

Introduction to Advanced Java

In core Java, we can develop standalone applications

standalone —

1. GUI Applications (Desktop Applications) like MSWord, Calculator, Games etc
2. CUI Based Application (Console Application) like Cmd > Java Test

Through Advance java, we can develop **web applications** like Gmail,irctc,upes.ac.in etc.

client/s-----request (from across the globe) → Server

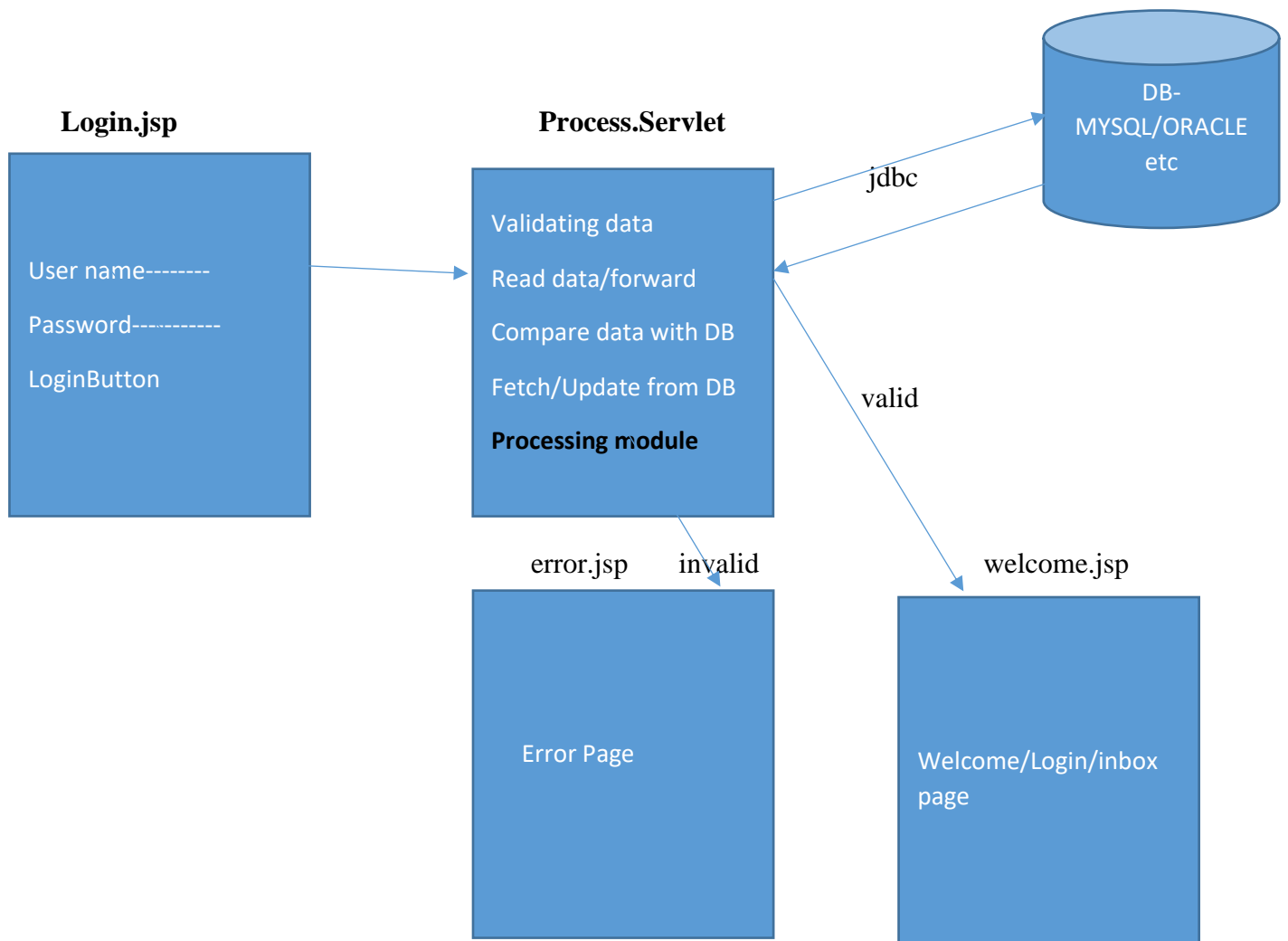
Server-----response→client

In advance java, we will learn 3 things, or We can develop Web applications through the following 3 technologies:

- JDBC: for connection with Java/Servlet
- JSP: Presentation logic/view
- Servlet: processing logic/business logic

According to Sun Microsystem, total Java is available in 3 editions:

- 1) Java Standard Edition(JSE/J2SE) (Core Java+ JDBC)
- 2) Java Enterprise Edition (JEE/J2EE) (Servlet + JSP)
- 3) Java micro edition (JME)/J2ME: mobile application, embedded microcontroller, cards, etc.



