Map design process modelling using BPEL language

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Used methodology

- Jan Pytel. NOP.

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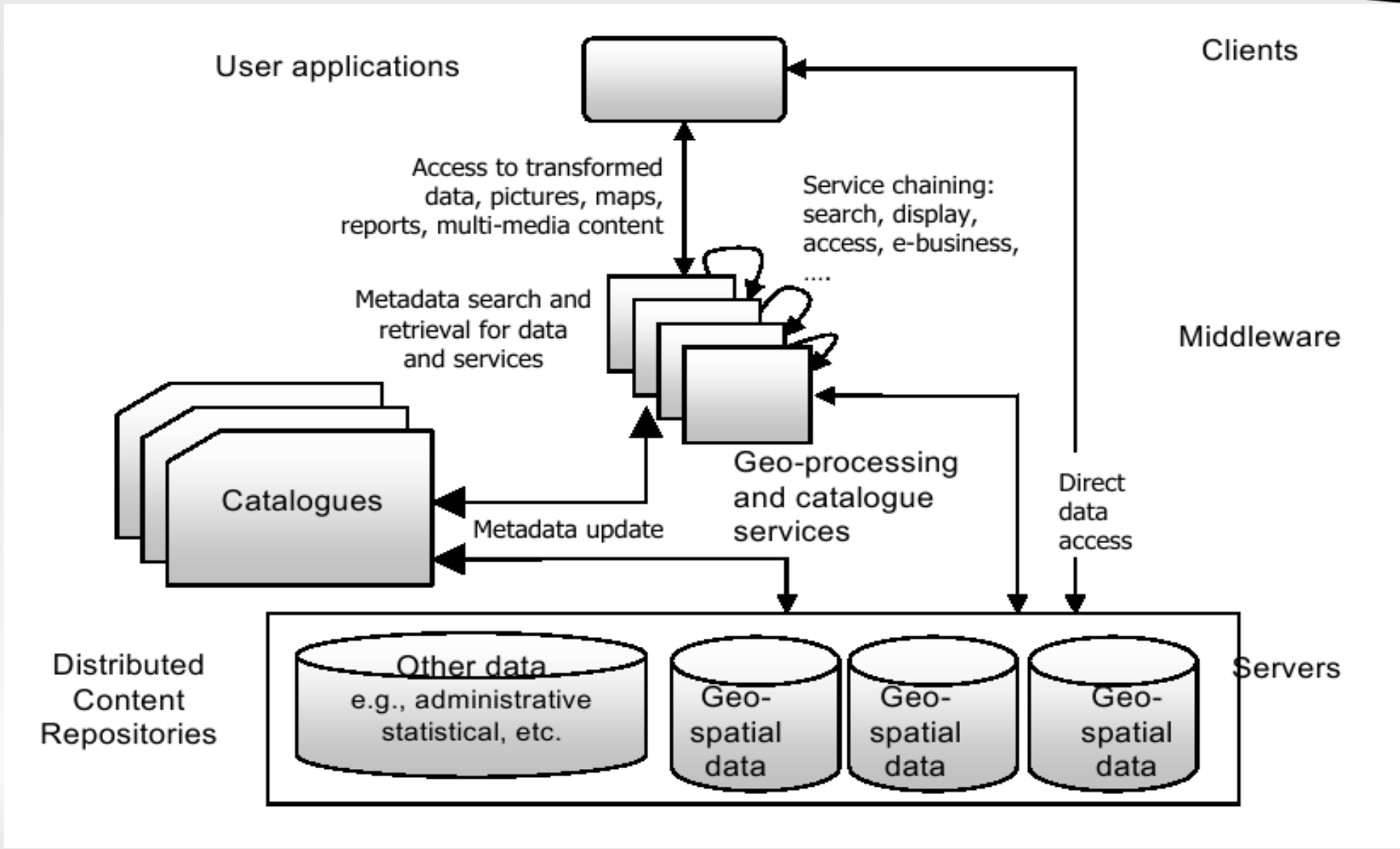
GeoWeb - INSPIRE



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GeoWeb

- WebMapping – clients and map services
- Web services
- Catalogues
- ...

