ESTABLISHING A PROCESS ENGINEERING ORGANIZATION

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A TYPICAL DEVELOPER IN AUTOMOTIVE…

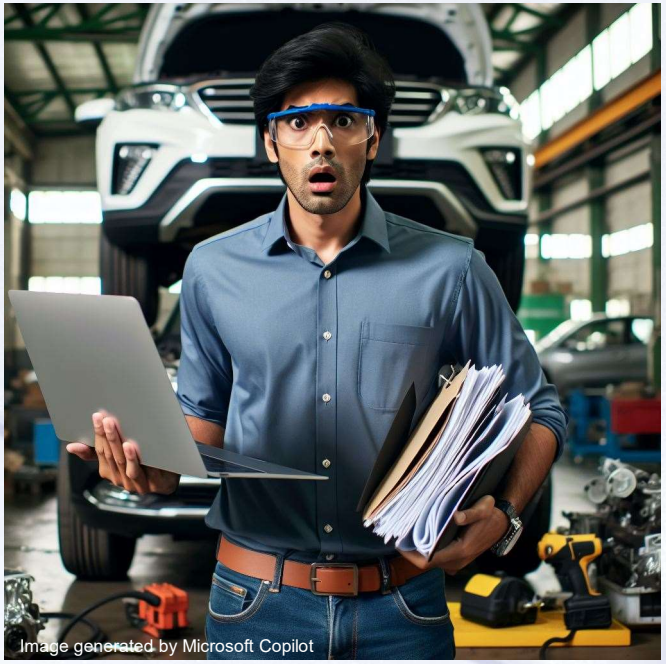
We need the release today!

Be compliant to 1000+ norms

Please also integrate these short-term change requests

Use this new technology

…



What takes so long?

Follow the process

No time for ramp-up, sorry…

Make it cheaper!

You need to work on your soft skills

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TRUST US AND FOLLOW THE PROCESS

Image Source: https://www.linkedin.com/pulse/bypassing-hype-cycle-matthew-holloway-efwae

Or how to fail with people following the process…

HOW TO FAIL

No people involvement	No added value	No or poor training
• Do not involve the engineers in process creation • No understanding about engineers needs and not considering their situation • Not invented here syndrome • Interpreting process violations as ignorance instead of valuable feedback	• Process, method or tool does not simplify the work • Just copying content (e.g., ASIL measures tables from ISO26262) • Standard process content distributed across several sources	• Not understandable as process is too abstract • Poor didactical presentation • Only quick presentations instead of training • No coaching

HOW TO FAIL II

Considering a process not like a product

Would you

- buy a product which has never received any testing?
- rely on poorly written product manuals or well-designed videos or someone even explaining it to you?
- use a product or an app, if it does not solve your issues or adds issues?
- trust a product if it was created by people without profound product development experience


Image: pexels.com

So why would you expect anyone to follow a process?

HOW TO SUCCEED

- Let selected **colleagues participate in process creation** and utilize them later as **multipliers/coaches** in series projects (of course this will become a capacity issue)
- Process developers should have **development experience**
- Consider **job rotation**
- **Present the process** not as a list of tasks or a simple V-model but according to the need / **use case of a developer**
- Use **AI to optimize process description** or also use v**ideos**
- Consider **process violations as a viable input**

HOW TO SUCCEED II

Example from daily experience with ISO26262

ISO 26262-4:2018(E)

Table 2 — Verification

Methods		ASIL			
		A	B	C	D
1a	Inspection[a]	+	++	++	++
1b	Walkthrough[a]	++	+	o	o
2a	Simulation[b]	+	+	++	++
2b	System prototyping and vehicle tests[b]	+	+	++	++
3	System architectural design analyses[c]	see Table 1			

[a] Methods 1a and 1b serve as a check of complete and correct implementation of the requirements.

[b] Methods 2a and 2b can be used advantageously as a fault injection test to support the argumentation of completeness and correctness of a system architectural design with respect to faults.

[c] For conducting safety analyses, see ISO 26262-9:2018, Clause 8.

Screenshot from ISO norm.

