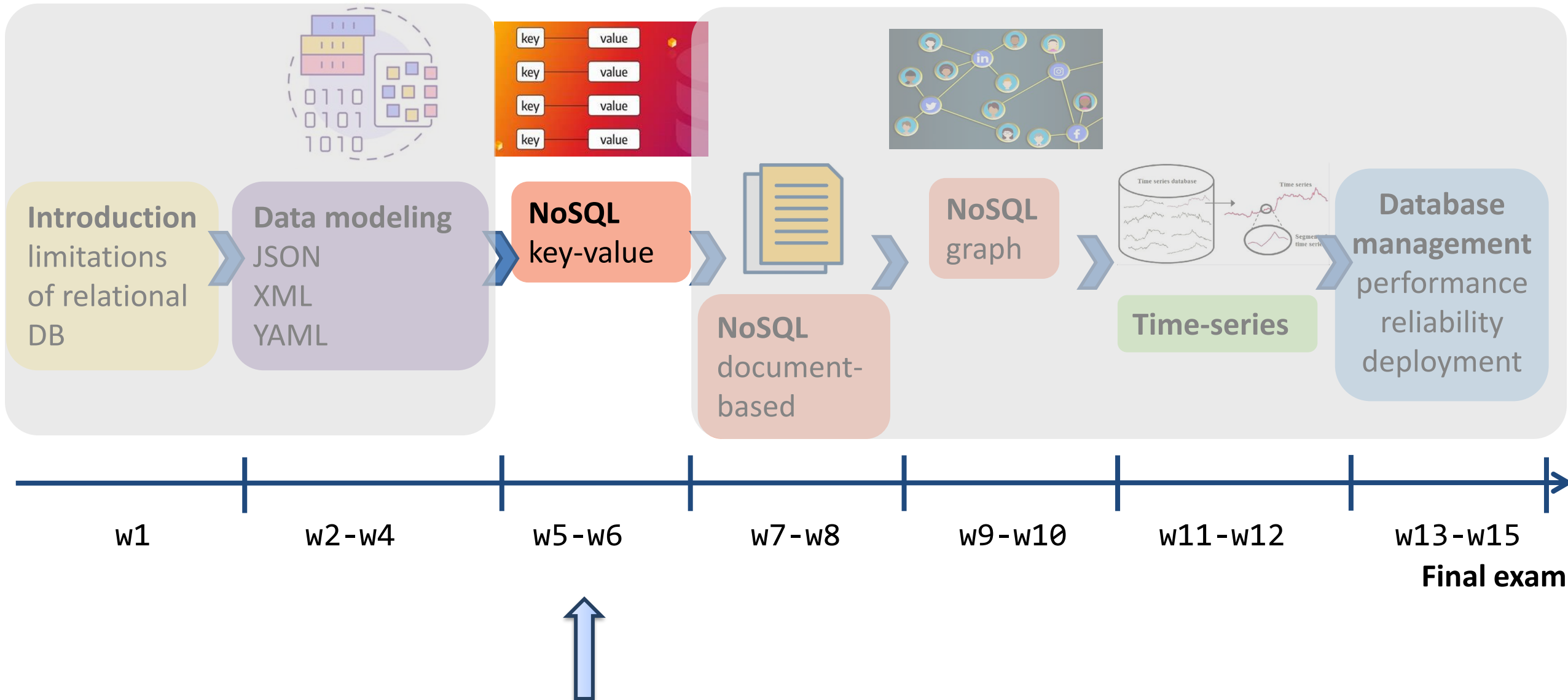




Key-value modeling lab

Beyond relational-DBs

Planning of the course



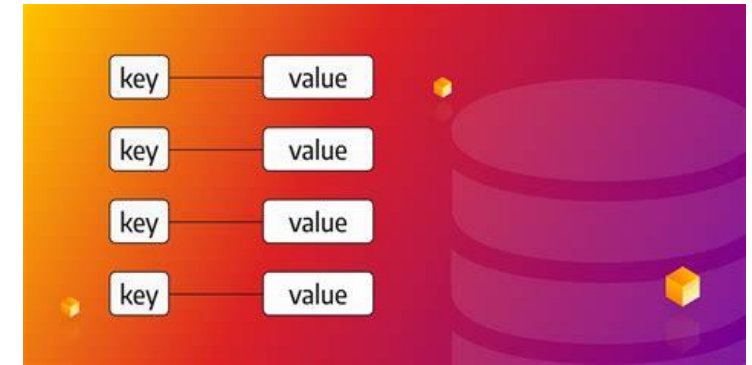
Calendar



Week	Date	Content	Given by
1	17.2	Introduction	Delgado, Schumann
2	24.2	JSON	Schumann
3	3.2	Parquet, XML	Schumann, Delgado
4	10.3	XML, YAML	Delgado
5 - 6	17.3, 24.3	Key-value store	Delgado
7 - 8	31.3, 07.4	Document-based	Schumann
9	14.4	Graph	Delgado
	21.4	EASTER BREAK	
	28.4	Graph	Delgado
10	5.5, 12.5	Time series	Schumann
13 - 15	19.5, 26.5, 2.6	Reliability, deploy performance	Delgado

