

# 1 輕鬆學會使用資料庫 Java 程式設計—MariaDB, MySQL

## 簡介

MySQL（官方發音為英語發音：/maɪˈɛskjuːˈɛl/「My S-Q-L」，但也經常讀作英語發音：/maɪˈsiːkwəl/「My Sequel」）原本是一個開放原始碼的關聯式資料庫管理系統，原開發者為瑞典的 MySQL AB 公司，該公司於 2008 年被昇陽微系統（Sun Microsystems）收購。2009 年，甲骨文公司（Oracle）收購昇陽微系統公司，MySQL 成為 Oracle 旗下產品。

MySQL 在過去由於效能高、成本低、可靠性好，已經成為最流行的開源資料庫，因此被廣泛地應用在 Internet 上的中小型網站中。隨著 MySQL 的不斷成熟，它也逐漸用於更多大規模網站和應用，比如維基百科、Google 和 Facebook 等網站。非常流行的開源軟體組合 LAMP 中的「M」指的就是 MySQL。LAMP (Linux, Apache, MySQL, PHP)

但被甲骨文公司收購後，Oracle 大幅調漲 MySQL 商業版的售價，且甲骨文公司不再支援另一個自由軟體專案 OpenSolaris 的發展，因此導致自由軟體社群們對於 Oracle 是否還會持續支援 **MySQL 社群版**（MySQL 之中唯一的免費版本）有所隱憂，因此原先一些使用 MySQL 的開源軟體逐漸轉向其它的資料庫。例如維基百科已於 2013 年正式宣布將從 MySQL 遷移到 MariaDB 資料庫。MySQL 的創始人麥克爾·維德紐斯以 MySQL 為基礎，成立分支計劃 **MariaDB**。

<https://zh.wikipedia.org/wiki/MySQL>

MariaDB 資料庫管理系統是 MySQL 的一個分支，主要由開源社群在維護，採用 GPL 授權許可。開發這個分支的原因之一是：甲骨文公司收購了 MySQL 後，有將 MySQL 閉源的潛在風險，因此社群採用分支的方式來避開這個風險。

MariaDB 的目的是完全相容 MySQL，包括 API 和命令列，使之能輕鬆成為 MySQL 的代替品。在儲存引擎方面，10.0.9 版起使用 XtraDB（名稱代號為 Aria（英語：Aria (storage engine)））來代替 MySQL 的 InnoDB。

MariaDB 由 MySQL 的創始人麥克爾·維德紐斯（英語：Michael Widenius）

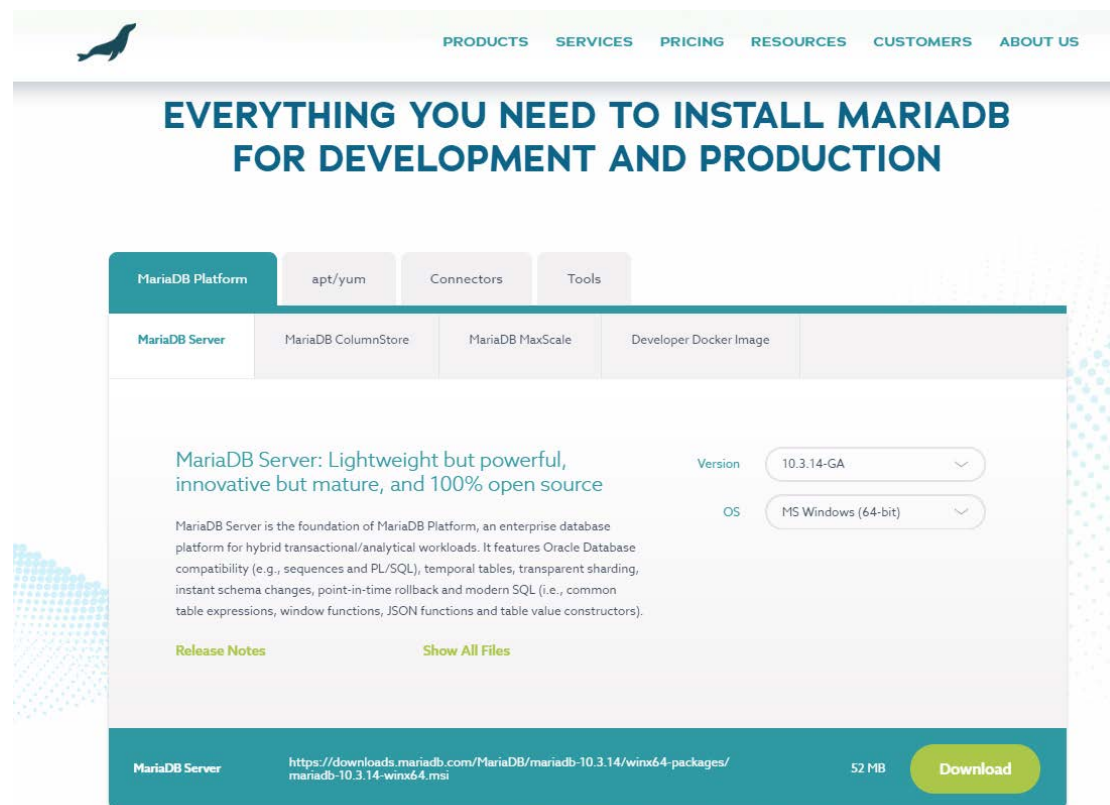
2  
主導開發，他早前曾以 10 億美元的價格，將自己建立的公司 MySQL AB 賣給了 SUN，此後，隨著 SUN 被甲骨文收購，MySQL 的所有權也落入 Oracle 的手中。MariaDB 名稱來自麥克爾·維德紐斯的女兒瑪麗亞(英語：Maria)的名字。

<https://www.wikiwand.com/zh-tw/MariaDB>

## 使用 MariaDB

### 安裝

#### 下載與安裝




The screenshot shows the MariaDB website's download page. At the top, there's a navigation bar with links: PRODUCTS, SERVICES, PRICING, RESOURCES, CUSTOMERS, and ABOUT US. Below this is a large banner with the text "EVERYTHING YOU NEED TO INSTALL MARIADB FOR DEVELOPMENT AND PRODUCTION". The main content area features a grid of product categories: MariaDB Platform, apt/yum, Connectors, and Tools. Under "MariaDB Platform", there are sub-categories: MariaDB Server, MariaDB ColumnStore, MariaDB MaxScale, and Developer Docker Image. The "MariaDB Server" category is selected, showing a description: "MariaDB Server: Lightweight but powerful, innovative but mature, and 100% open source". It also includes a brief description of the server's capabilities. To the right, there are dropdown menus for "Version" (set to 10.3.14-GA) and "OS" (set to MS Windows (64-bit)). Below the description, there are links for "Release Notes" and "Show All Files". At the bottom, a footer bar displays the product name "MariaDB Server", the download URL "https://downloads.mariadb.com/MariaDB/mariadb-10.3.14/win64-packages/mariadb-10.3.14-win64.msi", the file size "52 MB", and a prominent "Download" button.

## Download

MariaDB Server is available in the standard repositories of all major Linux distributions. Just look for the package *mariadb-server* using the package manager of your operating system.

Proceed to [downloads.mariadb.org](https://downloads.mariadb.org) if you need:

- › MariaDB for Windows
- › MariaDB for Linux, if your current distribution does not provide the version of MariaDB you need
- › The Galera Cluster version (if not available from your Linux distribution)
- › Specific plugins or storage engines
- › Developers tools, like Java, ODBC or C/C++ connectors (if not available from your Linux distribution)
- › The MariaDB source code

 Download

## MariaDB 10.2.14 Stable 2018-03-27

[Release Notes](#)
[Changelog](#)

Affordable, enterprise class product support, professional services, and training for your MariaDB database is available from the MariaDB Foundation's release sponsor, MariaDB Corporation. To learn more about them and their services for MariaDB, visit their [website](#), or email MariaDB Corporation at [sales@mariadb.com](mailto:sales@mariadb.com).

