

22.03.2018

A microservice approach in the boundaries of a traditional enterprise environment

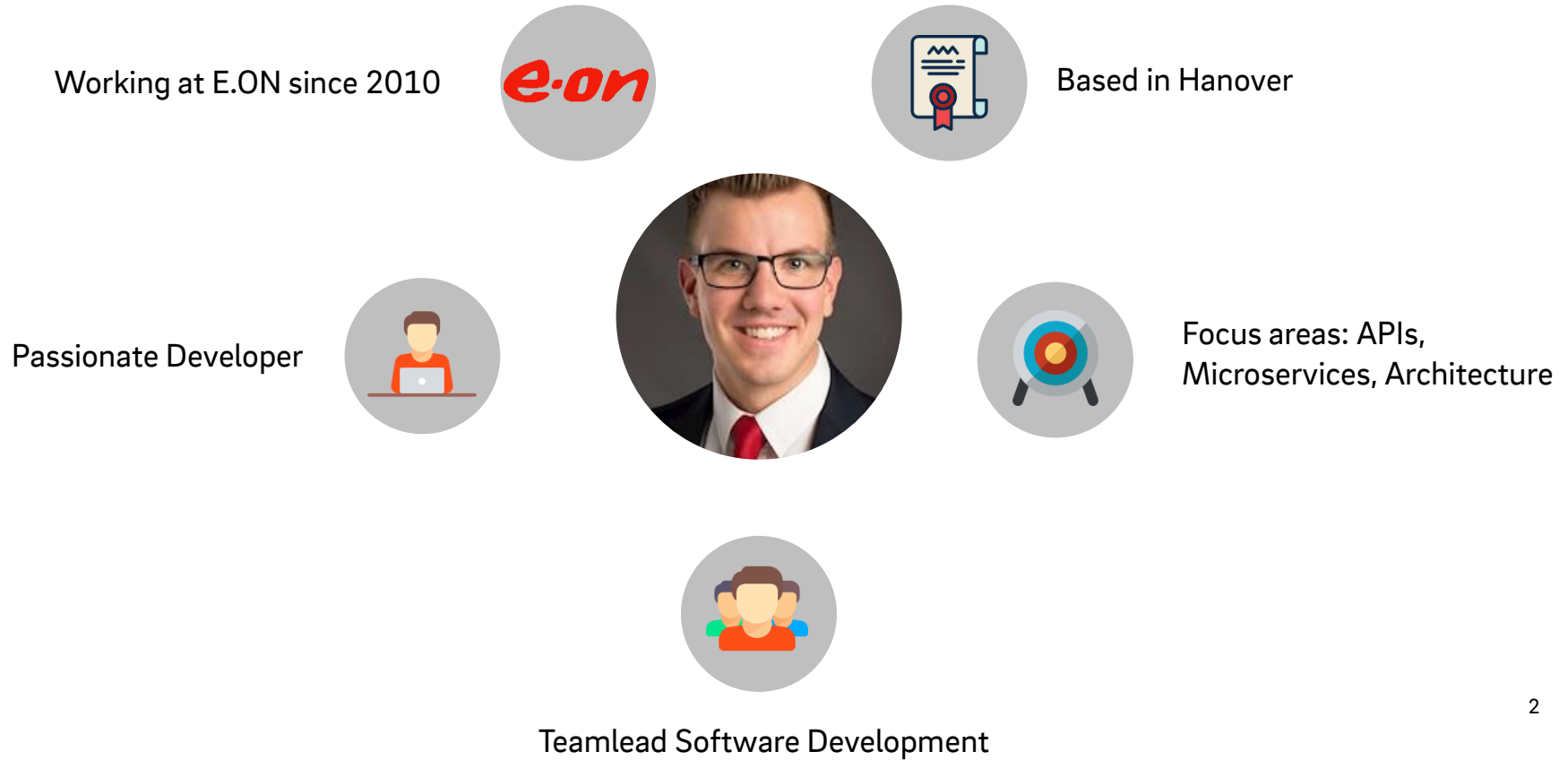
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Conference: microXchg 2018

Location: Berlin (Germany)



Who am I ?



