adesso business. people. technology.

Verteiltes und sicheres Datenmanagement in der Cloud

Cloud-ready und Cloud-native

Jens Kohler

Inhalt

Persönliche Vorstellung

adesso SE
Frühlingstraße 8
76131 Karlsruhe

Ausbildung / Zertifikate

- Dissertation
- Master of Science
- Diplom-Wirtschaftsinformatiker
- iSAQB Software Architekt (Foundation) (Zertifikat)
- AEVO (Zertifikat)
- ITIL v3 Foundation (Zertifikat)
- SAP Logistik (Zertifikat)
- SAP Controlling (Zertifikat)

Branchen

- Banking
- Öffentliche Verwaltung
- Forschung & Entwicklung

Sprachen

- Deutsch (Muttersprache)
- Englisch (Verhandlungssicher)

Fachliche Schwerpunkte

- Architektur & Integration von Cloud-Infrastrukturen in bestehende Anwendungslandschaften
- Architektur von verteilten & komplexen Softwaresystemen (insbes. Docker, Kubernetes und Cloud Foundry)
- Ganzheitliche Analyse und Konzeption von komplexen Software- und Datenbanksystemen
- Konzeption von verteilten, komplexen, relationalen und nicht-relationalen Datenbankarchitekturen
- Konzeption, Architektur und Tests von verteilten Systemen (u.a. SOA, JEE, Microservices)
- Anforderungsmanagement und Prozessmodellierung (vorwiegend mit Methoden der UML und BPMN)
- Evaluation von technischen Fachkonzepten vorwiegend hinsichtlich Machbarkeit und Performance

Beruflicher Werdegang

- Seit 02/2019 adesso SE
- 2010 – 2019 Hochschule Mannheim
- 2004 – 2010 Studium Wirtschaftsinformatik

Relevante Erfahrungen

Architekt
Aufbau eines unternehmensweiten Data Lakes auf einer Cloud Platform.
Eingesetzte Technologien:
Google Cloud Stack, Jira, Confluence, IntelliJ, Git, GitHub, GitHub Actions, REST, SOAP/WSDL

Architekt
Migration einer Anwendungslandschaft (500+ Anwendungen)
Eingesetzte Technologien:
Google Cloud Stack, Jira, Confluence, IntelliJ, Git, GitHub, GitHub Actions, REST, SOAP/WSDL

Architekt
Abbildung eines ELT-Prozesses (Extract, Load, Transform) komplett serverless mit dem Amazon Web Services (AWS) Stack.
Eingesetzte Technologien:
AWS Lambda, AWS Glue, AWS CodePipeline, Java, Git, Maven, IntelliJ

Softwareentwickler, Konzeptioner
Migration des bestehenden Finanzportals von einem .NET auf die JavaEE-Plattform. Abhängige 3rd-Party Dienste werden über REST bzw. SOAP/WSDL angebunden.
Eingesetzte Technologien:
.NET Core, Entity Framework, JavaEE, SpringMVC, REST, SOAP/WSDL, Jira, Confluence, Eclipse, Postman, SoapUI

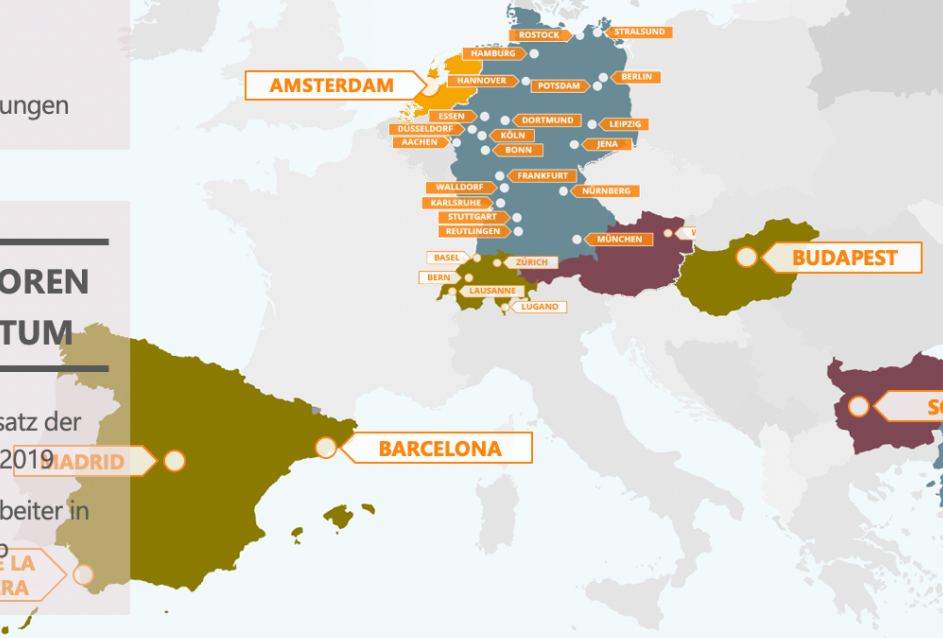
adesso SE

BRANCHEN UND TECHNOLOGIE-FÜHRUNG

- Kundenfokus
- Kooperationen mit Universitäten und Forschungseinrichtungen

ERFOLGSFAKTOREN UND WACHSTUM

- 449,7 Mio. € Umsatz der adesso Group in 2019
- Über 4.500 Mitarbeiter in der adesso Group



PARTNER IN DER DIGITALEN TRANSFORMATION

adesso optimiert die Kerngeschäftsprozesse von Unternehmen durch Beratung und Entwicklung kundenspezifischer Software und Branchenlösungen

- **Methoden und praktische Erfahrung**
  Interaction Room | Internet of Things |Digital Workplace | Mobile Business | Data Science und Analytics

