



Exasol AI Analytics Roadshow 2024

Experience the Power of AI and Data Analytics in Vienna

**Start Your Roadmap to AI Success
on a Solid Foundation**

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High Performance Analytics
Database Architectures
Database Security

Attributes of a Solid Data Foundation



Data Quality Management



Data Quality Management

DQ-Rules

- technical Profiling
 - Where?
 - in the ETL-process
 - in the source
 - What?
 - techn. validation
 - distributions
 - formats
 - value ranges
 - compare to source
- content validation
 - base attributes and derived KPIs
 - consistency
 - target values & thresholds



DQ-Reporting

- active rules overview
- DQIs thresholds
- issues
- recommendations



Ad hoc Corrections

- Where?
 - in the source
 - in the DWH

Regular corrections within the ETL process are transformations and not ad hoc corrections!
- How?
 - strictly audited
 - reproducible
 - documented (approval process)

The reproducibility of the reporting must not be compromised!.



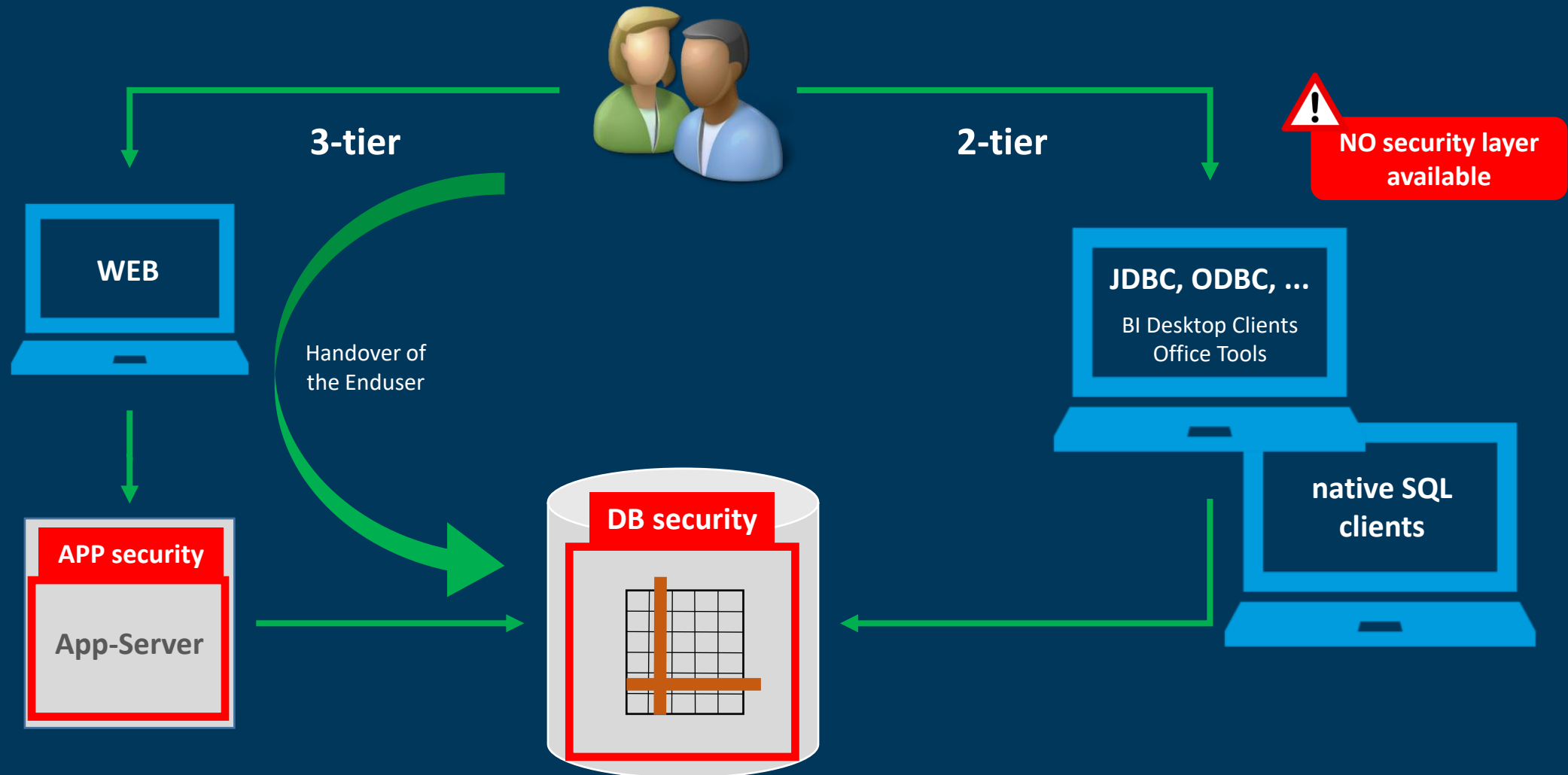
Levels & Goals of Database Security



Basic Principals

- 1 Security is always bound to the human user
- 2 Security is tool-agnostic
- 3 Audit shows the human user on each and every access path
- 4 Human users cannot delegate their access rights without permission
