Reporting Framework for Enterprise Architecture Debts
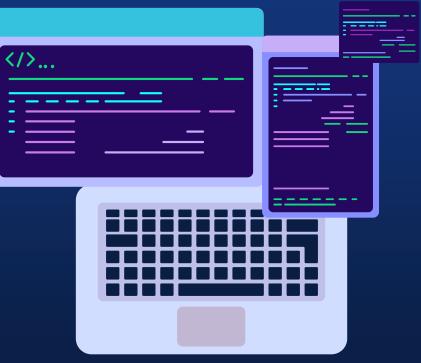
Sana Kanji

Master Thesis: Software Systems Engineering

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CONTEXT

Enterprise Architecture Debt

- A metric that depicts the deviation of the currently present state of an enterprise from a hypothetical ideal state

- Caused by:
  - Expedient decisions
  - Lack of communication
  - Lack of resources

- Results in:
  - Changes more costly

EA debt

Current state → Sustainable state

02

PROBLEM

Problem Statement

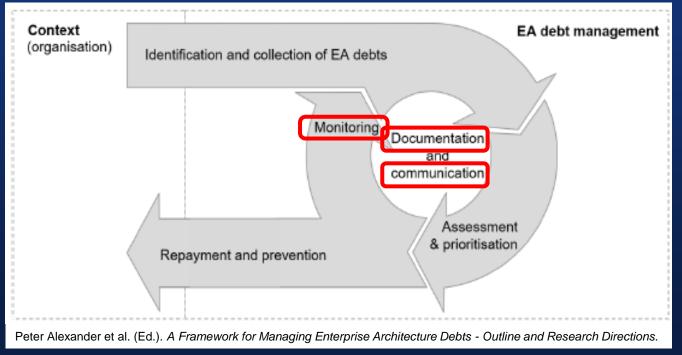There is no defined process and mechanism to report EA debts.

Benefits:
- o Aids communication
- o Supports multiple viewpoints
- o Provides up-to-date information for decision-making

FRAMEWORK FOR EA DEBTS

Peter Alexander et al. (Ed.). *A Framework for Managing Enterprise Architecture Debts - Outline and Research Directions.*

What is required?

The process should be able to handle
- Lifecycle of EA debts
- Lifecycle of EA debt reports
- Continuous distribution of EA debt information

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RESEARCH
QUESTIONS

Research Questions

RQ1: What concerns should the EA debt reporting framework support?

RQ2: How to implement a continuous reporting of EA debt?

- o What will be the lifecycle of EA debts?

- o What will be the lifecycle of EA debt reports?
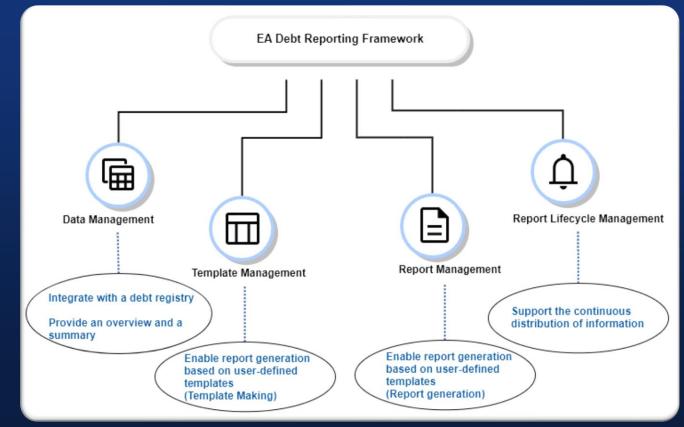
- o How to make the EA debt reporting process continuous?

