



Row Level Security in SAP Data Warehouse Cloud Modelling Scenarios

May 2021

PUBLIC

Current **challenges** (End-)Users face

Request authorizations

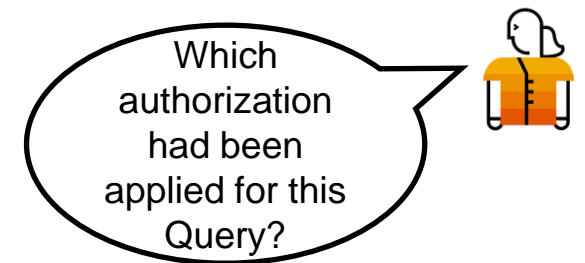
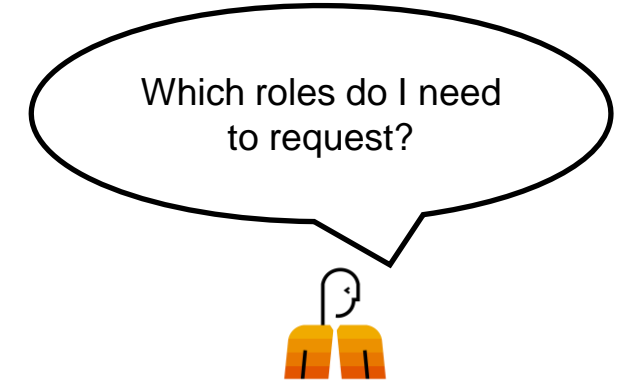
- Technical knowledge required and strong alignment with IT

Transparency

- Behavior of authorizations assigned is hard to understand for a Business User

Different authorization concepts in underlying systems

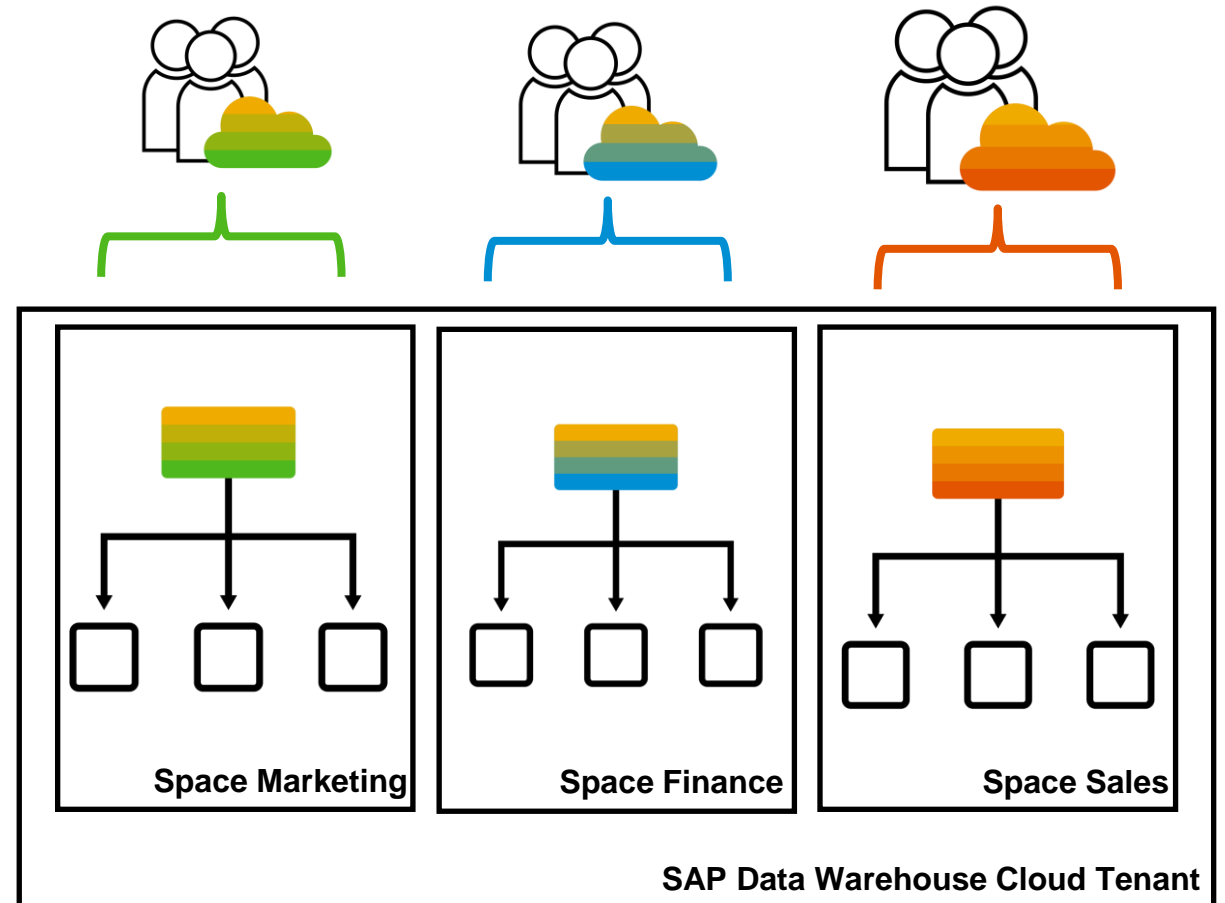
- Ensure secure access of data
- Leverage already defined authorizations in source systems



