

Building Eudoxus.gr with FOSS and Open Standards

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What is Eudoxus

- A distributed system that supports and streamlines processes and operations related to the textbooks distribution for the higher education institutions of Greece
- Stakeholder: Hellenic Ministry of Education <http://minedu.gov.gr/>
- Developed, operated and supported by GRNET <http://grnet.gr/>
- Users: Students, Secretariats, Publishers, Distribution Points (e.g. Bookstores), related Ministry depts, Courier service, Helpdesk- **More than 270.000 individual users**
- Multiple APIs and integration with other ISs <http://eudoxus.gr>

Presentation Focus

- Design and software architecture
 - by design based on 100% FOSS infrastructure
 - adopting open standards
- Building within a very tight schedule and ever changing requirements
 - agile methodology
 - FOSS development tools
- Evaluating the results of the 100% FOSS decision (a year later)

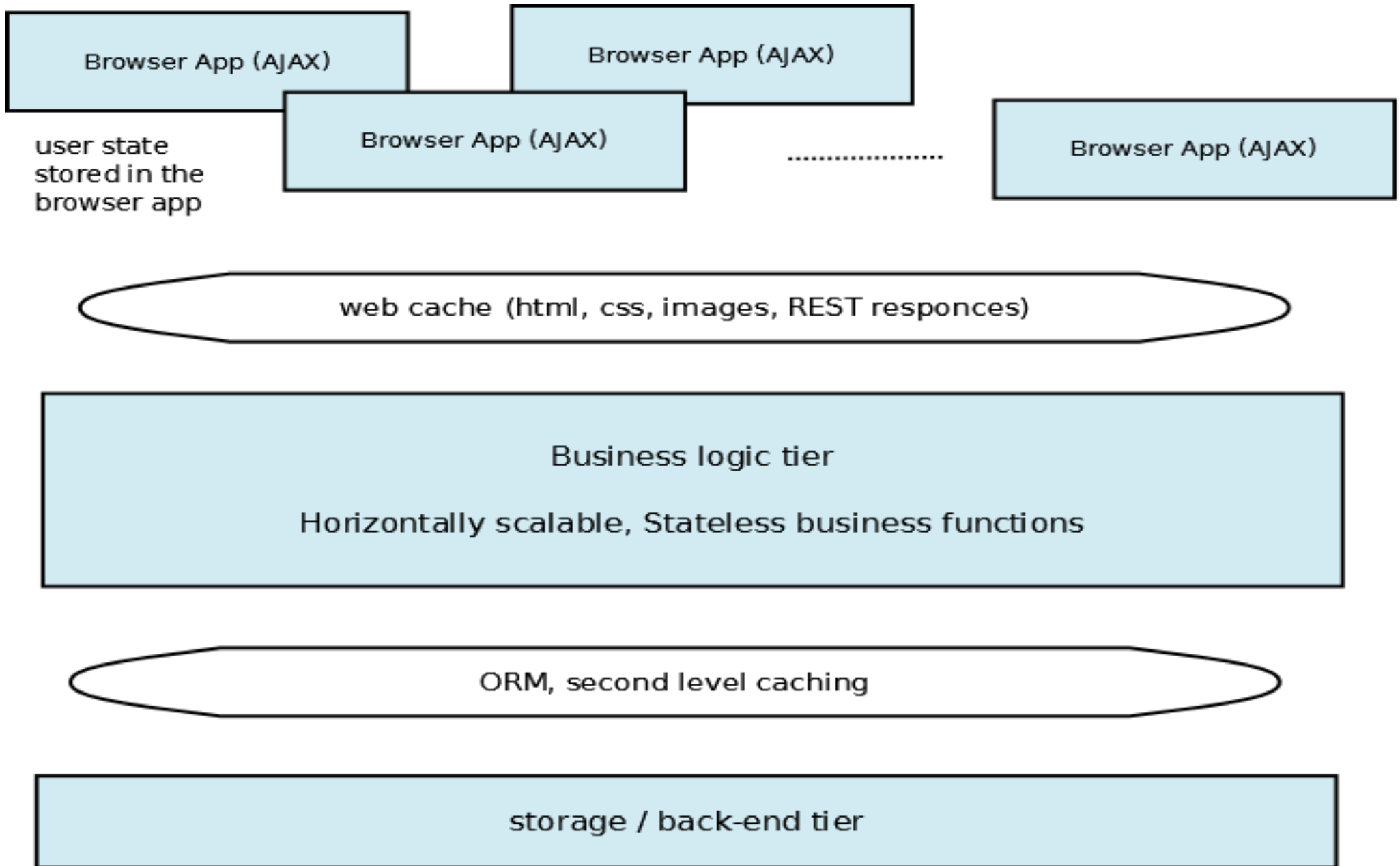
Design Goals - Challenges

- Tight schedule, fixed milestones - deadlines
 - Incrementally release modules in production
- Not finalized requirements
 - Be flexible, handle changing requirements
- High availability
 - Redundant architecture
 - Live application updates
- Impossible to predict usage load
 - Scalability, elastically use infrastructure to serve growing usage
- Safeguard the transactional nature of related processes
- Synchronize data and connect to other systems

Technology decisions

- Web-based user interfaces
- RESTFul APIs
 - use SOAP-based web services for integration in specific cases (e.g. courier service)
- Java-based core (business logic tier)
- Javascript-based / GWT-based rich GUIs, AJAX
- Back-end storage: RDBMS vs noSQL decision
 - noSQL options offer better scalability than typical RDBMS
 - Needed at least a minimal transactional core - eventual consistency is not acceptable
 - Dropped the initial hybrid approach - full RDBMS design
- Shibboleth-based authentication for students

