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Architecture Decision Records

Short: ADR

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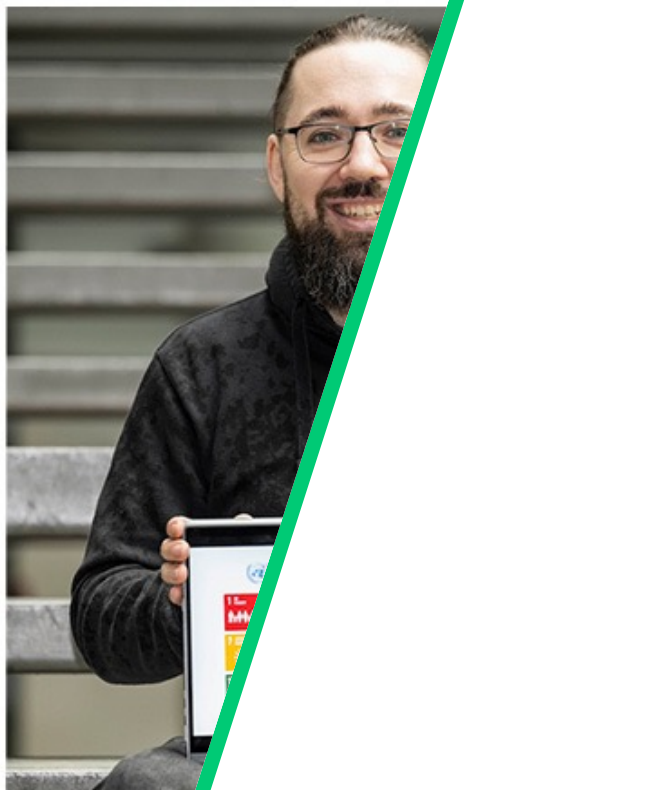
- Consultant, Architect, Developer, Speaker, …
- Working in software development for over 10 years
- DDD enthusiast
- Organizer of the Meetup DDD Rhein/Main

Lowis Engel

- Software Engineer and Junior software architect at Accso GmbH
- Specialized in Java and Angular



Accso GmbH

- Consultant & Tailor for individual software solutions
- Solution for companies from a wide range of branches
- Expert in Software Engineering, Architecture, IOT, Machine learning, BPM, VR/AR/MR, ….
- Over 270 employees
- Offices in Frankfurt, Darmstadt, Munich, Cologne and Cape Town

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Typical Problems in *Consulting*

A short story - that keeps repeating itself

- You start in new projects with new customers
- The project deals with the maintenance and further development of existing software
- There is hopefully documentation
  - However, the documentation usually only describes the current status of the software
  - If you are lucky, there is still a handover phase with the last company
- Perfect. You think you have understood everything

Time passes by …

- The first technical problems regarding performance appear
- New technical requirements cannot be implemented well on the basis of the existing code
- You look for solutions and you find some
- You think what kind of noobs were those from the last company
- But the reality may be that the old solution was exactly the right one at the time and our newly found solution was also considered at the time but ...
  - was too complex and unnecessary at the time or
  - has other disadvantages that we did not take into account

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What are ADRs?

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Questions for the video

- What are possible advantages of using ADRs?
- Who should have access to the ADRs?
- Which elements contain reasons for the decision?

Let‘s start with a video!

