elasticsearch

(R)Evolution

Philipp Krenn @xeraa

elastic

elastic

Developer 🥑

Questions: **https://sli.do/xeraa**

Answers: **https://twitter.com/xeraa**


Revolution

https://db-engines.com/en/ranking

343 systems in ranking, June 2018

Rank Jun 2018	Rank May 2018	Rank Jun 2017	DBMS	Database Model	Score Jun 2018	Score May 2018	Score Jun 2017
1.	1.	1.	Oracle	Relational DBMS	1311.25	+20.84	-40.51
2.	2.	2.	MySQL	Relational DBMS	1233.69	+10.35	-111.62
3.	3.	3.	Microsoft SQL Server	Relational DBMS	1087.73	+1.89	-111.23
4.	4.	4.	PostgreSQL	Relational DBMS	410.67	+9.77	+42.13
5.	5.	5.	MongoDB	Document store	343.79	+1.67	+8.79
6.	[illegible]	[illegible]	DB2	[illegible]	[illegible]	[illegible]	-1.86
7.	7.	↑ 9.	Redis	Key-value store	136.30	+0.95	+17.42
8.	↑ 9.	↑ 11.	Elasticsearch	Search engine	131.04	+0.60	+19.48
9.	↓ 8.	↓ 7.	Microsoft Access	Relational DBMS	130.99	-2.12	+4.44
10.	10.	↓ 8.	Cassandra	Wide column store	119.21	+1.38	-4.91
11.	11.	↓ 10.	SQLite	Relational DBMS	114.26	-1.19	-2.44
12.	12.	12.	Teradata	Relational DBMS	75.77	+1.36	-1.55
13.	↑ 14.	↑ 18.	MariaDB	Relational DBMS	65.85	+0.85	+12.95
14.	↓ 13.	↑ 16.	Splunk	Search engine	65.78	+0.68	+8.26
15.	15.	↓ 14.	Solr	Search engine	62.06	+0.55	-1.55

343 systems in ranking, June 2018

Rank			DBMS	Database Model	Score		
Jun 2018	May 2018	Jun 2017			Jun 2018	May 2018	Jun 2017
1.	1.	1.	Oracle	Relational DBMS	1311.25	+20.84	-40.51
2.	2.	2.	MySQL	Relational DBMS	1233.69	+10.35	-111.62
3.	3.	3.	Microsoft SQL Server	Relational DBMS	1087.73	+1.89	-111.23
4.	4.	4.	PostgreSQL	Relational DBMS	410.67	+9.77	+42.13
5.	5.	5.	MongoDB	Document store	343.79	+1.67	+8.79
6.	6.	6.	DB2	Relational DBMS	185.64	+0.03	-1.86
7.	7.	↑ 9.	Redis	Key-value store	136.30	+0.95	+17.42
8.	↑ 9.	↑ 11.	Elasticsearch	Search engine	131.04	+0.60	+19.48
9.	↓ 8.	↓ 7.	Microsoft Access	Relational DBMS	130.99	-2.12	+4.44
10.	10.	↓ 8.	Cassandra	Wide column store	119.21	+1.38	-4.91
11.	11.	↓ 10.	SQLite	Relational DBMS	114.26	-1.19	-2.44
12.	12.	12.	Teradata	Relational DBMS	75.77	+1.36	-1.55
13.	↑ 14.	↑ 18.	MariaDB	Relational DBMS	65.85	+0.85	+12.95
14.	↓ 13.	↑ 16.	Splunk	Search engine	65.78	+0.68	+8.26
15.	15.	↓ 14.	Solr	Search engine	62.06	+0.55	-1.55

