

30-09-2025

From Paper to Pixels: Kaufland's Electronic Price Labeling Revolution

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Business Context

01

SCHWARZ



Kaufland Price Labeling



1.600

Kaufland stores



≈ 30.000

Articles per store



2016

Year of first electronic shelf labels (ESLs)



≈ 500

ESLs per store

Full ESL rollout in Fruit & Vegetables and Bakery



Kaufland Price Labeling

**Grillbox Ribs&Wings
Schweinerippen und**
Hühnerflügel marin.
800g Packung

E: 07.08.25
G: 13.04.25

5 P
0013724 1006
9006450993108

9.99
(1 kg = 12.49)

4 Ordersatz

**Backfrische Pizza
Thunfisch**
Nestlé Wagner
340g Schachtel

ZERTIFIZIERTE
NACHHALTIGE
FISCHEREI
MSC
www.msc.org/de

DISCOUNT-
BILLIG!

E: 04.08.25
G: 13.01.23

10
0871574 1020
4009233006854

3.49
(1 kg = 10.27)

AUS UNSERER
WERBUNG

**Mövenpick Kaffee
Der Himmlische**
gemahlen
500g Packung

36%
~~9.49~~

von 07.08.25
bis 13.08.25

30
2404184 1043
4006581001 777

5.99
(1 kg = 11.98)

4 Ordersatz

**Bioland Bauernhandkä
Sauermilchkäse**
0,5% Fett i.Tr.
200g Stück

LAKTOSEFREI

Bioland

E: 04.08.25
G: 27.02.22

5
0500484 1024
4051900004 052

2.99
(1 kg = 14.95)

**Nordh.Heuchelberg
Lemberger**
QbA trocken
1,0l Flasche
Pfand 0,03
Preis+Pfand 5.52

Rotwein

Kräftig

HERGESTELLT IN
BADEN-
WÜRTTEMBERG

E: 04.08.25
G: 23.01.21

1711365 1055
4016941000 715

5.49

**Kaufland
Card**
Kaufland Card Rabatt

**TUC
Cracker
Original**
1 x 3x100g

11.08.2025 - 13.08.2025
entspricht per Packung 1,59
Standardpreis per 1 kg 5,97

1249521
G: 11.08.25

1.59
(1 kg = 5.30)

IT Systems

02

EPS Classic



Hybrid Price Labeling for
≈ 50.000.000



Age in years (started with J2SE 1.4 and J2EE 1.4)
≈ 25



Invest in person / years (permanently 3-6 developers)
> 75



Infrastructure (Production)
24 Servers, 108 Cores, 358 GB RAM



Architecture (JEE on application server)
JEE Monolith



EPS NG



Hybrid Price Labeling for
> 100.000.000 Labels



Age
1.5 Years



Team
15 Person



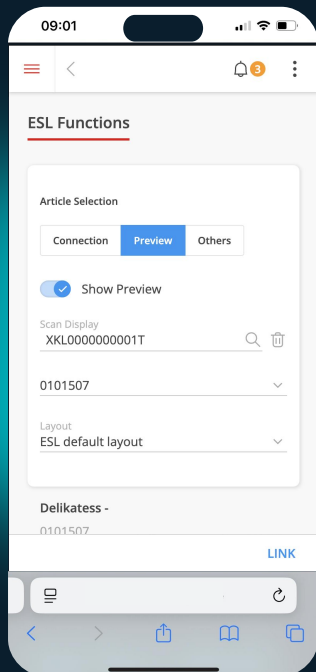
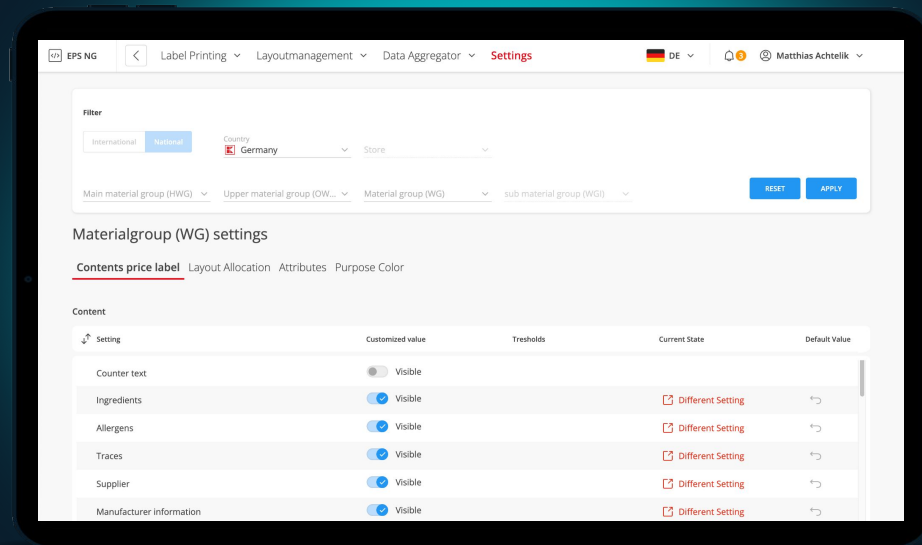
Architecture (cloud native & service oriented)
Self-contained Systems