Simple Web application example

JSP: JAVA SERVER PAGES- Meant for presentation logic to display something to the end user.

Wherever presentation logic is required, or we want to display something to the end user, we should go for JSP. End users can able to view `inbox.jsp` `/error.jsp` `/login...` these pages are view components, which contain presentation logic. So if you want to develop such view/presentation component, you should go for JSP.

Servlet: It meant for processing

Wherever some processing/business logic is required, we should go for Servlet.

Whenever we enter the submit button, the internal request goes to some component, and we can't see that component; it means someone reading data/comparing data/validating data/fetching

/updating data, it means someone internally processing our requests to perform something. This component is called a process servlet or servlet.

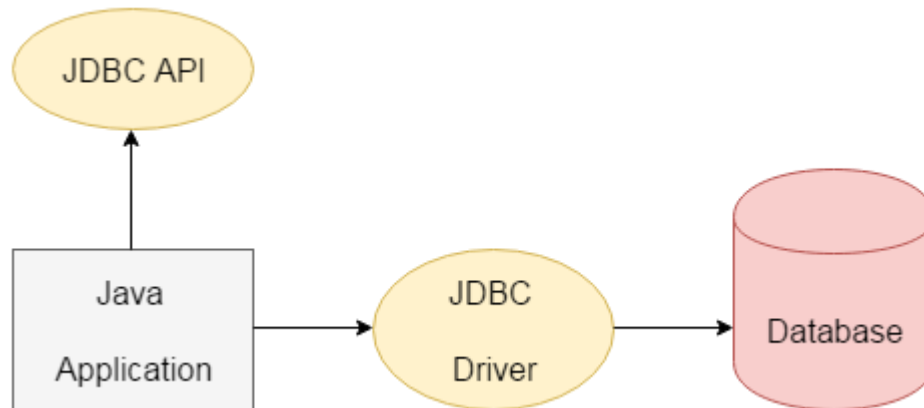
Wherever processing logic is required, we go for the servlet.

JDBC: if the Java application wants to communicate with the database, then we should go for JDBC.

Sometimes servlet (java component) is required to communicate with DB. Therefore, java to DB connection, if u want to communicate with DB, then we go for JDBC. Some technology must be required; this technology is nothing but JDBC.

JDBC

Java JDBC is a Java API to connect and execute queries with the database. JDBC API uses JDBC drivers to connect with the database.



Why use JDBC

Before JDBC (Java Database connectivity), ODBC (Open database connectivity) API was the database API to connect and execute queries with the database. But ODBC API uses ODBC driver, which is written in C language (i.e., platform dependent and unsecured). That is why Java has defined its own API (JDBC API) that uses JDBC drivers (written in Java language).

JDBC Driver

JDBC Driver is a software component that enables Java applications to interact with the database. There are four types of JDBC drivers:

1. JDBC-ODBC bridge driver
2. Native-API driver (partially java driver)
3. Network Protocol driver (fully java driver)
4. **Thin driver (fully java driver)//Popular**

1) JDBC-ODBC bridge driver

The JDBC-ODBC bridge driver uses the ODBC driver to connect to the database. The JDBC-ODBC bridge driver converts JDBC method calls into ODBC function calls. This is now discouraged because of the thin driver.