Introducing Row Level Security for SAP Data Warehouse Cloud

Situation to date

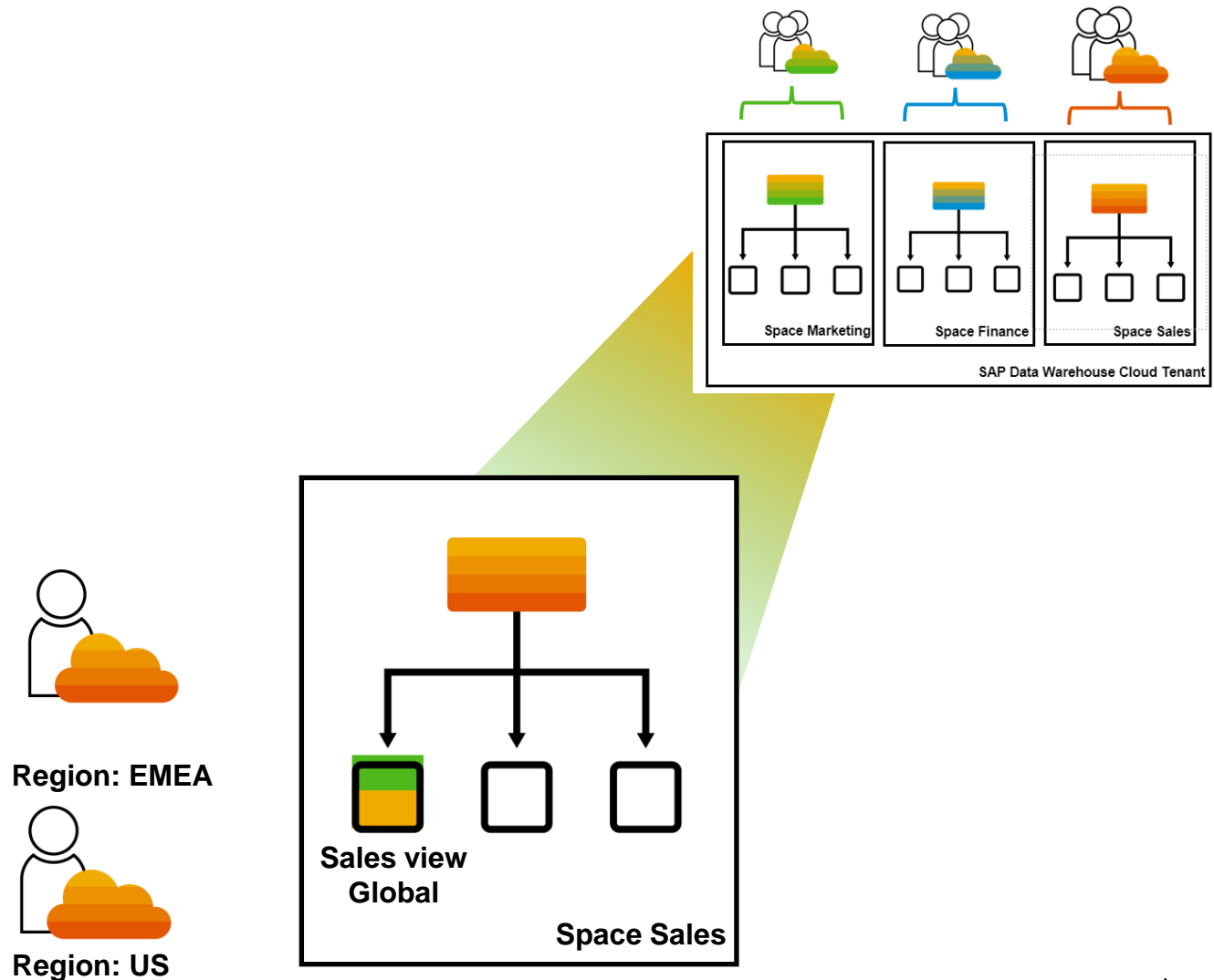
- All Business Users assigned to a given Space in SAP Data Warehouse Cloud were able to consume all of its data
- No possibility to restrict access to data of a dedicated view for instance



Introducing Row Level Security for SAP Data Warehouse Cloud

Introducing Row Level Security

- Fine granular access to certain slices of data from a given view
- Based on authorizations (e.g. In a Sales View, User 'A' can only see data for region 'EMEA')
- Flexible foundation for further enhancements (e.g. Hierachy Authorizations)




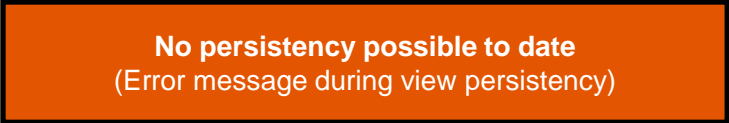
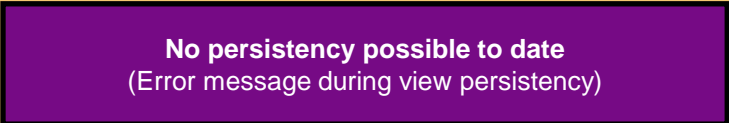
Row Level Security

Modelling Scenarios

Data Access Controls and View Persistency - Considerations

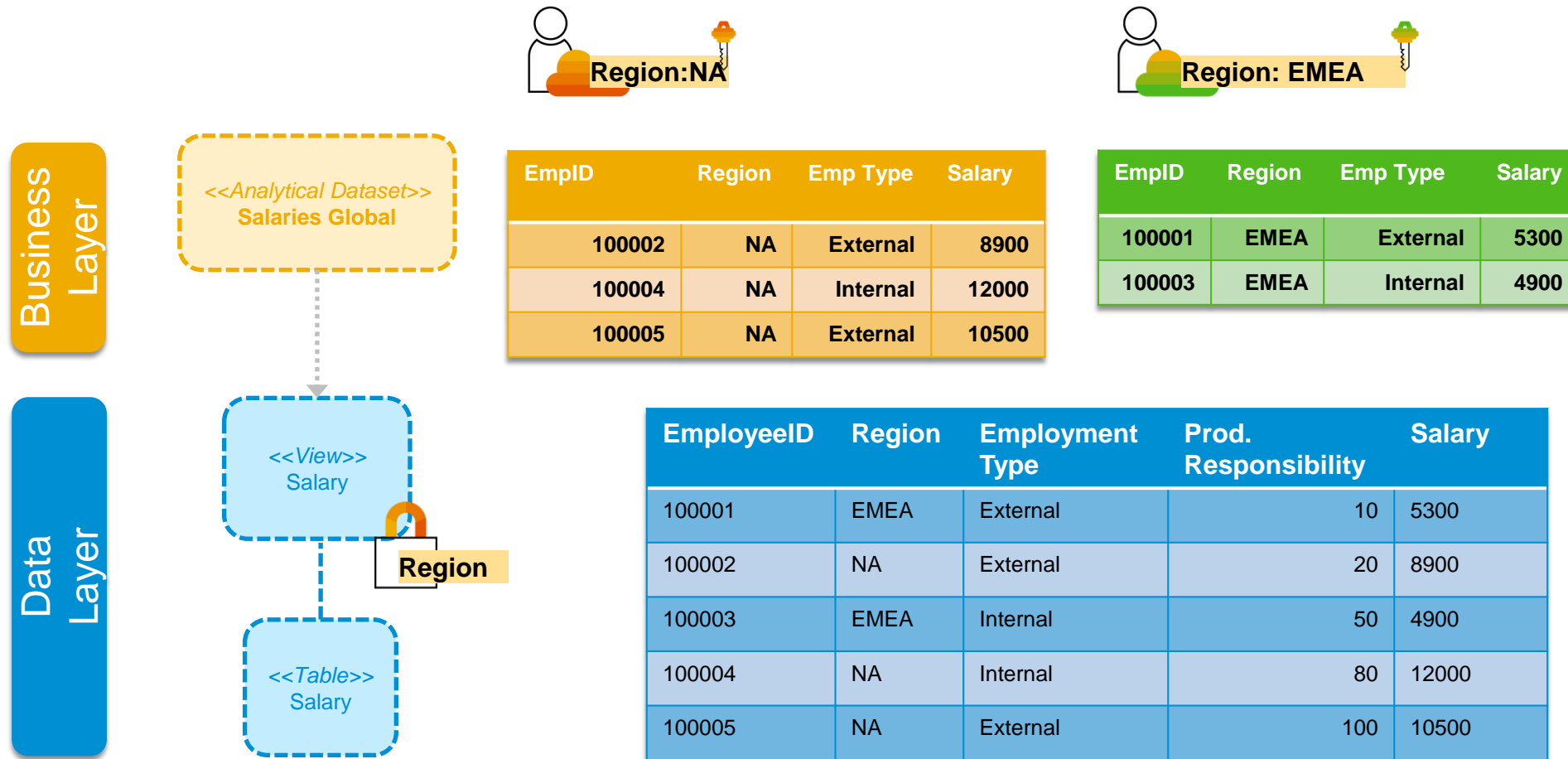
Data access controls and persisted Views cannot be combined in all possible situations.

