Analysis and Visualization of SAP Custom Code and its Relationships to the SAP System

VISAP the Visual SAP Analytics Process
A cooperation between GISA GmbH and Research Group Visual Software Analytics, Leipzig University

Pascal Kovacs
13.11.2020
Pascal Kovacs

- Since 2010 Development Consultant at Gisa GmbH 3 days a week
- Since 2019 in full time 5 days a week
- SAP-ISU Billing
- Project Manager Custom Code Lifecycle Management

Managing the cooperation-project VISAP

Recruiting and supporting of new trainees and employees

2011 – 2019 Researcher at Leipzig University 2 days a week
- PhD-Thesis „Interaction with 3D Software Visualization“
- Lecture „Developing of distributed Applications“
- Supervising of Bachelor- and Master-Thesis
## Over 25 years of experience

<table>
<thead>
<tr>
<th><strong>GiSA is…</strong></th>
<th>Full IT service provider and specialist for the energy industry and public sector clients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Turnover 2019</strong></td>
<td>€ 104 million (IFRS)</td>
</tr>
<tr>
<td><strong>Employees 2019</strong></td>
<td>830</td>
</tr>
<tr>
<td><strong>Foundation</strong></td>
<td>1993</td>
</tr>
<tr>
<td><strong>Locations &amp; offices</strong></td>
<td>headquarter: Halle (Saale)</td>
</tr>
<tr>
<td><strong>Certification</strong></td>
<td>BSI-certified high-performance data center multi-certified SAP and Microsoft Partner</td>
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</tbody>
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Qualified partner of energy industry
Many years of experience and professional IT support of all market-controlled

Solution portfolio
- Billing- and device management
- Smart meter gateway administration & EMT-Integration
- Facility and geodata management
- Sales and customer management
- Portals und Mobile IT
- Human resource management
- Enterprise Resource Planning
- Enterprise Information Management
- IT security und IT compliance
- Solution for Remunicipalisation

Market topics of the future
- Digital management consulting
- Augmented Reality (Visualization)
- Internet of Things
- Hybride Cloud Solutions
- Predictive Maintenance
- Predictive Analytics
- Big Data
- Blockchain
- eMobility
Qualified Partner for Public Sector
Many years of experience and professional IT support

Solution portfolio
- Enterprise Resource Planning
- Human resource management
- Enterprise Information Management
- IT security und IT compliance
- New municipal financial management
- SAP Public Sector Management
- Electronic files und IT-based transaction processing
- Facility and geodata management
- Portals und Mobile IT

Market topics of the future
- Internet of Things
- Augmented Reality (Visualisierung)
- Hybride Cloud-Lösungen
- Predictive Maintenance
- Predictive Analytics
- Big Data
- Blockchain
- eMobility
Perspectives for personalities

Individual Career Planning

- Dual study programs in cooperation with selected universities
- Entry young professionals
- Internships and work-study activities
- Supervision of theses
- Training and qualification programs

- Performance-based pay
- Flexible working hour models
- Above-average employee benefits
Nice.. but what's the point?
Software Visualization in a Nutshell

Visual Analytics
Software Visualization in a Nutshell

Class

Method

Method

Attribute
The Why, What and How of the Visualization of SAP Systems
What is a SAP-System?

A big big database

Data that the user needs

„Smaller“ applications working on the database

Data that the user needs
How does a SAP-System works?

Everything is a database table

Your code is in a table

Your class definitions are in a table

Also code versions are stored in tables

There is even a table of all tables of the SAP-System
How to develop in a SAP-System?

Every tool is integrated into the SAP-System

- The editor
- The debugger
- The version system

You can debug the debugger if you like
How is a SAP System deployed?

Application Server

Database Server
…so the main influence factor on SAP System performance is…
...so the solution is...

SAP HANA
In-Memory-
Database

Database Server

Application Server
Ok, everything good so far?

