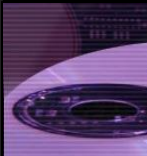
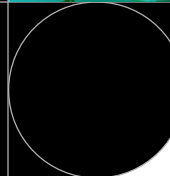
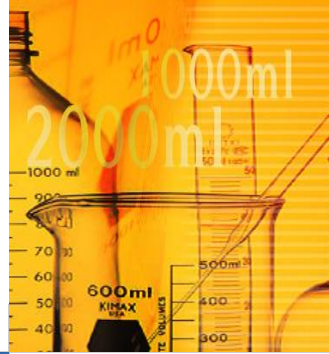


introduction

Fundamentals of database

Sejong Oh

Bio Information Technology Lab.



- Course description
 - This course presents the basic theory of database and the standard language SQL.
 - Students are expected to learn the notions of database systems, DBMS, Data models, and standard languages. Students are, also, expected to practice these notions using MySQL and apply them in various situations.
 - DBMS management tool, ODBC
 - DBMS : MySQL
 - DB security, ERD
- Text
 - None

- Evaluation
 - Midterm exam : 35%
 - Final exam : 35%
 - Exercise reports, quiz : 20%
 - Attendance : 10%

<https://realestate.daum.net/news/detail/main/20190215060805785>

줄줄새는 아파트 관리비도 꿈쩍마!.."빅데이터만 돌렸는데 한집 3만원씩 줄었죠"

[빅데이터로 뚝뚝해지는 행정] ②실제 성공적 적용 사례
경기도만 쏙단지 감사에 240년.. 빅데이터로 단축 가능
관리비와 세부 원천데이터 비교.. 152억 부당부과 적발
표준분석모델, 他지자체 보급.. "전국 적용땐 1.1조 절감"
행안부 "국민 직접체감 기대.. 모델 확산 적극 나설 것"

<https://yukaichou.com/loyalty/big-data-how-target-knows-you-are-pregnant/>



1. Data

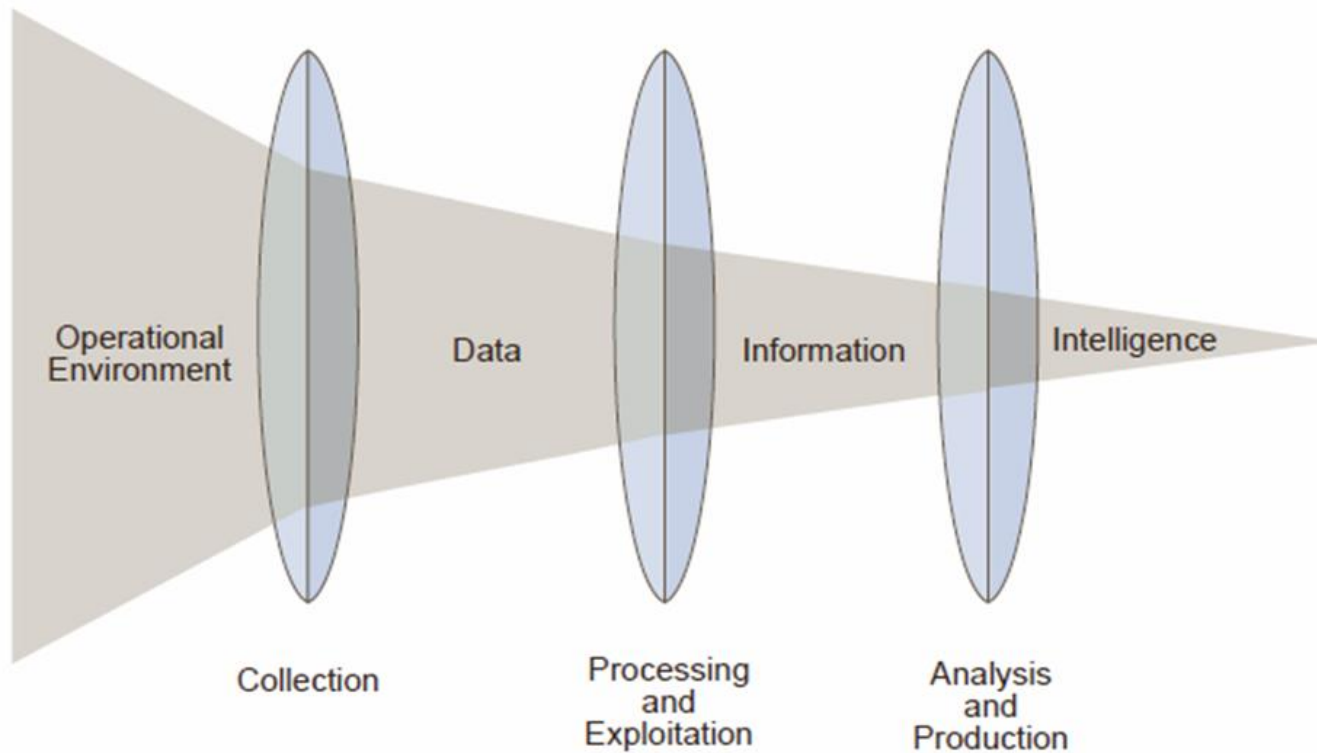
- Definition

- 추정과 추론의 근거가 되는 사실 (옥스форд 사전)
- A thing given or granted; something known or assumed as fact, and made the basis of reasoning or calculation;
- Data is a set of values of subjects with respect to qualitative or quantitative variables. (wiki)
- data is collected by a huge range of organizations and institutions, including businesses
- Data is measured, **collected** and reported, and **analyzed**, whereupon it can be **visualized** using graphs, images or other analysis tools

