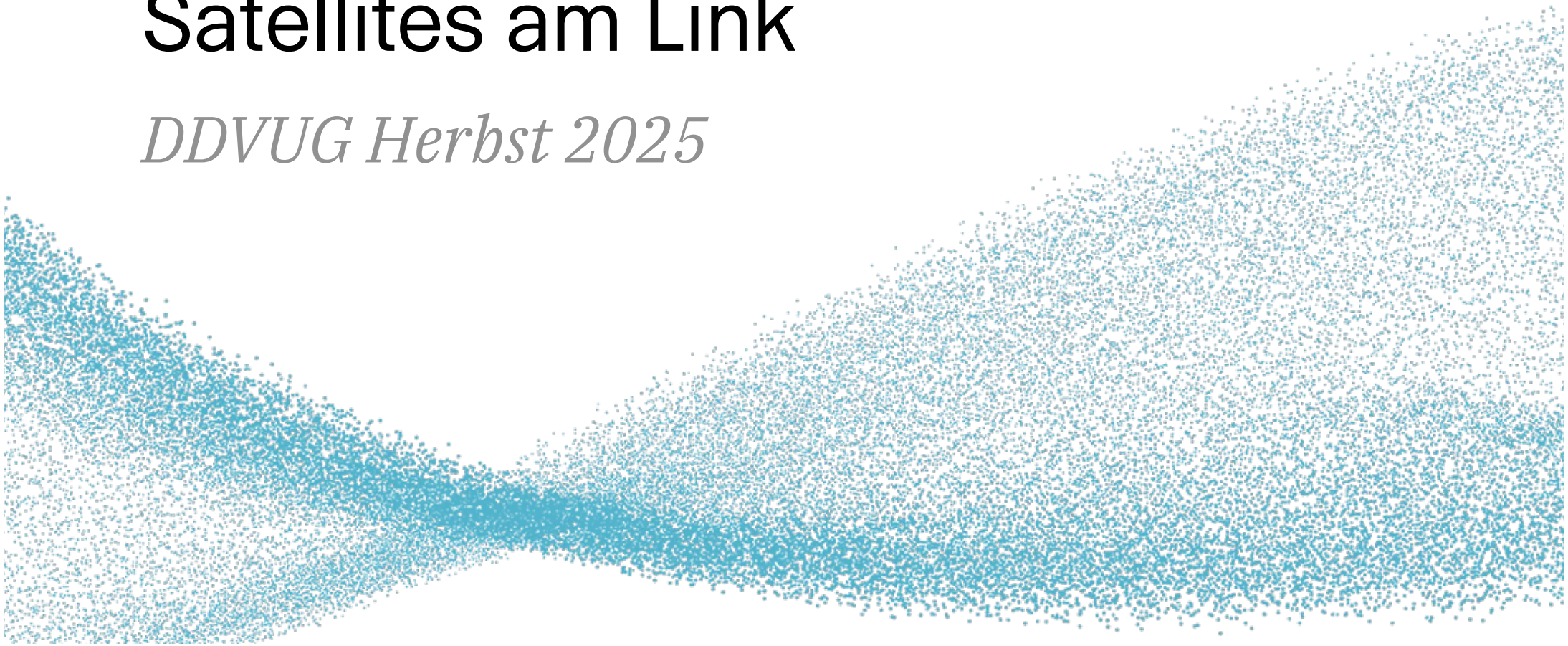