File Name	Package Type	OS / CPU	Size	Meta
<a href="#">mariadb-10.2.14.tar.gz</a>	source tar.gz file	Source	72.6 MB	<a href="#">Checksum</a> <a href="#">Instructions</a>
<a href="#">Galera 25.3.23 source and packages</a>		Source		
For best results with RPM and DEB packages, use the <a href="#">Repository Configuration Tool</a> .				
<a href="#">mariadb-10.2.14-winx64.msi</a>	MSI Package	Windows x86_64	55.0 MB	<a href="#">Checksum</a> <a href="#">Instructions</a>
<a href="#">mariadb-10.2.14-winx64.zip</a>	ZIP file	Windows x86_64	194.8 MB	<a href="#">Checksum</a> <a href="#">Instructions</a>
<a href="#">mariadb-10.2.14-win32.zip</a>	ZIP file	Windows x86	157.6 MB	<a href="#">Checksum</a> <a href="#">Instructions</a>
<a href="#">mariadb-10.2.14-win32.msi</a>	MSI Package	Windows x86	49.4 MB	<a href="#">Checksum</a> <a href="#">Instructions</a>
<a href="#">mariadb-10.2.14-linux-x86_64.tar.gz</a>	gzipped tar file	Linux x86_64	452.0 MB	<a href="#">Checksum</a> <a href="#">Instructions</a>
<a href="#">mariadb-10.2.14-linux-systemd-x86_64.tar.gz (for systems with systemd)</a>	gzipped tar file	Linux x86_64	736.3 MB	<a href="#">Checksum</a> <a href="#">Instructions</a>
<a href="#">mariadb-10.2.14-linux-glibc_214-x86_64.tar.gz (requires GLIBC_2.14+)</a>	gzipped tar file	Linux x86_64	603.0 MB	<a href="#">Checksum</a> <a href="#">Instructions</a>
<a href="#">mariadb-10.2.14-linux-i686.tar.gz</a>	gzipped tar file	Linux x86	436.6 MB	<a href="#">Checksum</a> <a href="#">Instructions</a>
<a href="#">mariadb-10.2.14-linux-systemd-i686.tar.gz (for systems with systemd)</a>	gzipped tar file	Linux x86	587.2 MB	<a href="#">Checksum</a> <a href="#">Instructions</a>

Want to learn more about MariaDB? Check out our [whitepapers](#).

### Operating System

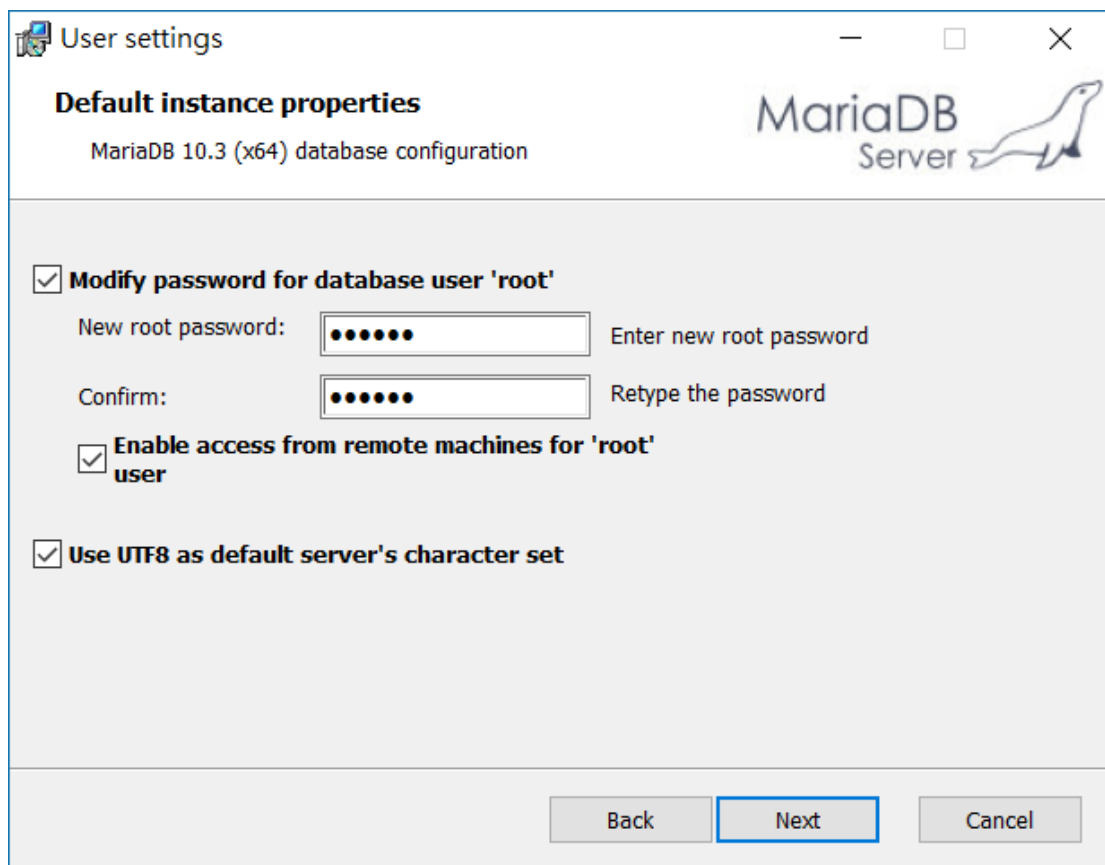
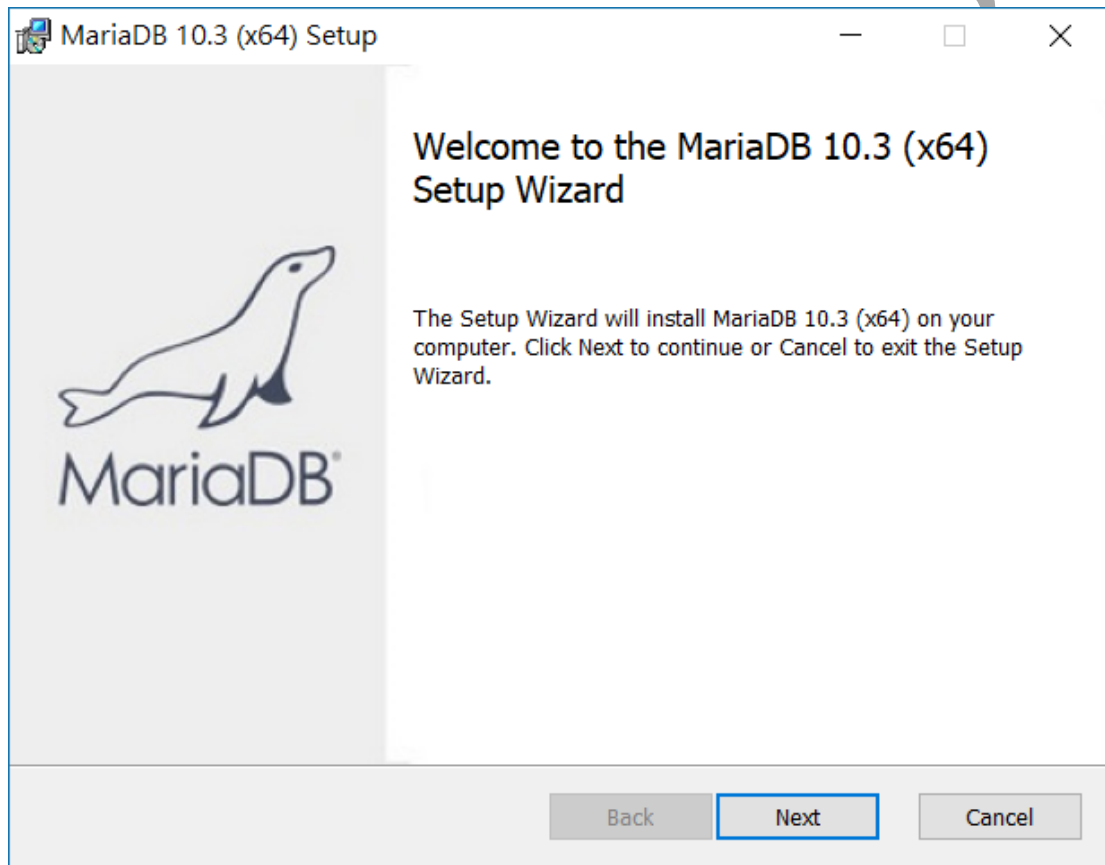
- ☐ DEB Package
- ☐ Generic Linux
- ☐ RPM Package
- ☐ Source Code
- ☐ Windows

