EAI War Stories

Praxisbeispiele zu EAI-Pattern und Lessons Learned

Alexander Heusingfeld, @goldstift
Martin Huber, @waterback

We take care of it - personally!

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EAI Pattern in 2013?

Nobody uses them anymore!

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That’s THE problem!

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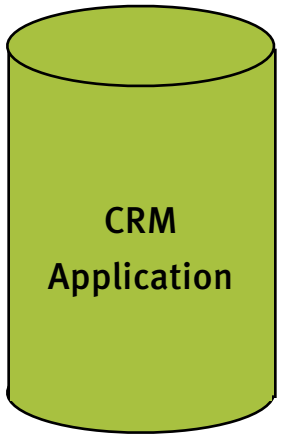
Integration is ubiquitous

Multitude of potential service consumers



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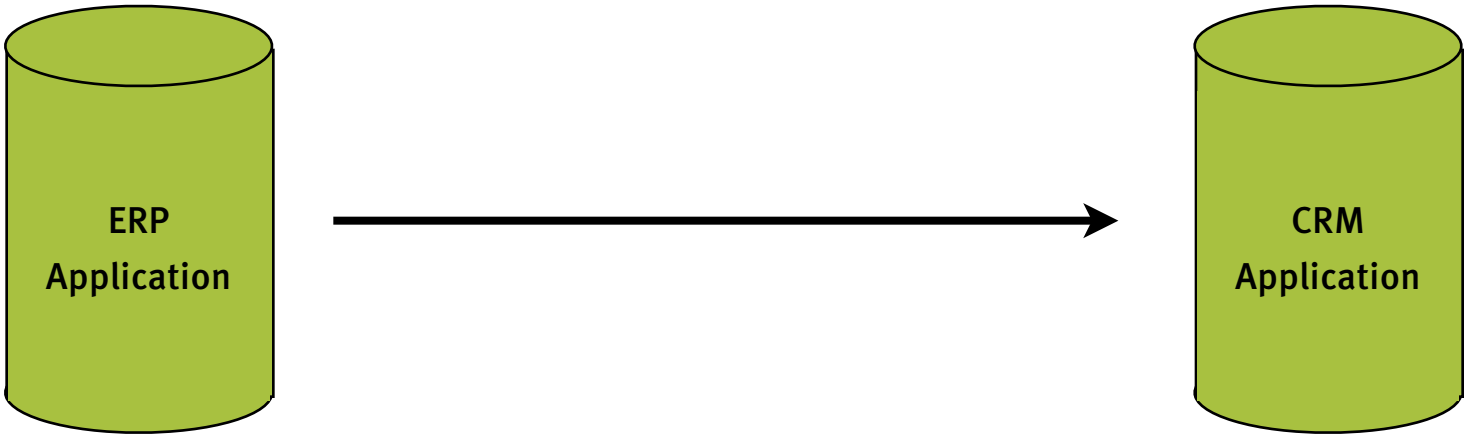

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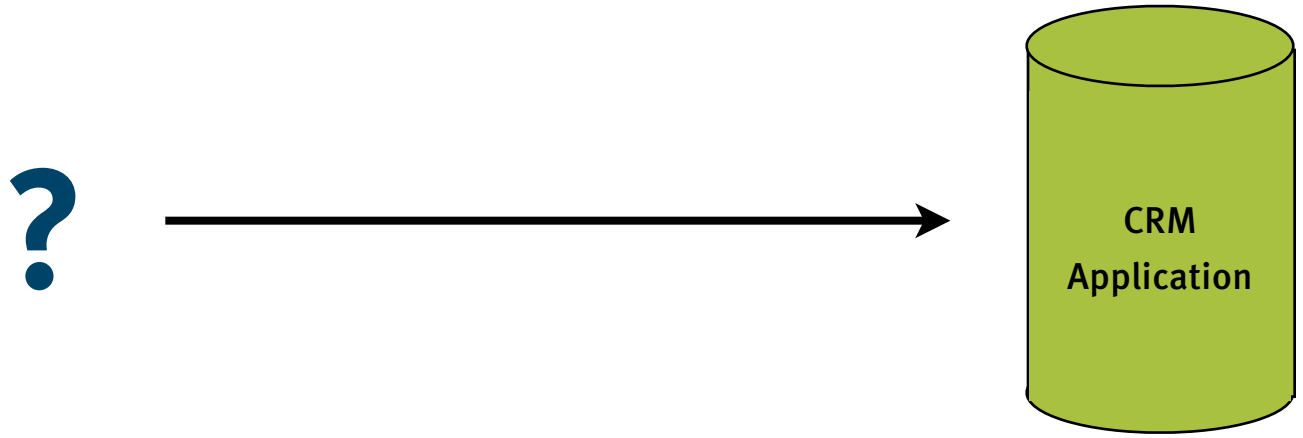

Integration is ubiquitous

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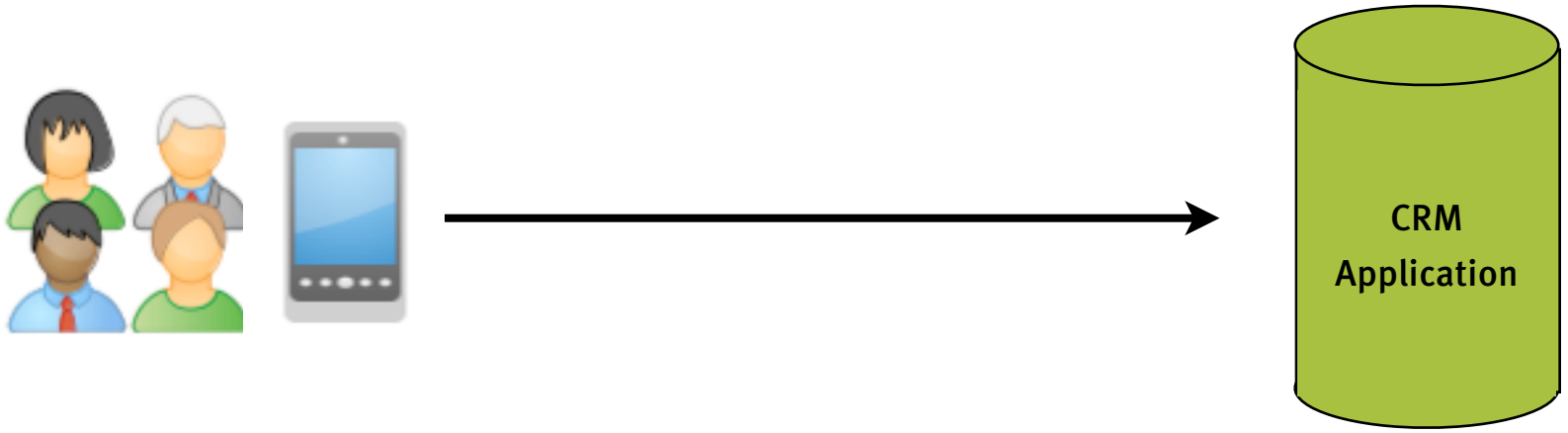

Integration Styles

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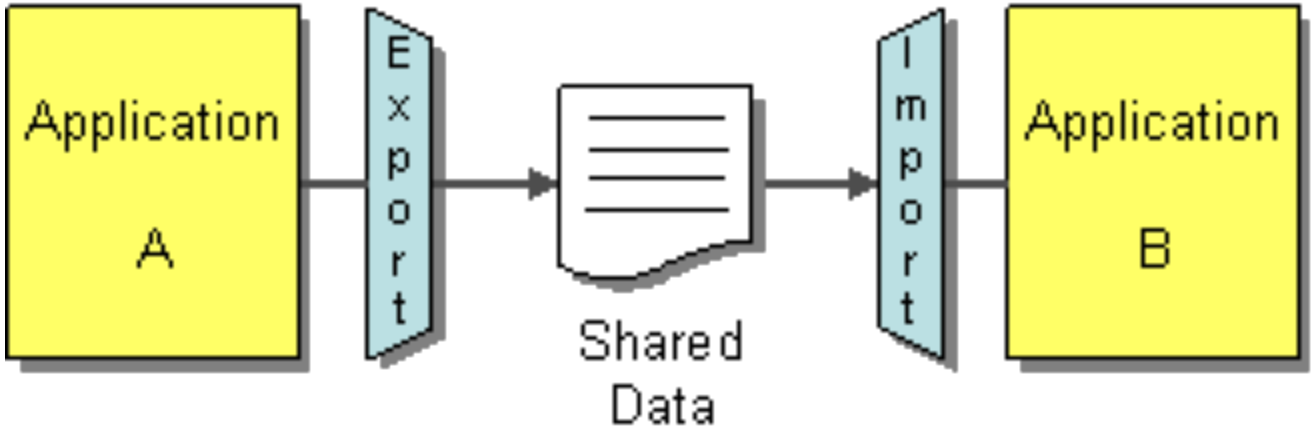
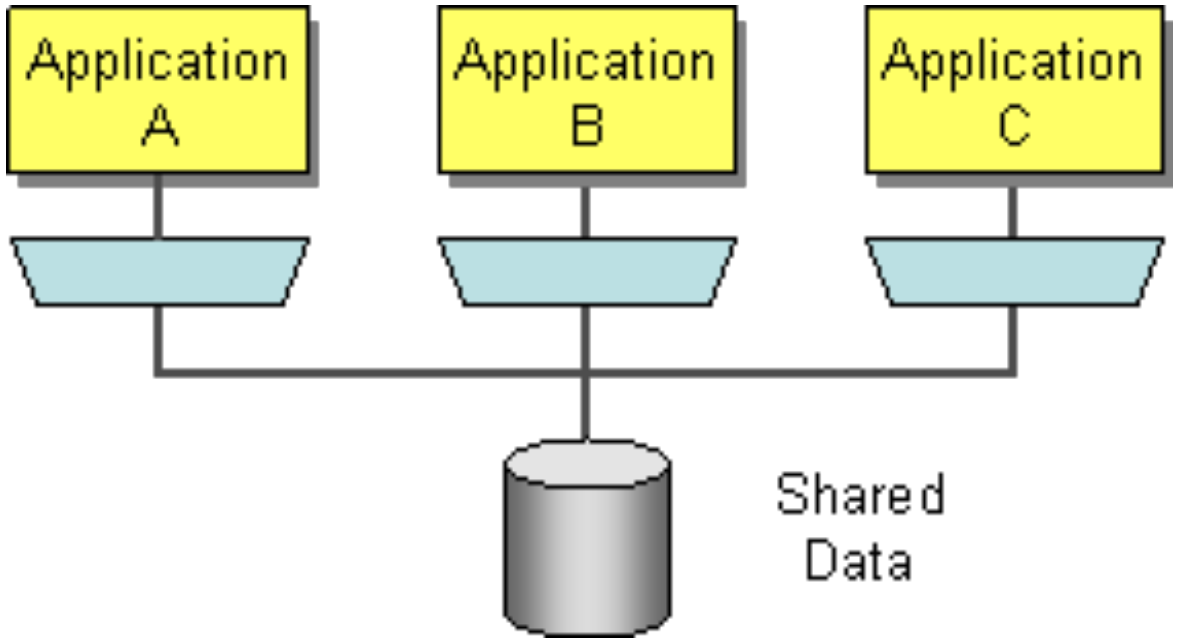
File Transfer

