MySQL:

Introduction
Features
Benefits

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Introduction

Relational Database Management System

- Outcome of Open Source and Free Software

- Free

Widley used - Information Systems/embedded systems

Primarily written in C/C++

Available for Linux, Solaris, MS Windows and other Operating Systems

Introduction

Client – Server architecture

MySQL Server

MySQL Client- command line, desktop
applications, web applications

A bit of History

Named after co-founder Monty Widenius's daughter, My

mSQL- tweaks and hacks to form MySQL

- MySQL AB, now a subsidiary of Sun Microsystems, which holds the copyright to most of the codebase
- "AB" part of the company name is the acronym for the Swedish "aktiebolag," or "stock company"

A bit of History

The name of the MySQL Dolphin (MySQL logo) is "Sakila," which was chosen by the founders of MySQL AB from a huge list of names suggested by users in their "Name the Dolphin" contest

MySQL Features and Architecture

MySQL: Features

Speed
- Multi-threaded architecture: Multiple clients have concurrent access
- Query Cache: Cache the results of common queries

Reliability

Ease of use
- Command line interface
- Graphical tools- Desktop/ Web based

MySQL: Features

Multi-User support
- Multiple clients have concurrent access to one (or more) databases simultaneously
- Powerful and flexible user privilige system
- User and host-based authentication schemes

Scalability
- Databases containing 50 million records!
- Businesses- Yahoo!, NASA, Google.com

MySQL: Features

Portability

Unix/ Non-Unix: Linux, Solaris, Windows..

Intel x86, Alpha, SPARC, PowerPC

Standards Compliance

MySQL operates in different modes that comply to different SQL standards

Modes: Server SQL modes define what SQL syntax MySQL should support and what kind of data validation checks it should perform

FAQ: http://dev.mysql.com/doc/refman/5.0/en/faqs-sql-modes.html

MySQL: Features

Internationalization

Support for various languages and character sets

Wide Application support

MySQL database driven applications for the Desktop and Web

APIs for: C/C++, Java, PHP, Perl, Ruby, Python…

MySQL: Features

Stored Programs

   Stored Procedures and functions

   Triggers

Views

Event Scheduler

Architecture of MySQL
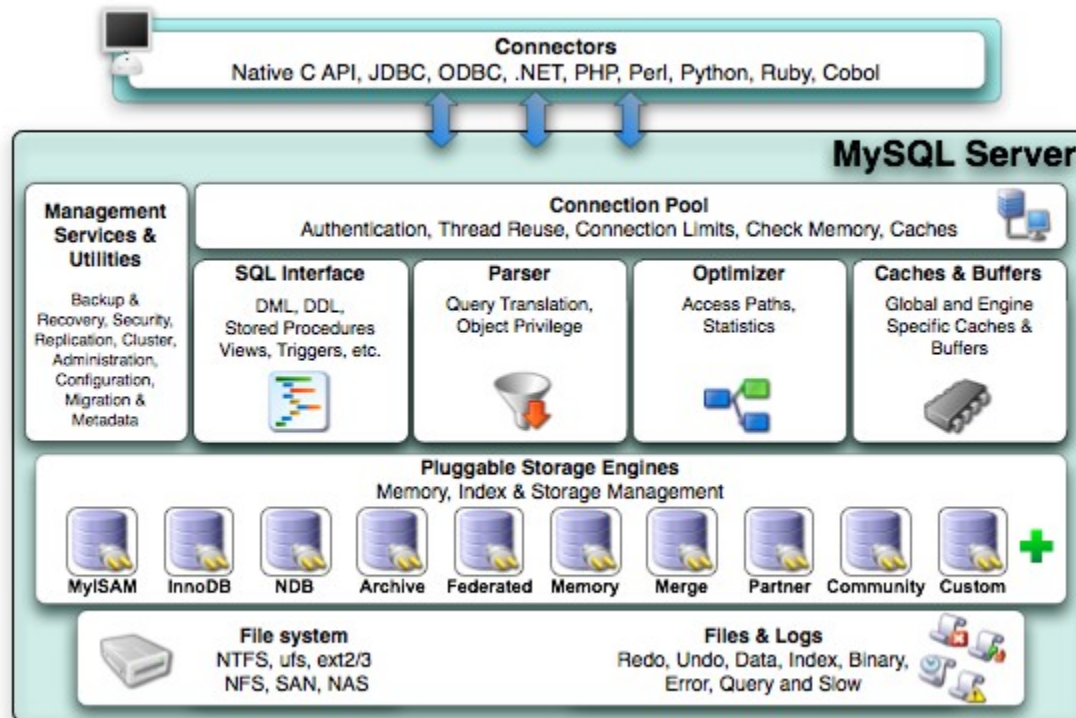
Architecture of MySQL

