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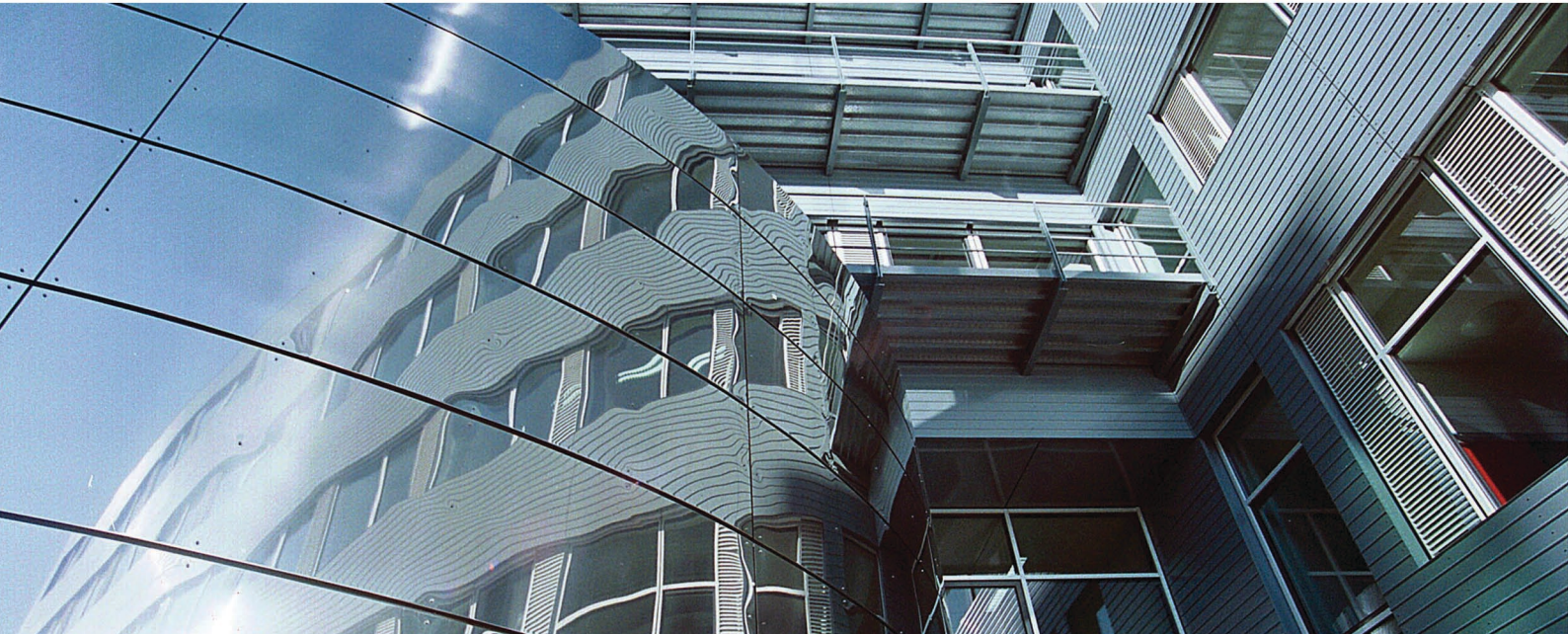
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Sascha Roth, Marin Zec, Florian Matthes

# Enterprise Architecture Visualization Tool Survey 2014



# Enterprise Architecture Visualization Tool Survey 2014

## State-of-the-Art and Future Development

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## About sebis

The chair for Software Engineering for Business Information Systems (sebis) is based within the Department of Informatics at Technische Universität München. The chair has been established in 2002 with funding from Ernst Denert-Stiftung and is headed by Professor Dr. Florian Matthes.

The main research areas of sebis are Enterprise Architecture Management and Social Software Engineering. In addition, Professor Matthes puts particular emphasis on knowledge transfer from academia to industry. He is co-founder and chairman of CoreMedia (1996) and infoAsset (1999) with more than 180 employees, co-founder of further small software and service university spin-offs, as well as scientific advisor of UnternehmerTUM, the center of innovation and business creation at Technische Universität München.

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## **Abstract**

A major factor for successful Enterprise Architecture initiatives is continuous communication between different stakeholders. If used properly, visualizations are an effective means of communication. In recent years, EA tools evolved from simple solutions for collecting EA information and generating basic reports to more mature platforms providing users with sophisticated features to configure and customize visualizations. However, EA tools differ considerably with respect to their visualization capabilities (e.g. supported visualization types, import/export capabilities and support for customization).

This technical report sheds light on the state-of-the-art in EA visualizations and respective tool support. It contains results from a two-part study in which we analyzed both the feature set of 19 available EA tools from 18 vendors and actual usage patterns of 109 EA practitioners. This report focuses on EA visualizations. However, aspects around configuration and the information model are covered as well. We provide a synthesized collection of 26 visualization types and assess the current tool support of these visualization types. This report contains 295 figures and screenshots of EA tools and comprehensive descriptions of their capabilities illustrated in 248 tables.

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**Part I.**

# **Enterprise Architecture Visualizations**



# CHAPTER 1

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## Introduction

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The goal of Enterprise Architecture (EA) management is to align business with Information Technology (IT) which is expected to gain strategic advantage over competitors because of shorter reaction times and higher cost efficiency of frequent environmental changes in globalized markets. Thus, EA management requires a holistic view of the entire EA including business capabilities, business processes, business services, applications, infrastructure services, platforms, databases, etc. EA information is commonly highly interlinked and thus can also be regarded as a complex system of systems. In line with the International Organization for Standardization (ISO) 42010 standard we define an EA as the “fundamental organization of a system embodied in its components, their relationships to each other, and to the environment, and the principles guiding its design and evolution.” [ISO07]. To communicate EA information and complex information in general [Sp01, Wa12], visualizations are a common means and consequently play an important role in EA management. EA visualizations can be used for various purposes. For instance, EA visualizations help to

- communicate and analyze complex information,
- promote stakeholder involvement, or
- increase transparency.

To cope with the sheer amount of information, EA management commonly uses an EA repository to manage information. In the remainder of the present study we refer to these repositories as EA tools. Two major capabilities of EA tools are EA (information) model maintenance and report generation. Reports often include EA visualizations or turn out to be visualizations themselves.

This study contains a comprehensive analysis of current tool support for these visualizations. The analysis covers not only visualization facilities as such but also model maintenance, configuration, customization, generation, layouting and import/export capabilities. In the next section we recap related studies briefly.

### 1.1. Related Studies on EA Tools

In the past, we conducted two EA management tool surveys in 2005 and 2008 respectively [MBL<sup>+</sup>08]. Back then, the EA tool market was perceived as emerging. Although, recent technology trends [BBDF<sup>+</sup>12] have been identified in 2012 as well as challenges EA management is facing [HSR<sup>+</sup>13], our general hypothesis is that EA tools have advanced significantly: particularly when it comes to visualization capabilities. Practical implementation of EA management functions are much more mature as well, .g. in terms of the maintained information base [GMR12, FBH<sup>+</sup>13a]. Back in 2008, our EA tool evaluation was based on a list of criteria and two sets of scenarios. The first set reflected rather technical scenarios such as model data import, export and validation. The second set of scenarios reproduced various typical EA management tasks such as landscape management or business object management. These essential EA management tasks were identified in collaboration with sponsors and partners. The evaluation was carried out based on the simulation of the scenarios on a illustrative case study which was based on the notional department store SoCaStore. This way, we made sure to ensure consistency and continuity of the evaluation across all EA tools.

	EAMTS08 [MBL <sup>+</sup> 08]	TEAMT [BBDF <sup>+</sup> 12]	The Forrester Wave Q2 2013 [Fo13]	Gartner 2013 [Ga13]	EAVTS14
Focus	Scenario Based: 8 dimensions of functionality, 9 EA management tasks	Trend Study, Current and Future Scenarios	69 Criteria split by current offer- ing, strategy and market presence of a vendor	Trend Study and market segmen- tation in one of the quadrants: leaders, chal- lengers, vision- aries, and niche players	Visualization, Configuration, and Meta- Modeling Ca- pabilities
Year	2008	2012	2013	2013	2014
# Vendors	9	None	10	14	18

**Table 1.1.:** Overview of tool surveys related to this study

The case study data and the underlying information model are described in more detail in [MBL<sup>+</sup>08]. The first set of scenarios consisted of the following technical tasks:

- Importing, editing, and validating model data,
- Creating visualizations of the application landscape,
- Interacting with and editing of visualizations of the application landscape,
- Supporting lightweight access,
- Editing model data using an external editor,
- Adapting the information model,
- Handling large scale application landscapes,
- Supporting multiple users and collaborative work, and
- Support for simulation in EA management.

The second set of scenarios consisted of the following management tasks:

- Landscape Management,
- Demand Management,
- Project Portfolio Management,
- Synchronization Management,
- Strategies and Goals Management,
- Business Object Management,
- SOA Transformation,



- IT Architecture Management, and
- Infrastructure Management.

In [MBL<sup>+</sup>08], each of the scenarios is introduced in the same way. First, a short motivation for the specific task is provided. Then, goals are described. Finally, examples of associated deliverables were presented.

Recently, Forrester Research analyzed 10 Enterprise Architecture Management Suites (EAMS) in the “The Forrester Wave: Enterprise Architecture Management Suites” [Fo13].

*In Forrester’s 69-criteria evaluation of EAMS vendors, we [Forrester Research] identified the 10 most significant software providers based on breadth of EA coverage and ability to fulfill four common EA objectives — alfabet, Avolution, BOC Group, Casewise, EAS, IBM, Mega International, OpenText, Software AG, and Troux Technologies — and researched, analyzed, and scored them.*

The study is based on empirical results from 30 interviews in enterprises which use an EA tool and 10 interviews with tool vendors. In the final part of the study, Forrester Research mentions additional vendors that are included in the present study: Atoll Technologies, BiZZdesign, iteratec, and Future Tech Systems.

Gartner Research [Ga13] conducts another major EA tool market study annually. While Gartner included 15 EA tools in 2012 [Ga12], only 14 EA tools have been included in 2013 [Ga13].

The research focus varies among related studies. In [MBL<sup>+</sup>08] we evaluated typical scenarios that have to be accomplished when pursuing an EA management endeavor. Other studies focus on trends [BBDF<sup>+</sup>12], position vendors in the EA tool market [Ga12, Ga13, Fo13], or detail technical capabilities [KS13].

In the present study, we analyze offerings of 18 vendors in the EA tool market. We cover a major portion of Gartner’s Magic Quadrants 2012 and 2013 as well as most of the vendors considered in Forrester Research’s study [Fo13]. Table 1.1 provides an overview of the relationship between the present study and previous studies of EA tools. In addition to the vendors analyzed by Gartner, Forrester and in our EAMMTS2008, we include some niche players.

We conclude this section by giving a concrete overview of Vendors and Tools that are subject of analysis in the different studies on EA tools. Table 1.2 gives a more detailed view which illustrates which vendors and tools have been analyzed by the different studies. As depicted, we included the major players in the market and some niche players we regarded worthwhile to have a look at. Although invited to participate, Troux Technologies and QualiWare have decided not to participate in our study.

## 1.2. Intended Audience

The primary target audience of this technical report are EA practitioners such as C-level executives, strategic enterprise architects, portfolio managers, consultants or analysts. In addition, we consider EA tool vendors and EA researchers as secondary target audience.

Vendor	EAMTS08 [MBL <sup>+</sup> 08]	Gartner 2012 [Ga12]	Gartner 2013 [Ga13]	Forrester 2013 [Fo13]	EAVTS14
ABACUS (Avolution)	✗	✓	✓	✓	✓
adaptive EAM (adaptive Inc.)	✓	✗	✗	✗	✗
ADOit (BOC AG)	✓	✗	✗	✓	✓
ARIS (Software AG)	✓	✓	✓	✓	✓
BiZZdesign EA Tool Suite (BiZZdesign)	✗	✓	✓	✗	✓
Corporate Modeler Suite (Casewise)	✗	✓	✓	✓	✓
Essential Project (EAS)	✗	✗	✗	✓	✗
Embarcadero EA/Studio (Embarcadero Technologies Inc.)	✓	✗	✗	✗	✗
Enterprise Architect (SparxSystems Ltd)	✗	✓	✓	✗	✓
Envision VIP (Future Tech Systems)	✗	✓	✗	✗	✓
iteraplan (iteratec GmbH)	✗	✓	✓	✗	✓
Layer8 (Layer8-Solutions GbR)	✗	✗	✗	✗	✓
leanIX (LeanIX GmbH)	✗	✗	✗	✗	✓
MEGA (MEGA International)	✓	✓	✓	✓	✓
OpenText (OpenText Corp.)	✓ <sup>a</sup>	✓	✓	✓	✗
planningIT (Software AG)	✓	✓	✓	✓	✓
PowerDesigner (Sybase/SAP AG)	✗	✓	✓	✗	✓
process4.biz (process4.biz Softwareentwicklungs- und Vertriebs GmbH)	✗	✗	✗	✗	✓
QPR EnterpriseArchitect (QPR Software)	✗	✗	✗	✗	✓
QualiWare Enterprise Architecture (QualiWare)	✗	✓	✓	✗	✗
Rational System Architect (IBM)	✓ <sup>b</sup>	✓	✓	✓	✓
SAMU Repository (Atoll Technologies Ltd)	✗	✓	✓	✗	✓
Troux (Troux Technologies)	✓	✓	✓	✓	✗
Txture (QELaB Business Services GmbH)	✗	✗	✗	✗	✓

<sup>a</sup> MetaStorm is now OpenText, i.e. the analysis contained in the study focuses on ProVision by Metastorm.

<sup>b</sup> Telelogic has been acquired by IBM, i.e. the analysis contained in the study focuses on the System Architect by Telelogic AB.

**Table 1.2.:** Overview of tools that are subject of analysis in the respective surveys

This report describes the results of our most recent research project which was concerned with the state-of-the-art in EA visualizations and their tool support. It contains observations we made in the course of two surveys. The first survey was targeted at EA tool vendors and collected comprehensive information on tool capabilities. The goal of the second survey was to assess which usage patterns and demands are widespread in practice. The overall goal of our study was to investigate the level of alignment between demand (i.e. EA visualization use cases in practice) and offerings (i.e. EA tool visualization capabilities) in the EA domain.

### 1.3. Contributions

We consider this report to be useful for EA practitioners, EA tool vendors as well as EA researchers for various reasons. It serves EA practitioners as

- an overview of EA visualizations supported by EA tools,
- a source of ideas about the use of visualization types for specific stakeholders,
- a frame of reference and basis for buying decisions for an EA tool.

Vendors get insights into actual usage of visualization types among various practitioners. EA tool vendors get

- a comprehensive competitor and market analysis,
- ideas about which visualization types are used for which stakeholders,
- a list of pain points and possible features.

White spots identified may serve as starting points for further research efforts in the field. Researchers get

- an overview of widely accepted visualization types,
- respective tool support,
- their actual usage (popularity) in practice, and
- insights into market demands in terms of desired visualization types and EA tool features.

### 1.4. Structure of this Report

This document is split into three parts. It contains 295 figures and 248 tables.

**Part I** contains an executive summary, presents our methodology, and introduces the visualization types identified in the course of the study.

**Part II** consists of 18 EA tool profiles providing details about tool capabilities. The profile is presented in a tabular format to facilitate readability and comparison.

**Part III** reports survey results from our analysis based on the information reported by 109 practitioners.

This document features an organized index structure and can be browsed in different ways. While a written document has linear character, we tried to provide the reader with two major entry points to read this document. The two major approaches to navigate within this report are:

- Tool by visualization type, i.e. the reader wants to learn how different tools implement a particular visualization type
- Visualization type by tool, i.e. the reader wants to learn more about all the visualization types which are supported by a specific tool

The index starts at page 397. This structure is also reflected in the executive summary in Chapter 3 and facilitated by referring to the relevant pages that illustrate how the respective visualization type is implemented in the respective tool.

A color-coded thumb index for quick access is provided such that different tools can be compared more easily.

## **1.5. Analyzed Enterprise Architecture Management Tools**

- ABACUS (Avolution)
- ADOit (BOC AG)
- ARIS (Software AG)
- BiZZdesign EA Tool Suite (BiZZdesign)
- Corporate Modeler Suite (Casewise)
- Enterprise Architect (SparxSystems Ltd)
- Envision VIP (Future Tech Systems)
- iteraplan (iteratec GmbH)
- Layer8 (Layer8-Solutions GbR)
- leanIX (LeanIX GmbH)
- MEGA (MEGA International)
- planningIT (Software AG)
- PowerDesigner (Sybase/SAP AG)
- process4.biz (process4.biz Softwareentwicklungs- und Vertriebs GmbH)
- QPR EnterpriseArchitect (QPR Software)
- Rational System Architect (IBM)

- SAMU Repository (Atoll Technologies Ltd)
- Txture (QELaB Business Services GmbH)

### 1.6. Acknowledgment

We thank the tool vendors for their participation in our study. In alphabetical order, our thanks go to:

- Atoll Technologies Ltd
- Avolution
- BiZZdesign
- BOC AG
- Casewise
- Future Tech Systems
- IBM
- infoAsset AG
- iteratec
- Layer8-Solutions GbR
- LeanIX GmbH
- MEGA International
- process4.biz Softwareentwicklungs- und Vertriebs GmbH
- QELaB Business Services GmbH
- QPR Software
- Software AG
- SparxSystems Ltd
- Sybase/SAP AG

Moreover, we thank all practitioners who participated in our survey for their valuable contributions, feedback and insights into actual usage of EA visualizations in practice. In alphabetical order our thanks go to: act! consulting GmbH, Adaptive, Inc., adidas AG, BayernLB, BBGG - Berlin Business Group GmbH, Business Engineering Group, Cardcenter, Carl Zeiss AG, Cobb Systems Group, Dr. Nink IT Consulting, eda.c, Friedrich-Schiller-Universität Jena, Golsoft, HCL, Hermes Europe GmbH, IRM Business Innovation AB, Kanton Aargau, Konsit, KVB, LEONI AG, Macmillan, Ministry of Justice, Nokia Siemens Networks, NTT DATA, Polizei Niedersachsen, Real IRM Solutions, Sanacorp GmbH, SCHUFA Holding AG, SMART360, Systematics, T-Systems International GmbH, Universität Mannheim, Wüstenrot & Württembergische AG, Zumtobel AG

Our special thanks for his feedback on an earlier version of this report go to Thomas Reschenhofer.

## CHAPTER 2

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### A Brief Overview of the Enterprise Architecture Management Function

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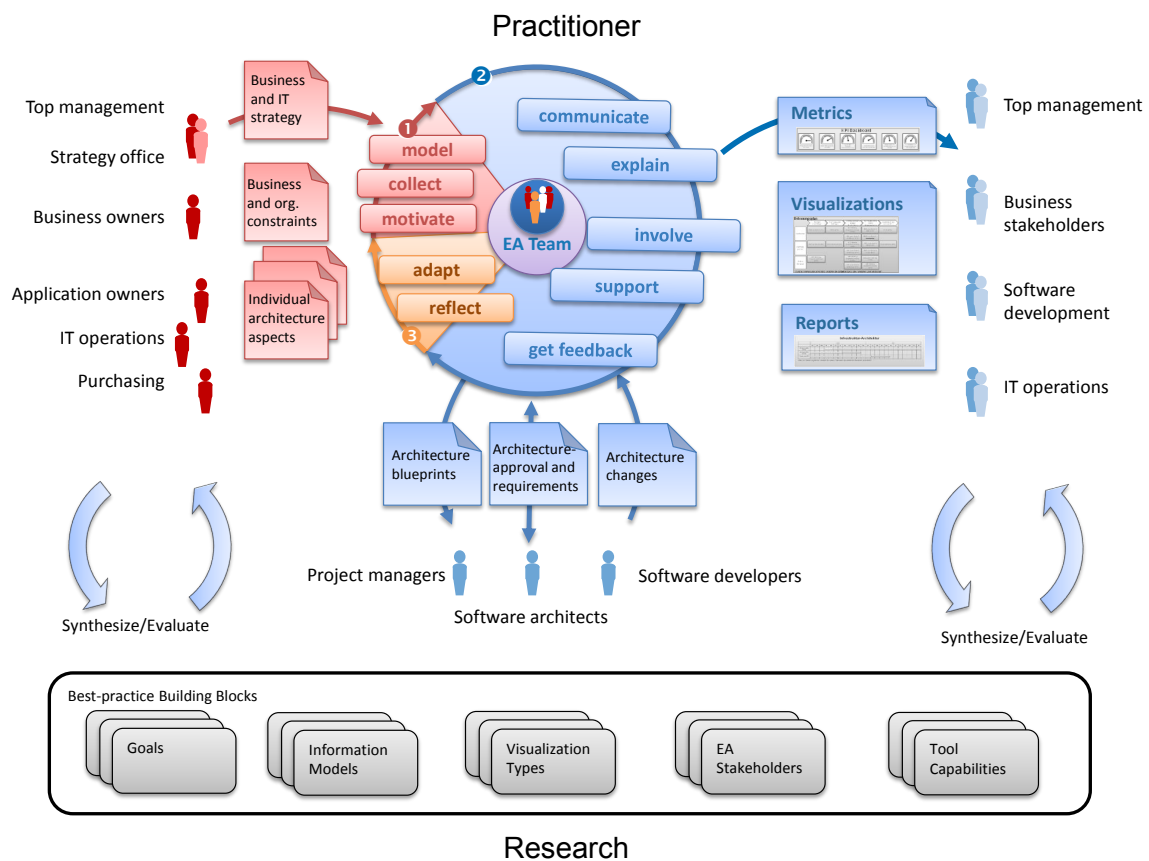
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Over the past decades, EA management gained momentum and may be considered a commonly accepted means to increase the mutual alignment of both business and IT nowadays. Many different EA frameworks evolved throughout the past years. Well-known examples of EA frameworks are Zachman [Za87] and The Open Group Architecture Framework (TOGAF) [Th11].

## 2.1. An Iterative Approach to the Enterprise Architecture Management Function

Figure 2.1 illustrates an iterative process to the EA management function. It includes essential steps of EA management, generated artifacts, relevant stakeholders as well as the relationship between practitioners and researchers.



**Figure 2.1.:** Iterative Process of the Enterprise Architecture Management Function

In a first step, the EA model is conceptualized and initial data is gathered. Prior to the actual modeling and data collection, consideration of social aspects is of major importance. For instance, we find repeatedly that support by top management is a crucial success factor for EA management. The strategy office may provide a business and IT strategy that can serve as a starting point for EA management, focusing on aligning business and IT strategy.



## 2. A Brief Overview of the Enterprise Architecture Management Function

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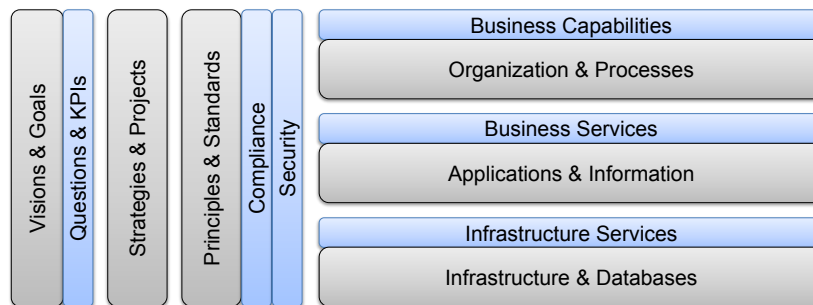
Next to top management support, stakeholder buy-in and proactive stakeholder engagement are of utmost importance. Not only business and application owners but also more technical staff such as IT operations should be counted among EA stakeholders. Ideally, each individual aspect is reflected by the conceptualization of the entire EA. A common pitfall is over-modeling of the EA: the attempt to capture each and every detail in the EA model. To avoid this anti-pattern, the focus should be on the most important aspects that generate value.

In a second step, the EA team should show the turnover for each individual stakeholder. While EA management is meant to realize mid- to long-term goals, it is important to justify intermediate costs for EA management. The EA model as well as its usefulness for the organization as a whole and for individual members of the organization should be communicated and explained explicitly. Artifacts such as reports containing metrics or visualizations play an important role in this communication process. It is important to involve stakeholders at all levels, i.e. top management, business stakeholders, software developers, IT operations, solution architects, project managers, etc. The EA team might support stakeholders in solving their individual challenges such that the information collection is justified.

In a third step, the EA management function as well as organizational processes may have to be adjusted in response to the feedback gathered in the second step. Given a new basis of information, the EA team reflects on the EA management function and may propose changes to processes. For instance, architectural changes could require an approval by the EA management team which in turn might have a finite (and shared) set of requirements for the EA or individual solution architectures.

While EA practitioners seek to align business with IT to increase flexibility and respond to an ever changing environment, EA research designs new artifacts, i.e. frameworks, methods, techniques, etc. This is done by analyzing and consolidating best practices, creating artifacts from scratch and evaluating developed designs in practice. Proven and tested solutions are maintained in the body of knowledge. The present study focuses on visualization types and tool capabilities.

### 2.2. Essential Layers and Cross Cutting Aspects of an Enterprise Architecture



**Figure 2.2.:** Essential Layers and Cross Cutting Aspects of an Enterprise Architecture [Wi07, BEG<sup>+</sup>12]

Figure 2.2 illustrates a holistic conceptual view on an EA. It starts bottom-up with infrastructure & databases, e.g. networks, routers, server farms, etc. Those infrastructure elements are provided as infrastructure services to an upper layer, where applications & information are used to provide business services. Business services are building blocks for business processes. They can be rearranged to create new business processes. Business capabilities describe core competencies whereas the organizational structure is designed to execute business processes as efficiently and effectively as possible. Various cross-cutting aspects influence the aforementioned layers. A common vision is used to derive goals that are measured in key performance indicators (KPIs). On all introduced levels, strategies and projects drive change that is guided by corporate principles and standards with respect to external factors like compliance and security. In EA management, a primary goal is to meet ‘the right’ information demands of involved stakeholders. Those are manifold and could refer to the entire EA or parts thereof (cf. Figure 2.2). An analysis of approaches for gathering EA information, e.g. the current state of the application landscape, reveals a high degree of manual effort, e.g. interviews with information stewards, resulting in an error-prone and time-consuming task. With increasing requirements on flexibility, agility, etc., recent approaches are not able to meet current challenges, in particular since there is a constantly growing information volume and little chance to determine the right information and the right quality.



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In this chapter we summarize the results of this report. First, we provide an overview of the study design. Then, we provide summaries of the subsequent chapters. Please familiarize yourself with the characteristics of the underlying empirical data and study design to interpret our analysis reasonably and estimate the relevance for your particular situation (cf. Chapter 24 and Section 27.2).

The present report contains our analysis of an extensive study and survey. The study was carried out in two phases. In the first phase, we surveyed EA tool vendors. The goal of this phase was to find out which

- visualization,
- configuration, and
- adaptation capabilities

EA tools currently provide.

Our analysis covers the following EA management tools:

- ABACUS (Avolution)
- ADOit (BOC AG)

### 3. Executive Summary

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- ARIS (Software AG)
- BiZZdesign EA Tool Suite (BiZZdesign)
- Corporate Modeler Suite (Casewise)
- Enterprise Architect (SparxSystems Ltd)
- Envision VIP (Future Tech Systems)
- iteraplan (iteratec GmbH)
- Layer8 (Layer8-Solutions GbR)
- leanIX (LeanIX GmbH)
- MEGA (MEGA International)
- planningIT (Software AG)
- PowerDesigner (Sybase/SAP AG)
- process4.biz (process4.biz Softwareentwicklungs- und Vertriebs GmbH)
- QPR EnterpriseArchitect (QPR Software)
- Rational System Architect (IBM)
- SAMU Repository (Atoll Technologies Ltd)
- Txture (QELaB Business Services GmbH)

We concluded the first phase by consolidating the data collected and synthesizing necessary information for the second phase (i.e. list of visualization types).

The goal of the second phase was to understand current EA practices, market demands and identify trends. We asked EA practitioners which of the features provided by current EA tools they are actually using or planning to use. Having the information captured what the EA tools and the EA tool market currently offers, we asked EA practitioners what they are actually applying, plan to apply and do not apply in practice. In addition, we asked the practitioners to provide us with information about their pain points, hints for improvements and missing features (cf. Chapter 26). We put focus on:

- visualization types EA practitioners (plan to) use,
- how they (plan to) configure visualizations,
- how they (plan to) adapt visualizations,
- how they (plan to) adapt the information model,
- if and how they (plan to) integrate their EA tool with other tools.

Visualization Type	ABACUS (p. 76)	ADOit (p. 96)	ALFABET (p. 114)	BIZdesign Architect (p. 134)	Corporate Modeler Suite (p. 154)	Enterprise Architect (p. 166)	Envision VIP (p. 178)	iteraplan (p. 194)	Layer8 (p. 208)	leanIX (p. 222)	MEGA (p. 236)	PowerDesigner (p. 254)	process4.biz (p. 266)	QPR EnterpriseArchitect (p. 280)	Rational System Architect (p. 298)	SAMU Repository (p. 308)	Tricia (p. 324)	Txture (p. 336)
Matrix (p. 47)	p. 82	p. 102	p. 120 <sup>a</sup>	p. 140	p. 160	p. 172	p. 184	p. 200	p. 214		p. 242	p. 260	p. 272	p. 286	p. 305	p. 314	p. 330	
Cluster Map (p. 48)	p. 82	p. 102	p. 120 <sup>a</sup>	p. 140	p. 160		p. 184	p. 200		p. 228		p. 260	p. 272	p. 286	p. 305	p. 314	p. 330	
Timeline (p. 49)	p. 83	p. 103	p. 121 <sup>a</sup>	p. 141	p. 161	p. 172		p. 201		p. 228	p. 242		p. 273	p. 287 <sup>c</sup>		p. 315	p. 331	
Flow Diagram (p. 50)	p. 83	p. 103	p. 121 <sup>a</sup>	p. 141		p. 173	p. 185	p. 201	p. 214	p. 229	p. 243		p. 273	p. 287		p. 315		
List (p. 51)	p. 84	p. 104	p. 122 <sup>a</sup>	p. 142		p. 173		p. 202	p. 215	p. 229	p. 243	p. 261	p. 274	p. 288		p. 316	p. 331	p. 342
Graph (p. 52)	p. 84	p. 104	p. 122 <sup>a</sup>	p. 142	p. 161	p. 174	p. 185	p. 202	p. 215		p. 244	p. 261	p. 274	p. 288	p. 306	p. 316	p. 332	p. 342
ER Diagram (p. 53)	p. 85		p. 123 <sup>a</sup>	p. 143	p. 162	p. 174	p. 186		p. 216		p. 244	p. 262	p. 275	p. 289		p. 317		
Bar Chart (p. 54)	p. 85	p. 105	p. 123 <sup>a</sup>	p. 143			p. 186	p. 203	p. 216	p. 230	p. 245		p. 275	p. 289 <sup>c</sup>		p. 317	p. 332	
BPMN Diagram (p. 55)	p. 86	p. 105	p. 124 <sup>b</sup>	p. 144		p. 175	p. 187			p. 230	p. 245	p. 262	p. 276	p. 290	p. 306	p. 318		
UML Diagram (p. 56)	p. 86		p. 124 <sup>b</sup>	p. 144	p. 162	p. 175	p. 187				p. 246	p. 263	p. 276	p. 290			p. 333	
Bubble Chart (p. 57)	p. 87	p. 106	p. 125 <sup>a</sup>	p. 145				p. 203		p. 231	p. 246		p. 277			p. 318	p. 333	
Treeview (p. 58)	p. 87	p. 106	p. 125 <sup>a</sup>	p. 145		p. 176		p. 204	p. 217	p. 231	p. 247	p. 263		p. 291		p. 319		
Pie Chart (p. 59)	p. 88	p. 107	p. 126 <sup>a</sup>	p. 146			p. 188	p. 204	p. 217	p. 232	p. 247		p. 277	p. 291 <sup>c</sup>		p. 319		
Dashboard (p. 60)	p. 88	p. 107	p. 126 <sup>a</sup>	p. 146	p. 163		p. 188	p. 205	p. 218		p. 248			p. 292 <sup>c</sup>		p. 320		
Radar Diagram (p. 61)	p. 89	p. 108	p. 127 <sup>a</sup>	p. 147			p. 189		p. 218		p. 248			p. 292 <sup>c</sup>		p. 320	p. 334	
EPC Diagram (p. 62)	p. 89	p. 108	p. 127 <sup>b</sup>	p. 147	p. 163	p. 176							p. 278	p. 293				
ArchiMate Diagram (p. 63)	p. 90	p. 109	p. 128 <sup>b</sup>	p. 148	p. 164						p. 249			p. 293		p. 321		
Line Chart (p. 64)	p. 90		p. 128 <sup>a</sup>	p. 148			p. 189	p. 205 <sup>d</sup>	p. 219	p. 232	p. 250			p. 294 <sup>c</sup>				
Scatter Chart (p. 65)	p. 91	p. 109	p. 129 <sup>a</sup>	p. 149				p. 206	p. 219		p. 250			p. 294 <sup>c</sup>		p. 321		
Geographic Map (p. 66)	p. 91		p. 129 <sup>a</sup>	p. 149			p. 190		p. 220	p. 233	p. 251					p. 322		
Business Model Canvas (p. 67)	p. 92	p. 110	p. 130 <sup>b</sup>	p. 150							p. 251	p. 264						
Gauges (p. 68)	p. 92	p. 110	p. 130 <sup>a</sup>				p. 190		p. 220		p. 252			p. 295 <sup>c</sup>				
Treemap (p. 69)	p. 93	p. 111	p. 131 <sup>a</sup>	p. 150			p. 191				p. 252							p. 343
Tag Cloud (p. 70)				p. 151			p. 191					p. 264	p. 278					
Sunburst (p. 72)	p. 93	p. 111																
3D Visualization (p. 71)	p. 94				p. 164		p. 192											

<sup>a</sup> According to Software AG, this visualization type is supported best with planningIT.

<sup>b</sup> According to Software AG, this visualization type is supported best with ARIS.

<sup>c</sup> This visualization type is only provided by the QPR metrics add-on.

<sup>d</sup> This visualization type is only provided by the ITM Analytics add-on of iteraplan.

**Table 3.1.:** Index to Examples of Visualization Types Supported by EA Tools

	Capability	ABACUS (p. 76)	ADOit (p. 96)	ALFABET (p. 114)	BiZZdesign Architect (p. 134)	Corporate Modeler Suite (p. 154)	Enterprise Architect (p. 166)	Envision VIP (p. 178)	iteraplans (p. 194)	Layers8 (p. 208)	leanIX (p. 222)	MEGA (p. 236)	PowerDesigner (p. 254)	process4.biz (p. 266)	QPR EnterpriseArchitect (p. 280)	Rational System Architect (p. 298)	SAMU Repository (p. 308)	Tricia (p. 324)	Txture (p. 336)	
Binding	Loose Coupling	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Schema Binding	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Data Filter	✓	✓	✓ <sup>a,b</sup>	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗
	Other	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Approach	model based	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✓	✓	✓	✓	✗
	Form based	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✗	✓	✗	✓	✓	✓	✗	✗	✓	✗	✓	✓	✗
	Scripting	✓	✗	✓ <sup>a,b</sup>	✓	✗	✓	✗	✓	✗	✓	✓	✓	✓	✗	✓	✗	✓	✓	✓
	Manual drawing	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✗	✓	✗
	Other	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

<sup>a</sup> According to Software AG, this feature is supported by planningIT.

<sup>b</sup> According to Software AG, this feature is supported by ARIS.

**Table 3.2.:** Information model binding and approach to create a visualization

Layout	Parameters																		
		ABACUS (p. 76)	ADOit (p. 96)	ALFABET (p. 114)	BiZZdesign Architect (p. 134)	Corporate Modeler Suite (p. 154)	Enterprise Architect (p. 166)	Envision VIP (p. 178)	iteraplan (p. 194)	Layer8 (p. 208)	leanIX (p. 222)	MEGA (p. 236)	PowerDesigner (p. 254)	process4.biz (p. 266)	QPR EnterpriseArchitect (p. 280)	Rational System Architect (p. 298)	SAMU Repository (p. 308)	Tricia (p. 324)	Txture (p. 336)
Parameters	Caption	✓	✓	✓ <sup>a,b</sup>	✓	✗	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✗
	Color	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗
	Orientation	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✗	✓	✓	✓	✗
	Position	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✗	✓
	Shape	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓
	Size	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗
	Other	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Layout	Automatic	✓	✓	✓ <sup>a</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓
	Manual	✓	✓	✓ <sup>a</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓
	Other	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

<sup>a</sup> According to Software AG, this feature is supported by planningIT.

<sup>b</sup> According to Software AG, this feature is supported by ARIS.

**Table 3.3.:** Customization of visual parameters and layouting



	File Format	ABACUS (p. 76)	ADOit (p. 96)	ALFABET (p. 114)	BizZdesign Architect (p. 134)	Corporate Modeler Suite (p. 154)	Enterprise Architect (p. 166)	Envision VIP (p. 178)	iteraplan (p. 194)	Layers8 (p. 208)	leanIX (p. 222)	MEGA (p. 236)	PowerDesigner (p. 254)	process4.biz (p. 266)	QPR EnterpriseArchitect (p. 280)	Rational System Architect (p. 298)	SAMU Repository (p. 308)	Tricia (p. 324)	Txture (p. 336)
Import	CSV	✓	✓	✗	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✗	✓	✗	✗	✗
	JSON	✓	✓	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
	ODBC	✓	✓	✗	✗	✗	✓	✗	✓	✓	✗	✓	✓	✓	✗	✗	✗	✗	✗
	XMI	✓	✗	✗	✓	✗	✓	✗	✓	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗
	XML	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✗	✗
	XLS(X)	✓	✓	✗	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✗	✗	✗	✗	✗
	TXT	✓	✓	✗	✓	✗	✓	✓	✓	✓	✗	✓	✓	✓	✗	✓	✗	✗	✗
	Other	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Export	CSV	✓	✓	✗	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✗	✓	✗	✗	✗
	JSON	✓	✓	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗
	ODBC	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗
	XMI	✓	✗	✗	✓	✗	✓	✗	✓	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗
	XML	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗
	XLS(X)	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗
	TXT	✗	✓	✗	✓	✗	✓	✓	✗	✓	✗	✓	✓	✓	✗	✓	✗	✗	✗
	Other	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

<sup>a</sup> According to Software AG, this feature is supported by planningIT.

<sup>b</sup> According to Software AG, this feature is supported by ARIS.

**Table 3.4.:** Configuration Import/Export Summary

	File Format	ABACUS (p. 76)	ADOit (p. 96)	ALFABET (p. 114)	BizZdesign Architect (p. 134)	Corporate Modeler Suite (p. 154)	Enterprise Architect (p. 166)	Envision VIP (p. 178)	iteraplan (p. 194)	Layers8 (p. 208)	leanIX (p. 222)	MEGA (p. 236)	PowerDesigner (p. 254)	process4.biz (p. 266)	QPR EnterpriseArchitect (p. 280)	Rational System Architect (p. 298)	SAMU Repository (p. 308)	Tricia (p. 324)	Txture (p. 356)
Import	CSV	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✗	✗	✗
	JSON	✓	✓	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗
	TXT	✓	✓	✓ <sup>a,b</sup>	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗
	XMI	✓	✗	✓ <sup>a,b</sup>	✓	✗	✓	✗	✓	✗	✓	✓	✓	✗	✗	✓	✗	✓	✗
	XML	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗
	XLS(X)	✓	✓	✓ <sup>a,b</sup>	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓
	OData	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗
	Other	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Export	CSV	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✗	✓	✓	✗	✗
	JSON	✓	✗	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✓	✓	✗
	TXT	✓	✓	✗	✓	✗	✓	✓	✓	✓	✗	✓	✓	✓	✗	✓	✓	✗	✓
	XMI	✓	✗	✓ <sup>a,b</sup>	✓	✗	✓	✗	✓	✗	✗	✓	✓	✗	✗	✓	✗	✗	✗
	XML	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗
	XLS(X)	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✗	✓	✓	✗	✓	✓	✓	✓	✗	✓	✓	✓
	OData	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗
	Other	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

<sup>a</sup>According to Software AG, this feature is supported by planningIT.

<sup>b</sup>According to Software AG, this feature is supported by ARIS.

**Table 3.5.:** Data Import/Export Summary

	File Format	ABACUS (p. 76)	ADOit (p. 96)	ALFABET (p. 114)	BizZdesign Architect (p. 134)	Corporate Modeler Suite (p. 154)	Enterprise Architect (p. 166)	Envision VIP (p. 178)	iteraplan (p. 194)	Layers8 (p. 208)	leanIX (p. 222)	MEGA (p. 236)	PowerDesigner (p. 254)	process4.biz (p. 266)	QPR EnterpriseArchitect (p. 280)	Rational System Architect (p. 298)	SAMU Repository (p. 308)	Tricia (p. 324)	Txttrs (p. 356)	
Import	CSV	✗	✗	✗	✓	✗	✓	✓	✗	✓	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗
	JSON	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
	TXT	✗	✗	✗	✓	✗	✓	✗	✗	✓	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗
	XMI	✓	✗	✓ <sup>b</sup>	✓	✗	✓	✗	✓	✓	✗	✓	✓	✗	✗	✓	✗	✓	✓	✗
	XML	✓	✓	✓ <sup>a</sup>	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✗
	XLS(X)	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✓	✗	✗	✗	✗	✓	✓	✗
	OData	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓	✓	✗
	Other	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Export	CSV	✗	✓	✗	✓	✗	✓	✓	✗	✓	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗
	JSON	✓	✗	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
	TXT	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✗
	XMI	✓	✗	✓ <sup>b</sup>	✓	✗	✓	✗	✓	✓	✗	✓	✓	✗	✗	✓	✗	✓	✓	✗
	XML	✓	✓	✓ <sup>a</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗
	XLS(X)	✗	✓	✗	✗	✗	✓	✗	✗	✓	✗	✓	✓	✗	✗	✗	✗	✗	✗	✗
	OData	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗
	Other	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

<sup>a</sup>According to Software AG, this feature is supported by planningIT.

<sup>b</sup>According to Software AG, this feature is supported by ARIS.

**Table 3.6.:** Schema Import/Export

	ABACUS (p. 76)	ADOit (p. 96)	ALFABET (p. 114)	BIZdesign Architect (p. 134)	Corporate Modeler Suite (p. 154)	Enterprise Architect (p. 166)	Envision VIP (p. 178)	iteraplan (p. 194)	Layer8 (p. 208)	leanIX (p. 222)	MEGA (p. 236)	PowerDesigner (p. 254)	process4.biz (p. 266)	QPR_EnterpriseArchitect (p. 280)	Rational System Architect (p. 298)	SAMU Repository (p. 308)	Tricia (p. 324)	Txture (p. 336)
Full schema	✓	✓	✓ <sup>a,b</sup>	✓	✗	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✗
Configurable building blocks	✓	✓	✗	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✗	✓	✓	✗	✗
User defines the schema	✗	✓	✗	✗	✗	✓	✓	✗	✓	✗	✗	✗	✓	✓	✗	✓	✓	✓
Sub-classing/inheritance	✓	✓	✓ <sup>a,b</sup>	✓	✗	✓	✓	✓	✓	✗	✓	✓	✓	✗	✓	✗	✗	✓

<sup>a</sup> According to Software AG, this feature is supported by planningIT.

<sup>b</sup> According to Software AG, this feature is supported by ARIS.

**Table 3.7.:** Schema Setup and Configuration

	Concept	ABACUS (p. 76)	ADOit (p. 96)	ALFABET (p. 114)	BiZZdesign Architect (p. 134)	Corporate Modeler Suite (p. 154)	Enterprise Architect (p. 166)	Envision VIP (p. 178)	iteraplan (p. 194)	Layer8 (p. 208)	leanIX (p. 222)	MEGA (p. 236)	PowerDesigner (p. 254)	process4.biz (p. 266)	QPR EnterpriseArchitect (p. 280)	Rational System Architect (p. 298)	SAMU Repository (p. 308)	Tricia (p. 324)	Txture (p. 336)	
Import	Classes (schema of objects)	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓
	Objects (instances of classes)	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Relationships (schema of objects)	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Attributes (part of the schema of classes)	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Attribute values (instances of attributes)	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Access rights	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✗	✗	✓	✓	✗	✓	✓	✓	✓	✗
	Roles	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓	✗	✗	
	Other	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Export	Classes (schema of objects)	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Objects (instances of classes)	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Relationships (schema of objects)	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Attributes (part of the schema of classes)	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Attribute values (instances of attributes)	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Access rights	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✗	✗	✓	✓	✗	✓	✓	✓	✓	✗
	Roles	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓	✗	✗	
	Other	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

<sup>a</sup> According to Software AG, this feature is supported by planningIT.

<sup>b</sup> According to Software AG, this feature is supported by ARIS.

**Table 3.8.:** Concepts that can be imported/exported

Direction	Push	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗
	Pull	✓	✓	✓ <sup>a,b</sup>	✗	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✗	✓	✓	✓	✗
	Other	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Category of Tool	Business Intelligence Tools	✓	✓	✓ <sup>a</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗
	Business Process Engines	✓	✓	✓ <sup>a</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✓	✓	✓	✗
	Change Management Tools	✓	✓	✓ <sup>a</sup>	✓	✓	✓	✓	✓	✓	✗	✓	✓	✗	✗	✗	✓	✓	✓	✗
	Cloud Services	✓	✓	✓ <sup>a</sup>	✗	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✓	✓	✓	✗
	Configuration Management Database	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Enterprise Service Bus	✓	✓	✓ <sup>a</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✓	✓	✓	✗
	Infrastructure Monitoring Tools	✓	✓	✗	✓	✓	✓	✓	✓	✓	✗	✓	✓	✗	✗	✓	✓	✓	✓	✗
	License/IT Asset Management Tools	✓	✓	✓ <sup>a</sup>	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✗	✗	✓	✓	✓	✗
	Project Portfolio Management Tools	✓	✓	✓ <sup>a</sup>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✓	✓	✓	✗
	Release Management Tools	✓	✓	✓ <sup>a</sup>	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✗	✗	✓	✓	✓	✗
	Other	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

<sup>a</sup> According to Software AG, this feature is supported by planningIT.

<sup>b</sup> According to Software AG, this feature is supported by ARIS.

**Table 3.9.:** Interoperability Support of EA tools for Third Party Applications Summary

Framework	ABACUS (p. 76)	ADOit (p. 96)	ALFABET (p. 114)	BiZZdesign Architect (p. 134)	Corporate Modeler Suite (p. 154)	Enterprise Architect (p. 166)	Envision VIP (p. 178)	iteraplan (p. 194)	Layers8 (p. 208)	leanIX (p. 222)	MEGA (p. 236)	PowerDesigner (p. 254)	process4.biz (p. 266)	QPR_EnterpriseArchitect (p. 280)	Rational System Architect (p. 298)	SAMU Repository (p. 308)	Tricia (p. 324)	Txture (p. 336)
ArchiMate	✓	✓	✓ <sup>b</sup>	✓	✓	✓	✓	✗	✓	✗	✓	✗	✗	✓	✓	✓	✗	✗
DoDAF	✓	✗	✓ <sup>b</sup>	✓	✓	✓	✓	✗	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗
IAF	✓	✗	✓ <sup>b</sup>	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
MODAF	✓	✗	✓ <sup>a,b</sup>	✓	✓	✓	✓	✗	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗
NAF	✓	✗	✓ <sup>b</sup>	✗	✓	✓	✓	✗	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗
PEAF	✓	✓	✓ <sup>a,b</sup>	✓	✓	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓	✗	✗
TOGAF	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✓	✓	✗	✓	✗	✓	✓	✓	✓	✗	✗
Zachman	✓	✓	✓ <sup>a,b</sup>	✓	✓	✓	✓	✗	✓	✗	✓	✗	✗	✓	✓	✗	✗	✗
Other	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

<sup>a</sup> According to Software AG, this feature is supported by planningIT.

<sup>b</sup> According to Software AG, this feature is supported by ARIS.

**Table 3.10.:** Supported EA Frameworks

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Methodology and Conceptual Framework

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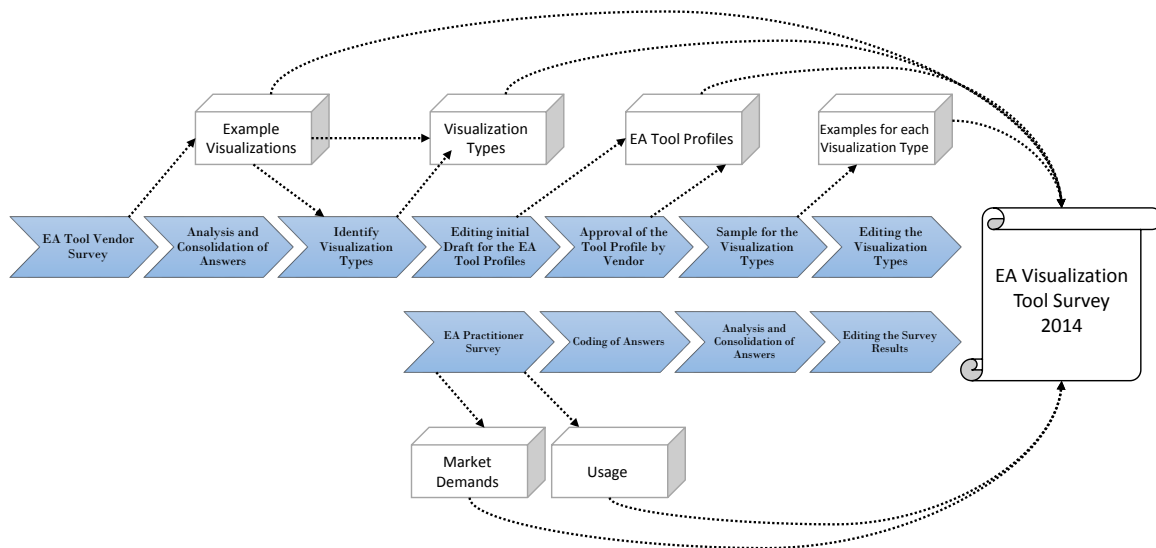


In this chapter, we present the methodology applied in this study and subsequently describe our conceptual framework to provide the reader with a common terminology.

### 4.1. Design of the Enterprise Architecture Visualization Tool Survey 2014

Our study has been carried out in two phases, each consisting of multiple steps:

1. an EA Tool Vendor Survey among 18 market players and
2. an EA Practitioner Survey among 109 EA experts.



**Figure 4.1.:** Underlying Method of the EA Visualization Tool Survey 2014

Figure 4.1 shows the steps that we carried out towards developing the present report.

#### First Phase: EA Tool Vendor Survey

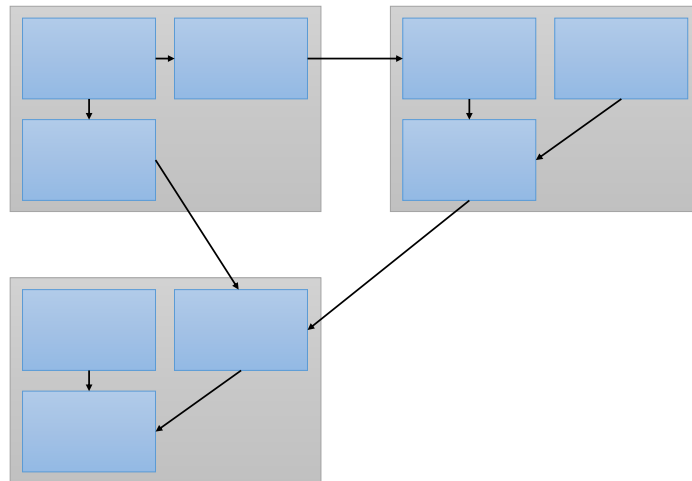
In the first phase, we conducted an online survey among EA tool vendors. In July 2013, we invited over 50 EA tool vendors to participate in our survey. The long list of tool vendors can be found in Appendix A.

Thereby, we intended to get an overview of the current state-of-the-art in EA visualizations. On the one hand, this includes an overview of visualization types EA tools currently support. On the other hand visualization types that are planned for future releases are in the scope of the present study as well. Another important point that does not directly address EA visualizations is the flexibility and adaptability of the EA information model. We investigated the configuration capabilities of EA tools in particular.

The goal of the EA Tool Vendor Survey was to get an overview of the current capabilities of EA tools with a particular focus on

- supported visualization types,
- end-user configuration of visualizations and binding to a model,
- adaptation of the information model, and
- interoperability with other tools.

We asked the tool vendors to provide us with example visualizations and answer an online questionnaire that focuses on different aspects of EA tool capabilities. In a second step, we analyzed and consolidated the results rigorously. We received a broad variety of visualization types as well as slight variations. In multiple iterations, over 1000 visualizations were clustered into different groups. We discussed the assignments of the visualizations to the clusters in 4 sessions involving 3 researchers and a graduate student. The large variety of visualizations has been a challenge. Especially when two visualization types are obviously mixed together, one could argue that they make up a potential third visualization type. For instance, Figure 4.2



**Figure 4.2.:** Mixed visualization types: Graph and Cluster

shows a cluster which can (visually) be considered to be a graph at the same time.

Next to this initial analysis, we carefully considered which abstract visualization types stick out (i.e. have distinct visual properties). In total, we identified 26 distinct visualization types. We created a conceptual profile for each identified type which served as input for the second phase (i.e. practitioner survey).

We began preparing the tool profiles and 26 visualization types for the report and started conducting the second survey targeted at EA practitioners concurrently. In the next step, we handcrafted three documents to facilitate the tool profile reviews by the vendors. These documents were

- a frame of reference for the terminology to ensure consistency among answers of different vendors,

#### 4. Methodology and Conceptual Framework

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- a compilation of the 26 visualization types we extracted, and
- an initial draft of the tool profile which contained the information provided by the respective vendor in the preceding survey.

In the next step, we sent out those documents to each tool vendor and requested

- high quality/resolution examples for each supported visualization type,
- a review of the tool profile draft, and
- permission for scientific publication of the material provided (screenshots and answers to the questionnaire).

In parallel to handcrafting the documents mentioned above, we prepared a survey that should reveal the interest, usage behavior, and market demands of EA experts. For this survey, the 26 visualization types were ordered by the expected usage frequency based on our experience and integrated into the survey.

#### **Second Phase: EA Practitioner Survey**

In the second phase, we conducted another online survey. This time, we targeted industry experts currently involved in EA management. The aim of this second survey was to

- find out which visualization types are currently used in practice or are planned to be used,
- understand typical usage scenarios of the EA visualization types,
- potentially find new visualization types used in industry,
- and identify market demands.

More than 1200 survey invitations were sent out to EA practitioners in November 2013. The survey was accessible for three weeks. We received 109 complete answers from 330 participants in total ( 77% dropout). The survey has been designed to take approximately 30 to 40 minutes, the actual duration depended on the concrete organizational context. We asked the practitioners for each of the 26 visualization types whether they

- currently use,
- plan to use, or
- do not use,

the respective visualization type. We assumed that drawing and presentation tools are used to create EA visualizations in practice. Therefore, participants were asked to upload examples of visualization types that were not represented in our collection of 26 visualization types.

Besides visualization types usage, we asked several questions focusing on

- generation and configuration of visualizations,
- adaptation of the EA information model, and

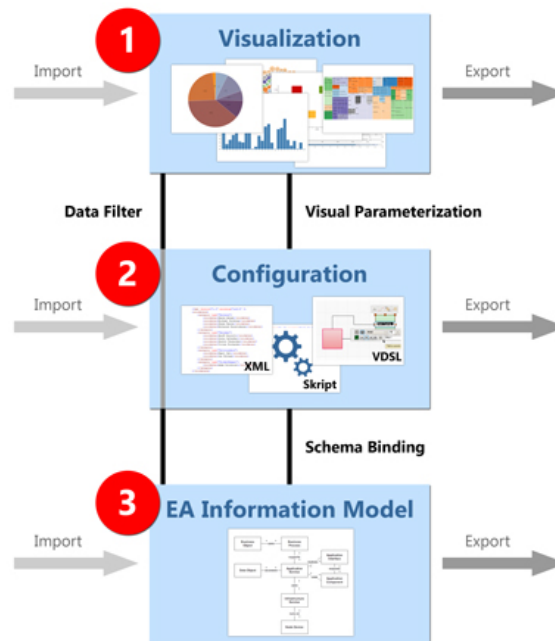
- integration of other tools as information sources.

### Additional Design Considerations

Each survey has been pre-tested by multiple researchers who have not been involved in the survey design process. In the area of EA visualizations, a common reference architecture is missing [SMR12]. As a consequence, we provided tool vendors with a frame of reference which is introduced in Section 4.2. It was presented in the introduction to the survey to ensure a common understanding and to be able to compare answers across the vendors. Each tool vendor representative confirmed that (s)he has fully understood the conceptual framework.

## 4.2. Conceptual Framework for EA Visualizations

In line with Wittenburg [Wi07] and Schaub et al. [SMR12] Figure 4.3 presents a simplified conceptual framework for model-driven EA visualizations which we observed in practice multiple times.



**Figure 4.3.:** Conceptual framework for model-driven EA visualizations

We distinguish between visualization types, information model, and configuration. The configuration specifies the link between a concrete visualization and the underlying EA information model. Hence, we will introduce the terms visualization type and information model first and configuration second.

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**Information Model.** The information model (schema) is a conceptual representation of the EA model (data). It describes entities, their attributes as well as their relationships among each other. EA tool support for EA information models differ from tool to tool. Some tools provide fixed schemas, other tools support flexible schemas. While some tools make default EA schemas available, others require to develop an EA information model from scratch.

**Visualization Types.** The visualization type layer contains a set of finite visual variants an EA can be represented in. While early developments did not abstract from the used information model, a separation between model and visualization took place which more often than not also is facilitated by configuration mechanisms.

**Configuration.** The configuration layer defines binding of EA information model entities (i.e. data) to a specific visualization type. EA tools may provide various methods to define bindings such as configuration wizards or scripting languages. Configuration options may include aspects such as complex data processing using pipes and filters, customization of visual primitives or fine-grained control over layout algorithms.

As depicted in Figure 4.3, importing and exporting is generally possible in each layer. Import and export capabilities primarily serve for pre- and/or post-processing of data using different software tools, information exchange and backups.

For visualizations, an import of a visualization primarily serves the propagation of visual changes to respective underlying data. Exporting a visualization on the other hand may serve to capture temporary EA plans developed in a workshop, to be included in an executive presentation or being processed by another tool such as image editing software.

Further, configurations of visualizations that are generated employing model-driven paradigms can be exported. Sharing such a configuration can be useful since the visualizations are updated automatically. While an exchange of visualization exports do not embrace the configuration and thus do not get updated instantly, exchanging the configuration empowers the receiving party to recreate the visualization with up-to-date data. Moreover, this export and import mechanisms can be used to store and restore (backup) configurations.

In terms of import and export mechanisms provided in the EA information model layer, it is important to distinguish between schema and data. If an EA tool does not provide adequate import/export mechanisms, the possibility of a vendor lock-in has to be considered.

Besides the different layers introduced above, Figure 4.3 depicts connections between the different layers.

**Schema Binding:** The schema binding describes the binding between concepts of the EA information model and a visualization type. The schema binding is usually part of the configuration and may either be defined by the user or hard coded in the EA management tool.

**Example:** `let all business applications be represented as rectangles.`

**Data Filter:** Visualizations are usually easier to process if they show relevant information only. Hence, filtering the EA information using data filters to reduce visual complexity is a commonly desired feature among practitioners.

Example: visualize all business processes owned by ‘Peter Higgins’.

**Visual Parametrization:** A specific set of customizations can be applied by configuring visual variability points of a visualization type which change its appearance.

Example: rectangles have rounded corners with radius of 5 pixels.

### Deployment Approach and Platforms

Sometimes decisions for or against a specific tool depend on a particular form of deployment or platform. In our study we distinguish between the following deployment approaches:

- Desktop installation,
- Client-Server installation, and
- Software as a Service (SaaS).

Further, we asked the tool vendor which of the following client platforms are supported.

- Windows, i.e. a desktop application or fat-client running as either in 32-bit or 64-bit native application,
- Linux, i.e. a desktop application or fat-client running in the X Window System (X11),
- MacOS, i.e. a desktop application or fat-client application that runs on a Mac,
- Browser-based, i.e. a client-server based solution using browser technology, and
- Java-based, i.e. an application (desktop or client-server) running on the Java Virtual Machine.

The latter two imply cross-platforms compatibility (given a state-of-the-art browser or the Java Virtual Machine, respectively). In this study, we did not analyze the support for particular browsers. However, practitioners should make sure that their browser is supported when evaluating a particular EA tool.

Mobile is another trend we currently see. Therefore, we wanted to learn more about support for mobile devices. We asked the tool vendors whether they offer native mobile applications for the major mobile platforms as of today.

- Android,
- iOS, and
- Windows Mobile

### **EA (modeling) Frameworks**

EA frameworks play an important role in the efforts to understand and standardize EA management. This commonly includes methods as well as models or model building block that can be applied in practice. Two well-known examples for EA frameworks are Zachman and TOGAF. Some of these frameworks are shipped with a particular information model. We asked the tool vendors which of the following EA frameworks or modeling approaches their tools support:

- The France DGA Architecture Framework (AGATE),
- ArchiMate,
- Building-blocks for Enterprise Architecture Management Solutions (BEAMS),
- The US Department of Defense Architecture Framework (DoDAF),
- Generalised Enterprise Reference Architecture and Methodology (GERAM),
- International Defence Enterprise Architecture Specification (IDEAS) Group,
- Integrated Architecture Framework (IAF),
- Information FrameWork (IFW),
- The UK Ministry of Defence Architecture Framework (MODAF),
- The NATO Architecture Framework (NAF),
- The Pragmatic EA Framework (PEAF),
- Quasar Enterprise,
- TOGAF, and
- Zachman.

For this and some other questions, the EA tool vendors were provided with the option to choose ‘other’ to express that they support additional features. This accounts for the fact that the list of EA frameworks or other features and characteristics we provided to choose from are not considered to be exhaustive.

### **Licensing**

Manifold licensing options are available in the EA tool market such as:

- Client licenses, i.e. for each client that uses the EA tool a fee is paid,
- SaaS leasing, i.e. the EA tool is hosted by the vendor or a third party, or
- Cloud deployment, i.e. the EA tool is deployed in a cloud.

In practice, combinations of these approaches are common and we found a broad variety of licensing options.

## Visualization Type

One central concept of the present report is the notion of visualization type. EA information models are arbitrary and highly customized in general. Consequently, visualizations are used to display a broad and unpredictable range of information. This is why we abstracted from concrete visualizations in order to compare EA tools as well as practitioner demands in a consistent manner. In the context of this study, we define a visualization type as a reoccurring visual layout that can be used for different contexts.

We asked tool vendors which visualization types they currently support and whether they planned to implement additional types in the future (cf. Chapter 4).

## View-driven approach to EA modeling

As of today, we find that the common approach to EA management is to collect the information first and then generate an adequate visualization. However, the other way around is also possible. One can create visualizations first, possibly with stub or dummy data, and extract the information demand based on the information necessary to generate this visualizations afterwards.

## Export formats for visualizations

Often, visualizations are externalized, i.e. sent via mail or printed as a huge poster to be pinned up at the wall. Therefore, a common need is the possibility to export the visualization to a standard file format.

Vector formats:

- Scalable Vector Graphics (SVG)
- Microsoft Visio Format (VSD/VSDX)
- Microsoft Powerpoint Format (PPT/PPTX)
- Portable Document Format (PDF)

Rasterized formats:

- Bitmap (BMP)
- Joint Photographic Experts Group (JPG/JPEG)
- Portable Network Graphics (PNG)
- Portable Document Format (PDF)

## Creating and Configuring a Visualization

First, we wanted to find out whether bindings to information are hard-coded or loosely coupled. The latter describes the ability to employ a certain visualization type to display arbitrary model elements in an EA information model.

This can be realized using

- schema bindings or
- filter bindings.



## 4. Methodology and Conceptual Framework

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The former describes the binding of a visualization type to instances of a particular class, attributes relationships, etc. The latter describes the filtering of an existing schema binding by attribute values or customized formulas.

### **Creating a visualization**

The creation of a visualization can be implemented in multiple ways. We asked tool vendors which of the following approaches they support:

- Model-driven,
- Form based,
- Scripting, or
- Manual drawing.

The model-driven approach refers to visualizations that are generated based on data binding to a given information model.

The form based approach refers to a wizard which guides the user through the configuration and generation process of a particular visualization type.

Scripting subsumes special purpose languages, so-called domain specific languages (DSL) that are used to ‘program’ (i.e. script) a visualization.

Manual drawings are — from a visual perspective — the most powerful and flexible way to display information since every aspect can be drawn manually. At the same time, this approach tends to be very time consuming.

### **Visual Parameters**

We asked the vendors which visual customization their tool offers. We were interested in customization capabilities for the following parameters:

- Font,
- Color,
- Orientation,
- Position,
- Shape, and
- Size.

### Layouting

Although model-driven approaches commonly employ an automated layouting, manually layouting is generally still possible. Manual drawing approaches are usually combined with manual layouting mechanisms. However, the possibility to align objects to a specified reference is supported often, e.g. align all objects to the same horizontal position. Manual layouting can also be combined with an automatic layouting and vice versa.

### Storing and restoring a Configuration

Some EA tools offer means to store and restore configurations of visualizations. For this purpose, vendors use one of the following formats:

- comma-separated values (CSV),
- JavaScript Object Notation (JSON),
- XML Metadata Interchange (XMI),
- Extensible Markup Language (XML),
- Microsoft Excel Spreadsheet Format (XLS/XLSX), and
- Plain Text file (TXT).

### Setting-up and Adapting the EA Information Model

While being a notable feature in 2005 and 2008, the possibility to adapt the EA information model during runtime has become a commodity nowadays.

We asked the vendors whether their EA tool is shipped with a predefined EA information model. This can be either

- a full schema or
- configurable building blocks.

While the former can serve as best practice guide, the latter has to be adapted to the organizational context during initial setup of the EA tool.

It might be possible to create a meta-model on your own as well. We asked whether users can configure their information model using predefined building-blocks if the information model is initially undefined.

In terms of flexibility, we asked which schema elements can be extended or adapted. Elements that can be modified are

- classes,
- attributes,
- relationships,

## 4. Methodology and Conceptual Framework

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- cardinality constraints,
- type constraints, and
- access rights.

For each element, we asked which of the following operations are supported:

- create,
- modify,
- delete,
- copy/clone,
- merge, and
- move.

Note that the copy/clone operation refers to the ability to create a deep copy of a model element. This might be possible at schema level, i.e. class, attribute, and relationship as well as data level, i.e. objects, values, and links.

The merge operation refers to the ability to create a model element based on information contained in two or more model elements. This ability may be implemented at schema and data level as well. Note that in this context, the EA tool must deal with conflicts that arise during such an operation.

Move refers to the ability to move objects or classes within a model. This operation may produce side-effects that the user is unaware of especially if the tool supports inheritance.

Against this background, we were interested in finding out whether subclassing, i.e. class inheritance, is supported as well.

### **Data Import**

A recent trend in EA management is to integrate information that is stored in third party information sources ranging from database management systems over interfaces to other business applications to flat CSV or Excel files. Thereby, we distinguish between pull and push approaches. Pull refers to the fact that structured information is imported using built-in scripting facilities of the EA tool whereas push denotes the structured import of information using built-in scripting functionalities of the information source. We asked tool vendors which types of third-party tools can be integrated

- Business Intelligence Tools,
- Business Process Engines,
- Change Management Tools,
- Cloud Services,
- Configuration Management Tools,

- Enterprise Service Buses,
- Infrastructure Monitoring Tools,
- Licensing Management / IT Asset Management Tools,
- Project Portfolio Management Tools, and
- Release Management Tools.

In addition, we asked which file formats can be used to export from and import data into the EA tool:

- CSV,
- JSON,
- XLS, XLSX,
- XMI,
- XML, and/or
- OData.

We further asked which file formats can be used to export and import a schema:

- JSON,
- XMI,
- XML, and/or
- OData.

We then asked which elements of the EA information model can be exported and imported:

- Schema
  - Classes
  - Relationships
  - Attribute Definitions
- Instances
  - Objects (instance of a class)
  - References/Links
  - Attribute values
- Meta-information
  - Roles
  - Access Rights



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## 5. EA Visualization Types

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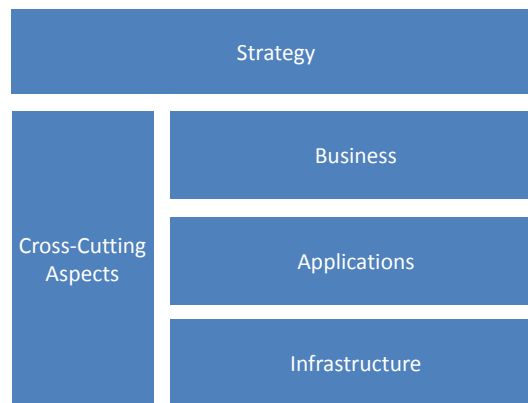
<b>5.24. Tag Cloud . . . . .</b>	<b>70</b>
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We invited tool vendors to submit a list of up to 100 screenshots and brief descriptions demonstrating the visualization capabilities of their EA tools. All submitted screenshots were clustered into different groups. The clustering is mainly based on visual primitives instead of semantics even though the two aspects usually are closely linked to each other (e.g. UML, Business Model Canvas or Project Portfolio Matrix). However, since we observed a large variety of very specific visualizations, we decided to focus on common visual patterns. In this chapter, we introduce the 26 visualization types which were identified in our analysis. Please note that some types are quite similar. In fact, various visualization types are combined and/or merged in practice to create specific visualizations when they satisfy particular information demands better than simple diagrams. In summary, the following list of visualization types should be considered to be a pragmatic generalization of a wide range of more or less highly specific visualizations.

Survey participants were asked to provide details about up to 5 usage scenarios for each visualization type including information about usage domain and targeted stakeholder group.

We used a simplified version of the layered perspective on EA depicted in Figure 2.2.



**Figure 5.1.:** Our modified layered view on Enterprise Architecture

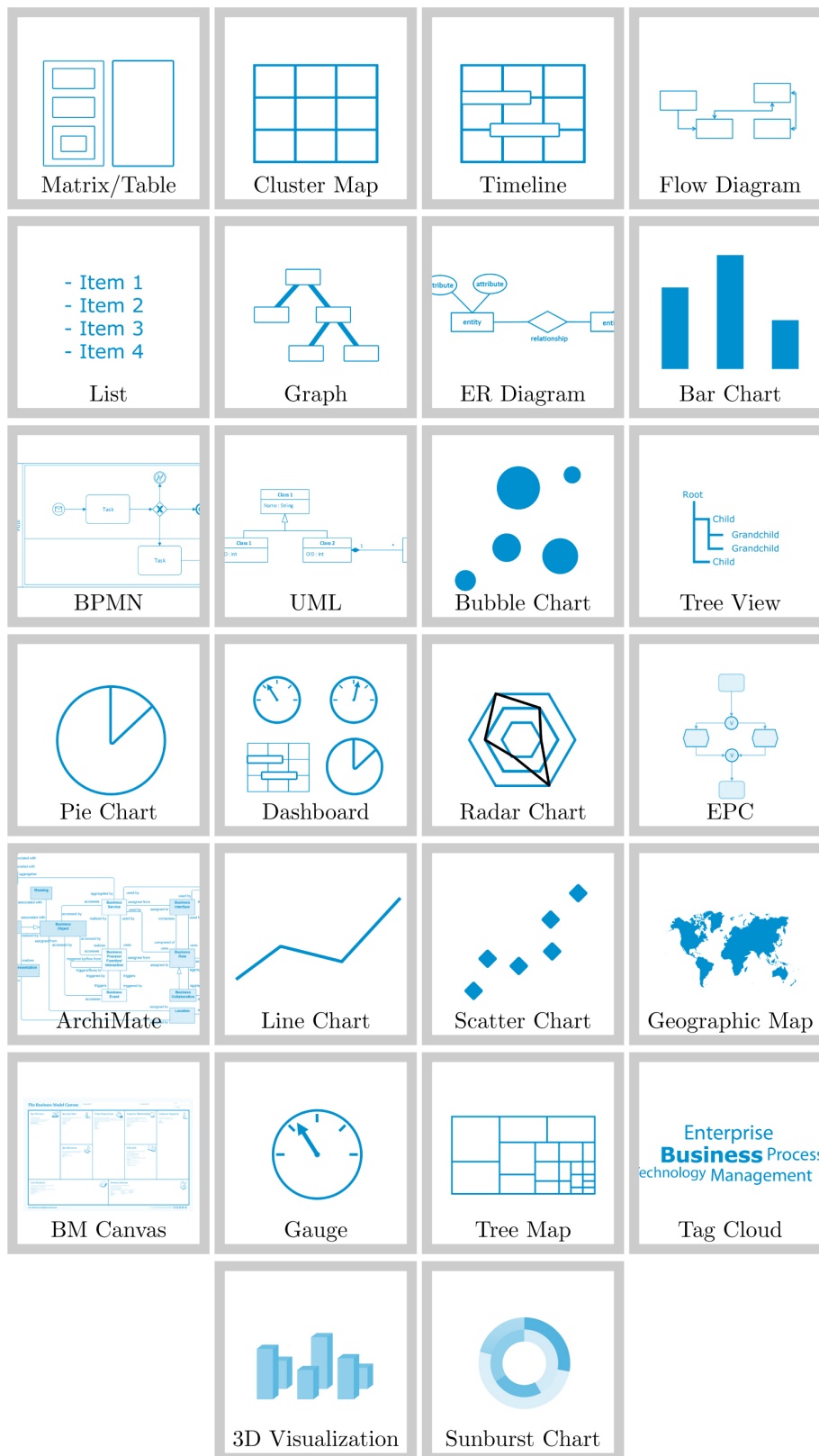
Practitioners were able to specify one of the following stakeholders as target group for each provided example scenario:

- Business Analyst
- CxO (e.g. CEO, CFO, CIO)
- Enterprise Architect
- Junior/Senior Manager (Business)
- Junior/Senior Manager (IT)
- Solutions Architect
- Other



## 5. EA Visualization Types

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**Figure 5.2.:** Overview of 26 visualization types found in our study

### 5.1. Matrix/Table

A matrix is a structured graphical representation of information. Data is organized in rows and columns. Rows and columns are visually aligned.

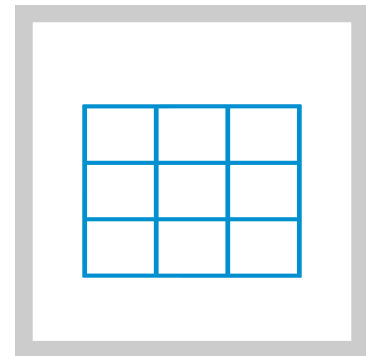
#### Usage

According to our survey, 82 out of 109 practitioners use some kind of matrix/table. They provided 176 examples to illustrate how they use this visualization type. Matrices/tables are mainly used to display information that is concerned with application and business aspects according to our practitioner survey.

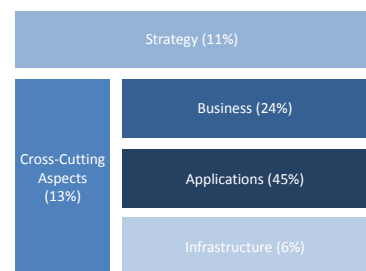
Strategy	11%
Business	24%
Applications	24%
Infrastructure	6%
Cross-Cutting Aspects	13%
n = 176	

#### Stakeholders

Business Analyst	10%
CxO (e.g. CEO, CFO, CIO)	9%
Enterprise Architect	34%
Junior/Senior Manager (Business)	5%
Junior/Senior Manager (IT)	17%
Solutions Architect	11%
Other	13%
n = 166	



#### Usage Domain



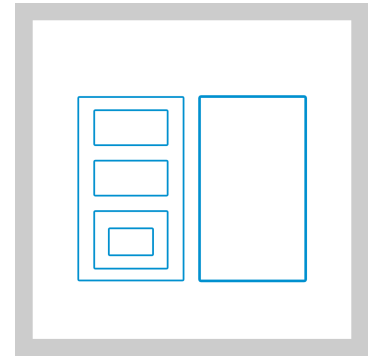
#### Examples

Control Level IERM/Inherent Risk				
	Very Low	Low	Medium	High
Very Weak	0	1	0	0
Weak	0	1	2	7
Medium	0	0	10	3
Strong	0	8	0	1
Very Strong	2	0	0	0
Total	2	10	12	11

Item	Item ID	Item Name	Item Description	Item Category	Item Status	Item Risk	Item Control	Item Owner	Item Date
Item 1	Item 1 ID	Item 1 Name	Item 1 Description	Item 1 Category	Item 1 Status	Item 1 Risk	Item 1 Control	Item 1 Owner	Item 1 Date
Item 2	Item 2 ID	Item 2 Name	Item 2 Description	Item 2 Category	Item 2 Status	Item 2 Risk	Item 2 Control	Item 2 Owner	Item 2 Date
Item 3	Item 3 ID	Item 3 Name	Item 3 Description	Item 3 Category	Item 3 Status	Item 3 Risk	Item 3 Control	Item 3 Owner	Item 3 Date
Item 4	Item 4 ID	Item 4 Name	Item 4 Description	Item 4 Category	Item 4 Status	Item 4 Risk	Item 4 Control	Item 4 Owner	Item 4 Date
Item 5	Item 5 ID	Item 5 Name	Item 5 Description	Item 5 Category	Item 5 Status	Item 5 Risk	Item 5 Control	Item 5 Owner	Item 5 Date

## 5.2. Cluster Map

Cluster maps are widespread in Enterprise Architecture. They are often used to visualize hierarchical relationships between entities. For instance, a mapping from applications to business domains or processes can be visualized in a cluster map: outer rectangles represent business domains, inner rectangles represent applications. Then, each rectangle corresponding to a business domain contains all rectangles which correspond to an application that supports the respective business domain.

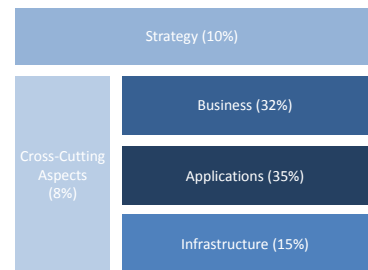


### Usage

According to our survey, 82 out of 109 practitioners use some kind of cluster map. They provided 220 examples to illustrate how they use this visualization type. Practitioners report that cluster maps are mainly used at the application and business layer.

Strategy	10%
Business	32%
Applications	32%
Infrastructure	15%
Cross-Cutting Aspects	8%
n = 220	

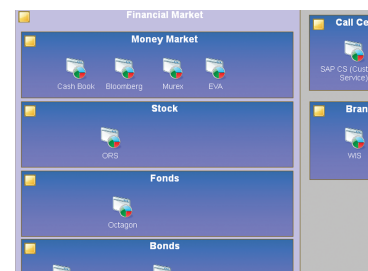
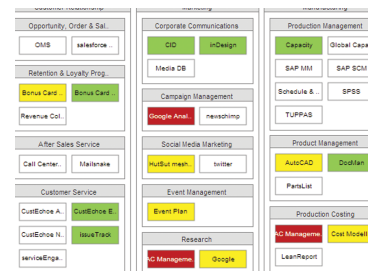
### Usage Domain



### Stakeholders

Business Analyst	8%
CxO (e.g. CEO, CFO, CIO)	18%
Enterprise Architect	20%
Junior/Senior Manager (Business)	13%
Junior/Senior Manager (IT)	15%
Solutions Architect	16%
Other	11%
n = 213	

### Examples



### 5.3. Timeline

A timeline is a graphical representation of time periods and/or points in time. Timelines are frequently used to show the chronology of related events and/or activities from a project plan. A widely-used variant of a timeline is the GANTT diagram. In EA, GANTT diagrams are often used to visualize project roadmaps.

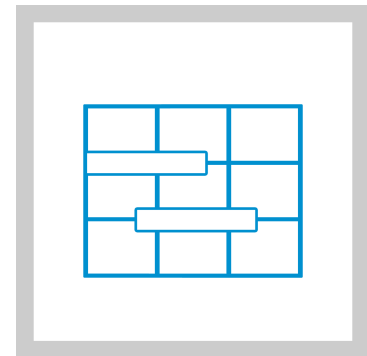
#### Usage

According to our survey, 77 out of 109 practitioners use some kind of timeline. They provided 95 examples to illustrate how they use this visualization type. Timeline charts are mainly used at the Application layer or cross-cutting purposes.

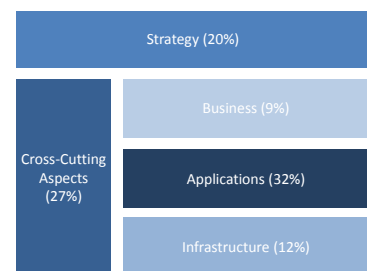
Strategy	20%
Business	9%
Applications	9%
Infrastructure	12%
Cross-Cutting Aspects	27%
n = 95	

#### Stakeholders

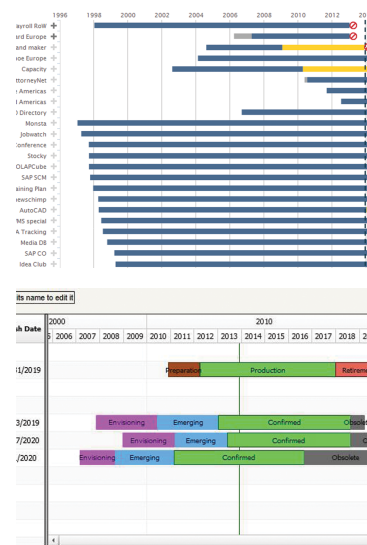
Business Analyst	3%
CxO (e.g. CEO, CFO, CIO)	17%
Enterprise Architect	21%
Junior/Senior Manager (Business)	13%
Junior/Senior Manager (IT)	23%
Solutions Architect	12%
Other	10%
n = 99	



#### Usage Domain



#### Examples



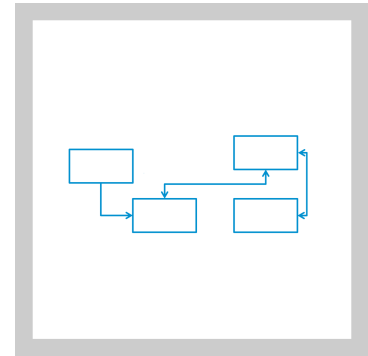
## 5.4. Flow Diagram

A flow diagram depicts the flow of data or control between different entities. Typically, flows are represented by arrows and structural entities are represented by boxes or symbols. In EA, for instance, flow diagrams are used to visualize business process steps or data flow between different applications.

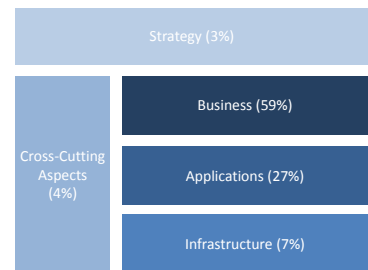
### Usage

According to our survey, 74 out of 109 practitioners use some kind of flow diagram. They provided 74 examples to illustrate how they use this visualization type. Flow diagrams are mainly used to display information about business aspects and, to a lesser extent, the application landscape.

Strategy	3%
Business	59%
Applications	59%
Infrastructure	7%
Cross-Cutting Aspects	4%
n = 74	



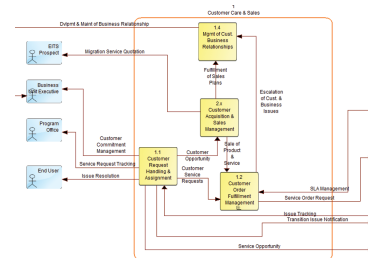
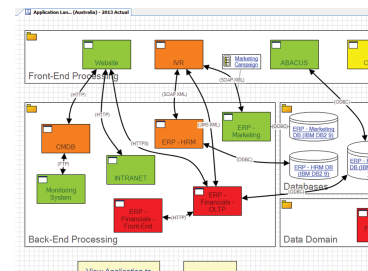
### Usage Domain



### Stakeholders

Business Analyst	33%
CxO (e.g. CEO, CFO, CIO)	1%
Enterprise Architect	16%
Junior/Senior Manager (Business)	17%
Junior/Senior Manager (IT)	8%
Solutions Architect	12%
Other	13%
n = 76	

### Examples



### 5.5. List

A list is an enumeration of (textual) items displayed in a repetitive pattern. Items are usually separated by a specific separator and/or position such as a bullet point or bars.

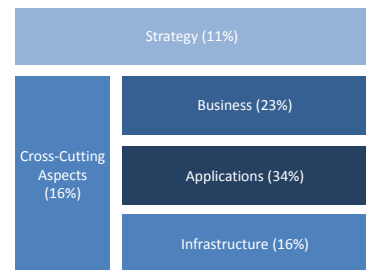
#### Usage

According to our survey, 73 out of 109 practitioners use some kind of list. They provided 96 examples to illustrate how they use this visualization type. Lists are predominantly used to display information about the application landscape.



Strategy	11%
Business	23%
Applications	23%
Infrastructure	16%
Cross-Cutting Aspects	16%
n = 96	

#### Usage Domain



#### Stakeholders

Business Analyst	13%
CxO (e.g. CEO, CFO, CIO)	9%
Enterprise Architect	24%
Junior/Senior Manager (Business)	7%
Junior/Senior Manager (IT)	13%
Solutions Architect	23%
Other	11%
n = 96	

#### Examples

Examples of list visualizations in an application landscape tool:

- HP Service Desk**: With HP Service Desk we manage all service tickets and the service desk management.
- HR Plan**: HR Plan plans the development of our workforce, from a qualitative and quantitative aspect.
- HypeCollab**: Collaboration for idea and innovation management we use HypeCollab. It can manage user and work groups, c documentation with definable access rights.
- IdeaIT**: IdeaIT enables every employee to enter ideas for enhancements so to reduce problems in the Internet. The ad integrated workflow supports the assessment and approval process.
- Payroll Germany**

Name	Type	Description
"EurekaPersistenceLayer"	DeployableArtifact	dummy description
"FastWebServiceLayer"	DeployableArtifact	dummy description
"OneServiceLayerEAI"	DeployableArtifact	dummy description
"HappyInvestEAI"	DeployableArtifact	dummy description
"HappyInvesttranEAI"	DeployableArtifact	dummy description
"HappyTirenet"	DeployableArtifact	dummy description
"Helpmanager"	DeployableArtifact	dummy description
"Imagerycorp"	DeployableArtifact	dummy description
"LOG_JRLea-SSP RTS"	LogicSoftwareComponent	dummy description
"LOG_JRLeaManagementConsole RTS"	LogicSoftwareComponent	dummy description

## 5. EA Visualization Types

### 5.6. Graph

A graph is a graphical representation of entities and their relations. Entities are depicted as nodes (e.g. filled circle or symbol) and their relationships are depicted as lines (edges) connecting the nodes.

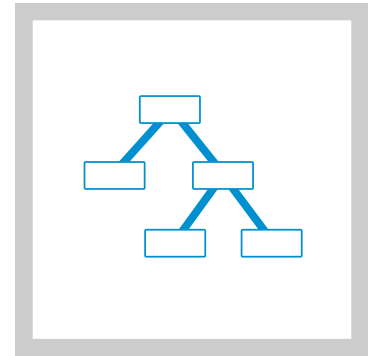
#### Usage

According to our survey, 64 out of 109 practitioners use some kind of graph. They provided 117 examples to illustrate how they use this visualization type. Graph visualizations are mainly used at the Business and Application layers.

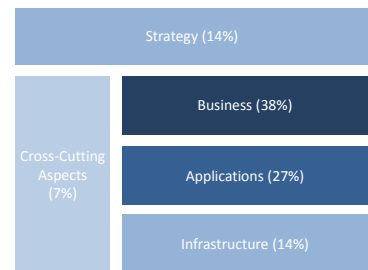
Strategy	14%
Business	38%
Applications	38%
Infrastructure	14%
Cross-Cutting Aspects	7%
n = 117	

#### Stakeholders

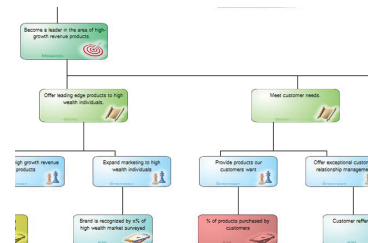
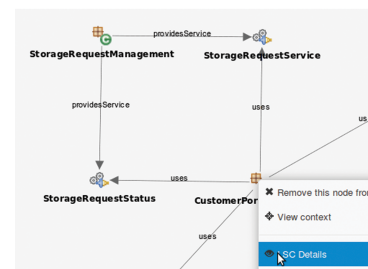
Business Analyst	13%
CxO (e.g. CEO, CFO, CIO)	15%
Enterprise Architect	28%
Junior/Senior Manager (Business)	12%
Junior/Senior Manager (IT)	8%
Solutions Architect	13%
Other	12%
n = 112	



#### Usage Domain

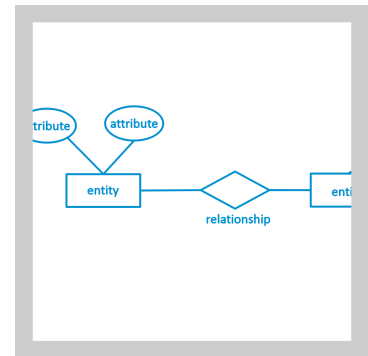


#### Examples



### 5.7. Entity-Relationship Diagram

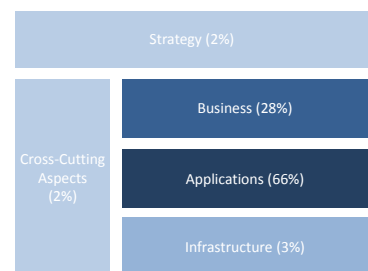
An entity-relationship (ER) diagram is a graphical abstraction of structural elements and their relationships. Entities are shown as rectangles and their relationships are represented as connecting lines between entities. In addition, entities and relationships can be described in more detail by attaching attributes (represented as ellipses). In EA, for instance, ER diagrams can be used to describe attributes of and relationships between different applications.



#### Usage

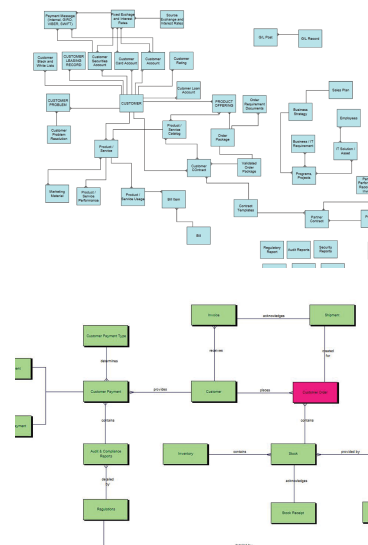
According to our survey, 63 out of 109 practitioners use some kind of entity-relationship diagram. They provided 64 examples to illustrate how they use this visualization type. ER diagrams are primarily used to display information at the application layer and secondary to visualize information about business aspects.

#### Usage Domain



Strategy	2%
Business	28%
Applications	28%
Infrastructure	3%
Cross-Cutting Aspects	2%
n = 64	

#### Examples



#### Stakeholders

Business Analyst	19%
CxO (e.g. CEO, CFO, CIO)	0%
Enterprise Architect	25%
Junior/Senior Manager (Business)	3%
Junior/Senior Manager (IT)	14%
Solutions Architect	28%
Other	11%
n = 64	



## 5.8. Bar Chart

Bar charts visualize quantitative data associated to a set of categories. Each category is represented as a rectangle. The length of the rectangle is proportional to the corresponding quantitative value. A bar chart might be used, for instance, to show the IT budget of different business domains.

### Usage

According to our survey, 54 out of 109 practitioners use some kind of bar chart. They provided 54 examples to illustrate how they use this visualization type. Cross-cutting aspects and information about the application landscape are two major types of information which are illustrated as bar charts.

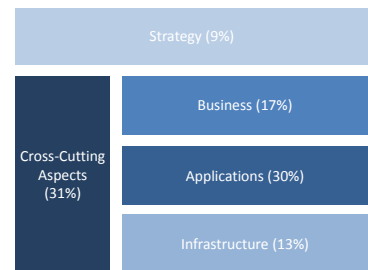
Strategy	9%
Business	17%
Applications	17%
Infrastructure	13%
Cross-Cutting Aspects	31%
n = 54	

### Stakeholders

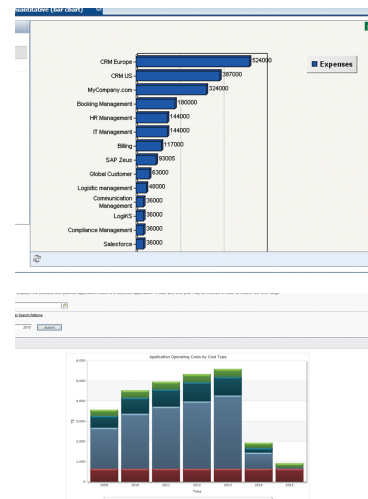
Business Analyst	2%
CxO (e.g. CEO, CFO, CIO)	22%
Enterprise Architect	26%
Junior/Senior Manager (Business)	11%
Junior/Senior Manager (IT)	24%
Solutions Architect	6%
Other	9%
n = 54	



### Usage Domain

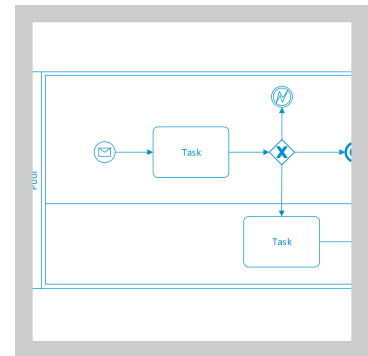


### Examples



## 5.9. Business Process Model and Notation (BPMN)

The Business Process Model and Notation (BPMN) specification is a standard for business process modeling. It provides a graphical notation for defining business processes in a Business Process Diagram (BPD). A business process is drawn as a rectangle and may contain sub-processes that are modeled using rectangles with rounded corners. The control flow between elements is represented by arrows. So-called gateways represent logical conditions (AND, OR, XOR) for the control flow.

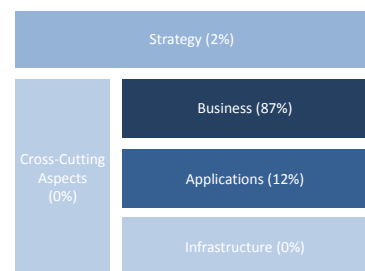


### Usage

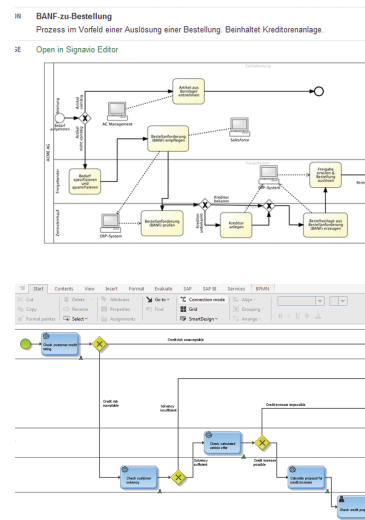
According to our survey, 50 out of 109 practitioners use some kind of BPMN notation. They provided 52 examples to illustrate how they use this visualization type. As expected, BPMN diagrams are heavily used at the business layer.

Strategy	2%
Business	87%
Applications	87%
Infrastructure	0%
Cross-Cutting Aspects	0%
n = 52	

### Usage Domain



### Examples



### Stakeholders

Business Analyst	38%
CxO (e.g. CEO, CFO, CIO)	2%
Enterprise Architect	10%
Junior/Senior Manager (Business)	31%
Junior/Senior Manager (IT)	8%
Solutions Architect	6%
Other	6%
n = 52	

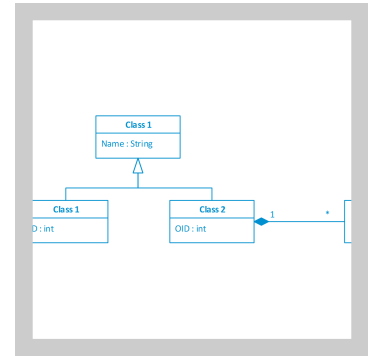
## 5.10. Unified Modeling Language

The Unified Modeling Language (UML) is one of the most widely used (visual) modeling languages. UML offers various diagram types to model structure as well as behavior. In EA, UML can be used for various purposes such as modeling and visualizing infrastructure or data structures.

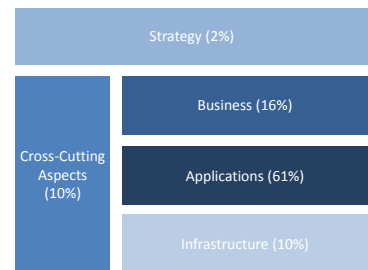
### Usage

According to our survey, 50 out of 109 practitioners use some kind of UML diagram. They provided 49 examples to illustrate how they use this visualization type. UML diagrams are mainly used to display information at the application layer.

Strategy	2%
Business	16%
Applications	16%
Infrastructure	10%
Cross-Cutting Aspects	10%
n = 49	



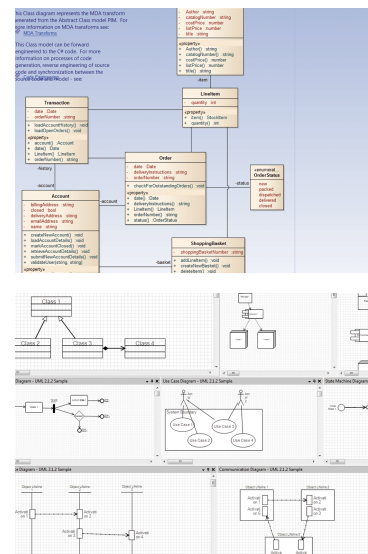
### Usage Domain



### Stakeholders

Business Analyst	12%
CxO (e.g. CEO, CFO, CIO)	0%
Enterprise Architect	20%
Junior/Senior Manager (Business)	6%
Junior/Senior Manager (IT)	14%
Solutions Architect	39%
Other	10%
n = 51	

### Examples



### 5.11. Bubble Chart

A bubble chart displays three-dimensional data. Each data point (i.e. triple) is represented as a disk. Two of the data point values determine the x and y location of the disk. The third value determines the size of the disk. In EA, bubble charts are used, for instance, to show an overview of applications in terms of importance (number of dependencies), business criticality and IT evaluation.

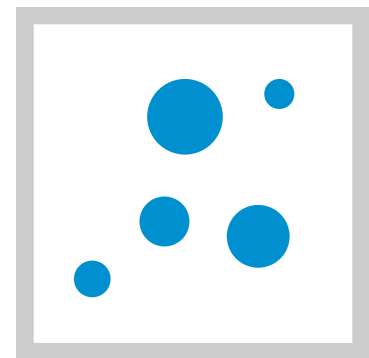
#### Usage

According to our survey, 50 out of 109 practitioners use some kind of bubble chart. They provided 61 examples to illustrate how they use this visualization type. Bubble charts are heavily used to display information at the strategy level.

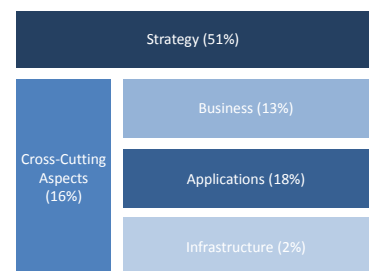
Strategy	51%
Business	13%
Applications	13%
Infrastructure	2%
Cross-Cutting Aspects	16%
n = 61	

#### Stakeholders

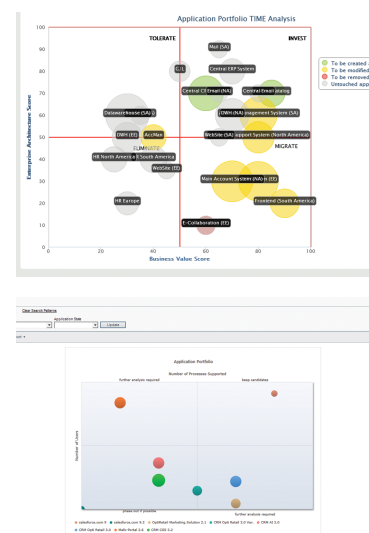
Business Analyst	2%
CxO (e.g. CEO, CFO, CIO)	42%
Enterprise Architect	10%
Junior/Senior Manager (Business)	18%
Junior/Senior Manager (IT)	26%
Solutions Architect	2%
Other	2%
n = 62	



#### Usage Domain



#### Examples



## 5. EA Visualization Types

### 5.12. Tree View

A tree view is a graphical representation of hierarchical, tree-like information as a list of items. Different hierarchy levels usually are represented using indentation.

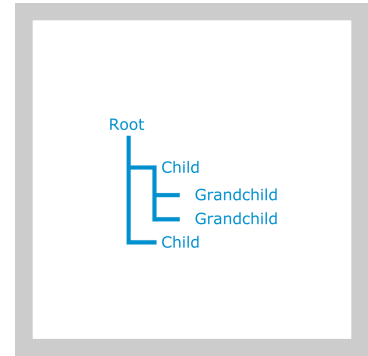
#### Usage

According to our survey, 48 out of 109 practitioners use some kind of tree view. They provided 60 examples to illustrate how they use this visualization type. Tree views are primarily used to display information about business aspects and the application landscape.

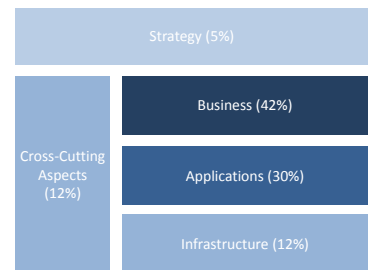
Strategy	5%
Business	42%
Applications	42%
Infrastructure	12%
Cross-Cutting Aspects	12%
n = 60	

#### Stakeholders

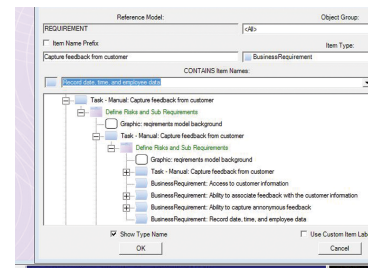
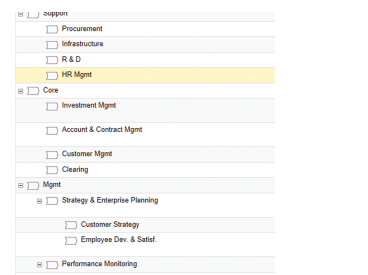
Business Analyst	12%
CxO (e.g. CEO, CFO, CIO)	5%
Enterprise Architect	33%
Junior/Senior Manager (Business)	7%
Junior/Senior Manager (IT)	21%
Solutions Architect	9%
Other	14%
n = 58	



#### Usage Domain



#### Examples



### 5.13. Pie Chart

A pie chart is a circular chart to visualize quantitative ratios. The circle is divided into segments, each representing one data point. The size of the segment is proportional to the value of the data point. A pie chart might be used to illustrate the shares of all the cost components contributing to total spending of a project.

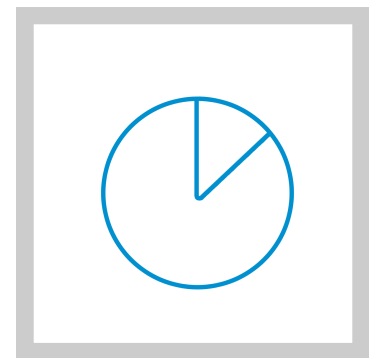
#### Usage

According to our survey, 42 out of 109 practitioners use some kind of pie chart. They provided 41 examples to illustrate how they use this visualization type. Pie charts are predominantly used to display information about cross-cutting aspects, the application landscape and strategic issues.

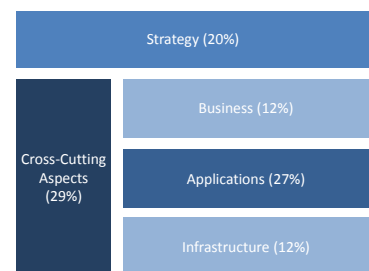
Strategy	20%
Business	12%
Applications	12%
Infrastructure	12%
Cross-Cutting Aspects	29%
n = 41	

#### Stakeholders

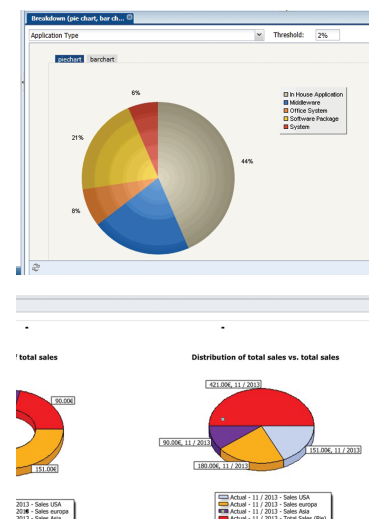
Business Analyst	2%
CxO (e.g. CEO, CFO, CIO)	26%
Enterprise Architect	31%
Junior/Senior Manager (Business)	14%
Junior/Senior Manager (IT)	21%
Solutions Architect	0%
Other	5%
n = 42	



#### Usage Domain



#### Examples



## 5.14. Dashboard

A dashboard is a fixed or customized composition of different single visualizations. Dashboards are used to provide an overview of different information which are relevant for a specific purpose such as monitoring different aspects of a certain project.

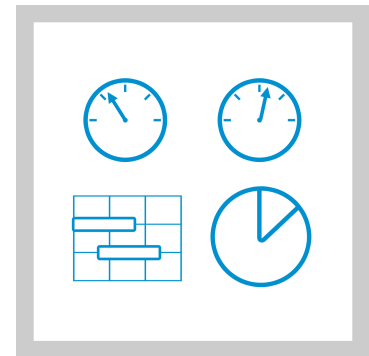
### Usage

According to our survey, 41 out of 109 practitioners use some kind of dashboard. They provided 44 examples to illustrate how they use this visualization type. In practice, dashboards are mainly used to display information which address strategic or cross-cutting concerns.

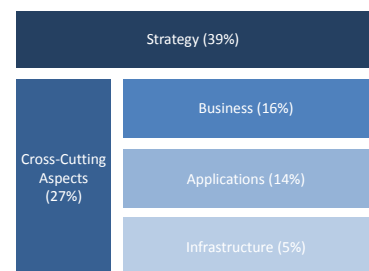
Strategy	39%
Business	16%
Applications	16%
Infrastructure	5%
Cross-Cutting Aspects	27%
n = 44	

### Stakeholders

Business Analyst	2%
CxO (e.g. CEO, CFO, CIO)	44%
Enterprise Architect	26%
Junior/Senior Manager (Business)	7%
Junior/Senior Manager (IT)	14%
Solutions Architect	2%
Other	5%
n = 43	



### Usage Domain



### Examples



### 5.15. Radar Chart

A radar chart displays n-dimensional data using n concentric axes. Each axis represents one dimension. A data point (i.e. n-tuple) is represented by a polygon. Each vertex is located on a different axis and represents the corresponding value. In EA, for instance, a radar chart might be used to evaluate a project and visualize it in terms of specific criteria such as costs, importance and duration.

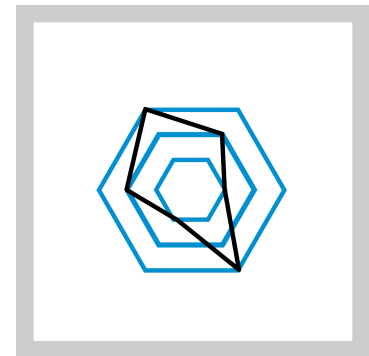
#### Usage

According to our survey, 39 out of 109 practitioners use some kind of radar chart. They provided 51 examples to illustrate how they use this visualization type. Radar charts are used to display information at each layer with similar frequency except for information about infrastructure.

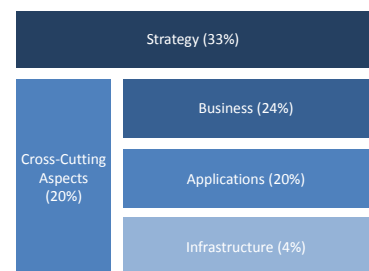
Strategy	33%
Business	24%
Applications	24%
Infrastructure	4%
Cross-Cutting Aspects	20%
n = 51	

#### Stakeholders

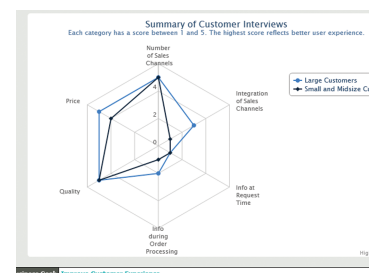
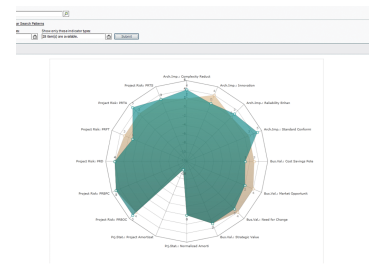
Business Analyst	6%
CxO (e.g. CEO, CFO, CIO)	25%
Enterprise Architect	24%
Junior/Senior Manager (Business)	18%
Junior/Senior Manager (IT)	20%
Solutions Architect	6%
Other	2%
n = 51	



#### Usage Domain



#### Examples





## 5.16. Event-Driven Process Chain (EPC)

An EPC diagram can be used to model business processes and workflows. The flow of events within a process can be modeled using sequences of activities that are controlled by the combination of events and conditions.

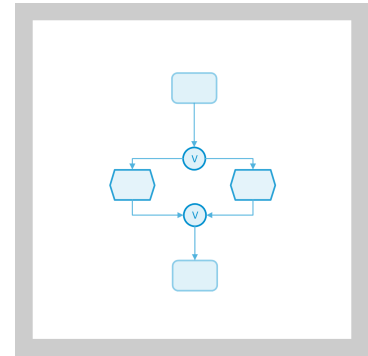
### Usage

According to our survey, 29 out of 109 practitioners use some kind of EPC diagram. They provided 20 examples to illustrate how they use this visualization type. Similar to BPMN diagrams, EPC diagrams are mostly used to show information addressing business concerns.

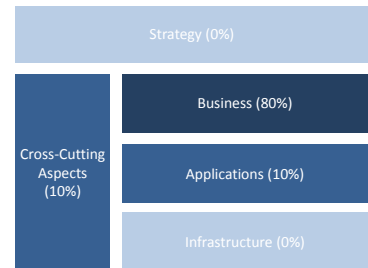
Strategy	0%
Business	80%
Applications	80%
Infrastructure	0%
Cross-Cutting Aspects	10%
n = 20	

### Stakeholders

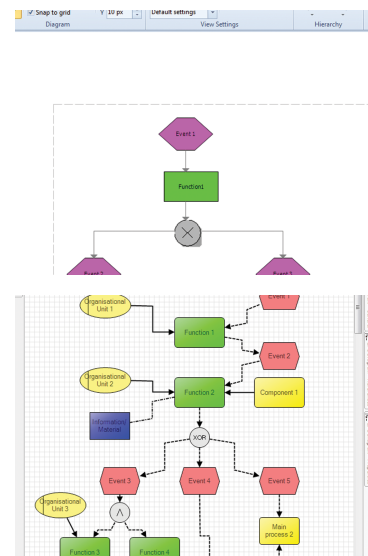
Business Analyst	52%
CxO (e.g. CEO, CFO, CIO)	0%
Enterprise Architect	5%
Junior/Senior Manager (Business)	19%
Junior/Senior Manager (IT)	10%
Solutions Architect	10%
Other	5%
n = 21	



### Usage Domain



### Examples



### 5.17. ArchiMate

ArchiMate is an open and independent modeling language for enterprise architecture. ArchiMate promotes a three layered view on enterprise architecture: business layer, application layer and technology layer. It provides means of expression for structural, behavioral and informational concepts for each of the layers.

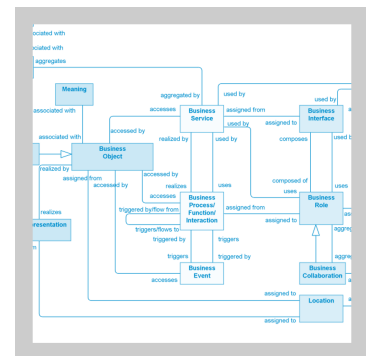
#### Usage

According to our survey, 28 out of 109 practitioners use some kind of ArchiMate diagram. They provided 25 examples to illustrate how they use this visualization type. ArchiMate notation is mainly used to display information about application and business aspects.

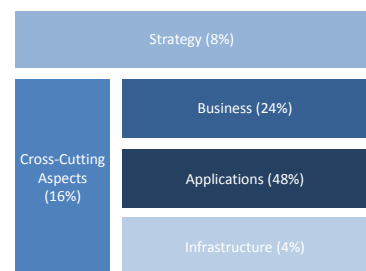
Strategy	8%
Business	24%
Applications	24%
Infrastructure	4%
Cross-Cutting Aspects	16%
n = 25	

#### Stakeholders

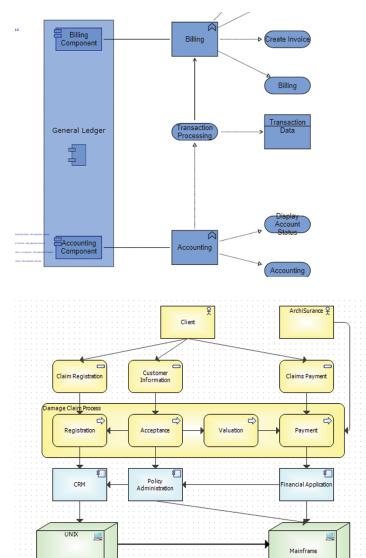
Business Analyst	8%
CxO (e.g. CEO, CFO, CIO)	0%
Enterprise Architect	42%
Junior/Senior Manager (Business)	8%
Junior/Senior Manager (IT)	13%
Solutions Architect	25%
Other	4%
n = 24	



#### Usage Domain



#### Examples



## 5.18. Line Chart

A line chart illustrates one or more series of data points connected by straight line segments. Line charts are often used to show trends over a specific time period. In EA, for instance, line charts might be used to visualize the total number of used applications.

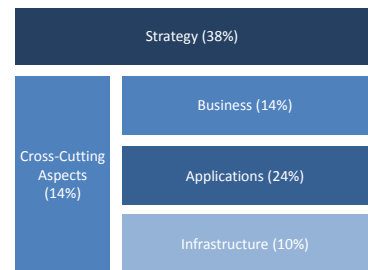
### Usage

According to our survey, 27 out of 109 practitioners use some kind of line chart. They provided 21 examples to illustrate how they use this visualization type. Line charts mostly show information about strategy or the application landscape.

Strategy	38%
Business	14%
Applications	14%
Infrastructure	10%
Cross-Cutting Aspects	14%
n = 21	



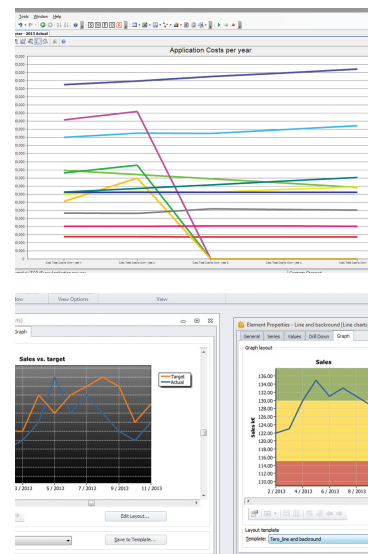
### Usage Domain



### Stakeholders

Business Analyst	0%
CxO (e.g. CEO, CFO, CIO)	36%
Enterprise Architect	5%
Junior/Senior Manager (Business)	14%
Junior/Senior Manager (IT)	32%
Solutions Architect	5%
Other	9%
n = 22	

### Examples



### 5.19. Scatter Chart

A scatter chart displays two-dimensional data. Data points (i.e. value pairs) are represented as points on a two-dimensional plane. Each axis corresponds to one dimension. In EA, a scatter plot might be used to display an overview of projects in terms of costs and duration.

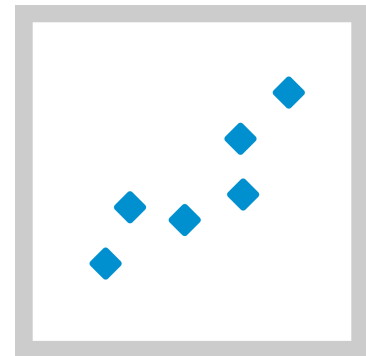
#### Usage

According to our survey, 24 out of 109 practitioners use some kind of scatter chart. They provided 22 examples to illustrate how they use this visualization type. Practitioners mainly use scatter charts to display information about strategy or cross-cutting concerns.

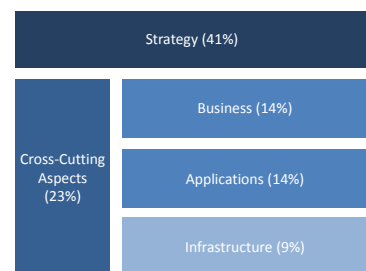
Strategy	41%
Business	14%
Applications	14%
Infrastructure	9%
Cross-Cutting Aspects	23%
n = 22	

#### Stakeholders

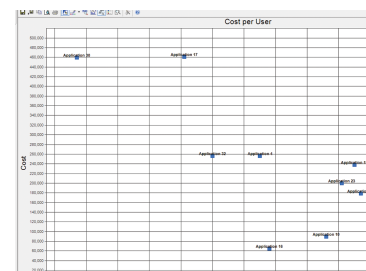
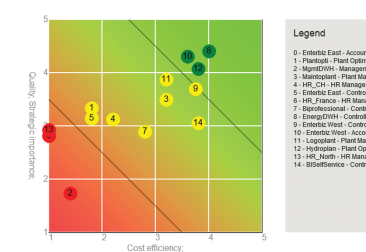
Business Analyst	0%
CxO (e.g. CEO, CFO, CIO)	38%
Enterprise Architect	14%
Junior/Senior Manager (Business)	24%
Junior/Senior Manager (IT)	19%
Solutions Architect	0%
Other	5%
n = 21	



#### Usage Domain



#### Examples



## 5.20. Geographic Map

A geographic map shows multi-dimensional information where (at least) one dimension corresponds to a location. In EA, for instance, geographic maps are used to show the distribution of IT infrastructure such as servers.