Beste Arbeitgeber Deutschland Great Place To Work. 2020

1. Platz
IN DER GRÖSSENKATEGORIE:
2.001-5.000
MITARBEITENDE

GREAT PLACE TO WORK 2018 Beste Arbeitgeber ITK

1. Platz
IN DER GRÖSSENKATEGORIE:
> 1.000
MITARBEITENDE

GREAT PLACE TO WORK 2018 Beste Arbeitgeber Deutschland

TOP NATIONALER ARBEITGEBER 2018 FOCUS

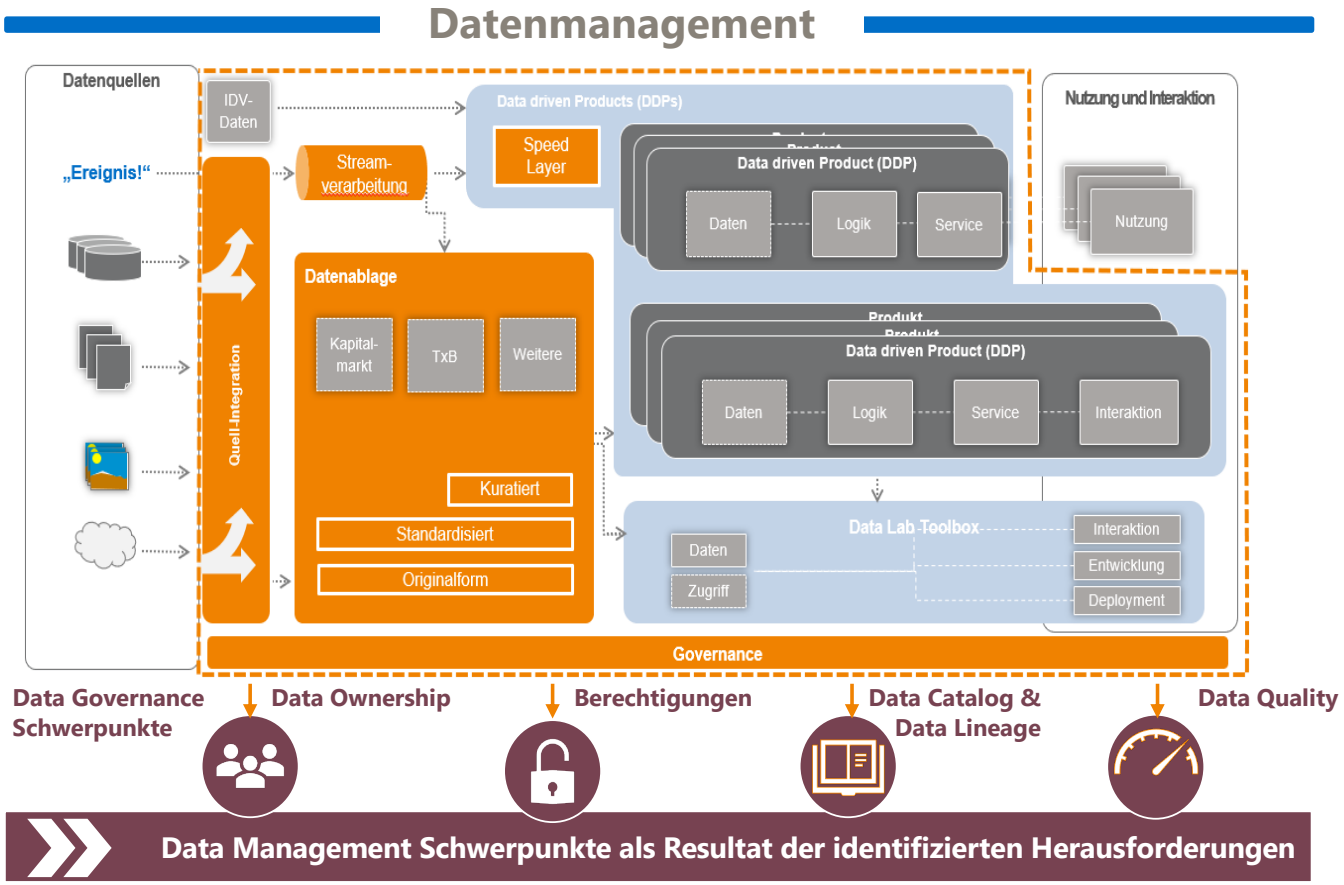
Ziel des Vortrags

- **Verständnis schaffen:**
  - Datenmanagement
  - Cloud (ready & native)

- **Hypothese:**
  - Cloud-native wird bis zum *31.07.2027* dafür sorgen, dass traditionelle Hardware (i.S.v. Server, Entwickler-Laptops, etc.) nicht mehr benötigt wird.

Verteiltes und sicheres Datenmanagement in der Cloud

Datenmanagement



Verteiltes und sicheres Datenmanagement in der Cloud

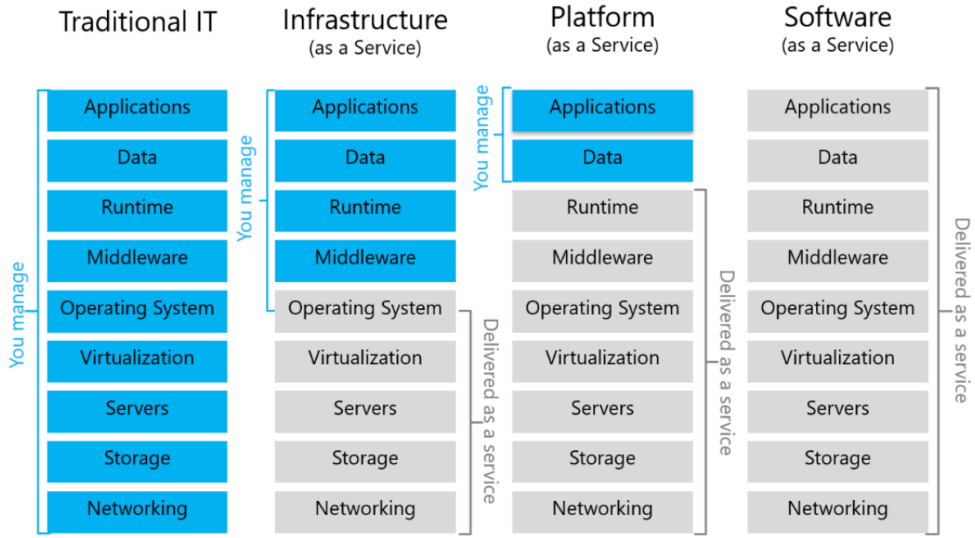
Cloud

- Deployment- & Service-Modelle

Public Cloud

Hybrid

Private Cloud

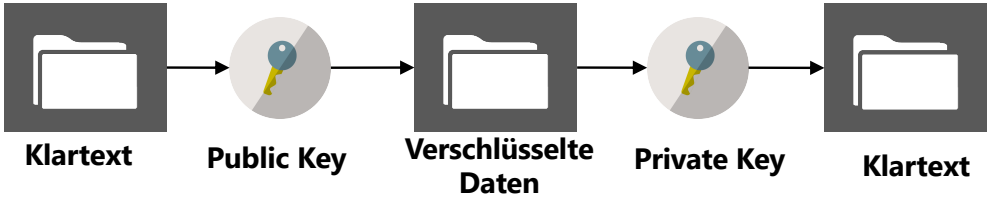


Cloud Service Models (IaaS, PaaS, SaaS) Diagram.