Agenda

1

Constraints & Motivation for „Microservice Blueprint“

2

Details of „Microservice Blueprint“

3

Living Project Example

4

Summary

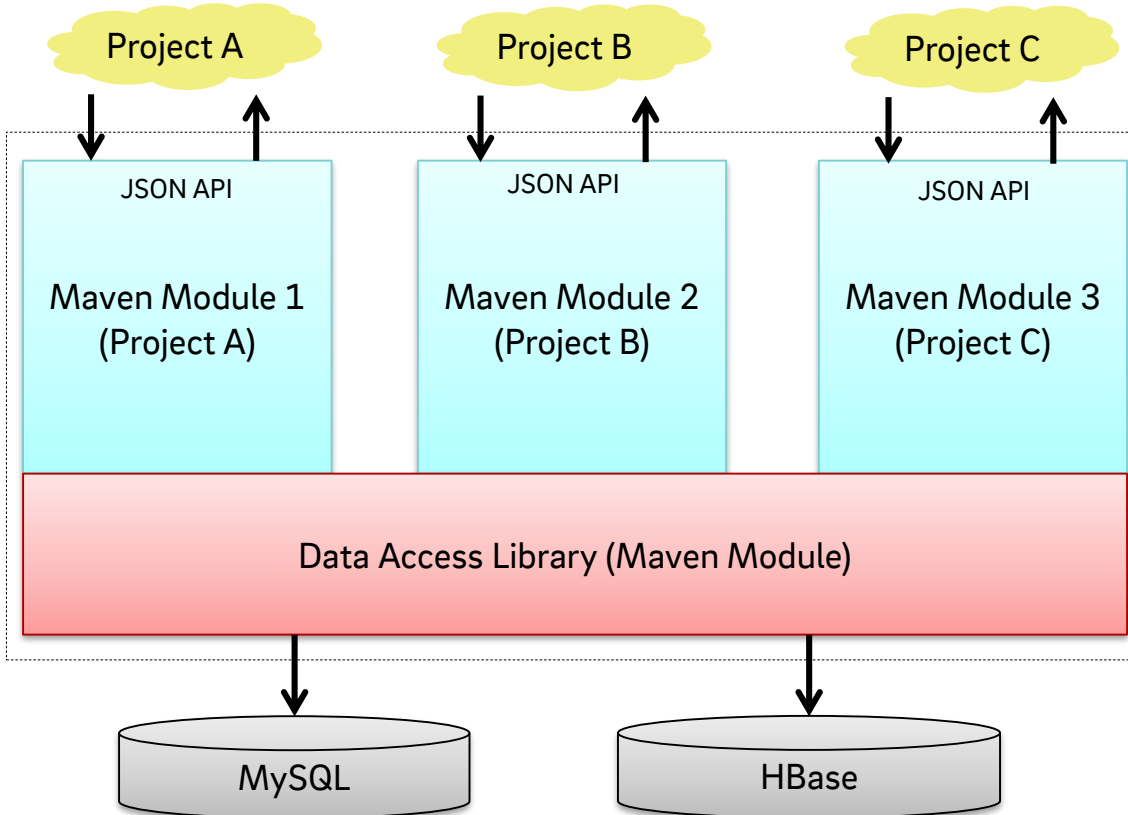
Constraints & Motivation for „Microservice Blueprint“

I was asked for a code review and found this ...

```
public interface ApplianceDAO {  
    @SqlQuery("select * from appliances where owner_id = :owner_id")  
    @Mapper(ApplianceMapper.class)  
    List<Appliance> findAllAppsofOwner(@Bind("owner_id") int owner_id);  
  
    //@SqlUpdate("CREATE TABLE IF NOT EXISTS appliances (id INT(11) NOT NULL AUTO_INCREMENT, name TINYTEXT NOT NULL, quantity TINYINT(3) UNSIGNED  
    @SqlUpdate("CREATE TABLE `appliances` (" +  
        "`id` INT(11) NOT NULL AUTO_INCREMENT," +  
        "`quantity` TINYINT(3) UNSIGNED ZEROFILL NOT NULL DEFAULT '000'," +  
        "`appliance_map_id` INT(11) NOT NULL," + "`name` TINYTEXT NULL," +  
        "`utc_ts` TIMESTAMP NOT NULL DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP," +  
        + "`owner_id` INT(11) NOT NULL," + "PRIMARY KEY (`id`)," +  
        "INDEX `FK1_owners` (`owner_id`)," +  
        "INDEX `FK2_appliance_map` (`appliance_map_id`)," +  
        "CONSTRAINT `FK1_owners` FOREIGN KEY (`owner_id`) REFERENCES `owners` (`id`) ON UPDATE CASCADE ON DELETE CASCADE," +  
        +  
        "CONSTRAINT `FK2_appliance_map` FOREIGN KEY (`appliance_map_id`) REFERENCES `appliance_map` (`id`) ON UPDATE CASCADE ON DELETE CASCADE" +  
        + ") COLLATE='utf8_general_ci' AUTO_INCREMENT=38")  
    int createTestTable();  
  
    @SqlUpdate("drop table appliances")  
    int dropTestTable();  
}
```

```
@Override  
public String toString() {  
    return "Device [id=" + id + ", device_id=" + device_id + ", type=" + type + ", user_defined_name=" +  
        + user_defined_name + ", uuid=" + uuid + ", last_upload=" + last_upload + ", last_event_fetch=" +  
        + last_event_fetch + ", owner=" + owner_id + ", is_NILM=" + is_NILM + ", is_registered=" + is_registered +  
        + ", uuid_bidgely=" + uuid_bidgely + ", capacity=" + capacity + ", direction=" + direction + ", angle=" +  
        + angle + ", withBattery=" + withBattery + ", withLoadManagement=" + withLoadManagement +  
        + ", installationDate=" + installationDate + ", meta=" + getMeta() + " ]";  
}
```