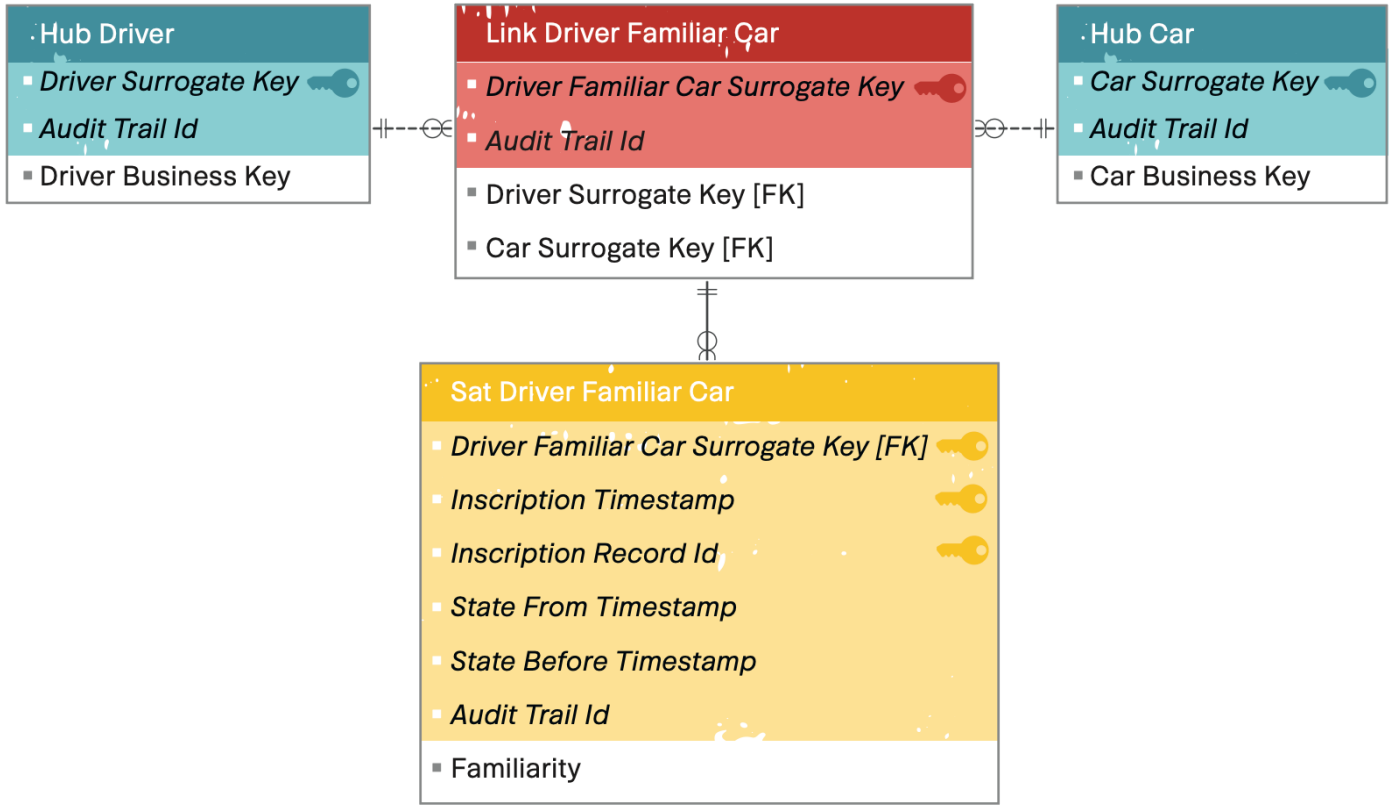
Data Engine
Thinking