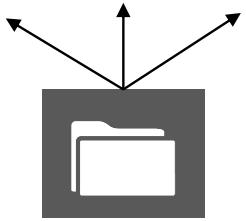
Source: https://dachou.github.io/2018/09/28/cloud-service-models.html

Ansätze

- Verschlüsselung



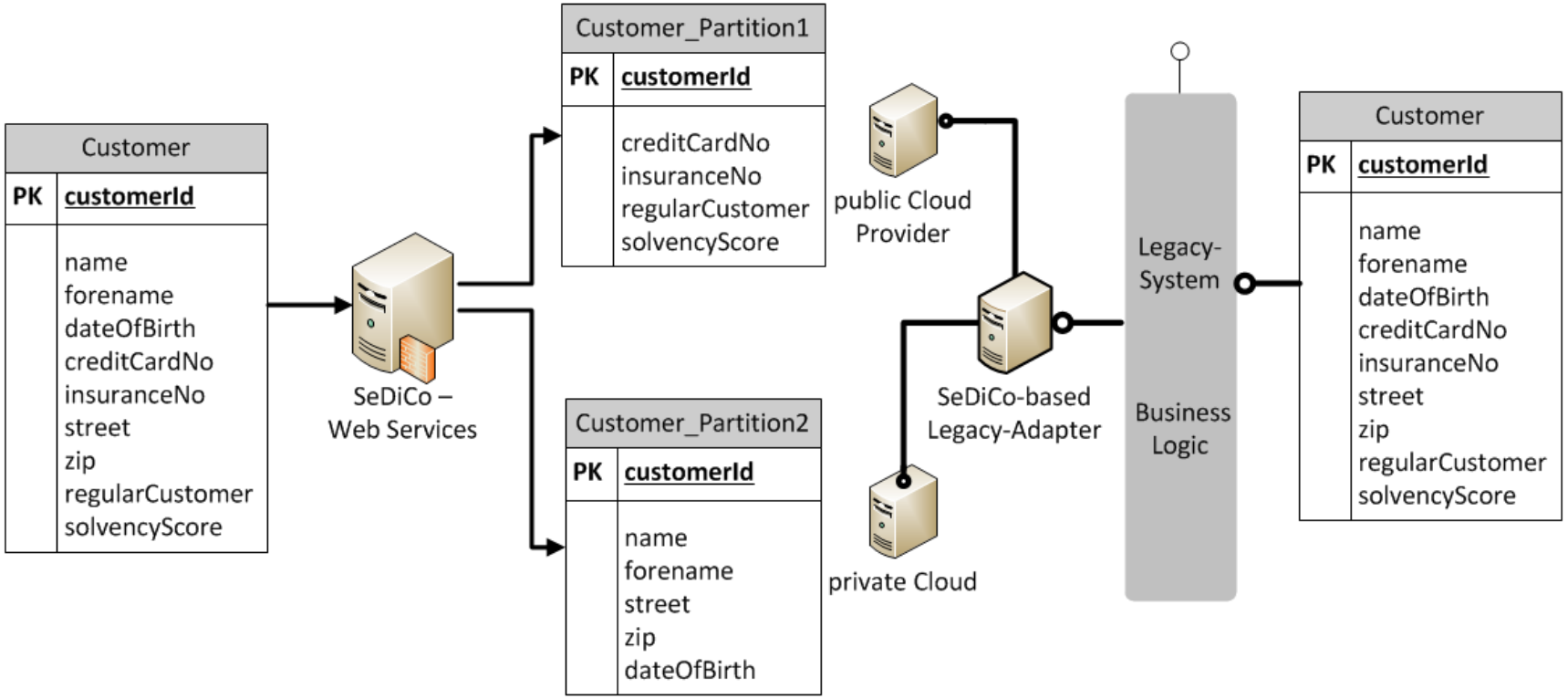
- Verteilung



- Kombination: Verschlüsselung & Verteilung

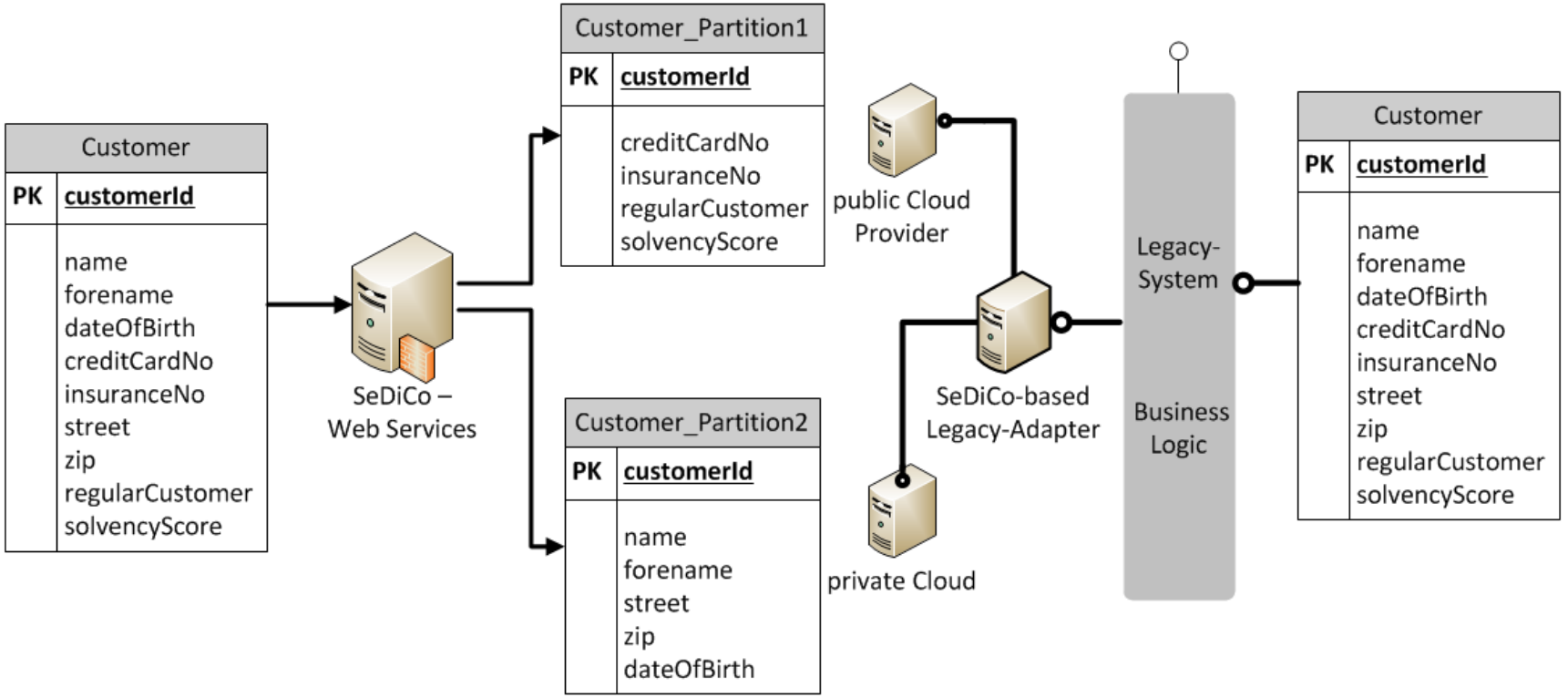
Verteiltes und sicheres Datenmanagement in der Cloud

