Introduction of spatial enabled data warehouse technology across the enterprise

Geospatial World Forum
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Joachim Figura, CISS TDI GmbH
Company Profile

The 3 Use Cases – Herten, Siegen, Duesseldorf

GeoETL-Tool CITRA®

Challenging CITRA Projects in brief

Closing Remarks
Foundation: 1982

Location:

CISS TDI
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Branch:
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CITRA®

Software product for analysis, modeling and exchange of complex spatial information between GIS and data bases.

Market entry in 1987

Currently > 5000 licenses in the market
(Geo) Data Warehouse

- Integration of data of different source systems and their administration in data bases
- Data supply with CITRA-ExportCenter or purchase via the web according to user needs
Data migration

Service for the complete and high quality transfer of data sets from a system A into another system B

CITRA’s modeling capabilities make it happen!
Company Profile

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Closing Remarks
Project GDW Herten – Parties Involved

→ City of Herten, multiple departments

→ Herten Public Works

→ Herten Utilities, gas, electricity, district heating

Illustration based on http://de.wikipedia.org/wiki/Ruhrgebiet
Available Geodata

- Municipal specific data
- Environment
- Public Transportation
- Traffic
- Land Register
- General Planning
- Urban Planning
- Urban Topography
- District Heating
- Electricity
- Sewage
- Gas
- Municipal specific data
- Civil
3 use-cases

Systems Involved

- Municipal specific data
- Web-Inquiry
- Sewag
- MapXtreme 2008
- Distric heating
- Urban topography
- MapInfo
- Electricit y
- Gas
- Environment
- Traffic
- ESRI
- Municipal specific data
- External
- Land register
- AutoCAD
3 use-cases

**Systems Involved – Connected by CITRA**

- Municipal specific data
  - Web-Inquiry
- Sewage
- PitneyBowes MapInfo
  - MapXtreme 2008
- AutoCAD
- External
  - Land register
- ESRI
  - Environmental
  - Traffic
  - Municipal specific data
  - District heating
  - Urban topography
  - Gas
  - Electricity
  - ...
The Challenge

- Constant growth of geodata sets
- Increasing demand for use of geodata
- Data exchange between different GIS-Applications and GIS-Technologies
- Internal exchange & with external partners
- Concepts for keeping data from the various systems and applications up-to-date
Goal (User Perspective)

- Improving the availability and usability of geodata within the company group
- Improving efficiency in decision processes
- Reducing costs due to consolidated and standardized processes
- Rapid benefits by implementing the most urgent components short term...
- ...and being able to complete the project without having to change technology
Goal (IT Perspective)

- Contemporary IT-structures (focus on IT not on GIS!):
  (geo-)data warehouse
- Separation of production and usage of data
- Standards, e.g. OGC
- Incremental implementation with low project risk
  → Moderate financial efforts
  → Benefits right from the start with the first data sets
  → Ready for future extension by adding new data sets or GIS technology.
Goal (IT Perspective)

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→ Oracle Locator/Spatial as geodata warehouse platform
3 use-cases

Systems Involved – Connected by CITRA

CITRA

- Municipal specific data
  - Web-Inquiry
- Environmental data
- Traffic
- Municipal specific data

- ESRI
- Urban topography
- Distric heating
- Gas
- Electricity
- External
- Land register
- Planning

MapXtreme 2008

Pitney Bowes MapInfo
3 use-cases

Systems Involved – Connected by CITRA

- Municipal specific data
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- MapXtreme 2008
- District heating
- Urban topography
Data Warehouse at Herten Group

3 use-cases

Production

Processing

Data Management

Users

utility data
- Smallworld -
Herten Municipal Utilities

environmental data
- Shape -
City of Herten

cadastral data
- MI TAB -
Dep. of traffic, transport...

