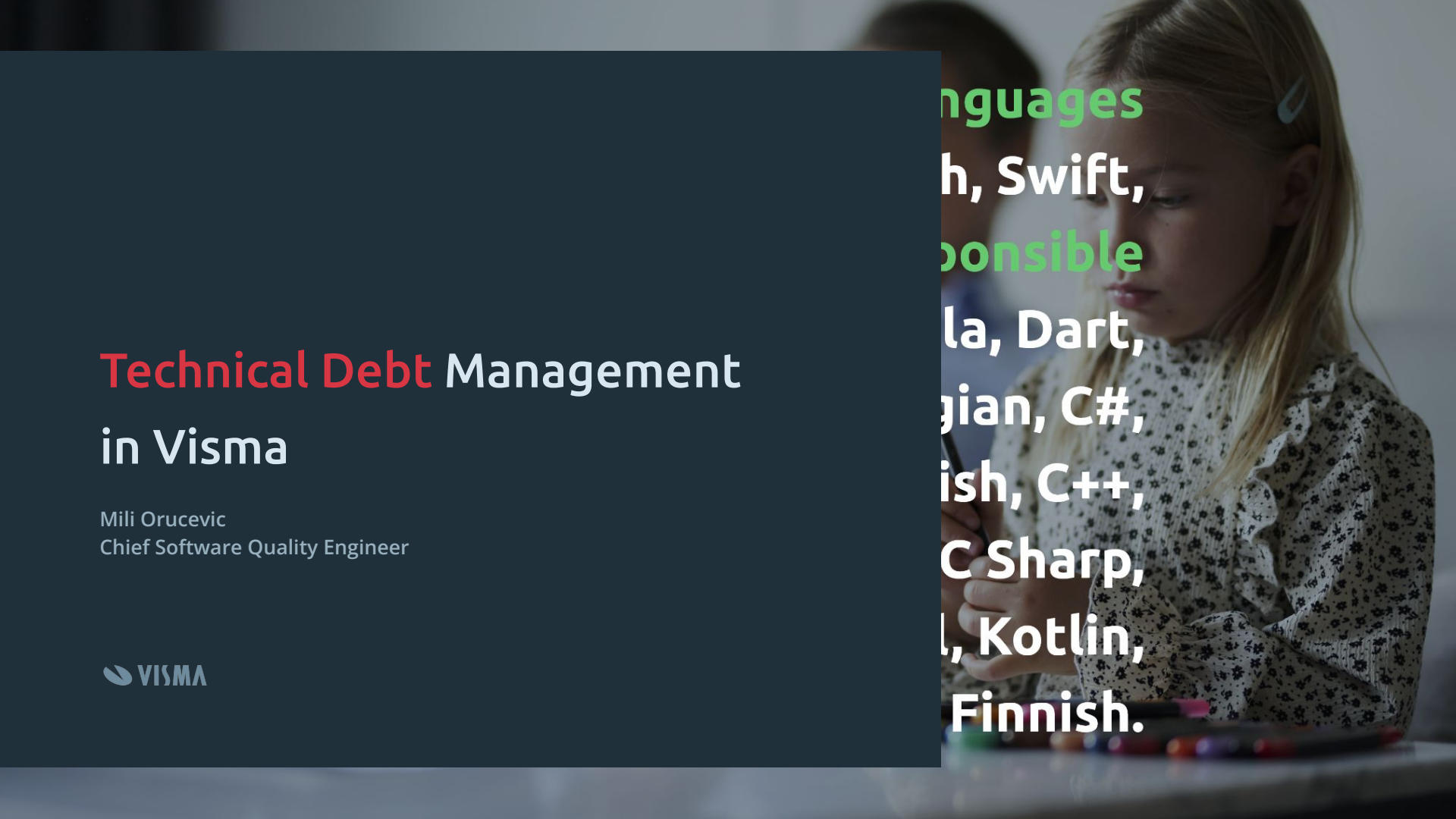
Technical Debt Management in Visma

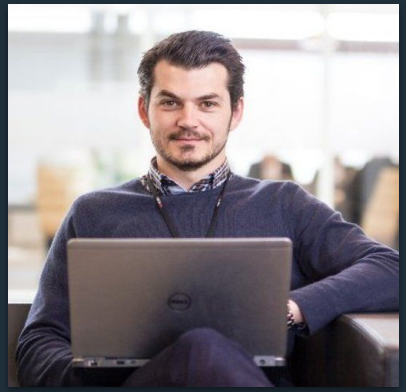
Mili Orucevic
Chief Software Quality Engineer

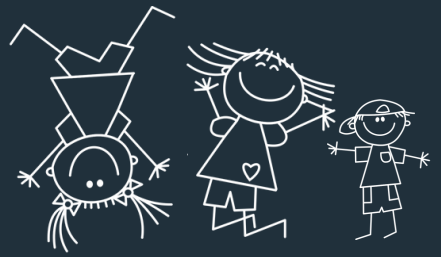
VISMA



Agenda

- Technical Debt in General
- How are we working with Technical Debt in Visma?
- Dive into some examples
  - Assessment
  - Dashboards
  - Indexes
  - Example of large Technical Debt
- Research: Why Technical Debt Matter?





Mili Orucevic

Chief Software Quality Engineer

https://www.linkedin.com/in/milio

VISMA

Lehman's Law of Software Evolution

Law of Continuing Change

"A system must be continually adapted or it becomes progressively less satisfactory"

Law of Increasing Complexity

"As a system evolves, its complexity increases unless work is done to maintain or reduce it."

VISMA

Technical Debt definition

"Shipping first time code is like going into debt. A little debt speeds development so long as it is paid back promptly with a rewrite. Objects make the cost of this transaction tolerable. The **danger occurs when the debt is not repaid.** Every minute spent on **not-quite-right code** counts as **interest on that debt**. Entire engineering organizations can be brought to a stand-still under the debt load of an unconsolidated implementation, object- oriented or otherwise"

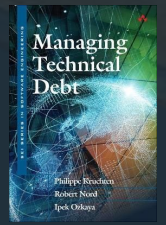
1992 Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)

Ward Cunningham

"In software-intensive systems, technical debt consists of design or implementation constructs that are **expedient in the short term** but that set up a technical context that **can make a future change more costly or impossible**. Technical debt is a contingent liability whose impact is limited to internal system qualities—primarily, but not only, maintainability and evolvability."