Typical approach

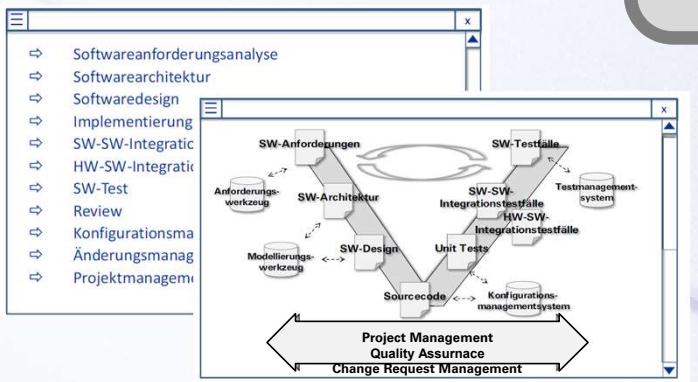
- Project teams would need to select methods and give an argumentation for selection

Better approach:

- Standard process already contains the interpreted method definitions (including arguments) which inherently fulfil norms
- Project fulfils norms “without even knowing”

HOW TO SUCCEED III

Poor didactial value ➔ people will ignore your process descriptions !

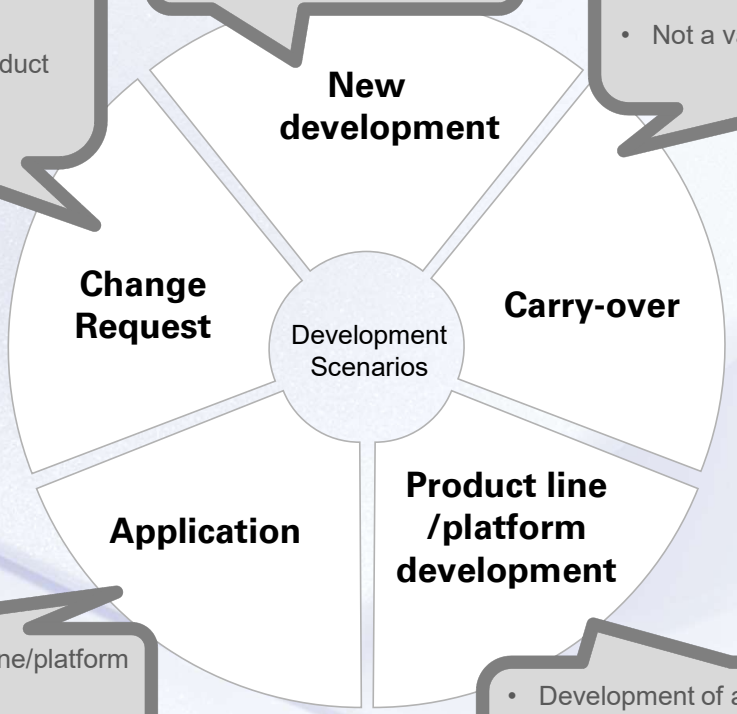


- Externally (customer)
- Internally (optimization, fixes)