... with a „**Microservice Architecture**“ looking like that !



Constraints of E.ON

(in regards to Microservice considerations)

Market View

- Commodity energy prices for power and gas are under high pressure
- Need to develop innovative products leads to a lot of agile product development MVPs in different domains, like:
 - PV & Battery
 - E-Mobility
 - IoT/ Connected Home
 - Smart Metering

Organizational View

- Old view: Traditional enterprise company with IT as cost-driver
- New view: Product centric organization with IT at its heart
- This includes a number of challenges:
 - Many externals (incl. high fluctuation)
 - Cost-pressure on product dev.
 - Multiple disconnected initiatives
 - No central architecture governance

Motivation of „Microservice Blueprint“

Trigger 1

Problems in existing projects in regards to technical quality and maintainability

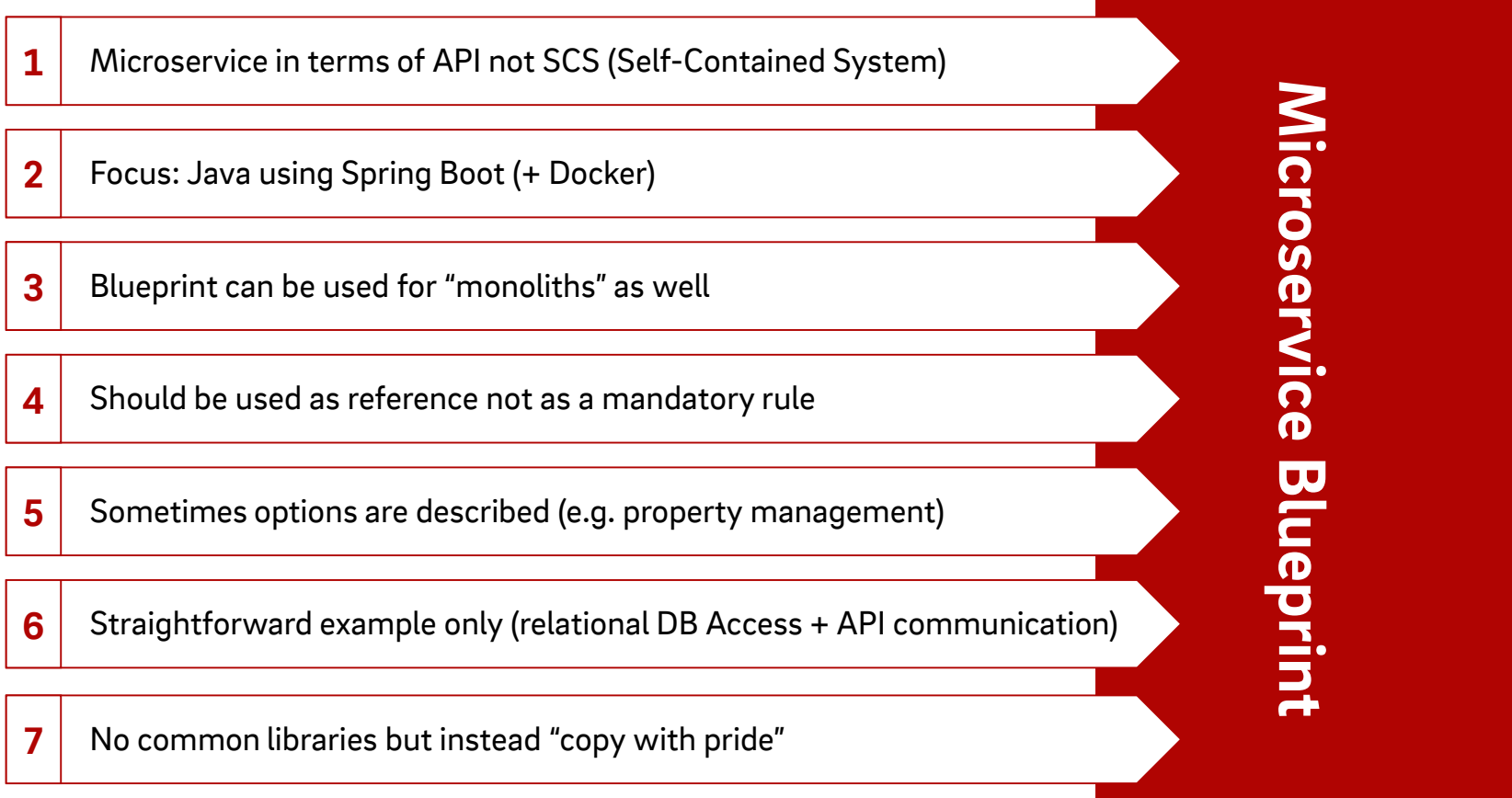
Trigger 2

Many starting projects have the same technical requirements of Microservices

Having a **well documented** and a **working reference implementation** for a **java-based Microservice/API development project** taking into account the **best practices** of the last projects

Details of „Microservice Blueprint“

General Remarks in regards to „Microservice Blueprint“

- 
- The diagram consists of seven horizontal white bars, each containing a numbered remark. Each bar has a red arrow pointing to the right, towards a large red vertical rectangle on the right side of the slide. This rectangle contains the text 'Microservice Blueprint' written vertically in white.
- 1 Microservice in terms of API not SCS (Self-Contained System)
 - 2 Focus: Java using Spring Boot (+ Docker)
 - 3 Blueprint can be used for “monoliths” as well
 - 4 Should be used as reference not as a mandatory rule
 - 5 Sometimes options are described (e.g. property management)
 - 6 Straightforward example only (relational DB Access + API communication)
 - 7 No common libraries but instead “copy with pride”

Topics covered by „Microservice Blueprint“

[Confluence Documentation](#)

General Development Environment

- Setup of IDE
- Setup Postman
- Naming Conventions
- GIT Naming & Branching Conventions
- Versioning and Releasing Conventions
- Setup Development Stage
- **CI/CD Setup**
- SonarQube Usage
- Splunk Monitoring & Questionnaire
- Docker Deployment