Kruchten, Nord, Ozkaya (p.5)

Managing Technical Debt



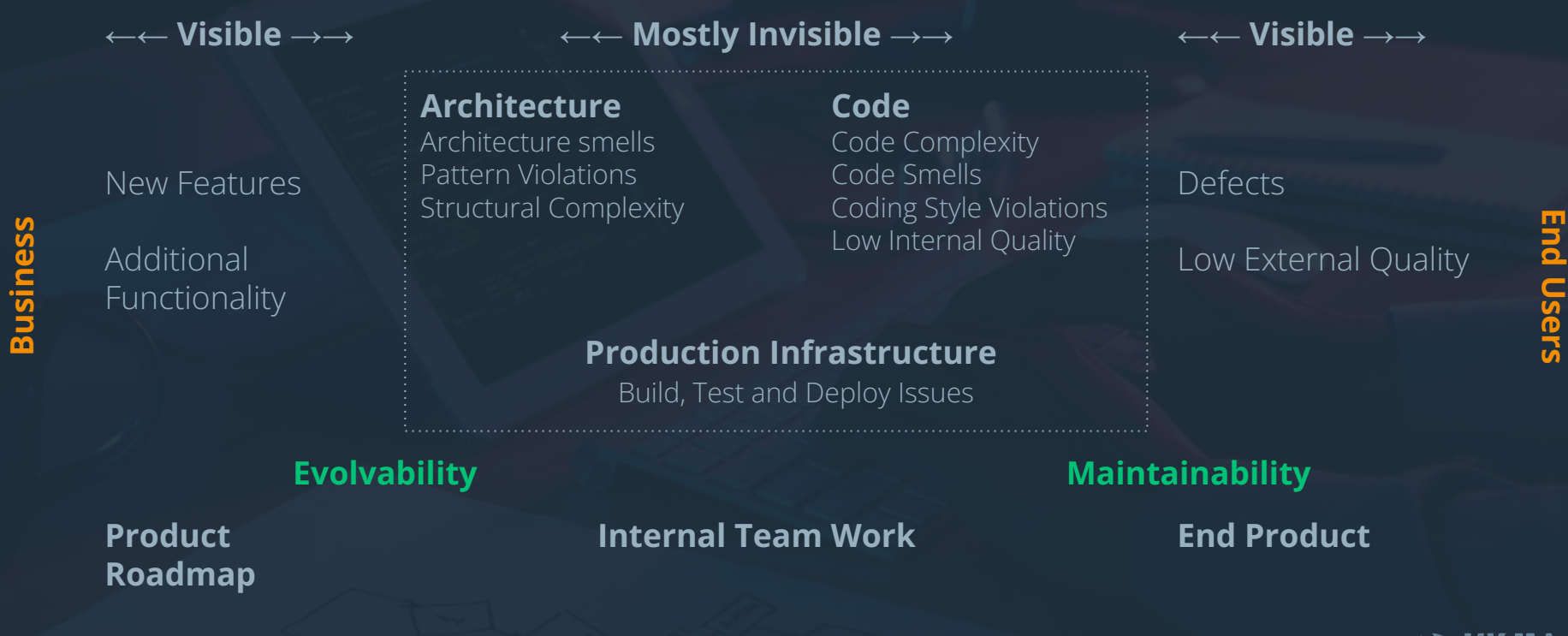
Software systems are prone to the **build up of cruft** - deficiencies in internal quality that **make it harder than it would ideally be to modify and extend** the system further. Technical Debt is a metaphor, coined by Ward Cunningham, that frames how to think about dealing with this cruft, thinking of it like a financial debt. The extra effort that it takes to add new features is the interest paid on the debt.