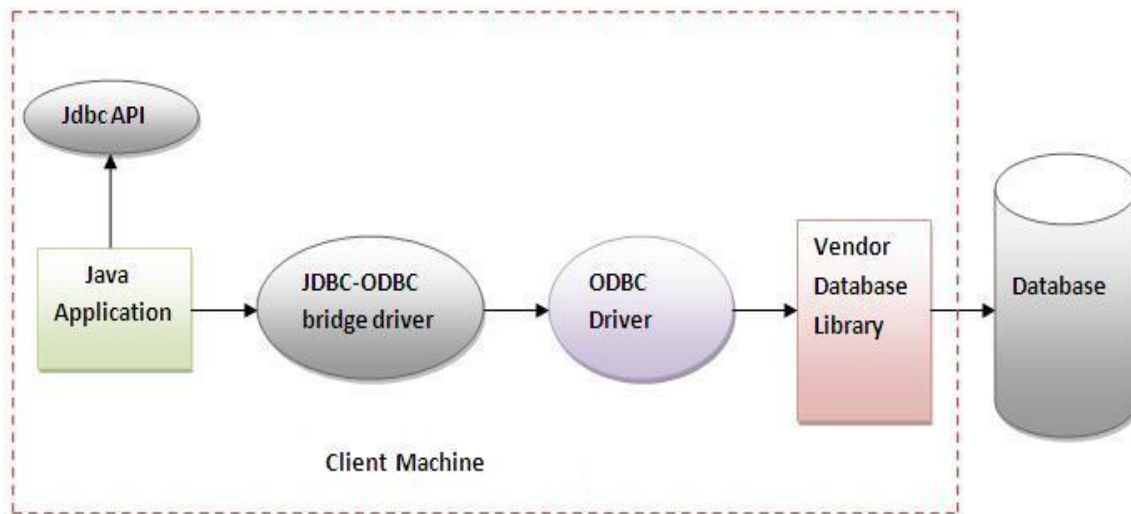


Figure- JDBC-ODBC Bridge Driver

Advantages:

- easy to use.
- can be easily connected to any database.

Disadvantages:

- Performance degraded because the JDBC method call is converted into the ODBC function calls.
- The ODBC driver needs to be installed on the client machine.

2) Native-API driver

The Native API driver uses the client-side libraries of the database. The driver converts JDBC method calls into native calls of the database API. It is not written entirely in java.

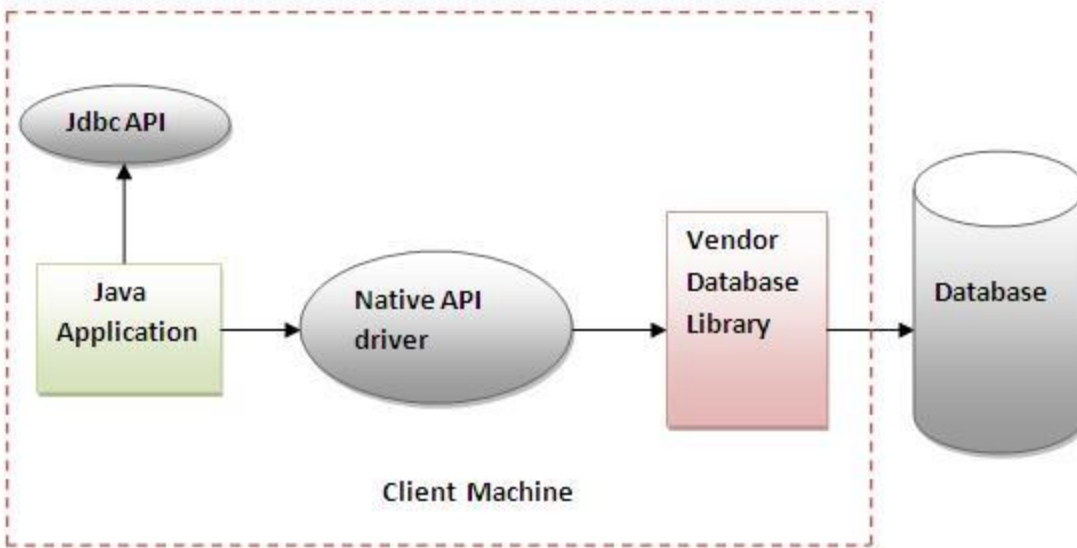


Figure- Native API Driver

Advantage:

- Performance upgraded than JDBC-ODBC bridge driver.

Disadvantage:

- The Native driver needs to be installed on each client machine.
- The Vendor client library needs to be installed on the client machine.

3) Network Protocol driver

The Network Protocol driver uses middleware (application server) that converts JDBC calls directly or indirectly into the vendor-specific database protocol. It is fully written in java.