1. Data

- Data, information, intelligence

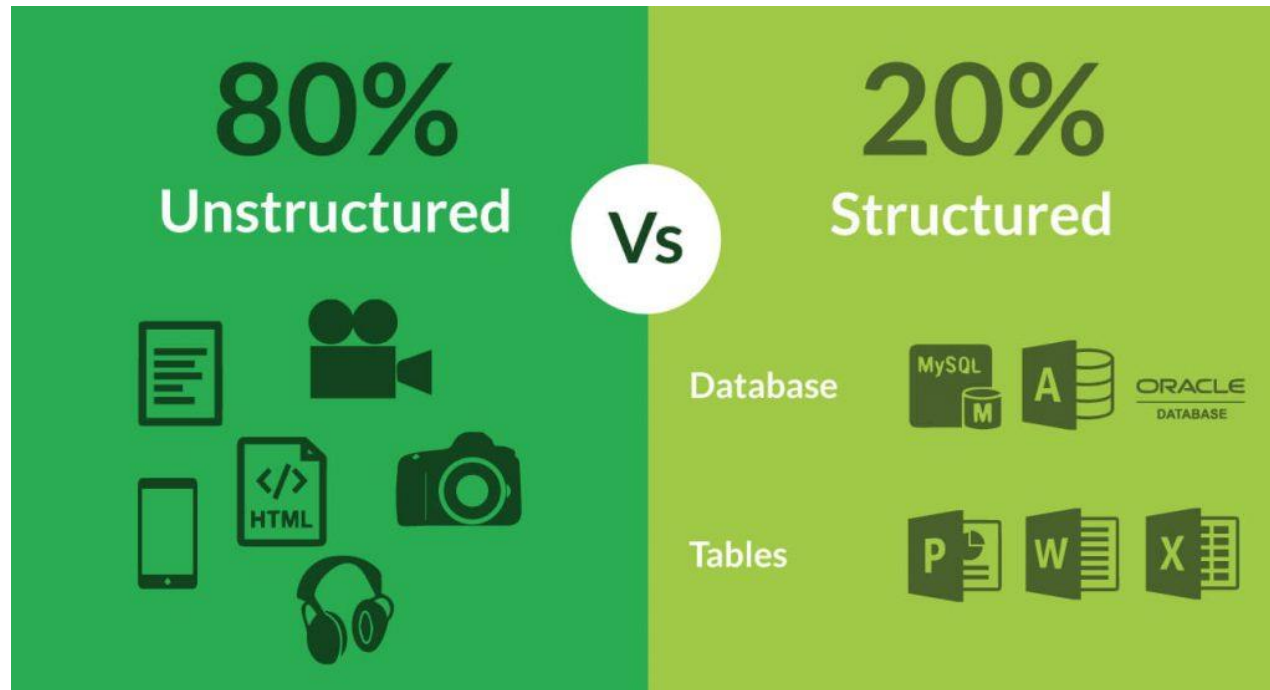
Relationship of Data, Information and Intelligence



Source: Joint Intelligence / Joint Publication 2-0 (Joint Chiefs of Staff)

1. Data

- Types of data



<http://www.ndimensionz.com/kb/volume-velocity-and-variety-three-vs-of-big-data-management/>

