

Post-relational databases

**What's wrong with web
development?**

Dobrica Pavlinušić

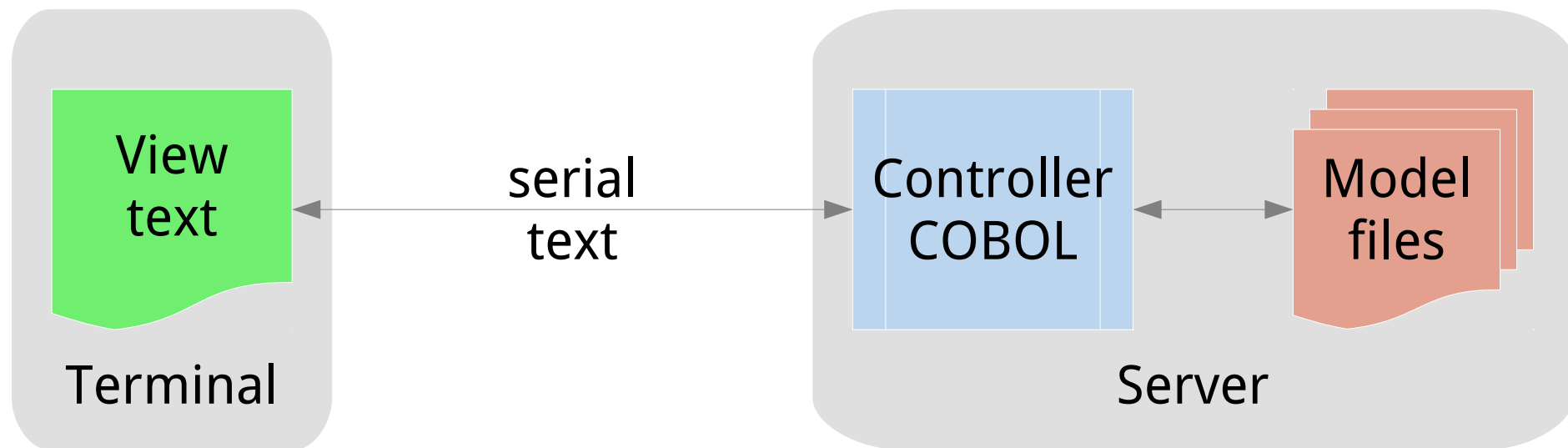
<http://blog.rot13.org>

WebUG, 2011-06-16

Who am I?

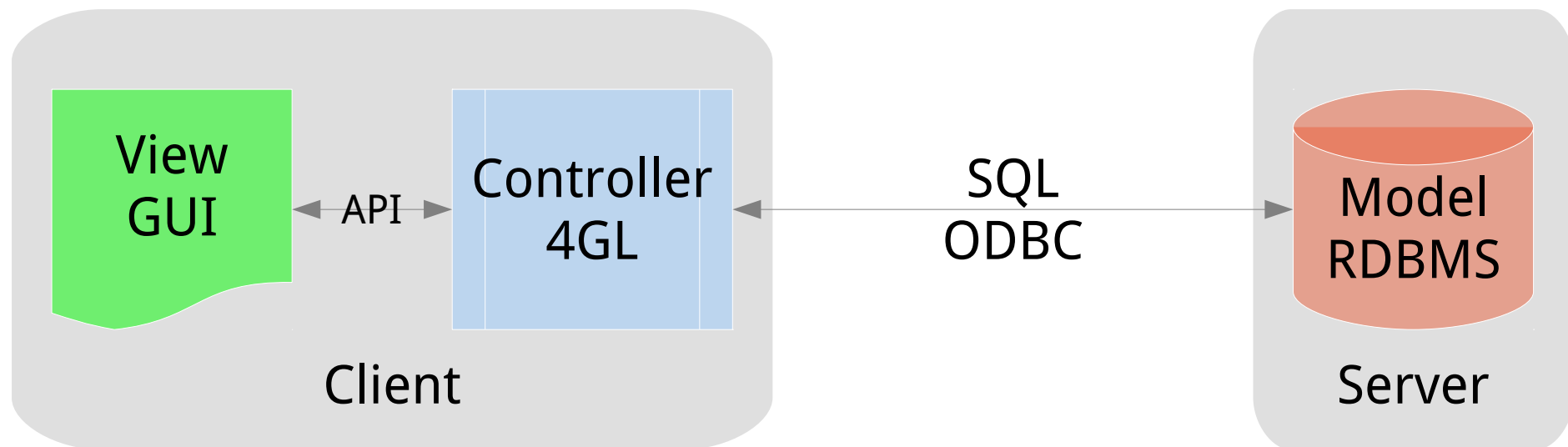
- Web programming since 1995 using FLOSS
- Languages: ~~php~~, perl, JavaScript
- Databases: PostgreSQL, ~~MySQL~~, CouchDB
- 5+ years of experience as system architect on large intranet content portal
- <http://blog.rot13.org>
- Big question: **are we solving same problems over and over again?**
- Model-View-Controller pattern

Back in mainframe days...