Primary Subsystems
  Query Engine
    Syntax parser
    Query Optimizer
    Query Cache
    Execution component

  Transaction Manager
  Buffer manager
  Management and Service utilities
  Storage Engine

MySQL Storage Engines

Storage Engine: Writes the data to persistent storage

Unique feature of MySQL: Pluggable storage engines

   What does this mean?

   Level of abstraction between the storage devices / formats and the rest of the MySQL server architecture- lowest layer of the MySQL server

   Since it is pluggable, it allows the storage engine to be dynamically loaded/changed at runtime

MySQL Storage Engines

MyISAM

CSV

HEAP

InnoDB

Falcon

Cluster

.

. *< Your own storage engine >*

MySQL Architecture Internals

Kernel threads (if OS supports) and multiple processors, if available

Thread based memory allocation system

Temporary tables- Virtual tables, tables form nested SQL queries are implemented using in-memory hash tables

Installation and Getting Started
Windows, Linux, Solaris

MySQL Downloads

Community Server V$ Enterprise

- Free

- No professional support

- Ideal for Individual users-developers/stude nts/business having more time than money

- Paid

- Professional support

- Ideal for business with more money than time

MySQL Versions

Current Release (Recommended)

MySQL 5.0—Generally Available (GA) release for production use

Here, I am using MySQL 5.0.67

Upcoming Releases

MySQL 5.1 — Release Candidate release, Test new features early!

MySQL 6.0 — Alpha

MySQL Maria Preview

http://dev.mysql.com/downloads/

Installing MySQL on Windows

Installing MySQL Server

Download the MySQL installer (Windows ZIP/Setup.EXE, 32/64-bit) from
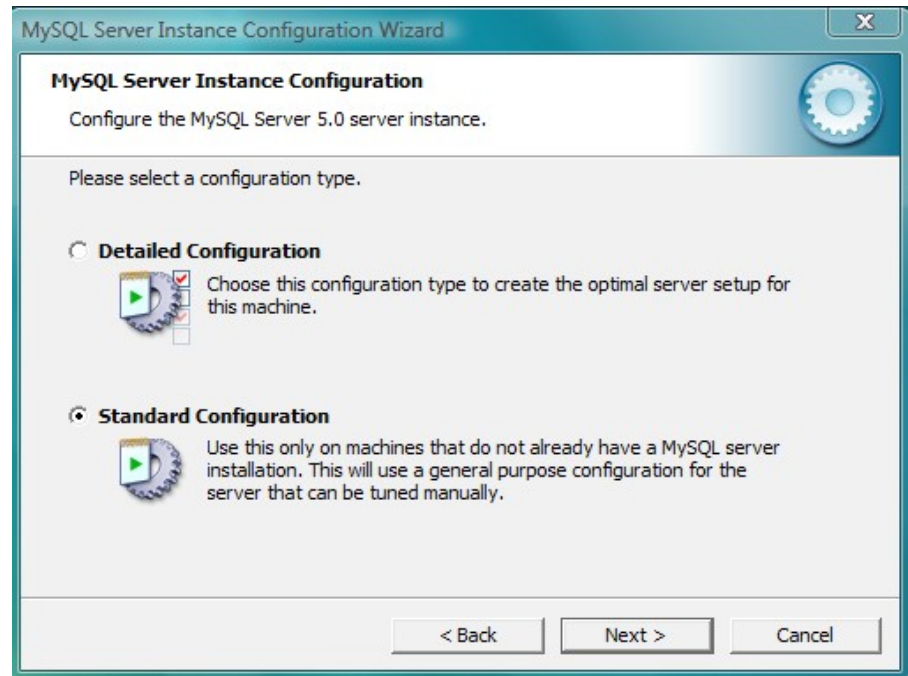http://dev.mysql.com/downloads/mysql/5.0.html#downloads