…for a platform, for an application, or a series product

- From scratch
- No reuse

- Reuse of a previously developed customer-specific product
- Not a variant

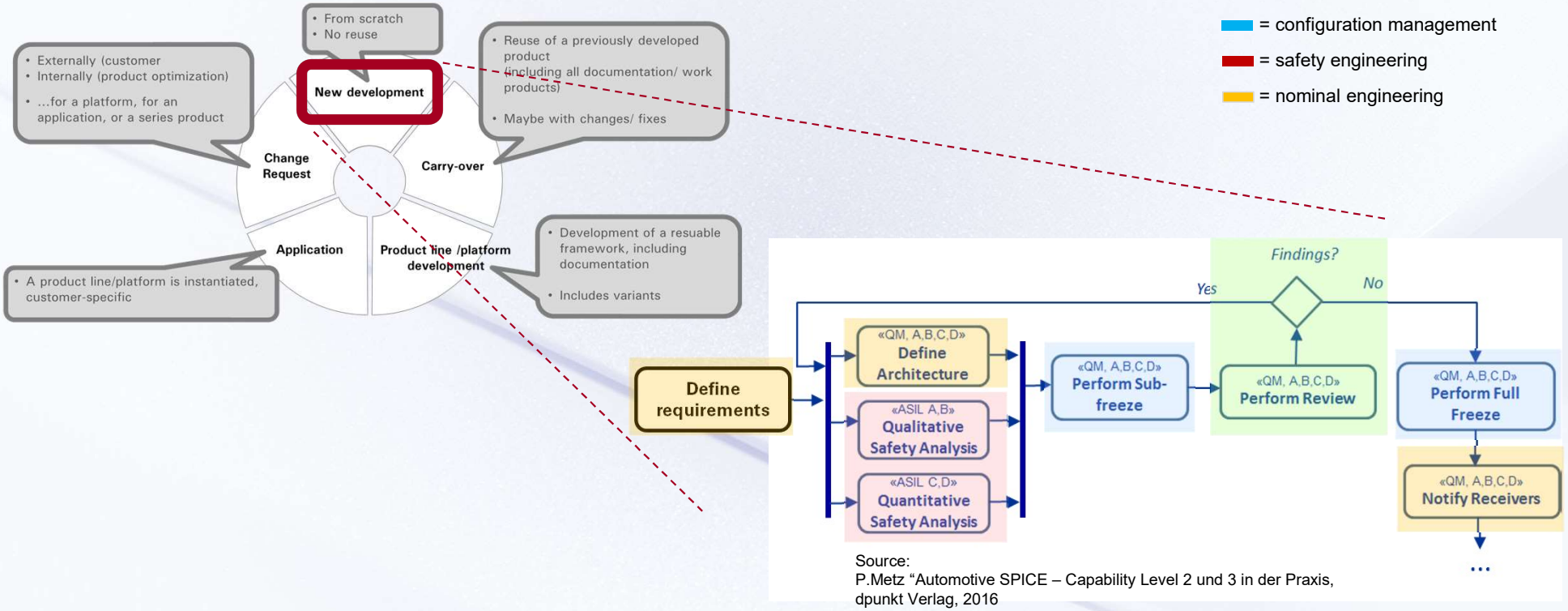


- Customer-specific instantiation of a product line/platform

- Development of a re-usable framework, including documentation
- Includes variants to choose from

EXAMPLE DEVELOPMENT USE CASES

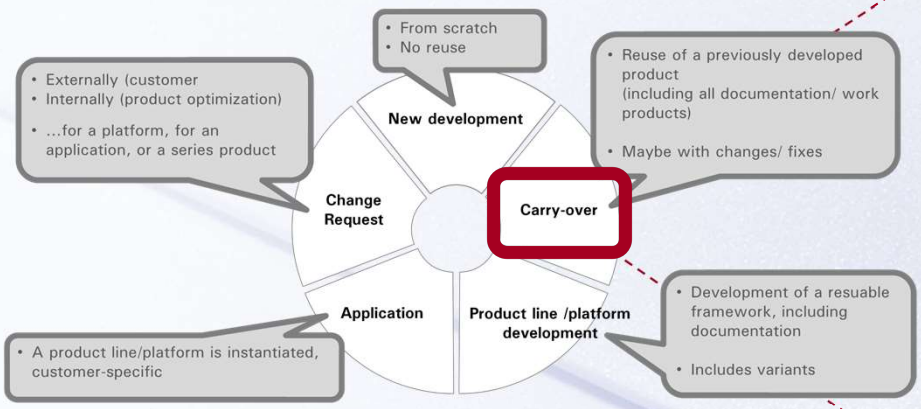
New development

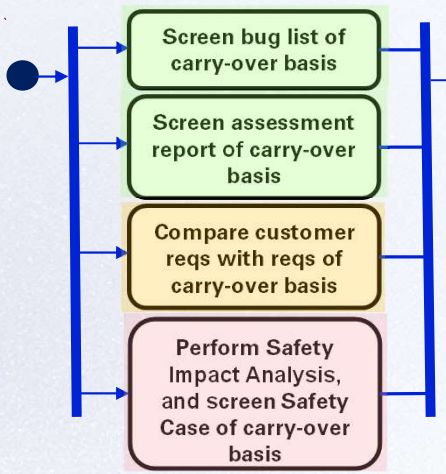


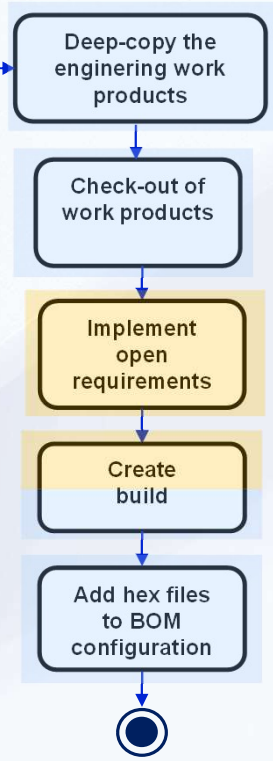
Source:
P.Metz “Automotive SPICE – Capability Level 2 und 3 in der Praxis, dpunkt Verlag, 2016