- 5 Security must not prevent users from collaboration in various projects

Access Paths – The Big Picture



DB-Security: 3 Levels

Object Level Security
OLS

Row Level Security
RLS

Column Level Security
CLS

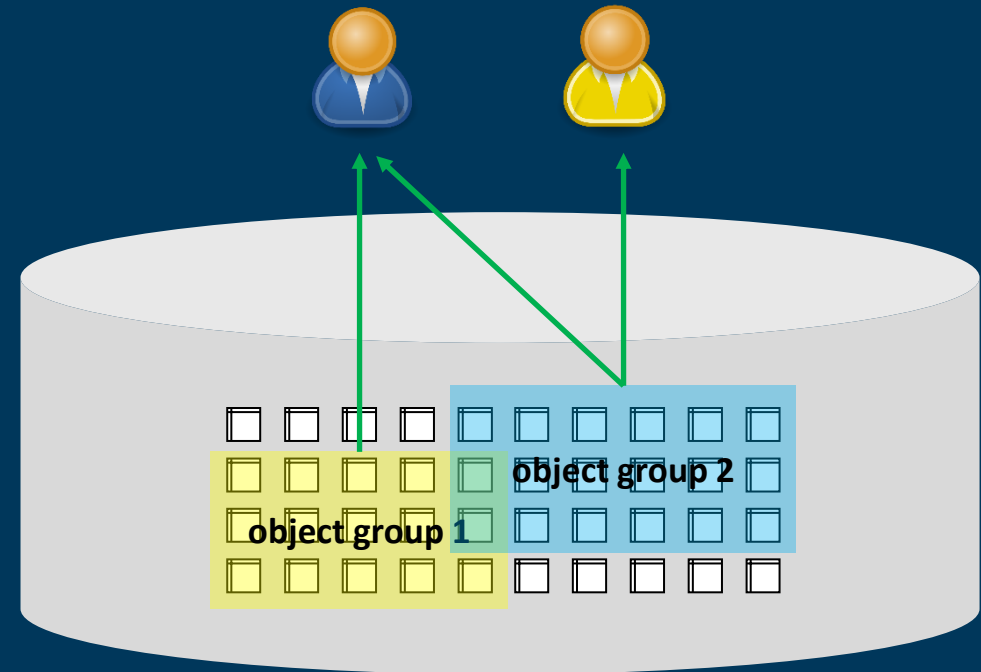
OLS – Define Object Groups

object groups contain tables and views

object groups may be overlapping

object groups may be related to roles 1:1

object groups are associated with users



Example: Row Level Security



INSTITUTE	DEPARTMENT	...	AMOUNT
103	DEP2	...	300
196	DEP2	...	400
104	DEP2	...	10000



INSTITUTE	DEPARTMENT	...	AMOUNT
196	DEP2	...	400

select * from table;

department=DEP2

institute=196 and department=DEP2

INSTITUTE	DEPARTMENT	...	AMOUNT
196	DEP1	...	5000
103	DEP2	...	300
196	DEP2	...	400
104	DEP2	...	10000

Example: Column Level Security



INSTITUTE	DEPARTMENT	...	AMOUNT
196	DEP1	...	(null)
103	DEP2	...	300
196	DEP2	...	(null)
104	DEP2	...	10000



INSTITUTE	DEPARTMENT	...	AMOUNT
196	DEP1	...	(null)
103	DEP2	...	(null)
196	DEP2	...	(null)
104	DEP2	...	(null)

select * from table;

sensitive columns only for INSTITUTE 103,104

no sensitive columns at all

INSTITUTE	DEPARTMENT	...	AMOUNT
196	DEP1	...	5000
103	DEP2	...	300
196	DEP2	...	400
104	DEP2	...	10000

Historisation



Historization – what for?