9. Redis

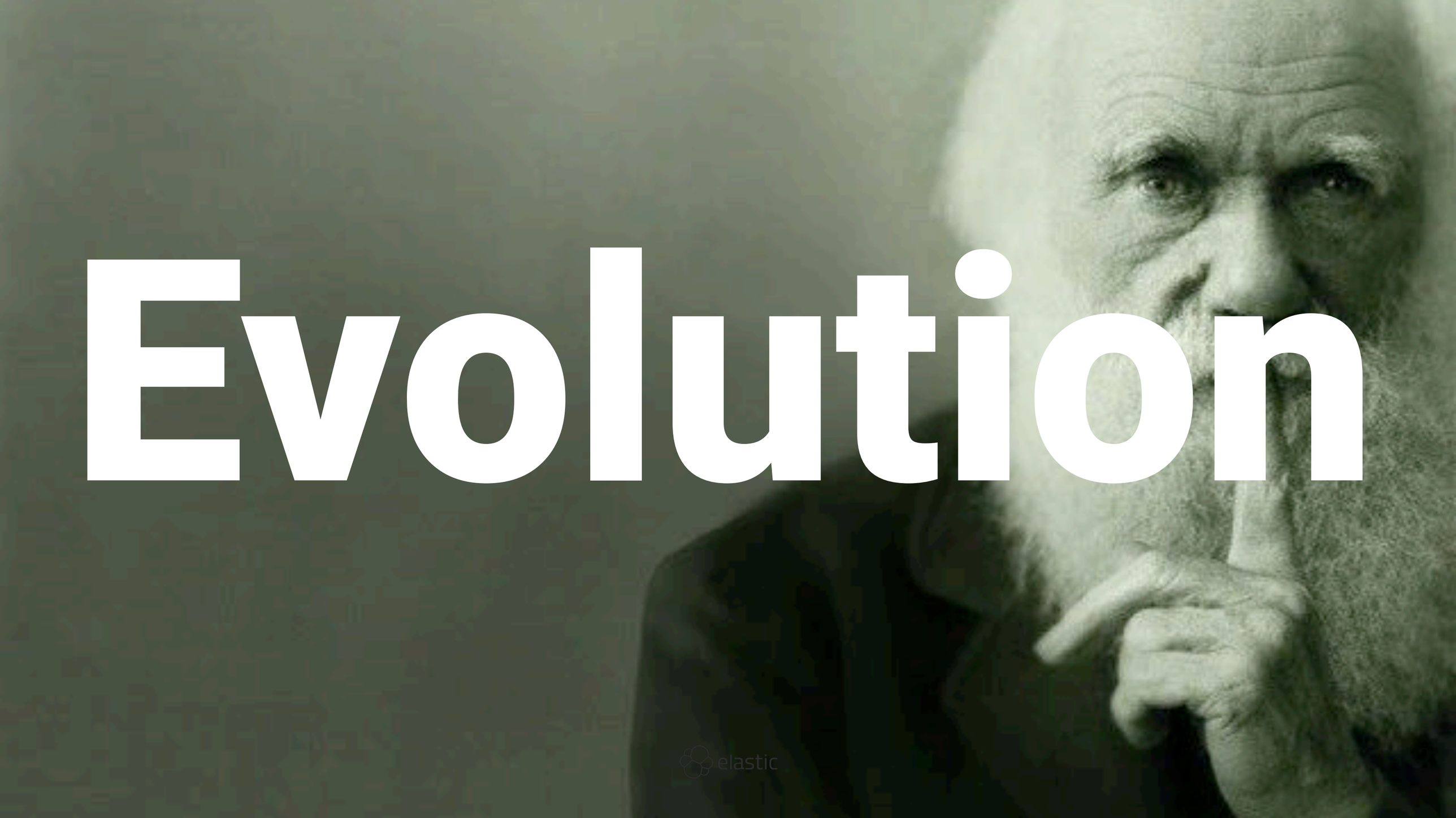
11. Elasticsearch

7. Microsoft Access

8. Cassandra

10 SQLite

Evolution



elastic

Strictness*

5.0

* Demo


IT'S BAD

Bootstrap Checks

https://www.elastic.co/guide/en/elasticsearch/reference/current/bootstrap-checks.html

Bootstrap Checks

- Heap size check
- File descriptor check
- Memory lock check
- Maximum number of threads check
- Maximum size virtual memory check
- Max file size check
- Maximum map count check
- Client JVM check
- Use serial collector check
- System call filter check
- OnError and OnOutOfMemoryError checks
- Early-access check
- G1GC check
- All permission check