Data Vault End-Dating Satellites am Link

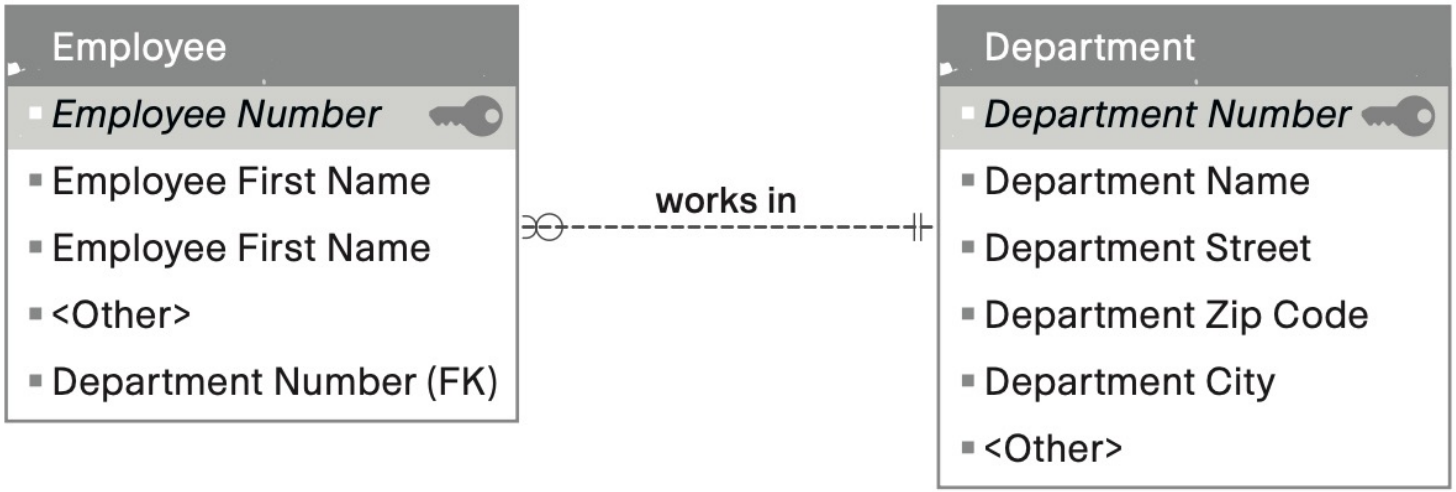
DDVUG Herbst 2025



Traditionally, in Data Vault



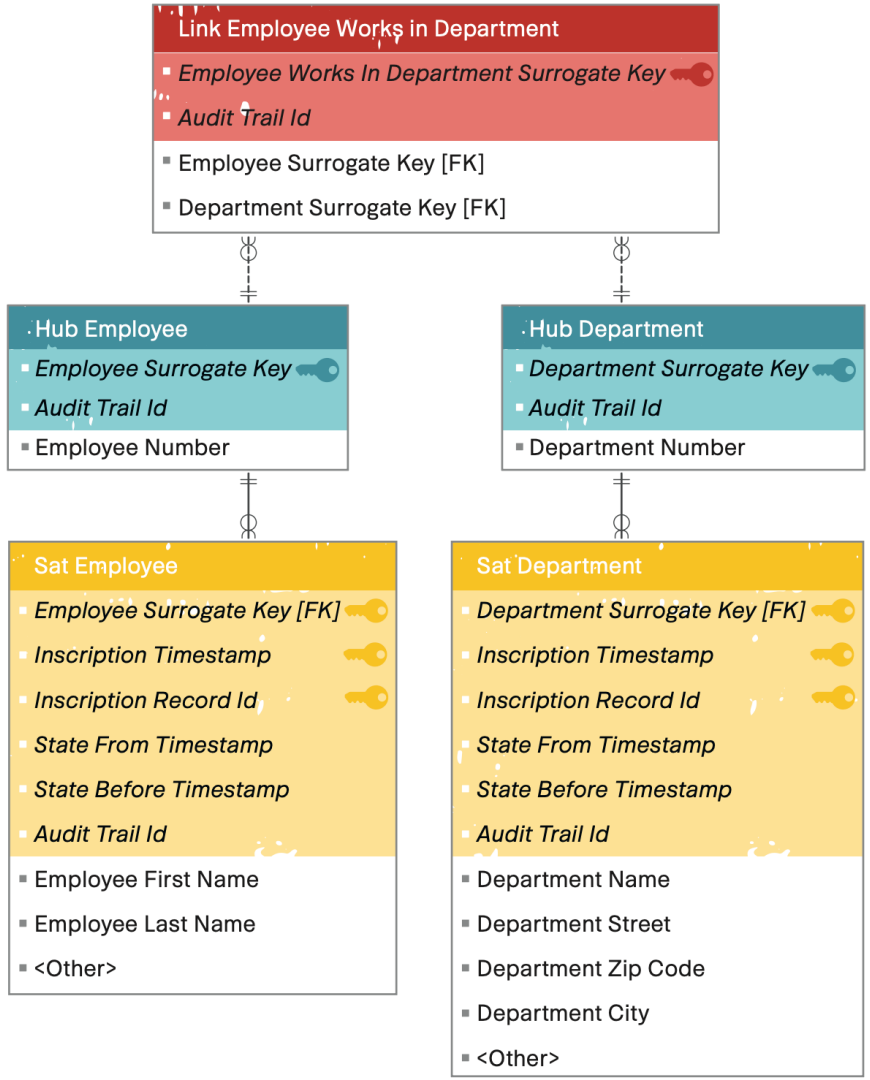
Take a step back – the information model