SeDiCo-Ansatz



Verteiltes und sicheres Datenmanagement in der Cloud

SeDiCo-Ansatz: Demo



SeDiCo-Ansatz: Herausforderungen

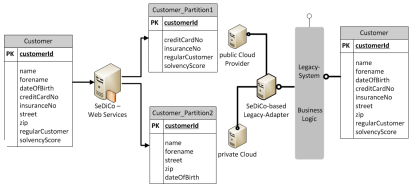


Table 1. MySQL Local Hibernate Query Times

# tuples	Query time (ms)
288K	12.073
88K	4.603
50K	3.253
25K	2.774
20K	2.475
15K	2.461
10K	2.267
5K	1.215
4K	1.078
3K	943
2K	752
1K	545
500	350
250	221
125	152
100	138
50	107
25	89
15	74
10	73
5	67
1	69

Table 2. Oracle Local Hibernate Query Times

# tuples	Query time (ms)
288K	14.761
88K	5.358
50K	3.226
25K	2.063
20K	2.020
15K	1.879
10K	1.778
5K	1.102
4K	1.038
3K	942
2K	742
1K	550
500	358
250	264
125	225
100	202
50	174
25	165
15	152
10	142
5	142
1	139

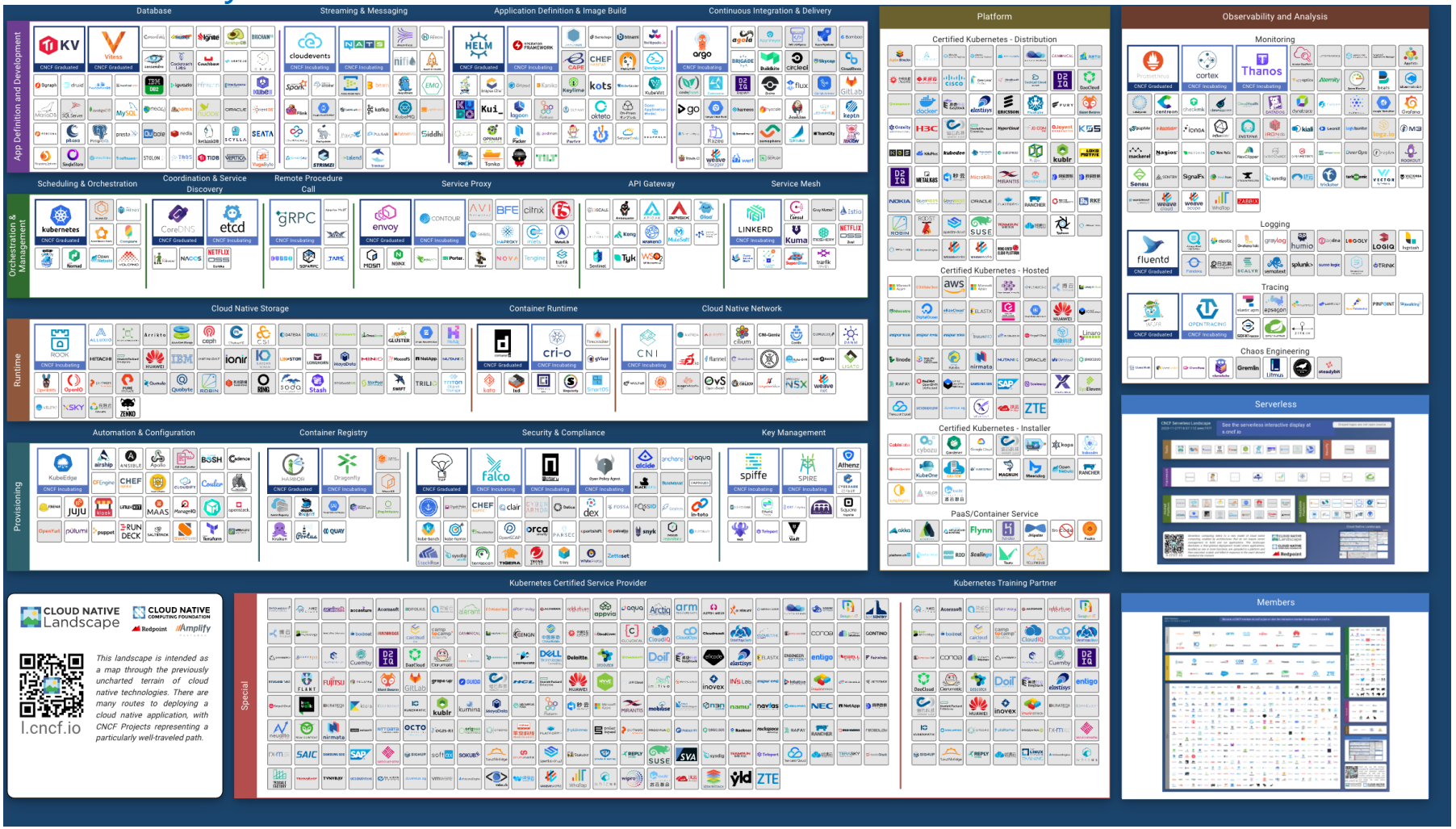
Table 3. MySQL Vertical Local Query Times

# tuples	Query time (ms)
288K	3.155.194
88K	954.316
50K	545.730
25K	280.577
20K	222.842
15K	170.582
10K	117.718
5K	62.323
4K	51.241
3K	39.040
2K	27.586
1K	14.769
500	7.872
250	4.369
125	2.410
100	1.900
50	1.112
25	750
15	549
10	429
5	221
1	92

Table 4. Oracle Vertical Local Query Times

# tuples	Query time (ms)
288K	14.487.465
88K	4.459.647
50K	2.528.230
25K	1.274.628
20K	1.021.531
15K	769.599
10K	517.878
5K	263.053
4K	211.346
3K	159.583
2K	104.623
1K	49.562
500	25.145
250	12.916
125	6.066
100	5.459
50	3.002
25	1.583
15	1.012
10	704
5	414
1	154