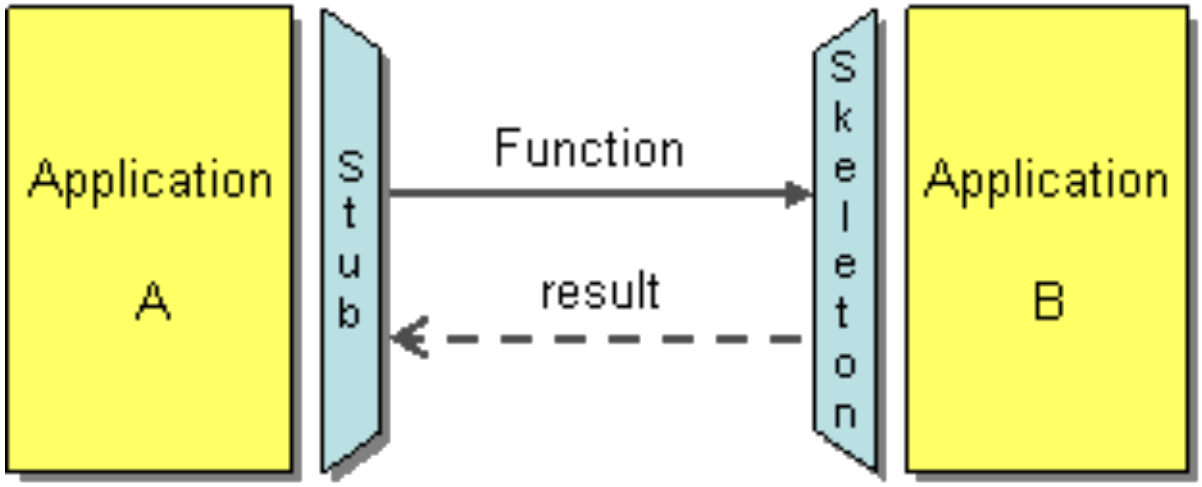


Shared Database

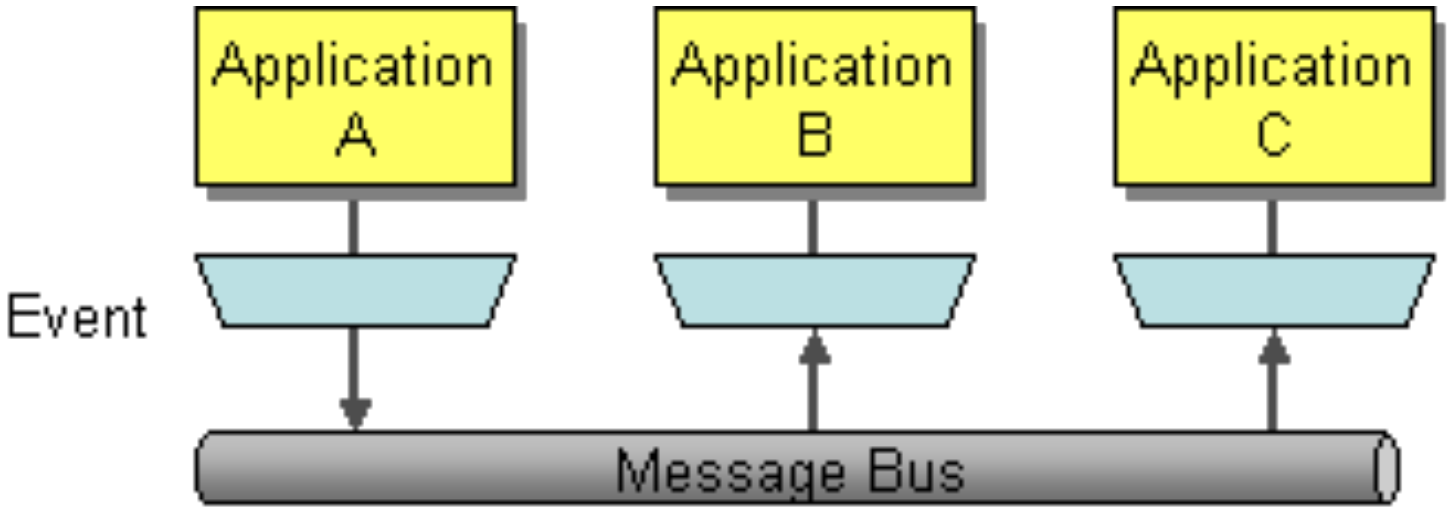


http://www.eaipatterns.com/SharedDataBaseIntegration.h

Remote Procedure Invocation

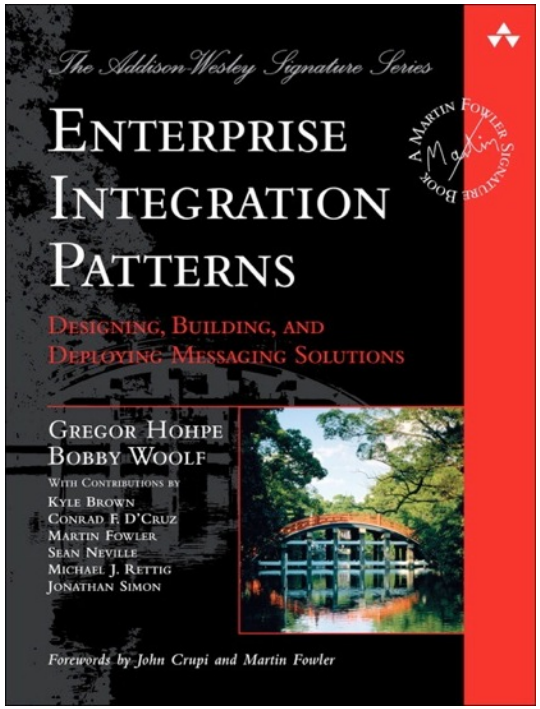


Messaging




http://bit.ly/PtrhWy
REICHSPOST
Deutsche Post
BRIEFKASTEN
Variationen
eines
Klassikers
DEUTSCHE
Messaging?

Searching for a book?



Enterprise Integration Patterns

(Hohpe & Woolf), 2003

www.eaipatterns.com

Swiss-army knife for asynchronous messaging

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Theories in practice

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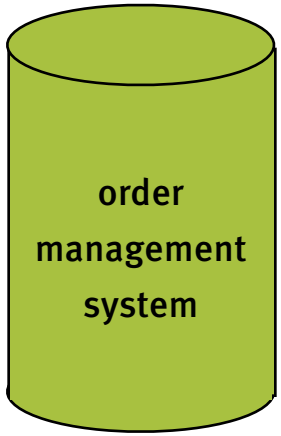
Real Life Scenario

Simple order management system (CRUD)



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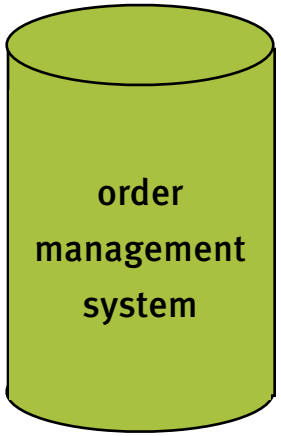
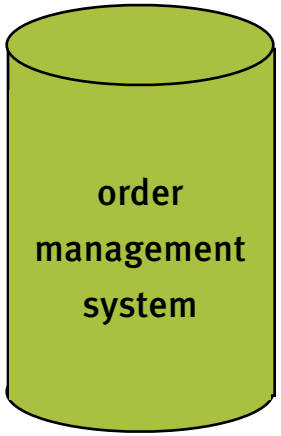
Simple ChangeRequest



Simple ChangeRequest

We need an importer!



A Java EE servlet to the rescue

```
@WebServlet(urlPatterns = {"/order/import"})
public class ImporterServlet extends HttpServlet {

    @Inject OrderBean bean;
    @Inject CsvDataParser parser;

    @Override
    protected void doPost(HttpServletRequest request,
            HttpServletResponse response)
            throws ServletException, IOException {
        String data = request.getParameter("csvdata");
        List<Order> orders = parser.transform(data);
        for (Order order : orders) {
            bean.persist(order);
        }
    }
}
```

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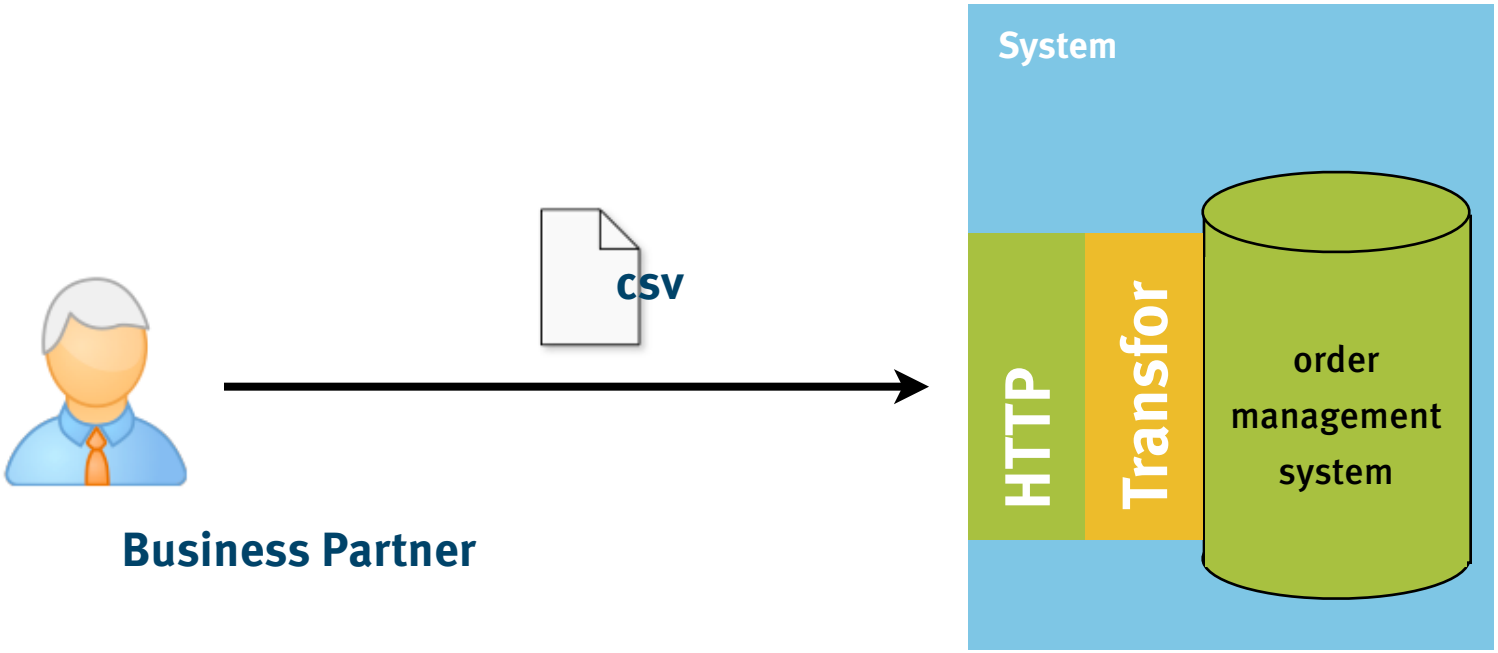
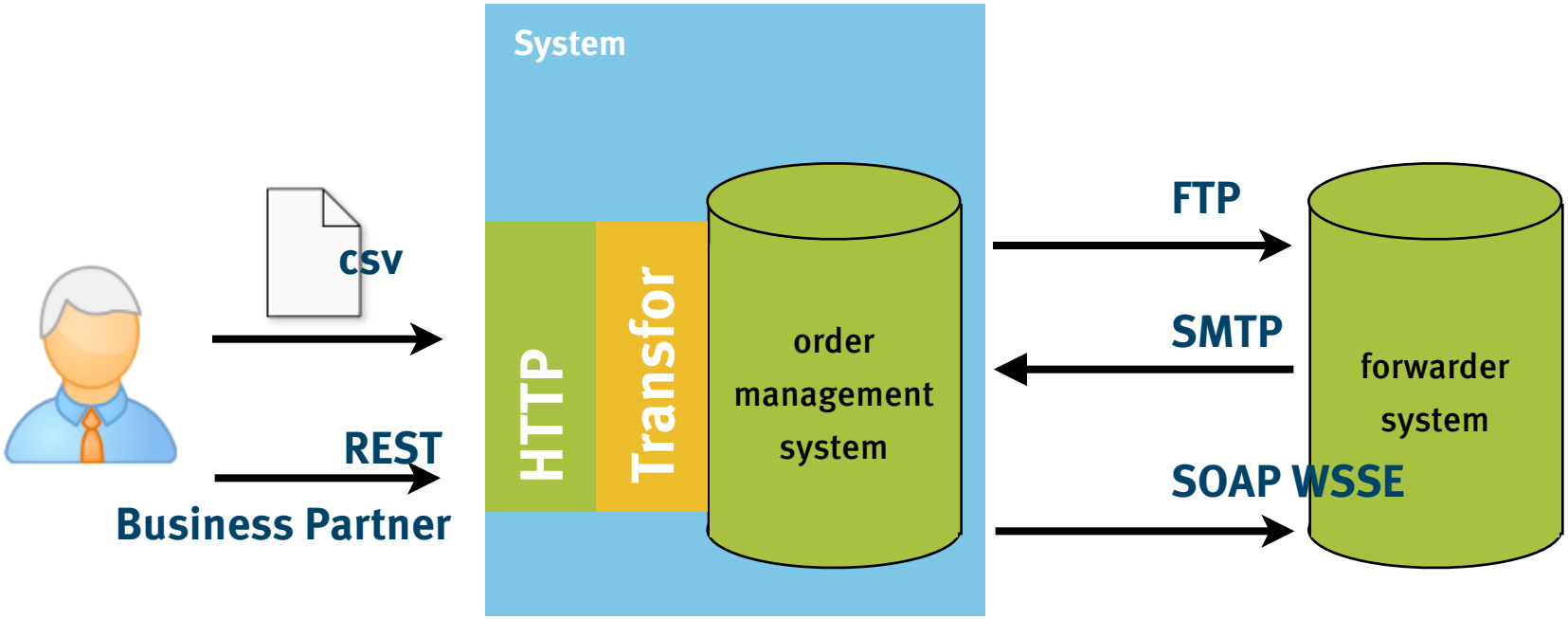
Simple Change done



Change happens

Integrate the system of a forwarder



What are the lessons learned?