Blogpost, 21.05.2019:
https://martinfowler.com/bliki/TechnicalDebt.html

Martin Fowler

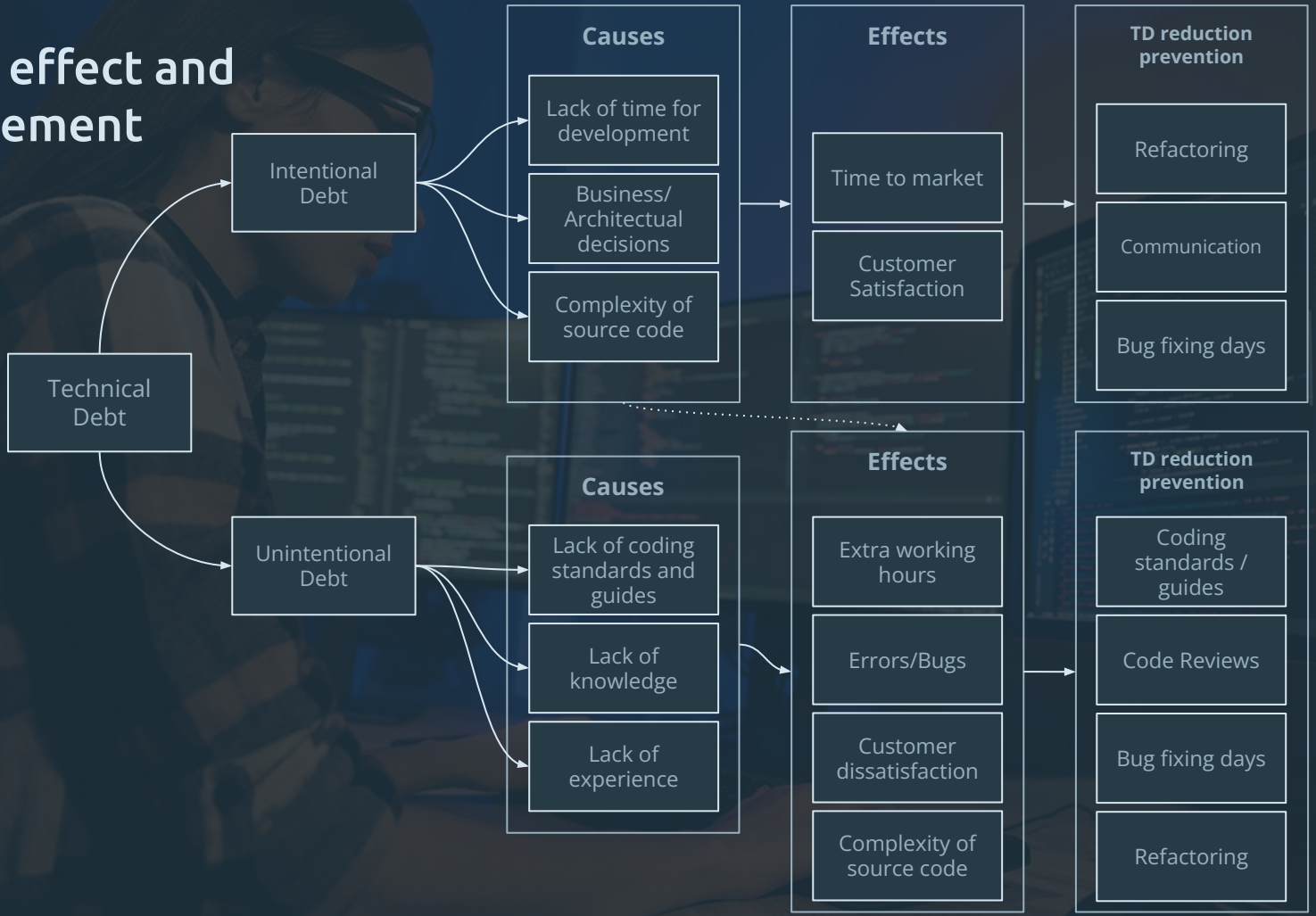
VISMA

Technical Debt Landscape



VISMA

Cause, effect and management



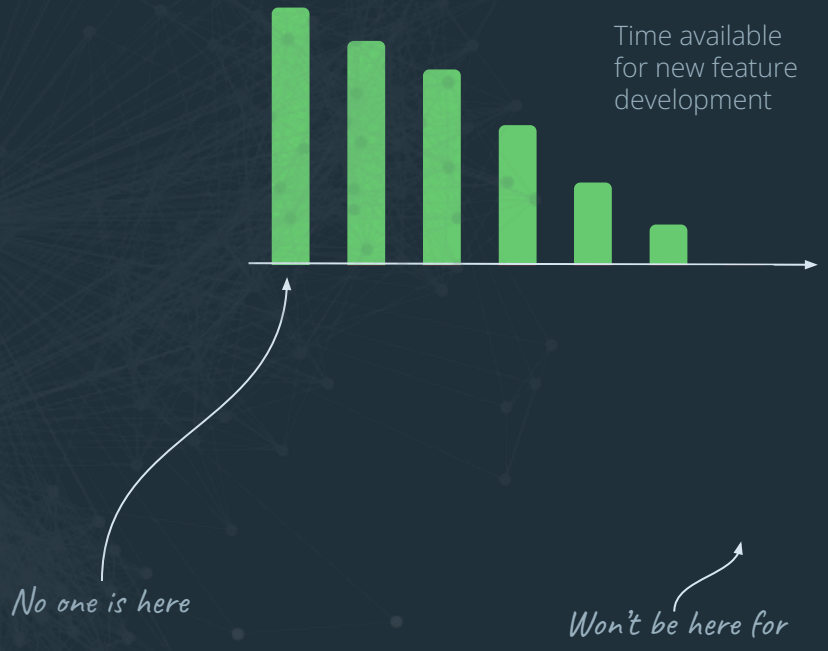
VISMA

Visualizing Technical Debt

Possible symptoms of Technical Debt

- Decline in number of releases
- Increase in delivery lead time
- Less and less time for developing new features

- Might treat symptoms instead of real issues



VISMA

Measuring Technical Debt

Static Code Analysis

- 18626 days or 51 years of technical debt, for 1106 projects
  - ~16 days effort per project

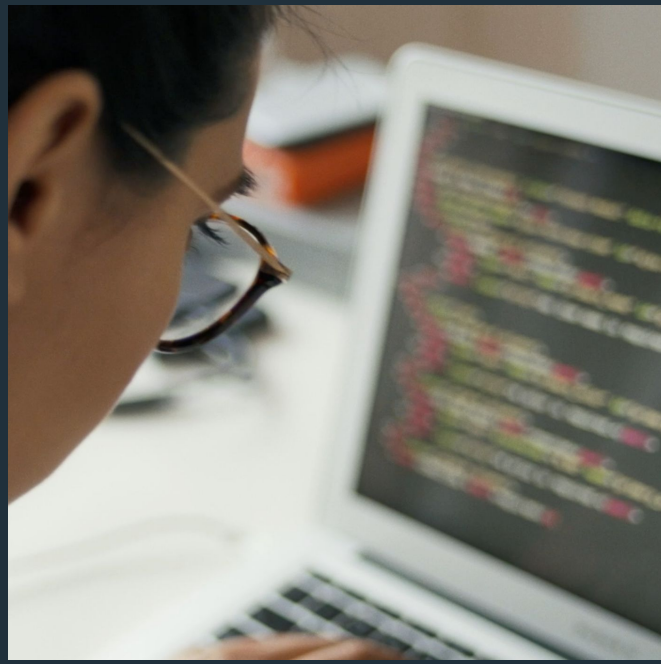
- First 10 days of March, 51 days of effort of technical debt was introduced
  - 7 min per project per day

Other examples outside Visma

- Project: 15 year old code based
- Technical debt accumulated: 4000 years

Should not be the only way to measure technical debt

How are we creating awareness and work with Technical Debt in Visma?



VISMA

Visma - a SaaS company

14 000
Engaged employees

With more than **6 500** developers

Since 2014 more than **140 companies** have joined Visma

1 135 000
Customers

We are where you are
Strong local presence with more than **150** locations

Running through Visma's systems in September '21:

10,3 million payslips
23,2 million invoices

What did we want to solve?

Raise the **awareness** of technical debt in teams

Create **visibility** of technical debt

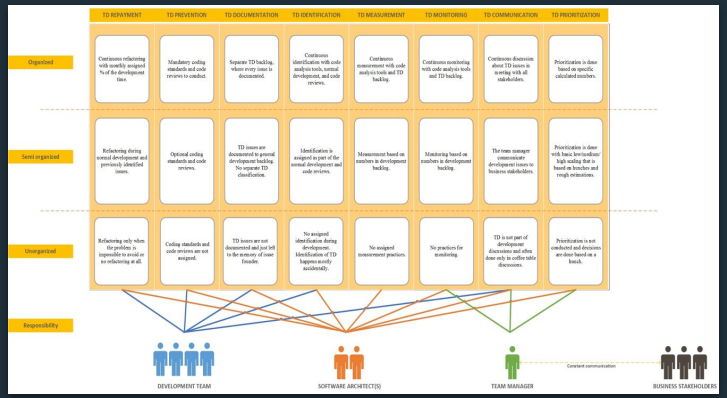
Common **process** for dealing with technical debt