The table below should give an overview on the different scenarios where errors might occur and situations when view persistency is possible.

Scenario/Situation	Behavior	Outlook
If no DACs are assigned (directly or indirect, persistency is possible		
View persistency for views where DACs are directly assigned should be enabled soon		Planned for 2021*
In subsequent steps, also View persistency for views is supported which are consuming views with DACs assigned		Planned*

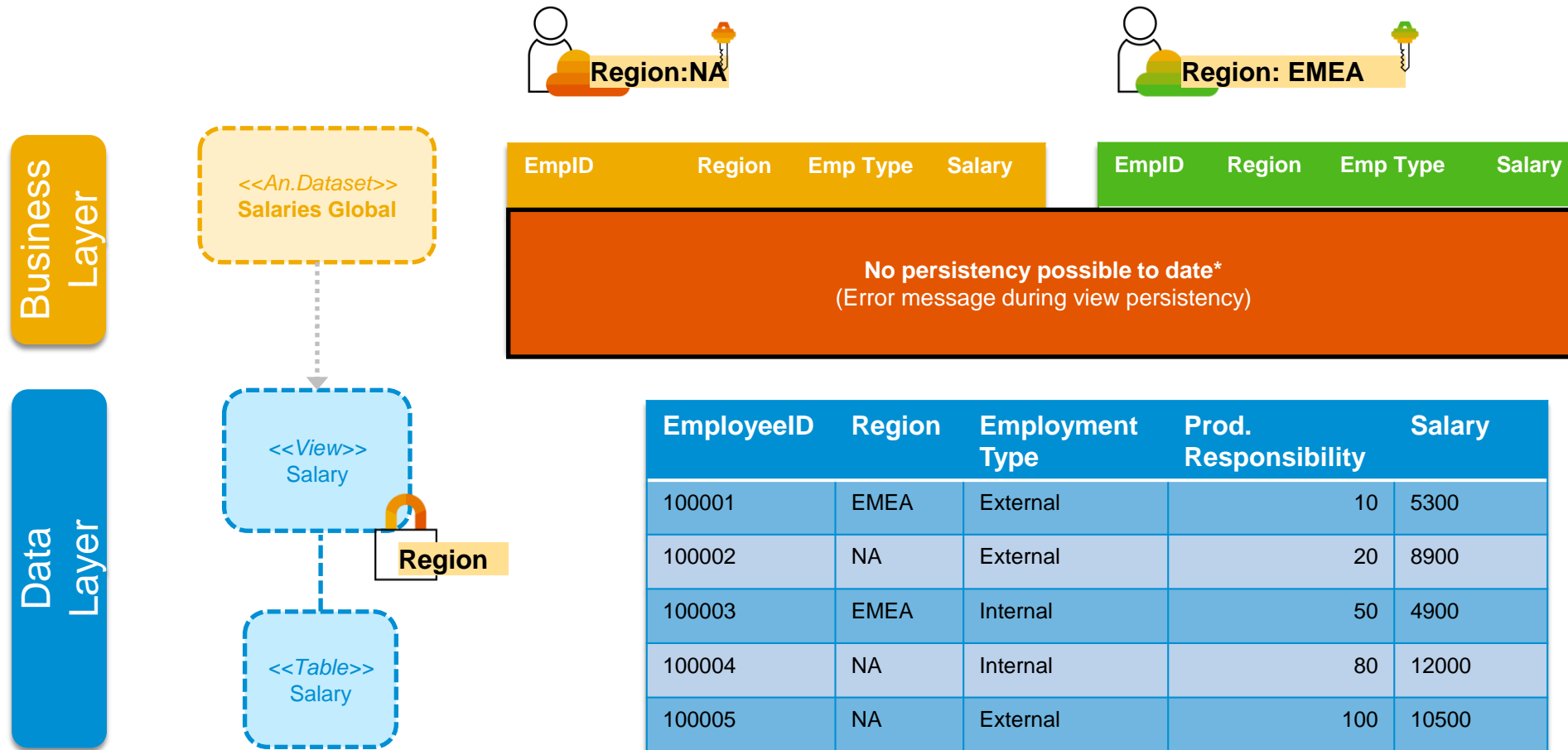
* According to the [SAP Data Warehouse Cloud Roadmap](#).

Simple Scenarios (One DAC) – One Data Access Control



Simple Scenario: One Data Access Control with one column (Region) to be checked
 Authorization checked by region only, data displayed accordingly by authorized values