Parameters & Configs

Rolling Upgrades*

6.0

* Demo

elastic

Floodstage Watermark*

6.0

* Demo

elastic


Sawyer Rd
NEXT SIGNAL

Low 85%

High 90%

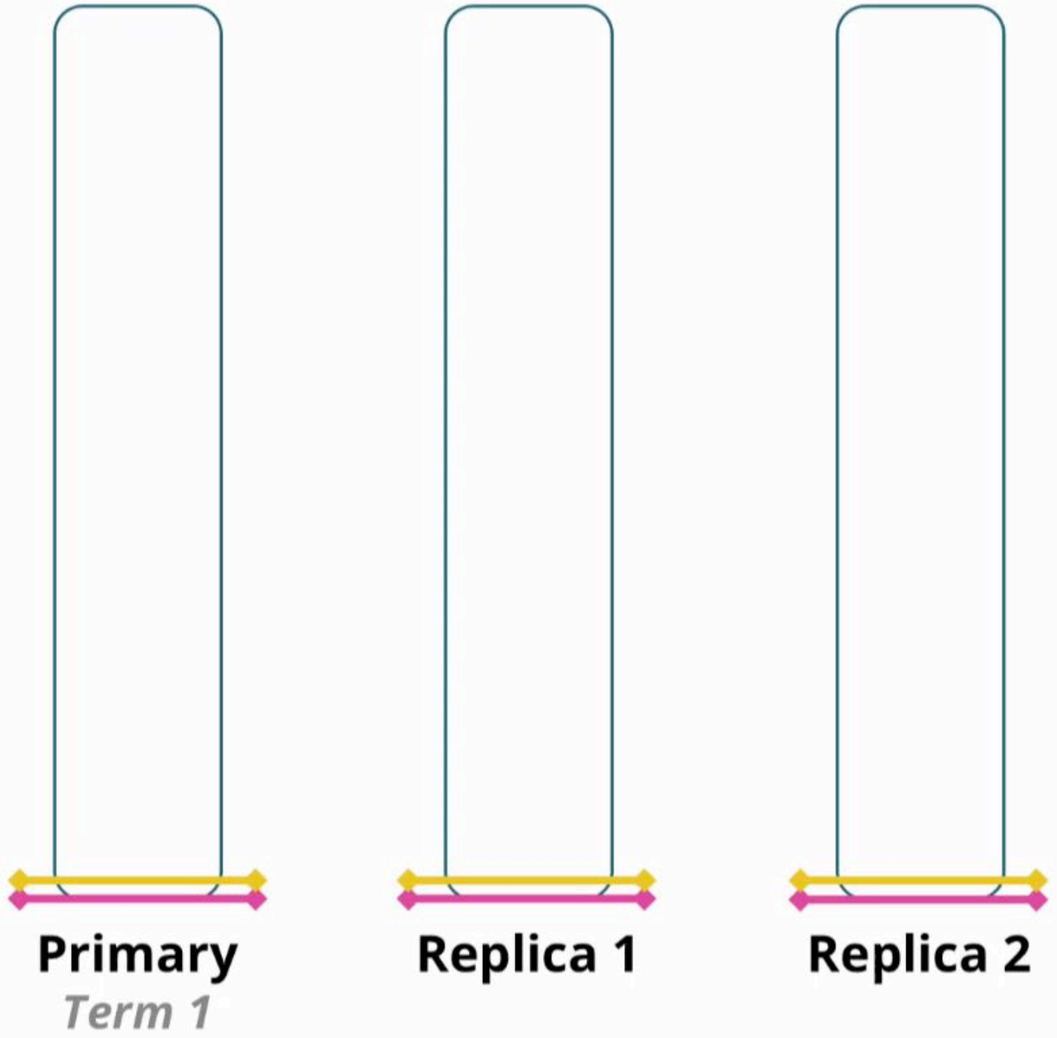
Floodstage 95%

Sequence Numbers*

6.0

* Demo

elastic


Primary
Term 1
Replica 1
Replica 2
Global checkpoint
Local checkpoint

63 bits ought to be
enough for anyone.

Tradeoff

```
index.translog.retention.size: 512MB

index.translog.retention.age: 12h
```

Cross Datacenter Replication

6.x or 7.x

elastic

~~Types~~*

5.6 to 8.0

* Demo

Why

Data types

Sparsity

Scoring

How

5.6 opt-in single type

6.x single type

7.x type optional in API

8.x no more types

https://www.elastic.co/guide/en/elasticsearch/reference/current/removal-of-types.html#_schedule_for_removal_of_mapping_types

Automatic Queue Resizing

6.0

elastic

Reject and Retry Instead of Long Queues

`thread_pool.search.target_response_rate: 2s`

Serving 50 requests/s

Queue size: $2 * 50 = 100$

Adaptive Replica Selection

6.1 (enabled by default in 7.0)