Hub-Sat combo

Based on the notion

1. The attribute that identifies the entity becomes the business key
2. Any descriptive attributes are placed in a Satellite
3. The relationship itself is represented by a Link

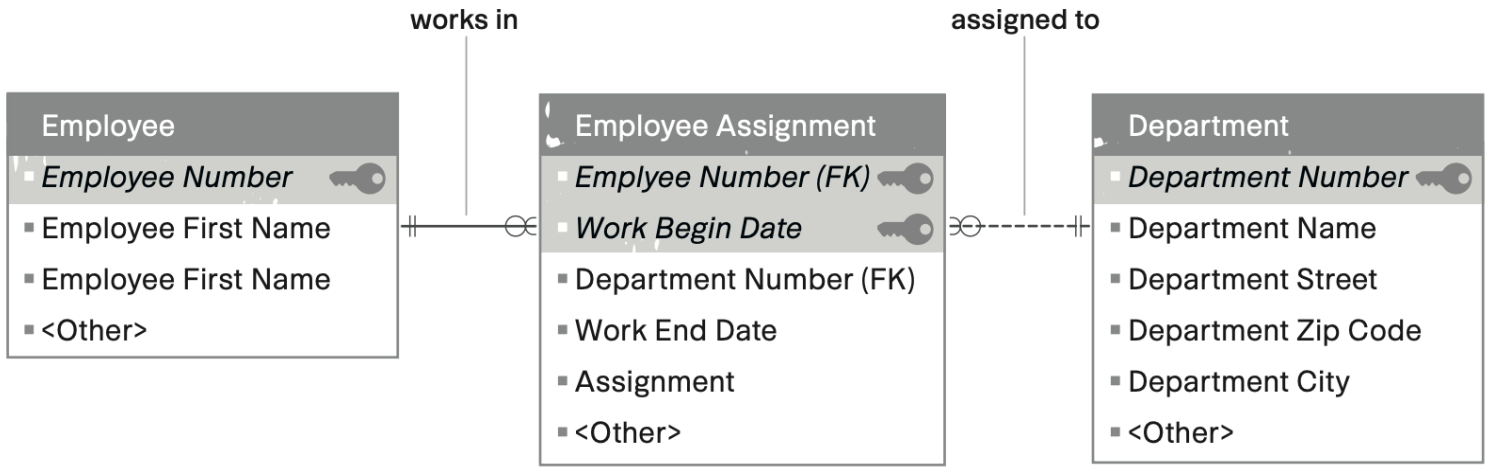


Data Engine Thinking

Emp changes Dept

Only for technical historization

Relationship contains attributes



Dependend Hub

The updated modeling guidelines:

1. The attribute that identifies the entity becomes the business key
2. Any descriptive attributes are placed in the Satellite
3. The relationship itself is represented by a Link
4. An associative entity in the information model is implemented as a Hub, Satellite, and Link combination

Data Vault | From business data model

Satellite on Links, yes or no? – The ‘Diego guide‘

English Blogpost

German Blogpost

Data Engine Thinking

Driving Key

Staging Layer

Employee	Department	Inscription Timestamp
John	Human Resources	2025-01-02
John	Marketing	2025-03-05

Link

Employee	Department
John	Human Resources
John	Marketing

Driving Key

Staging Layer

Employee	Department	Inscription Timestamp
John	Human Resources	2025-01-02
John	Marketing	2025-03-05

Link

Employee	Department
John	Human Resources
John	Marketing

End-Dating Link-Satellite

Employee	Department	Inscription Timestamp	State From Timestamp	State Before Timestamp
John	Human Resources	2025-01-02	2025-01-02	2025-03-05
John	Marketing	2025-03-05	2025-03-05	9999-12-31

Driving Key: A-B-A Pattern

Staging Layer

Employee	Department	Inscription Timestamp
John	Human Resources	2025-01-02
John	Marketing	2025-03-05
John	Human Resources	2025-09-01

Link

Employee	Department
John	Human Resources
John	Marketing

End-Dating Link-Satellite

Employee	Department	Inscription Timestamp	State From Timestamp	State Before Timestamp
John	Human Resources	2025-01-02	2025-01-02	2025-03-05
John	Marketing	2025-03-05	2025-03-05	2025-09-01
John	Human Resources	2025-09-01	2025-09-01	9999-12-31

Driving Key

Sum up and pitfalls

- Employee is the driving key
- Technical historization only
- End-Dating approach of regualar satellite
- A business rule
- Relies on data of the PSA
- Link does not reflect temporal dynamics

(Link) Driving Key and insert-only

Staging Layer

Employee	Department	Inscription Timestamp
John	Human Resources	2025-01-02
John	Marketing	2025-03-05
John	Human Resources	2025-09-01

Link

Employee	Department
John	Human Resources
John	Marketing

End-Dating Link-Satellite

Employee	Department	Inscription Timestamp	State From Timestamp
John	Human Resources	2025-01-02	2025-01-02
John	Marketing	2025-03-05	2025-03-05
John	Human Resources	2025-09-01	2025-09-01

Calculate the before timestamp, knowiing the driving key

```
SELECT
    <timestamp> AS FROM_TIMESTAMP
   ,LEAD(<timestamp>,1,'9999-12-31')
         OVER (PARTITION BY <driving key in Link)>
         ORDER BY <timestamp>)
AS BEFORE_TIMESTAMP
FROM <Link> link
JOIN <(Link)Satellite> sat
     ON link.<Link key> = sat.<Link key>
```

