

Support for MySQL in LinPAC

Applies to:			No. L6-004
Platform	OS version	SDK version	Classification
LX-8000/9000 series LP-8000/9000 series LP-22xx/51xx/52xx series	All versions	LP-51xx/8x3x/8x4x: 1.14 later LP-52xx/8x2x/9x2x: 1.5 later LP-8x8x/8x8x-atom: 0.8.3 later LX-8x3x/9x7x/9x8x: 0.8.8 later	Linux Applications

MySQL is a small open source 'Relational Database Management System' (RDBMS) that delivers a very fast, multithreaded, multi-user, and robust SQL (Structured Query Language) database server. A MySQL server can be deployed on LinPAC series devices and can be tested using the mysqldemo.c demo program. Figure 1 provides an illustration of the process used for deploying a MySQL server on a LinPAC series device.

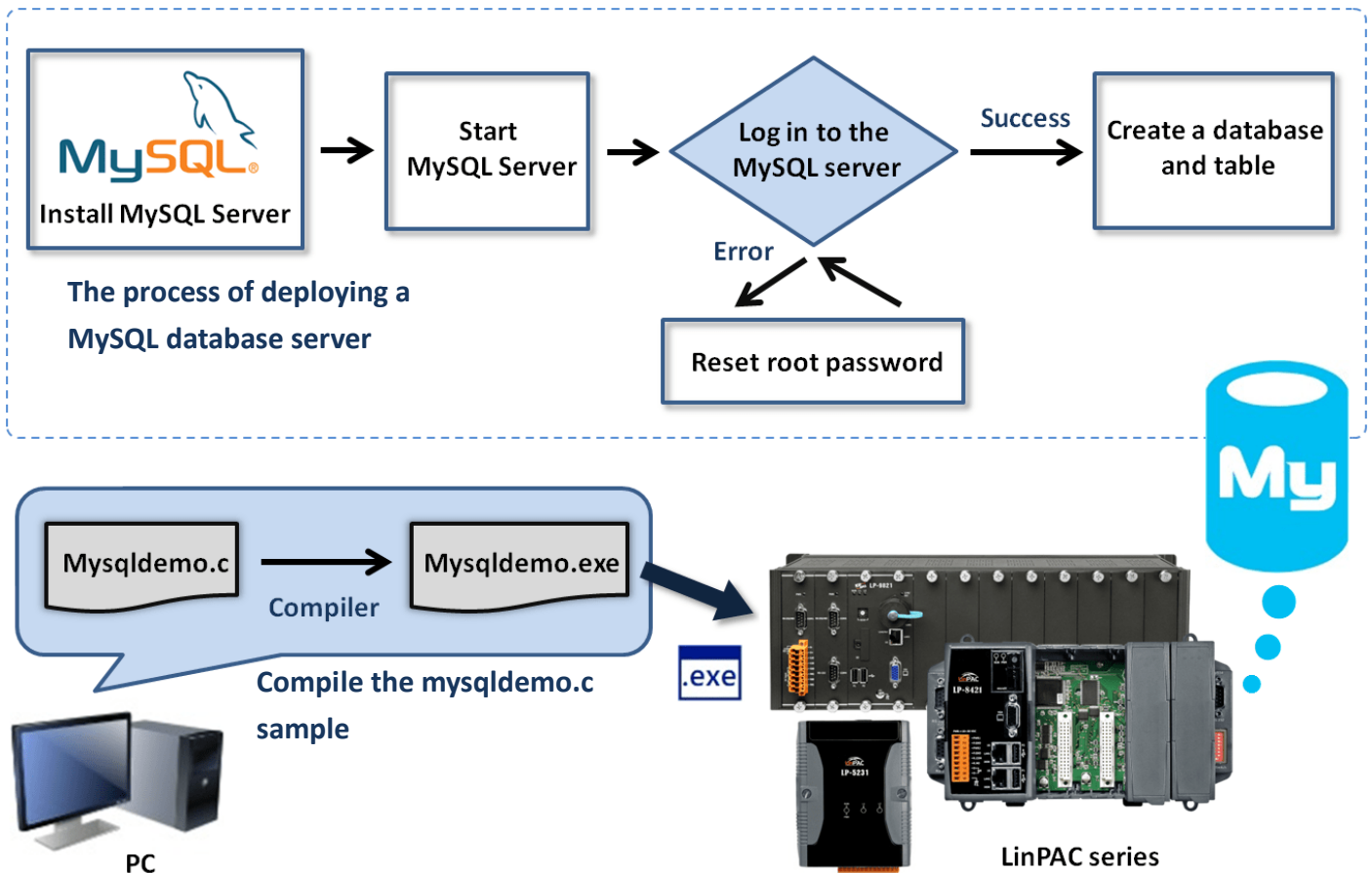


Figure 1. Deployment diagram using the MySQL demo on a LinPAC device

Section 1: Deploying a MySQL database server

Before deploying the MySQL server, the `mysql-server` package will first need to be installed on the LinPAC series module. Once installed, log into the MySQL database server and create a database and tables that can be used to test the MySQL demo program. Follow the procedure described below, where the AM335X PAC is used as an example:

❑ Install the MySQL server

Step 1: Use the following command to upgrade the package lists.

```
Command: sudo apt-get update
```

Step 2: Use the following command to install the `mysql-server` package.

```
Command: sudo apt-get install mysql-server
```

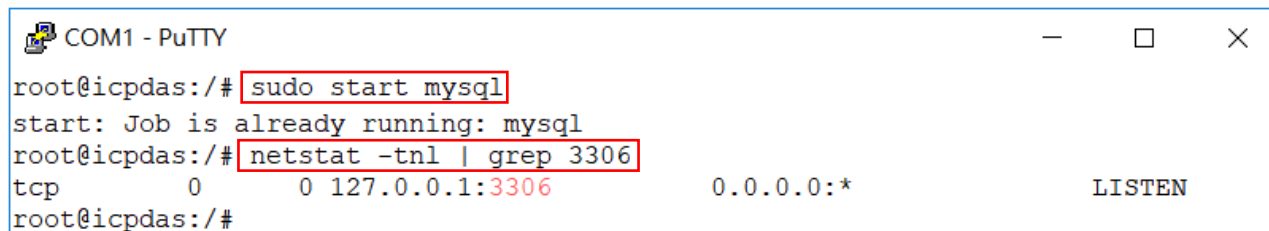
❑ Start the MySQL service

Step 1: Use the following command to start the MySQL service, as illustrated in Figure 2.

```
Command: sudo start mysql
```

Step 2: Use the `'netstat'` command to verify that the MySQL server is active. The MySQL server should listen on port 3306 by default, as illustrated in Figure 2.

```
Command: netstat -tnl | grep 3306
```



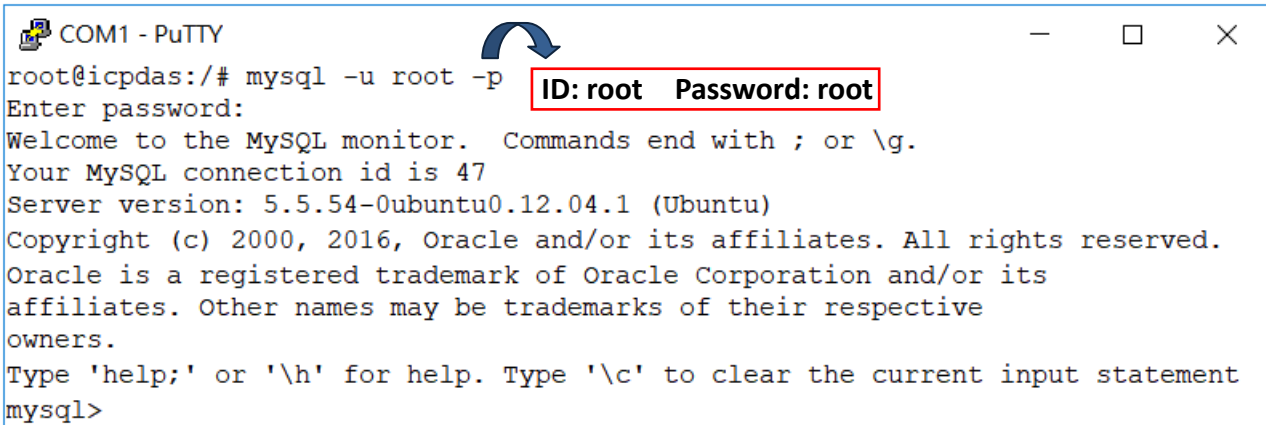
```
COM1 - PuTTY
root@icpdas:/# sudo start mysql
start: Job is already running: mysql
root@icpdas:/# netstat -tnl | grep 3306
tcp        0      0 127.0.0.1:3306      0.0.0.0:*           LISTEN
root@icpdas:/#
```

Figure 2. Confirm that the MySQL database server is active

❑ Log into the MySQL database server

Use the following command to log into the MySQL database server. Enter the default ID 'root' and the password 'root' to log in, as illustrated in Figure 3.