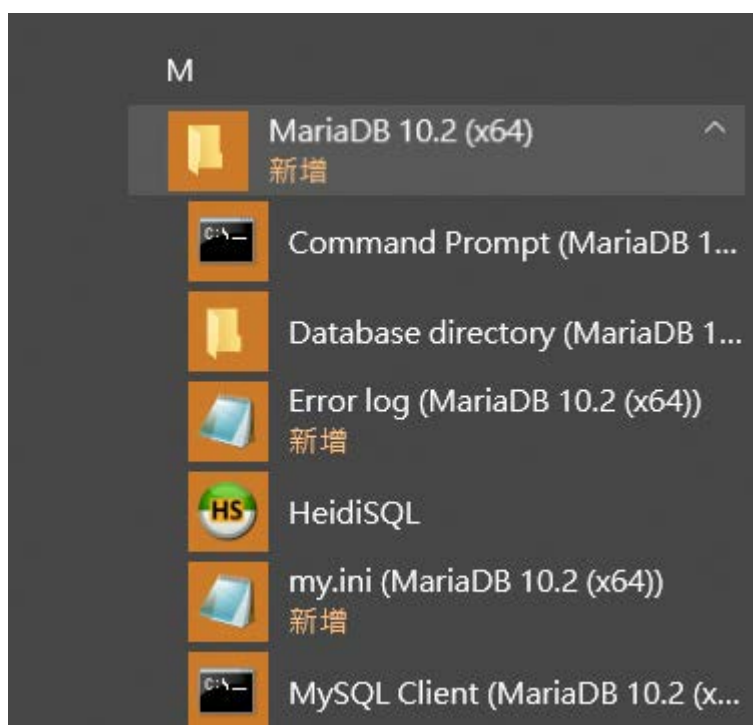
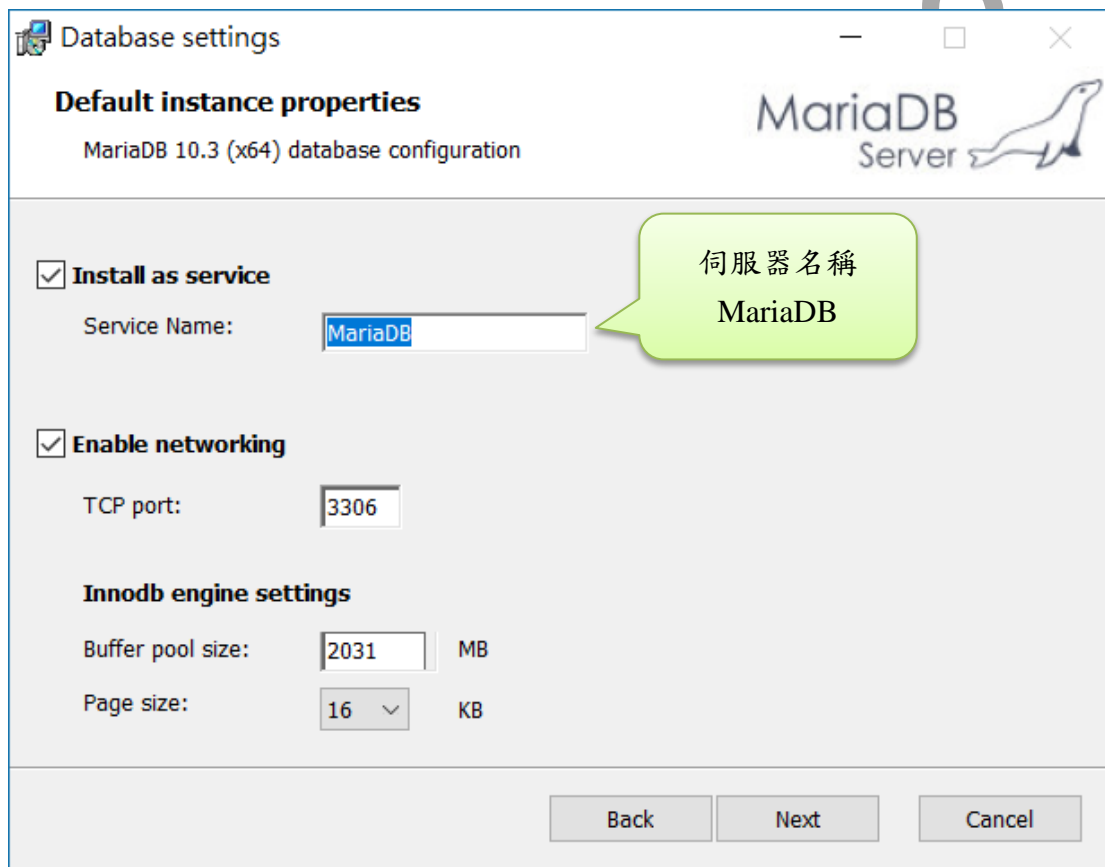
### Package Type

- ☐ MacOS pkg
- ☐ DEB Package
- ☐ RPM Package
- ☐ MSI Package
- ☐ ZIP file
- ☐ source tar.gz file
- ☐ source zip file
- ☐ gzipped tar file
- ☐ java source jar

### CPU

連結:<https://downloads.mariadb.org/mariadb/10.2.14/>





## 啟動與停止 資料庫伺服器 Server

\*如何將資料庫服務開啟?

以系統管理員身分執行命令列

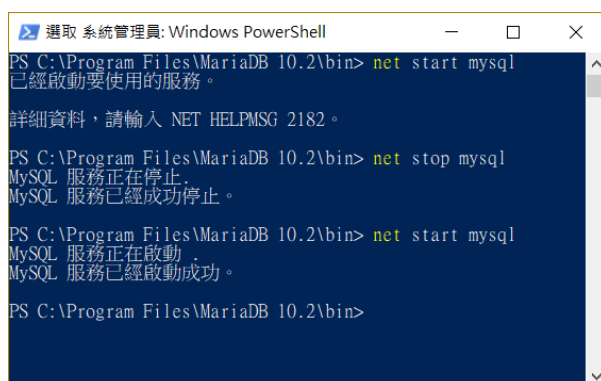
- 啟動 MariaDB 資料庫服務

```
net start mysql
```

- 停止 MariaDB 資料庫服務 當你長期不用時，建議關閉資料庫服務!

```
net stop mysql
```





```
選取 系統管理員: Windows PowerShell
PS C:\Program Files\MariaDB 10.2\bin> net start mysql
已經啟動要使用的服務。

詳細資料，請輸入 NET HELPMSG 2182。

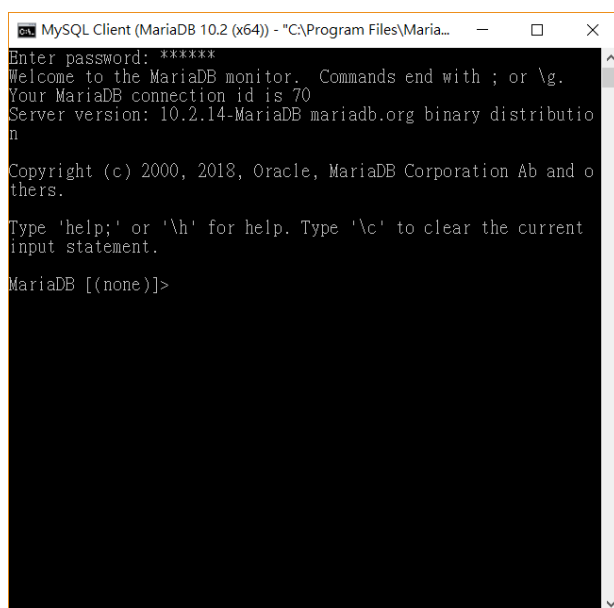
PS C:\Program Files\MariaDB 10.2\bin> net stop mysql
MySQL 服務正在停止。
MySQL 服務已經成功停止。

PS C:\Program Files\MariaDB 10.2\bin> net start mysql
MySQL 服務正在啟動。
MySQL 服務已經啟動成功。

PS C:\Program Files\MariaDB 10.2\bin>
```