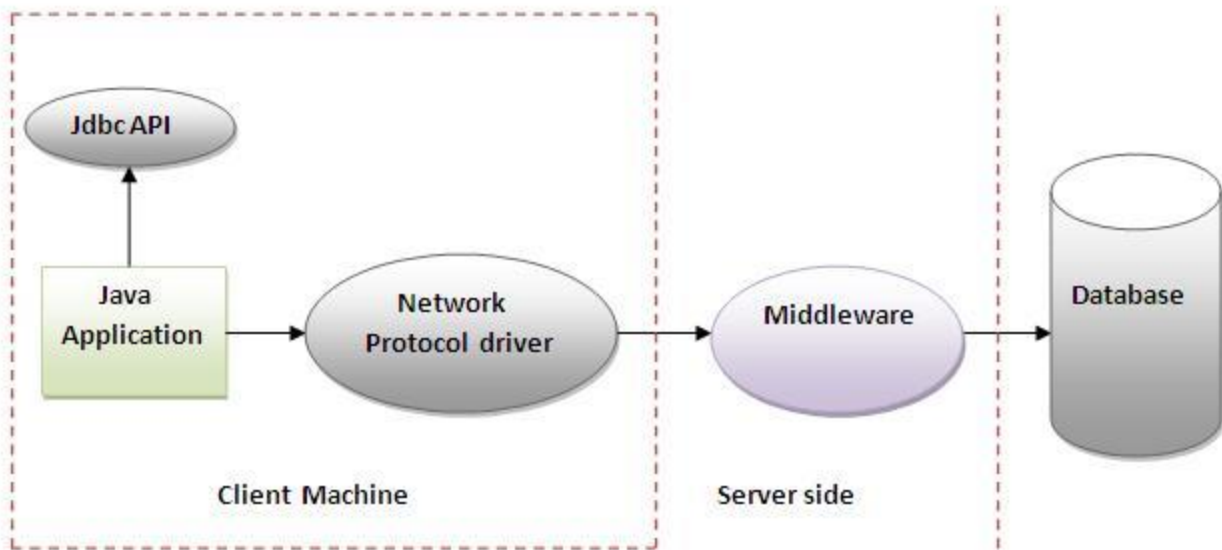


Figure- Network Protocol Driver

Advantage:

- No client-side library is required because of the application server can perform many tasks like auditing, load balancing, logging, etc.

Disadvantages:

- Network support is required on the client machine.
- Requires database-specific coding to be done in the middle tier.
- Maintenance of the Network Protocol driver becomes costly because it requires database-specific coding to be done in the middle tier.

4) Thin driver

The thin driver converts JDBC calls directly into the vendor-specific database protocol. That is why it is known as a thin driver. It is fully written in Java language.

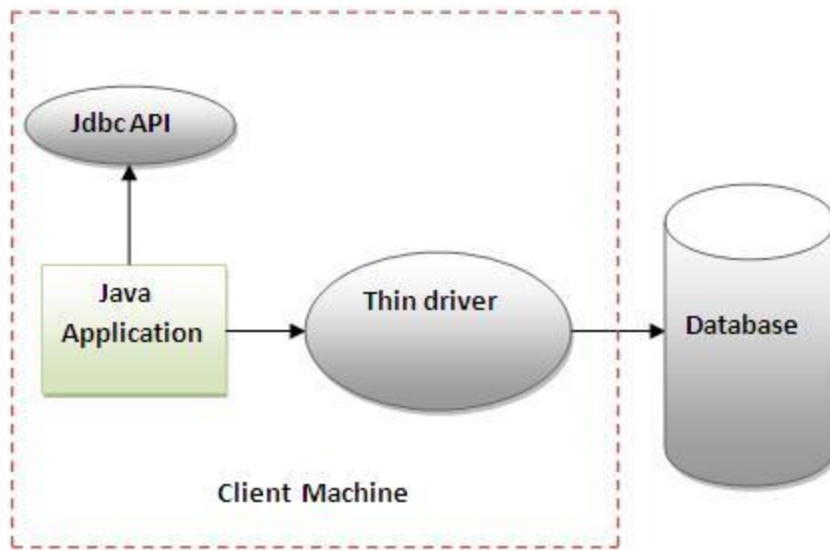


Figure- Thin Driver

Advantage:

- Better performance than all other drivers.
- No software is required on the client side or server side.

Disadvantage:

- Drivers depend on the Database.

Installation of MySQL Server

Download: mysql-5.5.50-winx64.msi installer (Approx 40Mb) from following website:
<http://downloads.mysql.com/archives/community/>

The screenshot shows the MySQL Downloads website. The browser address bar displays <https://downloads.mysql.com/archives/community/>. The page features the MySQL logo and navigation links: MYSQL.COM, DOWNLOADS (highlighted), DOCUMENTATION, and DEVELOPER ZONE. A secondary navigation bar includes Enterprise, Community, Yum Repository, APT Repository, SUSE Repository, Windows, and Archives. On the left, a sidebar lists various MySQL products, with 'MySQL Community Server' selected. The main content area is titled 'MySQL Community Server (Archived Versions)'. A yellow warning box states: 'Please note that these are old versions. New releases will have recent bug fixes and features! To download the latest release of MySQL Community Server, please visit [MySQL Downloads](#).' Below this, three dropdown menus are set to '5.5.50', 'Microsoft Windows', and 'Windows (x86, 64-bit)'. A table lists the available MSI installer:

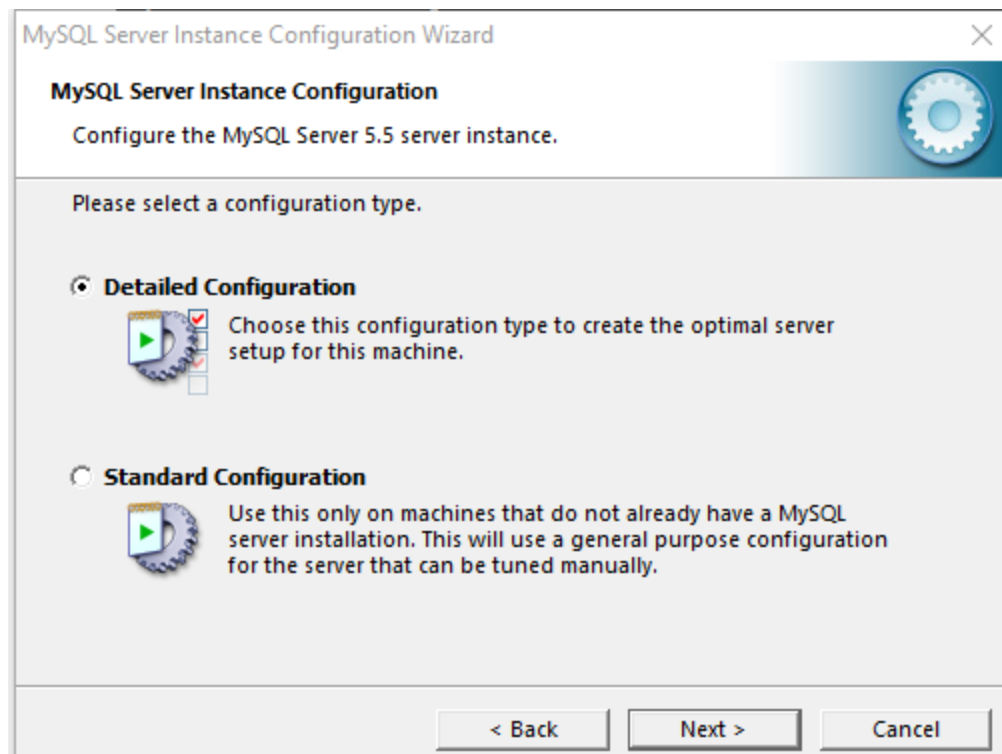
MSI Installer	May 17, 2016	41.4M	Download
(mysql-5.5.50-winx64.msi)			MD5: b40243b985d288e8e8285e86f65febd1 Signature

Download Installer.

▼ Today (1)

 mysql-5.5.50-winx64	11/15/2022 9:46 AM	Windows Installer ...	42,443 KB
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Double click on installer→Next→next.....→choose password and remember→next→finish.



MySQL Server Instance Configuration Wizard


MySQL Server Instance Configuration

Configure the MySQL Server 5.5 server instance.

Please select a server type. This will influence memory, disk and CPU usage.


☒

Developer Machine

 This is a development machine, and many other applications will be run on it. MySQL Server should only use a minimal amount of memory.


☐

Server Machine

 Several server applications will be running on this machine. Choose this option for web/application servers. MySQL will have medium memory usage.

☐

Dedicated MySQL Server Machine

 This machine is dedicated to run the MySQL Database Server. No other servers, such as a web or mail server, will be run. MySQL will utilize up to all available memory.

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Cancel

MySQL Server Instance Configuration Wizard


MySQL Server Instance Configuration

Configure the MySQL Server 5.5 server instance.

Please select the database usage.


☒

Multifunctional Database

 General purpose databases. This will optimize the server for the use of the fast transactional InnoDB storage engine and the high speed MyISAM storage engine.


☐

Transactional Database Only

 Optimized for application servers and transactional web applications. This will make InnoDB the main storage engine. Note that the MyISAM engine can still be used.

☐

Non-Transactional Database Only

 Suited for simple web applications, monitoring or logging applications as well as analysis programs. Only the non-transactional MyISAM storage engine will be activated.

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Cancel

MySQL Server Instance Configuration Wizard

MySQL Server Instance Configuration

Configure the MySQL Server 5.5 server instance.

Please select the drive for the InnoDB datafile, if you do not want to use the default settings.

InnoDB Tablespace Settings



Please choose the drive and directory where the InnoDB tablespace should be placed.

C: ▾

Installation Path ▾ ...

Drive Info

Volume Name: **Windows**

File System: **NTFS**



108 GB Diskspace Used

353.5 GB Free Diskspace

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Cancel

MySQL Server Instance Configuration Wizard

MySQL Server Instance Configuration

Configure the MySQL Server 5.5 server instance.

Please set the approximate number of concurrent connections to the server.

