
'$sqluser", "$sqlpass");
PMCollection/connection local.php: $dbcnx = mysql connect("$sqlhost",
"$sqluser", "$sqlpass");
PMEcards/connection.php: $dbcnx = mysql connect("$sqlhost", "$sqluser",
"$sqlpass");
core/connection.php:
                         $dbcnx = mysql connect("$sqlhost", "$sqluser",
"$sqlpass");
discussion admin/db fns.php: $cid = mysql connect("localhost", "museum",
discussion admin/header.php:// $cid = mysql connect("localhost", "museum",
"*****");
discussion_admin/inc_title.php: //$cid = mysql_connect("localhost",
"museum", "*****");
discussion admin/stats.php: //$cid = mysql connect("localhost", "museum",
```