Command: `mysql -u root -p`



```

COM1 - PuTTY
root@icpdas:/# mysql -u root -p ID: root Password: root
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 47
Server version: 5.5.54-0ubuntu0.12.04.1 (Ubuntu)
Copyright (c) 2000, 2016, Oracle and/or its affiliates. All rights reserved.
Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement
mysql>
  
```

Figure 3. Logging into the MySQL database server

Note: If an error message is displayed after logging into the account, stop the MySQL service and reset the root password.

```

ERROR 1045 (28000): Access denied for user 'root'@'localhost' (using password: No)
ERROR 1045 (28000): Access denied for user 'root'@'localhost' (using password: Yes)
  
```

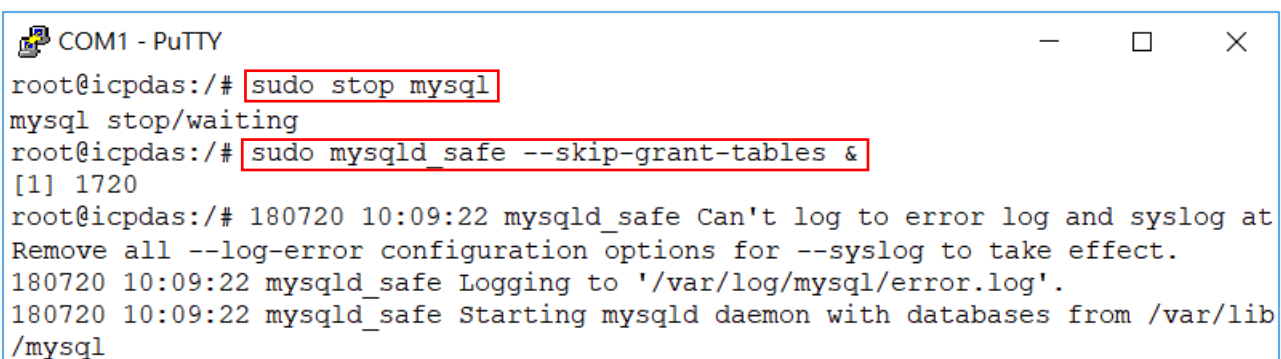
❑ Reset the root password

Step 1: Use the following command to stop the MySQL service, as illustrated in Figure 4.

Command: `sudo stop mysql`

Step 2: Use the following command to skip the grant tables to access the MySQL database server, as illustrated in Figure 4.

Command: `mysqld_safe --skip-grant-tables &`



```

COM1 - PuTTY
root@icpdas:/# sudo stop mysql
mysql stop/waiting
root@icpdas:/# sudo mysqld_safe --skip-grant-tables &
[1] 1720
root@icpdas:/# 180720 10:09:22 mysqld_safe Can't log to error log and syslog at
Remove all --log-error configuration options for --syslog to take effect.
180720 10:09:22 mysqld_safe Logging to '/var/log/mysql/error.log'.
180720 10:09:22 mysqld_safe Starting mysqld daemon with databases from /var/lib
/mysql
  
```

Figure 4. Resetting the MySQL root password

Step 3: Enter the 'mysql -u root' command to log into the MySQL database server and then modify the root password, as illustrated in Figure 5.

```
mysql> use mysql;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A
Database changed
mysql> update user set password=PASSWORD("rootpw")where user="root";
Query OK, 4 rows affected (0.02 sec)
Rows matched: 4  Changed: 4  Warnings: 0
mysql> flush privileges;
Query OK, 0 rows affected (0.00 sec)
```

Figure 5. Modifying the MySQL root password.

Step 4: Restart the MySQL service and log in to the MySQL database server using the new password, as illustrated in Figure 6.

```
root@icpdas:~# sudo stop mysql
mysql stop/waiting
root@icpdas:~# sudo start mysql
mysql start/running, process 2032
root@icpdas:~# mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
```

Figure 6. Restarting the MySQL service

Create databases and tables

Create the necessary databases and tables in the database server so that the MySQL demo program can be tested, as illustrated in Figure 7.

```
mysql> create database icpdasDB;
Query OK, 1 row affected (0.00 sec)
mysql> use icpdasDB
Database changed
mysql> create table icpdasDB_table (Model_Name char(20),Number_of_slot int);
Query OK, 0 rows affected (0.00 sec)
mysql> insert into icpdasDB_table (Model_Name, Number_of_slot) values ('LP-5231','1');
Query OK, 1 row affected (0.01 sec)
mysql> insert into icpdasDB_table (Model_Name, Number_of_slot) values ('LP-8421','4');
Query OK, 1 row affected (0.00 sec)
```

Figure 7. Creating a database and table

More information regarding MySQL commands can be found at: <https://dev.mysql.com/doc/>

Section 2: Compile the mysqldemo.c demo program

Install the **LinPAC AM335x SDK**, and follow the procedure described below to compile the demo program. Refer to the mysqldemo.c file in the C:\cygwin\LinPAC_AM335x_SDK\examples\mysql\ folder for more information.