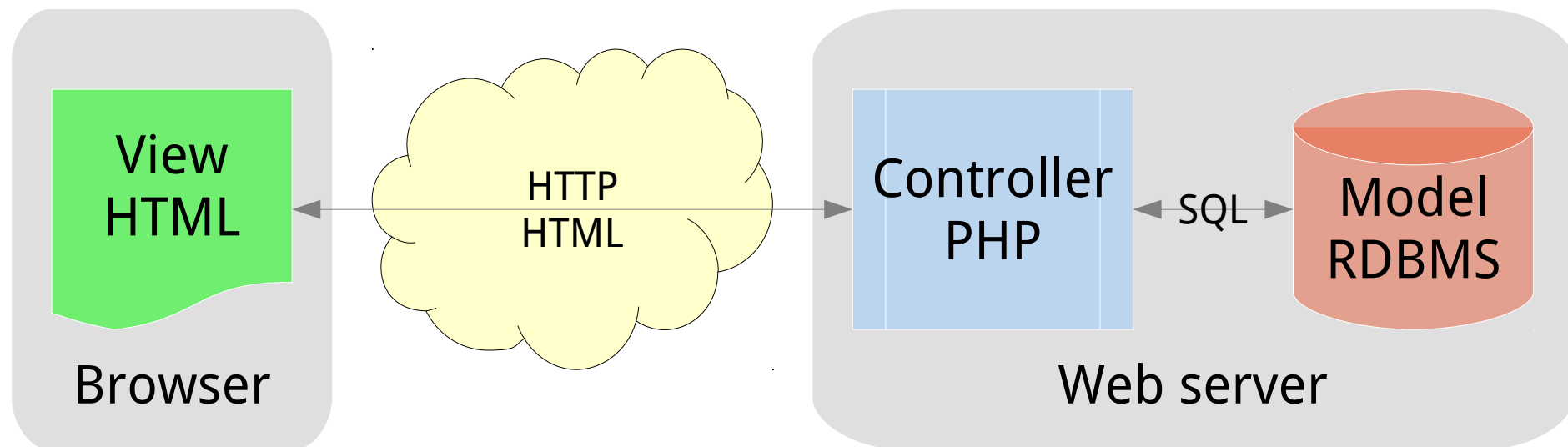
- All logic in COBOL application
- Similar to Clipper in DOS
- Payroll-type applications

GUI Client/Server RDBMS



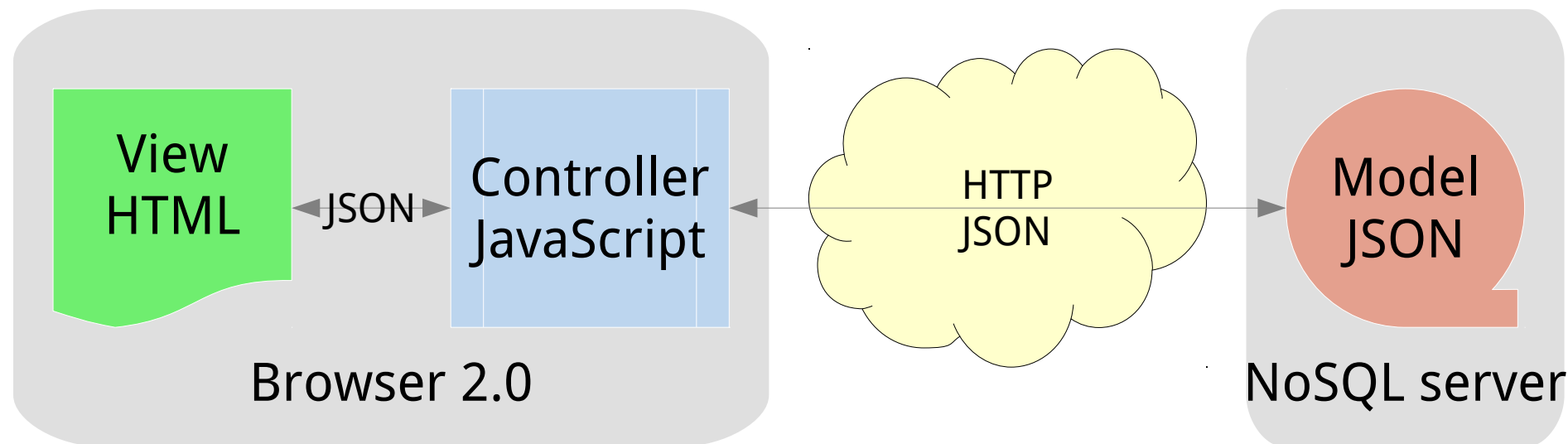
- **tabular** normalized data (3NF)
- SQL to query and modify data (static schema)
- logic in controller and RDBMS (validation)