EXAMPLE DEVELOPMENT USE CASES

Carry-over



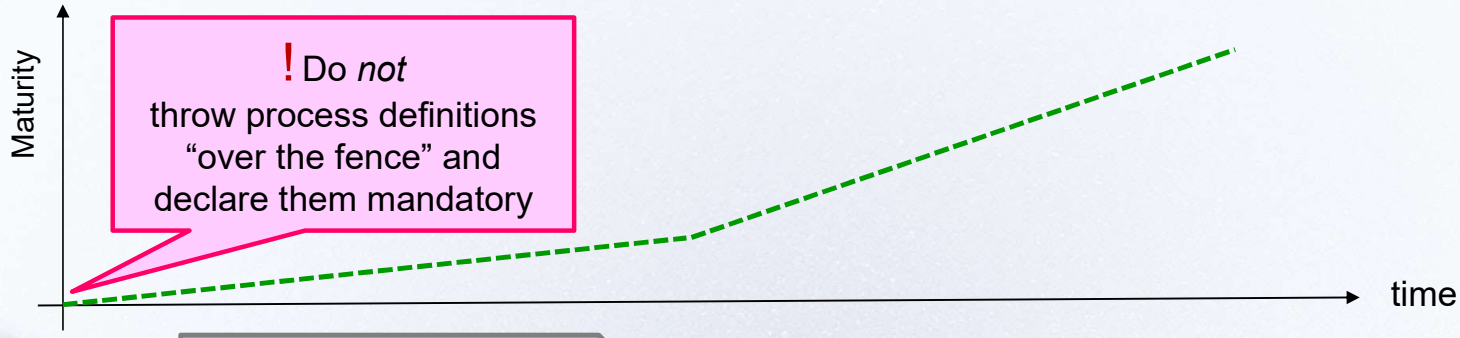




= quality assurance
= configuration management
= safety engineering
= nominal engineering

Source:
P.Metz “Automotive SPICE – Capability Level 2 und 3 in der Praxis, dpunkt Verlag, 2016

PROCESS ROLLOUT STRATEGY



! Do *not*
throw process definitions
"over the fence" and
declare them mandatory

Pilot project 1
Pilot project 2

- Coach 1 or 2 projects for the full project duration
- Explain theory as you go along, and then do it with the project staff hands-on

- You now have
  - a (somewhat) proven methodology
  - a first generation of trained people
- **Now write it down !**

- Then start organization-wide training

and

- send pilot project members to different projects

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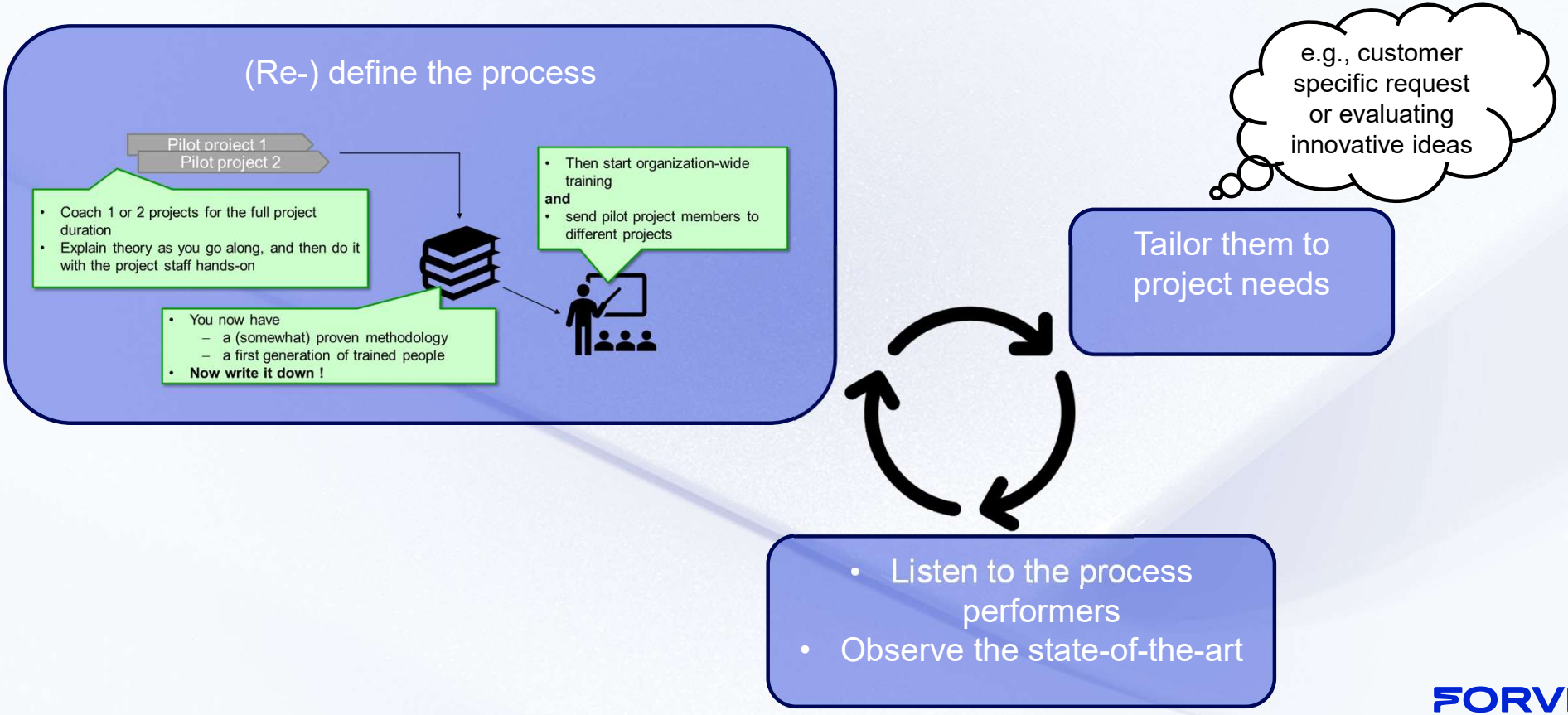
LIVING CULTURE OF CORPORATE LEARNING