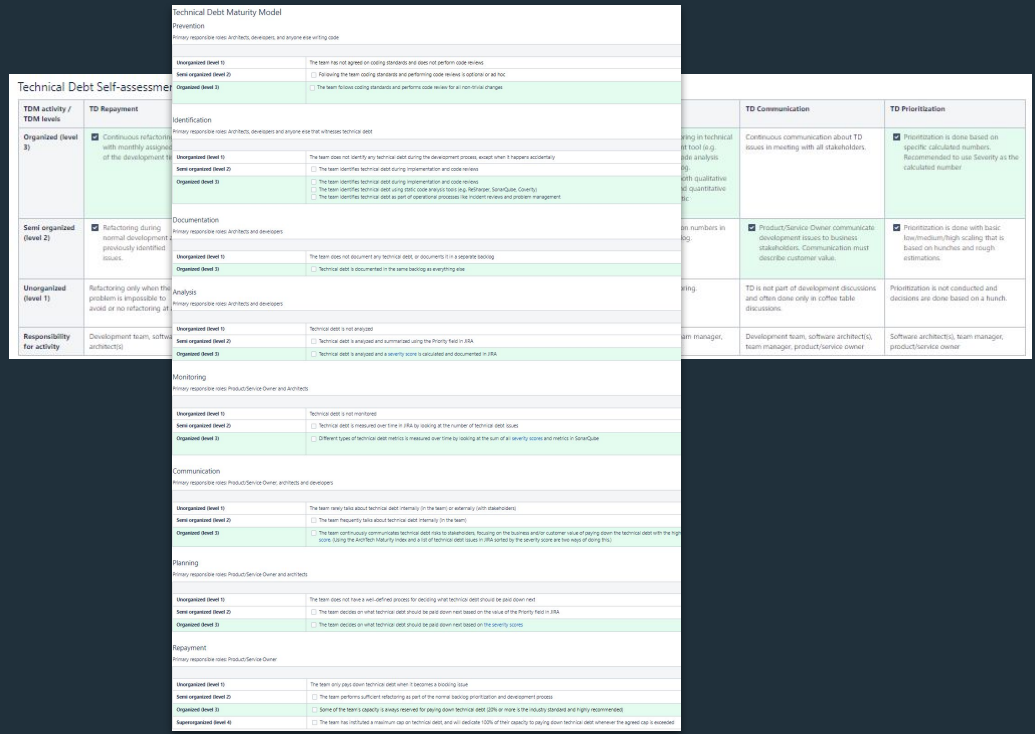
Keep a technical debt **register** for teams

Ensure that technical debt is **planned** and **repaid** where reasonable

VISMA

Technical Debt Maturity Assessment





Inspired by research done at the Lappeenranta University of Technology by Jesse Yli-Huumo.

VISMA

Technical Debt Maturity Assessment

Latest version

Category	Requirements
Prevention	☐ The team follows coding standards and performs code review for all non-trivial changes ☐ The intention of implementing any workaround or corner-cutting is discussed within the team before any code is written; team decides together if the workaround will be implemented or more time will be allocated to avoid it › More Info
Identification	☐ The team identifies technical debt during implementation and code reviews ☐ The team identifies technical debt using static/dynamic code analysis tools (e.g. ReSharper, SonarQube, Coverity, Snyk) and adds it in the backlog. › More info ☐ The team identifies technical debt as part of operational processes like incident reviews and problem management ☐ A process to identify outdated dependencies is implemented (e.g Dependabot, dotnet-outdated)
Documentation	☐ Technical debt is documented in the same backlog as everything else and the NFR label is used ☐ The team documents tech debt about to be introduced (intentional) technical debt › More Info ☐ Our top 3 TD issues are logged and documented in a way that are understandable for stakeholders and decision makers as well. Business impact, if relevant, is part of the documentation. › More Info
Analysis	☐ Technical debt is analyzed and a severity score is calculated and documented in JIRA › Why Severity Scores? ☐ The most important technical debt for our product is reflected in the top 3 TD issues logged in Jira
Monitoring	☐ All types of technical debt is visible in Jira by looking at the sum of severity scores. Here are suggestions for TD JIRA Dashboard / TD Dashboard › Click here to expand...
Communication	☐ The team continuously communicates technical debt risks to stakeholders and decision makers, focusing on the business and/or customer value of paying down the technical debt with the highest severity score. (Using the ArchTech Maturity Index and a list of technical debt issues in JIRA sorted by the severity score are two ways of doing this.) › Why is it important to communicate and be transparent about he technical debt?
Planning	☐ The team includes technical debt decisions and planning into their periodic processes. › Intention and More Info ☐ The team decides on what technical debt should be paid down next based on the severity scores
Repayment	☐ Some of the team's capacity is always reserved for paying down technical debt (20% or more is the industry standard and highly recommended)

VISMA

Technical Debt Maturity Assessment

Category	Description
Prevention	How is introduction of unintentional technical debt prevented?
Identification	How, and where is technical debt identified?
Documentation	How is technical debt documented and labeled?
Analysis	How is technical debt analyzed with emphasis on risk likelihood, impact and severity?
Monitoring	How is technical debt monitored over time, f.ex. trends, top TD issues
Communication	How is technical debt communicated outside the team, f.ex. towards stakeholders?
Planning	How is technical debt included and prioritized in the improvement plans?
Repayment	How is technical debt repaid?

VISMA

Technical Debt Maturity Assessment

Category	Description
Prevention	How is introduction of unintentional technical debt prevented?
Identification	How, and where is technical debt identified?
Documentation	How is technical debt documented and labeled?
Analysis	How is technical debt analyzed with emphasis on risk likelihood, impact and severity?
Monitoring	How is technical debt monitored over time, f.ex. trends, top TD issues
Communication	How is technical debt communicated outside the team, f.ex. towards stakeholders?
Planning	How is technical debt included and prioritized in the improvement plans?
Repayment	How is technical debt repaid?

VISMA

Technical Debt Maturity Assessment

Category	Description
Prevention	How is introduction of unintentional technical debt prevented?
Identification	How, and where is technical debt identified?
Documentation	How is technical debt documented and labeled?
Analysis	How is technical debt analyzed with emphasis on risk likelihood, impact and severity?
Monitoring	How is technical debt monitored over time, f.ex. trends, top TD issues
Communication	How is technical debt communicated outside the team, f.ex. towards stakeholders?
Planning	How is technical debt included and prioritized in the improvement plans?
Repayment	How is technical debt repaid?

VISMA

Technical Debt Maturity Assessment

Category	Description
Prevention	How is introduction of unintentional technical debt prevented?
Identification	How, and where is technical debt identified?
Documentation	How is technical debt documented and labeled?
Analysis	How is technical debt analyzed with emphasis on risk likelihood, impact and severity?
Monitoring	How is technical debt monitored over time, f.ex. trends, top TD issues
Communication	How is technical debt communicated outside the team, f.ex. towards stakeholders?
Planning	How is technical debt included and prioritized in the improvement plans?
Repayment	How is technical debt repaid?