Today's agenda

- ▶ Summary last week
- ▶ Advanced Redis
 - ▶ Redis on Flash
 - ▶ Transactions in Redis
 - ▶ Redis OM
- ▶ Lab 2: Chirp



logo <https://dribbble.com/shots/4173979-Chirp-Logo>

Summary last week

- ▶ Key-value what/when/why
- ▶ Key-value vs relational DB
- ▶ Overview of available DBMS



DynamoDB



Voldemort



- ▶ Redis & use cases
- ▶ Hands on lab with Redis

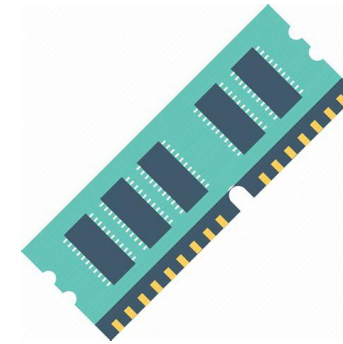


ADVANCED REDIS FEATURES



Optimisations: Redis Flash

- ▶ Redis → in-memory DB
 - ▶ expensive
 - ▶ limited space
- ▶ Redis on Flash
 - ▶ frequently accessed data in RAM
 - ▶ less frequently in flash
 - ▶ cost savings 80%



Redis on Flash use cases

Real-time analytics

- recent purchases
- trending items
- leaderboards
- top scores

Streaming data

- IoT devices with very little hardware
- Time-series → more on that later!

Metering and traffic

- ttl
- enforce traffic shaping

Transactions with Redis

- ▶ Allow for single step operations:

- ▶ MULTI
- ▶ EXEC
- ▶ DISCARD

```
> MULTI
OK
> INCR foo
QUEUED
> DISCARD
OK
```

```
> MULTI
OK
> INCR foo
QUEUED
> INCR bar
QUEUED
> EXEC
1) (integer) 1
2) (integer) 1
```

Last, but not least... Redis modules

- ▶ Redis has many modules that support different things:

- ▶ search
- ▶ graph
- ▶ time-series
- ▶ others (JSON, AI, ...)

Type	SQL	Redis Stack
Selection	<code>SELECT * FROM bicycles WHERE price >= 1000</code>	<code>FT.SEARCH idx:bicycle "@price:[1000 +inf]"</code>

Beta: Redis OM

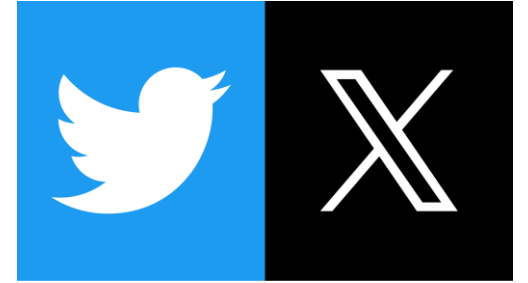
- ▶ Object Mapping → still in Beta!
 - ▶ when declaring a class → extend JsonModel
 - ▶ when declaring a field → specify whether an index is needed or not, text search yes/no
 - ▶ overview <https://redis.io/docs/connect/clients/om-clients/stack-python/>
- ▶ What do you think?



LAB2: CHIRP



Lab 2 - Chirp



- ▶ Learning goals:
 - ▶ Model a practical data-intensive application as key-value
 - ▶ Programmatically interacting with key-value
 - ▶ Engineering: translate requirements to tasks
- ▶ Idea: make a lightweight version of Twitter

Lab 2 - Chirp

- ▶ graded!
- ▶ work in pairs
- ▶ due 30th of April 2025
- ▶ submission
 - ▶ link to a repo with: readme.md + code + (data)
 - ▶ report

Chirp tasks

- ▶ Tasks:
 - ▶ model key-value database
 - ▶ programmatically interact with this database
 - ▶ (optionally) tiny webapp
- ▶ Some information is purposely missing !!
 - ▶ See task 3



References & sources

- ▶ Redis ebook: <https://redis.com/ebook/>
- ▶ Redis commands: <https://redis.io/commands/>
- ▶ Json jq: <https://jqlang.github.io/jq/manual/v1.7/>
- ▶ Streamlit: <https://docs.streamlit.io/library/api-reference>
- ▶ Redis transactions: <https://redis.io/docs/interact/transactions/>

Lab2 – Chirp evaluation criteria

Aspect	Weight	Grade	Criteria
Key-value data modeling	50%	6	data is modelled by using a variety of structures beyond expectation
		5	data modeling is correctly done and arguments make sense
		4	data modeling is correctly done for most of the use cases
		3	data modeling is only partially done
		2	lack of data modeling
Functionalities & code	30%	6	ready for production and easily scalable in terms of use and data
		5	all the functionalities are implemented without any glitches
		4	most of the functionalities are implemented correctly
		3	partial implementation of functionalities
		2	the code can't run or lacks most of the implementation
Report	20%	6	elements, writing and structure in the report could be taken as a base for building an excellent bachelor project report
		5	report is complete and contains
		4	report is complete but contains only the minimal analysis (particularly b, c, and d)
		3	some elements are missing in the report
		2	severely lacking

ANY
QUESTIONS
?