... and what’s about the usage of the database?
How is the code of a SAP System structured?

SAP-Standard-Code

What is used

How it is connected

What is the influence on performance?

Custom Code

Also big, complex and grown historically
Migration S/4 HANA
Biggest migration ever?

In-memory database HANA
with new depending code features

What happens to the custom code?
Huge challenges need new innovative approaches

Software visualization in 3D for visual analytic of custom code

Visual SAP Analytics Process (VISAP)
First look on VISAP

(What and How)
A first visualization of a customer SAP system
A detailed view of another example
How are the data of the modules integrated in VISAP?
Visual SAP Analytics Process (Central VISAP 2.0)

Central Custom Code Lifecycle Management System

- Customer System
  - RFC
  - VISAP Extractor
  - VISAP Exporter

- Additional Data (Inspection, Migration, Usage ...)
- CSV
- Neo4J Import
- City Generator
- User Interface
- Getaviz (Version 2.0)

Realisation in projects

Analysis Report

Derive recommendations for action

Visual Analytics
VISAP Future Work

- Dynamic lazy loading and layouting
- Integration of additional data and interaction techniques
- Optimization of the visual representation
- Visualization of additional SAP elements and relationships
- Evaluation of the application in customer and internal projects
Thank you for your attention
IT works.

Boost your Career!

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Senior Development Consultant

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System Analysis with SAP

Quality
- Appropriate
- To be improved
- Inappropriate

Business Criticality
1: Non Mission Critical
5: Mission Critical

Custom code management governance model
Simplification

Get transparency
Build the city
- Get transparency on Custom Code and its characteristics in modernization
- Understand existing CCM processes and strategy
- Evaluate impact of changes and reduce efforts for changes adoption on custom code

Simplify
- Get the city green and small
- Setup efficient custom code management
- Retire unused custom code
- Improve custom code quality

Efficient & effective custom code management
- Keep the city green and small
- Avoid unnecessary custom codes
- Use SAP standard

Supported by...
- Custom Code Lifecycle Management (CCLM)
- Usage and Procedure Logging
- CCM/UCAMA
- SQL Monitor (SCQM)

Supported by...
- CCLM – Decommissioning
codes
- CCLM – Quality codes
- ACP/STK Concept (ATC)

Supported by...
- Custom Code Lifecycle Management (CCLM) – JDA's Custom Code Development guidelines
System Upgrade with SAP
Source-Code-Elements

- **Reports**
  - Forms (subprograms)
  - Attributes

- **Function Groups**
  - Function Modules (free functions)
  - Attributes

- **Classes & Interfaces**
  - Methodes
  - Attributes
  - Inheritance

The diagram illustrates the relationship between packages and their contained elements.
Data-Dictionary-Elements (DDIC)

- **Domains**
  - Type-Definition on a Basetype like CHARakter

- **Data Elements**
  - Type-Deklaration of a Domain with Metadata

- **Structure**
  - Structure-Definition with Fields and Data Elements

- **Table-Types**
  - Type-Definition of an internal Table using a Structure

- **Tables**
  - Table-Definition of „physical Tables“ with Fields and Data Elements
Dependencies between ABAP-Elements

- Report calls Function Module
- Function Module instantiates Class
- Domain uses Data Element
- Data Element uses Structur
- Structur uses Table-Type
- Table-Type uses Table
- Class reads Table
Vision ABAP-Metropolis-Metaphor
The Idea...

Source-Code-Elements

- Does something
- Uses something
- Consumes & produces something
- Work
- Worker
- Products

Data-Dictionary-Elements

- Does nothing alone
- Is used by SC-Elements
- Stores something
- Inhabitants
- Worker
- Product storage

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ABAP-Metropolis-Metaphor – a first view
ABAP-Metroplois – Source-Code-Elements
ABAP-Metropolis – Data-Dictionary-Elements

Data Element District
Domain
Data Element
Structure District
Structure Element