VISMA

Technical Debt Maturity Assessment

Category	Description
Prevention	How is introduction of unintentional technical debt prevented?
Identification	How, and where is technical debt identified?
Documentation	How is technical debt documented and labeled?
Analysis	How is technical debt analyzed with emphasis on risk likelihood, impact and severity?
Monitoring	How is technical debt monitored over time, f.ex. trends, top TD issues
Communication	How is technical debt communicated outside the team, f.ex. towards stakeholders?
Planning	How is technical debt included and prioritized in the improvement plans?
Repayment	How is technical debt repaid?

VISMA

Technical Debt Maturity Assessment

Category	Description
Prevention	How is introduction of unintentional technical debt prevented?
Identification	How, and where is technical debt identified?
Documentation	How is technical debt documented and labeled?
Analysis	How is technical debt analyzed with emphasis on risk likelihood, impact and severity?
Monitoring	How is technical debt monitored over time, f.ex. trends, top TD issues
Communication	How is technical debt communicated outside the team, f.ex. towards stakeholders?
Planning	How is technical debt included and prioritized in the improvement plans?
Repayment	How is technical debt repaid?

VISMA

Technical Debt Maturity Assessment

Category	Description
Prevention	How is introduction of unintentional technical debt prevented?
Identification	How, and where is technical debt identified?
Documentation	How is technical debt documented and labeled?
Analysis	How is technical debt analyzed with emphasis on risk likelihood, impact and severity?
Monitoring	How is technical debt monitored over time, f.ex. trends, top TD issues
Communication	How is technical debt communicated outside the team, f.ex. towards stakeholders?
Planning	How is technical debt included and prioritized in the improvement plans?
Repayment	How is technical debt repaid?

VISMA

Technical Debt Maturity Assessment

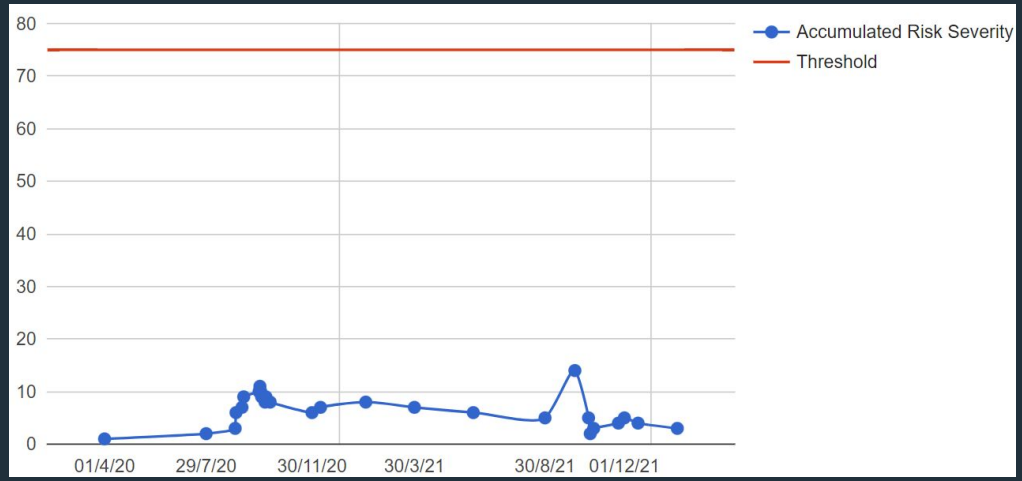
Category	Description
Prevention	How is introduction of unintentional technical debt prevented?
Identification	How, and where is technical debt identified?
Documentation	How is technical debt documented and labeled?
Analysis	How is technical debt analyzed with emphasis on risk likelihood, impact and severity?
Monitoring	How is technical debt monitored over time, f.ex. trends, top TD issues
Communication	How is technical debt communicated outside the team, f.ex. towards stakeholders?
Planning	How is technical debt included and prioritized in the improvement plans?
Repayment	How is technical debt repaid?

VISMA

Example assessment

Link to assessment

Dashboard - team A



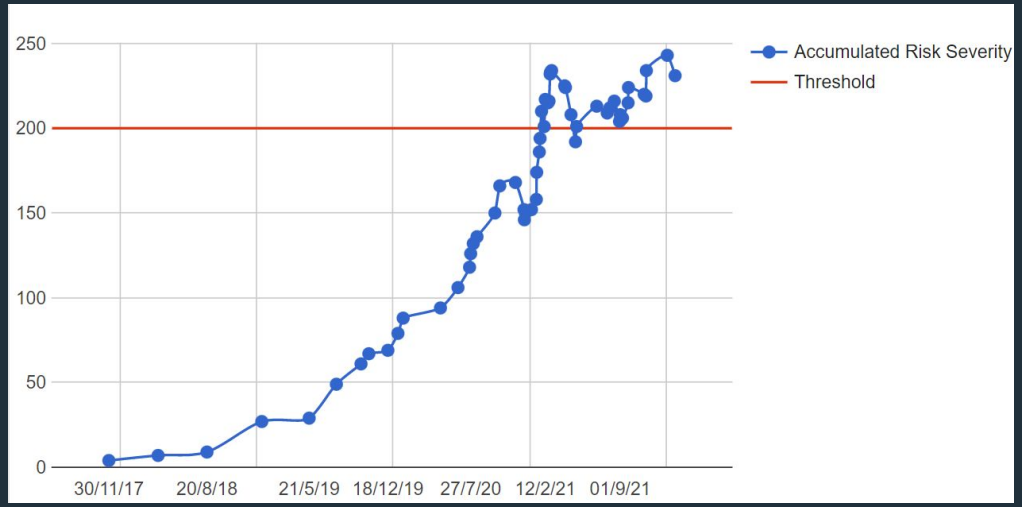
Filter Results: TDMA Example

T		P	Risk Impact	Risk Likelihood	Risk Severity ↓
		=	3	3	9
		=	3	1	3
		=	1	1	1
		=	1	1	1
		=	1	1	1
		=	1	1	1
		⌄⌄	1	1	1
		=	1	1	1
		=	1	1	1
		=	1	1	1
		=	1	1	1
		=	1	1	1