C3: Cutting Tail Latency in Cloud Data Stores via Adaptive Replica Selection

Lalith Suresh, ***Technische Universität Berlin;*** **Marco Canini,** ***Université catholique de Louvain;***
Stefan Schmid, ***Technische Universität Berlin and Telekom Innovation Labs;***
Anja Feldmann, ***Technische Universität Berlin***

https://www.usenix.org/conference/nsdi15/technical-sessions/presentation/suresh

Pick Best Shard

Exponentially Weighted Moving Average (EWMA)

Piggyback on responses to coordinating node

Shrink & Split*

5.0 6.1

* Demo

Shrink

Combine shards by a factor

Split

Split into a factor of `number_of_routing_shards`

Not required in 7.0+

Open Code

6.3

elastic

Public Repo

elasticsearch

code

License: **Apache 2.0**

Private Repo

x-pack-elasticsearch

code

License: **Elastic EULA**

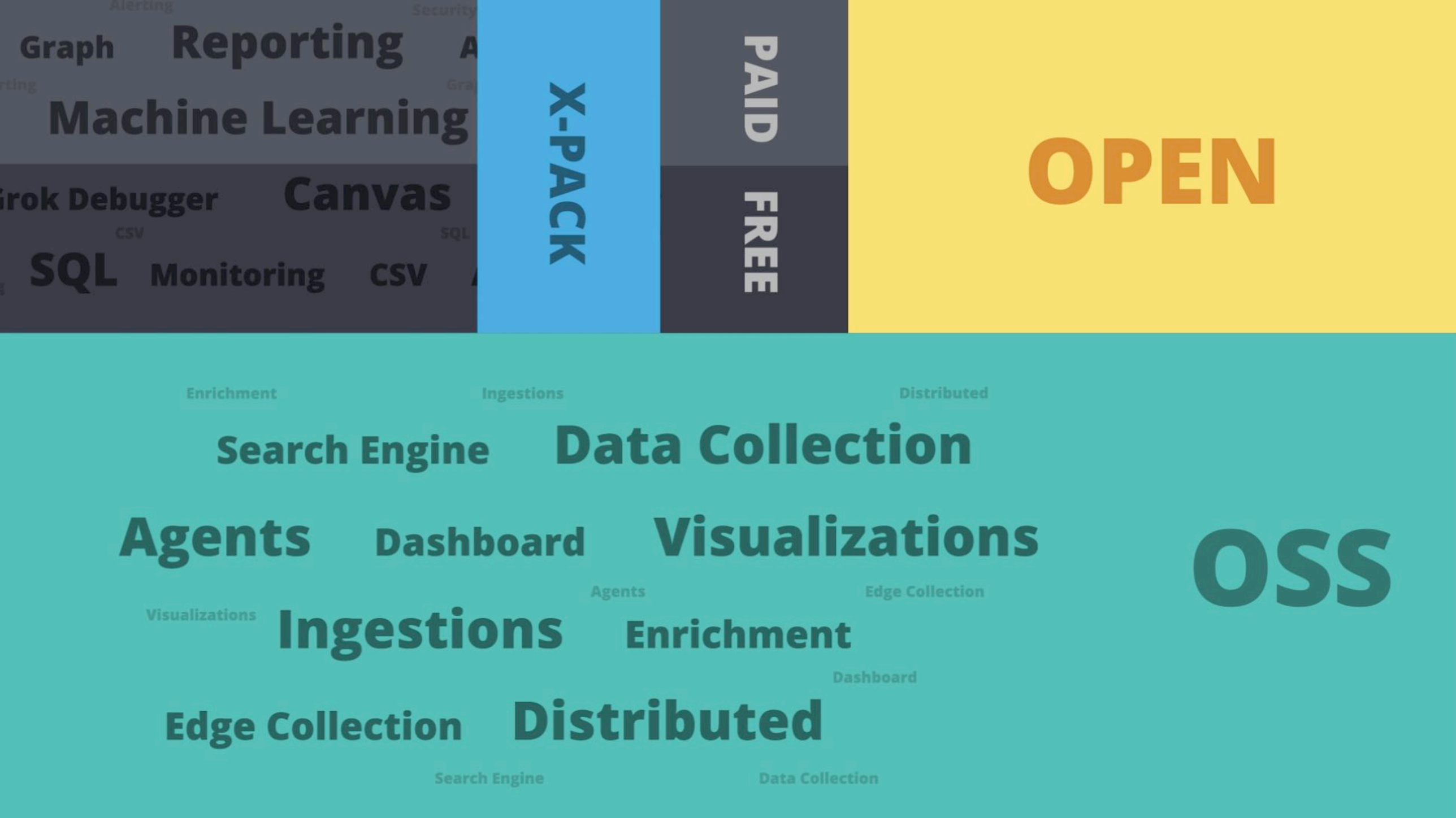
Public Repo

elasticsearch

oss code
Apache 2.0

x-pack code
Elastic EULA

Community License: **Apache 2.0 + EULA**


Graph
Reporting
Machine Learning
Grok Debugger
Canvas
SQL
Monitoring
CSV
X-PACK
PAID
FREE
OPEN
Enrichment
Ingestions
Distributed
Search Engine
Data Collection
Agents
Dashboard
Visualizations
Edge Collection
OSS