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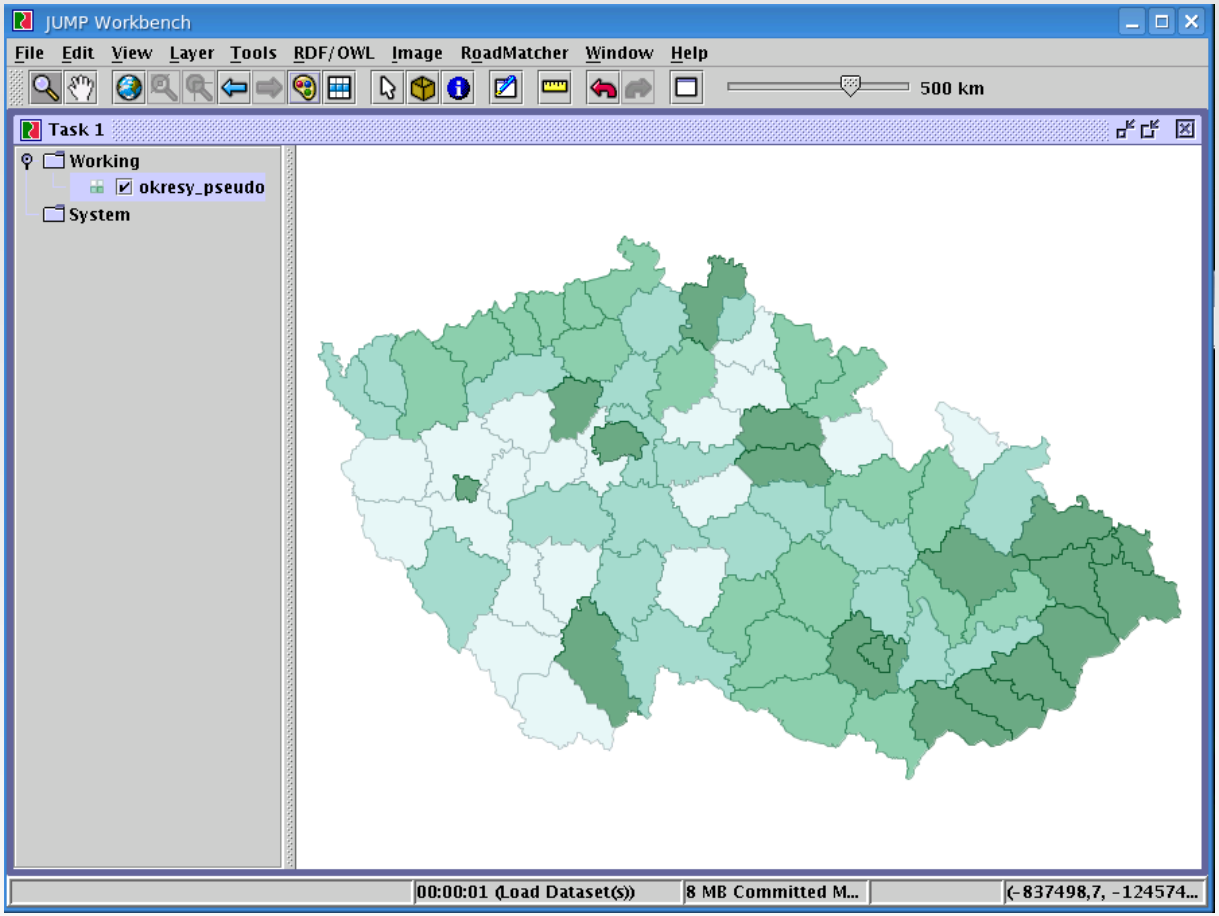
Services

- Geodata
- Metadata
- Cartography
- Sensors
- Analytical
- Transform
- ...