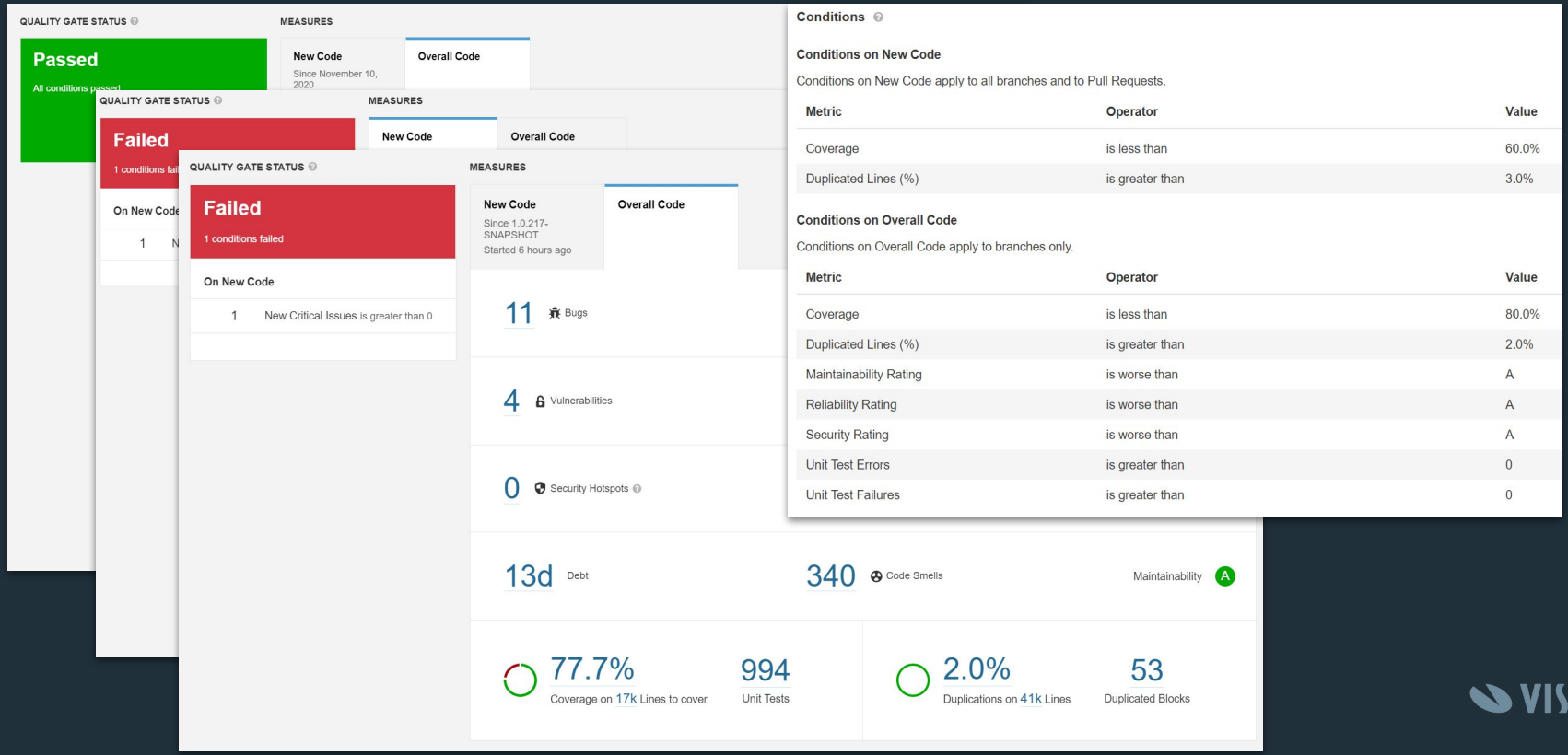
1–12 of 12

VISMA

Dashboard - team B

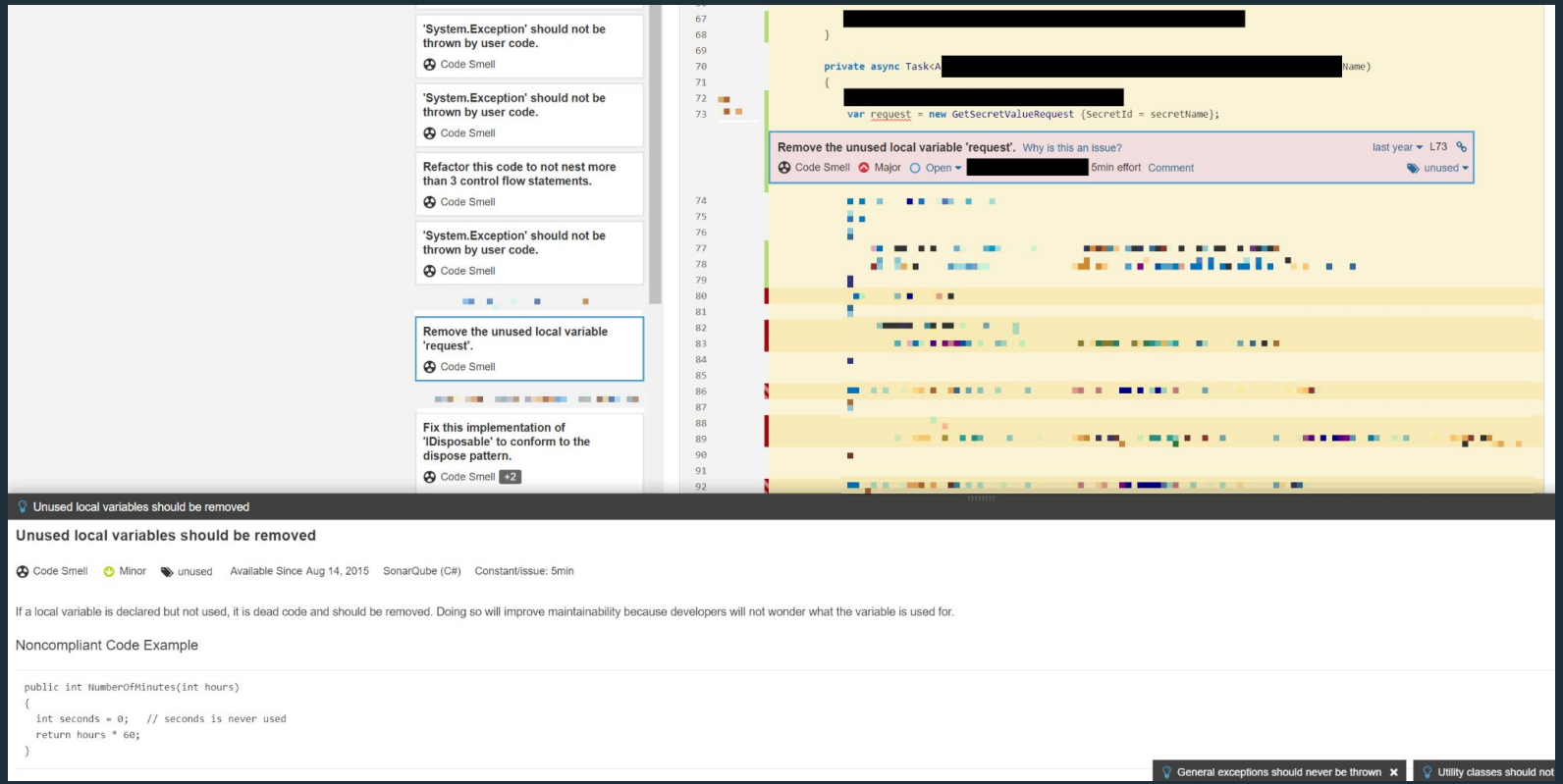


Examples from SonarQube



VISMA

Examples from SonarQube



“Not our fault”