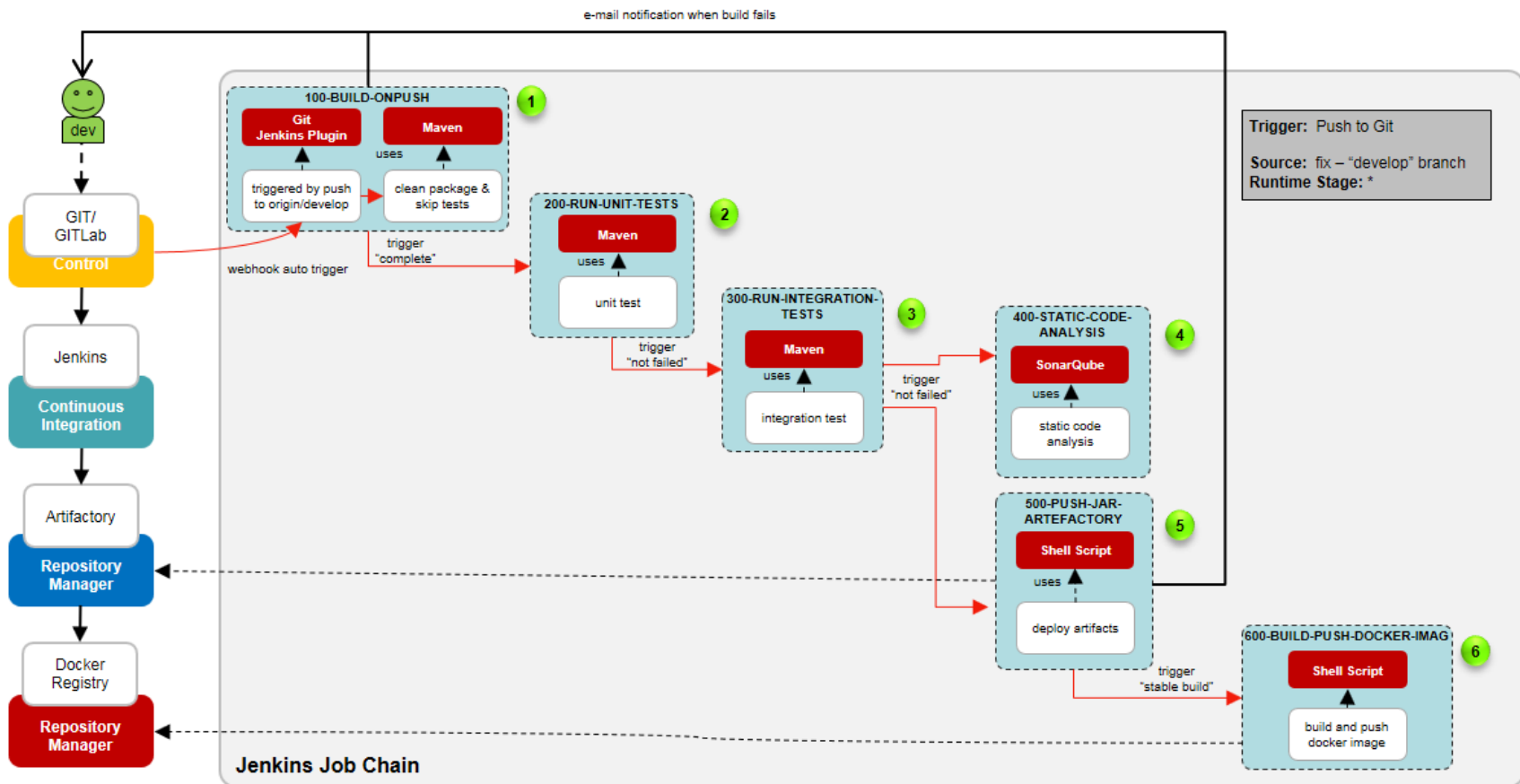
External Facing Considerations

- API Design & Principles
- API Documentation
- **Exception Handling for Clients**

Internal Facing Considerations

- **Layering & Project Structure**
- Profile & Property Management
- Internal Exception Handling
- Validation (JSR 303)
- Database Access (Spring Data)
- Logging Policy & Format
- Security / API Protection
- Admin Endpoints
- Testing Concept
- Coding Conventions
- REST API Communication
- Usage of HATEOAS

CI/CD - Jenkins



CI/CD – GitLab CI

esp-templates / cds-blueprint-api

passed Pipeline #21546 triggered 12 minutes ago by Bernhard Kern

CDS-380 refine cache and exclude dbseed from sonar

9 jobs from feature/CDS-380_gitlabci in 5 minutes 30 seconds (queued for 1 second)

8a965dbd

Pipeline Jobs 9

```
graph LR; Build[Build] --> Test[Test]; Test --> Publish[Publish]; Publish --> Deploy[Deploy]; Deploy --> Acceptance[Acceptance test];
```

Available 3 Stopped 0				
Environment	Deployment	Job	Commit	Updated
dev	#23 by	deploy dev #40865	40d21626 cds-351 adds wso2jwtvalidator tests	1 day ago Re-deploy
prod	#24 by	deploy prod #40867	40d21626 cds-351 adds wso2jwtvalidator tests	Re-deploy
qa	#25 by	deploy qa #40866	40d21626 cds-351 adds wso2jwtvalidator tests	1 day ago Re-deploy