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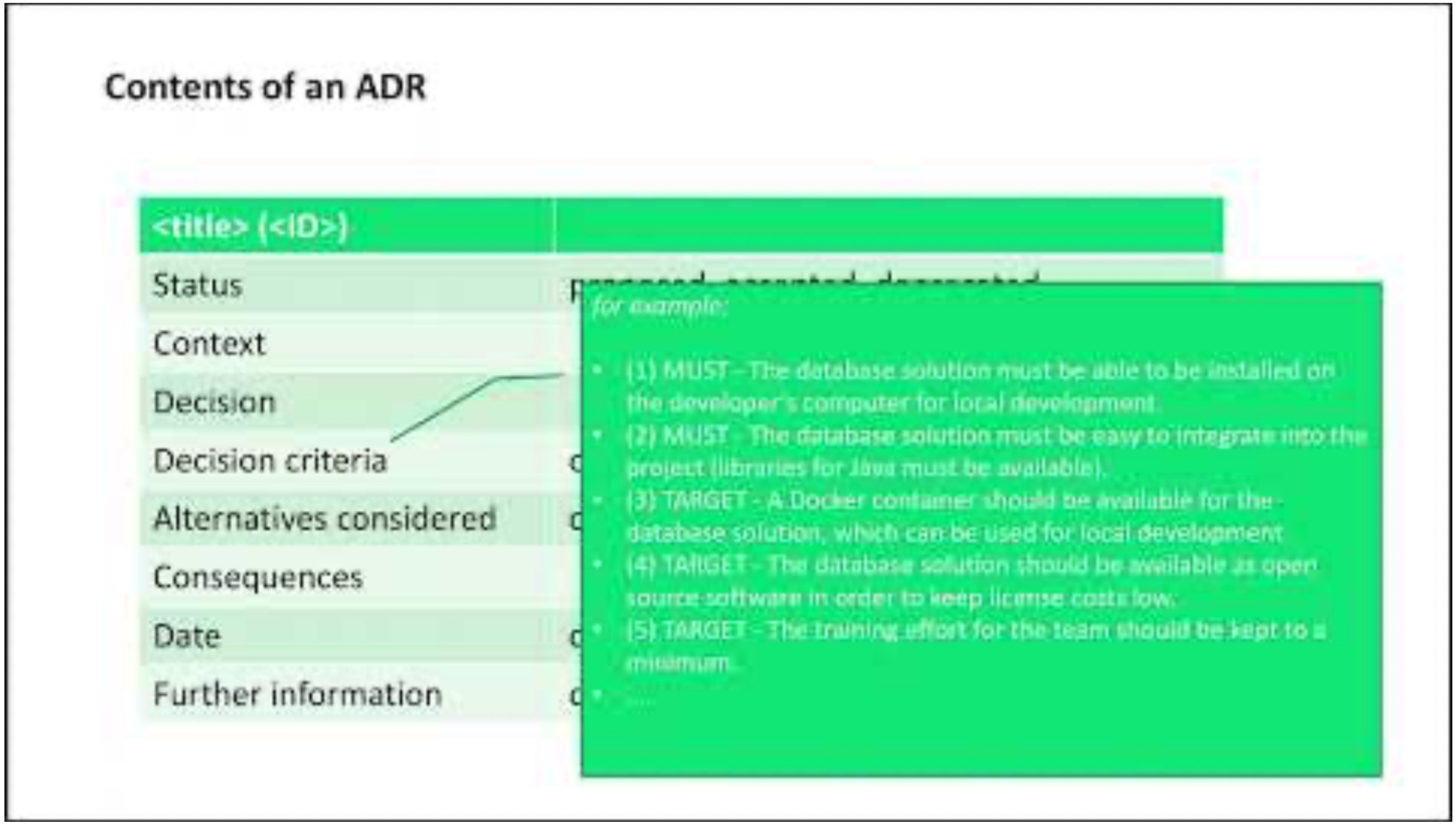

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Questions for the video

- What are possible advantages of using ADRs?
  - Lightweight documentation
  - Reasons & context for decisions
  - No repeated justification
  - Easier re-evaluation

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Questions for the video

- What are possible advantages of using ADRs?
- Who should have access to the ADRs?
  - The whole team
  - E.g. add them to the architecture documentation

Which elements contain reasons for the decision?

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<title> (<ID>)	
Status	proposed, accepted, deprecated
Context	
Decision	
Decision criteria	optional
Alternatives considered	optional
Consequences	
Date	optional
Further information	optional

Explicitly: Decision

<title> (<ID>)	
Status	
Context	
Decision	
Decision criteria	
Alternatives considered	
Consequences	
Date	optional
Further information	optional

for example:

We use a Postgres database to store the address data.

The team is very familiar with this technology as they have already worked with it in other projects. Therefore, only little training effort is to be expected. Postgres is a widely used, actively developed technology with a large community.