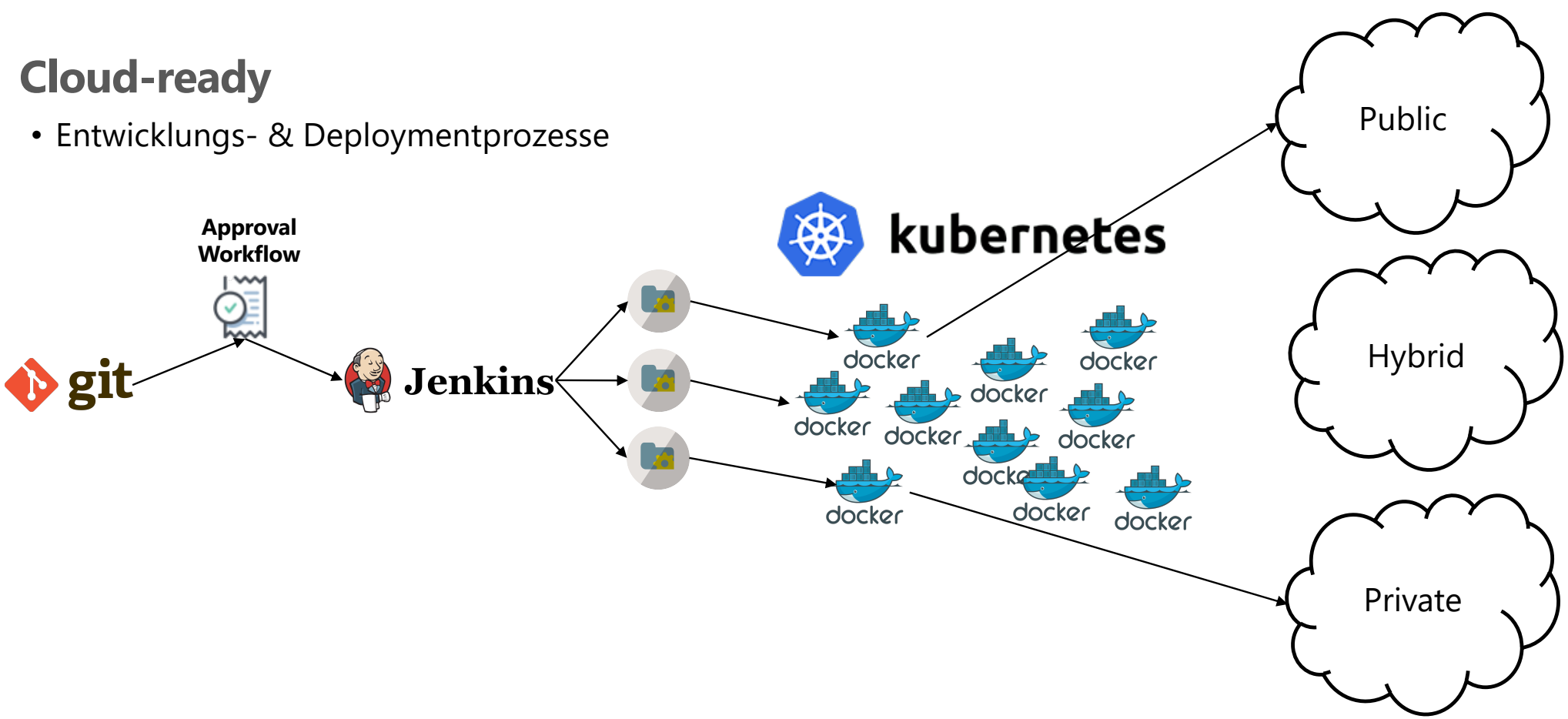
Cloud-ready & Cloud-native



Cloud-ready & Cloud-native

Cloud-ready

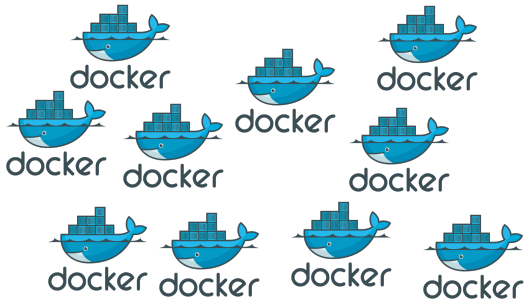
- Entwicklungs- & Deploymentprozesse

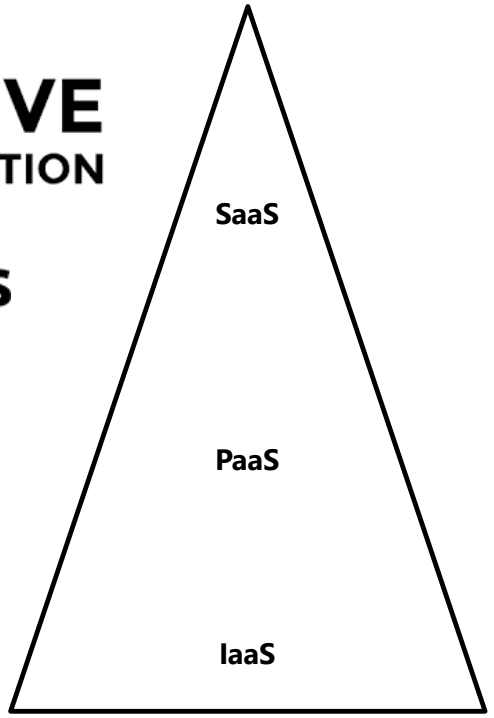


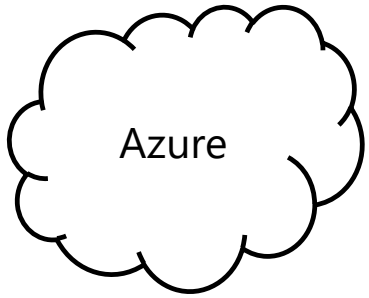
Cloud-ready & Cloud-native

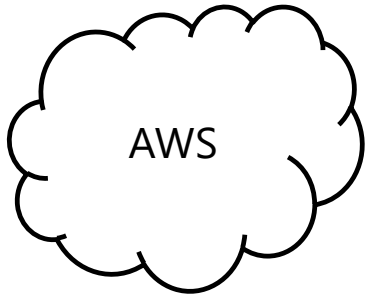
Cloud-native

- Cloud-Agnostik
- Entwicklungs- & Deploymentprozesse









FAQ

Ihre Meinung zur eingangs gestellten Hypothese?

Kontakt:

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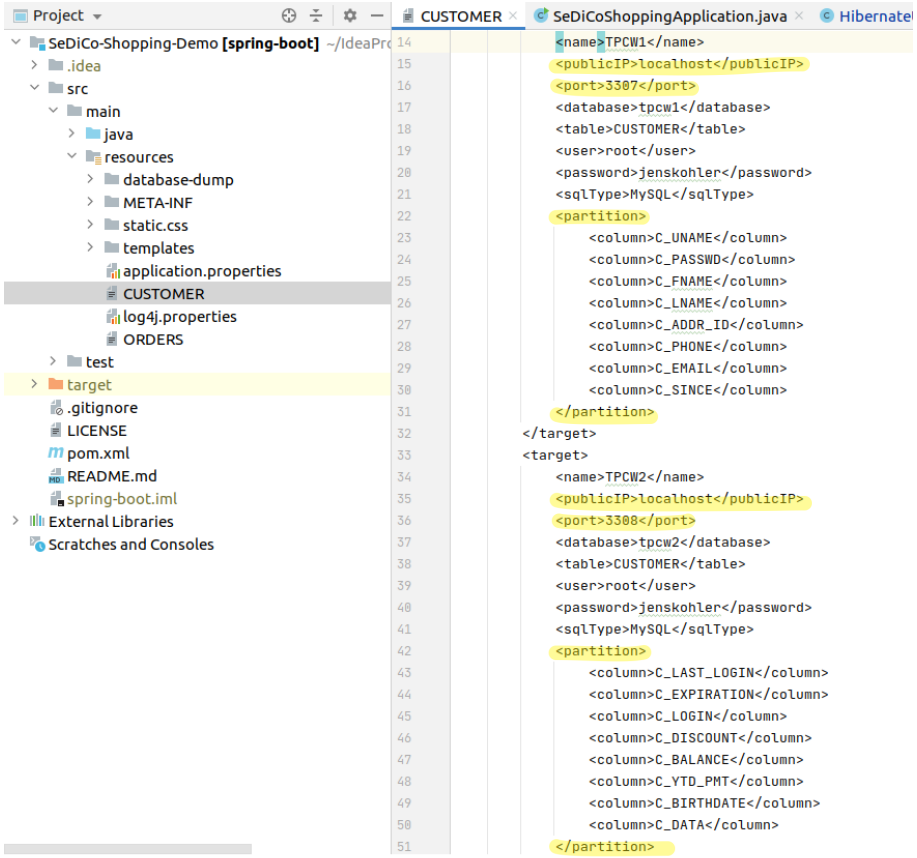
76131 Karlsruhe