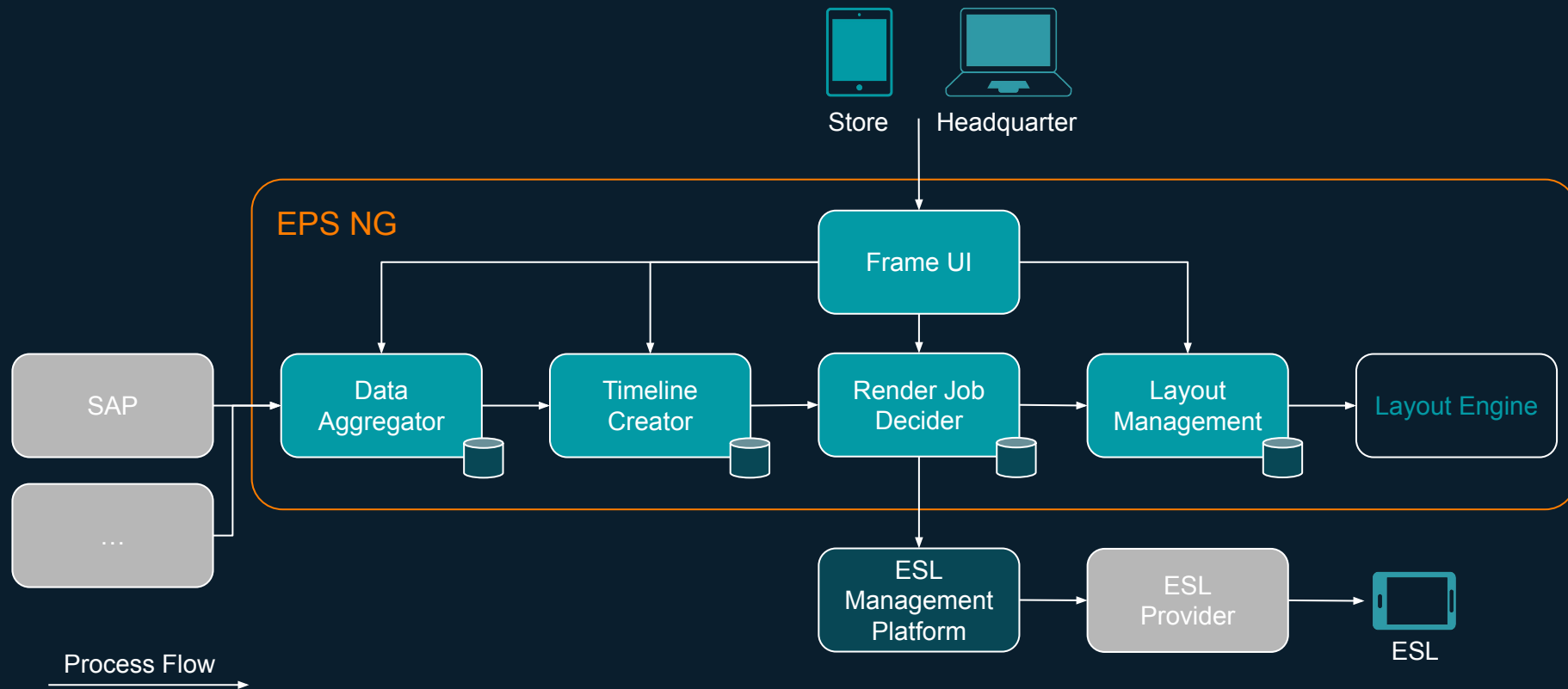
Vue.js



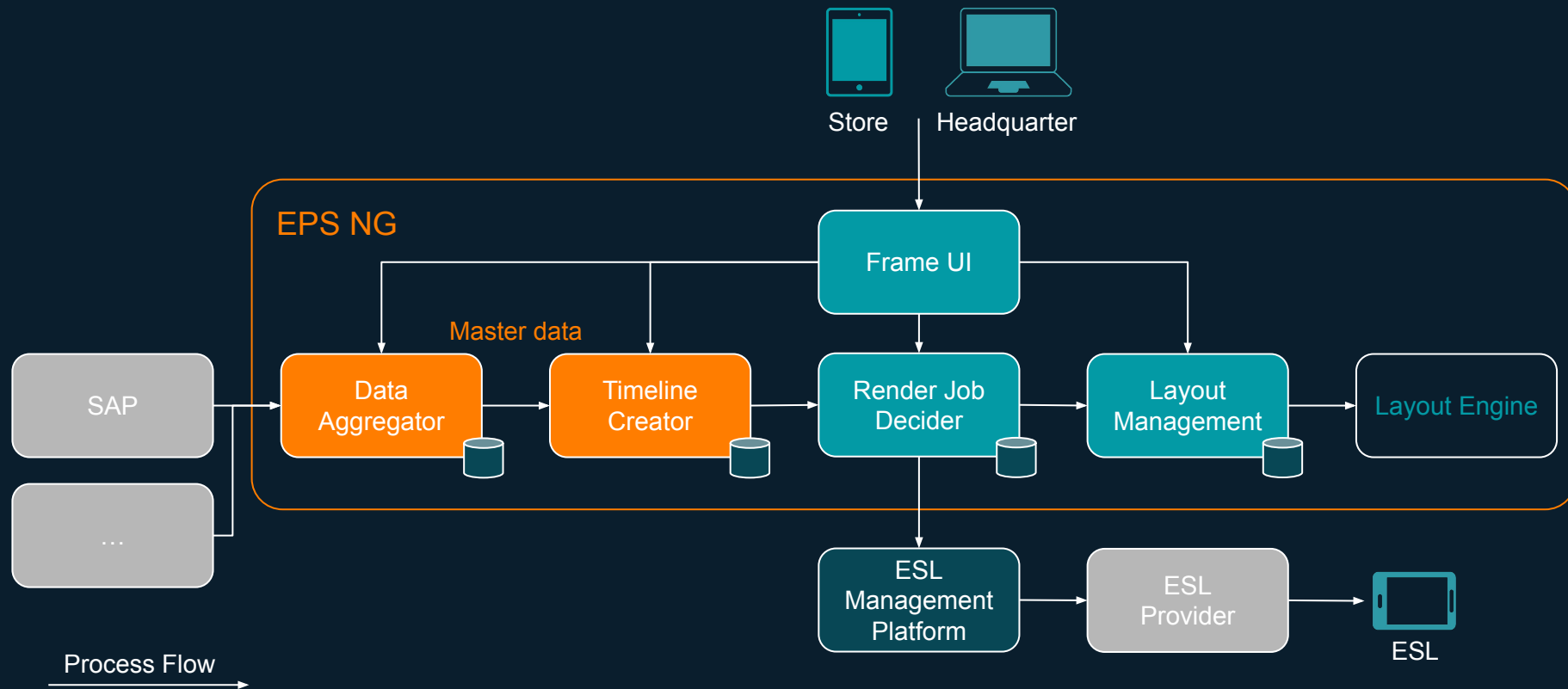