1. Data

- Types of data



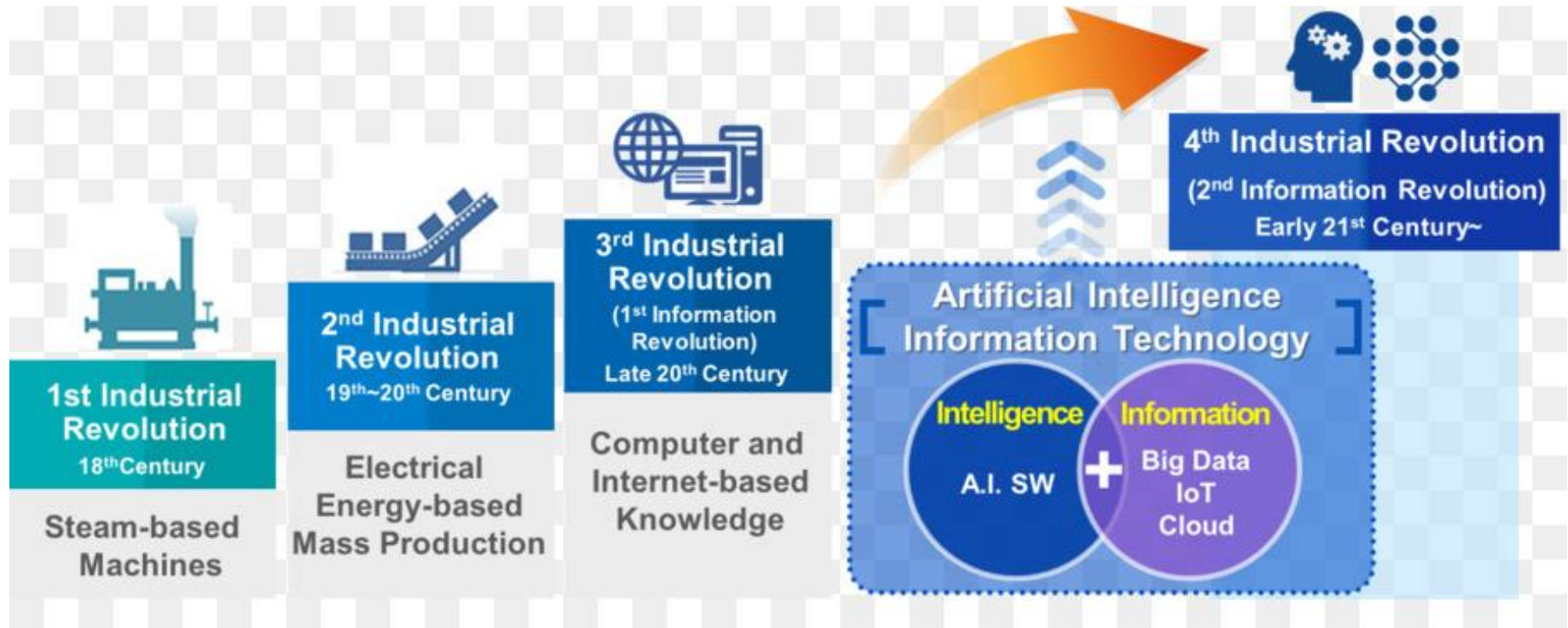
1. Data

- The age of data
 - “Data are becoming the new raw material of business” - Craig Mundie, Microsoft
 - “Data tab has been turned on and will never be turned off” – Mike Hoskins, Actian CTO, 2013
 - “You can have data without information, but you cannot have information without data” – Writer
 - “It is a capital mistake to theorize before one has data” – Sherlock Homes
 - “Data is the new oil” – Clive Humby, ANA Senior marketer’s submit



1. Data

- 4th industrial revolution & data



<https://banner2.kisspng.com/20180510/ahq/kisspng-fourth-industrial-revolution-artificial-intelligen-5af46a3f716053.6382638915259674234644.jpg>

1. Data

MODERN DATA SCIENTIST

Data Scientist, the sexiest job of 21st century requires a mixture of multidisciplinary skills ranging from an intersection of mathematics, statistics, computer science, communication and business. Finding a data scientist is hard. Finding people who understand who a data scientist is, is equally hard. So here is a little cheat sheet on who the modern data scientist really is.

MATH & STATISTICS

- ☆ Machine learning
- ☆ Statistical modeling
- ☆ Experiment design
- ☆ Bayesian inference
- ☆ Supervised learning: decision trees, random forests, logistic regression
- ☆ Unsupervised learning: clustering, dimensionality reduction
- ☆ Optimization: gradient descent and variants

PROGRAMMING & DATABASE

- ☆ Computer science fundamentals
- ☆ Scripting language e.g. Python
- ☆ Statistical computing package e.g. R
- ☆ Databases SQL and NoSQL
- ☆ Relational algebra
- ☆ Parallel databases and parallel query processing
- ☆ MapReduce concepts
- ☆ Hadoop and Hive/Pig
- ☆ Custom reducers
- ☆ Experience with xaaS like AWS

DOMAIN KNOWLEDGE & SOFT SKILLS

- ☆ Passionate about the business
- ☆ Curious about data
- ☆ Influence without authority
- ☆ Hacker mindset
- ☆ Problem solver
- ☆ Strategic, proactive, creative, innovative and collaborative

COMMUNICATION & VISUALIZATION

- ☆ Able to engage with senior management
- ☆ Story telling skills
- ☆ Translate data-driven insights into decisions and actions
- ☆ Visual art design
- ☆ R packages like ggplot or lattice
- ☆ Knowledge of any of visualization tools e.g. Flare, D3.js, Tableau



https://cdn-images-1.medium.com/max/1200/1*T5GfsoZ-IWK3rcVkZ7R2bw.png

MarketingDistillery.com is a group of practitioners in the area of e-commerce marketing. Our fields of expertise include: marketing strategy and optimization: customer tracking and on-site analytics: predictive analytics and econometrics: data warehousing and big data systems: marketing channel insights in Paid Search, SEO, Social, CRM and brand.

Marketing
DISTILLERY

DATA LAB.

2. Big Data

- Big data
 - Big data refers to data sets that are too large or complex for traditional data-processing application software to adequately deal with.

