A Bird and the Web

crossbreeding experience

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Welcome and thanks

Thanks to:

- Sita software
- IBPhoenix
- IBSurgeon
- All attended :)

About us

- Small outsourcing company, which is specializing in web-site development, games and some special software for TV and banks.
- We are 6 years on the market, did 150+ websites (50 for government institutions).
- Sites are from 5 to 500 pages (some news portals - over 100 000 pages).
- DB sizes - typical 50-100 MB, some 500-1500 MB, some 2-4 GB.
- Number of records to manipulate - from 10K to 25M.

Common tasks to solve in the web

1. Parallel access to DB - from tens to hundreds connections
2. Multi-user access with different permissions
3. **Huge amount of short-life small-data queries (AJAX)**
4. Load-balancing - data replication, cross-database queries
5. **Dynamic or static: that is the question**

Some statistics for one web-portal
no counts counted :)

Static, 25 days, 2 nodes, partial AJAX trace:
  1. **691 115 Visits**
  2. **AVG 27 644 Visits/Day**
  3. <mark>**1 936 339**</mark> **requests**
  4. **77 450 requests/Day**
  5. **Peak: 117 841 req/Day**

The same data as it was if site was dynamic - 1 page generation per request, near 15-20 selects per page.

Static, 25 days, 2 nodes, full AJAX trace:
  1. 703 147 Visits
  2. 28 125 Visits/Day
  3. <mark>12 411 999</mark> requests
  4. 496 480 requests/Day
  5. Peak: 707 761 req/Day

The same data as it was if site was dynamic - several data blocks per request, near 15-20 selects per page in total.

Games - is it serious?
some statistics for typical round

- DB file size - 850MB
- Number of active users - from 10 454 to 3 921
- Round length - 51 days
- Number of transactions - 20 713 104
- 406 139 transactions per day
- TIP was written on disk 31 579 112 times
- Most read table - 2 799 267 records
- Most read/write table - 3 458 313 records
- No NoSQL cache ... yet ;-)
- Galaxy name - Firebird :)

RO and RW transactions, lifetime and errors in the web environment

- **Over 95% of queries just READ the data ***
- **Near all queries MUST be short - limited to lifetime of script execution - typical less than 0.5 seconds, 1 second is too much, 5 seconds is unacceptable!**
- **Users do not care about ANY problems with your DB - do not bore them with messages about lock conflicts!**

* but not in our game

BL in DB - to be or not to be?

NO BL in DB:
- **DB is portable to other RDBMS**
- **You have to implement BL each time you change access layer to DB**
- **You have to manage permissions to access data by your BL**

BL in DB:
- DB is NOT portable
- You can easy change access layer from PHP to Delphi/C#/Whatever
- You do not care about data access security - just grant permissions to SP

Static or dynamic - what to choose?

Static site mode:
- +Fast
- +Scalable
- +Portable as archive
- +Practically no DB load
- -Delayed update
- -No user interaction

Dynamic mode:
- Reasonable Fast
- -Not Scalable
- -Not portable as archive
- -High DB load
- +Instant update
- +User interaction

Choose both and go ahead :)

Counters, ooh, counters!
two words about web and counters

- **Never use count(1) from table(s)!**
- **Never use direct updates if you want real data!**
- **Need general counts? Parse logs and do background update!**
- **Need real time counters? Use Redis/Memcache/etc**
- **Avoid counters, if you can! ;)**

Web: No SQL or NoSQL?