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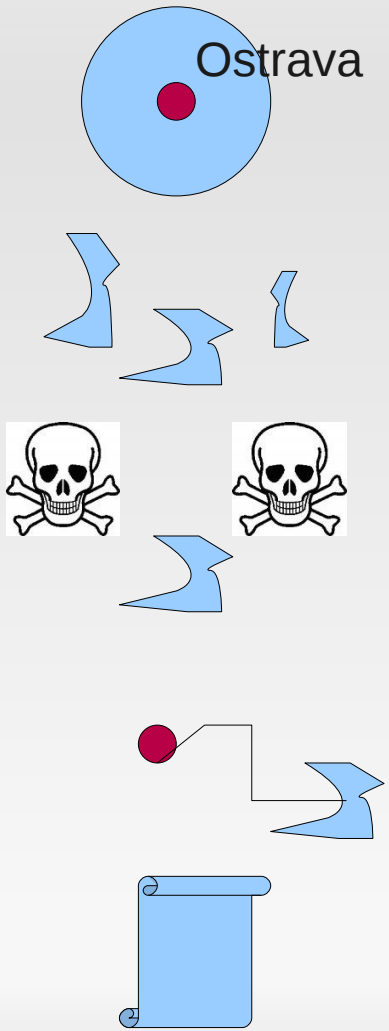
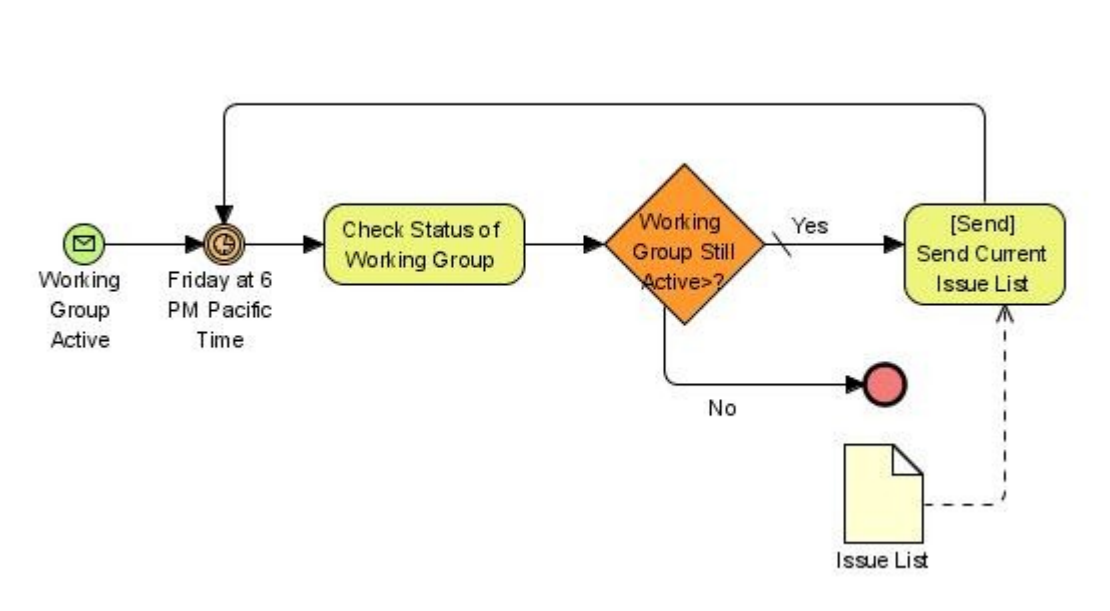
Simple process

- Find water areas for swimming
  - Buffer on city
  - Select water areas in the buffer
  - Information about water quality
  - Select water area with appropriate water quality
  - Find shortest routes to selected areas from source place
  - Report routes and areas' names to user