Implicitly: Decision criteria

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<title> (<ID>)	
Status	proposed, accepted, deprecated
Context	
Decision	
Decision criteria	op
Alternatives considered	op
Consequences	
Date	op
Further information	op

for example:

- (1) MUST - The database solution must be able to be installed on the developer's computer for local development.
- (2) MUST - The database solution must be easy to integrate into the project (libraries for Java must be available).
- (3) TARGET - A Docker container should be available for the database solution, which can be used for local development.
- (4) TARGET - The database solution should be available as open source software in order to keep license costs low.
- (5) TARGET - The training effort for the team should be kept to a minimum.
- ...

Implicitly: Alternatives

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Status	p
Context	
Decision	
Decision criteria	c
Alternatives considered	c
Consequences	
Date	c
Further information	c

for example (incomplete list of PROs and CONTRAS for the listing of alternatives):

	PRO	CON
PostgreSQL	• **Open Source** • **Known in the team** • **Widely used** • **Available as AWS RDS**	
SQLite	• Open Source • Very slim • Widely used	• **Not suitable for our production requirements**
Oracle DB	• Widely used • Good support available directly from the manufacturer • Available as AWS RDS	• **High license costs** • **No experience in the team**

Implicitly: Context

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<title> (<ID>)	
Status	
Context	
Decision	
Decision criteria	
Alternatives considered	optional
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for example:

A relational data model is used to store address data, which is to be mapped in the SQL database to be selected. For development, the database is to be installed locally on the developer computers (if possible as a Docker container). A managed solution in the **AWS** environment is to be used for the test and production environment.

Time for Questions

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Exercises

Intro

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Congratulations

- You have won the bid for the maintenance and further development of an existing application.
- The new customer is IOSDC
- The application is called IOSDC-DB
  - Integrated with other applications of the company
    - Measuring stations
    - Evaluation system
    - Global monitoring and reporting system for early warning
    - ...
- Put together a team of 3-6 people