jens.kohler@adesso.de

GitHub | Xing | LinkedIn | Facebook | Twitter

Backup


Project
SeDiCo-Shopping-Demo [spring-boot] ~/IdeaPr
.idea
src
main
java
resources
database-dump
META-INF
static.css
templates
application.properties
CUSTOMER
log4j.properties
ORDERS
test
target
.gitignore
LICENSE
pom.xml
README.md
spring-boot.iml
External Libraries
Scratches and Consoles
CUSTOMER
SeDiCoShoppingApplication.java
Hibernate
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<publicIP>localhost</publicIP>
<port>3307</port>
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<password>jenskohler</password>
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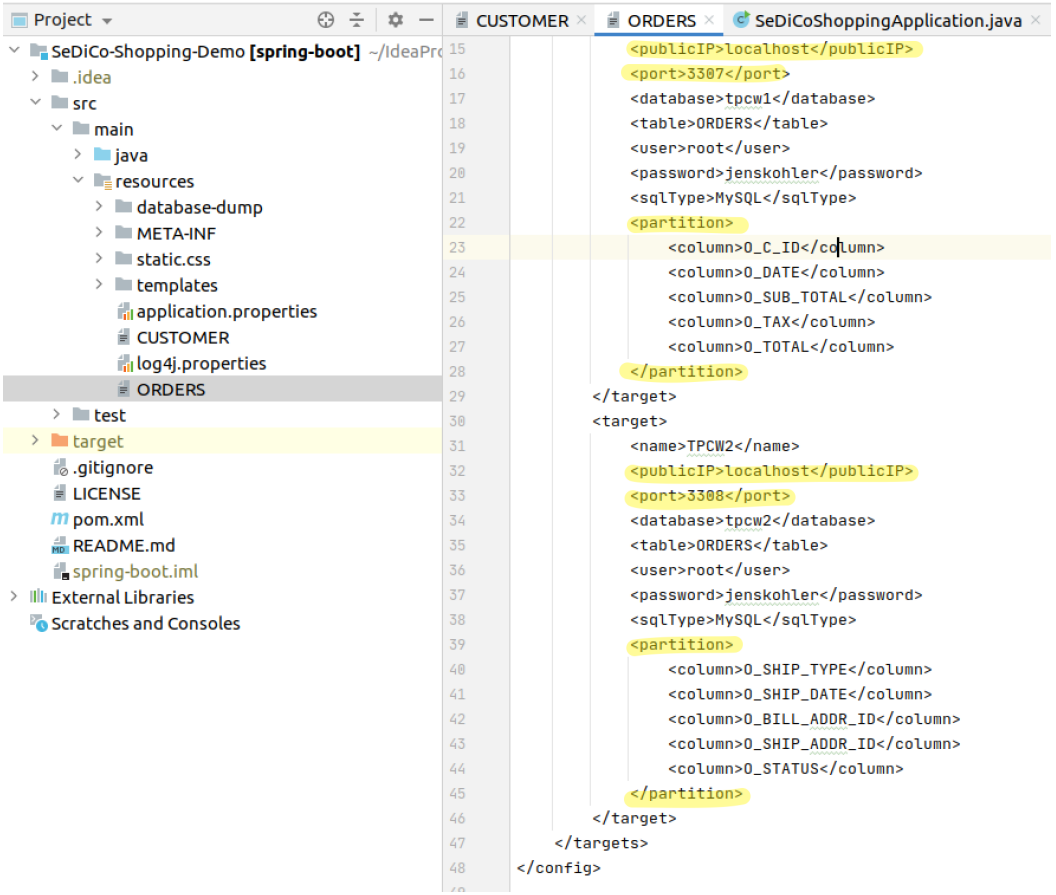
Project
SeDiCo-Shopping-Demo [spring-boot] ~/IdeaPr
.idea
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CUSTOMER
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SeDiCoShoppingApplication.java
<publicIP>localhost</publicIP>
<port>3307</port>
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<table>ORDERS</table>
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<password>jenskohler</password>
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<column>O_SHIP_ADDR_ID</column>
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</targets>
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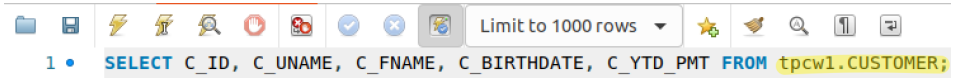
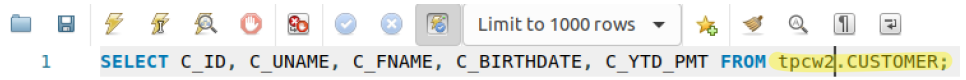
Backup





Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Cont

#	C_ID	C_UNAME	C_FNAME	C_BIRTHDATE	C_YTD_PMT
1	1	OG	gV;.O{*:uxrXG^M	NULL	NULL
2	2	AL	]yiO,TeM,nIx-HF	NULL	NULL
3	3	RI	?wQFKaZc	NULL	NULL
4	4	RE	Ou$cRl?G	NULL	NULL
5	5	SE	;I#Lz?x$!	NULL	NULL
6	6	AT	w)hYK?uHIyd	NULL	NULL
7	7	UL	pF##Bz;W	NULL	NULL
8	8	IN	xoWOwruZ	NULL	NULL
9	9	NG	GrVRR@@Yq){	NULL	NULL
10	10	OGBA	e]]=TG[bpu%g	NULL	NULL
11	11	OGOG	g |T)gP;IhoHID+	NULL	NULL
12	12	OGAL	:nBe!u_AlE;$vCb	NULL	NULL
13	13	OGRI	k%C&yqBwQM	NULL	NULL
14	14	OGRE	-VBGGyW]jJgh…	NULL	NULL
15	15	OGSE	T-BBdj#$;L	NULL	NULL
16	16	OGAT	;Uz!WHa)Sve,_pi	NULL	NULL
17	17	OGUL	Z=gJYpGhF-D	NULL	NULL
18	18	OGIN	+oCB.yUWBot…	NULL	NULL
19	19	OGNG	;eM=j-SYqlBryC	NULL	NULL