Example of a bigger technical debt

- Unintentional
- External factors
- Time

“Move from AngularJS to new version of Angular”

~ 1583 hours = 66 days

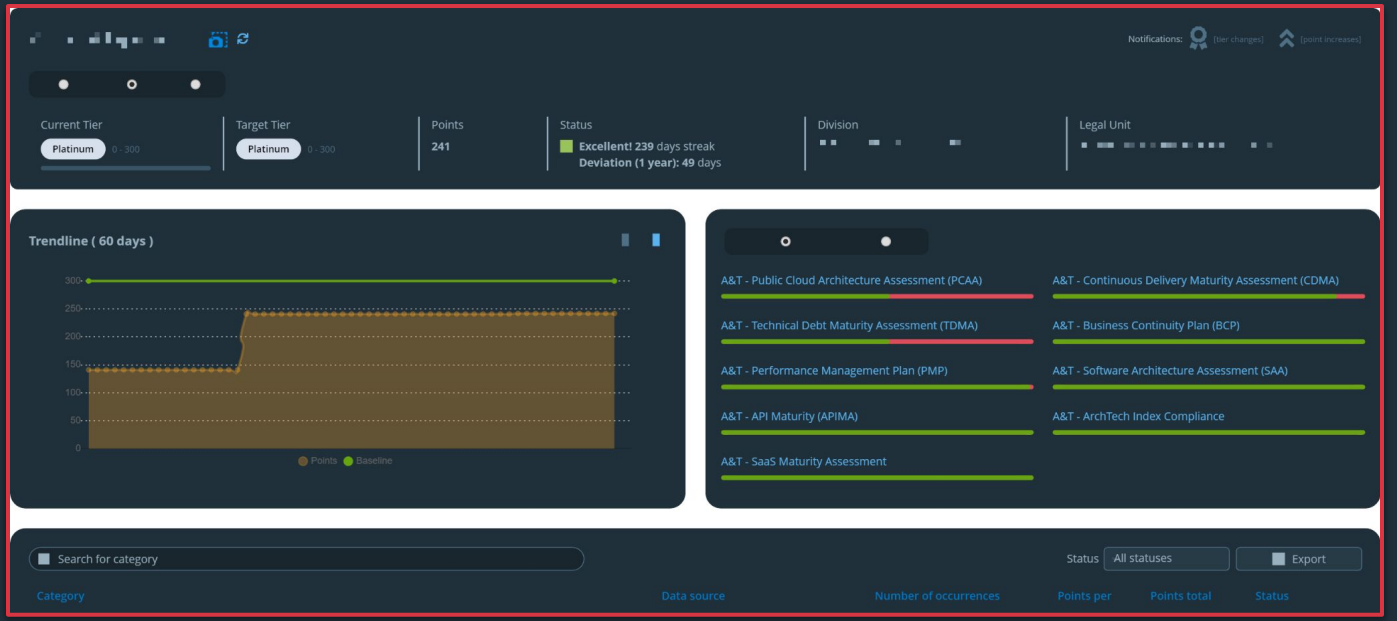
VISMA

Automatically track deviations

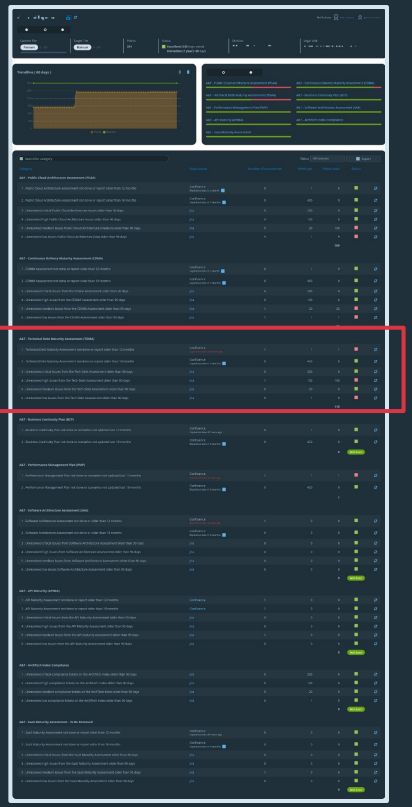
Visma Index

VISMA

Visma Index


Notifications:
[tier changes]
[point increases]
Current Tier
Platinum
0 - 300
Target Tier
Platinum
0 - 300
Points
241
Status
Excellent! 239 days streak
Deviation (1 year): 49 days
Division
Legal Unit
Trendline (60 days)
300
250
200
150
100
50
0
Points
Baseline
A&T - Public Cloud Architecture Assessment (PCAA)
A&T - Continuous Delivery Maturity Assessment (CDMA)
A&T - Technical Debt Maturity Assessment (TDMA)
A&T - Business Continuity Plan (BCP)
A&T - Performance Management Plan (PMP)
A&T - Software Architecture Assessment (SAA)
A&T - API Maturity (APIMA)
A&T - ArchTech Index Compliance
A&T - SaaS Maturity Assessment
Search for category
Status
All statuses
Export
Category
Data source
Number of occurrences
Points per
Points total
Status

Visma Index

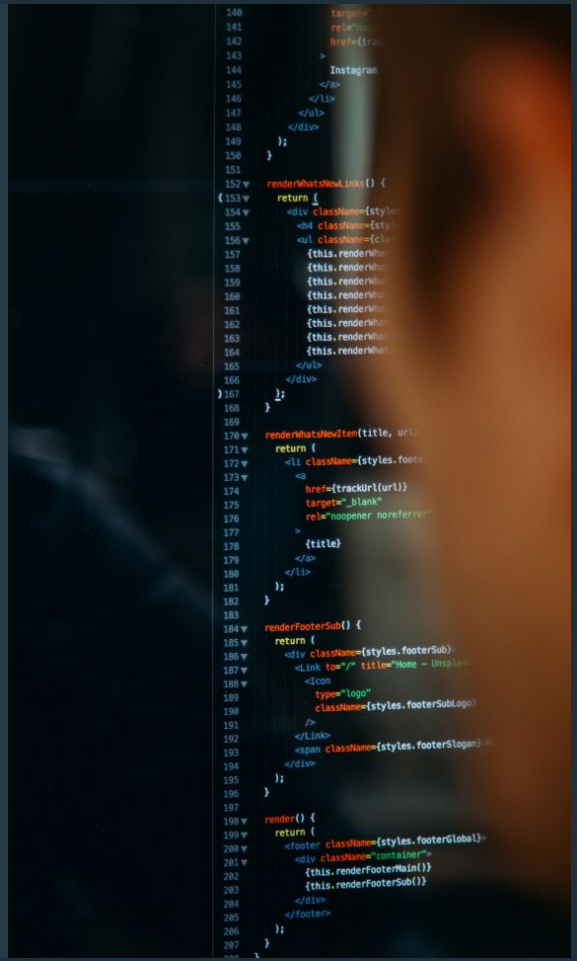


A&T - Technical Debt Maturity Assessment (TDMA)