EPS NG



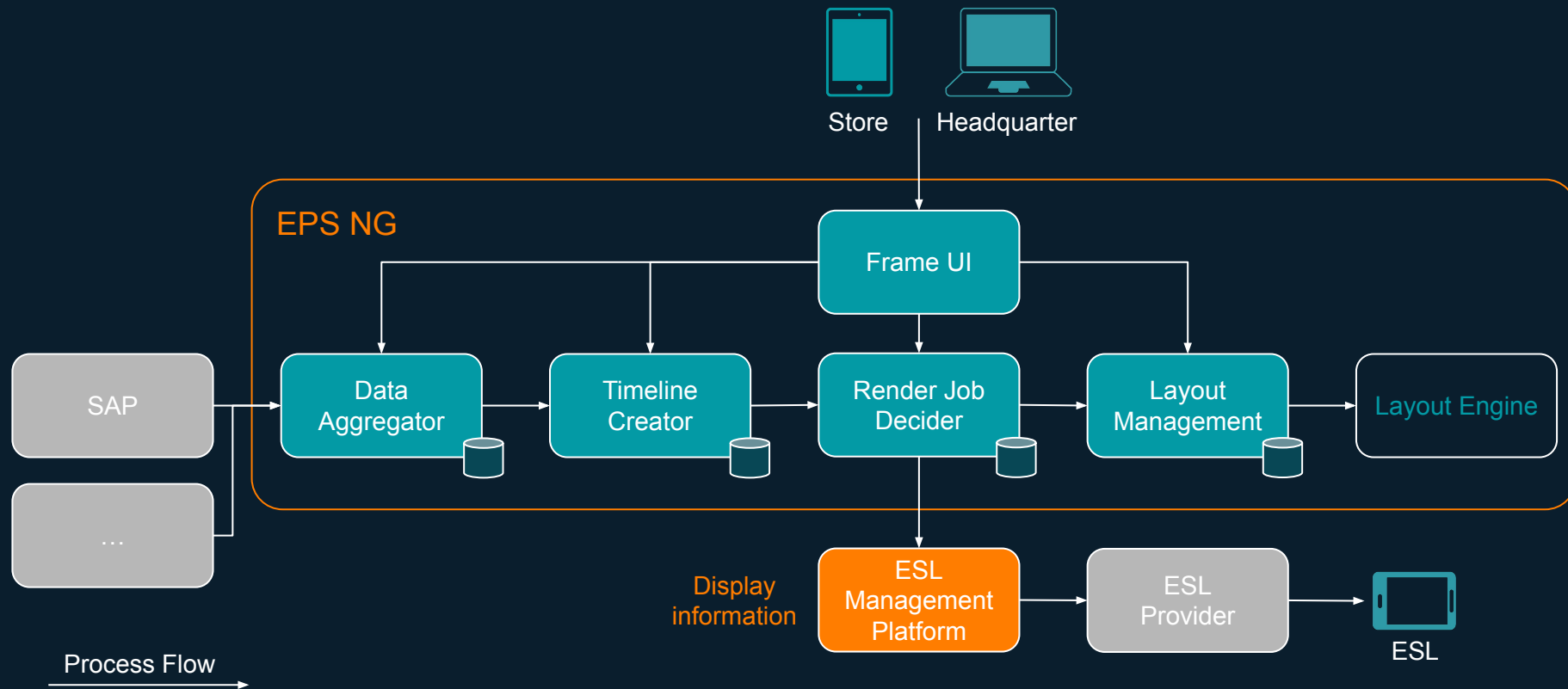
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