The Vitens GIS-Architecture and how it combines with SAP.

Wybren de Jong
8-5-2019
Wybren de Jong

- 47 years old
- Living in Utrecht
- Working for Vitens since 1997

- Job: Information analyst
- Role: Solution architecture for the GIS/BI domains
- Currently working on the Vitens SAP-transformation program
- Formerly involved in the Vitens GIS4ALL-project and the Vitens Design-tool.
### Vitens in figures

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>provinces</td>
</tr>
<tr>
<td>110</td>
<td>public shareholders</td>
</tr>
<tr>
<td>1.383</td>
<td>employees</td>
</tr>
<tr>
<td>49.000</td>
<td>km water mains</td>
</tr>
<tr>
<td>5.600.000</td>
<td>customers</td>
</tr>
<tr>
<td>108.000.000</td>
<td>€ investments</td>
</tr>
<tr>
<td>350.000.000</td>
<td>m³ pure drinking water p/y</td>
</tr>
</tbody>
</table>
1400 x valuable

Mechanics
Relation managers
Process operators
Samplers
Analists
Customer service

Regional managers
Hydrologists
Internet technology specialists
Communications specialists
Project leaders
Contractors
Vitens and ESRI

Timeline:
<2013: ESRI as the geo analytics tool (geohydrology)
2013: real time alerts
2014: Designtool
2015: GIS4ALL: Geographical Data visualisation
2018: GIS roadmap
GIS4all examples:
GIS Roadmap

- Planning the road ahead
- Two main goals:
  - Plotting business questions and IT developments for the various domains in the upcoming years
  - Finding the connection between our own developments and the roadmaps of our strategic Suppliers
- GIS roadmap was the 2nd roadmap finished
Water=main network incl. valves and hydrants, WP=extraction wells (sources), AS=house connection sketches, GHD=geo-hydrological data
Target-architecture

- Water=mains network incl. valves and hydrants, WP=extraction wells (sources), AS=house connection sketches, GHD=Geo-hydrological Data

External (eco-) systems
- GIS-Cloud Providers
- Vitens API Gateway
- GIS-Domain
  - Self Service GIS-Portal
  - GIS-Integration-platform
- ERP-Domain
  - S4Hana
  - SAP GEF
  - SAP PO
- ECM-Domain
  - AWMS-Domain
  - Dynamic Data Gateway
  - MES
  - LIMS
- AWMS-Domain
  - AWMS-Domain
  - Dynamic Data Gateway
- S4Hana
  - MES
  - LIMS
- SAP GEF
- SAP PO

GIS Domain
- Geo-Analytics service
- Spatial Data Hub & Historian (DHH)
- ETL-service
- Spatial Data Hub & Historian (DHH)
- Geo-Analytics service
- Self Service GIS-Portal
- Basic maps, NHA, BGT, ...
- ISO 19125

External (eco-) systems
- GIS-Cloud Providers
- Kadaster
- PDOK
- BAG
- BGT
- BRT
- BRO
- BRT
- KLIC-Portaal
- SaaS-providers

GIS Integration-platform
- Dynamic Data Gateway
- GIS Cloud
- ETL-service
- ISO 19125

GIS Registration
- Water
- BGT
- BAG
- AS
- WM
- MNO

Legend
- source-data
- Replica
- Future
- System
- Datastream
- Interface

Vitens API Gateway

Flexible frontend
Stable backend
Combining GIS and SAP
The first steps

**History:** A manual synchronisation of address data between SAP en GIS

**2016:** Intelligent intake: Using a map when answering callers with water complaints
Implemeted SAP GEO-e: Arcgis server integrated in a standard SAP client.

**Challenge:**
It’s possible to bring GIS data to SAP, but it’s not easy to do it the other way around.
Vitens decided to re-implement SAP with SAP4Hana (reducing of customizing)

Multiple use cases for using GIS information within SAP:
1. Outage desk
2. Laboratory sample requests on hydrological observation points
3. Real estate

So we decided to implement a new SAP product SAP GEF.
SAP GEF = in SAP embedded GIS

Common development in GIS: Other applications embeds Gis-functionality. SAP GEF is the SAP-version.