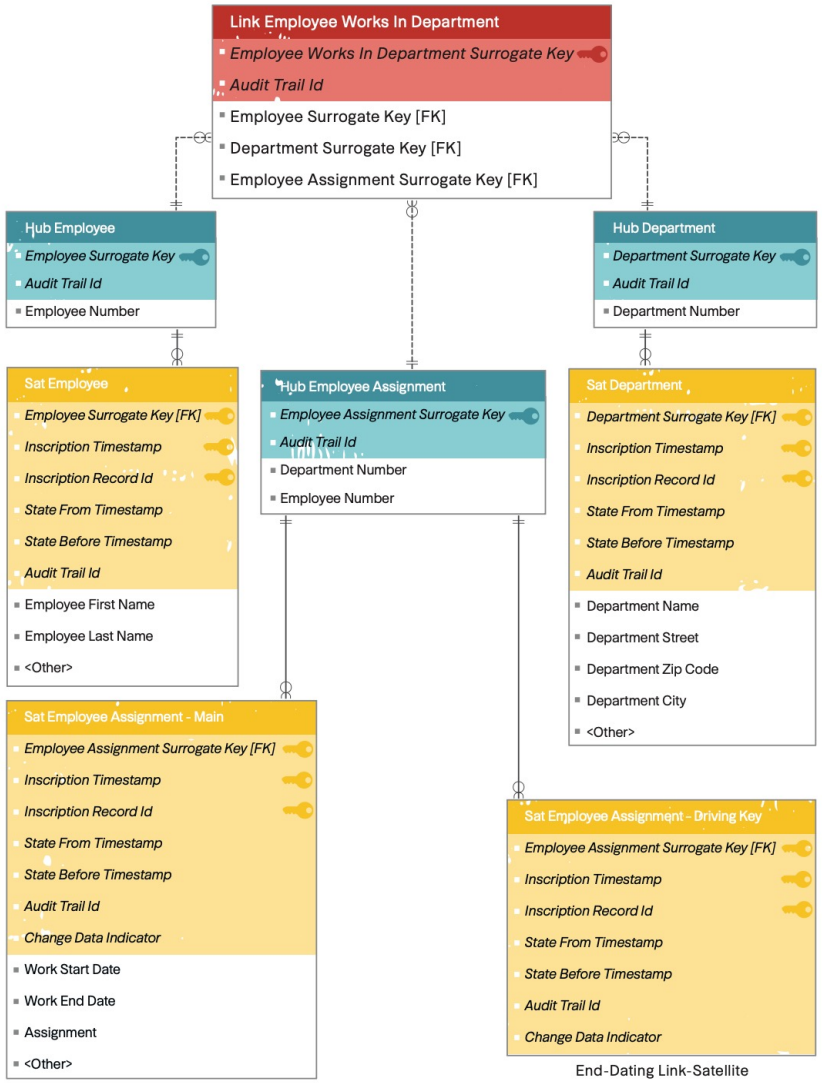
(Hub) Driving Key and insert-only

Retrieving data, knowing the driving key

```
SELECT
    LEAD([State_From_Timestamp],1,'9999-12-31‘)
        OVER (PARTITION BY [Employee Number]
        ORDER BY [State_From_Timestamp])
    AS [State_Before_Timestamp]
FROM <Dependend Hub> hub
JOIN <Driving Key Satellite> sat
        ON hub.<Hub key> = sat.<Hub key>
```

Retrieving data, regular Satellite

```
SELECT
    LEAD([State_From_Timestamp],1,'9999-12-31‘)
        OVER (PARTITION BY [Employee Assignment Surrogate Key]
        ORDER BY [State_From_Timestamp])
    AS [State_Before_Timestamp]
FROM <Regular Satellite> sat
```

