Lessons learned
from
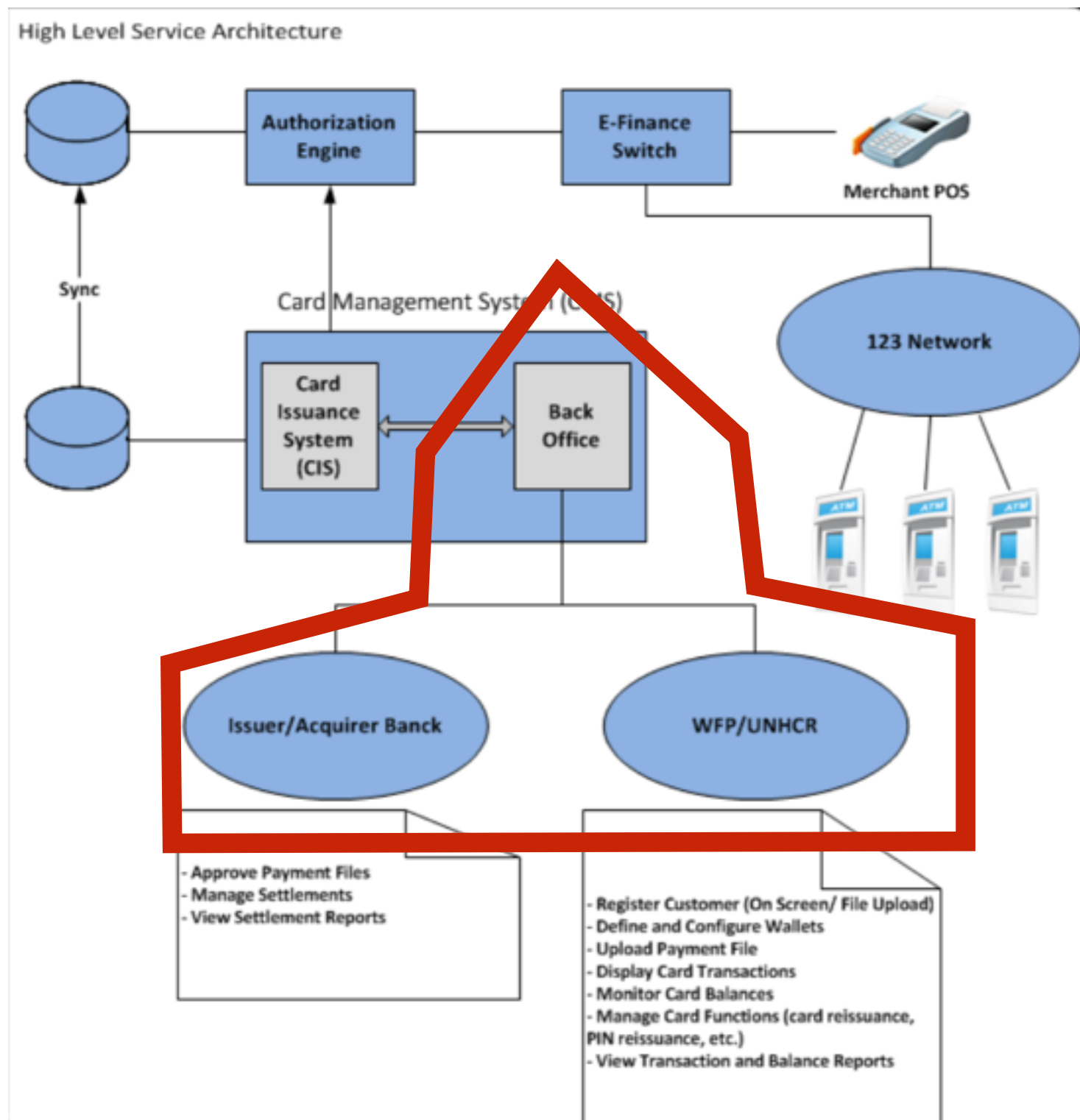# real-world deployments
of
Java EE 7

Arun Gupta, Red Hat
@arungupta

- UN agency to protect and support refugees

- Help UN refugees to get benefits through secured card wallets

  - Register, issue card, POS, ATM, Settlement

  - Refugees get cash or use cards at merchants

Architecture

High Level Service Architecture

Technology

- **JSON**: Notification messages to agents (simple messages created using `JSONBuilder`, No dependency on 3rd party library)

- **Batch**: End of day tasks like posting of accounts, generation of reports, email to clients and banks

- **Concurrency**: Managed threads pool for work??

- **EJB**: Backend services (locally and remotely)

- **JAX-WS**: Integration with WFP/UNHCR systems (exposed interface)

Technology

- **JPA**

  - Stored procedure calls (Oracle and SQL Server)

  - Two-way schema (model using JPA, generate schema, tune it, and regenerate entities)

    - Change requests

- Default **CDI** enabled (ease of integration between different layers)

Additional Libraries

- PrimeFaces

  - Great support in NetBeans

  - Generator plugin (in NetBeans) that facilitate and streamline development of pages based on entity beans (e.g. Admin and Operations page)

- jQuery stock library (streamline UI development in few lines)

Runtime

- GlassFish 4

  - 2 instances deployed locally

  - Mandate to use commercial app server

- Java SE 7

- Oracle 11g and Microsoft SQL Server 2008

Tools

- NetBeans 7.4

  - Integrated GlassFish management

  - Many templates to start from

  - PrimeFaces generator plugin

  - Great compatibility with HTML5

Acknowledgments

@_tamanm

miles2run.org

- Track your daily runs

- Day or distance-based goals or community runs

- Social network for runners

- Its free

Miles 2 Run

Community Runs

8
Runners

477.85
Miles

7.49
Hours

8
Cities

6
Countries

Join Miles2Run Today

Capture all your runs, anytime, anywhere.