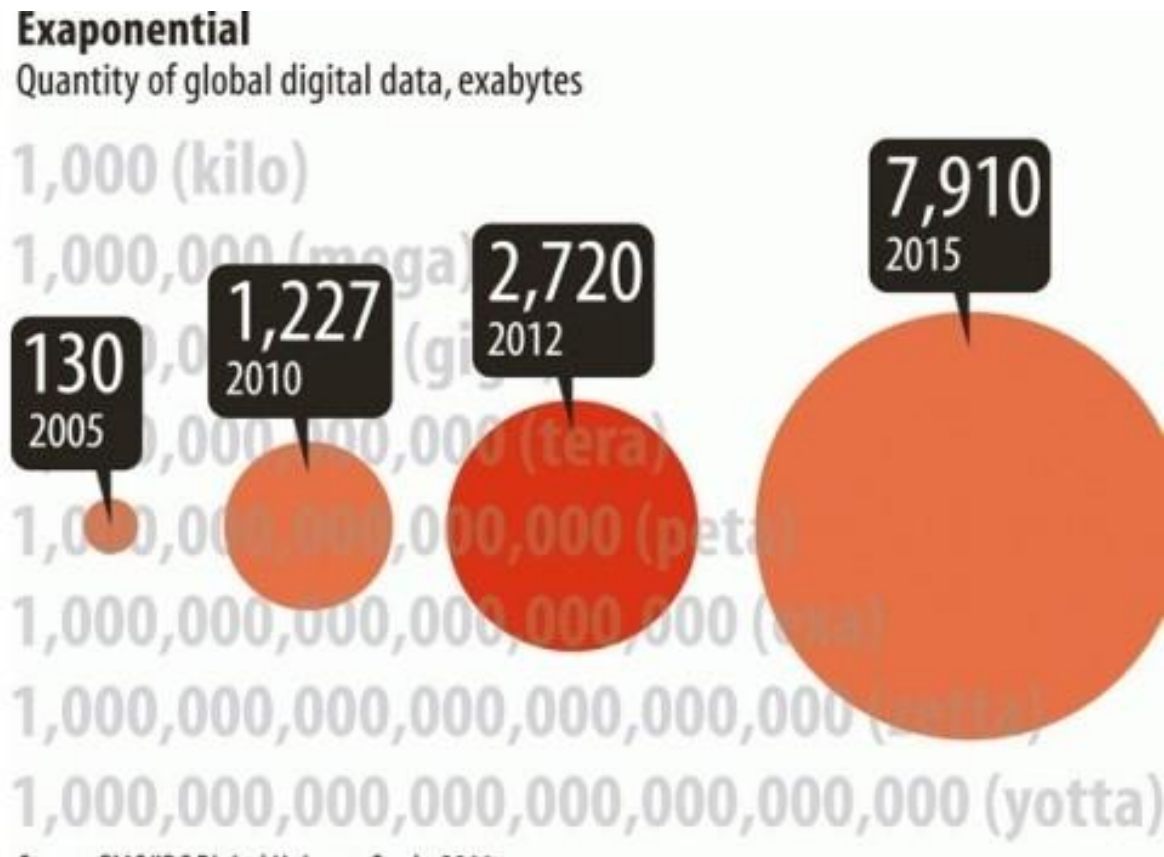
빅 데이터 생성 속도

- 하루 **250경** 바이트 비정형 정보
- 매달 **10억** 여 개 트윗
- 매달 **300억** 여 개 페이스북 메시지
- **1조** 대 이상 모바일 기기로 가속화