1 . Technical Debt Maturity Assessment not done or report older than 12 months	Confluence Expiration date 3 months ago	1	1	1	
2 . Technical Debt Maturity Assessment not done or report older than 18 months	Confluence Expiration date in 3 months	0	450	0	
3 . Unresolved critical issues from the Tech Debt Assessment older than 30 days	Jira	0	200	0	
4 . Unresolved high issues from the Tech Debt Assessment older than 90 days	Jira	1	100	100	
5 . Unresolved medium issues from the Tech Debt Assessment older than 90 days	Jira	0	20	0	
6 . Unresolved low issues from the Tech Debt Assessment older than 90 days	Jira	9	1	9	
				110	

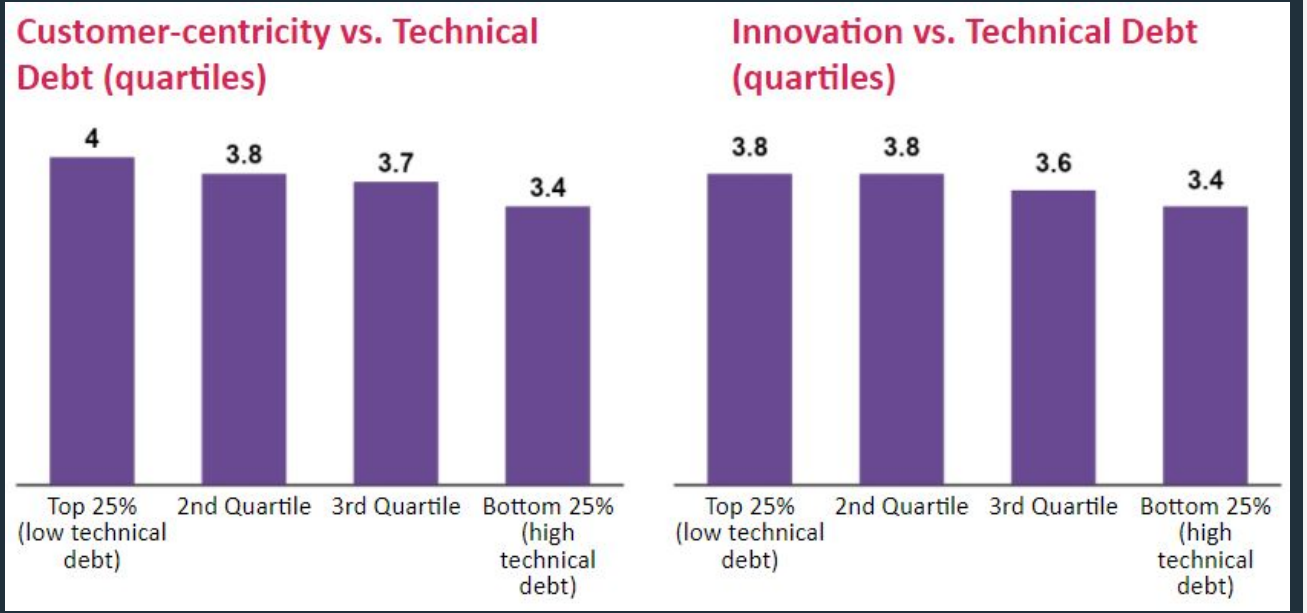
Why Technical Debt Matter?

Lessons learned from own research



VISMA

Technical debt matters!



Products with **more technical debt** are developed by teams with **lower customer-centricity and innovation** scores.

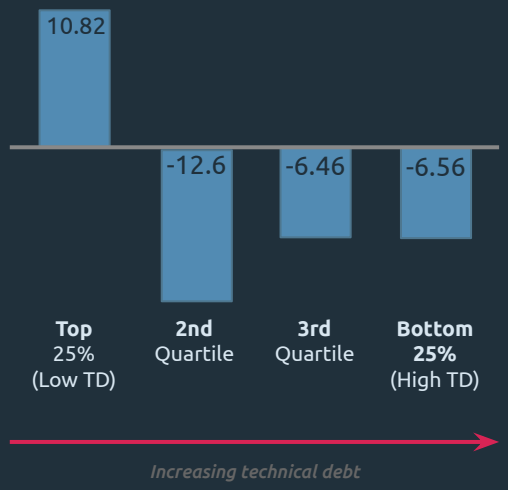
Presumably, it's difficult to have time and energy for being innovative and customer-centric when you have work with and around old technology and practices.

VISMA

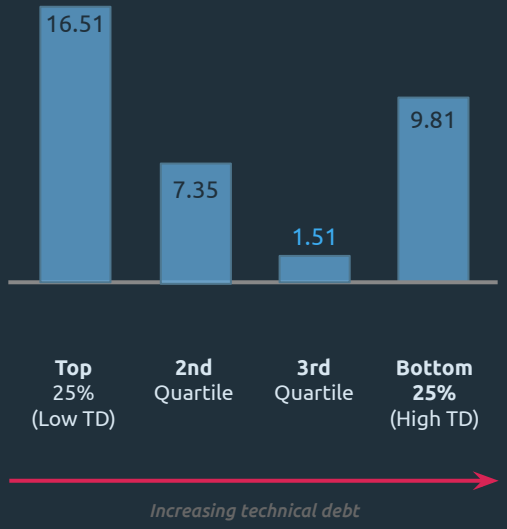
Technical debt matters!

The reduced innovation and customer-centricity in products with high technical debt drives down customer satisfaction and revenue growth.

1. Product NPS by technical debt (quartiles)



2. CBV Growth Rate (%) by technical debt (quartiles)



1. In general, products with less technical debt are more successful

- Higher product NPS
- Higher product growth rate

2. Product lines in the bottom 25% of technical debt have higher growth rate than expected. These product lines tend to have lower CBV, and could be smaller products that have accumulated technical debt through rapid growth.

VISMA

Entrepreneurial

Responsible

Dedicated

Inclusive

Make progress happen

VISMA