JACOBS
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Wrap-Up

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Summary: Why Use a DBMS?

- DBMS: serving large data sets to large, heterogeneous user groups
- Quality of service
  - (optimized) query language = fast & flexible access to large data assets
  - Concurrent access
  - Data independence
- Efficiency
  - scalability; reduced application development time
- Information integration
  - Uniform data administration; concise information modelling
- Safety
  - Data integrity & security; Crash recovery

„Big Data“: Definition

- 4V definition [Doug Laney / Gartner & IBM]:
  - Volume
  - Velocity
  - Variety
  - Veracity
  - plus more in blogs: Value, Verisimilitude, Variability, Visualization, ...

Databases,
by definition,
always were made
for Big Data

- ...or simply: „Data too big to transport“

DB Ranking by Deployments

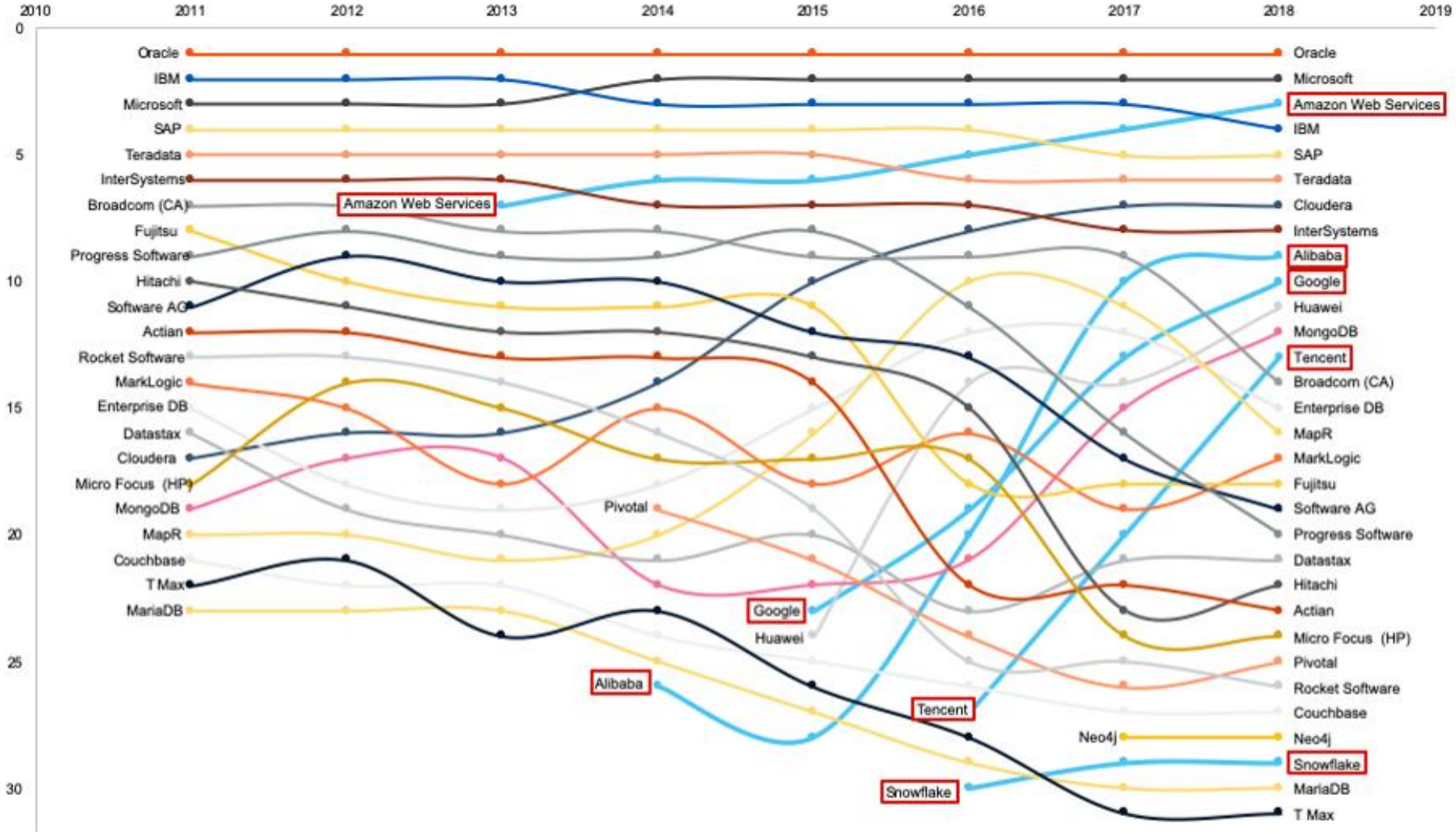
356 systems in ranking, June 2020

Rank Jun 2020	Rank May 2020	Rank Jun 2019	DBMS	Database Model	Score Jun 2020	Score May 2020	Score Jun 2019
1.	1.	1.	Oracle	Relational, Multi-model	1343.59	-1.85	+44.37
2.	2.	2.	MySQL	Relational, Multi-model	1277.89	-4.75	+54.26
3.	3.	3.	Microsoft SQL Server	Relational, Multi-model	1067.31	-10.99	-20.45
4.	4.	4.	PostgreSQL	Relational, Multi-model	522.99	+8.19	+46.36
5.	5.	5.	MongoDB	Document, Multi-model	437.08	-1.92	+33.17
6.	6.	6.	IBM Db2	Relational, Multi-model	161.81	-0.83	-10.39
7.	7.	7.	Elasticsearch	Search engine, Multi-model	149.69	+0.56	+0.86
8.	8.	8.	Redis	Key-value, Multi-model	145.64	+2.17	-0.48
9.	9.	↑ 11.	SQLite	Relational	124.82	+1.78	-0.07
10.	↑ 11.	10.	Cassandra	Wide column	119.01	-0.15	-6.17
11.	↓ 10.	↓ 9.	Microsoft Access	Relational	117.18	-2.72	-23.83
12.	12.	12.	MariaDB	Relational, Multi-model	89.79	-0.30	+4.59
13.	13.	13.	Splunk	Search engine	88.08	+0.33	+3.46
14.	14.	14.	Hive	Relational	78.65	-2.89	-0.40

DB Ranking by Dev‘ers, Stackoverflow

1. MySQL
2. PostgreSQL
3. Microsoft SQL Server
4. SQLite
5. MongoDB
6. Redis