Internet! Web 1.0



- "network is computer" – browser thin client
- Logic in controller, RDBMS & view (JavaScript)
- Trees (XML)? Self-referencing data?

AJAX JSON REST Web2.0



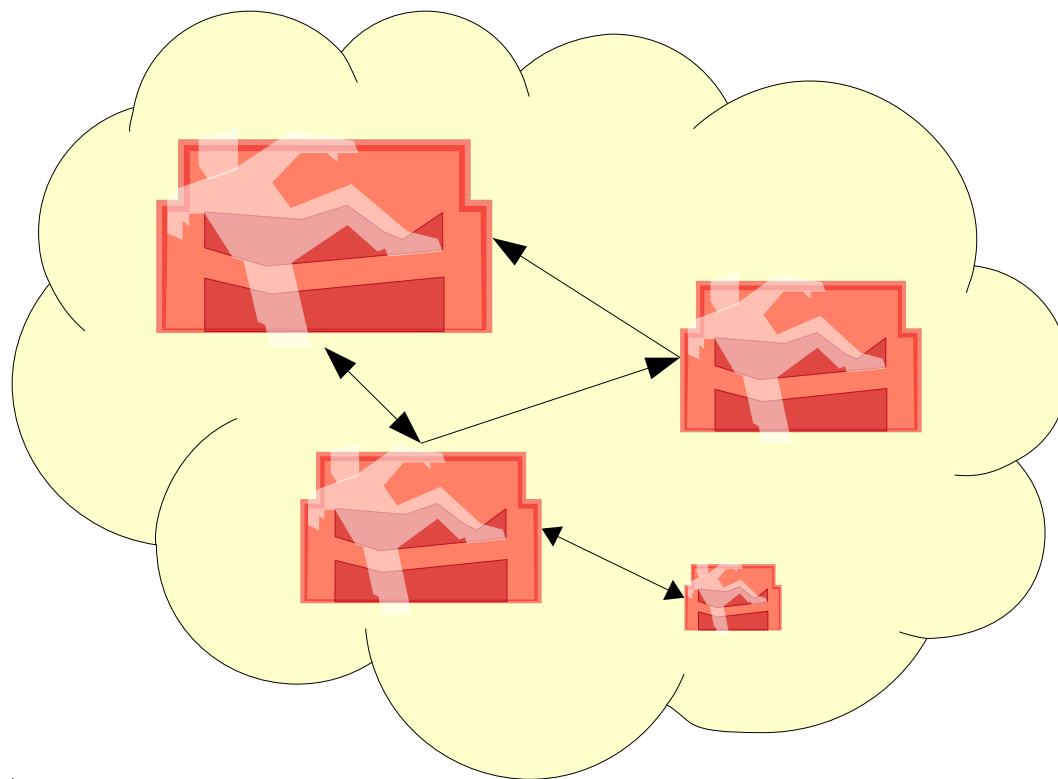
- JSON without schema (or verification!)
- Logic in JavaScript on client **and** server
- Turtles all the way down reduces complexity

Perfect web stack

- HTTP REST API with JSON
 - GET, PUT/POST, DELETE
- JavaScript queries using map/reduce
 - Real-world dirty data from views
- Serve application from HTTP database (content-type support)
- Two-way data binding forms \leftrightarrow JSON
 - HTML is only template we need!
- Single language: JavaScript (+jquery)
- "simple app in single afternoon" benchmark

CouchDB

- Designed for replication over HTTP
 - applications replicated with data (off-line)
- Custom views, requests and `_changes` feed