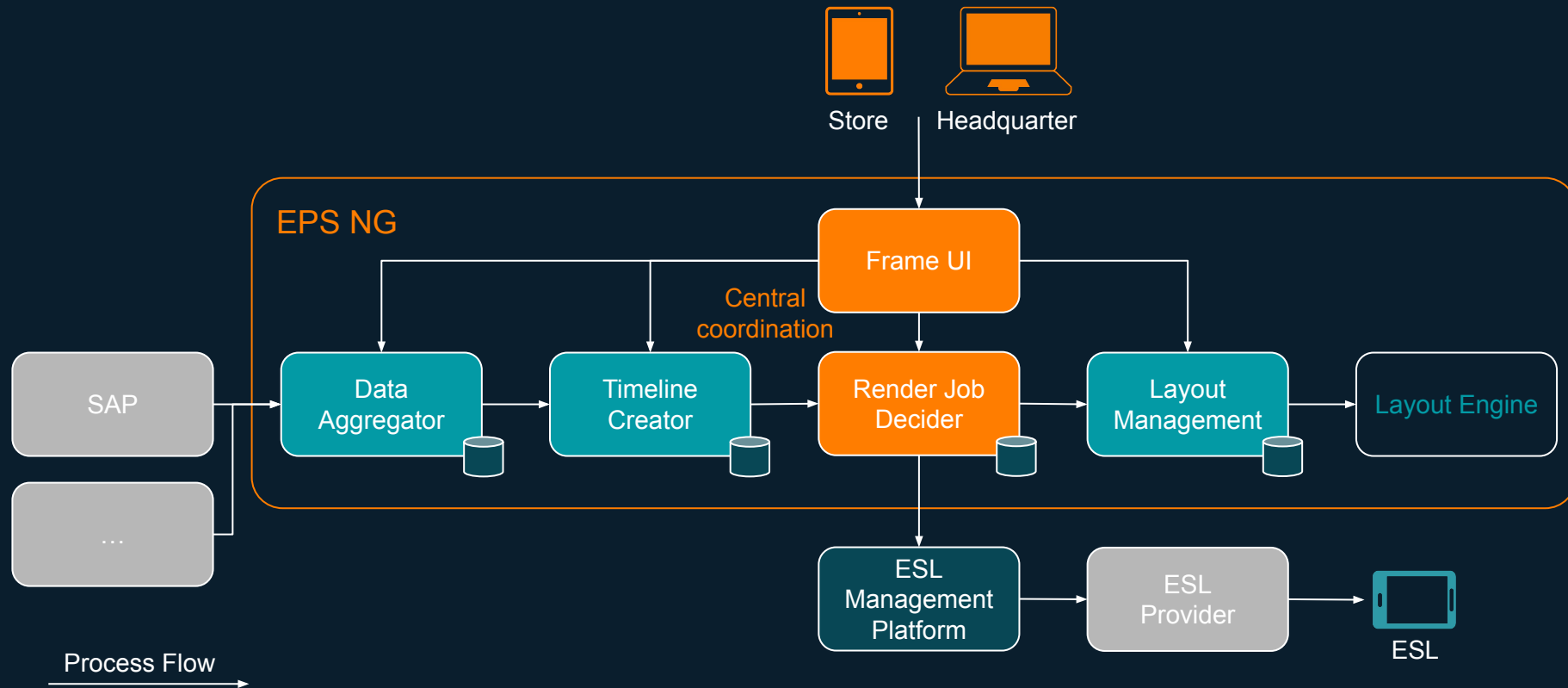