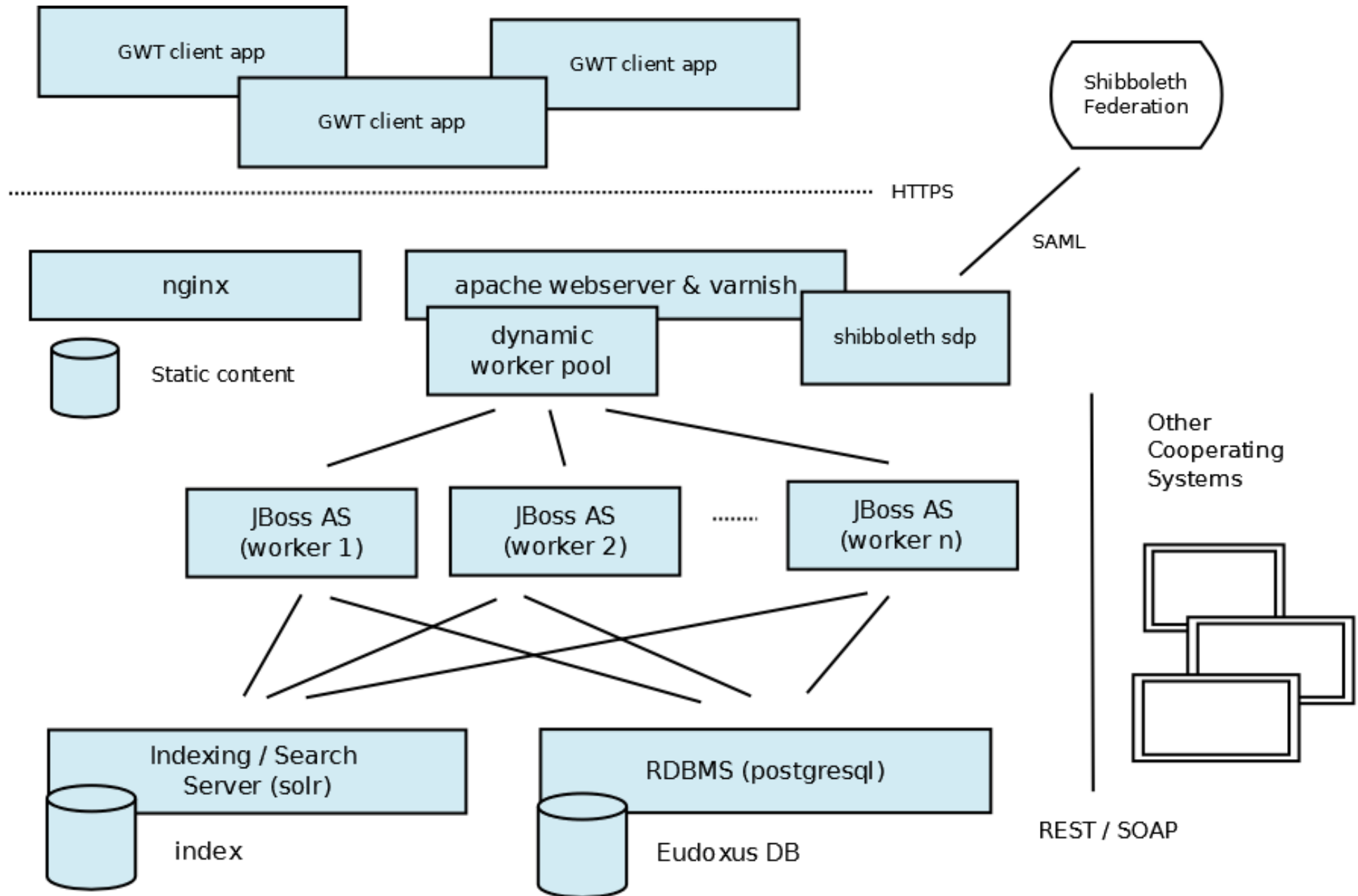
High level architecture



Infrastructure Software (100% FOSS)

- Server-side hosted on GRNET's cloud infrastructure (debian VMs)
- Google Web Toolkit (GWT) for the rich GUI clients (browser)
- Apache, nginx front-ends
- Varnish web cache
- JBoss Application Server
 - stateless EJBs implementing core business logic
 - JPA ORM (hibernate substrate)
 - JMS Queues and Message Driven Beans
 - JMX MBeans for scheduled tasks and maintenance
- PostgreSQL RDBMS
- Solr (Lucene server) indexing / search server
- A multitude of FOSS libraries and frameworks

Technical Architecture



Meeting Tight Schedules

- □ Typical setup
 - VCS (mercurial), wiki for requirements, issue tracker
 - dedicated release engineer, dedicated DBA
 - local development -> test server -> production server
 - FOSS dev tools (Eclipse, ant, etc)
- Agile approach
- Documentation was the first victim of the pressing schedule :(
- Updated unit tests was the second :o
- A few statistics on the team
 - ~10 developers
 - ~**10** testers
 - ~20 helpdesk members for end-user support
 - Full GRNET NOC support!

Eudoxus & FOSS: a year after

- A multitude of mature FOSS libraries and frameworks to try and select from. This lead to choosing optimal (or near optimal solutions) for the task at hand
- Very efficient and flexible development environment 100% based on FOSS
- Eudoxus proved (again) that you can successfully built and operate a large scale, business critical, high availability, distributed information system based 100% on FOSS software



Εύδοξος

Ηλεκτρονική Υπηρεσία Ολοκληρωμένης Διαχείρισης
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