No SQL: pure key-value:
- **+ Fast, incredibly fast**
- **+ Build-in replication**
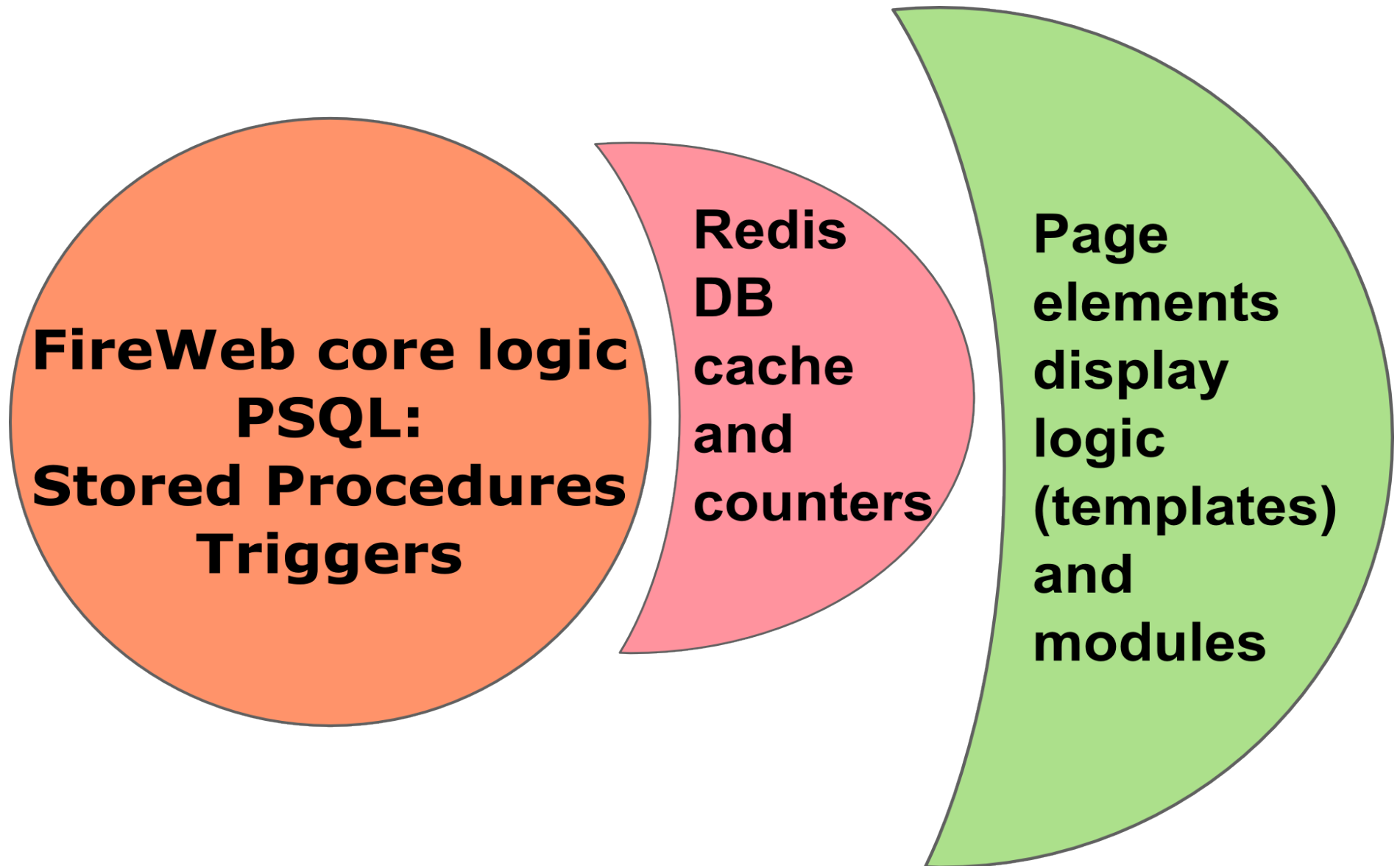- **Not relational**
- **- no BL in DB ***
- **- no ACID**

NoSQL: Firebird+key-value:
- **+ Fast**
- **+ Build-in replication ***

- **+ Relational**
- **+ BL in DB**
- **+ ACID**

Melt them together - and enjoy the speed.

* only key-value DB

Citius, Altius, Fortius: anatomy of the FireWeb 5.0 engine

FireWeb core logic PSQL: Stored Procedures Triggers

Redis DB cache and counters

Page elements display logic (templates) and modules

Summary

- Firebird SQL can be used in the web :)
- Use the power of PSQL
- Optimize queries
- Use RO transactions
- Do not compete with key-value - use NoSQL!

QUESTIONS?

Never ask, if it is possible. It is.