Exception Handling

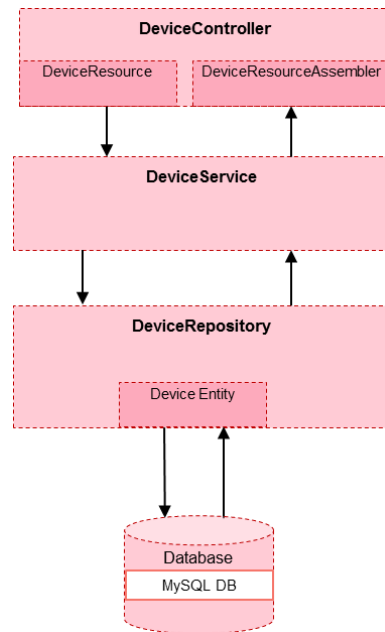
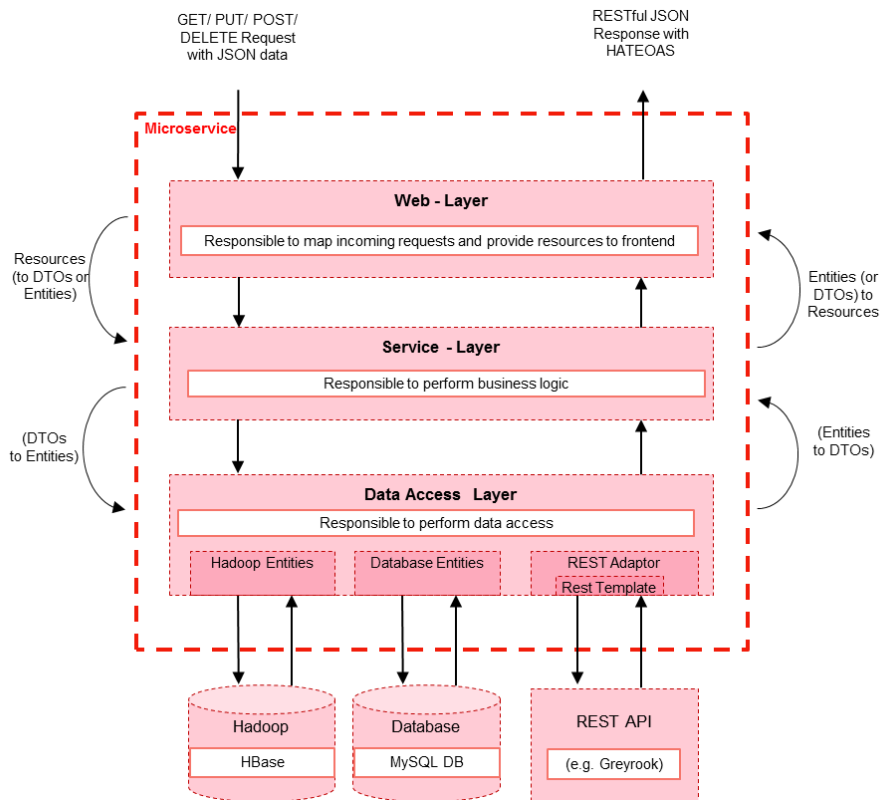
```
{
  "errors": [{
    "code": "ERROR_CODE_FOR_CLIENT_MESSAGE",
    "error-message": "some details"
    "parameters": [{
      "param1",
      "param2"
    }],
    "placeholders": [{
      "name": "the key",
      "type": "the type",
      "value": "the value"
    }]
  }]
}
```

```
{
  "errors": [{
    "code": "ERR_PRODUCT_CHANGE_NOT_ALLOWED",
    "error-message": "Product change not allowed"
    "placeholders": [{
      "name": "allowedProductChangeDate",