### Usage

According to our survey, 21 out of 109 practitioners use some kind of geographic map. They provided 15 examples to illustrate how they use this visualization type. Geographic maps mainly display information about strategic, cross-cutting and application aspects.

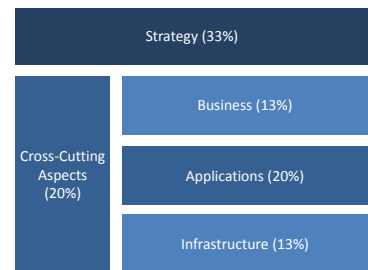
Strategy	33%
Business	13%
Applications	13%
Infrastructure	13%
Cross-Cutting Aspects	20%
n = 15	

### Stakeholders

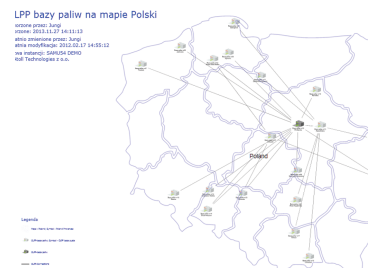
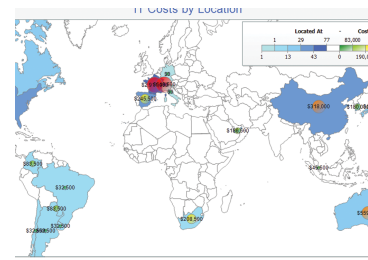
Business Analyst	0%
CxO (e.g. CEO, CFO, CIO)	47%
Enterprise Architect	13%
Junior/Senior Manager (Business)	13%
Junior/Senior Manager (IT)	13%
Solutions Architect	7%
Other	7%
n = 15	



### Usage Domain



### Examples



## 5.21. Business Model Canvas

The Business Model Canvas is a visual template to document key aspects of a business model. In EA, for instance, it can be used to facilitate discussion about business strategies across different departments and/or projects.

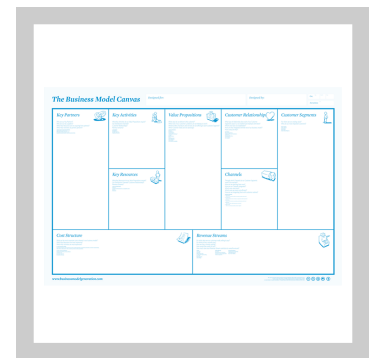
### Usage

According to our survey, 18 out of 109 practitioners use some kind of Business Model Canvas. They provided 17 examples to illustrate how they use this visualization type. As anticipated, practitioners use the Business Model Canvas to visualize information which addresses concerns at the strategy and business level.

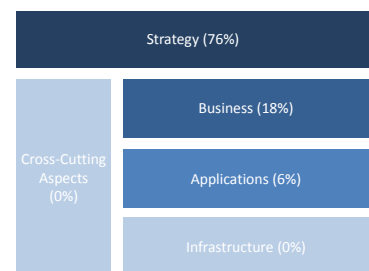
Strategy	76%
Business	18%
Applications	18%
Infrastructure	0%
Cross-Cutting Aspects	0%
n = 17	

### Stakeholders

Business Analyst	11%
CxO (e.g. CEO, CFO, CIO)	50%
Enterprise Architect	33%
Junior/Senior Manager (Business)	0%
Junior/Senior Manager (IT)	6%
Solutions Architect	0%
Other	0%
n = 18	



### Usage Domain



### Examples



## 5.22. Gauge

A gauge is the graphical representation of a single indicator. It is often depicted as a circle with a certain scale and a pointer indicating the corresponding value of the data point. A gauge can be used, for instance, to visualize key performance indicators.

### Usage

According to our survey, 12 out of 109 practitioners use some kind of gauge. They provided 5 examples to illustrate how they use this visualization type. Gauges are mainly used to display information which is relevant for strategic concerns.

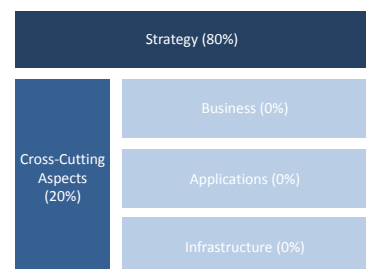
Strategy	80%
Business	0%
Applications	0%
Infrastructure	0%
Cross-Cutting Aspects	20%
n = 5	

### Stakeholders

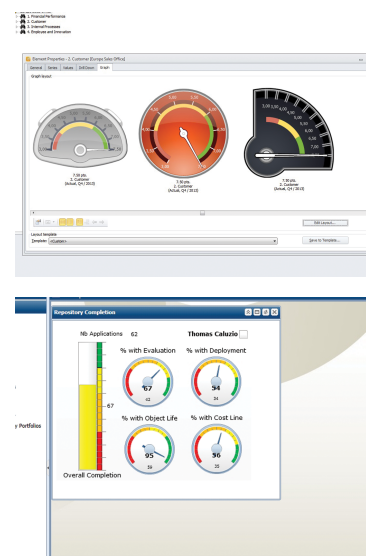
Business Analyst	0%
CxO (e.g. CEO, CFO, CIO)	60%
Enterprise Architect	0%
Junior/Senior Manager (Business)	20%
Junior/Senior Manager (IT)	0%
Solutions Architect	0%
Other	20%
n = 5	



### Usage Domain



### Examples



### 5.23. Treemap

Treemaps display hierarchical, treelike data as nested rectangles. Each branch of the tree is represented as a rectangle and is in turn tiled with rectangles which correspond to sub-branches. The rectangle sizes are proportional to a specific (quantitative) dimension of the data. In EA, treemaps can be used to, for instance, show the budget allocated to different departments of the organization.

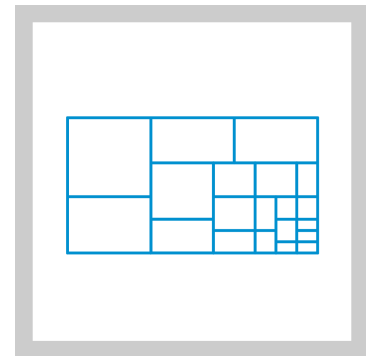
#### Usage

According to our survey, 11 out of 109 practitioners use some kind of treemap. They provided 19 examples to illustrate how they use this visualization type. Practitioners use tree maps at each information level with similar frequency.

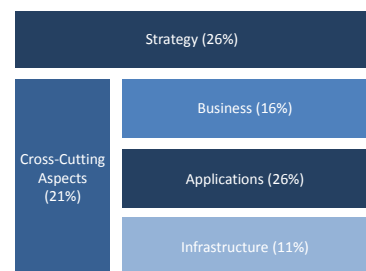
Strategy	26%
Business	16%
Applications	16%
Infrastructure	11%
Cross-Cutting Aspects	21%
n = 19	

#### Stakeholders

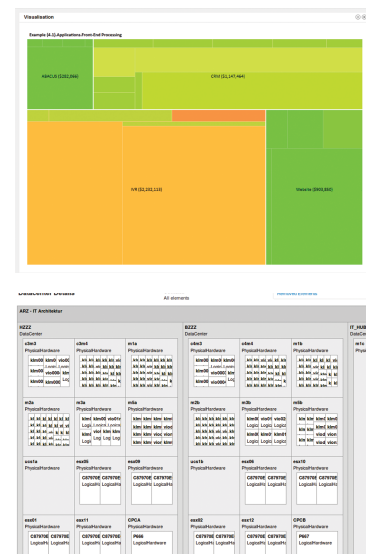
Business Analyst	0%
CxO (e.g. CEO, CFO, CIO)	47%
Enterprise Architect	21%
Junior/Senior Manager (Business)	16%
Junior/Senior Manager (IT)	16%
Solutions Architect	0%
Other	0%
n = 19	



#### Usage Domain



#### Examples





## 5.24. Tag Cloud

A tag cloud is a visual representation of a set of keywords. Metadata of the keywords is shown using style variables such as font size, color or position.

### Usage

According to our survey, 8 out of 109 practitioners use some kind of tag cloud. They provided 8 examples to illustrate how they use this visualization type. Tag clouds are mainly used to display information about the application landscape and strategic aspects.

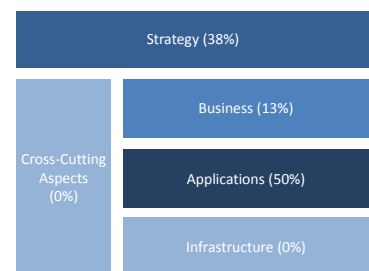
Strategy	38%
Business	13%
Applications	13%
Infrastructure	0%
Cross-Cutting Aspects	0%
n = 8	

### Stakeholders

Business Analyst	27%
CxO (e.g. CEO, CFO, CIO)	9%
Enterprise Architect	36%
Junior/Senior Manager (Business)	0%
Junior/Senior Manager (IT)	9%
Solutions Architect	0%
Other	18%
n = 11	



### Usage Domain



### Examples

—  
—

### 5.25. 3D Visualization

A three-dimensional visualization utilizes one additional dimension compared to two-dimensional visualizations. In general, 3D projections are used instead of true 3D visualizations since the typically used medium is two-dimensional (e.g. screens, paper).

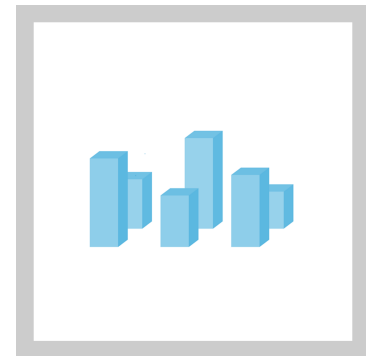
#### Usage

According to our survey, 3 out of 109 practitioners use some kind of 3D visualization/projection. They provided 5 examples to illustrate how they use this visualization type. The few survey participants who utilize 3D visualizations, use them to display information at each level except for cross-cutting aspects.

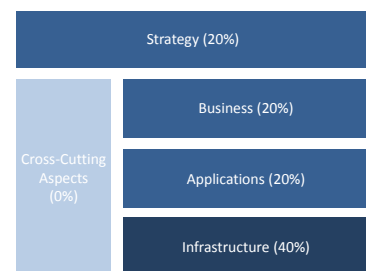
Strategy	20%
Business	20%
Applications	20%
Infrastructure	40%
Cross-Cutting Aspects	0%
n = 5	

#### Stakeholders

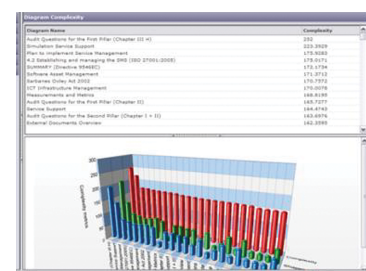
Business Analyst	50%
CxO (e.g. CEO, CFO, CIO)	12.5%
Enterprise Architect	12.5%
Junior/Senior Manager (Business)	12.5%
Junior/Senior Manager (IT)	12.5%
Solutions Architect	0%
Other	0%
n = 8	



#### Usage Domain

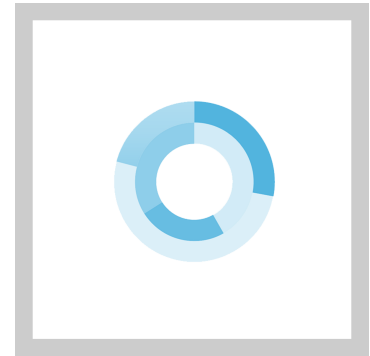


#### Examples



## 5.26. Sunburst Chart

A sunburst chart is a multi-level pie chart. It is used to visualize hierarchical data in multiple concentric circles. Each circle represents one hierarchy layer and is divided in segments. Each segment corresponds to one item at the respective hierarchy level. The size of the segments is proportional to the value in one particular dimension of the corresponding data point (i.e. item). Subitems are arranged on the next outer circle, adjacent to their parent item. Sunburst charts can be used to show a drill-down of the cost component structure of a certain project or department.

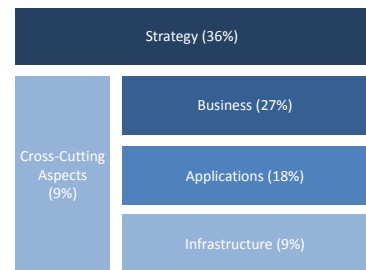


### Usage

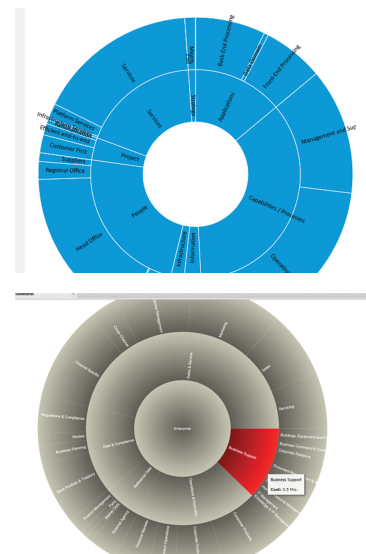
According to our survey, 8 out of 109 practitioners use some kind of sunburst chart. They provided 11 examples to illustrate how they use this visualization type. Sunburst charts are mainly used to display information at the strategy, business or application level.

Strategy	36%
Business	27%
Applications	27%
Infrastructure	9%
Cross-Cutting Aspects	9%
n = 11	

### Usage Domain



### Examples



### Stakeholders

Business Analyst	27%
CxO (e.g. CEO, CFO, CIO)	9%
Enterprise Architect	36%
Junior/Senior Manager (Business)	0%
Junior/Senior Manager (IT)	9%
Solutions Architect	0%
Other	18%
n = 11	

**Part II.**

**EA Tools and Vendor Profiles**



## CHAPTER 6

## ABACUS (Avolution)

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## 6. ABACUS (Avolution)

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Avolution Pty Ltd was founded in 2001 and has more than 12 years of experience in the EA domain. The company is vendor of ABACUS which is offered in version 4.2 at the editorial deadline. ABACUS supports 25 out of 26 visualization types. ABACUS implements a convenient way that allows to map the information demand of a visualization to an EA information model via drag-and-drop operations. This way existing model elements can be mapped to visual symbols on an instance of a visualization type. ABACUS actually uses the concept of a visualization type as a means to browse through the respective instances, i.e. configured visualizations. A configured visualization can be created by end users. In this process, a model element that previously has been linked to a visual symbol can be added to the visualization via drag-and-drop.

Avolution Pty Ltd also published a white paper that gives some advices on how to choose an EA tool focusing on features and their technical implementation (cf.[Av12]). In this white paper Avolution Pty Ltd lists 22 (very technical) criteria that may guide to differentiate EA tools.

### 6.1. Background Information

Vendor	Avolution Pty Ltd
Founding year	2001
Years active in EA market	12
Number of employees	51–250
URL	<a href="http://www.avolution.com.au">www.avolution.com.au</a>

**Table 6.1.:** Vendor Information of Avolution Pty Ltd

6. ABACUS (Avolution)

Tool Name	ABACUS	
Version	4.2	
Client Platforms	✓ Windows ✗ MacOS ✓ iOS ✓ Windows Mobile	✗ Linux ✓ Browser ✓ Android ✗ Other
Deployment Approach	✓ Desktop ✓ Server	✓ SaaS ✓ Other
EA Frameworks	✓ ArchiMate ✓ DoDAF ✓ IAF ✓ MODAF ✗ Other	✓ NAF ✓ PEAf ✓ TOGAF ✓ Zachman

Table 6.2.: General Information (ABACUS)

## 6.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	✗	✓
DOC(X)	✗	✓
HTML	✗	✓
JPG/JPEG	✗	✓
PDF	✗	✓
PNG	✗	✓
PPT(X)	✓	✗
SVG	✓	✓
VSD(X)	✓	✓
Other	✗	✓

Table 6.3.: Visualization Import/Export File Formats (ABACUS)



6. ABACUS (Avolution)

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### 6.3. Visualization Configuration

#### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✓
Data Filter	✓
Other	✓

**Table 6.4.:** Binding (ABACUS)

#### Generation Approach

Model-Driven	✓
Form-Based	✓
Scripting	✓
Manual Drawing	✓
Other	✗

**Table 6.5.:** Visualization Generation Approach (ABACUS)

#### Visual Customization and Layouting

Customization	Caption	✓
	Color	✓
	Orientation	✓
	Position	✓
	Shape	✓
	Size	✓
	Other	✗
Layout	Automated	✓
	Manual	✓
	Other	✗

**Table 6.6.:** Visual Customization (ABACUS)

### Import/Export of Visualization Configurations

Format	Import	Export
CSV	✓	✓
JSON	✓	✓
ODBC	✓	✗
XMI	✓	✓
XML	✓	✓
XLS(X)	✓	✓
TXT	✓	✗
Other	✓	✓

**Table 6.7.:** Configuration Import/Export (ABACUS)

## 6.4. Information Model

### Information Model Type

Full Schema	✓
Configurable Building Blocks	✓
User-defined	✗
Subclassing/class inheritance	✓

**Table 6.8.:** Information Model Type (ABACUS)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓	✓	✓	✓	✓	✓
Modify	✓	✓	✓	✓	✓	✓
Delete	✓	✓	✓	✓	✓	✓
Copy	✓	✓	✓	✓	✓	✓
Merge	✓	✓	✓	✓	✓	✓
Move	✓	✓	✓	✓	✓	✓

**Table 6.9.:** Information Model Flexibility (ABACUS)

6. ABACUS (Avolution)

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## 6.5. Interoperability

### Import Mechanisms

Pull	✓
Push	✓
Other	✓

**Table 6.10.:** Import Mechanisms (ABACUS)

### Third Party Tools

Business Intelligence Tools	✓
Business Process Engines	✓
Change Management Tools	✓
Cloud Services	✓
Configuration Management Database	✓
Enterprise Service Bus	✓
Infrastructure Monitoring Tools	✓
License/IT Asset Management Tools	✓
Project Portfolio Management Tools	✓
Release Management Tools	✓
Other	✓

**Table 6.11.:** Interoperability with Third Party Tools (ABACUS)

## Data & Schema Import/Export

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	✓	✓	✗	✗
JSON	✓	✓	✓	✓
TXT	✓	✓	✗	✗
XMI	✓	✓	✓	✓
XML	✓	✓	✓	✓
XLS(X)	✓	✓	✗	✗
OData	✓	✓	✓	✓
Other	✓	✓	✓	✓

**Table 6.12.:** Data & Schema Import/Export (ABACUS)

## Model Element Import/Export

Model Element	Import	Export
Classes	✓	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	✓	✓
Roles	✓	✓
Other	✓	✓

**Table 6.13.:** Model Element Import/Export (ABACUS)

6. ABACUS (Avolution)

6.6. Visualization Examples of ABACUS

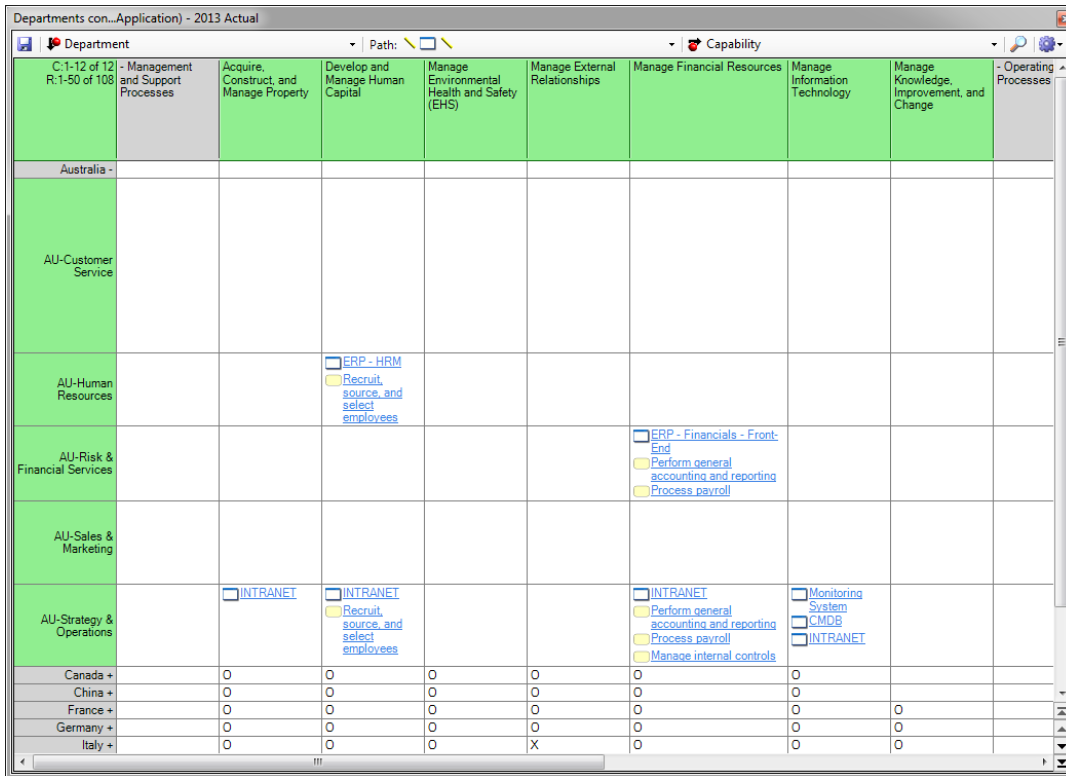


Figure 6.1.: Matrix of ABACUS

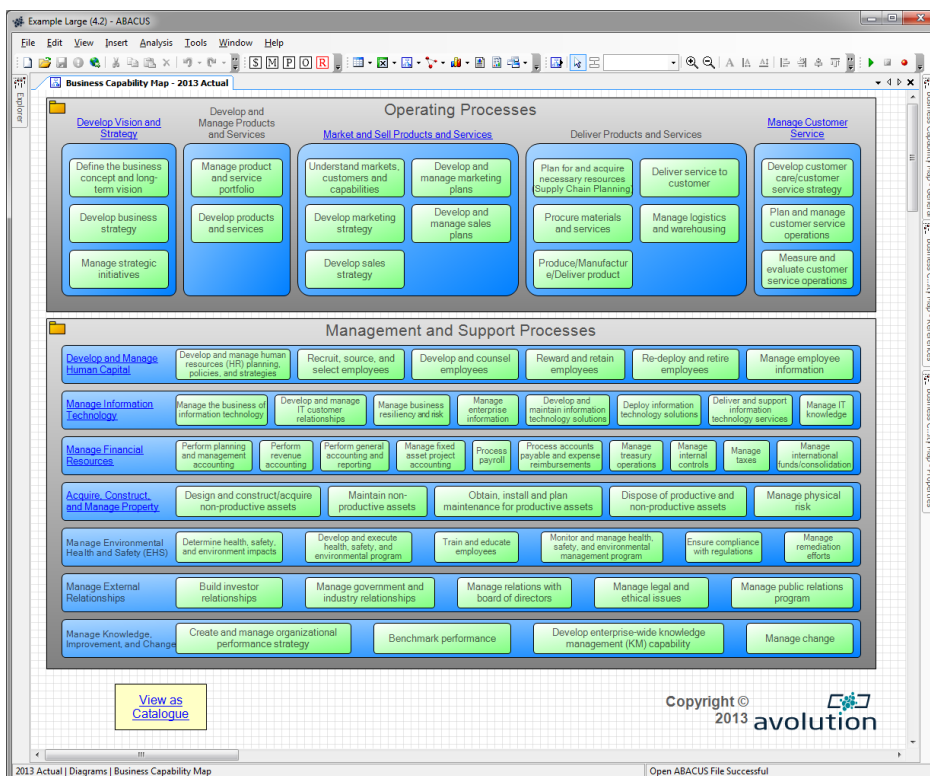


Figure 6.2.: Cluster Map of ABACUS

6. ABACUS (Avolution)

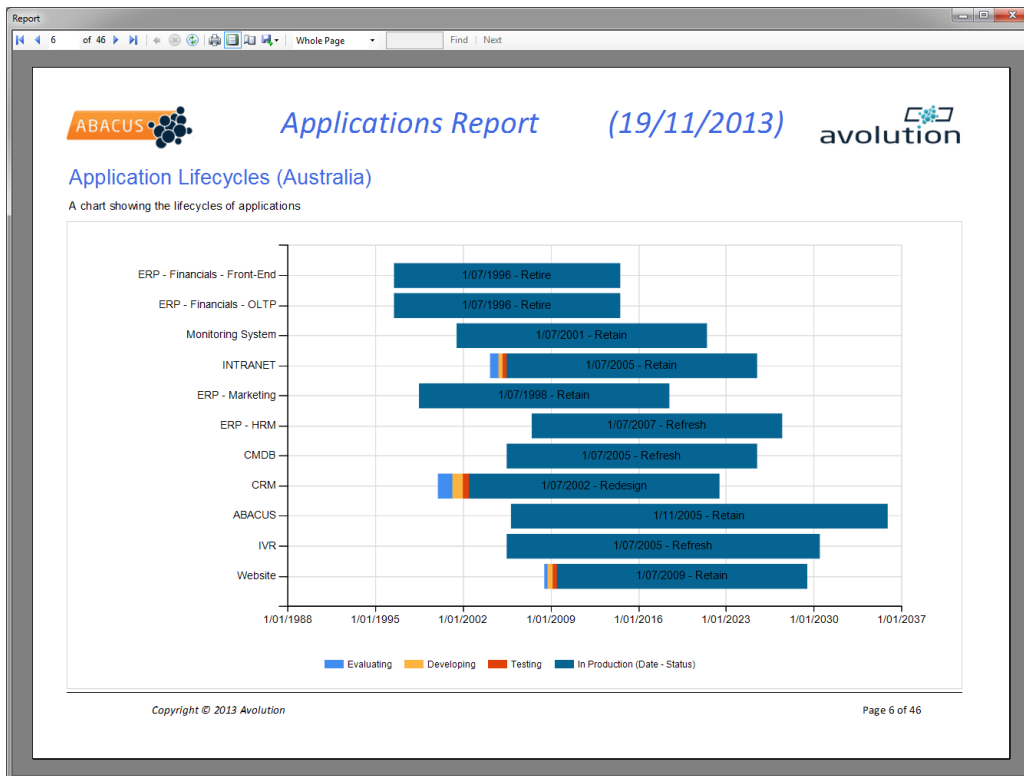


Figure 6.3.: Timeline of ABACUS

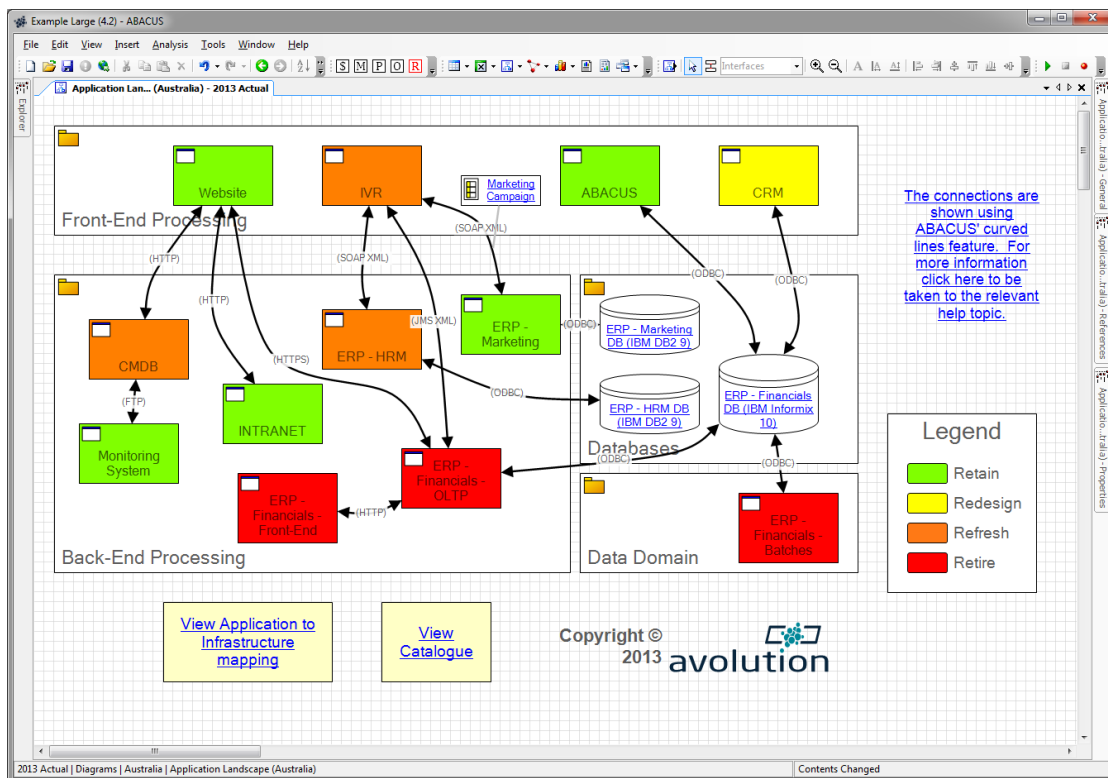


Figure 6.4.: Flow Diagram of ABACUS

## 6. ABACUS (Avolution)

Application	Name	Description	Supplier	Is Supplied By	URL	Version	Type	Application Manager	Owns/Connections from Department Components	Uses/Connections from Process Components	Implemented By/Connections from Service Components	Stage	Business Hours	Status	Criticality	DR Provision	Business Fit	Technical Fit
Applications   Australia   Front-End Processing - 4 item(s)	ABACUS	ABACUS	Avolution		<a href="http://www.avolution.com.au">http://www.avolution.com.au</a>	3.4	Business	Mary Shaw	AI-Strategy & Operations		Strategy	Production	8am to 5pm	Retain	<Decreased>	Gold	3	3
Applications   Australia   Front-End Processing	CRM	CRM	in house		<a href="http://crm.abc.com">http://crm.abc.com</a>	11.4	Business	John Smith	AI-Customer Service	Measure and evaluate customer service operations	CRM	Production		Redesign	5	Gold	-2	1
Applications   Australia   Front-End Processing	IVR	Interactive Voice Response	123 Ltd			3.0	Business	Joe Black	AI-Customer Service	Manage customer service requests/queries	CRM	Production	7am to 7pm	Refresh	5	Platinum	2	-3
Applications   Australia   Front-End Processing	Website		in house		<a href="http://www.abc.com">http://www.abc.com</a>	n/a	Business	Roger Black	AI-Customer Service	Manage customer service requests/queries	CRM	Production	24 hour	Retain	5	Platinum	1	2
Applications   Australia   Back-End Processing - 7 item(s)	CMDB	CMDB	Acme Ltd		<a href="http://cmdb.abc.com">http://cmdb.abc.com</a>	1.3	Support	Harry Upton	AI-Strategy & Operations		Operations	Production	24 hour	Refresh	3	Gold	0	0
Applications   Australia   Back-End Processing	ERP - Financials - Front-End	ERP - Financials	XYZ Ltd	XYZ	<a href="http://erp.abc.com">http://erp.abc.com</a>	9.0	Support	Mark Green	AI-Risk & Financial Services	Perform general accounting and reporting (Process payroll)	Financials	Production	8am to 6pm	Retire	4	Gold	-3	-2
Applications   Australia   Back-End Processing	ERP - Financials - OLT	ERP - Financials	XYZ Ltd	XYZ	<a href="http://erp.abc.com">http://erp.abc.com</a>	9.0	Support	Peter Low	AI-Risk & Financial Services		Financials	Production	8am to 6pm	Retire	2	Silver	-3	-1
Applications   Australia   Back-End Processing	ERP - HRM	ERP - HRM	XYZ Ltd	XYZ	<a href="http://erp.abc.com">http://erp.abc.com</a>	9.0	Support	Bruce King	AI-Human Resources	Recruit, source, and select employees	HR	Production	8am to 6pm	Refresh	2	Silver	1	-2
Applications   Australia   Back-End Processing	ERP - Marketing	ERP - Marketing	XYZ Ltd	XYZ	<a href="http://erp.abc.com">http://erp.abc.com</a>	9.0	Support	Kevin Shaw	AI-Sales & Marketing	Develop and manage marketing plans	Sales	Production	8am to 6pm	Retain	2	Silver	2	2
Applications   Australia   Back-End Processing	INTRANET		in house		<a href="http://intranet.abc.com">http://intranet.abc.com</a>	n/a	Support	Tim Johnson	AI-Strategy & Operations	Manage internal controls. Perform general processing and reporting (Process payroll)	HR	Production	24 hour	Retain	4	Platinum	1	2
Applications   Australia   Back-End Processing	Monitoring System	Monitoring System	MS R Us Inc		<a href="http://msr.us.com">http://msr.us.com</a>	6.5	Support	Sally Field	AI-Strategy & Operations		Operations	Production	24 hour	Retain	4	Gold	0	1
Applications   Australia   Data Domain - 1 item(s)	ERP - Financials - Back-End	ERP - Financials - Back-End	XYZ Ltd	XYZ		9.0	Support	Mary White	AI-Risk & Financial Services		Financials	Production	24 hour	Retire	1	Silver	-3	-3
Applications   Canada - 32 item(s)	Application 1	lorem ipsum	Supplier 87			7	Support	<Required>	CA-Department 3	Deploy information technology solutions		Production	24 hour	Refresh	1	Silver	2	-3

Figure 6.5.: List of ABACUS

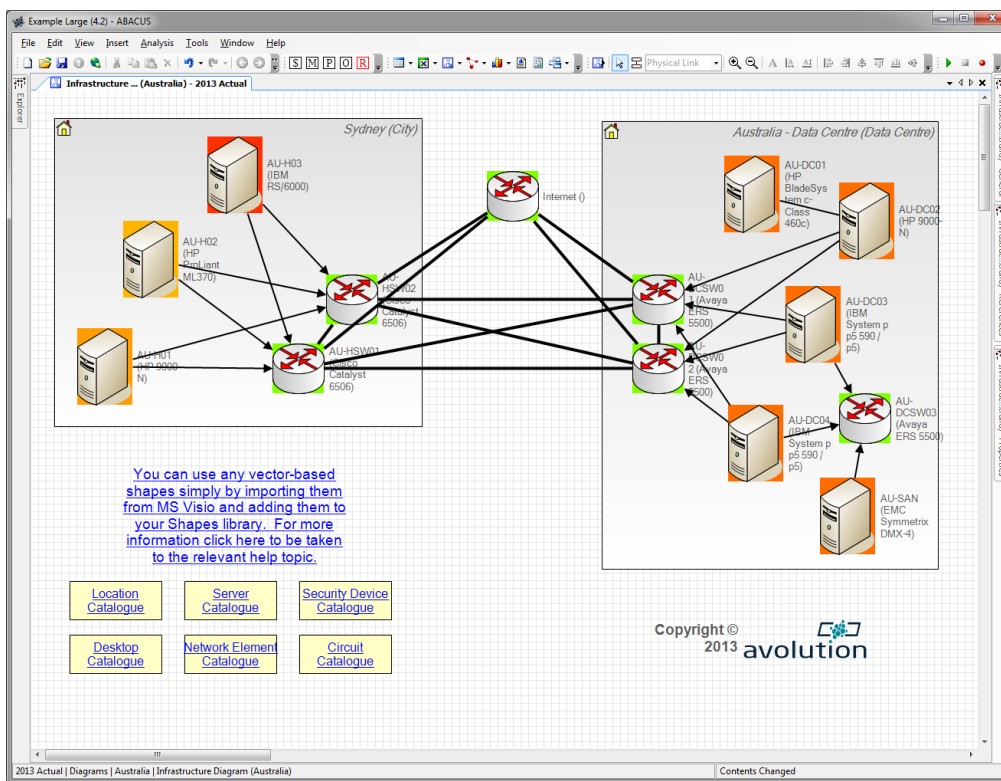


Figure 6.6.: Graph of ABACUS

6. ABACUS (Avolution)

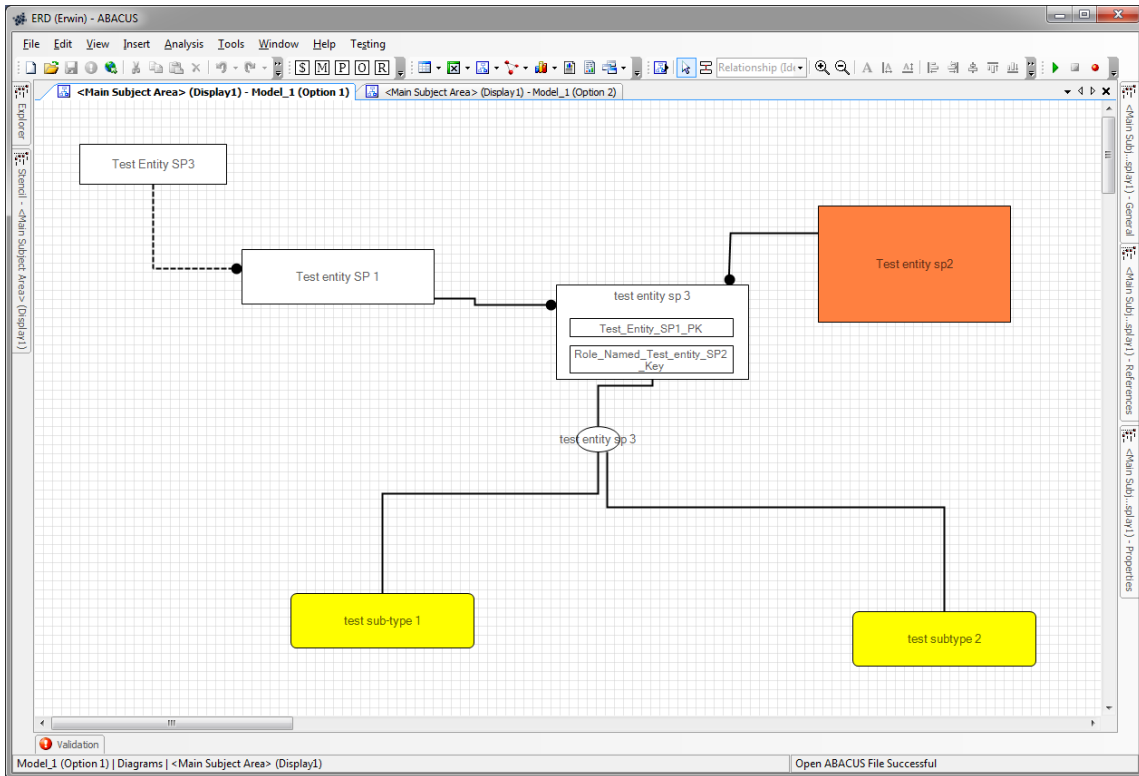


Figure 6.7.: ER Diagram of ABACUS

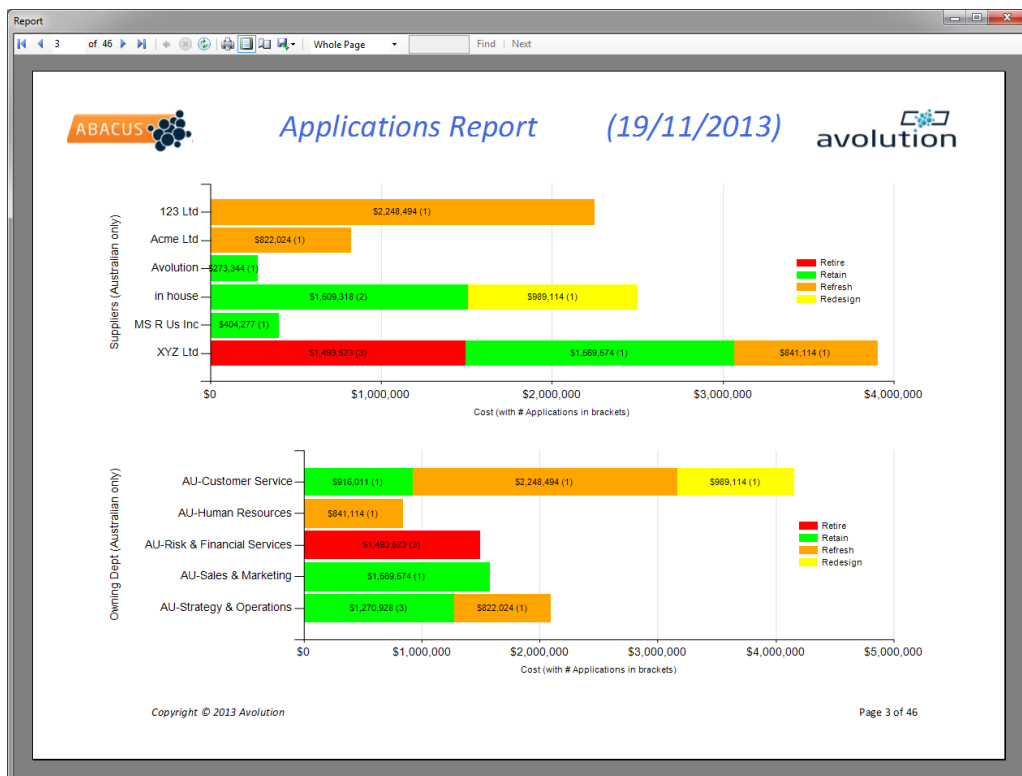


Figure 6.8.: Bar Chart of ABACUS



6. ABACUS (Avolution)

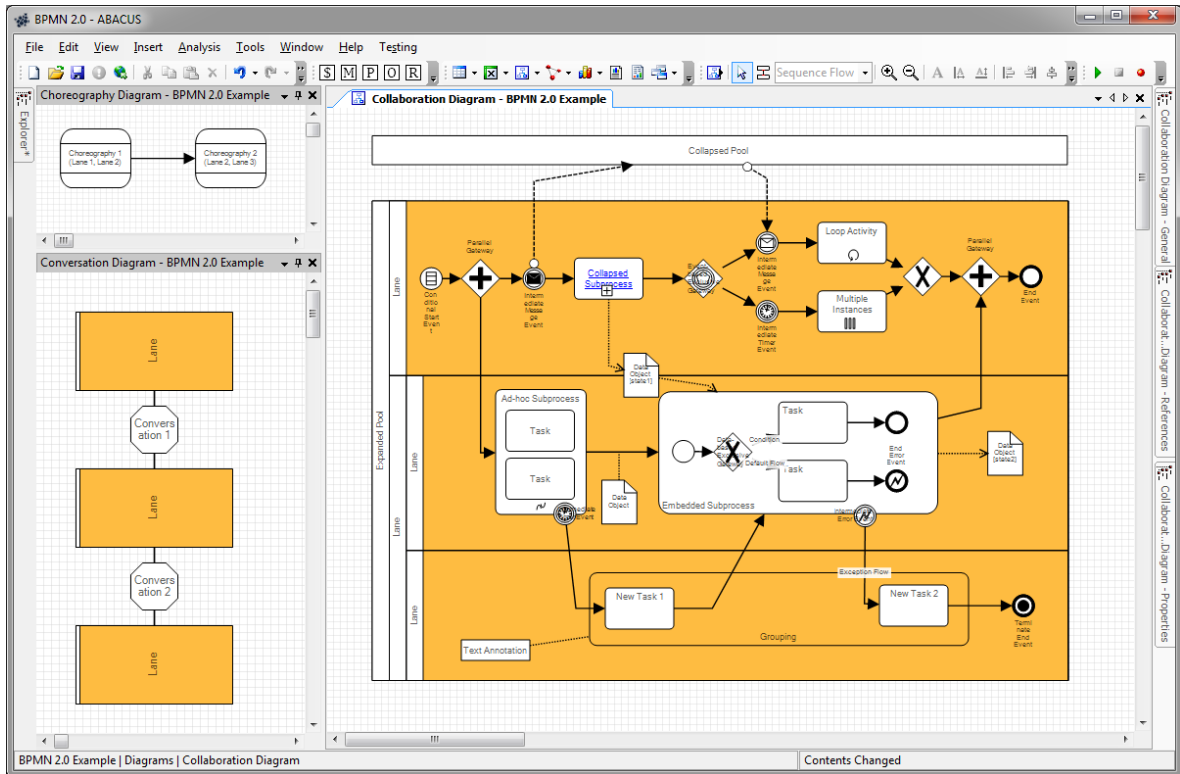


Figure 6.9.: BPMN Diagram of ABACUS

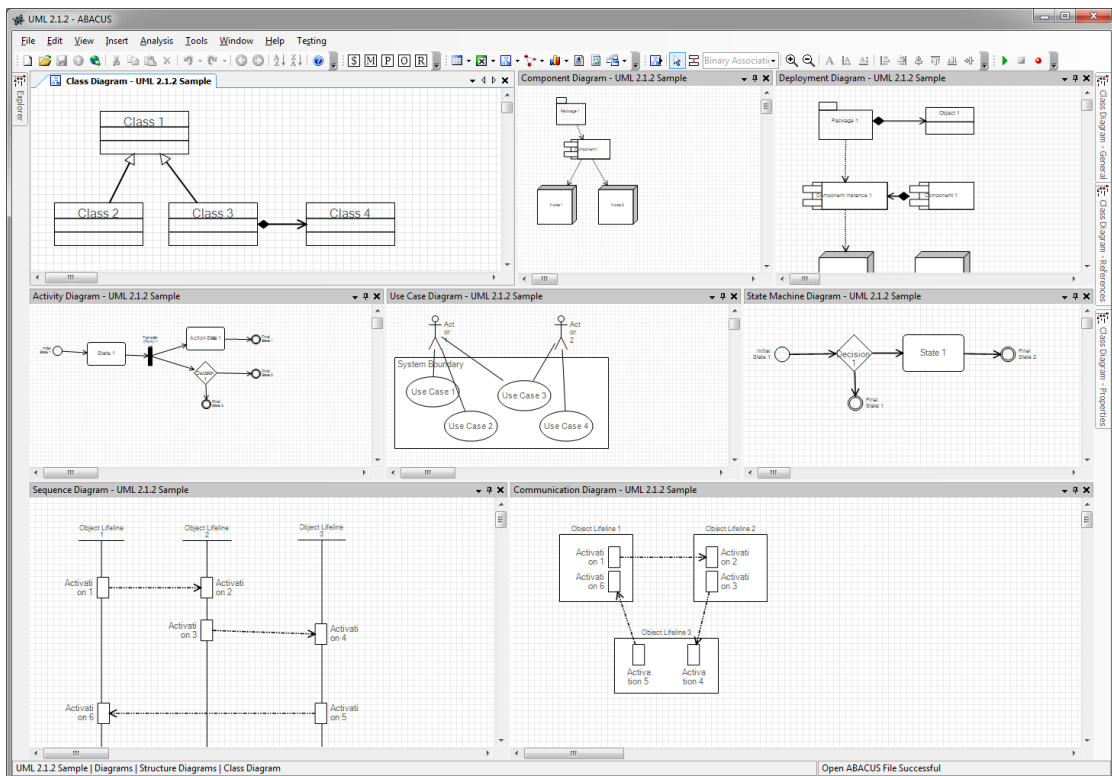


Figure 6.10.: UML Diagram of ABACUS

6. ABACUS (Avolution)

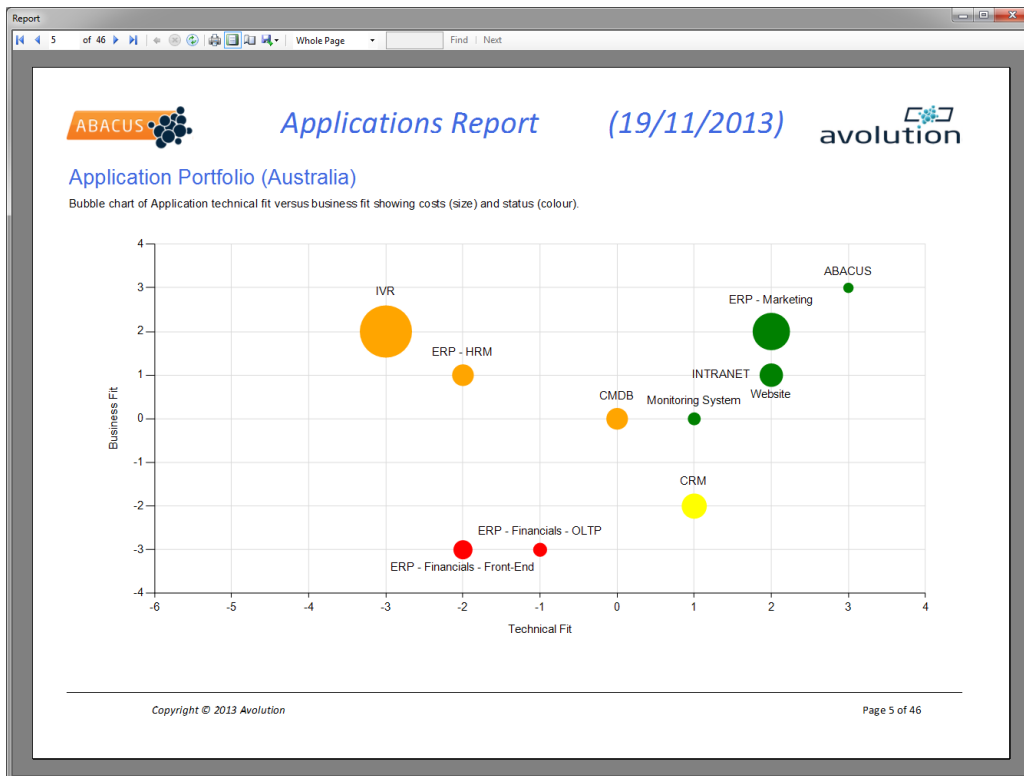


Figure 6.11.: Bubble Chart of ABACUS

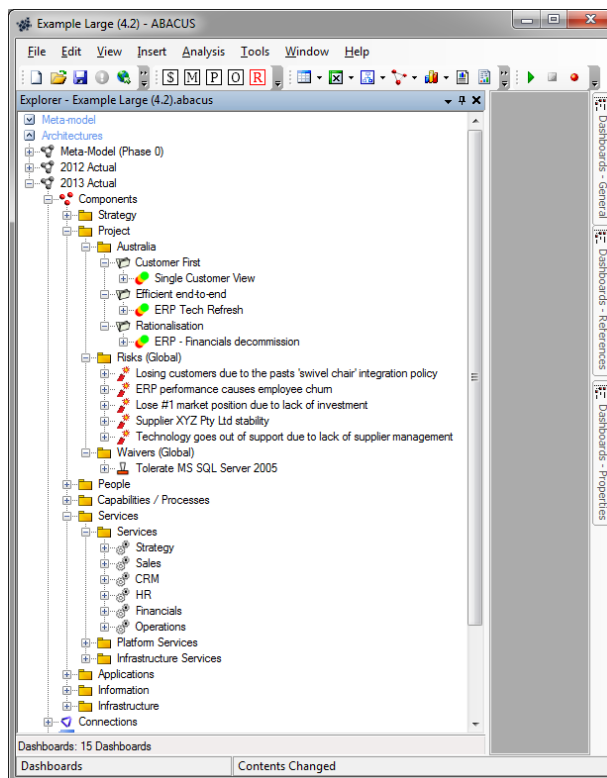


Figure 6.12.: Treeview of ABACUS

6. ABACUS (Avolution)

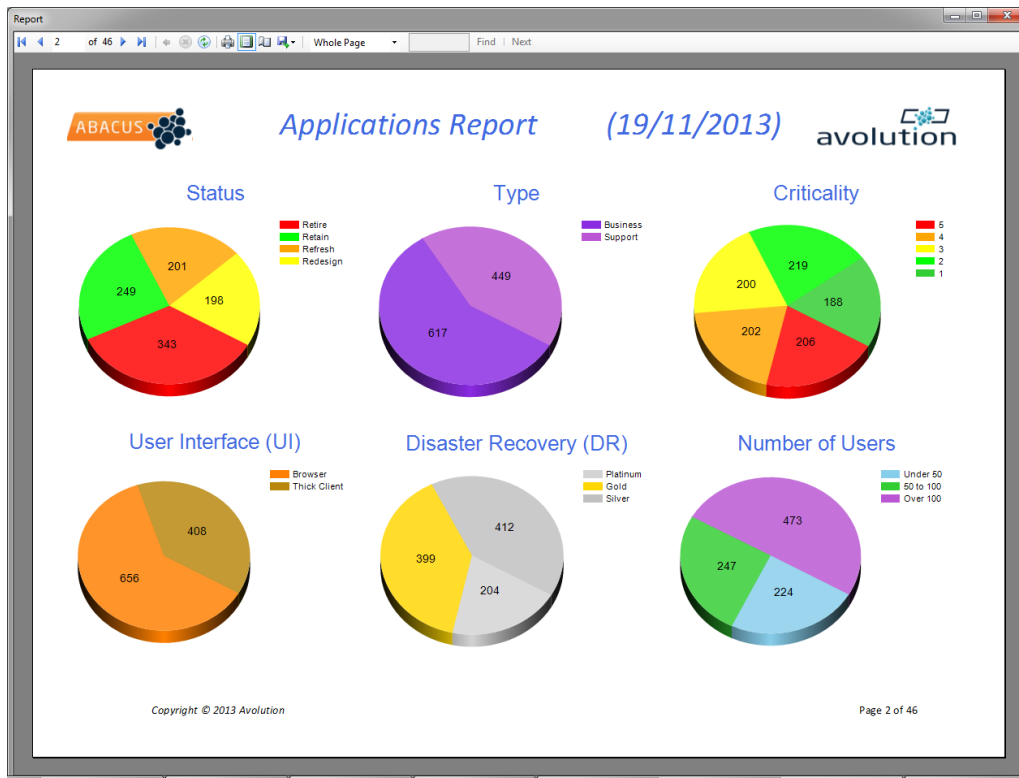


Figure 6.13.: Pie Chart of ABACUS

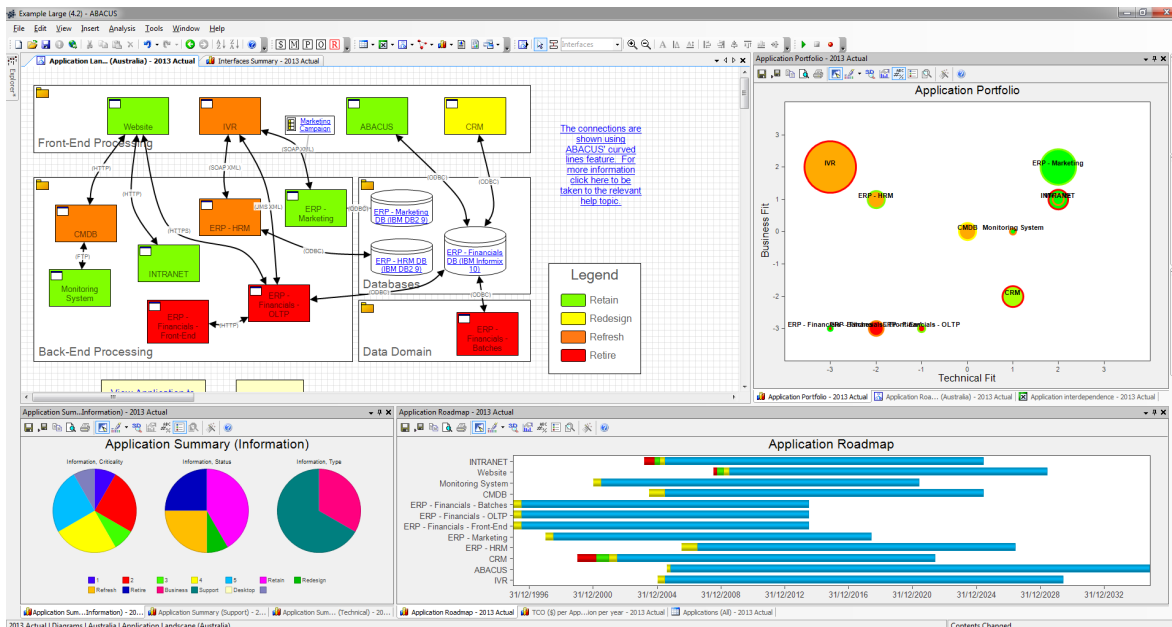


Figure 6.14.: Dashboard of ABACUS

6. ABACUS (Avolution)

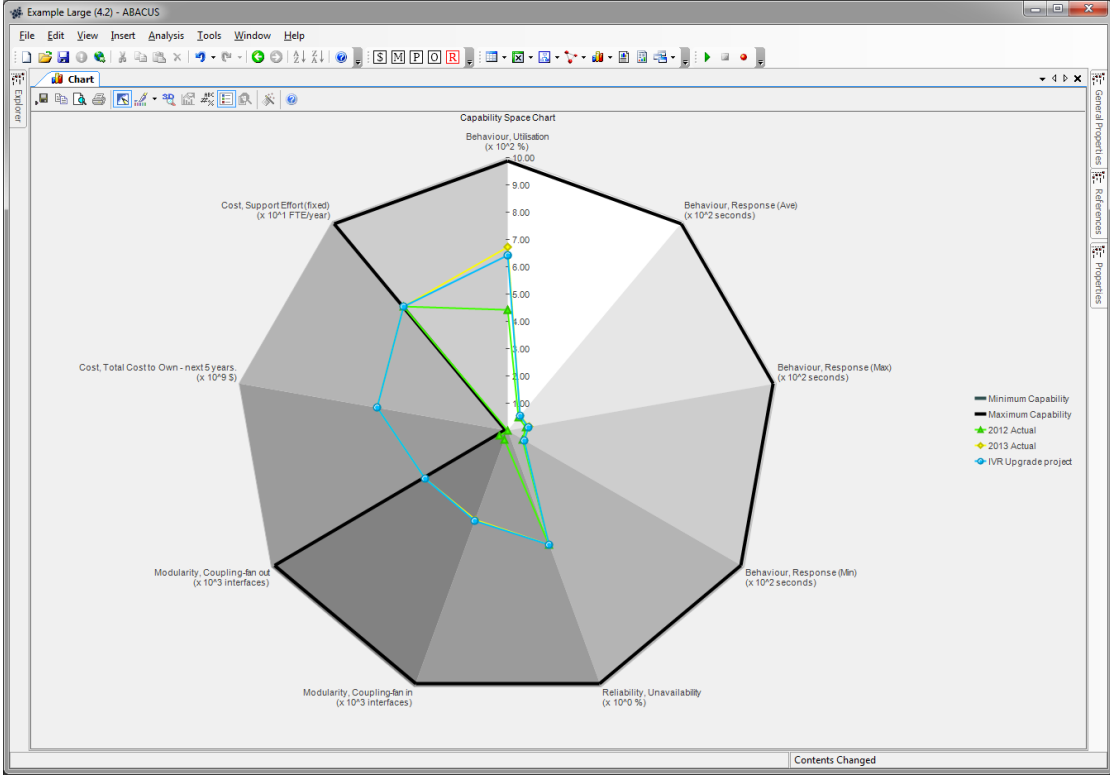


Figure 6.15.: Radar Diagram of ABACUS

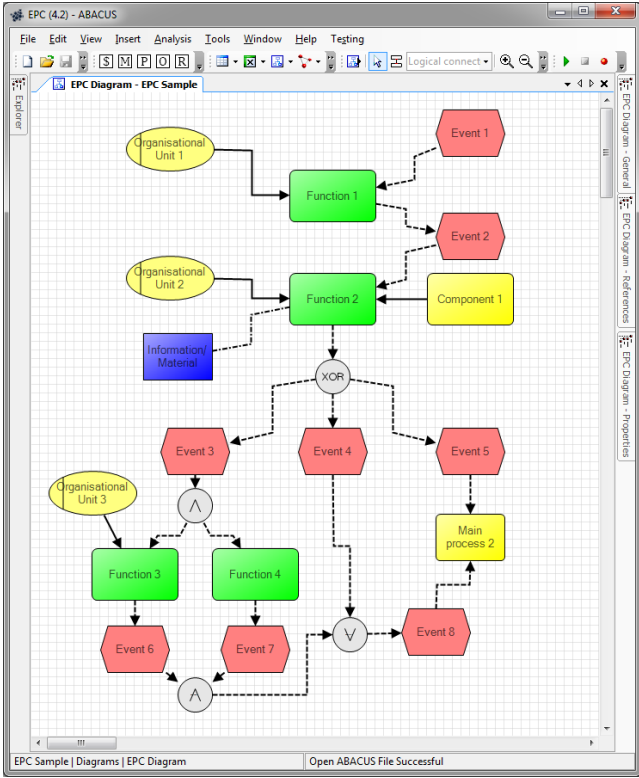


Figure 6.16.: EPC Diagram of ABACUS

## 6. ABACUS (Avolution)

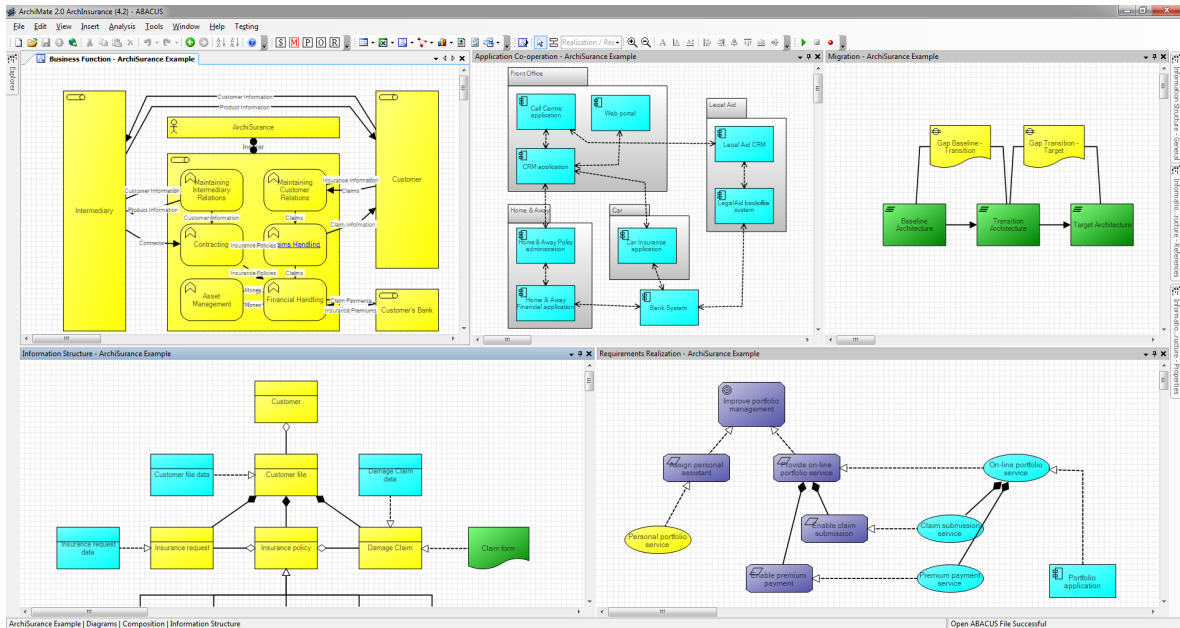


Figure 6.17.: ArchiMate Diagram of ABACUS

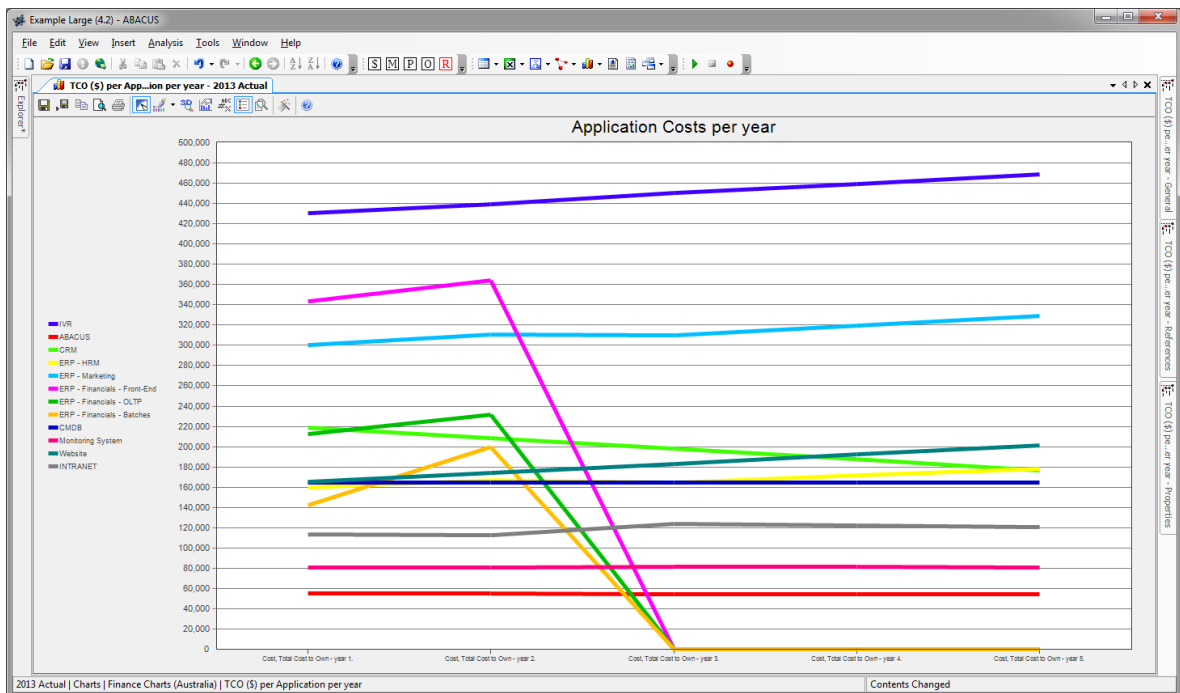


Figure 6.18.: Line Chart of ABACUS

6. ABACUS (Avolution)

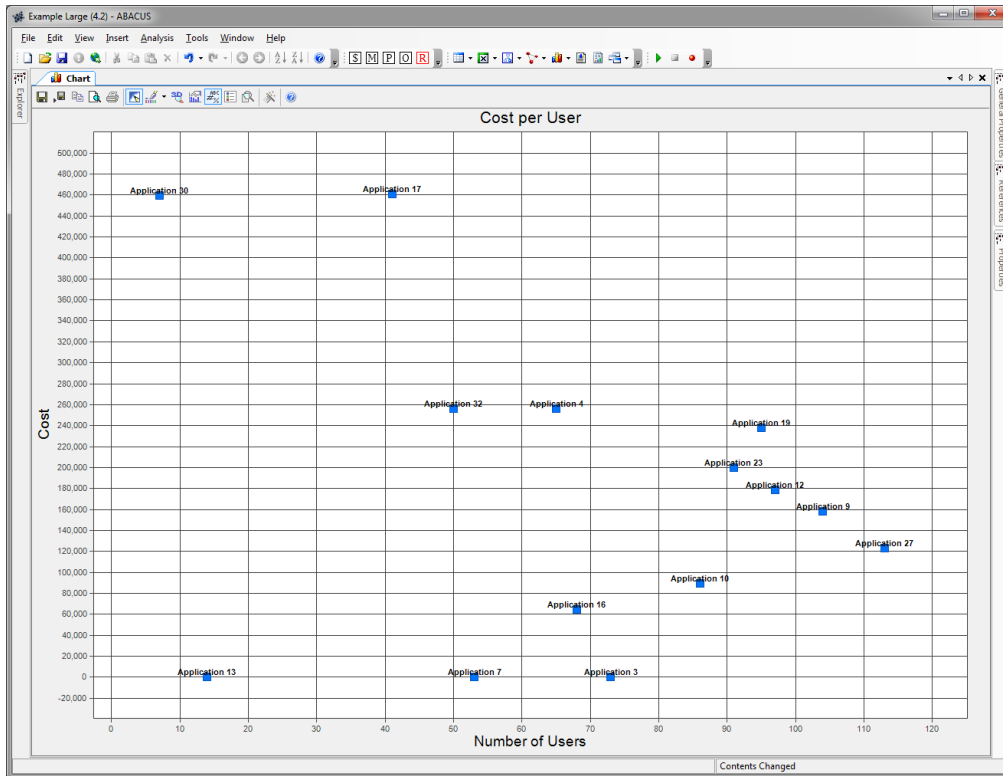


Figure 6.19.: Scatter Chart of ABACUS

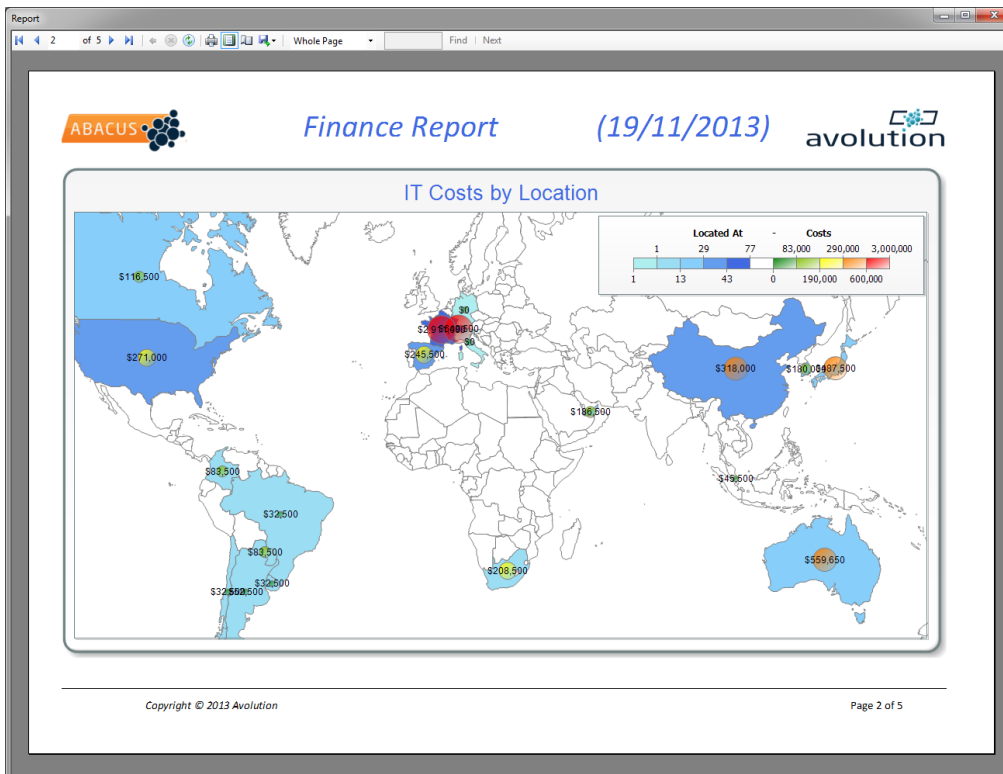


Figure 6.20.: Geographic Map of ABACUS

6. ABACUS (Avolution)

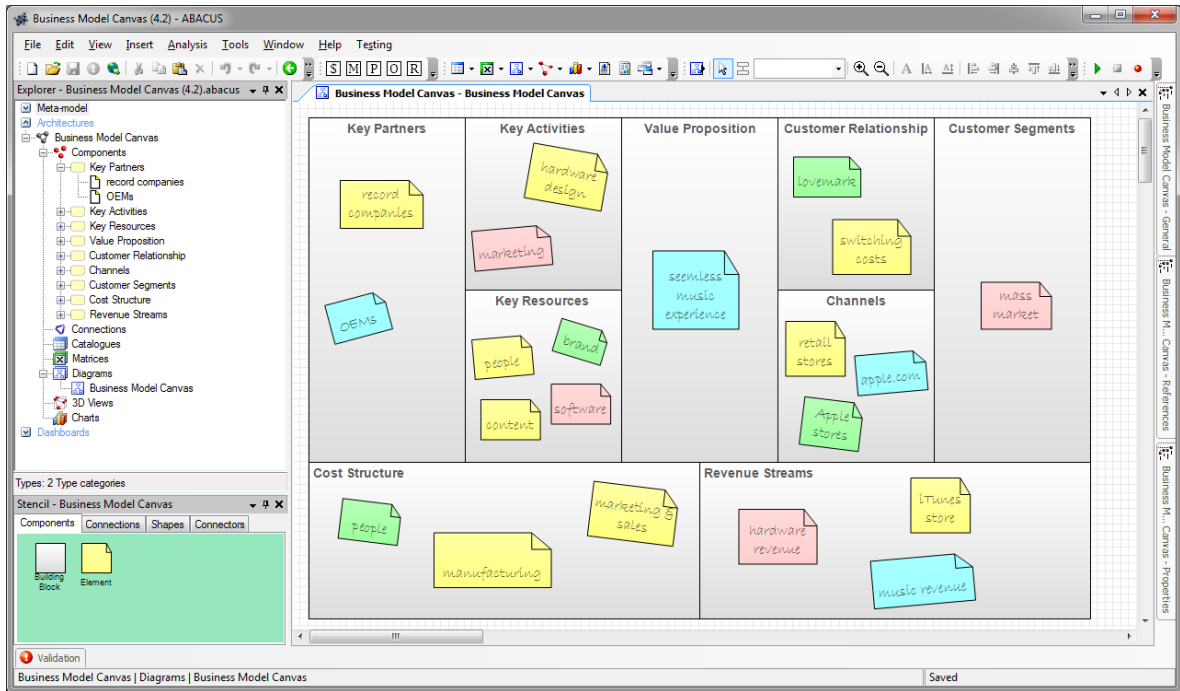


Figure 6.21.: Business Model Canvas of ABACUS

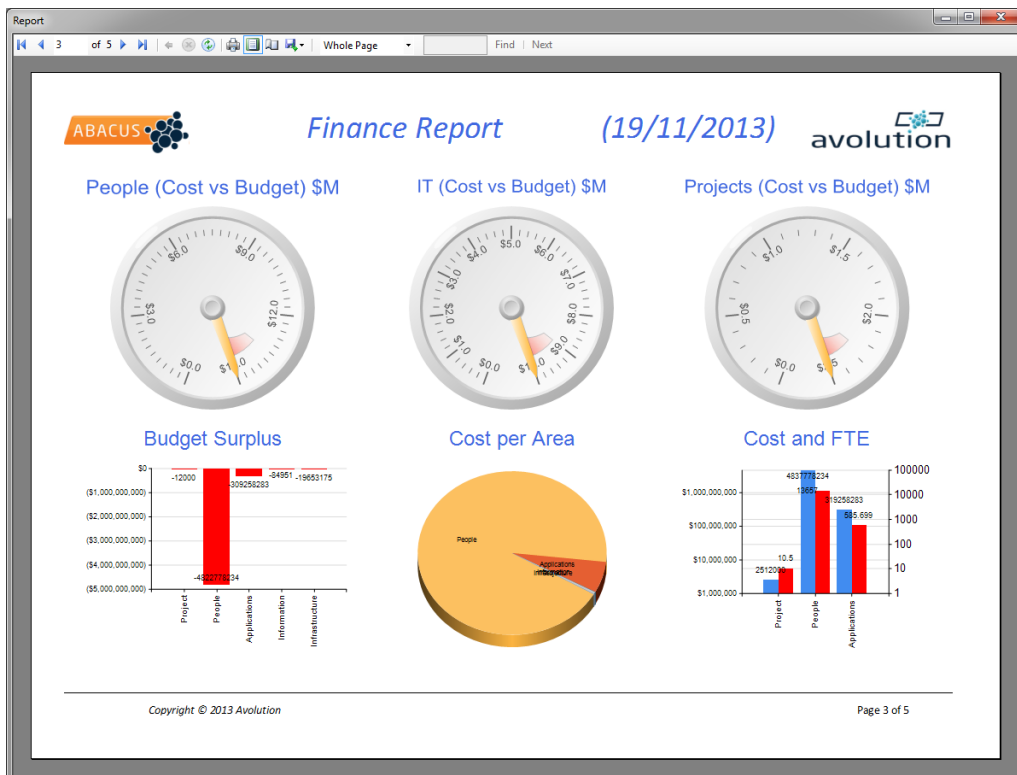


Figure 6.22.: Gauges of ABACUS

6. ABACUS (Avolution)

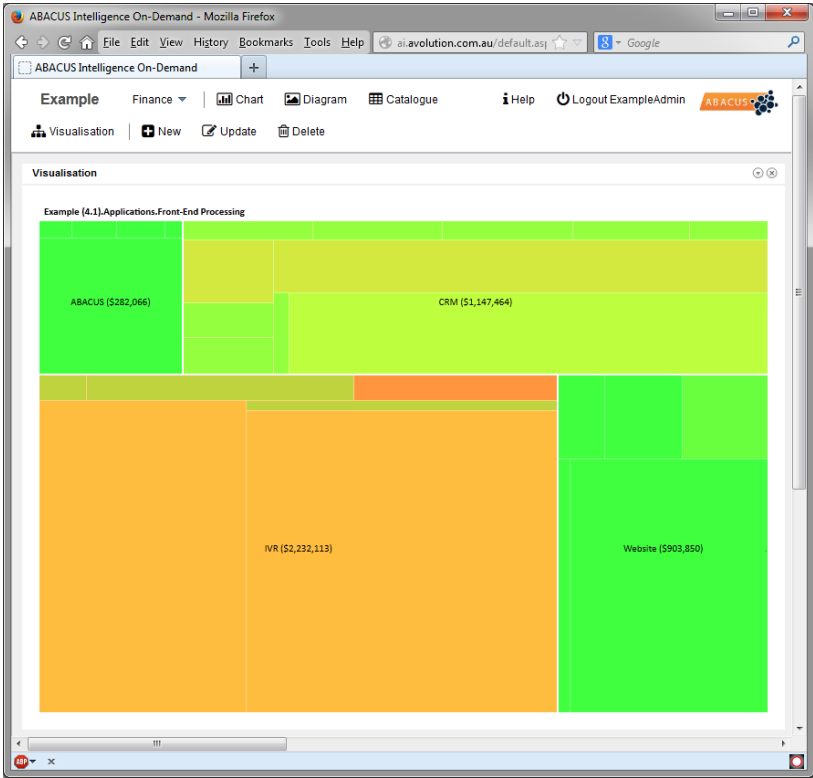


Figure 6.23.: Treemap of ABACUS

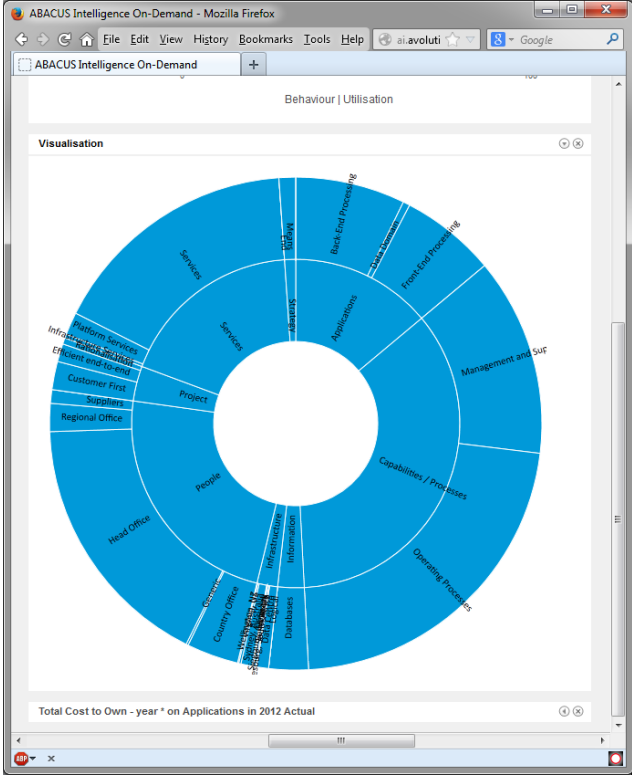


Figure 6.24.: Sunburst of ABACUS



6. ABACUS (Avolution)

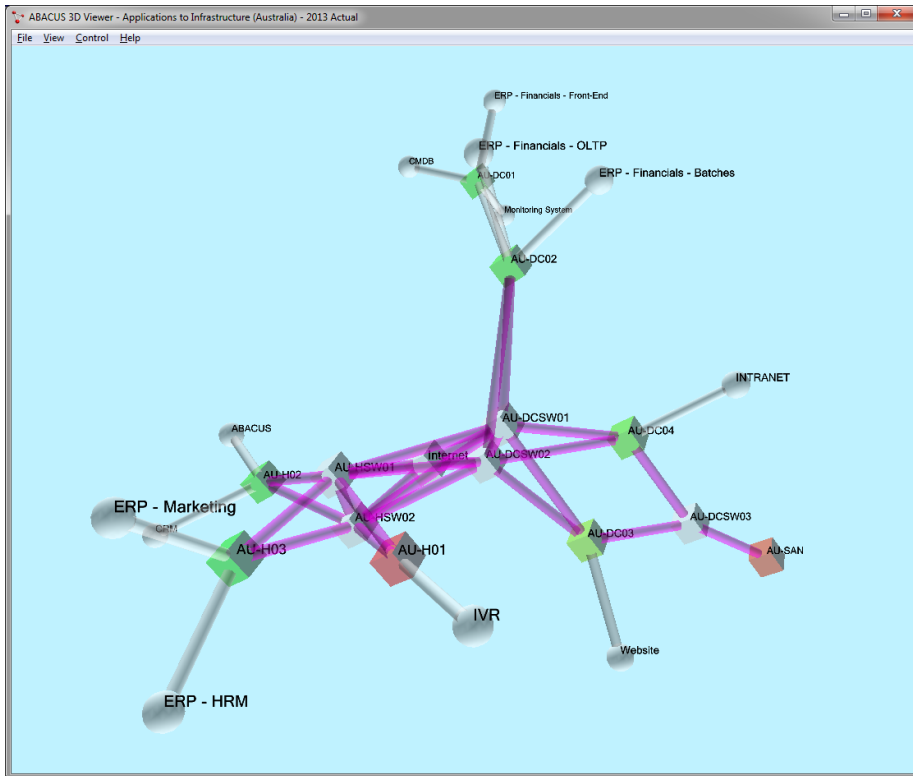


Figure 6.25.: 3D Visualization of ABACUS

## CHAPTER 7

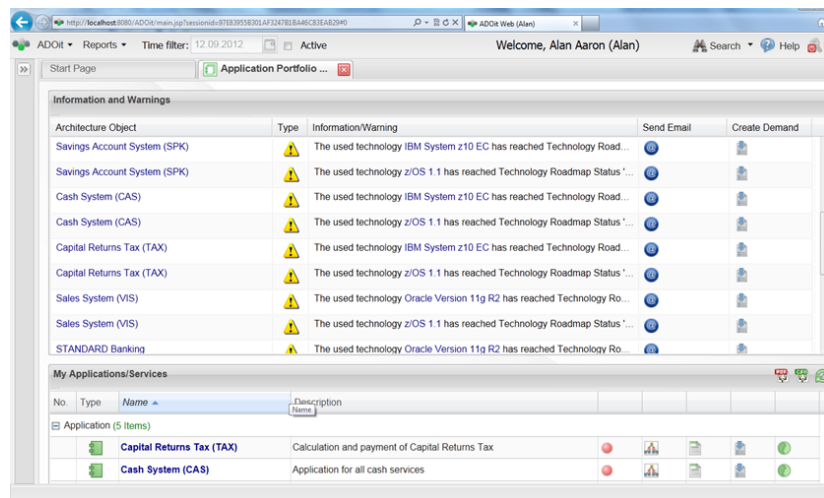
ADOit (BOC AG)

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## 7. ADOit (BOC AG)

BOC AG was founded in 1995 and has more than 10 years of experience in the EA domain. The company is vendor of ADOit which is offered in version 6.0 at the editorial deadline. ADOit supports 20 out of 26 visualization types. ADOit is a product of the integrated BOC Management Office. Besides ADOit, the BOC Management Office comprises ADOscore for strategy and performance management, ADONIS for business process management, and ADOlog for supply chain management. These tools provide additional views, not considered in this survey. ADOit is an EA tool with fully configurable and customizable views and underlying EA information model.



**Figure 7.1.:** E-Mail Notification of ADOit

ADOit enables collaboration via a web-based client for a decentralized model maintenance. The EA tool incorporates mechanisms for email notification of model events (cf. Figure 7.1). The information model covers concepts derived from best-practice standards such as Zachman, TOGAF, Control Objectives for Information and Related Technology (COBIT), and Information Technology Infrastructure Library (ITIL).

### 7.1. Background Information

Vendor	BOC AG
Founding year	1995
Years active in EA market	10
Number of employees	51–250
URL	www.boc-group.com

**Table 7.1.:** Vendor Information of BOC AG

Tool Name	ADOit			
Version	6.0			
Client Platforms	✓	Windows	✗	Linux
	✗	MacOS	✓	Browser
	✗	iOS	✗	Android
	✗	Windows Mobile	✗	Other
Deployment Approach	✓	Desktop	✓	SaaS
	✓	Server	✗	Other
EA Frameworks	✓	ArchiMate	✗	NAF
	✗	DoDAF	✓	PEAF
	✗	IAF	✓	TOGAF
	✗	MODAF	✓	Zachman
	✓	Other		

**Table 7.2.:** General Information (ADOit)

## 7.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	✗	✗
DOC(X)	✗	✓
HTML	✗	✓
JPG/JPEG	✗	✓
PDF	✗	✓
PNG	✗	✓
PPT(X)	✗	✗
SVG	✗	✓
VSD(X)	✗	✗
Other	✗	✗

**Table 7.3.:** Visualization Import/Export File Formats (ADOit)

## 7.3. Visualization Configuration

### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✓
Data Filter	✓
Other	✗

**Table 7.4.:** Binding (ADOit)

### Generation Approach

Model-Driven	✓
Form-Based	✓
Scripting	✗
Manual Drawing	✓
Other	✗

**Table 7.5.:** Visualization Generation Approach (ADOit)

### Visual Customization and Layouting

Customization	Caption	✓
	Color	✓
	Orientation	✓
	Position	✓
	Shape	✓
	Size	✓
	Other	✗
Layout	Automated	✓
	Manual	✓
	Other	✗

**Table 7.6.:** Visual Customization (ADOit)

## Import/Export of Visualization Configurations

Format	Import	Export
CSV	✓	✓
JSON	✓	✓
ODBC	✓	✓
XMI	✗	✗
XML	✓	✓
XLS(X)	✓	✓
TXT	✓	✓
Other	✗	✗

**Table 7.7.:** Configuration Import/Export (ADOit)

## 7.4. Information Model

### Information Model Type

Full Schema	✓
Configurable Building Blocks	✓
User-defined	✓
Subclassing/class inheritance	✓

**Table 7.8.:** Information Model Type (ADOit)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓	✓	✓	✓	✓	✓
Modify	✓	✓	✓	✓	✓	✓
Delete	✓	✓	✓	✓	✓	✓
Copy	✓	✓	✓	✓	✓	✓
Merge	✗	✗	✗	✗	✗	✓
Move	✓	✓	✓	✓	✓	✓

**Table 7.9.:** Information Model Flexibility (ADOit)

## 7.5. Interoperability

### Import Mechanisms

Pull	✓
Push	✓
Other	✓

**Table 7.10.:** Import Mechanisms (ADOit)

### Third Party Tools

Business Intelligence Tools	✓
Business Process Engines	✓
Change Management Tools	✓
Cloud Services	✓
Configuration Management Database	✓
Enterprise Service Bus	✓
Infrastructure Monitoring Tools	✓
License/IT Asset Management Tools	✓
Project Portfolio Management Tools	✓
Release Management Tools	✓
Other	✓

**Table 7.11.:** Interoperability with Third Party Tools (ADOit)

## Data & Schema Import/Export

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	✓	✓	✗	✓
JSON	✓	✗	✗	✗
TXT	✓	✓	✗	✗
XMI	✗	✗	✗	✗
XML	✓	✓	✓	✓
XLS(X)	✓	✓	✗	✓
OData	✗	✗	✗	✗
Other	✗	✓	✗	✗

**Table 7.12.:** Data & Schema Import/Export (ADOit)

## Model Element Import/Export

Model Element	Import	Export
Classes	✓	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	✓	✓
Roles	✓	✓
Other	✗	✗

**Table 7.13.:** Model Element Import/Export (ADOit)



7. ADOit (BOC AG)

7.6. Visualization Examples of ADOit

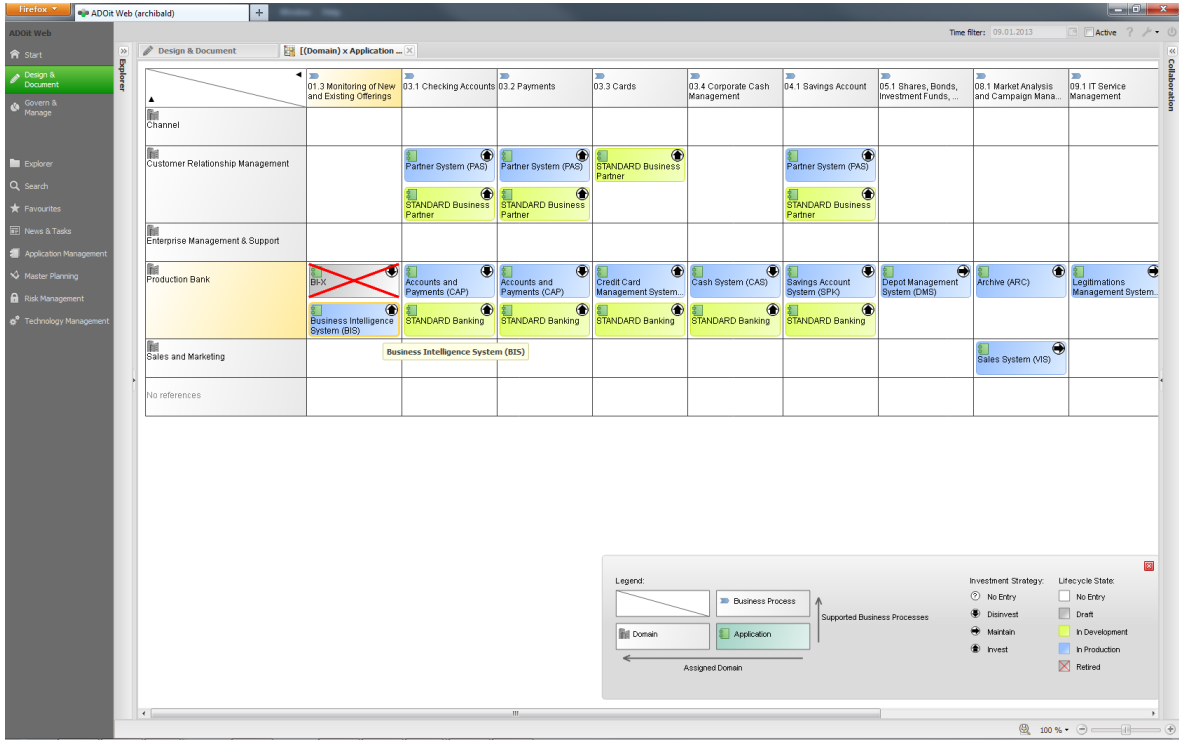


Figure 7.2.: Matrix of ADOit

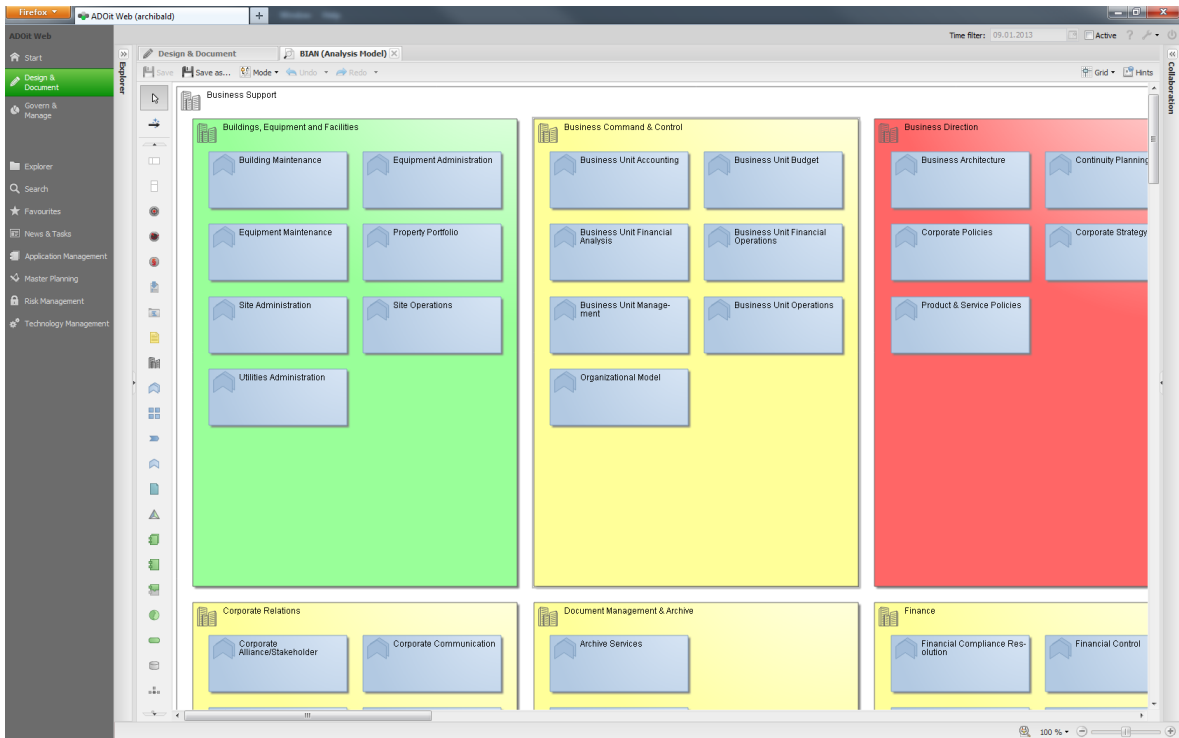


Figure 7.3.: Cluster Map of ADOit

7. ADOit (BOC AG)

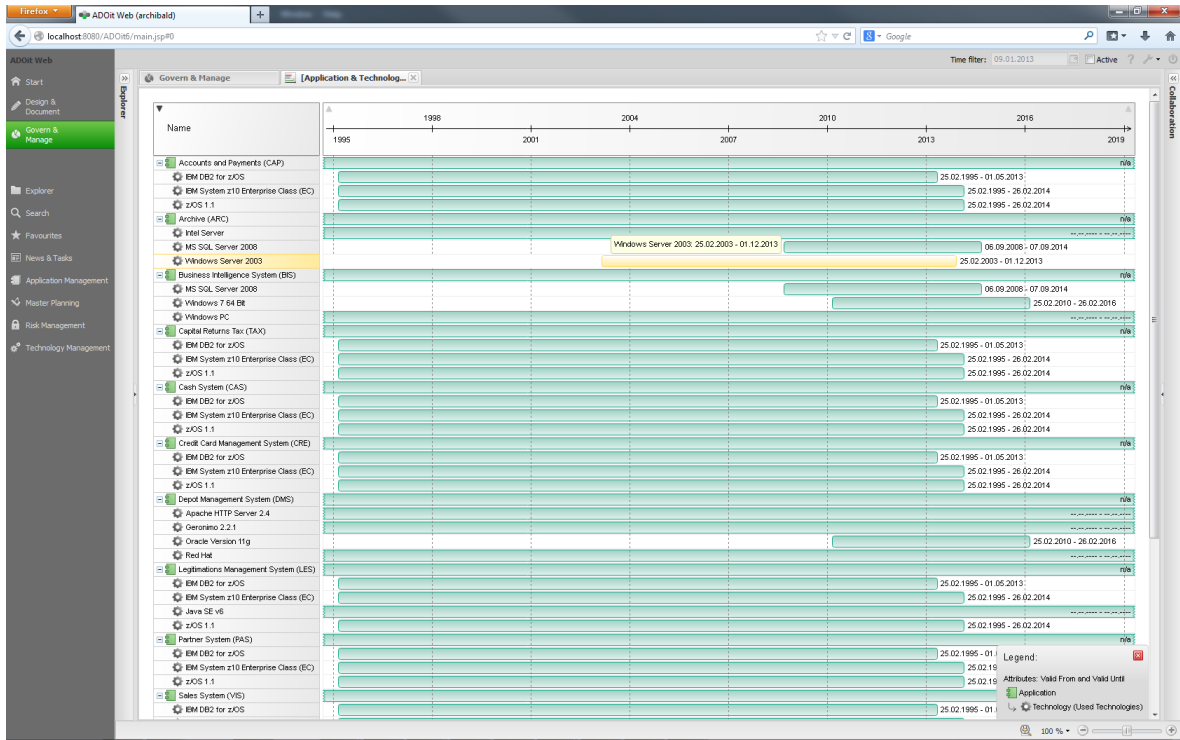


Figure 7.4.: Timeline of ADOit

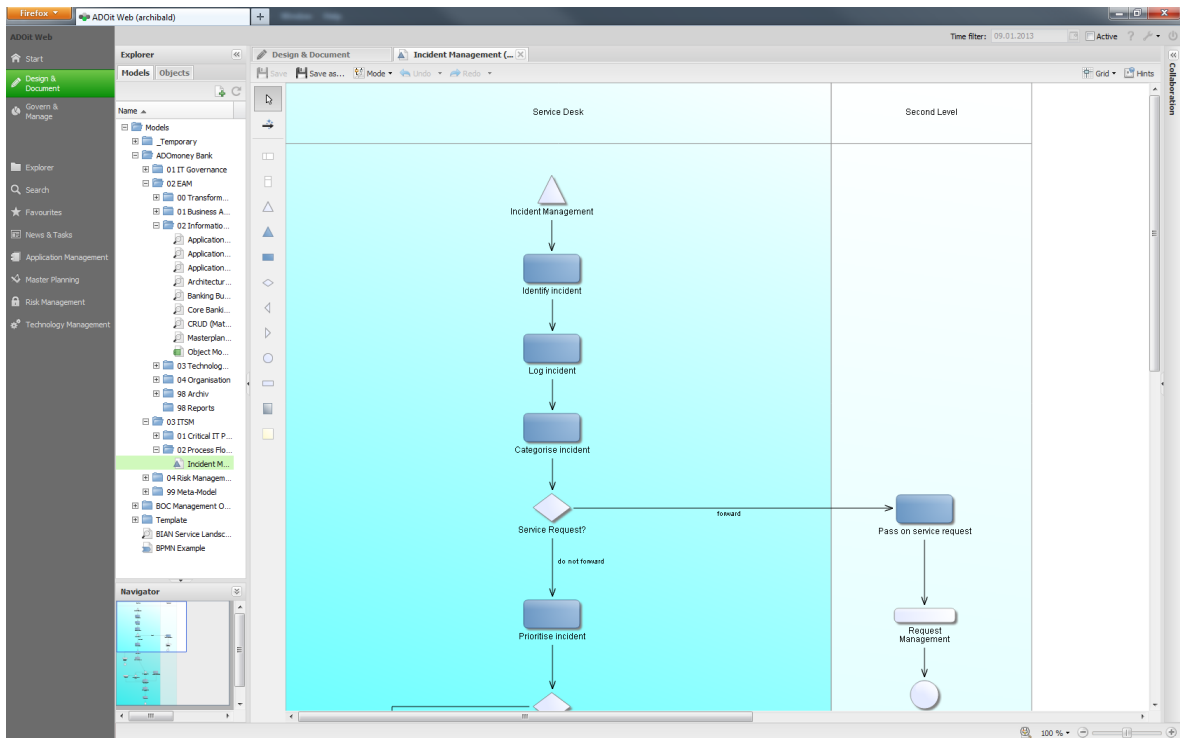


Figure 7.5.: Flow Diagram of ADOit

## 7. ADOit (BOC AG)

Name	ID	Description	Subordinated B...	Action Required	Reason	Responsible Per...	Responsible Per...	Responsible Org...	Referenced Org...	Additional Infor...	Assigned Domain	Additional Infor...	Strategic Impor...
1	Syndicated Loan	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Corporate B...	No Entry	No Entry
2	Product Quality ...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Product Man...	No Entry	No Entry
3	System Develop...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] IT Managem...	No Entry	No Entry
4	Servicing Issue	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Servicing	No Entry	No Entry
5	Building Mainten...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Buildings, Eq...	No Entry	No Entry
6	Economic Capital	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Models	No Entry	No Entry
7	Employee Acces...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Human Reso...	No Entry	No Entry
8	Consumer Finance	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Consumer Lo...	No Entry	No Entry
9	Product Expert	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Sales	No Entry	No Entry
10	Prospect Campa...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Marketing	No Entry	No Entry
11	Equipment Maint...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Buildings, Eq...	No Entry	No Entry
12	Disbursement	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Operational...	No Entry	No Entry
13	Business Unit O...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Business Co...	No Entry	No Entry
14	Card Case	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Servicing	No Entry	No Entry
15	Syndicate Mana...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] External Age...	No Entry	No Entry
16	Travel & Expens...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Human Reso...	No Entry	No Entry
17	Channel Portfolio	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Business Pla...	No Entry	No Entry
18	Product Design	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Product Man...	No Entry	No Entry
19	Financial Compl...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Finance	No Entry	No Entry
20	Business Risk M...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Models	No Entry	No Entry
21	Systems Assura...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] IT Managem...	No Entry	No Entry
22	PEX Management	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Channel Spe...	No Entry	No Entry
23	Business Unit Bu...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Business Co...	No Entry	No Entry
24	Collections	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Collateral Ad...	No Entry	No Entry
25	Product Pricing ...	No Entry	No	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Product Man...	No Entry	No Entry
26	Company Billing ...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Non IT and ...	No Entry	No Entry
27	Trade Finance S...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Trade Finance	No Entry	No Entry
28	Customer Entite...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Market Oper...	No Entry	No Entry
29	Collateral Asset ...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Collateral Ad...	No Entry	No Entry
30	Utilities Administr...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Buildings, Eq...	No Entry	No Entry
31	Bank Guarantee	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Trade Finance	No Entry	No Entry
32	Legal Assurance	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Non IT and ...	No Entry	No Entry
33	Market Trading	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Wholesale Tr...	No Entry	No Entry
34	Financial System...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Finance	No Entry	No Entry
35	Competitor Anal...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Business Pla...	No Entry	No Entry
36	Servicing Activi...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Cross Channel	No Entry	No Entry
37	Corporate Credi...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Corporate B...	No Entry	No Entry
38	Intellectual Prop...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Knowledge &...	No Entry	No Entry
39	Market Analysis	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Business Pla...	No Entry	No Entry
40	Open Item Man...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Operational...	No Entry	No Entry
41	Trade/Price Rep...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Market Oper...	No Entry	No Entry
42	Relevant Credit...	Example of use:...	No Entry	No	No Entry	No Entry	No Entry	No Entry	No Entry	No Entry	[1] Planner S	No Entry	No Entry

Figure 7.6.: List of ADOit

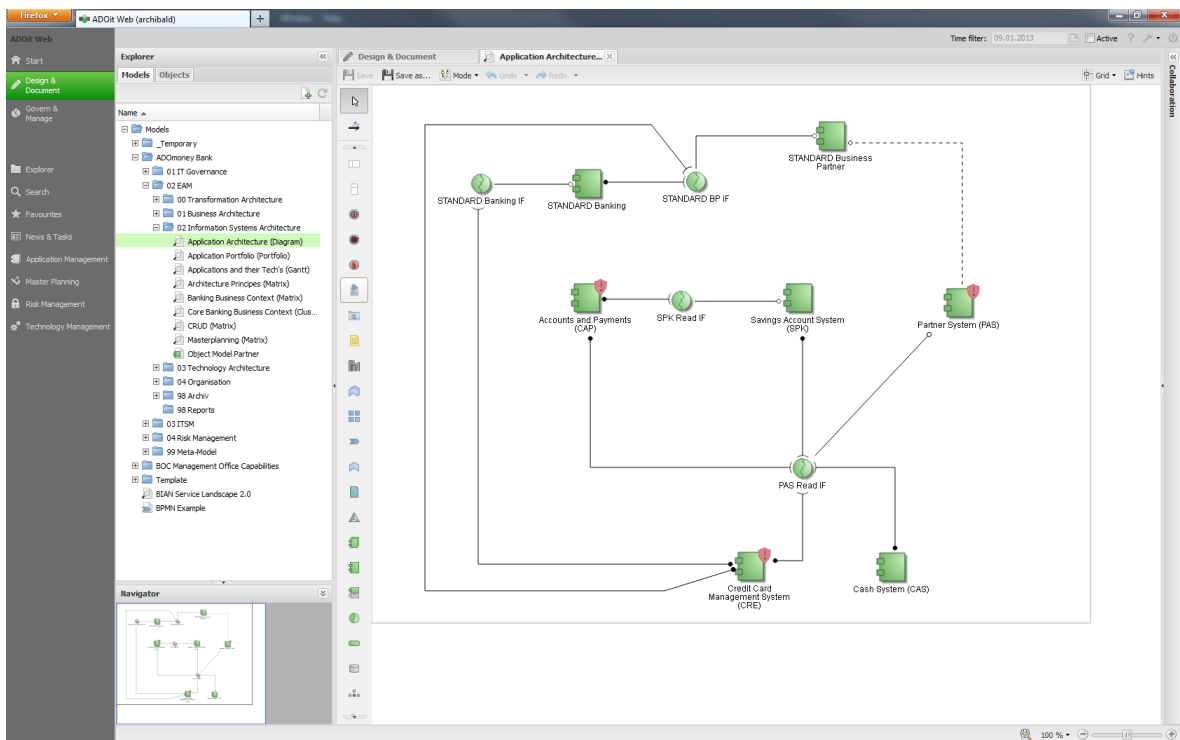


Figure 7.7.: Graph of ADOit

7. ADOit (BOC AG)

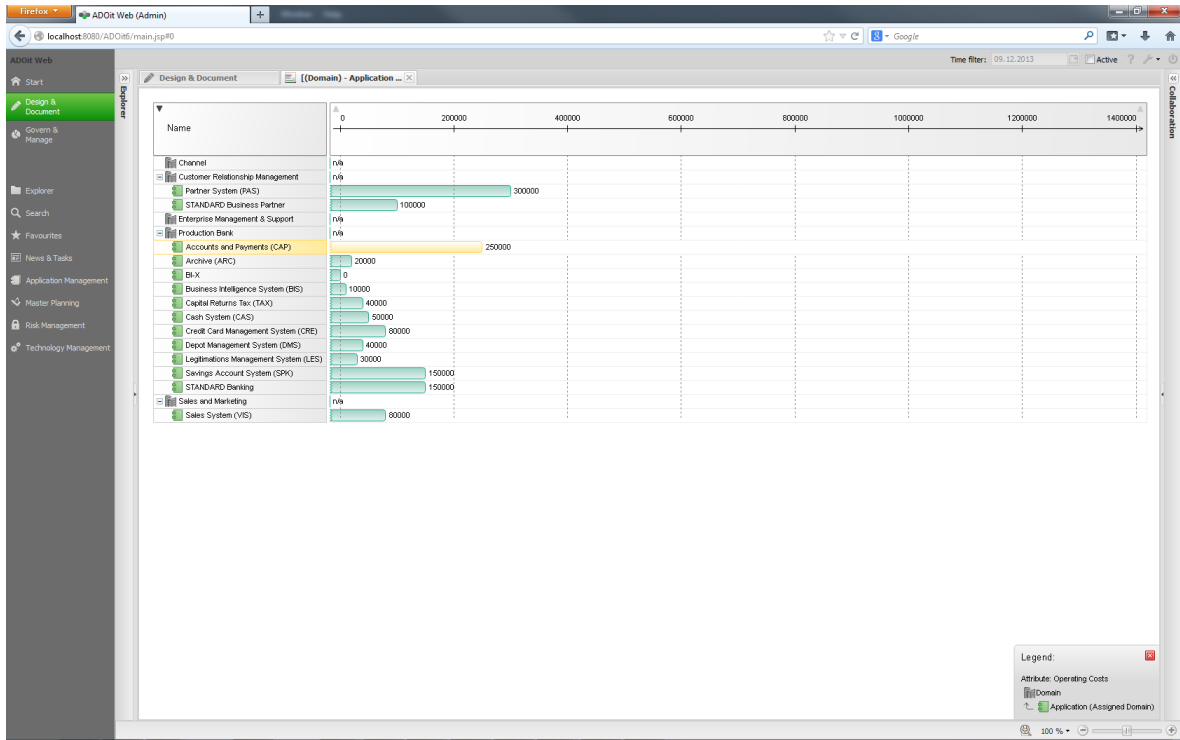


Figure 7.8.: Bar Chart of ADOit

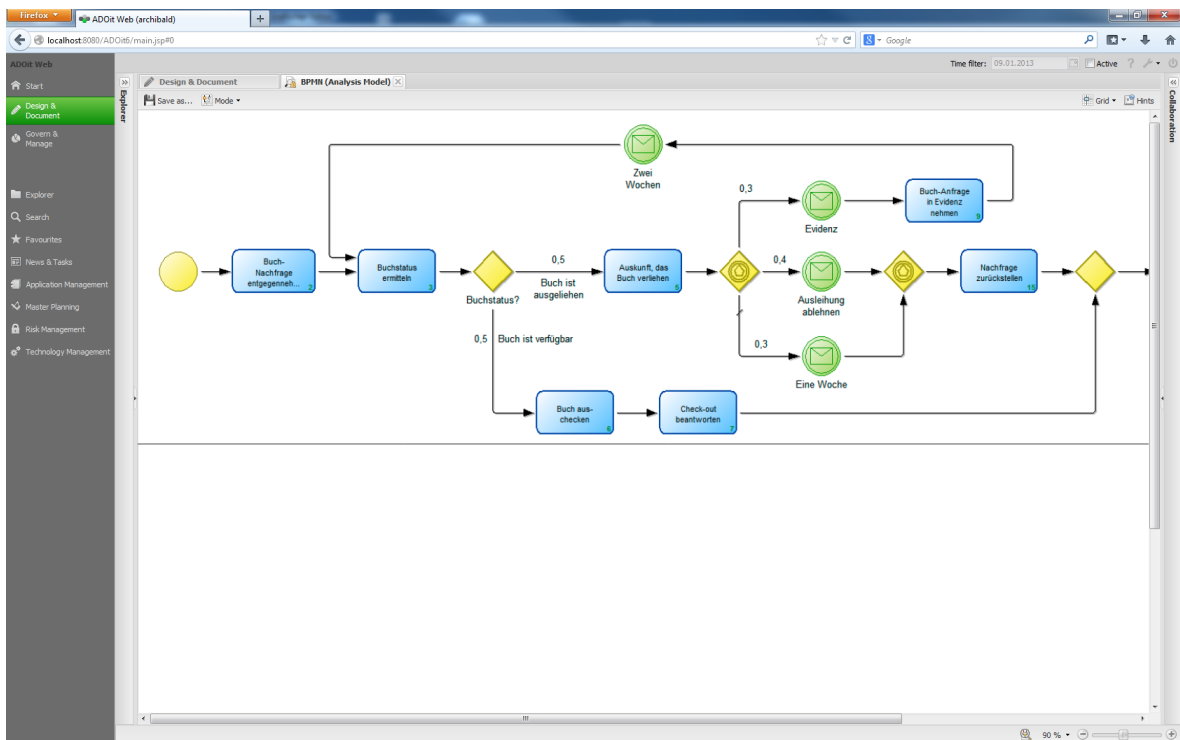


Figure 7.9.: BPMN Diagram of ADOit

## 7. ADOit (BOC AG)

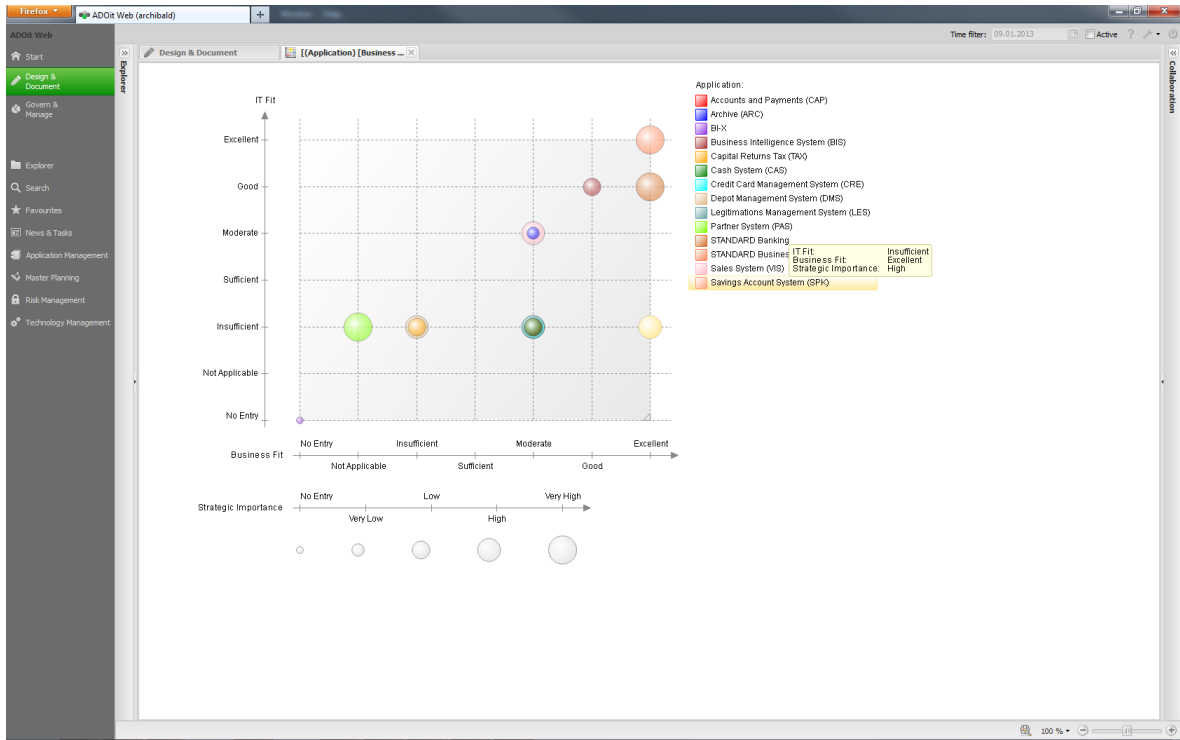


Figure 7.10.: Bubble Chart of ADOit

Name	ObjektInfo	Status	Einführung	Konsistenz
Analytics & Risk	GB-004	Gepüft		●
Eingehende Beziehung: Fachobjekt -> Referenzierte Domäne				
Zugeordnete Sub-Domäne				
Bankportfolio & Treasury	GD-020	Draft		●
Eingehende Beziehung: Fachobjekt -> Referenzierte Domäne				
Zugeordnete Sub-Domäne				
Cash & Liquiditätsmanagement	SD-096	Draft		●
Treasury Operations	SD-094	Gepüft		●
Asset & Liability Management	SD-097	Gepüft		●
Analytics & Risk	GB-004	Gepüft		●
Eingehende Beziehung: Fachobjekt -> Referenzierte Domäne				
Zugeordnete Sub-Domäne				
Eingehende Beziehung: Jobangebot/Serviceangebot -> Referenzierte Serviceomäne				
Eingehende Beziehung: Prinzip -> Prinzipienzuordnung				
Eingehende Beziehung: Domänenabhängigkeit				
Eingehende Beziehung: Trifaaspekt -> Domänenbetroffenheit				
Zugeordnete Sub-Domäne				
Leistungserbringer				
Domänenabhängigkeit				
Facharchitekt				
Eingehende Beziehung: Jobangebot/Serviceangebot -> Referenzierte Serviceomäne				
Eingehende Beziehung: Prinzip -> Prinzipienzuordnung				
Eingehende Beziehung: Domänenabhängigkeit				
Eingehende Beziehung: Trifaaspekt -> Domänenbetroffenheit				
Zugeordnete Sub-Domäne				
Leistungserbringer				
Domänenabhängigkeit				
Facharchitekt				
Geschäftsplanung	GD-022	Gepüft		●
Modelle	GD-021	Gepüft		●
Regulation & Compliance	GD-023	Gepüft		●
Eingehende Beziehung: Jobangebot/Serviceangebot -> Referenzierte Serviceomäne				
Eingehende Beziehung: Prinzip -> Prinzipienzuordnung				
Eingehende Beziehung: Domänenabhängigkeit				
Eingehende Beziehung: Trifaaspekt -> Domänenbetroffenheit				