☒ **Decision Support (DSS)/OLAP**



Select this option for database applications that will not require a high number of concurrent connections. A number of 20 connections will be assumed.

☐ **Online Transaction Processing (OLTP)**



Choose this option for highly concurrent applications that may have at any one time up to 500 active connections such as heavily loaded web servers.

☐ **Manual Setting**



Please enter the approximate number of concurrent

Concurrent connections:

15 ▾

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Cancel


MySQL Server Instance Configuration Wizard

MySQL Server Instance Configuration

Configure the MySQL Server 5.5 server instance.

Please set the networking options.

☒ **Enable TCP/IP Networking**

 Enable this to allow TCP/IP connections. When disabled, only local connections through named pipes are allowed.

Port Number: ☐ Add firewall exception for this port

Please set the server SQL mode.

☒ **Enable Strict Mode**

This option forces the server to behave more like a traditional database server. It is recommended to enable this option.

< Back Next > Cancel


MySQL Server Instance Configuration Wizard

MySQL Server Instance Configuration


Configure the MySQL Server 5.5 server instance.

Please select the default character set.


☒ **Standard Character Set**

 Makes Latin1 the default charset. This character set is suited for English and other West European languages.

☐ **Best Support For Multilingualism**

 Make UTF8 the default character set. This is the recommended character set for storing text in many different languages.

☐ **Manual Selected Default Character Set / Collation**

 Please specify the character set to use.


Character Set:


< Back Next > Cancel

MySQL Server Instance Configuration Wizard

MySQL Server Instance Configuration
Configure the MySQL Server 5.5 server instance.

Please set the Windows options.

☒ **Install As Windows Service**
 This is the recommended way to run the MySQL server on Windows.
Service Name:
☒ Launch the MySQL Server automatically


☐ **Include Bin Directory in Windows PATH**
 Check this option to include the directory containing the server / client executables in the Windows PATH variable so they can be called from the command line.


< Back Next > Cancel

MySQL Server Instance Configuration Wizard

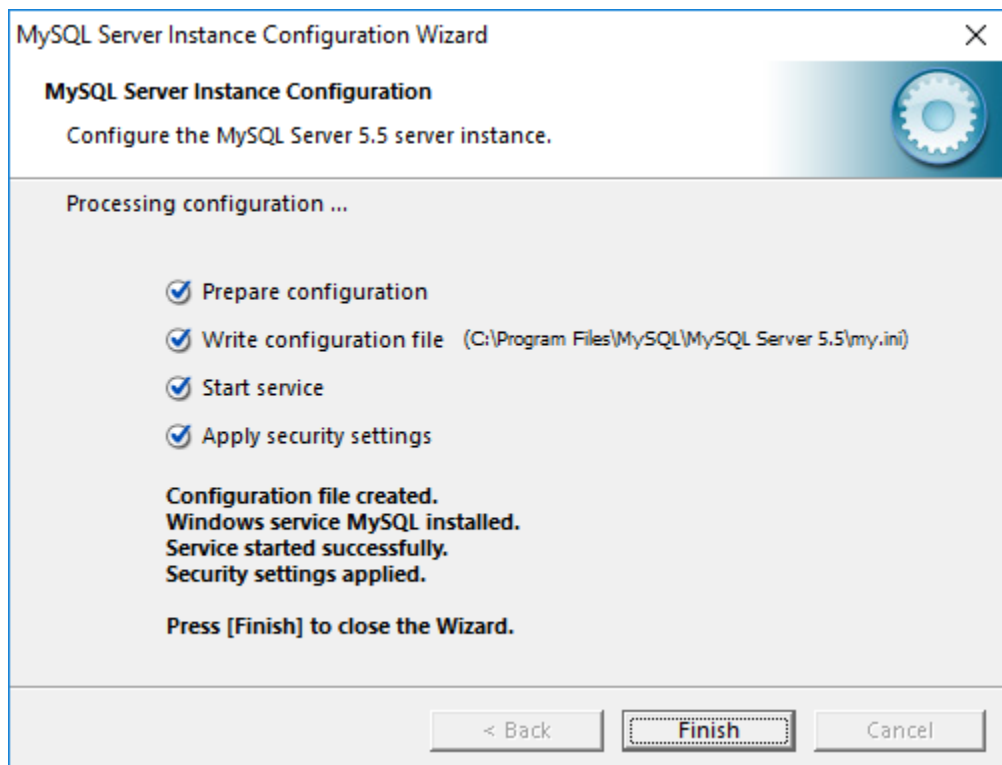
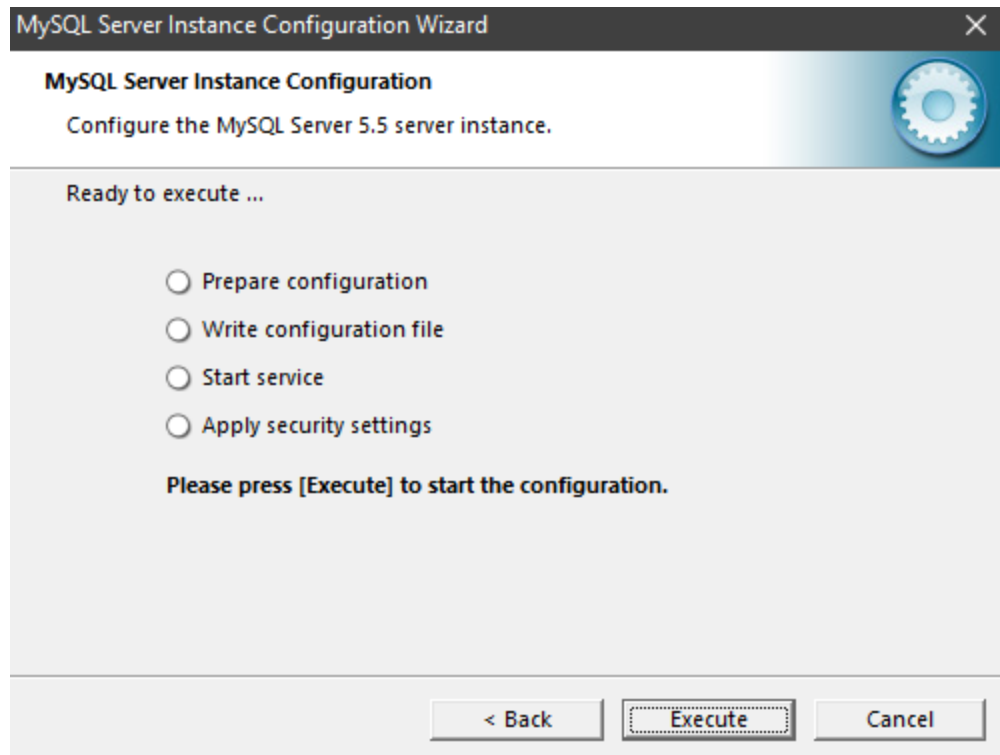
MySQL Server Instance Configuration
Configure the MySQL Server 5.5 server instance.