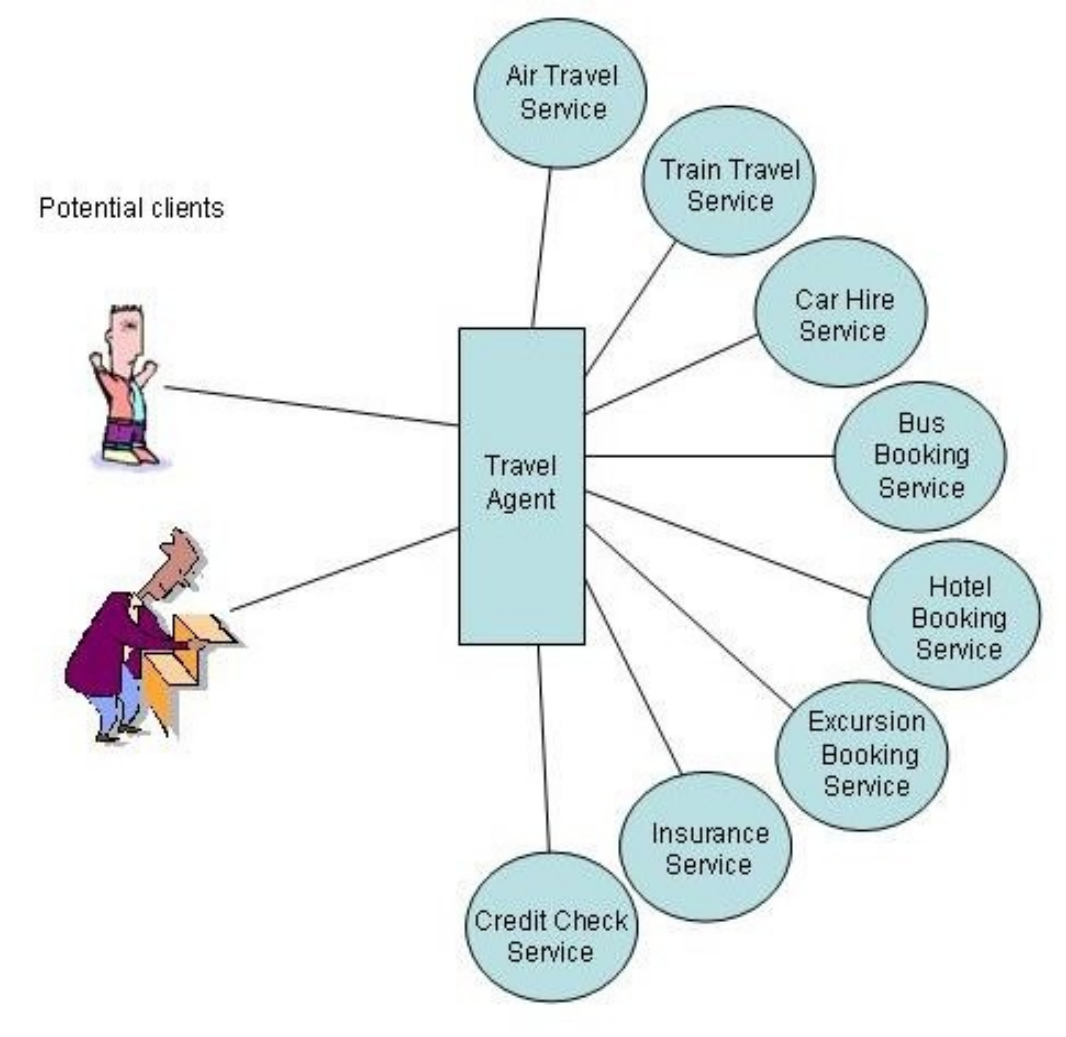
Process description

- Formal description of activities
- Schemas – UML, BPMN, BPEL



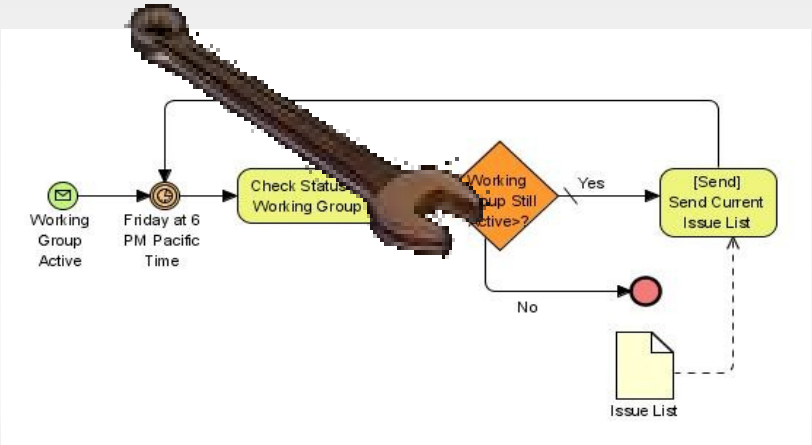
Orchestration of a process

- Chaining
- Coordination
- Conditions
- Loops
- Transactions
- Choreography
- ...