Figure 7.11.: Treewiew of ADOit

7. ADOit (BOC AG)

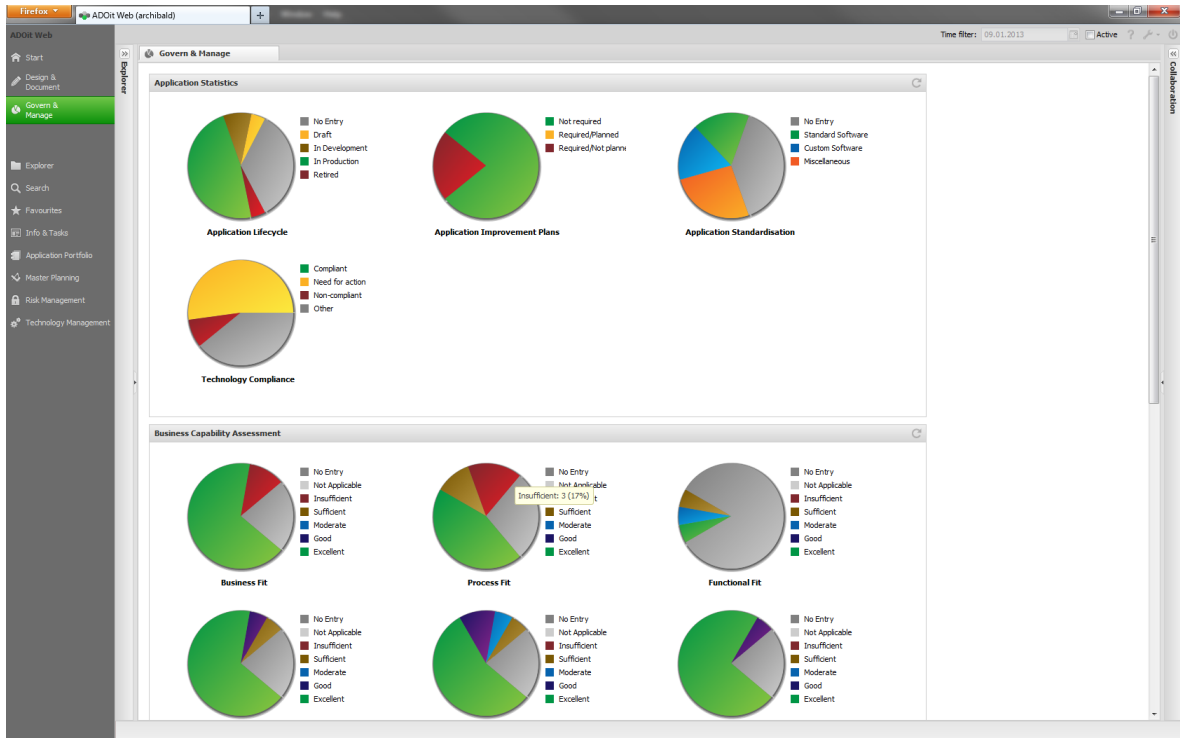


Figure 7.12.: Pie Chart of ADOit

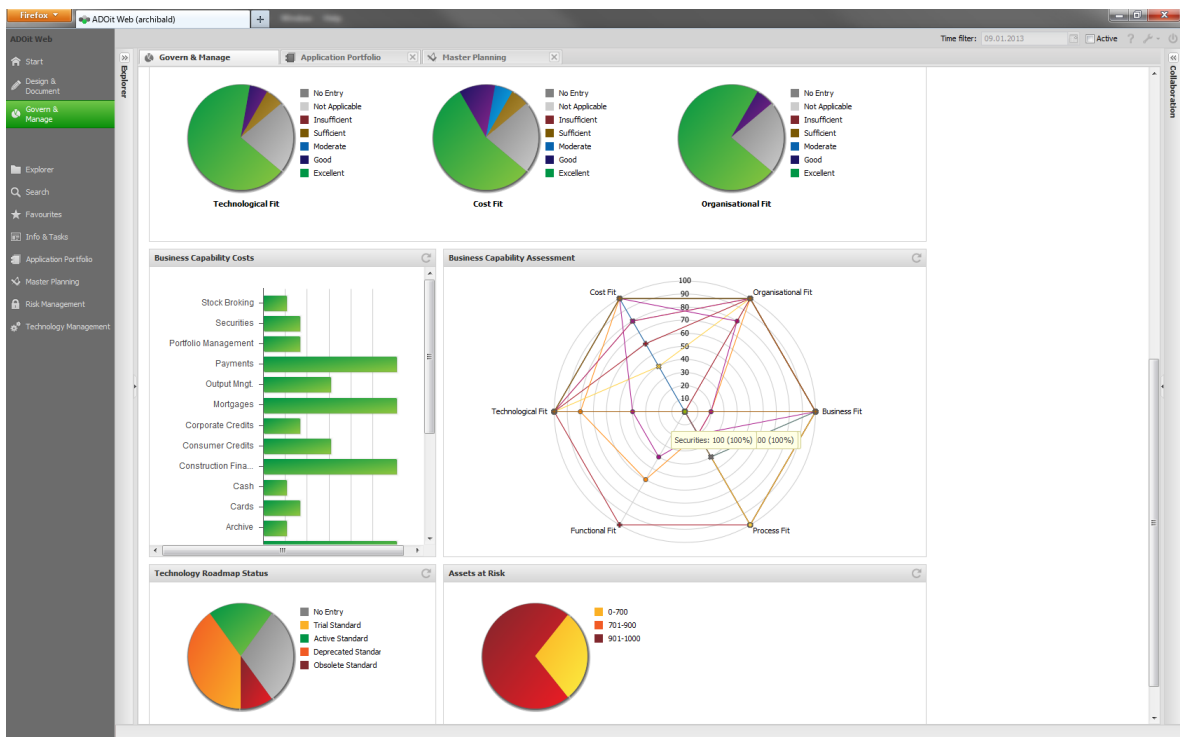


Figure 7.13.: Dashboard of ADOit

## 7. ADOit (BOC AG)

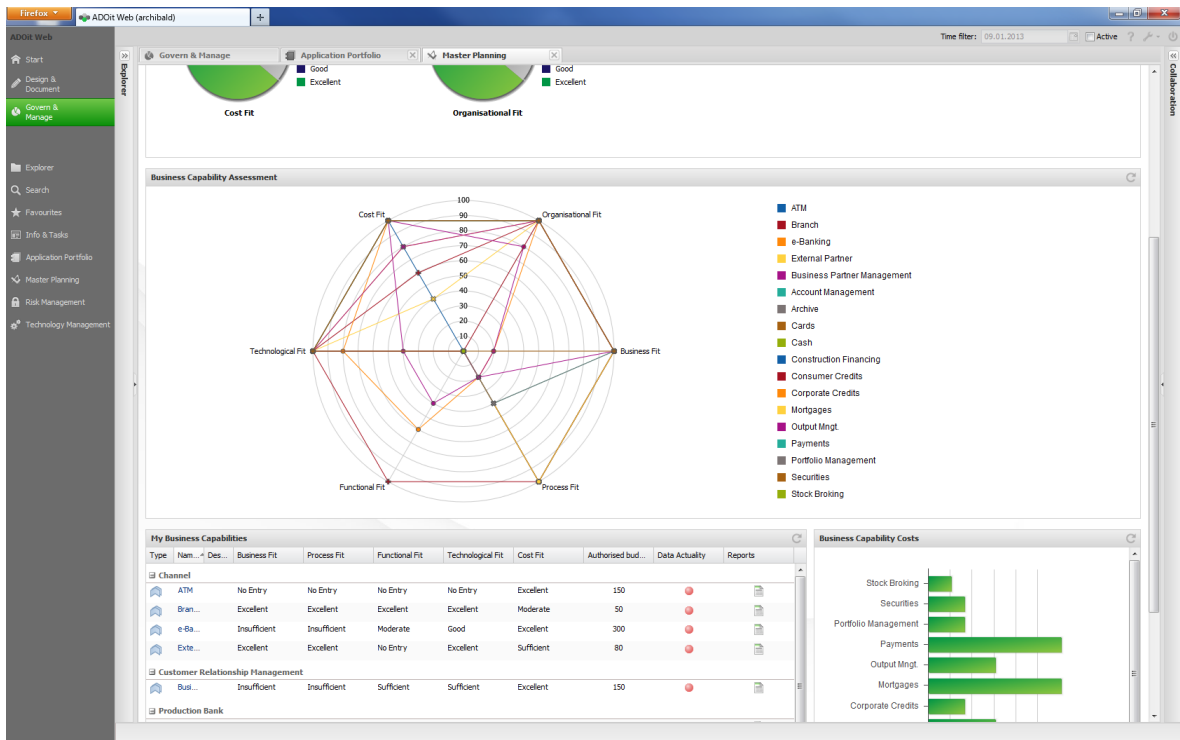


Figure 7.14.: Radar Diagram of ADOit

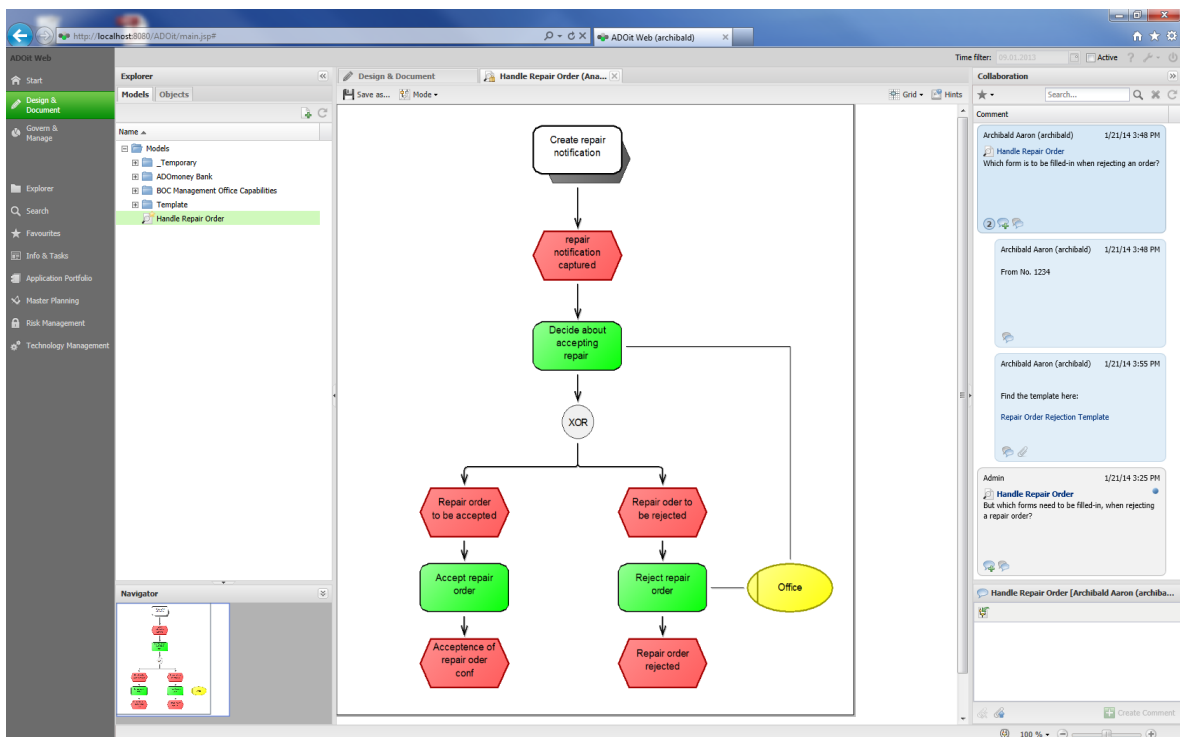


Figure 7.15.: EPC Diagram of ADOit

7. ADOit (BOC AG)

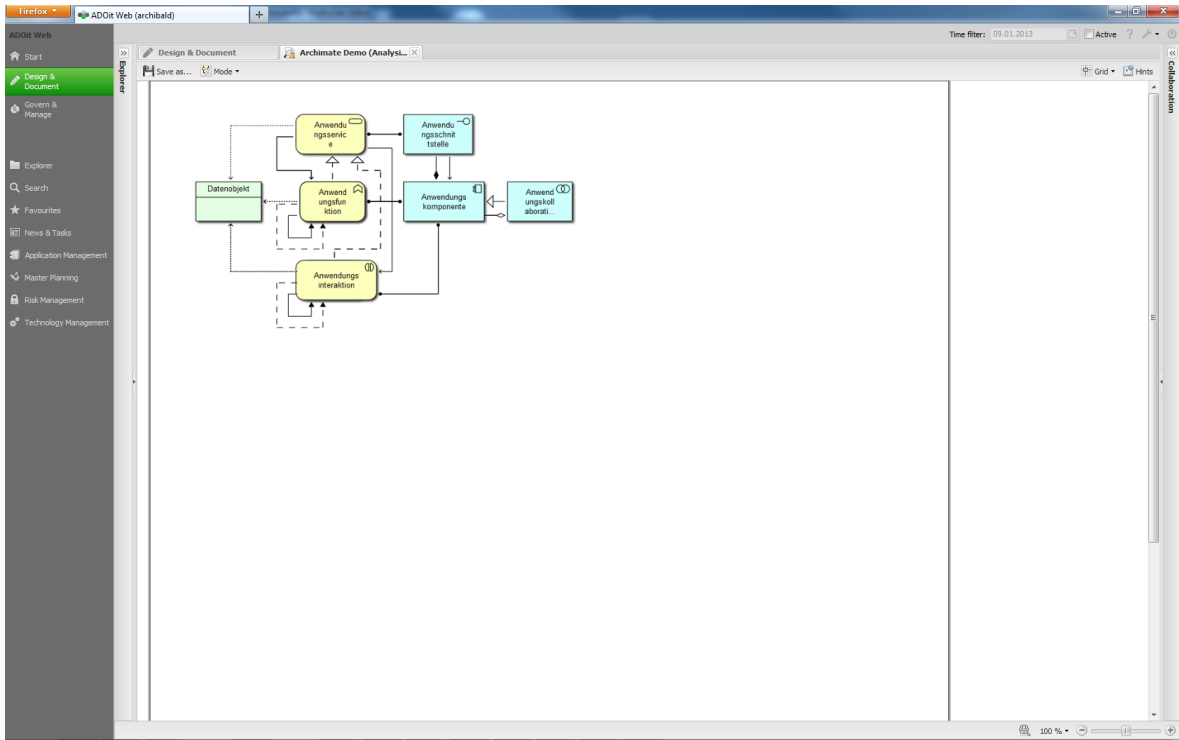


Figure 7.16.: ArchiMate Diagram of ADOit

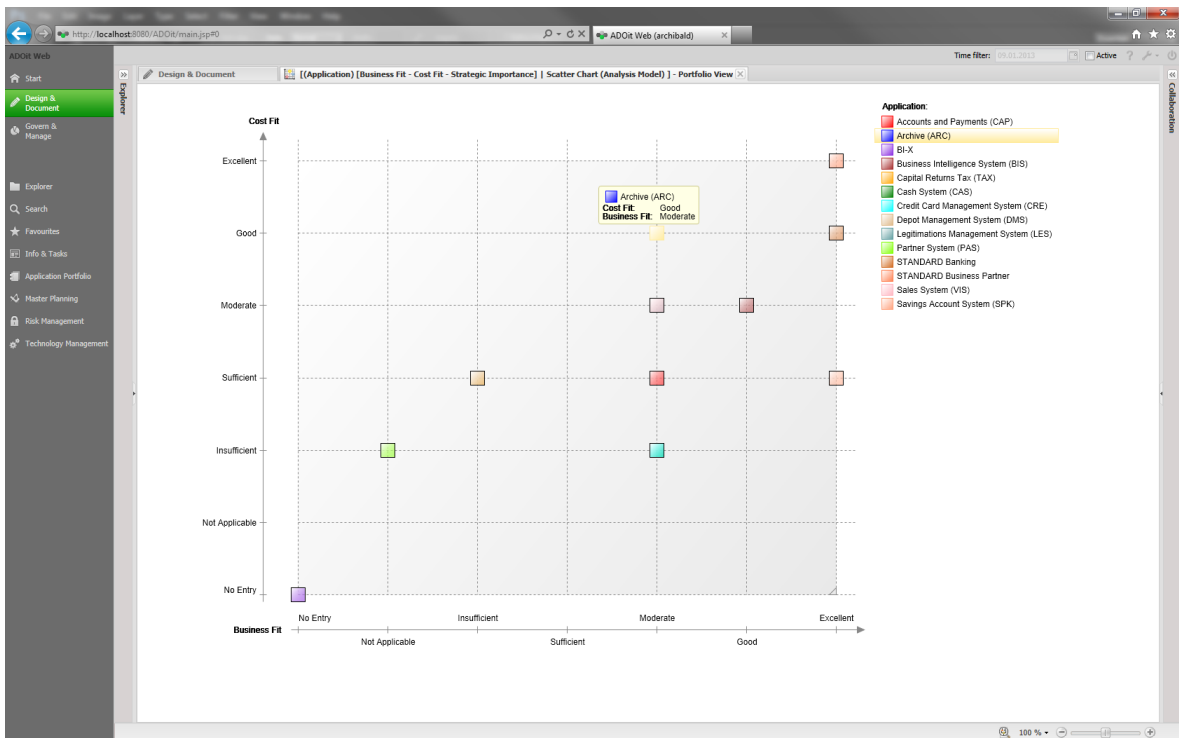


Figure 7.17.: Scatter Chart of ADOit



## 7. ADOit (BOC AG)

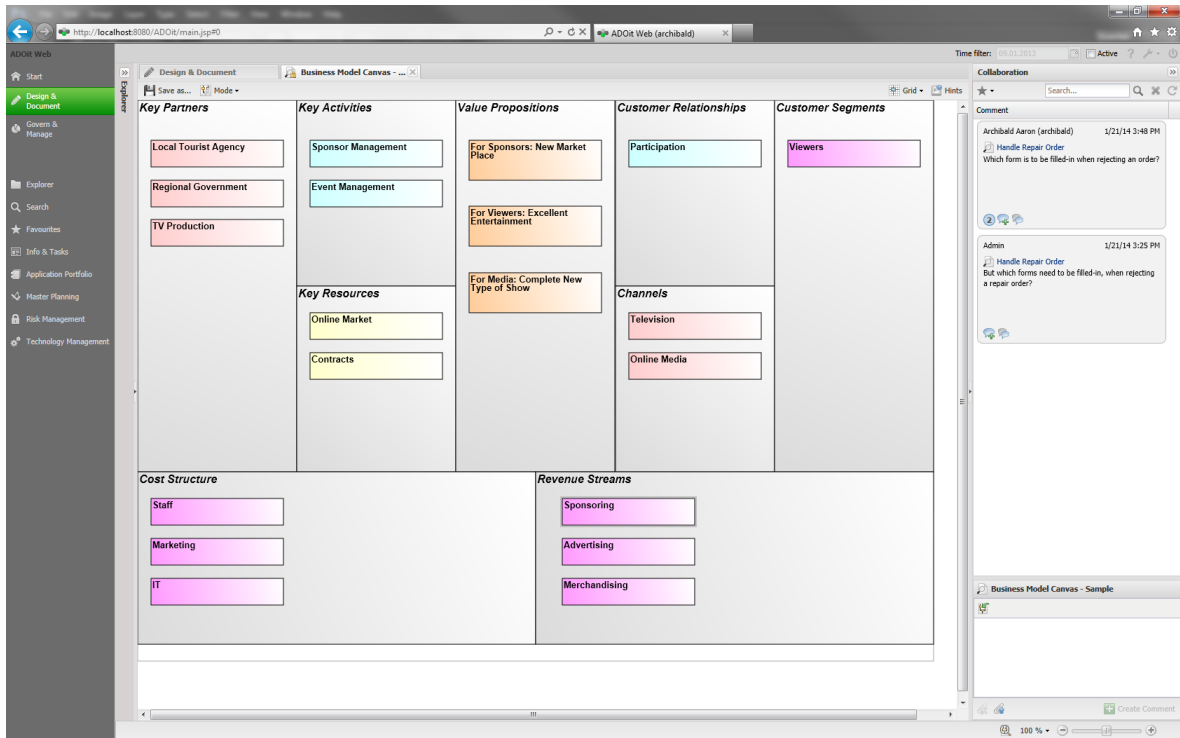


Figure 7.18.: Business Model Canvas of ADOit

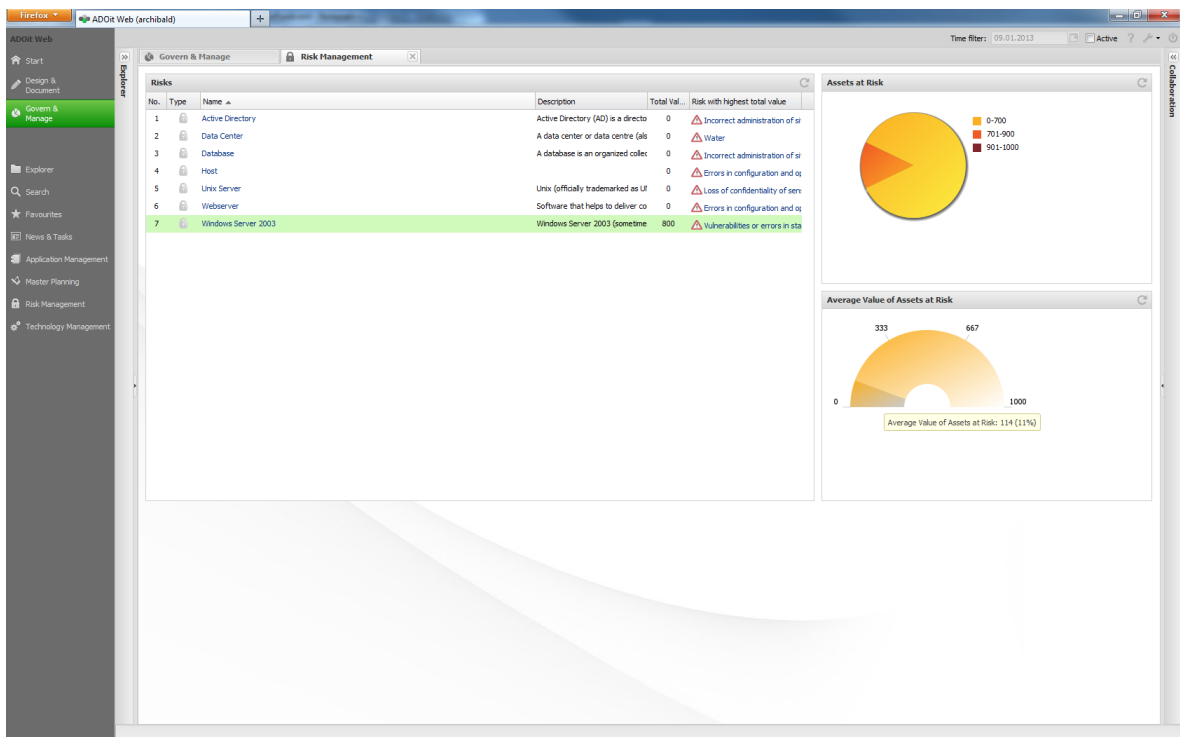


Figure 7.19.: Gauges of ADOit

7. ADOit (BOC AG)

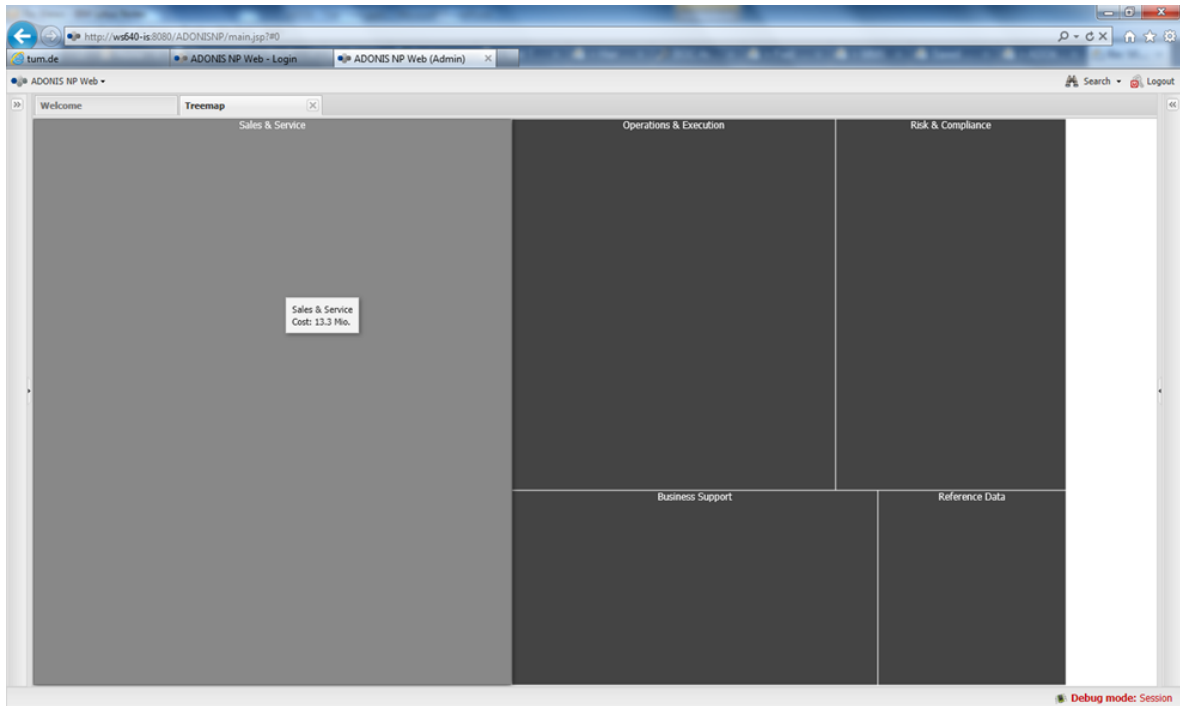


Figure 7.20.: Treemap of ADOit

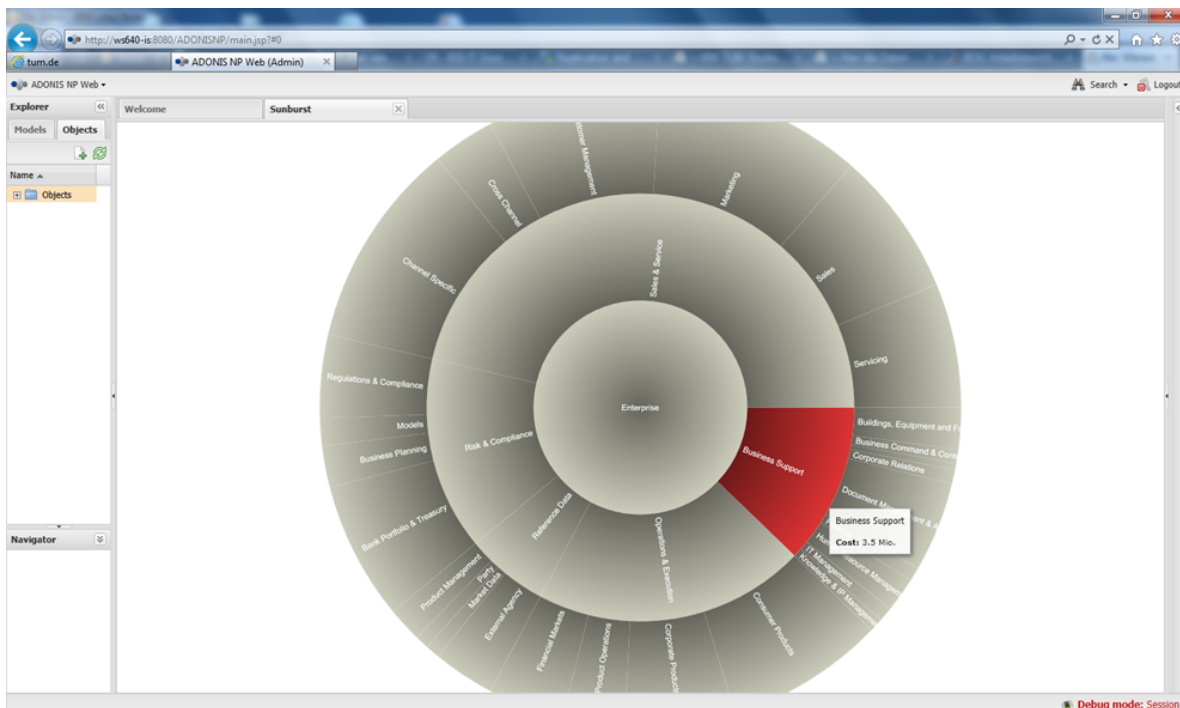


Figure 7.21.: Sunburst of ADOit



## CHAPTER 8

## ALFABET (Software AG)

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## 8. ALFABET (Software AG)

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Software AG was founded in 1969 and has more than 15 years of experience in the EA domain. The company is vendor of planningIT and ARIS which is offered in version 8.1<sup>a</sup>, 9.5<sup>b</sup> at the editorial deadline. planningIT and ARIS supports 21 out of 26 visualization types. After the acquisition of alfabet by Software AG in June 2013 the company will bundle its EA solution support under the brand name of ALFABET carrying forward the functionality currently provided by the two products ARIS and planningIT. Furthermore, the business process analysis and management support functionality will be bundled under the brand name of ARIS again combining the capabilities currently provided by ARIS and planningIT. To this end the two currently separated products will be further developed to share a federated inventory and provide user interface interoperability allowing for business users in ARIS to migrate to IT planning and portfolio management aspects and for IT planners and portfolio managers to continue on into the realms of business process analysis and modeling. The necessary product enhancements will be provided in two releases over the course of the year 2014. Going forward ARIS and ALFABET are sharing a harmonized release cycle.

### 8.1. Background Information

Vendor	Software AG
Founding year	1969
Years active in EA market	15
Number of employees	5 001–10 000
URL	<a href="http://www.softwareag.com">www.softwareag.com</a>

**Table 8.1.:** Vendor Information of Software AG

Tool Name	planningIT and ARIS			
Version	8.1 <sup>a</sup> , 9.5 <sup>b</sup>			
Client Platforms	✓ <sup>a,b</sup>	Windows	✗	Linux
	✗	MacOS	✓ <sup>a,b</sup>	Browser
	✗	iOS	✗	Android
	✗	Windows Mobile	✗	Other
Deployment Approach	✓ <sup>b</sup>	Desktop	✓ <sup>a,b</sup>	SaaS
	✓ <sup>a,b</sup>	Server	✗	Other
EA Frameworks	✓ <sup>b</sup>	ArchiMate	✓ <sup>b</sup>	NAF
	✓ <sup>b</sup>	DoDAF	✓ <sup>a,b</sup>	PEAF
	✓ <sup>b</sup>	IAF	✓ <sup>a,b</sup>	TOGAF
	✓ <sup>a,b</sup>	MODAF	✓ <sup>a,b</sup>	Zachman
	✓ <sup>a</sup>	Other		

Table 8.2.: General Information (planningIT and ARIS)

## 8.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	✗	✓ <sup>a,b</sup>
DOC(X)	✗	✓ <sup>a,b</sup>
HTML	✗	✓ <sup>a,b</sup>
JPG/JPEG	✗	✓ <sup>a,b</sup>
PDF	✗	✓ <sup>a,b</sup>
PNG	✗	✓ <sup>a,b</sup>
PPT(X)	✗	✓ <sup>a,b</sup>
SVG	✗	✓ <sup>a,b</sup>
VSD(X)	✗	✗
Other	✗	✓ <sup>a,b</sup>

Table 8.3.: Visualization Import/Export File Formats (planningIT and ARIS)

## 8.3. Configuration

### Binding

Loose coupling between model elements and visualizations	✓ <sup>a,b</sup>
Schema Bindings	✓ <sup>a,b</sup>
Data Filter	✓ <sup>a,b</sup>
Other	✓

**Table 8.4.:** Binding (planningIT and ARIS)

### Generation Approach

Model-Driven	✗
Form-Based	✓ <sup>a,b</sup>
Scripting	✓ <sup>a,b</sup>
Manual Drawing	✓ <sup>a,b</sup>
Other	✗

**Table 8.5.:** Visualization Generation Approach (planningIT and ARIS)

### Visual Customization and Layouting

Customization	Caption	✓ <sup>a,b</sup>
	Color	✓ <sup>a,b</sup>
	Orientation	✓ <sup>a,b</sup>
	Position	✓ <sup>a,b</sup>
	Shape	✓ <sup>a,b</sup>
	Size	✓ <sup>a,b</sup>
	Other	✓ <sup>a,b</sup>
Layout	Automated	✓ <sup>a</sup>
	Manual	✓ <sup>a</sup>
	Other	✗

**Table 8.6.:** Visual Customization (planningIT and ARIS)

**Import/Export**

Format	Import	Export
CSV	✗	✗
JSON	✗	✗
ODBC	✗	✗
XMI	✗	✗
XML	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>
XLS(X)	✗	✗
TXT	✗	✗
Other	✗	✗

**Table 8.7.:** Configuration Import/Export (planningIT and ARIS)**8.4. Information Model****Information Model Type**

Full Schema	✓ <sup>a,b</sup>
Configurable Building Blocks	✗
User-defined	✗
Does your EA tool allow subclassing/class inheritance	✓ <sup>a,b</sup>

**Table 8.8.:** Information Model Type (planningIT and ARIS)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>
Modify	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>
Delete	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>
Copy	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>
Merge	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>
Move	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✗	✗	✗

**Table 8.9.:** Information Model Flexibility (planningIT and ARIS)



## 8.5. Interoperability

### Import Mechanisms

Pull	✓ <sup>a,b</sup>
Push	✓ <sup>a,b</sup>
Other	✓

**Table 8.10.:** Import Mechanisms (planningIT and ARIS)

### Third Party Tools

Business Intelligence Tools	✓ <sup>a</sup>
Business Process Engines	✓ <sup>a</sup>
Change Management Tools	✓ <sup>a</sup>
Cloud Services	✓ <sup>a</sup>
Configuration Management Database	✓ <sup>a</sup>
Enterprise Service Bus	✓ <sup>a</sup>
Infrastructure Monitoring Tools	✗
License/IT Asset Management Tools	✓ <sup>a</sup>
Project Portfolio Management Tools	✓ <sup>a</sup>
Release Management Tools	✓ <sup>a</sup>
Other	✓

**Table 8.11.:** Interoperability with Third Party Tools (planningIT and ARIS)

**Data & Schema Import/Export**

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✗	✗
JSON	✗	✗	✗	✗
TXT	✓ <sup>a,b</sup>	✗	✗	✗
XMI	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>b</sup>	✓ <sup>b</sup>
XML	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✓ <sup>a</sup>	✓ <sup>a</sup>
XLS(X)	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>	✗	✗
OData	✗	✗	✗	✗
Other	✗	✗	✗	✗

**Table 8.12.:** Data & Schema Import/Export (planningIT and ARIS)**Model Element Import/Export**

Model Element	Import	Export
Classes	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>
Objects	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>
Relationships	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>
Attribute Definitions	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>
Attribute Values	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>
Access Rights	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>
Roles	✓ <sup>a,b</sup>	✓ <sup>a,b</sup>
Other	✗	✗

**Table 8.13.:** Model Element Import/Export (planningIT and ARIS)

8. ALFABET (Software AG)

8.6. Visualization Examples of planningIT and ARIS

ALFABET

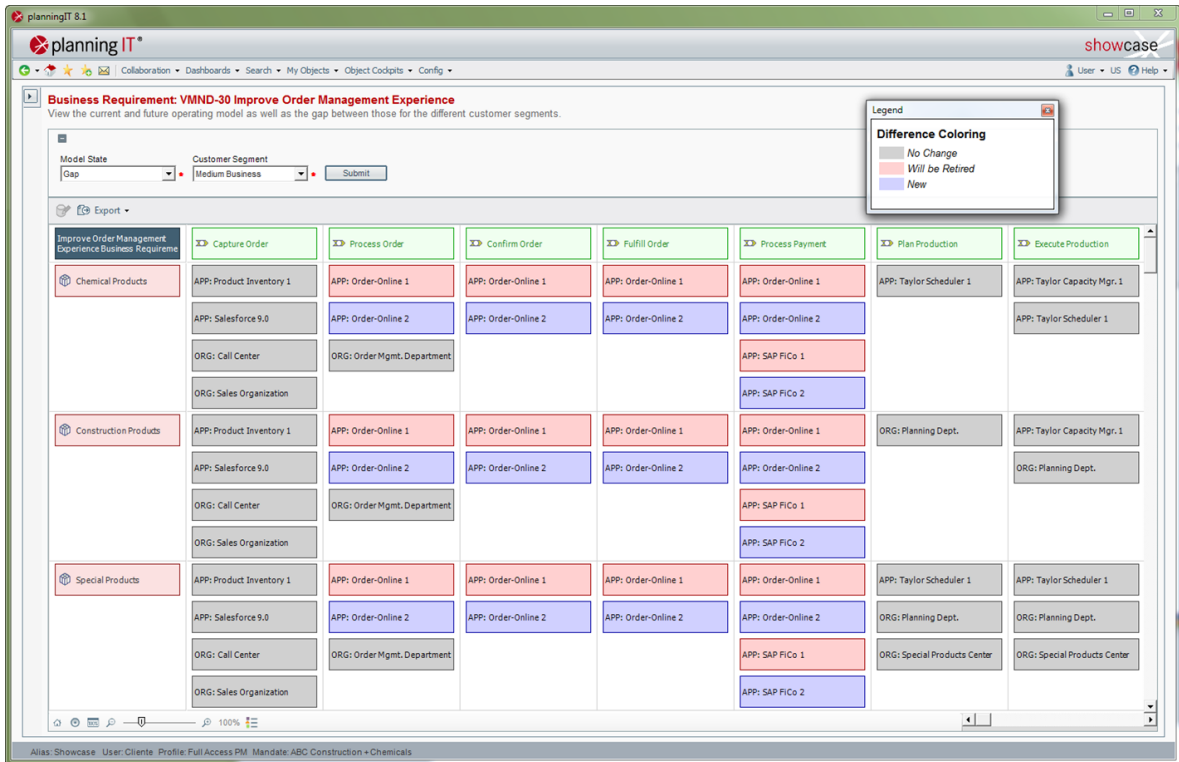


Figure 8.1.: Matrix of planningIT and ARIS

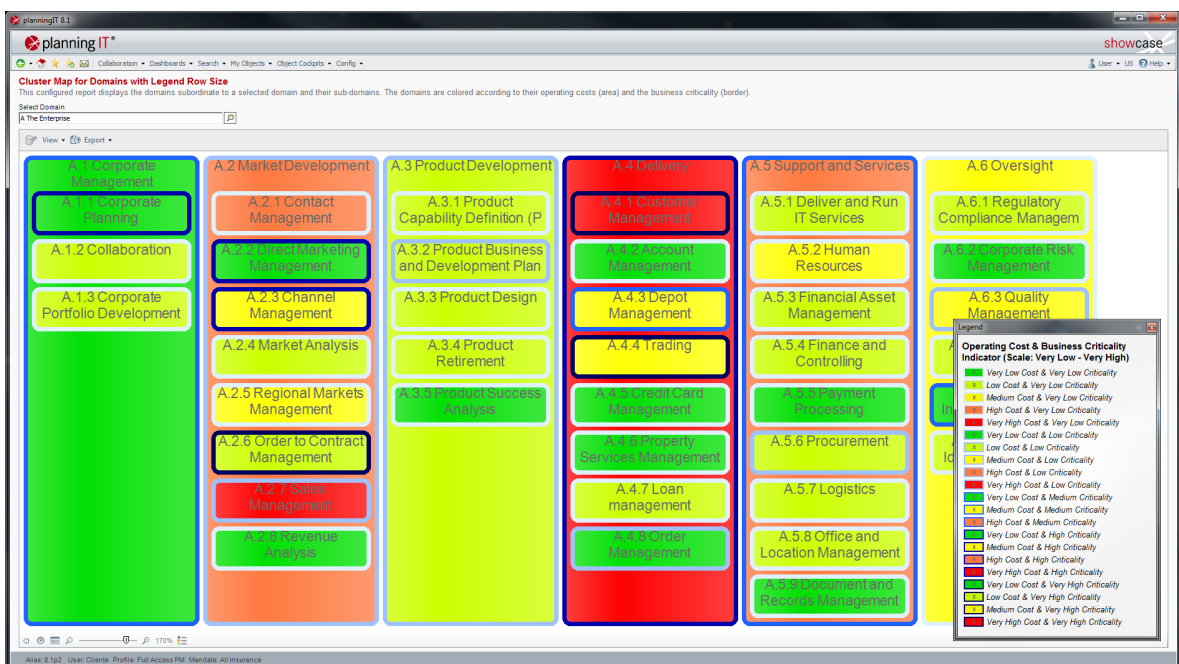


Figure 8.2.: Cluster Map of planningIT and ARIS

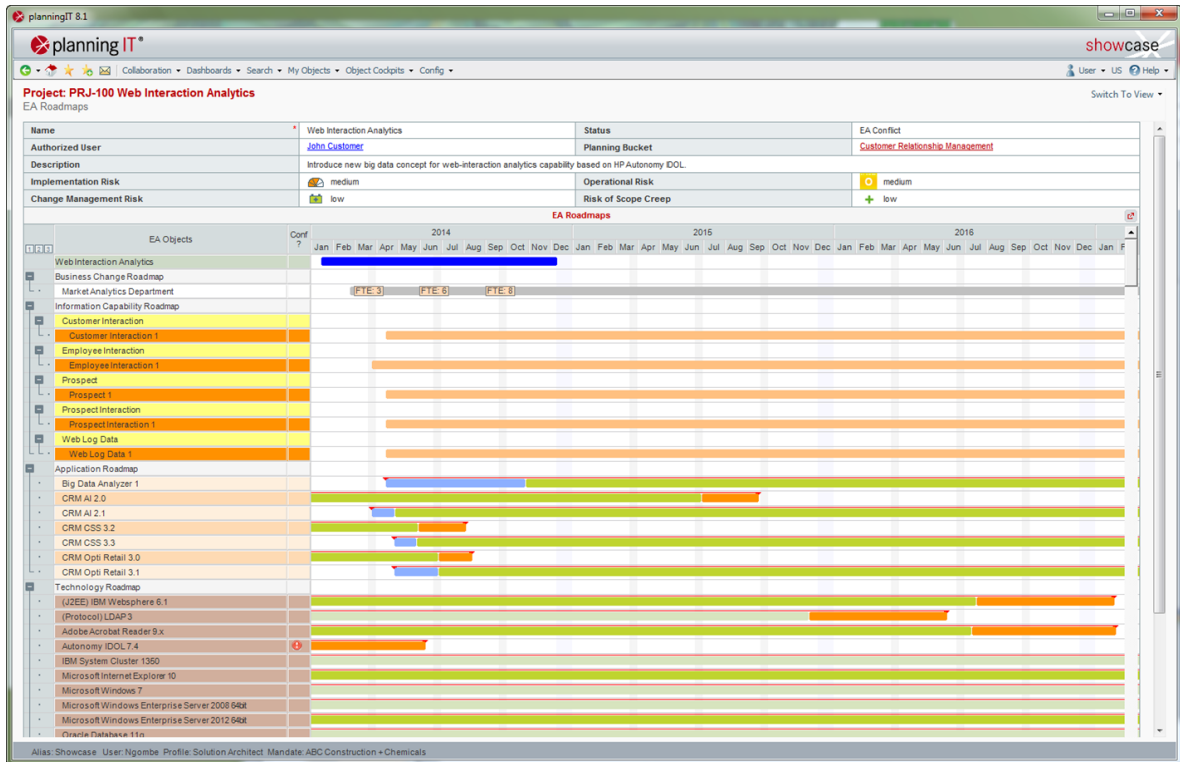


Figure 8.3.: Timeline of planningIT and ARIS

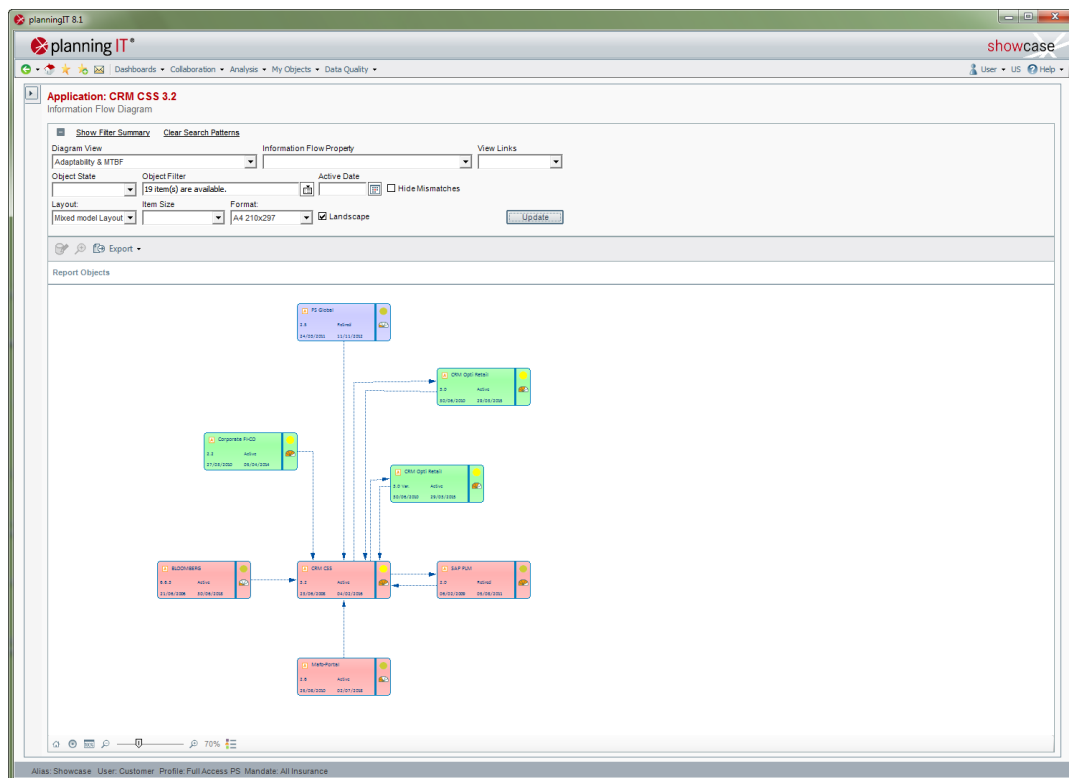


Figure 8.4.: Flow Diagram of planningIT and ARIS

## 8. ALFABET (Software AG)

ALFABET

ID	DOM-48	Name	Trading
Authorized User	Customer John	Parent Domain	Delivery
Applications	BLOOMBERG 6.5.2 BLOOMBERG 6.6.3 EasiTrade Web 2.1 Reuters Dealing 4.3 Reuters RMDS 1.5 SUNGARD TREASURY TRADER 3 Trade*Net 6.0.3 TradeLink 1.0 TradeStation 6.7 R23 TradeThru 1.0 TradeThru 1.4	Business Functions	Order Validation Trade Offering Pricing Settlement A.4.8.1 Pre-Trade Analytics A.4.8.2 Trade Execution and Clearing A.4.8.3 Trade Risk Analytics A.4.8.4 Trade Pricing
Projects	Enhance Trade*Net Implement Unified Trade Solution Retire GL Applications Upgrade GenLManager	Policies	Customer Identification Procedures Regulated Institutions Exemption
Description	<p>The domain "Trading" represents the business capability "Trading".</p> <p>This is a critical business capability and it represents the ability to plan, execute, monitor and audit any form of trade on the various financial markets in which the company is active. Speed and reliability of trades are critical to the company and market differentiating.</p> <p>Trading is done both on our own behalf and for business and consumer customers.</p>		

Figure 8.5.: List of planningIT and ARIS

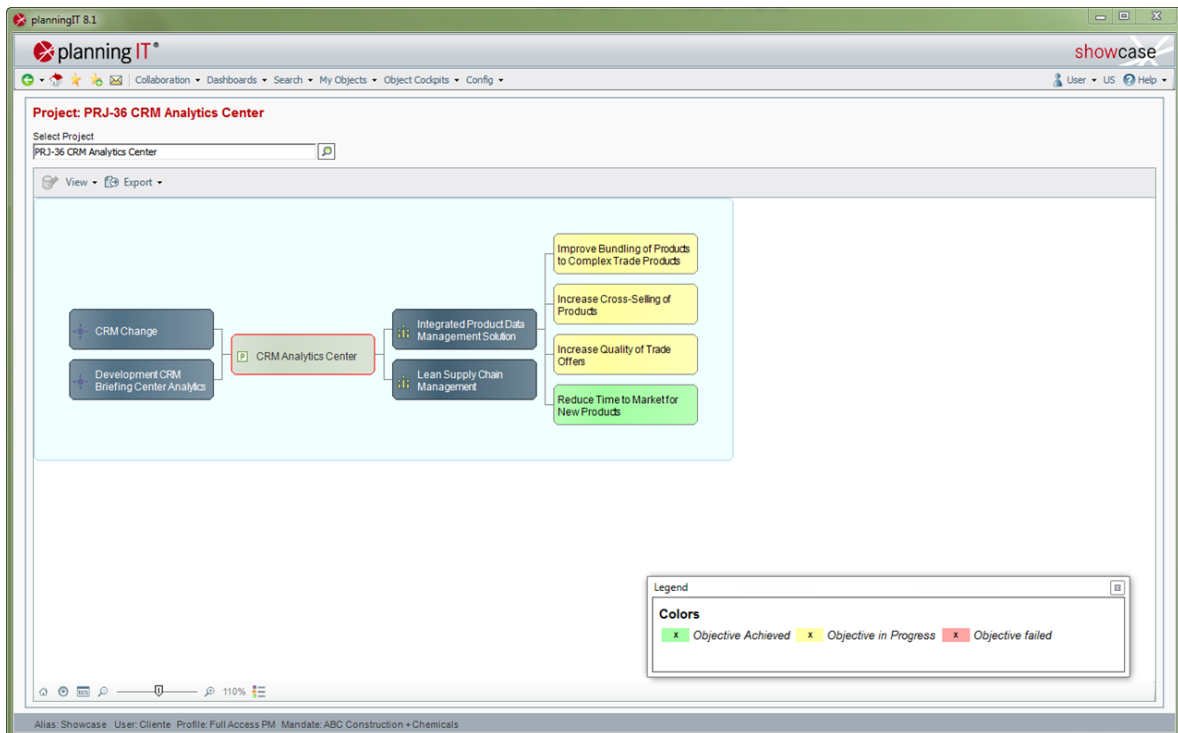


Figure 8.6.: Graph of planningIT and ARIS

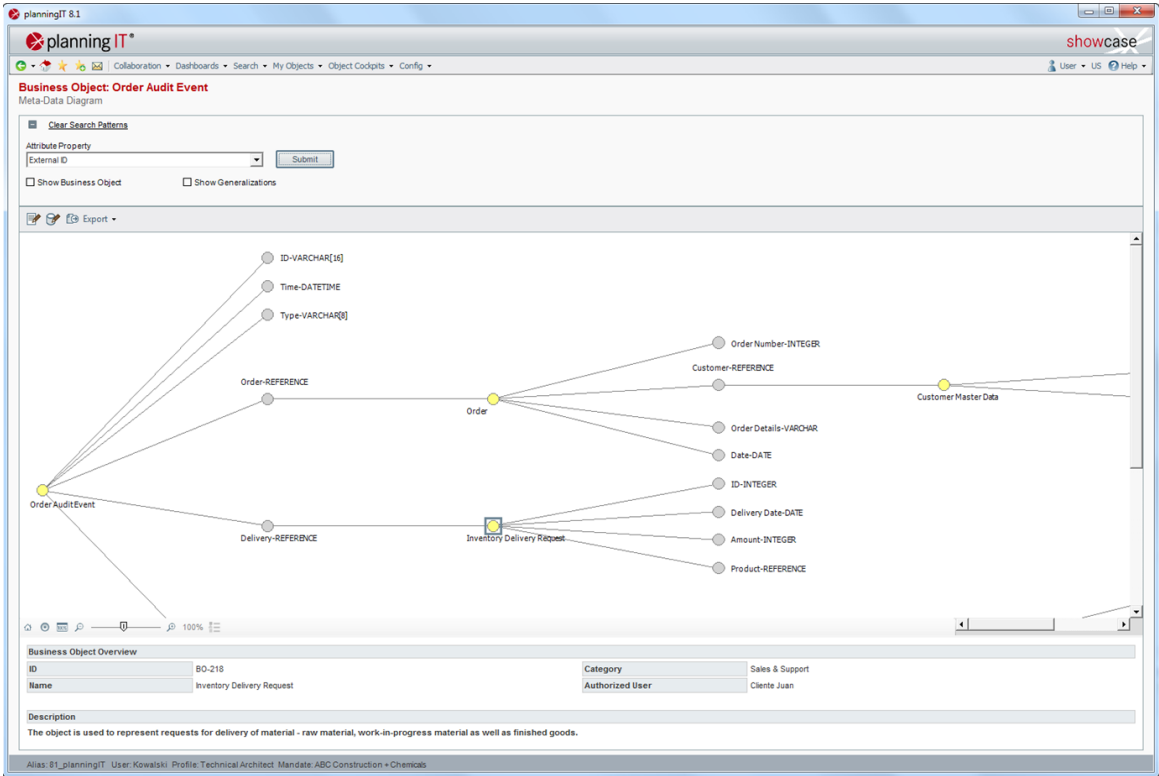


Figure 8.7.: ER Diagram of planningIT and ARIS

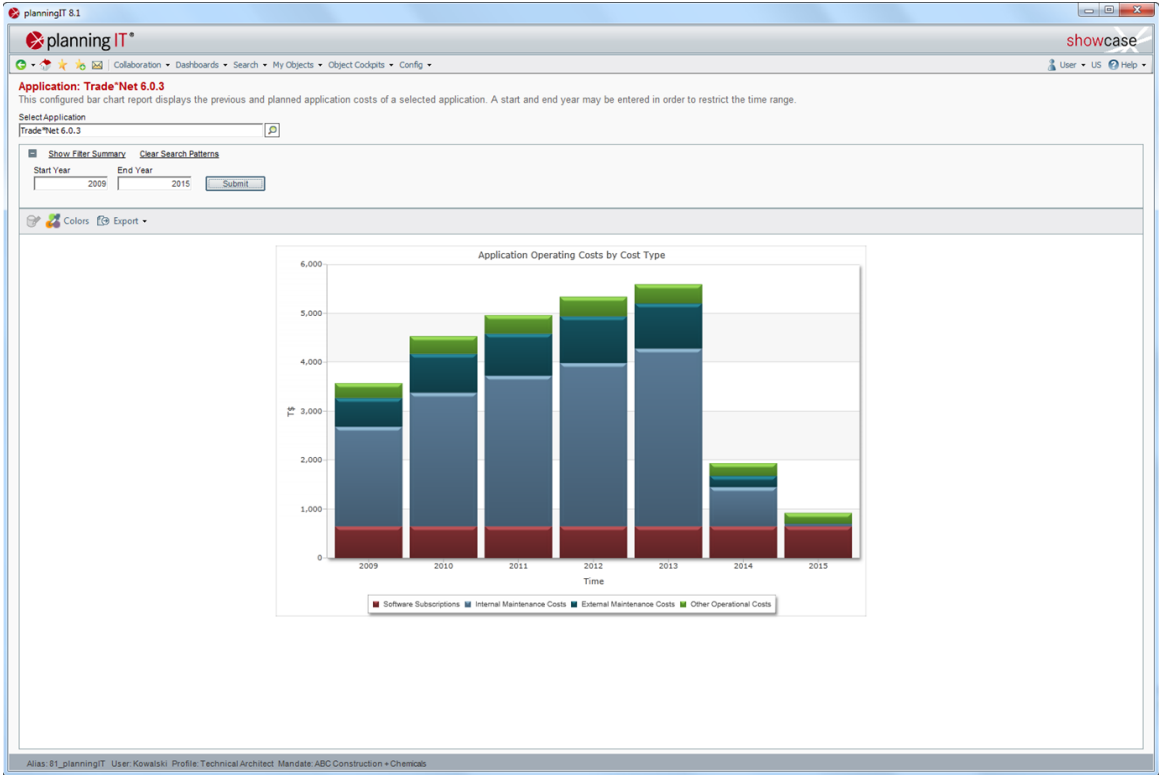


Figure 8.8.: Bar Chart of planningIT and ARIS

## 8. ALFABET (Software AG)

ALFABET

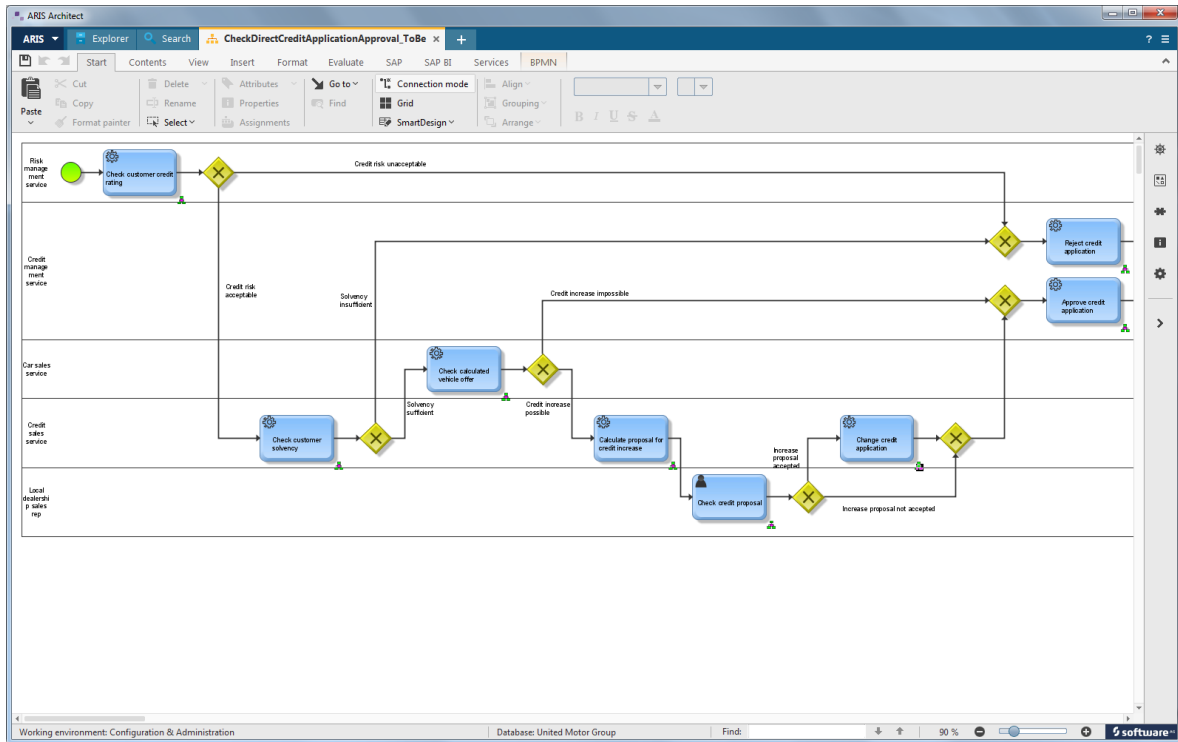


Figure 8.9.: BPMN Diagram of planningIT and ARIS

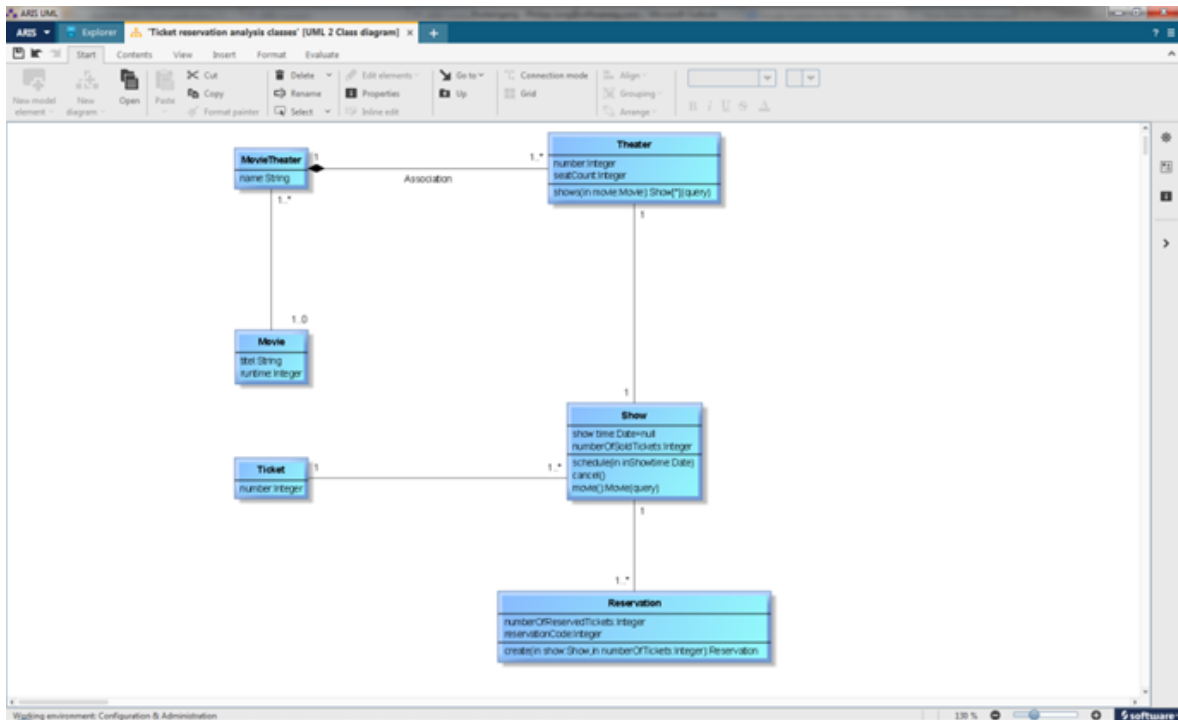


Figure 8.10.: UML Diagram of planningIT and ARIS

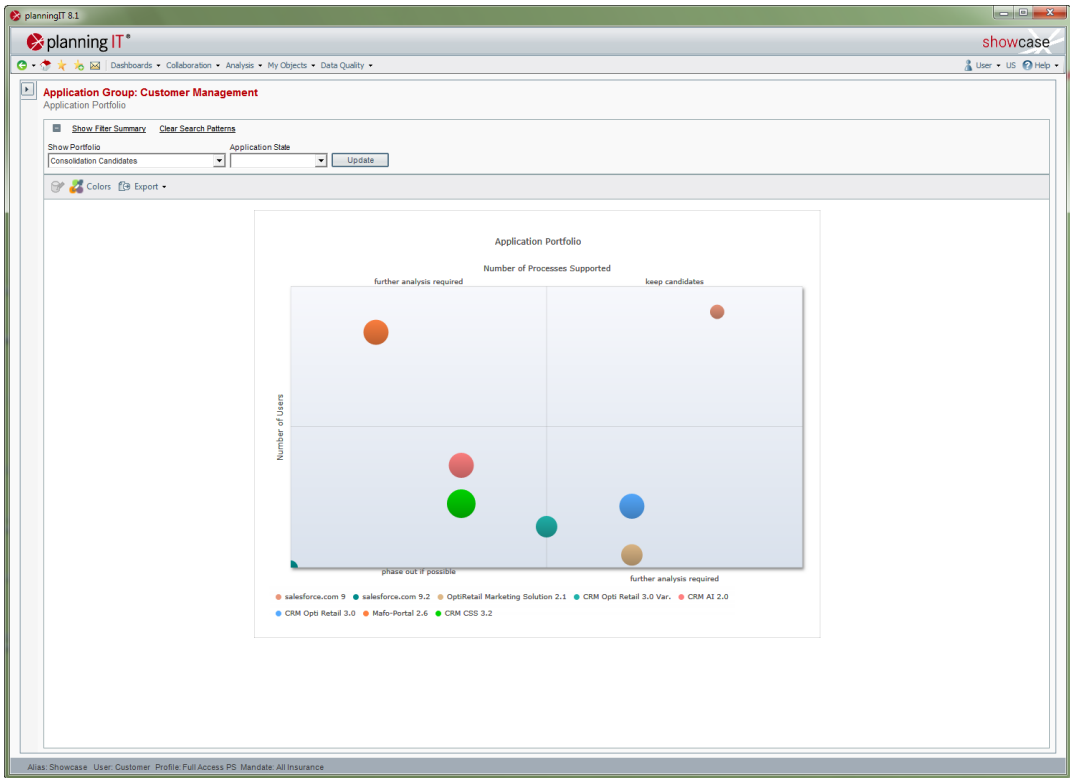


Figure 8.11.: Bubble Chart of planningIT and ARIS

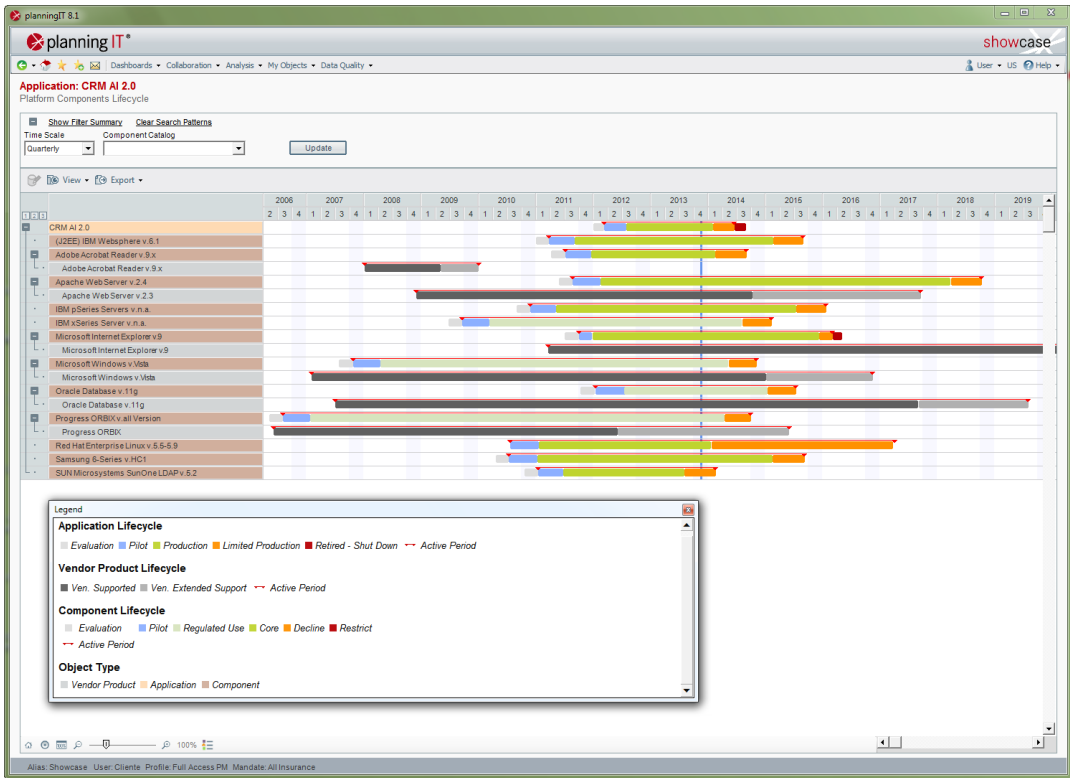


Figure 8.12.: Treewiew of planningIT and ARIS



## 8. ALFABET (Software AG)

ALFABET

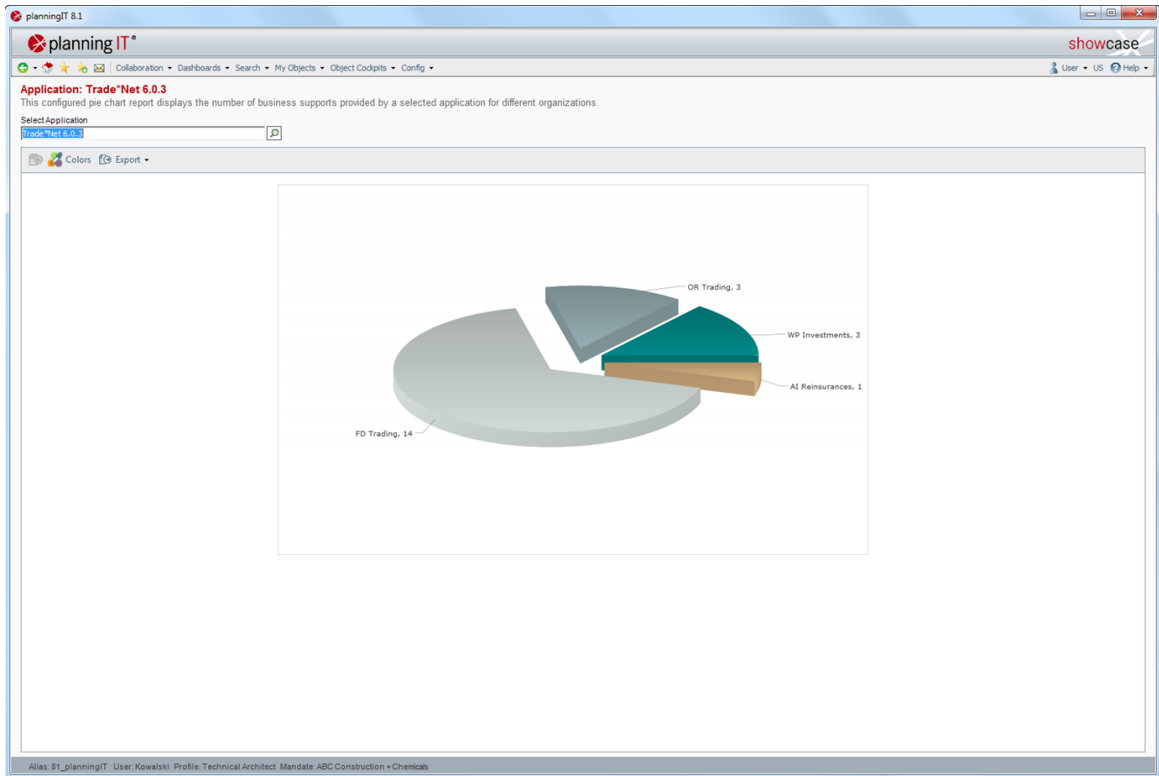


Figure 8.13.: Pie Chart of planningIT and ARIS

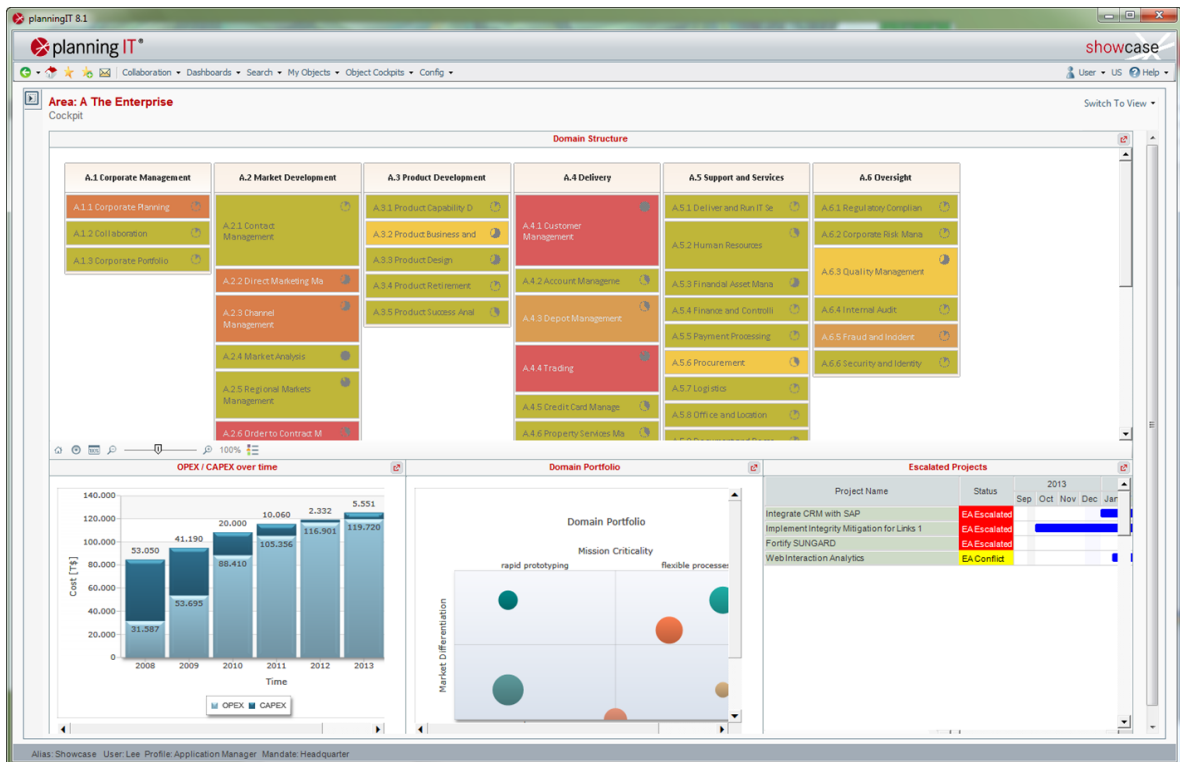


Figure 8.14.: Dashboard of planningIT and ARIS

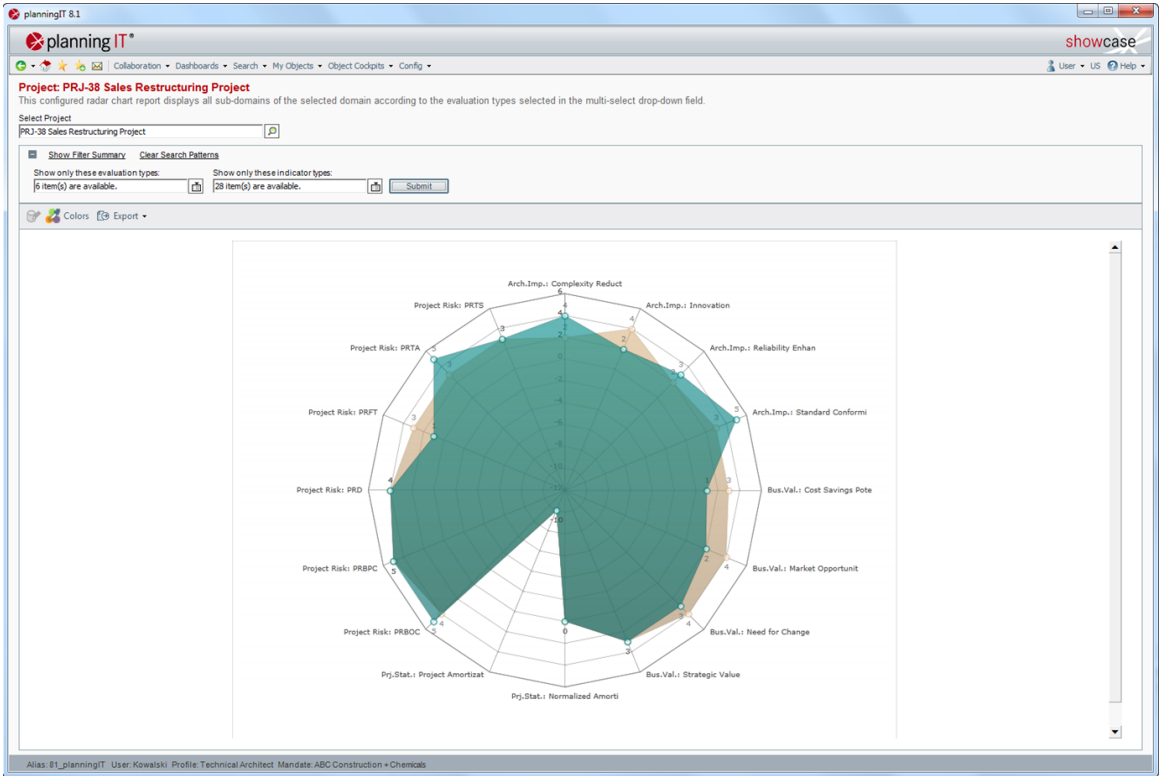


Figure 8.15.: Radar Diagram of planningIT and ARIS

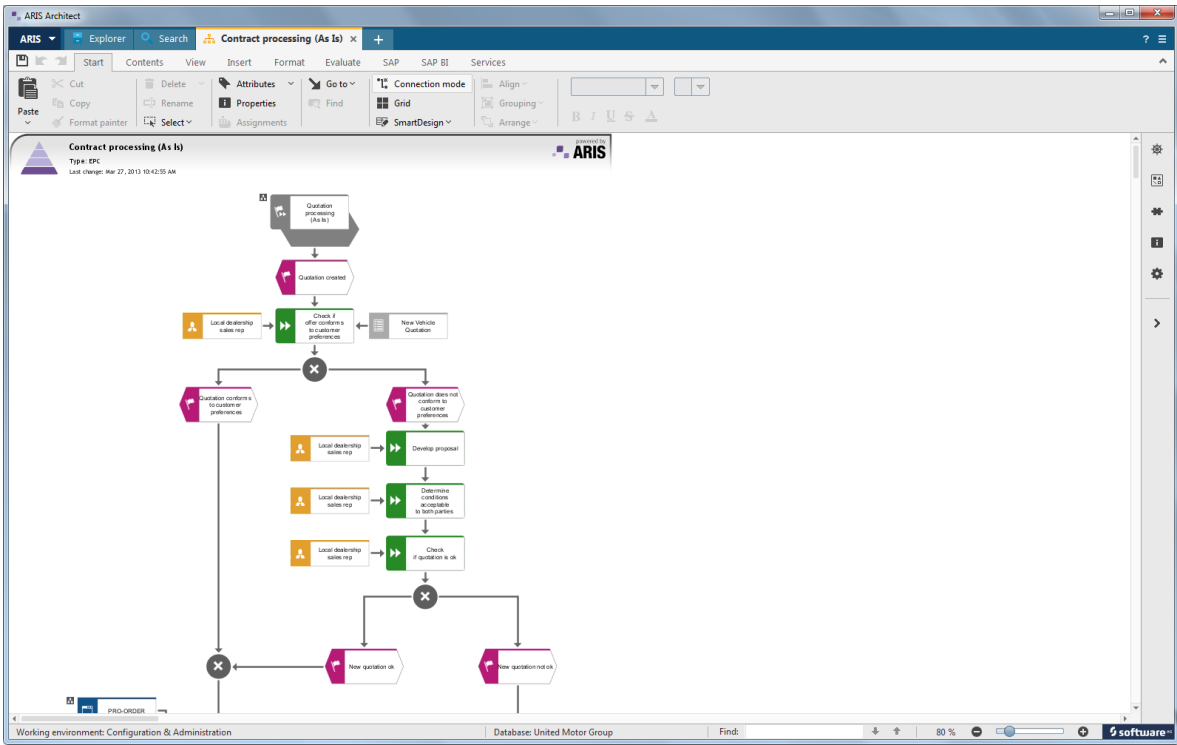


Figure 8.16.: EPC Diagram of planningIT and ARIS

## 8. ALFABET (Software AG)

ALFABET

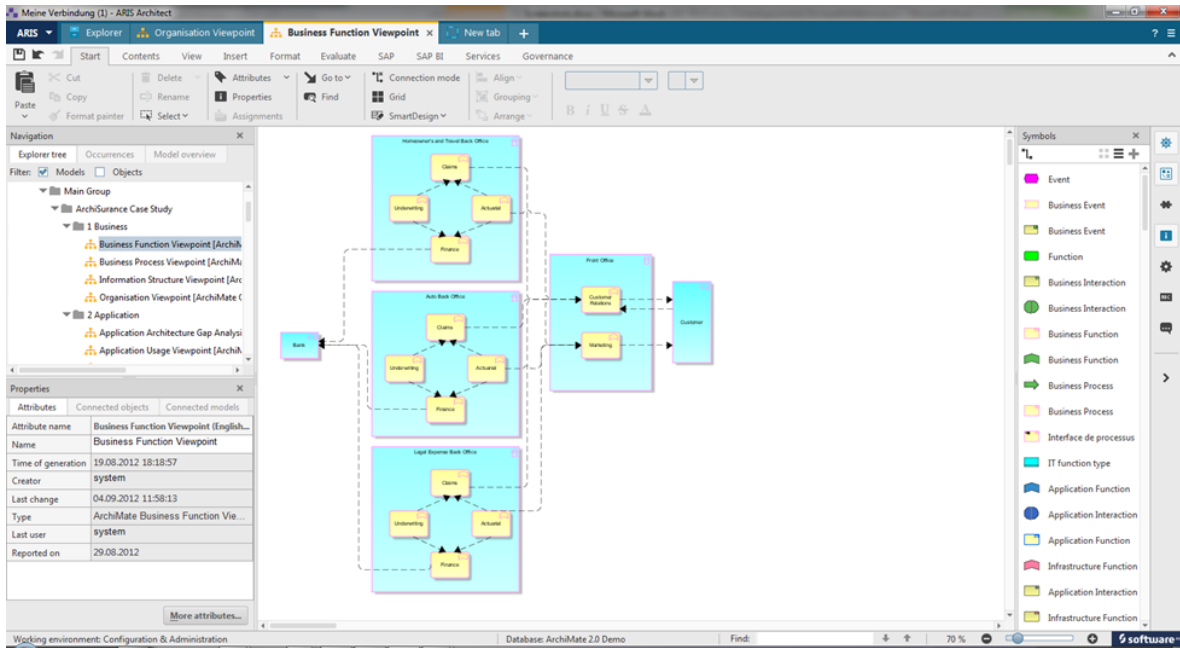


Figure 8.17.: ArchiMate Diagram of planningIT and ARIS

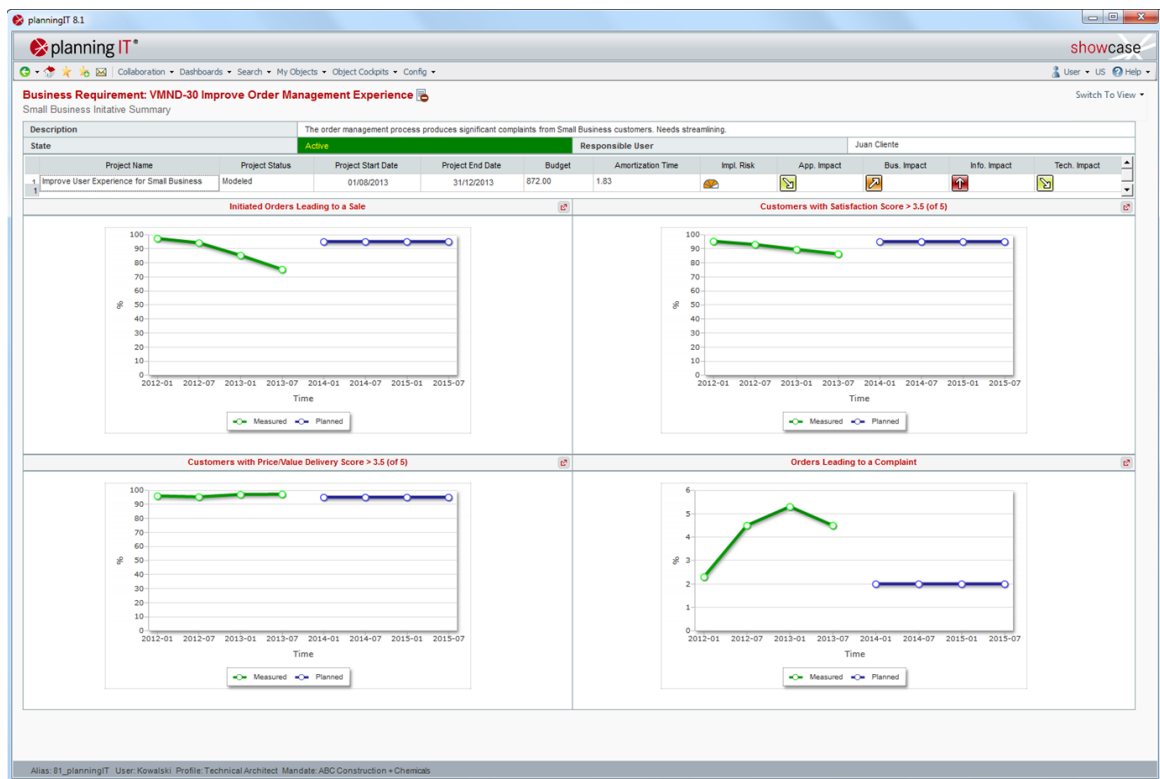


Figure 8.18.: Line Chart of planningIT and ARIS

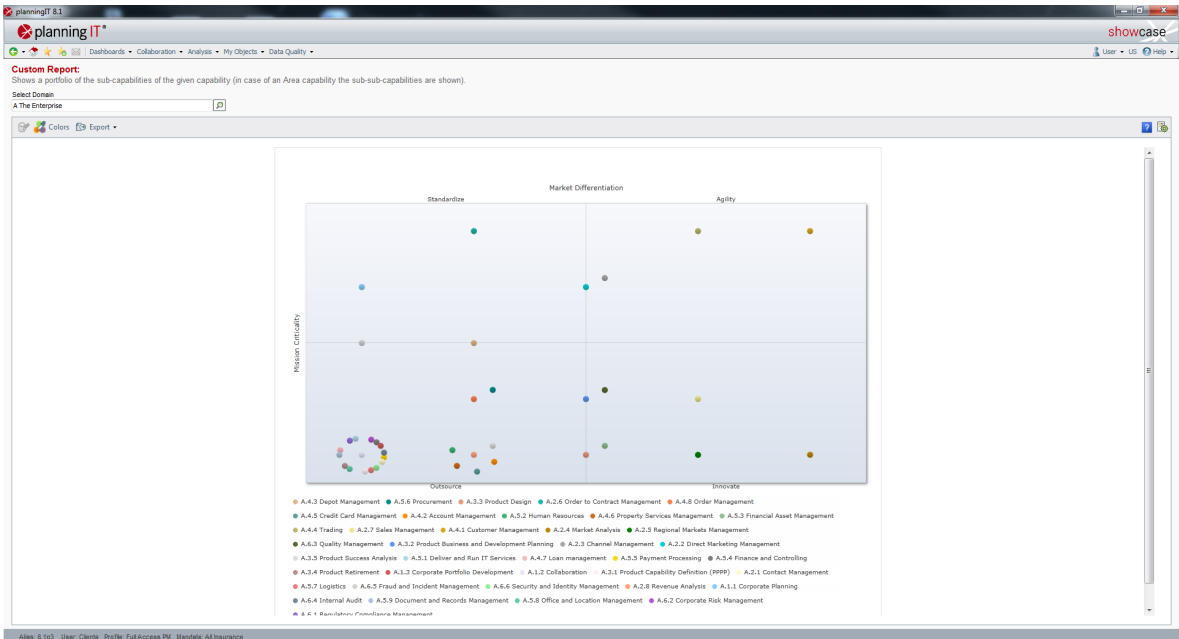


Figure 8.19.: Scatter Chart of planningIT and ARIS



Figure 8.20.: Geographic Map of planningIT and ARIS

## 8. ALFABET (Software AG)

ALFABET

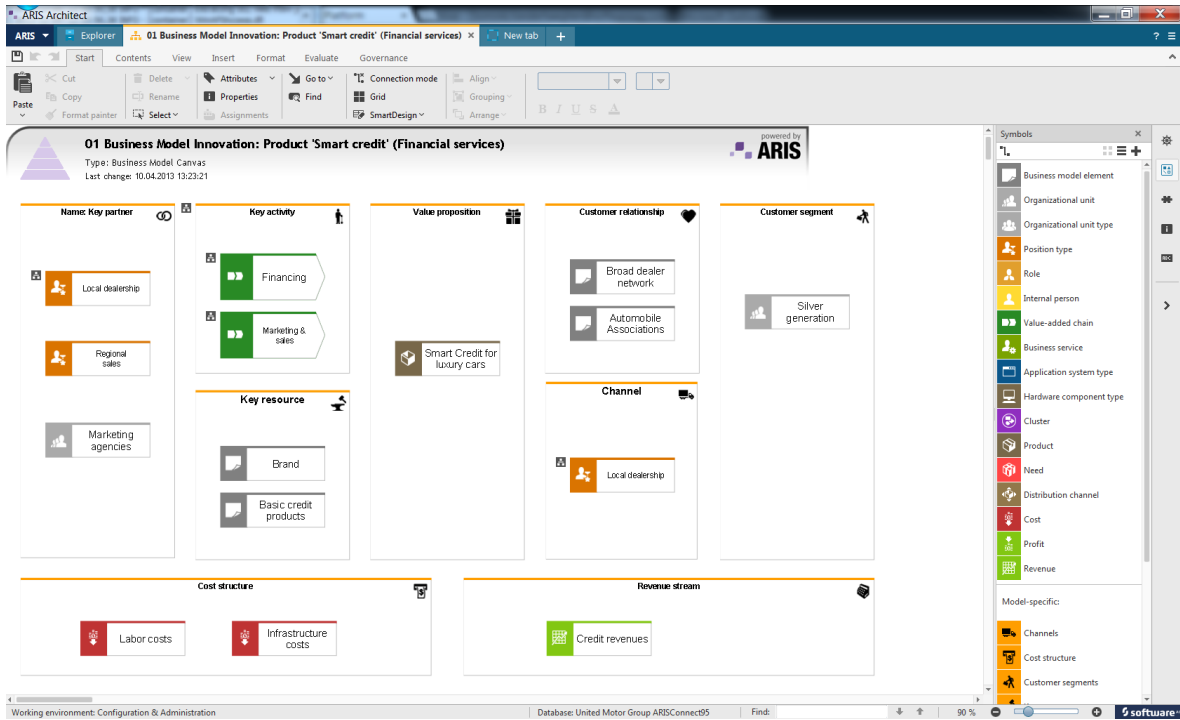


Figure 8.21.: Business Model Canvas of planningIT and ARIS

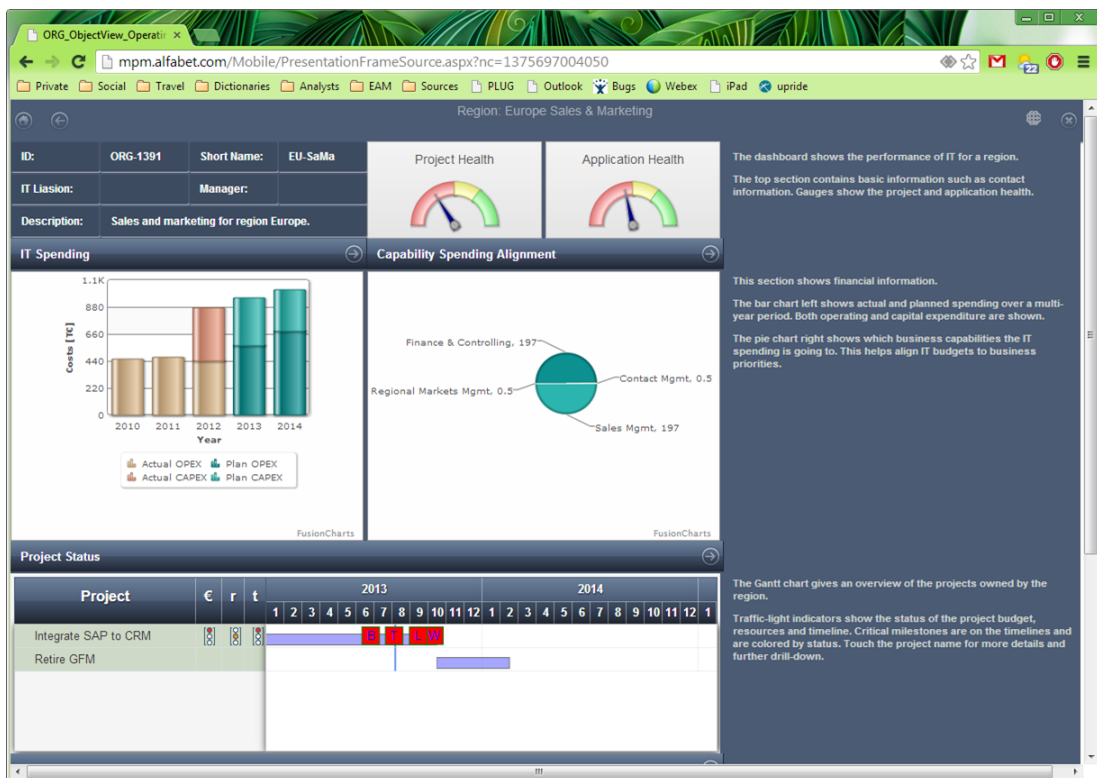


Figure 8.22.: Gauges of planningIT and ARIS

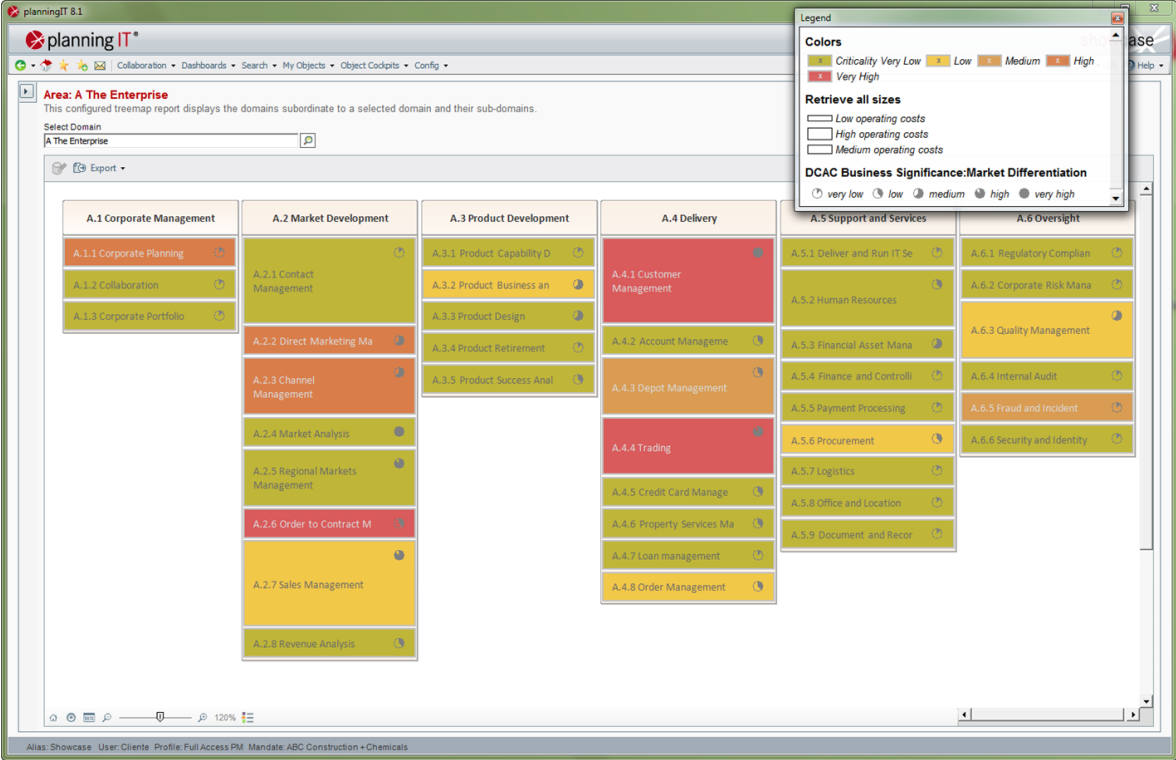


Figure 8.23.: Treemap of planningIT and ARIS

ALFABET

## CHAPTER 9

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### BiZZdesign Architect (BiZZdesign)

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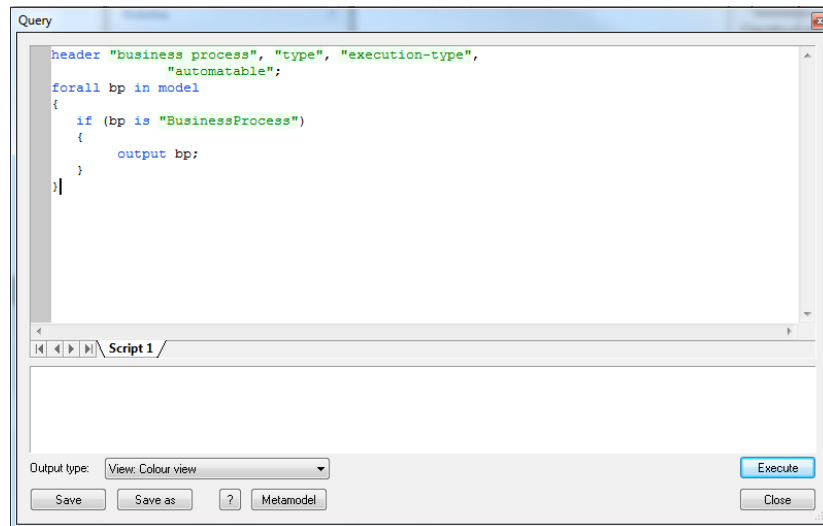
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## 9. BiZZdesign Architect (BiZZdesign)

BiZZdesign was founded in 2000 and has more than 11 years of experience in the EA domain. The company is vendor of BiZZdesign Architect which is offered in version 4.2 at the editorial deadline. BiZZdesign Architect supports 23 out of 26 visualization types.



**Figure 9.1.:** Query Dialog of BiZZdesign Architect

BiZZdesign Architect is an EA tool that features strong modeling facilities when it comes to ArchiMate [Th12] models. BiZZdesign Architect allows to analyze the model with its own domain specific language (DSL) (cf. Figure 9.1). The tool is shipped with the ArchiSurance case study. The layout of visualizations can be done manually, guided, or automatically.

### 9.1. Background Information

Vendor	BiZZdesign
Founding year	2000
Years active in EA market	11
Number of employees	51–250
URL	<a href="http://www.bizzdesign.com">www.bizzdesign.com</a>

**Table 9.1.:** Vendor Information of BiZZdesign

Tool Name	BiZZdesign Architect			
Version	4.2			
Client Platforms	✓	Windows	✗	Linux
	✗	MacOS	✗	Browser
	✗	iOS	✗	Android
	✗	Windows Mobile	✗	Other
Deployment Approach	✓	Desktop	✓	SaaS
	✓	Server	✗	Other
EA Frameworks	✓	ArchiMate	✗	NAF
	✓	DoDAF	✓	PEAF
	✓	IAF	✓	TOGAF
	✓	MODAF	✓	Zachman
	✓	Other		

Table 9.2.: General Information (BiZZdesign Architect)

## 9.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	✗	✓
DOC(X)	✓	✓
HTML	✗	✓
JPG/JPEG	✗	✓
PDF	✗	✓
PNG	✗	✓
PPT(X)	✗	✓
SVG	✓	✓
VSD(X)	✓	✗
Other	✗	✗

Table 9.3.: Visualization Import/Export File Formats (BiZZdesign Architect)

### 9.3. Visualization Configuration

#### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✓
Data Filter	✓
Other	✗

**Table 9.4.:** Binding (BiZZdesign Architect)

#### Generation Approach

Model-Driven	✓
Form-Based	✓
Scripting	✓
Manual Drawing	✓
Other	✗

**Table 9.5.:** Visualization Generation Approach (BiZZdesign Architect)

#### Visual Customization and Layouting

Customization	Caption	✓
	Color	✓
	Orientation	✓
	Position	✓
	Shape	✓
	Size	✓
	Other	✗
Layout	Automated	✓
	Manual	✓
	Other	✗

**Table 9.6.:** Visual Customization (BiZZdesign Architect)

## Import/Export of Visualization Configurations

Format	Import	Export
CSV	✓	✓
JSON	✗	✗
ODBC	✗	✗
XMI	✓	✓
XML	✓	✓
XLS(X)	✓	✓
TXT	✓	✓
Other	✓	✓

**Table 9.7.:** Configuration Import/Export (BiZZdesign Architect)

## 9.4. Information Model

### Information Model Type

Full Schema	✓
Configurable Building Blocks	✓
User-defined	✗
Subclassing/class inheritance	✓

**Table 9.8.:** Information Model Type (BiZZdesign Architect)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓	✓	✓	✓	✓	✓
Modify	✓	✓	✓	✓	✓	✓
Delete	✓	✓	✓	✓	✓	✓
Copy	✓	✓	✓	✓	✓	✓
Merge	✓	✓	✓	✓	✓	✓
Move	✓	✓	✓	✓	✓	✓

**Table 9.9.:** Information Model Flexibility (BiZZdesign Architect)

## 9.5. Interoperability

### Import Mechanisms

Pull	✓
Push	✗
Other	✗

**Table 9.10.:** Import Mechanisms (BiZZdesign Architect)

### Third Party Tools

Business Intelligence Tools	✓
Business Process Engines	✓
Change Management Tools	✓
Cloud Services	✗
Configuration Management Database	✓
Enterprise Service Bus	✓
Infrastructure Monitoring Tools	✓
License/IT Asset Management Tools	✓
Project Portfolio Management Tools	✓
Release Management Tools	✓
Other	✗

**Table 9.11.:** Interoperability with Third Party Tools (BiZZdesign Architect)

**Data & Schema Import/Export**

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	✓	✓	✓	✓
JSON	✗	✗	✗	✗
TXT	✓	✓	✓	✓
XMI	✓	✓	✓	✓
XML	✓	✓	✓	✓
XLS(X)	✓	✓	✗	✗
OData	✗	✗	✗	✗
Other	✗	✓	✗	✗

**Table 9.12.:** Data & Schema Import/Export (BiZZdesign Architect)**Model Element Import/Export**

Model Element	Import	Export
Classes	✓	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	✓	✓
Roles	✓	✓
Other	✓	✓

**Table 9.13.:** Model Element Import/Export (BiZZdesign Architect)

### 9.6. Visualization Examples of BiZZdesign Architect

BiZZdesign  
EA Tool  
Suite

Property table: functional\_quality, technical\_quality, operational\_since, ...

	functional_quality	technical_quality	operational_since	online_batch	end_of_life
Profit Enterprise Architecture					
Applications					
Acceptation system	medium	medium	Invalid date	online	01-09-2009
Administration system	unknown	medium	Invalid date	batch	10-07-2010
Assessment system	low	medium	Invalid date	unknown	31-12-2011
Customer administration system	low	medium	Invalid date	batch	10-07-2010
Document Information System	medium	high	01-01-2003	unknown	01-01-2012
Intermediary administration application	unknown	unknown	Invalid date	batch	01-09-2009
Intermediary administration module	unknown	low	Invalid date	batch	10-07-2010
Module customer data	medium	unknown	Invalid date	unknown	01-01-2010
Payment system	low	low	01-01-1990	batch	31-12-2008
Product module	unknown	medium	Invalid date	online	10-07-2009
Registration system	high	high	01-07-2001	online	30-11-2013

Print... Copy Copy + Refresh Default Landscape colours Change table...