## 資料庫管理—command line 指令

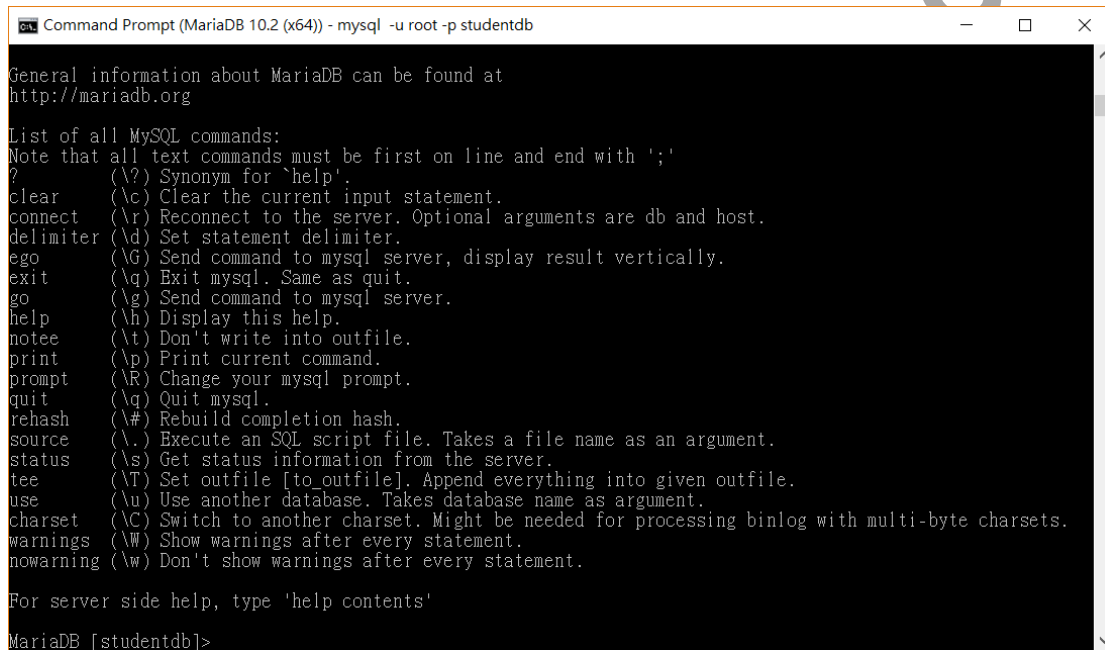
輸入 root 的密碼



```
MySQL Client (MariaDB 10.2 (x64)) - "C:\Program Files\Maria...
Enter password: *****
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 70
Server version: 10.2.14-MariaDB mariadb.org binary distributio
n
Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and o
thers.
Type 'help;' or '\h' for help. Type '\c' to clear the current
input statement.
MariaDB [(none)]>
```

可以用的指令:





```
Command Prompt (MariaDB 10.2 (x64)) - mysql -u root -p studentdb

General information about MariaDB can be found at
http://mariadb.org

List of all MySQL commands:
Note that all text commands must be first on line and end with ';'
?          (\?) Synonym for `help`.
clear      (\c) Clear the current input statement.
connect    (\r) Reconnect to the server. Optional arguments are db and host.
delimiter  (\d) Set statement delimiter.
ego        (\G) Send command to mysql server, display result vertically.
exit       (\q) Exit mysql. Same as quit.
go         (\g) Send command to mysql server.
help       (\h) Display this help.
notee      (\t) Don't write into outfile.
print      (\p) Print current command.
prompt     (\R) Change your mysql prompt.
quit       (\q) Quit mysql.
rehash     (\#) Rebuild completion hash.
source     (\.) Execute an SQL script file. Takes a file name as an argument.
status     (\s) Get status information from the server.
tee        (\T) Set outfile [to_outfile]. Append everything into given outfile.
use        (\u) Use another database. Takes database name as argument.
charset    (\C) Switch to another charset. Might be needed for processing binlog with multi-byte charsets.
warnings   (\W) Show warnings after every statement.
nowarning   (\w) Don't show warnings after every statement.

For server side help, type 'help contents'

MariaDB [studentdb]>
```

另外一種方式進入

`mysql -u root -p studentdb`

## 資料庫管理—SQLyog Community

SQLyog Community 64 - [MyMariaDB/studentdb - root@localhost\*]

File Edit Favorites Database Table Others Tools Powertools Transactions Window Help

studentdb

MyMariaDB

Filter tables in studentdb

Filter (Ctrl+Shift+B)

root@localhost

- information\_schema
  - Tables
  - Views
  - Stored Procs
  - Functions
  - Triggers
  - Events
- mysql
- performance\_schema
- studentdb
  - Tables
    - student
      - Columns
        - student\_id, varchar(7)
        - name, varchar(20)
        - phone, varchar(10)
      - Indexes
        - PRIMARY (student\_id)
    - Views
    - Stored Procs
    - Functions
    - Triggers
    - Events
  - test
    - Tables
    - Views
    - Stored Procs
    - Functions
    - Triggers
    - Events

Use HTTP/SSH Tunneling to connect to MySQL even if direct connection i...

Query 1 x History +

```

1  -- 學生資料表
2  -- DROP Table student;
3  CREATE TABLE student`student``student`t
4  (
5      student_id VARCHAR(7) NOT NULL,
6      NAME VARCHAR (20) NOT NULL,
7      phone VARCHAR (10) NOT NULL,
8      PRIMARY KEY(student_id)
9  );
10 INSERT INTO student (student_id,NAME,phone) VALUES
11 ('u001','王曉明','0935875178'),
12 ('u002','李大同','0933551246'),
13 ('u003','孫小毛','0965521126');
14

```

1 Messages 2 Table Data 3 Info

Limit rows First row 0

student_id	name	phone
u001	王曉明	0935875178
u002	李大同	0933551246
u003	孫小毛	0965521126
(NULL)	(NULL)	(NULL)