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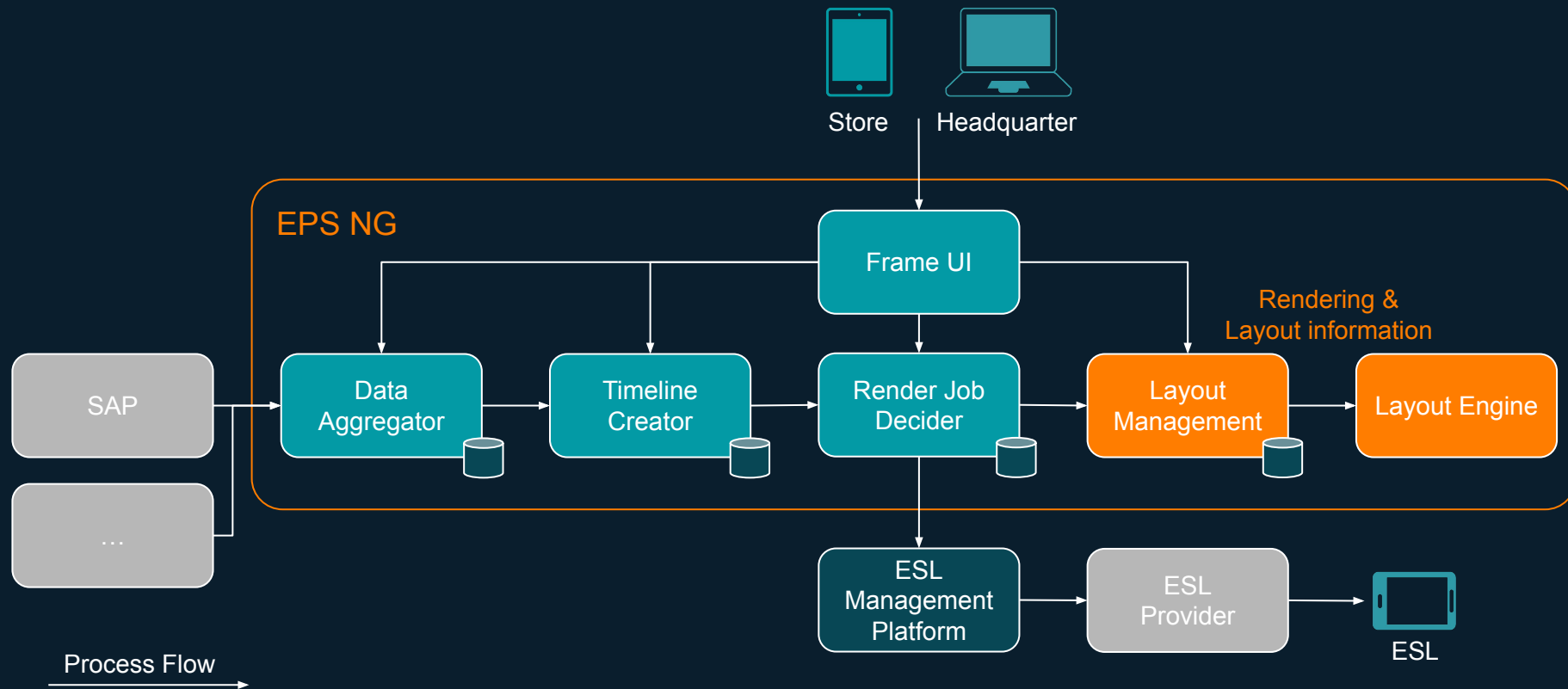