Figure 9.2.: Matrix of the BiZZdesign Architect

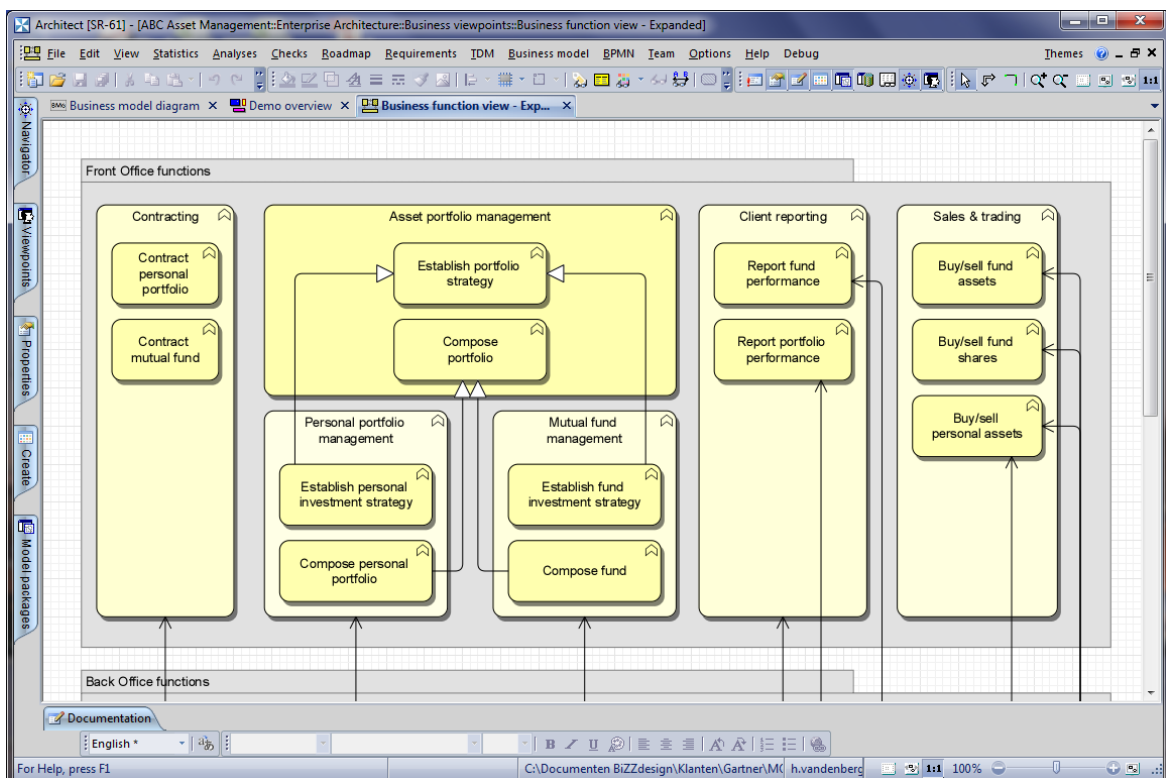


Figure 9.3.: Cluster Map of the BiZZdesign Architect

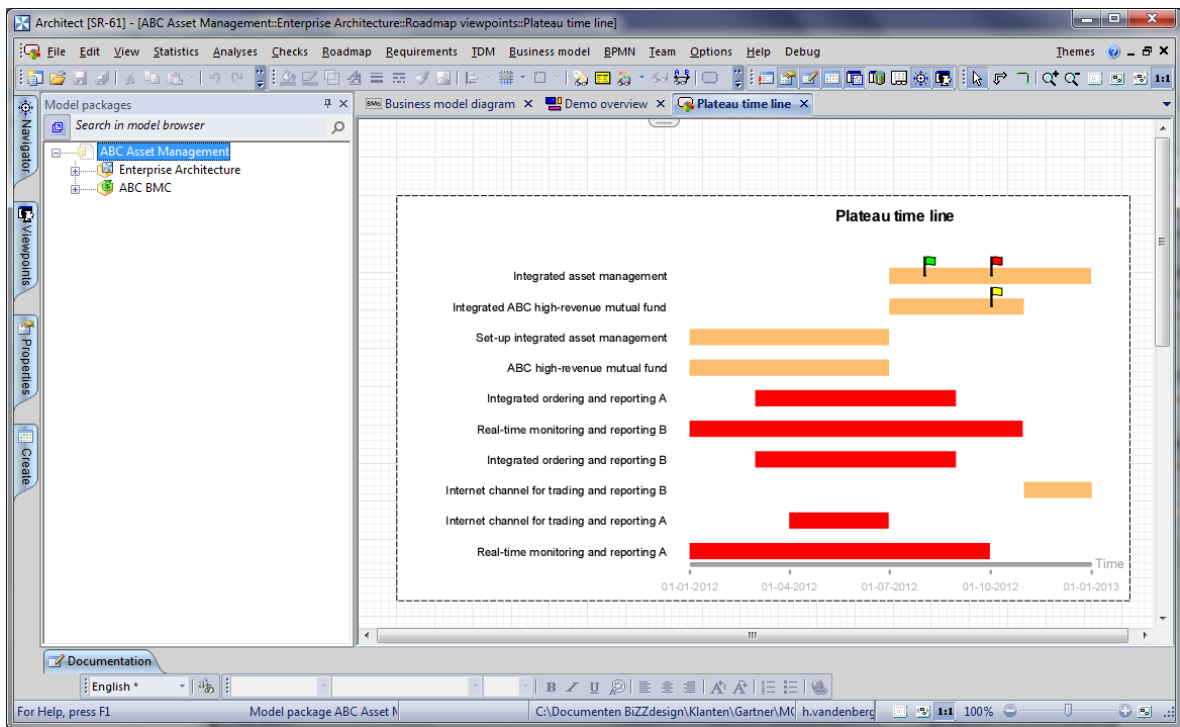


Figure 9.4.: Timeline of the BiZZdesign Architect

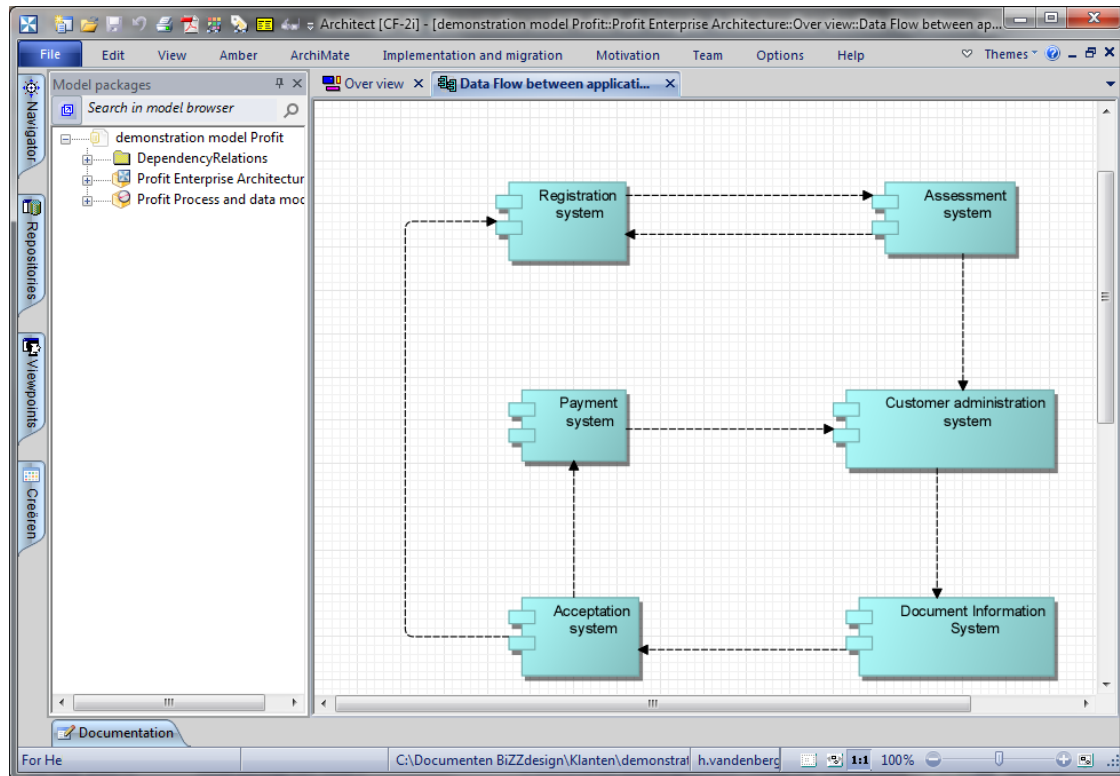


Figure 9.5.: Flow Diagram of the BiZZdesign Architect



## 9. BiZZdesign Architect (BiZZdesign)

BiZZdesign  
EA Tool  
Suite

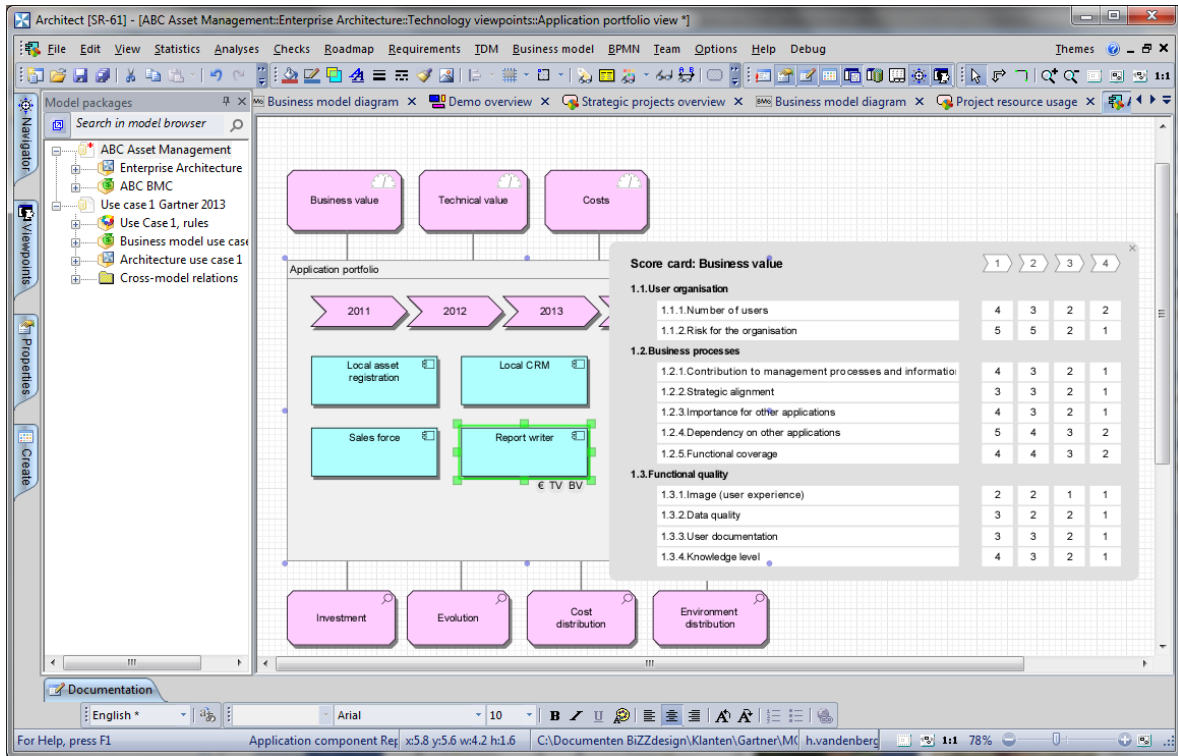


Figure 9.6.: List of the BiZZdesign Architect

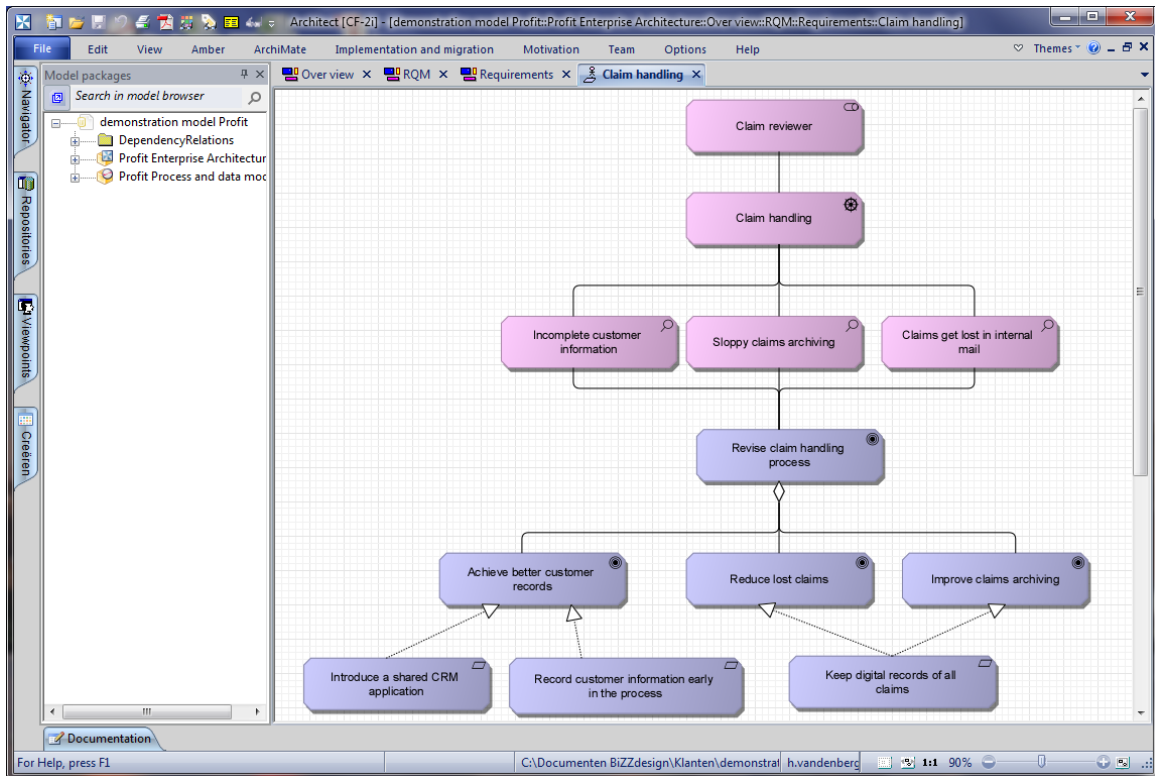
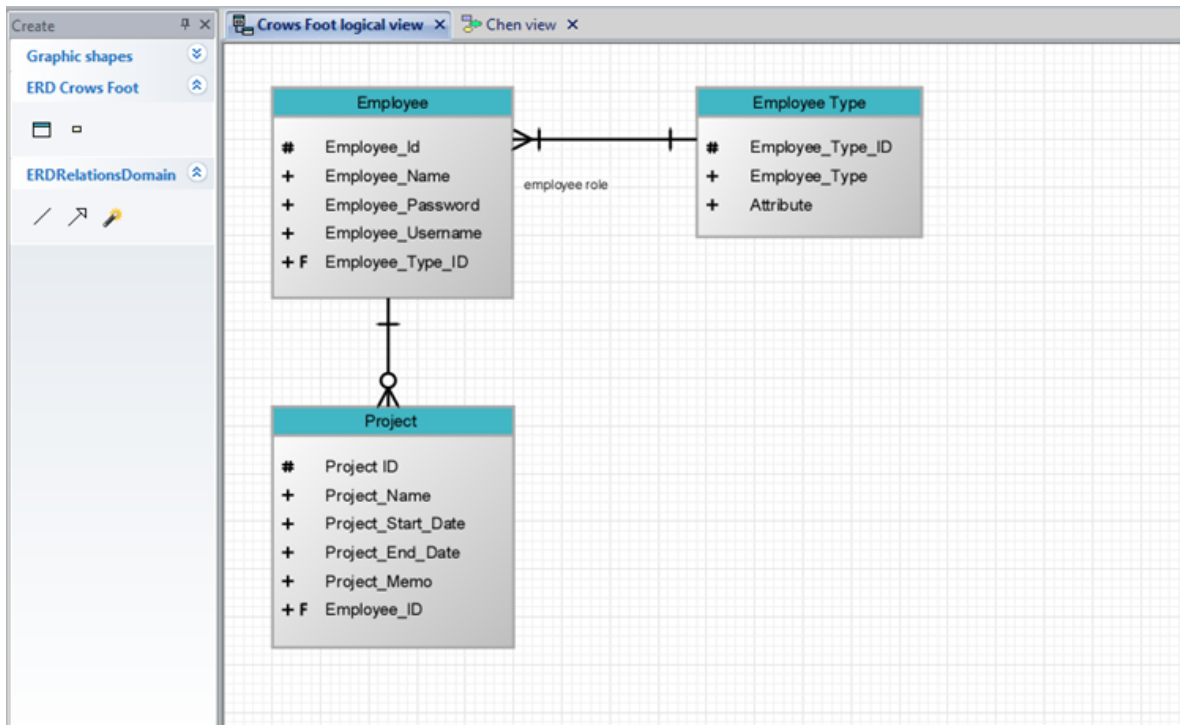


Figure 9.7.: Graph of the BiZZdesign Architect



BiZZdesign  
EA Tool  
Suite

Figure 9.8.: ER Diagram of the BiZZdesign Architect

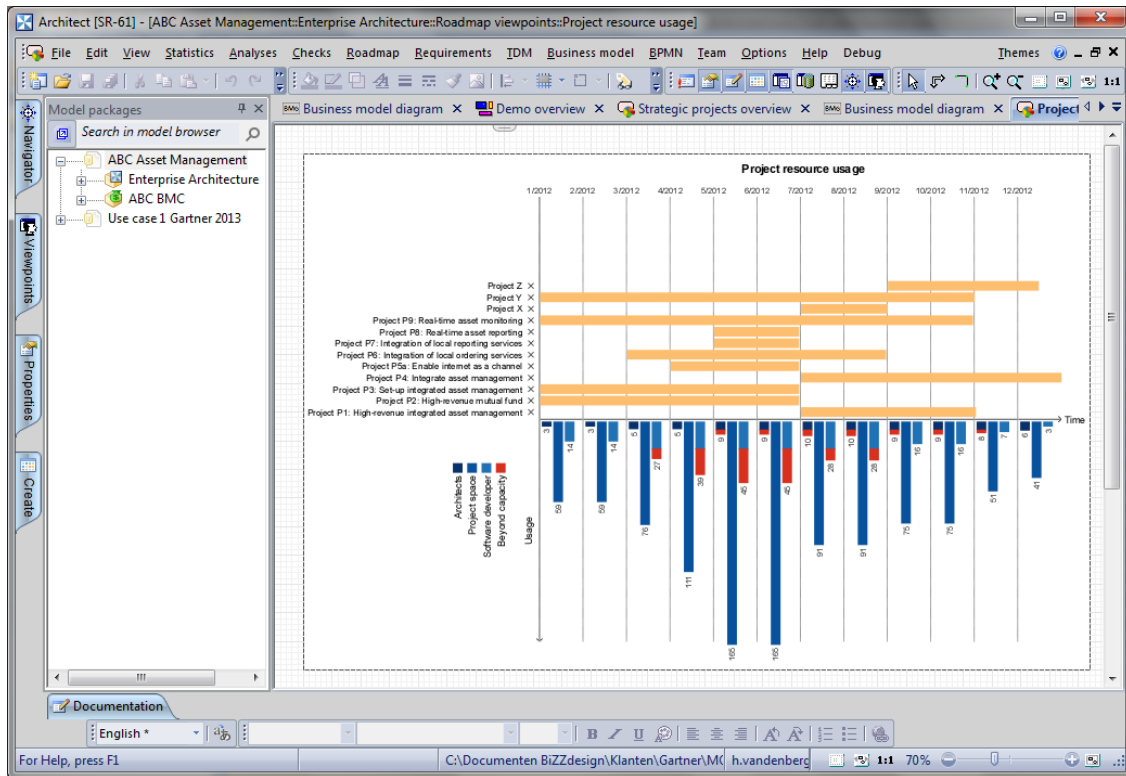


Figure 9.9.: Bar Chart of the BiZZdesign Architect

## 9. BiZZdesign Architect (BiZZdesign)

BiZZdesign  
EA Tool  
Suite

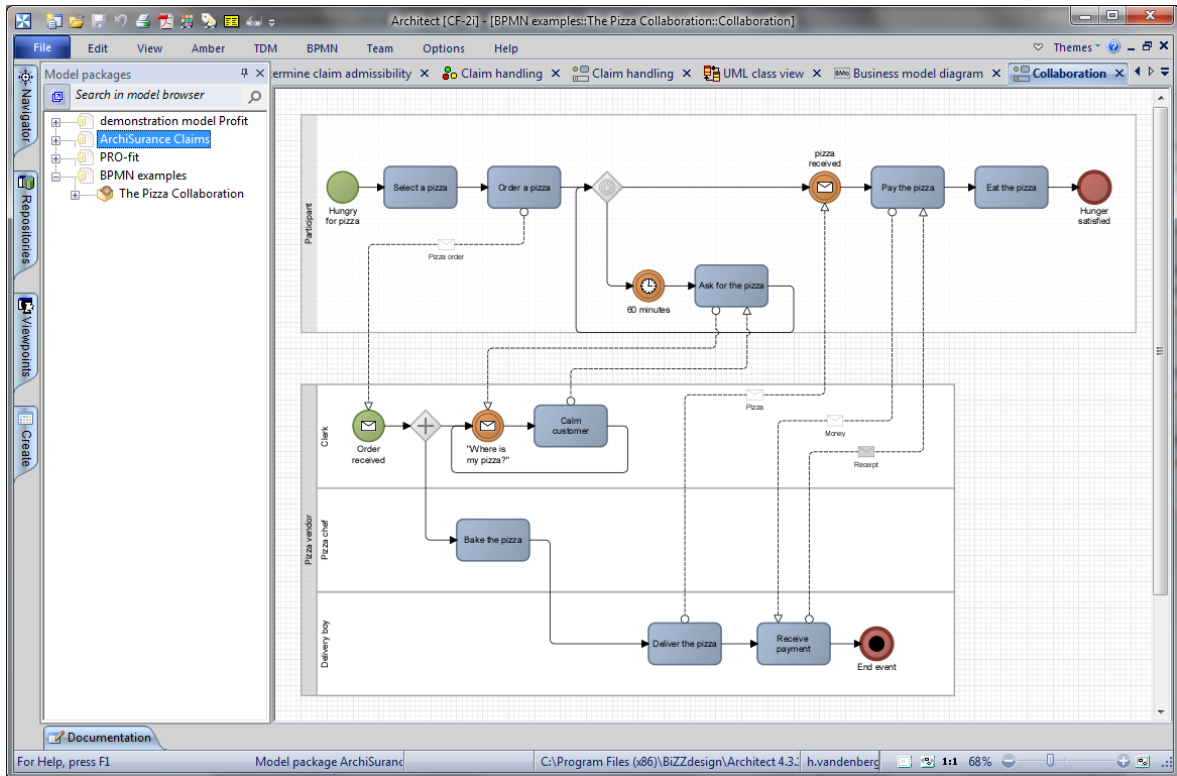


Figure 9.10.: BPMN Diagram of the BiZZdesign Architect

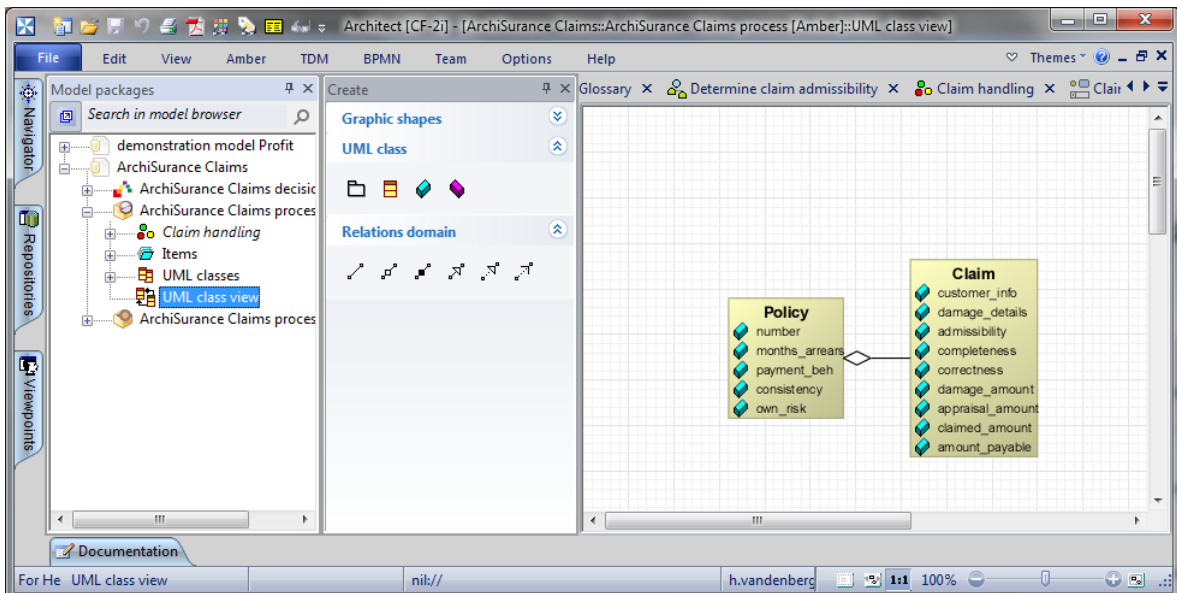


Figure 9.11.: UML Diagram of the BiZZdesign Architect

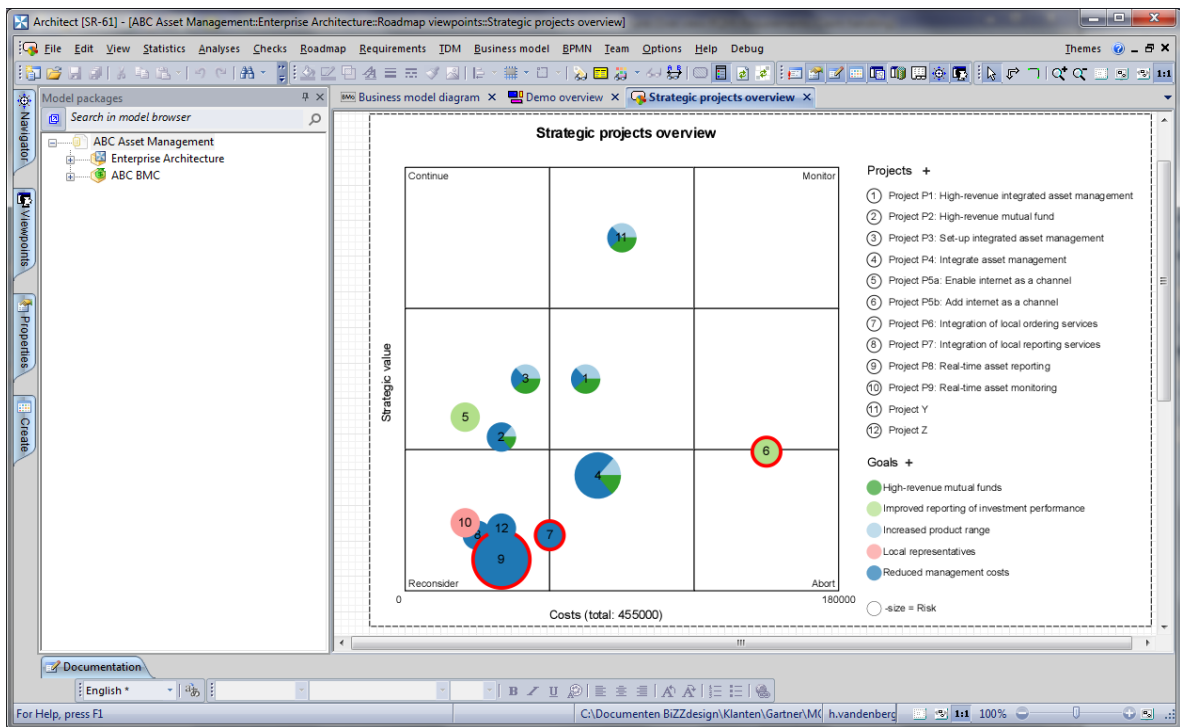


Figure 9.12.: Bubble Chart of the BiZZdesign Architect

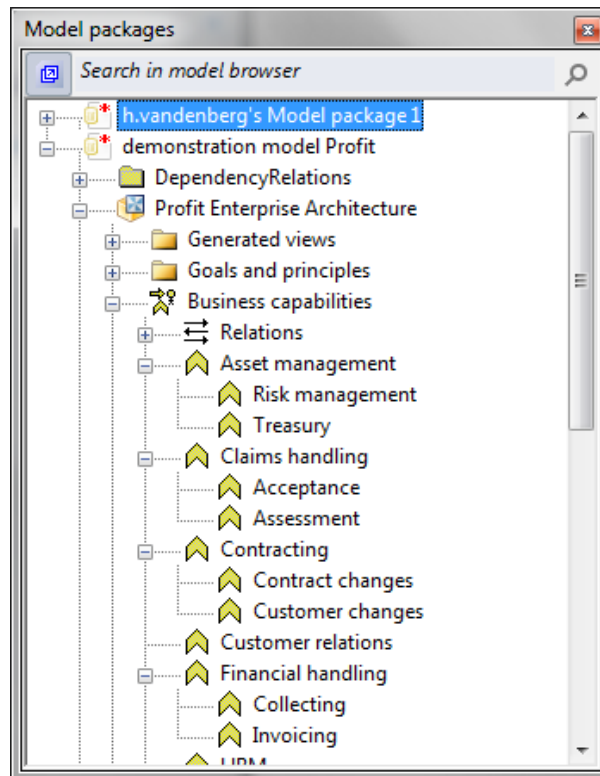


Figure 9.13.: Treeview of the BiZZdesign Architect

## 9. BiZZdesign Architect (BiZZdesign)

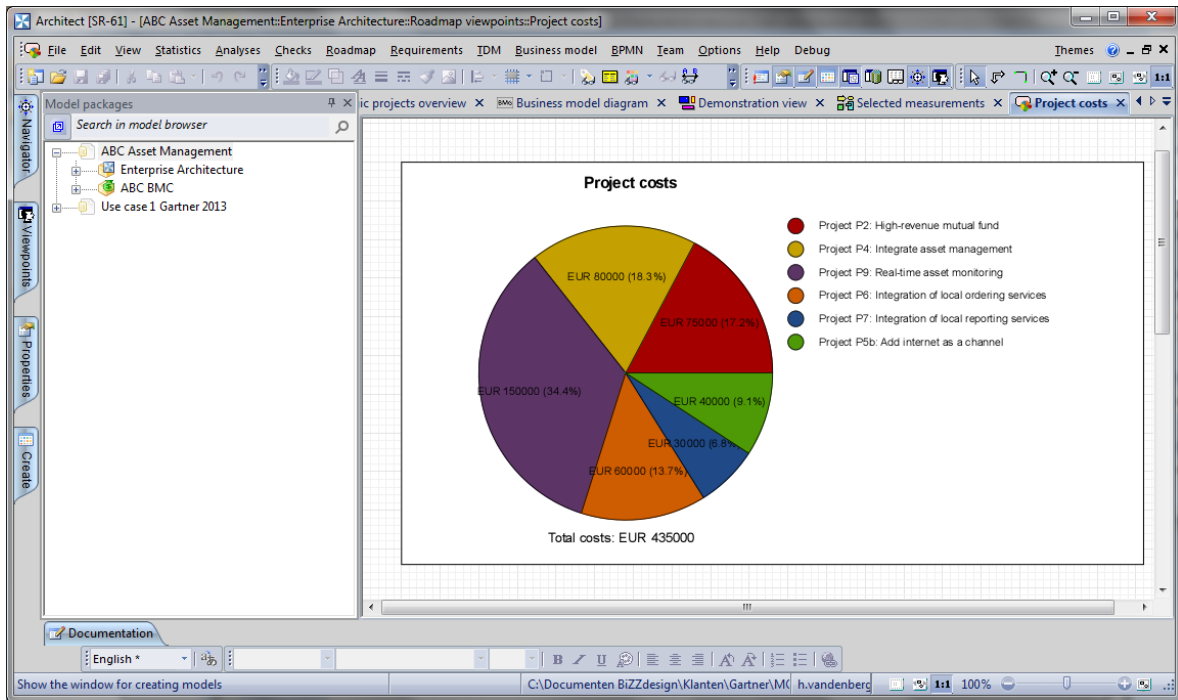


Figure 9.14.: Pie Chart of the BiZZdesign Architect

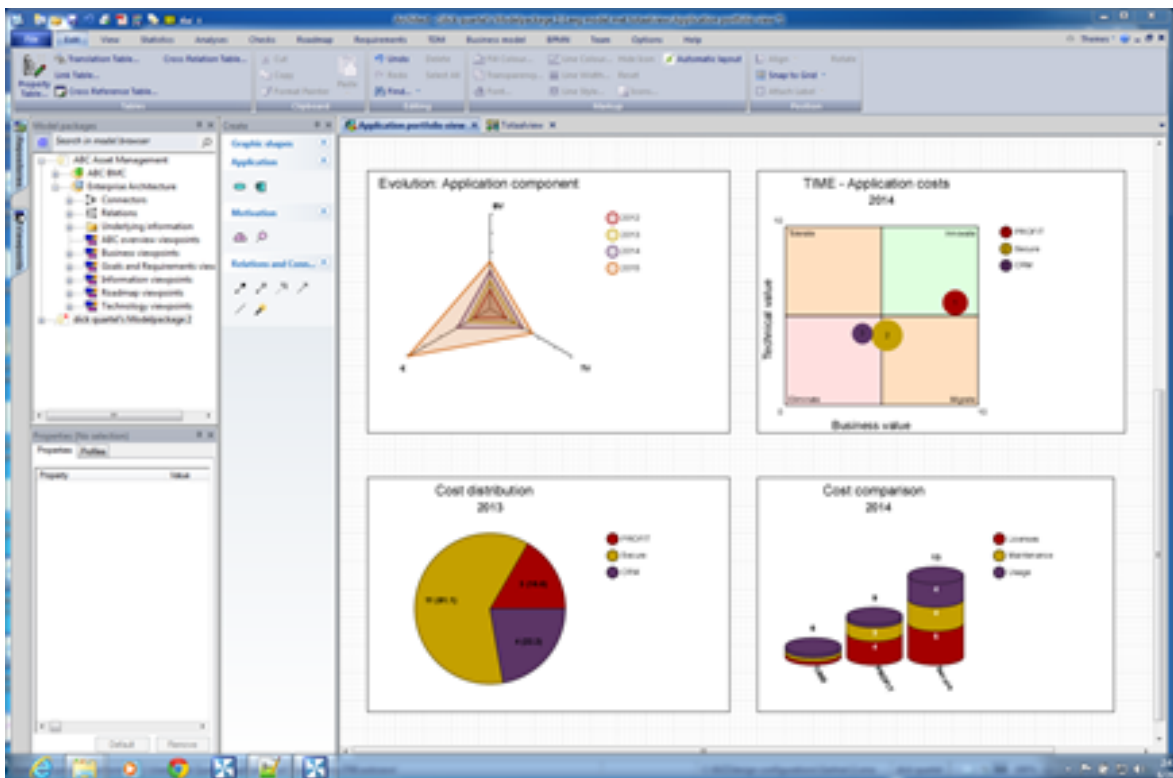


Figure 9.15.: Dashboard of the BiZZdesign Architect

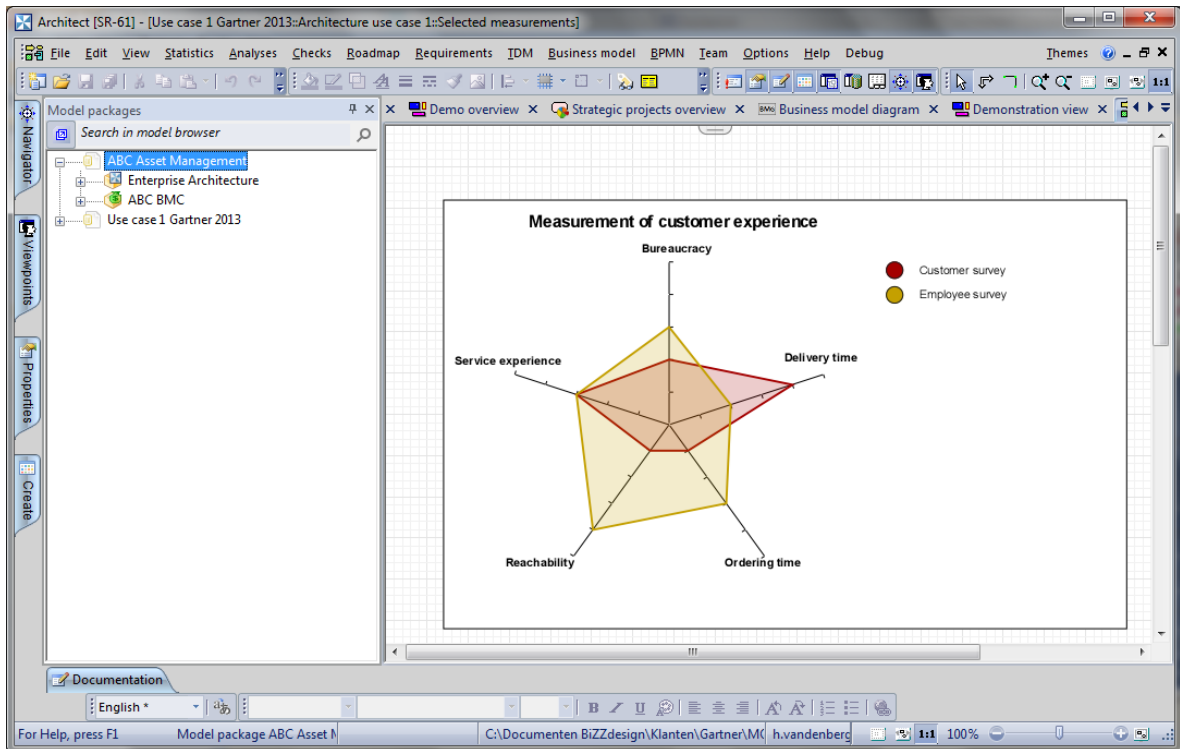


Figure 9.16.: Radar Diagram of the BiZZdesign Architect

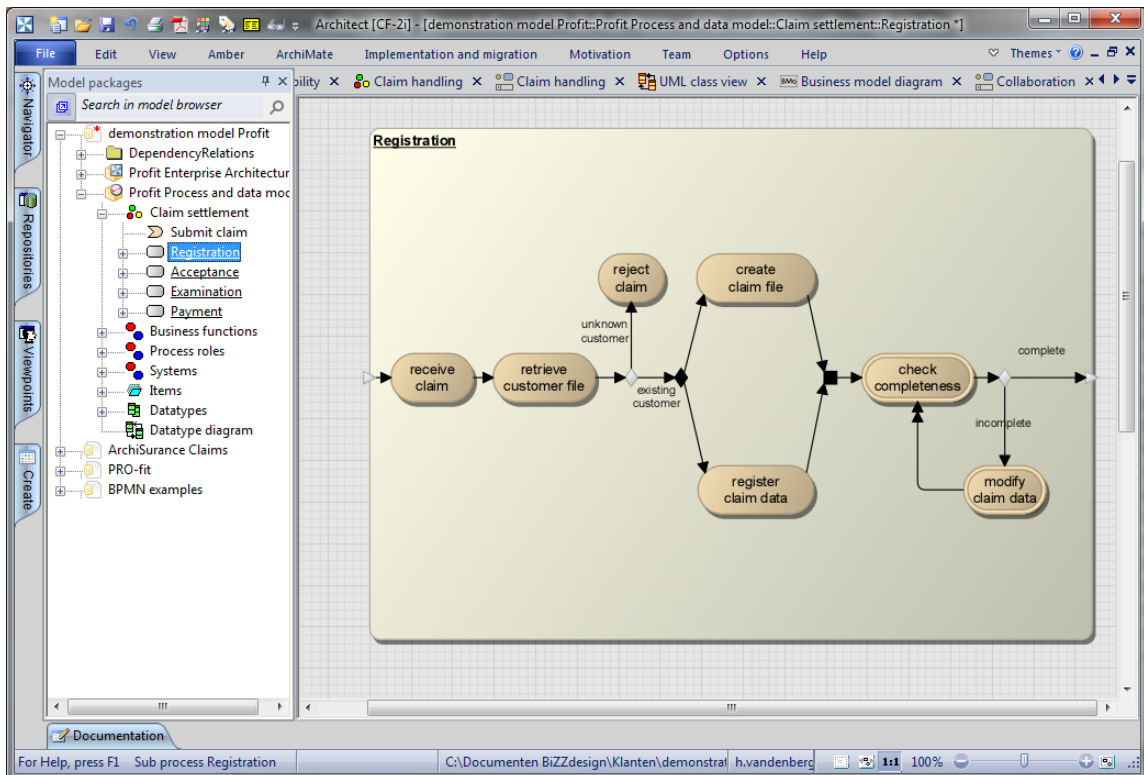


Figure 9.17.: EPC Diagram of the BiZZdesign Architect

## 9. BiZZdesign Architect (BiZZdesign)

BiZZdesign  
EA Tool  
Suite

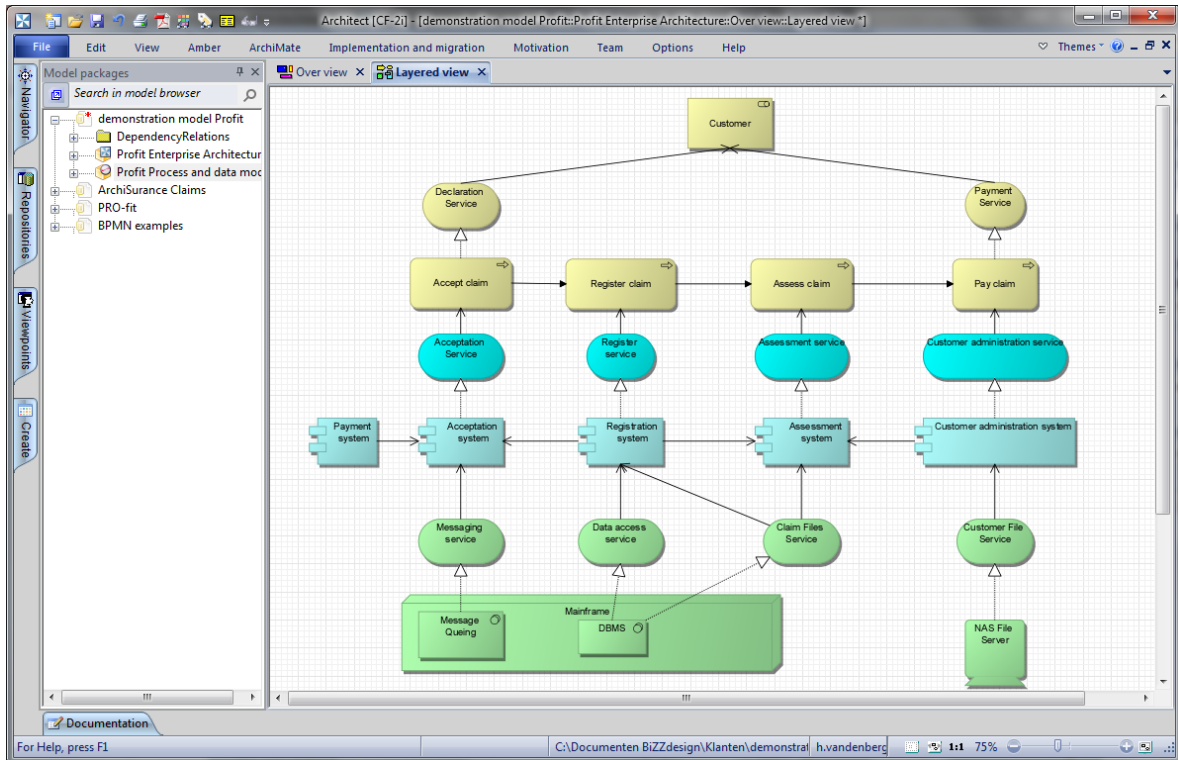


Figure 9.18.: ArchiMate Diagram of the BiZZdesign Architect



Figure 9.19.: Line Chart of the BiZZdesign Architect

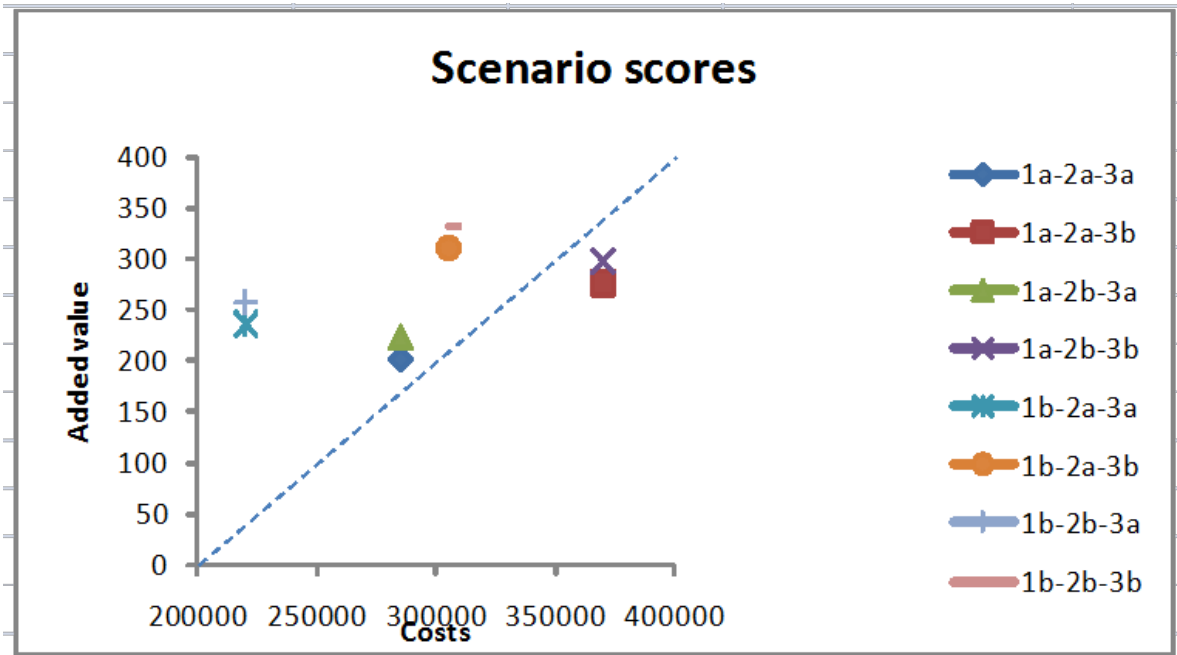


Figure 9.20.: Scatter Chart of the BiZZdesign Architect

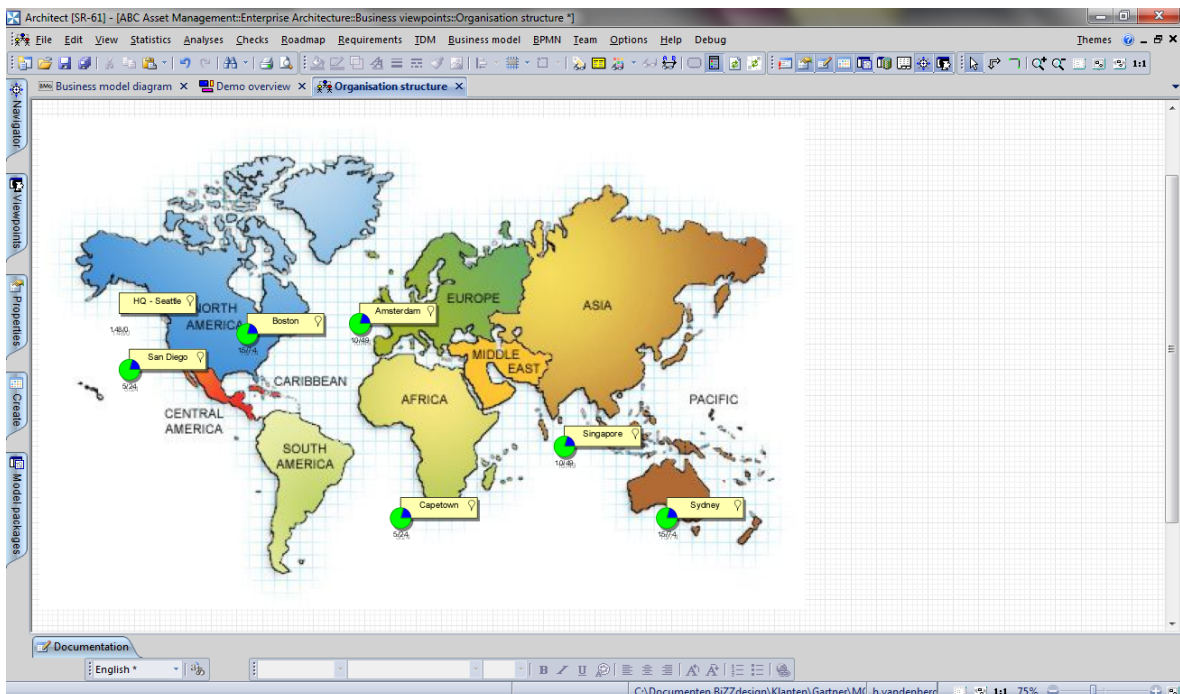


Figure 9.21.: Geographic Map of the BiZZdesign Architect



## 9. BiZZdesign Architect (BiZZdesign)

BiZZdesign  
EA Tool  
Suite

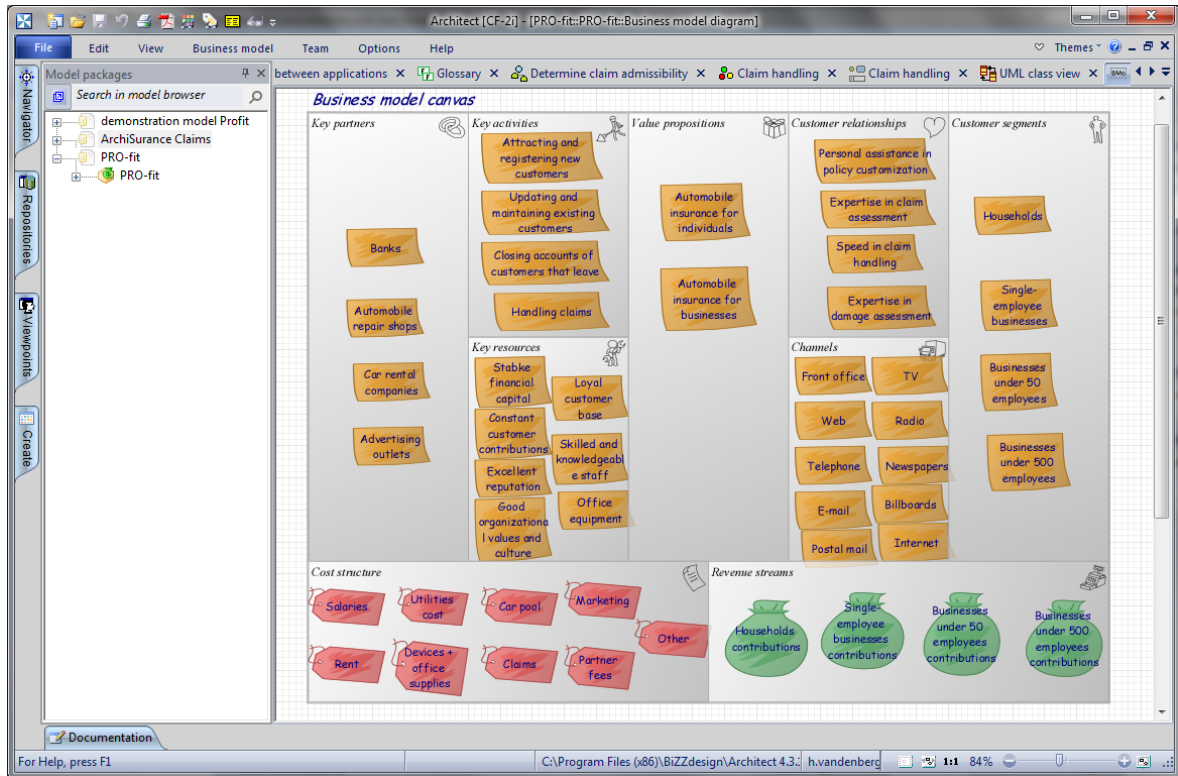


Figure 9.22.: Business Model Canvas of the BiZZdesign Architect

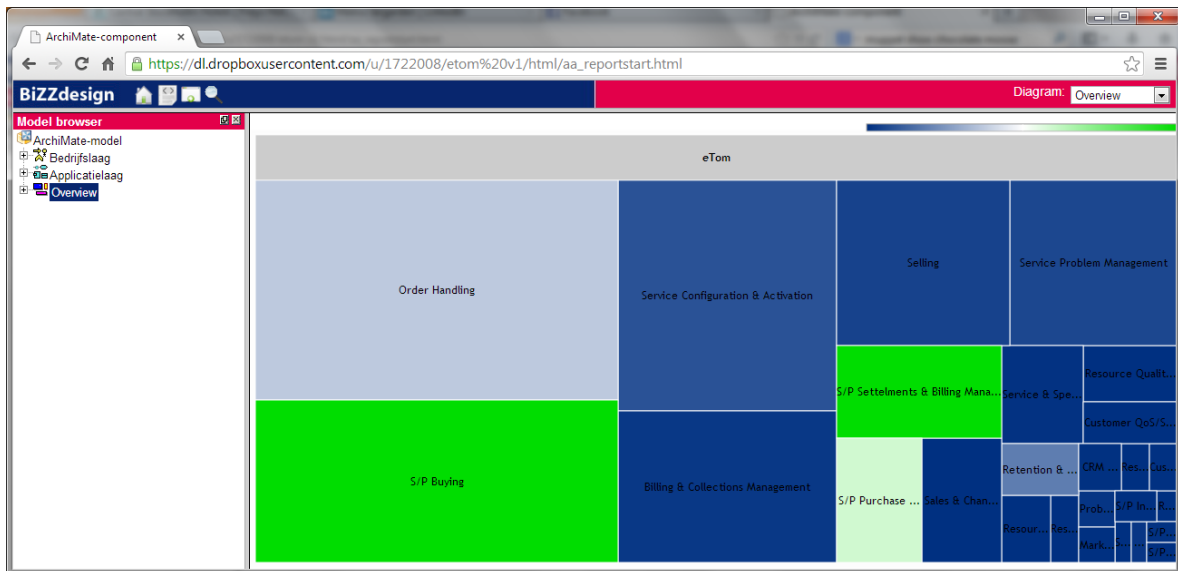


Figure 9.23.: Treemap of the BiZZdesign Architect



BiZZdesign  
EA Tool  
Suite

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**Corporate Modeler Suite (Casewise)**

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## 10. Corporate Modeler Suite (Casewise)

Casewise Ltd was founded in 1989 and has more than 20 years of experience in the EA domain. The company is vendor of Corporate Modeler Suite which is offered in version 2011.4 at the editorial deadline. Corporate Modeler Suite supports 10 out of 26 visualization types. At the editorial deadline Casewise Ltd could not provide us with high resolution screenshots. However, we included preliminary versions that have been provided by Casewise Ltd in the course of the initial EA Tool Vendor Survey.

Casewise Ltd advocates a top-down approach and thus can be regarded more business focused than other tools. This is also reflected in the companies slogan “Generating insights into your business — not just models”.

### 10.1. Background Information

Vendor	Casewise Ltd
Founding year	1989
Years active in EA market	20
Number of employees	51–250
URL	www.casewise.com

**Table 10.1.:** Vendor Information of Casewise Ltd

Tool Name	Corporate Modeler Suite	
Version	2011.4	
Client Platforms	✓ Windows	✗ Linux
	✗ MacOS	✓ Browser
	✗ iOS	✗ Android
	✗ Windows Mobile	✗ Other
Deployment Approach	✓ Desktop	✗ SaaS
	✓ Server	✗ Other
EA Frameworks	✓ ArchiMate	✓ NAF
	✓ DoDAF	✓ PEAf
	✓ IAF	✓ TOGAF
	✓ MODAF	✓ Zachman
	✓ Other	

**Table 10.2.:** General Information (Corporate Modeler Suite)

## 10.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	✗	✓
DOC(X)	✗	✓
HTML	✗	✓
JPG/JPEG	✗	✓
PDF	✗	✓
PNG	✗	✓
PPT(X)	✗	✓
SVG	✗	✓
VSD(X)	✗	✓
Other	✗	✓

Corporate  
Modeler  
Suite

**Table 10.3.:** Visualization Import/Export File Formats (Corporate Modeler Suite)

## 10.3. Visualization Configuration

### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✓
Data Filter	✗
Other	✗

**Table 10.4.:** Binding (Corporate Modeler Suite)

### Generation Approach

Corporate  
Modeler  
Suite

Model-Driven	✓
Form-Based	✓
Scripting	✗
Manual Drawing	✓
Other	✗

**Table 10.5.:** Visualization Generation Approach (Corporate Modeler Suite)

### Visual Customization and Layouting

Customization	Caption	✗
	Color	✓
	Orientation	✓
	Position	✓
	Shape	✓
	Size	✓
	Other	✗
Layout	Automated	✓
	Manual	✓
	Other	✗

**Table 10.6.:** Visual Customization (Corporate Modeler Suite)

## Import/Export of Visualization Configurations

Format	Import	Export
CSV	✓	✓
JSON	✗	✗
ODBC	✗	✗
XMI	✗	✗
XML	✓	✓
XLS(X)	✓	✓
TXT	✗	✗
Other	✓	✓

Corporate  
Modeler  
Suite

**Table 10.7.:** Configuration Import/Export (Corporate Modeler Suite)

## 10.4. Information Model

### Information Model Type

Full Schema	✗
Configurable Building Blocks	✓
User-defined	✗
Subclassing/class inheritance	✗

**Table 10.8.:** Information Model Type (Corporate Modeler Suite)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓	✓	✓	✗	✓	✓
Modify	✓	✓	✓	✗	✓	✓
Delete	✓	✓	✓	✗	✓	✓
Copy	✓	✓	✓	✗	✓	✓
Merge	✗	✗	✗	✗	✗	✗
Move	✓	✓	✓	✗	✓	✓

**Table 10.9.:** Information Model Flexibility (Corporate Modeler Suite)



## 10.5. Interoperability

### Import Mechanisms

Corporate  
Modeler  
Suite

Pull	✓
Push	✓
Other	✓

**Table 10.10.:** Import Mechanisms (Corporate Modeler Suite)

### Third Party Tools

Business Intelligence Tools	✓
Business Process Engines	✓
Change Management Tools	✓
Cloud Services	✓
Configuration Management Database	✓
Enterprise Service Bus	✓
Infrastructure Monitoring Tools	✓
License/IT Asset Management Tools	✓
Project Portfolio Management Tools	✓
Release Management Tools	✓
Other	✓

**Table 10.11.:** Interoperability with Third Party Tools (Corporate Modeler Suite)

**Data & Schema Import/Export**

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	✓	✓	✗	✗
JSON	✗	✗	✗	✗
TXT	✗	✗	✗	✗
XMI	✗	✗	✗	✗
XML	✓	✓	✓	✓
XLS(X)	✓	✓	✗	✗
OData	✗	✗	✗	✗
Other	✓	✓	✓	✓

Corporate  
Modeler  
Suite**Table 10.12.:** Data & Schema Import/Export (Corporate Modeler Suite)**Model Element Import/Export**

Model Element	Import	Export
Classes	✓	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	✓	✓
Roles	✓	✓
Other	✗	✗

**Table 10.13.:** Model Element Import/Export (Corporate Modeler Suite)

## 10.6. Visualization Examples of Corporate Modeler Suite

Corporate Modeler Suite

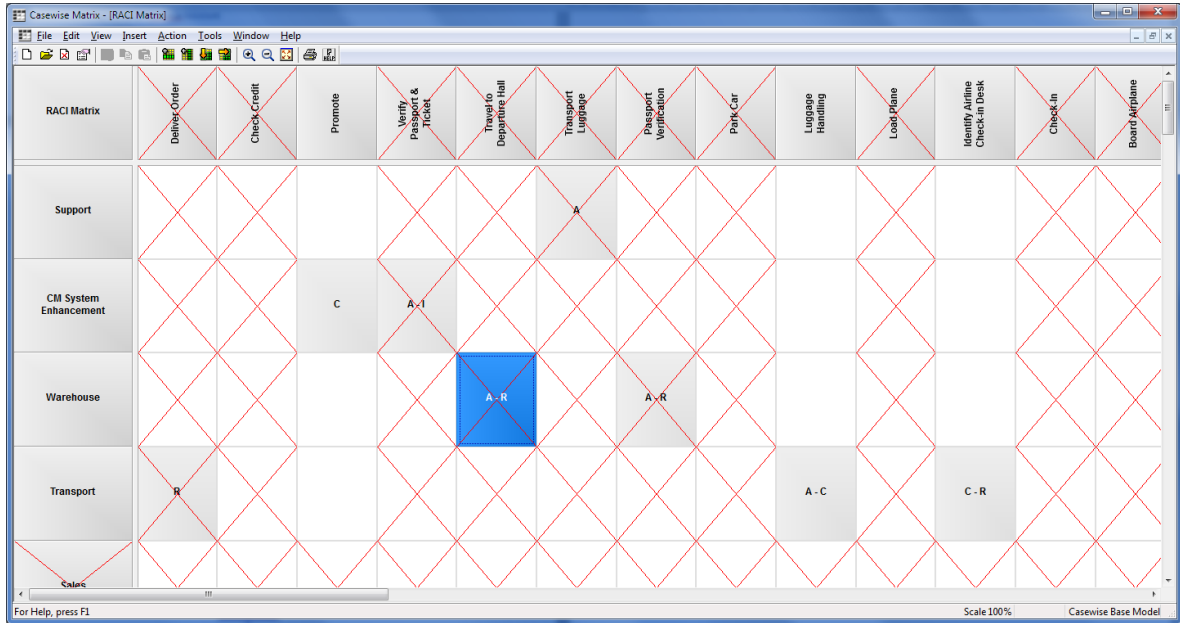


Figure 10.1.: Matrix of the Corporate Modeler Suite

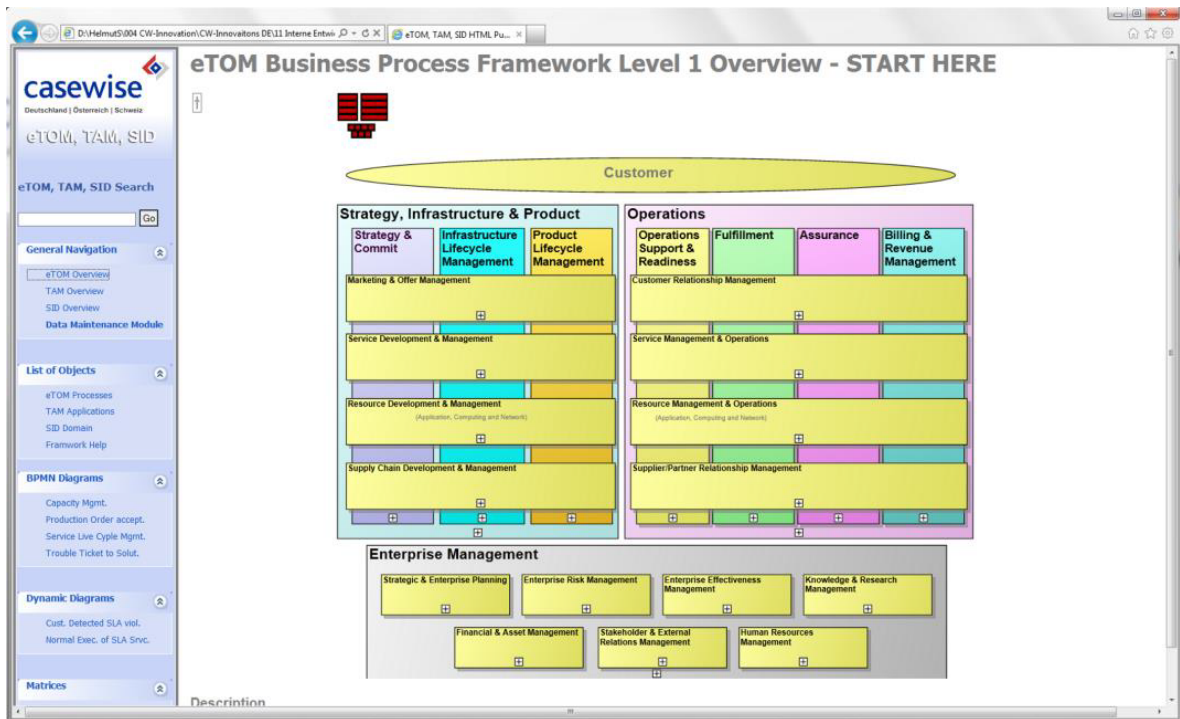
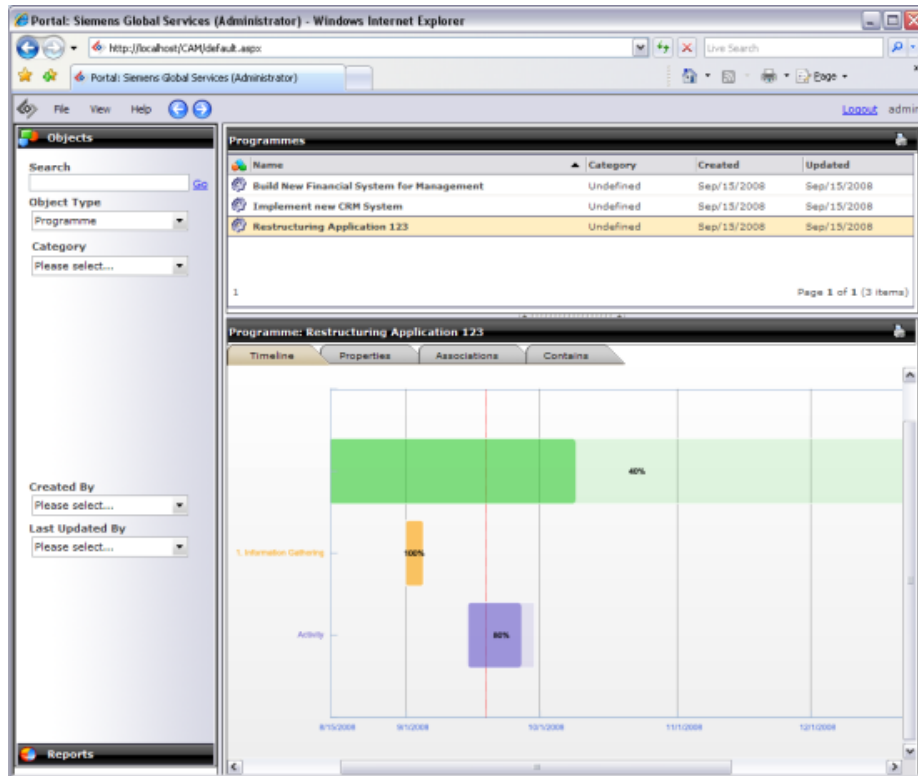


Figure 10.2.: Cluster Map of the Corporate Modeler Suite

10. Corporate Modeler Suite (Casewise)



Corporate Modeler Suite

Figure 10.3.: Timeline of the Corporate Modeler Suite

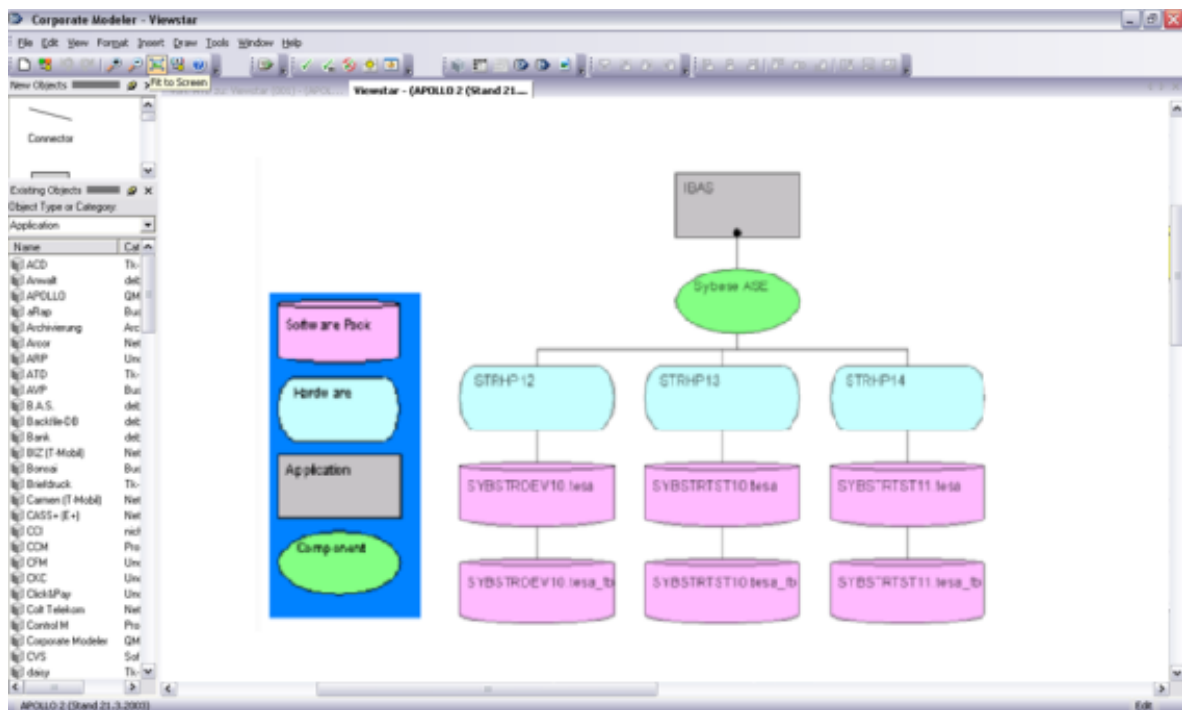


Figure 10.4.: Graph of the Corporate Modeler Suite

## 10. Corporate Modeler Suite (Casewise)

Corporate  
Modeler  
Suite

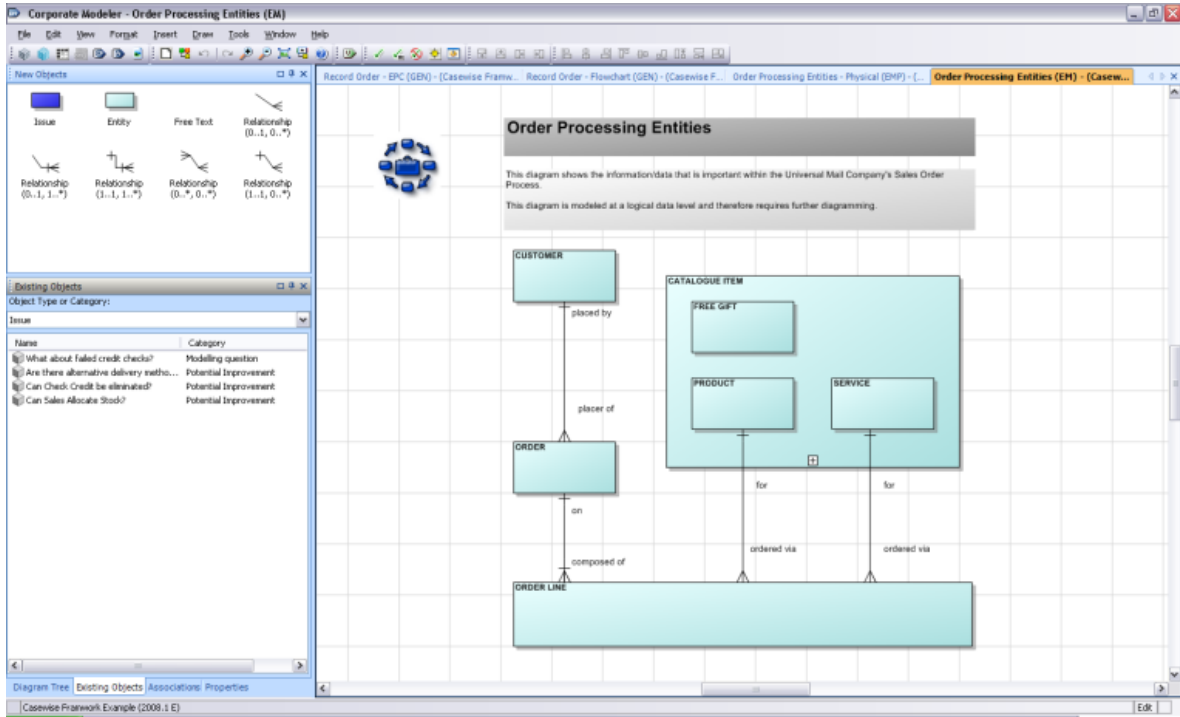


Figure 10.5.: ER Diagram of the Corporate Modeler Suite

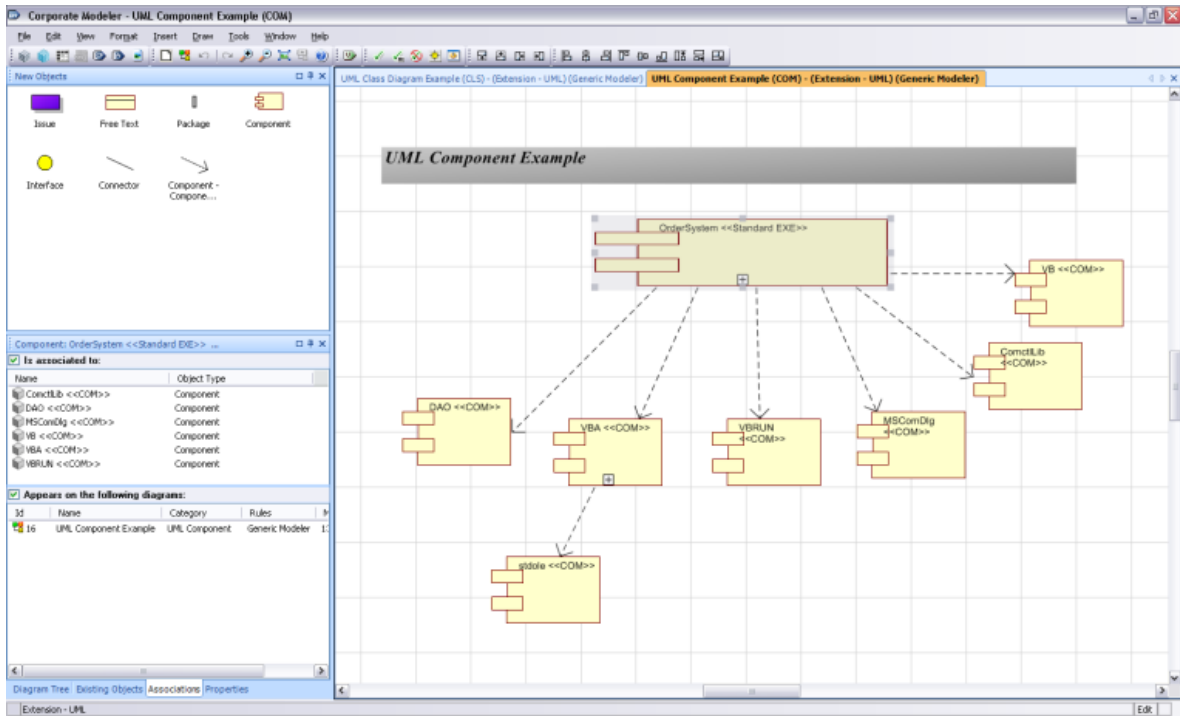
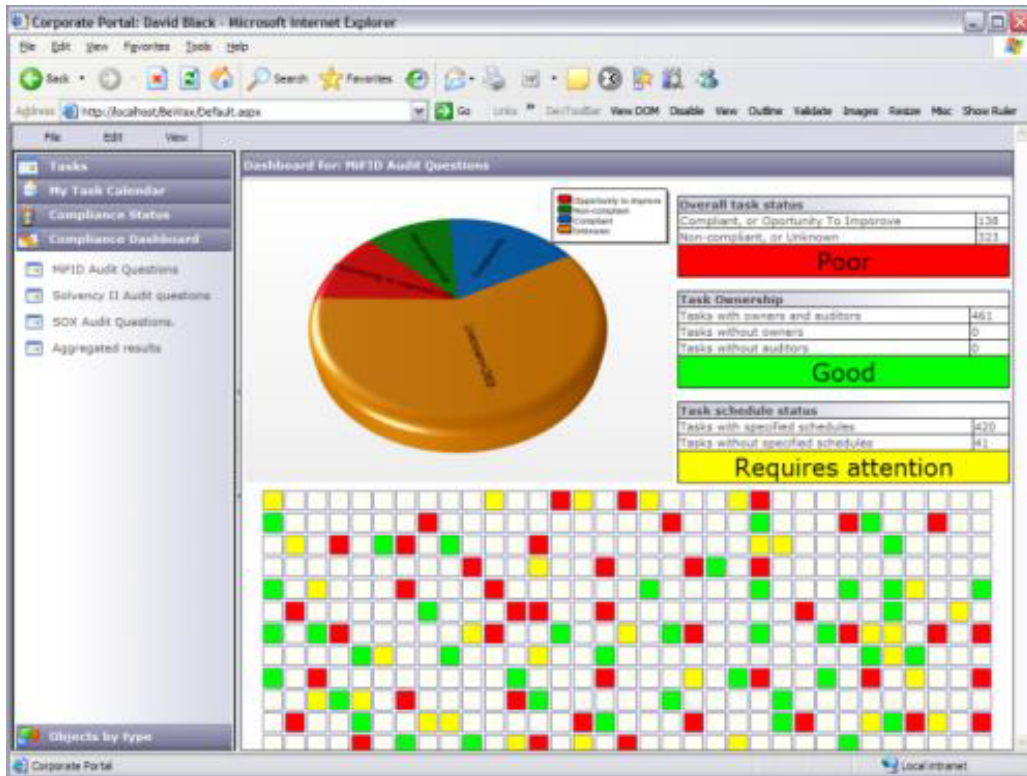


Figure 10.6.: UML Diagram of the Corporate Modeler Suite



Corporate Modeler Suite

Figure 10.7.: Dashboard of the Corporate Modeler Suite

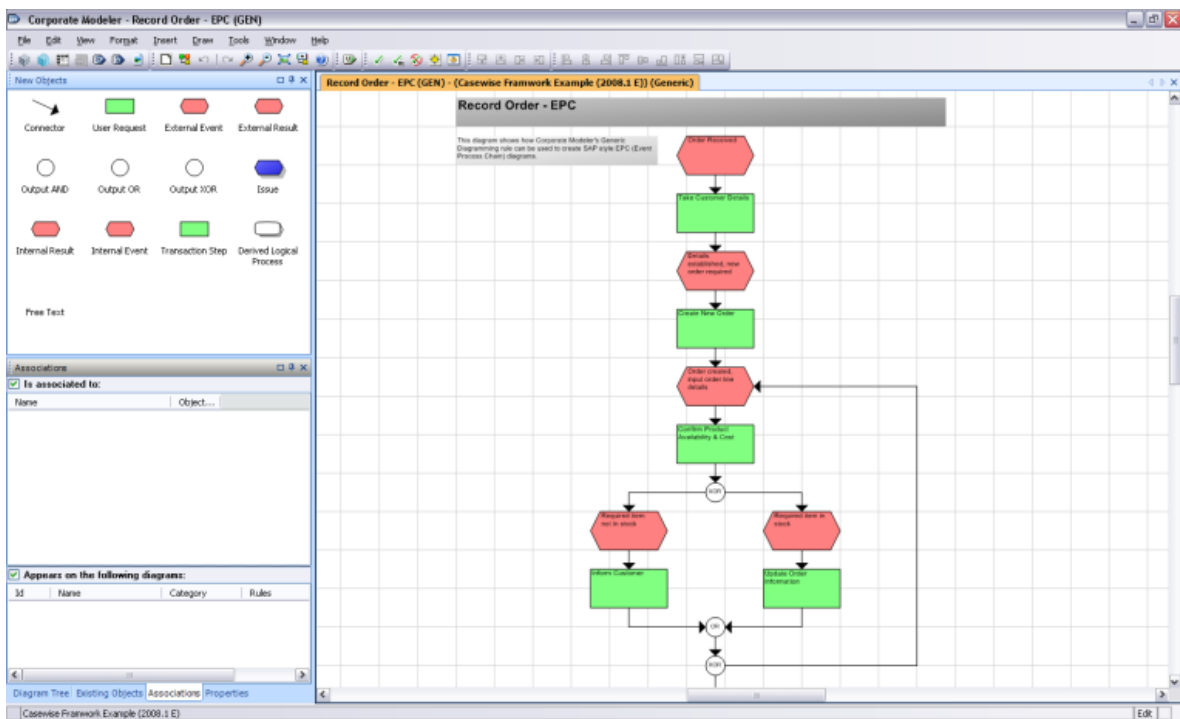


Figure 10.8.: EPC Diagram of the Corporate Modeler Suite

## 10. Corporate Modeler Suite (Casewise)

Corporate  
Modeler  
Suite

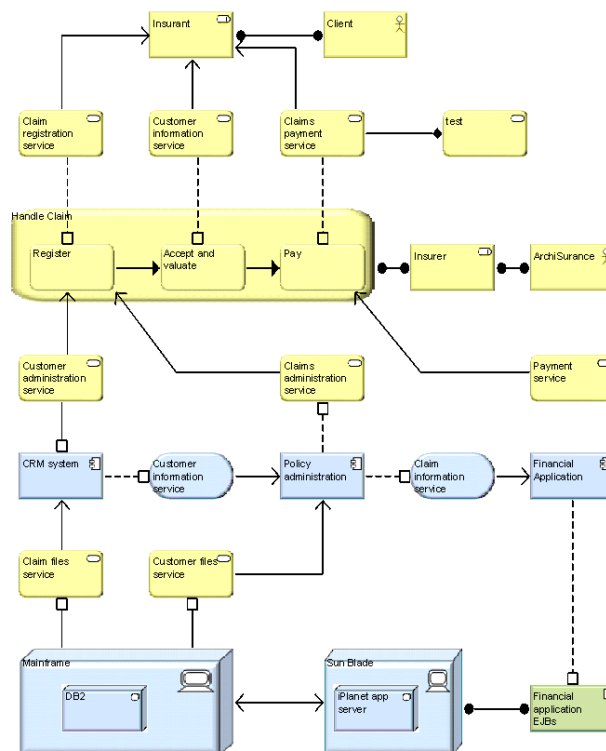


Figure 10.9.: ArchiMate Diagram of the Corporate Modeler Suite

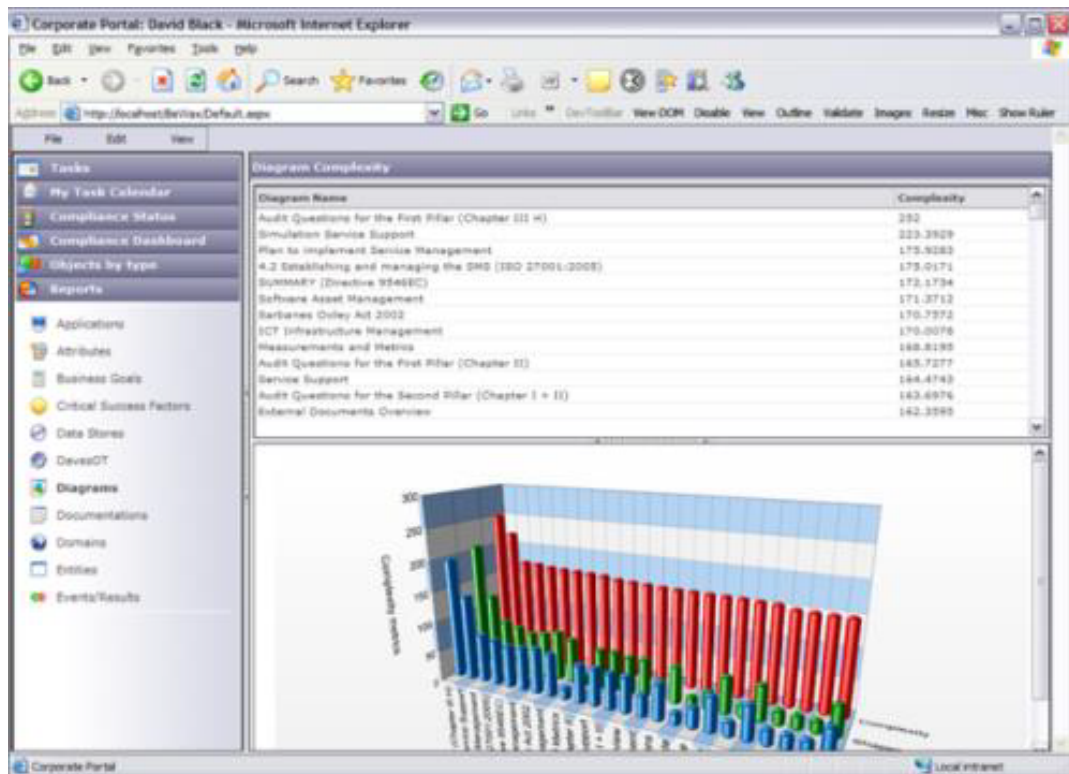


Figure 10.10.: 3D Visualization of the Corporate Modeler Suite

## Enterprise Architect (SparxSystems Ltd)

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## 11. Enterprise Architect (SparxSystems Ltd)

---

Sparx Systems Pty Ltd was founded in 1999 and has more than 10 years of experience in the EA domain. The company is vendor of Enterprise Architect which is offered in version 10 at the editorial deadline. Enterprise Architect supports 10 out of 26 visualization types. Sparx Systems Pty Ltd presents an EA tool that centers around Unified Modeling Language (UML). The extensions made by Sparx Systems Pty Ltd are conform to the UML profile mechanism. Besides UML, further standard notations such as for instance ArchiMate, Business Process Modeling Notation (BPMN), SysML or others are also supported. The Enterprise Architect may not only serve as an EA tool but also is meant to cover modeling needs in the course of requirements engineering and operations. The standard notations can be extended with customized shapes. The Enterprise Architect offers a shape script editor that lets users define custom shapes using a DSL. Besides that, cliparts in terms of metadata, e.g. Windows Metafile (WMF) or Windows Enhanced Metafile (EMF), can be imported to extend the build-in symbols.

Enterprise  
Architect

### 11.1. Background Information

Vendor	Sparx Systems Pty Ltd
Founding year	1999
Years active in EA market	10
Number of employees	11–50
URL	<a href="http://www.sparxsystems.eu">www.sparxsystems.eu</a>

**Table 11.1.:** Vendor Information of Sparx Systems Pty Ltd

Tool Name	Enterprise Architect			
Version	10			
Client Platforms	✓	Windows	✗	Linux
	✗	MacOS	✗	Browser
	✗	iOS	✗	Android
	✗	Windows Mobile	✓	Other
Deployment Approach	✓	Desktop	✗	SaaS
	✓	Server	✗	Other
EA Frameworks	✓	ArchiMate	✓	NAF
	✓	DoDAF	✗	PEAF
	✓	IAF	✓	TOGAF
	✓	MODAF	✓	Zachman
	✓	Other		

Enterprise  
Architect

Table 11.2.: General Information (Enterprise Architect)

## 11.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	✓	✓
DOC(X)	✓	✓
HTML	✓	✓
JPG/JPEG	✓	✓
PDF	✓	✓
PNG	✓	✓
PPT(X)	✓	✗
SVG	✓	✗
VSD(X)	✓	✗
Other	✓	✓

Table 11.3.: Visualization Import/Export File Formats (Enterprise Architect)

### 11.3. Visualization Configuration

#### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✓
Data Filter	✓
Other	✓

**Table 11.4.:** Binding (Enterprise Architect)

#### Generation Approach

Model-Driven	✓
Form-Based	✓
Scripting	✓
Manual Drawing	✓
Other	✗

**Table 11.5.:** Visualization Generation Approach (Enterprise Architect)

#### Visual Customization and Layouting

Customization	Caption	✓
	Color	✓
	Orientation	✓
	Position	✓
	Shape	✓
	Size	✓
	Other	✗
Layout	Automated	✓
	Manual	✓
	Other	✓

**Table 11.6.:** Visual Customization (Enterprise Architect)

### Import/Export of Visualization Configurations

Format	Import	Export
CSV	✓	✓
JSON	✗	✗
ODBC	✓	✗
XMI	✓	✓
XML	✓	✓
XLS(X)	✓	✓
TXT	✓	✓
Other	✓	✓

Enterprise Architect

**Table 11.7.:** Configuration Import/Export (Enterprise Architect)

## 11.4. Information Model

### Information Model Type

Full Schema	✓
Configurable Building Blocks	✓
User-defined	✓
Subclassing/class inheritance	✓

**Table 11.8.:** Information Model Type (Enterprise Architect)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓	✓	✓	✓	✓	✓
Modify	✓	✓	✓	✓	✓	✓
Delete	✓	✓	✓	✓	✓	✓
Copy	✓	✓	✓	✓	✓	✓
Merge	✓	✓	✓	✓	✓	✓
Move	✓	✓	✓	✓	✓	✓

**Table 11.9.:** Information Model Flexibility (Enterprise Architect)

## 11.5. Interoperability

### Import Mechanisms

Pull	✓
Push	✓
Other	✓

**Table 11.10.:** Import Mechanisms (Enterprise Architect)

### Third Party Tools

Business Intelligence Tools	✓
Business Process Engines	✓
Change Management Tools	✓
Cloud Services	✓
Configuration Management Database	✓
Enterprise Service Bus	✓
Infrastructure Monitoring Tools	✓
License/IT Asset Management Tools	✓
Project Portfolio Management Tools	✓
Release Management Tools	✓
Other	✓

**Table 11.11.:** Interoperability with Third Party Tools (Enterprise Architect)

**Data & Schema Import/Export**

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	✓	✓	✓	✓
JSON	✗	✗	✗	✗
TXT	✓	✓	✓	✓
XMI	✓	✓	✓	✓
XML	✓	✓	✓	✓
XLS(X)	✗	✓	✗	✓
OData	✗	✗	✗	✗
Other	✓	✗	✗	✗

**Table 11.12.:** Data & Schema Import/Export (Enterprise Architect)**Model Element Import/Export**

Model Element	Import	Export
Classes	✓	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	✓	✓
Roles	✓	✓
Other	✓	✓

**Table 11.13.:** Model Element Import/Export (Enterprise Architect)

## 11. Enterprise Architect (SparxSystems Ltd)

### 11.6. Visualization Examples of Enterprise Architect

Enterprise Architect

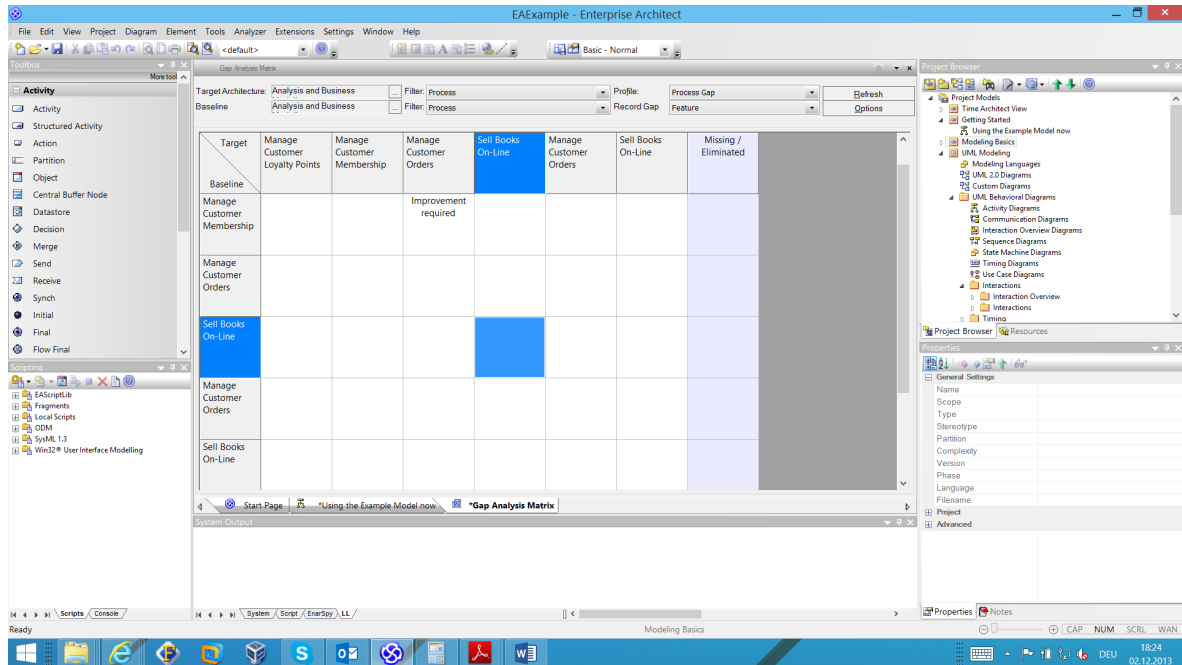


Figure 11.1.: Matrix of the Enterprise Architect

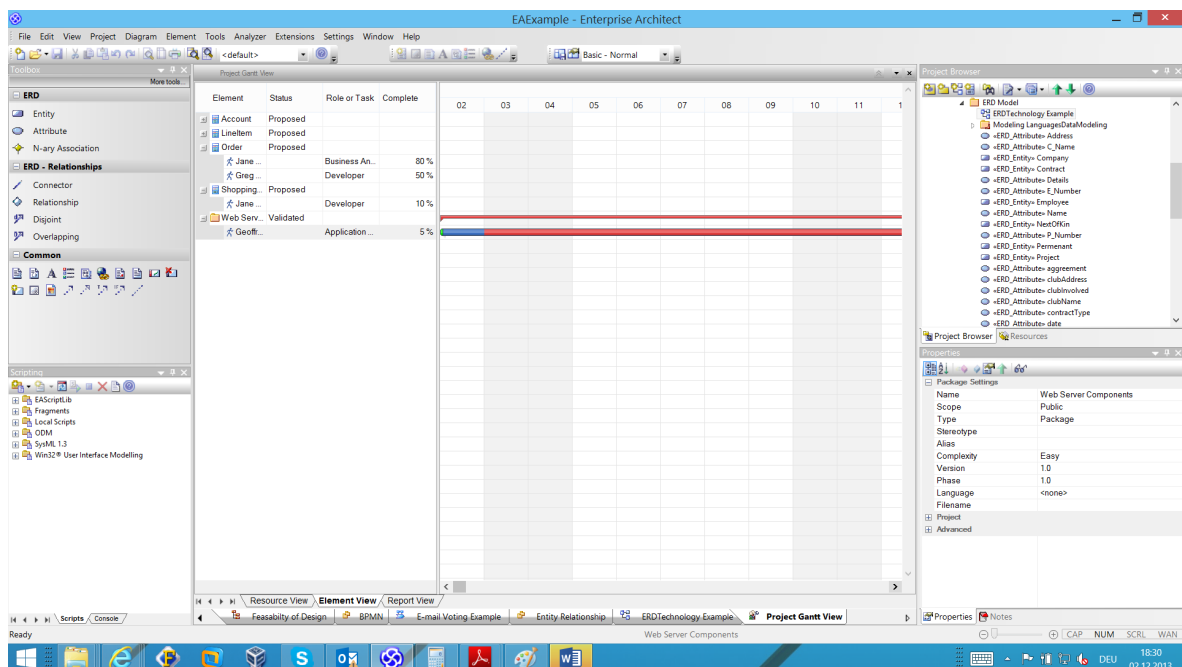
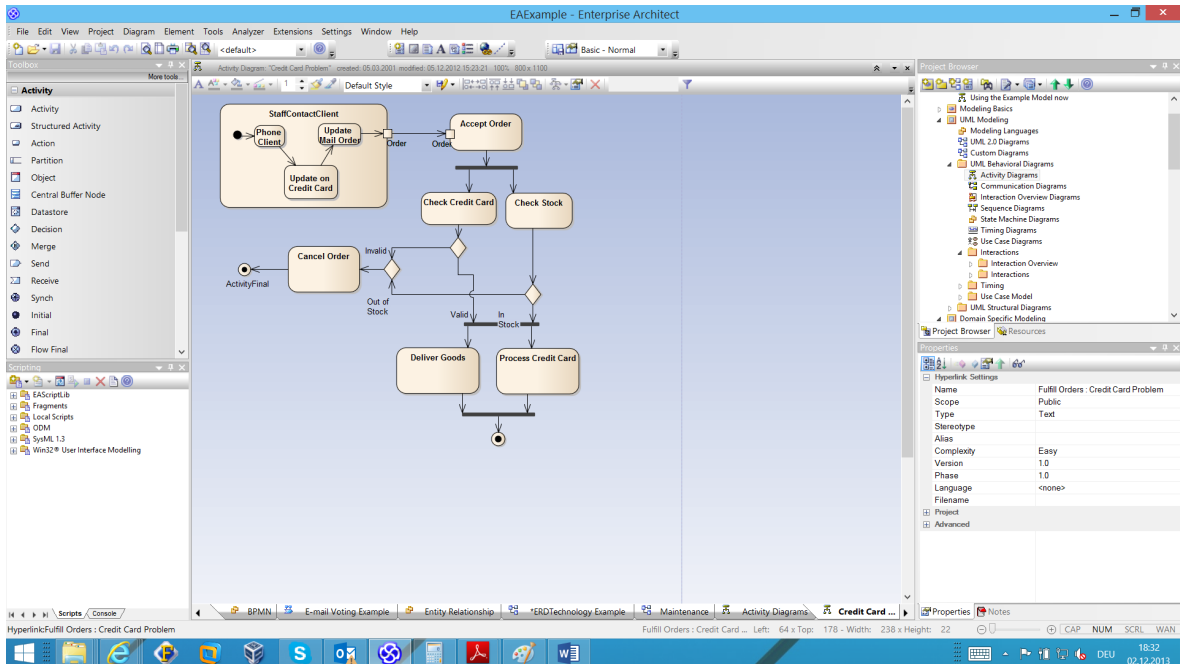


Figure 11.2.: Timeline of the Enterprise Architect

## 11. Enterprise Architect (SparxSystems Ltd)



Enterprise Architect

Figure 11.3.: Flow Diagram of the Enterprise Architect

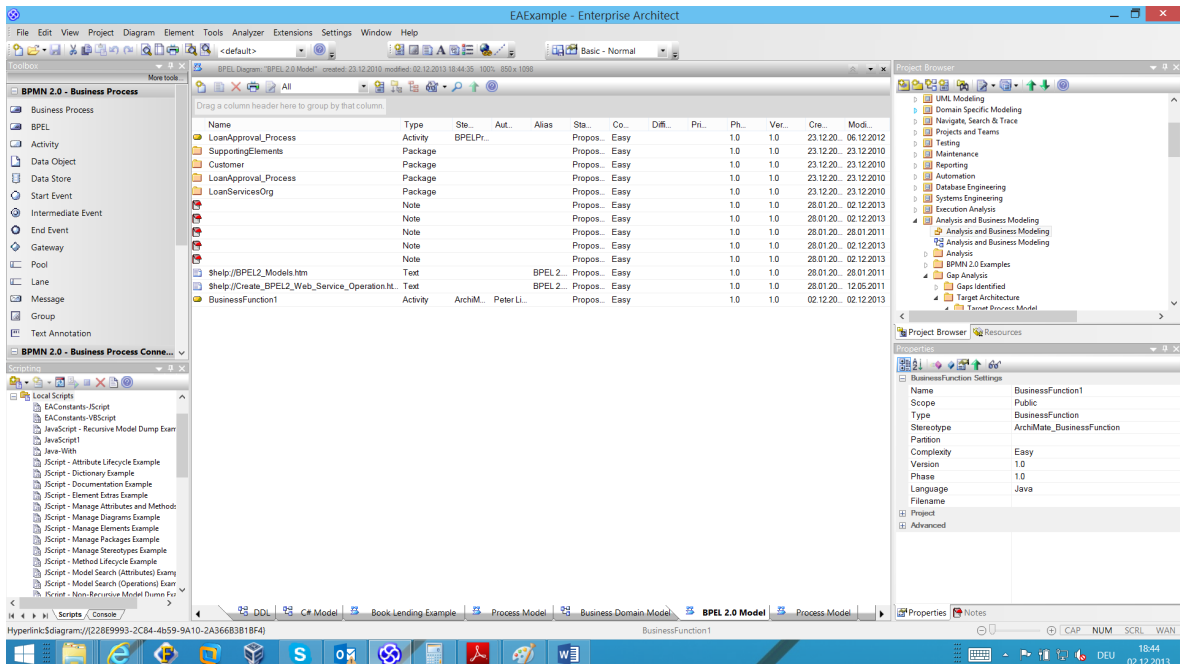
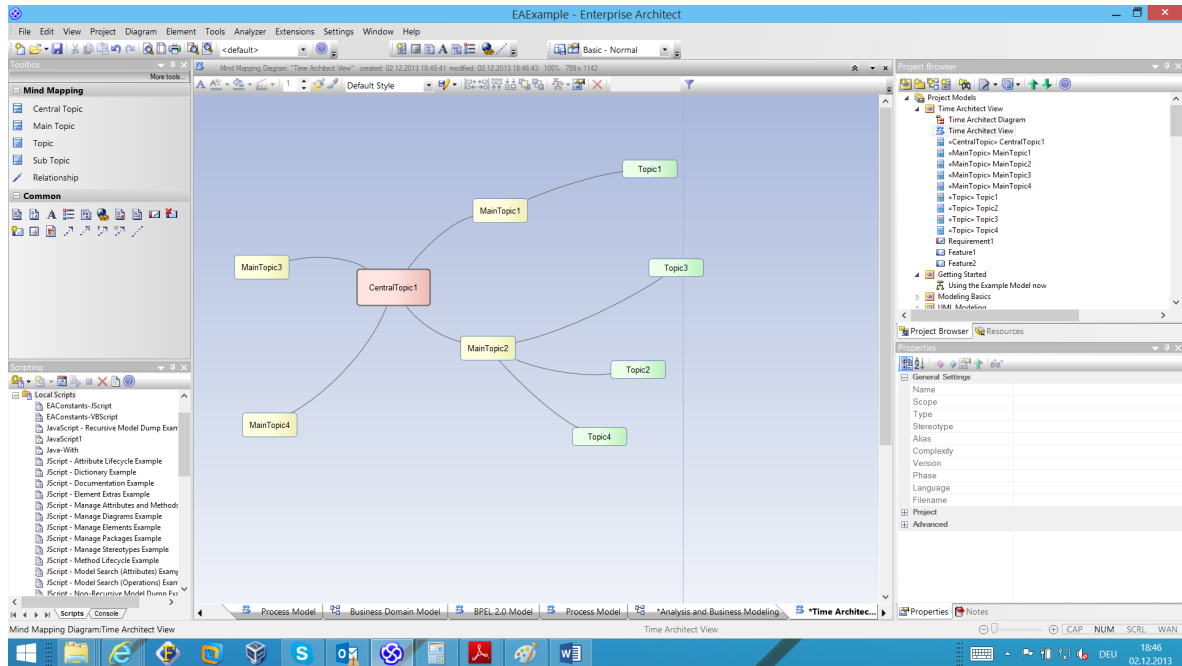


Figure 11.4.: List of the Enterprise Architect



## 11. Enterprise Architect (SparxSystems Ltd)



Enterprise Architect

Figure 11.5.: Graph of the Enterprise Architect

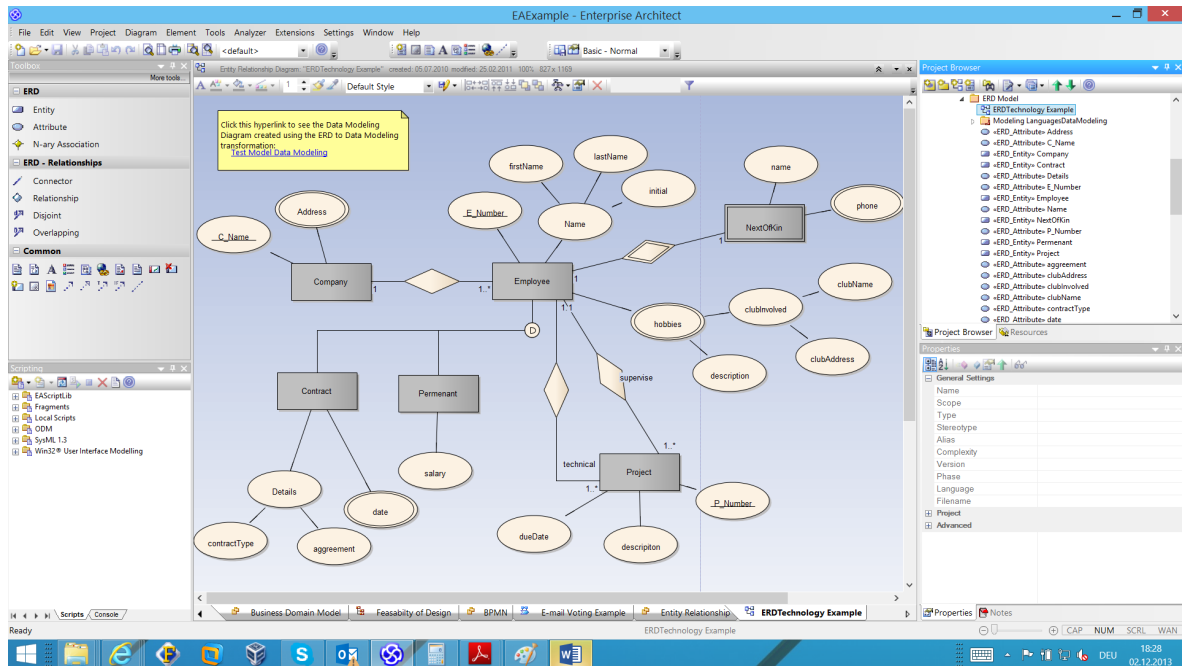
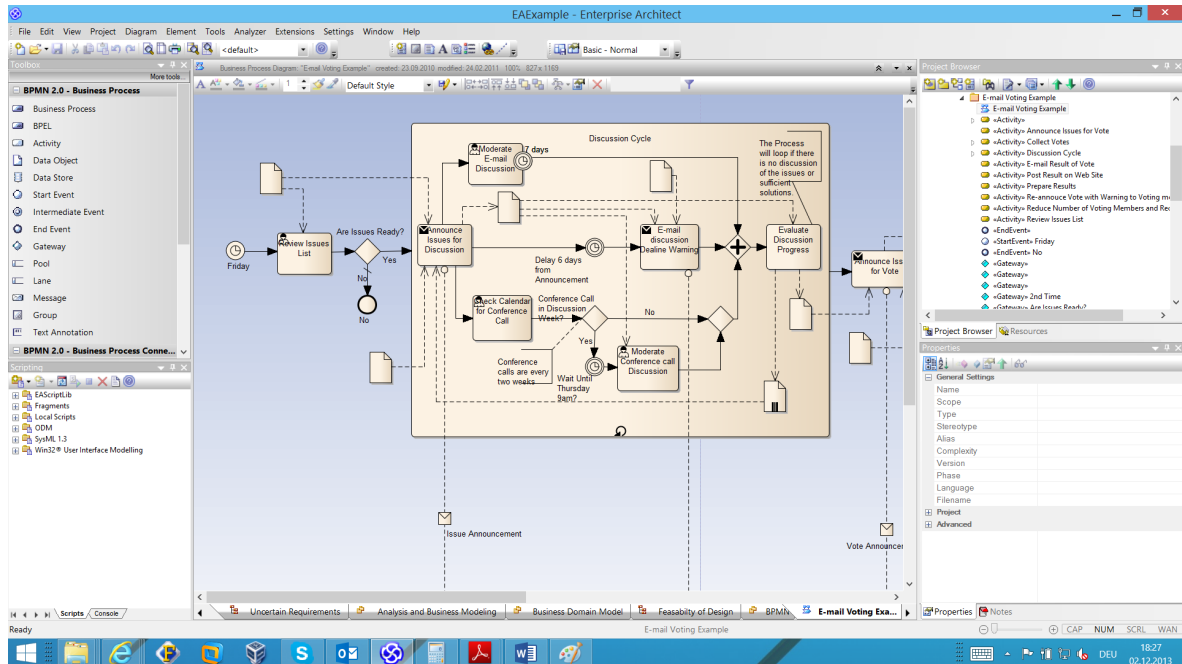


Figure 11.6.: ER Diagram of the Enterprise Architect

# 11. Enterprise Architect (SparxSystems Ltd)



Enterprise Architect

Figure 11.7.: BPMN Diagram of the Enterprise Architect

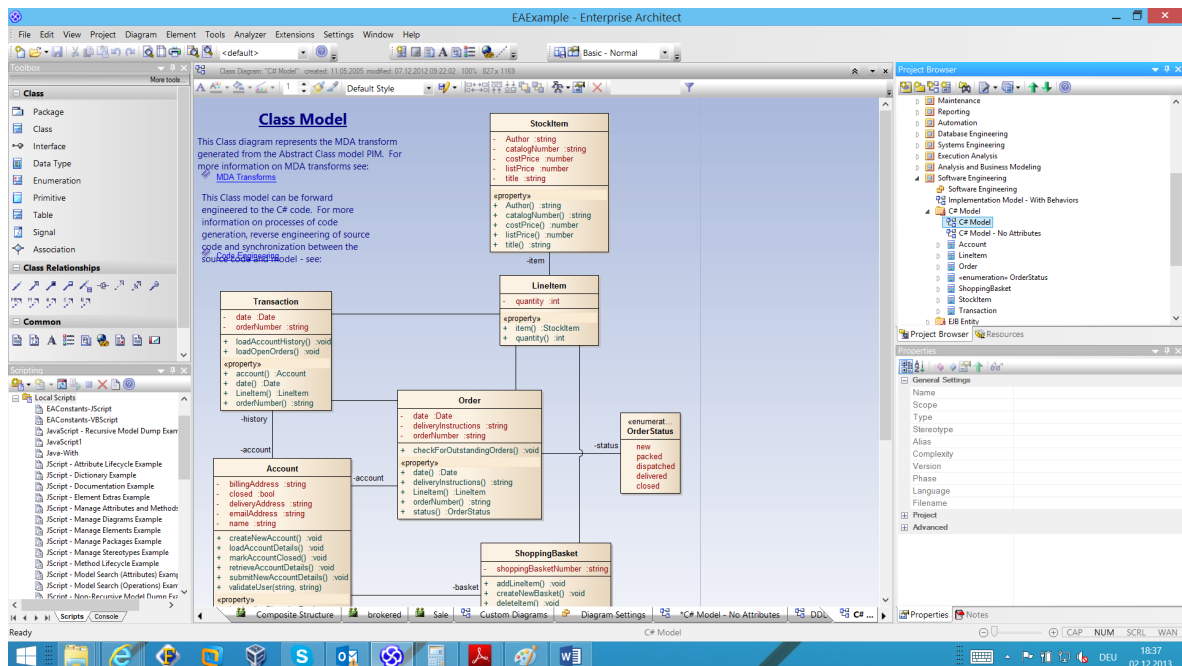


Figure 11.8.: UML Diagram of the Enterprise Architect

## 11. Enterprise Architect (SparxSystems Ltd)

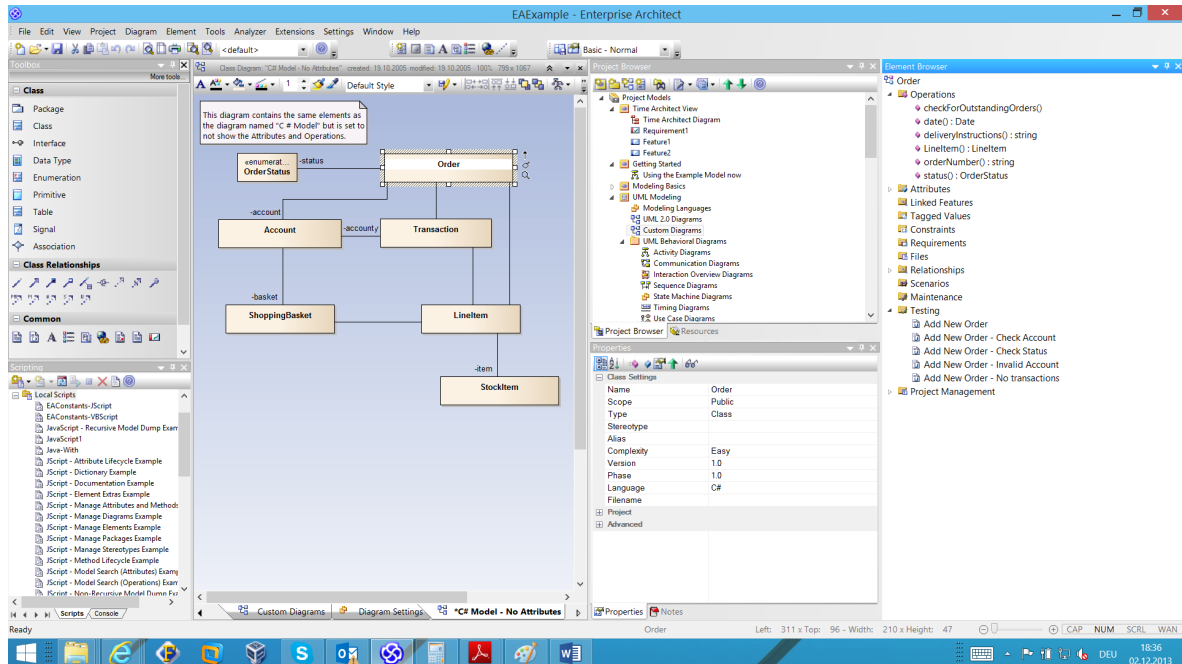


Figure 11.9.: Treeview of the Enterprise Architect

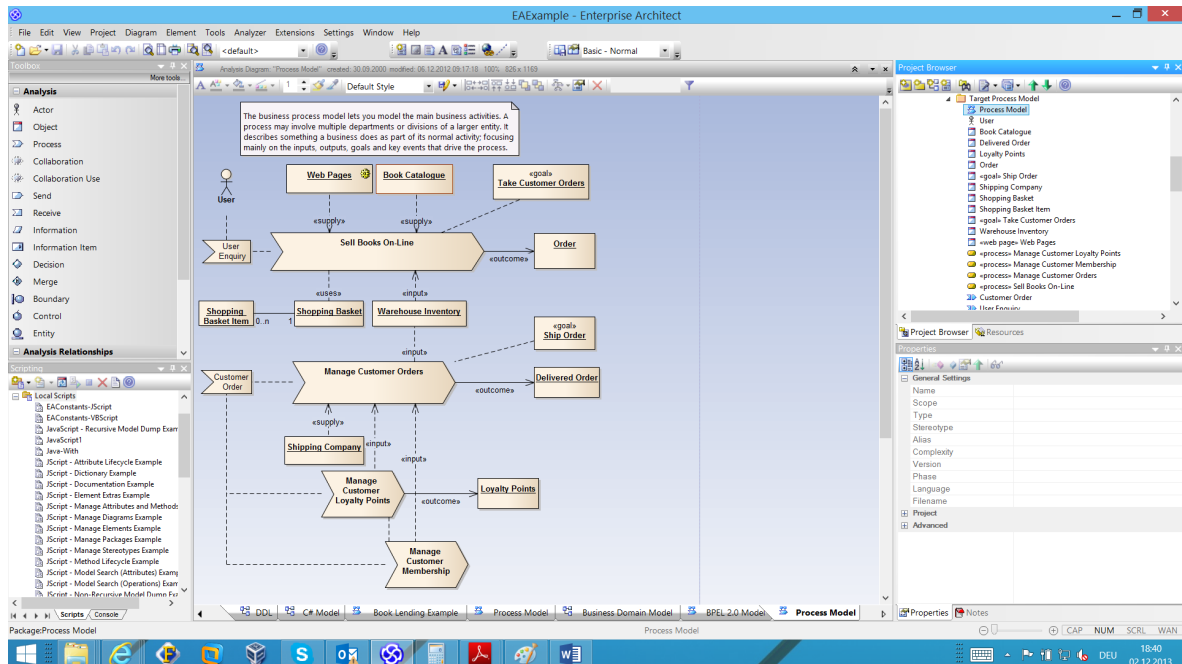


Figure 11.10.: EPC Diagram of the Enterprise Architect

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## 12. Envision VIP (Future Tech Systems)

Future Tech Systems, Inc. was founded in 1987 and has more than 13 years of experience in the EA domain. The company is vendor of Envision VIP which is offered in version 10.8 at the editorial deadline. Envision VIP supports 17 out of 26 visualization types. Envision VIP allows to create any new visualization with associated models, objects, and attributes. Customization facilities are very user-friendly making extensive use of intuitive dialog boxes, drag-and-drop capabilities from other existing classes, models, attributes, templates, etc. While Future Tech Systems, Inc. does offer XML import/export capabilities for literally all project and model configuration information, they claim to provide even more user friendly ways of importing and/or exchanging information from both internal and external information sources. Envision VIP supports all well-known EA frameworks. Additional stakeholder viewpoints/perspectives can be added and integrated at any time.

Envision  
VIP

### 12.1. Background Information

Vendor	Future Tech Systems, Inc.
Founding year	1987
Years active in EA market	13
Number of employees	11–50
URL	www.future-tech.com

**Table 12.1.:** Vendor Information of Future Tech Systems, Inc.

Tool Name	Envision VIP	
Version	10.8	
Client Platforms	✓ Windows	✗ Linux
	✗ MacOS	✓ Browser
	✗ iOS	✗ Android
	✗ Windows Mobile	✗ Other
Deployment Approach	✓ Desktop	✗ SaaS
	✓ Server	✗ Other
EA Frameworks	✓ ArchiMate	✓ NAF
	✓ DoDAF	✓ PEAf
	✓ IAF	✓ TOGAF
	✓ MODAF	✓ Zachman
	✓ Other	

**Table 12.2.:** General Information (Envision VIP)

## 12.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	✗	✗
DOC(X)	✗	✓
HTML	✗	✓
JPG/JPEG	✗	✗
PDF	✗	✓
PNG	✗	✗
PPT(X)	✗	✗
SVG	✗	✗
VSD(X)	✗	✓
Other	✗	✓

**Table 12.3.:** Visualization Import/Export File Formats (Envision VIP)

Envision  
VIP

## 12.3. Visualization Configuration

### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✓
Data Filter	✓
Other	✓

**Table 12.4.:** Binding (Envision VIP)

### Generation Approach

Model-Driven	✓
Form-Based	✗
Scripting	✗
Manual Drawing	✓
Other	✓

**Table 12.5.:** Visualization Generation Approach (Envision VIP)

Envision  
VIP

### Visual Customization and Layouting

Customization	Caption	✓
	Color	✓
	Orientation	✓
	Position	✓
	Shape	✓
	Size	✓
	Other	✓
Layout	Automated	✓
	Manual	✓
	Other	✓

**Table 12.6.:** Visual Customization (Envision VIP)

## Import/Export of Visualization Configurations

Format	Import	Export
CSV	✓	✓
JSON	✗	✗
ODBC	✗	✗
XMI	✗	✗
XML	✓	✓
XLS(X)	✓	✓
TXT	✓	✓
Other	✓	✓

Envision  
VIP

**Table 12.7.:** Configuration Import/Export (Envision VIP)

## 12.4. Information Model

### Information Model Type

Full Schema	✓
Configurable Building Blocks	✓
User-defined	✓
Subclassing/class inheritance	✓

**Table 12.8.:** Information Model Type (Envision VIP)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓	✓	✓	✓	✓	✓
Modify	✓	✓	✓	✓	✓	✓
Delete	✓	✓	✓	✓	✓	✓
Copy	✓	✓	✓	✓	✓	✓
Merge	✓	✓	✓	✓	✓	✓
Move	✓	✓	✓	✓	✓	✓

**Table 12.9.:** Information Model Flexibility (Envision VIP)



## 12.5. Interoperability

### Import Mechanisms

Pull	✓
Push	✓
Other	✓

**Table 12.10.:** Import Mechanisms (Envision VIP)

Envision  
VIP

### Third Party Tools

Business Intelligence Tools	✓
Business Process Engines	✓
Change Management Tools	✓
Cloud Services	✓
Configuration Management Database	✓
Enterprise Service Bus	✓
Infrastructure Monitoring Tools	✓
License/IT Asset Management Tools	✓
Project Portfolio Management Tools	✓
Release Management Tools	✓
Other	✓

**Table 12.11.:** Interoperability with Third Party Tools (Envision VIP)

## Data & Schema Import/Export

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	✓	✓	✓	✓
JSON	✗	✗	✗	✗
TXT	✓	✓	✗	✗
XMI	✗	✗	✗	✗
XML	✓	✓	✓	✓
XLS(X)	✓	✗	✗	✗
OData	✗	✗	✗	✗
Other	Microsoft Word Document Format (DOC/-DOCX)	✗	✓	✓

Envision  
VIP

**Table 12.12.:** Data & Schema Import/Export (Envision VIP)

## Model Element Import/Export

Model Element	Import	Export
Classes	✓	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	✓	✓
Roles	✓	✓
Other	✓	✓

**Table 12.13.:** Model Element Import/Export (Envision VIP)

## 12.6. Visualization Examples of Envision VIP

Envision  
VIP

The screenshot shows a software tool window titled "Hierarchical Matrix - Business Requirements Trace". The main area displays a matrix with the following columns: REQ BUSINESS, REQ USER, REQ INTERFACE, and REQ FUNCTION. The rows are numbered from 1 to 179. The matrix contains various requirements and their associated user and interface actions. For example, row 28 is highlighted in red and contains "Maintain Beneficiary Records For Elig" under REQ BUSINESS, "Assign-Agency-To-Bene" under REQ USER, and "Creates Beneficiary Record" under REQ FUNCTION. Other rows include "Issue Agency Payment Notices", "Issue Beneficiary Call In Notices", "Maintain Appeal Information", "Maintain VR Agency Records For Payments", and "Delete-Beneficiary-Record".