04

Realization

Framework and the functional requirements it will cover

EA Debt Reporting Framework

Data Management
- Integrate with a debt registry
- Provide an overview and a summary

Template Management
- Enable report generation based on user-defined templates (Template Making)

Report Management
- Enable report generation based on user-defined templates (Report generation)

Report Lifecycle Management
- Support the continuous distribution of information
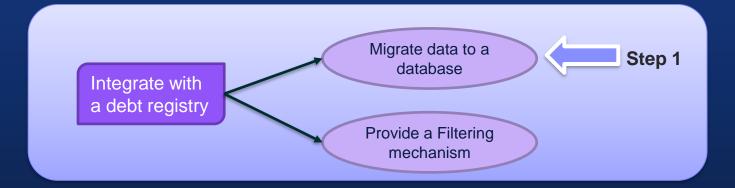
Non-functional:
- **Clear and concise** overview
- Report generation is **intuitive and easy**
- Framework should be **reusable** to support different organizations

Implementation

Debt Registry provided

#	Debt title	Debt description	Evidence (e.g. related principles, guidelines, standards)	Architecture Layers	Affected TITA Capabilities	Affected GEAR Applications	Sunk Costs Incurred (in Mio €)	Project name	Debt period
Give a unique number or an ID to this EA debt item.	*How would you call this EA debt problem?*	*What is this EA debt about?*	*Why is this an EA debt? Which architecture principles, guidelines, standards are violated?*	*Which architecture layers are involved? • BA: Business Architecture • AA: Application Architecture • IA: Information Architecture • TA: Technology Architecture*	*Which business capabilities are affected?*	*Which applications are affected?*	*How much sunk costs are incurred (in Mio)? How are these sunk costs distributed across the affected business capabilities and applications?*	*Which projects are related?*	*How long is this EA debt estimate to remain in the system? • Short-term: Up until 1-2 years • Medium-term: 2-5 years • Long-term: More than 5 years*
2	Usage of <legacy application x> for the development of <new product y2>	Implementation of <new product y2> in <legacy application x>	The <architecture standard z> <standard ID> is not respected here	Application Architecture (AA)	business capability A business capability B	application C	0,5	<project name P2>	Medium-term
3	Inability to terminate <legacy application x1>	Due to decision not to migrate historical data (additional effort to make the historical data available)	Old system not decommissioned completely	Application Architecture (AA)	business capability D business capability E	application F application G application H application J	0,6 (0,3 application F 0,2 application G 0,1 application H)	<project name P3>	long-term

Debt Registry in reporting application

Data Entry (Migration and Insertion of data)
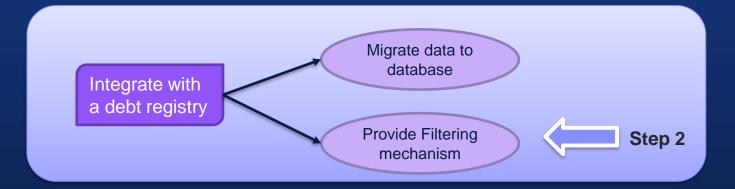
User will be able to upload excel data & view data

Implementation
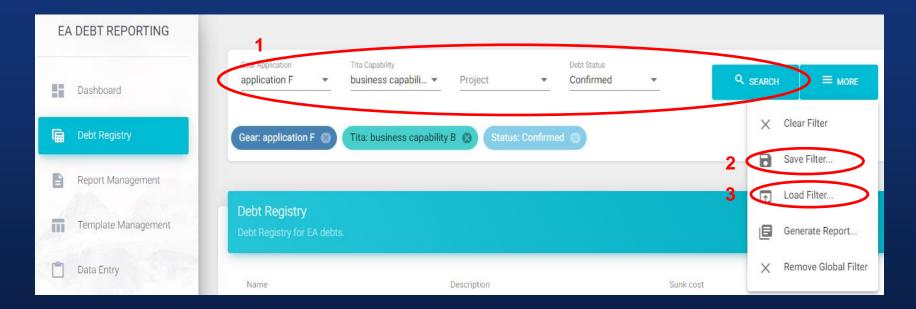
Debt Registry (apply, save & load filter)