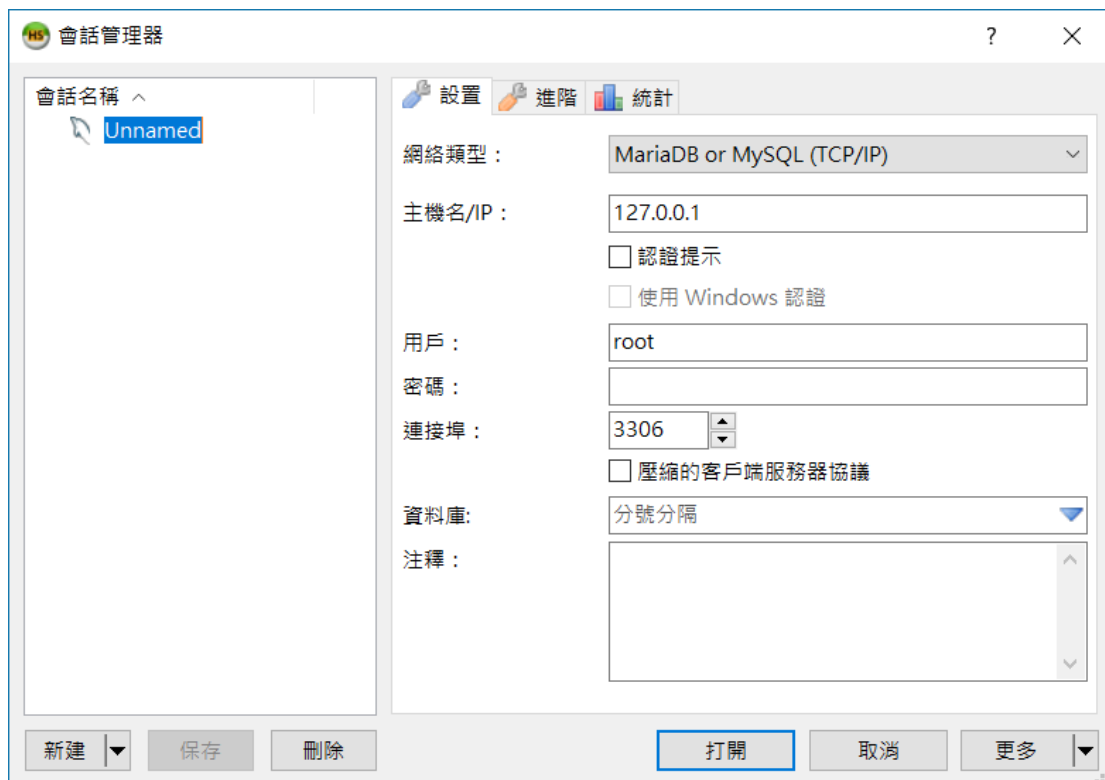
Database: studentdb Table: student

Connections: 1 Upgrade to SQLyog Professional/Enterprise/Ultimate

## 資料庫管理—HeidiSQL GUI Tool

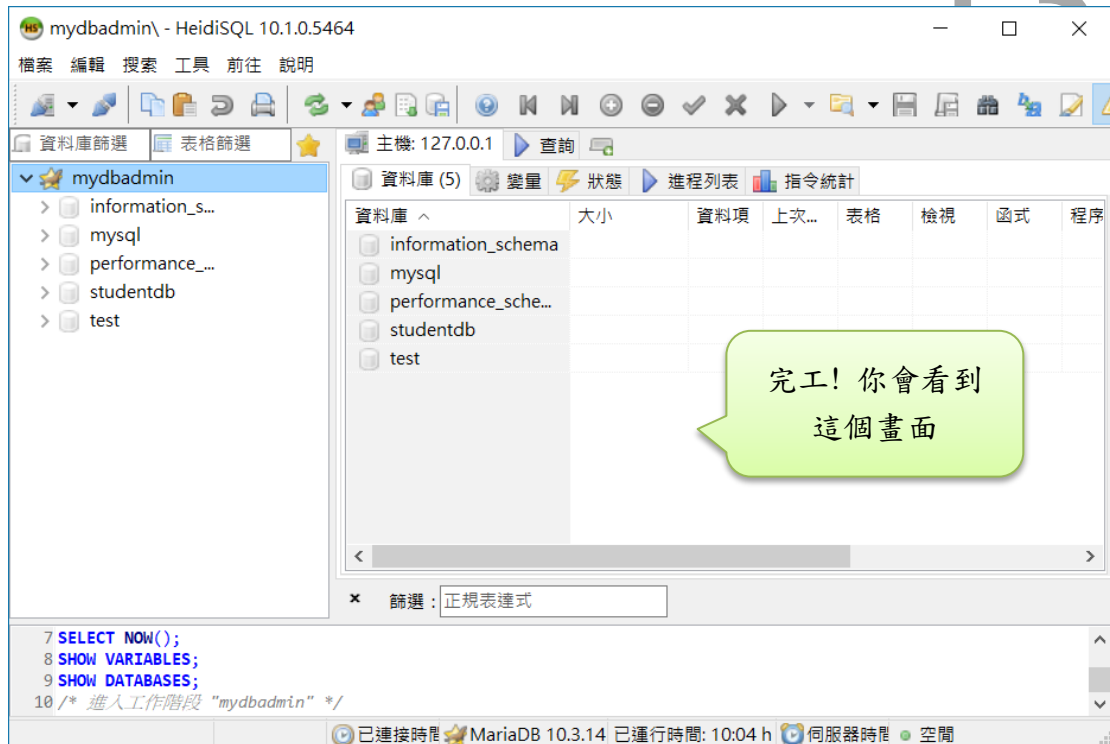


<http://www.imdb.com/title/tt3700392/>





都寫好之後，按下  
打開



## 使用 MySQL (可能是全世界最多人使用)

### 安裝

#### 下載與安裝 (MySQL Community Edition)

##### (1) MySQL Community Server

<https://dev.mysql.com/downloads/mysql/>

##### (2) 管理工具安裝:

##### MySQL Workbench

<https://dev.mysql.com/downloads/workbench/>

Workbench 管理工具功能蠻多的，需要花一些時間熟悉它。

MySQL Workbench provides DBAs and developers an integrated tools environment

for:

Database Design & Modeling  
SQL Development  
Database Administration  
Database Migration

## 資料庫管理—使用 MySQL Workbench(已經不支援 MariaDB)

管理工具安裝:

MySQL Workbench

<https://dev.mysql.com/downloads/workbench/>

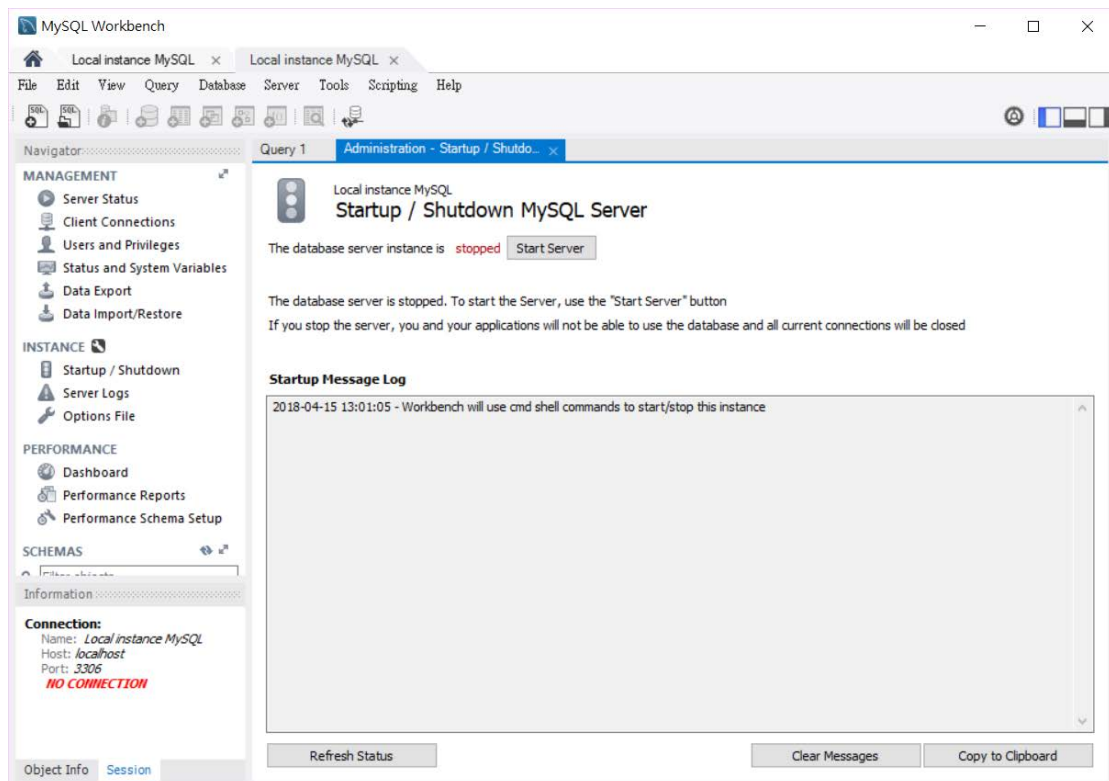
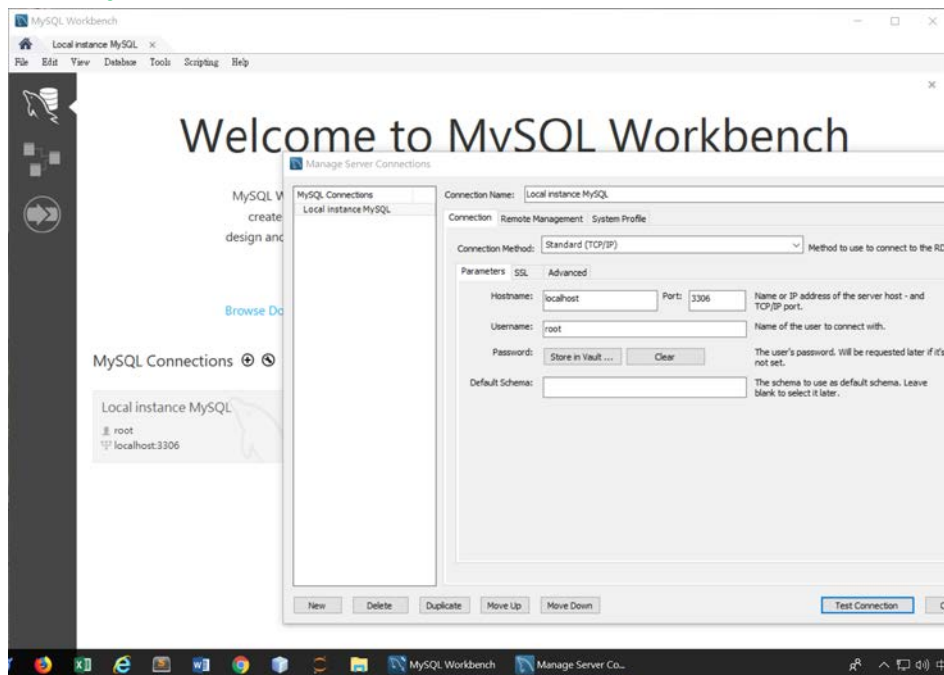
Workbench 管理工具功能蠻多的，需要花一些時間熟悉它。