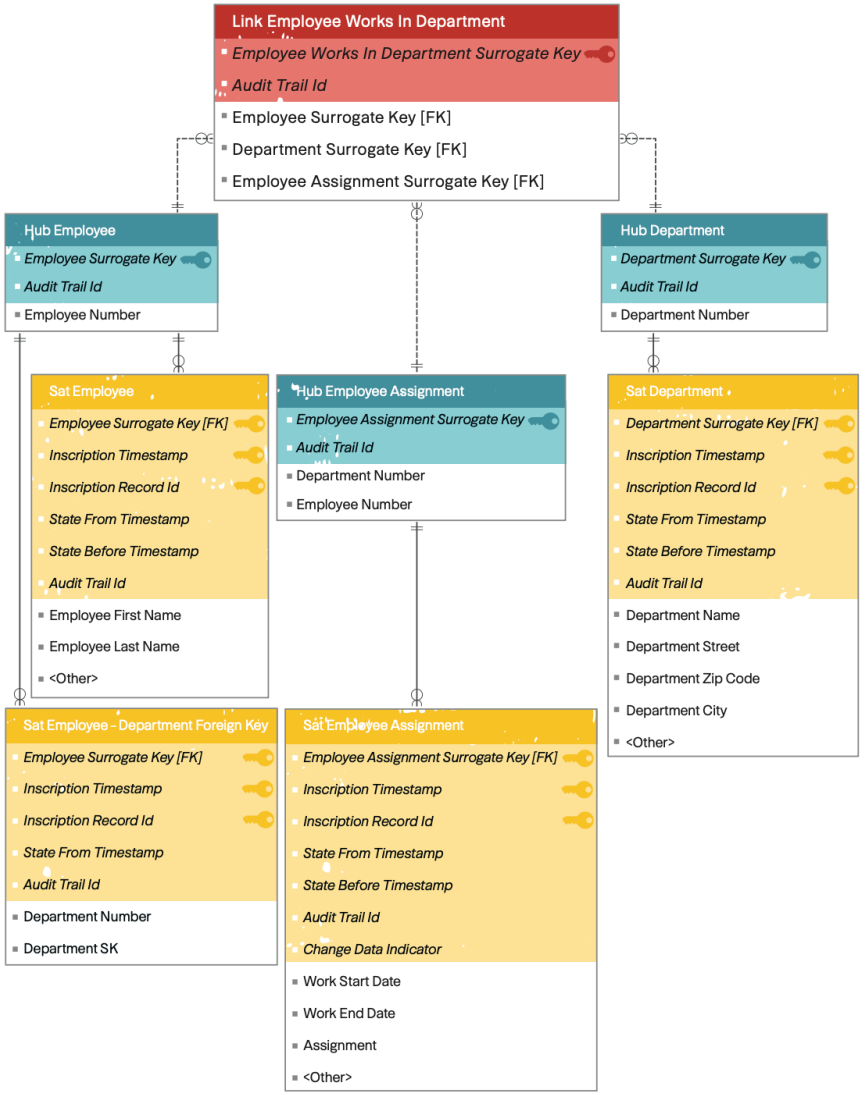


End-Dating Link-Satellite

Modifying the approach for insert-only

Retrieving data, knowing the driving key

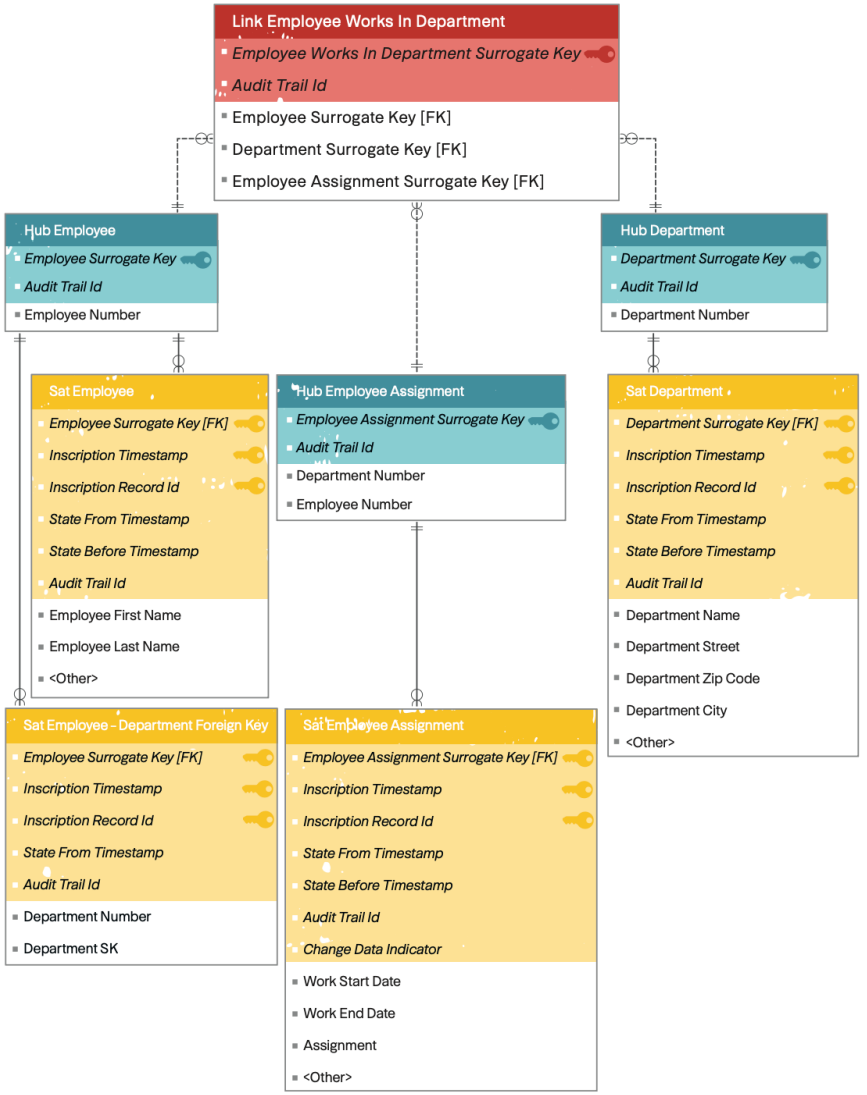
```
SELECT
    LEAD([State_From_Timestamp],1,'9999-12-31')
    OVER (PARTITION BY [Employee Surrogate Key]
       ORDER BY [State_From_Timestamp])
   AS [State_Before_Timestamp]
FROM <Foreign Key Satellite> sat
JOIN <Hub> hub
   ON hub.<Hub key> = sat.<Hub key>
JOIN <Link> link
  ON hub.<Hub key> = link.<Hub key>
  AND sat.<Link key> = link.<Link key>
```