Unzip the file

Start the installer- run setup.exe

Installing MySQL on Windows
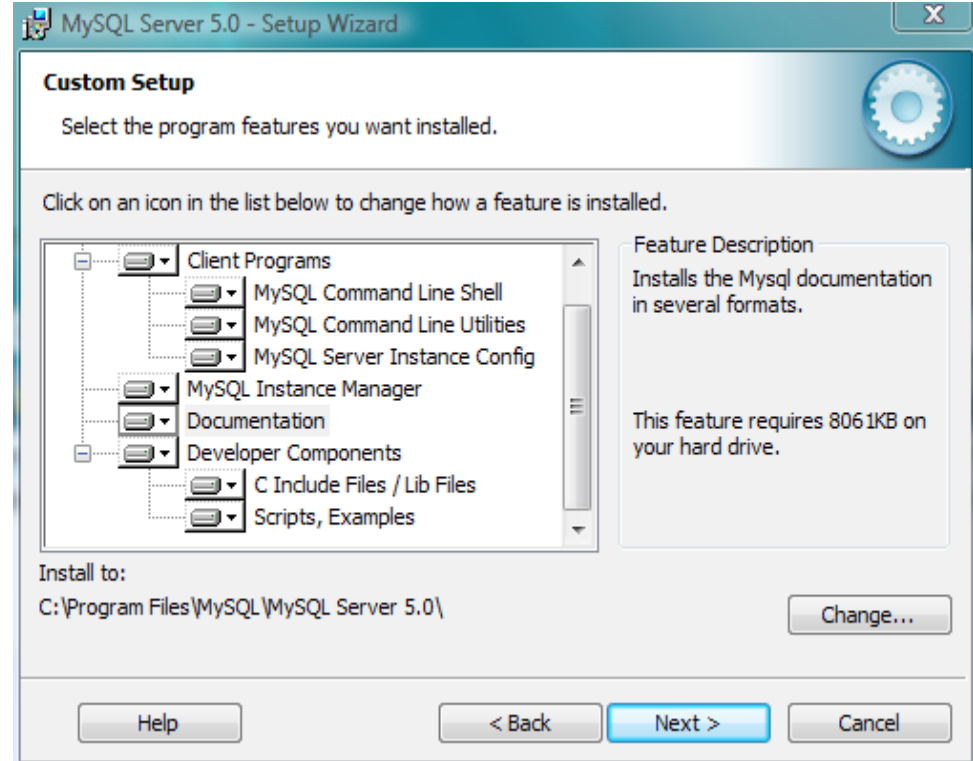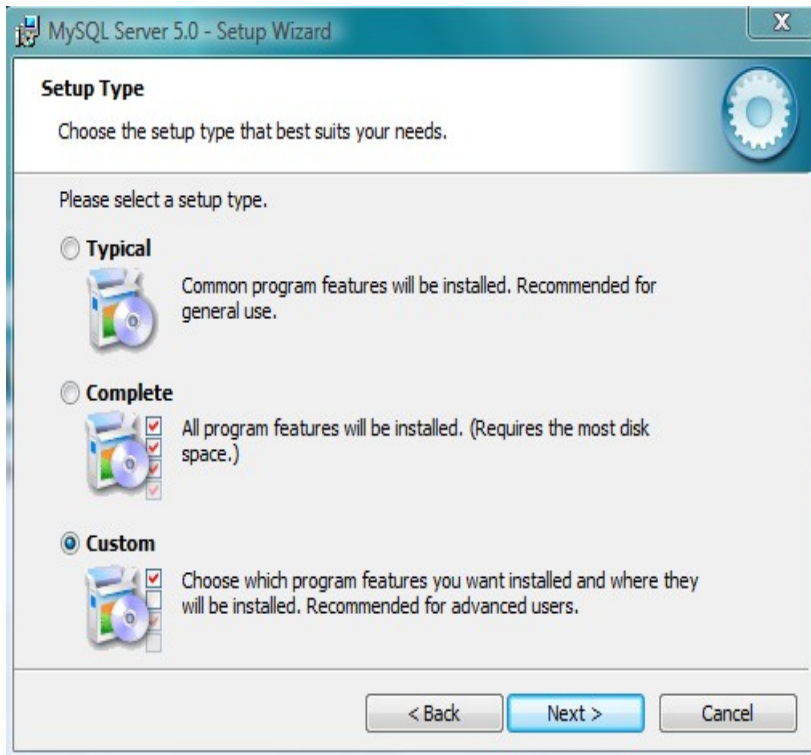
Configuring MySQL Server

Configuring MySQL Server

MySQL Server Instance Configuration Wizard

MySQL Server Instance Configuration

Configure the MySQL Server 5.0 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: MySQL ▼

☑ 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 5.0 server instance.

Please set the security options.

☑ **Modify Security Settings**

New root password: ****** Enter the root password.

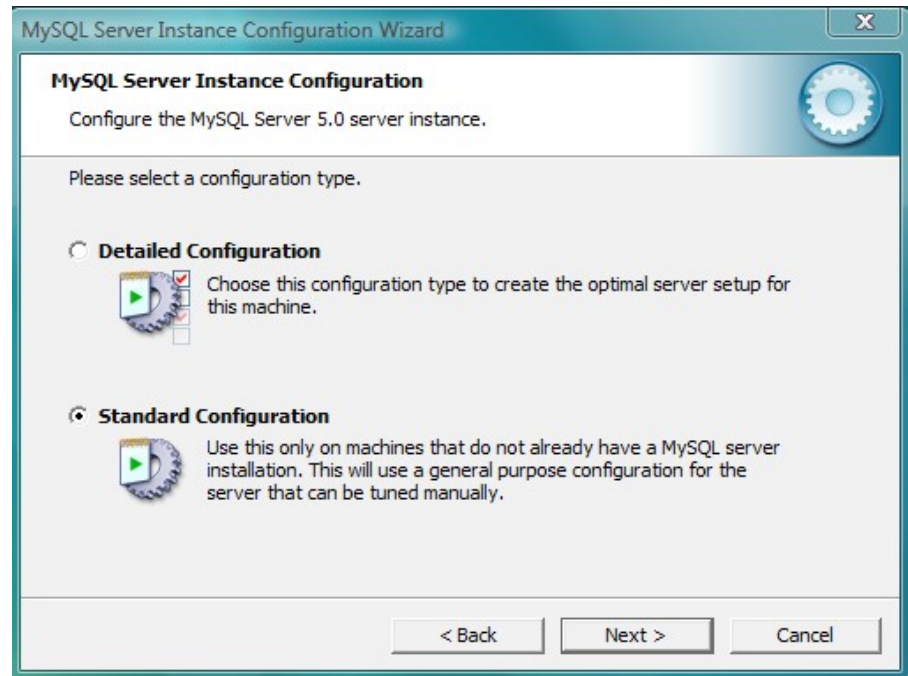Confirm: ****** Retype the password.

☐ 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

Configuring MySQL Server
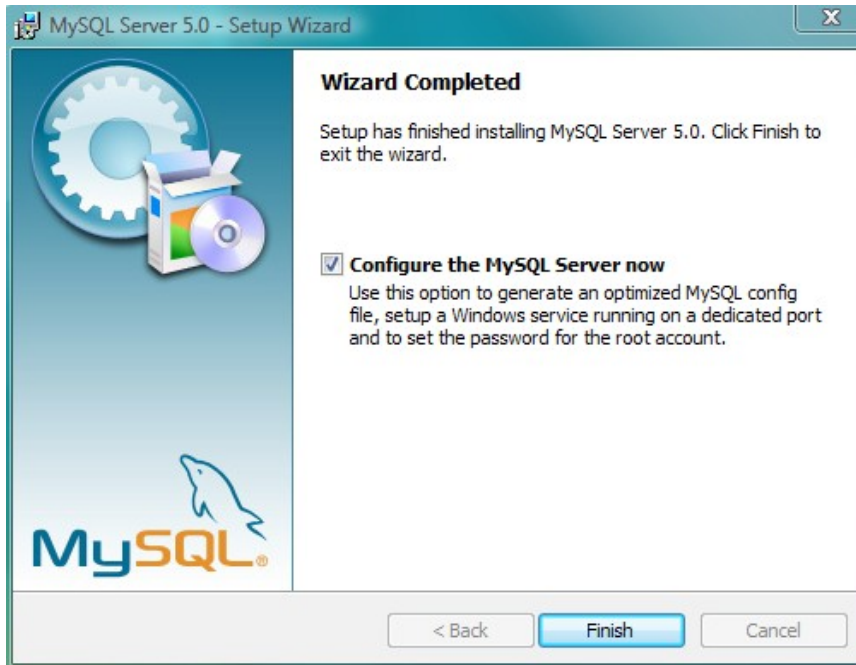
Finalizing the Configuration
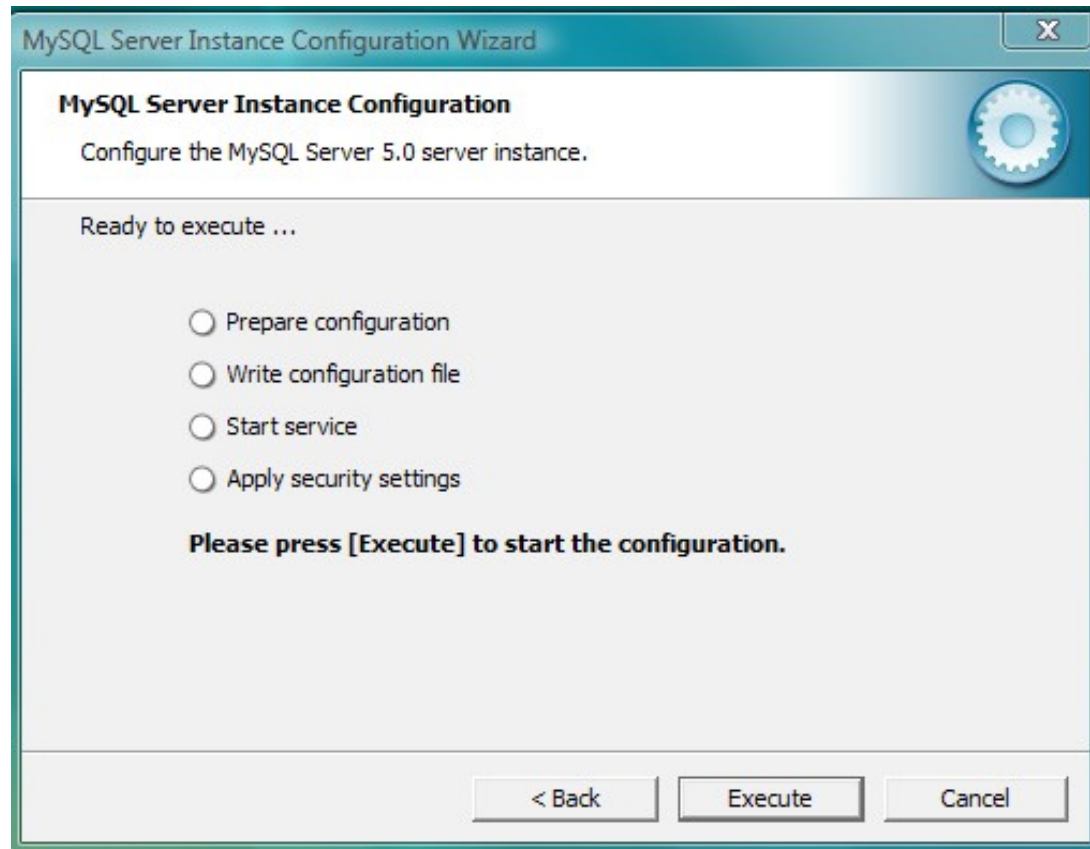
Installing MySQL on Linux

- Easiest method: Use the Operating System's package mangement utility
  - apt-get on Ubuntu/Debian
    - apt-get install mysql-server
    - apt-get install mysql-client
  - yum on Fedora
    - yum install mysql-server
    - yum install mysql
- Packages for Red Hat, Ubuntu are available as well and can be installed the native OS commands- rpm, dpkg

Installing MySQL on Open Solaris

On Open Solaris 2008.11
  pkg install SUNWmysql5
  pkg install SUNWmysql

'pkgadd' and 'tar' packages are
  available from the download site at
  http://dev.mysql.com/downloads/mys
  ql/5.0.html#downloads

Mac OSX, HP-UX, IBM AIX..

Packages are available for download at

http://dev.mysql.com/downloads/mysql/5.0.html#downloads

Source Code: Build from scratch

If you want to get dirty with the source code, you may also want to builld MySQL server and client from sources available for download at

http://dev.mysql.com/downloads/mysql/5.0.html#downloa

On Unix (Linux, Open Solaris), basic steps

./configure

make; make install

Post installation

Windows: new program shortcuts will be added to the Programs menu

MySQL command line client

MySQL Manual

MySQL Server Instance Config Wizard

Linux

- Mysql client programs installed in /usr/bin
- Accessible from the command line using 'mysql', 'mysqladmin', etc

Post installation

Solaris

Client programs installed in /usr/sfw/bin

Accessible from the terminal using the
program name:

$mysql

.

.

Notes on running MySQL

By default, MySQL server runs on port 3306 and the socket file /tmp/master.sock

Can be configured to use a different port and/or a different socket file

On Linux/Solaris: mysqld --port 9090 –-socket=/tmp/my.sock, will start the MySQL server on port 9090 and will use the socket file /tmp/my.sock

By, default MySQL client connects the server running on 3306.

To connect to a different port, use 'mysql --port XXX'

MySQL Programs

Server programs
   mysqld : MySQL Server program
   'd': daemon

Client programs
   mysql- MySQL client
   mysqladmin- client for administering a
      MySQL server

Other programs:
   http://dev.mysql.com/doc/refman/5.1/en/programs.htm

Invoking MySQL programs

Type in the program name (followed by options, if any) from the command line/shell

$mysql -u root

mysql>

Tutorial

Create a simple Database and populate it with a table

mysql> CREATE DATABASE vtu_edusat;

mysql> USE vtu_edusat;

mysql> CREATE TABLE t1(

    -> id INTEGER,

    -> name CHAR(20)

    ->);

Tutorial

```
mysql> INSERT INTO t1 VALUES( 1, 'foo');
mysql > INSERT INTO t1 VALUES( 2, 'bar');
mysql> SELECT * FROM t1;
+------+------+
| id   | name |
+------+------+
|    1 | foo  |
|    2 | bar  |
+------+------+
```

MySQL GUI Tools

Suite of Desktop applications

administration/usage of MySQL instances

Building and Manipulating the data within MySQL databases

Graphical

You may happily not use the command line :-)

MySQL GUI Tools

MySQL Administrator
administration tools and utilities to monitor and administer databases, users privileges and data

MySQL Query Browser
Building and testing queries

MySQL Migration Toolkit
Migrate existing database configuration to MySQL (Windows only)

Installing MySQL GUI Tools on Windows

Download the installer for Windows from
http://dev/mysql.com/downloads

Once the installation process is over, you will find the following new menu items
MySQL Administrator
MySQL Query Browser
MySQL Migration Toolkit

Installing MySQL GUI Tools on Linux

Ubuntu/Debian

   apt-get install mysql-admin

Fedora

   yum install mysql-gui-tools
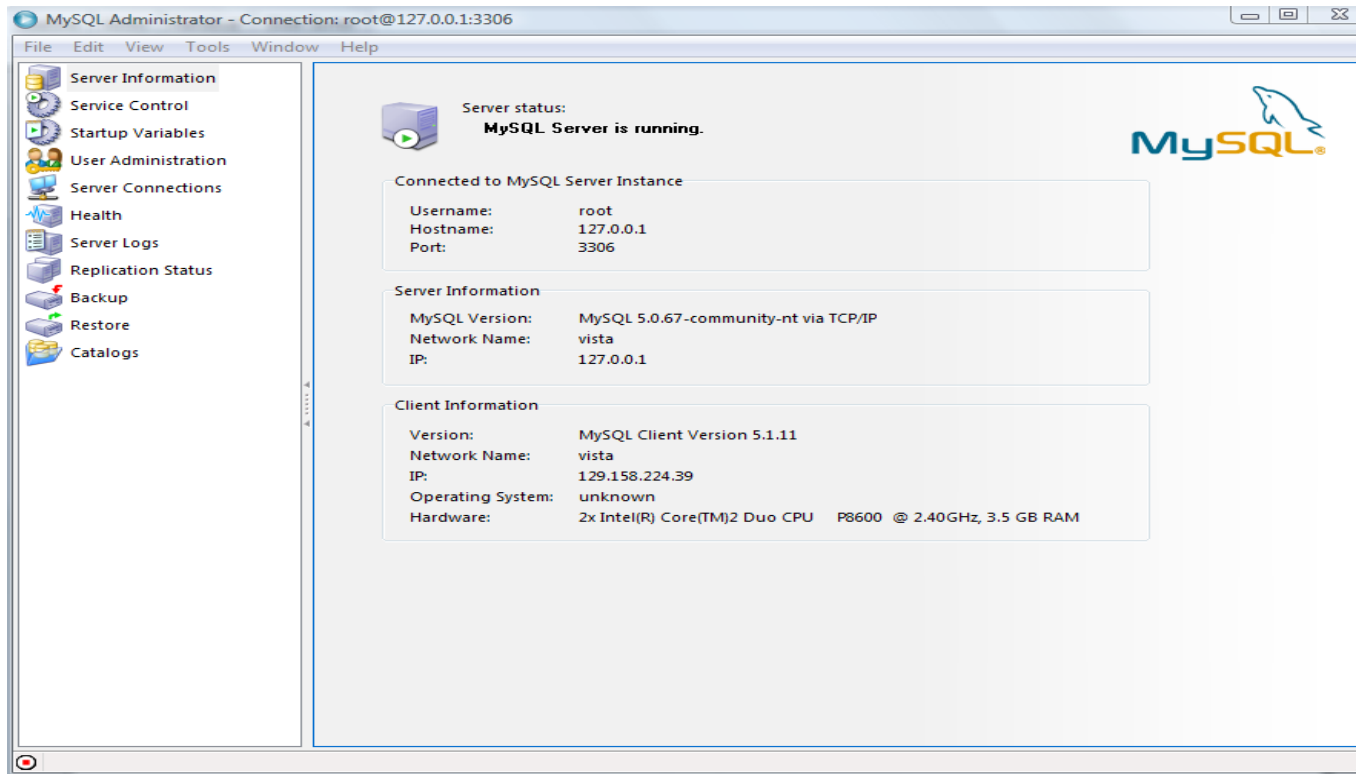
Packages for Red Hat Linux and sources are available from http://dev.mysql.com/downloads/gui-tools/5.0.html