Miles2Run is a fast and fun way to share your running activities with friends and family. Sign up, enter an activity, share, and track your progress. It's easy.

f Sign in with Facebook

g+ Sign in with Google

Sign in with Twitter

JavaOne 2014

27 June 2014 - 02 October 2014

JavaOne Community Run

Official website: http://oracle.com/javaone
Twitter: @javaoneconf

Join Community Run

4	452.83	0.54	4
RUNNERS	MILES	HOURS	CITIES

JavaOne 2014 Community Run

New Activity

452.83 — Total Distance (mi)

86 — Total Activities

98 — Total Days

84 — Completed Days

10 — Remaining Days

4 — Missed Days

Distance vs Pace

Day | Month

■ distance ■ pace

Progress

10.2%

85.7%
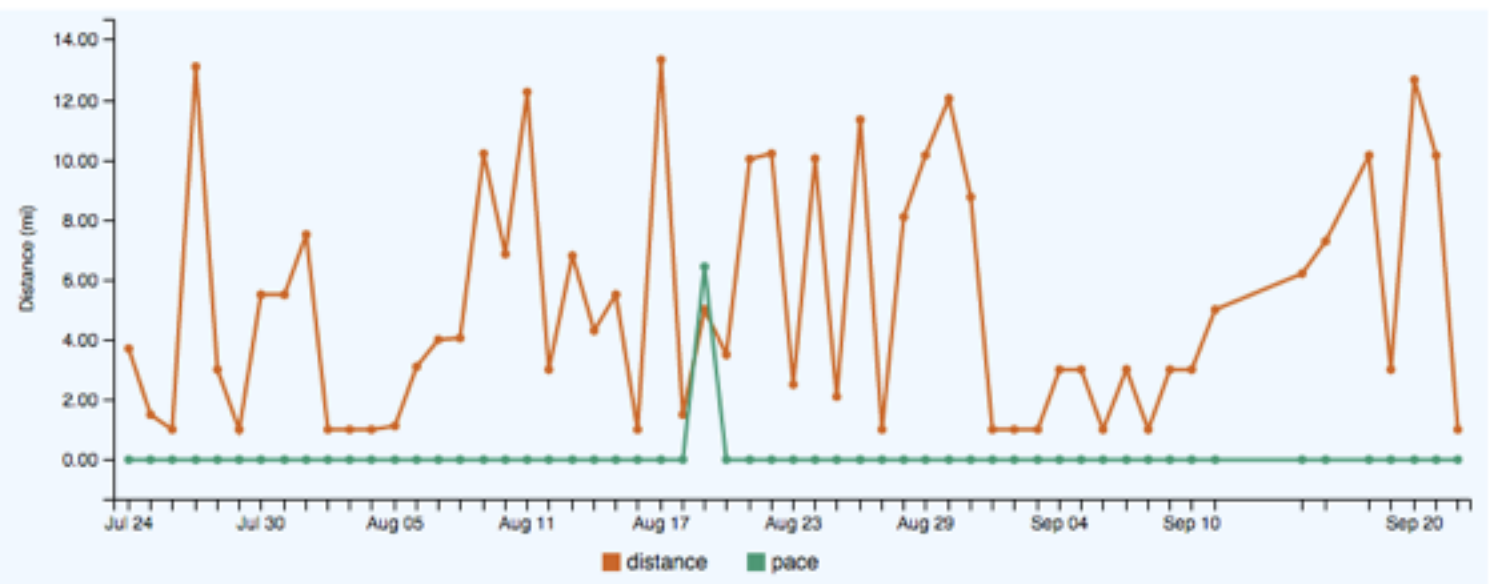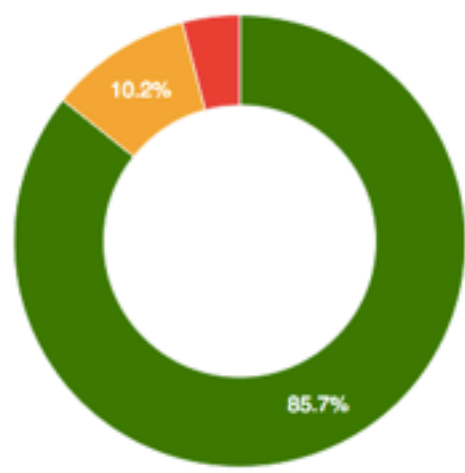
Activity Calendar

01	02	03	04	05	
08	09	10	11	12	
15	16	17	18	19	
22	23	24	25	26	27	28
29	30				

September-2014

Architecture Diagram

Technology Diagram

AngularJS-based Single Page Web Application
Twitter Bootstrap for Styling
D3.JS for Graphs

Thymeleaf views rendered by JAX-RS	REST Services exposed using JAX-RS

JAVA EE Technologies

JAX-RS	Interceptors	JPA with MySQL	Bean Validation
EJB	CDI Services for Redis AND MongoDB	CDI	Servlet