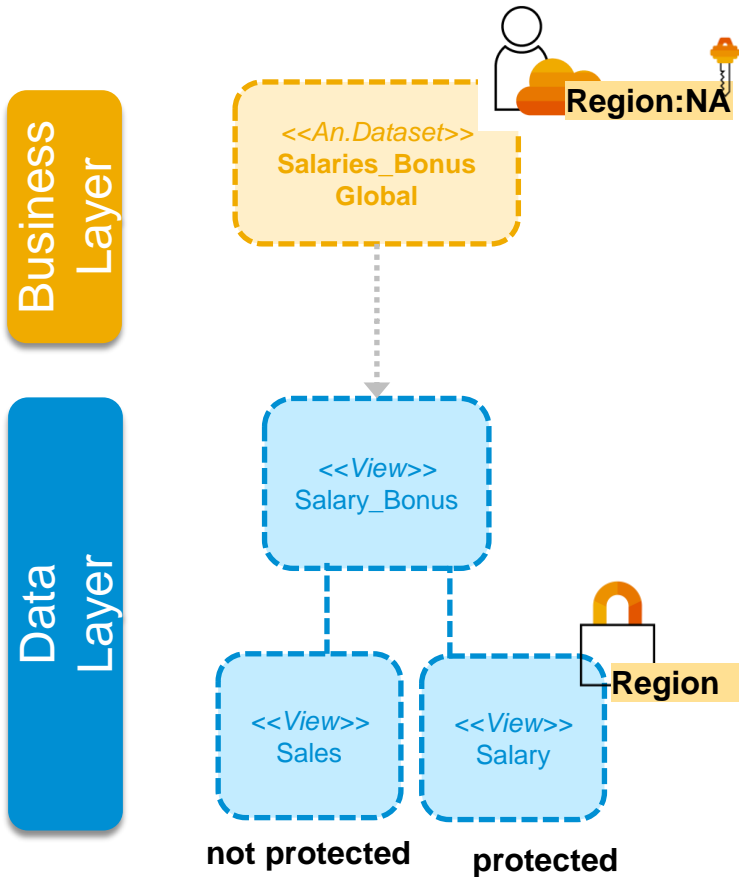
Simple Scenarios (One DAC) – View Persistency - One Data Access Control



Simple Scenario: One Data Access Control with one column (Region) to be checked

Authorization checked by region only, data displayed accordingly by authorized values

Simple Scenarios (One DAC) – Inner Join



Empl. ID	Sales Order	Prod. Resp.	Region	Emp. Type	Amount	Salary	Bonus 10% (Calculated)
100002	5001	20	NA	External	399	8900	50
100004	5003	80	NA	Internal	2499	12000	350
100005	5004	100	NA	External	6000	10500	500

Empl. ID	Sales Order	Prod. Resp.	Region	Emp. Type	Amount	Salary
100002	5001	20	NA	External	399	8900
100004	5003	80	NA	Internal	2499	12000
100005	5004	100	NA	External	6000	10500

InnerJoin Product=ProductResponsible

Sales Order	Product	Amount
5000	10	5800
5001	20	399
5002	50	899
5003	80	2499
5004	100	6000

View: Sales

Empl. ID	Prod. Resp.	Region	Emp. Type	Salary
100002	20	NA	External	8900
100004	80	NA	Internal	12000
100005	100	NA	External	10500
100009	150	EMEA	Internal	25000
100010	200	APJ	External	19000

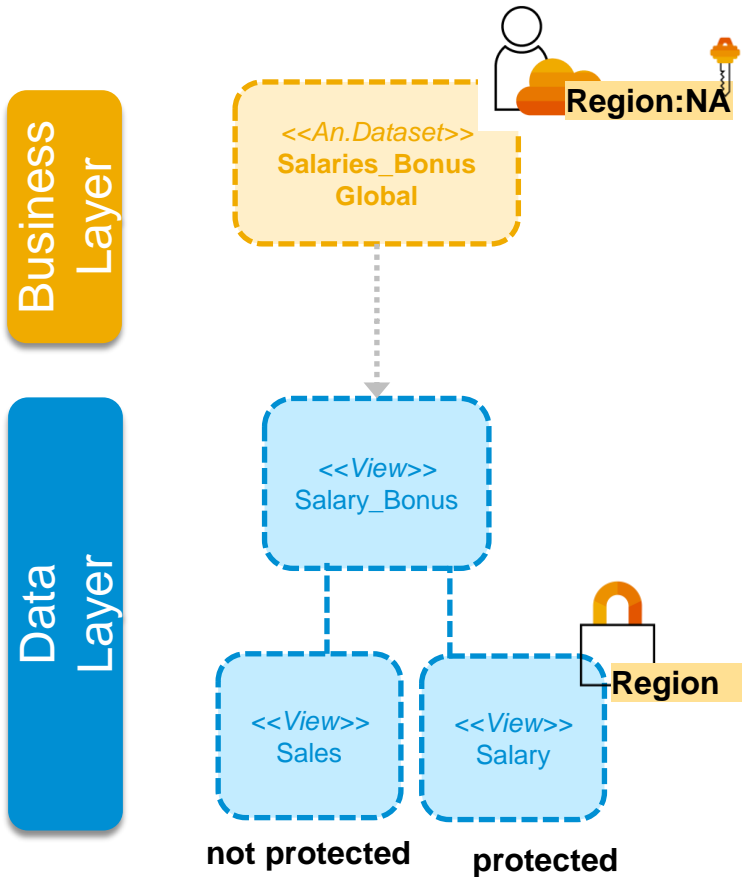
View: Salary



Advanced Scenario (Inner Join): Two Data Access Controls (with one column) to be checked

Data from view 'Salary' is protected according to DAC. Due to inner join only the sales records matching the authorized values from Salary view are selected

Simple Scenarios (One DAC) – View Persistency - Inner Join



Empl. ID	Sales Order	Prod. Resp.	Region	Emp. Type	Amount	Salary	Bonus 10% (Calculated)
100002	5001	20	NA	External	399	8900	50
100004	5003	80	NA	Internal	2499	12000	350
100005	5004	100	NA	External	6000	10500	500

Empl. ID	Sales Order	Prod. Resp.	Region	Emp. Type	Amount	Salary
No persistency possible to date* (Error message during view persistency)						

InnerJoin Product=ProductResponsible

Sales Order	Product	Amount
Persistence possible		

View: Sales

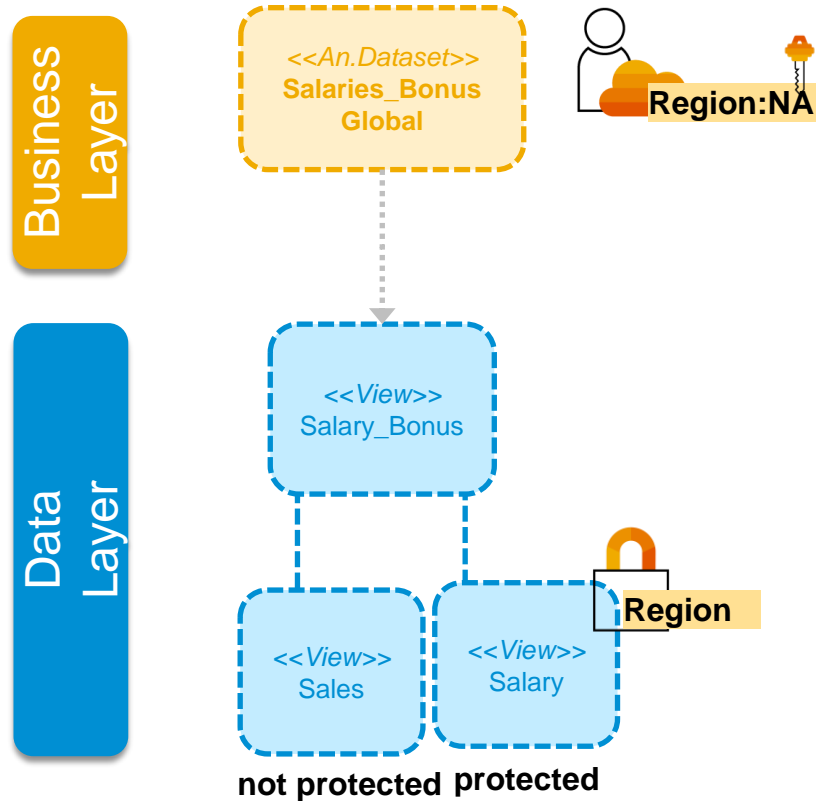
Empl. ID	Prod. Resp.	Region	Emp. Type	Salary
No persistency possible to date* (Error message during view persistency)				