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Recognize an integration task

when it‘s staring in your face?


http://www.flickr.com/photos/wespionage/184793114
EASY!

Build an easy and maintainable solution

for multiple integration challenges?

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http://www.flickr.com/ph
NO PROBLEM!

Any help in the toolbox?

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ADAPTERS?

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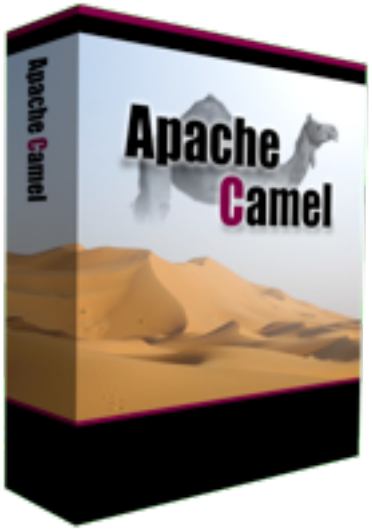
EAI Frameworks



Apache Camel

Spring Integration

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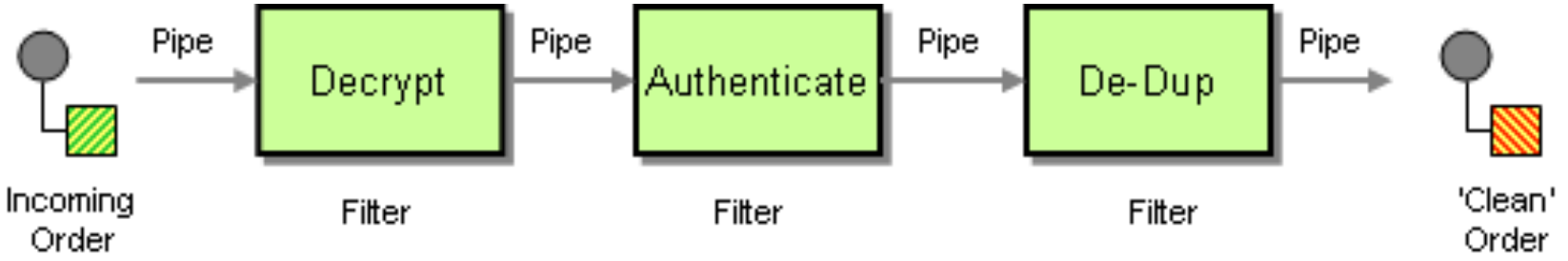
Pipes and Filters

divide your task into small steps



Camel-XML with Spring

```
<beans>
…
   <CamelContext id="mycoolCamelContext">
      <route>
         <from uri="file://Users/martinh/temp/sample1"/>
         <bean ref="orderTransform" method="transformOrder"/>
         <bean ref="orderCheckBean" method="validateOrder"/>
         <to uri="jms:queue:order.process"/>
      </route>
    </CamelContext>

    <bean id="orderTransform" class="con.innoq.sample.OrderTransform">
        <property name="company" value="acme" />
    </bean>

    <bean id="orderCheckBean" class="con.innoq.sample.OrderCheck">
    </bean>
</beans>
```

Camel fluent API in Java

```
public class PipelineExample extends RouteBuilder {

    @Override
    public void configure() throws Exception {
        from("file://Users/martinh/temp/sample1")
            .to("bean:orderTransform?method=transformOrder")
            .to("bean:orderCheckBean?method=validateOrder")
            .to("jms:queue:order.process");
    }
}
```

Pipes & Filters

```
public class PipesFiltersExample extends RouteBuilder {

    @Override
    public void configure() throws Exception {
        from("jms:queue:order.in?maxConcurrentConsumers=5")
            .to("bean:decryptBean")
            .to("seda:authenticate");

        from("seda:authenticate")
            .process(new AuthenticationProcessor())
            .to("seda:dedup");

        from("seda:dedup")
            .process(new DeDupProcessor()
            .to("jms:queue:order.processfurther");

    }
}
```

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Pipes & Filters

```
from("seda:authenticate")
    .process(new AuthenticationProcessor())
    .to("seda:dedup");
```

```
public class AuthenticationProcessor implements Processor {
    @Override
    public void process(Exchange exchange) throws Exception {
          MyOrder order = (MyOrder)exchange.getIn().getBody();
          String type = exchange.getIn().getHeader("orderType");
    }
}
```

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All you need are the right tools for the job?

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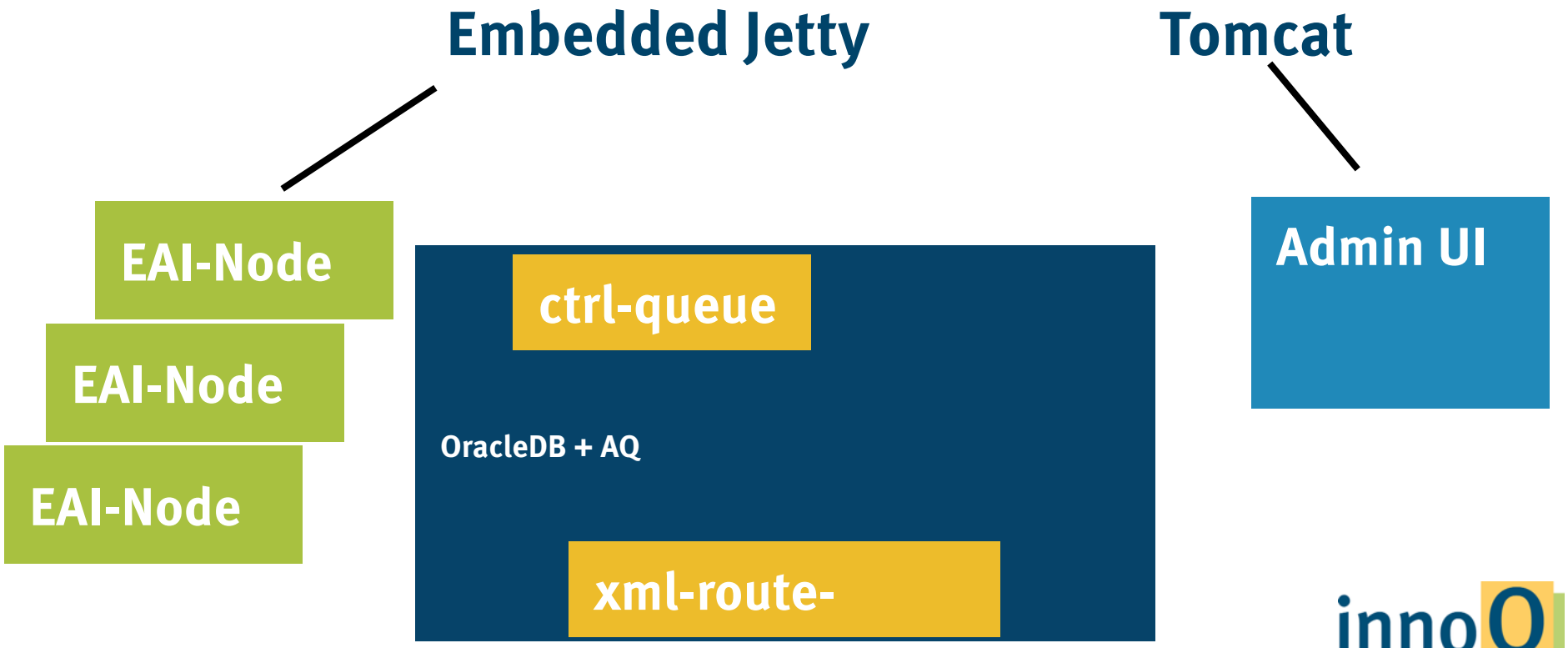
http://www.flickr.com/ph

ALMOST

Real-life scenario: Control Bus

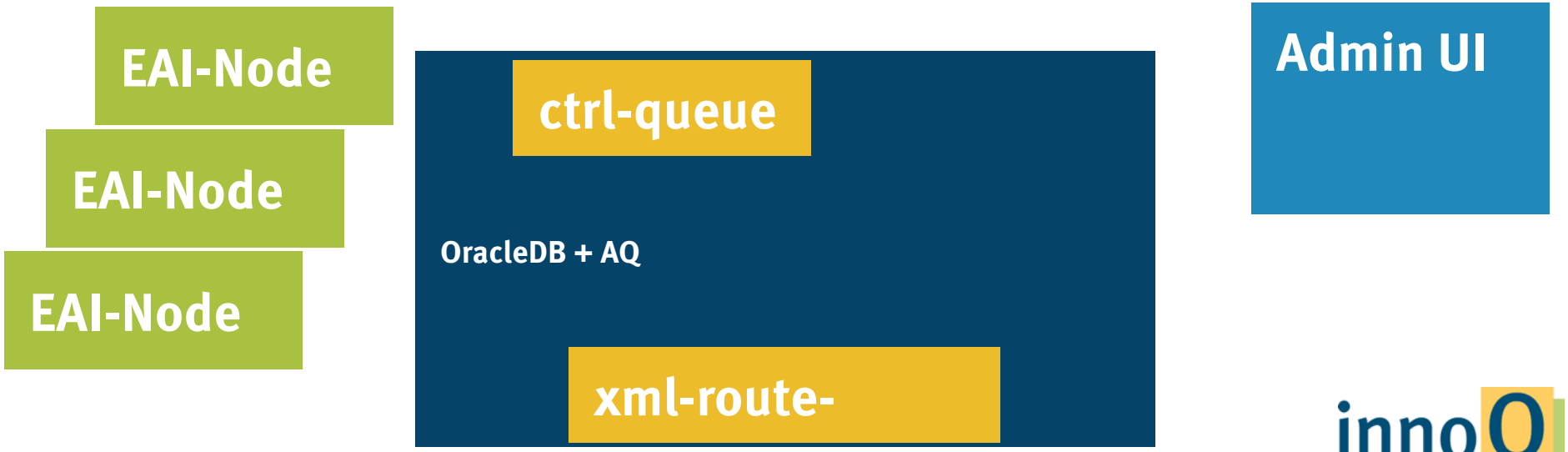


Real-life scenario: Control Bus

Initial Node configuration

database connection

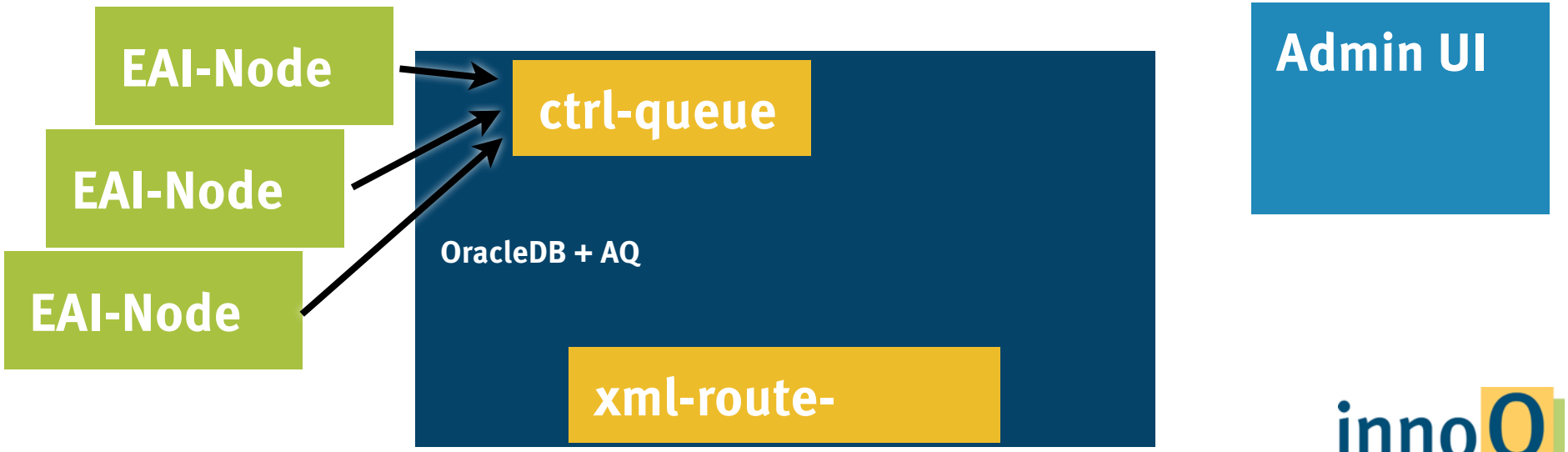
node type (command line arg)