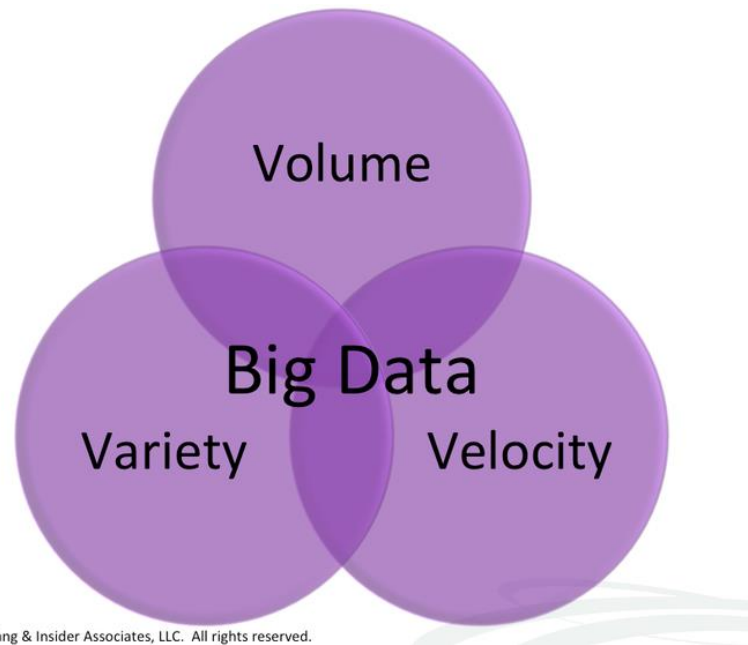
2. Big Data

- Grows of Data



2. Big data

- TDWI, BI/DW research institute, defined 3V of big data



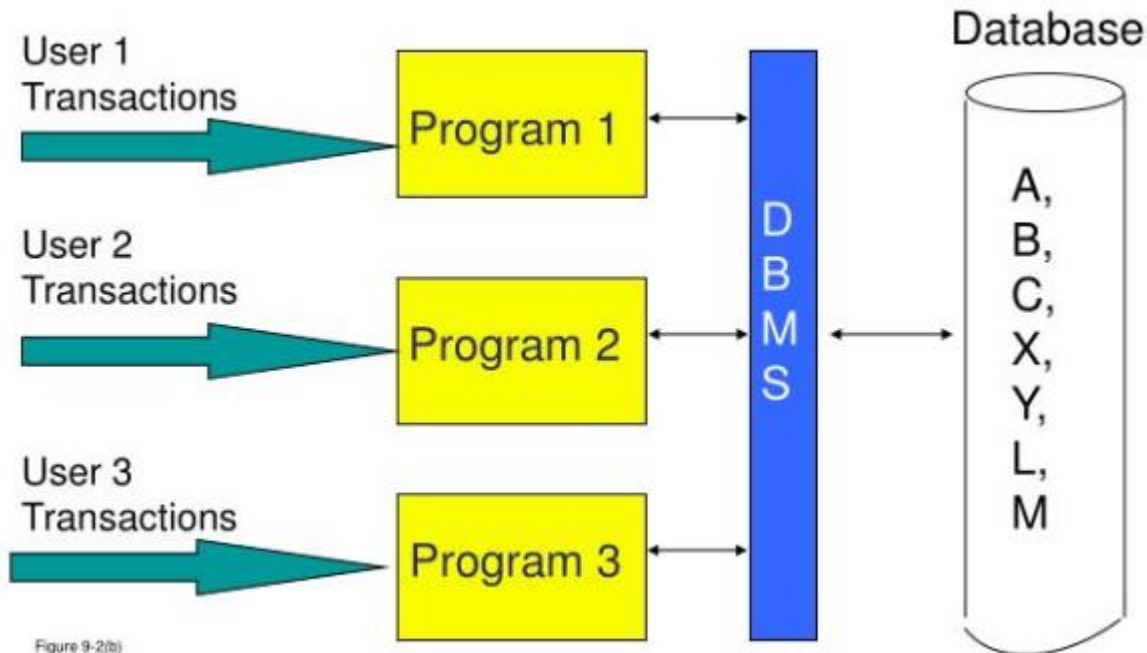
2. Big data



[출처:채승병 외, 빅데이터: 산업 지각변동의 진원, SERI CEO Information, 2012. 5]