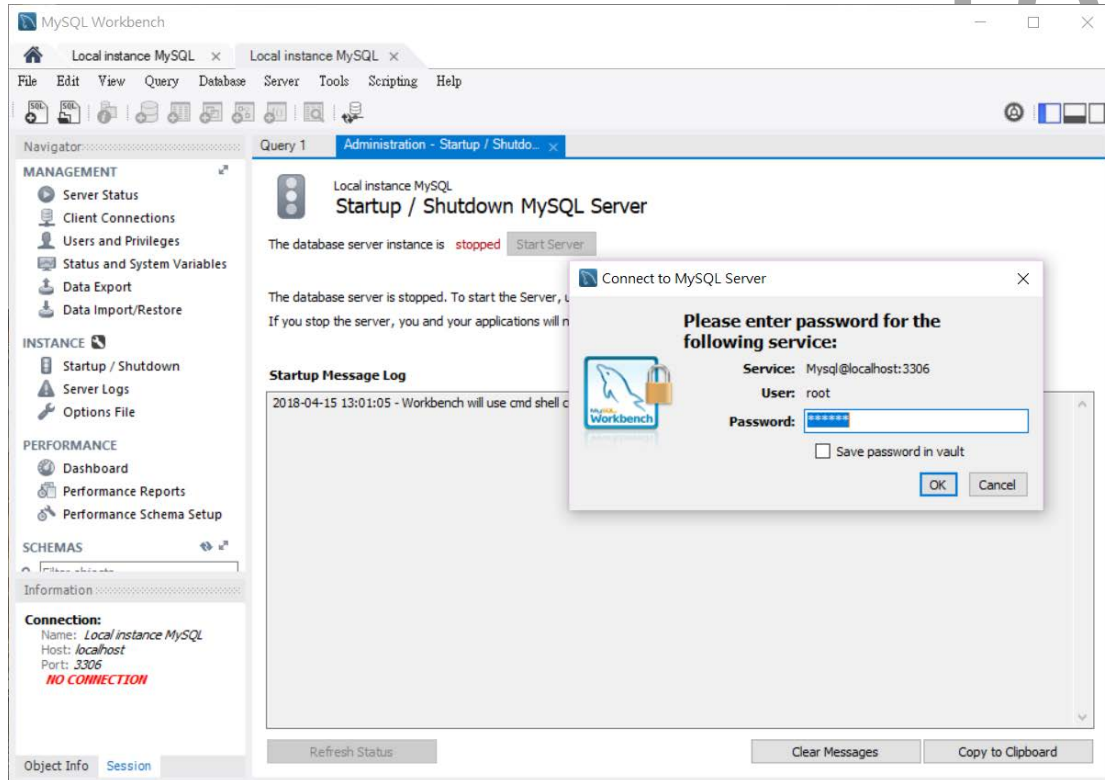
MySQL Workbench provides DBAs and developers an integrated tools environment for:

Database Design & Modeling  
SQL Development  
Database Administration  
Database Migration

## 啟動與停止資料庫伺服器 Server 管理

\*如何將資料庫服務開啟?

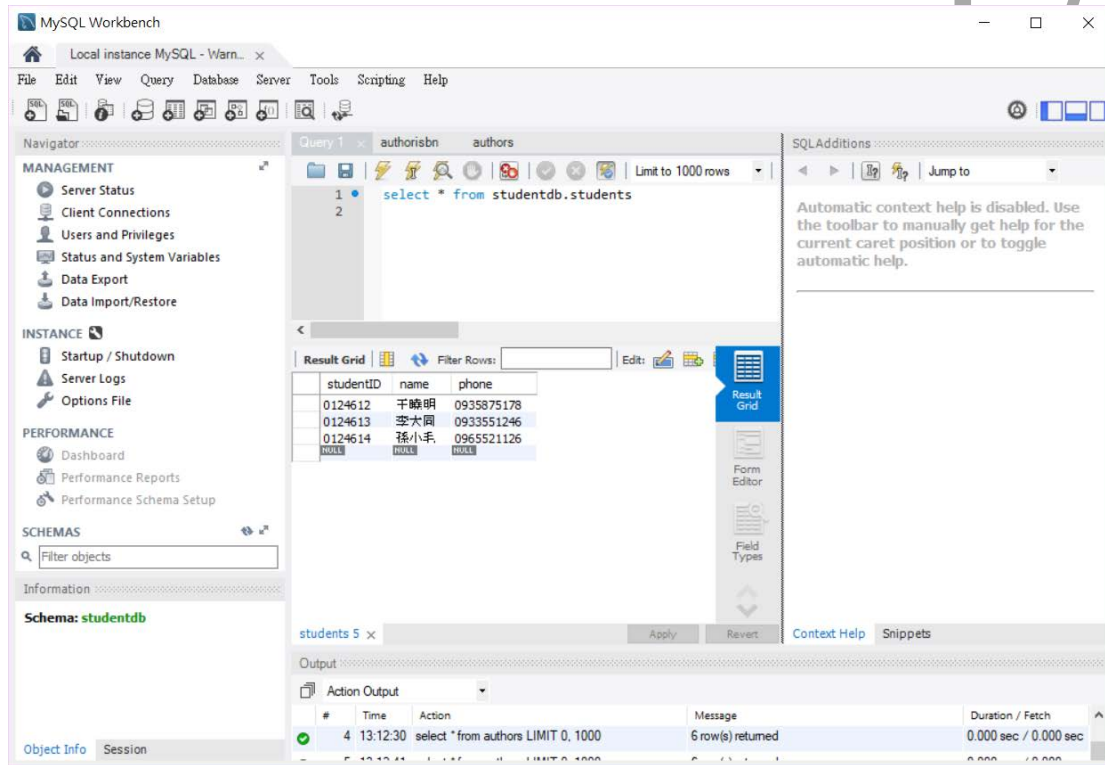




## 資料庫新增與管理

### 資料庫管理





## 驅動程式下載(for Java)

<https://dev.mysql.com/downloads/connector/j/>

Generally Available (GA) Releases
Development Releases

### Connector/J 5.1.40

Select Platform:

Platform Independent

Looking for previous GA versions?

Platform Independent (Architecture Independent), Compressed TAR Archive (mysql-connector-java-5.1.40.tar.gz)	5.1.40	3.7M	<a href="#">Download</a>
MD5: 415a375cf8a096ef0aa775a4ae36916d   <a href="#">Signature</a>			
Platform Independent (Architecture Independent), ZIP Archive (mysql-connector-java-5.1.40.zip)	5.1.40	4.1M	<a href="#">Download</a>
MD5: ed67bcb617bc949537219d42b8407d5   <a href="#">Signature</a>			

選擇 Platform Independent (Architecture Independent), ZIP Archive

下載的檔案

mysql-connector-java-5.1.40.zip

解壓縮之後，以下這個檔案就是驅動程式 driver  
mysql-connector-java-5.1.40-bin.jar

參考教學影片

<https://www.youtube.com/watch?v=2i4t-SL1VsU>

<https://www.youtube.com/watch?v=2i4t-SL1VsU>

<https://www.youtube.com/watch?v=16cf6Hc7aNA&list=PLZaC0jISFQBIPuQj3FxFj0y1Gy4hp4jAX#t=57.778823>

## 驅動程式下載(for Java)



### MariaDB is free and open source software

The MariaDB database server is published as free and open source software under the General Public License version 2. You can download and use it as much as you want free of charge. *All use of the binaries from mariadb.org is at your own risk as stated in the GPLv2.* While we do our best to make the world's best database software, the MariaDB Foundation does not provide any guarantees and cannot be held liable for any issues you may encounter.