Real-life scenario: Control Bus

1. Server startup

subscribe to control queue

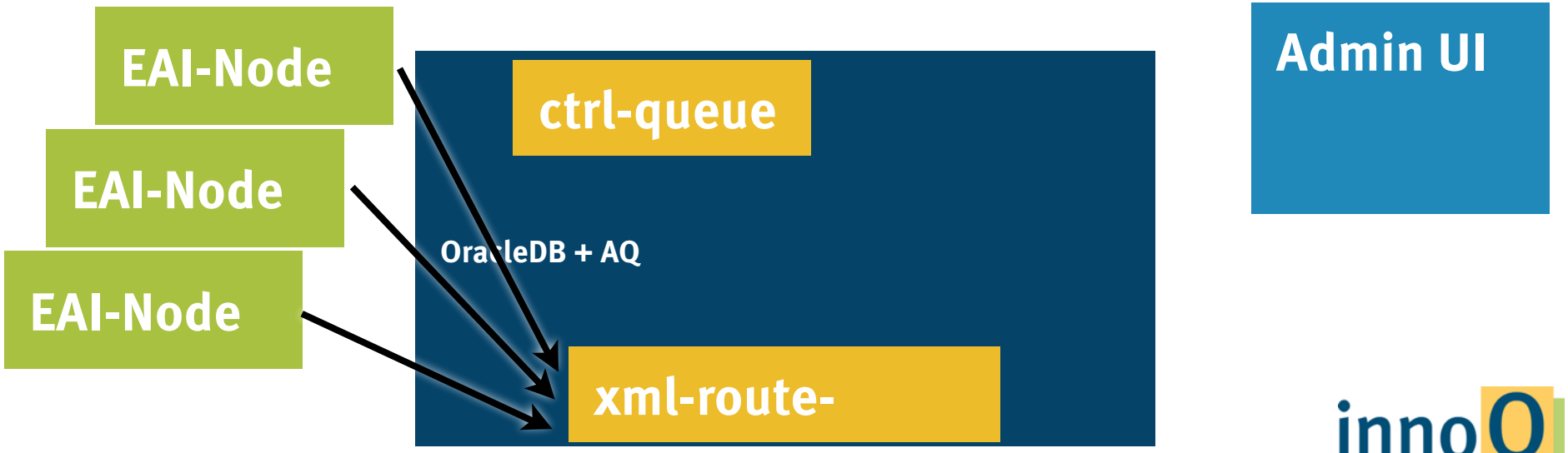


Real-life scenario: Control Bus

1. Server startup

subscribe to control queue

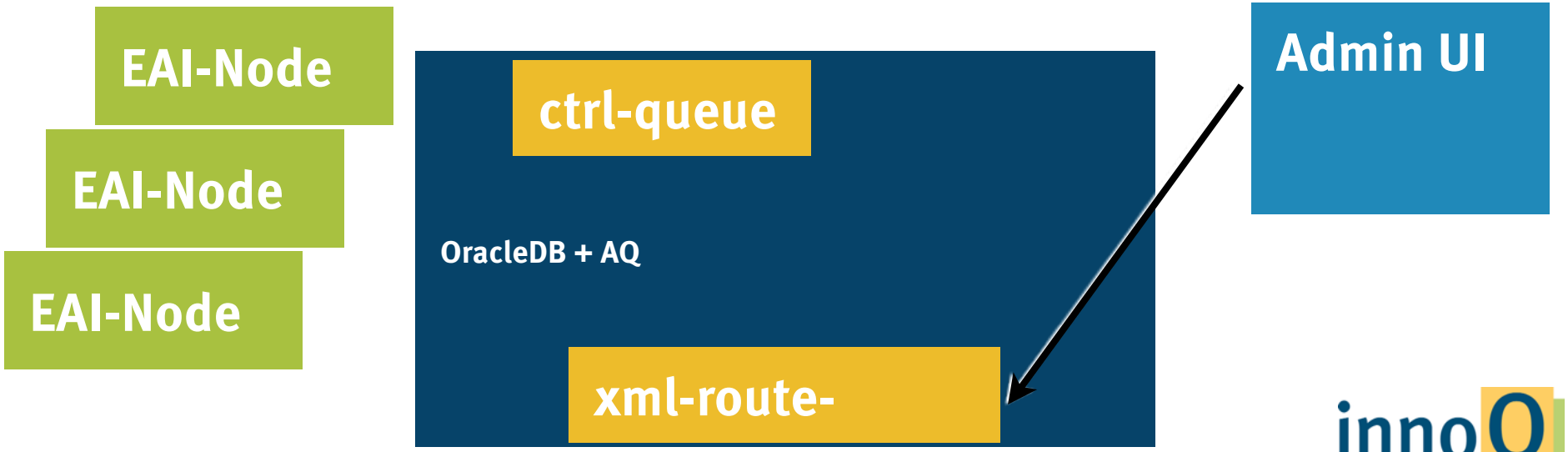
load *node-type specific* config



Config change @Runtime

2. during runtime

route config is changed

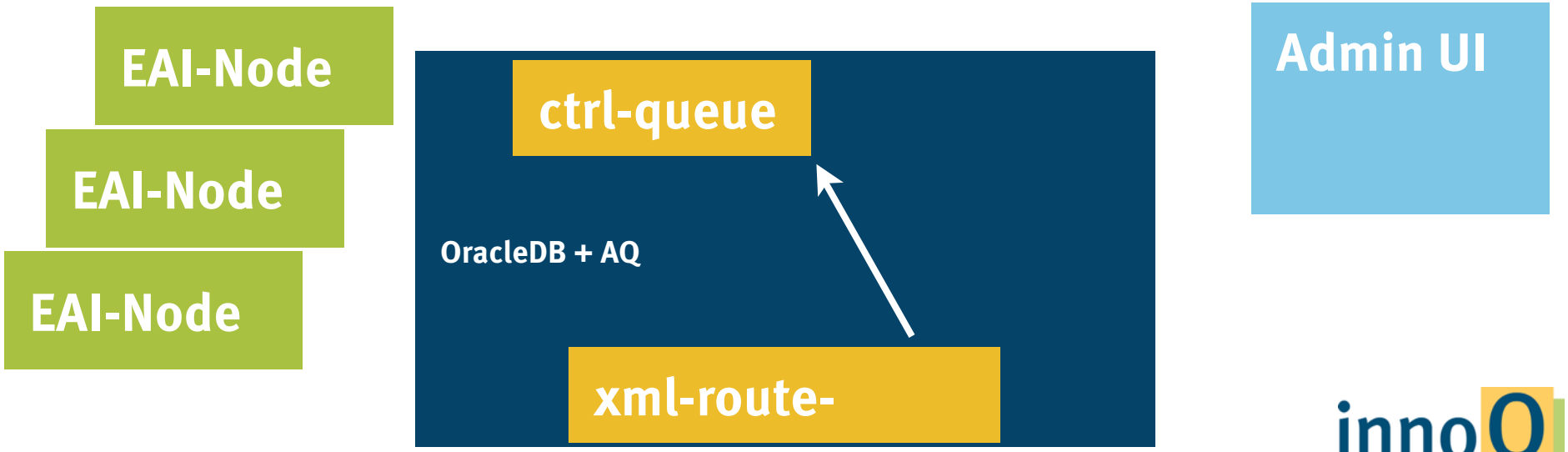


Config change @Runtime

2. during runtime

route config is changed

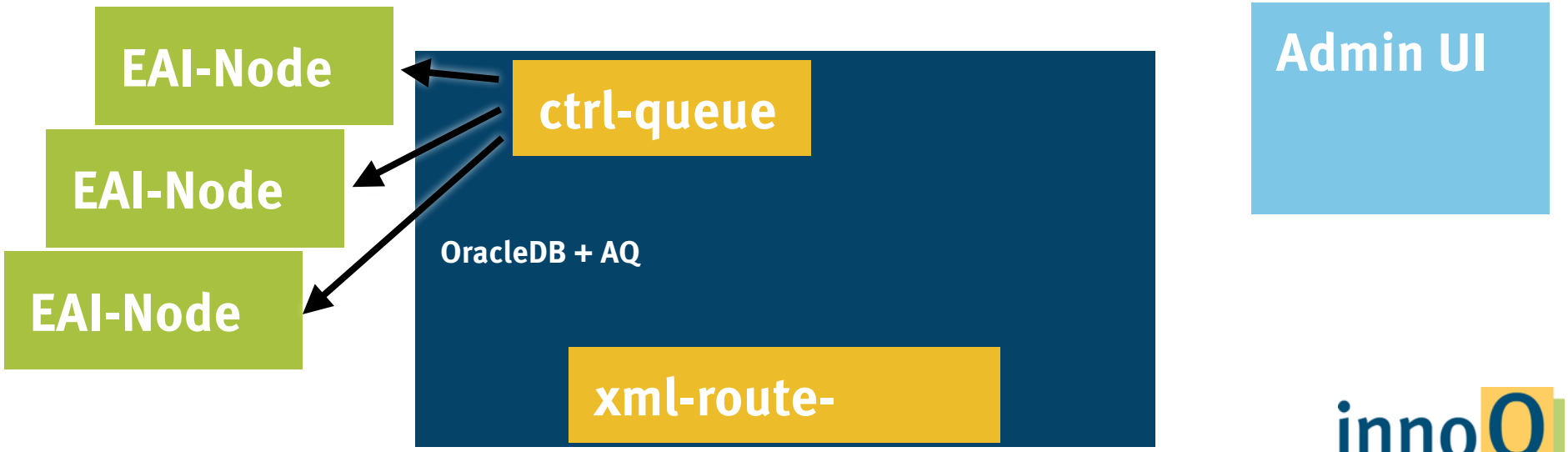
publish config update message



Config change @Runtime

3. upon control message arrival

interpret relevance of control message

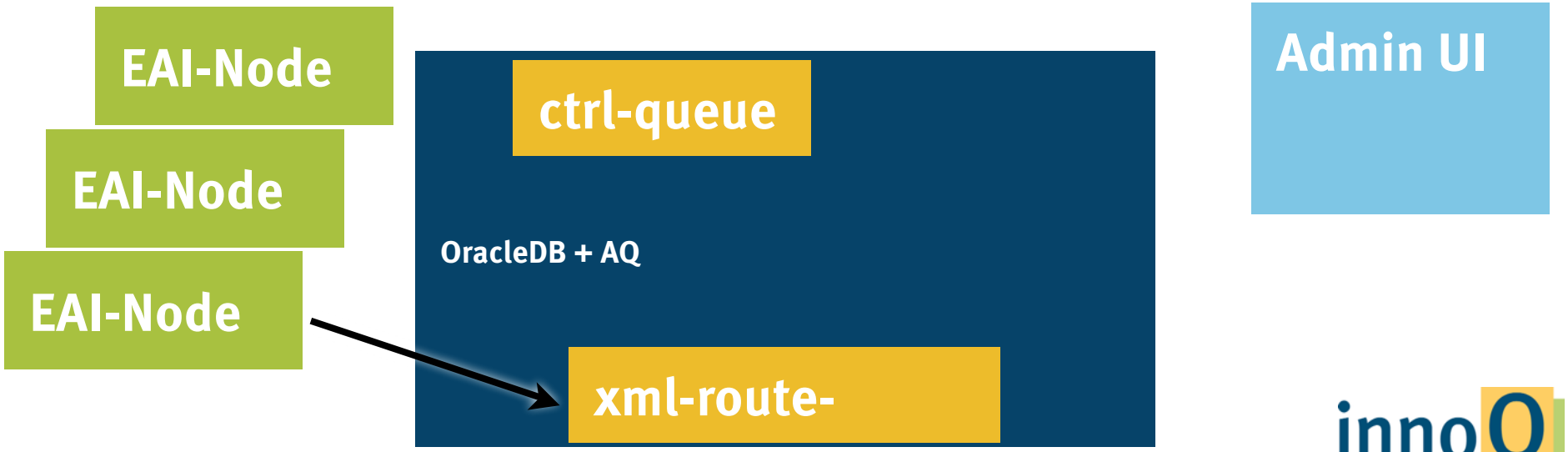


Config change @Runtime

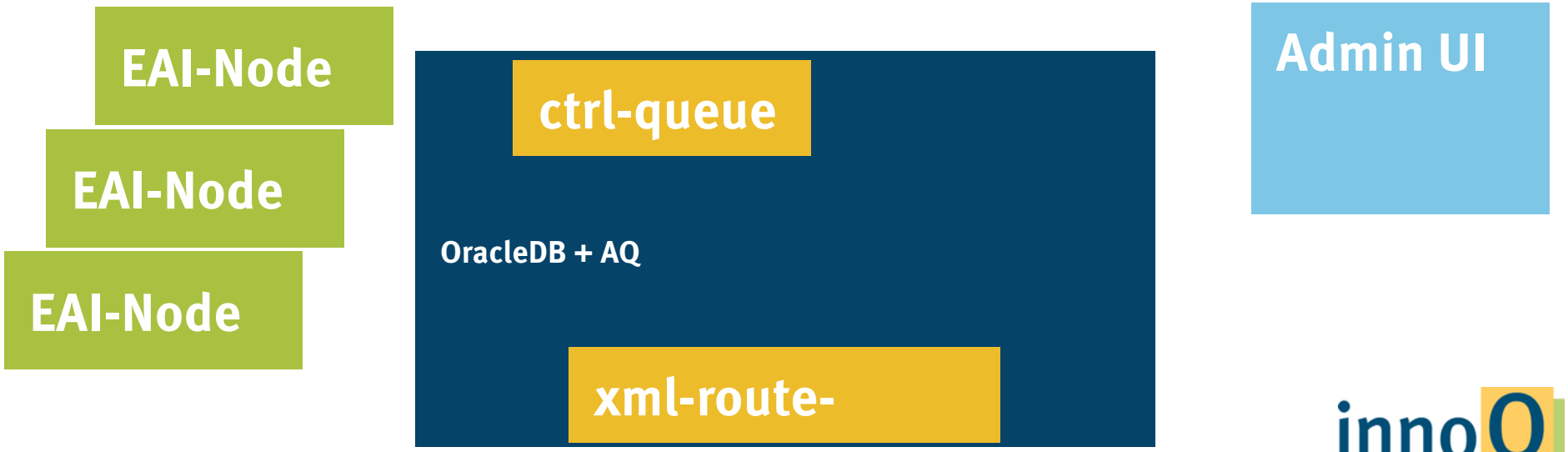
3. upon control message arrival

interpret relevance of control message

affected nodes reload configuration



Lessons Learned?



Testbarkeit vs. Konfigurierbarkeit?