<angular/>

- What if web browsers where written for web applications today?
 - html compiler inside browser
 - ng:repeat and friends to template objects
 - Objects persisted using REST to server
- <http://docs.angularjs.org/>
- Demos
 - <http://angularjs.org/slides/intro/#/8>
 - printer overview
 - conference submission app

angular-mojolicious

- Mojolicious – web in the box (perl)
 - <http://mojolicious.org/>
- Mojo::Client – chunked HTTP client
 - Perfect for CouchDB integration
- <https://github.com/dpavlin/angular-mojolicious>
- REST API for Angular's \$resource
 - CouchDB proxy or static JSON files
- Replication with getangular.com service
 - not API compliant, uses newer version
- Helpers to quickly prototype with angular

Server-side templates

- Generate slips server-side using angular
 - PhantomJS – headless WebKit browser
 - <http://www.phantomjs.org/>
 - <https://github.com/dpavlin/angular-uplatnica>

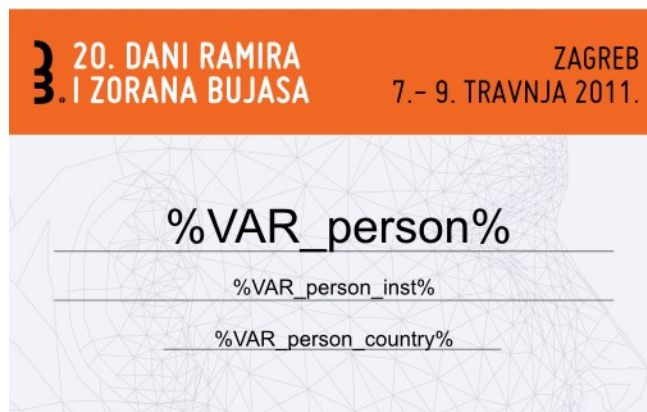
Hitnost PRIJENOS NALOG ZA UPLATA ISPLATA
 PLAĆANJE

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```
$ ./bin/phantomjs examples/rasterize.js \
'http://localhost:3000/app/index.html#/uplatnica' \
uplatnica.pdf
```

Pixel-exact PDF templates?

- Generate conference name tags
 - <http://blog.rot13.org/2011/04/print-conference-name-tags-using-inkscape.html>
 - Inkscape (SVG template)
 - pdfnup for to A4 page



CouchDB triggers

- Finite-state machine inside document
- Multiple workers - FSM for lock and status
- filter, trigger, commit on `_changes` feed
- Perfect for async tasks
 - executing shell
 - sending e-mail

CouchDB full-text search

- Implemented as filter-only trigger
- KinoSearch – full-text search, base for Apache lucy (Lucene in C)
- trigger which delete/add documents
 - Unroll structures into.flat.schema
- CouchDB external server to perform queries

CouchDB related projects

- BigCouch
 - <https://github.com/cloudant/bigcouch>
 - Consistent hashing, sharding
- ElasticSearch
 - <http://www.elasticsearch.com/>
 - CouchDB river
- GeoCouch
 - <https://github.com/vmx/couchdb>
 - Spatial index

Riak (search)



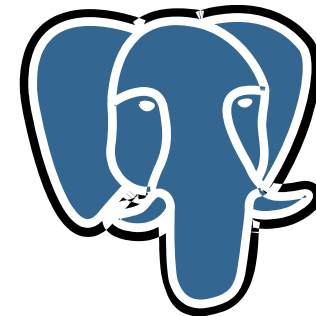
- **cluster** of machines!
- Amazon's dynamo model
 - r,w – eventual consistency
- Multiple map/reduce phases in single query
 - Ad-hoc, not cached, in parallel over cluster
- post-commit hooks (search)
- Links (REST traversal)
- HTTP and ProcolBuffers interfaces
- <http://www.basho.com/riaksearch.html>

Alternative JSON storage

- Raven DB
 - .Net platform
 - Linq Map/Reduce
 - RESTful JSON
 - <http://ravendb.net/>



- PostgreSQL
 - Mostly tabular data?
 - hstore - key/value pairs
 - own HTTP/JSON app (ORM?)
 - <http://www.postgresql.org/docs/9.0/static/hstore.html>



Overview

- Avoid complexity
 - Model: JSON
 - View: HTML
 - Controller: angular
- Solve offline problem: CouchDB
 - Attach async processes in the cloud!
- Generate pdfs server side
- Attack interesting problems
 - Tree-data, (social) networks