Advantages of orchestration

- Control over a process
- Visual design (diagrams) understandable on a different levels of a management
- Changes of the design are directly compiled into a software component



Software

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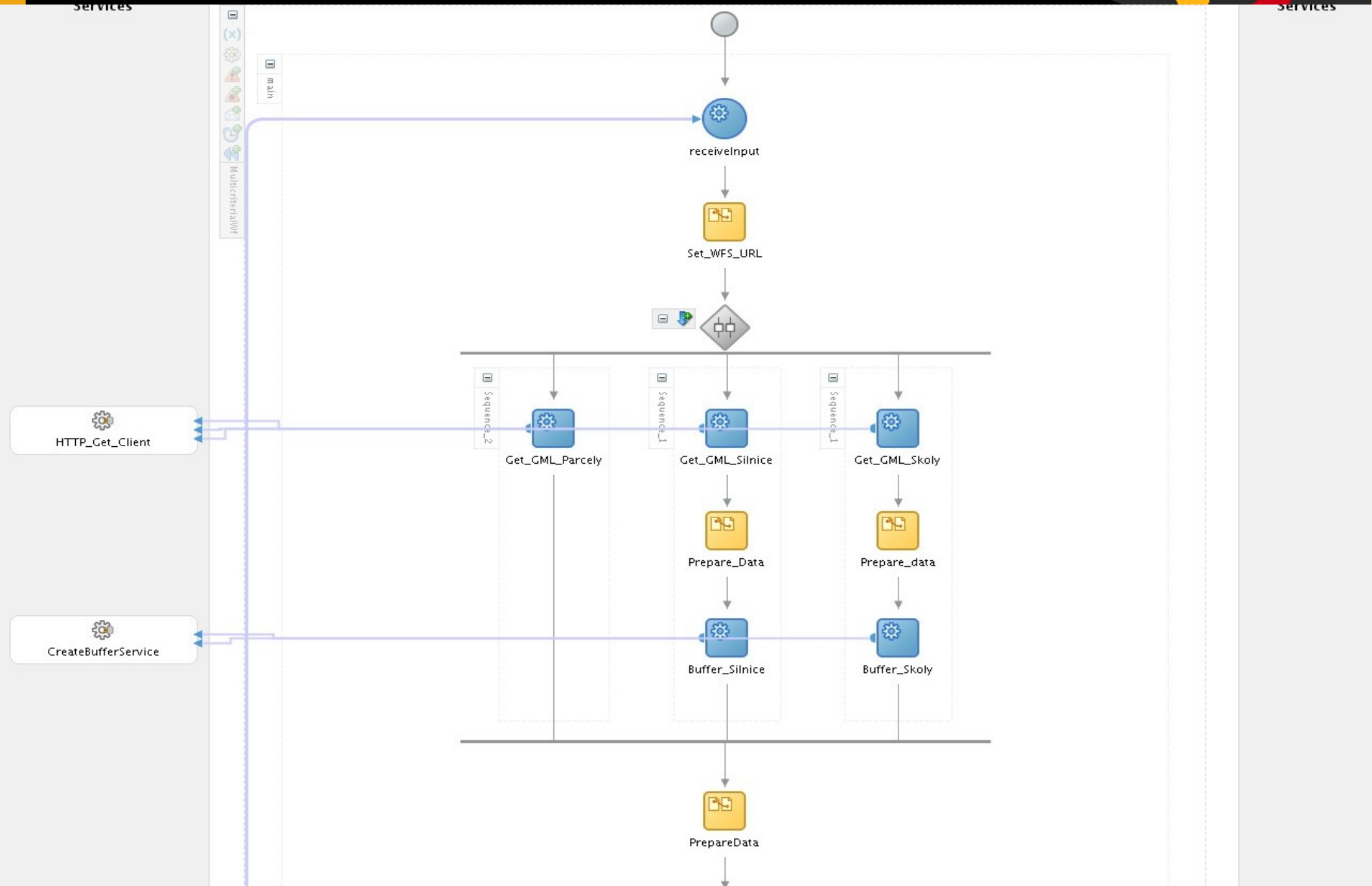
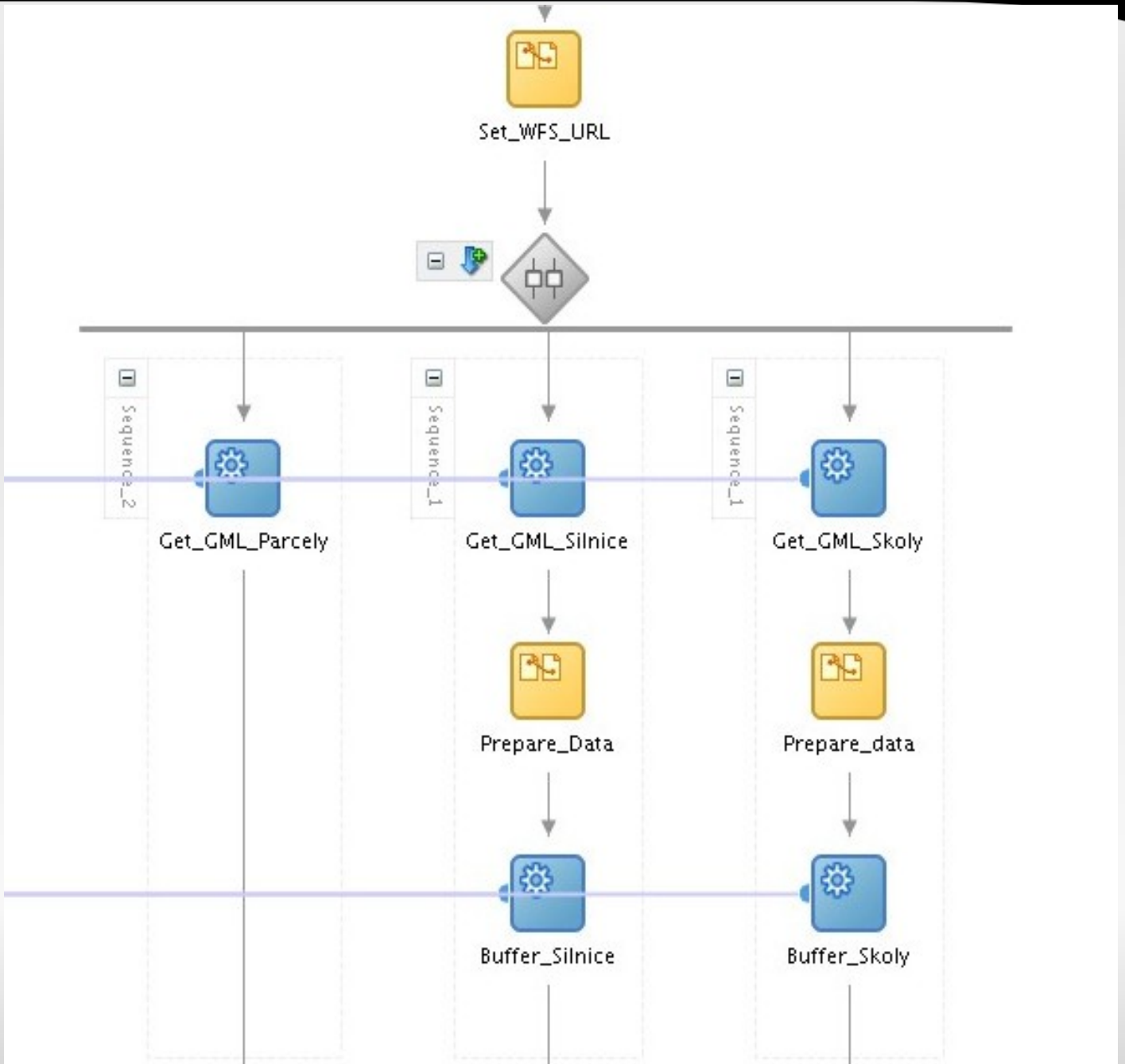
BPEL