(Geo) Data Warehouse

ArcGIS Server & ArcView

ArcGIS Server & ArcView

PitneyBowes MapInfo

autodesk

graphservice
3 use-cases

Achieved Results: Cadastre daily up-to-date
3 use-cases

Achieved Results: Gas Distribution Network
Benefits Realized Using CITRA for GDW projects

- All Goals and Requirements met or exceeded!
- Common and regulated use of data substantially improved
- Data is up-to-date
- Effort for provision of data is significantly reduced
- Synergies due to common usage of the ETL Tool CITRA, e.g. for the integration of data and for information retrieval
- Improved basis for taking decisions
- Process flow optimized due to direct access to the data
- Incremental implementation of GDW project stages
Data Warehouse at Herten Group

Production
- utility data - Smallworld - Herten Municipal Utilities
- environmental data - Shape - City of Herten
- cadastral data - MI TAB - Dep. of traffic, transport...

Processing
- CITRA neutral format

Data Management
- (Geo) Data Warehouse

Users
- Pitney Bowes MapInfo
- Autodesk
- Graphservice
Data Warehouse at Herten Group

Production

Processing

Data Management

Users

utility data
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environmental data
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ArcGIS Server & ArcView

PitneyBowes
MapInfo

autodesk

ORACLE

(Geo) Data Warehouse
Data Warehouse at Herten Group

3 use-cases

Operation ETL Warehouse Utilization

utility data - Smallworld - Herten Municipal Utilities
environmental data - Shape - City of Herten
cadastral data - MI TAB -

(geo) Data Warehouse

ArcGIS Server & ArcView
GC OSIRIS
PitneyBowes MapInfo

DXF
MapInfo
Shape

ALKIS

Geodaten-Online-Shop
Initial Situation: KDZ-Westfalen Sued Siegen

3 use-cases

HOST os390
landfill, sewage plant, etc.

ASCII data (e.g. town planning map)

OPR-GIAP

ALK-IDB
canal, natural monument, etc.

IBM-DB2

ALB/relational

S&K-Tiffany
small sewage works

Win-Kauf

ProBauG/G

MS-Access

Centura-DB e.g. cemetery

Win-Fried

CAD
DXF/DWG

Oracle

Oracle

Oracle
3 use-cases

Geodata Warehouse at KDZ-Westfalen Sued Siegen

Operation  ETL  Data management  Users

Cadastral data  Geodata  (Geo) Data Warehouse
Shape  Environmental data
DXF  Planning data
ISYBAU  Sewer data

Pitney Bowes MapInfo
autodesk
AutoCAD Map
StadtCAD Hippodamos
GeoMedia
Planning Office
GRAPPA / OnLine

graphservice
3 use-cases

Geodata Warehouse at Duesseldorf

Operation
- NAS / ALKIS
- MapInfo, Oracle
- MapInfo, Oracle
- MapInfo, Oracle

ETL

Data management
- MapInfo
- (Geo) Data Warehouse

Users
- Pitney Bowes
- MapInfo
- graphservice
- GRAPPA / OnLine
- GeoMedia
Geodata Warehouse at Duesseldorf

3 use-cases

Operation
- NAS / ALKIS
  - Cadastral data
- MapInfo, Oracle
  - Lande development
- MapInfo, Oracle
  - Hydrology
- MapInfo, Oracle
  - Waste deposits

ETL

Data management
- Oracle

Users
- MapInfo
- Oracle
- GRAPPA / OnLine
- graphservice

CITRA, GeoMedia, realis
Company Profile

The 3 Use Cases – Herten, Siegen, Duesseldorf

GeoETL-Tool CITRA®

Challenging CITRA Projects in brief

Closing Remarks
The Task
The Concept
The Translation in 3 Steps

Modeling tools

Working on CITRA format

Source ➔ “1:1” ➔ CITRA ➔ “1:1” ➔ Target

Syntactic conversion and classification of data

Syntactic conversion and checking consistency
The Implementation

Source → Analysis → Geometrical operations → Modify attributes → Enhance topology → Target

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Closing Remarks
Challenging CITRA use cases in brief

- Modelling of cadastre data
- CITRA Open Street Map Converter e.g. to Oracle & others
- CITRA in Smallworld Context
What does modelling mean?
Challenging CITRA use cases in brief

- Modelling of cadastre data
- CITRA Open Street Map Converter e.g. to Oracle & others
- CITRA in Smallworld Context
Open street Map → CITRA