View: Salary

Advanced Scenario (Inner Join): Two Data Access Controls (with one column) to be checked

Data from view 'Salary' is protected according to DAC. Due to inner join only the sales records matching the authorized values from Salary view are selected

Simple Scenarios (One DAC) – Left Outer Join



Empl. ID	SalesOrder	Prod.Resp	Region	Emp. Type	Amount	Salary	Bonus
100002	5001	20	NA	External	399	8900	50
100004	5003	80	NA	Internal	80	12000	350
100005	5004	100	NA	External	6000	10500	500
--	5000	10	--	--	5800	--	--
--	5002	50	--	--	899	--	--

Empl. ID	Sales Order	Prod. Resp.	Region	Emp. Type	Amount	Salary
100002	5001	20	NA	External	399	8900
100004	5003	80	NA	Internal	80	12000
100005	5004	100	NA	External	6000	10500
--	5000	10	--	--	5800	--
--	5002	50	--	--	899	--

LeftOuterJoin Product=ProductResponsible

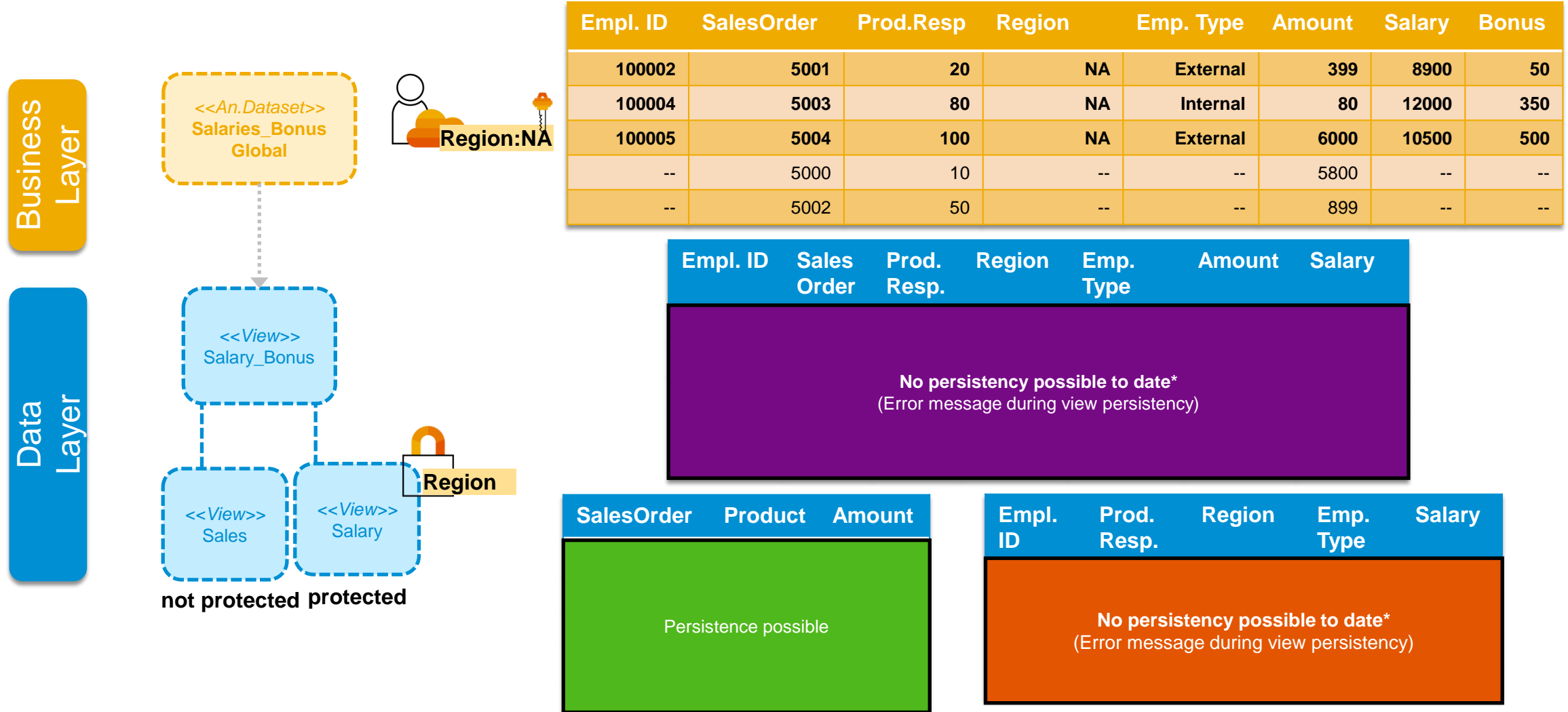
SalesOrder	Product	Amount
5000	10	5800
5001	20	399
5002	50	899
5003	80	2499
5004	100	6000

Empl. ID	Prod. Resp.	Region	Emp. Type	Salary
100002	20	NA	External	8900
100004	80	NA	Internal	12000
100005	100	NA	External	10500
100009	10	EMEA	Internal	25000

Advanced Scenario (Left. Outer Join): Two Data Access Controls (with one column) to be checked

Data from view 'Salary' is protected according to DAC. Due to left outer join, the sales records (even where no dedicated authorization granted) are selected.