User will be able to apply, save & load filter

Apply

Debt Status
Confirmed

☑ Confirmed

Status: Confirmed ⊗

Save

Filter name *

Save   Close

Load

⬈ Load Filter

filter3   ⋮

filter1   ⋮

Load   Close

⬈ Load Filter

filter3   ⋮

filter1

🗑 Delete

🌐 Make Global Filter

Close

Implementation

Template Management

Create Report Template ⌄

Report Templates
Use already present report templates.
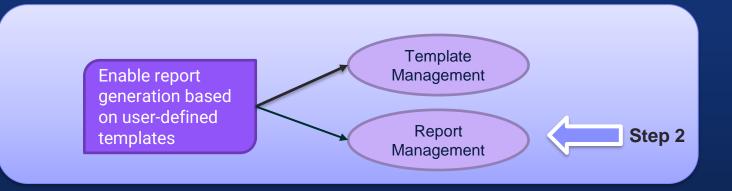
Name	Key Message		
Report 2 title	Report 2 message changed	✏️	🗑️
Report 2 title	Report 2 message again	✏️	🗑️
Report 2 title	Report 2 message changed	✏️	🗑️
Report edit check	Report 2 message changed	✏️	🗑️

Report templates per page: 5 ▾   1 - 4 of 4 templates   ‹ ›
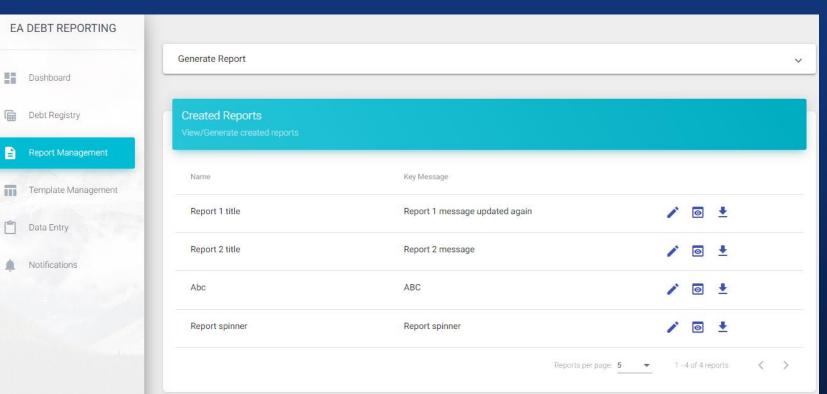
Implementation
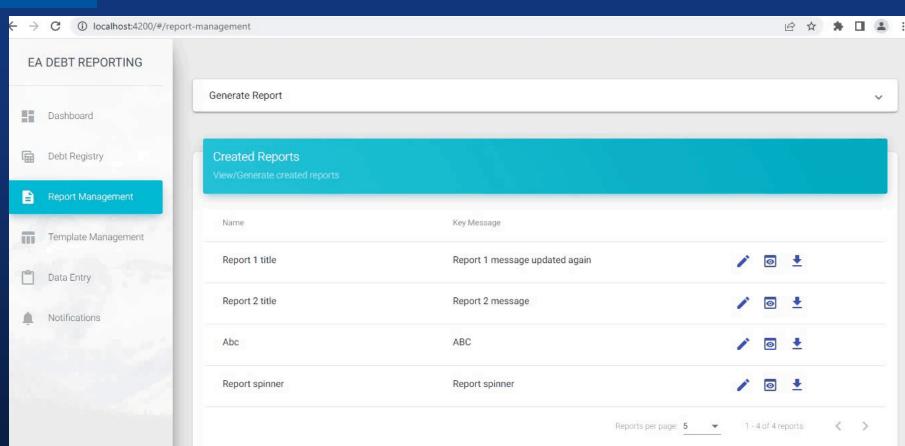
Report Management

User will be able to generate, edit, view & download reports

Generate

Report Details

Report Title *
Sample Report

Key Message
This is a sample report message

Created By *
Sana Kanji

Created Date
4/15/2022, 6:06:07 PM

Select Template *
Report 2 title

＋ Add Filter

Gear: application F Gear: application G Tita: business capability B Tita: business capability D Status: Confirmed