Modifying the approach for insert-only

Advantages

- Making it explicit in the data model
- Driving key mechanism moved to Employee
- Regular satellite loading pattern
- No ‚need to know' the driving key
- Simplify comlexity



The Book

Data is evidence on past activity, events that are frozen in time for us to uncover and analyze. Without understanding the context of how it is created, data is simply 'stuff'.

Data Engine Thinking covers the end-to-end methodology to deliver a data solution that is truly designed to adapt to progressive understanding - and ultimately meet the business' needs.

- Design and implement a solution that is designed for change
- Solve real-world problems encountered when working with data
- Fully automate your delivery

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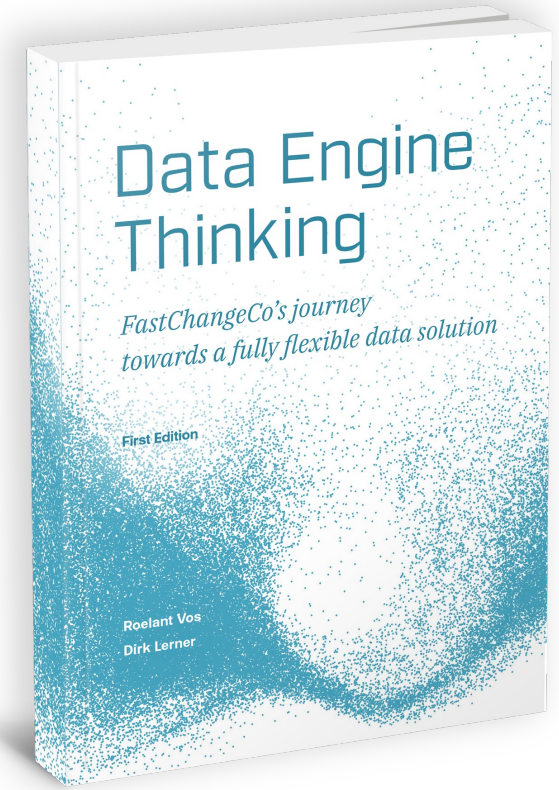

Contact

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