- One of the possible languages for a process modeling
- Business Process Execution Language
- OASIS

BPEL


Services
main
receiveInput
Set_WFS_URL
Sequence_2
Sequence_1
Sequence_1
HTTP_Get_Client
Get_GML_Parcely
Get_GML_Silnice
Get_GML_Skoly
Prepare_Data
Prepare_data
CreateBufferService
Buffer_Silnice
Buffer_Skoly
PrepareData
Services

BPEL


Set_WFS_URL
Sequence_2
Sequence_1
Sequence_1
Get_GML_Parcely
Get_GML_Silnice
Get_GML_Skoly
Prepare_Data
Prepare_data
Buffer_Silnice
Buffer_Skoly

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The Fire Protection Atlas of the Czech Republic

- Choropleth and diagram maps
- Based on statistical database of incidents investigations and data gathering
- User defined conditions

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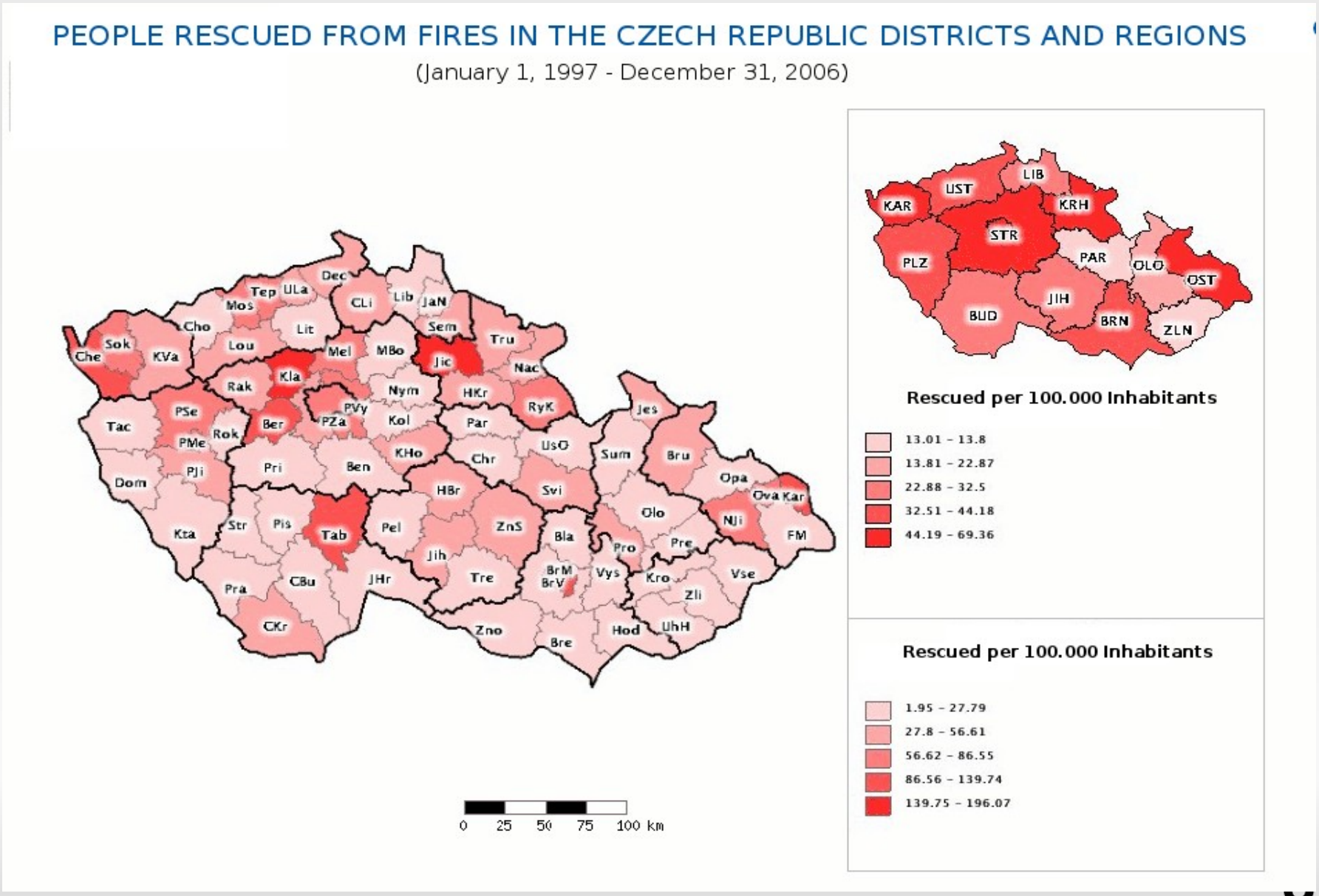
User defined conditions

- year from/to of events,
- type of events (e.g. fire where were injured fireman),
- statistical method for generating class intervals (Jenks, Equal interval, etc.),
- number of classes,
- type of frequency (square km, population)
- start colour, end colour for classes visualization