      "type": "date",
      "value": "01.05.2018"
    }]
  }]
}
```

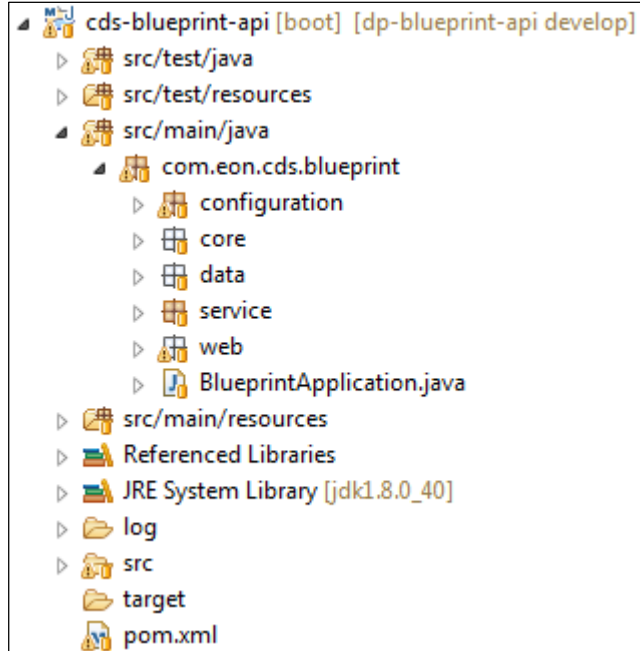
Error Conventions:

- **4xx** : „You did something wrong“ (e.g. missing parameter, wrong format of parameter, ...)
- **5xx** : „We did something wrong“ (e.g. database not available, other Microservice not reachable, ...)
- **Important:** All Microservices/ APIs needs to answer in the same structure!

Layering & Project Structure



Code Walkthrough

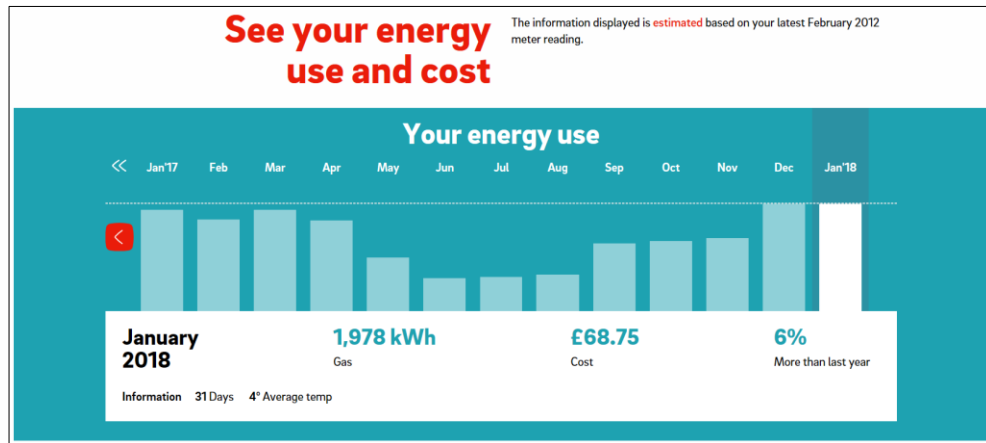


Lets jump into the IDE!