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Testbarkeit und Konfigurierbarkeit

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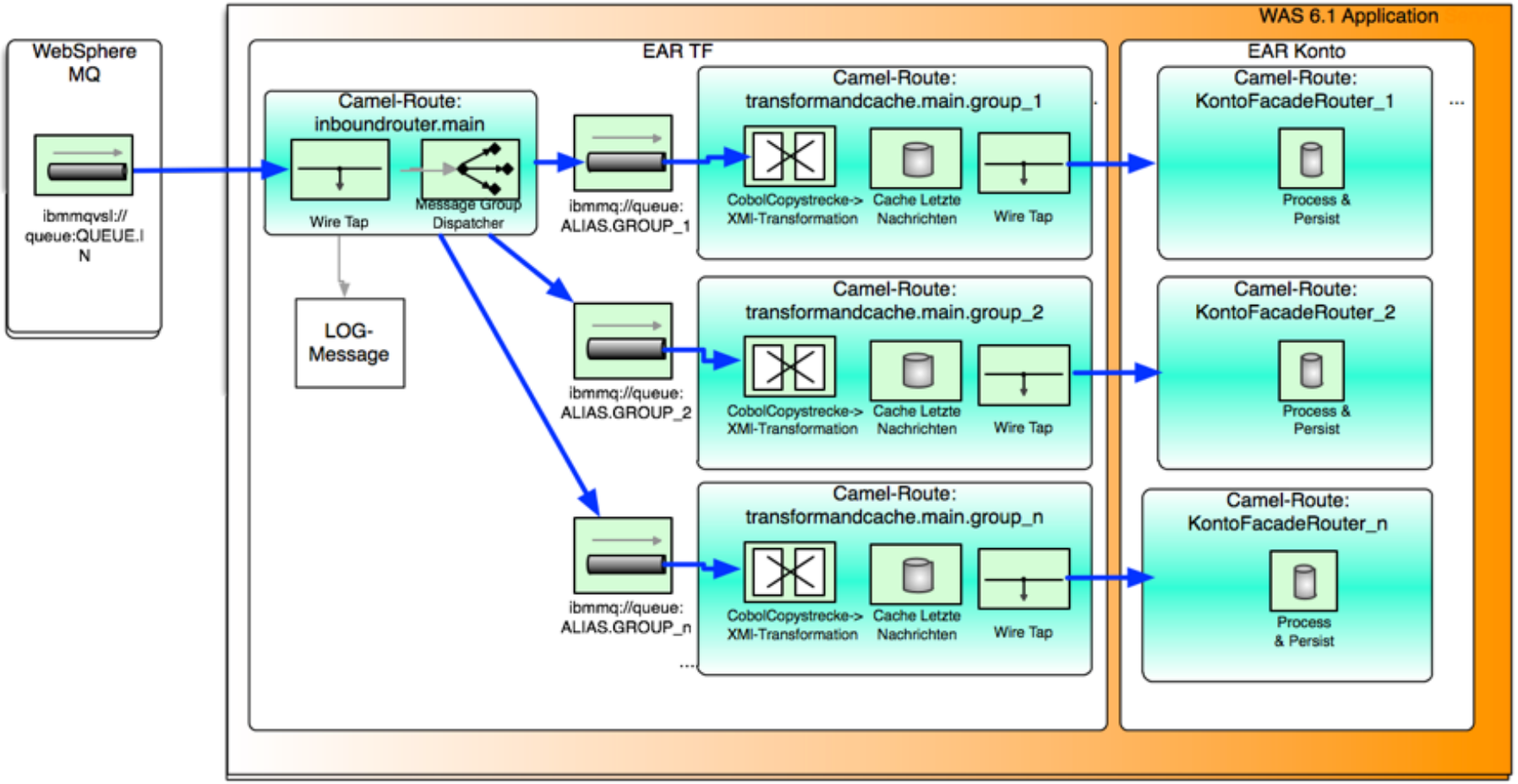
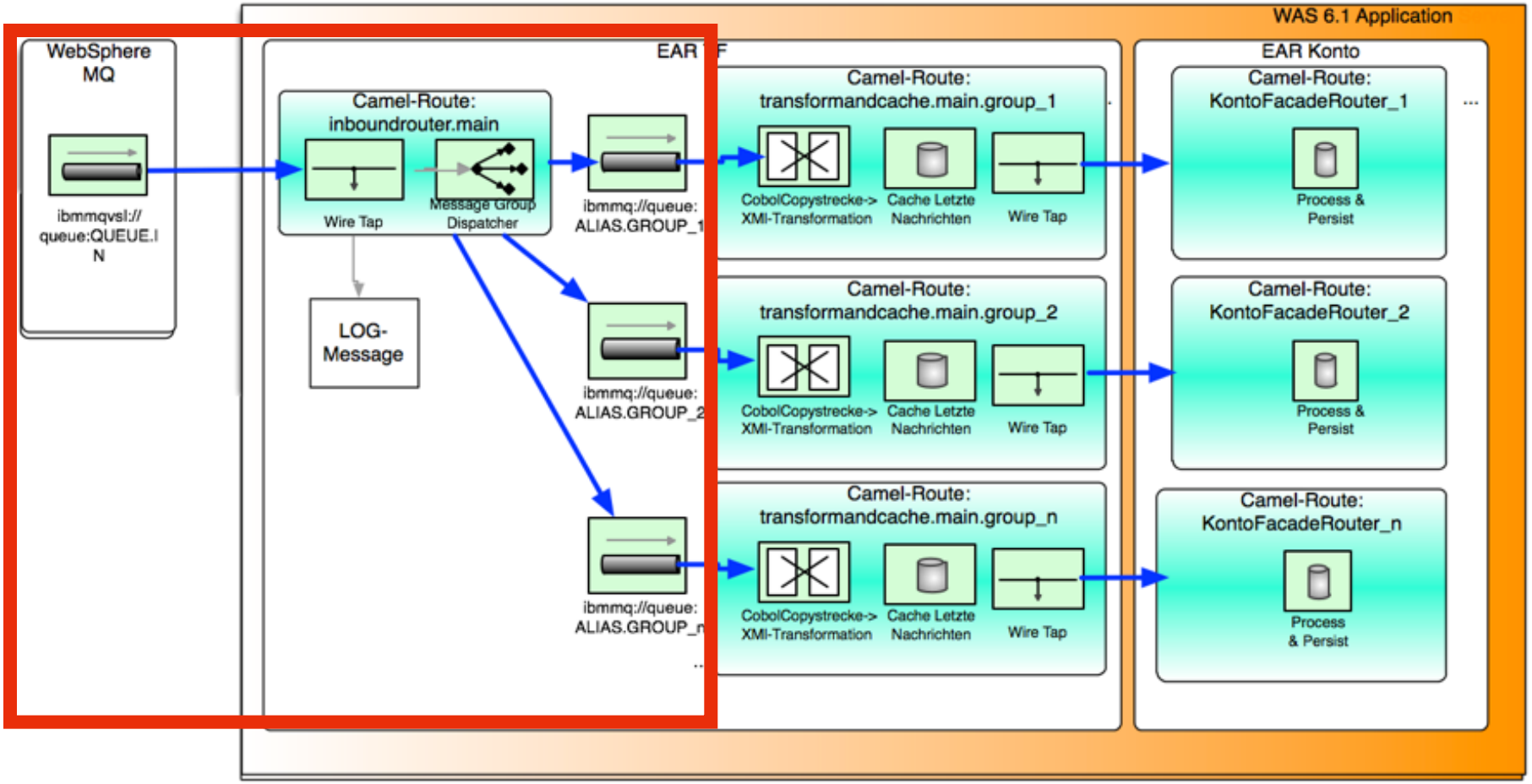
Message Ordering

Software-Architektur:
Skalierung & Pipes Filters bei Einhaltung der Nachrichten-Reihenfolge



Message Ordering

Software-Architektur:
Skalierung & Pipes Filters bei Einhaltung der Nachrichten-Reihenfolge



Message Ordering

```
from(“ibmmq:QUEUE.IN“).noAutoStartup()
            .transacted()
            .policy(required)
            .routeId(BasicRouteBuilder
                        .stdfromRouteId(this.componentBaseName))
            .process(vslHeadersProcessor)
            .setHeader(HDR_DUMMYCOMPLCHK_IBR, constant(PASSEDMSG))
            .bean(inboundTargetDispatcherBean)
            .wireTap("seda:inboundRouter.log");
```

