

# 21

## MySQL System Tables

In Chapter XXX: Security we saw how MySQL used its own internal tables to store the access information used to perform authentication. There are actually several internal tables that are created as part of every MySQL server installation. MySQL uses these tables for a variety of purposes.

### Columns\_Priv

Field	Type	Null	Key	Default	Extra
Host	char(60) binary		PRI		
Db	char(64) binary		PRI		
User	char(16) binary		PRI		
Table_name	char(64) binary		PRI		
Column_name	char(64) binary		PRI		
Timestamp	timestamp(14)	YES		NULL	
Column_priv	set('Select', 'Insert', 'Update', 'References')				

The columns\_priv table controls column-level access to a MySQL database table. The column-level check is the final check performed in the access verification sequence describe in Chapter XXX: Security. The information in this table can be broken into four sections: location, scope, privilege and timestamp.

### Location

These fields determine to whom this privilege applies. Any user who matches both of these fields in a given row will be subjected to the privilege rule for that row.

Host - The hostname or IP address of the user.

User - The authenticated username of the user.

## Scope

These fields determine exactly which column this rule is for. Any columns which match all three of these fields in a given row will have the privilege rule for that row apply.

Db - The database that contains the table with the column

Table\_name - The name of the table containing the column

Column\_name - The name of the column

## Privledge

The single privilege column, Column\_priv, determines which privileges are allowed for location and scope defined in the other fields in this table. The value of this column is a set that can contain any of the following privileges: Select, Insert, Update, References. Chapter XXX: Security describes the meanings of the individual privilege options.

## Timestamp

This field keeps a timestamp which records the last time the table was modified.

## db

Field	Type	Null	Key	Default	Extra
Host	char(60) binary		PRI		
Db	char(64) binary		PRI		
User	char(16) binary		PRI		
Select_priv	enum('N', 'Y')			N	
Insert_priv	enum('N', 'Y')			N	
Update_priv	enum('N', 'Y')			N	
Delete_priv	enum('N', 'Y')			N	
Create_priv	enum('N', 'Y')			N	
Drop_priv	enum('N', 'Y')			N	
Grant_priv	enum('N', 'Y')			N	
References_priv	enum('N', 'Y')			N	
Index_priv	enum('N', 'Y')			N	
Alter_priv	enum('N', 'Y')			N	

The db table controls database-level access to a MySQL server. The database-level check is the second check (after user) performed in the access verification sequence describe in Chapter XXX: Security. The information in this table can be broken into three sections: location, scope and privilege.

## Location

These fields determine to whom this privilege applies. Any user who matches both of these fields in a given row will be subjected to the privilege rule for that row.

Host - The hostname or IP address of the user.

User - The authenticated username of the user.

## Scope

The sole scope field for this table, 'Db' determines exactly which database this rule is for. Any database that matches this field in a given row will have the privilege rule for that row apply.

## Privledge

These fields determine which privileges are allowed for location and scope defined in the other fields in this table. The values of all of these fields is an enumeration consisting of either 'Yes' or 'No' depending on whether the privilege is allowed for a particular rule.

Select\_priv - The Select privilege

Insert\_priv - The Insert privilege

Update\_priv - The Update privilege

Delete\_priv - The Delete privilege

Create\_priv - The Create privilege

Drop\_priv - The Drop privilege

Grant\_priv - The Grant privilege

References\_priv - The References privilege

Index\_priv - The Index privilege

Alter\_priv - The Alter privilege

## func

Field	Type	Null	Key	Default	Extra
name	char(64) binary		PRI		
ret	tinyint(1)			0	
dl	char(128)				
type	enum('function', 'aggregate')			function	

The func table contains a list of all currently active user defined functions. Chapter XXX: Extending MySQL describes how to create a user defined function as well as how to use the SQL commands CREATE FUNCTION and REMOVE FUNCTION to manipulate the data in this table. It should be noted that the fields in this table merely contain the location of the user defined function, not the function code itself; that is stored in a system-specific dynamic library.

name - The name of the user defined function. This name must match the name of the C or C++ function within the dynamic library for this function.

ret - The return value of this function. This is stored as an integer that is keyed to an enumeration defined in the standard MySQL C header file. A String return value is 0, a real (floating point) numeric value is 1 and an integer numeric value is 2.

dl - The name of the dynamic library containing the function. This library must be accessible to MySQL through the dynamic loading mechanism defined for the MySQL server's system. For example, on most Unix systems, the library must be in a directory within the LD\_LIBRARY\_PATH environment variable.

type - This field defines whether the function is a standard function (takes one or more single-value arguments) or an aggregate function (is given a set of values on which to perform an operation, as with the built-in MySQL functions SUM(), COUNT() and AVG()). The value of this field is an enumeration which must be either 'function' or 'aggregate'.

## host

Field	Type	Null	Key	Default	Extra
Host	char(60) binary		PRI		
Db	char(64) binary		PRI		
Select_priv	enum('N', 'Y')			N	
Insert_priv	enum('N', 'Y')			N	
Update_priv	enum('N', 'Y')			N	
Delete_priv	enum('N', 'Y')			N	
Create_priv	enum('N', 'Y')			N	
Drop_priv	enum('N', 'Y')			N	
Grant_priv	enum('N', 'Y')			N	
References_priv	enum('N', 'Y')			N	
Index_priv	enum('N', 'Y')			N	
Alter_priv	enum('N', 'Y')			N	

The host table controls remote host-level access to a MySQL server. The host-level check is the third check (after user and db) performed in the access verification sequence describe in Chapter XXX: Security. The information in this table can be broken into three sections: location, scope and privilege.