E.ON Saving Energy Tool

A living example

Functional Overview



Your energy cost

Compare your monthly costs

Oct'17 £72.44

Electricity £31.87

Gas £40.57

Sep'17 £70.10

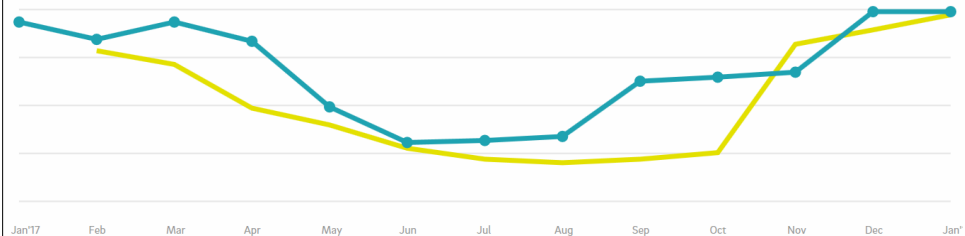
Electricity £30.84

Gas £39.26

How your energy use compares to 100 similar homes

→ What are similar homes?

You Similar homes



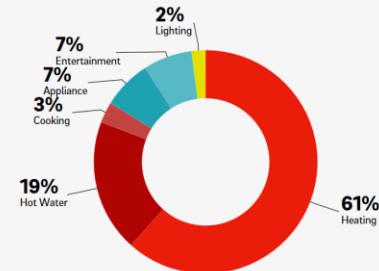
Energy breakdown for January

Here's a breakdown of your energy use based on what we know about your home.

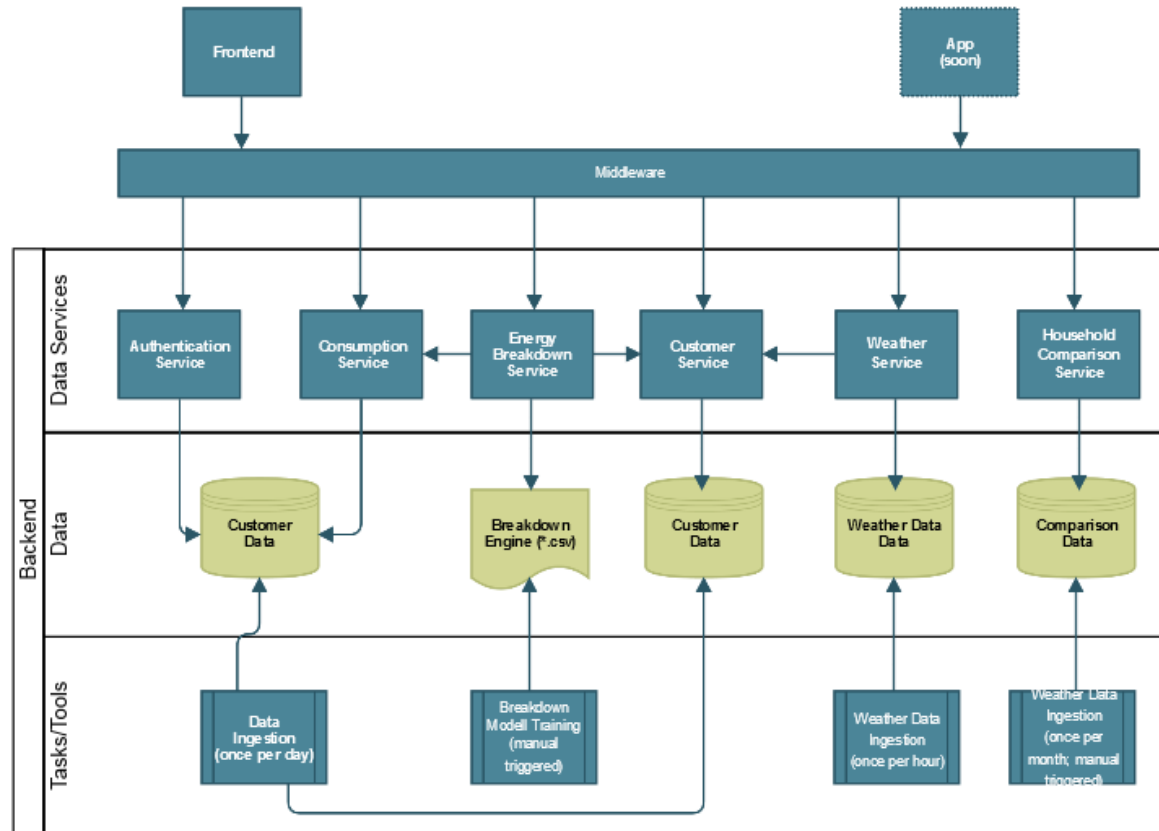
The more we know about your home, the more accurate your energy breakdown will be.