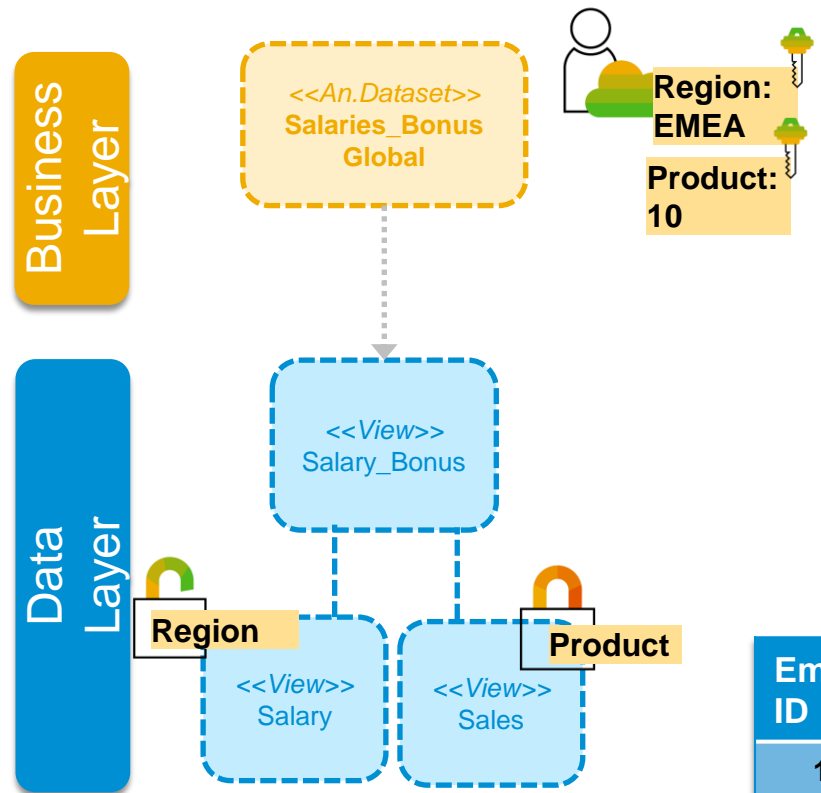
Simple Scenarios (One DAC) – View Persistency - Left Outer Join



Advanced Scenario (Left. Outer Join): Two Data Access Controls (with one column) to be checked

Data from view 'Salary' is protected according to DAC. Due to left outer join, the sales records (even where no dedicated authorization granted) are selected.

Advanced Scenarios (multiple DAC) – Left Outer Join



Empl. ID	SalesOrder	Prod.Resp	Region	Emp. Type	Amount	Salary	Bonus (Calc.)
100001	5000	10	EMEA	External	5800	5300	400
100003	--	50	EMEA	Internal	--	4900	350

Empl. ID	Sales Order	Prod. Resp.	Region	Emp. Type	Amount	Salary
100001	5000	10	EMEA	External	5800	5300
100003	--	50	EMEA	Internal	--	4900

LeftOuterJoin Product=ProductResponsible

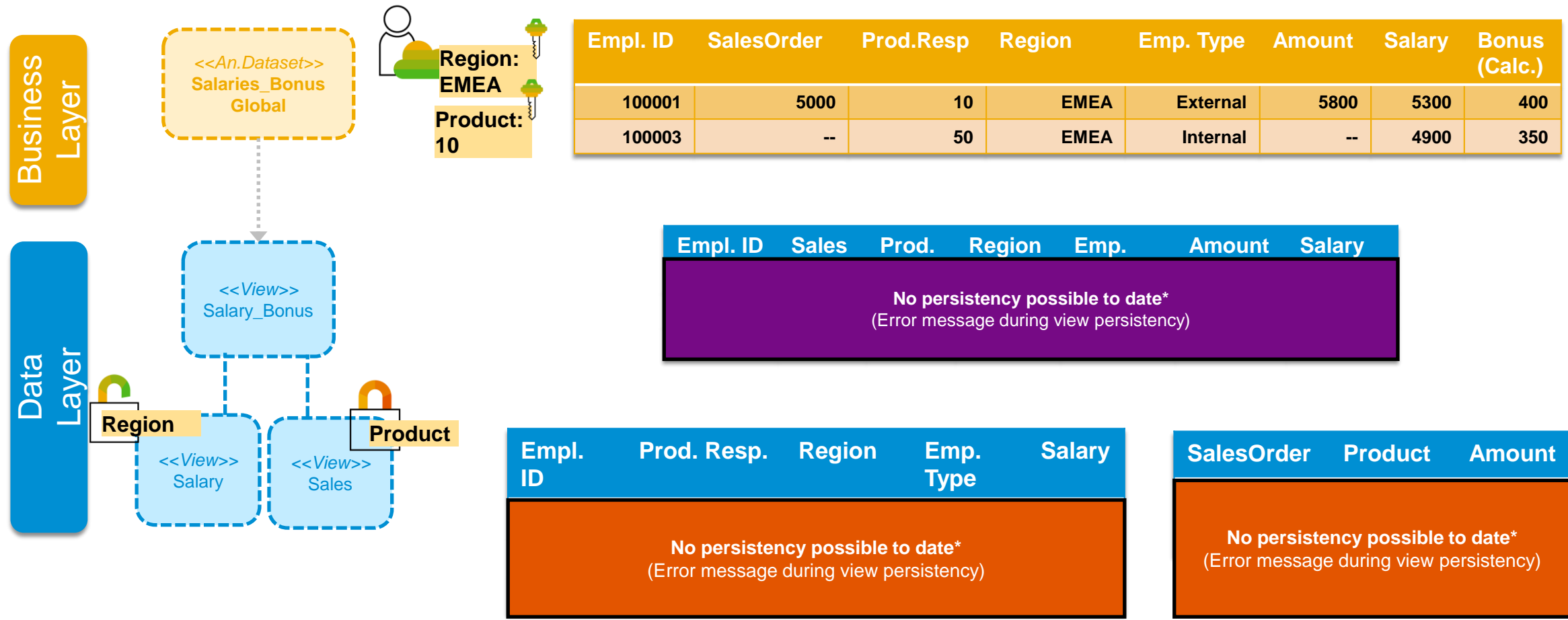
Empl. ID	Prod. Resp.	Region	Emp. Type	Salary
100001	10	EMEA	External	5300
100003	50	EMEA	Internal	4900
100009	80	NA	External	7000

SalesOrder	Product	Amount
5000	10	5800
7000	50	3500

Advanced Scenario (Left Outer Join): Two Data Access Controls (with one column) to be checked

Data from view 'Sales' is protected according to DAC (Product). Due to left outer join, the salary records (even where no dedicated authorization on product (responsibility) granted) are selected as long as they have the authorized region (EMEA).