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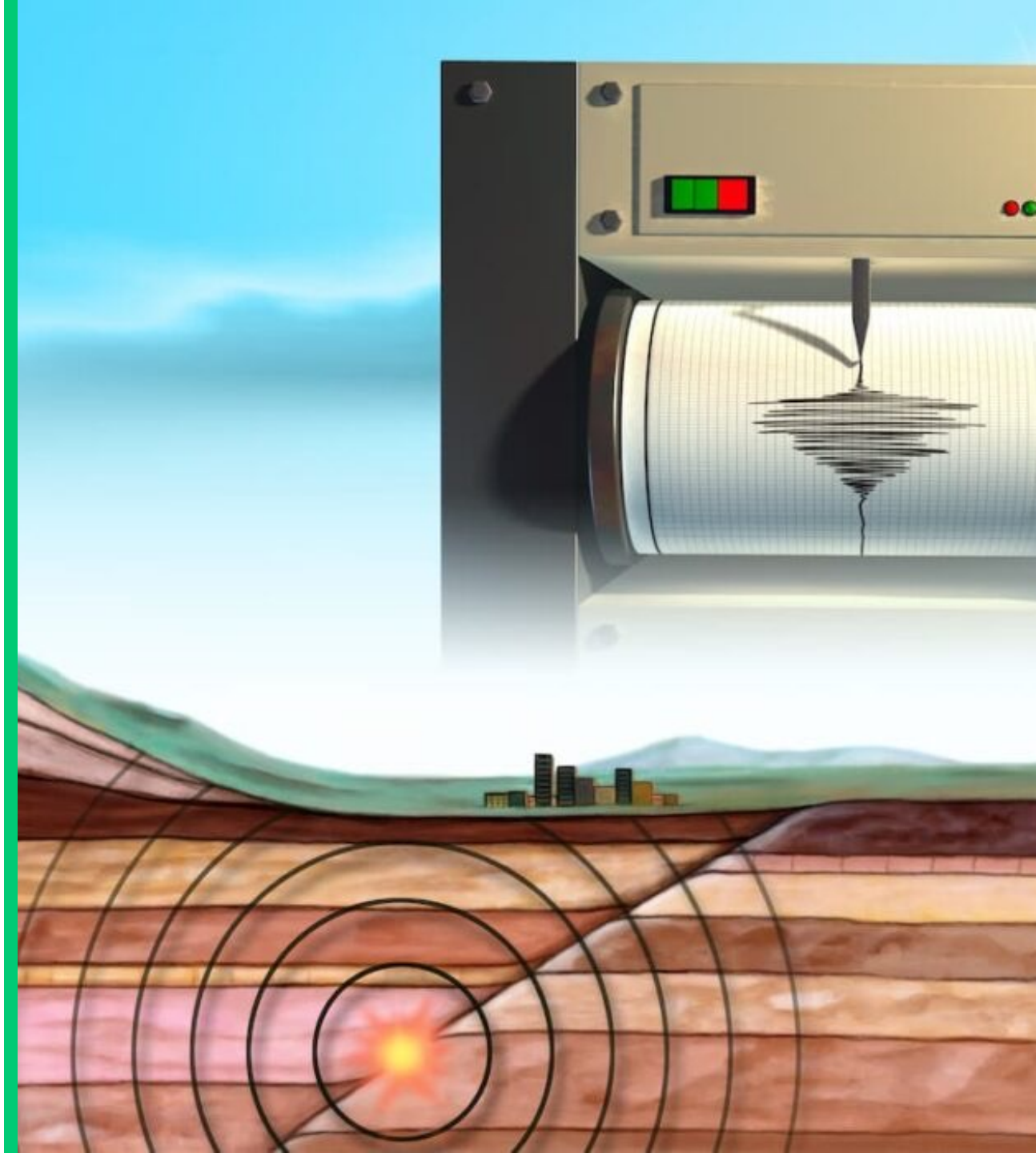