Next

2 Report Overview
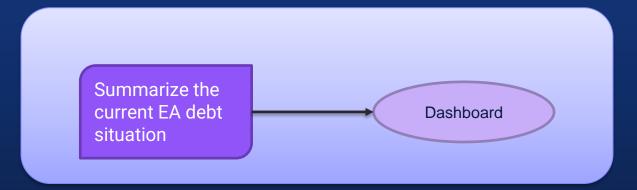
Edit, View & Download

Created Reports
View/Generate created reports

Name	Key Message			
Report 1 title	Report 1 message updated again	✏	🔘	⬇
Report 2 title	Report 2 message	✏	🔘	⬇
Abc	ABC	✏	🔘	⬇
Report spinner	Report spinner	✏	🔘	⬇

Reports per page: 5 ▾   1 - 4 of 4 reports ‹ ›
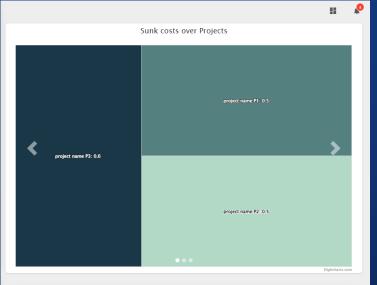
Implementation
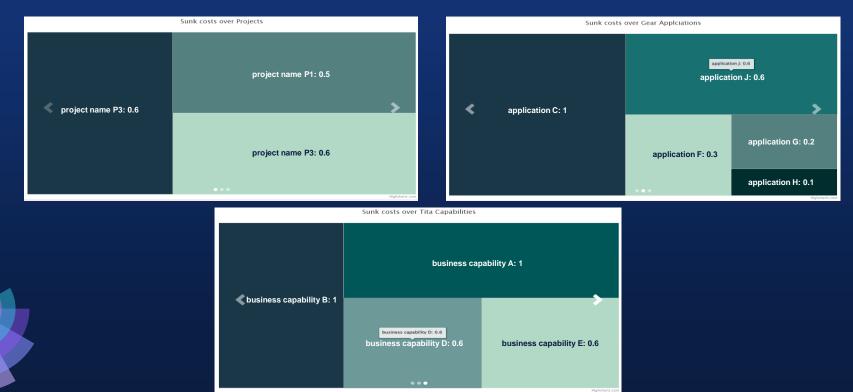
User will be able to see an overview of debts in projects, applications and capabilities

Sunk costs over Projects

- project name P1: 0.5
- project name P3: 0.6
- project name P3: 0.6

Sunk costs over Gear Applciations

- application C: 1
- application J: 0.6
- application F: 0.3
- application G: 0.2
- application H: 0.1

Sunk costs over Tita Capabilities

- business capability B: 1
- business capability A: 1
- business capability D: 0.6
- business capability E: 0.6

User will be able to see the status and the stats of EA debts

Status occurences

Status	Occurrences
Confirmed	4

Debt Item Stats

Id	Name	State
2	Usage of <legacy application x> for the development of <new product y2>	🟢
3	Inability to terminate <legacy application x1>	🟢
4	Usage of <legacy application x> for the development of <new product y2>	🟠
1	abcdefg	🔴

User will be able to see the status and the stats of EA debts

Status occurences

Status	Occurrences
Confirmed	4

Debt Item Stats

Id	Name	State
2	Usage of <legacy application x> for the development of <new product y2>	🟢
3	Inability to terminate <legacy application x1>	🟢
4	Usage of <legacy application x> for the development of <new product y2>	🟠
1	abcdefg	🔴

🔔 Debt Item Details

ID:	2
Title:	Usage of <legacy application x> for the development of <new product y2>
Description:	Implementation of <new product y2> in <legacy application x>
Evidence:	The <architecture standard z> <standard ID> is not respected here
Layers:	Application Architecture (AA)
Tita Capabilities:	business capability B, business capability A
Gear Applications:	application C
Sunk Cost:	0.5
Projects:	<project name P2>
Period:	Medium-term
Implementation Date:	4th quarter of 2020
Recommended Actions:	Define business requirements and rules for <strategy S>
Status:	Confirmed
Comments:	Reason for debt: Reducing the project risk of going overbudget and behind the schedule. [Assumption] investment I is planned to mitigate this debt item

Close

Implementation

Notifications

User will be able to compare, generate & notify about reports

Generate & Notify

🔔 Notify

Report Name
Demo Report

Name *
Sana Kanji

Name the person who has to be notified

Message
Check out this new report!