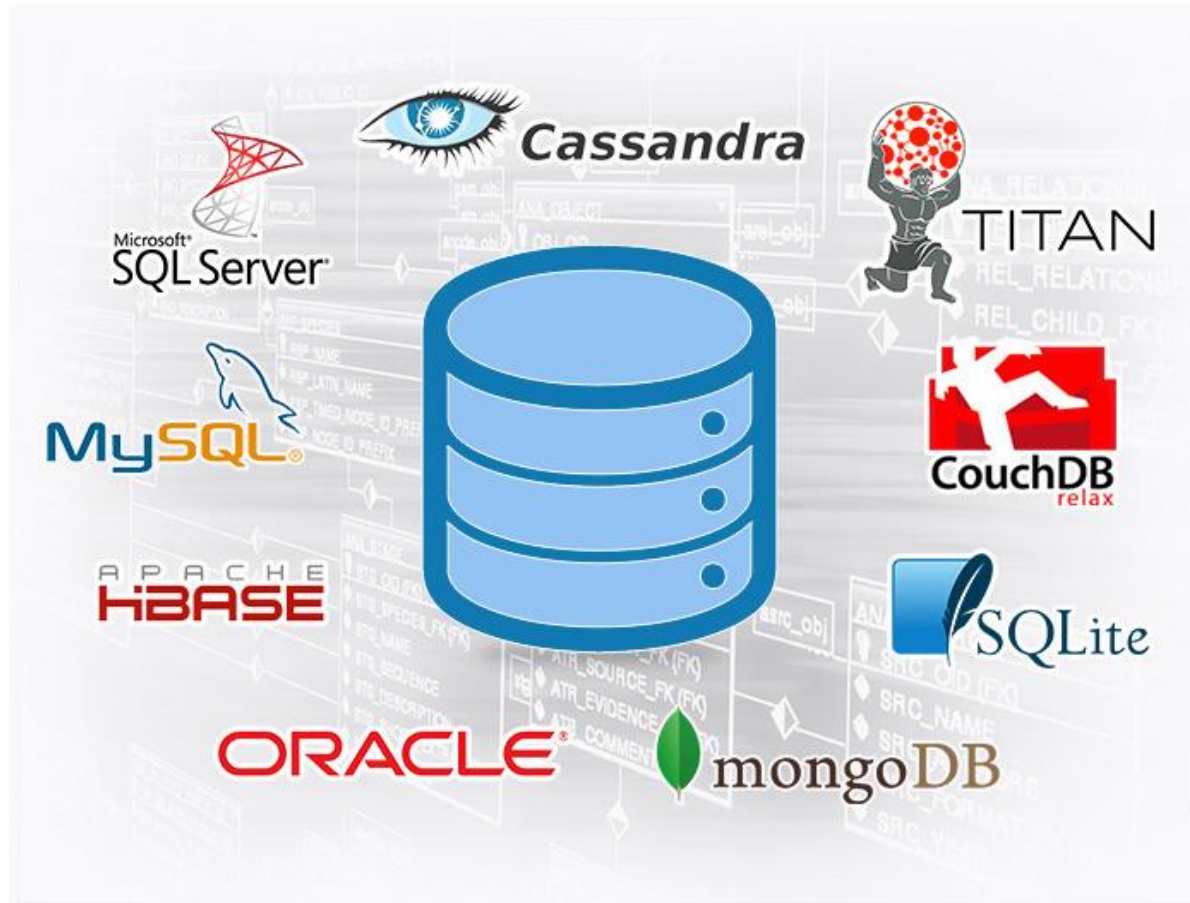
3. Database

- A **database** is an organized collection of data, generally stored and accessed electronically from a computer system. (wiki)
- The database management system (**DBMS**) is the software that interacts with end users, applications, and the database itself to capture and analyze the data.



3. Database

- products



<https://www.novelucent.com/templates/novelucent/images/database-services.jpg>

4. Setup practice environment

- Install by your self
 - MySQL server
 - MySQL workbench
 - MySQL shell

4. Setup practice environment

- <https://www.mysql.com/downloads/>

MySQL Community Edition (GPL)

Community (GPL) Downloads »



MySQL Community Downloads

MySQL Community Server (GPL)

(Current Generally Available Release: 8.0.15)

MySQL Community Server is the world's most popular open source database.

DOWNLOAD

MySQL Cluster (GPL)

(Current Generally Available Release: 7.6.9)

MySQL Cluster is a real-time, open source transactional database.

DOWNLOAD

MySQL Router (GPL)

(Current Generally Available Release: 8.0.15)

MySQL Router is lightweight middleware that provides transparent routing between your application and any backend MySQL Servers.

DOWNLOAD

New! MySQL Shell (GPL)

(Current Generally Available Release: 8.0.15)

The MySQL Shell is an interactive Javascript, Python, or SQL interface supporting development and administration for the MySQL Server and is a component of the MySQL Server.

DOWNLOAD

MySQL Workbench (GPL)

(Current Generally Available Release: 8.0.15)

MySQL Workbench is a next-generation visual database design application that can be used to efficiently design, manage and document database schemata. It is available as both open source and commercial.

- Download installer

MySQL Community Server 8.0.15

Select Operating System:

Microsoft Windows ▼

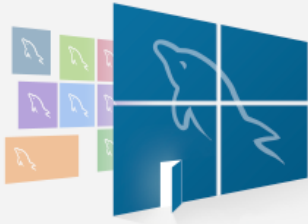
Looking for previous GA versions?

Recommended Download:

MySQL Installer for Windows

All MySQL Products. For All Windows Platforms. In One Package.

Starting with MySQL 5.6 the MySQL Installer package replaces the standalone MSI packages.



Windows (x86, 32 & 64-bit), MySQL Installer MSI

[Go to Download Page >](#)

Other Downloads:

Windows (x86, 64-bit), ZIP Archive (mysql-8.0.15-winx64.zip)	8.0.15	184.1M	Download
		MD5: 75fd5cd2676209550a8b9bac4fd0a8b6 Signature	
Windows (x86, 64-bit), ZIP Archive Debug Binaries & Test Suite (mysql-8.0.15-winx64-debug-test.zip)	8.0.15	270.3M	Download
		MD5: 92bdd691744c1947f5deff1c7ffae81e Signature	

Generally Available (GA) Releases

MySQL Installer 8.0.15

Select Operating System:

Microsoft Windows ▼

[Looking for previous GA versions?](#)

Windows (x86, 32-bit), MSI Installer

8.0.15

16.4M

[Download](#)

(mysql-installer-web-community-8.0.15.0.msi)

MD5: 66363d23d2474113decf683cf84f5820 | [Signature](#)