Please set the security options.

☒ **Modify Security Settings**
 New root password: Enter the root password.
Confirm: Retype the password.
☐ Enable root access from remote machines

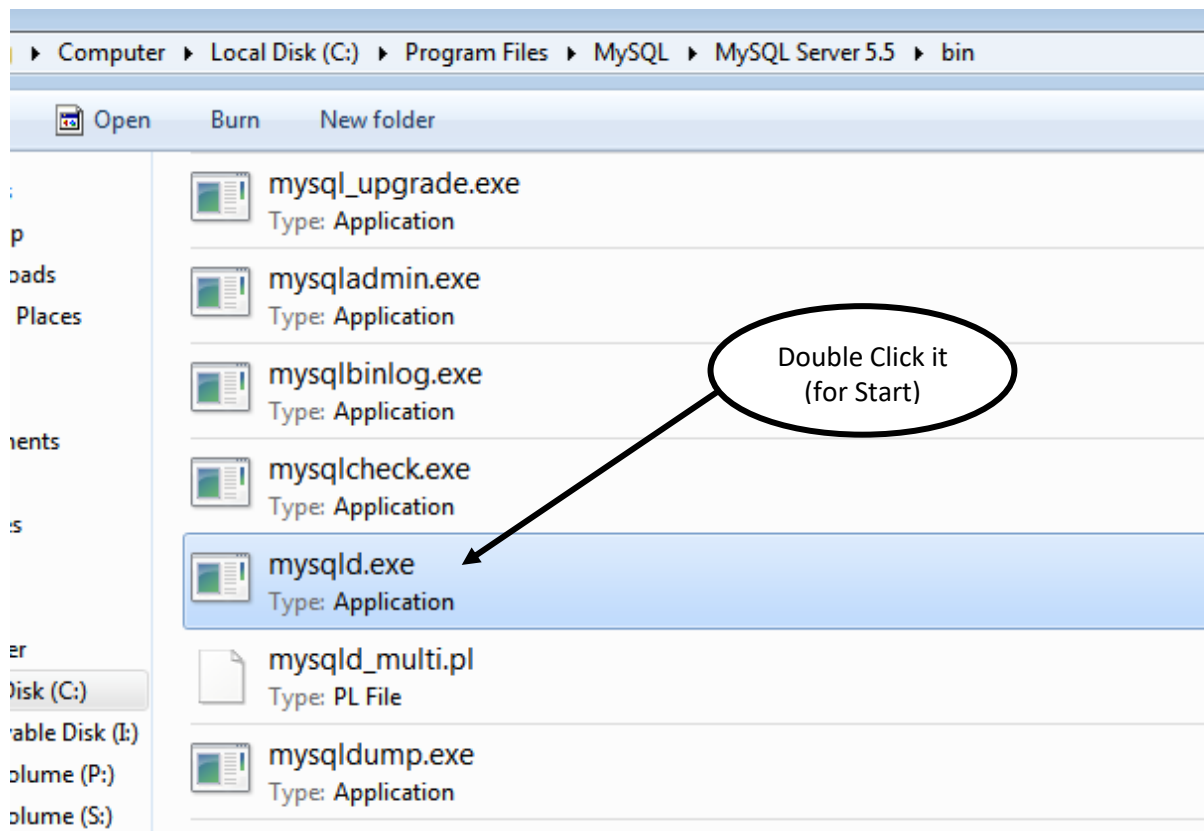
☐ **Create An Anonymous Account**
 This option will create an anonymous account on this server. Please note that this can lead to an insecure system.