100% reproducible Reporting

business point of view

On which business date was the row valid?

Business Day Logic

Business Date (BDate)

*bi-temporal
2-dimensional*

technical point of view

When did the row arrive in the DWH?

systimestamp

Technical Date (TDate)

Master Data & Event Data

Master Data

- valid for a period of time
- e.g. account data, customer data

KundenNr	Name	BDate
123	Müller	2023-11-21
123	Müller	2023-11-22
123	Mayer	2023-11-23

KundenNr	Name	BDate_From	BDate_To
123	Müller	2023-11-21	2023-11-22
123	Mayer	2023-11-23	9999-12-31

business-related:
extend validity to a period
of time

technical:
deduplication

Event Data

- valid only at a specific point in time
- z.B. transactions, purchases
- BDate results from the transaction date

RE_Nr	Name	RE_Datum	BDate
100	Popcorn	2023-11-21 17:21	2023-11-21
100	Nachos	2023-11-21 17:21	2023-11-21
...
187	Cola	2023-11-23 20:11	2023-11-23

The Business (Surrogate) Key

Business Key (BK)

BLZ	AccountNr	Opening_Date	...	BSK
32105	0101246	2008-04-30	...	99f7558a58ace36441e256b6ddecbb94
34200	0100222	1999-05-17	...	abf7dc25b0cf875d218646e025ba4891

Business Surrogate Key
MD5 Hash of BK

- BSK is the basis for historisation
 - monitor the changes over time for the same business key
- BK mostly results from the primary key (PK) in the source
 - but: not always!
 - sometimes no PK is defined
 - PK in the source may contain time dependend information
 - especially if the source is already somehow historised itself

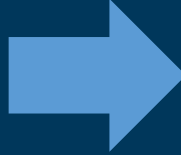
Technical Historisation

Source

CustNr	Nam	BDate
123	Müller	2023-11-15

CustNr	Nam	BDate
123	Müller	2023-11-16

CustNr	Nam	BDate
123	Mayer	2023-11-17



no change row ignored!

Correction

CustNr	Nam	BDate
123	Meier	2023-11-17

DWH

CustNr	Nam	BDate_From	BDate_To	TDate_From	TDate_To
123	Müller	2023-11-15	9999-12-31	2023-11-15 23:15:41	9999-12-31

CustNr	Nam	BDate_From	BDate_To	TDate_From	TDate_To
123	Müller	2023-11-15	9999-12-31	2023-11-15 23:15:41	2023-11-17 23:16:00
123	Müller	2023-11-15	2023-11-16	2023-11-17 23:16:00	9999-12-31
123	Mayer	2023-11-17	9999-12-31	2023-11-17 23:16:00	9999-12-31

CustNr	Nam	BDate_From	BDate_To	TDate_From	TDate_To
123	Müller	2023-11-15	9999-12-31	2023-11-15 23:15:41	2023-11-17 23:16:00
123	Müller	2023-11-15	2023-11-16	2023-11-17 23:16:00	9999-12-31
123	Mayer	2023-11-17	9999-12-31	2023-11-17 23:16:00	2023-11-18 08:00:00
123	Meier	2023-11-17	9999-12-31	2023-11-18 08:00:00	9999-12-31

Technical Historisation

Ask for the status as of the booking date 16.11., which was valid at 8:30 am on 17.11.

```
SELECT *  
FROM kunde  
WHERE '2023-11-16' BETWEEN bdate_from AND bdate_to  
AND '2023-11-17 08:30:00' BETWEEN tdate_from and tdate_to;
```



CustNr	Nam	BDate_From	BDate_To	TDate_From	Tdate_To
123	Müller	2023-11-15	9999-12-31	2023-11-15 23:15:41	2023-11-17 23:16:00
123	Müller	2023-11-15	2023-11-16	2023-11-17 23:16:00	9999-12-31
123	Mayer	2023-11-17	9999-12-31	2023-11-17 23:16:00	2023-11-18 08:00:00
123	Meier	2023-11-17	9999-12-31	2023-11-18 08:00:00	9999-12-31

100% reproducible





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Questions?