Windows (x86, 32-bit), MSI Installer

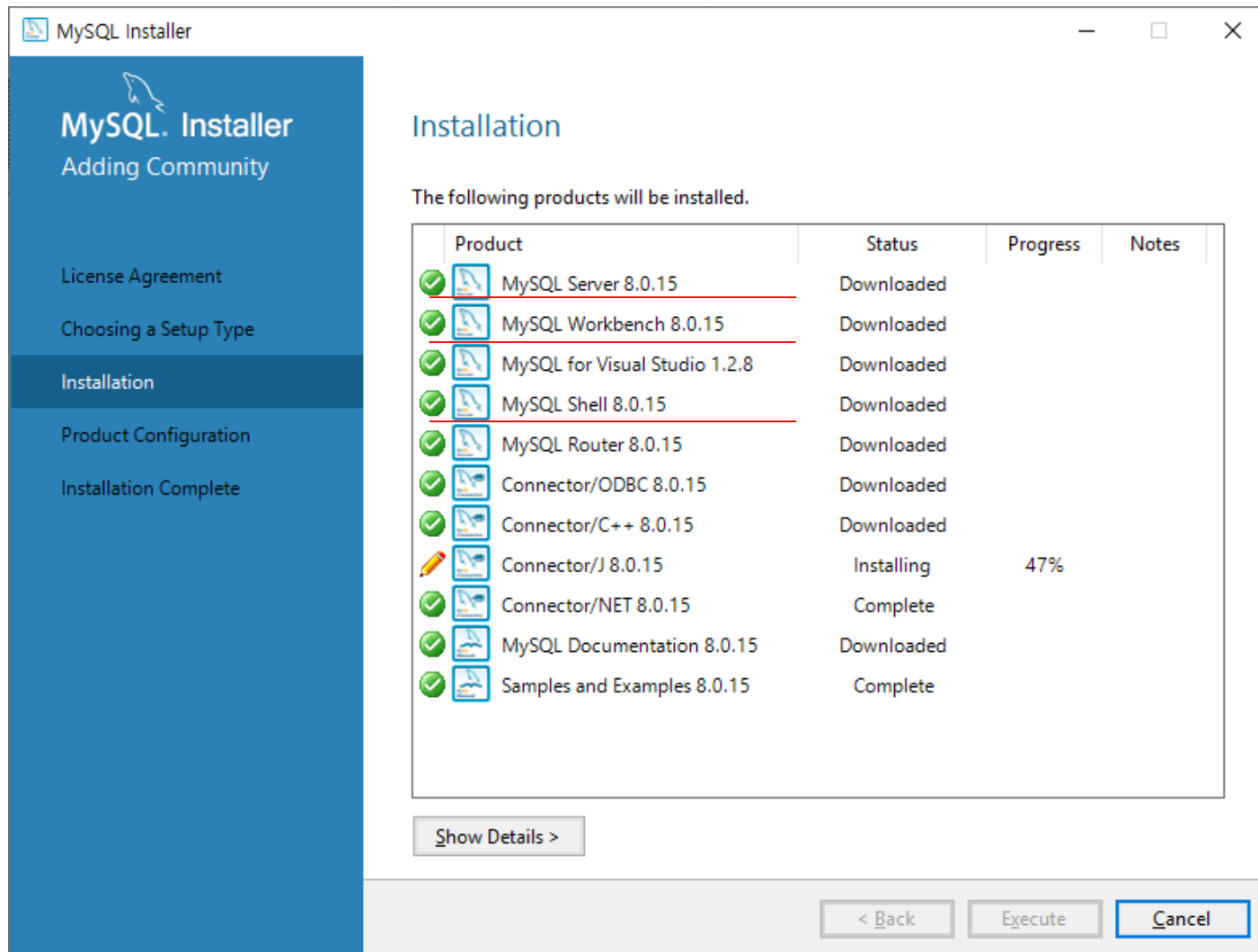
8.0.15

324.3M

[Download](#)

(mysql-installer-community-8.0.15.0.msi)

MD5: 367e72f275a82b31442f38b485359a68 | [Signature](#)



MySQL Installer

MySQL Server 8.0.15

Group Replication

Type and Networking

Authentication Method

Accounts and Roles

Windows Service

Apply Configuration

Accounts and Roles

Root Account Password

Enter the password for the root account. Please remember to store this password in a secure place.

MySQL Root Password:

Repeat Password:

Password strength: **Weak**

MySQL User Accounts

Create MySQL user accounts for your users and applications. Assign a role to the user that consists of a set of privileges.

