Electronic Learning platform
Who are we?

LORAN ALSSEMA
Verjo Group
Responsible IT & Innovation
VERJO
• Create contents & products
• Driving Education

ROBRECHT ANRIJS
AXIANS
Teamlead WIXMO project
Axians Belgium
• Custom applications
• Education, Healthcare, Industry
Introduction
INTRODUCTION

History
Wees WegWijs

- Developed 10 years ago by Axians
- Acquired by VERJO Group
- Monolith
- Not scalable
- No responsive design
- Old frameworks
- High cost for new improvements
History
Wees WegWijs architecture

Master tenant

Author Tenant X

Author Tenant Y

Coaches & Students Tenant X

Coaches & Students Tenant Y

CMS

ELP

PUSH
Why a custom Learning platform?
Custom way of...

- Content management
- Student-tracking system
- Smart Learning system
- Coaching
- Message-box (direct communication students – teacher)
- Webinar

⇒ WIXMO
Requirements
Non functionals

- Scalability
- Multi-tenant
- Content separation but also sharing
- User-management
  - GDPR, 2FA
  - SSO capabilities
- Cloud ready
- Mobile ready
Logical components

**CMS**
Content management System
- Authors
- Course
  - Creation
  - Validation
  - Publish

**ELP**
Electronic learning Platform
- Coaches & students
- Execute course
  - Start
  - Read & exercise
  - Test
- Tracking progress
Logical view

Master: Author

Author X

Author Y
Multi master tenant

WIXMO

Master WIXMO

Author X

Coaches, Students

Coaches, Students

Coaches, Students
Multi master tenant

VERJO

Master VERJO

Author A

Coaches, Students A

Coaches, Students B
Multi master tenant

ARCHITECTURE

WIXMO

CMS

ELP

CMS

ELP

CMS

ELP

VERJO

CMS

ELP

CMS

ELP

WEESWEGWIJS

CMS

ELP

CMS

ELP

WEESWEGWIJS

CMS

ELP

CMS

ELP
Development
Challenges

APPLICATION
- Build once, run everywhere
  - Configurational parameters
- Cloud agnostic

DATABASE
- RDBMS
- NoSQL
<table>
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<tr>
<th>#</th>
<th>Status</th>
<th>Branch</th>
<th>Commit Hash</th>
<th>Label</th>
<th>Description</th>
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<td>2.0.8</td>
<td>83f55f0d0</td>
<td>prd-deploy</td>
<td>deploy to production</td>
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<td>copy image to azure cluster</td>
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<td>build</td>
<td>build</td>
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<tr>
<td>#115675</td>
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<td>ci</td>
<td>compile and unit test</td>
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<td>compile and unit test</td>
</tr>
</tbody>
</table>
Security
Challenges

- Secure application & API’s
- Cookie or JWT-token
- GDPR
- Platform independent
- No vendor lock-in
- DRY
Keycloak as SSO-provider

- Open source
- Relative easy to upgrade to Red Hat SSO
- UI not so end-user-friendly
  - Using Keycloak API’s
- Theming login & registration
OpenShift Implementation

- Azure Cloud
- Each tenant = 1 OpenShift project
- Each application = 1 pod
  - Multiple pods possible
  - Sticky sessions
- Each database = 1 pod
OpenShift Implementation

Communication
- Application -> database: OpenShift service
- External -> application: https endpoint (routes & services)
- Application -> application: https endpoint

Secrets
- Contains Passwords of Keycloak service-accounts
- Database passwords

Config map
OpenShift challenges

- Database volume mounts
  - Managed disks
  - NFS
  - Gluster FS
  - Netapp -> experience AXIANS

- Database backups
  - Daily dump
  - Store in azure containers
Improvements

- **Certificate management**
  - Letsencrypt support (creation new tenant)

- **Further automation adding new tenants**
  - Shellsrcript -> Ansible

- **Deployment of a lot of tenants**
  - Gitlab pipelines optimization
    - No image stream triggers & Rollout oc calls gitlab
Improvements

- Clustering Mongo DB
  - Statefull sets

- Liquibase changelog lock.
  - Lifecycle hooks
Thank you!

Questions?

robrecht.anrijs@axians.com
loran@verjo.nl