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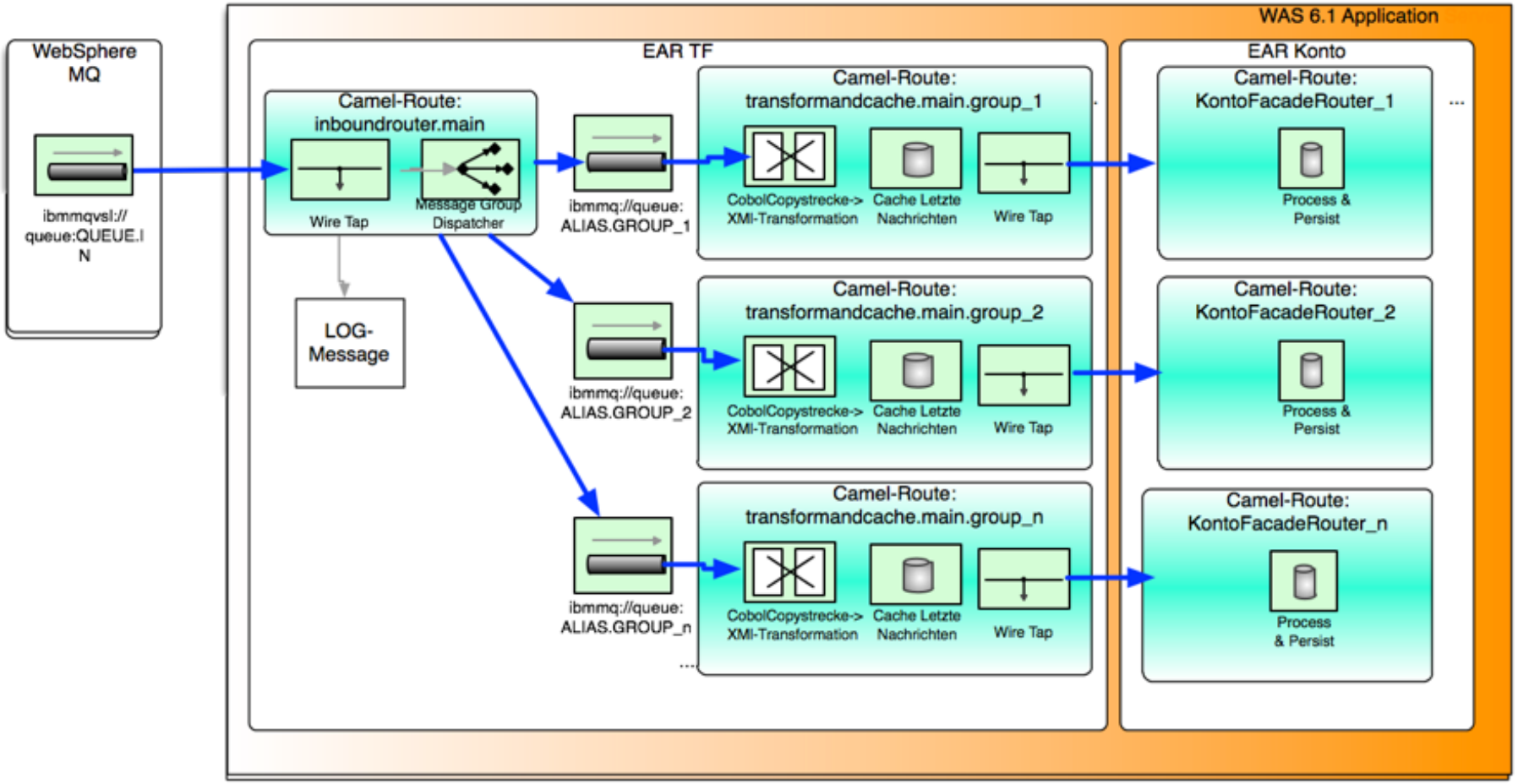
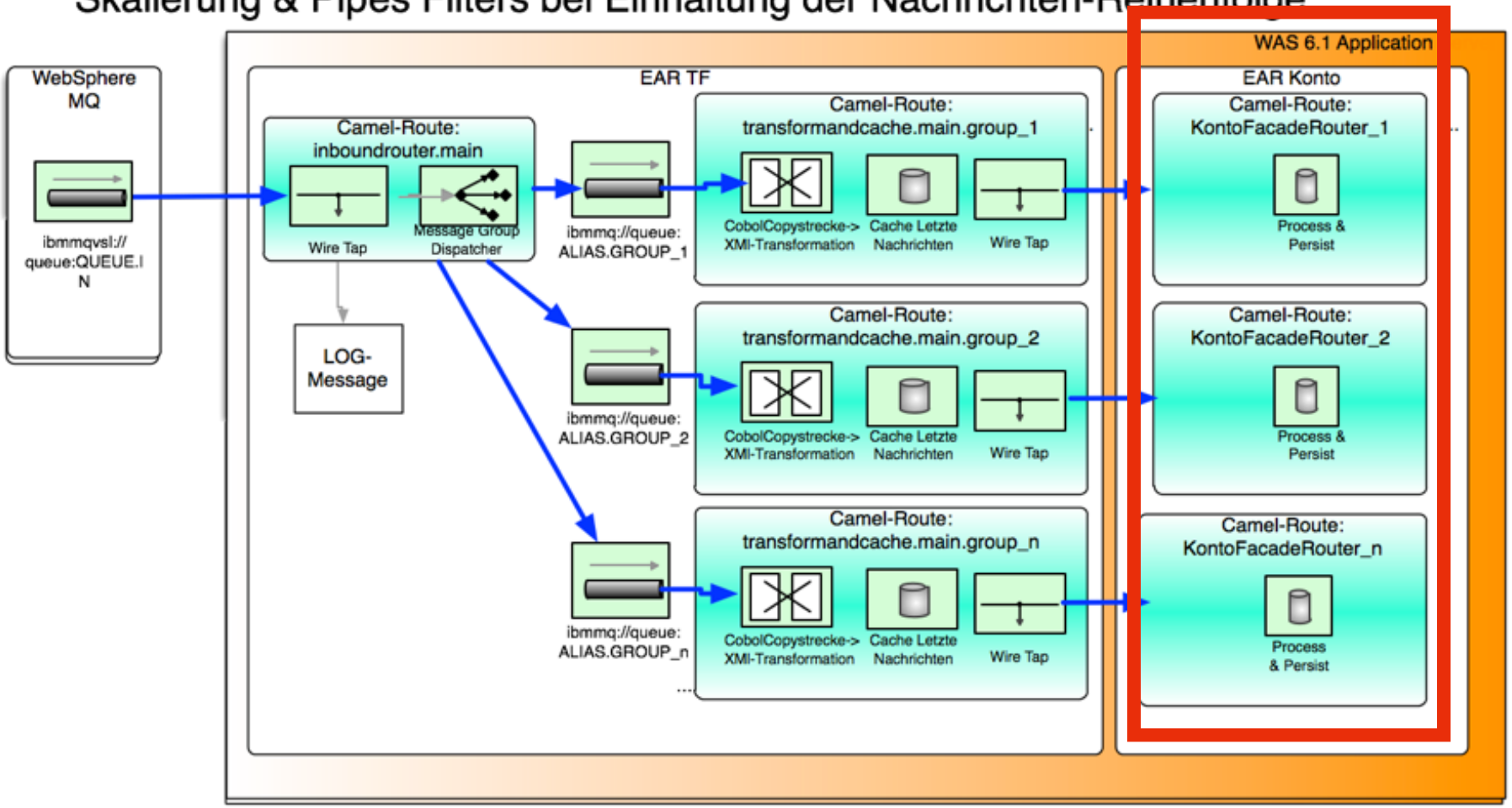
Message Ordering

Software-Architektur:
Skalierung & Pipes Filters bei Einhaltung der Nachrichten-Reihenfolge



Message Ordering

Software-Architektur:
Skalierung & Pipes Filters bei Einhaltung der Nachrichten-Reihenfolge



Message Ordering

```
SpringTransactionPolicy required = lookup("PROPAGATION_REQUIRED",
                                          SpringTransactionPolicy.class);
for (int i = 0; i < NROFROUTES; i++) {
    String iasS = String.valueOf(i);
    from(fromEndpoint.replaceAll("§", iasS)).noAutoStartup()
        .transacted()
        .policy(required)
        .routeId(KONTO_ZP_PREROUTEID + iasS)
        .process(new CheckRedeliveryProcessor())
        .process(new ZahlplanFacetConverter())
        .bean(zpBean, "process")
        .to("bean:kontostatctr?method=stopCounter")
        .wireTap(logEndpoint);

}
```

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Does it save money?

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Does it save money?

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Backward compatibility via EAI

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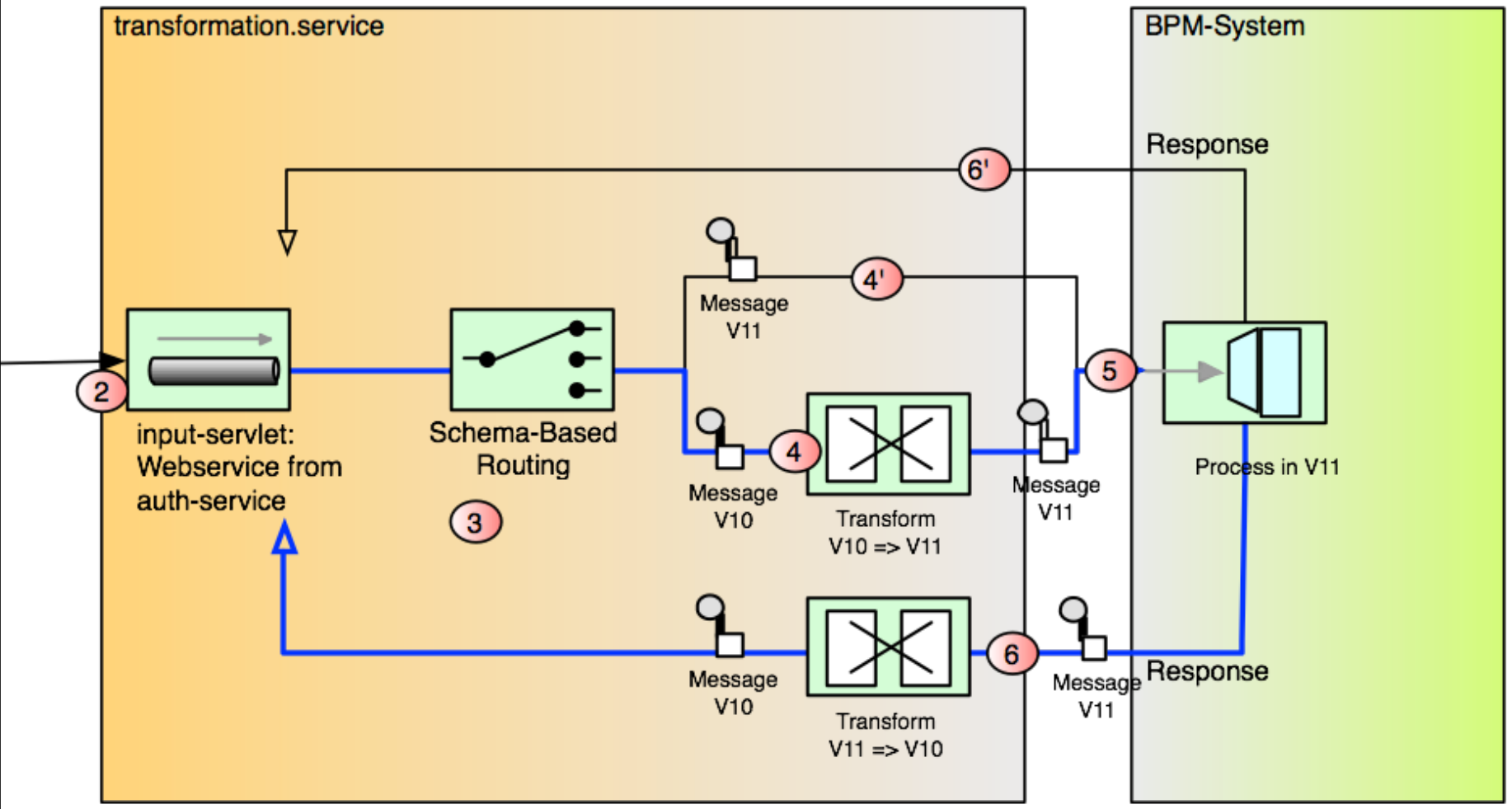
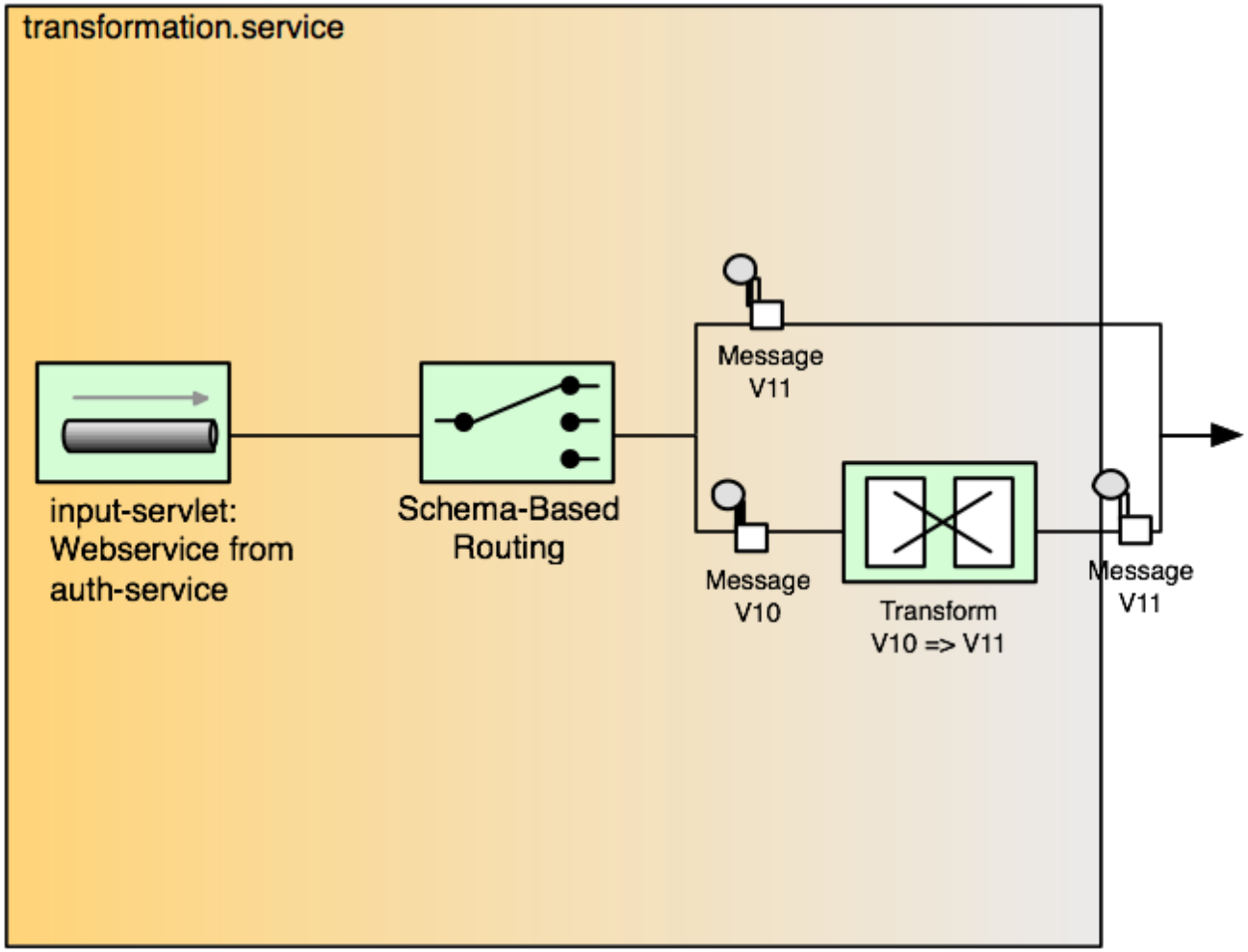
Transformation mit BPMN-System (1)