7. MariaDB
8. Oracle
9. Firebase
10. Elasticsearch

Gartner Market Share Ranking



[blog.gartner.com]

„No One Size Fits All“

- General insight today: no singular data modeling paradigm (eg, sets) can match all requirements in semantics & performance
- Ex: SAP HANA: four main-memory storage engines
  - column-store, for OLAP-dominant & mixed workloads
  - row-store, for OLTP-dominant workloads
  - graph engine
  - text engine

http://martinfowler.com/bliki/PolyglotPersistence.html

- Refs:
  - M. Stonebraker et al. *”One size fits all”: an idea whose time has come and gone*. ICDE, 2005
  - F. Färber et al.: *The SAP HANA Database – An Architecture Overview*. IEEE Data Eng. Bull., 35(1):28–33, 2012
  - V. Sikka et al. *Efficient transaction processing in SAP HANA database: the end of a column store myth*. SIGMOD, 2012

Course Plot – or: why did I take it?

- How to design databases, and how to search them
- How to design (Internet) services

What industry expects a CS graduate to know

- Database services revisited
- Practice: set up a Web service
  - LAMP = Linux, Apache, MySQL, PHP

Your entry point to the DB [admin] world

Check also database videos, such as this one

Must-Haves for IT Job Interviews

- "47% of the job ads analyzed expect economics knowledge. Also, communication skills are emphasized.
- Currently database skills are at the top of the IT companies' wish list, every 3rd IT job ad requires them. Further, Business Intelligence, Enterprise Resource Planning, and Service-Oriented Architectures are an asset. Additionally, relevant hands-on experience, e.g., in project work, plays an important role."

  -- Thomas Reher, Executive Board member, PPI AG

But, Mind You:

- Chances are you won't use classroom knowledge as is
  - Diversity of technology, requirements, enterprise setups, ...
- ...then why did we do it??
  - Grasp the concepts
  - Whatever gossip says – SQL is like English: y'all just need to know (at least basics)
  - Able to immerse into any DB & Web services technology rapidly