### Location

The sole location field, Host, determines to whom this privilege applies. Any user connection from a host that matches this field in a given row will be subjected to the privilege rule for that row.

### Scope

The sole scope field for this table, 'Db' determines exactly which database this rule is for. Any database that matches this field in a given row will have the privilege rule for that row apply.

## Privledge

These fields determine which privileges are allowed for location and scope defined in the other fields in this table. The values of all of these fields is an enumeration consisting of either 'Yes' or 'No' depending on whether the privilege is allowed for a particular rule.

Select\_priv - The Select privilege  
 Insert\_priv - The Insert privilege  
 Update\_priv - The Update privilege  
 Delete\_priv - The Delete privilege  
 Create\_priv - The Create privilege  
 Drop\_priv - The Drop privilege  
 Grant\_priv - The Grant privilege  
 References\_priv - The References privilege  
 Index\_priv - The Index privilege  
 Alter\_priv - The Alter privilege

## tables\_priv

Field	Type	Null	Key	Default	Extra
Host	char(60) binary		PRI		
Db	char(64) binary		PRI		
User	char(16) binary		PRI		
Table_name	char(60) binary		PRI		
Grantor	char(77)		MUL		
Timestamp	timestamp(14)	YES		NULL	
Table_priv	set('Select','Insert','Update', 'Delete','Create','Drop', 'Grant','References', 'Index','Alter')				
Column_priv	set('Select','Insert', 'Update','References')				

The tables\_priv table controls table-level access to a MySQL database. The table-level check is the second to last check performed (before column-level) in the access verification sequence describe in Chapter XXX: Security. The information in this table can be broken into four sections: location, scope, privilege and other.

## Location

These fields determine to whom this privilege applies. Any user who matches both of these fields in a given row will be subjected to the privilege rule for that row.

Host - The hostname or IP address of the user.  
 User - The authenticated username of the user.

## Scope

These fields determine exactly which table this rule is for. Any table that matches both of these fields in a given row will have the privilege rule for that row apply.

Db - The database that contains the table with the column

Table\_name - The name of the table containing the column

## Privledge

These fields determine which privileges are allowed for location and scope defined in the other fields in this table.

Table\_priv - The value of this field is a set that determines the privileges allowed for the table(s) matching this rule. The values of this set can be any of the following: Select, Insert, Update, Delete, Create, Drop, Grant, References, Index, and Alter.

Column\_priv - The value of this field is a set that determines the privileges allowed for all columns in the matching table(s). The values of this set can be any of the following: Select, Insert, Update, and References. Chapter XXX: Security describes the meanings of the individual privilege options.

## Other

These fields store meta-data related to the access rule.

Timestamp – This field keeps a timestamp which records the last time the table was modified.

Grantor – The user name of the user which created this rule. This field will only be automatically populated if the rule was created using the SQL GRANT statement. If a rule is created by manually adding a row to this table, this field must also be filled in manually.

## user

Field	Type	Null	Key	Default	Extra
Host	char(60) binary		PRI		
User	char(16) binary		PRI		
Password	char(16) binary				
Select_priv	enum('N', 'Y')			N	
Insert_priv	enum('N', 'Y')			N	
Update_priv	enum('N', 'Y')			N	
Delete_priv	enum('N', 'Y')			N	
Create_priv	enum('N', 'Y')			N	
Drop_priv	enum('N', 'Y')			N	
Reload_priv	enum('N', 'Y')			N	
Shutdown_priv	enum('N', 'Y')			N	
Process_priv	enum('N', 'Y')			N	
File_priv	enum('N', 'Y')			N	
Grant_priv	enum('N', 'Y')			N	
References_priv	enum('N', 'Y')			N	

Index_priv	enum('N', 'Y')			N	
Alter_priv	enum('N', 'Y')			N	

The user table controls user-level access to a MySQL server. The user-level check is the first check performed in the access verification sequence describe in Chapter XXX: Security. The information in this table can be broken into two sections: location/identification and privilege. Note the absence of the scope-related fields that are present in all of the other security tables. As might be inferred from this, privileges set in this table apply to every database, table and column in the server.

## Location/Identification

These fields determine to whom this privilege applies. Any user who matches all three of these fields in a given row will be subjected to the privilege rule for that row.

Host - The hostname or IP address of the user.

User - The username of the user.

Password - The password of the user.

## Privledge

These fields determine which privileges are allowed for location and scope defined in the other fields in this table. The values of all of these fields is an enumeration consisting of either 'Yes' or 'No' depending on whether the privilege is allowed for a particular rule.

Select\_priv - The Select privilege

Insert\_priv - The Insert privilege

Update\_priv - The Update privilege

Delete\_priv - The Delete privilege

Create\_priv - The Create privilege

Drop\_priv - The Drop privilege

Grant\_priv - The Grant privilege

References\_priv - The References privilege

Index\_priv - The Index privilege

Alter\_priv - The Alter privilege

References\_priv - The References privilege

Reload\_priv - The Reload privilege

Shutdown\_priv - The Shutdown privilege

Process\_priv - The Process privilege

File\_priv - The file privilege