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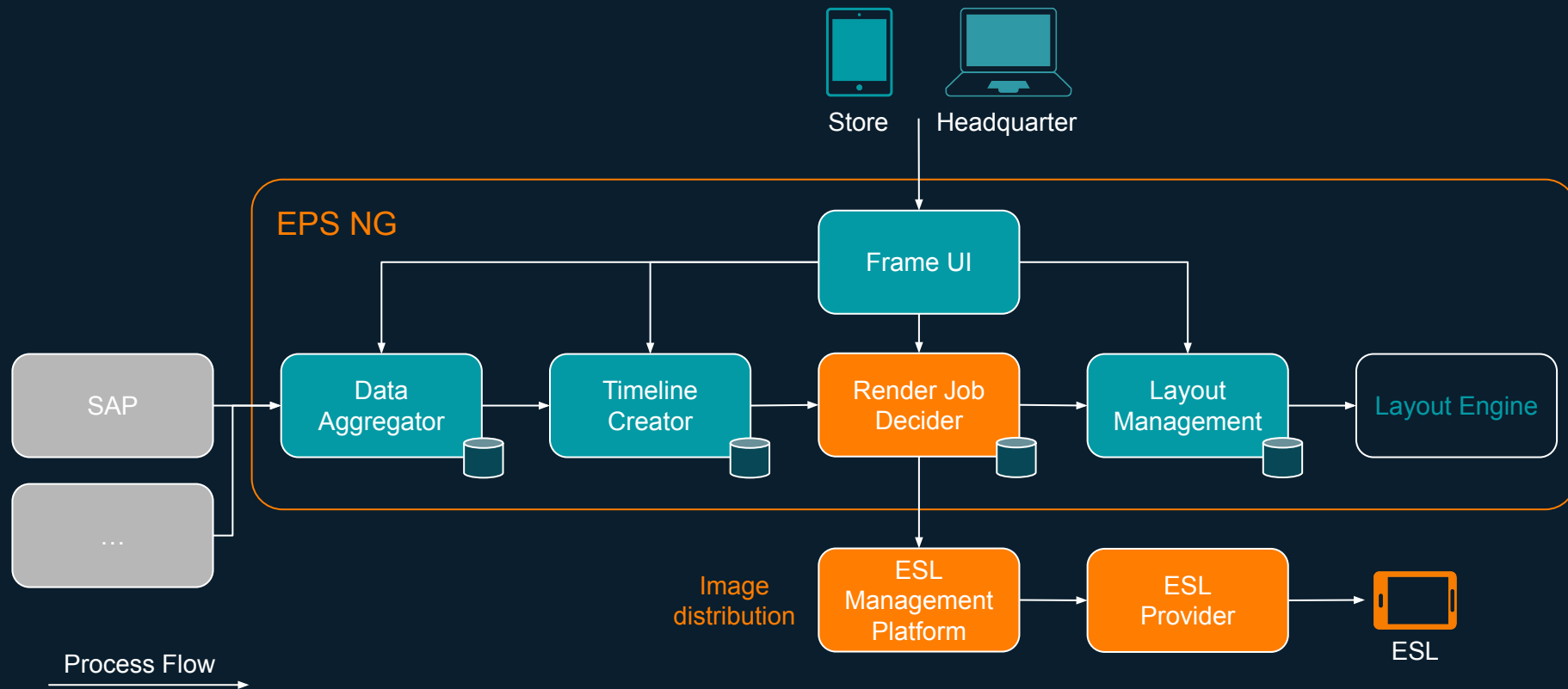
EPS NG