Shards

7.0

Default: 1 Shard per Index

Oversharding

Simon Says

Use a single shard until it blows up

Beats: Rollover

Planning phase: size based, depends on ILM

JDK 11?

7.0

Can users upgrade?

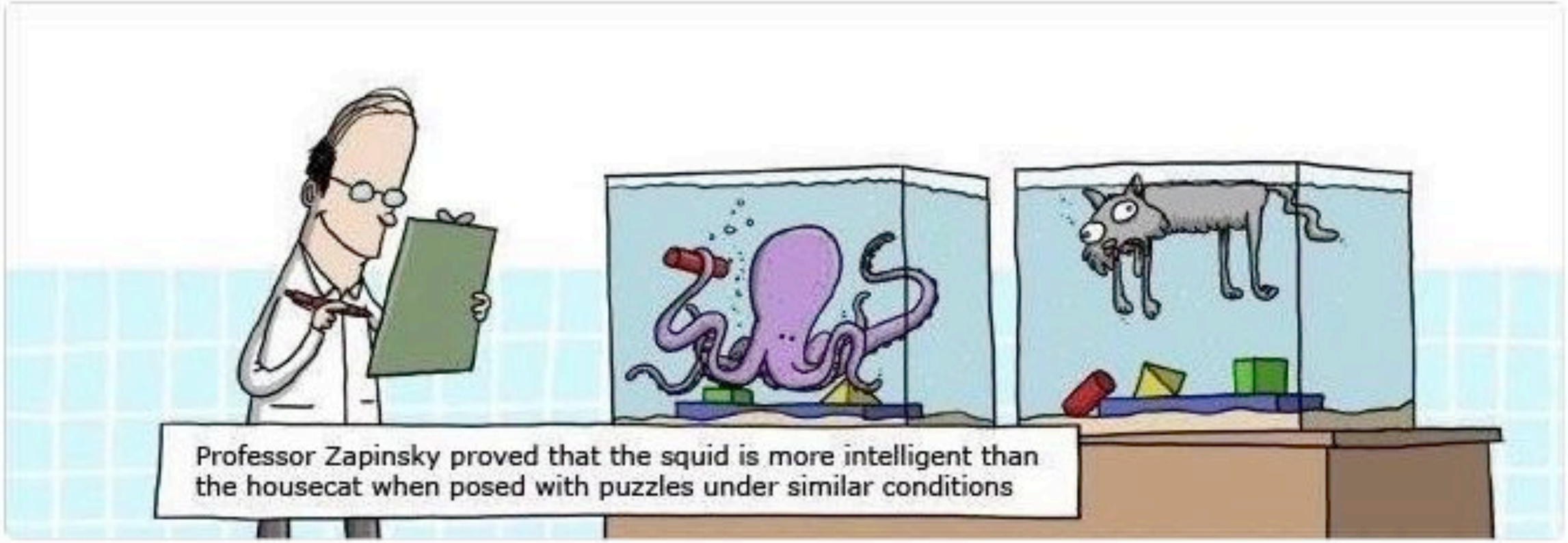
Version for Java clients?

Low-level REST: independent (JDK 7)

High-level REST: JDK 11

Transport: deprecated

Benchmarks


Professor Zapinsky proved that the squid is more intelligent than the housecat when posed with puzzles under similar conditions

elastic

Rally

https://elasticsearch-benchmarks.elastic.co

Conclusion

Don't be Shay to change

Strictness

Rolling Upgrades

Floodstage Watermark

Sequence Numbers

~~Types~~

Automatic Queue Resizing &
Adaptive Replica Selection

Shrink & Split

Open Code

Default Shard Number

JDK 11

https://www.meetup.com/Elasticsearch-Berlin/

Thursday, June 14, 19:00, Springer Nature

elastic

Questions?

Philipp Krenn @xeraa