Transformation für BPMN-System (2)



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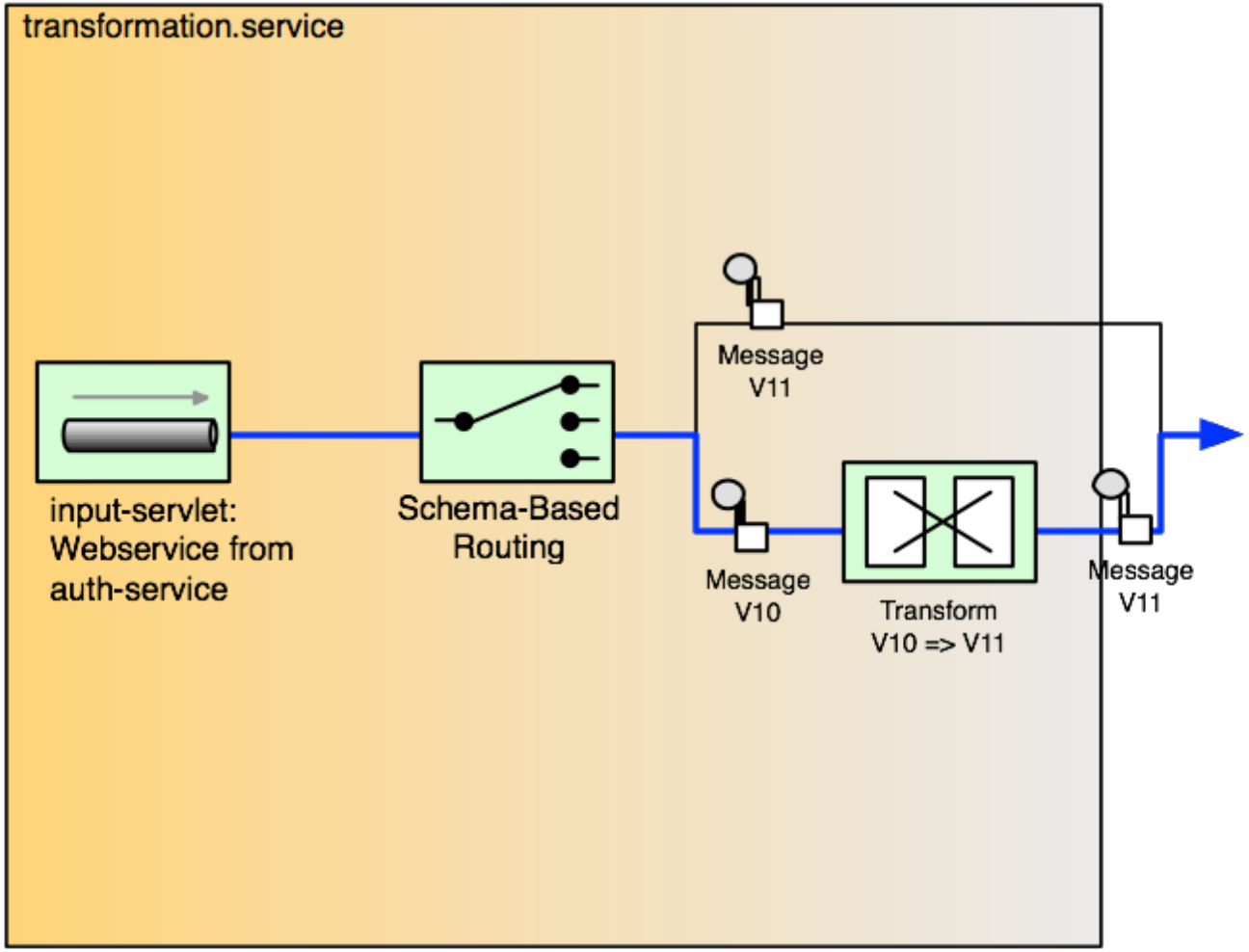

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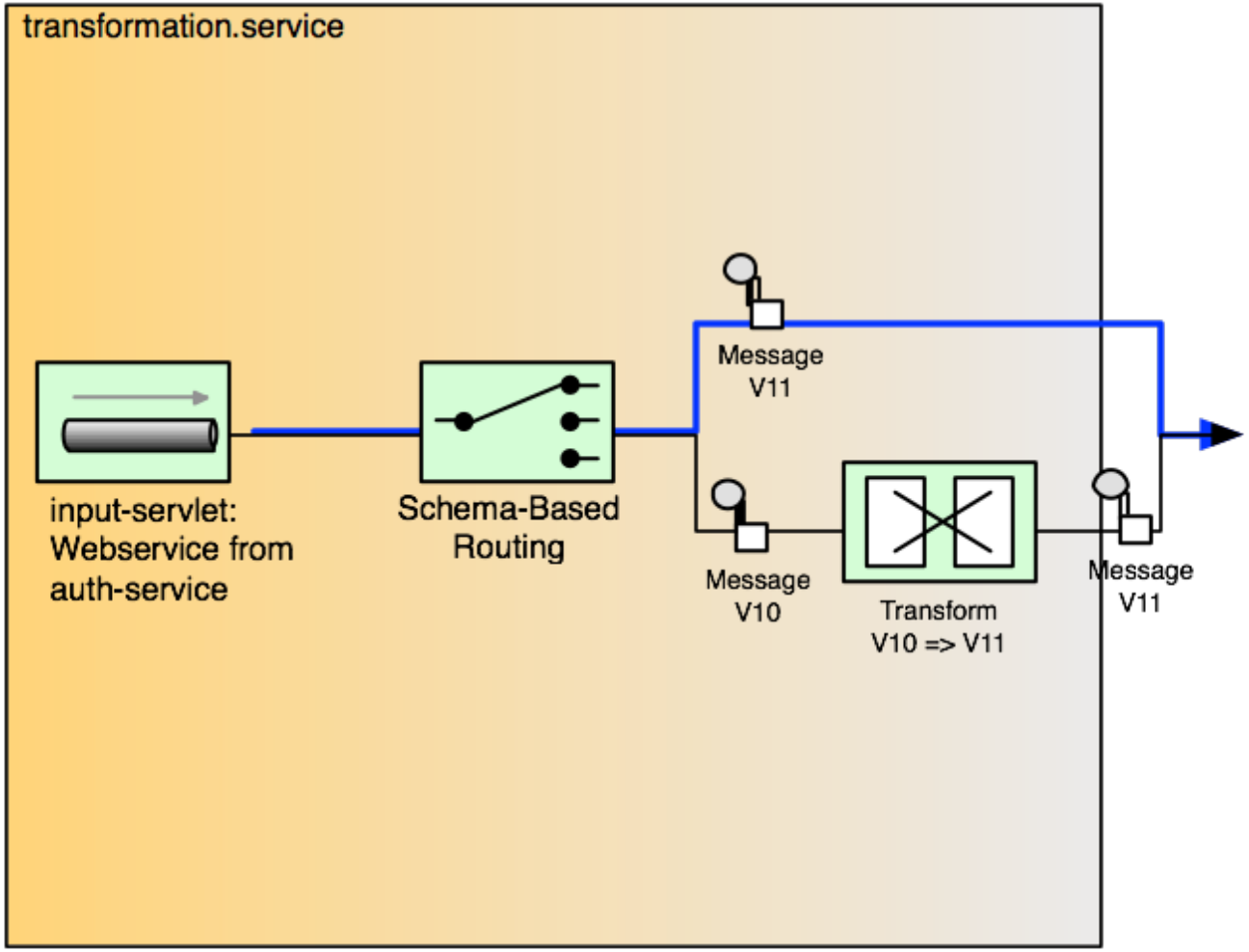
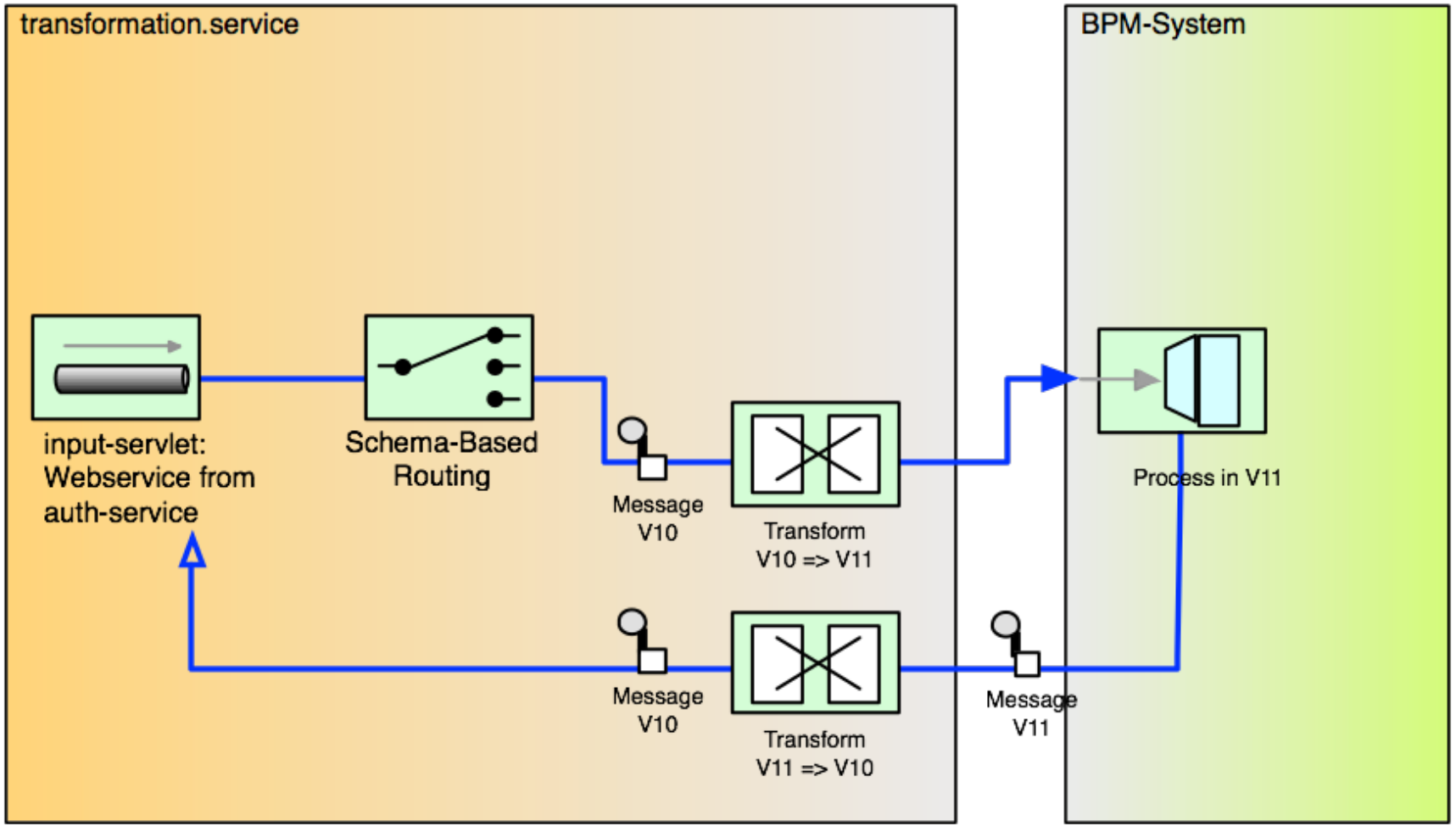


