Geneva cadastral data historization (4D)

Outline

- Introduction
- Context
- Technical description
  - Use of temporal data
- Feedback / Conclusion
arx iT presentation

- Founded in 2001
- Company based in Geneva, Paris, Lyon
- Core business: provide a wide range of GIS services
- The company is active in the following domains:
  - Set up SDI
  - Custom GIS development (Desktop, Web and mobile)
  - Spatial data processing (open & big data)
  - Consulting / Expertise / Training
Customer’s context

- The customer = Official Survey Department of the Canton of Geneva (DMO)
- DMO is in charge to keep the cadastral data up to date
- To meet a legal requirement (Ogéo law), forcing the historical description of geographical data ->
  - DMO decided to add a temporal component to its data management / process
- The main goal is to query and visualize the state of the cadastral data for any given date
Customer’s context

- **1st step**: analyze the possibilities provided by existing standard ESRI products used by DMO such as ArcGIS.
  - Unfortunately, using these existing tools was not sufficient enough to meet the client’s needs regarding it’s data management

- **2nd step**: development of a prototype tool – based on ESRI technologies – capable of managing data temporality
  - This proof of concept was a success, as it was possible to visualize the evolution of geographical objects throughout time and space
Customer’s approach

- 3rd step: implementation of the final solution, in a production environment
- This solution is composed of:
  - A temporal geodatabase
  - An ArcMap Add-In plugged to the editing tools
  - Quality control tools
Temporal geodatabase

- The concept: feature classes + temporal attributes, Event table

- Each object has a lifetime $\rightarrow$ tracking its evolution

- Events used to log modifications on the objects $\rightarrow$ statistics
ArcMap Add-In plugged to the editing tools

- Data management workflow:
  - The ArcMap Add-In is seamlessly integrated with the initial process
The Add-In user interface

- Visualization of the changed objects
- Logging an event for each object
- Saving the objects into the temporal database
The Add-In user interface

- *4D in action!*
Use of standard ArcMap tools

- Use the time slider to visualize the evolution of data
- **4D in action!**
Control tools using temporality

Two monitoring and data query tools have been developed and deployed at DMO

1. Visualization of the modifications:
   - Highlights on the map all the updates made in the current session
   - Export them into a csv file
Control tools using temporality

2. Visualization of the temporal data:
- Query the Event table (attributes only)
- Visualize the corresponding geographical objects on the map
Feedbacks / Conclusion

- The temporality tool is used successfully for more than a year

- All the data managed by DMO, 90 entity classes, are time-enabled and:
  - Any change in the cadastral database is logged and historized
  - The new process is fully integrated with the initial workflow; this new tool has a minor impact on the every day work of the DMO operators
Feedbacks / Conclusion

- DMO is a pioneer in cadastral data historization

- The application is highly flexible: its principle can be applied:
  - To other topics
  - To other GIS clients (for instance QGIS)

- The new version supports historization for 3D objects

- Other departments are interested in deploying this tool for their projects