• Derivation of an intelligent data model
• Handling of the large variety of combinations of OSM features and available tags.
• Management of exclaves and enclaves
• Suitable for a quick visualization
• Storage without loss of any information from the original source data
• Mapping on the Oracle Network Data Model
Map in MapInfo (data from Oracle Spatial)
OpenStreetMap in MapInfo from TAB-Format
Use cases in brief

Shortest Path
Challenging CITRA use cases in brief

- Modelling of cadstre data
- CITRA Open Street Map Converter e.g. to Oracle & others
- CITRA in Smallworld Context
Example Smallworld (e.g. LINZ AG)

- Mapping Smallworld -> Oracle Network Data Model
  - Topology on Smallworld is Geometry orientated
  - The Network Model on Oracle is Node Egde orientated

- Extraction of the entire data
- Dimensions
- Differential update
- Internal worlds
- Ready to use configurations from Smallworld NRM’s to Oracle, DXF SHP
- Raster data

→ Replacement of FME
Use cases in brief

Linz AG (Austria)

Dokumentation/As-built plans
- Netzinformation GE-Smallworld
  - Updating of the NIS-plans from SWS to Oracle
    - Daily update
  - Objects excavation projects in „GIS-Oracle“ „Live-Access“

Geodata Warehouse
- GIS ORACLE
  - Excavation coordination (incl. data collection)
  - NIS-Inquiry + NIS-Analysis
  - NIS-Inquiry-“Power“ + NIS-Analysis
  - GIS for public transport (Linz Lines)
  - Comprehensive NIS-Analysis
  - In development Internet plan inquiry

Applications (Inquiry, Analysis, partially data collecting)
- Additional modul to NRM's
- Thematic Mapping
- GeoMedia (shape)
  - comprehensive NIS-Analysis
    - Hydroconsult
- CAD (dxf)
  - Microstation, Autocad
    - sporadically
- GeoMedia (shape)
- CAD (GIS)
  - (dgn/dwg/dxf)

Bentley Microstation

Intergraph
Use cases in brief

Linz AG (Austria)

Intergraph Smart Client Workflow-application excavation plan

Planprintout: Excavation coordination (actual excavation plan Intergraph + as-built information from Smallworld)
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Closing Remarks
Challenge Warehouse

• merge data from different sources
• create a common data model for different requirements in usage and technology, as a rule - simplify data model, create metadata, create presentation – but regardless
• usage as comprehensive background information having sufficient space for future growth
• good visual presentation
Challenge Migration

- get all required data from source to goal
- map data best possible on the target
- quality assurance
- improve data quality e.g. correct data errors, create topology according to the possibilities of the goal system
Questions
Use cases in brief
Austrian Linz AG

Intergraph Smart Client

Inquiry und Analysis via Intergraphs
Smart Client in the Intranet

- From the Oracle-Geodata Warehouse
- Geobasis data (basemap, orthophotos, …)
- All network data from Smallworld-NRM
  (electric power, gas, district heating, water, sewer)
- GIS-Data Linz public transport lines
  (INGR-Geotrams for public transport e.g. bus, street car)
Use cases in brief

Austrian Linz AG

Intergraph Smart Client Workflow-application excavation plan

Excavation coordination within LINZ AG = Workflow-controlled Coordination of excavation projects across all divisions using Intergraph Smart Client-Workflow with network data from GE-Smallworld
Gas billing
– Query on Geografic Data without GIS

Task:

Legal Provision:

The gas bill has to be based among others on the elevation of the delivery point. The delivery points have to be assigned to appropriate elevation zones.
Query on Geografic Data without GIS
Gas billing

Problem:

- Addresses don’t have any coordinates, nor information about the elevation, nor an assignment to appropriate elevation zones, e.g. urban districts
- Elevation is only available in form of the DTM (raster)
Query on Geographic Data without GIS
Gas billing

Solution:

• Geocoding of the addresses, projection of the elevation from the adjacent raster points to the addresses, searching appropriate elevation zones and mapping of the addresses to the zones, and if required use a background map, e.g. OSM, Navteq, Tomtom