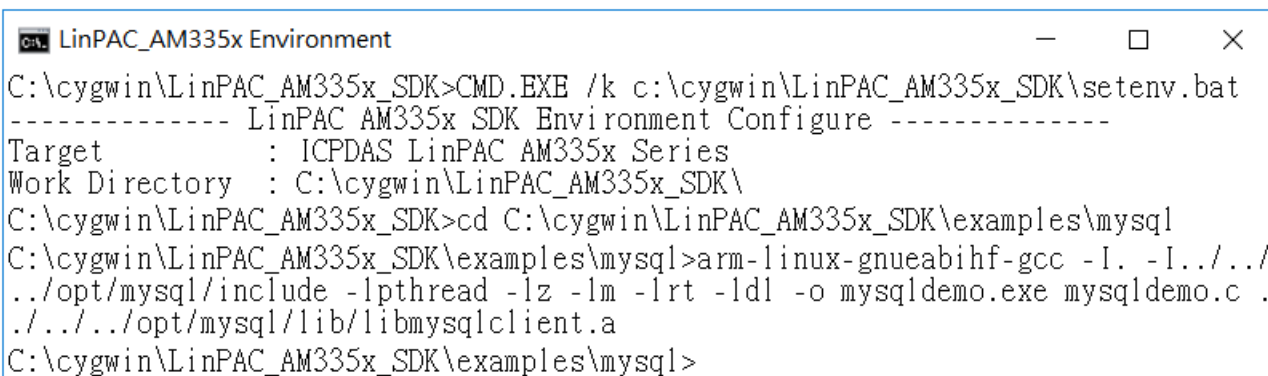
Step 1: Double-click the 'LinPAC_AM335x Environment' icon to compile the applications.

Step 2: Use the following command to change the path, as illustrated in Figure 8.

Command: cd C:\cygwin\LinPAC_AM335x_SDK\examples\mysql\

Step 3: Use the following command to compile the mysqldemo.c program into the mysqldemo.exe executable file, as illustrated in Figure 8.

Command: arm-linux-gnueabi-gcc -I. -I../..../opt/mysql/include -lpthread -lz -lm -lrt -ldl -o mysqldemo.exe mysqldemo.c ../..../opt/mysql/lib/libmysqlclient.a



```

C:\cygwin\LinPAC_AM335x_SDK>CMD.EXE /k c:\cygwin\LinPAC_AM335x_SDK\setenv.bat
----- LinPAC AM335x SDK Environment Configure -----
Target          : ICPDAS LinPAC AM335x Series
Work Directory  : C:\cygwin\LinPAC_AM335x_SDK\
C:\cygwin\LinPAC_AM335x_SDK>cd C:\cygwin\LinPAC_AM335x_SDK\examples\mysql
C:\cygwin\LinPAC_AM335x_SDK\examples\mysql>arm-linux-gnueabi-gcc -I. -I../..../
../opt/mysql/include -lpthread -lz -lm -lrt -ldl -o mysqldemo.exe mysqldemo.c .
../..../opt/mysql/lib/libmysqlclient.a
C:\cygwin\LinPAC_AM335x_SDK\examples\mysql>
  
```

Figure 8. Compiling the mysqldemo.c file

Section 3: Execute the mysqldemo.exe file

Create the database and table on both the local and the remote hosts, as illustrated in Figure 9. Use the mysqldemo.exe demo program to read a table data from the local host or from a remote database. The process can be divided into two steps, which are described below:

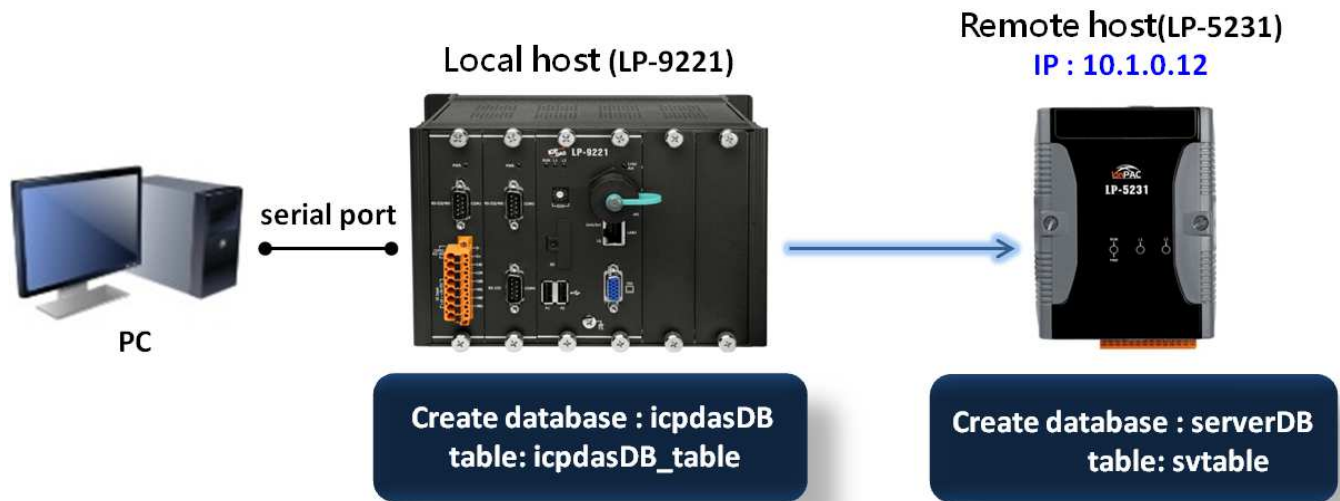


Figure 9. Creating a database and table

- (1) Transfer the `mysqldemo.exe` file to the LinPAC module and change the permissions for the file. Refer to Chapter 4.3.3: 'Execute Demo' of the LinPAC AM335x series user manual for details, which you can download from:

https://www.icpdas.com/web/product/download/pac/linux/lp-9000/document/manual/linpac-am335x_user_manual_en.pdf

- (2) Execute the '`mysqldemo.exe`' file to read the MySQL database table.

- Use the following command to connect to the MySQL database on the local host and read the table data from the database, as illustrated in Figure 10.

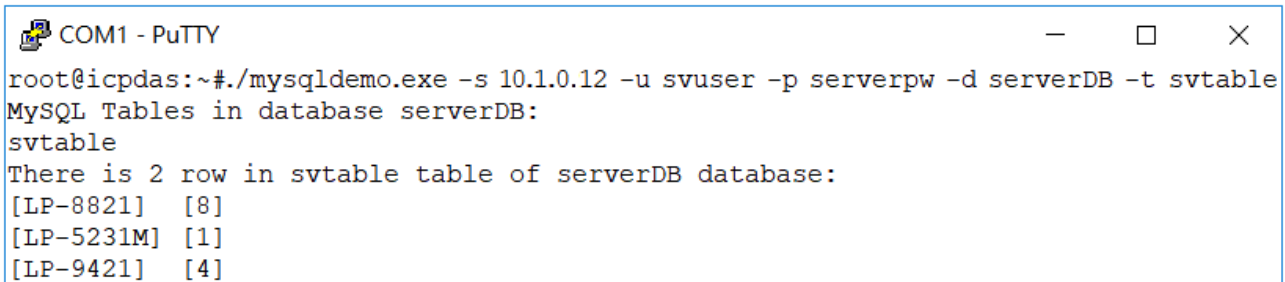
Command: `./mysqldemo.exe -u <ID> -p <PW> -d <database name> -t <table name>`

```
COM1 - PuTTY
root@icpdas:~# ./mysqldemo.exe -u root -p rootpw -d icpdasDB -t icpdasDB_table
MySQL Tables in database icpdasDB:
icpdasDB_table
There is 2 row in icpdasDB_table table of icpdasDB database:
[LP-5231] [1]
[LP-8421] [4]
```

Figure 10. Displaying the table data from the database on the local host

- ❑ Use the following command to connect to the remote database and read the table data from the remote database, as illustrated in Figure 11.

Command: `./mysqldemo.exe -s <IP address> -u <ID> -p <PW> -d <database name> -t <table name>`



```
COM1 - PuTTY
root@icpdas:~#. /mysqldemo.exe -s 10.1.0.12 -u svuser -p serverpw -d serverDB -t svtable
MySQL Tables in database serverDB:
svtable
There is 2 row in svtable table of serverDB database:
[LP-8821] [8]
[LP-5231M] [1]
[LP-9421] [4]
```

Figure 11. Displaying the table data from the remote database

Note: Before attempting to connect to a remote database server from the local host, ensure that remote access has been granted to the user account on the remote database server.