## Downloads Source, Binaries, and Packages

To show only the files you want, use the checkboxes in the sidebar. For other MariaDB Connector/J releases, click on "[View All Releases](#)". For faster downloads choose a mirror close to you.

MariaDB Connector/J is used to connect applications developed in Java to MariaDB and MySQL databases using the standard JDBC API. The client library is LGPL licensed.

See [this article](#) for more information.

MariaDB Connector/J .jar files are available at:  
<https://downloads.mariadb.com/Connectors/java/>

### MariaDB Connector/J 2.2.3 Stable

2018-03-14

[Release Notes](#)

[Changelog](#)

[View all releases](#)

Affordable, enterprise class product support, professional services, and training for your MariaDB database is available from the MariaDB Foundation's release sponsor, MariaDB Corporation. To learn more about them and their services for MariaDB, visit their [website](#), or email MariaDB Corporation at [sales@mariadb.com](mailto:sales@mariadb.com).

File Name	Package Type	OS / CPU	Size	Meta
<a href="#">mariadb-java-client-2.2.3-sources.jar</a>	java source jar	Source	600.8 kB	<a href="#">Checksum</a> <a href="#">Instructions</a>
<a href="#">MariaDB Connector/J .jar files</a>	jar	Universal		<a href="#">Checksum</a> <a href="#">Instructions</a>

Want to learn more about MariaDB? Check out our [whitepapers](#).

Mirror

連結:<https://downloads.mariadb.org/connector-java/2.2.3/>

## 新增 Java 專案

新增專案，程式碼如範例程式

必須將 mysql 驅動程式載入才能執行  
MariaDB 驅動程式載入方式一樣

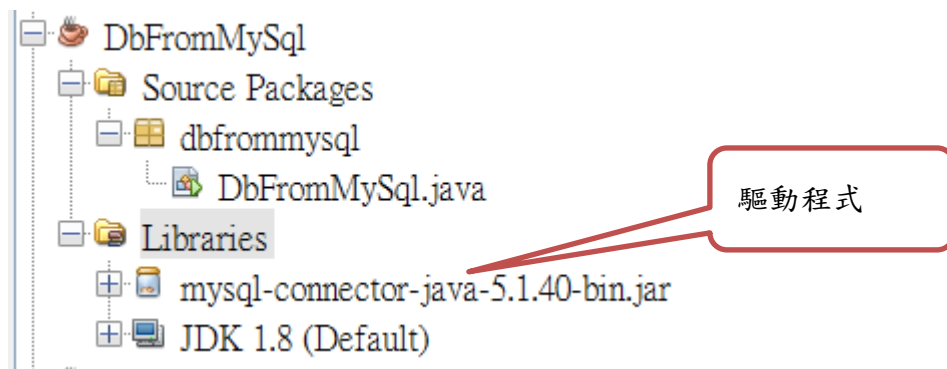
\*必須將 mysql 驅動程式載入才能執行

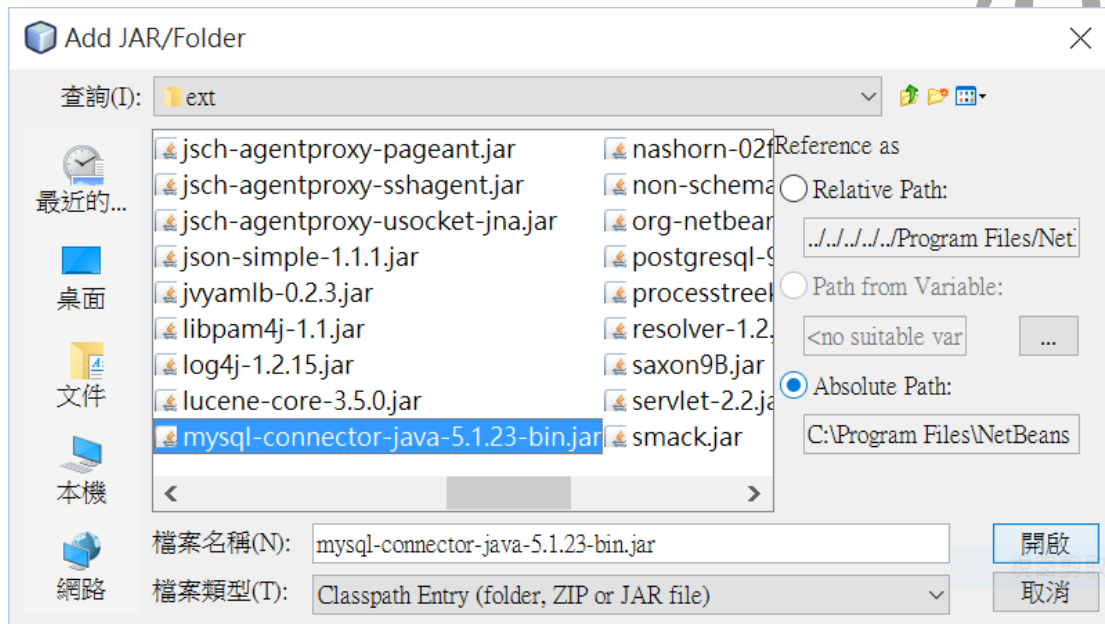
->Libraries->按右鍵->加入 jar 檔->選擇你安裝的目錄之下的 mysql-connector-java-5.1.40-bin.jar

NetBeans 中已經有這個驅動程式，位於：

C:\Program Files\NetBeans 8.0.2\ide\modules\ext\mysql-connector-java-5.1.23-bin.jar

若是沒有，或是版本太舊，則下載一個





## 使用 JavaDB (Netbeans 附帶的簡易資料庫)

### 啟動與新增資料庫

- \*如何將資料庫服務開啟?

點選 Java Netbeans 之 Services

滑鼠移到 Java DB，將資料庫伺服器啟動

按右鍵 Start Server

- \*如何產生一個資料庫？稱為 student\_db?

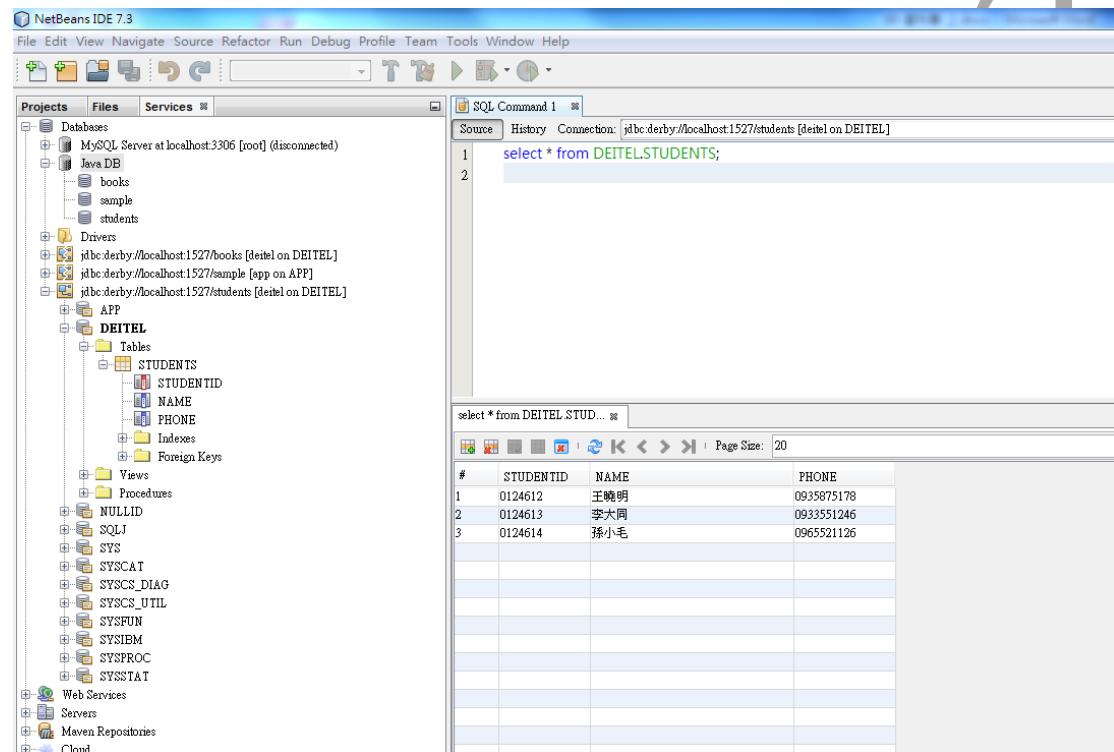
Create Database

輸入

資料庫名稱 使用者名稱 密碼

e.g., student\_db deitel deitel

- 在資料庫 student\_db 按右鍵 連結上去 Connect...