WildFly 8.1.0 FINAL

MySQL   Mongo   Redis

JDK 8

OpenShift
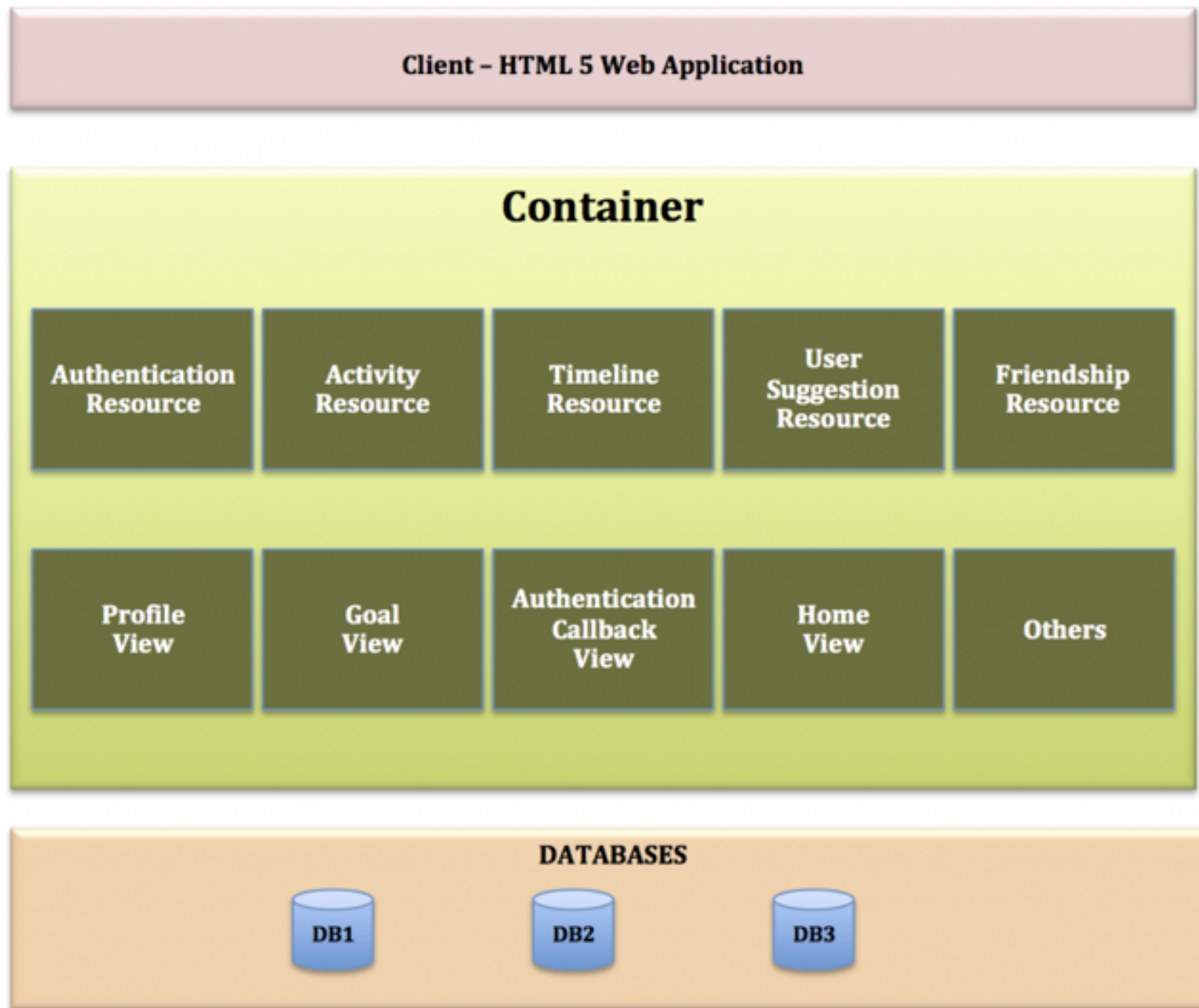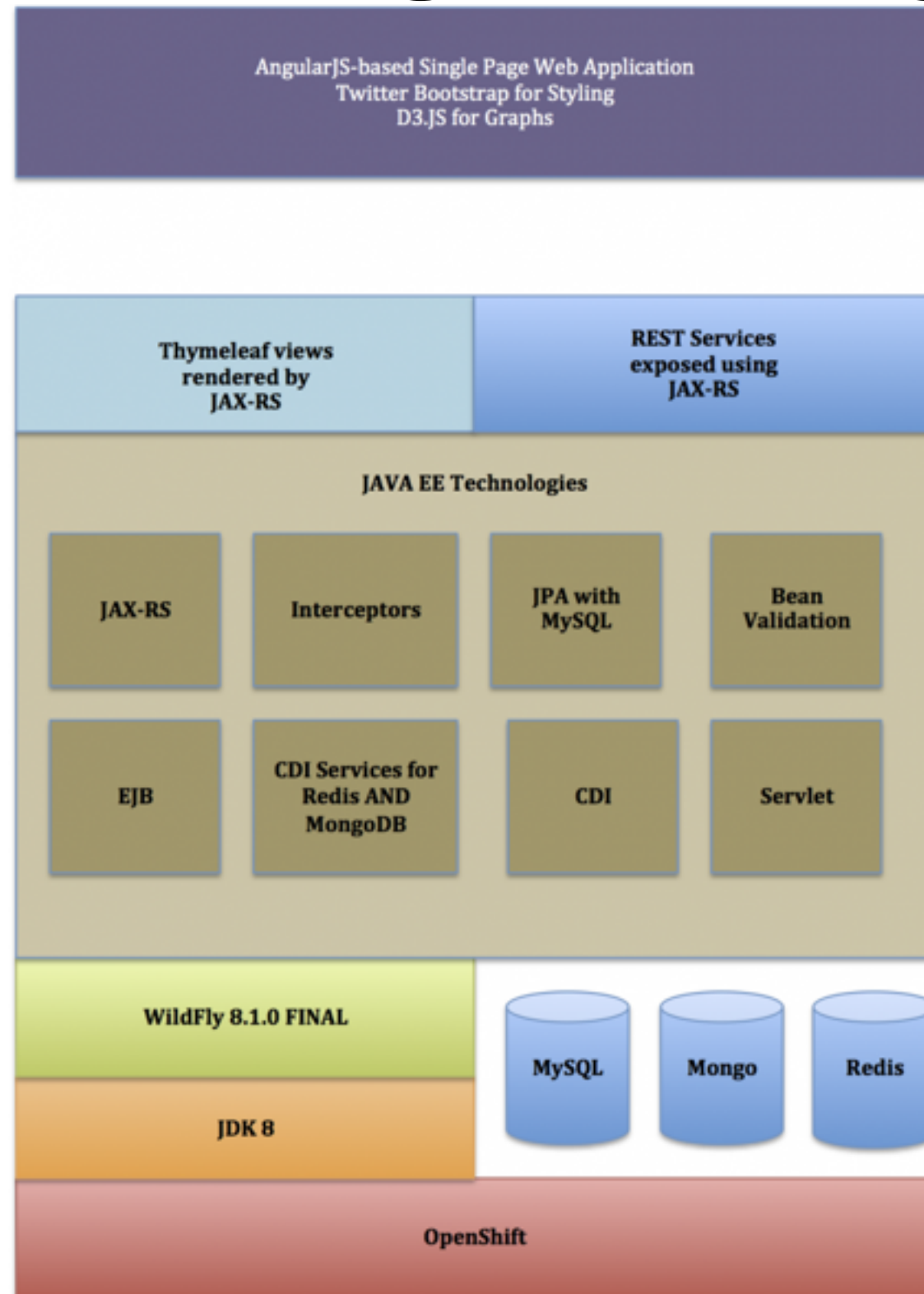
Technology