REQ ID	REQ BUSINESS	REQ USER	REQ INTERFACE	REQ FUNCTION
1	Issue Agency Payment Notices			
2		Send-Agency-Payment-Notice		
19	Issue Beneficiary Call In Notices			
20		Closeout-Case		
21		Send-Closeout-Notice		
22		Send-Follow-Up-Notice		
23		Send-Preliminary-Notice		
27	Maintain Appeal Information			
28	Maintain Beneficiary Records For Elig	Assign-Agency-To-Bene		Creates Beneficiary Record
29		Assign-Agency-To-Bene		Decides If Beneficiary Data
44		Create-Beneficiary-Record		Decides If Beneficiary Record
45			Sends Beneficiary Record Msg Created	
47			Sends Beneficiary Record Msg Exists	
48			Sends Beneficiary Record MsgInvalidData	
50			Submits Beneficiary Record Create	
51				
57				
58				
59		Delete-Beneficiary-Record		
74		Load-Control-File		
85		Read-Beneficiary Records		
95		Select-Agency-Records		
113		Select-Beneficiary-Records		
128		Update-Beneficiary-Record		
154	Maintain VR Agency Records For Payments			
155		Create-Agency-Record		
172		Delete-Agency-Record		
179		Read-Agency-Records		

Figure 12.1.: Matrix of Envision VIP

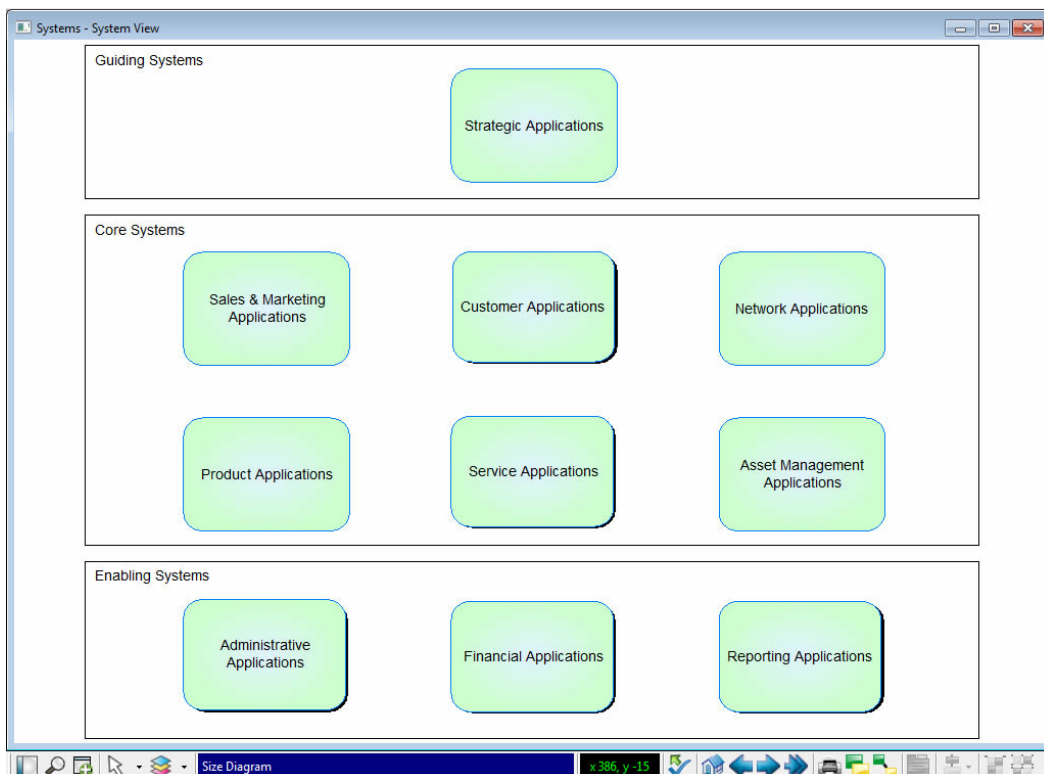
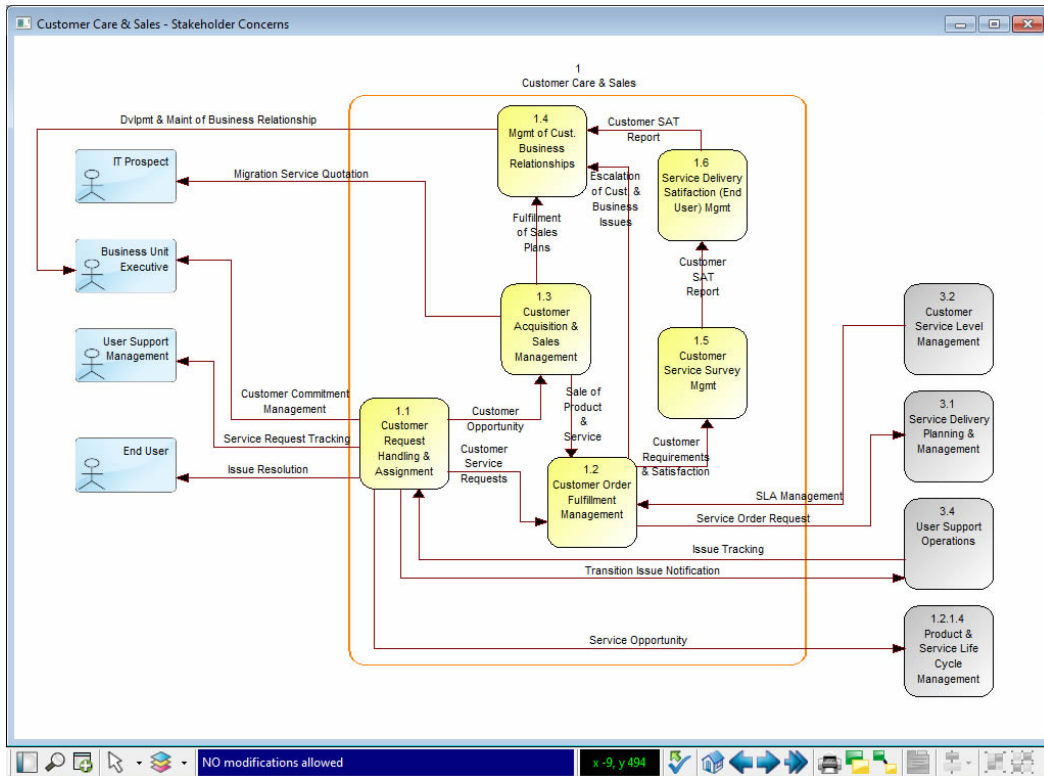


Figure 12.2.: Cluster Map of Envision VIP

## 12. Envision VIP (Future Tech Systems)



Envision  
VIP

Figure 12.3.: Flow Diagram of Envision VIP

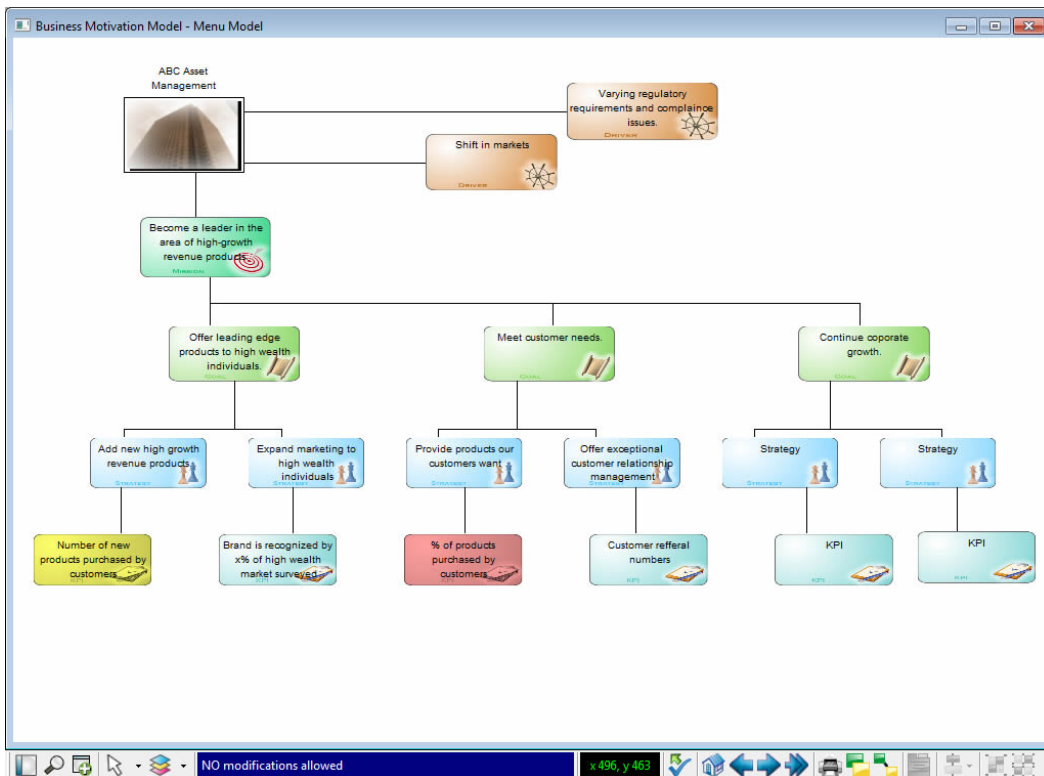


Figure 12.4.: Graph of Envision VIP

## 12. Envision VIP (Future Tech Systems)

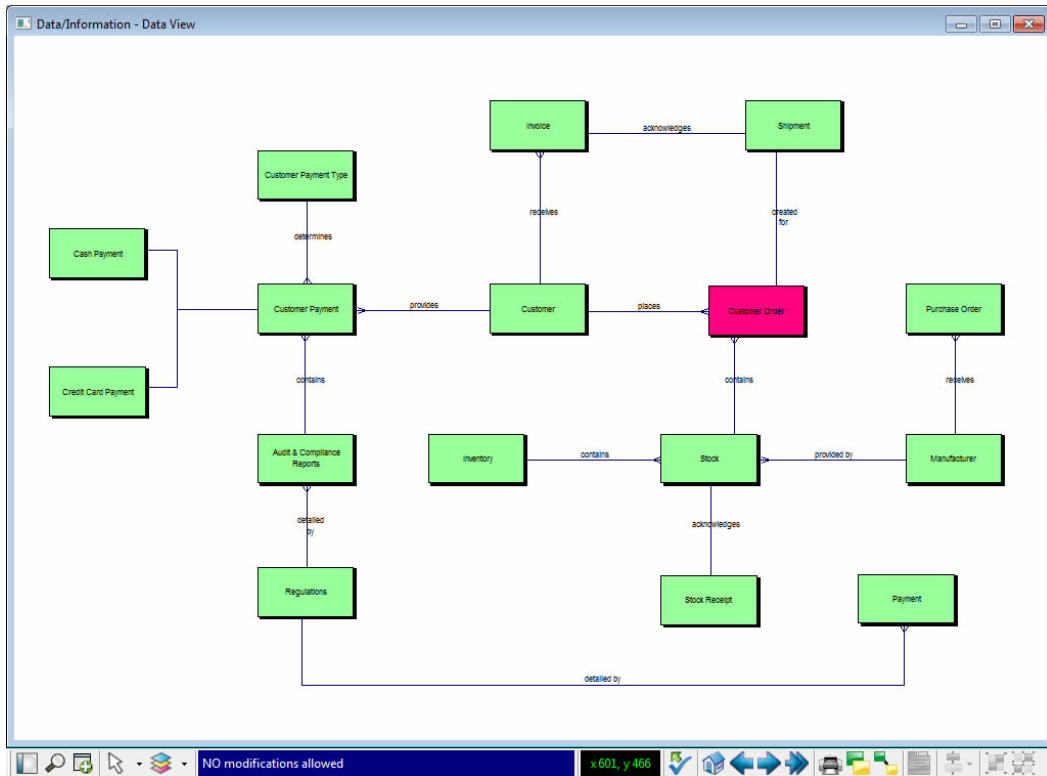


Figure 12.5.: ER Diagram of Envision VIP

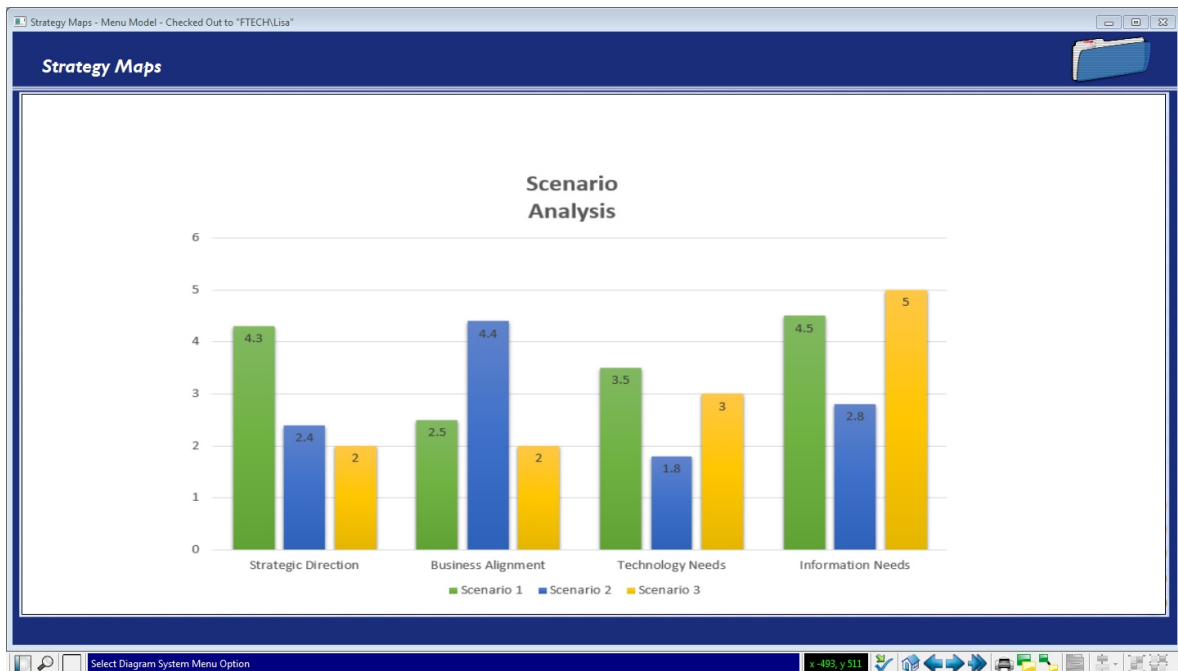


Figure 12.6.: Bar Chart of Envision VIP

## 12. Envision VIP (Future Tech Systems)

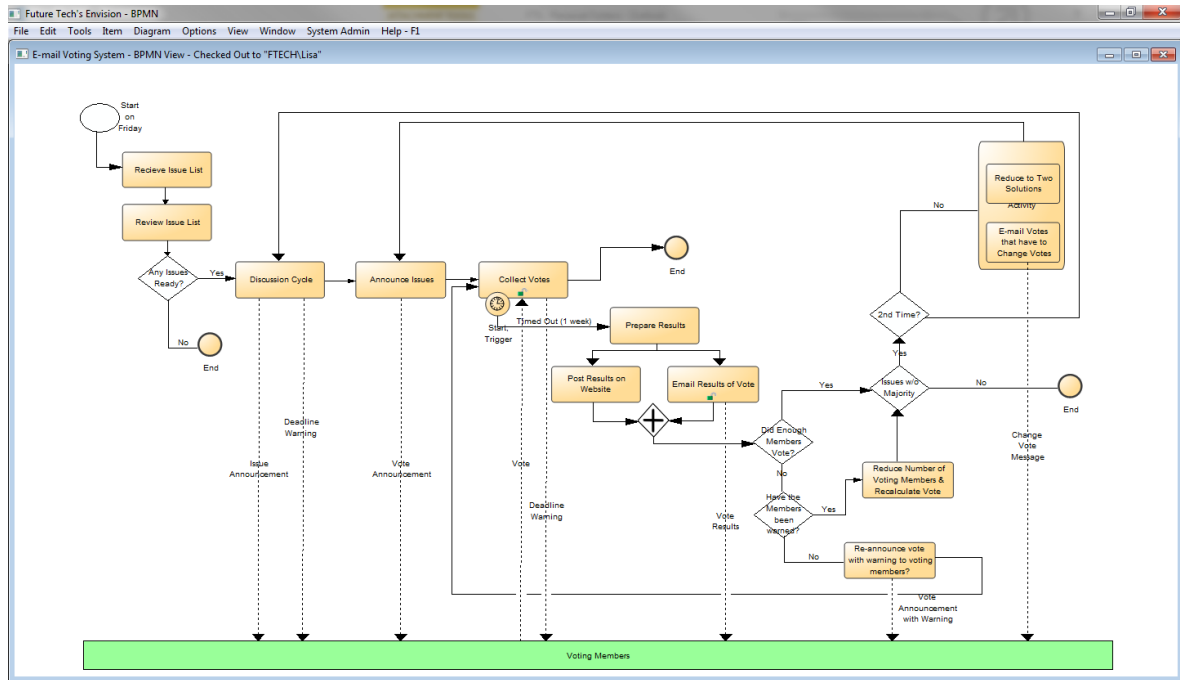


Figure 12.7.: BPMN Diagram of Envision VIP

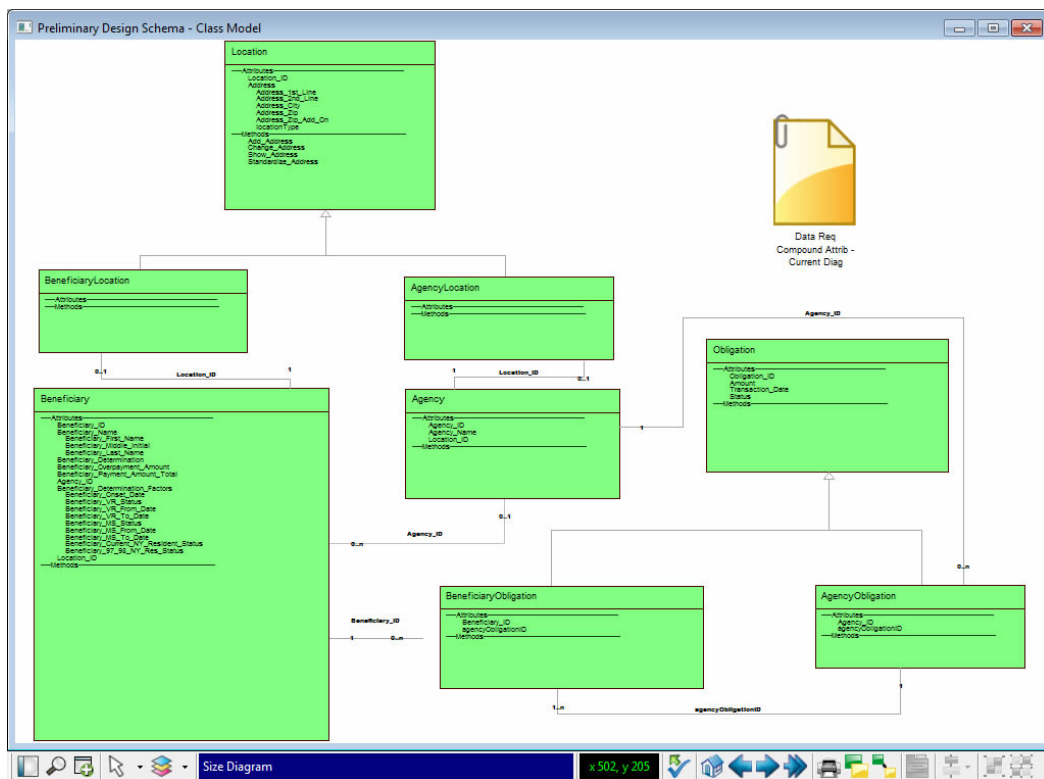


Figure 12.8.: UML Diagram of Envision VIP

Envision  
VIP

## 12. Envision VIP (Future Tech Systems)

Envision  
VIP

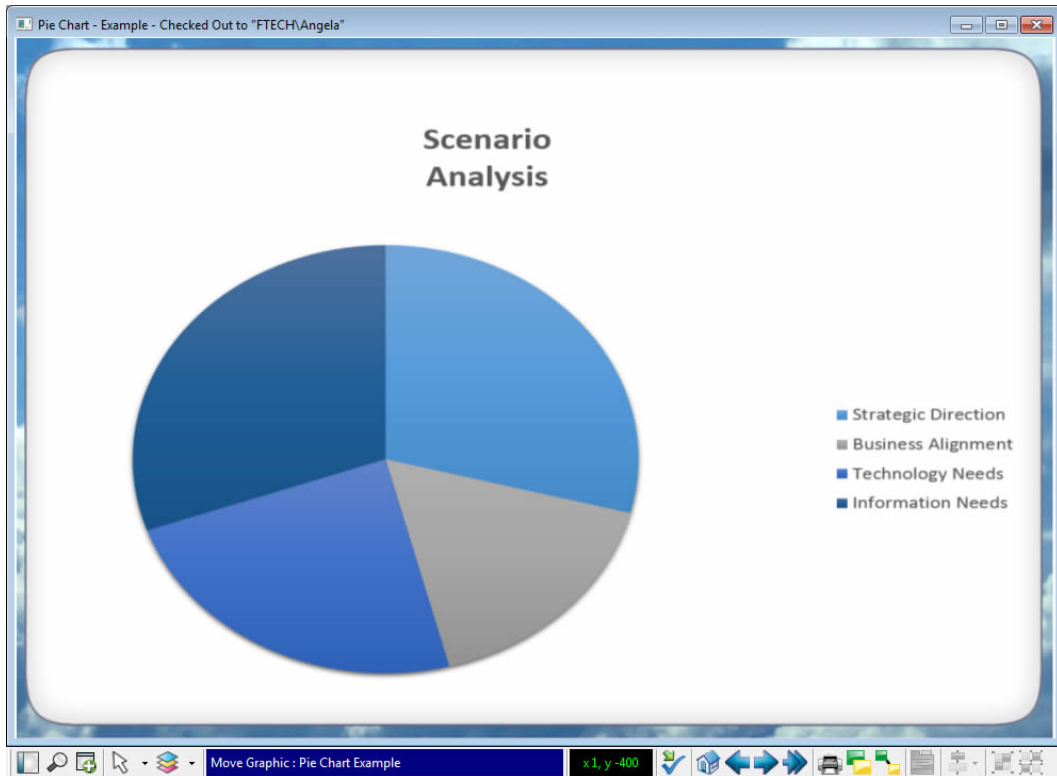


Figure 12.9.: Pie Chart of Envision VIP

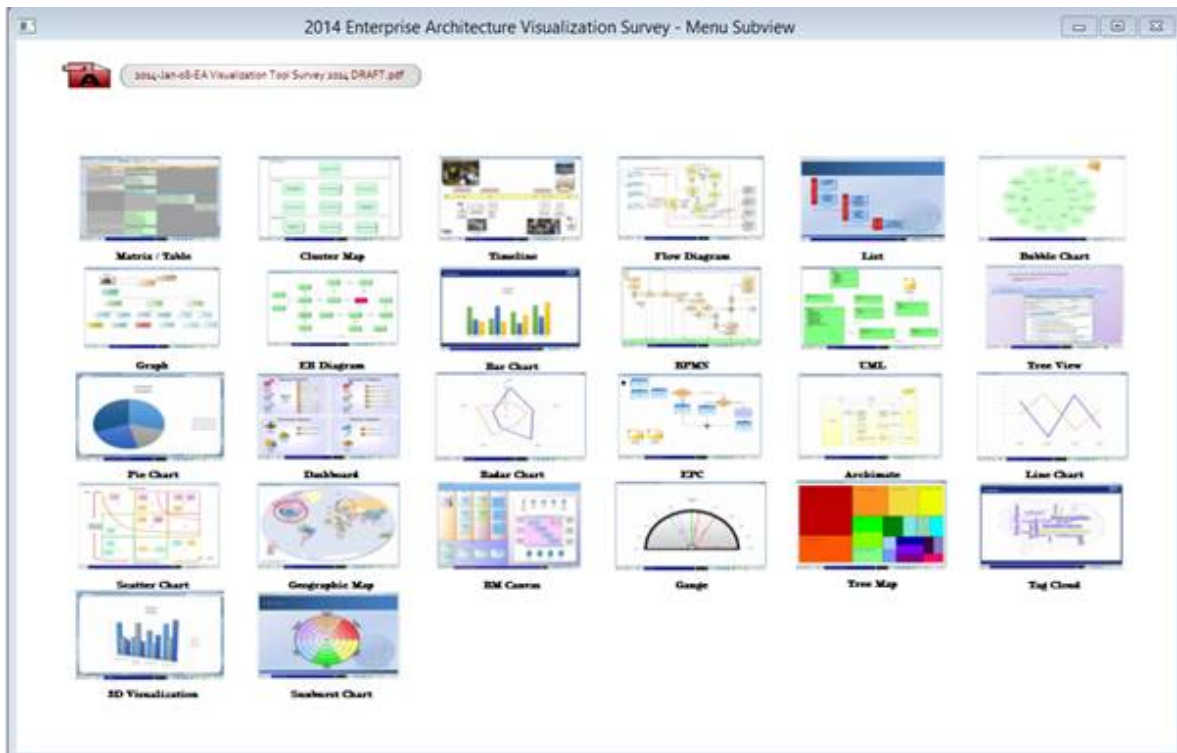
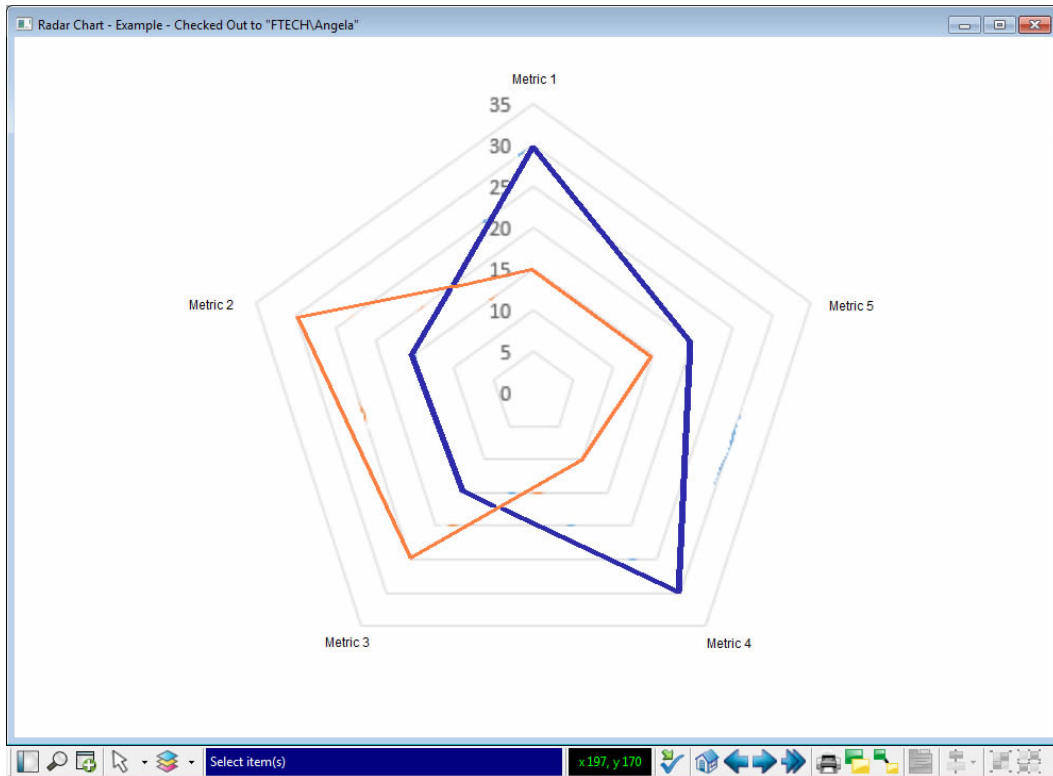


Figure 12.10.: Dashboard of Envision VIP



Envision  
VIP

Figure 12.11.: Radar Diagram of Envision VIP

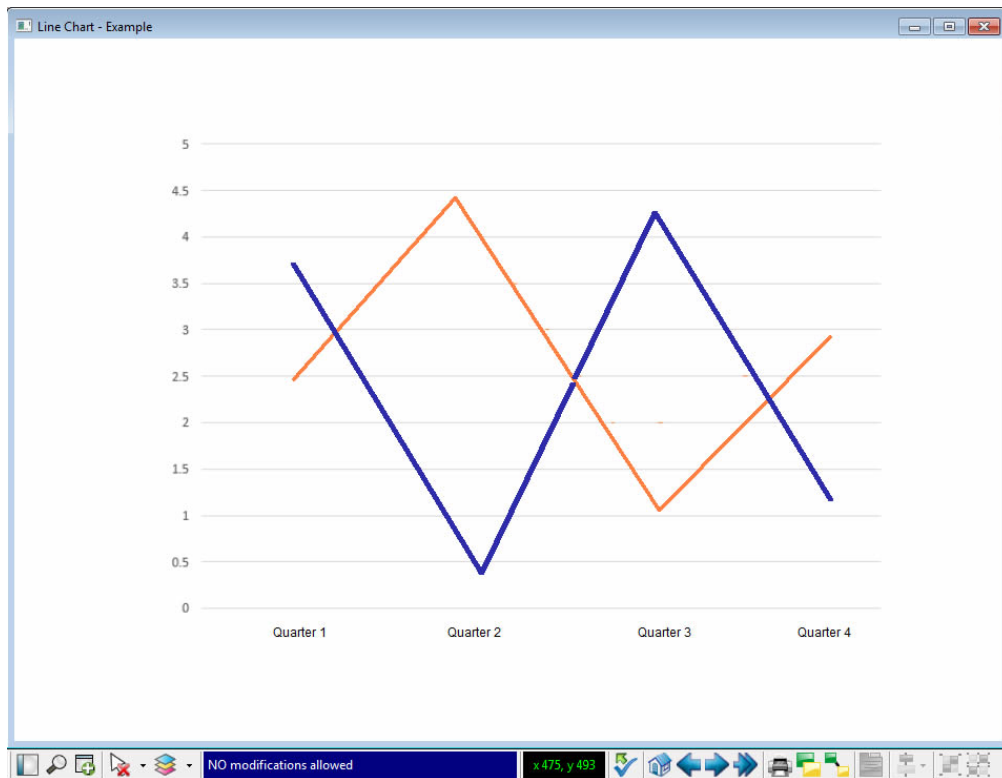


Figure 12.12.: Line Chart of Envision VIP



## 12. Envision VIP (Future Tech Systems)

Envision  
VIP

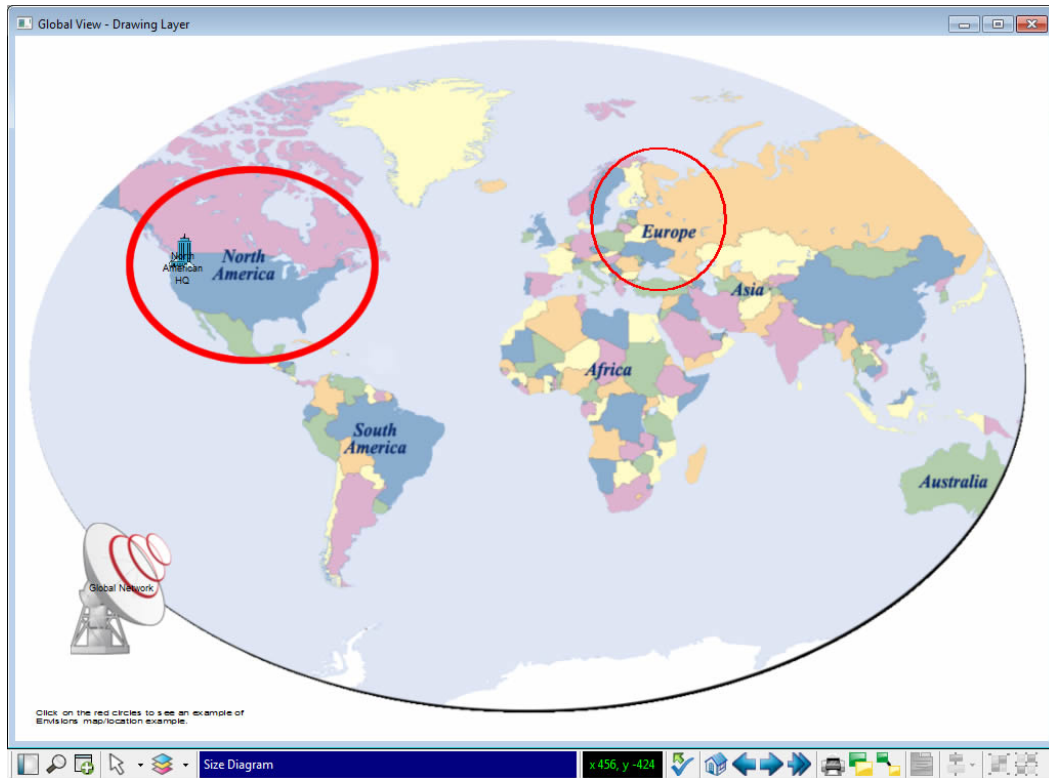


Figure 12.13.: Geographic Map of Envision VIP

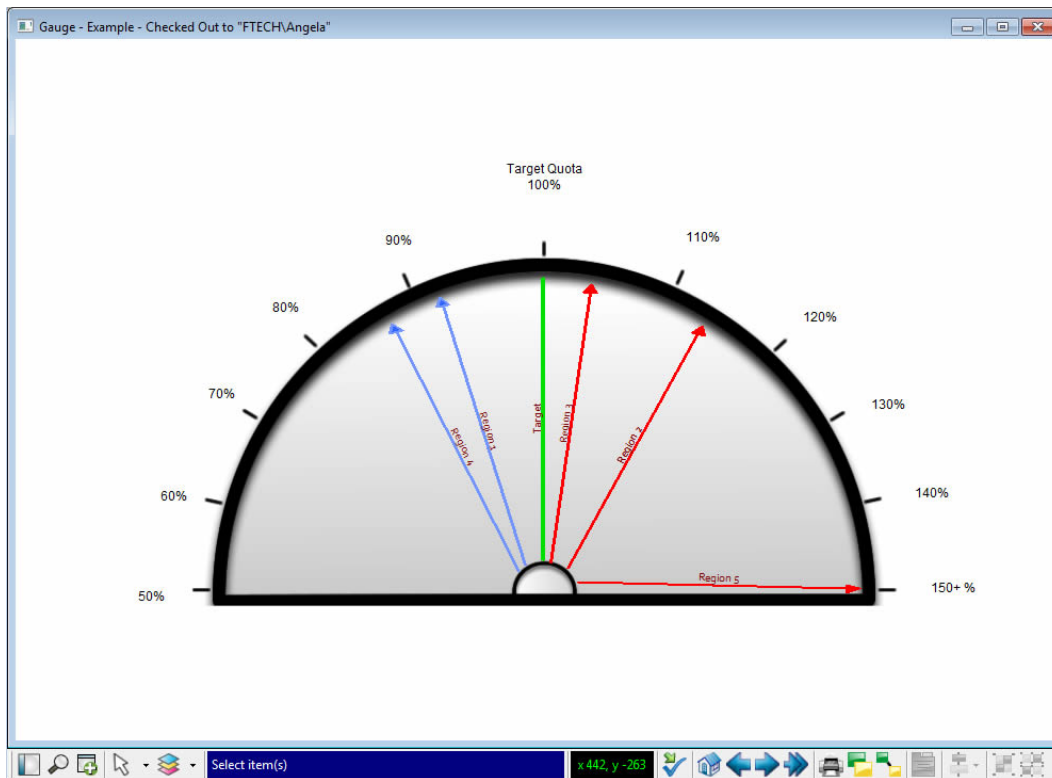
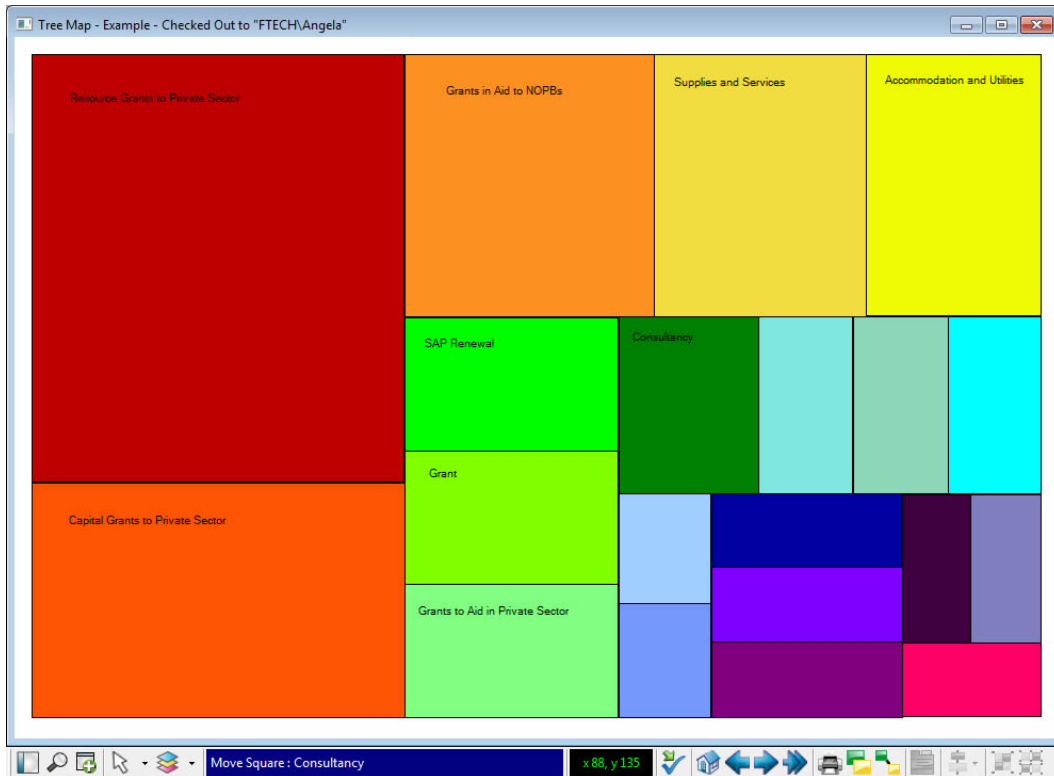


Figure 12.14.: Gauges of Envision VIP

12. Envision VIP (Future Tech Systems)



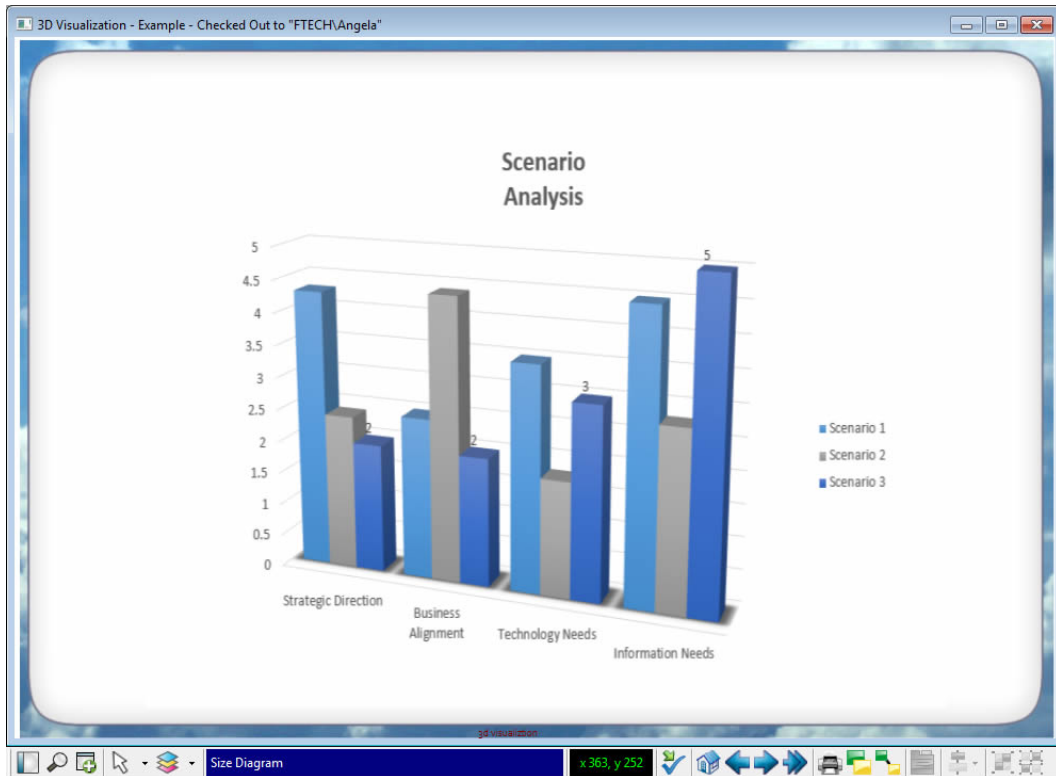
Envision  
VIP

Figure 12.15.: Treemap of Envision VIP



Figure 12.16.: Tag Cloud of Envision VIP

## 12. Envision VIP (Future Tech Systems)



Envision  
VIP

Figure 12.17.: 3D Visualization of Envision VIP

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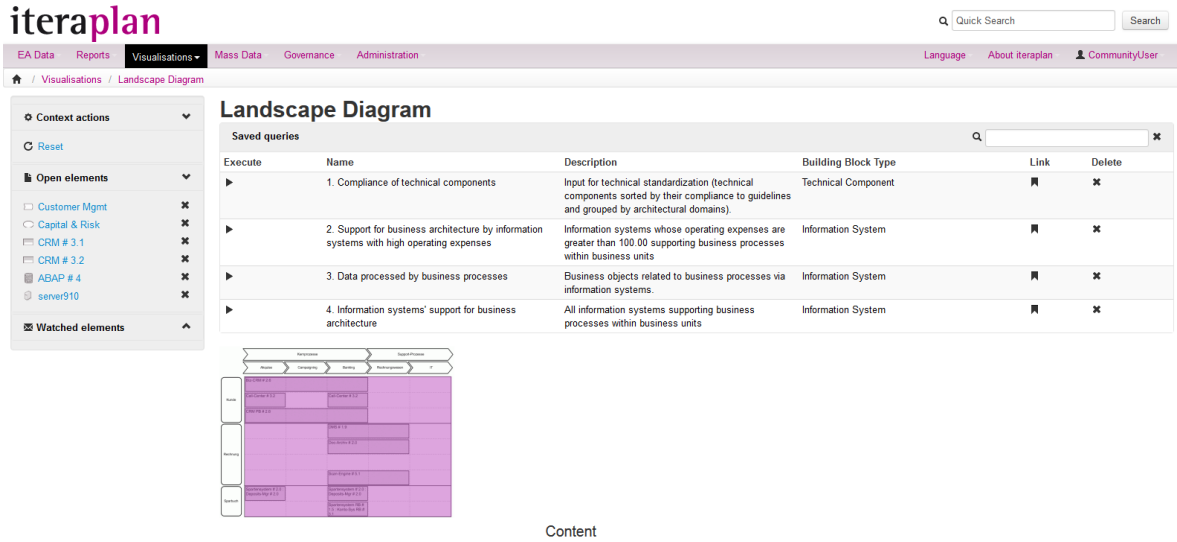
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### 13. iteraplan (iteratec)

iteratec GmbH was founded in 1996 and has more than 13 years of experience in the EA domain. The company is vendor of iteraplan which is offered in version 3.2 at the editorial deadline. iteraplan supports 13 out of 26 visualization types. iteraplan is known in the EA



**Figure 13.1.:** Form-based Visualization Wizard of iteraplan

community for its open-source version as it is an ideal candidate for low-budget EA initiatives. Besides the open-source community edition, iteraplan is offered as enterprise edition that includes more sophisticated features like import of data from third party information sources, Lightweight Directory Access Protocol (LDAP) interfaces, access rights and role management, etc. iteraplan features a build-in best-practice EA information model and, thus, enables for a quick start to EA management. In practice, we experienced that EA practitioners often use the well-written and hands-on guides by Hanschke, e.g. [Ha10]. These books also represent the guidelines and vision for the future development of the open-source tool iteraplan. In iteraplan, a wizard facilitates the configuration of visualizations (cf. Figure 13.1). This way, end-users can configure queries that define the data to be visualized. Multiple export formats complement the offering of iteratec GmbH.

### 13.1. Background Information

Vendor	iteratec GmbH
Founding year	1996
Years active in EA market	13
Number of employees	51–250
URL	www.iteratec.de, www.iteraplan.de

**Table 13.1.:** Vendor Information of iteratec GmbH

Tool Name	iteraplan	
Version	3.2	
Client Platforms	✗ Windows	✗ Linux
	✗ MacOS	✓ Browser
	✗ iOS	✗ Android
	✗ Windows Mobile	✗ Other
Deployment Approach	✓ Desktop	✓ SaaS
	✓ Server	✗ Other
EA Frameworks	✗ ArchiMate	✗ NAF
	✗ DoDAF	✗ PEAf
	✗ IAF	✓ TOGAF
	✗ MODAF	✗ Zachman
	✓ Other	

iteraplan

Table 13.2.: General Information (iteraplan)

## 13.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	✗	✓
DOC(X)	✗	✓
HTML	✗	✓
JPG/JPEG	✗	✓
PDF	✗	✓
PNG	✗	✓
PPT(X)	✗	✗
SVG	✓	✓
VSD(X)	✓	✓
Other	✗	✓

Table 13.3.: Visualization Import/Export File Formats (iteraplan)

## 13.3. Visualization Configuration

### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✓
Data Filter	✓
Other	✓

**Table 13.4.:** Binding (iteraplan)

### Generation Approach

iteraplan

Model-Driven	✓
Form-Based	✓
Scripting	✓
Manual Drawing	✓
Other	✗

**Table 13.5.:** Visualization Generation Approach (iteraplan)

### Visual Customization and Layouting

Customization	Caption	✓
	Color	✓
	Orientation	✓
	Position	✓
	Shape	✓
	Size	✓
	Other	✗
Layout	Automated	✓
	Manual	✓
	Other	✗

**Table 13.6.:** Visual Customization (iteraplan)

## Import/Export of Visualization Configurations

Format	Import	Export
CSV	✓	✓
JSON	✓	✓
ODBC	✓	✗
XMI	✓	✓
XML	✓	✓
XLS(X)	✓	✓
TXT	✓	✗
Other	✓	✓

Table 13.7.: Configuration Import/Export (iteraplan)

iteraplan

## 13.4. Information Model

### Information Model Type

Full Schema	✓
Configurable Building Blocks	✓
User-defined	✗
Subclassing/class inheritance	✓

Table 13.8.: Information Model Type (iteraplan)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓	✓	✓	✓	✓	✓
Modify	✓	✓	✓	✓	✓	✓
Delete	✓	✓	✓	✓	✓	✓
Copy	✓	✓	✓	✓	✓	✓
Merge	✓	✓	✓	✓	✓	✓
Move	✓	✓	✓	✓	✓	✓

Table 13.9.: Information Model Flexibility (iteraplan)



## 13.5. Interoperability

### Import Mechanisms

Pull	✓
Push	✓
Other	✓

**Table 13.10.:** Import Mechanisms (iteraplan)

### Third Party Tools

Business Intelligence Tools	✓
Business Process Engines	✓
Change Management Tools	✓
Cloud Services	✓
Configuration Management Database	✓
Enterprise Service Bus	✓
Infrastructure Monitoring Tools	✓
License/IT Asset Management Tools	✓
Project Portfolio Management Tools	✓
Release Management Tools	✓
Other	✓

**Table 13.11.:** Interoperability with Third Party Tools (iteraplan)

iteraplan

## Data & Schema Import/Export

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	✓	✓	✗	✗
JSON	✓	✓	✓	✓
TXT	✓	✓	✗	✗
XMI	✓	✓	✓	✓
XML	✓	✓	✓	✓
XLS(X)	✓	✓	✗	✗
OData	✓	✓	✓	✓
Other	✓	✓	✓	✓

**Table 13.12.:** Data & Schema Import/Export (iteraplan)

iteraplan

## Model Element Import/Export

Model Element	Import	Export
Classes	✓	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	✓	✓
Roles	✓	✓
Other	✓	✓

**Table 13.13.:** Model Element Import/Export (iteraplan)

### 13. iteraplan (iteratec)

## 13.6. Visualization Examples of iteraplan

Iteraplan Cluster Diagram

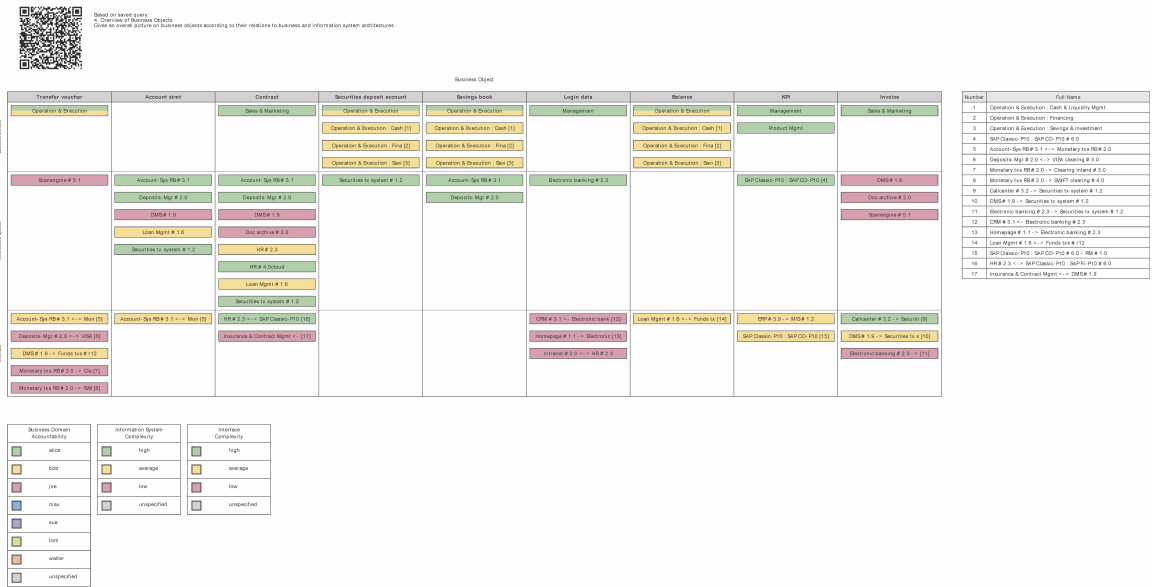


Figure 13.2.: Matrix of iteraplan

Nesting Cluster Diagram

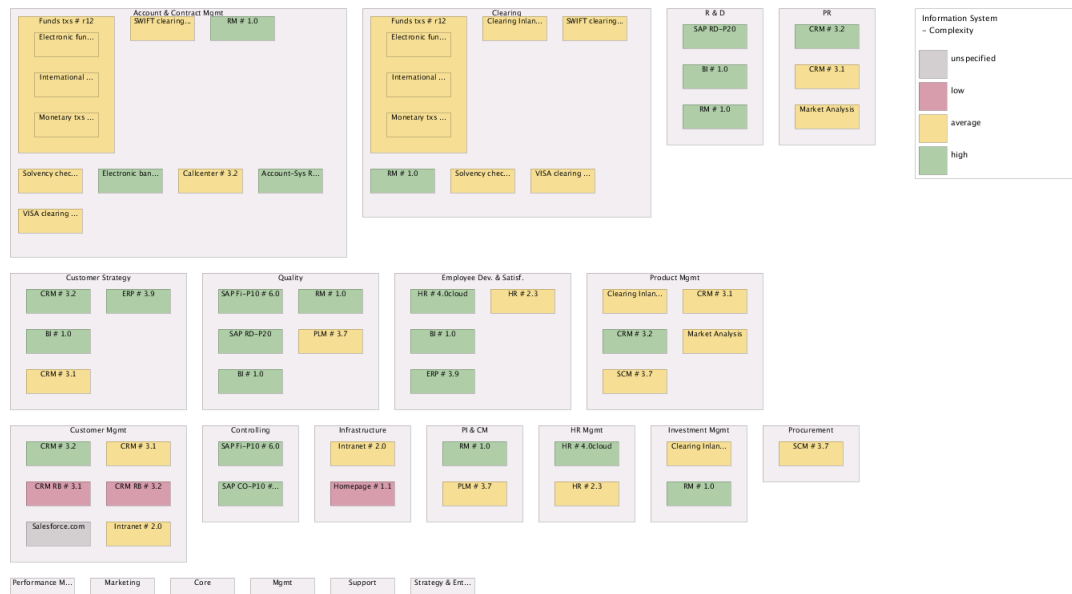


Figure 13.3.: Cluster Map of iteraplan

iteraplan Master plan Diagram  
Content: Project - Information Systems

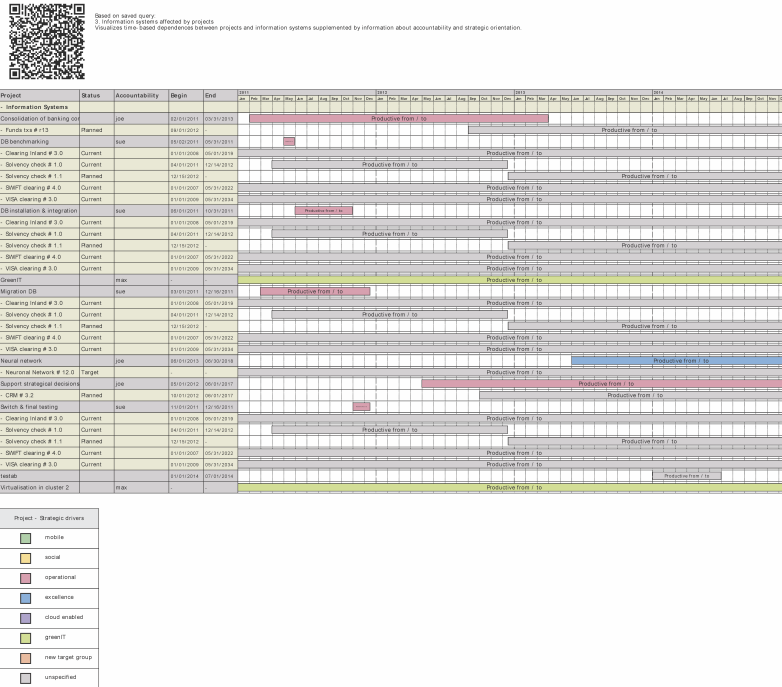


Figure 13.4.: Timeline of iteraplan

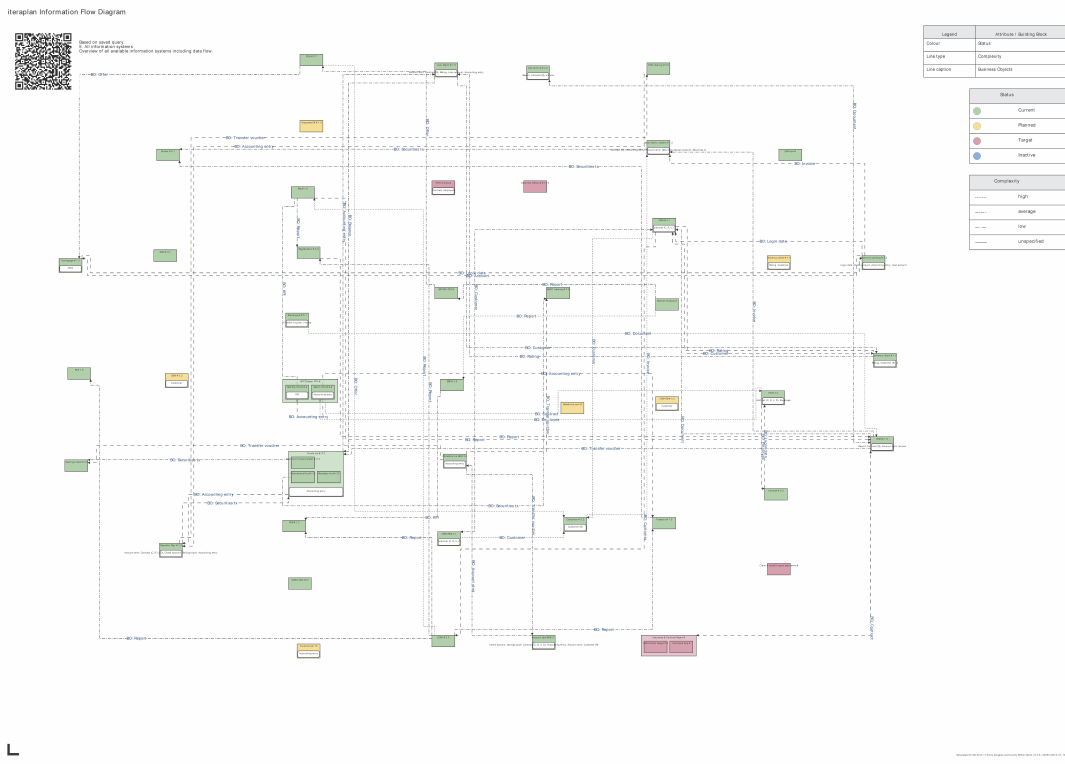


Figure 13.5.: Flow Diagram of iteraplan

### 13. iteraplan (iteratec)

Business Process	Hierarchical Name	Description	Accountability	Strategic value	Actions
-	-	This is a virtual element, which serves as the root element for the hierarchy of Business Processes. It may be edited to change the order of the top level Business Processes. None of its other properties, attributes or relations can be changed.			
Account & Contract Mgmt	Core : Account & Contract Mgmt	Account & Contract Management: application handling and service provision	bob	10.00	✂ 🗑 🔄
Clearing	Core : Clearing		bob	9.00	✂ 🗑 🔄
Controlling	Mgmt : Performance Monitoring : Controlling		alice	8.00	✂ 🗑 🔄
Core	Core processes		bob	9.00	✂ 🗑 🔄
Customer Mgmt	Core : Customer Mgmt	Customer Management: lead generation and consulting	bob	8.00	✂ 🗑 🔄
Customer Strategy	Mgmt : Strategy & Enterprise Planning : Customer Strategy		alice	9.00	✂ 🗑 🔄
Employee Dev & Satisf	Mgmt : Strategy & Enterprise Planning : Employee Dev. & Satisf.	Employee Development & Satisfaction	alice	5.00	✂ 🗑 🔄
HR Mgmt	Support : HR Mgmt	Human Resource Management	bob	5.00	✂ 🗑 🔄
Infrastructure	Support : Infrastructure	Intern communication via Email, Internet, videoconference	alice	5.00	✂ 🗑 🔄
Investment Mgmt	Core : Investment Mgmt	Investment Management: application handling and service provision	bob	10.00	✂ 🗑 🔄
Marketing	Mgmt : Marketing	Sales techniques, business communication, and business developments	alice	8.00	✂ 🗑 🔄
Mgmt	Management processes		alice	10.00	✂ 🗑 🔄
Performance Monitoring	Mgmt : Performance Monitoring	Measuring and controlling of KPI to indicate need for action.	alice	5.00	✂ 🗑 🔄
PI & CM	Mgmt : Performance Monitoring : PI & CM	Process Improvement & Change Management	alice	9.00	✂ 🗑 🔄

Figure 13.6.: List of iteraplan

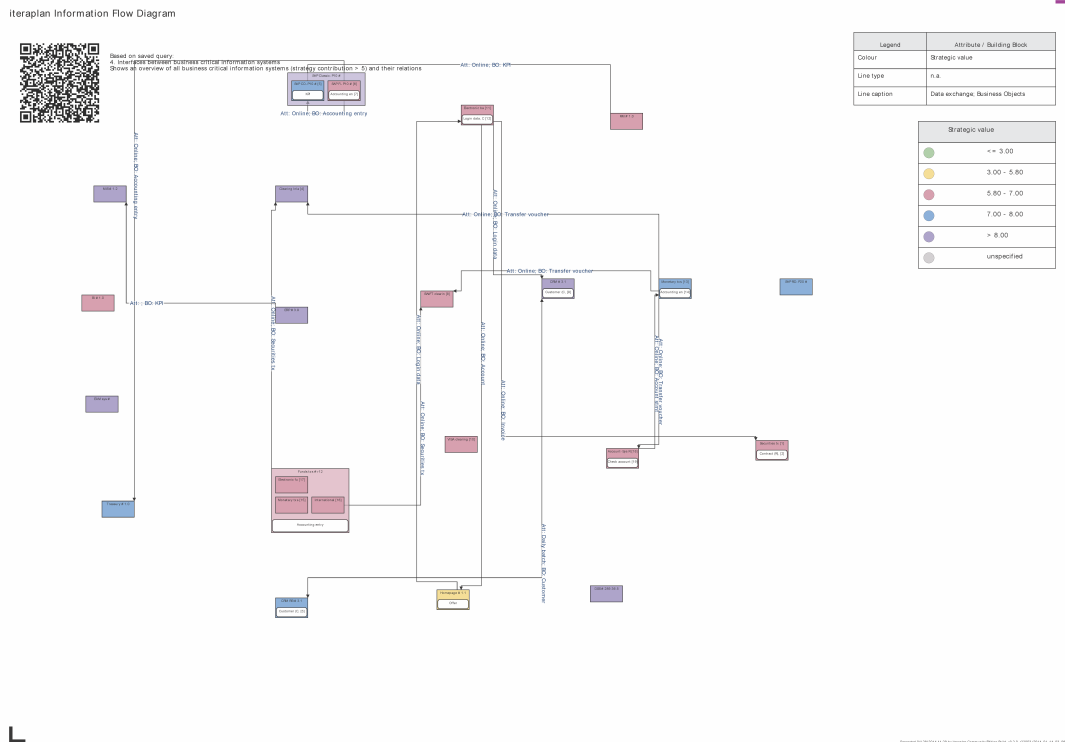
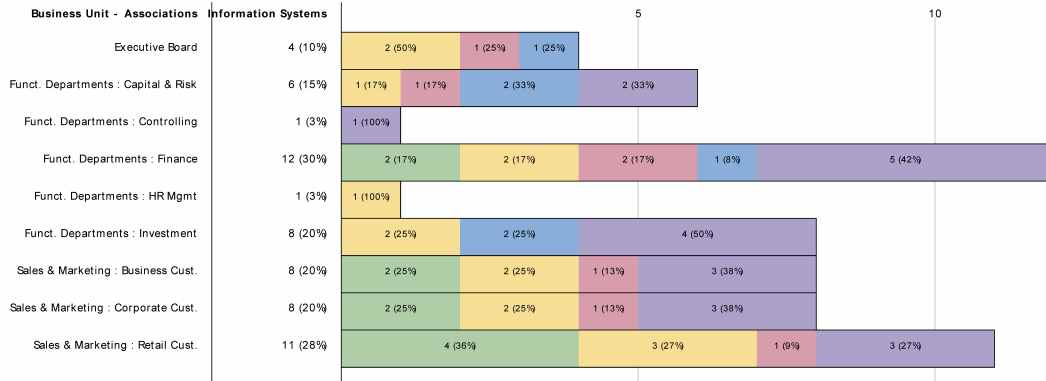


Figure 13.7.: Graph of iteraplan

40 Information Systems



Operating expenses	
Green	<= 20.00
Yellow	20.00 - 69.00
Pink	69.00 - 100.00
Blue	100.00 - 110.00
Purple	> 110.00

Generated 01/29/2014 11:34 by iteraplan Community Edition Build-v3.2.0-12253(2014-01-14-03-06-08)

Figure 13.8.: Bar Chart of iteraplan

iteraplan Portfolio Diagram - Report Date 01/28/2014 11:45  
Content: Information Systems



Based on saved query:  
2: Healthiness of all Information Systems  
Visualization of healthiness of all information systems integrated into iteraplan value added coordinate system

Legend	Attribute
X-axis	Value added (Strategic measurement categories)
Y-axis	Strategic value (Strategic measurement categories)
Size	Operating expenses (Strategic measurement categories)
Colour	State of health (Strategic measurement categories)
Position	The position of the bubbles is exact.

State of health		Operating expenses	
Green	good		<= 20.00
Yellow	average		20.00 - 69.00
Pink	bad		69.00 - 100.00
Blue	unspecified		100.00 - 110.00
			> 110.00
			unspecified

Generated 01/29/2014 11:45 by iteraplan Community Edition Build-v3.2.0-12253(2014-01-14-03-06-08)

Figure 13.9.: Bubble Chart of iteraplan

### 13. iteraplan (iteratec)

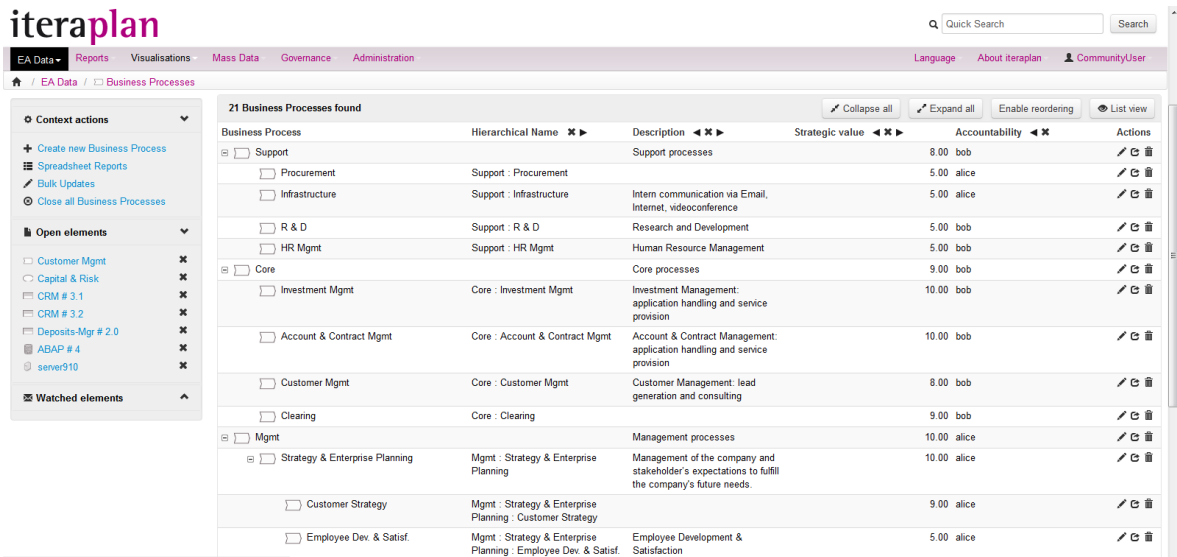
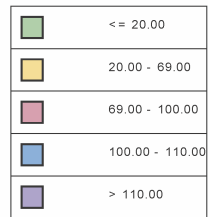
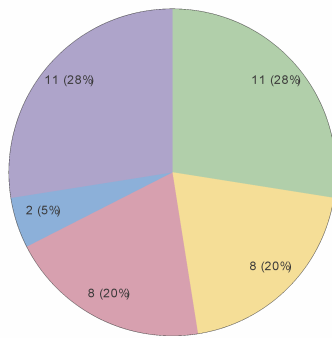


Figure 13.10.: Treeview of iteraplan

40 Information Systems



Based on saved query:  
3. Operating expenses general overview  
Distribution by percentage of operating expenses for IT-Support

Generated 01/29/2014 11:52 by iteraplan Community Edition Build -v3.2.0- (22053 (2014-01-14 03:06:08))

Figure 13.11.: Pie Chart of iteraplan

### 13. iteraplan (iteratec)

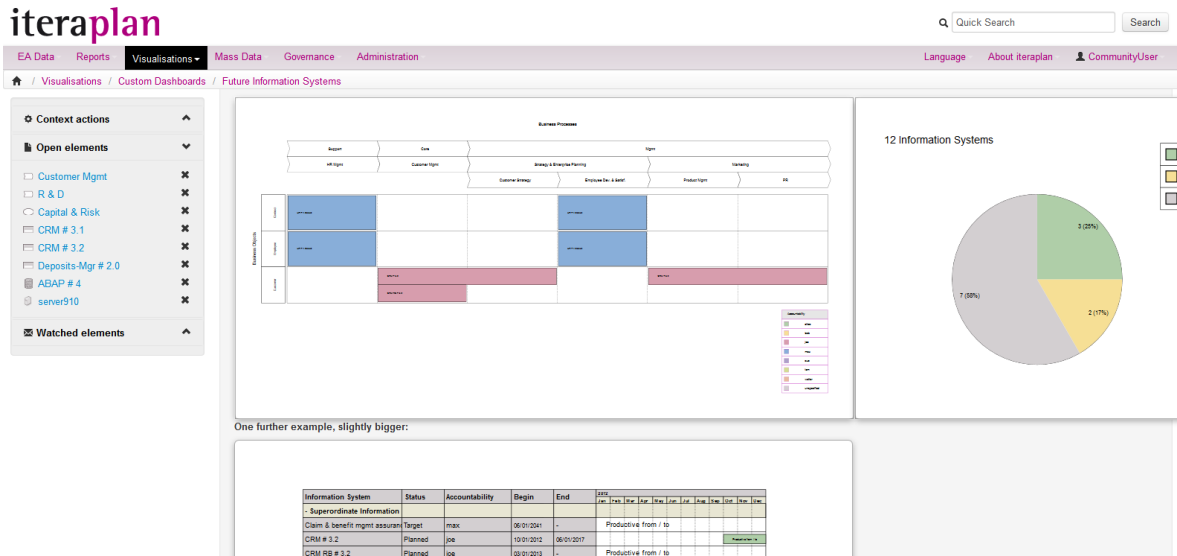


Figure 13.12.: Dashboard of iteraplan

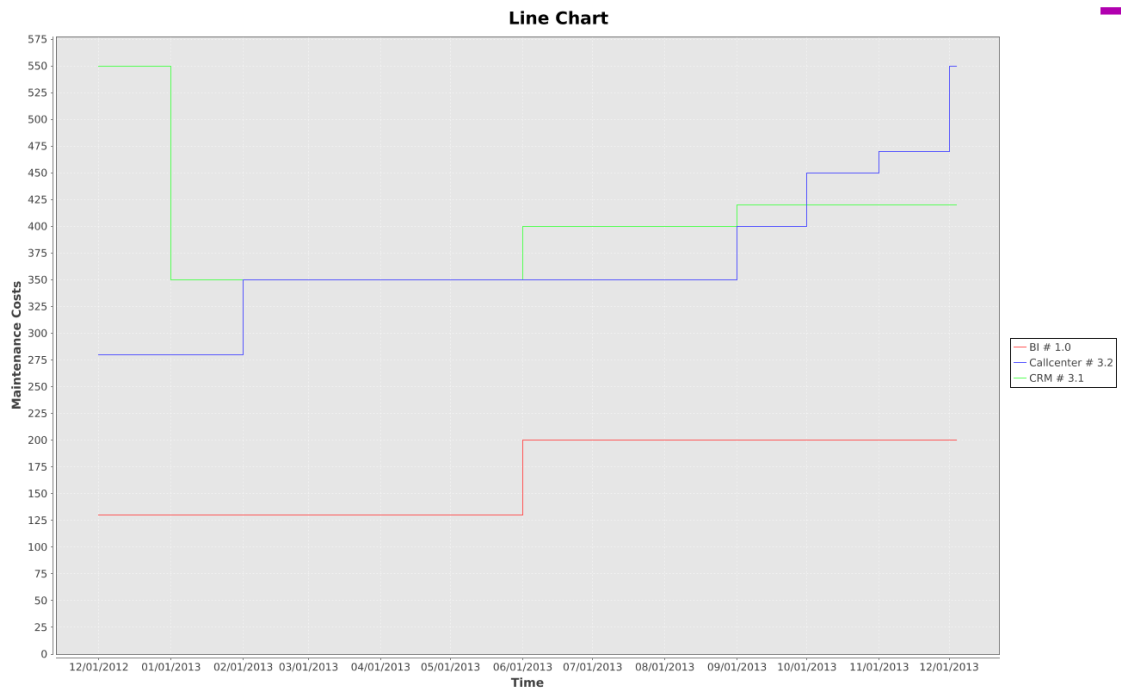


Figure 13.13.: Line Chart of iteraplan



### 13. iteraplan (iteratec)

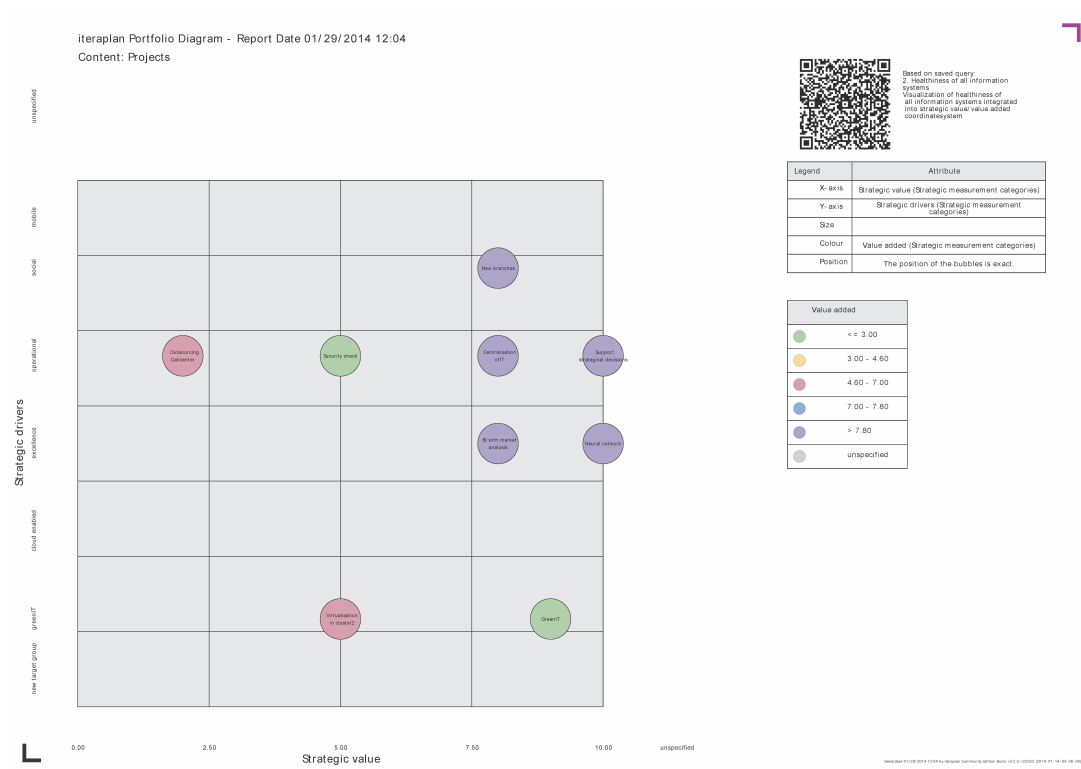


Figure 13.14.: Scatter Chart of iteraplan

# CHAPTER 14

## Layer8 (Layer8-Solutions)

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## 14. Layer8 (Layer8-Solutions)

Layer8-Solutions GbR was founded in 2011 and has more than 2 years of experience in the EA domain. The company is vendor of Layer8 which is offered in version 3 at the editorial deadline. Layer8 supports 14 out of 26 visualization types. Layer8 is a niche player in the EA tool market. The tool comes as a native desktop application for the Windows platform and has strong capabilities for the documentation of information flows, simulation of changes (impact analyses), and automated import of IT infrastructure information. Layer8 provides a scalable web-based collaboration platform for sharing, consuming and controlling visualized information across the organization. Layer8-Web is fully integrated into the Layer8 desktop application.

### 14.1. Background Information

Vendor	Layer8-Solutions GbR
Founding year	2011
Years active in EA market	2
Number of employees	11–50
URL	www.layer8-solutions.de

**Table 14.1.:** Vendor Information of Layer8-Solutions GbR

Tool Name	Layer8	
Version	3	
Client Platforms	✓ Windows	✗ Linux
	✗ MacOS	✓ Browser
	✓ iOS	✓ Android
	✗ Windows Mobile	✗ Other
Deployment Approach	✓ Desktop	✗ SaaS
	✓ Server	✗ Other
EA Frameworks	✓ ArchiMate	✗ NAF
	✗ DoDAF	✗ PEAf
	✗ IAF	✓ TOGAF
	✗ MODAF	✓ Zachman
	✗ Other	

**Table 14.2.:** General Information (Layer8)

## 14.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	✗	✓
DOC(X)	✗	✓
HTML	✗	✓
JPG/JPEG	✗	✓
PDF	✗	✓
PNG	✗	✓
PPT(X)	✗	✗
SVG	✗	✓
VSD(X)	✗	✗
Other	✗	✓

**Table 14.3.:** Visualization Import/Export File Formats (Layer8)

Layer8

## 14.3. Visualization Configuration

### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✓
Data Filter	✓
Other	✗

**Table 14.4.:** Binding (Layer8)

### Generation Approach

Model-Driven	✓
Form-Based	✗
Scripting	✗
Manual Drawing	✓
Other	✗

**Table 14.5.:** Visualization Generation Approach (Layer8)

### Visual Customization and Layouting

Customization	Caption	✓
	Color	✓
	Orientation	✓
	Position	✓
	Shape	✓
	Size	✓
	Other	✓
Layout	Automated	✓
	Manual	✓
	Other	✗

**Table 14.6.:** Visual Customization (Layer8)

## Import/Export of Visualization Configurations

Format	Import	Export
CSV	✓	✓
JSON	✗	✗
ODBC	✓	✗
XMI	✗	✗
XML	✓	✓
XLS(X)	✓	✓
TXT	✓	✓
Other	✗	✗

**Table 14.7.:** Configuration Import/Export (Layer8)

## 14.4. Information Model

Layer8

### Information Model Type

Full Schema	✓
Configurable Building Blocks	✓
User-defined	✓
Subclassing/class inheritance	✓

**Table 14.8.:** Information Model Type (Layer8)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓	✓	✓	✓	✓	✓
Modify	✓	✓	✓	✓	✓	✓
Delete	✓	✓	✓	✓	✓	✓
Copy	✓	✓	✓	✓	✓	✓
Merge	✓	✓	✓	✓	✓	✓
Move	✓	✓	✓	✓	✓	✓

**Table 14.9.:** Information Model Flexibility (Layer8)

## 14.5. Interoperability

### Import Mechanisms

Pull	✓
Push	✓
Other	✓

**Table 14.10.:** Import Mechanisms (Layer8)

### Third Party Tools

Business Intelligence Tools	✓
Business Process Engines	✓
Change Management Tools	✓
Cloud Services	✓
Configuration Management Database	✓
Enterprise Service Bus	✓
Infrastructure Monitoring Tools	✓
License/IT Asset Management Tools	✓
Project Portfolio Management Tools	✓
Release Management Tools	✓
Other	✓

**Table 14.11.:** Interoperability with Third Party Tools (Layer8)

## Data & Schema Import/Export

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	✓	✓	✓	✓
JSON	✗	✗	✗	✗
TXT	✓	✓	✓	✗
XMI	✗	✗	✓	✓
XML	✓	✓	✓	✓
XLS(X)	✓	✓	✓	✓
OData	✗	✗	✗	✗
Other	✓	✓	✗	✗

**Table 14.12.:** Data & Schema Import/Export (Layer8)

## Model Element Import/Export

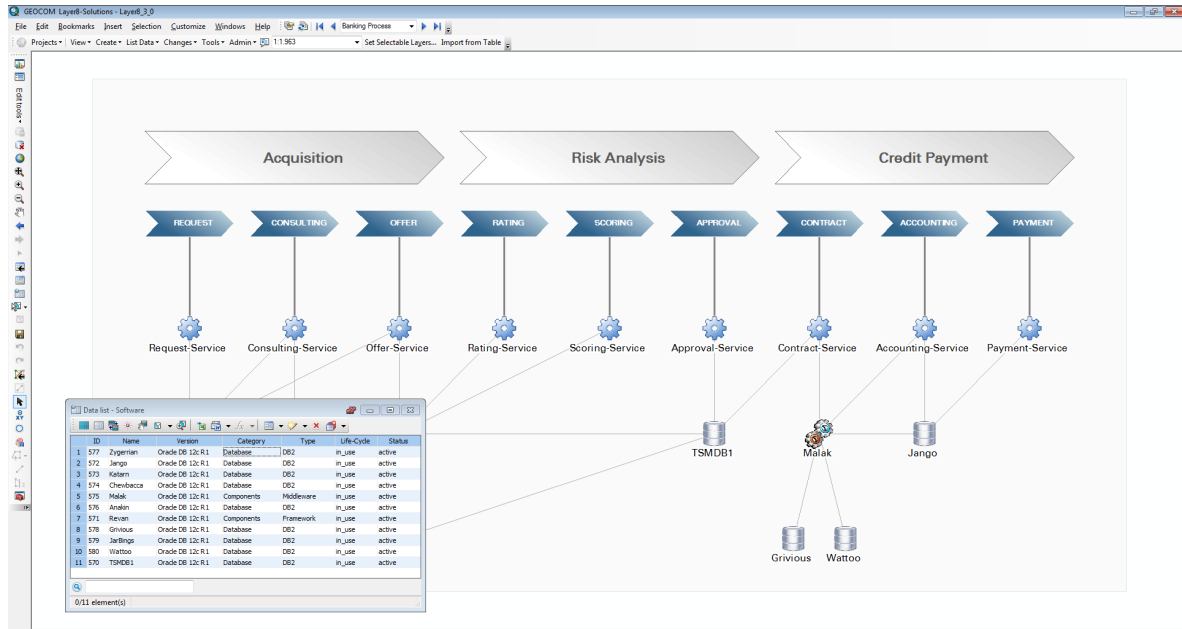
Model Element	Import	Export
Classes	✓	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	✓	✓
Roles	✓	✓
Other	✓	✓

**Table 14.13.:** Model Element Import/Export (Layer8)



## 14. Layer8 (Layer8-Solutions)

### 14.6. Visualization Examples of Layer8



Layer8

Figure 14.1.: Matrix of Layer8

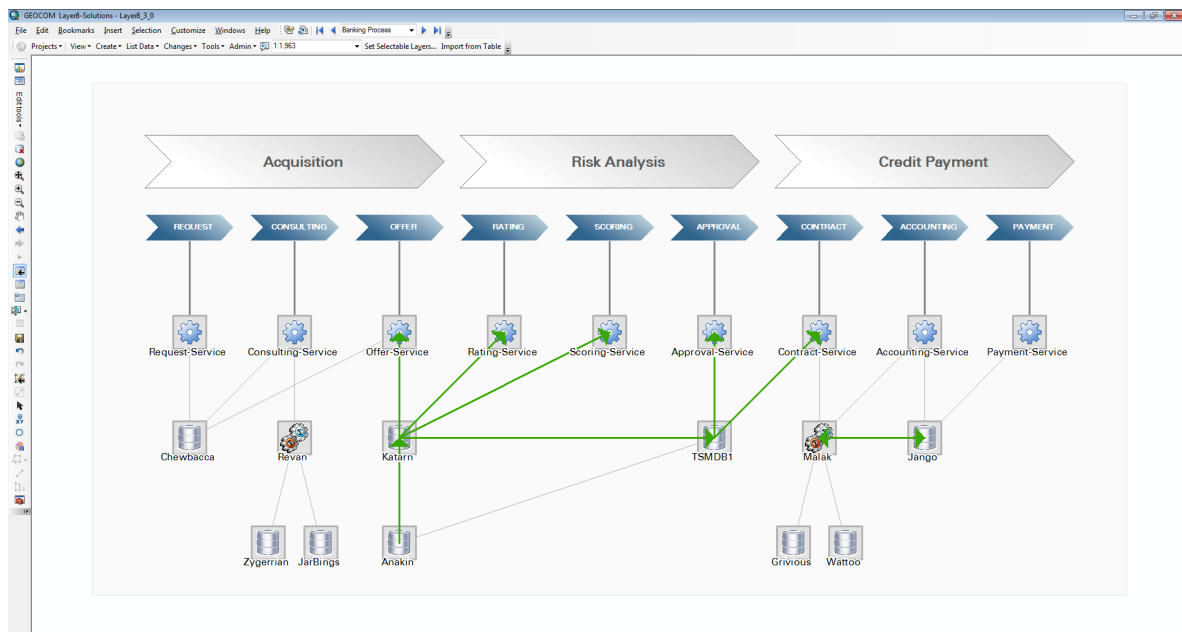


Figure 14.2.: Flow Diagram of Layer8



## 14. Layer8 (Layer8-Solutions)

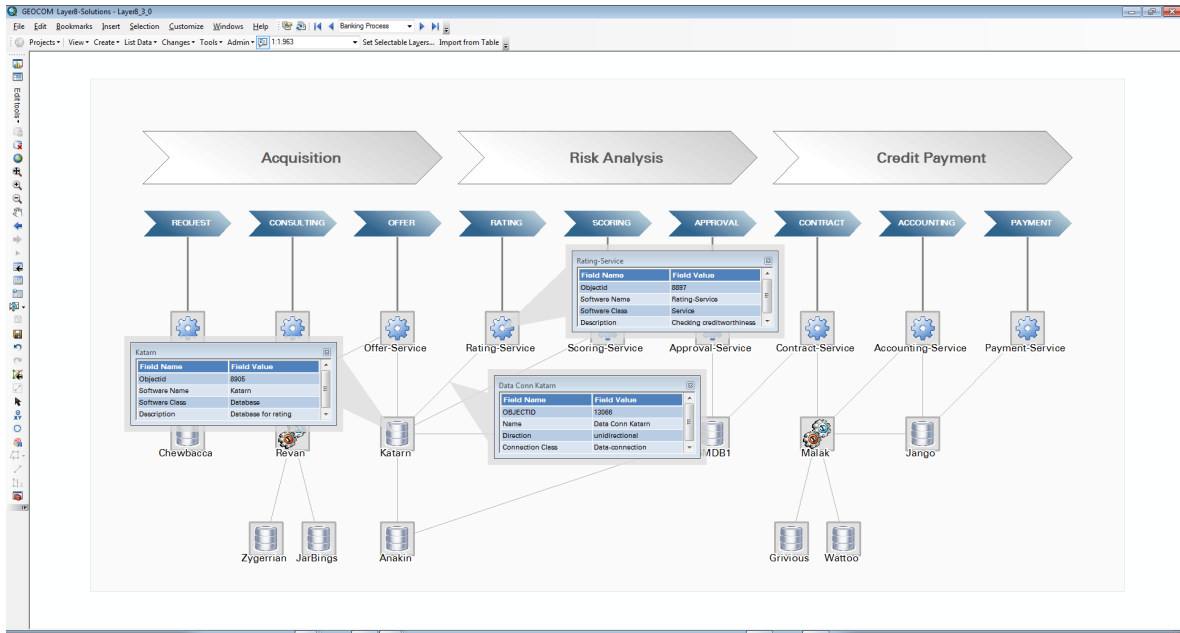


Figure 14.5.: ER Diagram of Layer8

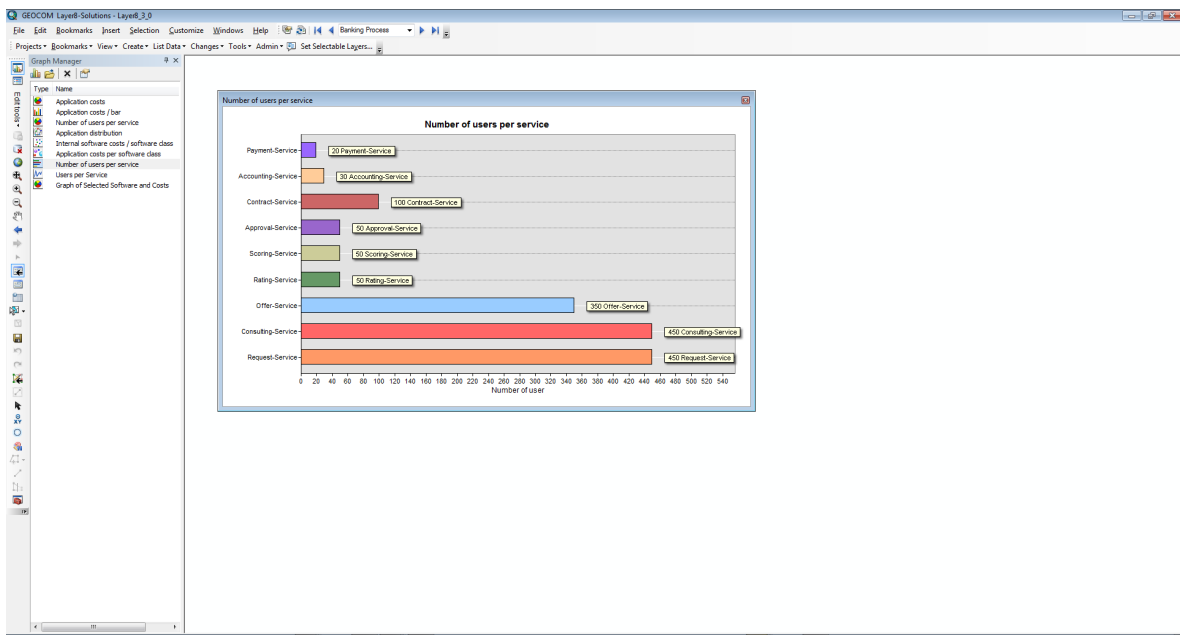


Figure 14.6.: Bar Chart of Layer8

## 14. Layer8 (Layer8-Solutions)

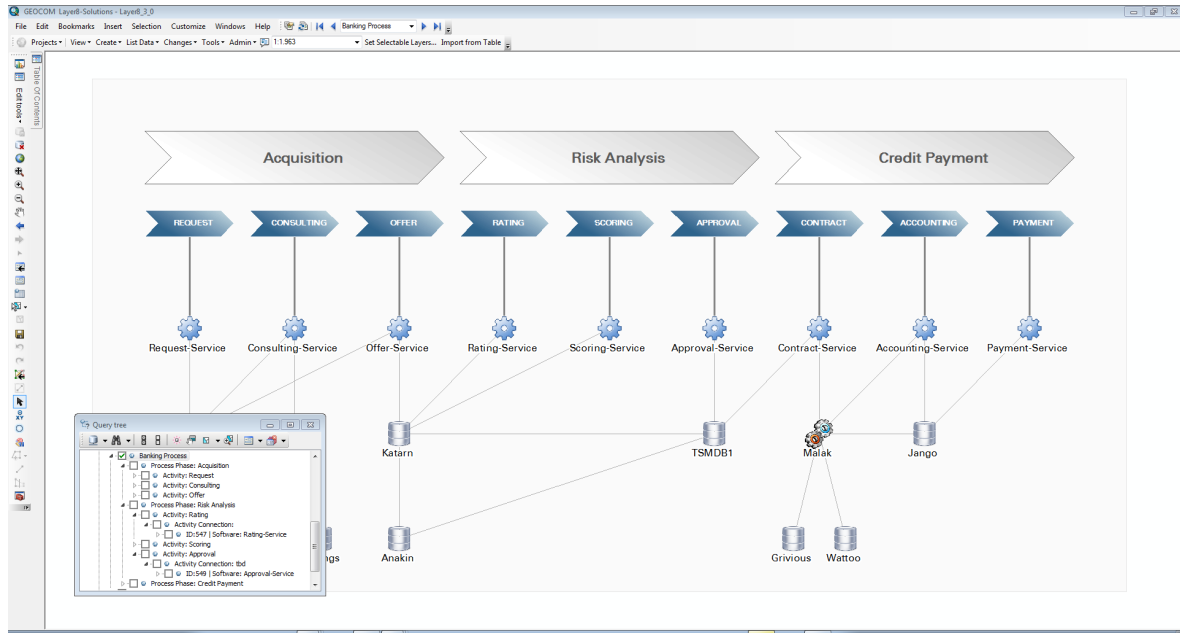


Figure 14.7.: Treewiew of Layer8

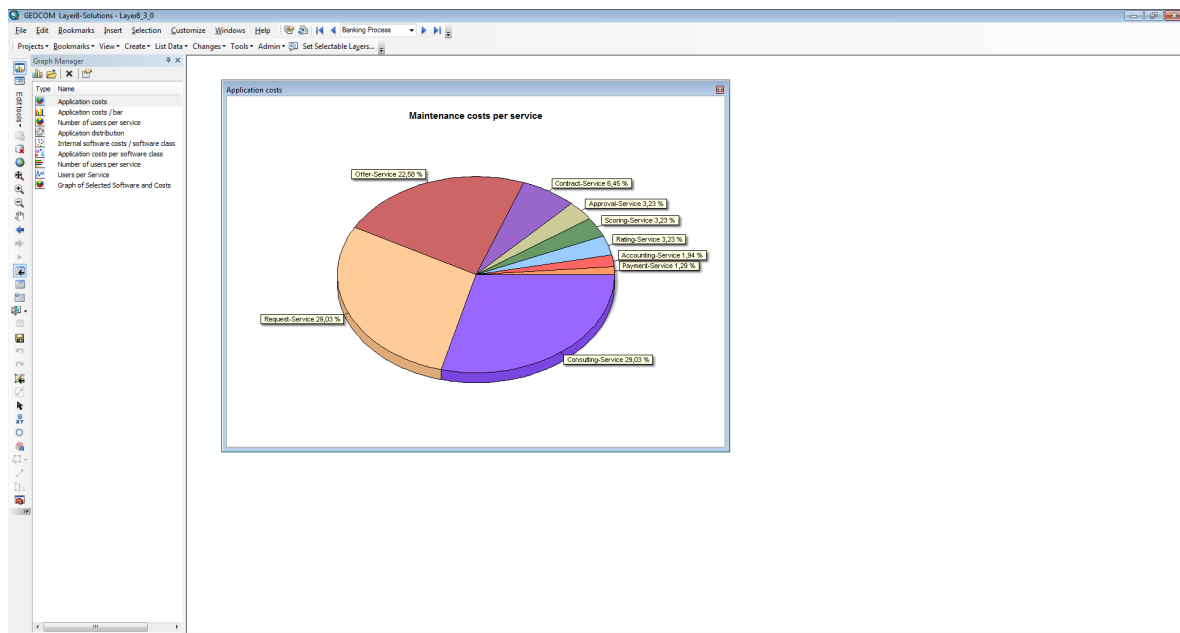


Figure 14.8.: Pie Chart of Layer8

## 14. Layer8 (Layer8-Solutions)

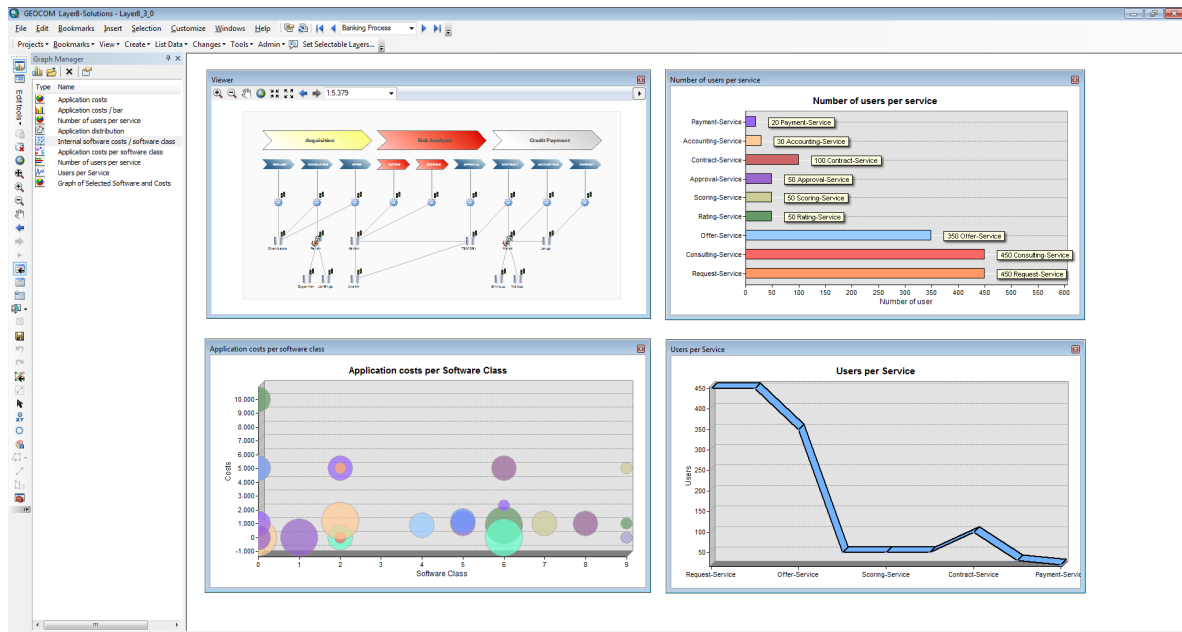


Figure 14.9.: Dashboard of Layer8

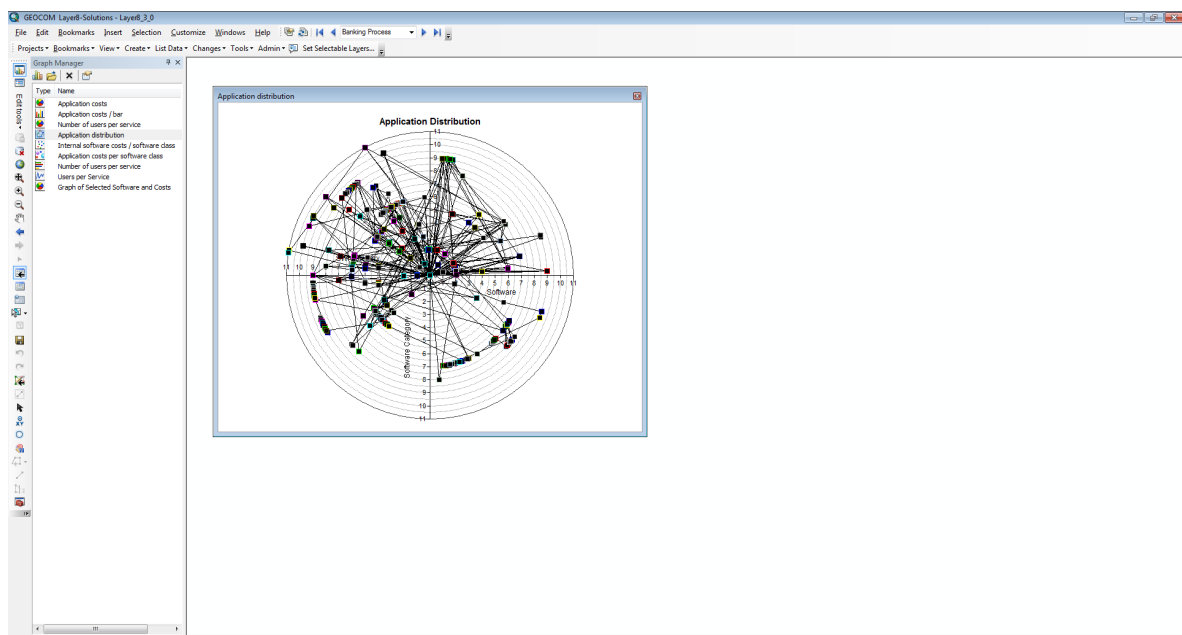


Figure 14.10.: Radar Diagram of Layer8

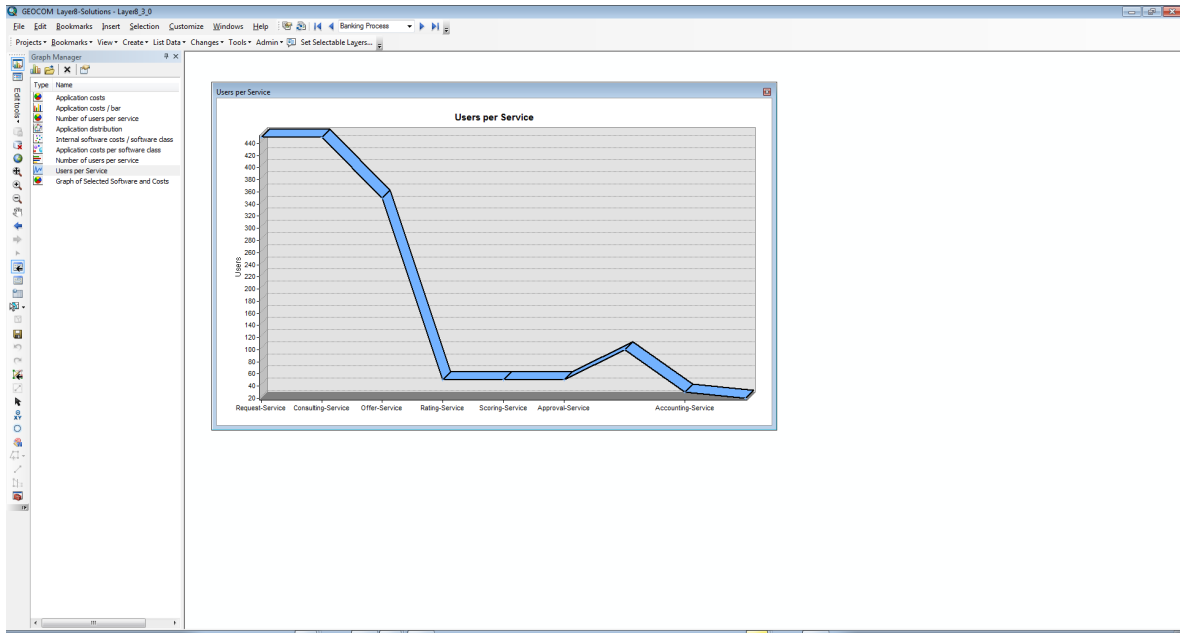


Figure 14.11.: Line Chart of Layer8

Layer8

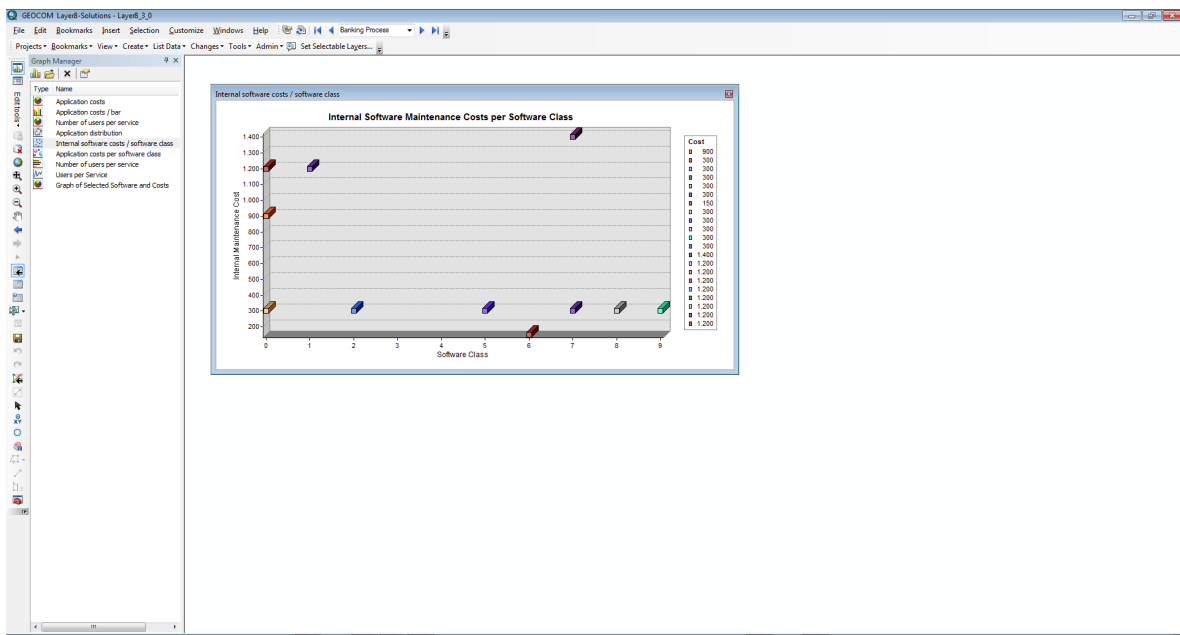


Figure 14.12.: Scatter Chart of Layer8

## 14. Layer8 (Layer8-Solutions)

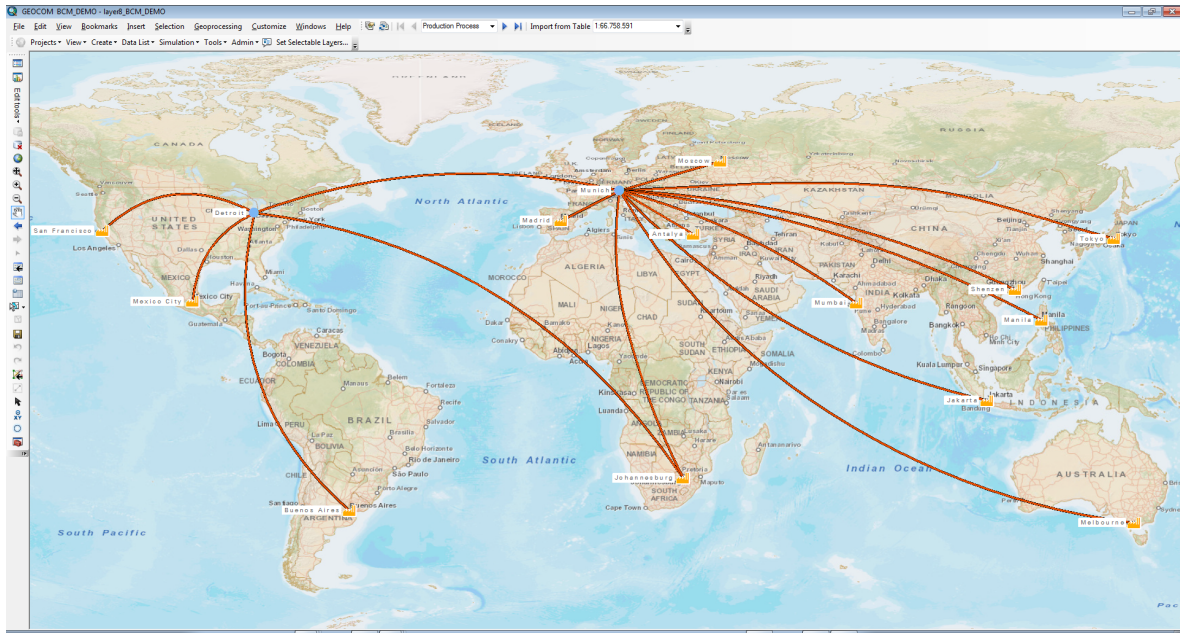


Figure 14.13.: Geographic Map of Layer8

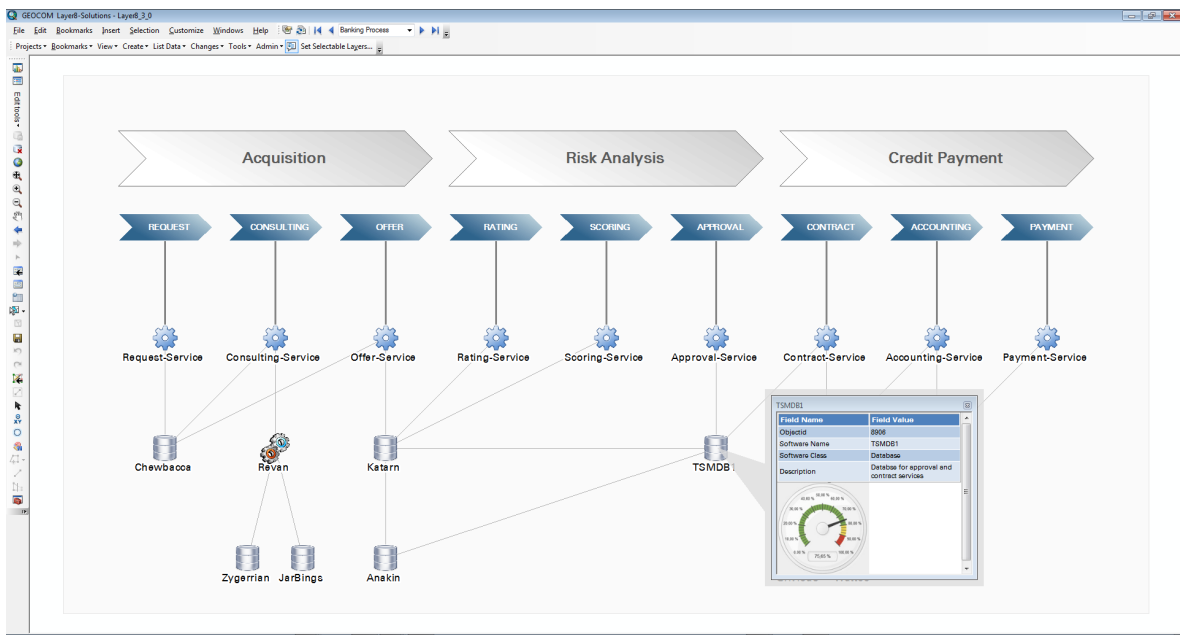


Figure 14.14.: Gauges of Layer8

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## 15. leanIX (LeanIX GmbH)

LeanIX GmbH was founded in 2012 and has more than 2 years of experience in the EA domain. The company is vendor of leanIX which is offered in version 1.7 at the editorial deadline. leanIX supports 11 out of 26 visualization types. New in the market, leanIX features a nice

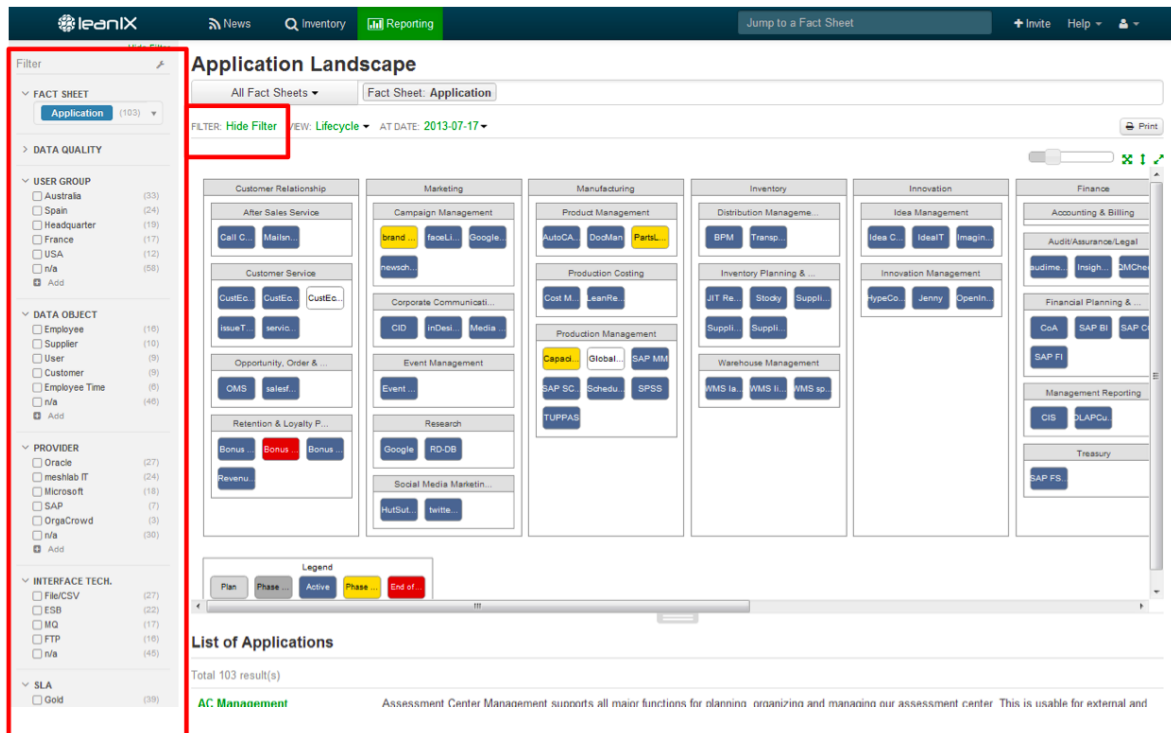


Figure 15.1.: Data filter and Visualization of leanIX

user interface (UI) with a consistent design and support for the basic visualization types. leanIX may convince EA experts when it comes to usability. In particular the multi-faceted filter (cf. Figure 15.1) empowers end users for ad-hoc analyses. The Representational State Transfer (REST) application programming interface (API) can be used to build more complex queries outside from leanIX in third party tools such as Microsoft Excel.

### 15.1. Background Information

Vendor	LeanIX GmbH
Founding year	2012
Years active in EA market	2
Number of employees	1–10
URL	www.leanix.net

Table 15.1.: Vendor Information of LeanIX GmbH

Tool Name	leanIX	
Version	1.7	
Client Platforms	✗ Windows	✗ Linux
	✗ MacOS	✓ Browser
	✗ iOS	✗ Android
	✗ Windows Mobile	✗ Other
Deployment Approach	✗ Desktop	✓ SaaS
	✗ Server	✓ Other
EA Frameworks	✗ ArchiMate	✗ NAF
	✗ DoDAF	✗ PEAR
	✗ IAF	✗ TOGAF
	✗ MODAF	✗ Zachman
	✓ Other	

Table 15.2.: General Information (leanIX)

## 15.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	✗	✗
DOC(X)	✗	✗
HTML	✗	✓
JPG/JPEG	✗	✗
PDF	✗	✓
PNG	✗	✗
PPT(X)	✗	✗
SVG	✗	✓
VSD(X)	✗	✗
Other	✗	✗

Table 15.3.: Visualization Import/Export File Formats (leanIX)

## 15.3. Visualization Configuration

### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✗
Data Filter	✓
Other	✗

**Table 15.4.:** Binding (leanIX)

### Generation Approach

Model-Driven	✓
Form-Based	✓
Scripting	✓
Manual Drawing	✗
Other	✓

**Table 15.5.:** Visualization Generation Approach (leanIX)

### Visual Customization and Layouting

Customization	Caption	✗
	Color	✓
	Orientation	✗
	Position	✗
	Shape	✗
	Size	✓
	Other	✓
Layout	Automated	✓
	Manual	✓
	Other	✓

**Table 15.6.:** Visual Customization (leanIX)

## Import/Export of Visualization Configurations

Format	Import	Export
CSV	✗	✗
JSON	✗	✓
ODBC	✗	✗
XMI	✗	✗
XML	✗	✓
XLS(X)	✗	✓
TXT	✗	✗
Other	✓	✓

**Table 15.7.:** Configuration Import/Export (leanIX)

## 15.4. Information Model

### Information Model Type

Full Schema	✓
Configurable Building Blocks	✗
User-defined	✗
Subclassing/class inheritance	✗

**Table 15.8.:** Information Model Type (leanIX)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✗	✓	✗	✗	✗	✗
Modify	✓	✓	✗	✗	✗	✗
Delete	✗	✓	✗	✗	✗	✗
Copy	✗	✗	✗	✗	✗	✗
Merge	✗	✗	✗	✗	✗	✗
Move	✗	✗	✗	✗	✗	✗

**Table 15.9.:** Information Model Flexibility (leanIX)

## 15.5. Interoperability

### Import Mechanisms

Pull	✓
Push	✓
Other	✓

**Table 15.10.:** Import Mechanisms (leanIX)

### Third Party Tools

Business Intelligence Tools	✓
Business Process Engines	✓
Change Management Tools	✗
Cloud Services	✓
Configuration Management Database	✓
Enterprise Service Bus	✓
Infrastructure Monitoring Tools	✗
License/IT Asset Management Tools	✗
Project Portfolio Management Tools	✓
Release Management Tools	✗
Other	✓

**Table 15.11.:** Interoperability with Third Party Tools (leanIX)

## Data & Schema Import/Export

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	✓	✗	✗	✗
JSON	✓	✓	✗	✓
TXT	✓	✗	✗	✗
XMI	✓	✗	✗	✗
XML	✓	✓	✗	✓
XLS(X)	✓	✗	✗	✗
OData	✗	✗	✗	✗
Other	✗	✗	✗	✗

**Table 15.12.:** Data & Schema Import/Export (leanIX)

## Model Element Import/Export

Model Element	Import	Export
Classes	✗	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	✗	✗
Roles	✓	✓
Other	✓	✗

**Table 15.13.:** Model Element Import/Export (leanIX)



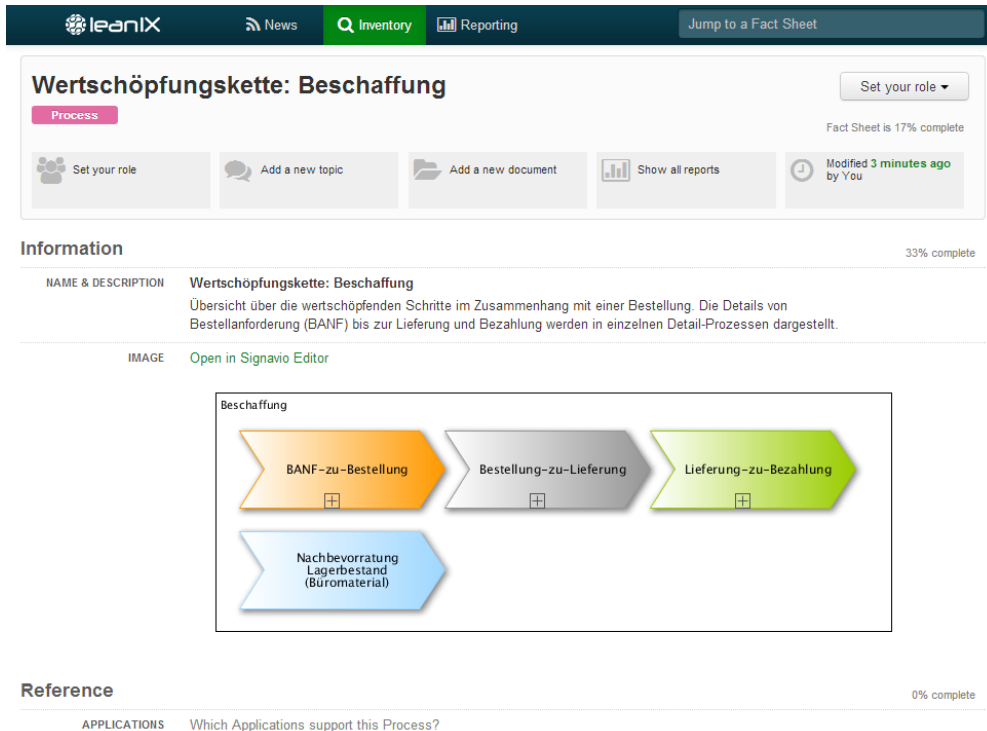


Figure 15.4.: Flow Diagram of the leanIX

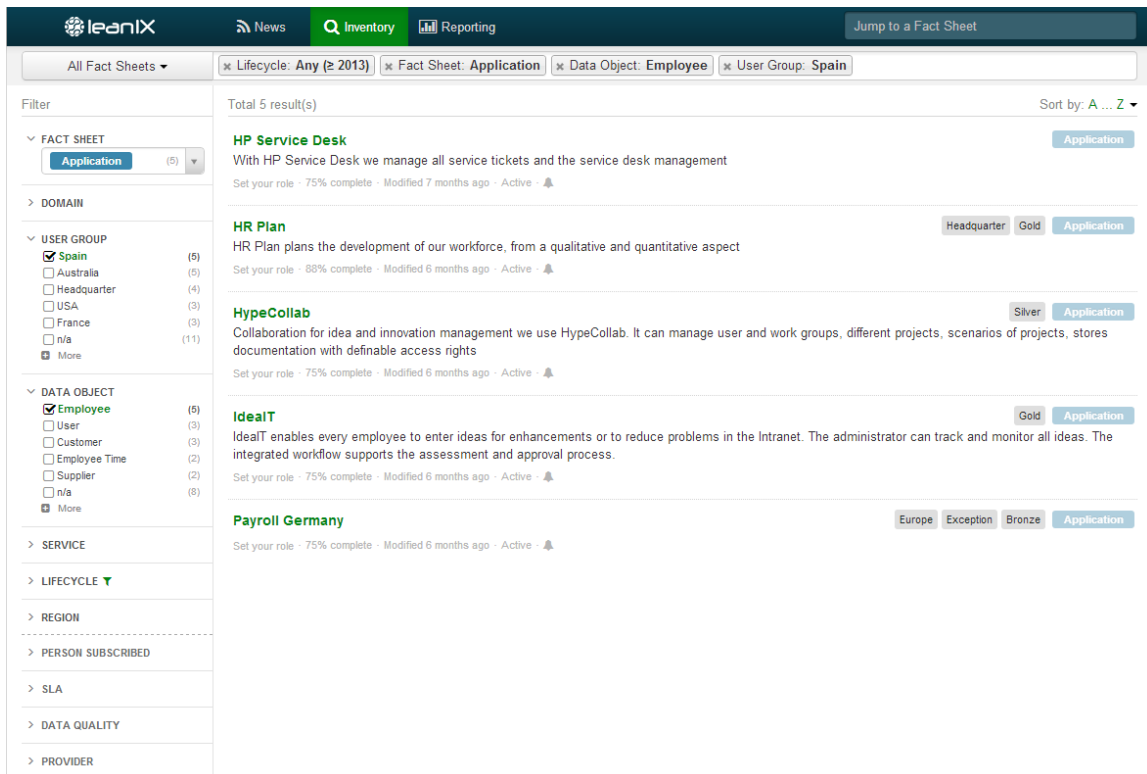


Figure 15.5.: List of the leanIX



15. leanIX (LeanIX GmbH)

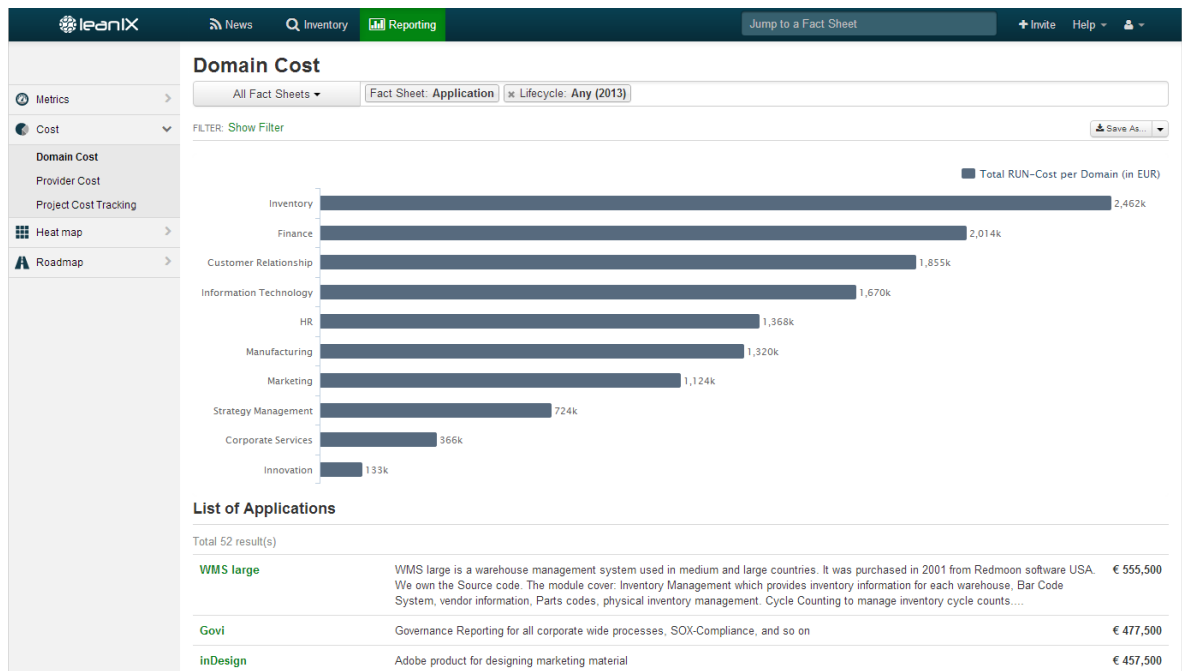


Figure 15.6.: Bar Chart of the leanIX

LeanIX

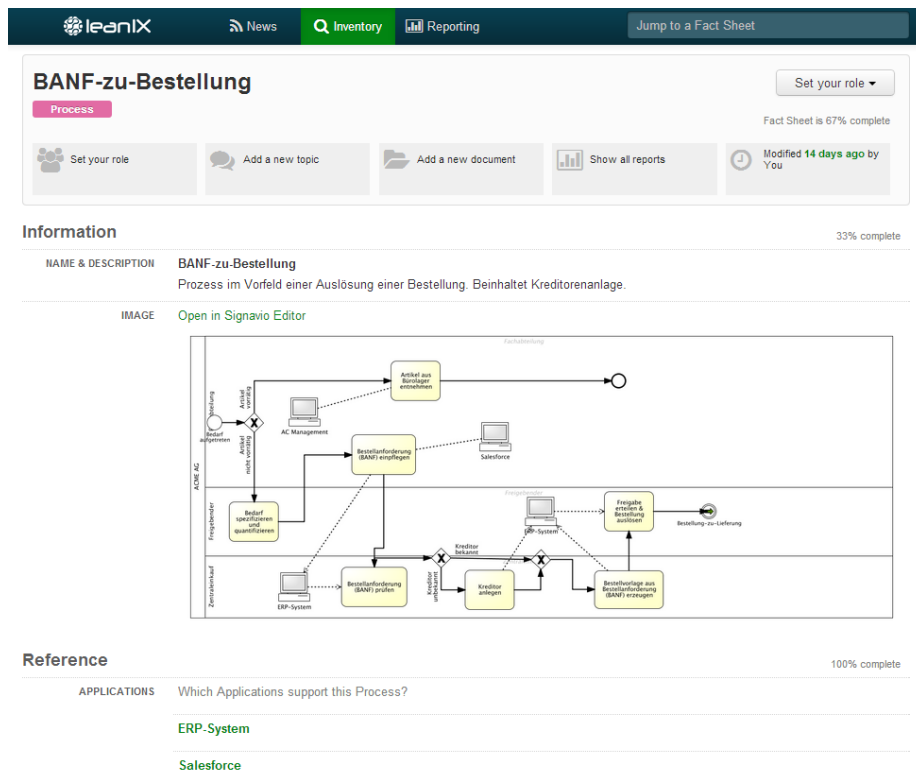


Figure 15.7.: BPMN Diagram of the leanIX

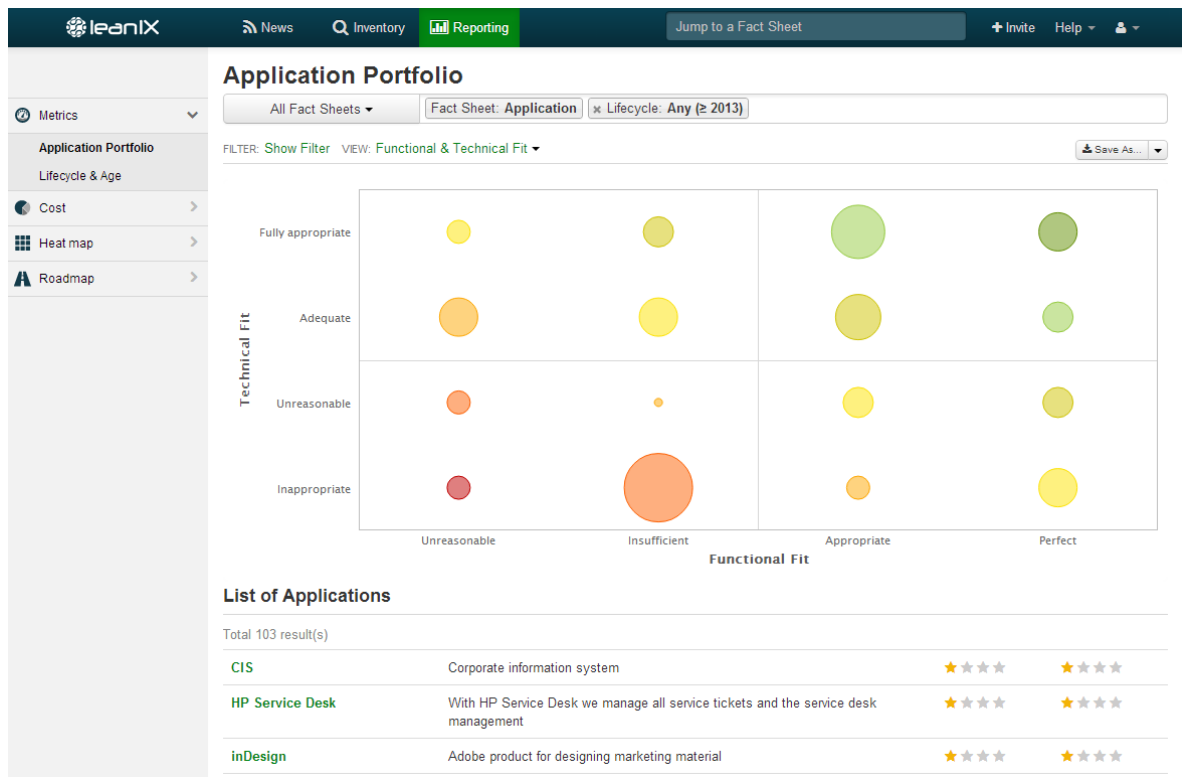


Figure 15.8.: Bubble Chart of the leanIX

LeanIX

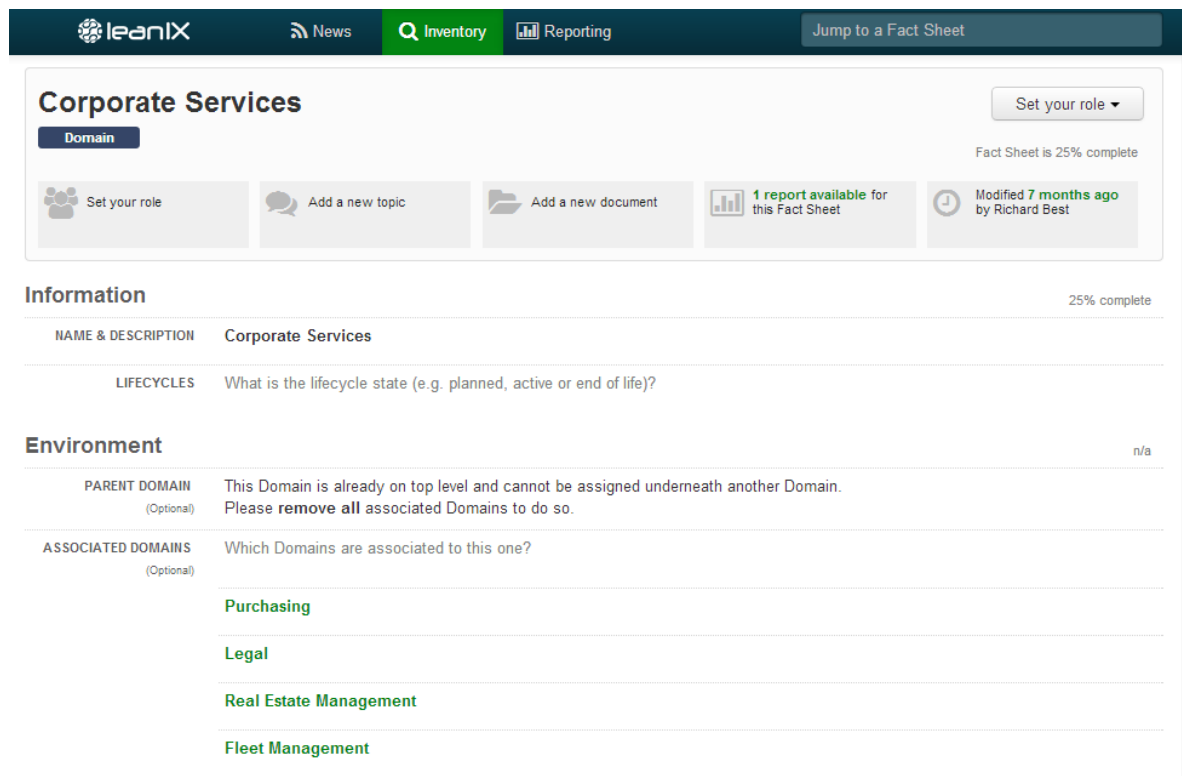


Figure 15.9.: Treeview of the leanIX

## 15. leanIX (LeanIX GmbH)

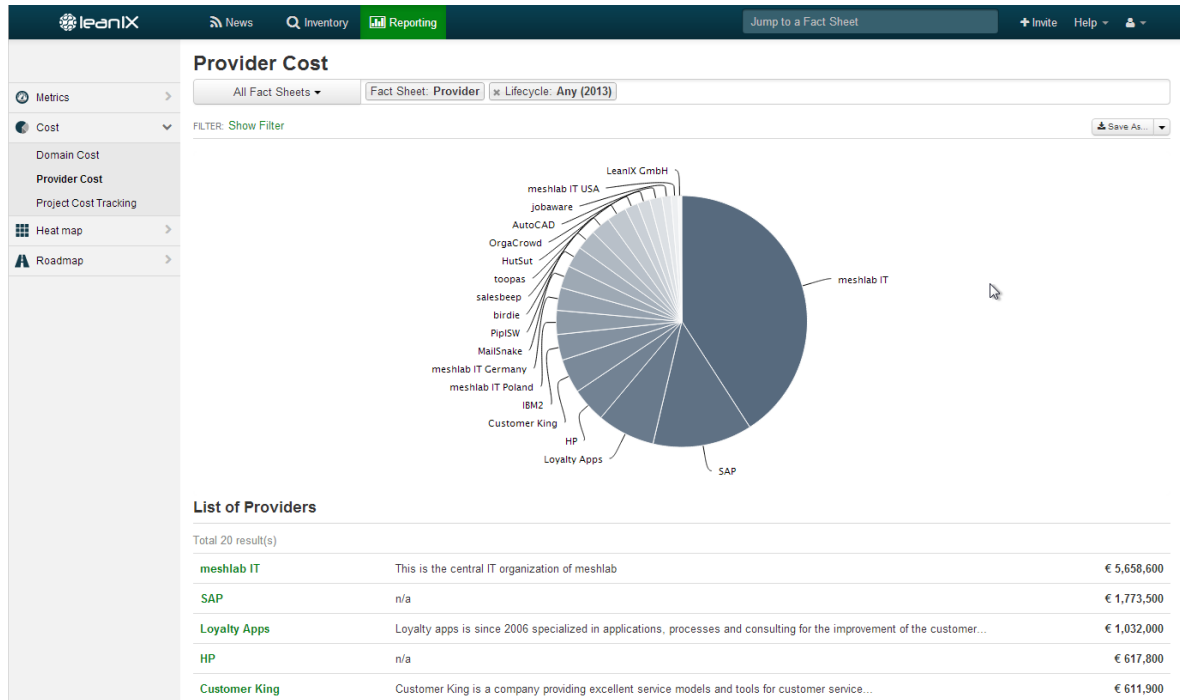


Figure 15.10.: Pie Chart of the leanIX

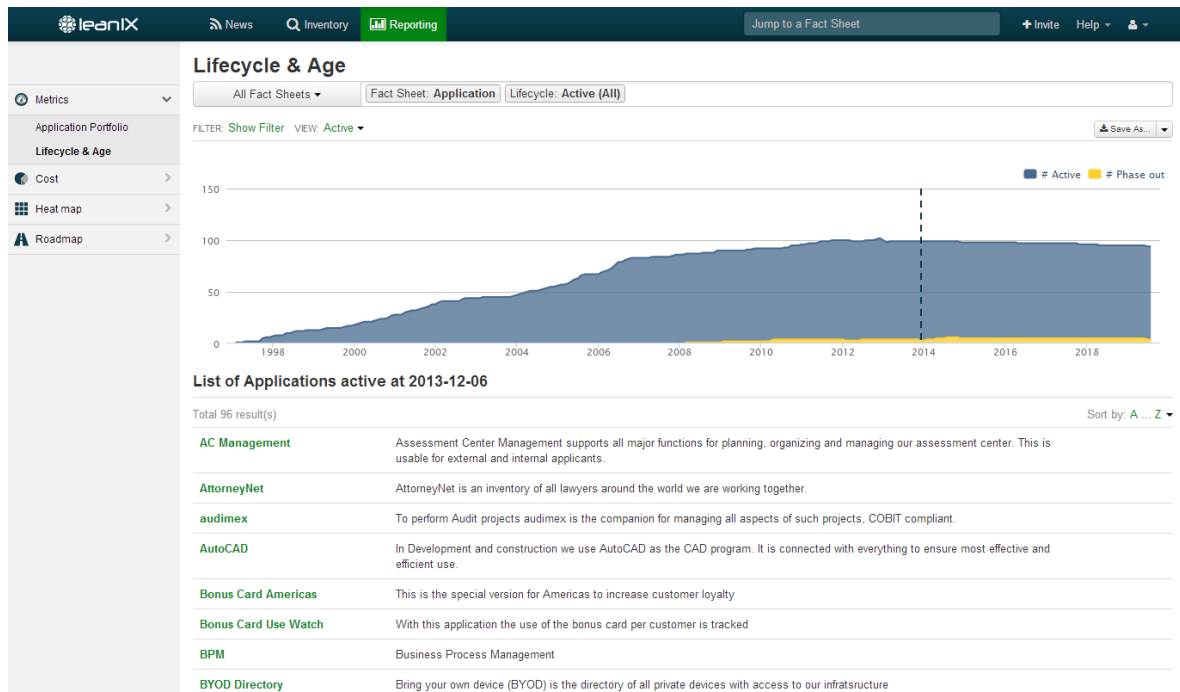


Figure 15.11.: Line Chart of the leanIX

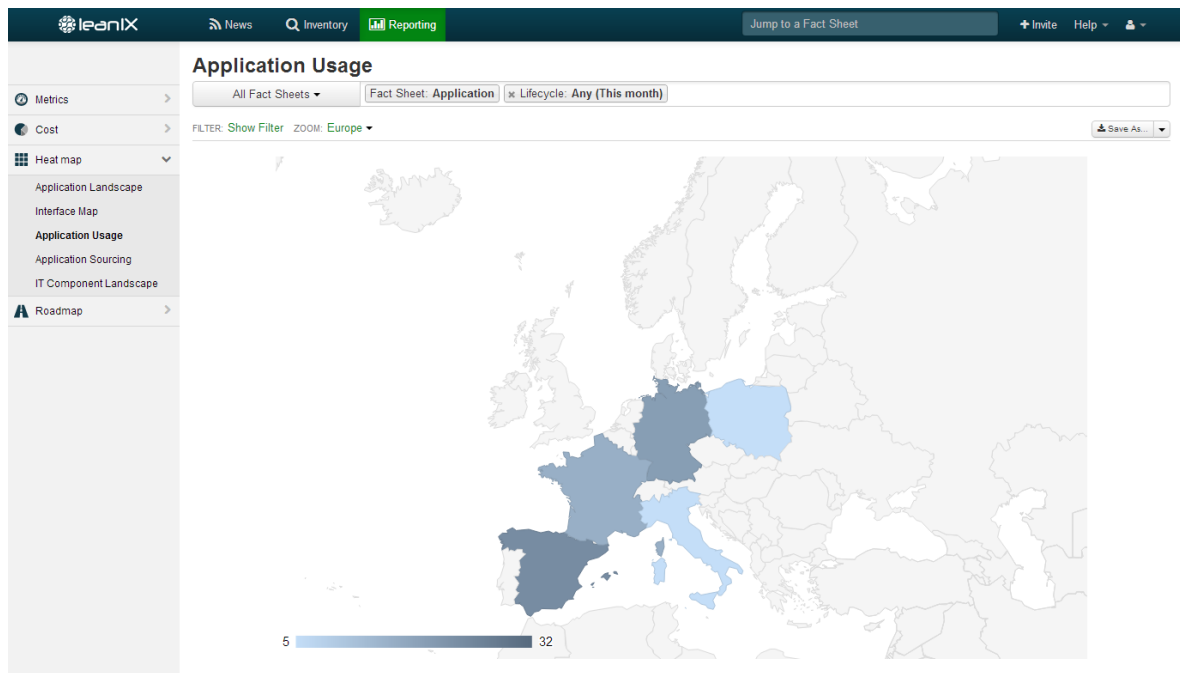


Figure 15.12.: Geographic Map of the leanIX



# CHAPTER 16

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## MEGA (MEGA International)

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MEGA International S.A. was founded in 1991 and has more than 22 years of experience in the EA domain. The company is vendor of MEGA Architecture which is offered in version HOPEX V1R1 at the editorial deadline. MEGA Architecture supports 22 out of 26 visualization types. Gartner Research currently sees MEGA Architecture as the leader among the EA tools [Ga13]. MEGA International S.A. wants to clarify that for the sake of simplicity they have included only the most basic examples so that it is easier for the viewer to understand. MEGA Architecture has many more powerful capabilities for visualization, import/export and metrics functionality.