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Conte

#	C_ID	C_UNAME	C_FNAME	C_BIRTHDATE	C_YTD_PMT
1	1	NULL	NULL	1993-12-13	534.53
2	2	NULL	NULL	1893-11-14	160.14
3	3	NULL	NULL	1895-05-10	111.54
4	4	NULL	NULL	1896-08-15	489.22
5	5	NULL	NULL	1896-11-24	21.56
6	6	NULL	NULL	1904-05-10	182.26
7	7	NULL	NULL	1903-02-27	388.79
8	8	NULL	NULL	1986-01-30	610.74
9	9	NULL	NULL	1953-12-11	692.19
10	10	NULL	NULL	1895-10-22	644.93
11	11	NULL	NULL	1964-08-27	500
12	12	NULL	NULL	1889-01-20	439.54
13	13	NULL	NULL	1971-09-18	77.36
14	14	NULL	NULL	1922-09-30	315.94
15	15	NULL	NULL	1920-08-18	853.21
16	16	NULL	NULL	1959-06-24	464.37
17	17	NULL	NULL	1911-12-31	598.22
18	18	NULL	NULL	1919-06-16	680.92
19	19	NULL	NULL	1921-08-13	24.84

Backup

Limit to 1000 rows

```
1  SELECT O_ID, O_C_ID, O_DATE, O_STATUS, O_TOTAL FROM tpcw1.ORDERS;
```

Result Grid | Filter Rows: | Edit: | Export/Import:

#	O_ID	O_C_ID	O_DATE	O_STATUS	O_TOTAL
1	1	29115	2014-01-22	NULL	9648.777475
2	2	145714	2013-12-22	NULL	1547.252675
3	3	39638	2013-12-15	NULL	3098.6674
4	4	225308	2014-02-06	NULL	175.79685
5	5	31020	2014-02-02	NULL	3579.2974
6	6	272801	2014-01-20	NULL	9052.957175
7	7	132915	2014-02-04	NULL	28.128925
8	8	219409	2014-01-08	NULL	7919.8462
9	9	223359	2014-02-10	NULL	6607.2690250000005
10	10	271273	2013-12-29	NULL	2197.2357
11	11	74181	2014-01-17	NULL	9284.338925
12	12	54168	2014-01-10	NULL	4793.6336
13	13	124064	2014-01-18	NULL	1154.69225
14	14	257257	2013-12-30	NULL	8866.002700000001
15	15	273880	2014-02-08	NULL	8285.789424999999
16	16	222217	2014-01-23	NULL	7777.264875
17	17	104001	2013-12-17	NULL	10280.338974999999
18	18	117060	2013-12-17	NULL	1787.60835
19	19	189278	2014-01-21	NULL	6115.774825

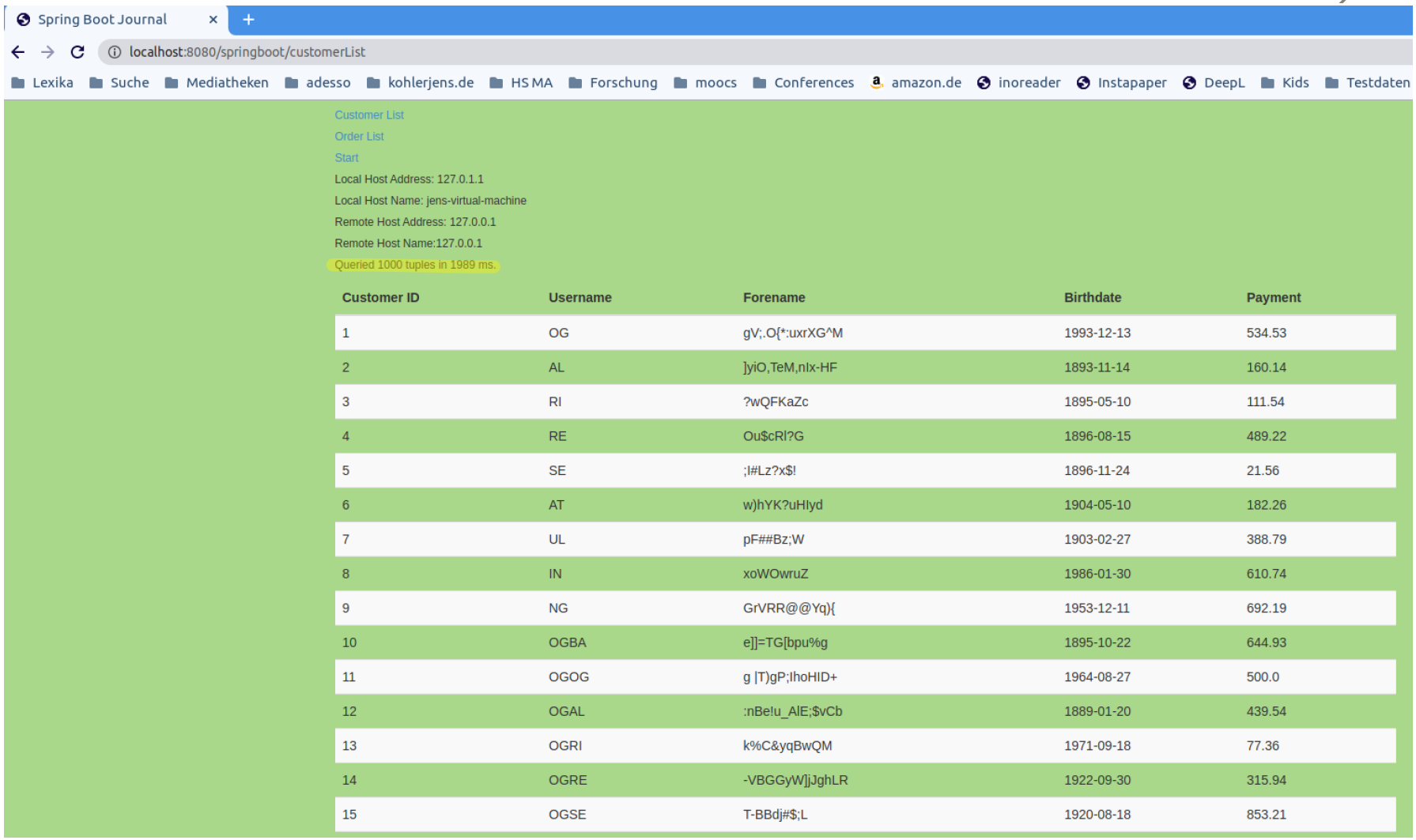
Limit to 1000 rows

```
1 •  SELECT O_ID, O_C_ID, O_DATE, O_STATUS, O_TOTAL FROM tpcw2.ORDERS;
```