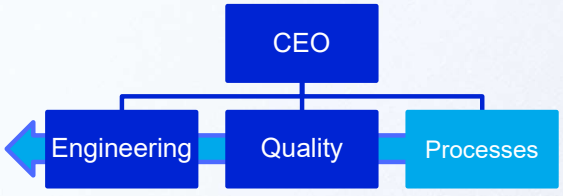


ORGANIZATION SETUP

Pros and Cons

Remember dark blue / light blue job rotation

Centralized



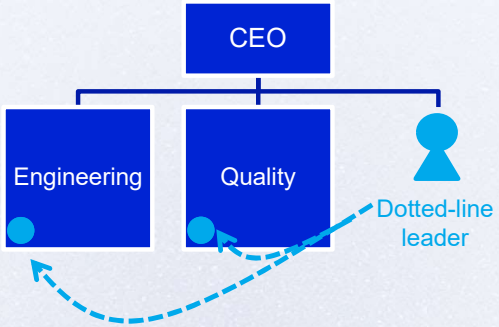
Con:
- Limited product knowledge

Pro
- Standardization is easier

Con:
- Enforcement in different (international) locations is not trivial

Con;
- You “own” the process experts

Dotted-Line



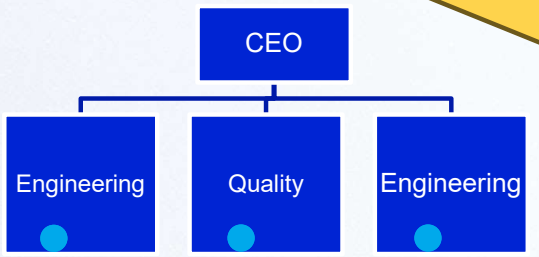
Pro:
- Process experts also have product/development know-how

Con:
- Standardization is difficult
- Possible synergies are not identified

Pro
- Local enforcement is easier

Con:
- High project pressure → process experts will be withdrawn from their roles/tasks

Decentralized



JOB ROTATION

Why job rotation helps preventing “ivory towers”

- Fosters mutual appreciation between process writers and performers
- Bias is reduced
- Outside-the-box thinking based on new perspectives
- “Having felt the pain” is different from “assuming you know the pain”

However:

- You cannot force people to take new jobs
- Must be based on enthusiasm


Image generated by Microsoft Copilot

SUMMARY

To establish a process engineering organization following good practices should be followed:

- Closely and actively involve the affected colleagues
- Consider the process development as a product development (experience, added value, testing, ask customers, …)
- Meet users where they are; understand their needs (V-model, pain, viewpoints, …)
- Do not build ivory towers (org setup with pro and con, job rotation, take feedback seriously)

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