### 16.1. Background Information

Vendor	MEGA International S.A.
Founding year	1991
Years active in EA market	22
Number of employees	251–500
URL	www.mega.com

**Table 16.1.:** Vendor Information of MEGA International S.A.

Tool Name	MEGA Architecture			
Version	HOPEX V1R1			
Client Platforms	✓	Windows	✗	Linux
	✗	MacOS	✓	Browser
	✗	iOS	✗	Android
	✗	Windows Mobile	✗	Other
Deployment Approach	✓	Desktop	✗	SaaS
	✓	Server	✓	Other
EA Frameworks	✓	ArchiMate	✓	NAF
	✓	DoDAF	✓	PEAF
	✗	IAF	✓	TOGAF
	✓	MODAF	✓	Zachman
	✓	Other		

**Table 16.2.:** General Information (MEGA Architecture)

## 16.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	✓	✓
DOC(X)	✓	✓
HTML	✓	✓
JPG/JPEG	✓	✓
PDF	✗	✓
PNG	✓	✓
PPT(X)	✓	✗
SVG	✓	✗
VSD(X)	✓	✓
Other	✓	✗

**Table 16.3.:** Visualization Import/Export File Formats (MEGA Architecture)

## 16.3. Visualization Configuration

### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✓
Data Filter	✓
Other	✓

**Table 16.4.:** Binding (MEGA Architecture)



### Generation Approach

Model-Driven	✓
Form-Based	✓
Scripting	✓
Manual Drawing	✓
Other	✗

**Table 16.5.:** Visualization Generation Approach (MEGA Architecture)

### Visual Customization and Layouting

Customization	Caption	✓
	Color	✓
	Orientation	✓
	Position	✓
	Shape	✓
	Size	✓
	Other	✓
Layout	Automated	✓
	Manual	✓
	Other	✗

**Table 16.6.:** Visual Customization (MEGA Architecture)



## Import/Export of Visualization Configurations

Format	Import	Export
CSV	✓	✓
JSON	✗	✗
ODBC	✓	✗
XMI	✓	✓
XML	✓	✓
XLS(X)	✓	✓
TXT	✓	✓
Other	✓	✗

**Table 16.7.:** Configuration Import/Export (MEGA Architecture)

## 16.4. Information Model

### Information Model Type

Full Schema	✓
Configurable Building Blocks	✓
User-defined	✗
Subclassing/class inheritance	✓

**Table 16.8.:** Information Model Type (MEGA Architecture)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓	✓	✓	✓	✓	✓
Modify	✓	✓	✓	✓	✓	✓
Delete	✓	✓	✓	✓	✓	✓
Copy	✓	✓	✓	✓	✓	✓
Merge	✓	✓	✓	✗	✗	✓
Move	✓	✓	✓	✗	✗	✗

**Table 16.9.:** Information Model Flexibility (MEGA Architecture)

## 16.5. Interoperability

### Import Mechanisms

Pull	✓
Push	✗
Other	✗

**Table 16.10.:** Import Mechanisms (MEGA Architecture)

### Third Party Tools

Business Intelligence Tools	✓
Business Process Engines	✓
Change Management Tools	✓
Cloud Services	✓
Configuration Management Database	✓
Enterprise Service Bus	✓
Infrastructure Monitoring Tools	✓
License/IT Asset Management Tools	✓
Project Portfolio Management Tools	✓
Release Management Tools	✓
Other	✗

**Table 16.11.:** Interoperability with Third Party Tools (MEGA Architecture)

## Data & Schema Import/Export

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	✓	✓	✗	✗
JSON	✗	✗	✗	✗
TXT	✓	✓	✗	✓
XMI	✓	✓	✓	✓
XML	✓	✓	✓	✓
XLS(X)	✓	✓	✗	✓
OData	✗	✗	✗	✗
Other	✗	✓	✗	Portable Document Format (PDF)

**Table 16.12.:** Data & Schema Import/Export (MEGA Architecture)

## Model Element Import/Export

Model Element	Import	Export
Classes	✗	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	✗	✗
Roles	✓	✓
Other	✗	✗

**Table 16.13.:** Model Element Import/Export (MEGA Architecture)

## 16.6. Visualization Examples of MEGA Architecture

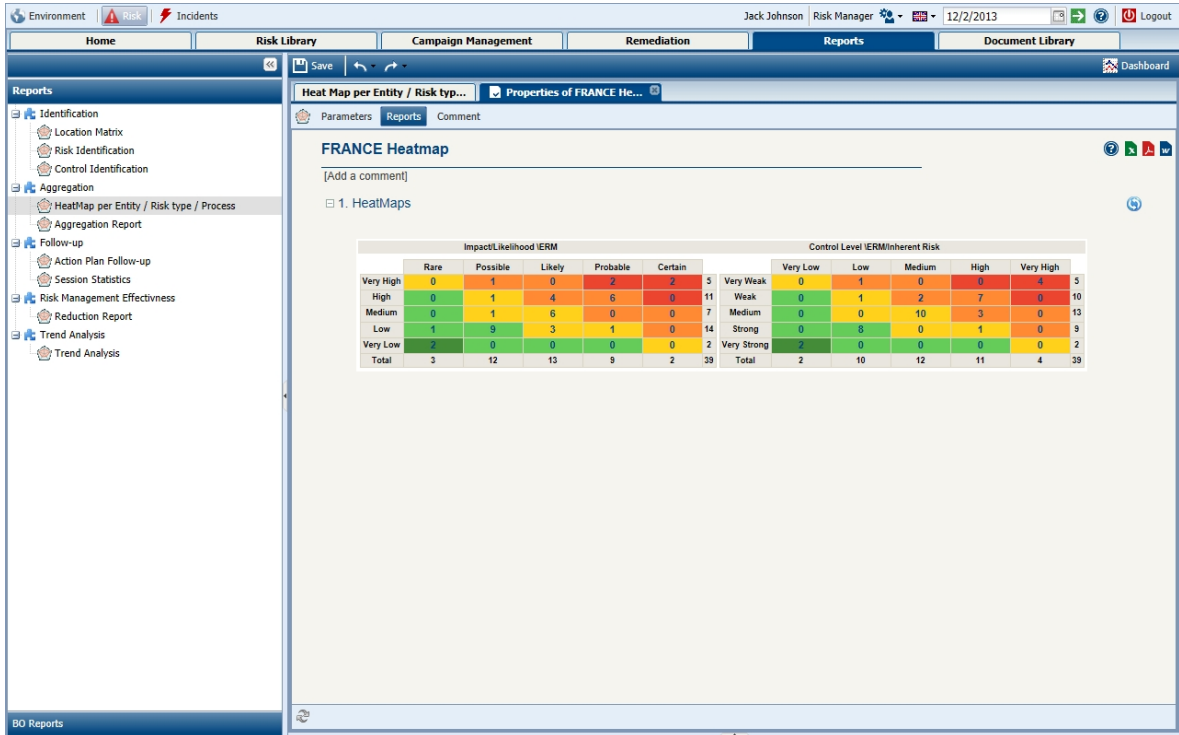


Figure 16.1.: Matrix of the MEGA Architecture

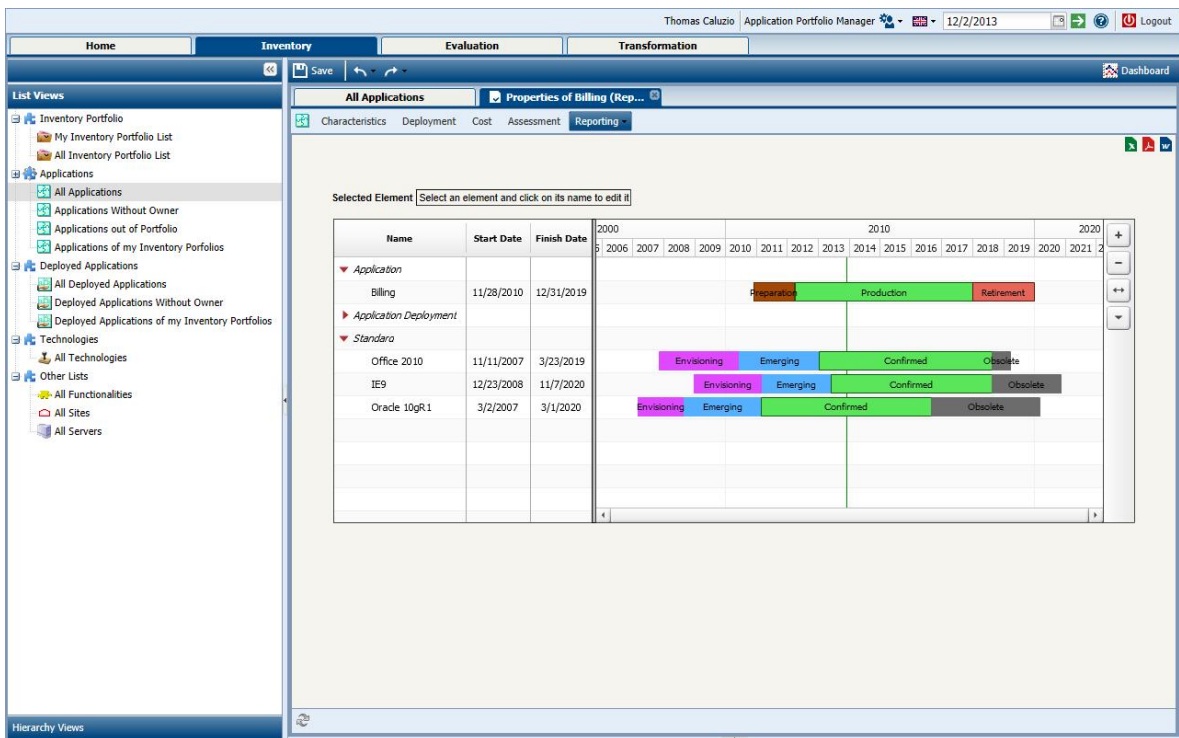


Figure 16.2.: Timeline of the MEGA Architecture

## 16. MEGA (MEGA International)

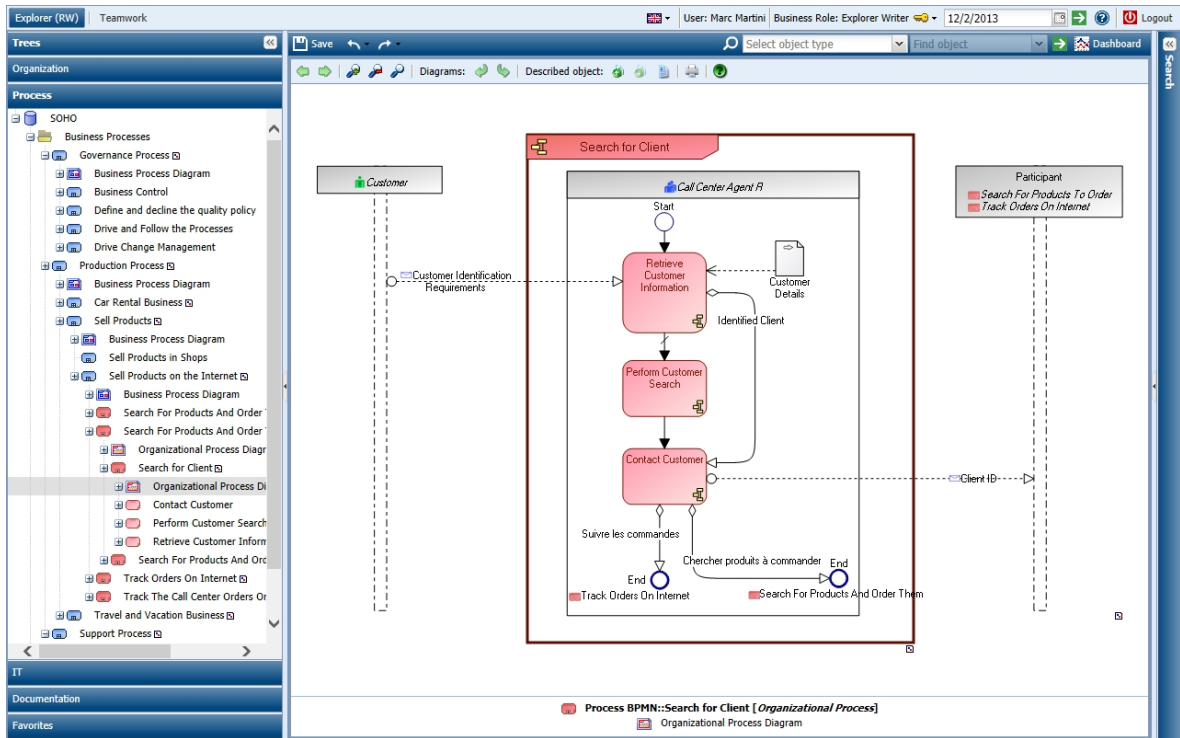


Figure 16.3.: Flow Diagram of the MEGA Architecture

The screenshot displays the MEGA software interface showing a list of applications. The table below represents the data shown in the "All Applications" view.

Local name	Application Code	Current State	Application Type	Expenses	Business Value	Functional Support	Technical Eff
CRM Europe	SapEu10.1.0	Production	In House Application	€524,000.00	Good	Good	Medium
CRM US	SapUs10.1.0	Production	In House Application	€387,000.00	Medium	Medium	Low
MyCompany.com	MyComp	Production	In House Application	€324,000.00	Good	Good	Poor
Booking Management	RESBOOK	Production	In House Application	€180,000.00			
IT Management	ITM	Production	Middleware	€144,000.00	Medium	Medium	Medium
HR Management	HRM	Production	System	€144,000.00	Low	Poor	Low
Billing	BIO42	Production	Office System	€117,000.00	Low	Medium	Good
SAP Zeus	AY1237	Production	In House Application	€93,005.00	Medium	Poor	Good
Global Customer	GC	Preparation	Software Package	€63,000.00		Low	Good
Logistic management	LM	Production	System	€48,000.00	Low	Low	Low
Salesforce	SalesF	Production	Software Package	€36,000.00	Good	Poor	Low
Compliance Management	CompM	Production	System	€36,000.00	Medium	Medium	Low
LogiKS	Log	Production	Middleware	€36,000.00	Low	Low	Low
Communication Management	Comun	Production	Middleware	€36,000.00	Medium	Poor	Good
Finance Management	FinM	Production	Software Package	€31,000.00	Medium	Medium	Good
Risk Management	RM	Production	Middleware	€24,000.00	Medium	Good	Good
Account Management	AccM	Production	In House Application	€24,000.00	Low	Medium	Good
GIP.SSI	GIP	Production	In House Application	€20,400.00	Poor	Poor	Poor
Carrier Management	CM2005	Production	Middleware	€18,000.00	Good	Low	Low
Strategic plan Management	SPM	Production	Software Package	€18,000.00	Low	Medium	Good
MEGA Hopex	HOPEX	Production	Software Package	€15,000.00	Good	Good	Good
Law recorder	Law	Production	In House Application	€14,400.00	Poor	Poor	Poor
SAGE	S2.1	Preparation	Software Package	€12,000.00			
Operation Support (Homemade)	SuppOp	Production	Middleware	€12,000.00	Poor	Medium	Poor

Figure 16.4.: List of the MEGA Architecture

## 16. MEGA (MEGA International)

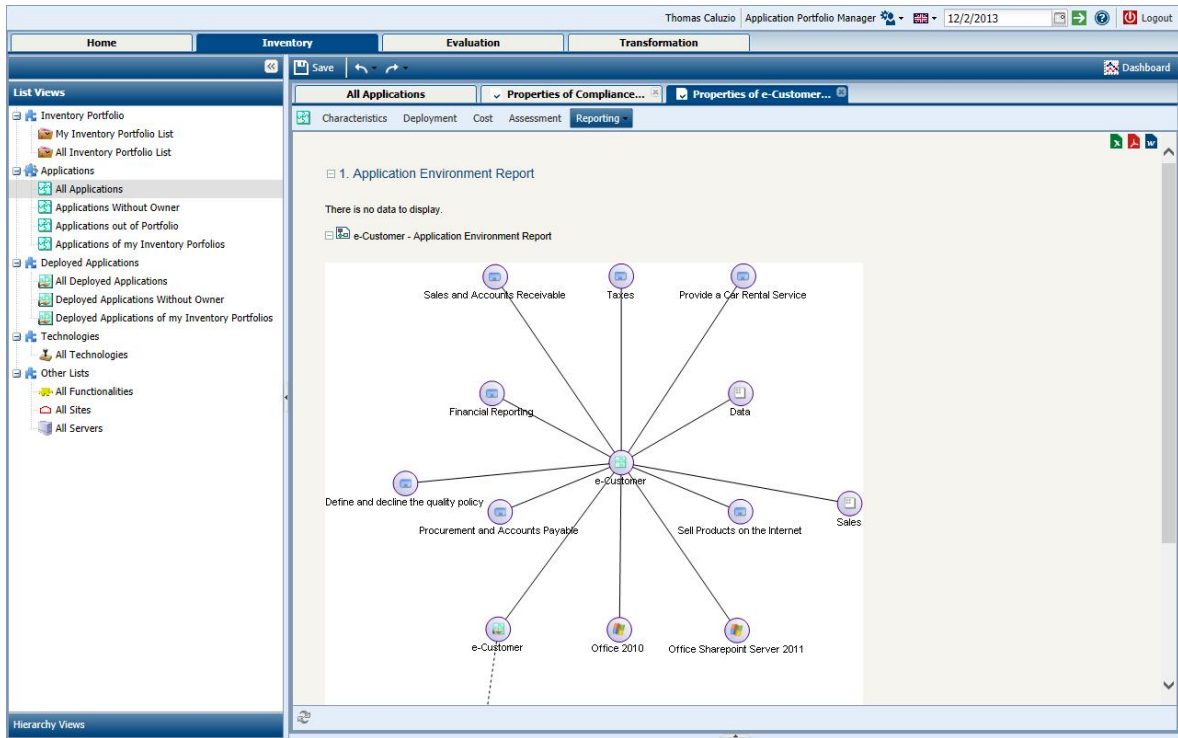


Figure 16.5.: Graph of the MEGA Architecture

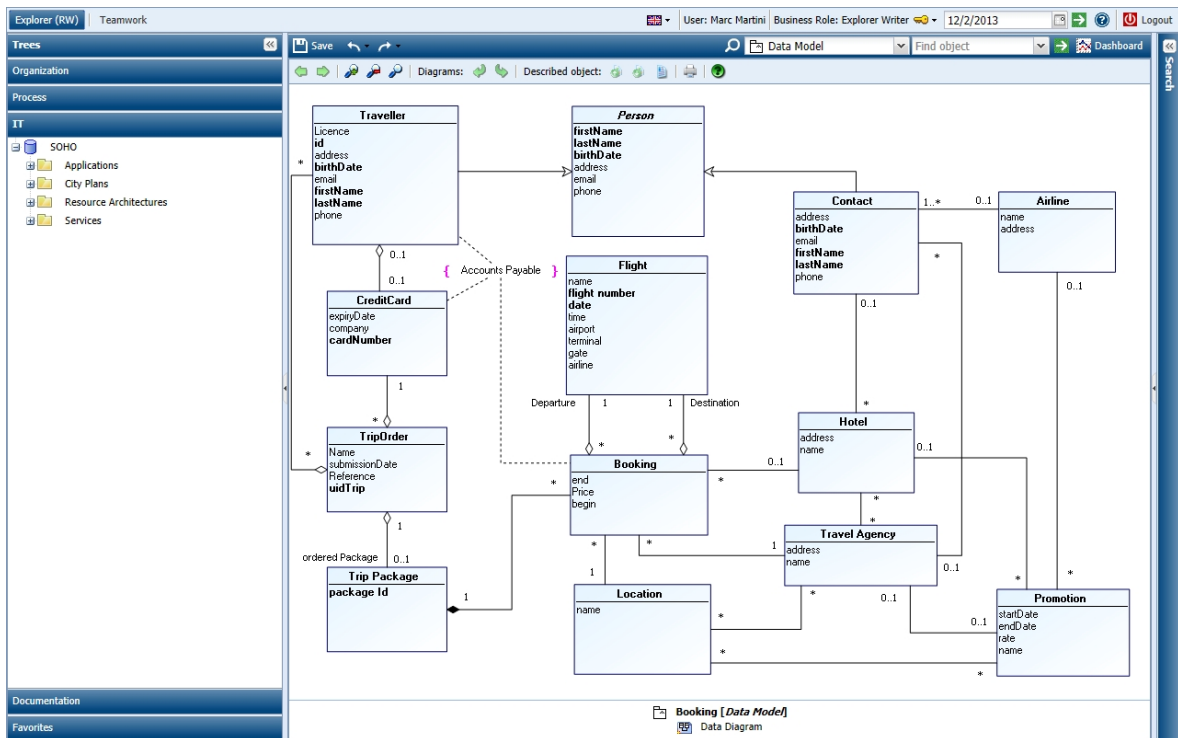


Figure 16.6.: ER Diagram of the MEGA Architecture

## 16. MEGA (MEGA International)

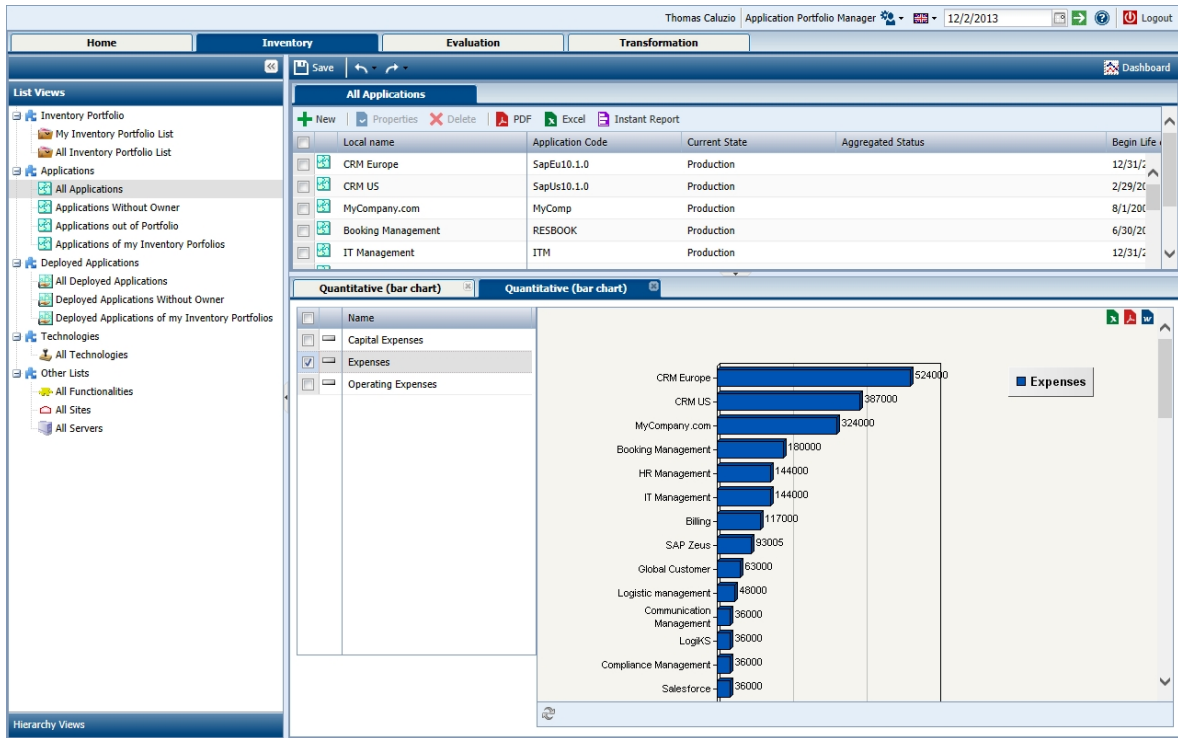


Figure 16.7.: Bar Chart of the MEGA Architecture

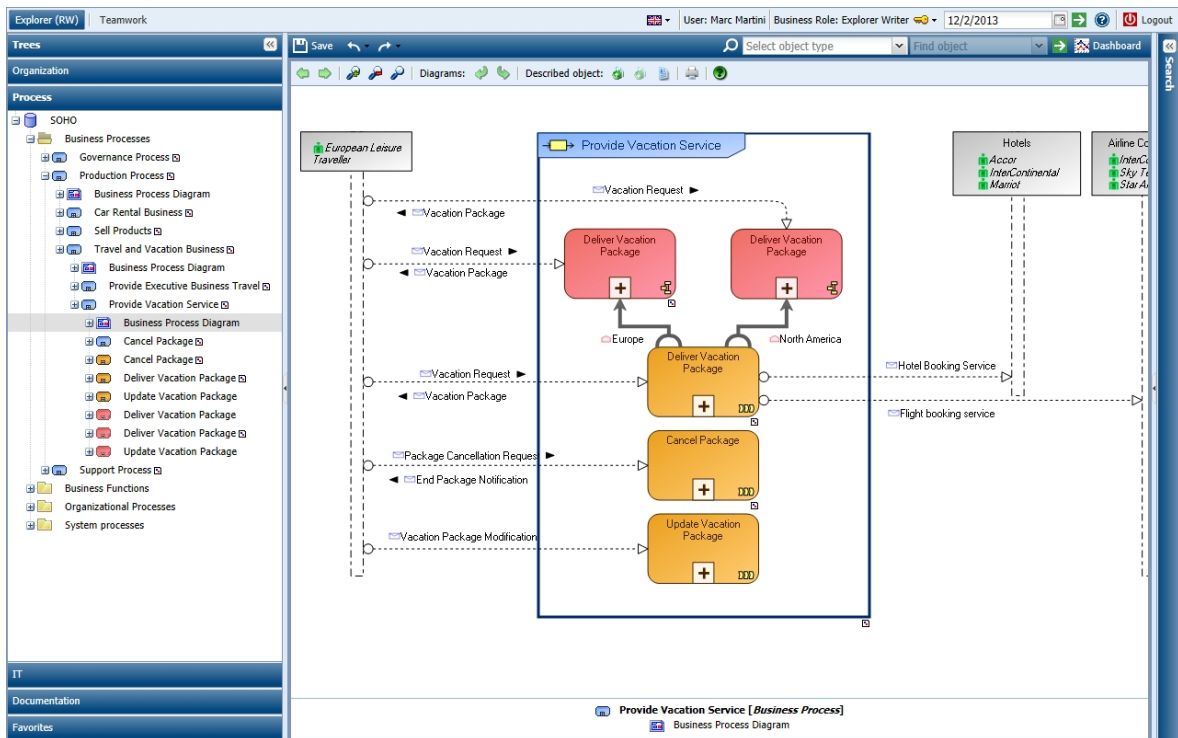


Figure 16.8.: BPMN Diagram of the MEGA Architecture



## 16. MEGA (MEGA International)

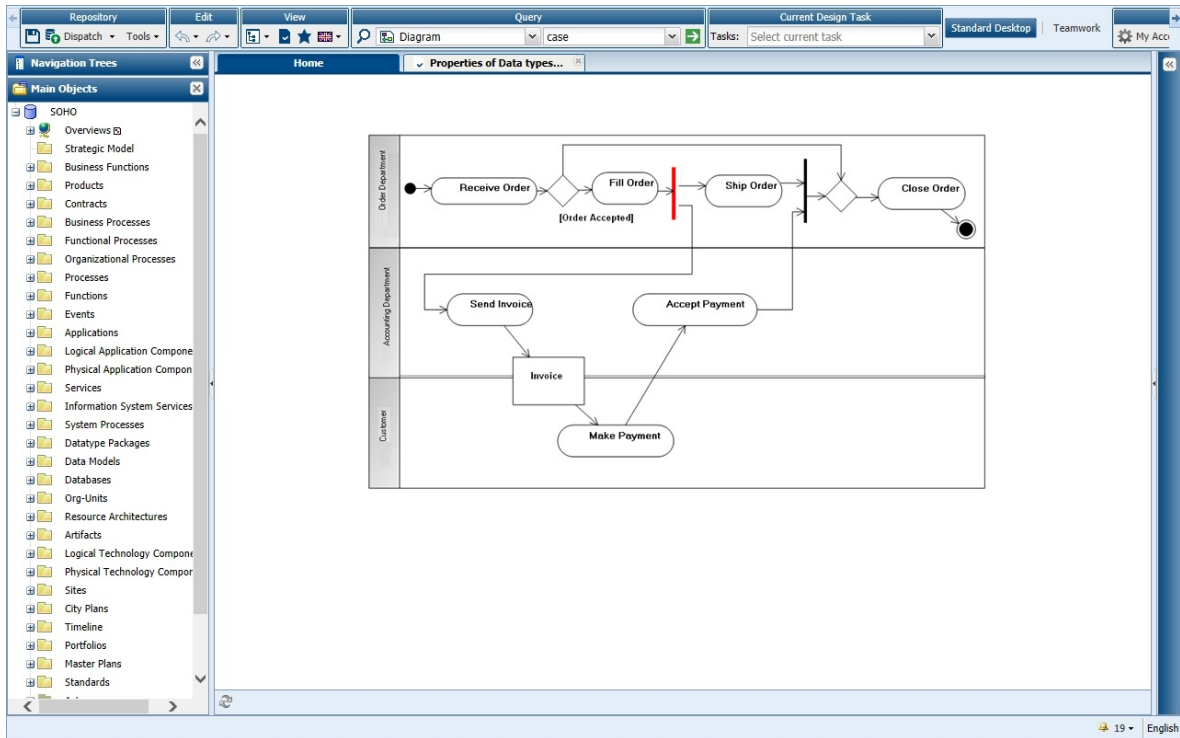


Figure 16.9.: UML Diagram of the MEGA Architecture



Figure 16.10.: Bubble Chart of the MEGA Architecture

16. MEGA (MEGA International)

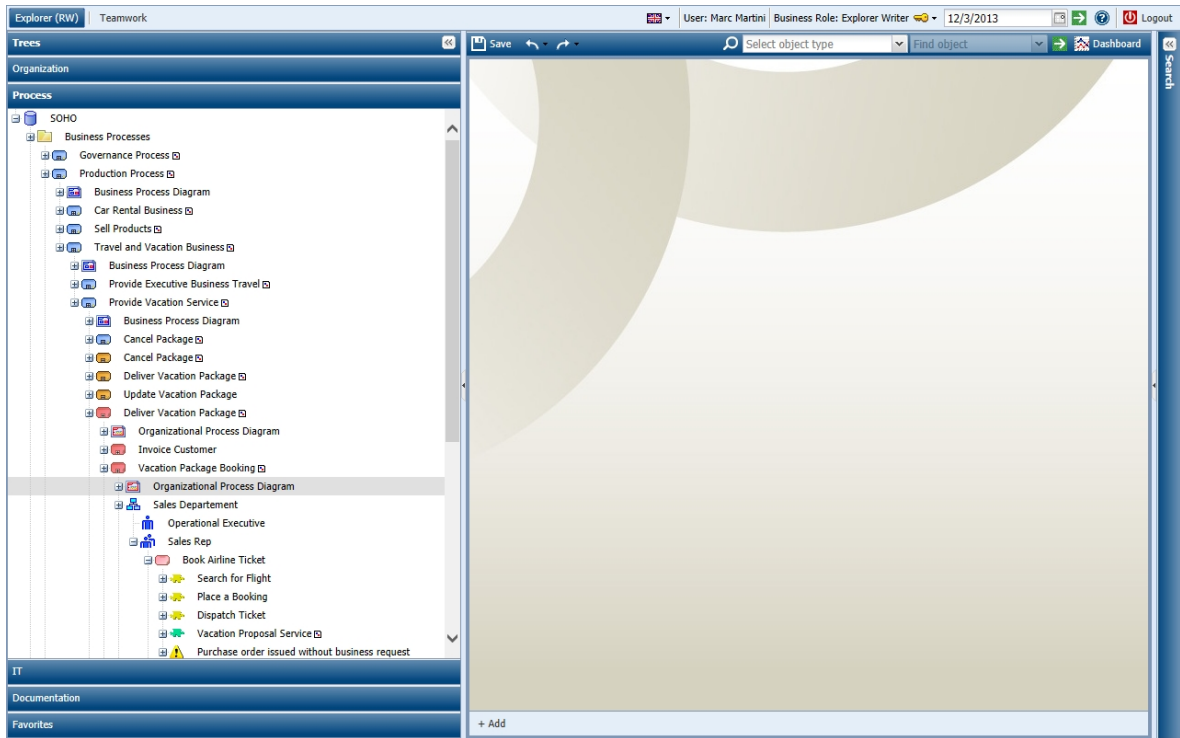


Figure 16.11.: Treeview of the MEGA Architecture

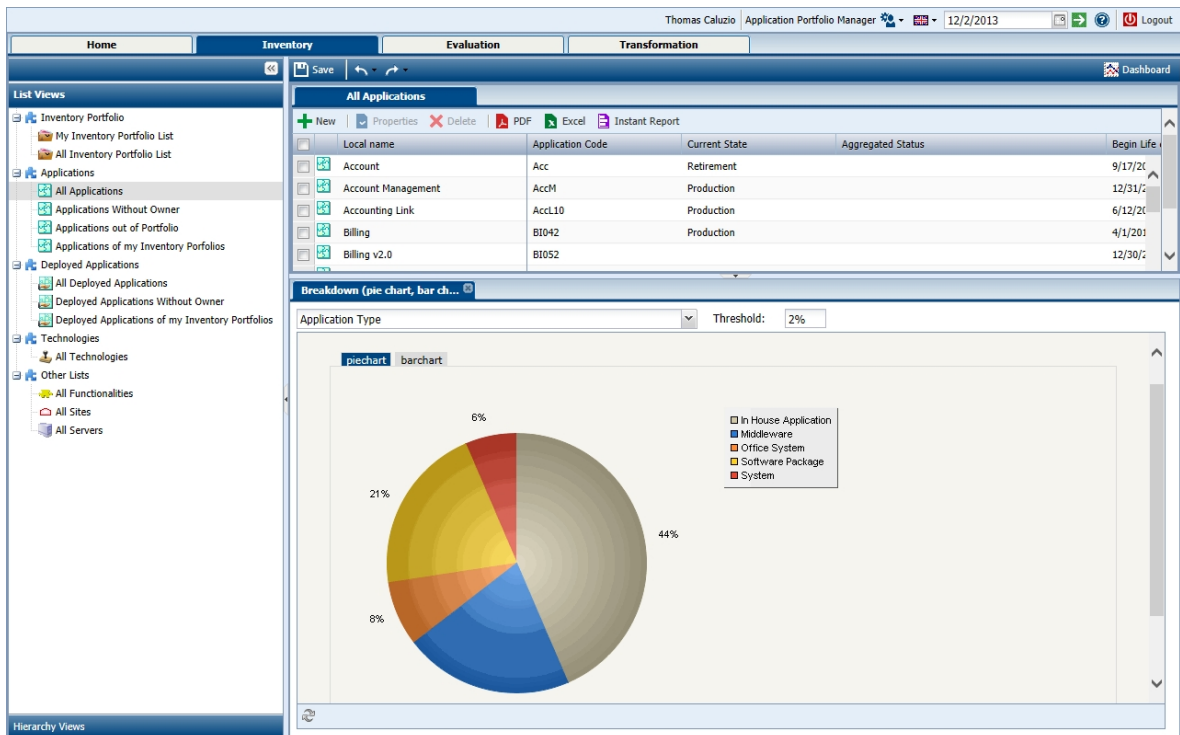


Figure 16.12.: Pie Chart of the MEGA Architecture

16. MEGA (MEGA International)

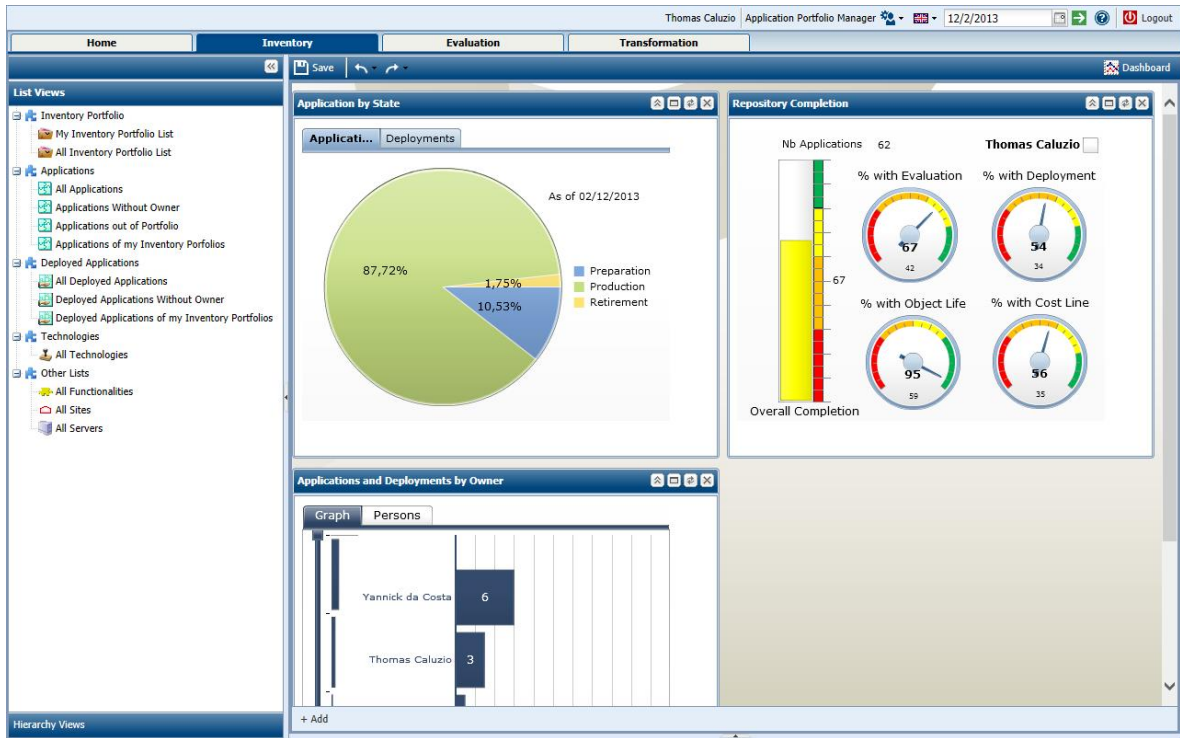


Figure 16.13.: Dashboard of the MEGA Architecture

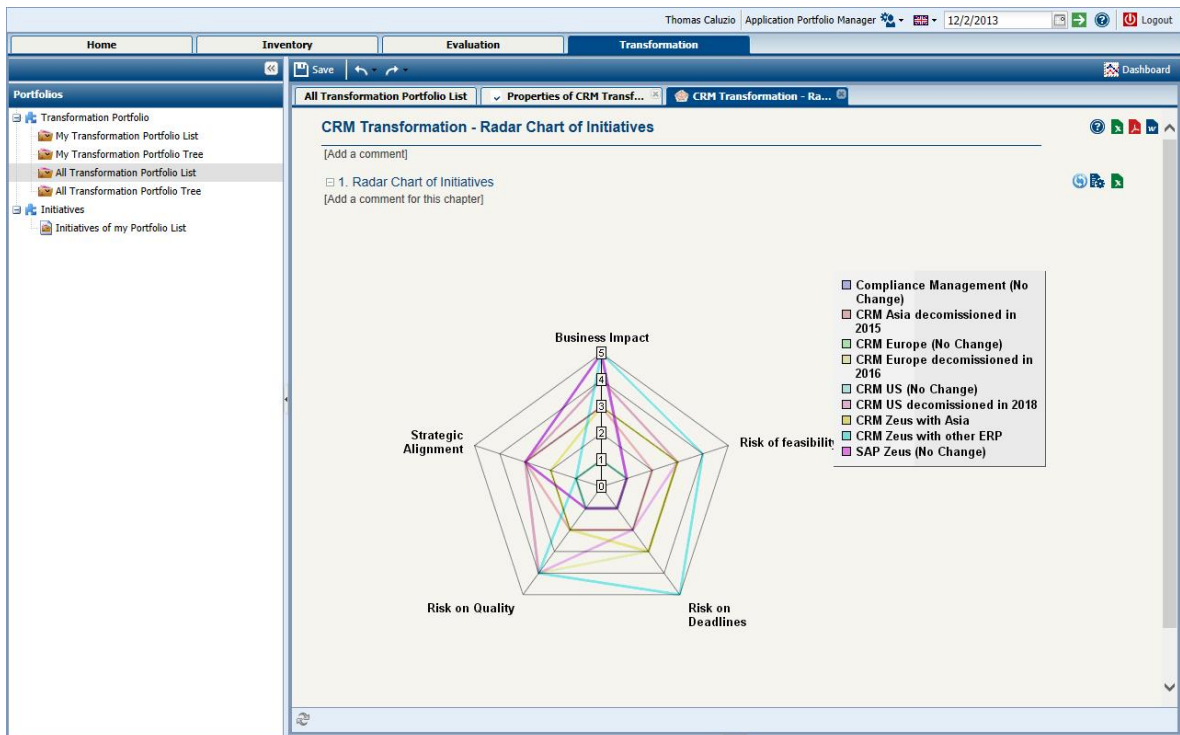


Figure 16.14.: Radar Diagram of the MEGA Architecture

16. MEGA (MEGA International)

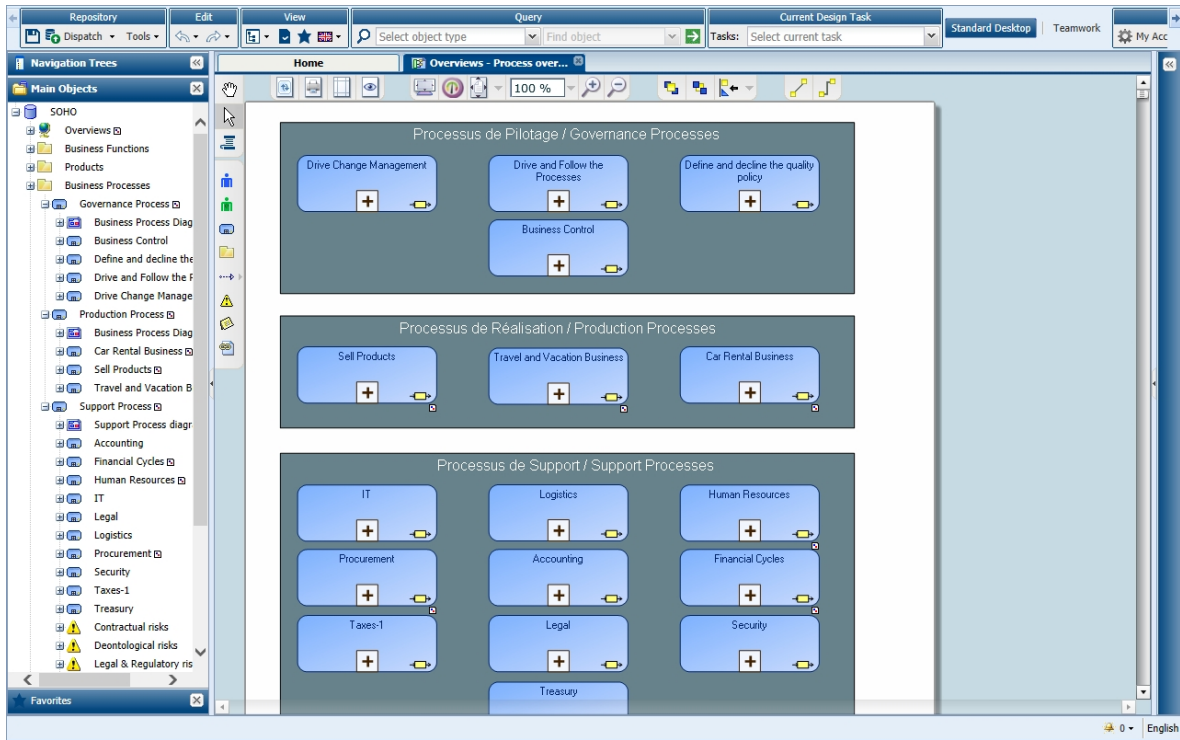


Figure 16.15.: EPC Diagram of the MEGA Architecture

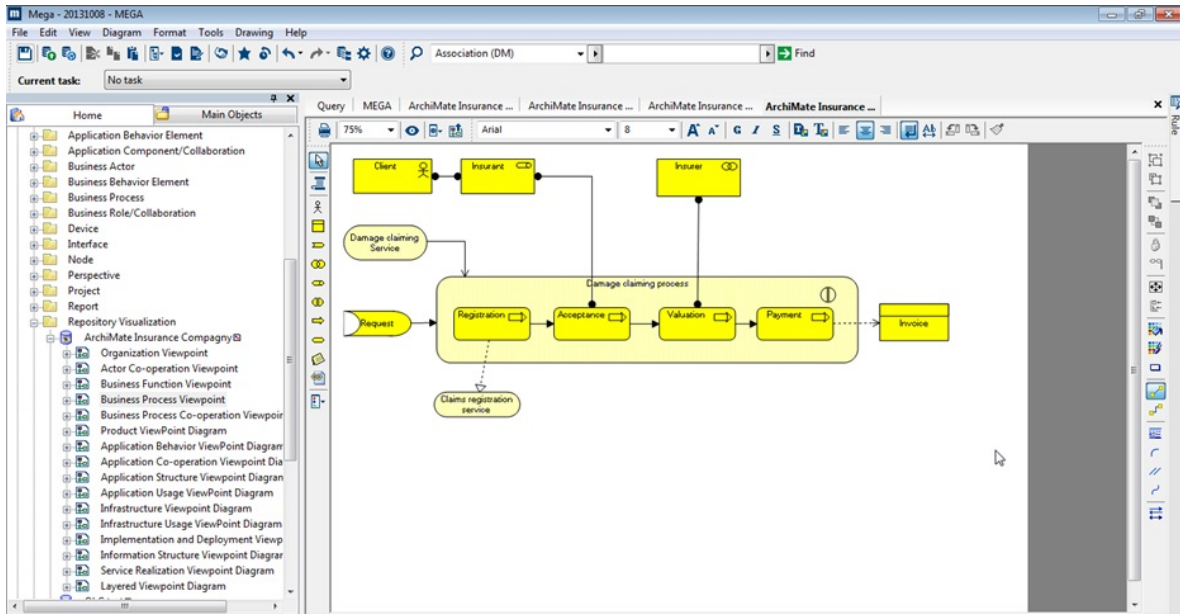


Figure 16.16.: ArchiMate Diagram of the MEGA Architecture

MEGA

## 16. MEGA (MEGA International)

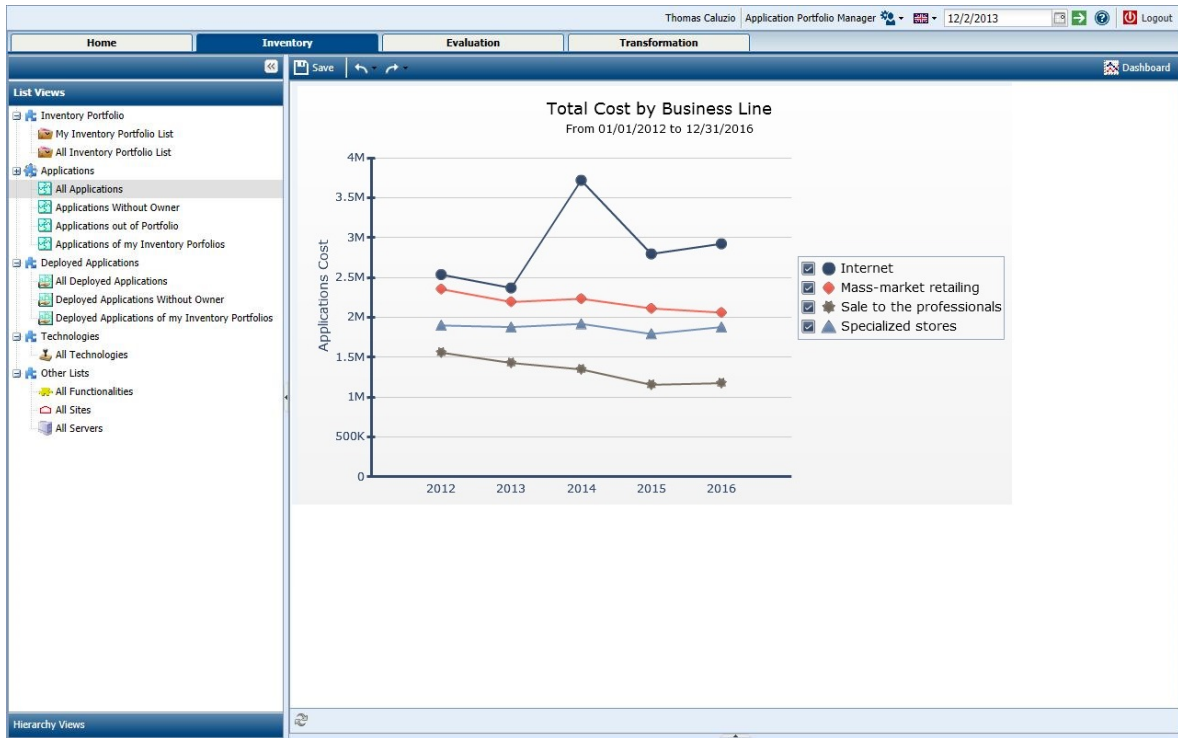


Figure 16.17.: Line Chart of the MEGA Architecture

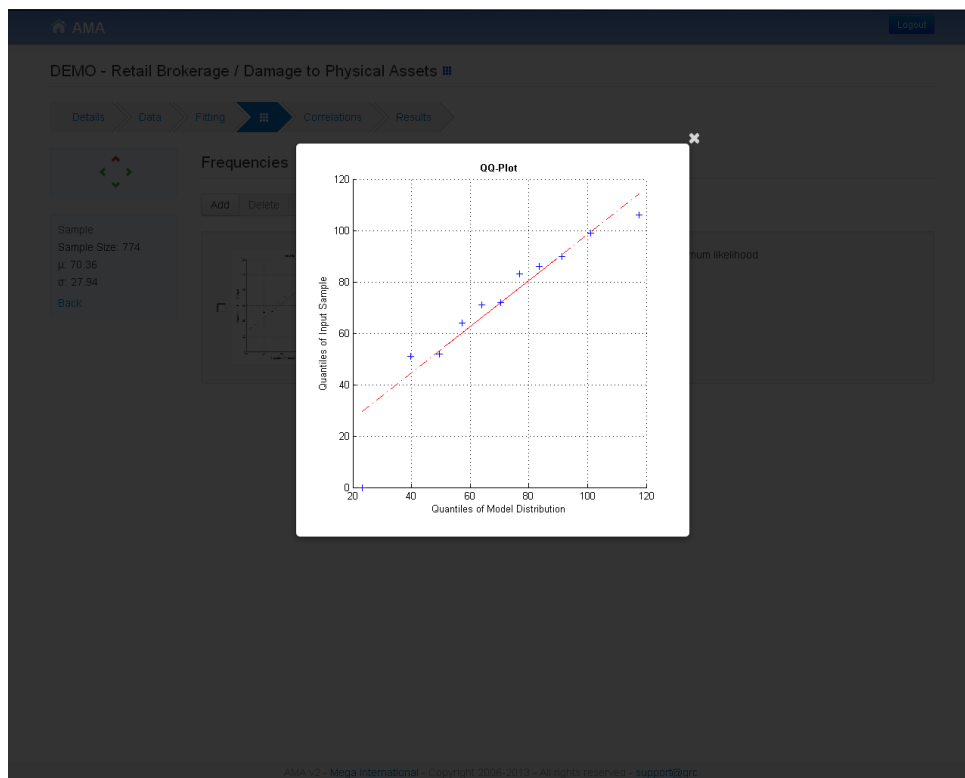


Figure 16.18.: Scatter Chart of the MEGA Architecture

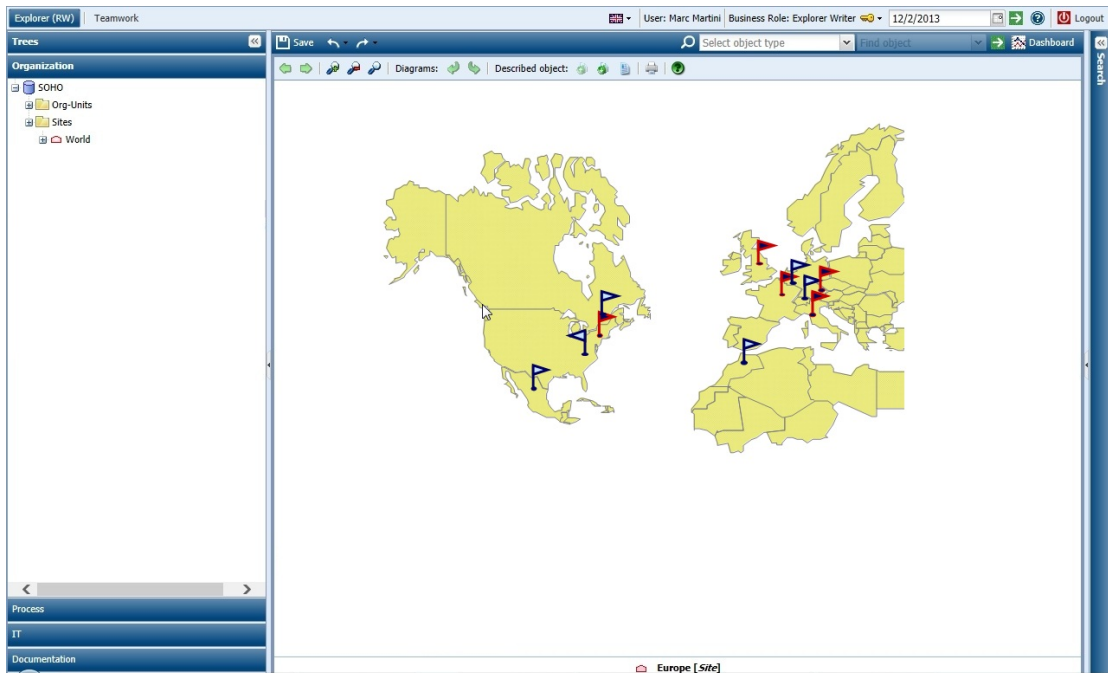
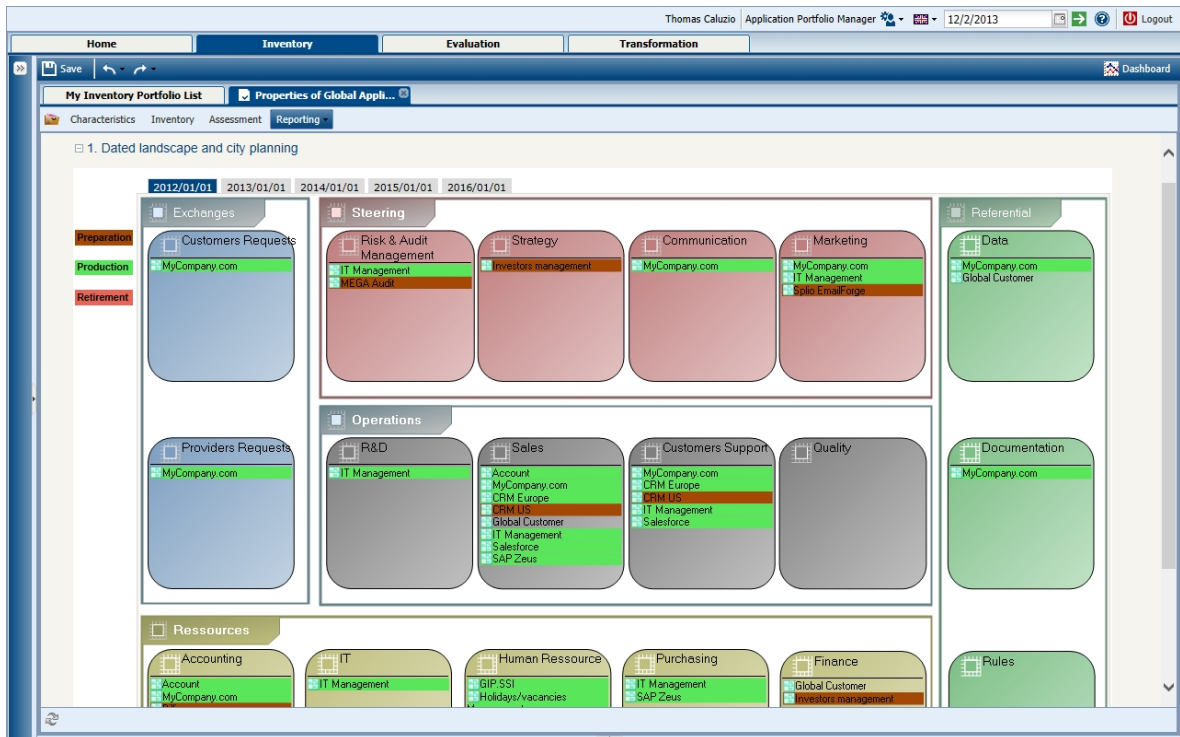


Figure 16.19.: Geographic Map of the MEGA Architecture



MEGA

Figure 16.20.: Business Model Canvas of the MEGA Architecture

## 16. MEGA (MEGA International)

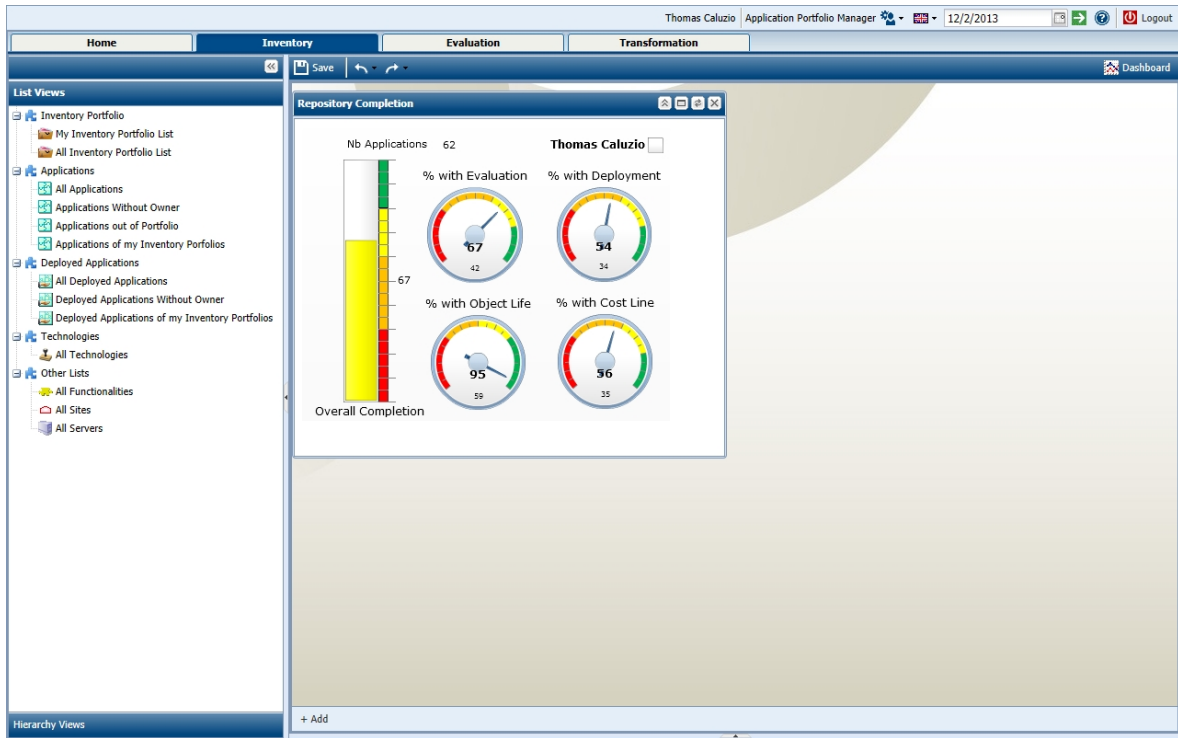


Figure 16.21.: Gauges of the MEGA Architecture

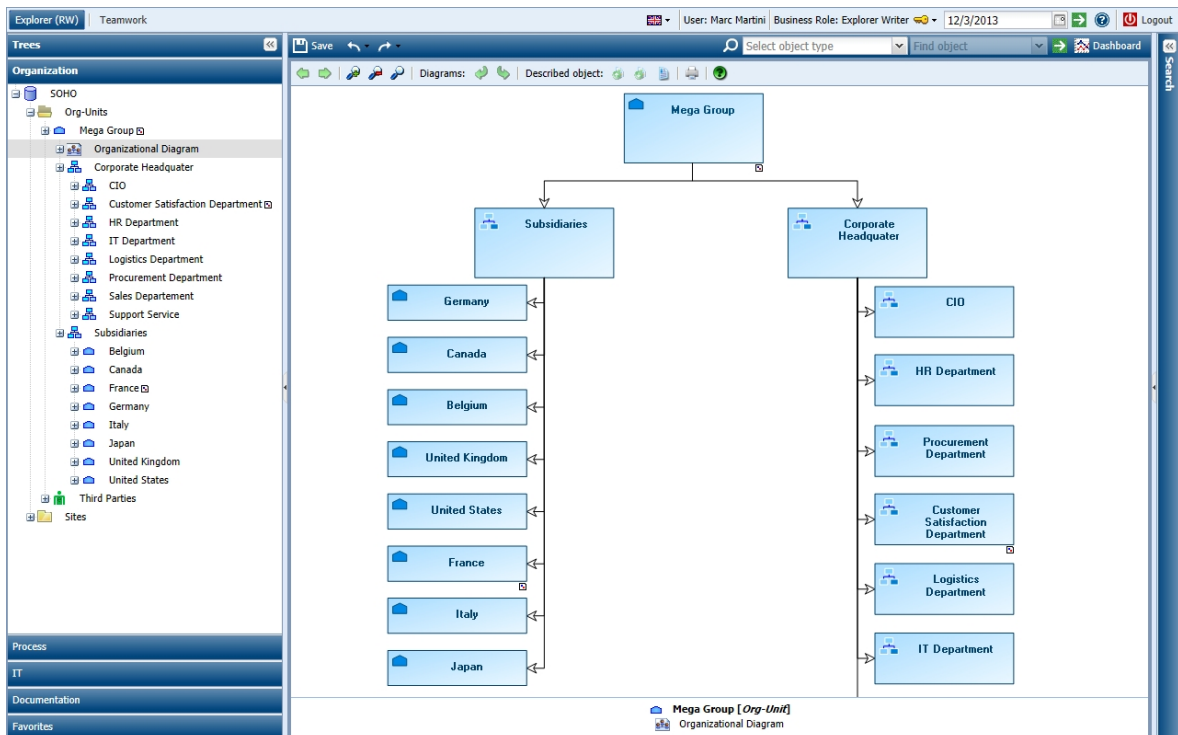


Figure 16.22.: Treemap of the MEGA Architecture

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SAP Deutschland AG & Co. KG was founded in 1972 and has more than 13 years of experience in the EA domain. The company is vendor of PowerDesigner which is offered in version 16.5.2 at the editorial deadline. PowerDesigner supports 10 out of 26 visualization types. PowerDesigner is a fully-fledged meta-modeling platform. It features support for object-oriented models as well as other well-known notations such as Entity Relationship (ER) models. The tool includes sophisticated features like configurable and customizable model differencing. A user can create visualization in PowerDesigner either by manual drag-and-drop operations or apply a set of sophisticated graph layout algorithms, e.g. organic layout, spring layout. As a fully-fledged meta-modeling platform, PowerDesigner enables to generate source code for the major programming languages.

### 17.1. Background Information

Vendor	SAP Deutschland AG & Co. KG
Founding year	1972
Years active in EA market	13
Number of employees	>10,000
URL	www.sap.com

**Table 17.1.:** Vendor Information of SAP Deutschland AG & Co. KG

Power Designer	Tool Name	PowerDesigner			
	Version	16.5.2			
	Client Platforms	✓	Windows	✗	Linux
		✗	MacOS	✗	Browser
		✗	iOS	✗	Android
		✗	Windows Mobile	✗	Other
	Deployment Approach	✓	Desktop	✗	SaaS
		✓	Server	✗	Other
	EA Frameworks	✗	ArchiMate	✗	NAF
		✗	DoDAF	✗	PEAF
✗		IAF	✗	TOGAF	
✗		MODAF	✗	Zachman	
✓		Other			

**Table 17.2.:** General Information (PowerDesigner)

## 17.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	✓	✓
DOC(X)	✓	✓
HTML	✗	✓
JPG/JPEG	✓	✓
PDF	✗	✗
PNG	✓	✓
PPT(X)	✗	✗
SVG	✗	✓
VSD(X)	✗	✗
Other	✓	✓

**Table 17.3.:** Visualization Import/Export File Formats (PowerDesigner)

## 17.3. Visualization Configuration

### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✓
Data Filter	✓
Other	✓

**Table 17.4.:** Binding (PowerDesigner)

### Generation Approach

Model-Driven	✓
Form-Based	✓
Scripting	✓
Manual Drawing	✓
Other	✓

**Table 17.5.:** Visualization Generation Approach (PowerDesigner)

### Visual Customization and Layouting

Customization	Caption	✓
	Color	✓
	Orientation	✓
	Position	✓
	Shape	✓
	Size	✓
	Other	✗
Layout	Automated	✓
	Manual	✓
	Other	✓

**Table 17.6.:** Visual Customization (PowerDesigner)

### Import/Export of Visualization Configurations

Format	Import	Export
CSV	✓	✓
JSON	✗	✗
ODBC	✓	✓
XMI	✓	✓
XML	✓	✓
XLS(X)	✓	✓
TXT	✓	✓
Other	✓	✓

**Table 17.7.:** Configuration Import/Export (PowerDesigner)

## 17.4. Information Model

### Information Model Type

Full Schema	✓
Configurable Building Blocks	✓
User-defined	✗
Subclassing/class inheritance	✓

**Table 17.8.:** Information Model Type (PowerDesigner)

Power Designer

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓	✓	✓	✓	✓	✓
Modify	✓	✓	✓	✓	✓	✓
Delete	✓	✓	✓	✓	✓	✓
Copy	✓	✓	✓	✓	✓	✓
Merge	✓	✓	✓	✓	✓	✓
Move	✓	✓	✓	✓	✓	✓

**Table 17.9.:** Information Model Flexibility (PowerDesigner)

## 17.5. Interoperability

### Import Mechanisms

Pull	✓
Push	✓
Other	✗

**Table 17.10.:** Import Mechanisms (PowerDesigner)

### Third Party Tools

Business Intelligence Tools	✓
Business Process Engines	✓
Change Management Tools	✓
Cloud Services	✓
Configuration Management Database	✓
Enterprise Service Bus	✓
Infrastructure Monitoring Tools	✓
License/IT Asset Management Tools	✓
Project Portfolio Management Tools	✓
Release Management Tools	✓
Other	✗

**Table 17.11.:** Interoperability with Third Party Tools (PowerDesigner)

## Data & Schema Import/Export

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	✓	✓	✓	✓
JSON	✗	✗	✗	✗
TXT	✓	✓	✓	✓
XMI	✓	✓	✓	✓
XML	✓	✓	✓	✓
XLS(X)	✓	✓	✓	✓
OData	✓	✓	✓	✓
Other	✗	✗	✗	✗

**Table 17.12.:** Data & Schema Import/Export (PowerDesigner)

## Model Element Import/Export

Model Element	Import	Export
Classes	✓	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	✓	✓
Roles	✓	✓
Other	✓	✓

**Table 17.13.:** Model Element Import/Export (PowerDesigner)

## 17.6. Visualization Examples of PowerDesigner

Activity	Master Production Scheduler	Material Planner	Material Operator	Operational Buyer	Operational Purchaser	Production Planner	Quality Manager	Quality Clerk	Quality Control	Quality Manager	Reception	Registrar	Sales Planner	Shipping Department	Strategic Buyer	Strategic Purchaser	System	Vendor	Warehouse Administration	Warehouse Operator	AP Accountant	AP Clerk	AR Clerk	Account Payable	Account Receivable Clerk
Check relevant sources																A, E									
Conduct supplier interview																A, E, R									
Maintain supplier profile data																A, E, R									
Review supplier interview																A, E, R									
Select supplier																A, E, R									
Evaluate & report supplier performance				R						R						E, R									
Maintain supplier KPIs					C					R			C			A, E, R									
Analyze supplier compliance										R						A, E, R									
Conduct supplier audit							R									A, E, R									
Initiate follow up and continuous improvement actions						I				C						A, E, R									
Record supplier audit results						I				R						A, E, R									
Review audit findings with suppliers																A, E, R									
Analyze & score RFQ responses																A, E, R									
Approve or reject quotation																A, E, R									
Check external sources																A, E, R									
Check internal sources																A, E, R									
Check quality relevant part of quotation										A, E, R						A, E, R									
Close RFQ																A, E, R									
Close RFQ for response																A, E, R									
Create a short list										C						A, E, R									
Create long list										C						A, E, R									
Create RFQ										C						A, E, R									
Create RFQ										C						A, E, R									
Determine evaluation criteria										C						A, E, R									
Identify potential supplier										C						A, E, R									
Review RF1 responses																A, E, R									
Review RFQ responses												C				A, E, R									
Send out FRQ																A, E, R									
Check supplier performance																A, E, R									

Figure 17.1.: Matrix of the PowerDesigner

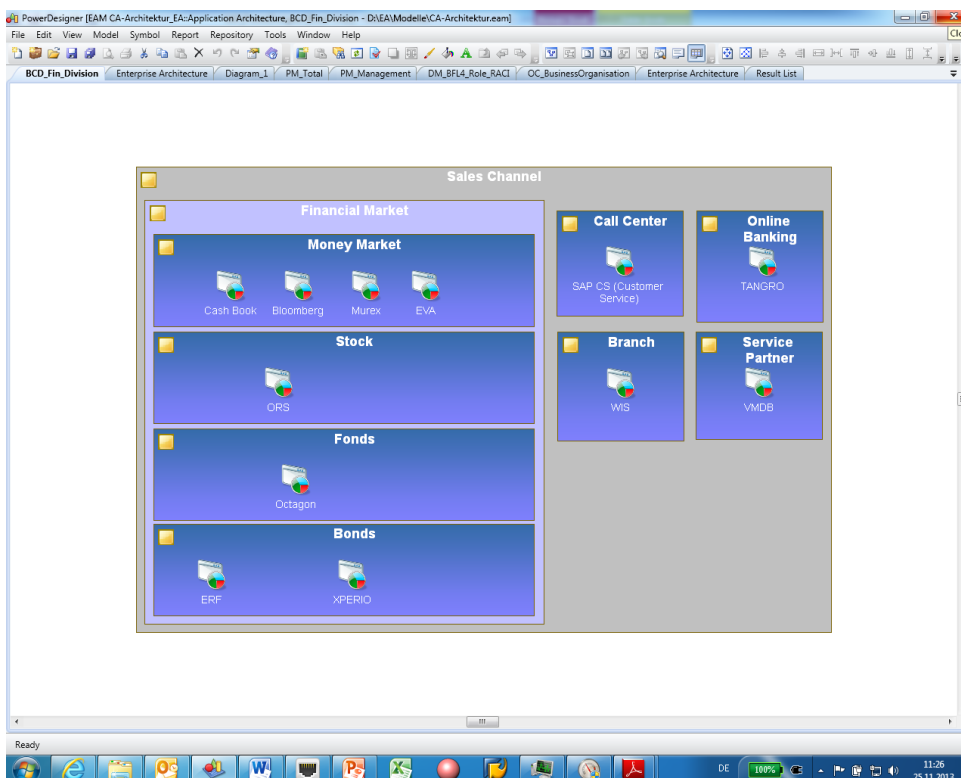


Figure 17.2.: Cluster Map of the PowerDesigner

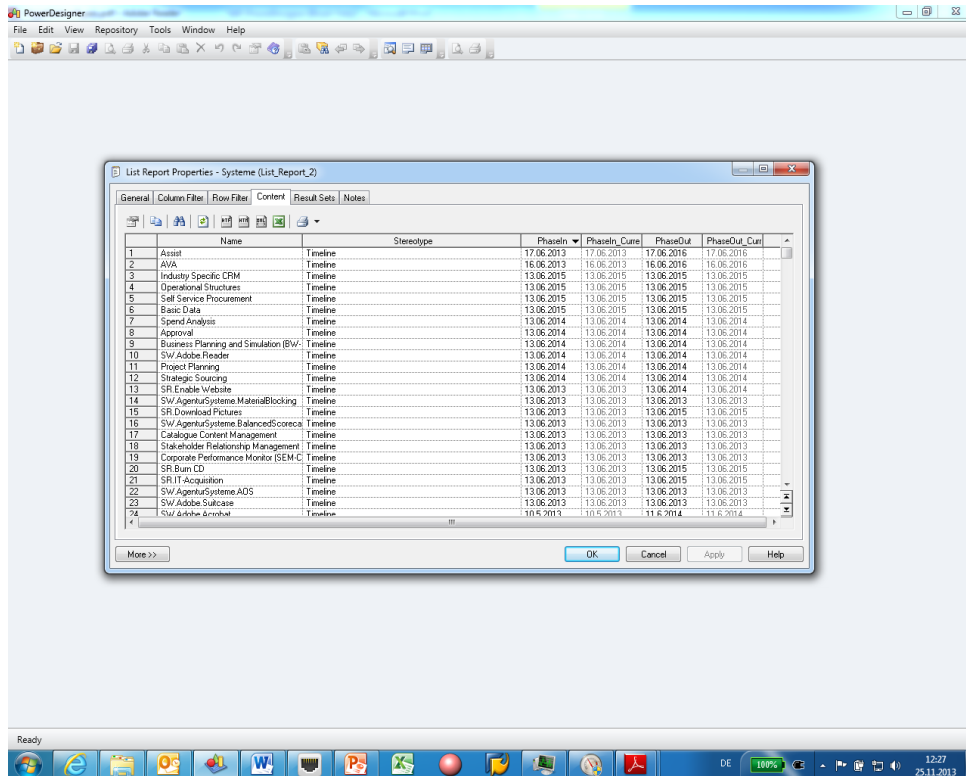
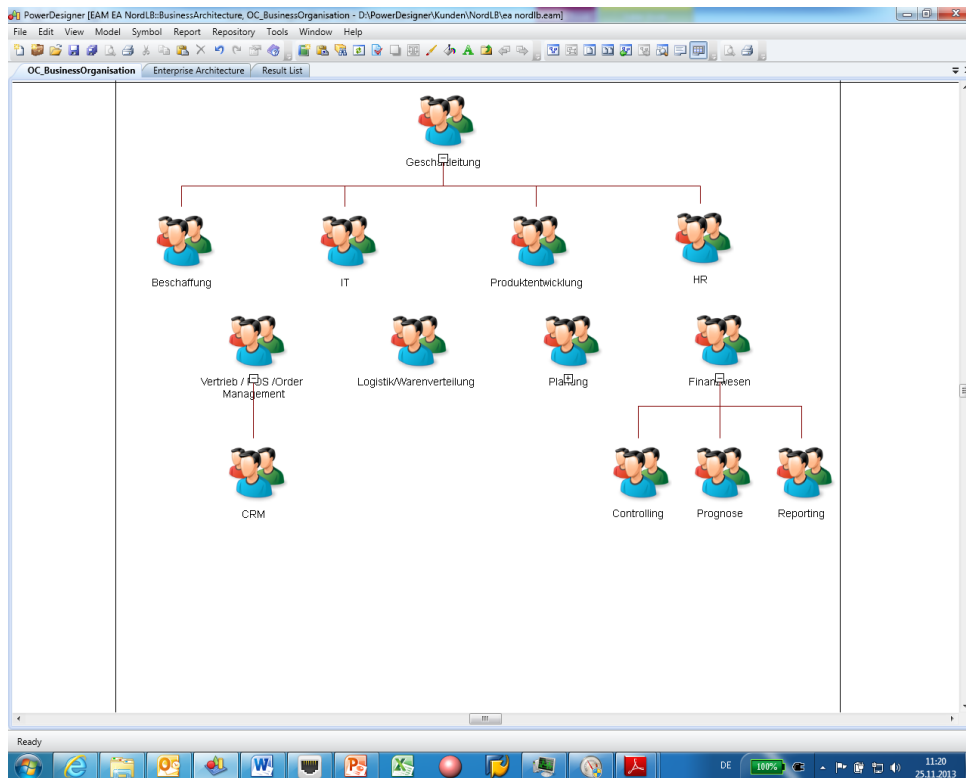


Figure 17.3.: List of the PowerDesigner



Power Designer

Figure 17.4.: Graph of the PowerDesigner



## 17. PowerDesigner (SAP AG)

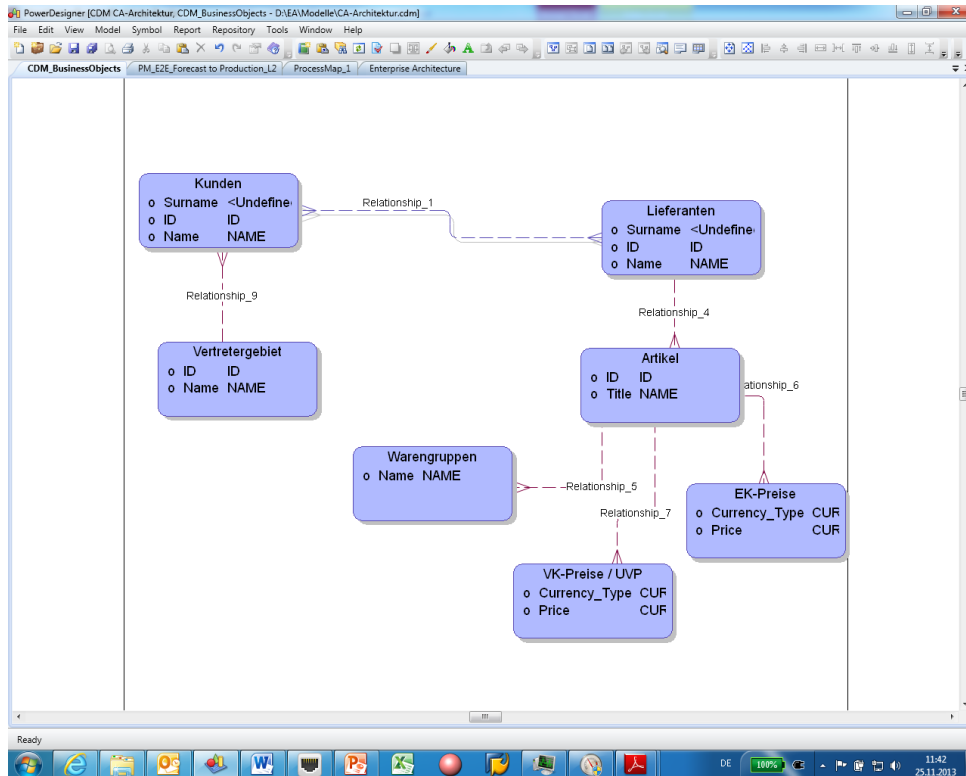


Figure 17.5.: ER Diagram of the PowerDesigner

Power  
Designer

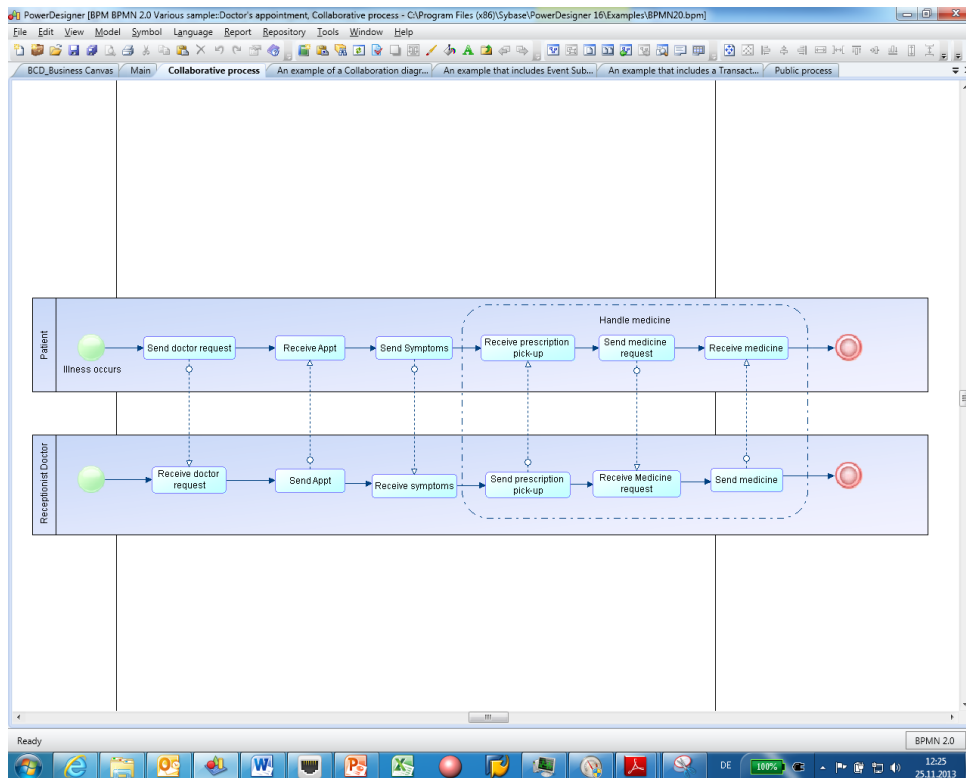


Figure 17.6.: BPMN Diagram of the PowerDesigner



## 17. PowerDesigner (SAP AG)

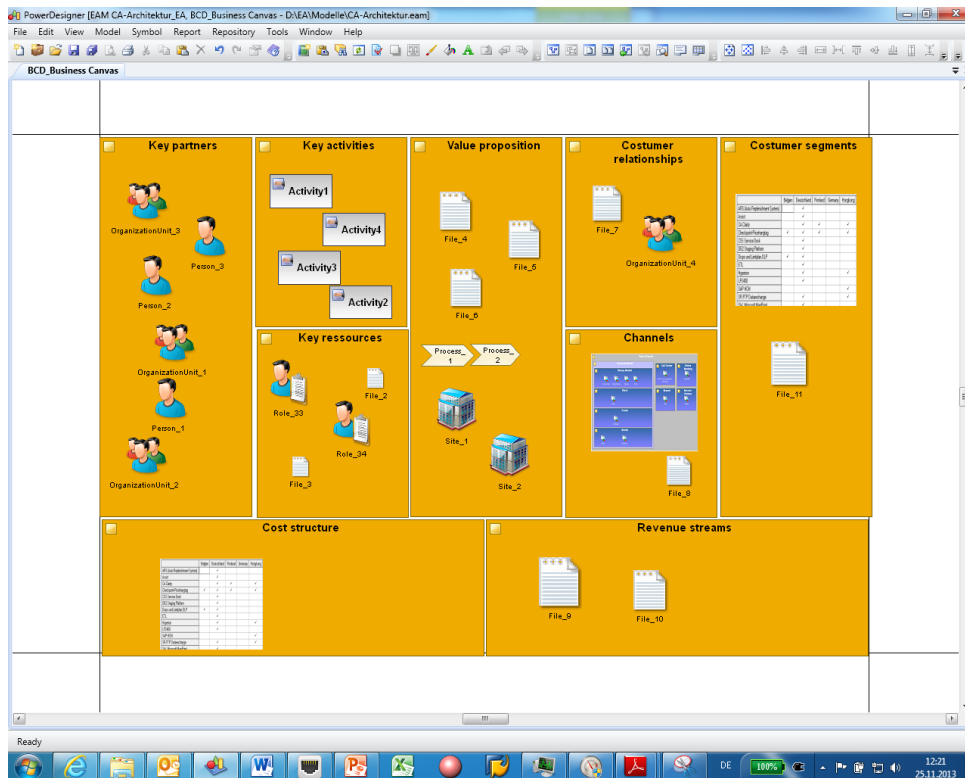


Figure 17.9.: Business Model Canvas of the PowerDesigner

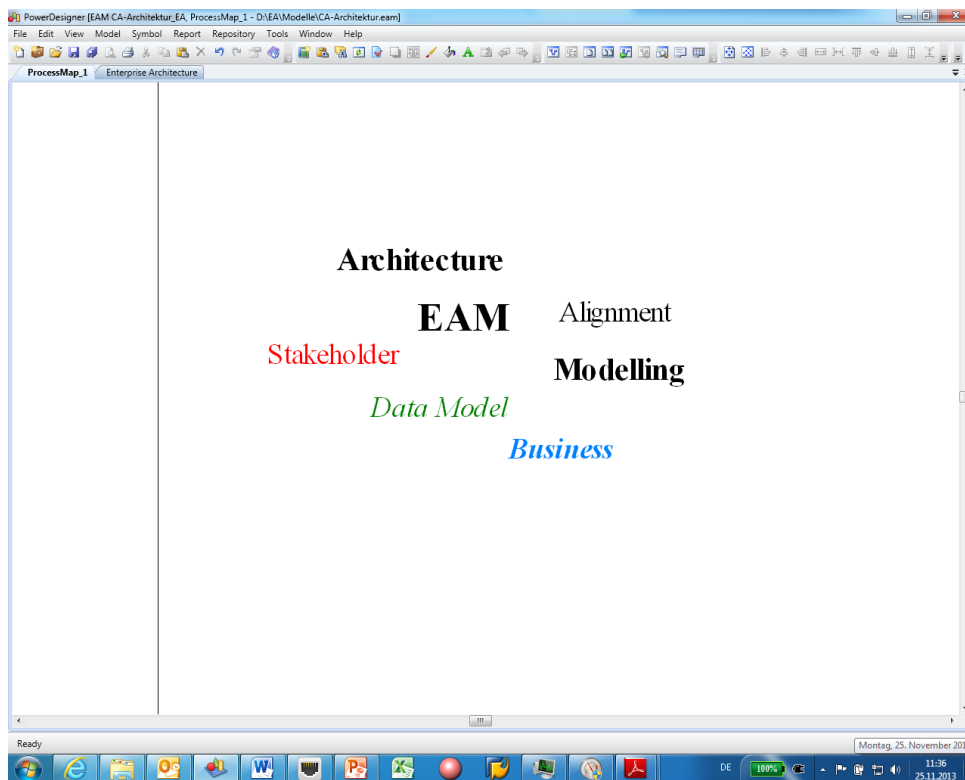


Figure 17.10.: Tag Cloud of the PowerDesigner

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process4.biz (process4.biz Softwareentwicklungs- und Vertriebs GmbH)

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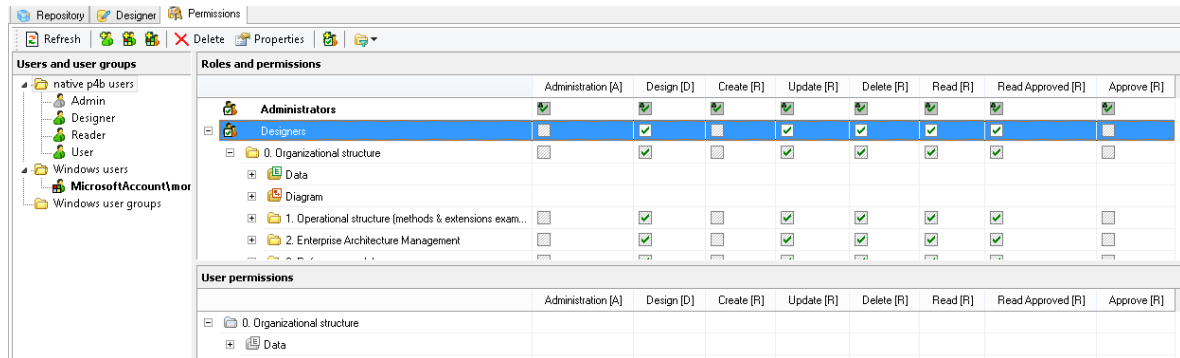
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## 18. process4.biz (process4.biz Softwareentwicklungs- und Vertriebs GmbH)

process4.biz Softwareentwicklungs- und Vertriebs GmbH was founded in 2003 and has more than 9 years of experience in the EA domain. The company is vendor of process4.biz which is offered in version 6 at the editorial deadline. process4.biz supports 14 out of 26 visualization types.



**Figure 18.1.:** Access management of process4.biz

process4.biz is based on Microsoft Visio and SQL databases. The vendor is advertising the product as “a flexible Business Process Management (BPM), EA management and strategic IT planning solution”. The tool is a highly specialized solution and implemented as a plugin for Microsoft Visio using an Structured Query Language (SQL) database for storing data. process4.biz features several templates and reference models for process modeling according to standards and specifications such as BPMN and Event-driven Process Chain (EPC). A Database Designer offers a Microsoft Visio-integrated access point to data structures of all models stored in a database. A central access management control empowers end-users to define access rights on different levels (cf. Figure 18.1).

### 18.1. Background Information

process4.biz

Vendor	process4.biz Softwareentwicklungs- und Vertriebs GmbH
Founding year	2003
Years active in EA market	9
Number of employees	11–50
URL	www.process4.biz

**Table 18.1.:** Vendor Information of process4.biz Softwareentwicklungs- und Vertriebs GmbH

Tool Name	process4.biz			
Version	6			
Client Platforms	✓	Windows	✗	Linux
	✗	MacOS	✓	Browser
	✗	iOS	✗	Android
	✗	Windows Mobile	✗	Other
Deployment Approach	✓	Desktop	✓	SaaS
	✓	Server	✗	Other
EA Frameworks	✗	ArchiMate	✗	NAF
	✗	DoDAF	✗	PEAF
	✗	IAF	✓	TOGAF
	✗	MODAF	✗	Zachman
	✗	Other		

**Table 18.2.:** General Information (process4.biz)

## 18.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	✓	✗
DOC(X)	✗	✓
HTML	✗	✓
JPG/JPEG	✓	✗
PDF	✓	✓
PNG	✓	✓
PPT(X)	✗	✓
SVG	✗	✓
VSD(X)	✓	✓
Other	✗	✗

**Table 18.3.:** Visualization Import/Export File Formats (process4.biz)

## 18.3. Visualization Configuration

### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✓
Data Filter	✓
Other	✗

**Table 18.4.:** Binding (process4.biz)

### Generation Approach

Model-Driven	✗
Form-Based	✗
Scripting	✓
Manual Drawing	✓
Other	✗

**Table 18.5.:** Visualization Generation Approach (process4.biz)

### Visual Customization and Layouting

Customization	Caption	✓
	Color	✓
	Orientation	✓
	Position	✓
	Shape	✓
	Size	✓
	Other	✗
Layout	Automated	✓
	Manual	✓
	Other	✗

**Table 18.6.:** Visual Customization (process4.biz)

## Import/Export of Visualization Configurations

Format	Import	Export
CSV	✓	✓
JSON	✗	✗
ODBC	✓	✗
XMI	✗	✗
XML	✓	✓
XLS(X)	✓	✓
TXT	✓	✓
Other	✓	✓

**Table 18.7.:** Configuration Import/Export (process4.biz)

## 18.4. Information Model

### Information Model Type

Full Schema	✗
Configurable Building Blocks	✓
User-defined	✓
Subclassing/class inheritance	✓

**Table 18.8.:** Information Model Type (process4.biz)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓	✓	✓	✓	✓	✓
Modify	✓	✓	✓	✓	✓	✓
Delete	✓	✓	✓	✓	✓	✓
Copy	✓	✓	✓	✓	✓	✓
Merge	✓	✓	✗	✗	✗	✓
Move	✓	✓	✓	✓	✓	✓

**Table 18.9.:** Information Model Flexibility (process4.biz)



## 18.5. Interoperability

### Import Mechanisms

Pull	✓
Push	✓
Other	✓

**Table 18.10.:** Import Mechanisms (process4.biz)

### Third Party Tools

Business Intelligence Tools	✓
Business Process Engines	✓
Change Management Tools	✗
Cloud Services	✗
Configuration Management Database	✓
Enterprise Service Bus	✗
Infrastructure Monitoring Tools	✗
License/IT Asset Management Tools	✓
Project Portfolio Management Tools	✓
Release Management Tools	✓
Other	✓

**Table 18.11.:** Interoperability with Third Party Tools (process4.biz)

## Data & Schema Import/Export

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	✓	✓	✗	✗
JSON	✗	✗	✗	✗
TXT	✓	✓	✗	✗
XMI	✗	✗	✗	✗
XML	✓	✓	✓	✓
XLS(X)	✓	✓	✗	✗
OData	✗	✗	✗	✗
Other	✓	✓	✗	✗

**Table 18.12.:** Data & Schema Import/Export (process4.biz)

## Model Element Import/Export

Model Element	Import	Export
Classes	✓	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	✓	✓
Roles	✓	✓
Other	✗	✗

**Table 18.13.:** Model Element Import/Export (process4.biz)

## 18.6. Visualization Examples of process4.biz

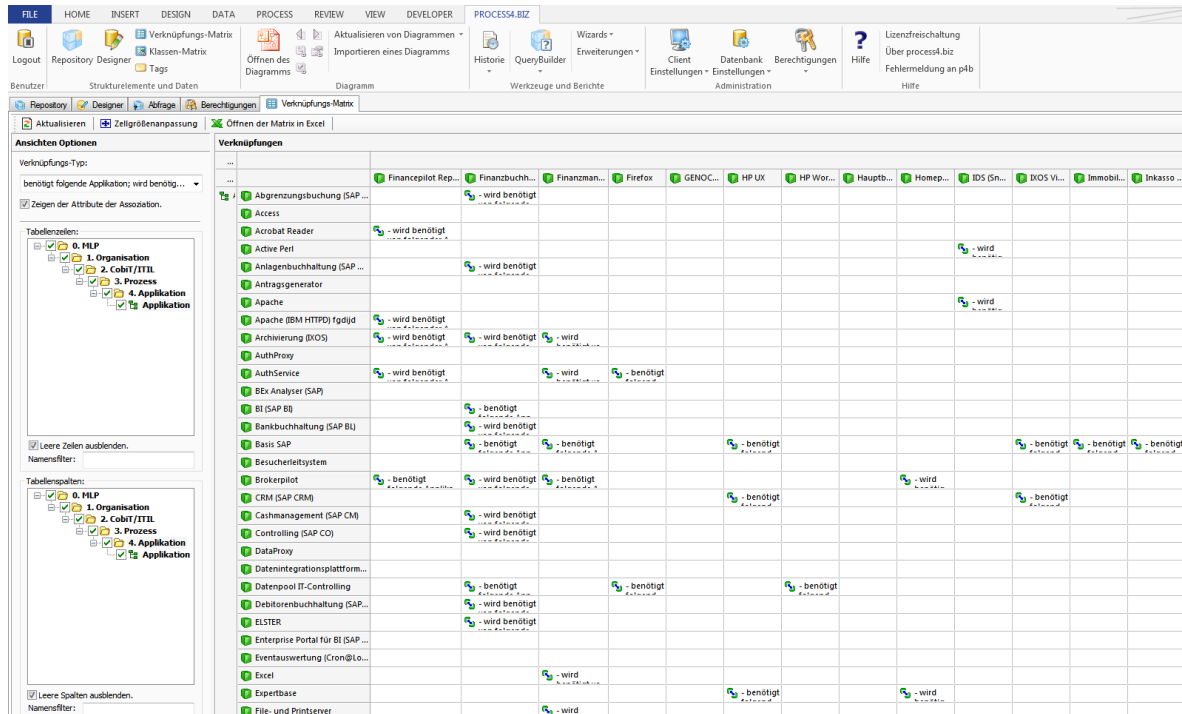


Figure 18.2.: Matrix of process4.biz

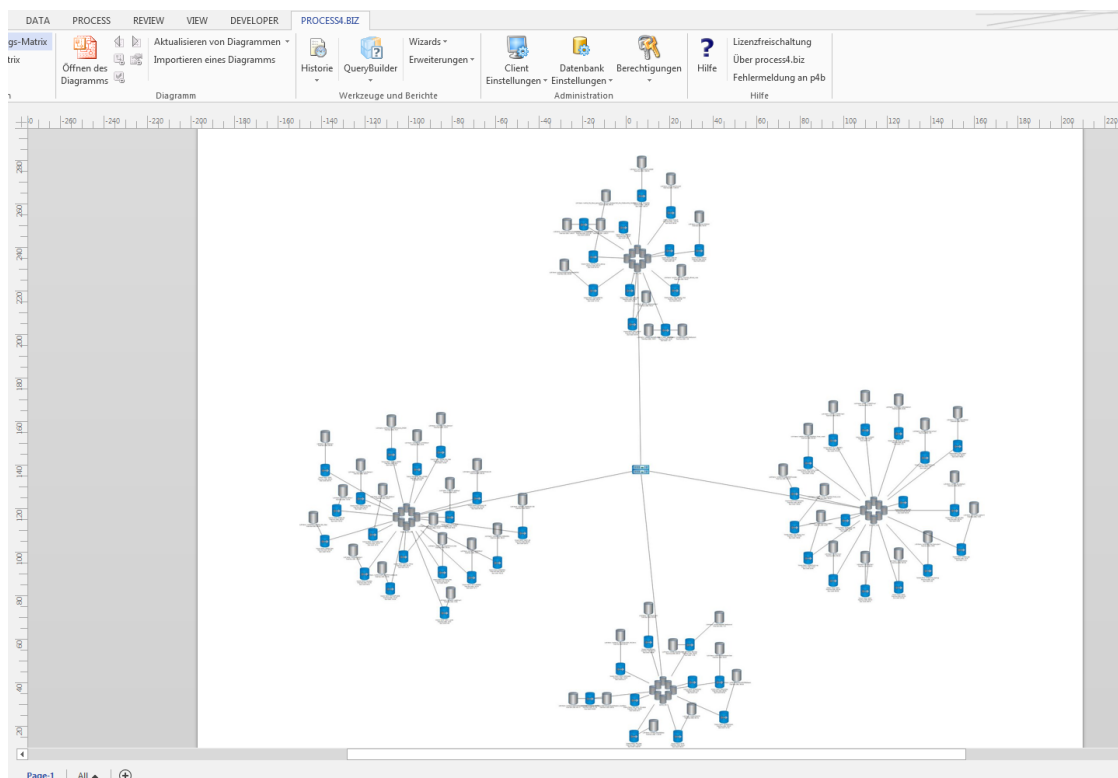


Figure 18.3.: Cluster Map of process4.biz

## 18. process4.biz (process4.biz Softwareentwicklungs- und Vertriebs GmbH)

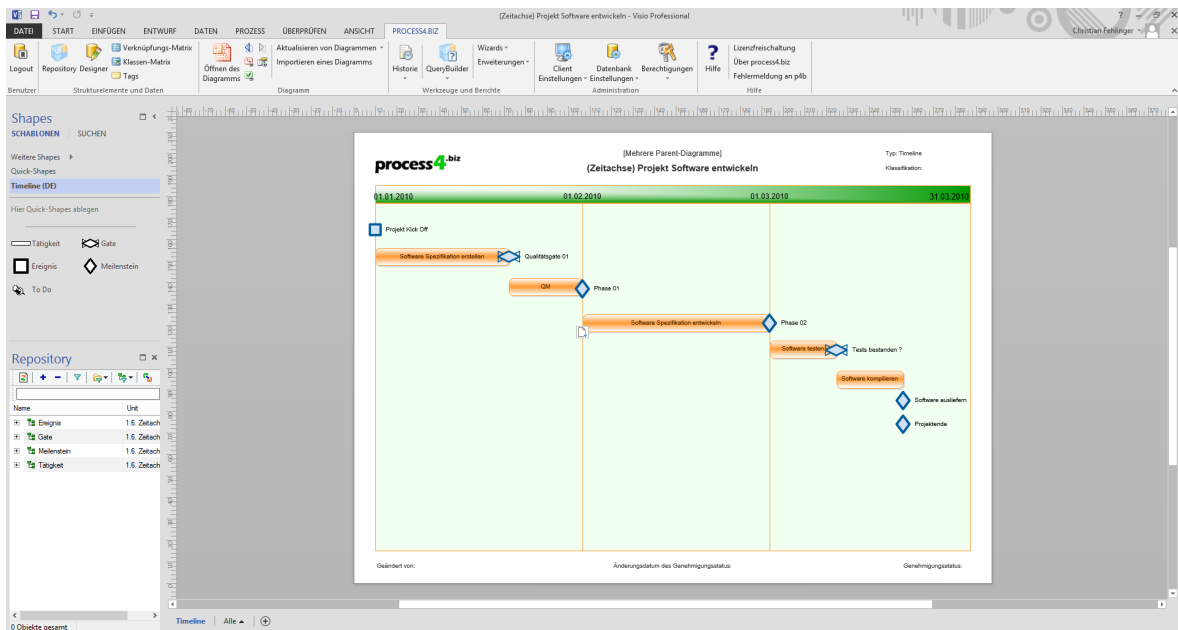


Figure 18.4.: Timeline of process4.biz

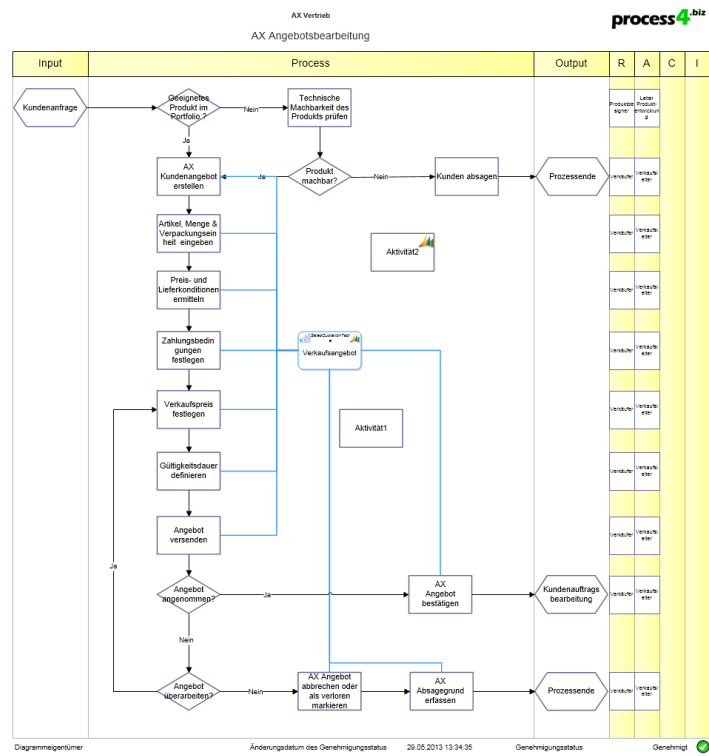


Figure 18.5.: Flow Diagram of process4.biz

process4.biz

## 18. process4.biz (process4.biz Softwareentwicklungs- und Vertriebs GmbH)

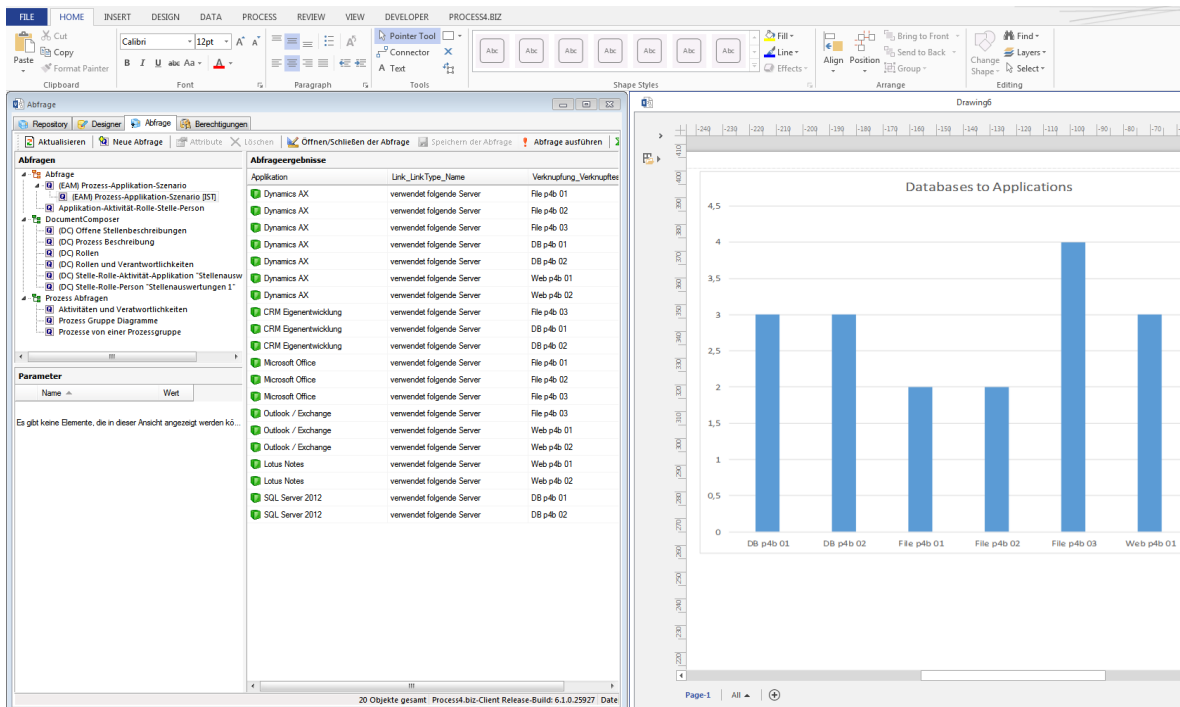


Figure 18.6.: List of process4.biz

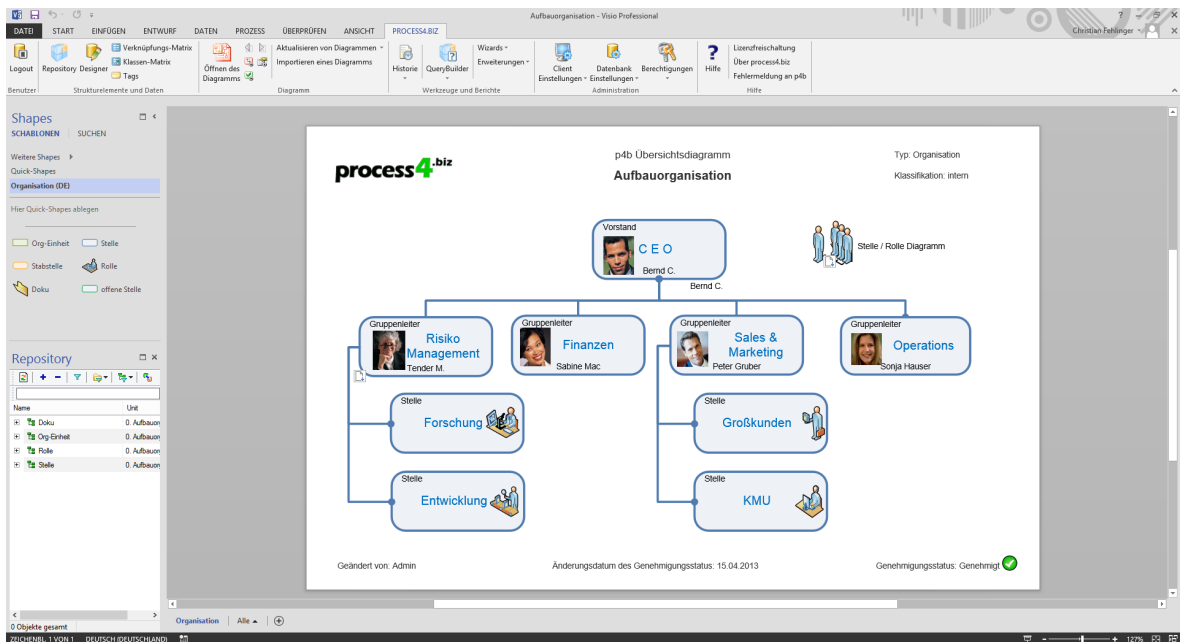


Figure 18.7.: Graph of process4.biz

## 18. process4.biz (process4.biz Softwareentwicklungs- und Vertriebs GmbH)

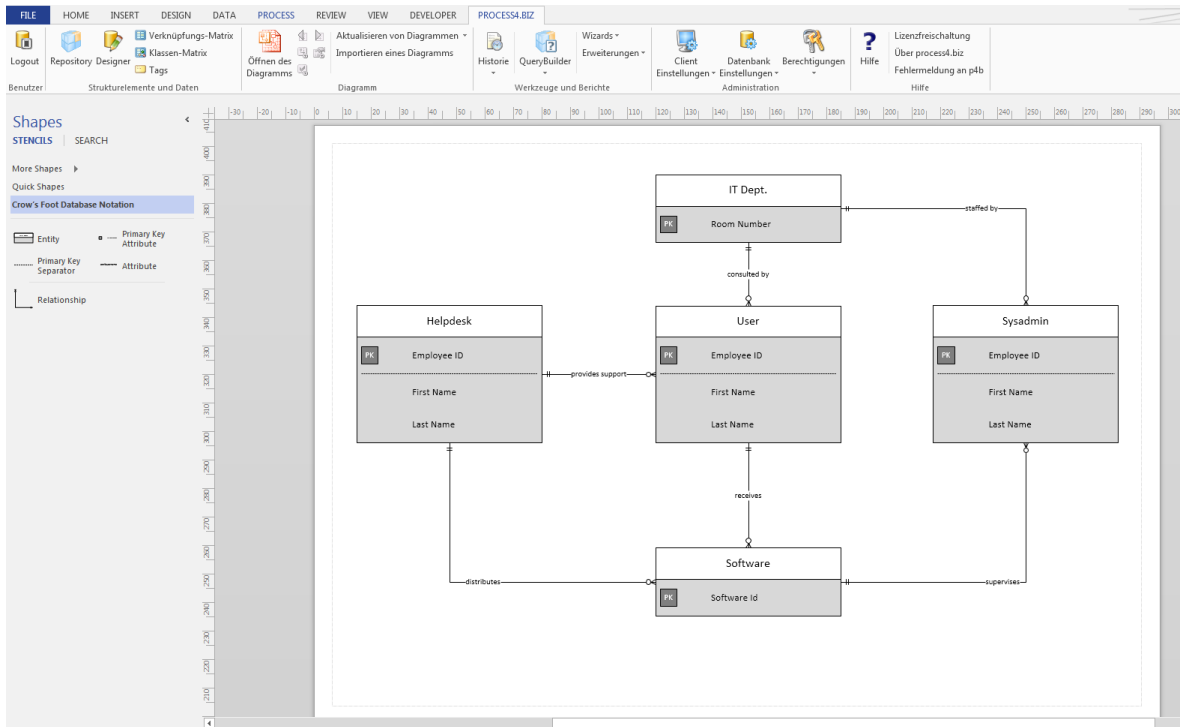


Figure 18.8.: ER Diagram of process4.biz

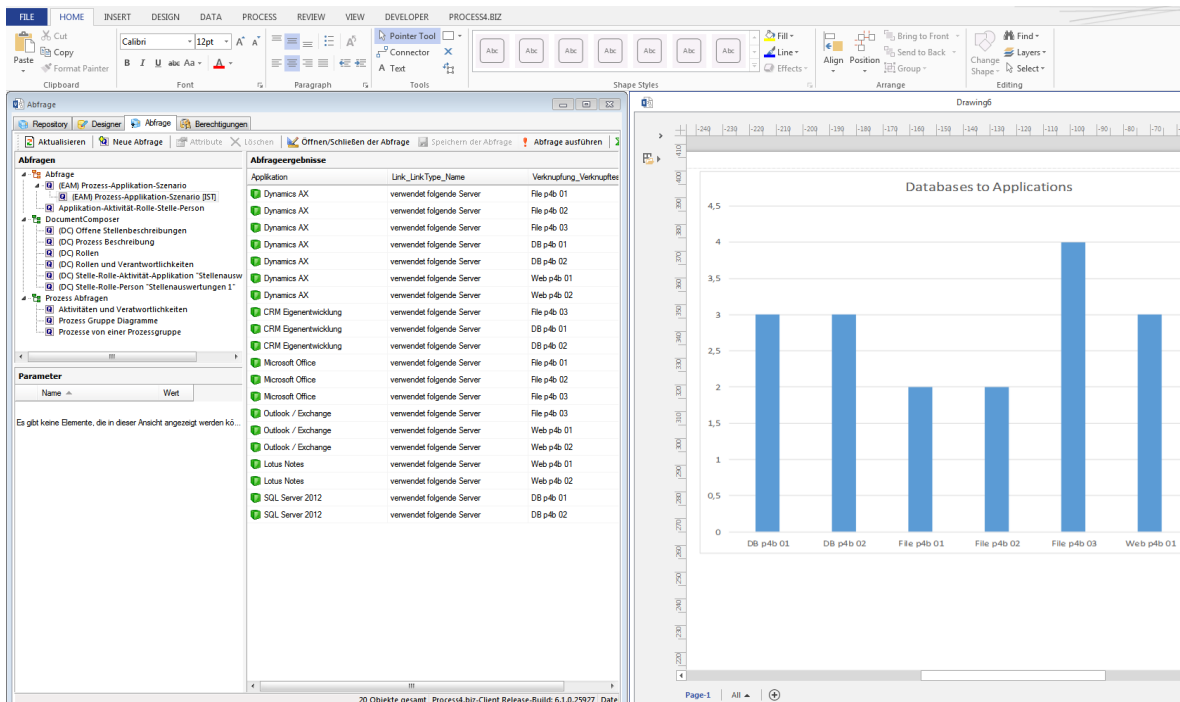


Figure 18.9.: Bar Chart of process4.biz

## 18. process4.biz (process4.biz Softwareentwicklungs- und Vertriebs GmbH)

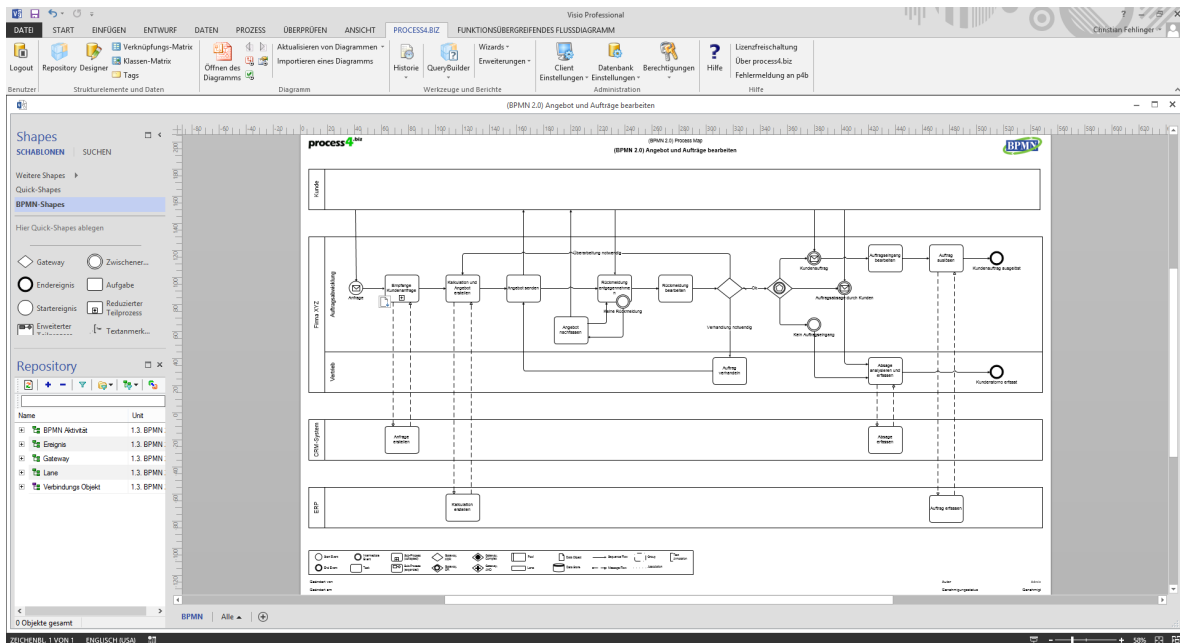


Figure 18.10.: BPMN Diagram of process4.biz

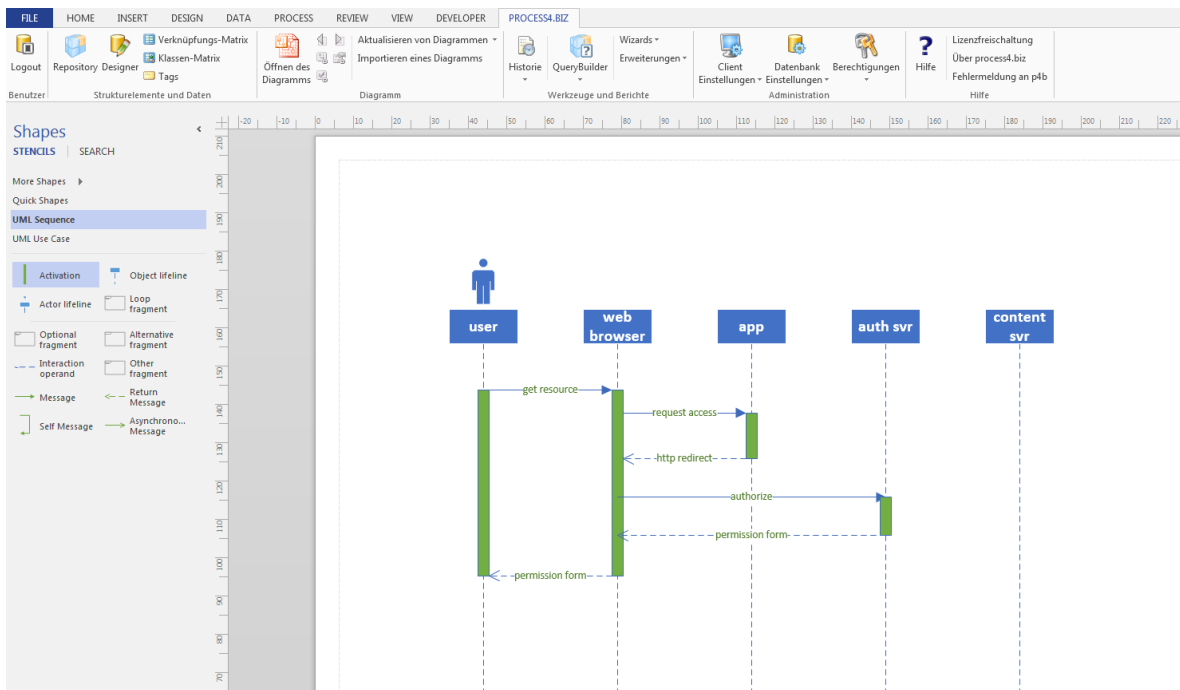


Figure 18.11.: UML Diagram of process4.biz

18. process4.biz (process4.biz Softwareentwicklungs- und Vertriebs GmbH)