Result Grid | Filter Rows: | Edit: | Export/Import:

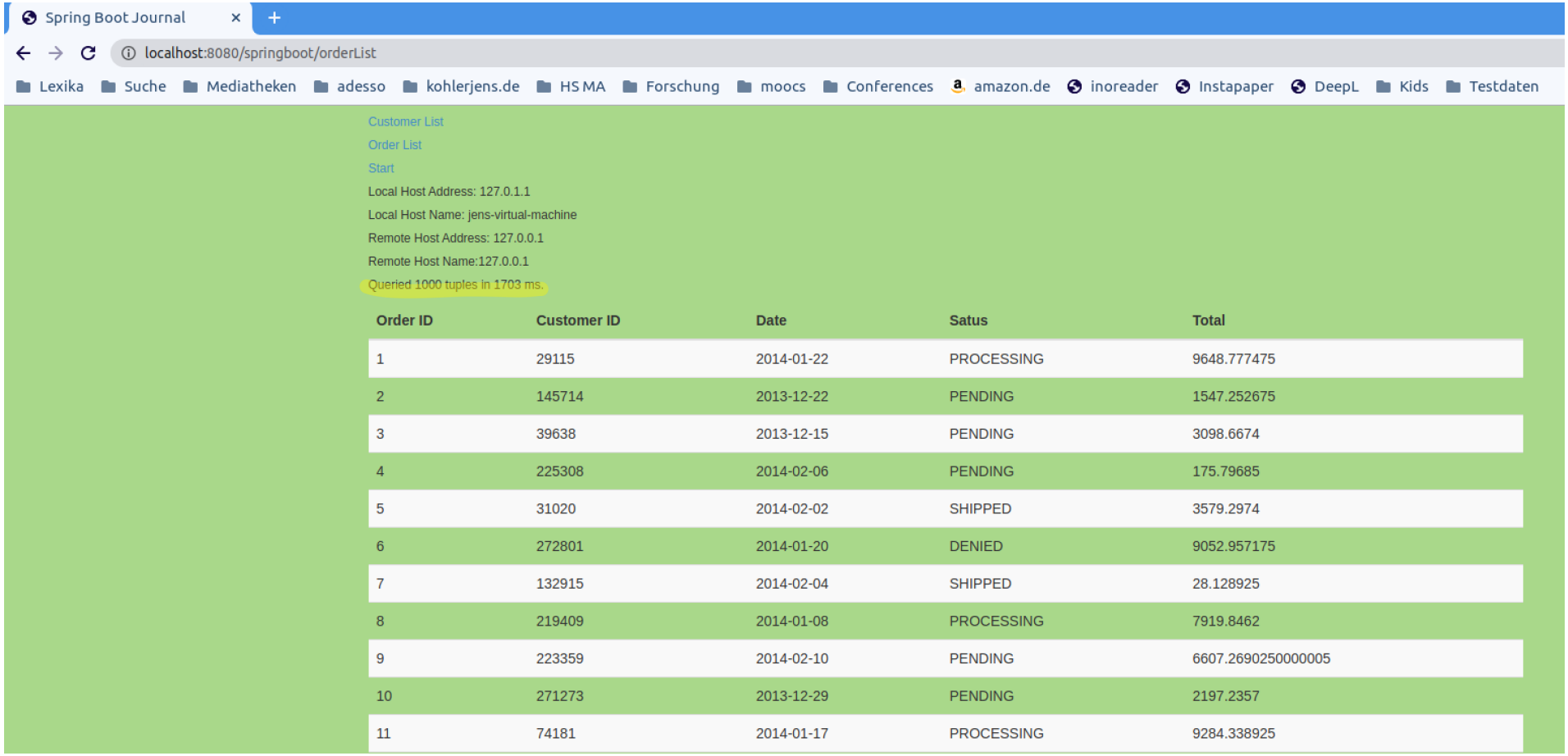
#	O_ID	O_C_ID	O_DATE	O_STATUS	O_TOTAL
1	1	NULL	NULL	PROCESSING	NULL
2	2	NULL	NULL	PENDING	NULL
3	3	NULL	NULL	PENDING	NULL
4	4	NULL	NULL	PENDING	NULL
5	5	NULL	NULL	SHIPPED	NULL
6	6	NULL	NULL	DENIED	NULL
7	7	NULL	NULL	SHIPPED	NULL
8	8	NULL	NULL	PROCESSING	NULL
9	9	NULL	NULL	PENDING	NULL
10	10	NULL	NULL	PENDING	NULL
11	11	NULL	NULL	PROCESSING	NULL
12	12	NULL	NULL	PROCESSING	NULL
13	13	NULL	NULL	PROCESSING	NULL
14	14	NULL	NULL	SHIPPED	NULL
15	15	NULL	NULL	SHIPPED	NULL
16	16	NULL	NULL	SHIPPED	NULL
17	17	NULL	NULL	SHIPPED	NULL
18	18	NULL	NULL	PROCESSING	NULL
19	19	NULL	NULL	DENIED	NULL

Backup



Customer ID	Username	Forename	Birthdate	Payment
1	OG	gV;.O{*:uxrXG^M	1993-12-13	534.53
2	AL	]yiO,TeM,nIx-HF	1893-11-14	160.14
3	RI	?wQFKaZc	1895-05-10	111.54
4	RE	Ou$cRl?G	1896-08-15	489.22
5	SE	;I#Lz?x$!	1896-11-24	21.56
6	AT	w)hYK?uHIyd	1904-05-10	182.26
7	UL	pF##Bz;W	1903-02-27	388.79
8	IN	xoWOwruZ	1986-01-30	610.74
9	NG	GrVRR@@Yq){	1953-12-11	692.19
10	OGBA	e]]=TG[bpu%g	1895-10-22	644.93
11	OGOG	g |T)gP;IhoHID+	1964-08-27	500.0
12	OGAL	:nBe!u_AlE;$vCb	1889-01-20	439.54
13	OGRI	k%C&yqBwQM	1971-09-18	77.36
14	OGRE	-VBGGyW]jJghLR	1922-09-30	315.94
15	OGSE	T-BBdj#$;L	1920-08-18	853.21

Backup



Order ID	Customer ID	Date	Satus	Total
1	29115	2014-01-22	PROCESSING	9648.777475
2	145714	2013-12-22	PENDING	1547.252675
3	39638	2013-12-15	PENDING	3098.6674
4	225308	2014-02-06	PENDING	175.79685
5	31020	2014-02-02	SHIPPED	3579.2974
6	272801	2014-01-20	DENIED	9052.957175
7	132915	2014-02-04	SHIPPED	28.128925
8	219409	2014-01-08	PROCESSING	7919.8462
9	223359	2014-02-10	PENDING	6607.2690250000005
10	271273	2013-12-29	PENDING	2197.2357
11	74181	2014-01-17	PROCESSING	9284.338925