## \*如何新建一個資料表 students?

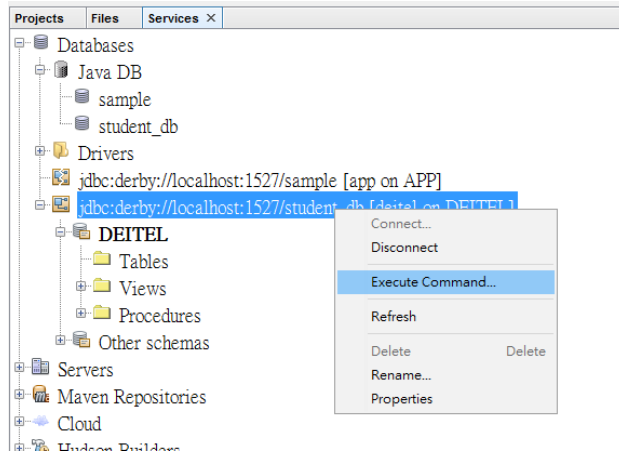
### ● 執行 SQL 指令

在資料庫 student\_db 之完整 url 名稱下

jdbc:derby://localhost:1527/student\_db [deitel on DEITEL]

按右鍵選擇 Execute command

產生一個執行 SQL 指令畫面



將 “學生資料表-SQL 命令” 貼上（請參看程式碼） 執行 SQL 命令  
產生 Tables , column 欄位名稱 與多筆紀錄資料

--學生資料表

DROP Table students;

CREATE TABLE students

```
(
    studentID varchar(7) not null,
    name varchar (20) not null,
    phone varchar (10) not null,
    Primary Key(studentID)
);
```

Insert Into students (studentID,name,phone) values

('0124612','王曉明','0935875178'),

('0124613','李大同','0933551246'),

('0124614','孫小毛','0965521126');

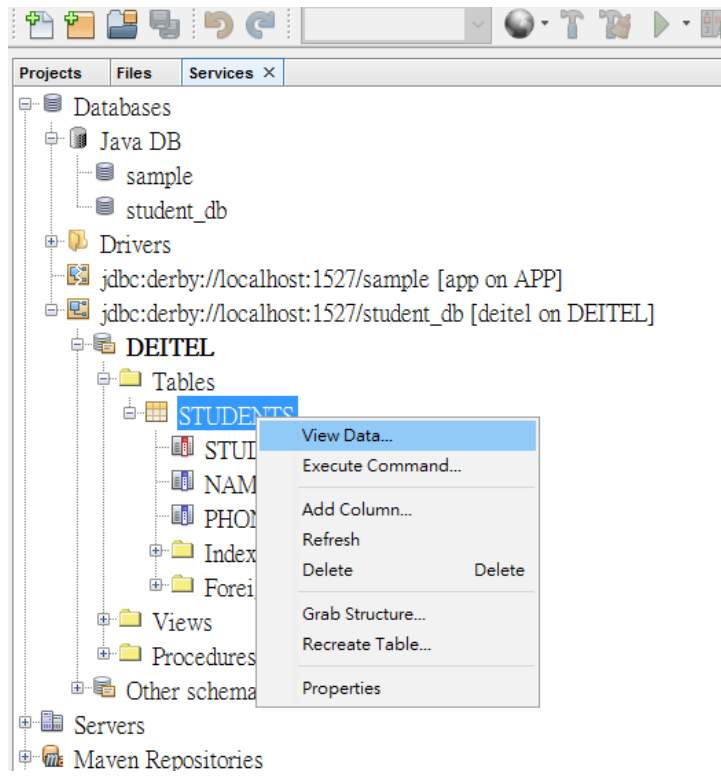
\*在資料庫 students 之完整 url 名稱下

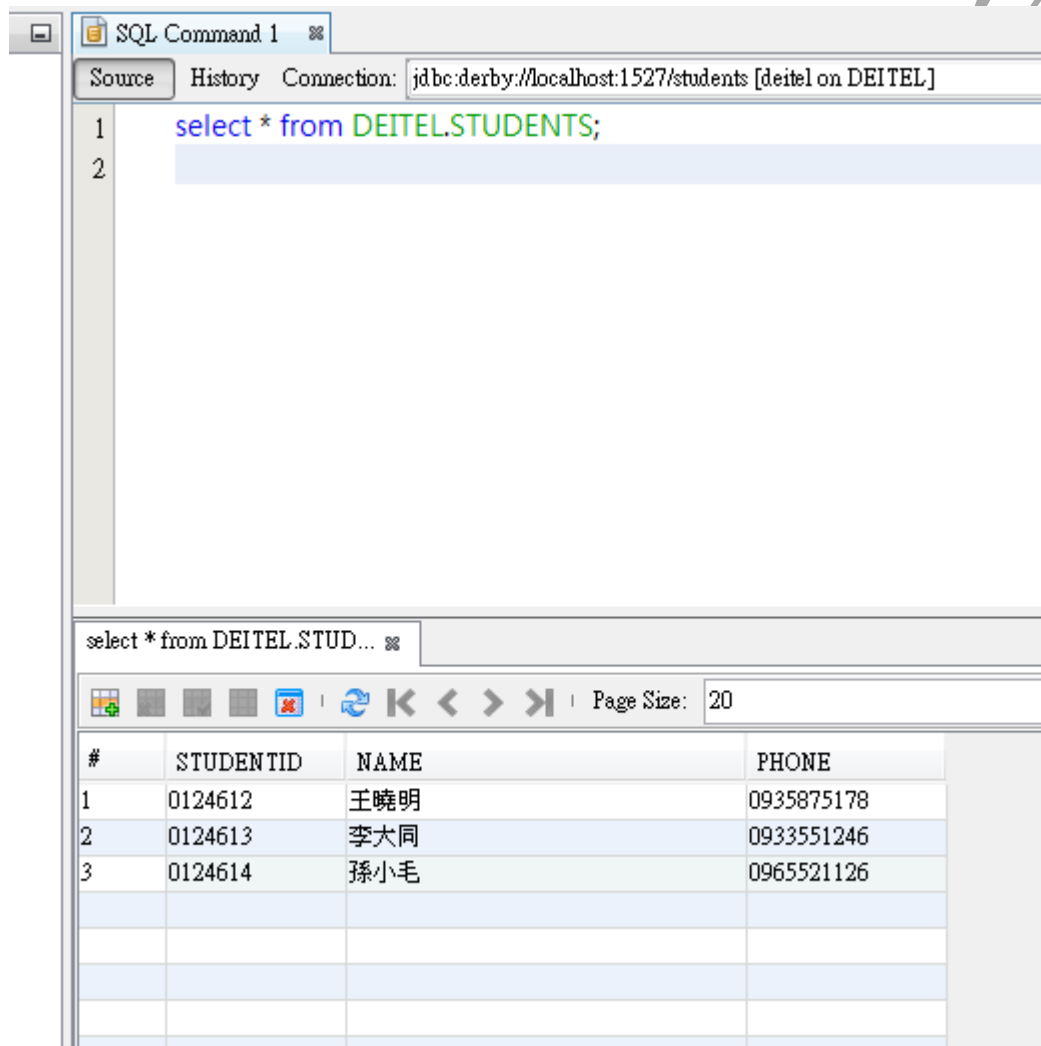
jdbc:derby://localhost:1527/students [deitel on DEITEL]

展開並選擇 student\_db 資料庫的 Table 之內的 Student 表格

按右鍵選擇 “view data”

可以看到完整的資料內容





## 指定資料庫驅動程式

Libraries 要指定資料庫驅動程式 ➔ **derbyclient.jar**

將 derby 驅動程式載入才能執行

->Libraries->按右鍵->加入 jar 檔->選擇 derbyclient.jar

\*Derby 資料庫放在哪個目錄裡？

C:\Program Files\Java\jdk1.8.0\_112\db\lib

(在 java 安裝目錄之下的 jdk1.8.0.x 之下的 db 之下的 lib 裡面)