- User Interface

  - Thymeleaf HTML5 templates rendered by JAX-RS

  - AngularJS based multiple SPA, consuming JAX-RS endpoints

  - Twitter Bootstrap theme

  - Authentication using JAX-RS filters

  - D3.js and C3.js for pretty graphs

Technology

- Middleware

  - EJB + JPA services for RDBMS

  - CDI services for NoSQL datastores

  - Joda-Time API for working with Date

  - Authenticating with various OAuth providers like Twitter using respective client API. Planning to upgrade to Keycloak.

  - SFL4J with logback for logging

Additional Libraries

- Thymeleaf template engine for server side HTML5 views

- OAuth providers with client libraries

- Joda-Time for working with date/time

- jadira.usertype for storing date as UTC in database

- Database drivers for Redis and Mongo

- JUnit with Mockito for Unit testing

- Arquillian for integration testing

Runtime

- JDK 8

- WildFly 8.1.0 Final: 2 scalable instances running on OpenShift with HA Proxy Load Balancer

- Data Stores

  - MySQL - All business entities like Activity, Goal, User profile, etc.

  - Redis - Generate timeline data using *sorted sets* and storing all counters

  - MongoDB - Location based user recommendations, follower/following stored using in-built array types

Tools

- IntelliJ IDEA

- Git as version control

- Jenkins - planned for CI and deployment

Wish list for Java EE 8

- Support for NoSQL database

- Easy to add OAuth support to application and use existing OAuth providers

- Modern MVC framework with support for pluggable template engines
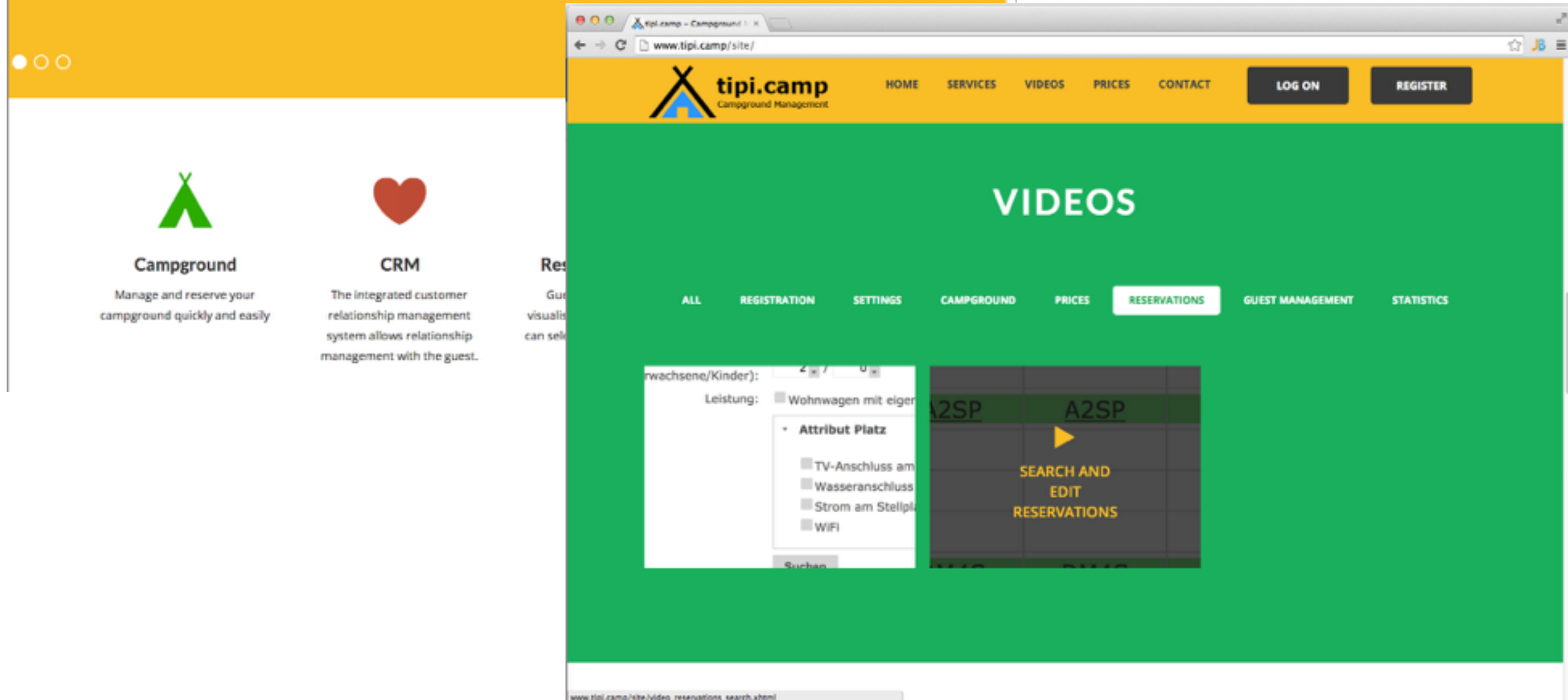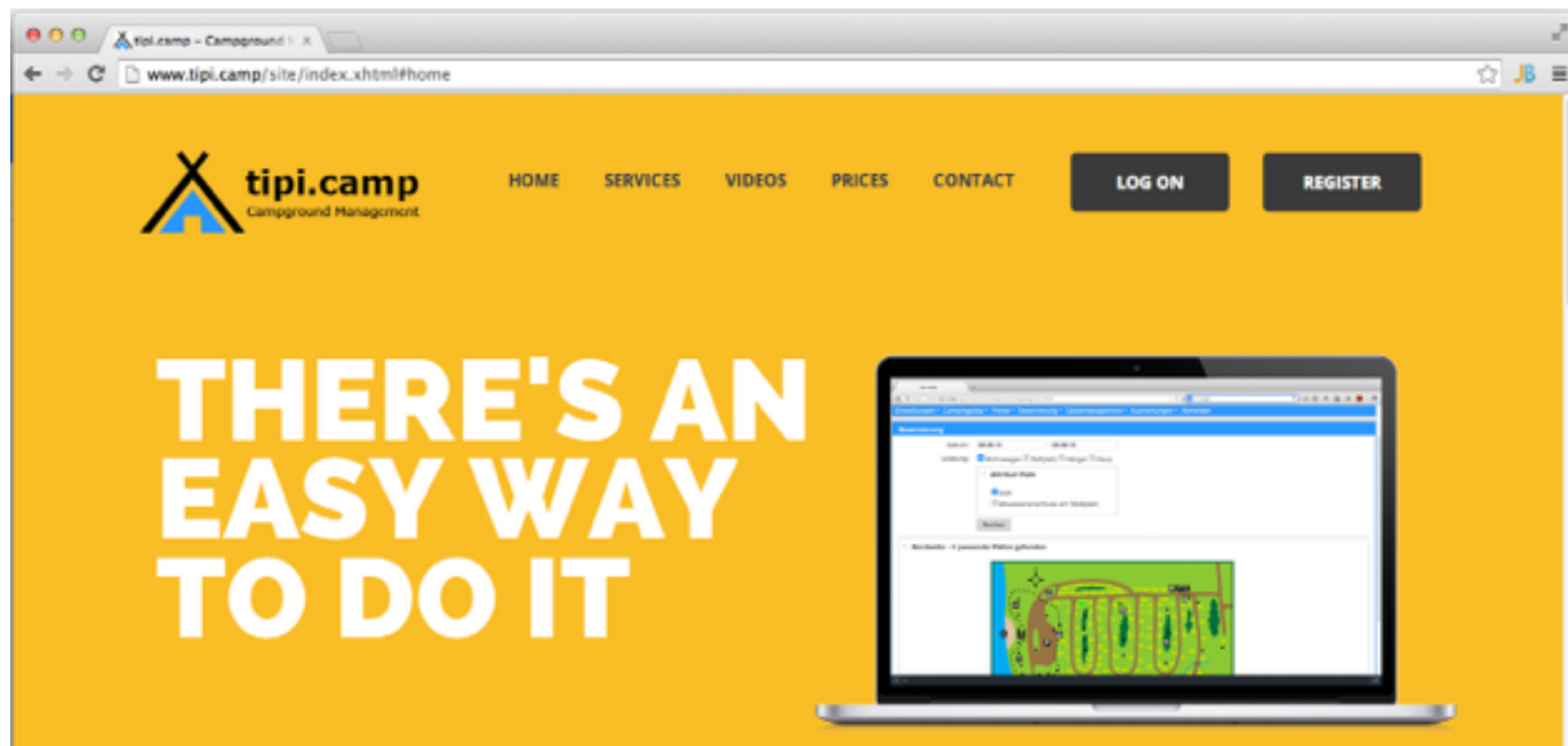
Acknowledgments

@shekhargulati

tipi.camp

- Campground management

  - Reservations, portal, email, monitoring, …

  - Targeting 25k+ campgrounds in Europe

- Customer-friendly booking portal

- On-premise or SaaS

- €1 or $1 / day

Browser 1 — www.tipi.camp/site/index.xhtml#home

tipi.camp
Campground Management

HOME   SERVICES   VIDEOS   PRICES   CONTACT

LOG ON   REGISTER

THERE'S AN EASY WAY TO DO IT

Campground
Manage and reserve your campground quickly and easily

CRM
The integrated customer relationship management system allows relationship management with the guest.