< Back Next > Cancel



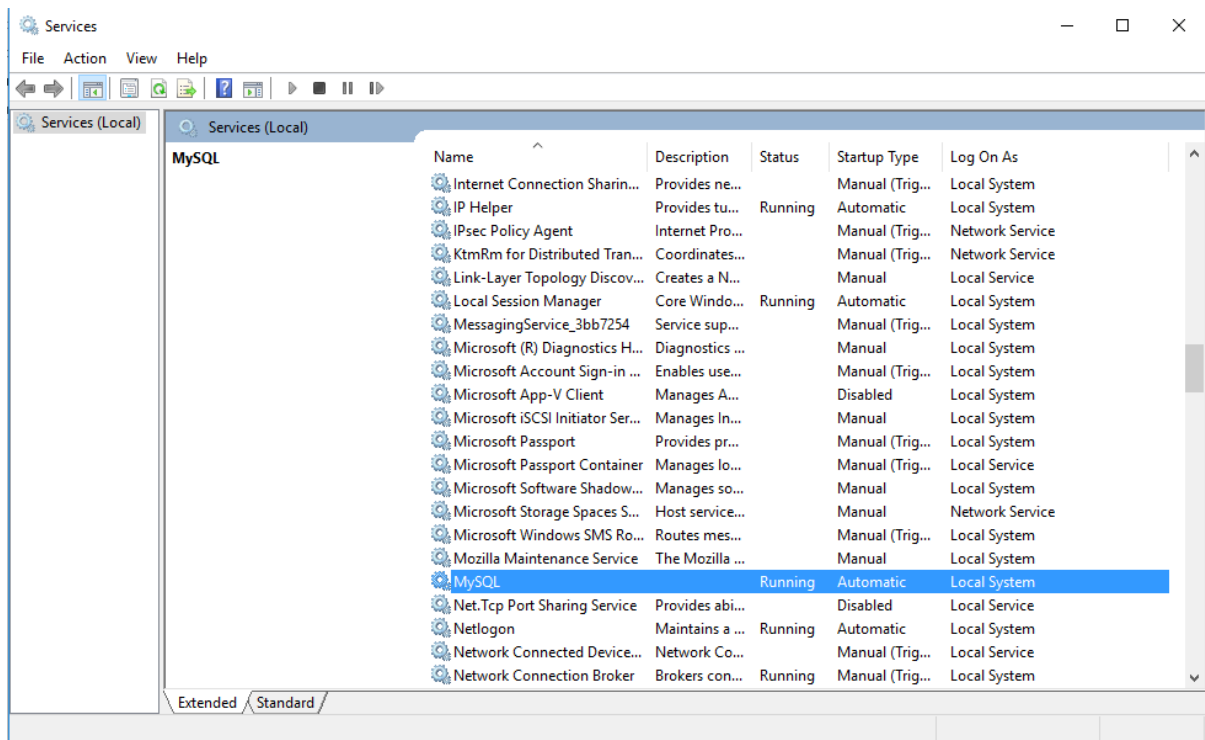
Start MySQL Server

C:\Program Files\MySQL\MySQL Server 5.5\bin→Double click on→mysqld.exe



Check whether the server is started or not:

Go in Control panel→Administrative tools→Services→mysql service(automatic mode)



OR

Open Task manager using (Alt+Ctrl+delete) keys →Processes→see mysql.exe