100% complete

[Tell us about your home](#)

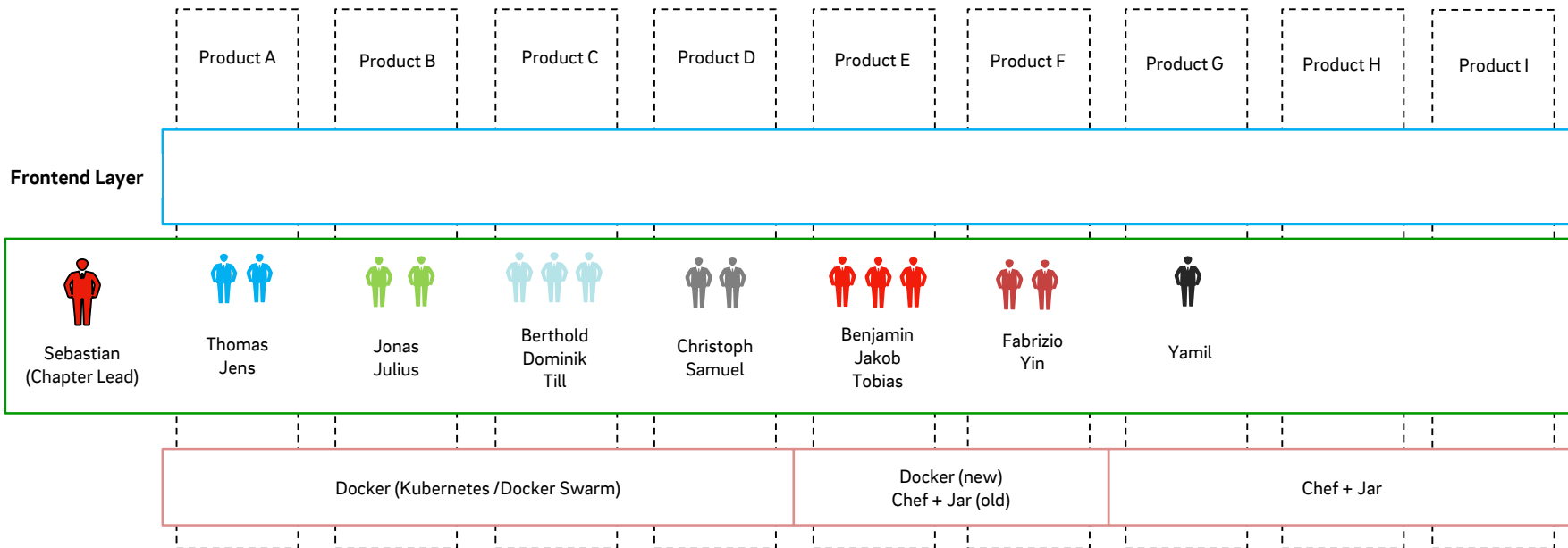


Architecture of Microservices



Data Service/ Middleware API Chapter

Real organization with anonymized names!



Summary

Summary

- 1 „Microservice Blueprint“ = reference implementation + documentation
- 2 Best Practices of blueprint has been a proven and used >10 projects
- 3 First living examples at E.ON available that use microservices
- 4 Challenge: Multiple small MVP developments rather than one „big“ product
- 5 Challenge: Stable internal teams (as too many externals)
- 6 Recommendation: Start with a monolith
- 7 Recommendation: Chapters are a good way to do knowledge transfer

Microservices @ E.ON

Questions ?

Thank you for your attention!

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The logo for e.on, featuring the text "e.on" in a bold, red, italicized sans-serif font. The "e" is lowercase and the "on" is lowercase, with a period separating them. The logo is positioned in the bottom right area of the slide, above the footer text.

e.on

BACKUP

Possible Blueprint Setup