Res...
Gue...
visualis...
can sel...

Browser 2 — www.tipi.camp/site/

tipi.camp
Campground Management

HOME   SERVICES   VIDEOS   PRICES   CONTACT

LOG ON   REGISTER

VIDEOS

ALL   REGISTRATION   SETTINGS   CAMPGROUND   PRICES   **RESERVATIONS**   GUEST MANAGEMENT   STATISTICS

...rwachsene/Kinder): 2   0
Leistung: Wohnwagen mit eiger

- **Attribut Platz**
  - TV-Anschluss am
  - Wasseranschluss
  - Strom am Stellpl
  - WiFi

Suchen

A2SP   A2SP

▶

SEARCH AND EDIT RESERVATIONS

www.tipi.camp/site/video_reservations_search.xhtml

Sundown Camping | Home | Lage | Plätze | Buchen | Aktuelles | Ausstattung | Preise | Bilder | Karten | Impressum

Sundown Camping

Willkommen bei Sundown-Camping

Genießen Sie den 4 Sterne Terrassencampingplatz in Sunhill am Bergsee.

Online Buchen

Sundown Camping | Kontakt | Geokoordinaten

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tipi.camp
Campground Management

Warenkorb (0)

Einstellungen · Campingplatz · Preise · Reservierungen · Gäste · Auswertungen · Abmelden

Kalender

Datum: 30.06.14 – 11.07.14

Suchen

Südseite

	30.06.14	01.07.14	02.07.14	03.07.14	04.07.14	05.07.14	06.07.14	07.07.14	08.07.14	09.07.14	10.07.14	11.07.14
1												
2		A2SP	A2SP	A2SP	A2SP	A2SP	A2SP	A2SP	A2SP	A2SP	A2SP	A2SP
2												
23												
3				W54A	W54A	W54A	W54A	W54A	W54A	W54A		
4	NR97	NR97	NR97	NR97	NR97							
47	XJQF	XJQF	XJQF	XJQF	XJQF	XJQF	XJQF	XJQF	XJQF			
71												
82	3W49	3W49	3W49							3W49		
Haus 85												

47

ID:	XJQF
Erstellt:	27.06.14 19:32 - Sarah - Intranet
Datum:	28.06.14 - 09.07.14
Platz:	47
Leistung:	Zeltplatz
Gast:	Mike Hellriegl
Autokennzeichen:	

Sundown Camping | Home | Lage | Plätze | Buchen | Aktuelles | Ausstattung | Preise | Bilder | Karten | Impressum

Buchen

Datum Anreise: 21.08.2014
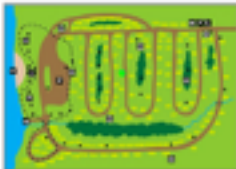Datum Abreise: 31.08.2014
Erwachsene: 2
Kinder: 0

Suchen

Stellplatz 33
Zeltplatz
Zeltplatz für 175,00 EUR Buchen

Stellplatz 9
Zeltplatz
Zeltplatz für 175,00 EUR Buchen

Sundown Camping | Kontakt | Geokoordinaten

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tipi.camp
Campground Management

Warenkorb (1)

Einstellungen · Campingplatz · Preise · Reservierungen · Gäste · Auswertungen · Abmelden

Warenkorb

▸ Reservierung

▾ 47 - Zeltplatz

Aus Warenkorb Entfernen

Anzahl Erwachsene: 2
Anzahl Kinder: 0

Name	Verwenden	Anzahl	Datum	Handp	Preis EUR	Total EUR
Kurtaxe	☑		18.07.14 - 22.07.14		2,00	8,00
Firewood	☑	2	18.07.14 - 22.07.14	☑	4,00	8,00
Grundpreis	☑		18.07.14 - 22.07.14		20,00	80,00
						96,00

▾ Gast

Gast: h

Klaus	Huber	Wien	klaus.huber@example.com
Mike	Hellriegl	Innsbruck	mike@h-e-l-l.at
Harald	Koblenzer	Hamburg	harald.d@google-mail.com
Hubert	Schmid	Zürich	schmid@schweiz-mail.ch
John	Miller	San Francisco	miller-jonny@googlemail.com

Anrede:
Vorname:
Nachname: Schmid

Architecture Diagram

Technology Diagram

tipi.camp			
JSF with Primefaces 5			
CDI Beans as @ViewScoped	Webhooks for Sendgrid and Paypal as @Servlet	RESTful Resources as @Path, …	
Business Boundaries as @Stateles EJB's Modules in the Entity-Control-Boundary Pattern			

Java/EE Platform

Used EE Technologies	JSF	JAX-RS	EL
JAAS with JDBC-Realm	Servlet	JSON	Concurrency
CDI	EJB	Bean Validation	JPA with MySQL