EPS NG



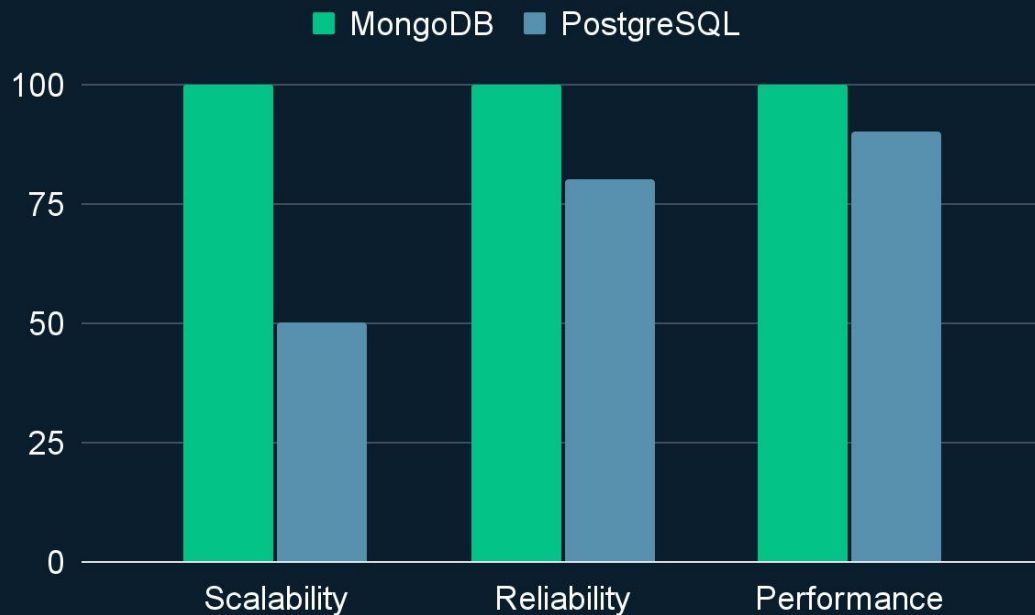
EPS NG



The journey with MongoDB

03

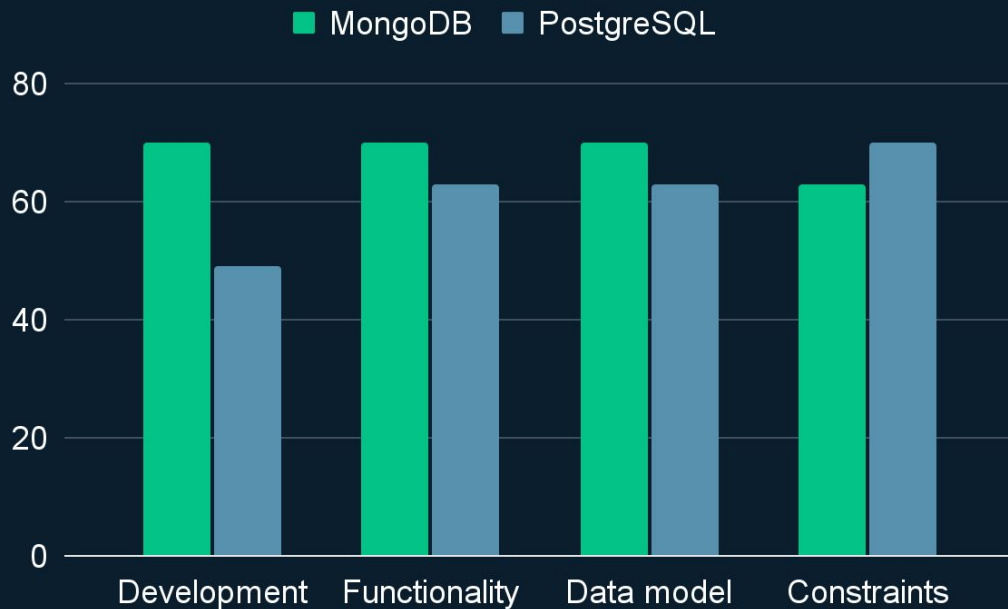
Our Decision-Making



It just works

- MongoDB works really stable and can handle our performance requirements very well.

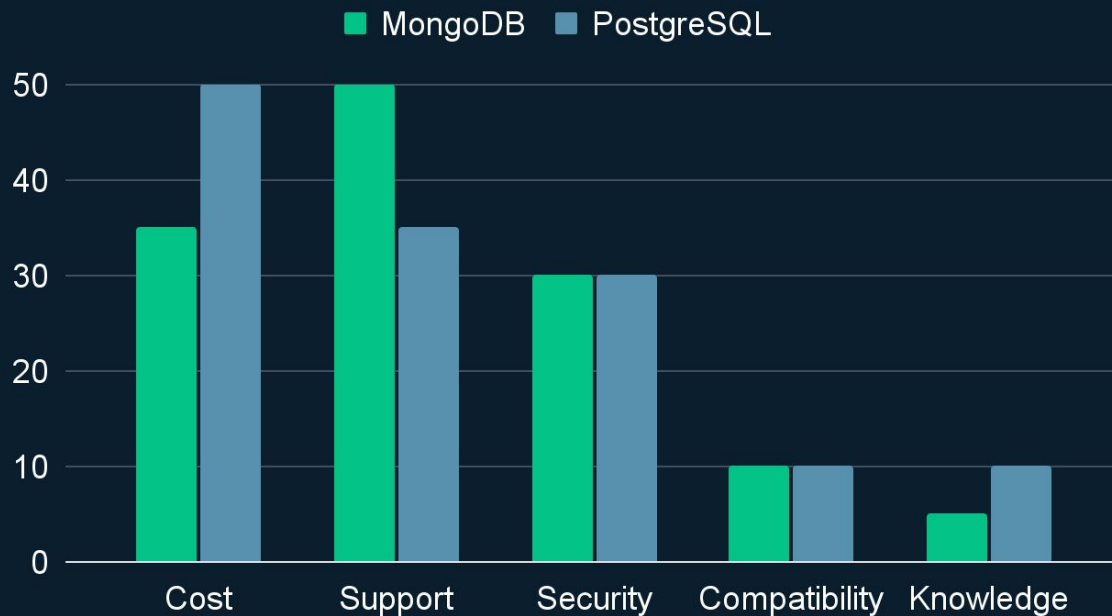
Our Decision-Making



We like it

- The flexible data model and the avoidance of ORM frameworks simplify development considerably.

Our Decision-Making



It suits

- Licence costs vs. simpler development.
- Contact to the experts and a good knowledge base.
- Usable by developers without any experience.

Our Article Data Model

- A logical identifier
- Entries that are complete in themselves
- 80.000.000 documents $\approx$ 50% of expected quantity
- Storage size = 58 GB | uncompressed = 378 GB
- Avg. size = 4,7 KB

Timeline

Identifier

countryCode: DE
storeNumber: 5190
articleNumber: 2424240

Entries []

validFrom: 2025-09-25T22:00:00.000+00:00
labelData: ...
layoutData: ...

validFrom: 2025-10-02T22:00:00.000+00:00
labelData: ...
layoutData: ...

Our Challenges

- Data Model Design
 - Avoid transactions
- Right Indexes
 - Order of fields, Compound, Sparse, ...
- Data Migration
 - Zero downtime
- Amount of Data
 - Performant operations



Our Highlights

- Query Syntax & Aggregation Pipeline
 - Easy, dynamic builders
- Codecs
 - Change type of an attribute
- Change Streams
 - Inform all application instances about changes
- With 4 CPUs and 16 GB RAM, we have a mid-sized database that offers plenty possibilities for growth.



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I look forward to
your **questions.**