Transformation für BPMN-System (3)



Should I always use an EAI-Framework?

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Should I always use an EAI-Framework?

It depends!

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Scenario: Kilogramm vs. Stück

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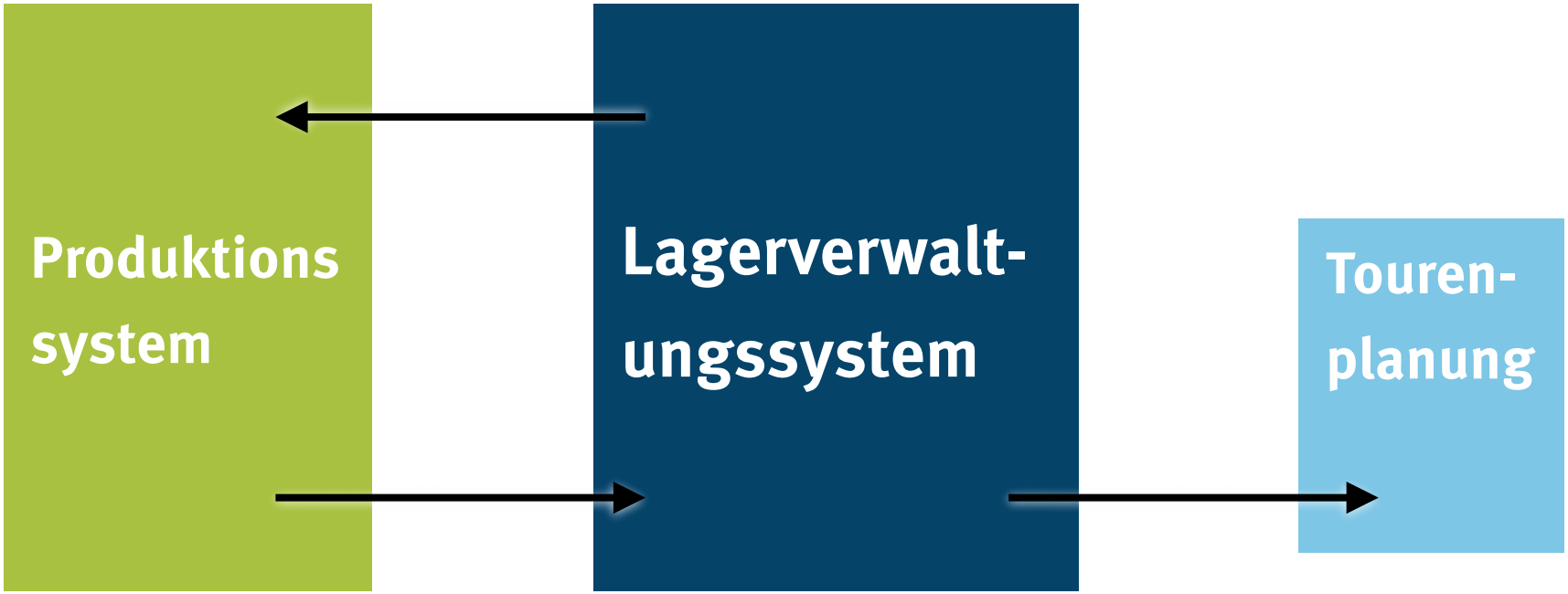
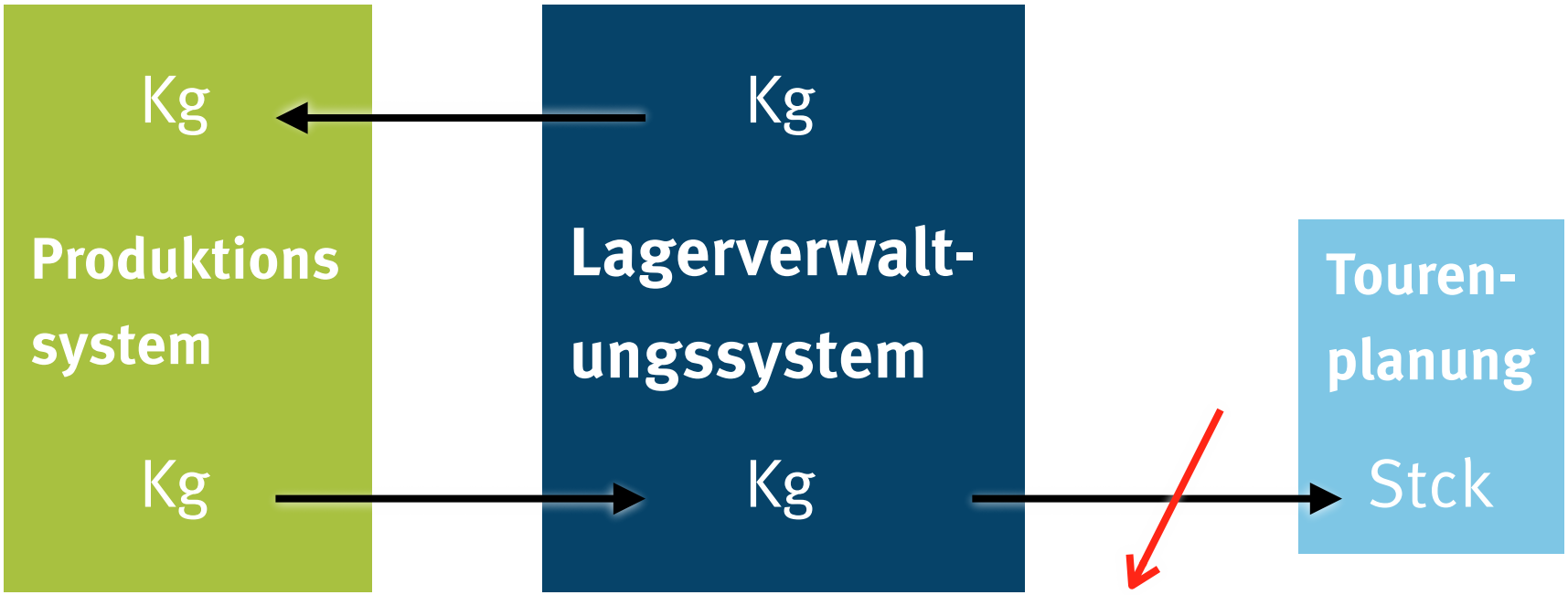
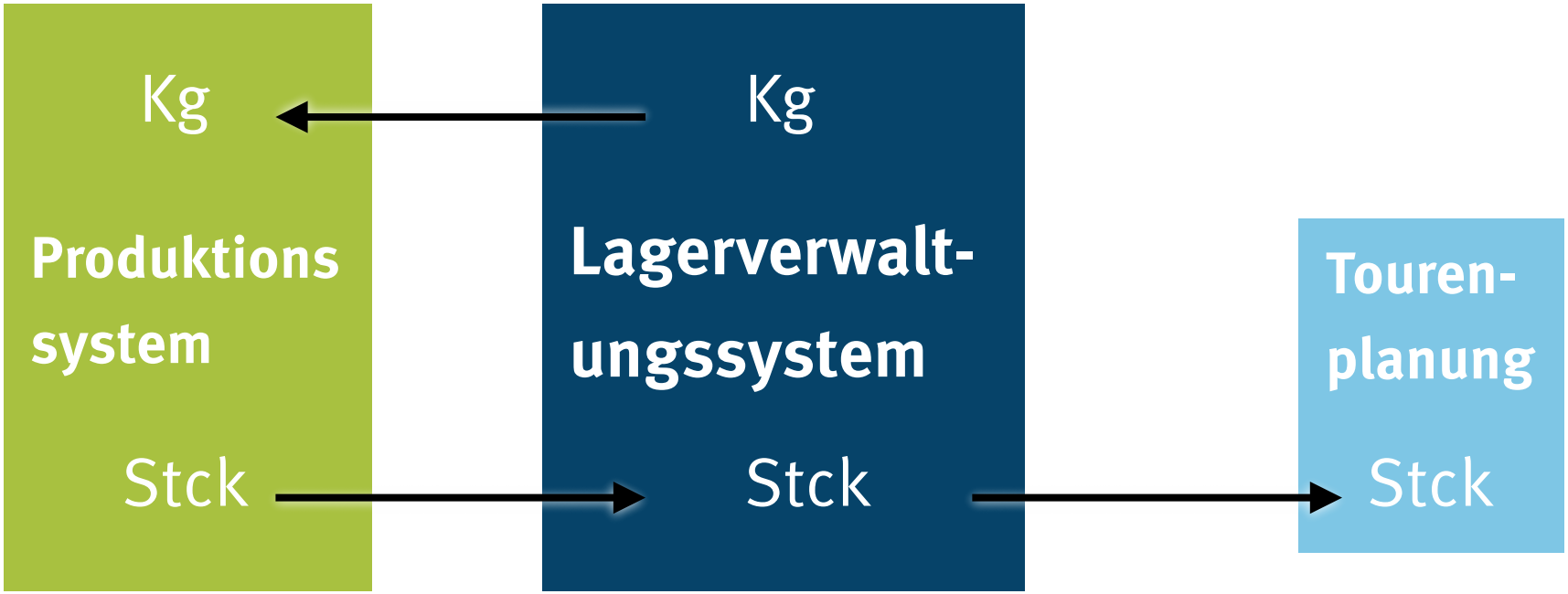
Ein Integrationsproblem?



Ein Integrationsproblem?



Kein Integrationsproblem



Further tips considering EAI

Further tips considering EAI

small building blocks

Further tips considering EAI

small building blocks

no shared mutable state

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Further tips considering EAI

small building blocks

no shared mutable state

use immutable DTOs

innoQ

Further tips considering EAI

small building blocks

no shared mutable state

use immutable DTOs

=› increased scalability

Further tips considering EAI

small building blocks

no shared mutable state

use immutable DTOs

=› increased scalability

advanced: see “SEDA” & “actor model”

Vielen Dank!

Alexander Heusingfeld, **@goldstift**

alexander.heusingfeld@innoq.com

Martin Huber, **@waterback**

martin.huber@innoq.com

http://www.innoq.com/de/talks

We take care of it - personally!

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