JDK 8

Linux with Apache httpd
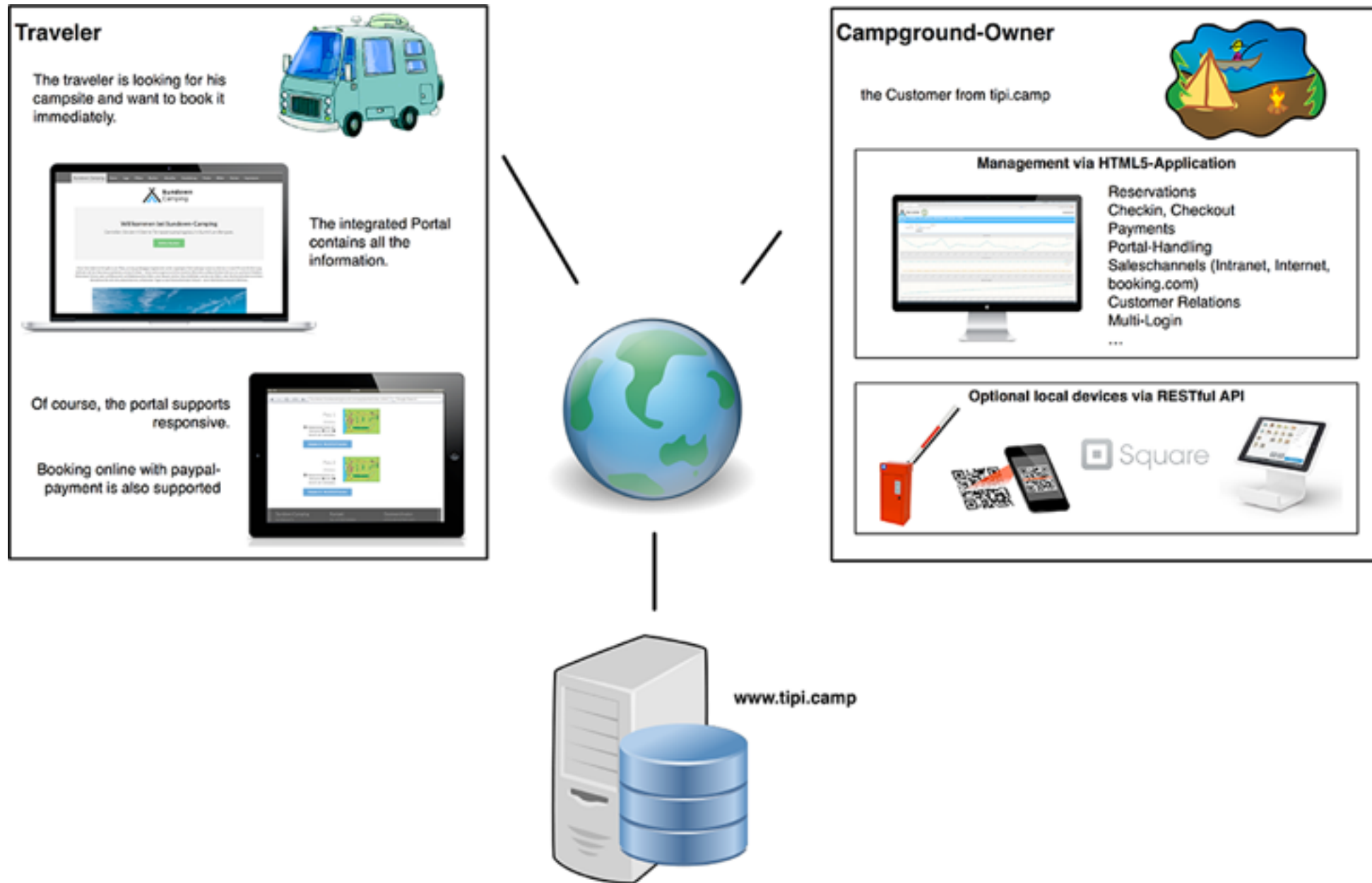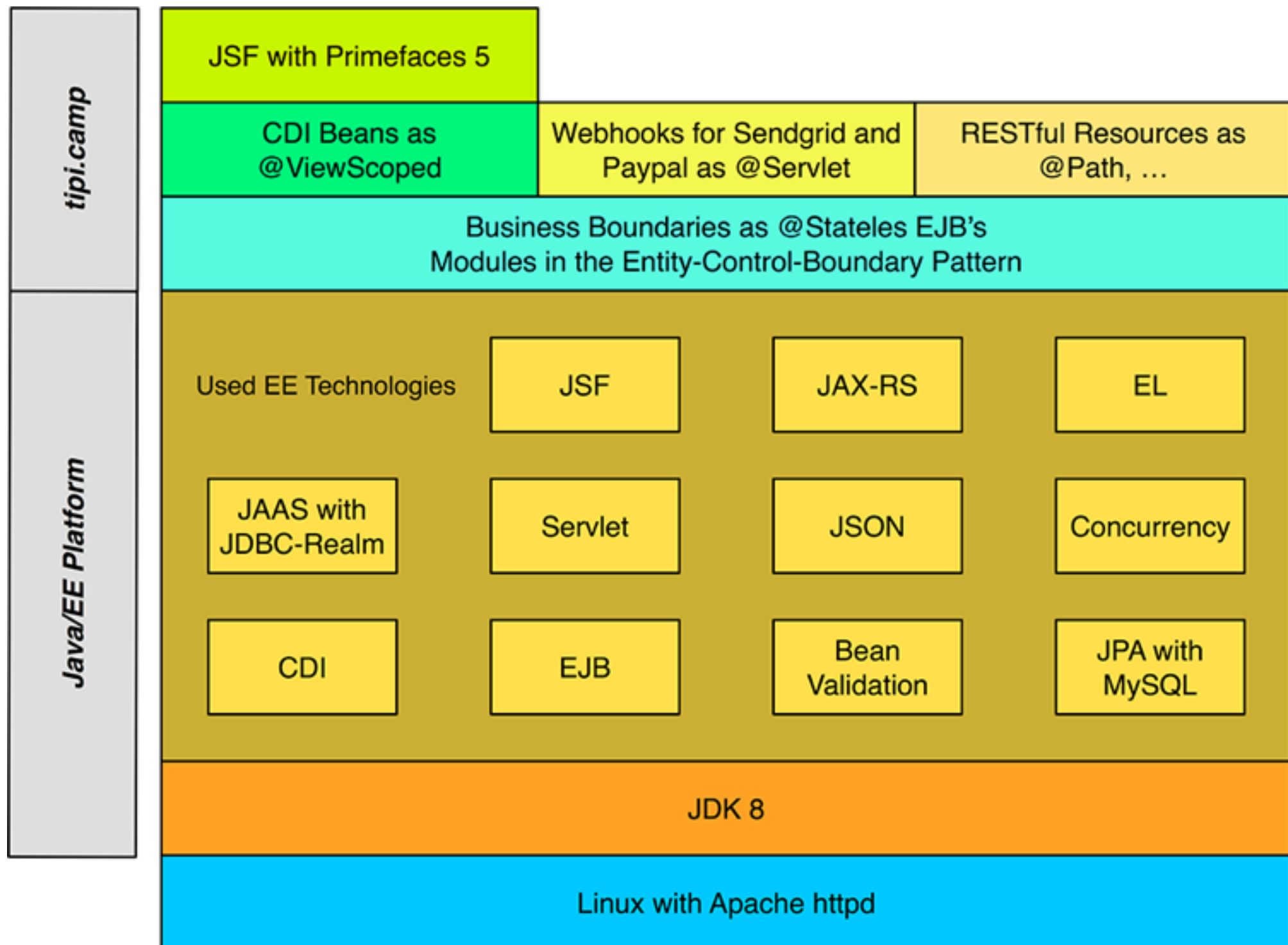
Technology