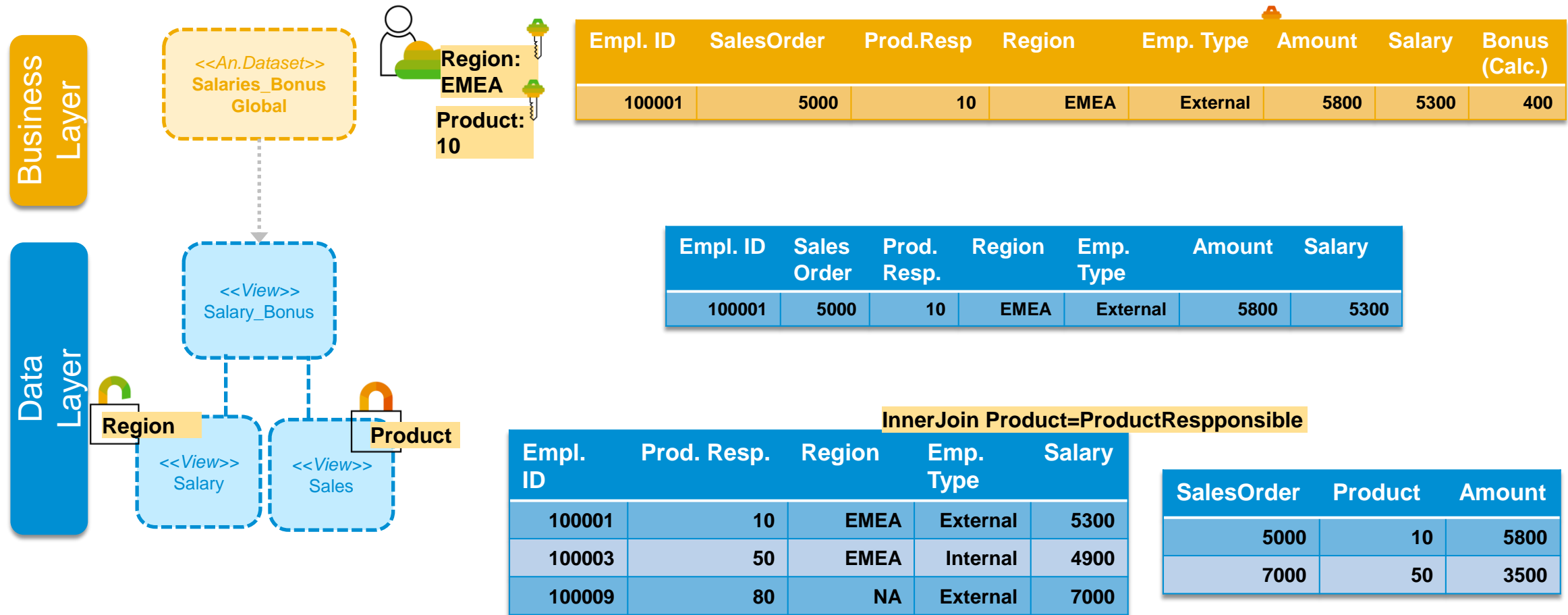
Advanced Scenarios (multiple DAC) – View Persistency - Left Outer Join



Advanced Scenario (Left Outer Join): Two Data Access Controls (with one column) to be checked

Data from view 'Sales' is protected according to DAC (Product). Due to left outer join, the salary records (even where no dedicated authorization on product (responsibility) granted) are selected as long as they have the authorized region (EMEA).

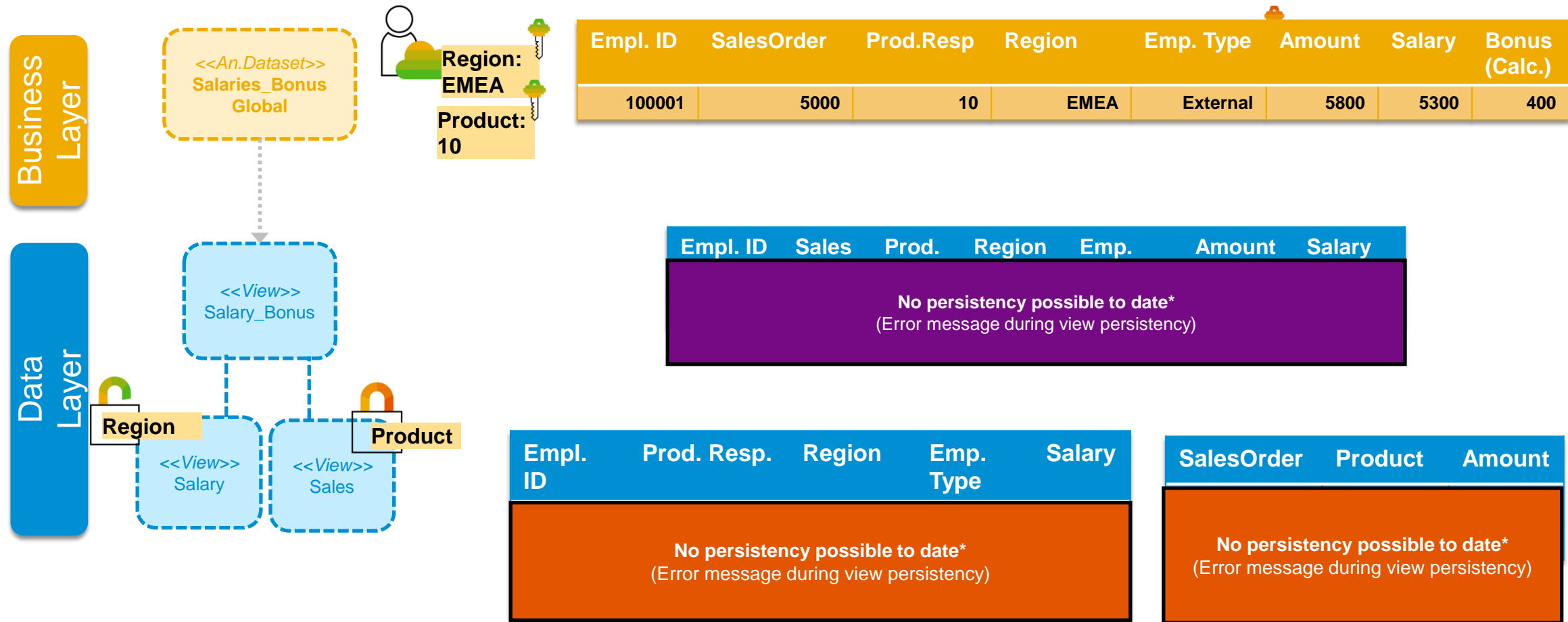
Advanced Scenarios (multiple DAC) – Inner Join



Advanced Scenario (Inner Join): Two Data Access Controls (with one column) to be checked

In case of an Inner Join both locks are applied and only records are shown which fulfill both authorizations (i.e.: Region = EMEA / (Resp.) Product = 10).