MySQL User Name	Host	User Role
-----------------	------	-----------

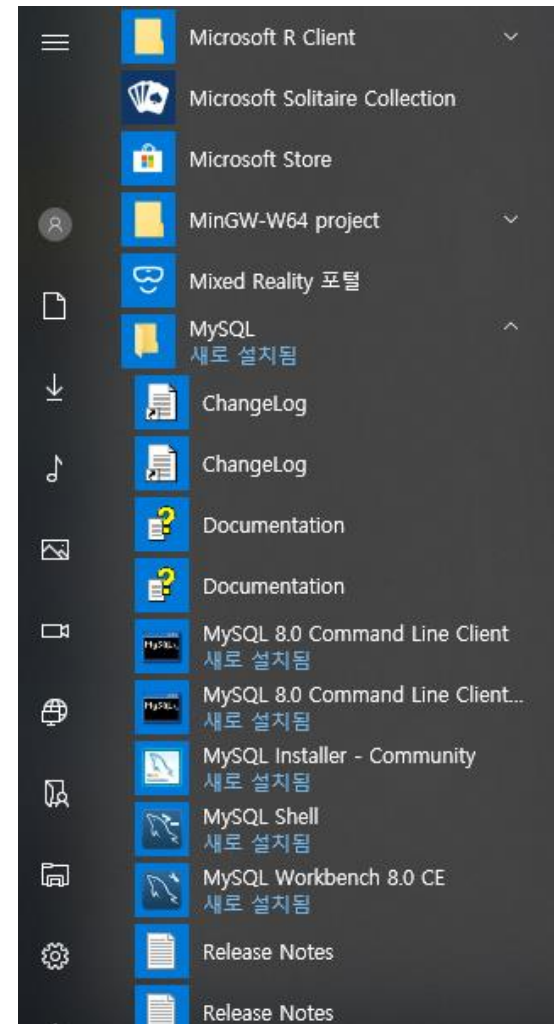
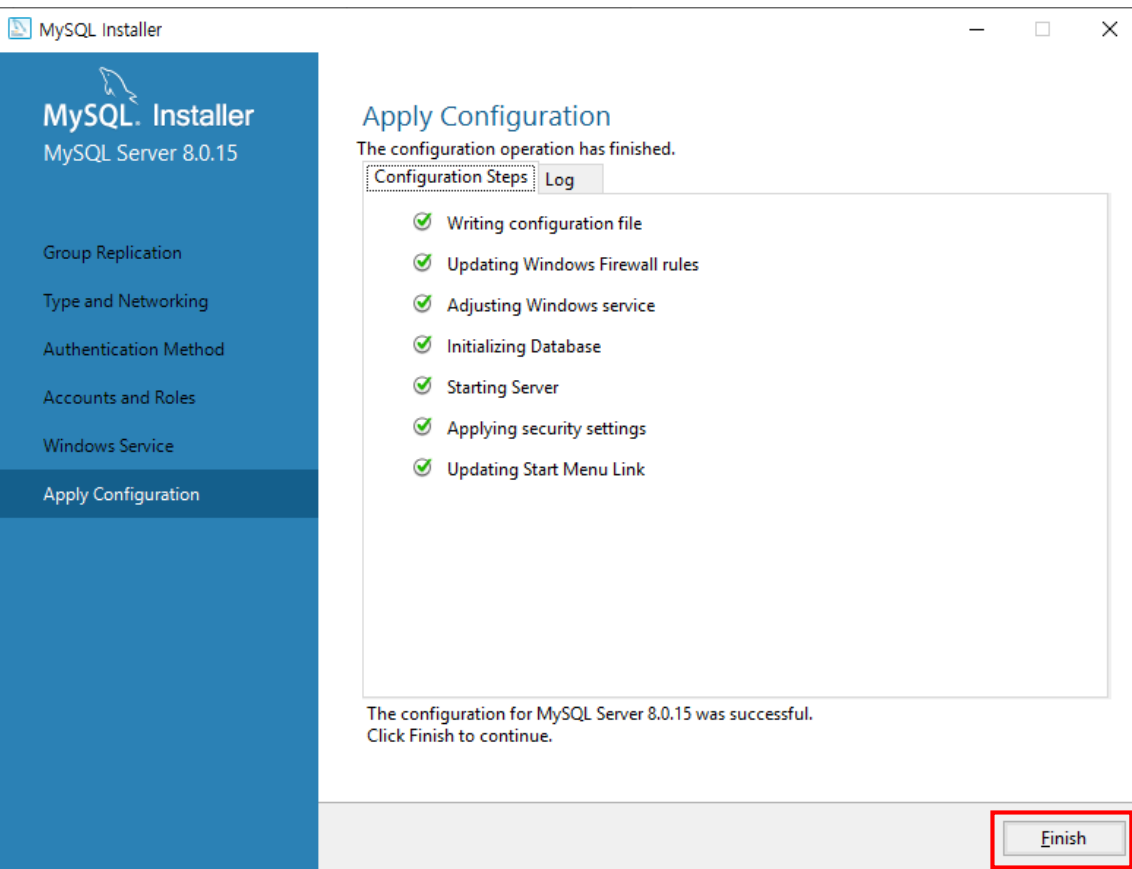
[Add User](#)

[Edit User](#)

[Delete](#)

[< Back](#) [Next >](#) [Cancel](#)

Set password



MySQL Installer

MySQL. Installer

Samples and Examples

Connect To Server

Apply Configuration

Connect To Server

Here are the compatible MySQL Svr instances installed in this computer.
Please select the ones where the sample schemas and data will be created.

☐ Show MySQL Server instances maybe running in read-only mode

	Server	Port	Arch...	Type	Status
<input checked="" type="checkbox"/>	MySQL Server 8.0.15	3306	X64	Stand-alone Server	Running

Now give us the credentials we should use (needs to have root privileges).
Click "Check" to make sure they work.

User name: Credentials provided in Server configuration

Password:

