



MySQL

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MySQL AB

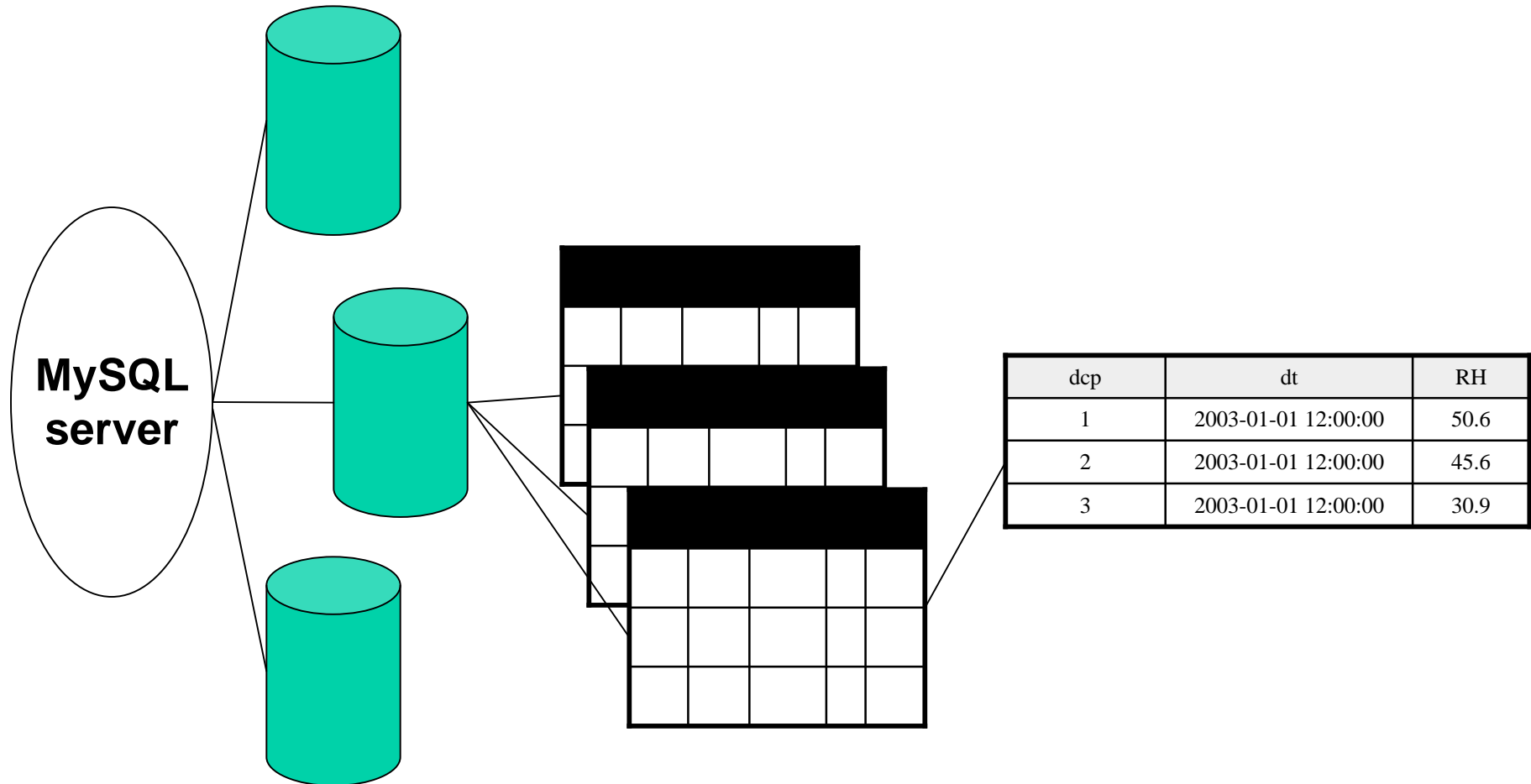


- MySQL AB

- Structured Query Language (My is unknown, and AB is Swedish for “incorporated”) MySQL will be implied throughout the course
- A relational database
 - A Data element stored in a column with attributes
 - A Row is collection of columns
 - A Table is a collection rows
 - A Database is a collection tables
 - MySQL server can interact with many databases
- Can run under many operating systems
 - FreeBSD, Linux, OS/2 Warp, UNIX, Windows 2000/XP
- MySQL has both a dual licensing GPL and Commercial
 - GPL (GNU Public License) free to use if following GPL
 - Commercial license costs money, but cheap at \$400!

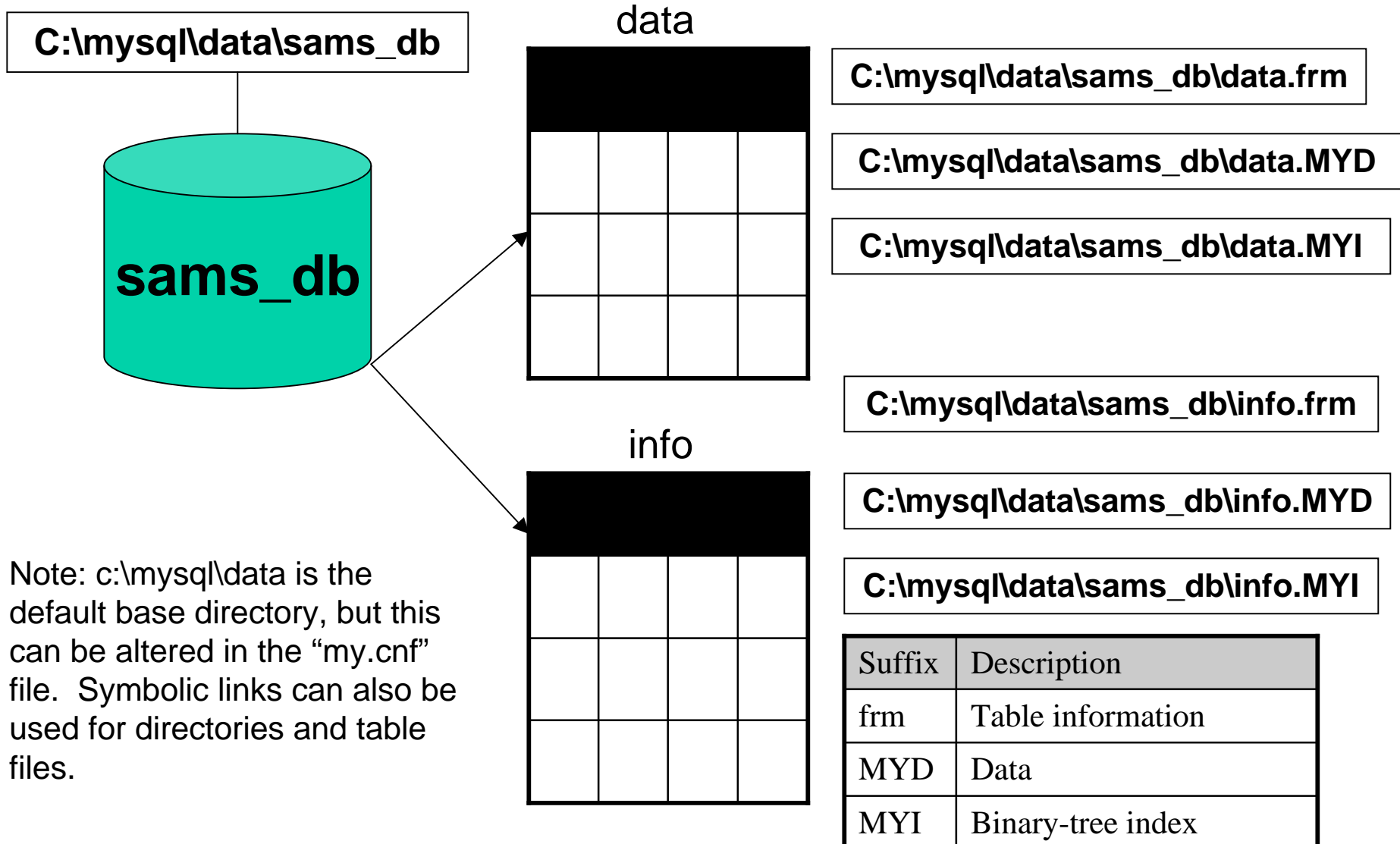


MySQL Relational Database Structure





MySQL Database Disk Structure



Note: c:\mysql\data is the default base directory, but this can be altered in the "my.cnf" file. Symbolic links can also be used for directories and table files.



Select^a Statement (General)



Select components^b (MySQL version 4.0.X)

1. Select (required)
2. Expression (required)
3. From Table (Only optional if table data is not used)
4. Where Condition (optional)
5. Group By (optional)
6. Having (optional)
7. Order By (optional)
8. Limit (optional)

^aWords listed in **blue** above are key (reserved) words in MySQL, except “Expression”

^bThere are many more components in the select statement, but only the most common are discussed



Select



- Is a MySQL keyword at the beginning of a Structured Query Language (SQL) statement or more simply a query that retrieves data from a database.
- It can be used in conjunction with the MySQL command **insert**, **replace**, and **create** table.



Expression



The “expression”

1. Selects which columns (by column name) will be retrieved
2. Apply MySQL functions on the columns of data

Examples—

* (Selects all columns in a table)

temperature * 1.8 + 32^a

dt, temperature, relative_humidity^b

^aApply arithmetic operations on a column

^bChoose multiple columns in single query

Note: columns are in **green**, tables are in **red**, MySQL functions are in **magenta**.



Expression Cont



More Examples--

$-1 * \text{speed} * \sin(\text{direction} * \text{pi}() / 180)$ ^c

$-1 * \text{speed} * \cos(\text{direction} * \text{pi}() / 180)$ as V^d

ave(temperature)^e

tableX.temperature, tableY.temperature^f

^cCan use built in mathematical functions.

^dThe 'as' keyword can be used to set the output column name.

^eCan retrieve a statistical value from rows of data. Must be used with 'group by'.

^fThe select can retrieve or make relationships from multiple tables from a single query. Note the '.' that separates the table name and column name.



From



Tells MySQL which table(s) to select from^a

^aIf multiple tables are used in the expression, they all must be listed here seperated by a ‘,’



Where



Sets the condition of which rows to select. Useful for eliminating unwanted data from your results.

Conditional

> Greater than
< Less than
>= Greater than or equal to
<= Less than or equal to
= Equals
!= Not equals

Logical

and True if both are true
or True if only one is true
() Useful for grouping or ordering multiple logical statements

String pattern matching

like a MySQL keyword in-between column and pattern
% a wildcard that matches all instances in a string
_ a wildcard that matches only the character location



Group By



Aggregates rows by distinct values in the columns listed in the 'group by' when using statistical functions (e.g., avg, std, max, min, sum, count, etc.)

Example--

group by site_id^a

group by site_id, month(dt)^b

^aSingle column

^bMultiple columns and apply functions on a column



Having



Similar to where, except that it must follow ‘group by’ group, and only eliminates results after the results have been aggregated. See [where](#) for more details.



Order By



- Orders the result rows defined by the columns in the ‘**order by**’ group
- The keyword **asc** (ascending) and **desc** (descending) to change the order of the result rows, and is always at the end of the **order by** component. **desc** is the default.

Examples—

order by dt

order by dt, site_id^a

^aThe first column is ordered first, second column is ordered second on the ordering of the first column, and so on



Order By Example



```
mysql>select ... order by site_id, month desc
```

site_id	month	ave_temp
1	1	32.3
1	2	40.2
1	3	49.5
2	1	35.6
2	2	41.3
2	3	53.5



Limit



Limits the number of rows from the result set

`limit row_counta`

`limit offset, row_countb`

^aStarts at the first row

^bStarts at the offset row



Conclusions



- See <http://www.mysql.com> for more information + tons of documentation