Demo

MySQL Administrator
Windows-> Program Menu
Linux → $mysql-administrator

Demo

MySQL Query Browser
Windows-> Program Menu
Linux → mysql-query-browser

Demo

MySQL Migration Toolkit

Windows-> Program Menu

Linux → Not Available
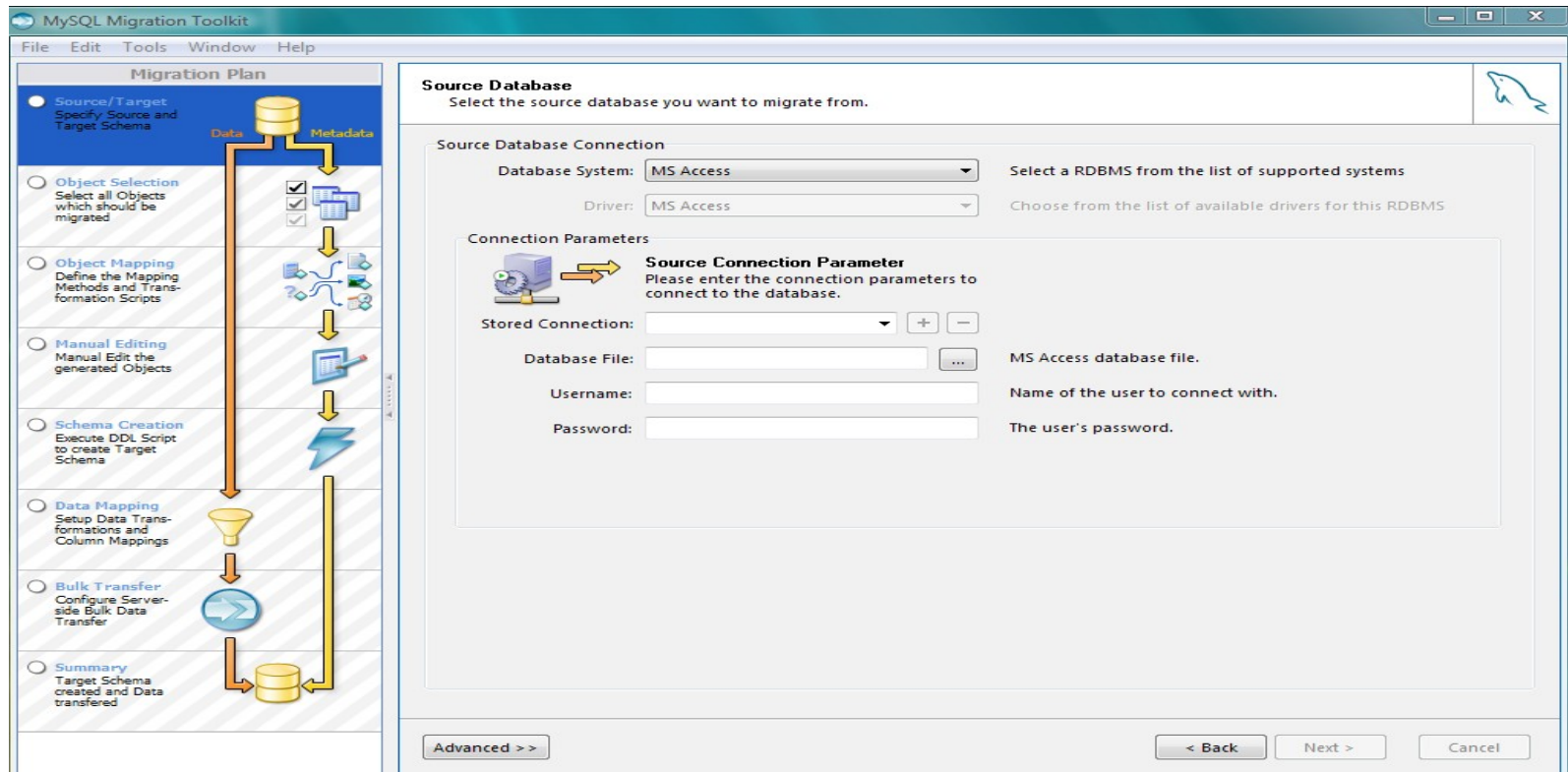
Development with MySQL