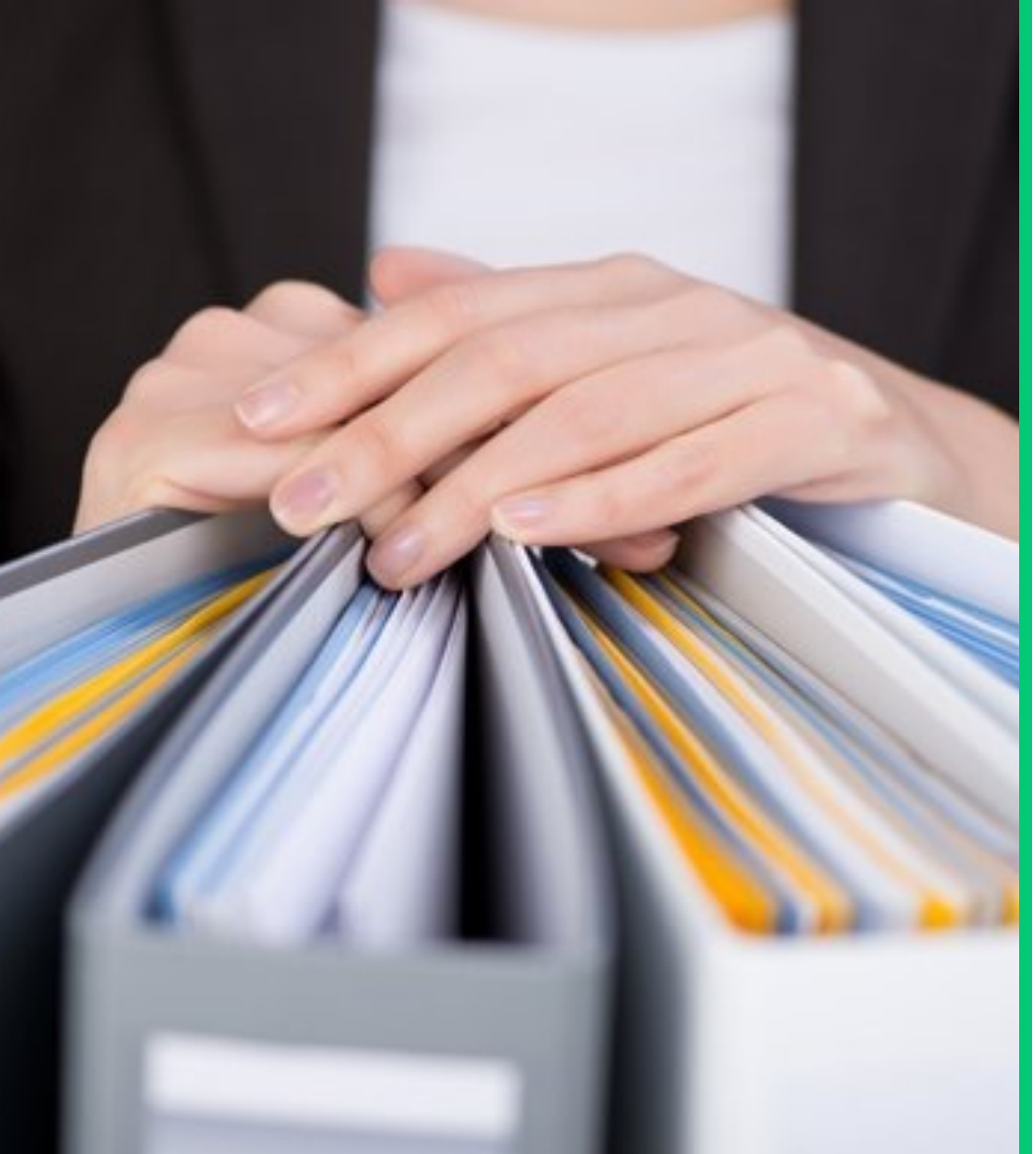
The International Organization of Seismological Data Collection (IOSDC)