- Presentation

  - JavaServer Faces + Expression Language

  - Security: JAAS principal + JDBC-realm

- Middle Tier

  - EJB for business boundaries

  - Servlets with JSON for web hooks: response from Paypal and Sendgrid

  - JAX-RS for exposing API to partners

Technology

- Backend

  - JPA + Bean Validation, use `@Index` for database generation

  - Concurrency: Calculation of statistics and sending messages (Using `@Startup @Singleton @Schedule`, Sendgrid takes ~1-4 seconds)

- JDK-8 specific features: Lambdas, parallel streams, Date/Time API

General Principles

- All components used with `@Inject`

  - `bean-discovery-mode="all"`

- All named beans are JSF 2.2 `@ViewScoped`

- All boundaries are only `@Stateless`, no `@Remote` or `@Local` interfaces

- All modules in *entity-control-boundary* pattern

Entity-Control-Boundary Pattern

package camp.tipi.business.messenger

Module „Messenger"

package
camp.tipi.business.messenger.boundary

package
camp.tipi.business.messenger.control

package
camp.tipi.business.messenger.entity

MessengerBoundary.java (@Stateless)

public sendMail(…) - public sendFax(….) - public sendSms(…)

MailMessengerControl.java

public send(..)
private prepareHtml(..)
private connectSMTP(..)
..

FaxMessengerControl.java

public send(..)
private renderDocument(..)
privater connectFaxServer(..)
..

SmsMessengerControl.java

public send(..)
private createMessage(..)
privater connectPhone(..)
..

MailMessage.java
(@Entity)

FaxMessage.java
(@Entity)

SmsMessage.java
(@Entity)

MessageState.java
(@Entity)

MessengerSettings.java (@Entity)

Additional Libraries

- PrimeFaces5 and Bootstrap for the responsive portal

- Sendgrid API for sending emails

- Flyway for database migrations

- Misc Apache Commons (`FileUtils.writeByteArrayToFile`, `IOUtils.toByteArray`)

- JUnit with Derby for testing

Runtime

- JDK 8

- WildFly 8.1.0 - *super, unique product*

- MySQL 5.1.73

Tools

- IntelliJ 13.1

- Jenkins

- loader.io for load testing

- Self-hosted Linux server in <u>hetzner.de</u> data center

  - Planning to migrate to OpenShift in 2015

Wishlist for Java EE 8

- Apache Commons Library

- Generics in Batch Processing

- `@Temporal` should work with `LocalDate` and `LocalDateTime`

*I have no great wishes, the **technology is perfect**. I'm with java/ee7 **very productive**, i'm and our customers are with java ee7 happy. With the technology, really **everything is possible**.*

Acknowledgments

@ChristophGapp

@AdamBien

Resources

- **Java EE 7 tutorial**: http://docs.oracle.com/javaee/7/tutorial/doc/home.htm

- **~200 code samples**: github.com/javaee-samples/javaee7-samples

- Lots of books