Features:
- A view of SAP-information on the map
- Limited analyses possibilities (how many work orders within a given area)
- ESRI based but build on a HANA-database
Main points for SAP-GEF

GEF is used by
  – planners
  – Front-office employees

• GEF gives *operational* support for:
  – Visualising work in progress
  – Following up work in progress from the map (actions)

• Operational rapports will be approached from SAP (SAP Fiori tiles). By example:
  – # completed work orders for a period
  – # completed notifications per period
Example IT support for Mechanics: What will be done in SAP and what in GIS?

Considerations:
1. Primary registration of asset conditions will be in SAP.
2. For a few activities GIS and SAP have to work together.
Using GIS-Data in SAP PO-plans

- Some GIS-information is used for work order management. For example for hydrant inspections. Then it will be necessary that a subset of GIS data is also stored in SAP. In addition, it is not inconceivable that a subset of SAP data must be stored in GIS.

- Important starting point: Only information essential for work order management will be synchronized.

- SAP factory will be brought in to implement this (using sync4GEF)
Complex Analyses which require a combination of GIS and SAP data

A growing number of analyses use a combination of GIS and SAP data (network analysis). A solution must be found for this: Important starting point: Different user groups receive different solutions.

Vitens now distinguishes:

- **Information consumer** -> standardized reports offered via SAP Fiori
- **Business analyst** -> own questions within standard building blocks. Use CDS views / SAP BW / SAP BO / power BI
- **Advanced analyst** -> use SAP and GIS data in own solution for example Infoworks/Arc Gis
- **Data scientist** -> explore data in proprietary tools using proprietary algorithms. The challenge is providing the data
Supporting Analysts:

Datascientist
Advanced analyst
Business analyst

Python
R
Datalake

Infoworks
ArcGis

PowerBI
CDS views
SAP BO

GIS4ALL
GEF

Spatial DWH
SAP BW

NRM
ArcGis Desktop
SAP 4Hana

Datalake
Virtual DWH (Logical datamodel)

Source
Integration

sketch
In Conclusion

- Starting in 2013: Vitens has been working on integrating GIS in our application portfolio. But it will take years to finalise.

- SAP and GIS were completely different worlds. Not many people had more than a basic knowledge how to combine both. Slowly the worlds of SAP and GIS are integrating. But to make it really work, will take time.
Standard vs customization the case of Rotating the map

Vitens made the choice to use standard software (anticipating acceleration of pace of software upgrades/the move to the cloud)

But what if functionality isn’t available in the standard product but the business demands it?

Example rotating the map on the laptop:
1. Not in the standard product
2. Roadmap ESRI: Functionality should be used on mobil platforms where it’s available
3. The Business don’t want to move to Arcgis for the fitters without it
4. Add ons have it (but buying it just for this feature?)
Example: Leak Finding
## Roadmap domein GIS

<table>
<thead>
<tr>
<th></th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>*<em>SAP Trans</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Koppeling SAP-GIS</td>
<td></td>
<td></td>
<td><strong>Geografische werkensturing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gs Doorontwikkeling 2019</td>
<td></td>
<td>Gs Doorontwikkeling 2020</td>
<td>Gs Doorontwikkeling 2021</td>
<td>Gs Doorontwikkeling 2022</td>
<td></td>
</tr>
<tr>
<td>real-time data en GIS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assetgegevens voor stakeholders</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tereinbeheer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GISALL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geoanalytics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brandfraanlocatieaanlevering aan veiligheid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assetmodellen op de kaart</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bodemverontreinigingsloket</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Umgevingsportal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uitfaseren Spatial workshop field</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Historisch geografisch inzicht in storingen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vectorseren huisaansluitchetsen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 D Gis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Overig</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Datakwaliteit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BGT/Bag rechtstreeks in het DWH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Beheer</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ArcGIS upgrade</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smallworld upgrade</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPW DWH upgrade</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infoworks upgrade</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ArcGIS Performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

*Note: The table contains information on various GIS-related developments and initiatives for the years 2018 to 2022, including topics such as GIS integration, real-time data, asset management, security, environmental analytics, and more.*
Locations