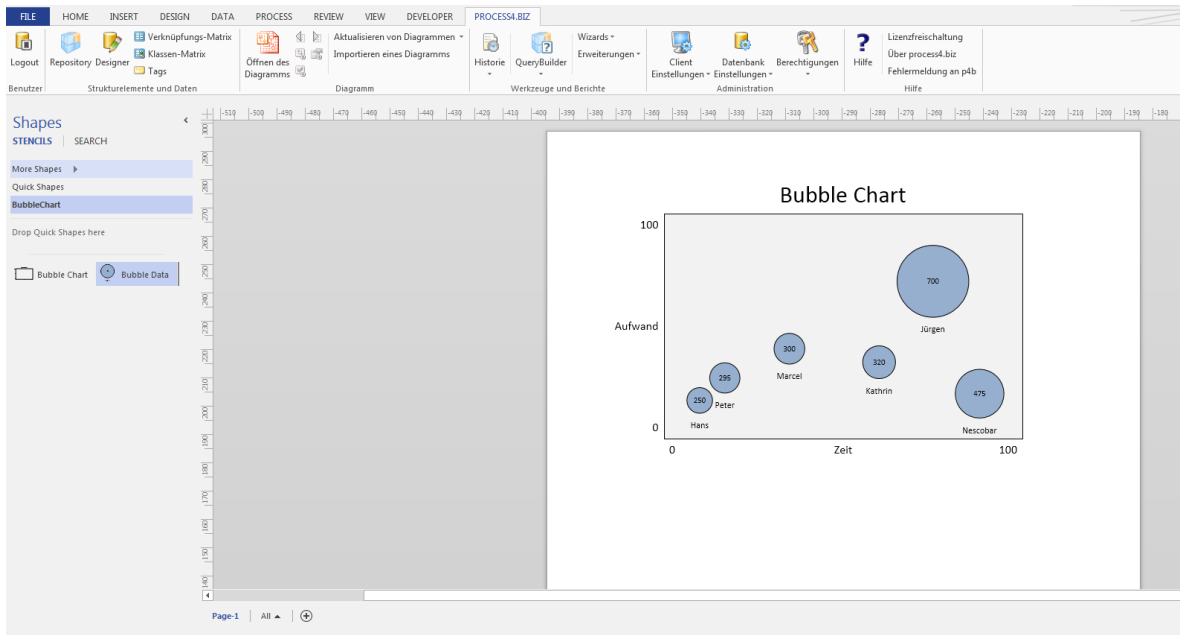
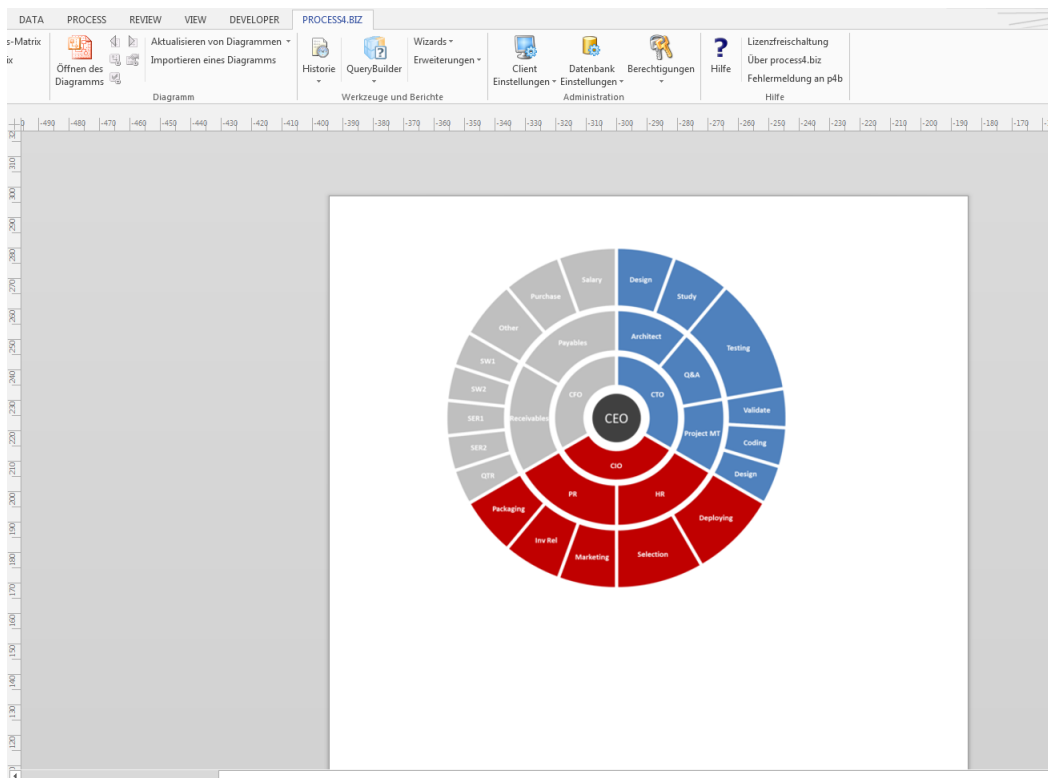


Figure 18.12.: Bubble Chart of process4.biz



process4.biz

Figure 18.13.: Pie Chart of process4.biz



18. process4.biz (process4.biz Softwareentwicklungs- und Vertriebs GmbH)

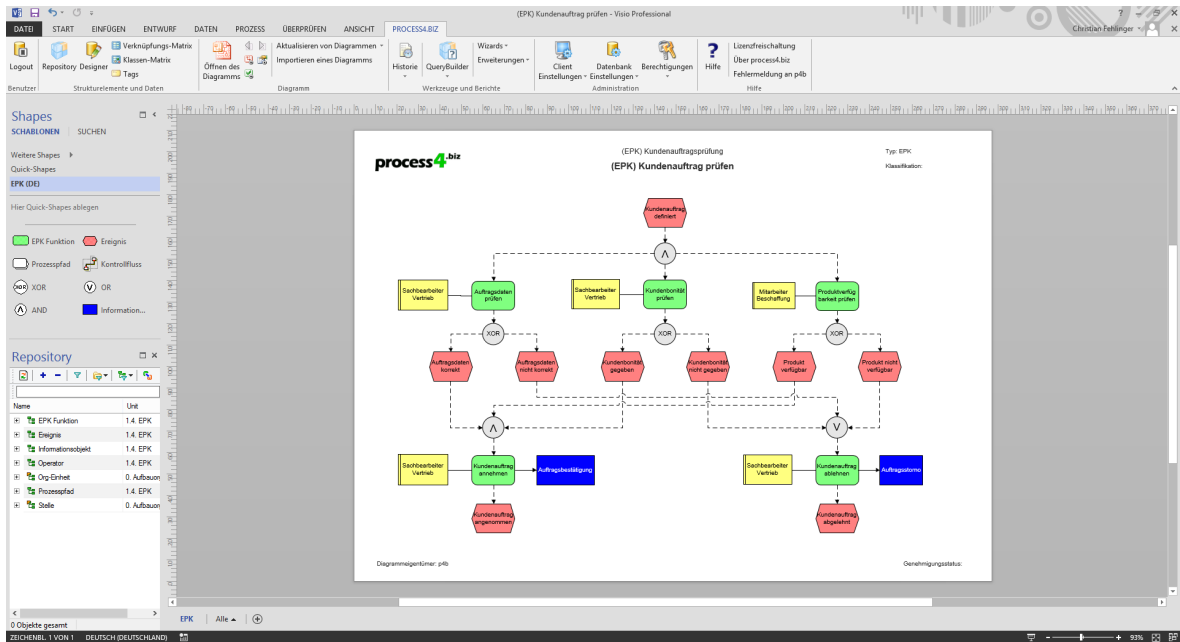


Figure 18.14.: EPC Diagram of process4.biz

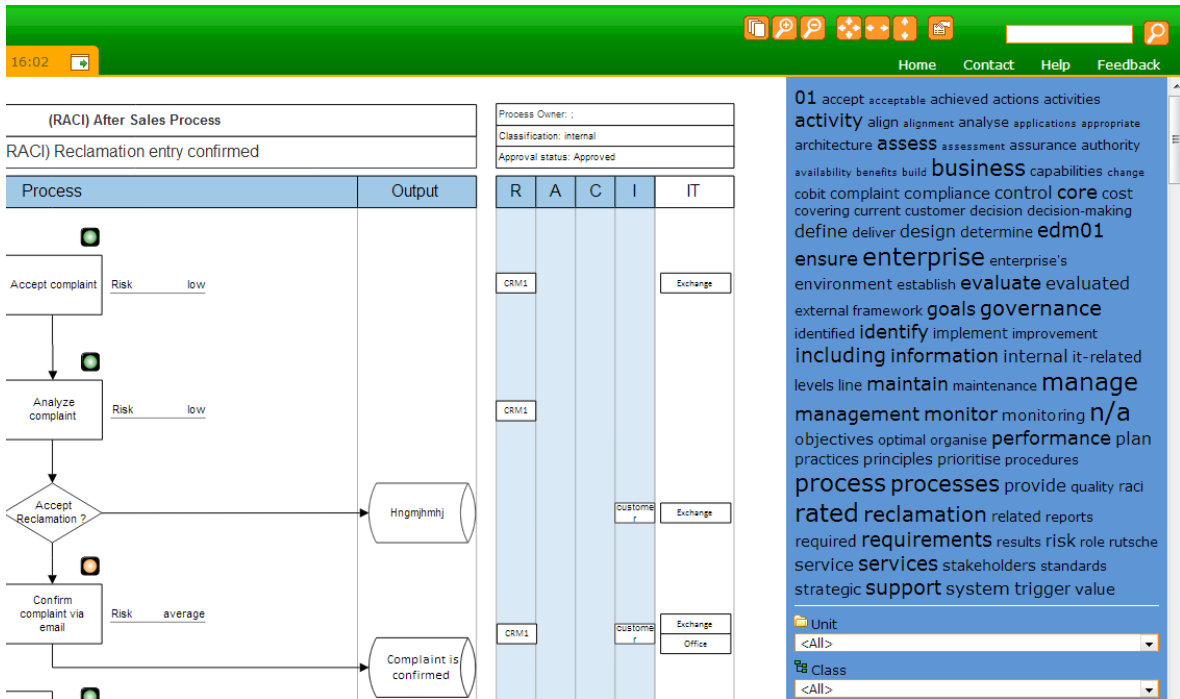


Figure 18.15.: Tag Cloud of process4.biz

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QPR EnterpriseArchitect (QPR Software)

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## 19. QPR EnterpriseArchitect (QPR Software)

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QPR Software Plc was founded in 1991 and has more than 18 years of experience in the EA domain. The company is vendor of QPR EnterpriseArchitect which is offered in version 2012.2 at the editorial deadline. QPR EnterpriseArchitect supports 19 out of 26 visualization types. In the upcoming release in January 2014 QPR EnterpriseArchitect will have new features and enhancements:

- automatic visualization and layout repository objects
- automatic switching of association visualization between nesting objects or explicit connectors
- harmonization of UI logic regarding diagram explorer and model navigator
- support for end user defined catalog and analysis views in navigator

### 19.1. Background Information

Vendor	QPR Software Plc
Founding year	1991
Years active in EA market	18
Number of employees	51–250
URL	<a href="http://www.qpr.com">www.qpr.com</a>

**Table 19.1.:** Vendor Information of QPR Software Plc

Tool Name	QPR EnterpriseArchitect			
Version	2012.2			
Client Platforms	✓	Windows	✗	Linux
	✗	MacOS	✓	Browser
	✗	iOS	✗	Android
	✗	Windows Mobile	✗	Other
Deployment Approach	✓	Desktop	✓	SaaS
	✓	Server	✗	Other
EA Frameworks	✓	ArchiMate	✗	NAF
	✗	DoDAF	✗	PEAF
	✗	IAF	✓	TOGAF
	✗	MODAF	✓	Zachman
	✓	Other		

Table 19.2.: General Information (QPR EnterpriseArchitect)

## 19.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	✓	✓
DOC(X)	✗	✓
HTML	✗	✓
JPG/JPEG	✓	✓
PDF	✗	✓
PNG	✓	✓
PPT(X)	✗	✓
SVG	✗	✗
VSD(X)	✗	✗
Other	✓	✓

Table 19.3.: Visualization Import/Export File Formats (QPR EnterpriseArchitect)

### 19.3. Visualization Configuration

#### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✓
Data Filter	✓
Other	✓

**Table 19.4.:** Binding (QPR EnterpriseArchitect)

#### Generation Approach

Model-Driven	✗
Form-Based	✗
Scripting	✗
Manual Drawing	✓
Other	✗

**Table 19.5.:** Visualization Generation Approach (QPR EnterpriseArchitect)

#### Visual Customization and Layouting

Customization	Caption	✓
	Color	✓
	Orientation	✓
	Position	✓
	Shape	✓
	Size	✓
	Other	✓
Layout	Automated	✗
	Manual	✓
	Other	✗

**Table 19.6.:** Visual Customization (QPR EnterpriseArchitect)

### Import/Export of Visualization Configurations

Format	Import	Export
CSV	X	X
JSON	X	X
ODBC	X	X
XMI	X	X
XML	✓	✓
XLS(X)	X	X
TXT	X	X
Other	X	X

**Table 19.7.:** Configuration Import/Export (QPR EnterpriseArchitect)

## 19.4. Information Model

### Information Model Type

Full Schema	✓
Configurable Building Blocks	X
User-defined	✓
Subclassing/class inheritance	X

**Table 19.8.:** Information Model Type (QPR EnterpriseArchitect)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓	✓	✓	✓	✓	✓
Modify	✓	✓	✓	✓	✓	✓
Delete	✓	✓	✓	✓	✓	✓
Copy	✓	X	X	X	X	X
Merge	X	X	X	X	X	X
Move	X	X	X	X	X	X

**Table 19.9.:** Information Model Flexibility (QPR EnterpriseArchitect)

## 19.5. Interoperability

### Import Mechanisms

Pull	✓
Push	✓
Other	✗

**Table 19.10.:** Import Mechanisms (QPR EnterpriseArchitect)

### Third Party Tools

Business Intelligence Tools	✓
Business Process Engines	✗
Change Management Tools	✗
Cloud Services	✗
Configuration Management Database	✗
Enterprise Service Bus	✗
Infrastructure Monitoring Tools	✗
License/IT Asset Management Tools	✗
Project Portfolio Management Tools	✗
Release Management Tools	✗
Other	✗

**Table 19.11.:** Interoperability with Third Party Tools (QPR EnterpriseArchitect)

## Data & Schema Import/Export

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	X	X	X	X
JSON	X	X	X	X
TXT	X	X	X	X
XMI	X	X	X	X
XML	✓	✓	✓	✓
XLS(X)	✓	✓	X	X
OData	X	X	X	X
Other	✓	✓	X	X

**Table 19.12.:** Data & Schema Import/Export (QPR EnterpriseArchitect)

## Model Element Import/Export

Model Element	Import	Export
Classes	✓	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	X	X
Roles	X	X
Other	X	X

**Table 19.13.:** Model Element Import/Export (QPR EnterpriseArchitect)



19. QPR EnterpriseArchitect (QPR Software)

19.6. Visualization Examples of QPR EnterpriseArchitect

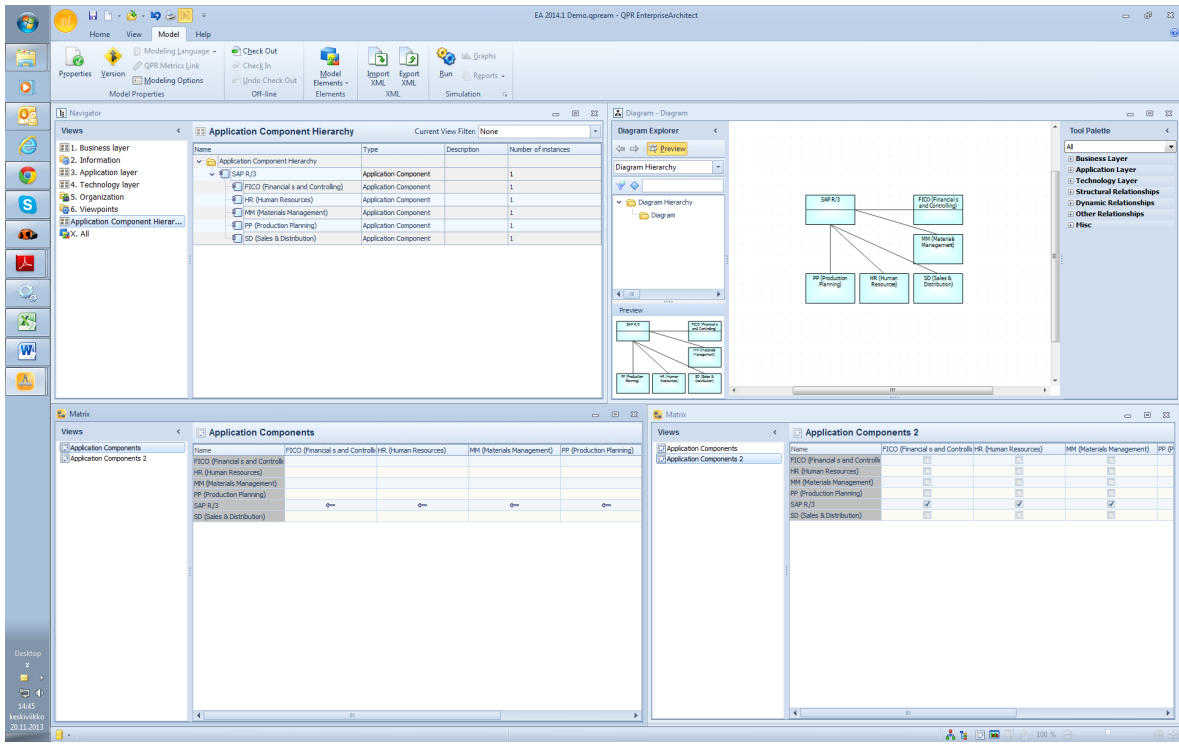


Figure 19.1.: Matrix of the QPR EnterpriseArchitect

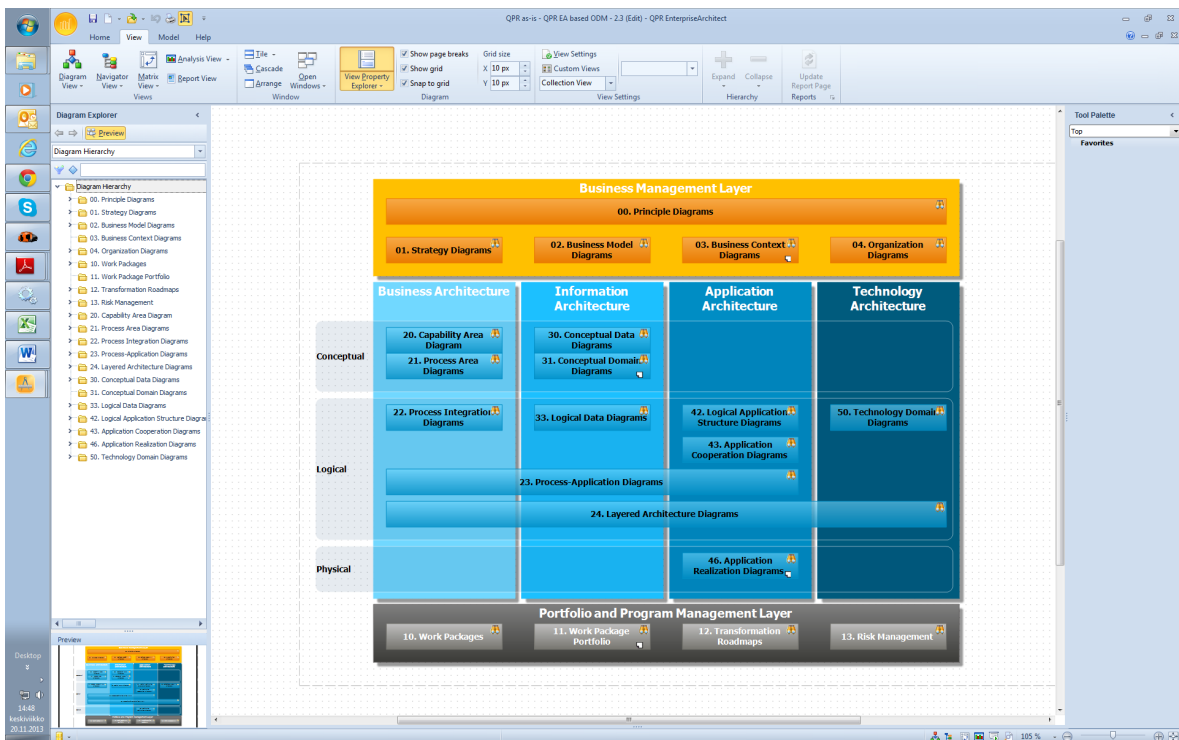


Figure 19.2.: Cluster Map of the QPR EnterpriseArchitect

QPR  
Enterprise  
Architect

## 19. QPR EnterpriseArchitect (QPR Software)

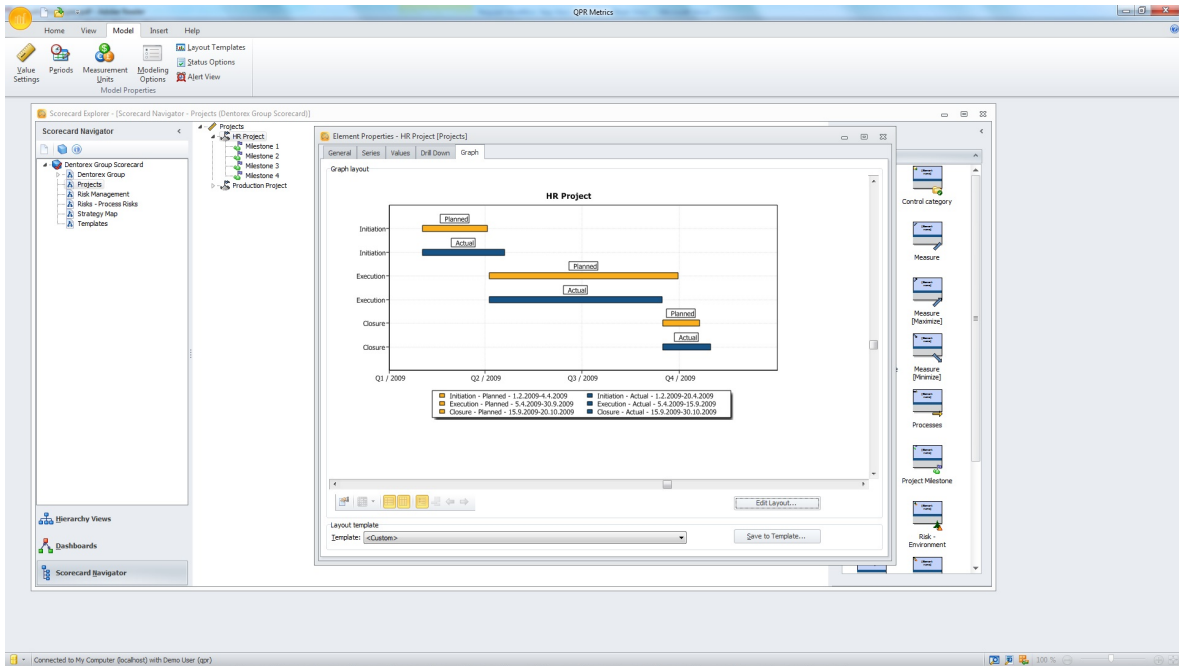


Figure 19.3.: Timeline of the QPR EnterpriseArchitect

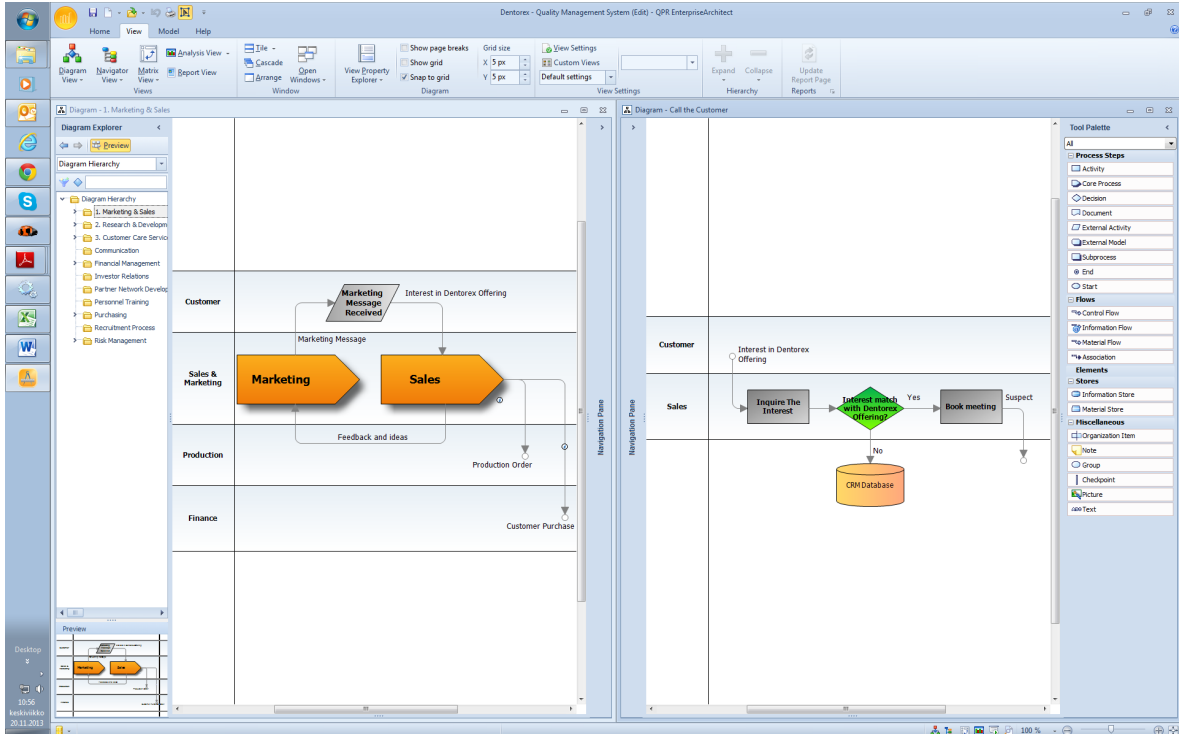


Figure 19.4.: Flow Diagram of the QPR EnterpriseArchitect

QPR  
Enterprise  
Architect

## 19. QPR EnterpriseArchitect (QPR Software)

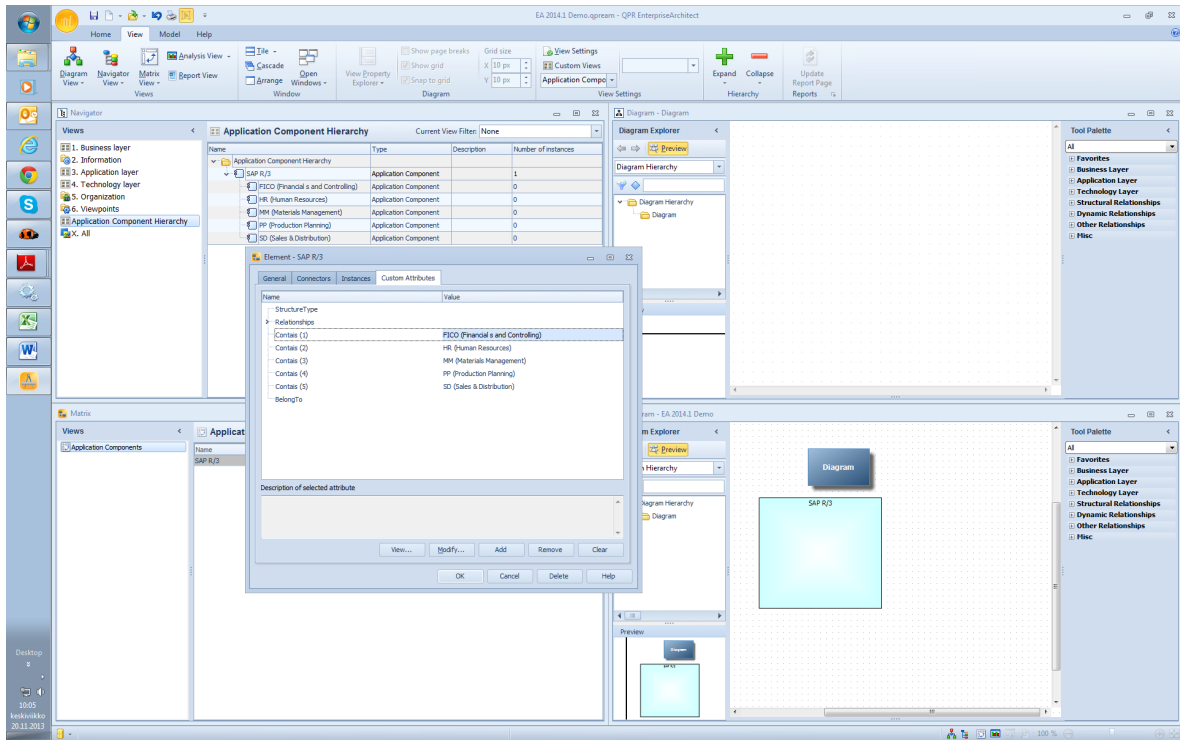


Figure 19.5.: List of the QPR EnterpriseArchitect

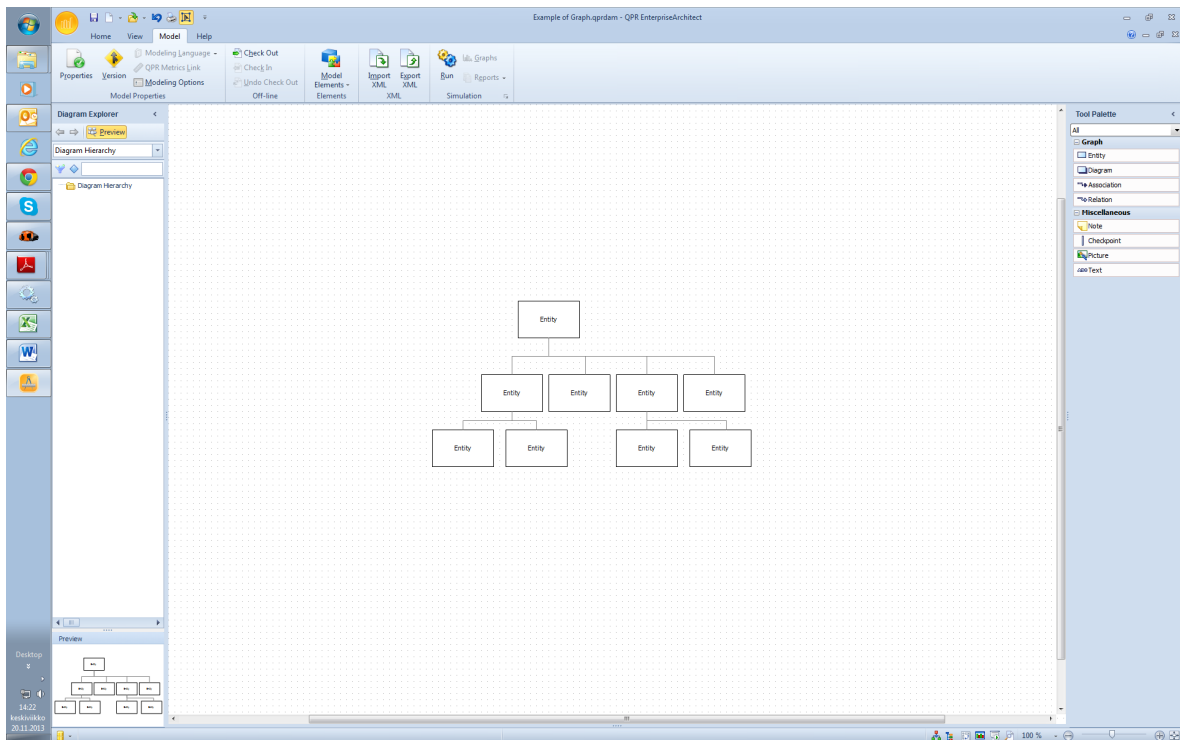


Figure 19.6.: Graph of the QPR EnterpriseArchitect

QPR  
Enterprise  
Architect

## 19. QPR EnterpriseArchitect (QPR Software)

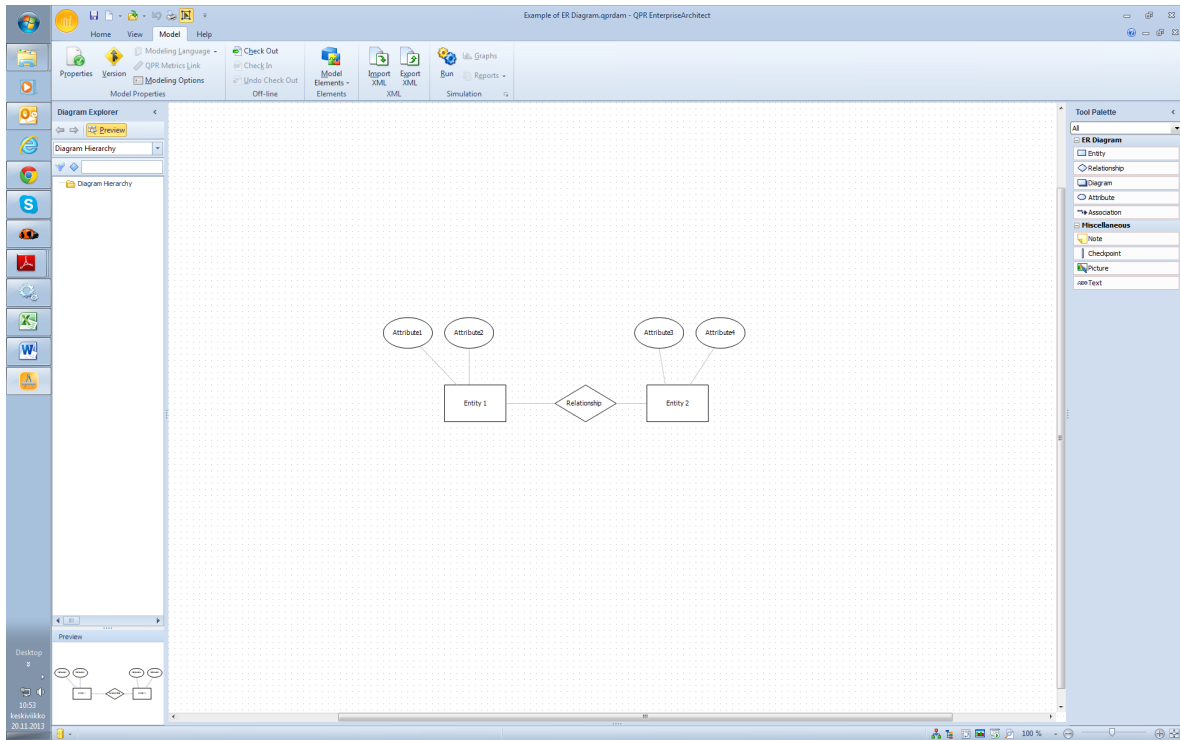


Figure 19.7.: ER Diagram of the QPR EnterpriseArchitect

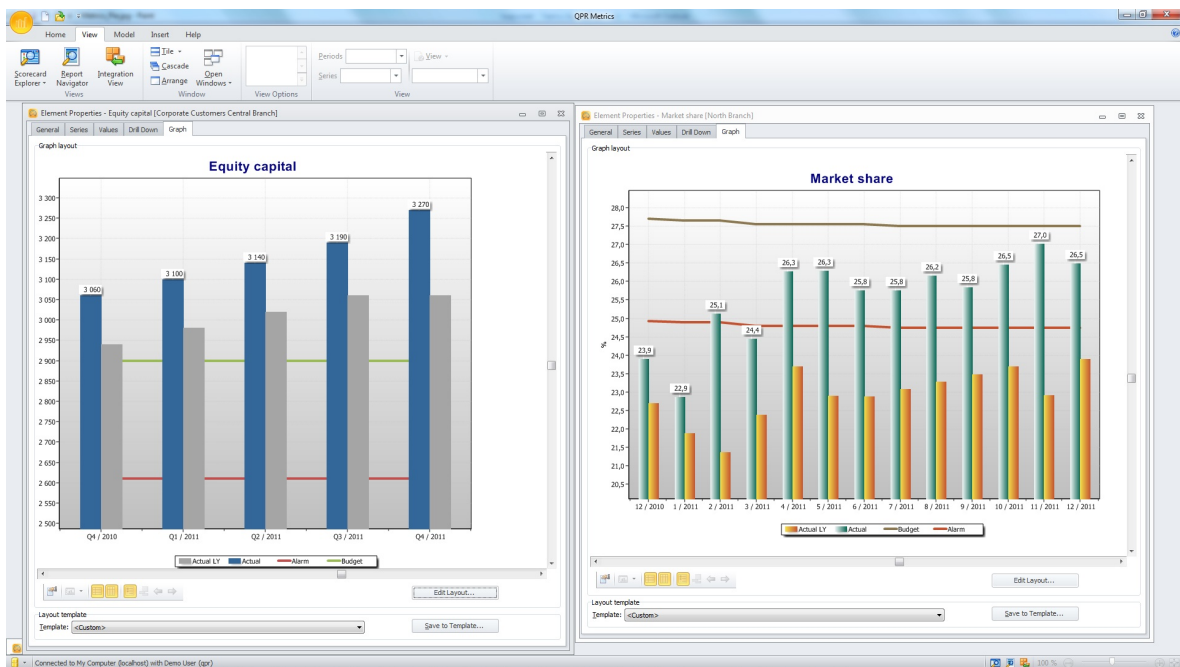


Figure 19.8.: Bar Chart of the QPR EnterpriseArchitect

QPR  
Enterprise  
Architect

## 19. QPR EnterpriseArchitect (QPR Software)

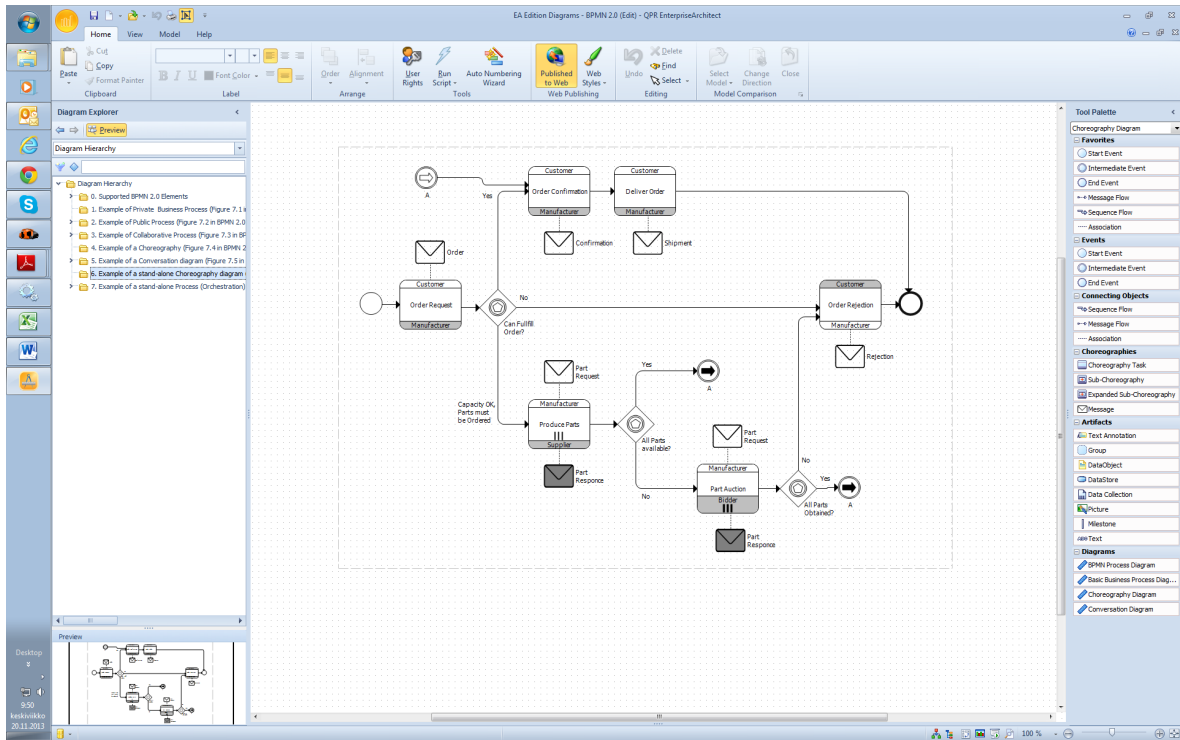


Figure 19.9.: BPMN Diagram of the QPR EnterpriseArchitect

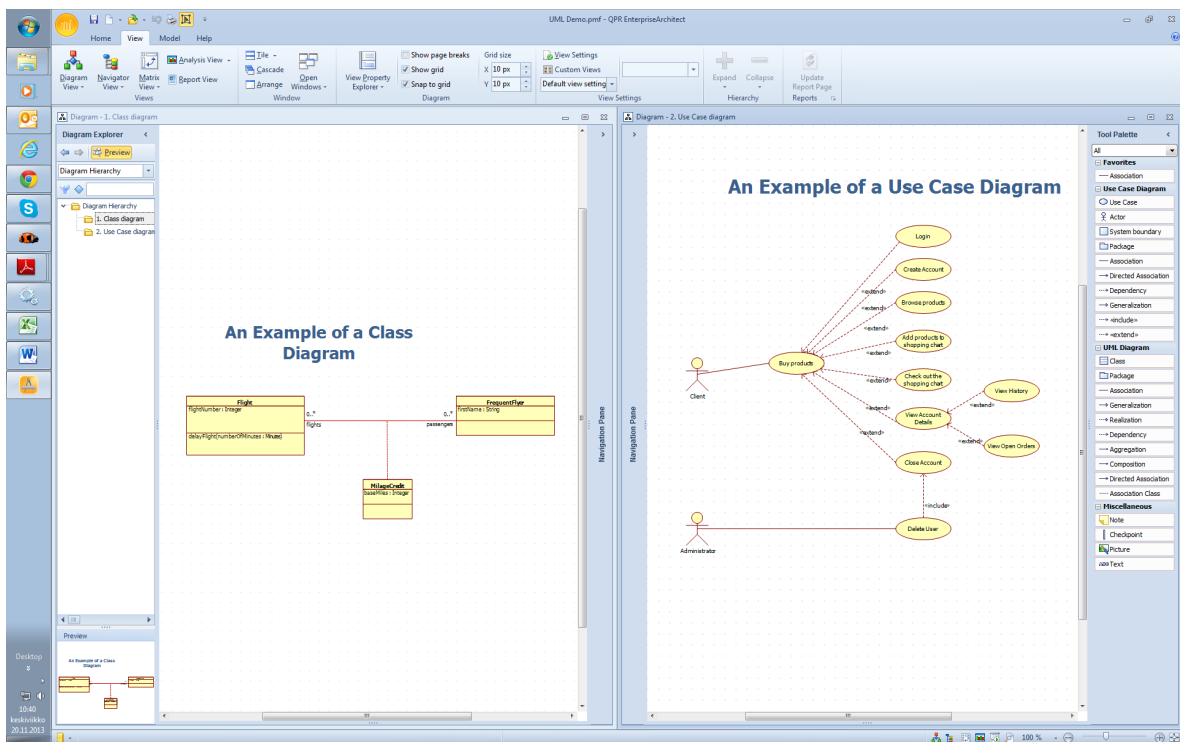


Figure 19.10.: UML Diagram of the QPR EnterpriseArchitect

## 19. QPR EnterpriseArchitect (QPR Software)

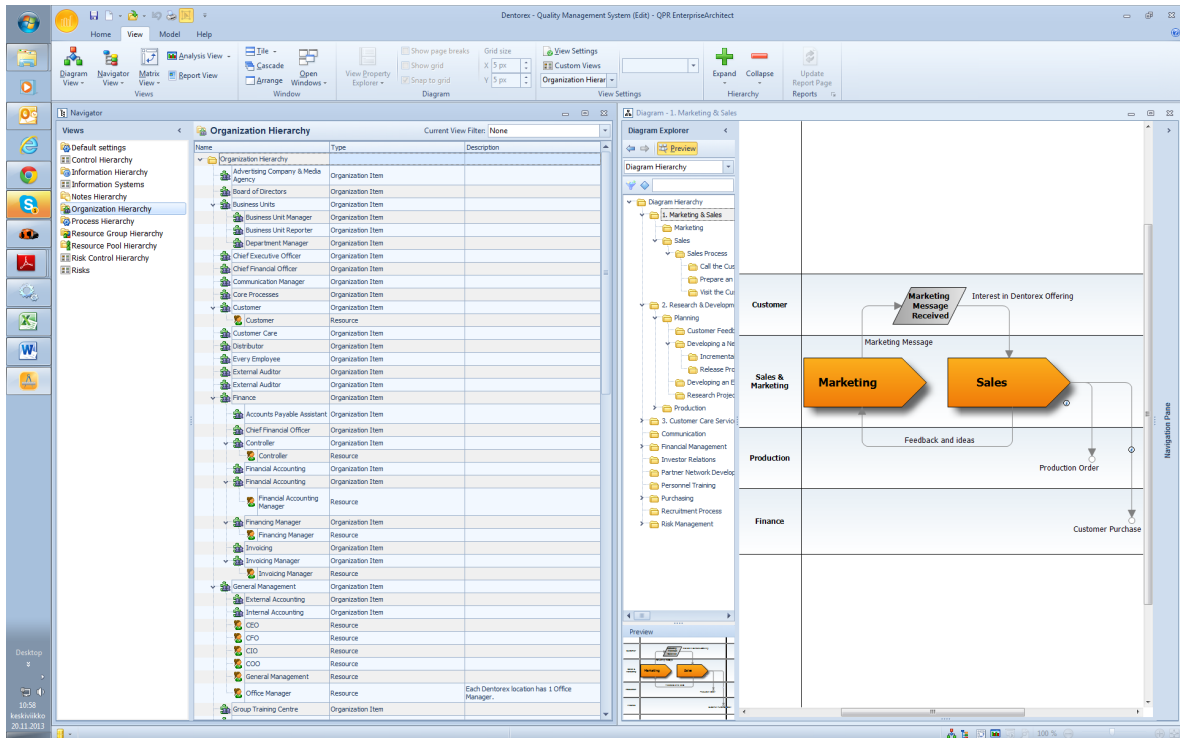


Figure 19.11.: Treeview of the QPR EnterpriseArchitect

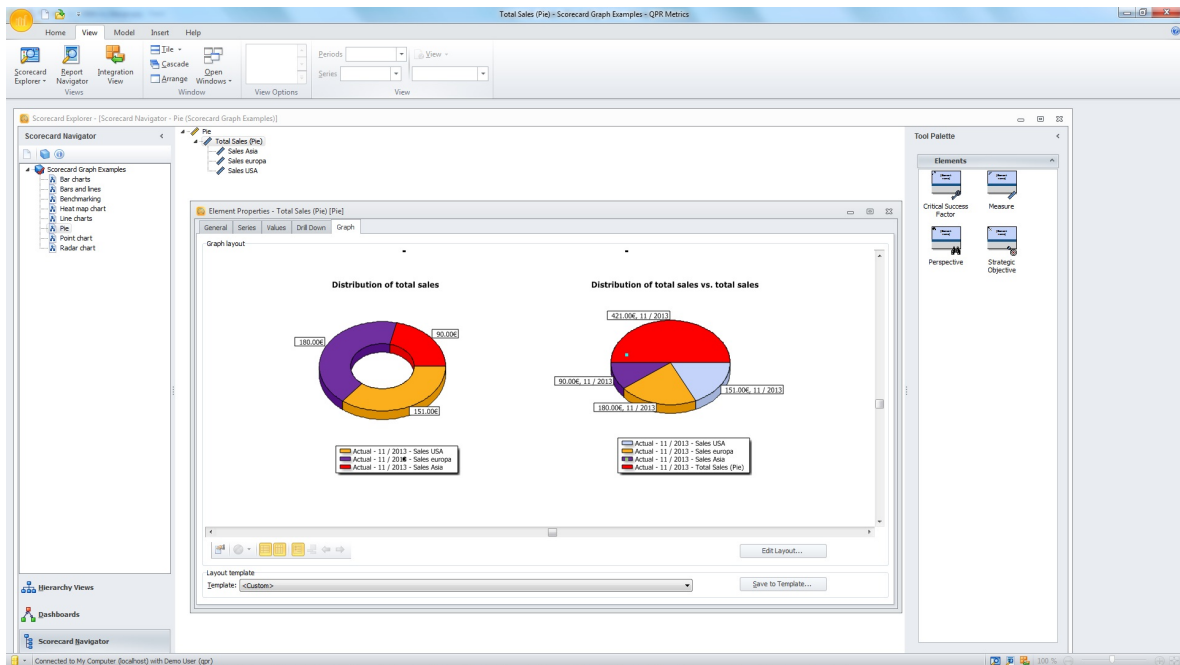


Figure 19.12.: Pie Chart of the QPR EnterpriseArchitect

## 19. QPR EnterpriseArchitect (QPR Software)



Figure 19.13.: Dashboard of the QPR EnterpriseArchitect

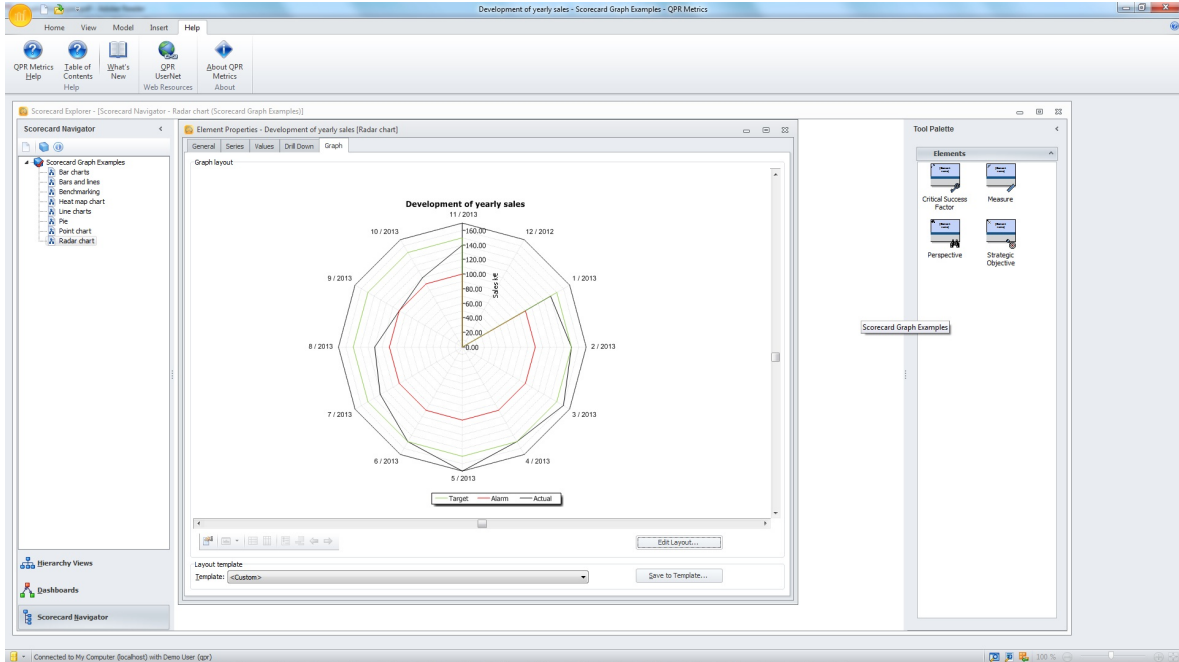


Figure 19.14.: Radar Diagram of the QPR EnterpriseArchitect

## 19. QPR EnterpriseArchitect (QPR Software)

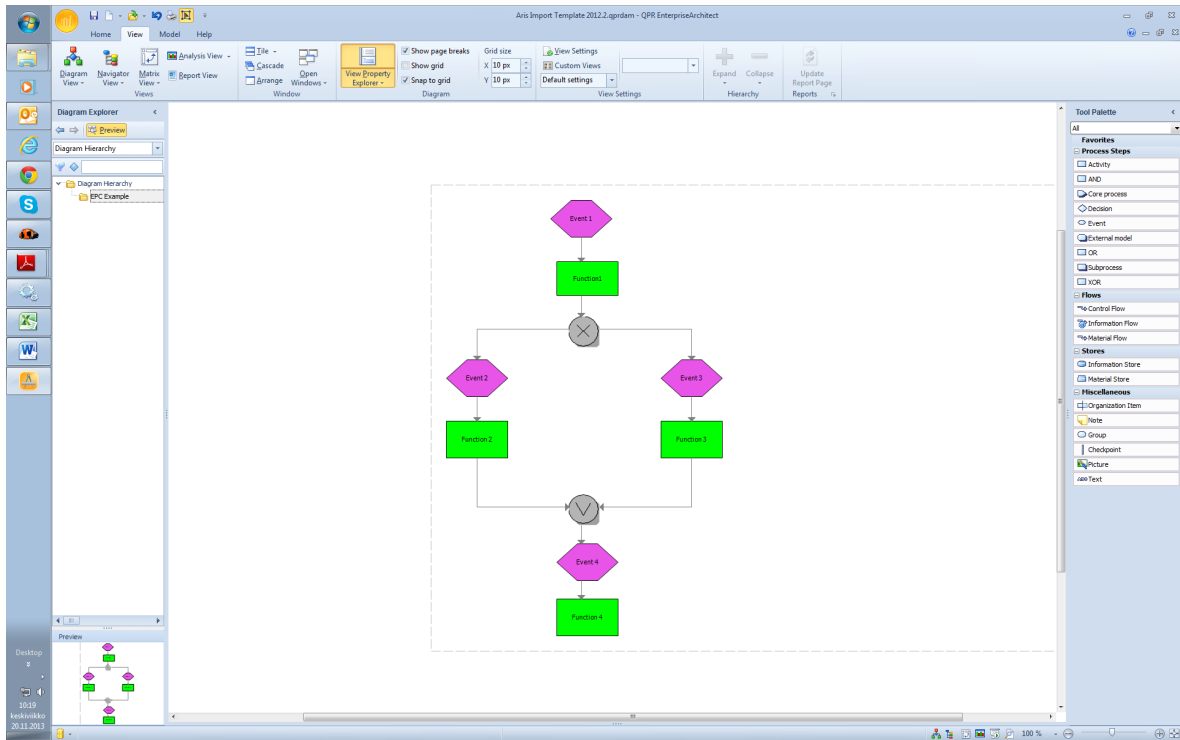


Figure 19.15.: EPC Diagram of the QPR EnterpriseArchitect

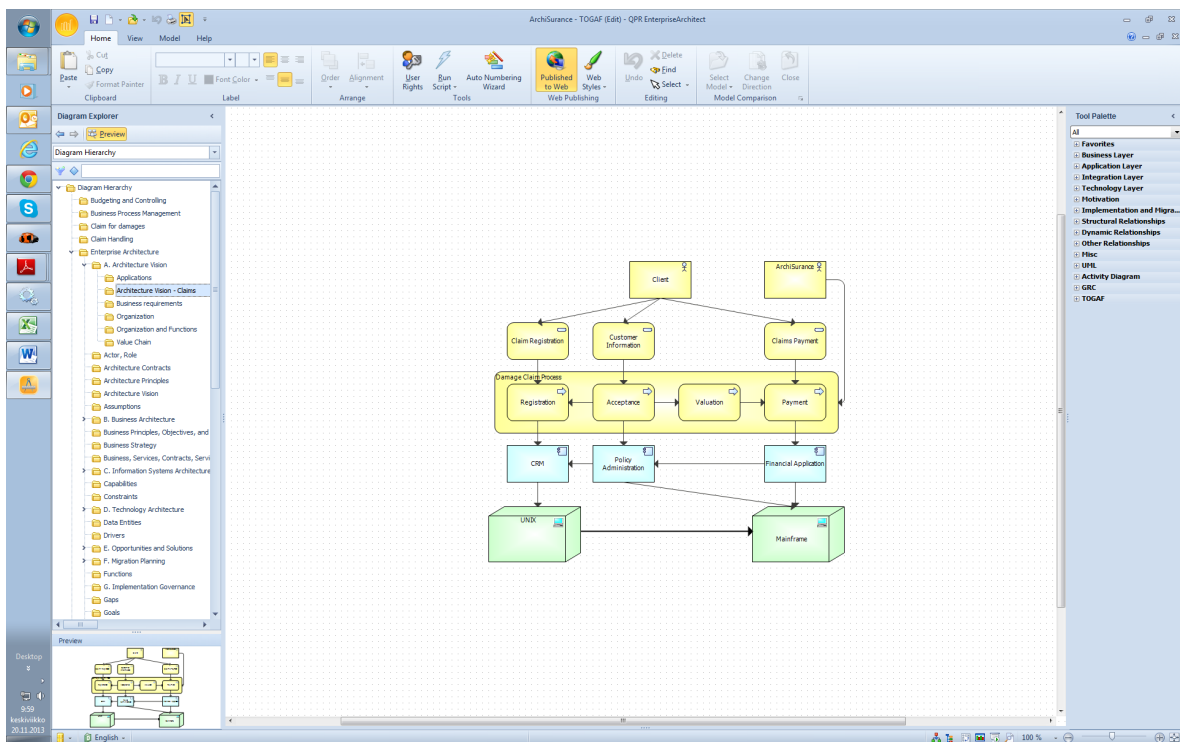


Figure 19.16.: ArchiMate Diagram of the QPR EnterpriseArchitect

QPR  
Enterprise  
Architect



## 19. QPR EnterpriseArchitect (QPR Software)

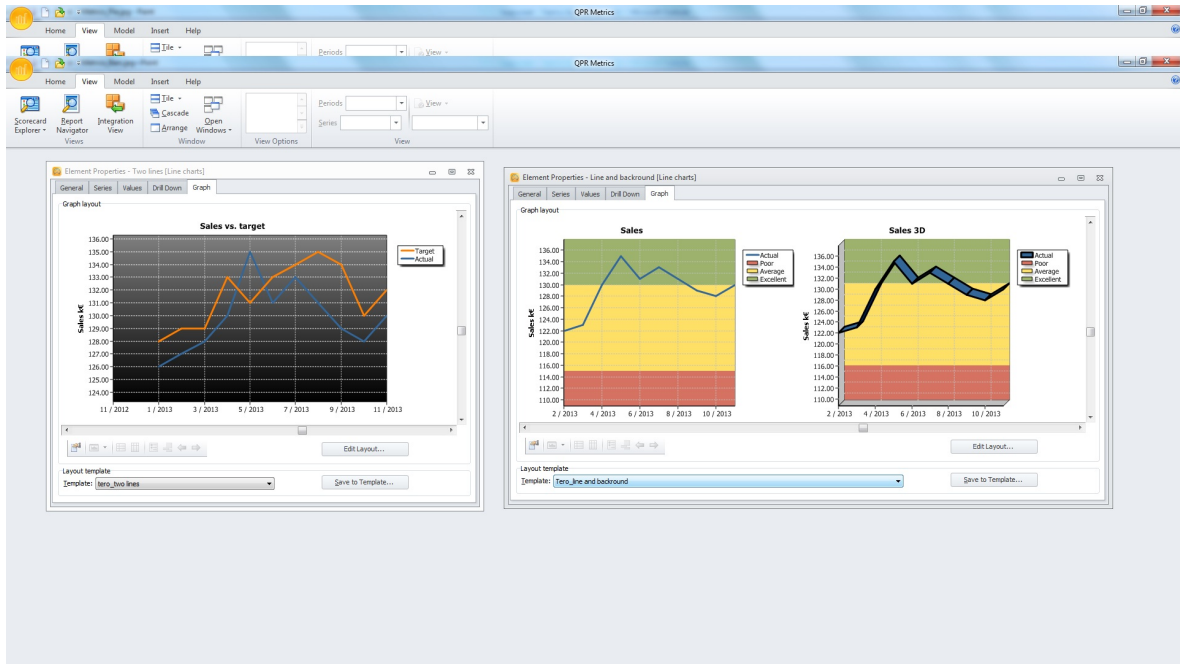


Figure 19.17.: Line Chart of the QPR EnterpriseArchitect

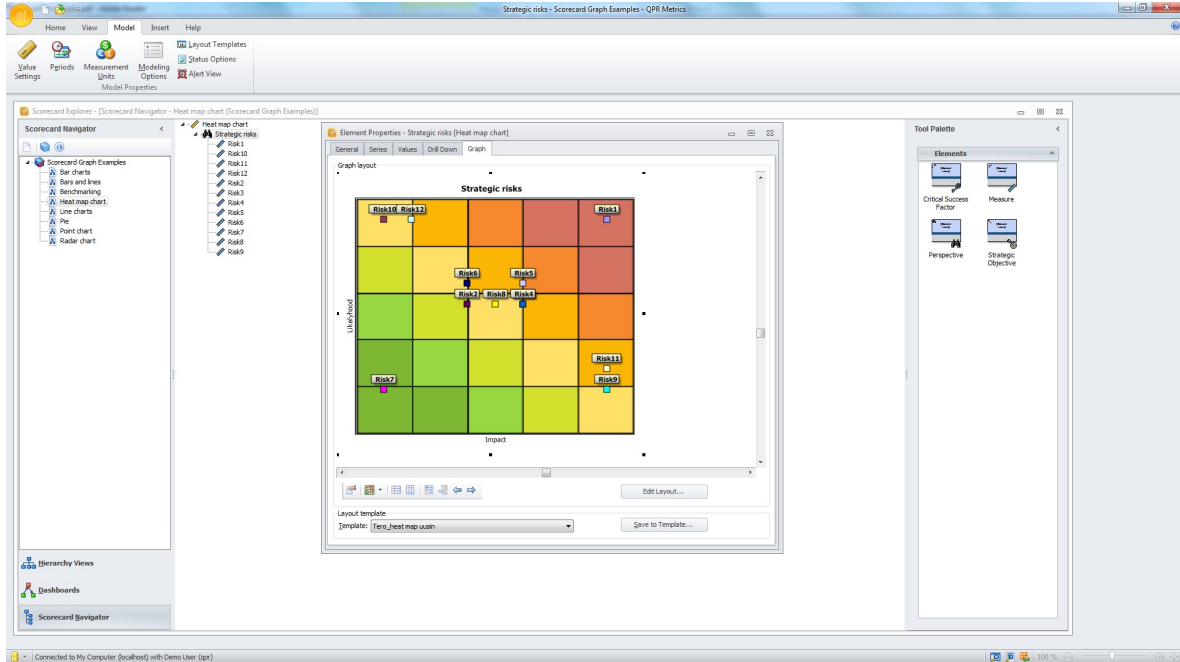


Figure 19.18.: Scatter Chart of the QPR EnterpriseArchitect

## 19. QPR EnterpriseArchitect (QPR Software)

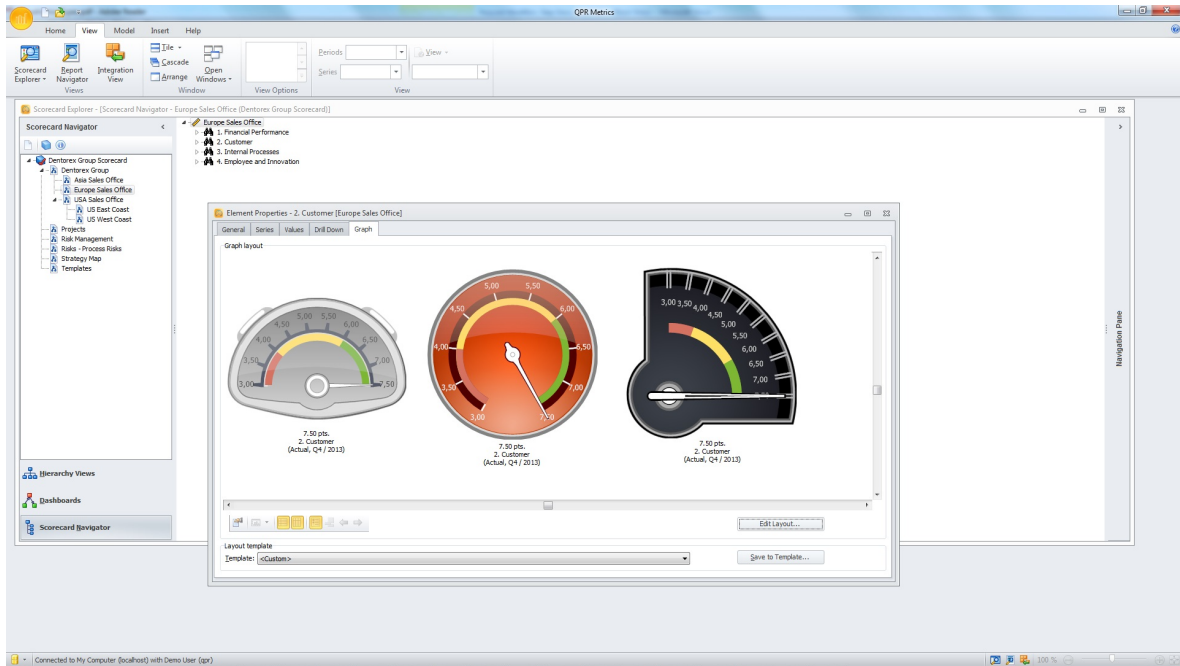


Figure 19.19.: Gauges of the QPR EnterpriseArchitect



## CHAPTER 20

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### Rational System Architect (IBM)

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## 20. Rational System Architect (IBM)

IBM Deutschland GmbH was founded in 1911 and has more than 10 years of experience in the EA domain. The company is vendor of Rational System Architect which is offered in version 11.4.2.5 at the editorial deadline. Rational System Architect supports 4 out of 26 visualization types. The Rational System Architect comes as a feature-rich EA tool. It allows to define metrics utilizing VBA and report macros. Defined metrics can be easily associated to a visualization via drag-and-drop operations. A so-called 'Heat Map Manager' allows to run different analyses dynamically. This also generates a meaningful legend automatically such that the interpretation is easy to grasp.

Characteristic for the Rational System Architect is the analysis support. As an example, Figure 20.1 illustrates an impact analysis in a graph visualization.

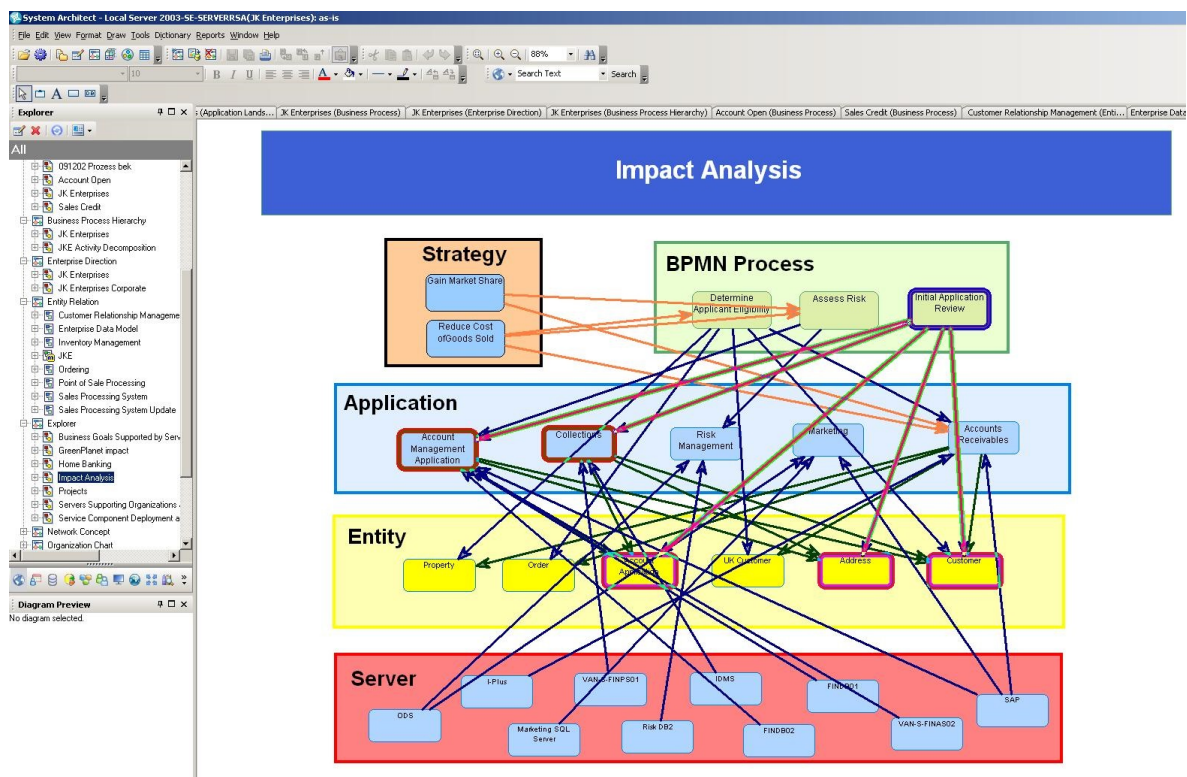


Figure 20.1.: Impact analysis in Rational System Architect

## 20.1. Background Information

Vendor	IBM Deutschland GmbH
Founding year	1911
Years active in EA market	10
Number of employees	>10.000
URL	www.ibm.com

**Table 20.1.:** Vendor Information of IBM Deutschland GmbH

Tool Name	Rational System Architect	
Version	11.4.2.5	
Client Platforms	✓ Windows	✗ Linux
	✗ MacOS	✓ Browser
	✗ iOS	✗ Android
	✗ Windows Mobile	✗ Other
Deployment Approach	✓ Desktop	✗ SaaS
	✓ Server	✗ Other
EA Frameworks	✓ ArchiMate	✓ NAF
	✓ DoDAF	✗ PEAf
	✓ IAF	✓ TOGAF
	✓ MODAF	✓ Zachman
	✓ Other	

**Table 20.2.:** General Information (Rational System Architect)

## 20.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	✗	✓
DOC(X)	✗	✓
HTML	✗	✓
JPG/JPEG	✗	✓
PDF	✗	✗
PNG	✗	✓
PPT(X)	✗	✗
SVG	✗	✓
VSD(X)	✗	✗
Other	✗	✓

**Table 20.3.:** Visualization Import/Export File Formats (Rational System Architect)

## 20.3. Visualization Configuration

### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✓
Data Filter	✓
Other	✓

**Table 20.4.:** Binding (Rational System Architect)

### Generation Approach

Model-Driven	✓
Form-Based	✓
Scripting	✓
Manual Drawing	✓
Other	✓

**Table 20.5.:** Visualization Generation Approach (Rational System Architect)

### Visual Customization and Layouting

Customization	Caption	✓
	Color	✓
	Orientation	✗
	Position	✓
	Shape	✓
	Size	✓
	Other	✓
Layout	Automated	✓
	Manual	✓
	Other	✗

**Table 20.6.:** Visual Customization (Rational System Architect)



### Import/Export of Visualization Configurations

Format	Import	Export
CSV	✓	✓
JSON	✗	✗
ODBC	✗	✗
XMI	✗	✗
XML	✓	✓
XLS(X)	✗	✗
TXT	✓	✓
Other	✗	✗

**Table 20.7.:** Configuration Import/Export (Rational System Architect)

## 20.4. Information Model

### Information Model Type

Full Schema	✓
Configurable Building Blocks	✓
User-defined	✗
Subclassing/class inheritance	✓

**Table 20.8.:** Information Model Type (Rational System Architect)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓	✓	✓	✓	✓	✓
Modify	✓	✓	✓	✓	✓	✓
Delete	✓	✓	✓	✓	✓	✓
Copy	✓	✓	✗	✓	✓	✓
Merge	✗	✗	✗	✗	✗	✗
Move	✓	✓	✓	✓	✓	✓

**Table 20.9.:** Information Model Flexibility (Rational System Architect)

## 20.5. Interoperability

### Import Mechanisms

Pull	✓
Push	✗
Other	✗

**Table 20.10.:** Import Mechanisms (Rational System Architect)

### Third Party Tools

Business Intelligence Tools	✓
Business Process Engines	✗
Change Management Tools	✗
Cloud Services	✗
Configuration Management Database	✗
Enterprise Service Bus	✗
Infrastructure Monitoring Tools	✓
License/IT Asset Management Tools	✗
Project Portfolio Management Tools	✗
Release Management Tools	✗
Other	✗

**Table 20.11.:** Interoperability with Third Party Tools (Rational System Architect)

**Data & Schema Import/Export**

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	✓	✓	✗	✗
JSON	✗	✗	✗	✗
TXT	✗	✓	✗	✗
XMI	✓	✓	✓	✓
XML	✓	✓	✓	✓
XLS(X)	✗	✗	✗	✗
OData	✗	✗	✗	✗
Other	✓	✓	✗	Portable Document Format (PDF)

**Table 20.12.:** Data & Schema Import/Export (Rational System Architect)**Model Element Import/Export**

Model Element	Import	Export
Classes	✓	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	✓	✓
Roles	✓	✓
Other	✗	✗

**Table 20.13.:** Model Element Import/Export (Rational System Architect)

## 20.6. Visualization Examples of Rational System Architect

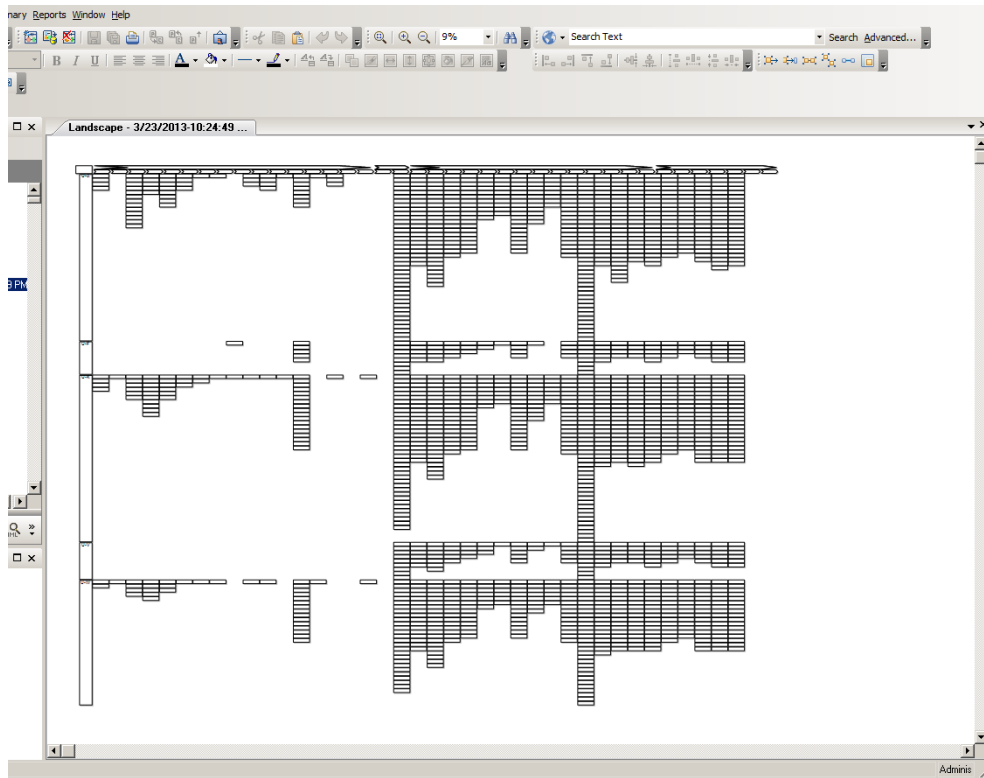


Figure 20.2.: Matrix of the Rational System Architect

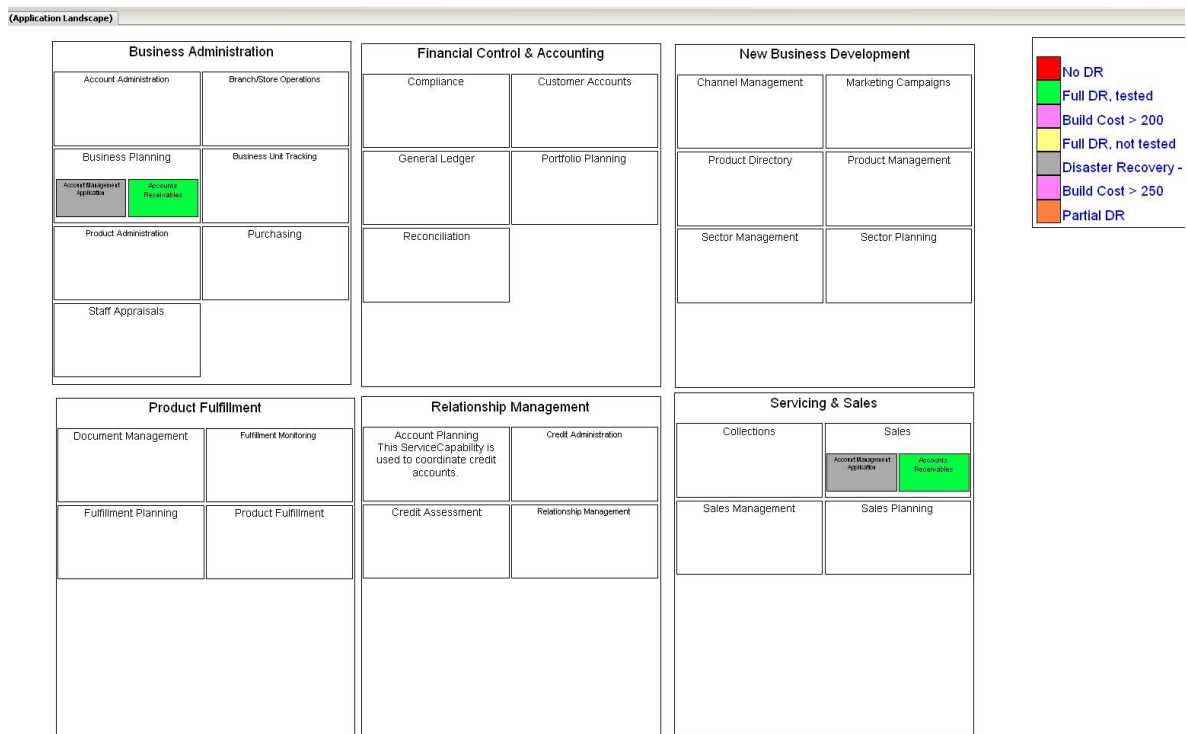


Figure 20.3.: Cluster Map of the Rational System Architect

## 20. Rational System Architect (IBM)

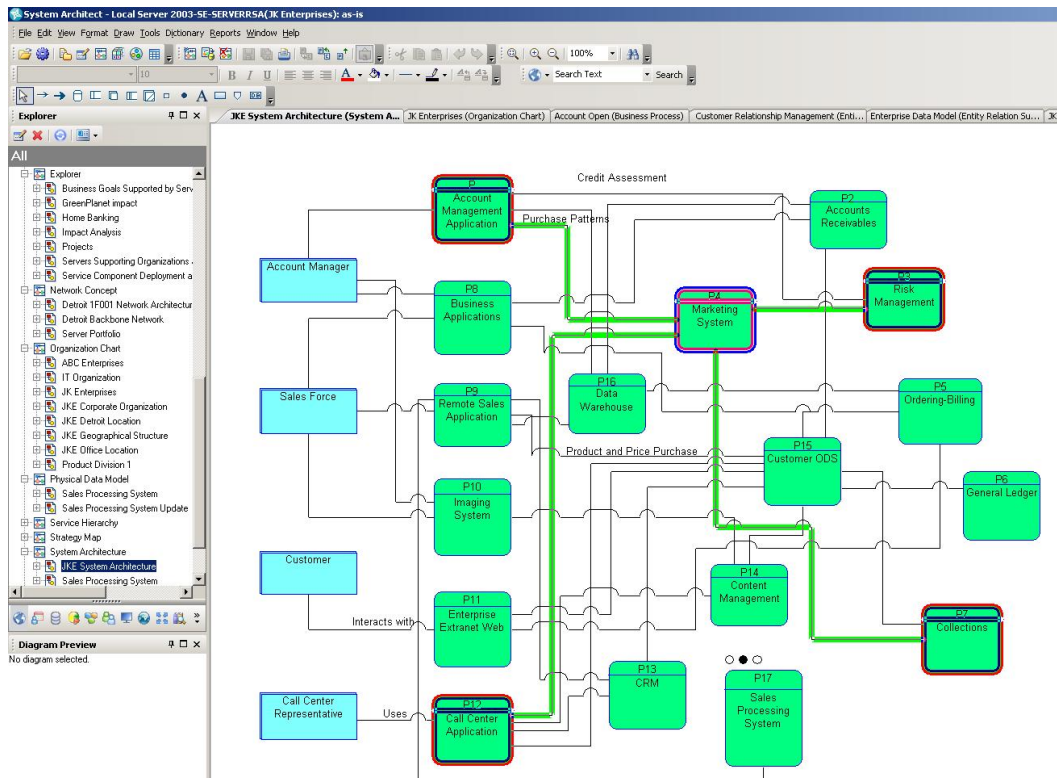


Figure 20.4.: Graph of the Rational System Architect

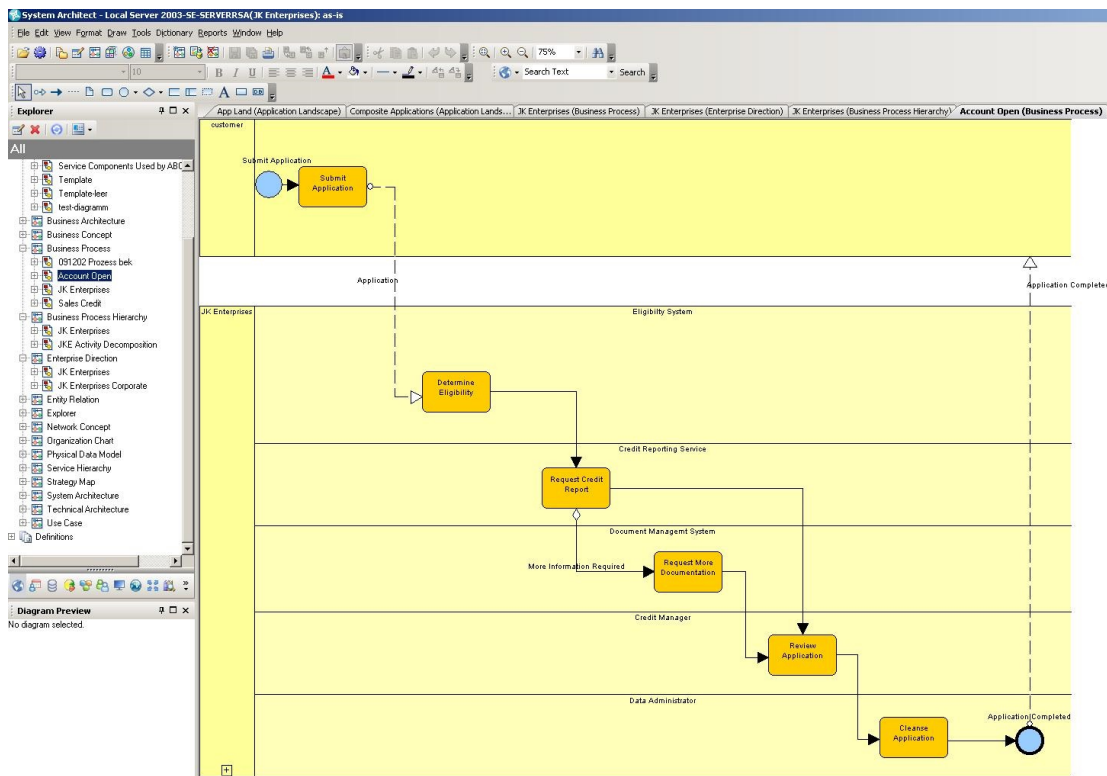


Figure 20.5.: BPMN Diagram of the Rational System Architect

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## SAMU Repository (Atoll Technologies Ltd)

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## 21. SAMU Repository (Atoll Technologies Ltd)

Atoll Technologies Ltd was founded in 2001 and has more than 10 years of experience in the EA domain. The company is vendor of SAMU Repository which is offered in version 5.42 at the editorial deadline. SAMU Repository supports 17 out of 26 visualization types. SAMU is a simple, yet flexible EA tool that was designed to support dynamic EA practices. All configuration is done on the graphical user interface. Features include: completely web-based, fully flexible meta-model, derived relationships (substitution), and query-based reporting.

In their continuous effort to provide more comprehensive solutions to their clients, Atoll Technologies Ltd has worked out an integrated solution stack with the leading business process analysis vendor Signavio. In practice this integration is realized on two levels:

- lightweight: hyperlinks in each tool pointing to associated elements across the tools
- full: data synchronization between repositories

### 21.1. Background Information

Vendor	Atoll Technologies Ltd
Founding year	2001
Years active in EA market	10
Number of employees	11–50
URL	www.atollgroup.eu

**Table 21.1.:** Vendor Information of Atoll Technologies Ltd

Tool Name	SAMU Repository			
Version	5.42			
Client Platforms	✗	Windows	✗	Linux
	✗	MacOS	✓	Browser
	✗	iOS	✗	Android
	✗	Windows Mobile	✗	Other
Deployment Approach	✗	Desktop	✗	SaaS
	✓	Server	✗	Other
EA Frameworks	✓	ArchiMate	✗	NAF
	✗	DoDAF	✓	PEAF
	✗	IAF	✓	TOGAF
	✗	MODAF	✗	Zachman
	✓	Other		

**Table 21.2.:** General Information (SAMU Repository)

## 21.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	✗	✗
DOC(X)	✗	✓
HTML	✗	✓
JPG/JPEG	✗	✓
PDF	✗	✓
PNG	✗	✓
PPT(X)	✗	✗
SVG	✗	✓
VSD(X)	✗	✗
Other	✗	✗

**Table 21.3.:** Visualization Import/Export File Formats (SAMU Repository)

## 21.3. Visualization Configuration

### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✓
Data Filter	✓
Other	✗

**Table 21.4.:** Binding (SAMU Repository)



### Generation Approach

Model-Driven	✓
Form-Based	✗
Scripting	✗
Manual Drawing	✓
Other	✗

**Table 21.5.:** Visualization Generation Approach (SAMU Repository)

### Visual Customization and Layouting

Customization	Caption	✓
	Color	✓
	Orientation	✓
	Position	✓
	Shape	✓
	Size	✓
	Other	✓
Layout	Automated	✓
	Manual	✓
	Other	✗

**Table 21.6.:** Visual Customization (SAMU Repository)

### Import/Export of Visualization Configurations

Format	Import	Export
CSV	X	X
JSON	X	X
ODBC	X	X
XMI	X	X
XML	✓	✓
XLS(X)	X	X
TXT	X	X
Other	X	X

Table 21.7.: Configuration Import/Export (SAMU Repository)

## 21.4. Information Model

### Information Model Type

Full Schema	✓
Configurable Building Blocks	✓
User-defined	✓
Subclassing/class inheritance	X

Table 21.8.: Information Model Type (SAMU Repository)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓	✓	✓	✓	✓	✓
Modify	✓	✓	✓	✓	✓	✓
Delete	✓	✓	✓	✓	✓	✓
Copy	X	X	X	X	X	✓
Merge	X	X	X	X	X	X
Move	X	X	X	X	X	X

Table 21.9.: Information Model Flexibility (SAMU Repository)

## 21.5. Interoperability

### Import Mechanisms

Pull	✓
Push	✓
Other	✓

**Table 21.10.:** Import Mechanisms (SAMU Repository)

### Third Party Tools

Business Intelligence Tools	✓
Business Process Engines	✓
Change Management Tools	✓
Cloud Services	✓
Configuration Management Database	✓
Enterprise Service Bus	✓
Infrastructure Monitoring Tools	✓
License/IT Asset Management Tools	✓
Project Portfolio Management Tools	✓
Release Management Tools	✓
Other	✓

**Table 21.11.:** Interoperability with Third Party Tools (SAMU Repository)

## Data & Schema Import/Export

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	X	✓	X	X
JSON	X	✓	X	X
TXT	X	✓	X	X
XMI	X	X	X	X
XML	✓	✓	✓	✓
XLS(X)	✓	✓	X	X
OData	X	X	X	X
Other	✓	✓	X	Microsoft Word Document Format (DOC/-DOCX)

**Table 21.12.:** Data & Schema Import/Export (SAMU Repository)

## Model Element Import/Export

Model Element	Import	Export
Classes	✓	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	✓	✓
Roles	✓	✓
Other	X	X

**Table 21.13.:** Model Element Import/Export (SAMU Repository)

## 21.6. Visualization Examples of SAMU Repository

Application / Application	AIEC	AIEC / CC	AIEC / IVR	AIEC / NETBANK	ARCHIVER	ARISTION	CaMS	CCBS	CIS	DWH	eMail system	EUA	FRONTEND	FX-RDA and some long text	G/L	GIS	RCBS	R-CRM	SAA	SCDB	SCORING	TMS
AIEC		CA_0006	CA_0007	CA_0008				CA_0016						CA_0018			CA_0017					
AIEC / CC	CA_0006																					
AIEC / IVR	CA_0007																					
AIEC / NETBANK	CA_0008																					
ARCHIVER								CA_0049				CA_0068					CA_0050					
ARISTION						CA_0031																
CaMS						CA_0031		CA_0037	CA_0035	CA_0056	CA_0057	CA_0040			CA_0019	CA_0039	CA_0036	CA_0038				
CCBS	CA_0016				CA_0049			CA_0037	CA_0035	CA_0056	CA_0057	CA_0041		CA_0029	CA_0020	CA_0047	CA_0027	CA_0001			CA_0002	
CIS								CA_0056	CA_0057													
DWH								CA_0040	CA_0041									CA_0042				
eMail system																						
EUA					CA_0068																	
FRONTEND								CA_0029														
FX-RDA and some long text	CA_0018						CA_0019	CA_0020										CA_0021				CA_0003
G/L								CA_0039	CA_0047													
GIS								CA_0027	CA_0047									CA_0028				
RCBS	CA_0017				CA_0050		CA_0036	CA_0038	CA_0001	CA_0042			CA_0030	CA_0021	CA_0048	CA_0028		CA_0046			CA_0003	CA_0004
R-CRM																		CA_0046			CA_0045	
SAA																						CA_0005
SCDB								CA_0002										CA_0003	CA_0045			
SCORING																		CA_0004			CA_0005	
TMS														CA_0025					CA_0024			

Figure 21.1.: Matrix of the SAMU Repository

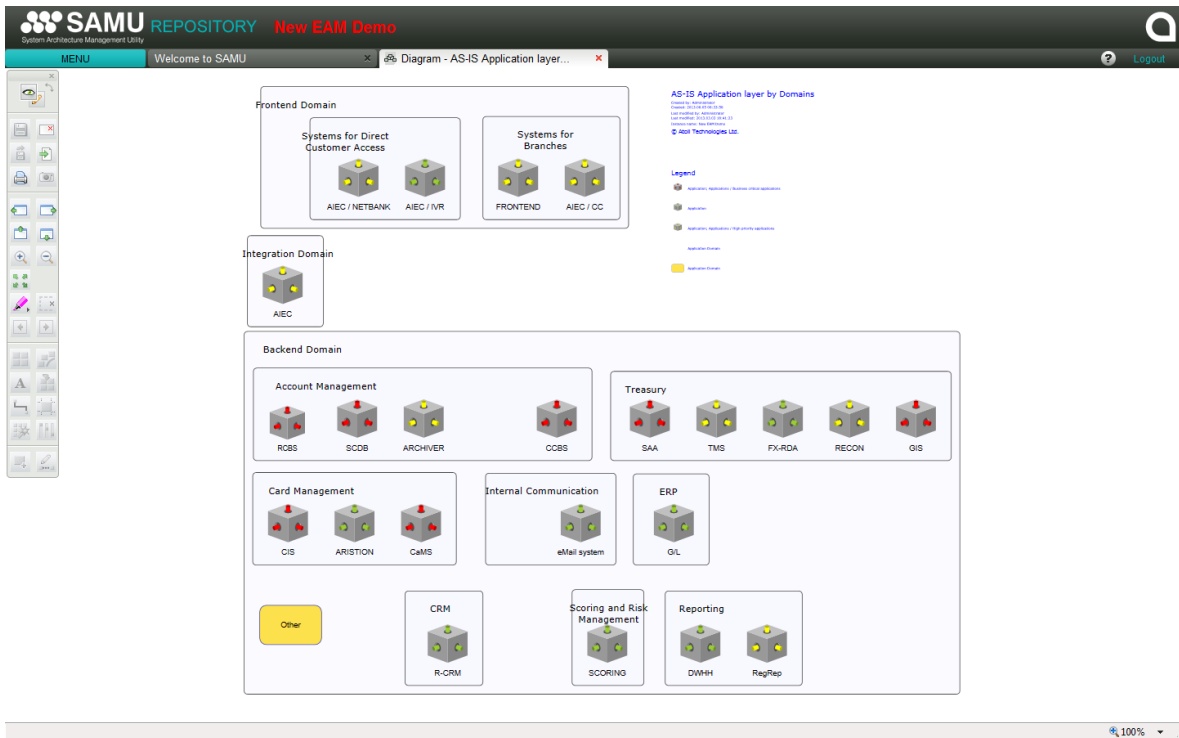


Figure 21.2.: Cluster Map of the SAMU Repository

## 21. SAMU Repository (Atoll Technologies Ltd)

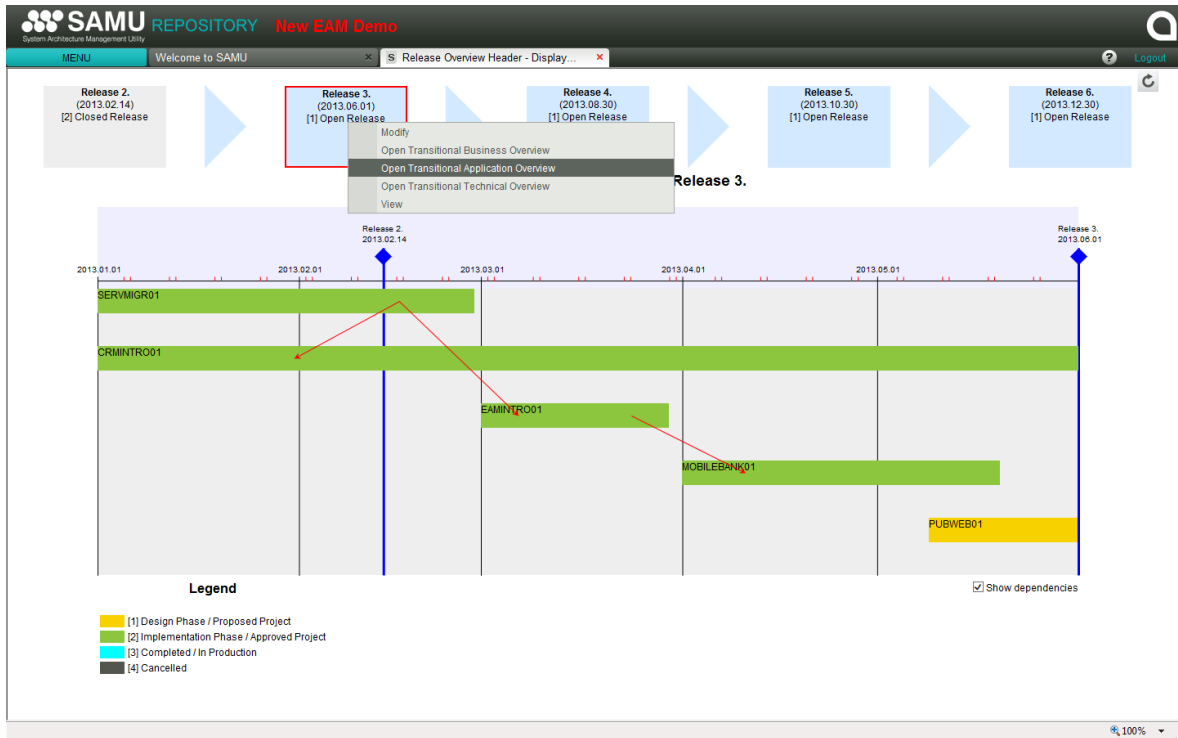


Figure 21.3.: Timeline of the SAMU Repository

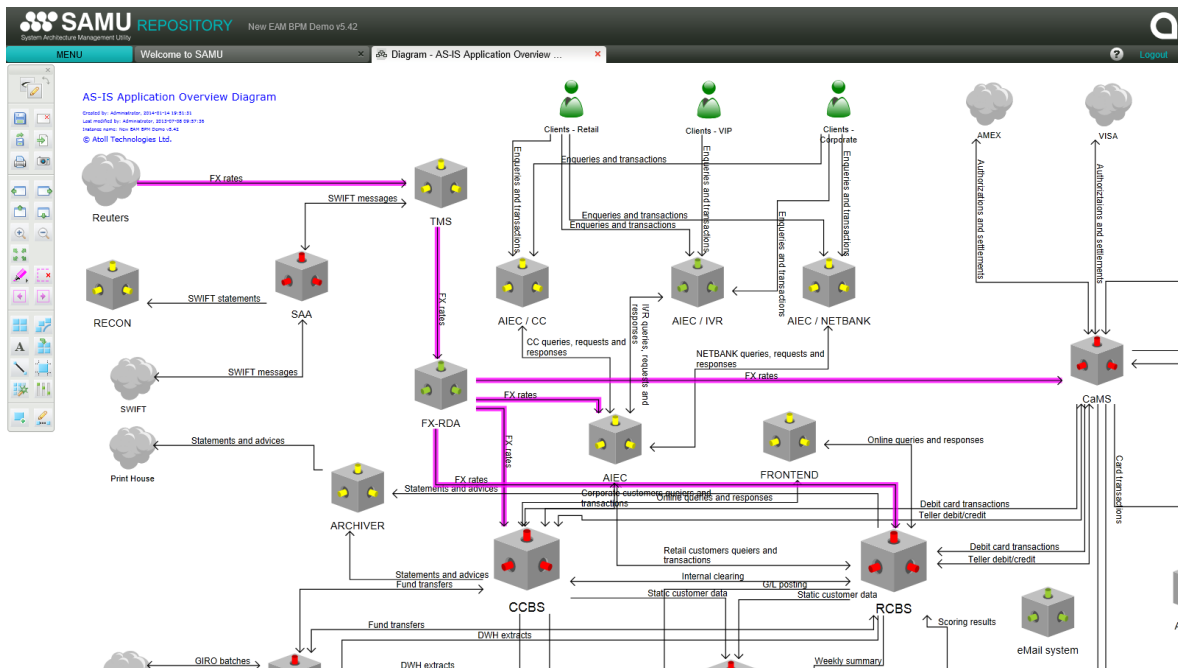


Figure 21.4.: Flow Diagram of the SAMU Repository

SAMU  
Repository

## 21. SAMU Repository (Atoll Technologies Ltd)

The screenshot displays the SAMU Repository interface. On the left, there is a navigation menu with categories like 'By selection' and 'By object type'. The main area shows a table of 29 applications. The table columns are: #, Short name, Name, Business priority, To be modified by, Version, and Transaction number. The applications listed include various banking systems such as AIEC, ARISTION, and CRM systems.