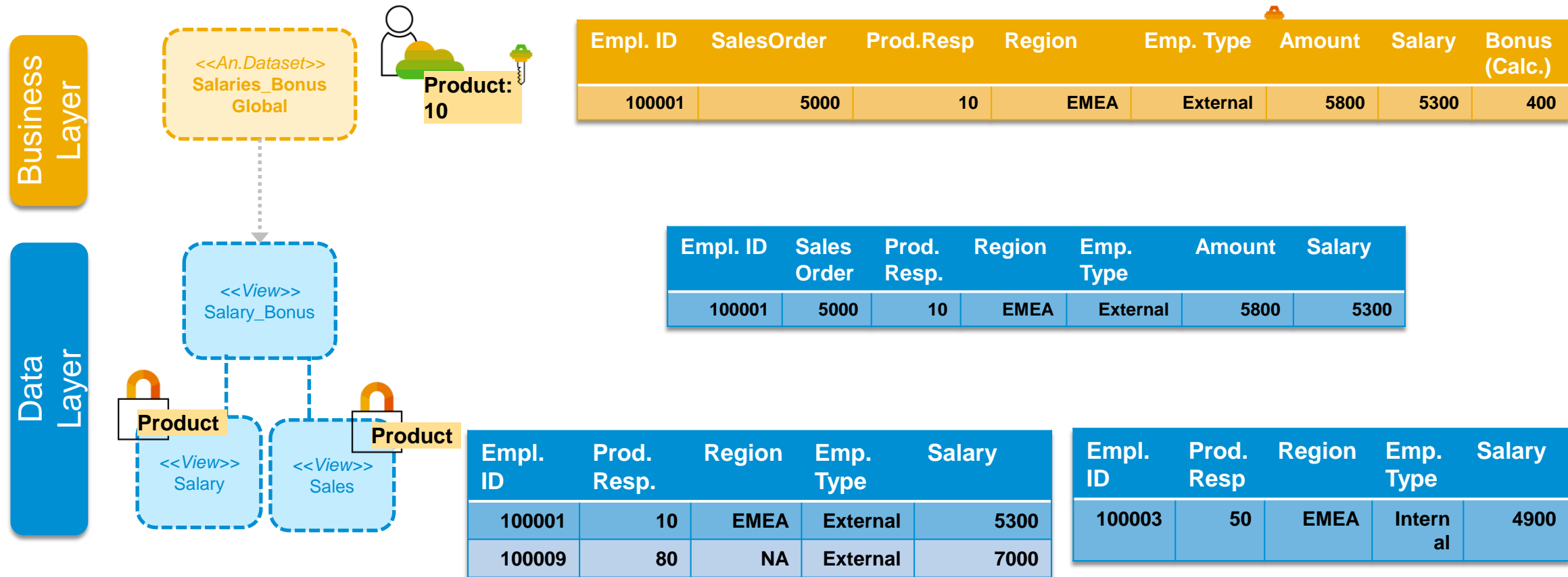
Advanced Scenarios (multiple DAC) – View Persistency - Inner Join



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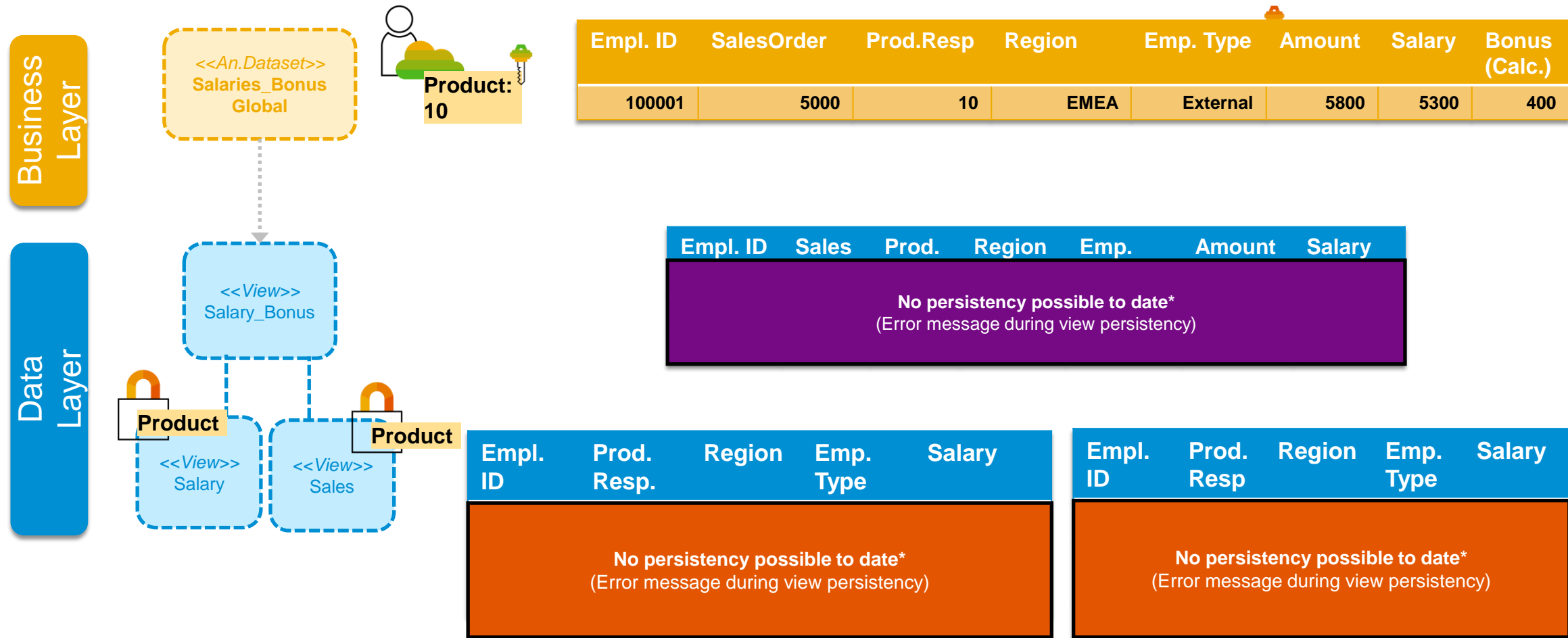
Advanced Scenarios – Same DAC on both Union partners



Advanced Scenario (Union): Two Data Access Controls (with one column) to be checked

In a Union the data records are selected from the underlying sources and the respective authorizations are applied. The result set is the sum of the records selected.

Advanced Scenarios – View Persistency - Same DAC on both Union partners



Advanced Scenario (Union): Two Data Access Controls (with one column) to be checked

In a Union the data records are selected from the underlying sources and the respective authorizations are applied. The result set is the sum of the records selected.

Thank you.

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