IOSDC

The IOSDC measures seismic activity and collects other geological data around the world.

- The IOSDC measures seismic activity and collects other geological data around the world
  - To research the internal structure of the earth
  - To provide early warning of earthquakes and other disasters
- There are hundreds of small autonomous stations with simple seismographs
- There are 12 large stations with various measuring devices where employees work
- The IOSDC collects the data from the stations and uses it in its models and for its research
- The IOSDC‘s main base is in Germany





Understand the status quo

- You have received the current architecture documentation
- 2 people from the old team are still available to answer your questions
  - Both have only a rudimentary knowledge of the processes and their development history

- Create an ADR based on the available information for the repair process.
  - What information are you missing?
  - Are these important for your understanding?

Time for Discussion

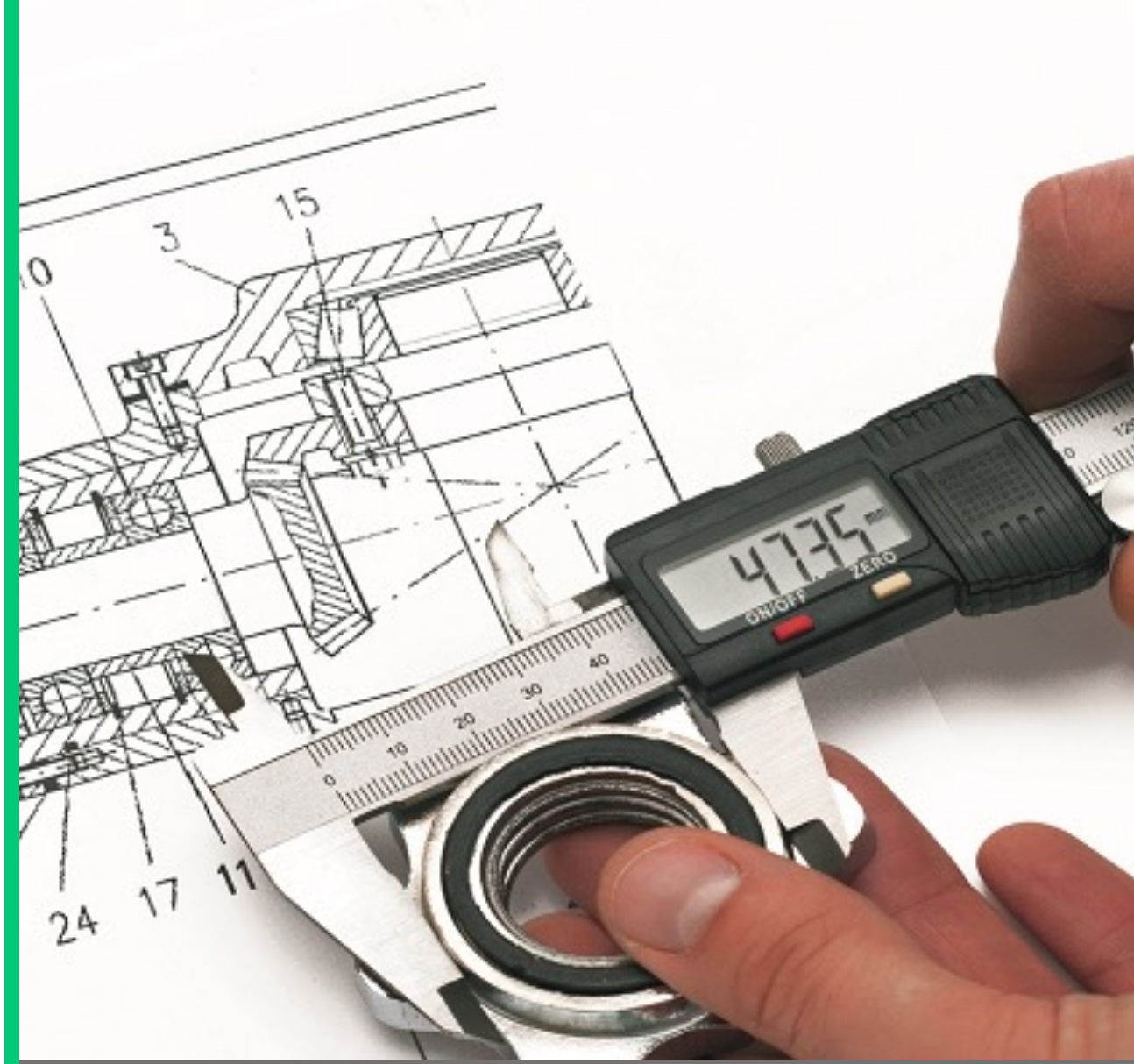
The first new Requirements come in e.g. Calibration* Request

To ensure that the IMTEs provide accurate data, they must be calibrated regularly

Calibration can be performed locally or in the main base of the IOSDC

- Too large a deviation may result in repair or replacement

- Create an ADR for the calibration request
- Design 2-3 possible solutions (these do not have to be detailed or necessarily realistic for the exercise)
- Make assumptions if necessary and document them
- Think about the consequences of the different solution options
- Decide on one solution option
  - E.g. by a thumb voting



*Calibration is a measurement process for comparing measured values. Measured values of the device to be tested are compared with those of a calibration standard (e.g. an already calibrated device) and checked for accuracy.

Time for Discussion

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Your Team is Rotating

- Swap the ADRs with another group
- One person changes the team together with the ADRs and can answer questions if necessary
- Try to understand the ADRs without the help of the new team member
- Compare this experience with the architecture documentation
  - What is different?
  - What is better or worse?
  - …

Time for Discussion

Requirements Change – Eichung*

A new regulation will soon come into force which obliges the IOSDC to eich all IMTEs at least every 6 years.

- Eichung may only be carried out by the engineers at the IOSDC headquarters in Germany.

- Create possible solution concepts for the Eichung process based on the ADRs that are available to you
- Document these in the form of an ADR
- Make a decision for a solution concept
- If your decision has an impact on existing decisions, document these as well
  - Several ADRs may be necessary or a structural adjustment of the ADRs

*Eichung is the legally prescribed testing of a measuring device for compliance with the legally regulated values in accordance with the Measurement and Calibration Act. Calibration may only be carried out by authorities or state-approved test centers.

Time for Discussion

What you should take with you

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ADRs

- What ADRs are!
- How to use them!

What to Document

- The Documentation of the …
  - why, consequences, considered alternatives and assumptions is important!

Requirements

- Requirements will change over the time!
- Requirements are not always as clear as we would like them to be!

Document your Decisions

- Make assumptions if necessary! You will never get all information you need!
- Be brave and make decisions when they have to be made.!
  - But document them together with your assumptions etc.!

And much more

.

- …

We hope you had fun and learned a lot!

Feedback?

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