The 'M' of Web Stacks

LA'M'P, SA'M'P, WA'M'P

L- Linux, S- Solaris, W- Windows
A- Apache, P- PHP/Python/Perl
M- MySQL

Open Solaris Web Stack

http://www.opensolaris.org/os/project/webstack/

Database Driven applications with MySQL

Desktop applications

Connectors for C/C++, C#, Java, Python, PHP, Ruby

Great alternative to MS Access or MS SQL Server for your database applications

NetBeans simplifies development with MySQL

Use MySQL with Desktop and web-based applications- Java, PHP, Ruby..

Generators for MySQL data snippets for PHP
NetBeans IDE 6.5+
http://php.netbeans.org

NetBeans simplifies development with MySQL

NetBeans IDE allows you to register a new MySQL server

You can work with MySQL tables from within NetBeans using a nice graphical interface

Refer: http://www.netbeans.org/kb/ for Help

Doing it with MySQL

What all can you do with MySQL?

Learn RDBMS concepts by using MySQL- Stored procedures, Triggers..

Develop database driven web and desktop applications in any language of your choice

Understand how various database features like Transactions, Concurrency management is done by looking at the source code

What all can you do with MySQL?

Become a contributor!

Do not forget that MySQL is a Open Source project. So you can CONTRIBUTE to the product as well!

How?

Fix bugs, Add new features, Write documentation

Getting started with contributing: http://forge.mysql.com/wiki/Contributing

http://forge.mysql.com/wiki/Code_Contribut

Benefits

FREE, as in cost

FREE as in Freedom- Open Source

> Wonderful opportunity to understand how a RDBMS works- read the source

> Customize MySQL for your needs- embedded applications or an Internet scale web application

Lightweight- doesn't bloat your system

MySQL Resources

Developers: http://dev.mysql.com

Downloads:
http://dev.mysql.com/downloads/

Reference/Manuals:
http://dev.mysql.com/doc/

MySQL University:

http://forge.mysql.com/wiki/MySQL_Univ

Planet MySQL:
http://www.planetmysql.org

More MySQL Resources

- Printed books:
  - MySQL- The Complete Reference
  - Expert MySQL
  - Understanding MySQL Internals
- Oracle and MySQL compared:
  http://download.oracle.com/docs/cd/E

Test your MySQL Skills!

Quiz Time!

Get Connected to Sun

Train to Win !

Participate in Open Source Communities

> > Download your SDN form from

> > >http://elearning.vtu.ac.in/VTU-S

> > Send it to Sun Microsystems and we will guide you through your first steps in getting connected to Sun

Important URLs

- www.in.sun.com

- www.in.sun.com/training

- http://netbeans.org

- www.java.net

- http://opensolaris.org

Thank You!

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