#	Short name	Name	Business priority	To be modified by	Version	Transaction number
1	AIEC	Advanced Integrated Electronic Channels Platform	[2] High	MOBILEBANK01; New Netba 4.16R2		60000/day
2	AIEC / CC	AIEC - Call Center	[2] High		18.2 alpha	N/A
3	AIEC / IVR	AIEC - Immediate Voice Response	[3] Medium		18.2 alpha	N/A
4	AIEC / NETBANK	AIEC - Internet Bank Application	[2] High		18.2 alpha	N/A
5	ARCHIVER	New Generation Archive Management System	[2] High		3.2.14R2	N/A
6	ARISTION	ARISTION Card Fraud Detection System	[4] Low		2.11	45.000/day
7	CaMS	Card Management System	[1] Business critical	CRMINTRO01; CRM System 2.3 build 0005		23.000/day
8	CCBS	Corporate Core Banking System	[1] Business critical	CRMINTRO01; CRM System 5.2.789		175.000/day
9	C-CRM	Central-CRM	[1] Business critical		12.03	
10	CIS	Card Issuing System	[1] Business critical		11.2	750 issued card/day
11	DWH	Controlling Datawarehouse	[3] Medium	CRMINTRO01; CRM System 4.21		147.000/day
12	eMail system	Email system	[3] Medium	INTRANET03; Intranet portal 2008 R1		
13	EUA	Enterprise User Administration	[3] Medium		4.08	N/A
14	FRONTEND	Ez lesz az új név.	[2] High	CRMINTRO01; CRM System 11.2.5b		45.000/day
15	FX-RDA	FX Rate Distribution Application	[4] Low		18.2c	N/A
16	GIL	General Ledger	[3] Medium		11.2 SP6	287.000/day
17	GIS	GIRO Interface System	[1] Business critical		2.3.12 patch 2	13.000/day
18	Intranet portal	Intranet portal	[3] Medium		1.0	
19	Leasing	Leasing system	[1] Business critical		10.1	
20	MOBILE BANK	Mobile Banking Frontend	[1] Business critical		1.0	
21	Public Website	The Bank's Public Website	[1] Business critical		1.0	200.000 hits/day
22	RCBS	Retail Core Banking System	[1] Business critical	CRMINTRO01; CRM System 12.1.9rev4		198.000/day
23	R-CRM	Retail CRM	[3] Medium		R2 2005.08.16p12	N/A
24	RECON	Nostro Reconciliation System	[2] High		16.3.4.2 build 12	500/day
25	RegRep	Regulatory Reporting System	[2] High		1.0	10000
26	SAA	SWIFT Alliance Application	[1] Business critical		5.3.3ST4000	250/day
27	SCDB	Shared Customer Database	[1] Business critical	LEASINGINT001; Implement 11.2.6.12 build 4065		14000/day

Figure 21.5.: List of the SAMU Repository

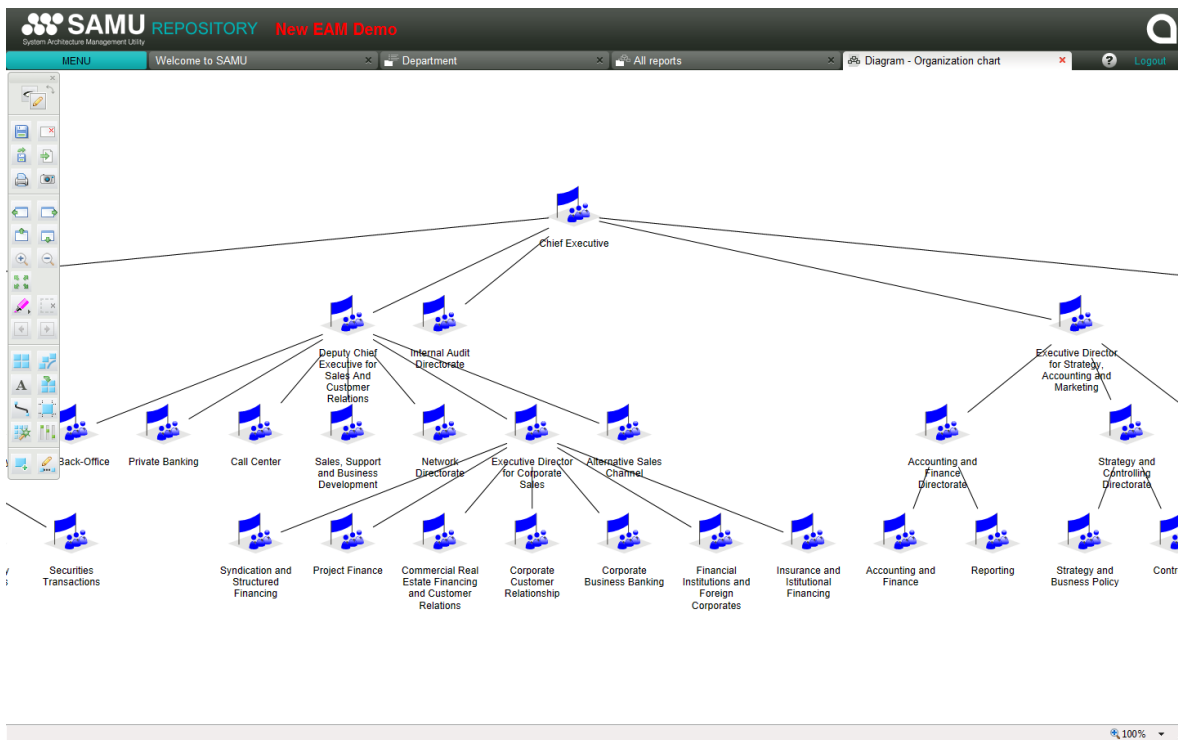


Figure 21.6.: Graph of the SAMU Repository

## 21. SAMU Repository (Atoll Technologies Ltd)

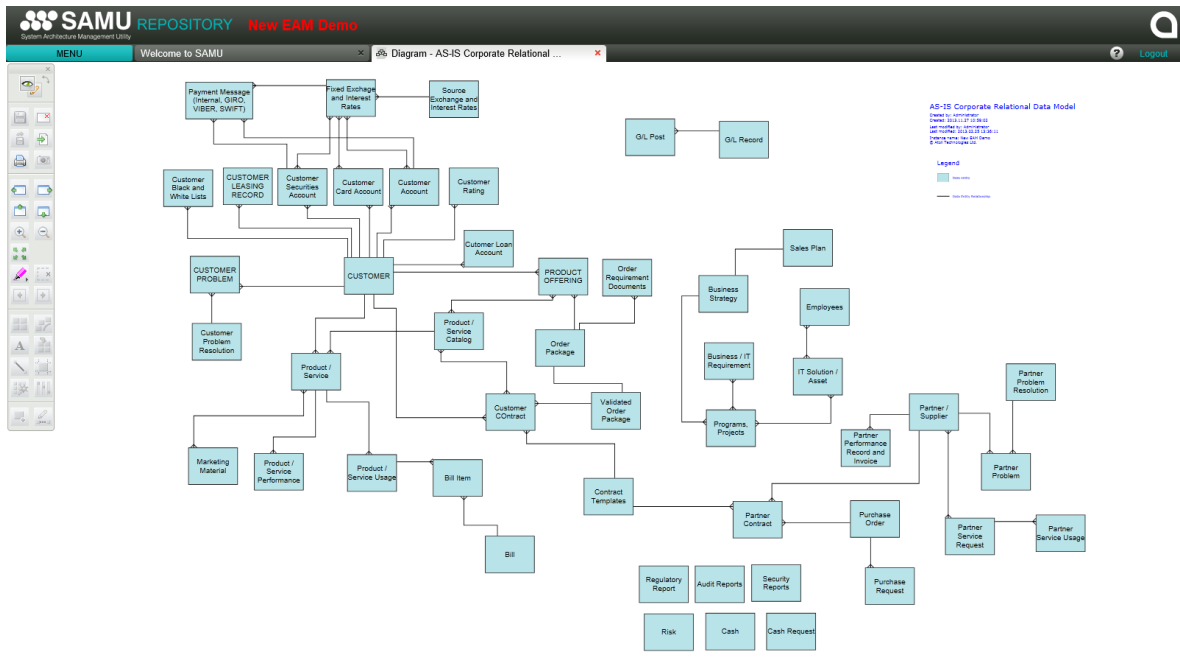


Figure 21.7.: ER Diagram of the SAMU Repository

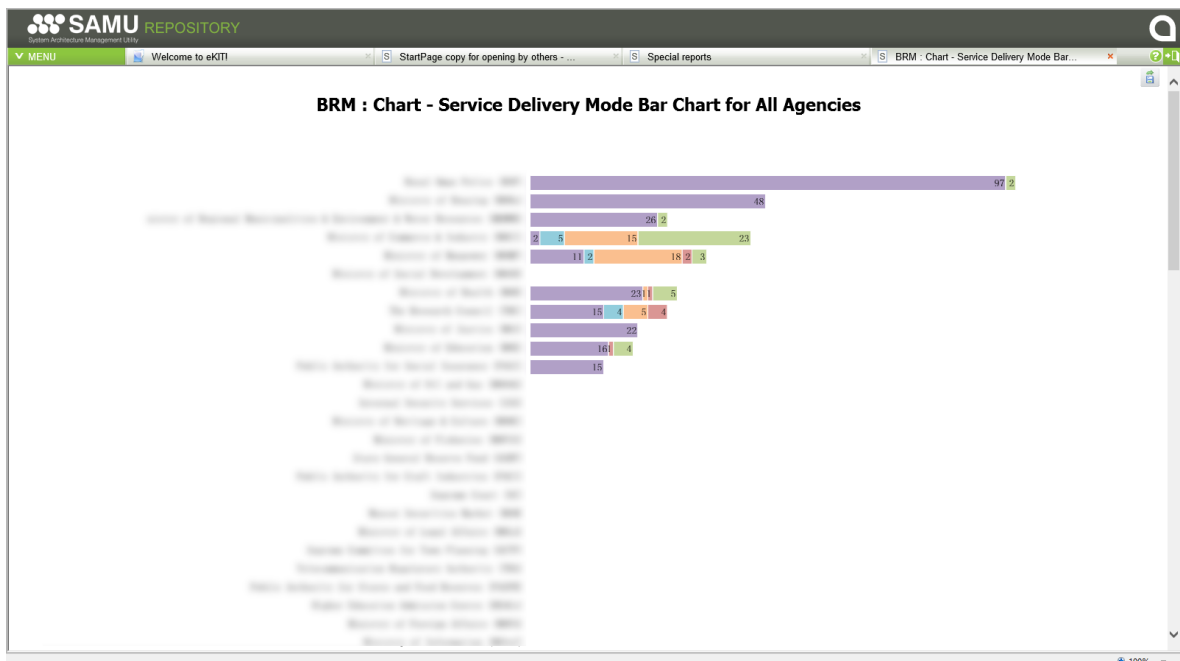


Figure 21.8.: Bar Chart of the SAMU Repository



## 21. SAMU Repository (Atoll Technologies Ltd)

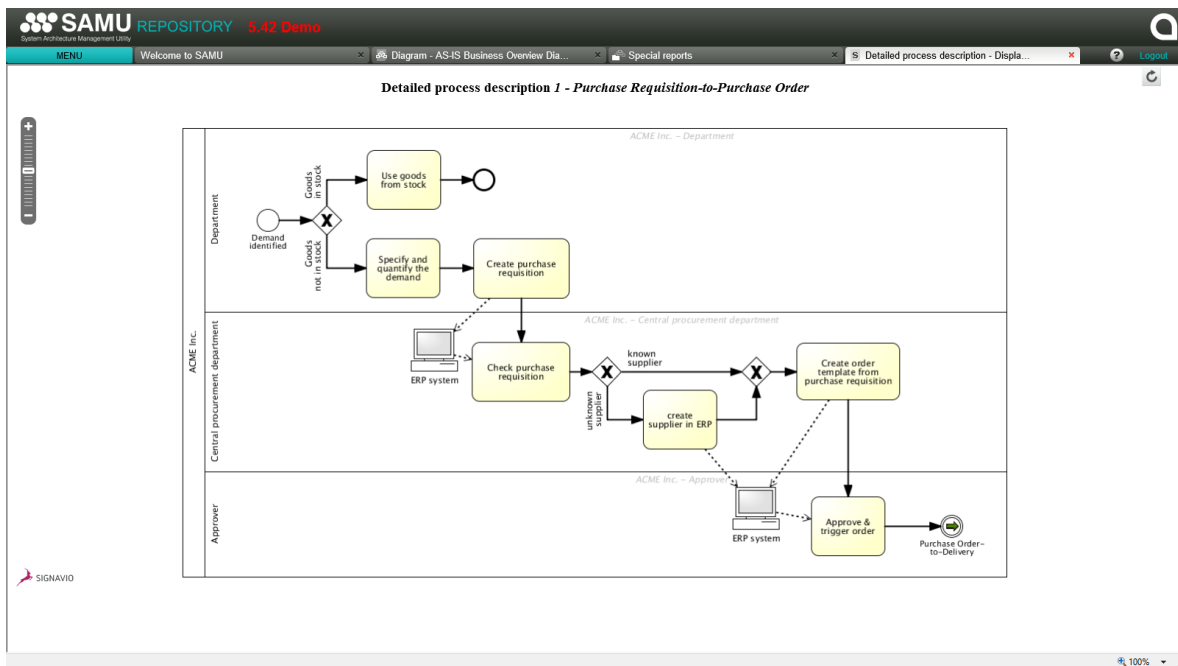


Figure 21.9.: BPMN Diagram of the SAMU Repository

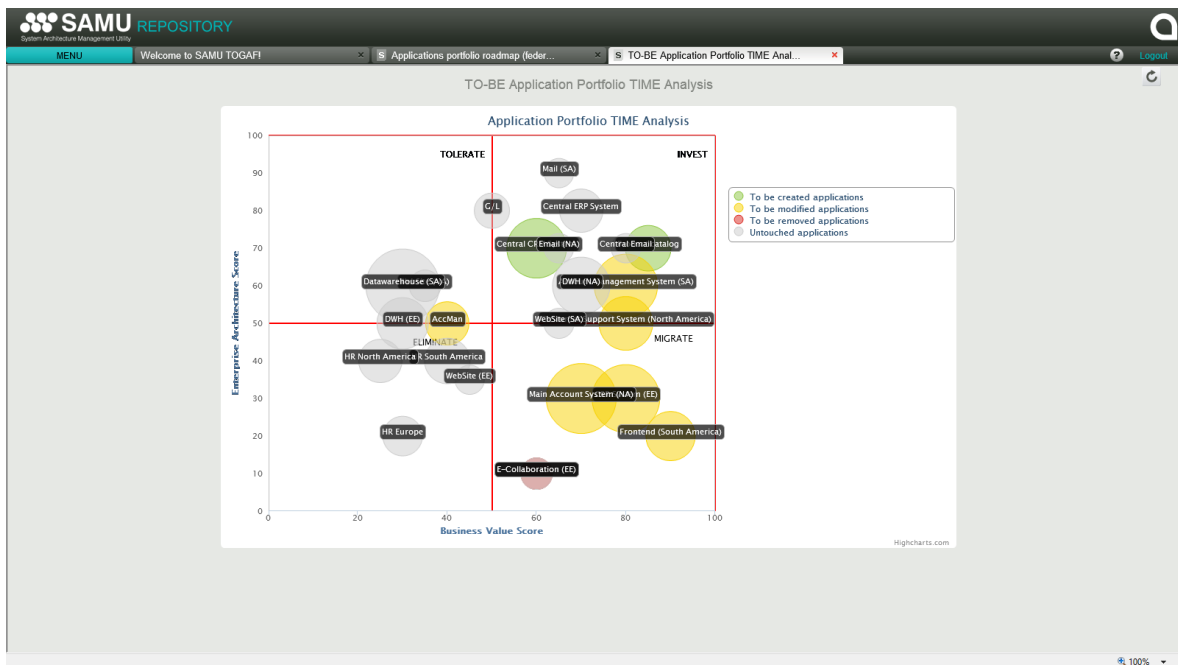


Figure 21.10.: Bubble Chart of the SAMU Repository

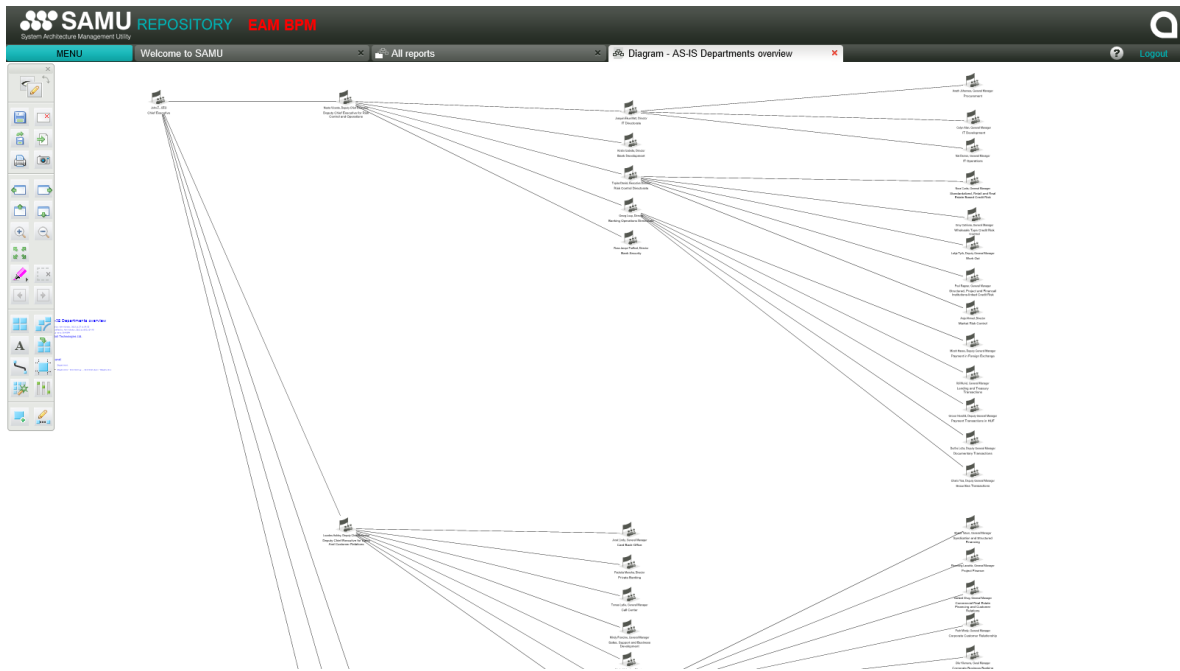


Figure 21.11.: Treeview of the SAMU Repository

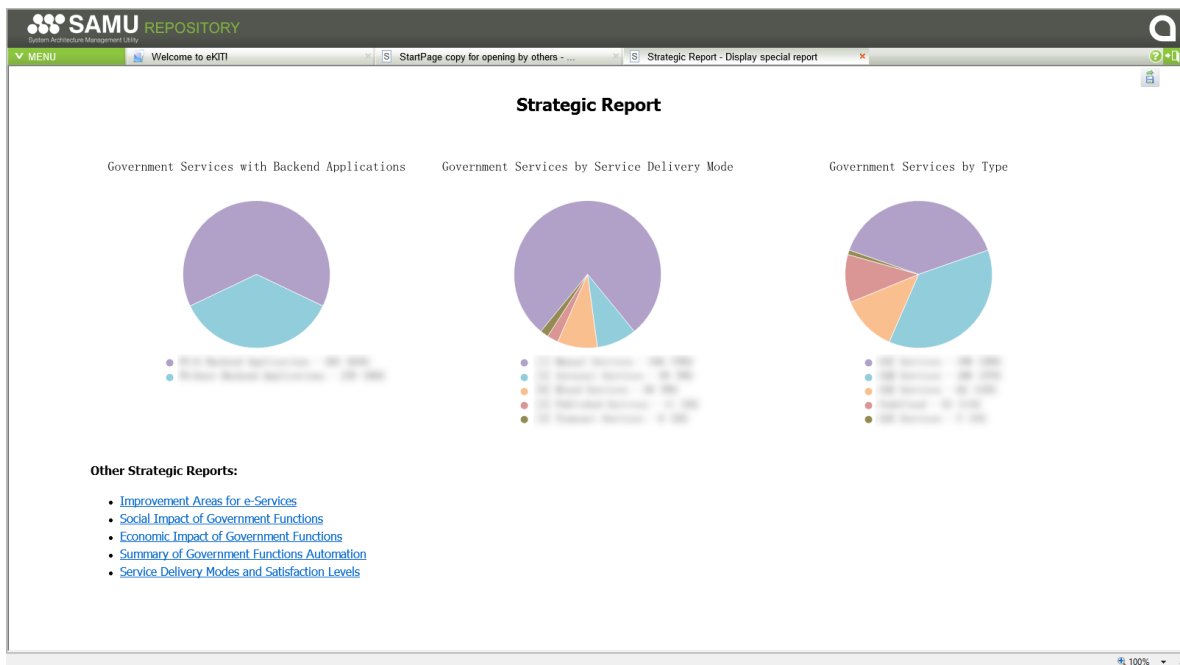


Figure 21.12.: Pie Chart of the SAMU Repository

## 21. SAMU Repository (Atoll Technologies Ltd)

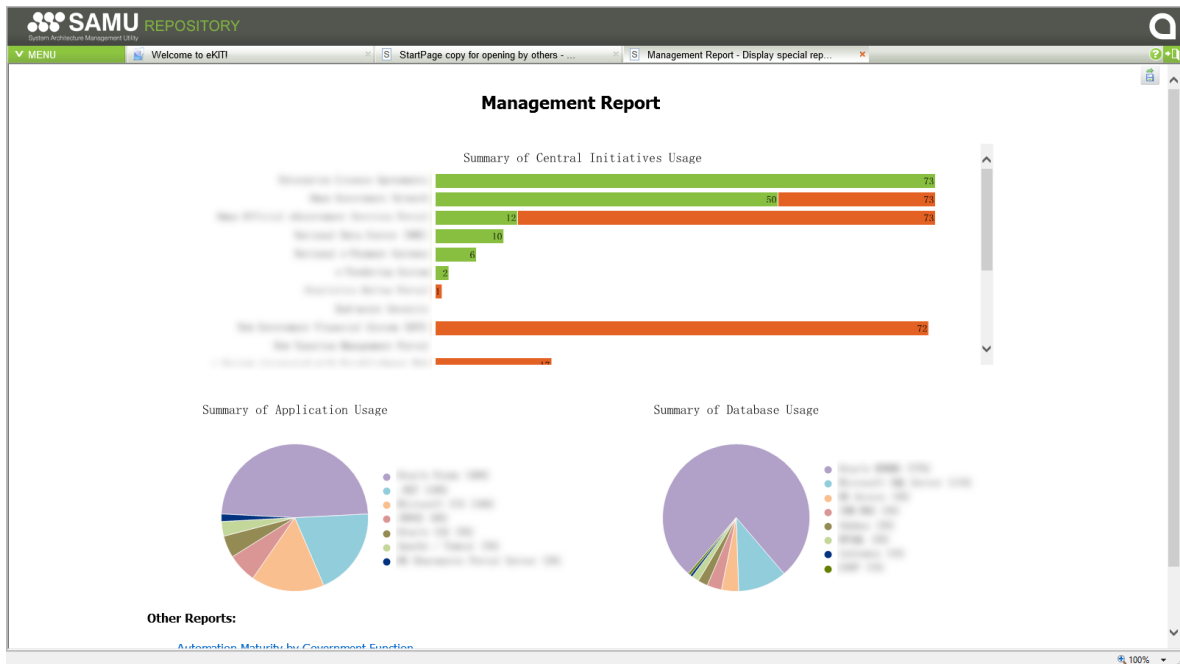


Figure 21.13.: Dashboard of the SAMU Repository

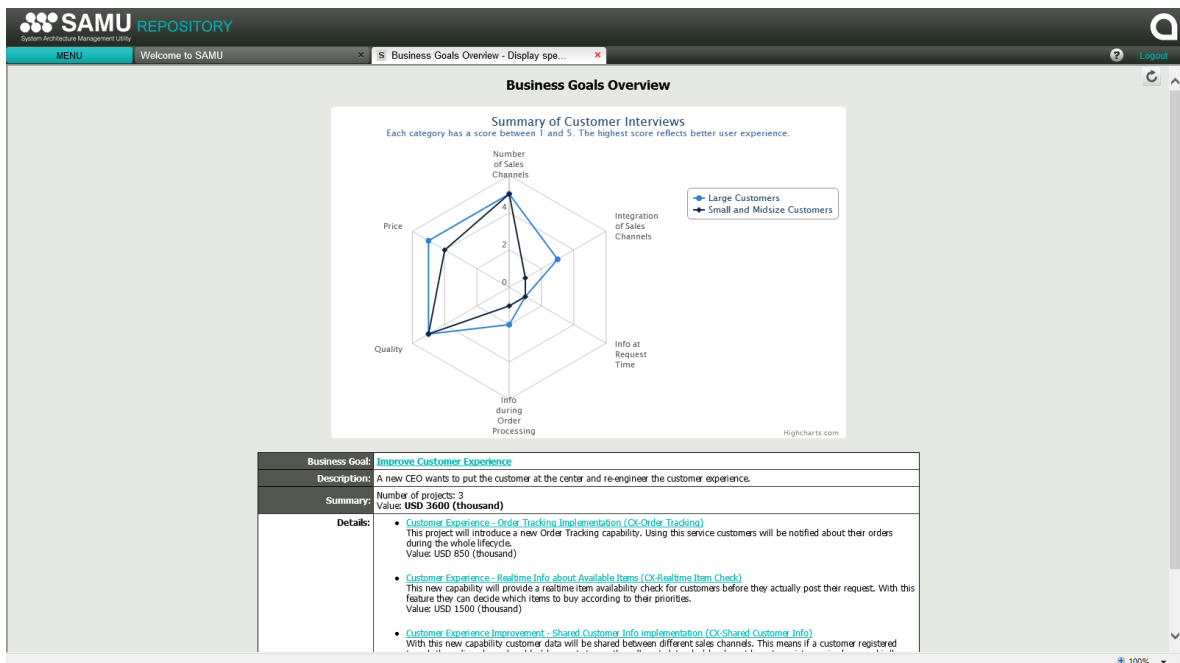


Figure 21.14.: Radar Diagram of the SAMU Repository

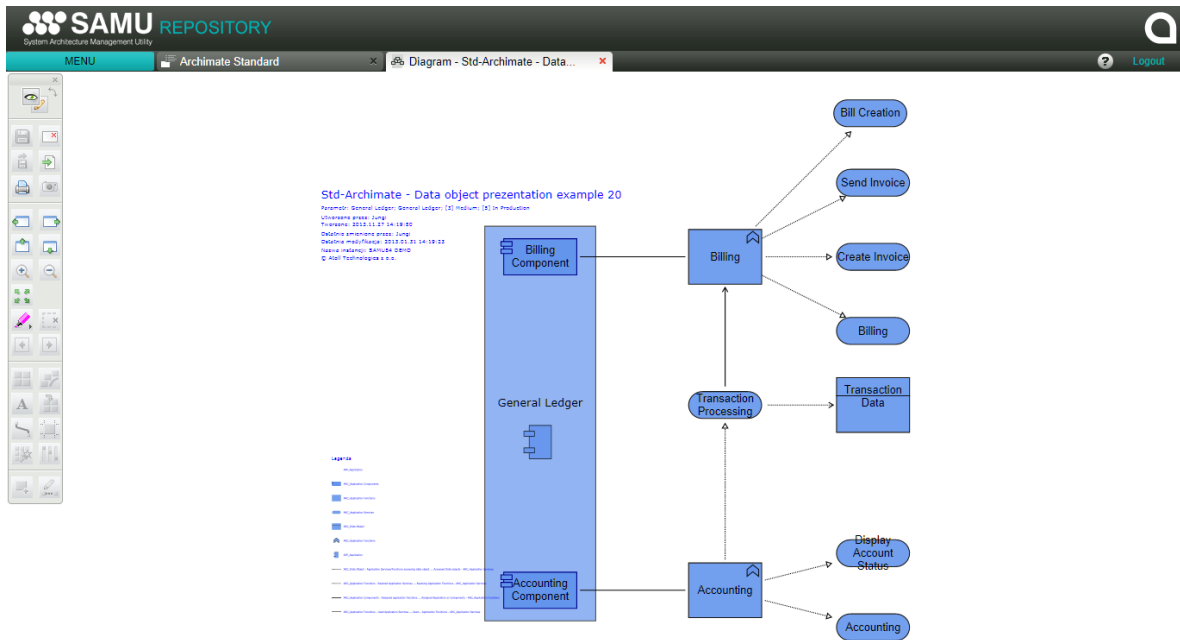


Figure 21.15.: ArchiMate Diagram of the SAMU Repository

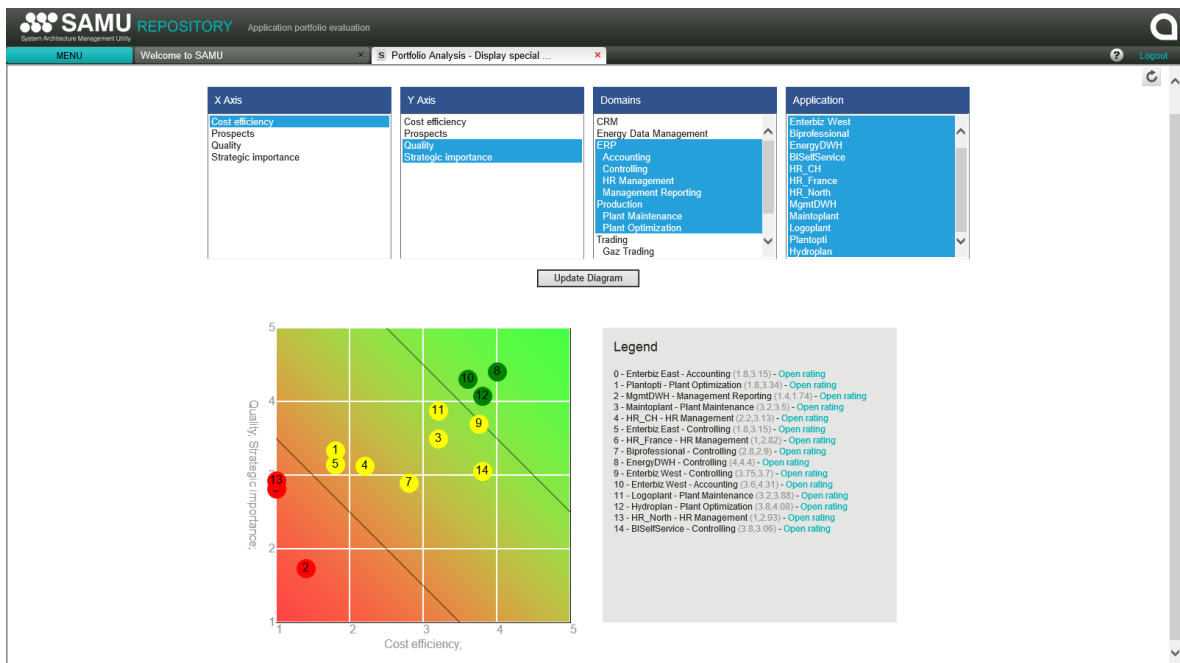


Figure 21.16.: Scatter Chart of the SAMU Repository

## 21. SAMU Repository (Atoll Technologies Ltd)

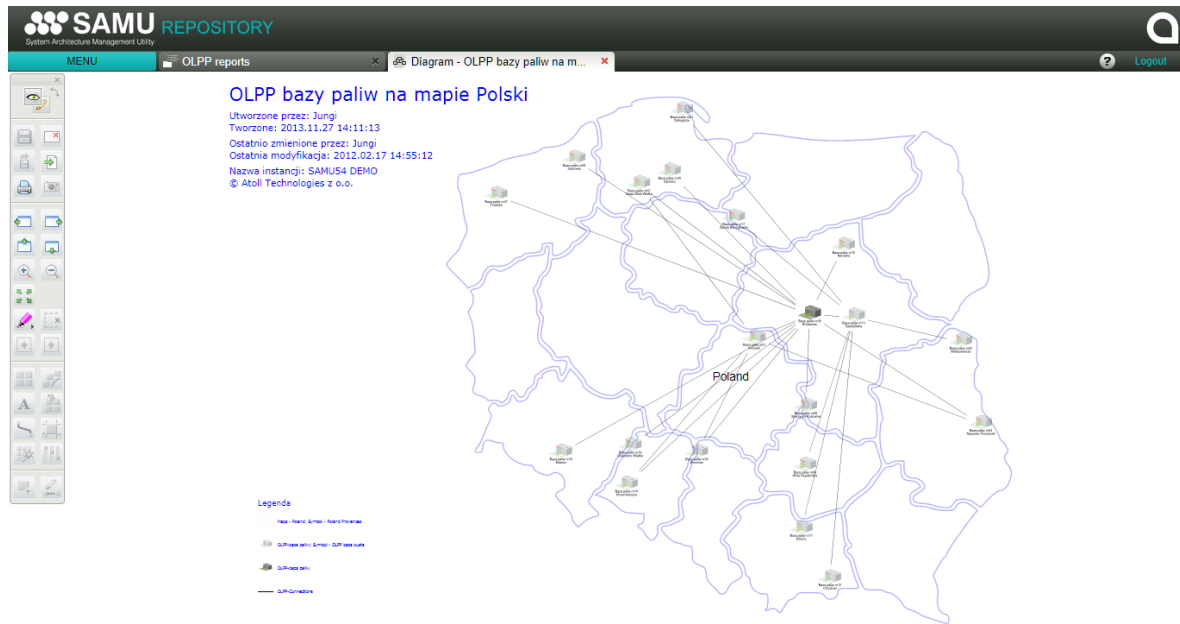


Figure 21.17.: Geographic Map of the SAMU Repository

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infoAsset AG was founded in 2000 and has more than 2 years of experience in the EA domain. The company is vendor of Tricia which is offered in version 3.9 at the editorial deadline. Tricia supports 9 out of 26 visualization types. infoAsset AG presents a lightweight approach to an EA tool. Tricia features strong collaboration capabilities. That includes easy to use access management and end-user-ready meta-modeling facilities. As an university spin-off, their approach is described in a dissertation [Ne12]. In [HMR<sup>+</sup>12], Hauder et al. present the idea to match an offer and demand model structurally. This has been implemented and the tool integrates visualization types in a loosely coupled manner. Tricia provides a wizard (cf. [RHZ<sup>+</sup>13]) to configure visualizations that display arbitrary concepts of an EA information model.

## 22.1. Background Information

Vendor	infoAsset AG
Founding year	2000
Years active in EA market	2
Number of employees	5-10
URL	www.infoasset.de

**Table 22.1.:** Vendor Information of infoAsset AG

Tool Name	Tricia	
Version	3.9	
Client Platforms	✓ Windows ✗ MacOS ✗ iOS ✗ Windows Mobile	✗ Linux ✓ Browser ✗ Android ✗ Other
Deployment Approach	✓ Desktop ✓ Server	✓ SaaS ✗ Other
EA Frameworks	✗ ArchiMate ✗ DoDAF ✗ IAF ✗ MODAF ✓ Other	✗ NAF ✗ PEAf ✗ TOGAF ✗ Zachman

**Table 22.2.:** General Information (Tricia)



## 22.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	X	X
DOC(X)	X	X
HTML	X	X
JPG/JPEG	X	✓
PDF	X	✓
PNG	X	✓
PPT(X)	X	X
SVG	X	✓
VSD(X)	X	X
Other	X	X

**Table 22.3.:** Visualization Import/Export File Formats (Tricia)

## 22.3. Visualization Configuration

### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✓
Data Filter	✓
Other	X

**Table 22.4.:** Binding (Tricia)



### Generation Approach

Model-Driven	✓
Form-Based	✓
Scripting	✓
Manual Drawing	✗
Other	✗

**Table 22.5.:** Visualization Generation Approach (Tricia)

### Visual Customization and Layouting

Customization	Caption	✓
	Color	✓
	Orientation	✓
	Position	✗
	Shape	✓
	Size	✓
	Other	✗
Layout	Automated	✓
	Manual	✗
	Other	✗

**Table 22.6.:** Visual Customization (Tricia)

## Import/Export of Visualization Configurations

Format	Import	Export
CSV	X	X
JSON	X	X
ODBC	X	X
XMI	X	X
XML	X	X
XLS(X)	X	X
TXT	X	X
Other	X	✓

**Table 22.7.:** Configuration Import/Export (Tricia)

## 22.4. Information Model

### Information Model Type

Full Schema	✓
Configurable Building Blocks	X
User-defined	✓
Subclassing/class inheritance	X

**Table 22.8.:** Information Model Type (Tricia)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓	✓	✓	✓	✓	✓
Modify	✓	✓	✓	✓	✓	✓
Delete	✓	✓	✓	✓	✓	✓
Copy	✓	X	X	X	X	✓
Merge	X	X	X	X	X	X
Move	X	X	X	X	X	X

**Table 22.9.:** Information Model Flexibility (Tricia)

## 22.5. Interoperability

### Import Mechanisms

Pull	✓
Push	✓
Other	✓

**Table 22.10.:** Import Mechanisms (Tricia)

### Third Party Tools

Business Intelligence Tools	✓
Business Process Engines	✓
Change Management Tools	✓
Cloud Services	✓
Configuration Management Database	✓
Enterprise Service Bus	✓
Infrastructure Monitoring Tools	✓
License/IT Asset Management Tools	✓
Project Portfolio Management Tools	✓
Release Management Tools	✓
Other	✓

**Table 22.11.:** Interoperability with Third Party Tools (Tricia)

## Data & Schema Import/Export

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	X	X	X	X
JSON	X	✓	X	X
TXT	X	X	X	X
XMI	✓	X	✓	✓
XML	X	X	✓	✓
XLS(X)	✓	✓	✓	X
OData	X	X	✓	X
Other	✓	✓	✓	✓

Table 22.12.: Data & Schema Import/Export (Tricia)

## Model Element Import/Export

Model Element	Import	Export
Classes	✓	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	✓	✓
Roles	X	X
Other	X	X

Table 22.13.: Model Element Import/Export (Tricia)

## 22.6. Visualization Examples of Tricia



Figure 22.1.: Matrix of Tricia

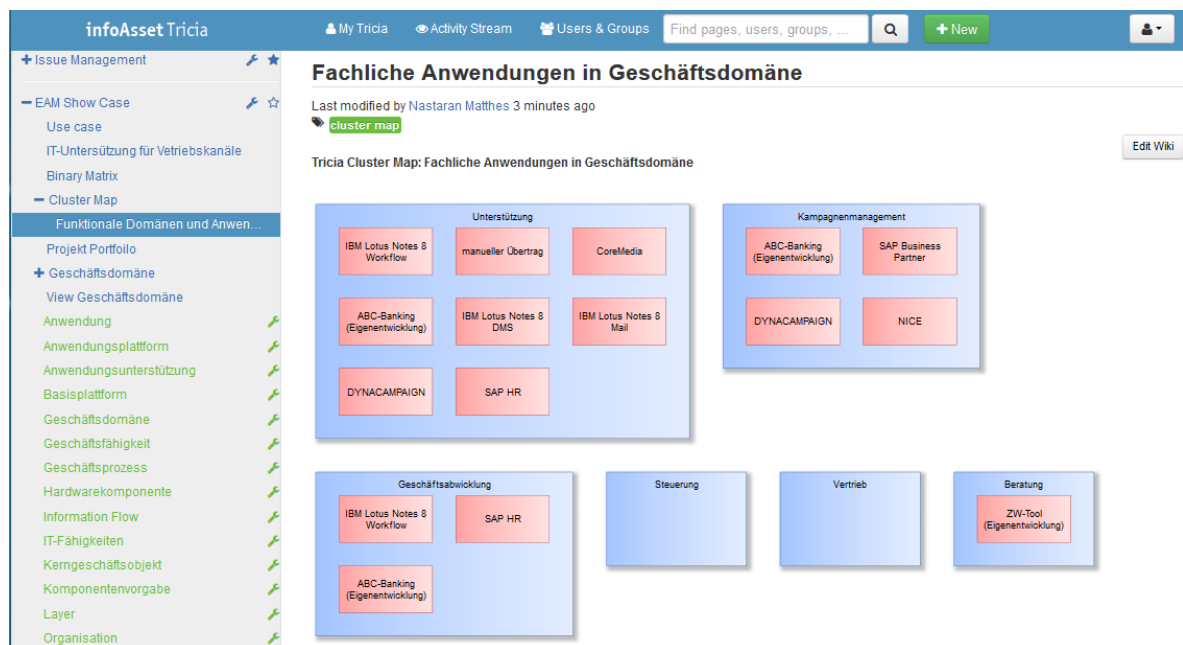


Figure 22.2.: Cluster Map of Tricia

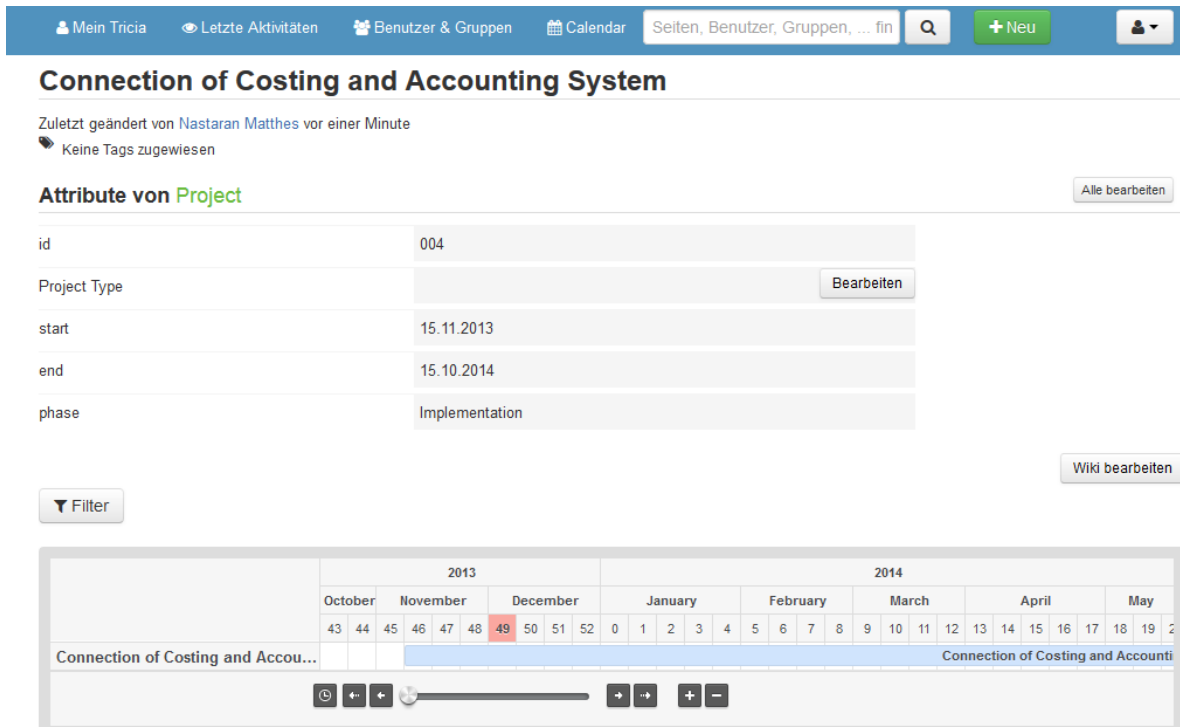


Figure 22.3.: Timeline of Tricia

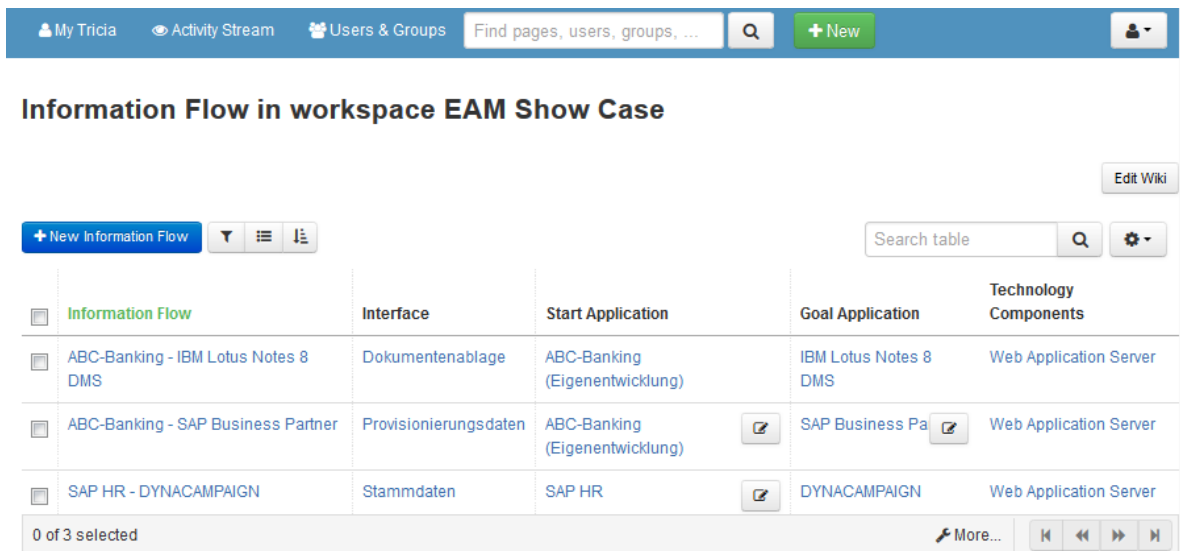


Figure 22.4.: List of Tricia

## 22. Tricia (infoAsset AG)

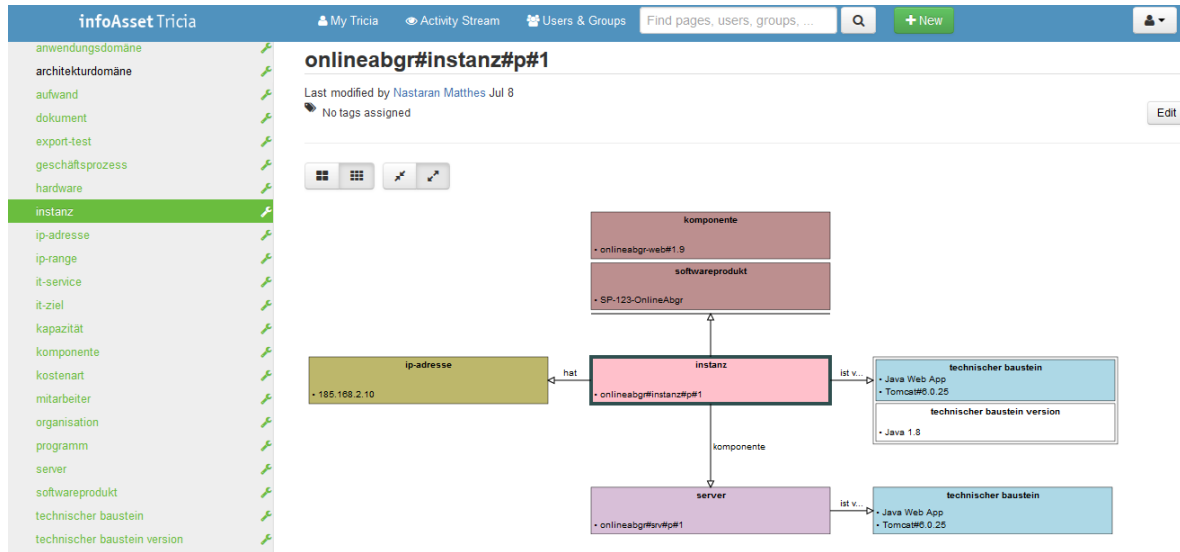


Figure 22.5.: Graph of Tricia

### Method 1 Overview

Last modified by Admin Matheis Apr 11, 2013

No tags assigned

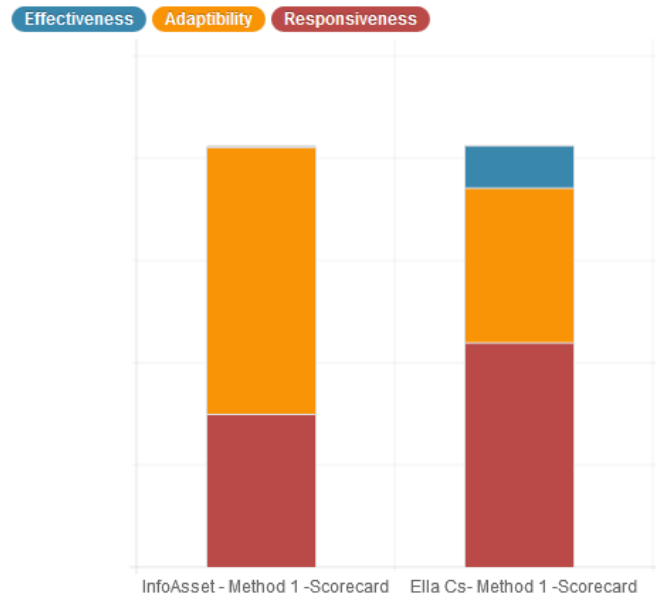


Figure 22.6.: Bar Chart of Tricia

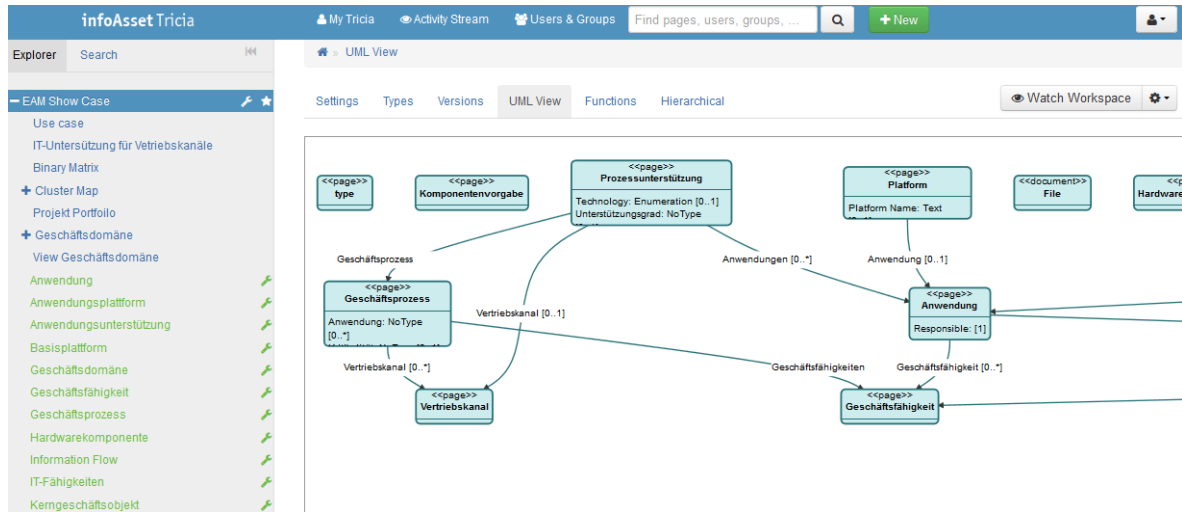


Figure 22.7.: UML Diagram of Tricia

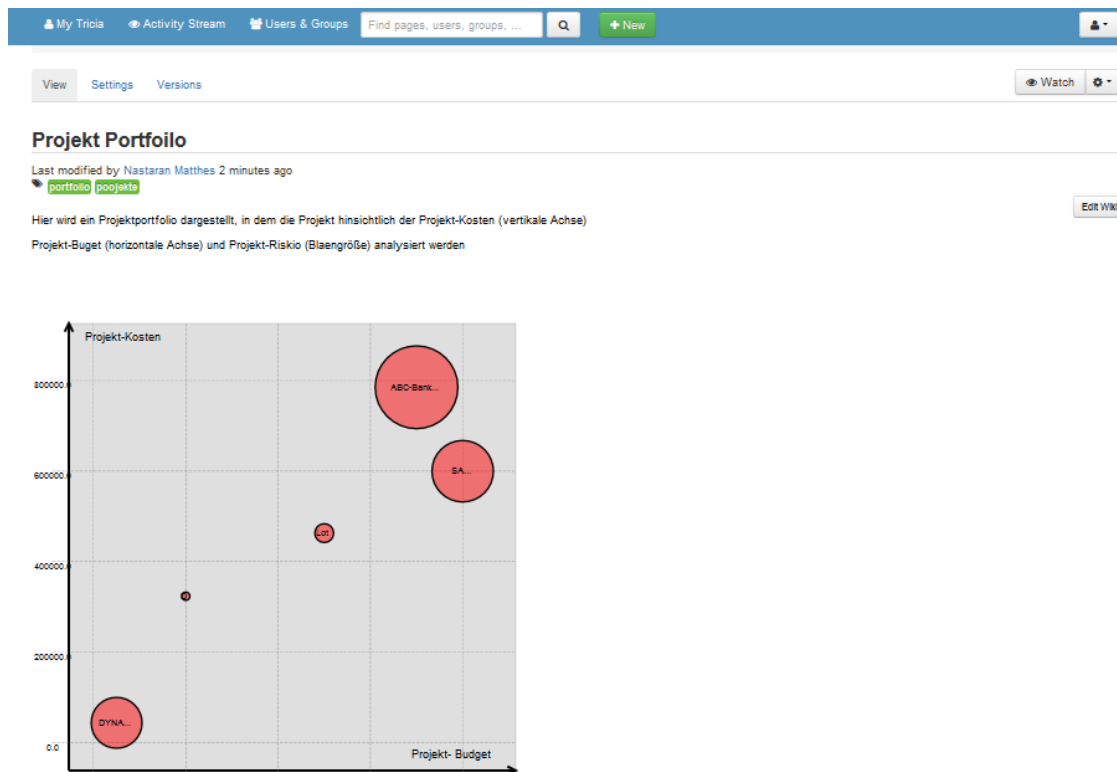
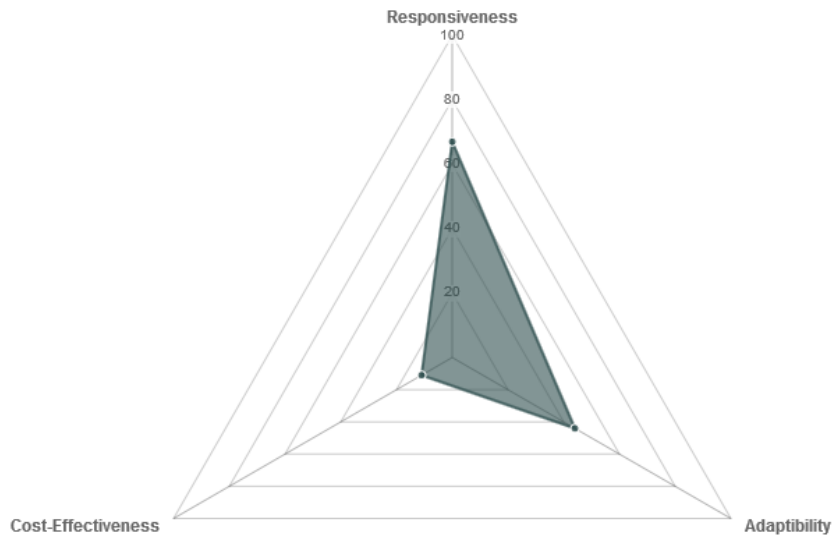
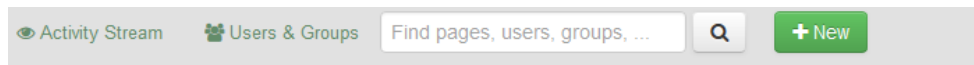


Figure 22.8.: Bubble Chart of Tricia



## 22. Tricia (infoAsset AG)

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**Figure 22.9.:** Radar Diagram of Tricia

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QELab was founded in 2011 and has more than 1 years of experience in the EA domain. The company is vendor of Txture which is offered in version 1 at the editorial deadline. Txture supports 3 out of 26 visualization types. Txture is a true niche player in the EA tool market. It offers an easy to grasp way to describe the EA in a textual manner. This in particular opens potential for an automated EA documentation. As a spin of from University of Innsbruck, the tool and a related case study are also described in a scholar article [FTB<sup>+</sup>13]. As of today, the tool is based on the Eclipse platform and available as a plugin. Besides this fat-client version, the tool features a web viewer to define dynamic queries using a powerful wizard. QELab reports that the current version is changed in order to support textual and web-based modeling simultaneously.

### 23.1. Background Information

Vendor	QELab
Founding year	2011
Years active in EA market	1
Number of employees	1–10
URL	www.txture.org

**Table 23.1.:** Vendor Information of QELab

Tool Name	Txture	
Version	1	
Client Platforms	✗ Windows	✗ Linux
	✗ MacOS	✓ Browser
	✗ iOS	✗ Android
	✗ Windows Mobile	✓ Other
Deployment Approach	✓ Desktop	✗ SaaS
	✓ Server	✗ Other
EA Frameworks	✗ ArchiMate	✗ NAF
	✗ DoDAF	✗ PEAf
	✗ IAF	✗ TOGAF
	✗ MODAF	✗ Zachman
	✗ Other	

**Table 23.2.:** General Information (Txture)

## 23.2. Visualization Capabilities

### Visualization Import/Export File Formats

Format	Import	Export
BMP	X	X
DOC(X)	X	X
HTML	X	X
JPG/JPEG	X	X
PDF	X	X
PNG	X	X
PPT(X)	X	X
SVG	X	X
VSD(X)	X	X
Other	X	X

**Table 23.3.:** Visualization Import/Export File Formats (Txture)

## 23.3. Visualization Configuration

### Binding

Loose coupling between model elements and visualizations	✓
Schema Bindings	✓
Data Filter	X
Other	X

**Table 23.4.:** Binding (Txture)

### Generation Approach

Model-Driven	X
Form-Based	X
Scripting	✓
Manual Drawing	X
Other	✓

**Table 23.5.:** Visualization Generation Approach (Txture)

### Visual Customization and Layouting

Customization	Caption	X
	Color	X
	Orientation	X
	Position	✓
	Shape	✓
	Size	X
	Other	✓
Layout	Automated	✓
	Manual	✓
	Other	✓

**Table 23.6.:** Visual Customization (Txture)

## Import/Export of Visualization Configurations

Format	Import	Export
CSV	X	X
JSON	✓	X
ODBC	X	X
XMI	X	X
XML	X	X
XLS(X)	X	X
TXT	X	X
Other	X	✓

**Table 23.7.:** Configuration Import/Export (Txture)

## 23.4. Information Model

### Information Model Type

Full Schema	X
Configurable Building Blocks	X
User-defined	✓
Subclassing/class inheritance	✓

**Table 23.8.:** Information Model Type (Txture)

Operation	Model element					
	Classes	Attributes	Relationships	Cardinality Constraints	Type Constraints	Access Rights
Create	✓	✓	✓	✓	✓	X
Modify	✓	✓	✓	✓	✓	X
Delete	✓	✓	✓	✓	✓	X
Copy	✓	✓	✓	✓	X	X
Merge	X	X	X	X	X	X
Move	X	X	X	X	X	X

**Table 23.9.:** Information Model Flexibility (Txture)

## 23.5. Interoperability

### Import Mechanisms

Pull	X
Push	X
Other	✓

**Table 23.10.:** Import Mechanisms (Txture)

### Third Party Tools

Business Intelligence Tools	X
Business Process Engines	X
Change Management Tools	X
Cloud Services	X
Configuration Management Database	X
Enterprise Service Bus	X
Infrastructure Monitoring Tools	X
License/IT Asset Management Tools	X
Project Portfolio Management Tools	X
Release Management Tools	X
Other	✓

**Table 23.11.:** Interoperability with Third Party Tools (Txture)

## Data & Schema Import/Export

Format	Import (Data)	Export (Data)	Import (Schema)	Export (Schema)
CSV	X	X	X	X
JSON	X	X	X	X
TXT	X	✓	X	X
XMI	X	X	X	X
XML	X	X	X	X
XLS(X)	X	X	X	X
OData	X	X	X	X
Other	✓	X	✓	✓

**Table 23.12.:** Data & Schema Import/Export (Txture)

## Model Element Import/Export

Model Element	Import	Export
Classes	✓	✓
Objects	✓	✓
Relationships	✓	✓
Attribute Definitions	✓	✓
Attribute Values	✓	✓
Access Rights	X	X
Roles	X	X
Other	X	X

**Table 23.13.:** Model Element Import/Export (Txture)



## 23.6. Visualization Examples of Txture

Name	Type	Description	Attributes
"EuefsPersistenceLayer"	DeployableArtifact	dummy description	type: DeployableArtifactType#EAR
"FaitWebServiceLayer"	DeployableArtifact	dummy description	type: DeployableArtifactType#EAR
"GeosServiceLayerEAR"	DeployableArtifact	dummy description	type: DeployableArtifactType#EAR
"HappyInvestEAR"	DeployableArtifact	dummy description	type: DeployableArtifactType#EAR
"HappyInvestIntranetEAR"	DeployableArtifact	dummy description	type: DeployableArtifactType#EAR
"HappyTInternet"	DeployableArtifact	dummy description	type: DeployableArtifactType#EAR
"Helpmanager"	DeployableArtifact	dummy description	type: DeployableArtifactType#EAR
"ibmasyncrsp"	DeployableArtifact	dummy description	type: DeployableArtifactType#EAR
"ILOG JRules-SSP RTS"	LogicalSoftwareComponent	dummy description	none
"ILOG JRulesManagementConsole RTS"	LogicalSoftwareComponent	dummy description	none

Showing 21 to 30 of 1,188 entries

Implementierung: Matthias Farwick, Thomas Trojer - QELaB Business Services GmbH

Figure 23.1.: List of Txture

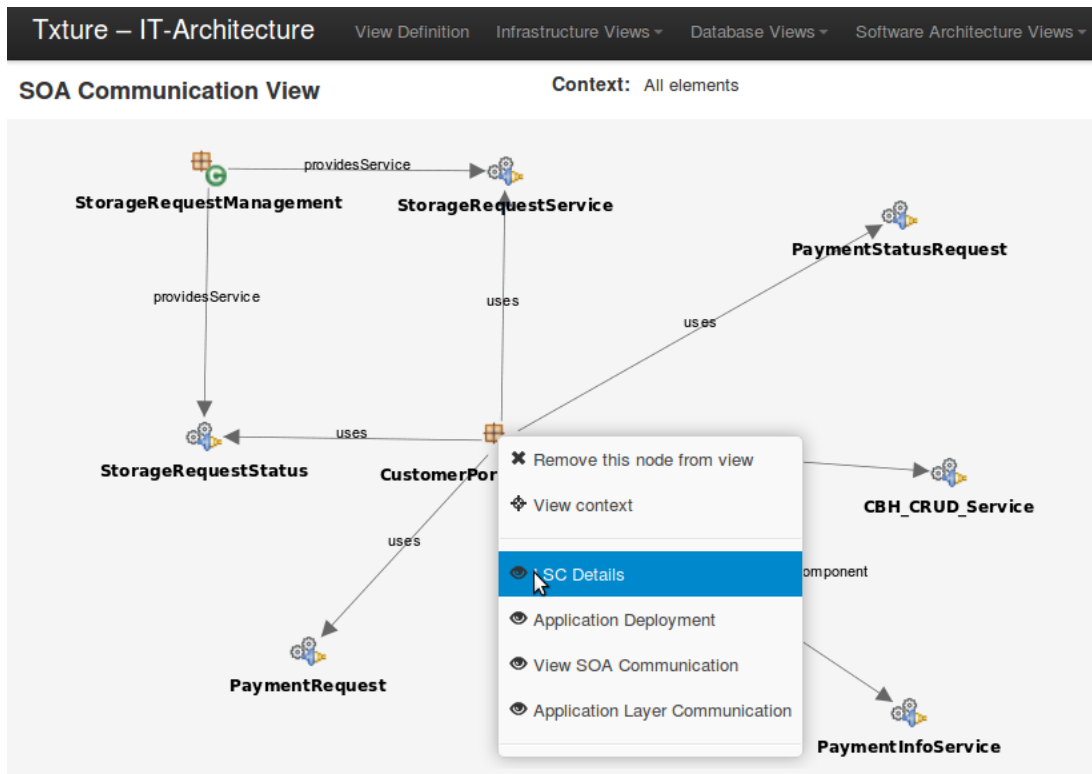


Figure 23.2.: Graph of Txture

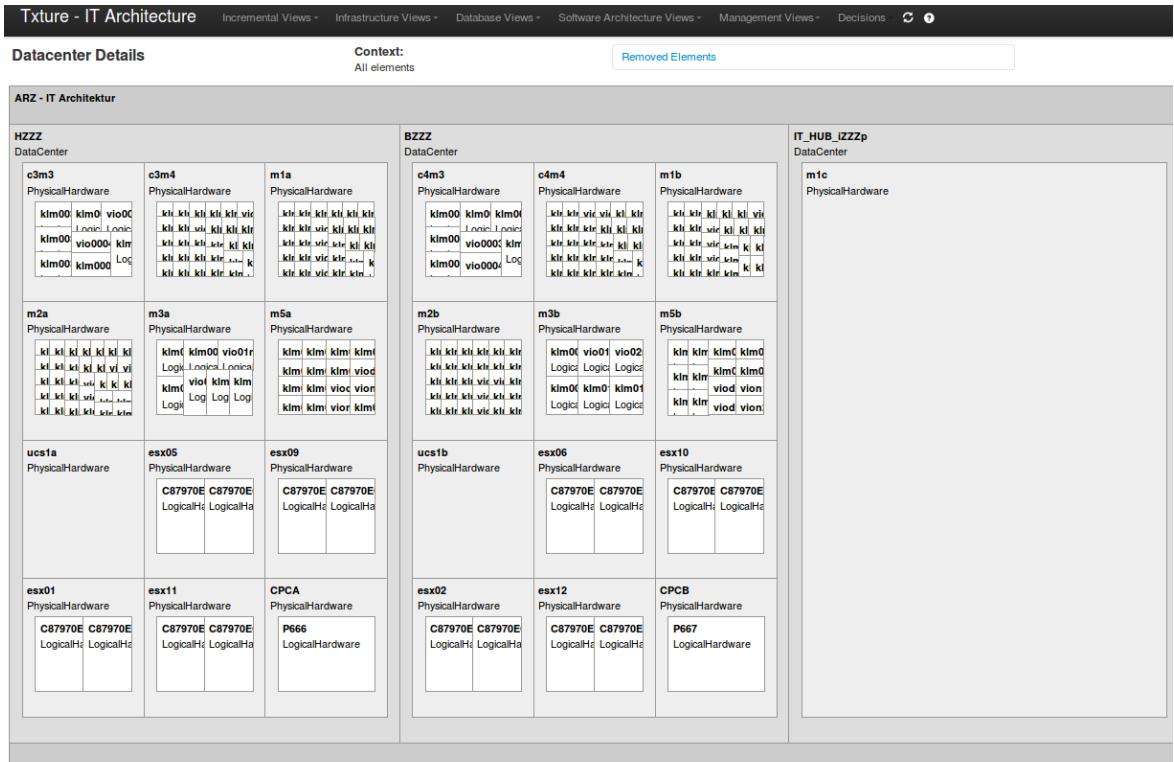


Figure 23.3.: Treemap of Txture



## **Part III.**

# **Market Demands and Trends**



## CHAPTER 24

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### Characteristics of the Data Set

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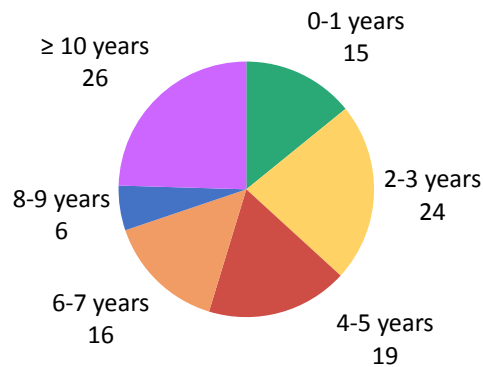
In this chapter we briefly describe the data collected in our EA practitioner survey. First, we report information about participating organizations (i.e. industry sector and size in terms of number of employees) and participants (i.e. job title and experience in EA management).

### 24.1. Information on the Organization

We asked our participants to provide us with context information about their organization (e.g. for how long their organization has been active in the EAM domain).

#### Years engaged in EA management

Figure 24.1 shows an overview of how long organizations are engaged in EA management. We



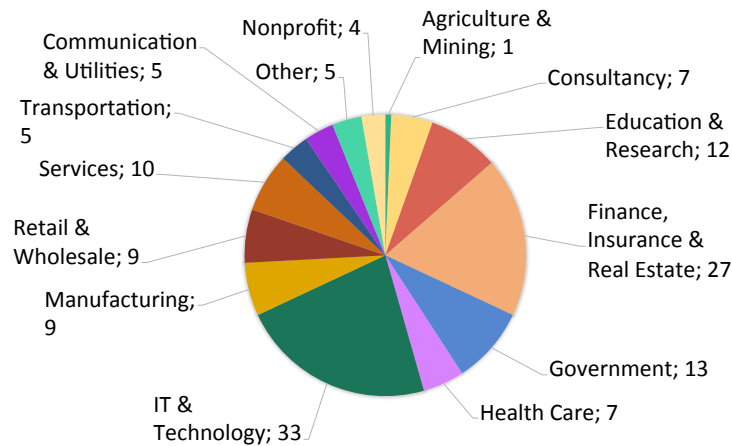
**Figure 24.1.:** Organizations by Number of Years active in EA management

find a rather diverse portfolio of organizations. Some are just about to start an EA initiative, some have already gained some experience while others have established EA management for several years.

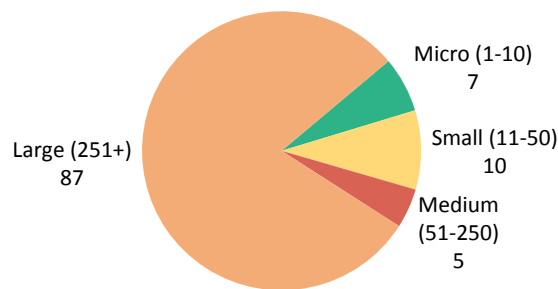
#### Industry Sector

EA management might play a different role in different domains [HSR<sup>+</sup>13]. To get an understanding of the organizational context, we asked the participants in which industry sector their organization has been operating in.

Figure 24.2 shows the sector distribution of the participating organizations; ‘IT, Technology, Internet’ and ‘Finance, Insurance, Real Estate’ make up the largest share.



**Figure 24.2.:** Organizations by Industry Sector



**Figure 24.3.:** Organizations by Number of Employees

## Number of Employees

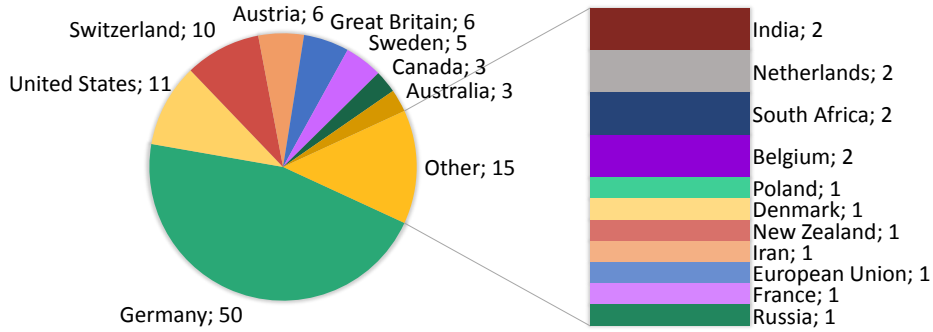
Figure 24.3 illustrates the size of the participating organizations based on the number of employees. As depicted, the majority of the participants work in a large scale enterprise (>250 employees). Medium (51 - 250 employees), small (11 - 50 employees) and micro (1 - 10 employees) companies account for smaller shares.

## 24.2. Participants

### By Country

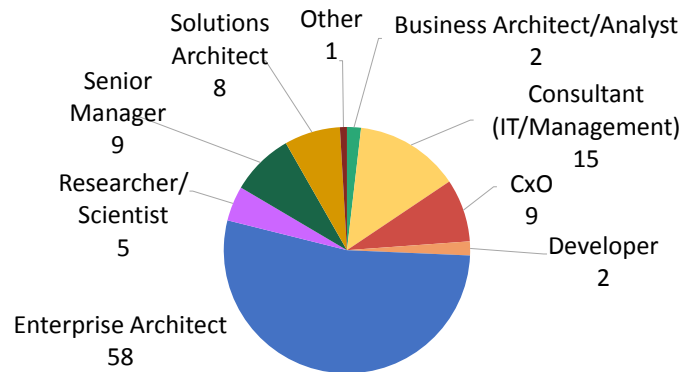
Figure 24.4 depicts the locations of the participants at the country level. There is a strong bias towards German-speaking countries: 66 of 109 participants work in Austria, Germany or Switzerland. The second largest group consists of participants living in the United States. Overall, the survey spread globally since EA experts from South Africa, Australia, Russia, Canada, India, and other countries participated in our survey as well.





**Figure 24.4.:** Participants by Country

### By Job Title



**Figure 24.5.:** Participants by Job Title

Figure 24.5 shows the distribution of job titles among participants. Unsurprisingly, Enterprise Architects make up the majority of participants, followed by consultants (14%), senior managers (8%) and CxOs (8%).

### By Experience in EA management

The level of experience in a field may highly impact an individual’s perception of tool support in a discipline. Thus, we asked the participants to provide information on their level of experience in EA management in number of years.

Figure 24.6 shows the results. Most participants have more than 3 years of experience in EA management. The figures suggest that the information we acquired reflect EA expert knowledge since only 5 novices count to the group of participants.

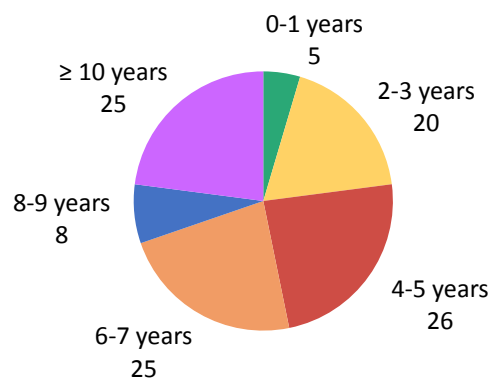


Figure 24.6.: EA management experience of the participants

## CHAPTER 25

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### EA Expert Feedback — Usage & Demands

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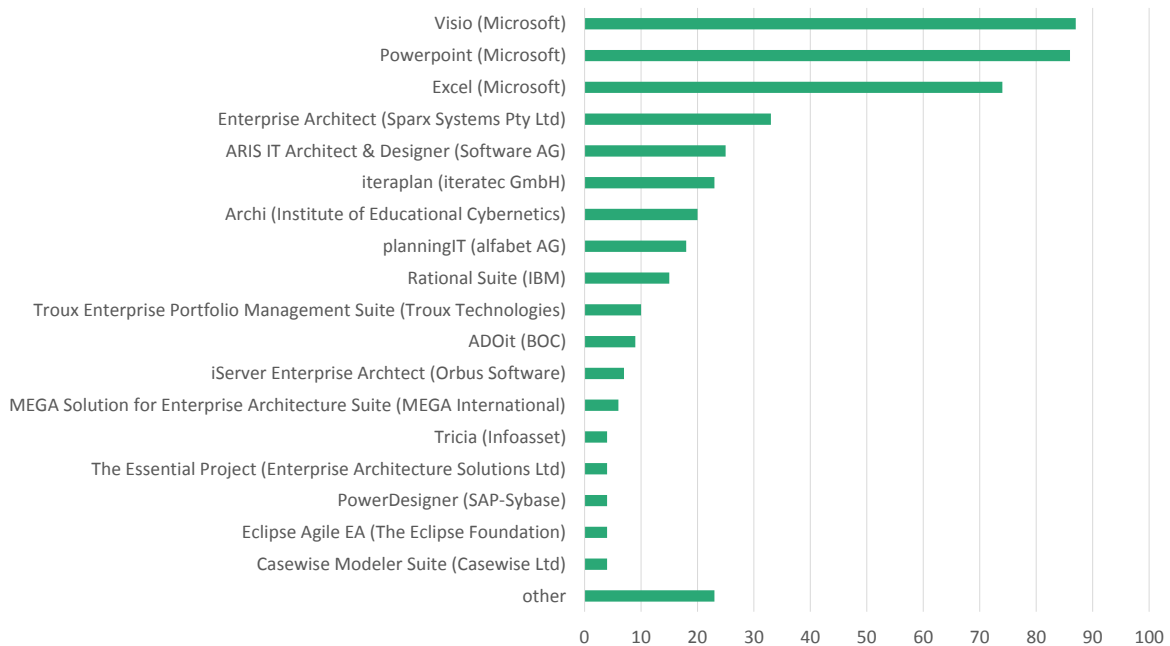
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In this chapter we present results of the practitioner survey. Please learn more about the context of the data collection before you interpret the data set (see Chapter 24).

## 25.1. EA Visualization Tools



**Figure 25.1.:** Which Tools do EA experts use to create EA visualizations?

In general, EA experts seem to be neutral or satisfied with their EA visualization tools. 9% of the participants are very satisfied with the EA tool, 24% satisfied, 49% have a neutral opinion, 16% are dissatisfied and only 3% are very dissatisfied.

Figure 25.1 shows a strong usage of Microsoft's Office products (Visio, Powerpoint, and Excel). The most frequently used EA tool is the Enterprise Architect (see Chapter 11) followed by Aris (see Chapter 8), iteraplan (see Chapter 13) and Archi (see [In12]). In near future, planningIT and ARIS will share a synchronized release cycle and their customer base (see Chapter 8). However, our data is not exhaustive and does not allow making predictions of how the entire EA market will develop (cf. also Section 27.2).

We also asked the EA experts whether they plan to migrate to different EA tool or version. In total, we had 35 answers for this question. 11% plan to migrate to a newer version of the current EA tool, 3% will use a different tool of the same vendor whereas 57% will switch the EA tool as well as vendor. 29% named other ways how they plan to replace their current EA tool.

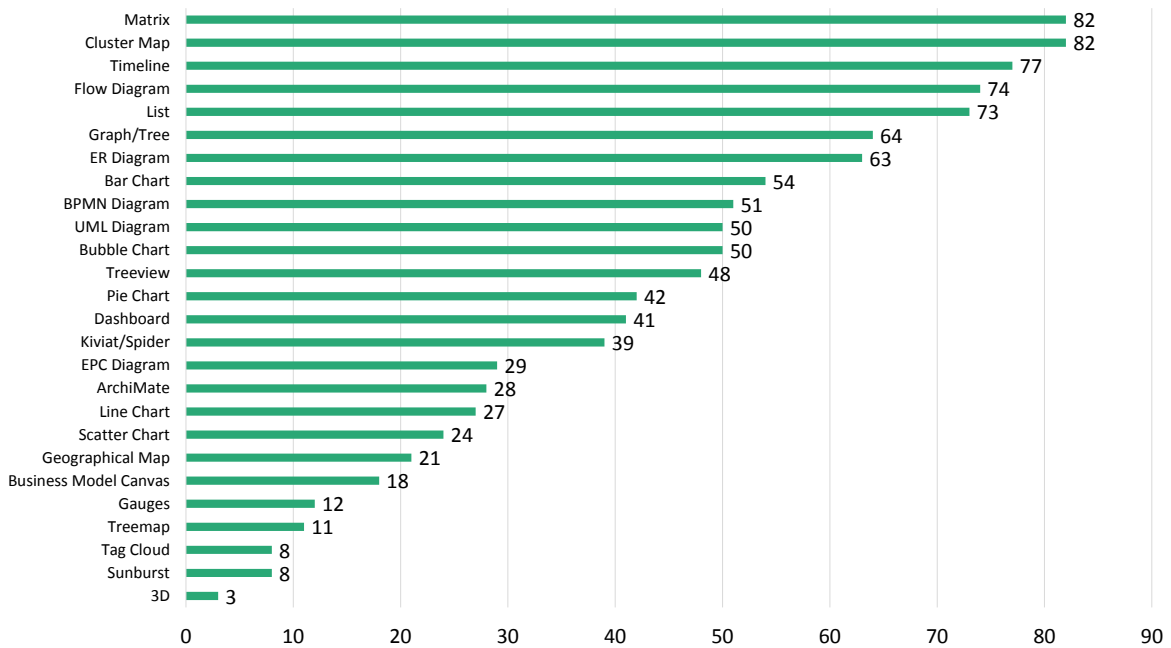


Figure 25.2.: Usage of Visualization Types by the EA experts

## 25.2. Usage of Visualization Types

In the first part of the survey, we asked EA experts which visualization types they use. We provided schematic illustrations. Figure 25.2 displays the aggregate usage of visualization types.

As expected, some visualization types are used very frequently. Thus, they might be considered typical. The most frequently used visualization types display relational information (matrices, cluster maps, flow diagrams and graphs) or time information (timeline).

Our second observation is the role of standard notations. Even though there seems to be no single standard notation, in general, notations such as UML, BPMN, EPC, or ER play an important role in EA management.

Interestingly, visualization of quantitative data seems to be less important in EA management. However, this might be a result of low data quality. We investigate this hypothesis below.

In addition to the 26 visualization types that were presented to them, practitioners were allowed to provide us with examples of other visualizations they were using as well. Two such visualizations have been uploaded. However, after thoughtful consideration, we identified these visualizations as instances of a dashboard and a gauge, respectively.

Figure 25.3 shows the usage of visualization type among practitioners.

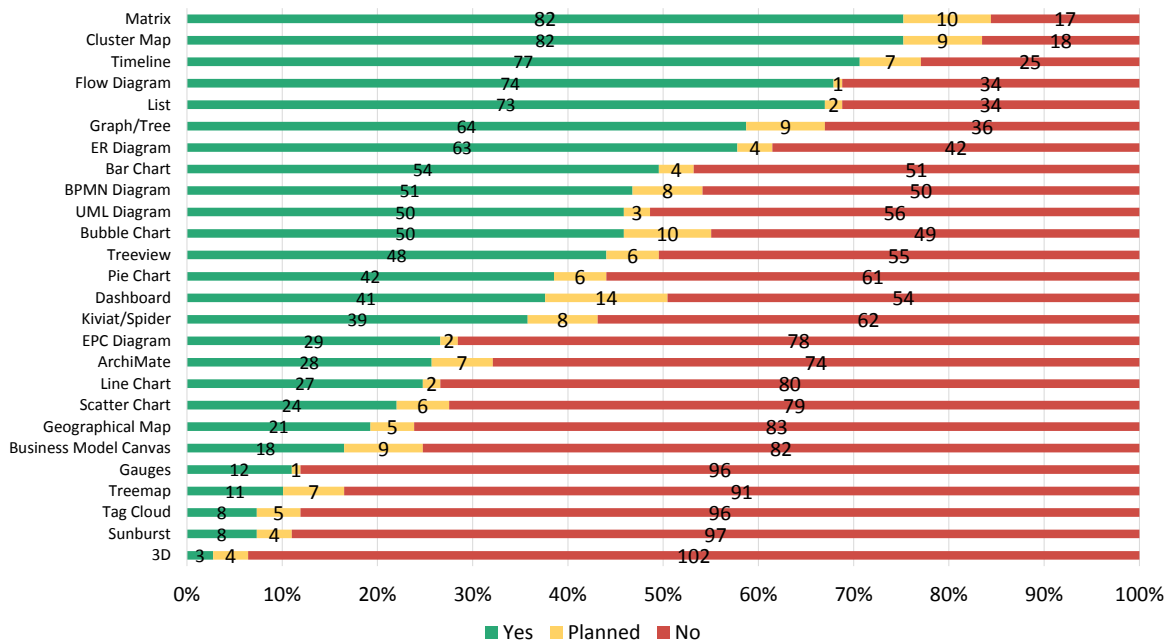


Figure 25.3.: Usage and Usage Intentions of Visualization Types by the EA experts

### 25.3. Update frequency of Visualization Types

The update frequency of visualizations differs among different stakeholders.

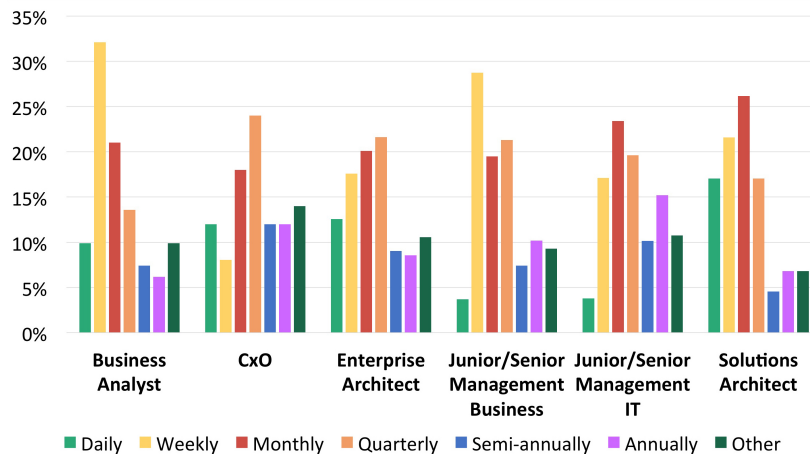
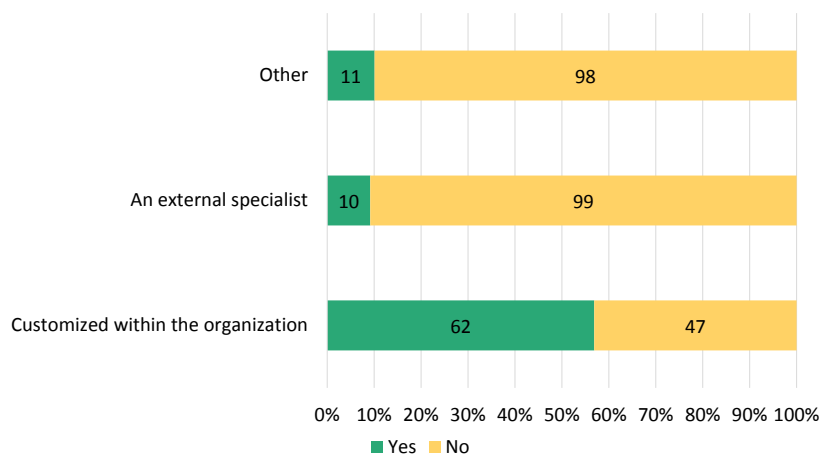


Figure 25.4.: How frequently are visualizations updated for specific stakeholders?

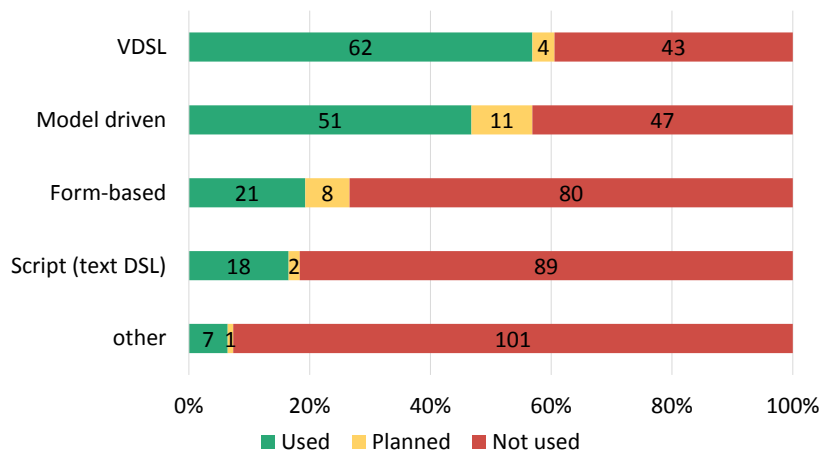
### 25.4. Customization of Visualizations

In our EA practitioner survey, 75 out of 109 participants stated that they customize visualizations.



**Figure 25.5.:** Who does the customization of EA visualizations?

As indicated by Figure 25.5, most customization is done internally (i.e. within the organization). Participants who chose ‘Other’ indicated that adaptations are done by the respondent.



**Figure 25.6.:** How do EA practitioners customize visualizations?

We asked the 75 participants who customize visualizations how they adjust their visualizations. Figure 25.6 shows that the majority neither uses scripting nor wizards. Even though multiple answers were possible, to our surprise, EA experts stated that the visualization is customized manually.

We asked the practitioners which visual attributes they customize. Figure 25.7 shows that they generally customize a broad spectrum of visual attributes such as colors, position, size, legend, font, shape and orientation.

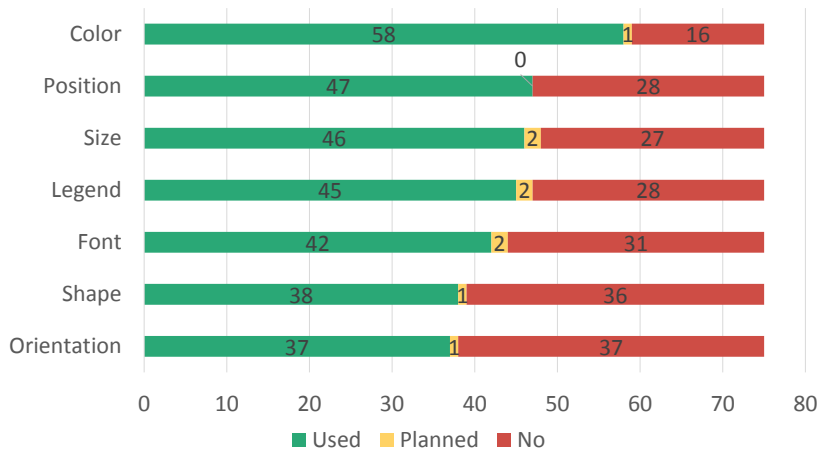


Figure 25.7.: Which visual attributes do EA experts customize?

## 25.5. Export of Visualizations

Our considerations for the next question is that one particular way to customize a visualization is to export it and post-process the visualization using a third-party application. Another important use case that calls for an export of a visualization is printing a visualization [SMR12]. Export formats range from flat files (Bitmap (BMP), Joint Photographic Experts Group (JPG/JPEG), Portable Network Graphics (PNG), etc.) to formats that may preserve the logical structure visualized (Portable Document Format (PDF), Microsoft Powerpoint Format (PPT/PPTX), Scalable Vector Graphics (SVG), Hypertext Markup Language (HTML), etc.). Preserving the logical structure could ease post-processing. However, although some file formats theoretically can keep structural information, EA tools do not necessarily make use of such facilities. In our next question, we asked what format are supported for export of visualizations. Figure 25.8 shows that PDF is the dominating export format.

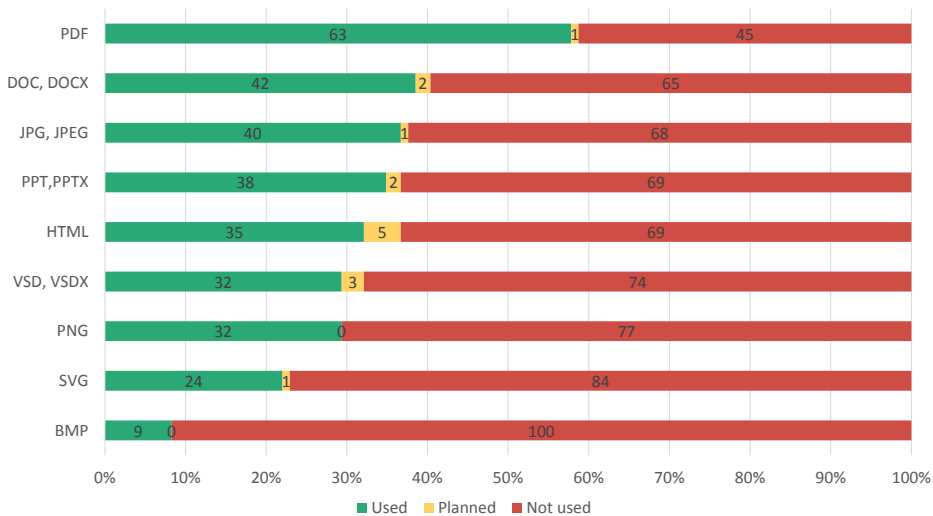
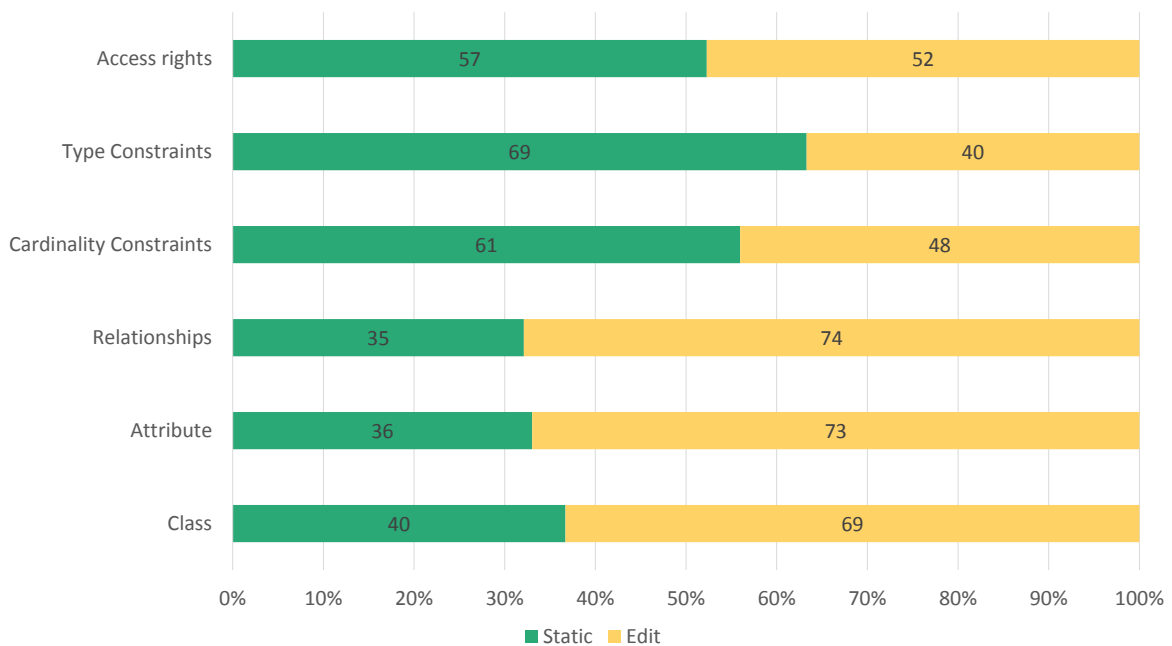


Figure 25.8.: Which export formats do EA experts use?



## 25.6. EA Information Model Adaptation

Next to the visualization types, we asked whether they are adapting the EA information model and, if so, how. First, we wanted to find out whether a common standard for an EA information model emerged in practice. Our hypothesis was that there is no such standard and EA information models are organization specific to a large extent. The data shows that 47 (43%) participants use a predefined schema (EA information model) which is shipped with (i.e. provided by) their EA tool. In contrast 62 (57%) participants use an organization specific EA information model.



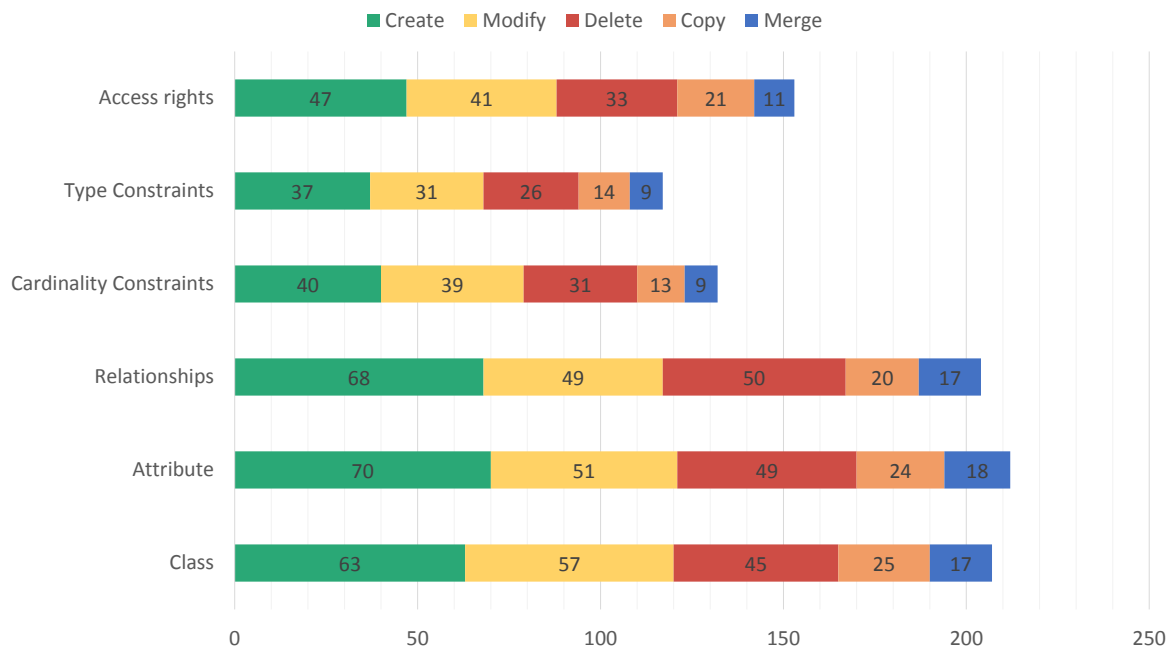
**Figure 25.9.:** Which concepts are adapted by EA experts?

Figure 25.9 illustrates that the most frequently adapted concepts are relationships, attributes, and classes. Access rights, cardinalities, and types seem to be not as important as reflecting on the right terminology, organization-specific structures and attributes.

EA information model adaptations range from minor to substantial changes of the overall structure of the model. To shed light on the nature of these adaptations, we asked which operations practitioners use to adapt the information model. Figure 25.10 illustrates the operations that are used by practitioners to modify their EA information model.

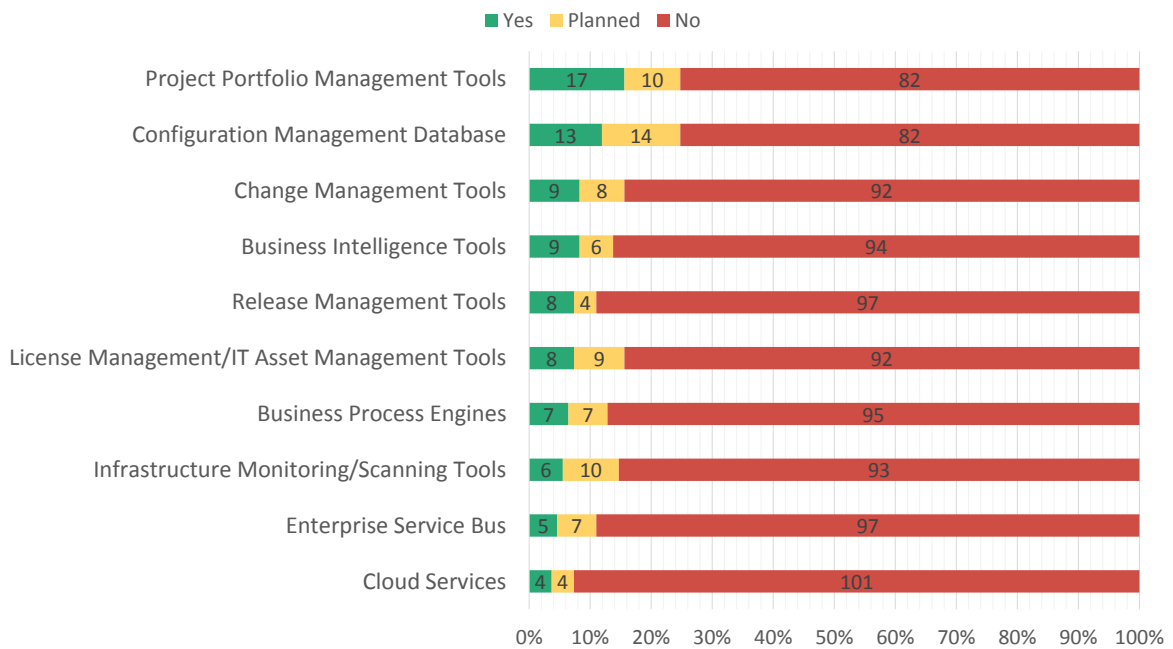
## 25.7. Integration with Third Party Tools

Figure 25.11 illustrates the integration of EA tools with third party software. We asked whether practitioners have integrated their EA tool with a product from one of these categories or plan to do so in the foreseeable future. An interesting observation is that project portfolio management tools rank first, followed by configuration management databases and change



**Figure 25.10.:** Which operations are used by EA experts to adapt an EA information model?

management tools. We refer the interested reader to [FBH<sup>+</sup>13a]. In this paper, we analyzed the information quality of different information sources in a joint effort with colleagues from the University of Innsbruck. Additional material on automating model maintenance can be found in [BEG<sup>+</sup>12, HMR12, RHF<sup>+</sup>13].



**Figure 25.11.:** Which information sources are integrated with the EA tool?

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Trends in EA Management and Tools

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In [BBDF<sup>+</sup>12], we reported on the development of EA management and tools as of 2011. In that publication, we put focus on different IT developments and trends such as cloud computing.

On the one hand, the present study puts emphasis on the analysis of visualizations. A key aspect of the study is to compare different EA tools by visualization support as well as configuration aspects. On the other hand, we put a strong focus on practitioners and actual market demands. This demands are reported in the following based on qualitative feedback from our 109 survey participants.

### 26.1. Increasing Variety

The set of exemplary visualizations provided by tool vendors contains a wide variety of mixed visualization types (cf. Chapter 1). Variety exists both in terms of semantics as well as visual appearance. In the course of our study, we observed that EA tools tend to implement highly specific visualizations tailored to very concrete EA concerns. However, we do not see a consolidation of EA visualization types. On the contrary, we see many singular variants of visualization types.

### 26.2. The Role of Standardized Notations

Looking at the collected data, we see that modeling notations such as UML, BPMN, ER, EPC, or ArchiMate are used for specific aspects of EA management in practice. These notations have a strong advantage over customized visualizations: precisely defined semantics. However, at the same time, we also see that no single standard notation seems to be suffice to represent all relevant aspects. Instead, a mixture of complementary visualizations is used to analyze and communicate EA related information in practice.

### 26.3. Major pain points of practitioners

In the final part of the survey, we collected major pain points and problems in EA management practice with respect to visualizations and tools. Table 26.1 lists the ten most frequently challenges in EA management as surveyed in an adjacent study [HSR<sup>+</sup>13]. In the following we map the problems and major pain points the EA experts report in our survey to these challenges. Were appropriate, we refer the interested reader to literature that also reported on these problems or seeks to cope with the problem.

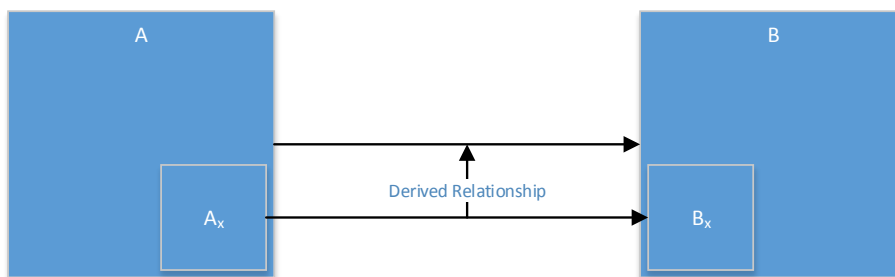
One participant emphasizes that the visualization of historical data is a problem which confirms our observation in [RM13].

Challenge	Agree		Neither		Disagree		No response	
	n	%	n	%	n	%	n	%
Ad hoc EAM demands	89	89,90%	6	6,06%	4	4,04%	3	3,03%
Unclear business goals	84	84,85%	11	11,11%	4	4,04%	3	3,03%
Hard to find experienced enterprise architects	82	87,23%	8	8,51%	4	4,26%	8	8,51%
EA demands unclear for EAM team	74	75,51%	13	13,27%	11	11,22%	4	4,08%
Enterprise environment changes too quickly	70	71,43%	9	9,18%	19	19,39%	4	4,08%
Conflicting interests among stakeholders	69	74,19%	15	16,13%	9	9,68%	9	9,68%
EAM team focuses primarily on IT	67	67,68%	9	9,09%	23	23,23%	3	3,03%
Reluctant information providers	62	64,58%	14	14,58%	20	20,83%	6	6,25%
Unavailable stakeholders	49	51,04%	26	27,08%	21	21,88%	6	6,25%
Late valuation of EAM through stakeholders	47	51,09%	26	28,26%	19	20,65%	10	10,87%

**Table 26.1.:** Ten most relevant challenges in EA management [HSR<sup>+</sup>13]

## Configuration

Another pain point is the configuration of visualizations by end users. A novel way to provide end-users a means to configure complex visualizations is proposed in our recent publication (see [RHZ<sup>+</sup>13]).



**Figure 26.1.:** Derived Relationships

One surveyed EA expert annotates that the “[EA] Tool can not visualize/calculate all derived relationships between objects automatically”. Figure 26.1 depicts this issue mentioned by the participant. Let  $A$  and  $B$  be objects with properties  $A_x$  and  $B_x$ . The expert wants to visualize communication of between  $A$  and  $B$  if the objects communicate via  $A_x$  and  $B_x$ . At

the present time and in line with this EA expert, we diagnose a lack of support for derived as well as transitive relationships.

### **Organizational Issues and Governance**

Other issues address organizational issues and lack of governance structures of EA management. Although, an EA tool cannot solve these issues, we include these issues in this report to properly reflect the status-quo of the discipline.

EA experts report on a lack of

- funding,
- understanding,
- EA maturity,
- consensus,
- stakeholder buy-in, and
- acceptance of governance roles & duties by business.

This underpins our motivation in the introduction stating a successful EA management function seeks to involve stakeholders early on (cf. Chapter 1). One practitioner mentions that a diversity of approaches in different departments may be an obstacle. In particular since such an environment requires to coordinate all IT activities, where responsibilities are heavily fragmented.

Outsources or boundaries between departments can also be an issue that has been reported by experts. Especially an alignment of strategy, architecture, and release planning without IT operations can be challenging. Another expert states that “business units are very autonomous” and the organization has not enough architects.

One EA expert mentions “politics and differences in approaches in the different organizations” as an important factor. The expert continues that “limited governance to steer thing centrally” is another issue. This goes in line with our results presented in []: a federated structure is more likely to succeed in EA, i.e. a central point for decision making with federated responsibilities.

### **The Right Level of Abstraction, Diversity of Tools, and Presentation**

One practitioner reports that management regards the EA tool as too complex and uses spread sheet applications or presentation software. Against this background, the export format of EA tools should be reconsidered by EA tool vendors.

Another expert reports on gaps between strategic, business, information system, and technology architecture. These gaps always result in a lot of additional manual work and periodic synchronization of architectures documented partially.

One EA expert reports that the “hordes of [consultancies] that only seem to use Office tools” as another pain point. This calls for an intermediate format as data exchange between the different tools.

### **Data Quality**

Data quality aspects are not to underestimate. In [AHR14] we report on this issue in the context of regulatory requirements. However, in general data quality and up-to-date information within an EA tool is another crucial factor for a successful an EA management initiative. Many experts confirm this statement and call for more flexible and dynamic visualizations.

One expert in particular mentions that the EA is “not alive, but just documented”. One way to increase data quality is to integrate operative information, e.g. of enterprise service buses. In Grunow et al. [GMR12], we report on perceived data quality within such an enterprise service bus system.

Another expert notes that “EA management is currently unable to provide a holistic picture with information that is relevant for different perspectives”. In addition, one expert even states that “EA information is not used for decision-making”. This leads to a lack of credibility of EA information which is confirmed by many experts.

In contrast to our recent publication in collaboration with University of Innsbruck [FBH<sup>+</sup>13b], one expert states that the “data quality of the repository, especially when defining models at the lower levels (solution architecture or physical applications)” is critical. One expert brings us to raised the question why the data quality of EA models is insufficient. The expert states that “users do not depend on the information within the EA repository”. The expert continues that “it is always a secondary source” and gives an example. Users query the EA repository for installed applications. However, they depend on other sources. Consequently, there is a trust issue with the completeness, actuality of the information maintained in the EA repository.

### **Return on Investment**

Five participants mentioned that EA management lacks of proven value and thus EA management is too expensive. One participant in underpins that it is a “necessity to develop a funding case first and establish business value of EA management”.

### **Interoperability**

Many participants report on ‘information islands’ within their enterprise. One expert states that there is “no consolidated repository of artifacts; no integrated EA management solution”. Many experts claim that there is no out-of-the-box “integration of operative applications [...] and project portfolio”. Other experts state that the information models of the EA tool are inflexible and static information models are an issue.



One expert claims that in larger organization a number of EA tools are used. The expert states that “the various tools have areas of immaturity and it is taking a fairly long time for required functionalities to be brought out”.

### **Ivory Tower**

In [HMR12] we report on the ivory tower syndrome (cf. Table 26.1). This is confirmed by one practitioner mentioning the “not-invented-here syndrome, i.e. acceptance of before agreed artifacts”. This constantly observed syndrome

- underpins the collaborative nature of a successful EA management function,
- the need to transparency early on, and
- stakeholder involvement when building an EA information model [RHM13].

### **Data and Maintenance**

Central to an EA tool is the collection and management of information. However, an EA expert states that “manually entering the data using a graphical tool is expensive and error-prone.” Some go even further and state that their tool is “not suitable for EA management”.

Another EA expert reports on problems that arise when contradicting information may exist and calls for support to find consistent data (sources) to decide which data(source) is valid.

## **26.4. Feature list and improvements**

We asked for possible improvements and features an EA tool should provide according to the EA experts. The participants were able to provide their answers as free text. As part of our analysis, we grouped similar and matching demands into topic clusters. In the following subsections, we introduce each cluster.

### **Visualizations and Appearance**

Most practitioners call for a better visualization support such as

- simpler visualizations,
- more intuitive,
- ‘nice’ reports for management (without external tools, e.g. Cognos),
- visualizing information within the version control system,
- multi-perspective visualizations with different layers (product, business model, etc.),
- visualization templates,

- visualization of roadmaps,
- visualization of the architecture as an evolving system over time.

### **Layouting**

While layouting is a matter of customization to a large extent, EA experts wish for enhanced layouting support.

One practitioner describes the problem in more detail:

In a first step, the visualization is generated in a model-driven manner. Then, the layout is altered manually by the expert. In a third step, the underlying information changes and the visualization is generated again. The problem is that minor changes in the information may ‘obscure’ the entire layout. Although the new layout may optimize after certain dimensions, the EA experts demand that the existing layout prevails and only changed information is added. The problem is that most layout algorithms calculate the positions based on the entirety of the rendered data. That in particular means the algorithms do not distinguish between the existing information and added, changed, and deleted information.

### **Export Formats**

In addition, EA experts have a demand for advanced export facilities. In particular, support for file formats which preserve structural information for post-processing is often lacking. In this context, Microsoft Powerpoint (PPT/PPTX) and Visio (Microsoft Visio Format (VSD/VSDX)) have been mentioned particularly. One practitioner wishes for the ability to export visualizations as packaged Data-Driven Documents (D<sup>3</sup>) visualization (cf. [BOH11]). This would allow manual customization and presentation using standard web technology.

### **Customization**

Practitioners call for better support for customization of visualizations as well. One practitioner wants to have enhanced customization facilities especially for publishing of defined IT architectures (cf. Section 26.4). More general the usability of customization facilities should be improved to lower the barrier for end-users.

### **Visual Interaction**

Another issue mentioned by EA experts is the interaction with visualizations. This often is referred to as ‘live-data’, ‘interactive visualization’ or ‘dynamic visualization’. EA experts want to get means to flexibly explore visualizations and influence visualizations with regards to contents. This includes, for instance, adding and deleting elements after generation. On the one hand, this falls into the category of export and customization. On the other hand, propagating visual changes to the repository is more sophisticated [SMR12].

One practitioner wishes for enhanced support to perform visual impact (dependency) analyses. Another EA expert proposes a specific feature to perform gap analyses as well as to govern roadmaps and trace the impact to the business architecture.

### **Interoperability and Collaboration**

Many EA experts call for better integration with third party tools.

In line with our research agenda for automated EA documentation [HMR12], one expert stated that the organization wants to “gather as much information as possible in an automated way”. A similar statement expresses demand for “interfaces for integration with other systems containing data that contribute to the IT-inventory”. Another expert asks for a better connection between design and runtime: information in the EA repository should reflect the reality more accurately. Practitioners wish to get “open interfaces for integration of diverse tools/repositories” and “better integration with other sources”. One expert calls for “maximum capabilities in importing and exporting information from and to other data sources respectively, full fledged integration between EAM and UML, freely available reusable EAM content like third party software catalog and alike”.

One provided feature request comes particularly close to the approach of Txture (cf. Chapter 23). The expert is looking for a possibly to have a DSL-like textual representation of the architecture model and tool support for validation, auto-completion, refactoring, a query language as well as a generator for visualization diagrams. The expert argues that such an approach could decrease model maintenance costs and increase usability. With respect to interoperability, one experts suggests that the EA toolset should conform to the OMG Interchange Diagram metamodel.

Another EA expert points out that interoperability is not only a concern of technical interfaces but process integration and collaboration support as well. A fellow practitioner calls, for instance, for “notifications of users [...] on changes which are of specific interest to them”.

### **Information Model**

Another important topic addressed by the EA experts is the information model. The survey participants call for more flexibility as well as concrete extensions such as strategic goals or geographical data as building blocks for an information model. In addition, they ask for improved facilities to link objects. One suggestion is to maintain links as distinct objects which may have attributes.

Another topic is the creation of planned states. Practitioners call for better usability to create scenarios (to-be) or alternative architectures. One participant wants to store changes to the architecture as a change history, i.e. the creation of immutable versions.

## Queries

The creation of reports and visualizations often comes with the need to aggregate data or query data in more sophisticated ways. This is reflected in the demands of EA experts. The participants call for enhanced capabilities for “data aggregation on logical structuring elements (e.g. domains)”. Two practitioners suggest to adopt an ontological approach.

Many other practitioners call for

- BI functionality,
- support to query and visualize transitive relationships, and
- an analysis of semi-structured data.

## Usability

An important factor for end-user acceptance is usability. Practitioners state that the models shipped with EA tools are often too complex to communicate. They ask for easy-to-use and simple modeling facilities. One expert explicitly states that (s)he prefers ease-of-use over accuracy. Another expert says that user interfaces should be more intuitive.

## Other

The EA experts mentioned other tool issues they encounter in practice such as lack of:

- support for simulations,
- multitenancy,
- support for integrated life-cycle management,
- ad-hoc reporting capabilities, and
- stability.

## CHAPTER 27

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Conclusion

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In this chapter, we conclude the report. First, we discuss the limitations of the study. Then, we give an outlook on future research in EA tools and visualizations.

## 27.1. Key observations

A general observation is the overall improvement of facilities that empower end-users to adapt model bindings as well as the information model.

Another key observation is the shift towards web-based solutions. We see a clear trend from read-only access browser support to feature rich web application clients.

Support for interactivity in visualizations has been increased at the same time. For current EA tools, it is no longer sufficient to just display information but to enable in-place interaction. This includes visual manipulation and analysis. More and more tools facilitate post-processing by supporting export formats that preserve the structure of the visualization (vector graphics). An additional aspect is the propagation of change such that data is manipulated through visual interactions.

The study also revealed that there is a strong demand for additional facilities to customize the EA information model. Most vendors confirmed that their tool supports an adaptation of the EA information model. However, there are multiple approaches to support model adaptations among the tools.

Some visualization types are used more often than others. The 5 most widely used visualization types are cluster map, matrix, graph, timeline and flow diagram. In almost every second provided usage scenario, one of them is used (48%,  $n = 1498$ ).

Another finding is that some visualization types are particularly relevant to specific stakeholders and used more often than others except for a few common types (i.e. cluster map, matrix, graph, timeline, flow diagram). Our participants report that

- Bubble charts are primarily used to communicate to management (Business as well as IT, including C-level)
- BPMN is mostly used to visualize information for business analysts and management (non C-level)
- UML is very relevant for enterprise and solution architects
- ER diagrams are particularly popular among enterprise architects, solution architects and business analysts
- Dashboards are mainly targeted at C-level stakeholders or enterprise architects
- EPC is significantly used by business analysts
- ArchiMate is almost primarily used by enterprise architects
- Bar charts, radar charts and pie charts are most popular among C-level management, enterprise architects and IT managers

Our study revealed differing update frequency patterns among different stakeholder groups. Visualizations for C-level management are mostly updated on a quarterly or monthly basis. In contrast, business analysts, solution architects as well as lower and middle level managers with business focus tend to demand for more frequent updates (e.g. on a weekly basis). A significant share of solutions architects even asks for daily updates.

### 27.2. Limitations

In this section, we briefly detail the limitations of the survey and point out some potential biases. This report includes empirical data. One should be cautious when interpreting empirical data. For instance, group characteristics of the participants and design of the survey(s) might influence the results. Therefore, it is important to put the results into context. While we carefully considered each single design decision, we would like to point out that the following factors might have biased the outcome of the study.

**Information on EA Tools is based on survey results.** All information included in this report has been provided by EA tool vendors. In contrast to [MBL<sup>+</sup>08], we did not assess the tools ourselves. We reviewed provided information as good as possible. However, we assume and have reason to believe that participants provided sincere answers. That said, we welcome any proposals for corrections or improvements.

**Empirical basis.** The identification of trends is based on information provided by a limited sample of EA practitioners (i.e. 109 participants). While the sample size is reasonable by scientific standards, an even larger empirical basis for further statistical analysis might provide even more confidence in some observations and interpretations. This study has been initiated from within the heart of Europe, this and other factors of our invited practitioners constitute potential biases to the results described in more detail in Part III of this report.

**Survey design.** A particular bias addresses the usage of visualization types in EA management. In the survey, we presented the visualization types in a particular order. Ideally, the order should have been randomized. However, due to technical limitations of the survey system, we stuck to a fixed sequence of visualization types. The following lists show the ordering of visualization types in the survey as well as according to provided information

about actual usage in practice:

*Order of visualization types as provided to the EA experts in the online survey:*

1. Cluster Map
2. Matrix
3. Graph
4. Timeline
5. Bubble Chart
6. Scatter Chart
7. Treemap
8. Treeview
9. Radar Diagram
10. Tag Cloud
11. Flow Diagram
12. Dashboard
13. 3D Visualization
14. Gauges
15. Sunburst
16. ER Diagram
17. UML Diagram
18. Business Model Canvas
19. BPMN Diagram
20. EPC Diagram
21. ArchiMate Diagram
22. Pie Chart
23. Bar Chart
24. List
25. Line Chart
26. Geographic Map

*Order of visualization types per actual usage by 109 EA experts:*

1. Matrix
2. Cluster Map
3. Timeline
4. Flow Diagram
5. List
6. Graph
7. ER Diagram
8. Bar Chart
9. BPMN Diagram
10. UML Diagram
11. Bubble Chart
12. Treeview
13. Pie Chart
14. Dashboard
15. Radar Diagram
16. EPC Diagram
17. ArchiMate Diagram
18. Line Chart
19. Scatter Chart
20. Geographic Map
21. Business Model Canvas
22. Gauges
23. Treemap
24. Tag Cloud
25. Sunburst
26. 3D Visualization



### 27.3. Outlook

This report about the results of the Enterprise Architecture Visualization Tool Survey 2014 provides an analysis of 19 tools of 18 vendors. EA tools are an essential means to manage the EA. Crucial criteria for the buying decision include 1) the way visualizations look like, 2) how these are configured, and 3) how an information model can be adapted to organization specific terminology and concepts such as attributes and relationships. Given the importance of visualization in the EA management function, the look and feel of visualizations can be a decisive factor whether to buy or not to buy a specific EA tool.

In this report, we present 26 synthesized visualization types. These generic visualization types have been extracted during a rigorous analysis of a large collection of screenshots provided by each of the 18 tool vendors. A description of each tool vendor and respective offerings as well as a comprehensive overview of technical capabilities are provided. For each visualization type we show concrete examples who they look in the 19 analyzed EA tools (if supported). We further list configuration capabilities of the EA tools, the ability to adapt the EA information model as well as integration of third party tools. In the final part of this study, we report on results of our survey among 109 EA experts. In that survey, we put focus on current usage behavior and future market demands. In addition, we provide a list of pain points that were reported by EA experts.

Compared to our study in 2008 [MBL<sup>+</sup>08], we find more sophisticated visualization capabilities. While the field of EA management evolved over the course of the past years, we still see a wide range of rather idiosyncratic visualization types applied in practice.

## APPENDIX A

### Long List

Organization	Product
AB Conseil	SOLU-QIQ
Artemis International	Accept360
Adaptive Inc	Adaptive Enterprise Architecture Manager
Agilense	
pulinco engineering ag	TopEase suite
alfabet AG	planningIT
Allen Systems Group Inc	ASG-Manager Products
Artemis International Solutions Corp.	Enterprise
Atoll Technologies Ltd	SAMU Repository
Avolution Pty Ltd	ABACUS
BiZZdesign	BiZZdesign Architect
BOC AG	ADOit
BTM Corporation	BTM 360 Product Suite
ca technologies	Clarity PPM for IT Governance
CACI International Inc	SIMPROCESS
Casewise Ltd	Casewise Modeler Suite
comma soft	infonea
Embarcadero	ER/Studio XE2
Enterprise Architecture Solutions Ltd	The Essential Project

## A. Long List

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Enterprise Elements Inc.	Elements repository
Foresight Systems M&S	Foresight Tool Suite
FrankITecture Solutions	MappIT
Future Tech Systems Inc	Envision VIP
GoAgile	
Hewlett Packard	Mercury Project and Portfolio Management Center
IBM Corp	Rational System Architect
IBM Corp	Rational Software Architect
IBM Corp	Rational Requirements Composer
IBM Corp	Rational Asset Manager
IBM Corp	Rational Asset Analyzer
IBM Corp	Rational Software Architect for WebSphere Software
IBM Corp	Rational Rhapsody Architect for Systems Engineers
IBM Corp	Rational Data and Application Modeling Bundle
INOVA Engineering GmbH	Merge Pro
Institute of Educational Cybernetics	Archi
Intelligile Inc.	Model, Analyze, Publish (MAP)
iteratec GmbH	iteraplan
Knotion Consulting Pty Ltd	Universal Data Element Framework
Knotion Consulting Pty Ltd	SYNAP-C Solution
Layer8-Solutions	Layer8.professional
LeanIX GmbH	leanIX
SOA Software Inc	Logidex
MEGA International SA	MEGA Solution for Enterprise Architecture Suite
OpenText	ProVision
Modeliosoft	Modelio
Salamander Technologies	MooD Platform
Oracle Corp.	Oracle Enterprise Manager
Oracle Corp.	Oracle Enterprise Repository
Orbus Software	iServer Enterprise Archtect
pinnacle EM Specialists	Primavera ProSight
process4.biz	process4.biz
Promis Ltd	EVA Netmodeler
QPR Oyj	QPR EnterpriseArchitect
QualiWare ApS	Enterprise Architect Suite
SAP-Sybase	PowerDesigner

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Select Business Solutions Inc.	Select Solution Factory
Select Business Solutions Inc.	Select Architect
SOA Software Inc	Lifecylce Manager
Software AG	ARIS IT Architect & Designer
Software AG	ARIS Business Architect & Designer
Software AG	ARIS ArchiMate Modeler
Software AG	ARIS Business Optimizer
Software AG	ARIS IT Inventory
Sparx Systems Pty Ltd	Enterprise Architect
Troux Technologies Inc	Troux Enterprise Portfolio Management Suite
Visible Systems Corp.	Visible Advantage
Visible Systems Corp.	Enterprise Products
Infoasset	Tricia
QE LaB Business Services GmbH	texture
OpenSource eclipse AgileEA	Eclipse Agile EA
Palisade	Risk and Decision Analysis
QPR	QPR Process Guide Xpress Enterprise Architect

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