Message for the person to be notified

Notify   Close

Notification

Demo Report
For: Sana Kanji   Message: Check out this new report!

Evaluation

- Interactive video evaluation

- Answers based on: Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree

EVALUATOR'S BACKGROUND	NOT KNOWLEDGEABLE	LITTLE KNOWLEDGE	VERY KNOWLEDGEABLE
AS A THESIS STUDENT		2	
AS AN EA DEBT RESEARCHER		1	
AS AN EA DEBT PRACTITIONER		1	1
OTHER	2	2	3

Evaluation results

$$\frac{\sum_{i=1}^{n} w_i}{n}$$

- w = weight of the answer
- n = no. of responses on a given question

- Resulting answer is picked from the table below

ANSWER TO SELECT	RANGE
STRONGLY DISAGREE	1 − 1.5
DISAGREE	1.5 − 2.5
NEUTRAL	2.5 − 3.5
AGREE	3.5 − 4.5
STRONGLY AGREE	4.5 − 5

Evaluation results for migration of data

Question	Average Answer
The organization's debt registry can be provided like the one that we have been provided with for making this solution	Agree
The upload functionality in the EA debt reporting framework is convenient.	Agree

Evaluation results for filtering mechanism

Question	Average Answer
The filter parameters provided in the debt registry are sufficient.	Neutral
The filter functionality helps to view the data	Strongly Agree
The application of filters process is clear	Strongly Agree
The save and load filter functionality is useful	Strongly Agree
The global filter functionality is useful	Agree

Evaluation results for template management

Question	Average Answer
The process of creating reusable templates supported in the EA debt reporting framework will save time	Strongly Agree
The widgets allow clear visualization of EA debt data	Strongly Agree
The template-making functionality in the EA debt reporting framework is straightforward	Agree
The iframe providing a preview of the template gives the stakeholder an impression of what the report will look like	Strongly Agree

Evaluation results for report management

Question	Average Answer
The reports help understand the current situation of EA debts in the organization	Agree
The reports will help in better communication between the stakeholders	Strongly Agree
The reports help make better decisions after understanding the current situation of EA debts in the organization	Agree
Reports are an effective mechanism in making EA debts more visible	Agree
You would be able to generate a report using the EA debt reporting framework	Strongly Agree

Evaluation results for dashboard

Question	Average Answer
The visualizations provide a summarized view of the EA debt situation	Strongly Agree
The visualizations serve their purpose of providing a summary of the EA debt situation	Agree
The detail view (which opens when an EA debt is clicked in the table) of the EA debt allows for a quick insight into the EA debt details	Agree

Evaluation results for notifications

Question	Average Answer
Comparing the old and new reports help in viewing the changes in the report	Agree
Receiving a notification is a good indicator of newly regenerated reports	Strongly Agree
Notifications about the report will help in taking action to mitigate the EA debts	Agree
Notifications mechanism keeps the EA debt reporting process continuous	Agree

Evaluation results for concluding questions

Question	Average Answer
The process of reporting on EA debts is now clear.	Agree
Having a specific tool for the reporting of EA debts is useful.	Strongly Agree
The EA debt reporting tool will be useful for organizations.	Agree

Discussion

RQ1: What concerns should the EA debt reporting framework support?

RQ2: How to implement a continuous reporting of EA debt?

- o What will be the lifecycle of EA debts?

- o What will be the lifecycle of EA debt reports?

- o How to make the EA debt reporting process continuous?

Conclusion

- Importing and viewing of debt registry
    - Providing a centralized repository for EA debts

- Creation of templates and reports
    - Supporting various viewpoints of stakeholders

- Summary of applications, business capabilities, projects, and status & stats of EA debts
    - Providing up-to-date information on EA debts

- Continuous flow of information using a notification mechanism
    - Providing up-to-date information on EA debts

Future Work

- Multiple EA Debt Registries

- Alternative views to provide more and better insights

- Support more ways of making the reporting process continuous

- Authentication and authorization mechanism

- Integrate with other parts of the EADM

- Workshop for the practitioners