Choropleth map as the result



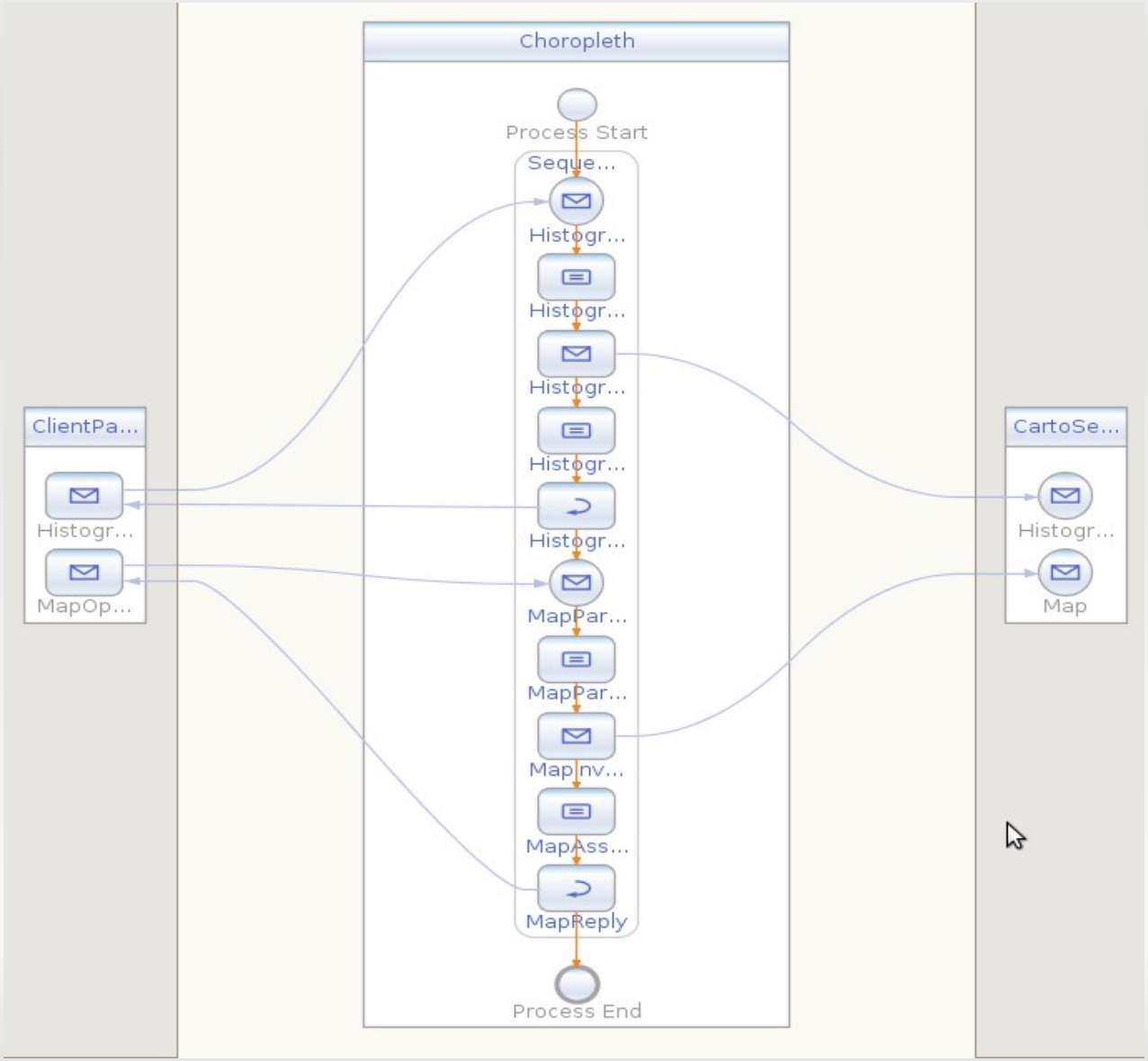
Two examples

- Model of the current situation
  - Asynchronous process
- Model of the possible future situation
  - Synchronous process

Asynchronous process

- Model of the current situation
- Two sets of steps (starts with user input)
  - Receive a first input from the user
  - Invoke WS that generates a histogram.
  - Reply the histogram to the user.
  - Receive a second input from the user
  - Invoke web service that generates a map.
  - Reply the map to the user

Asynchronous process



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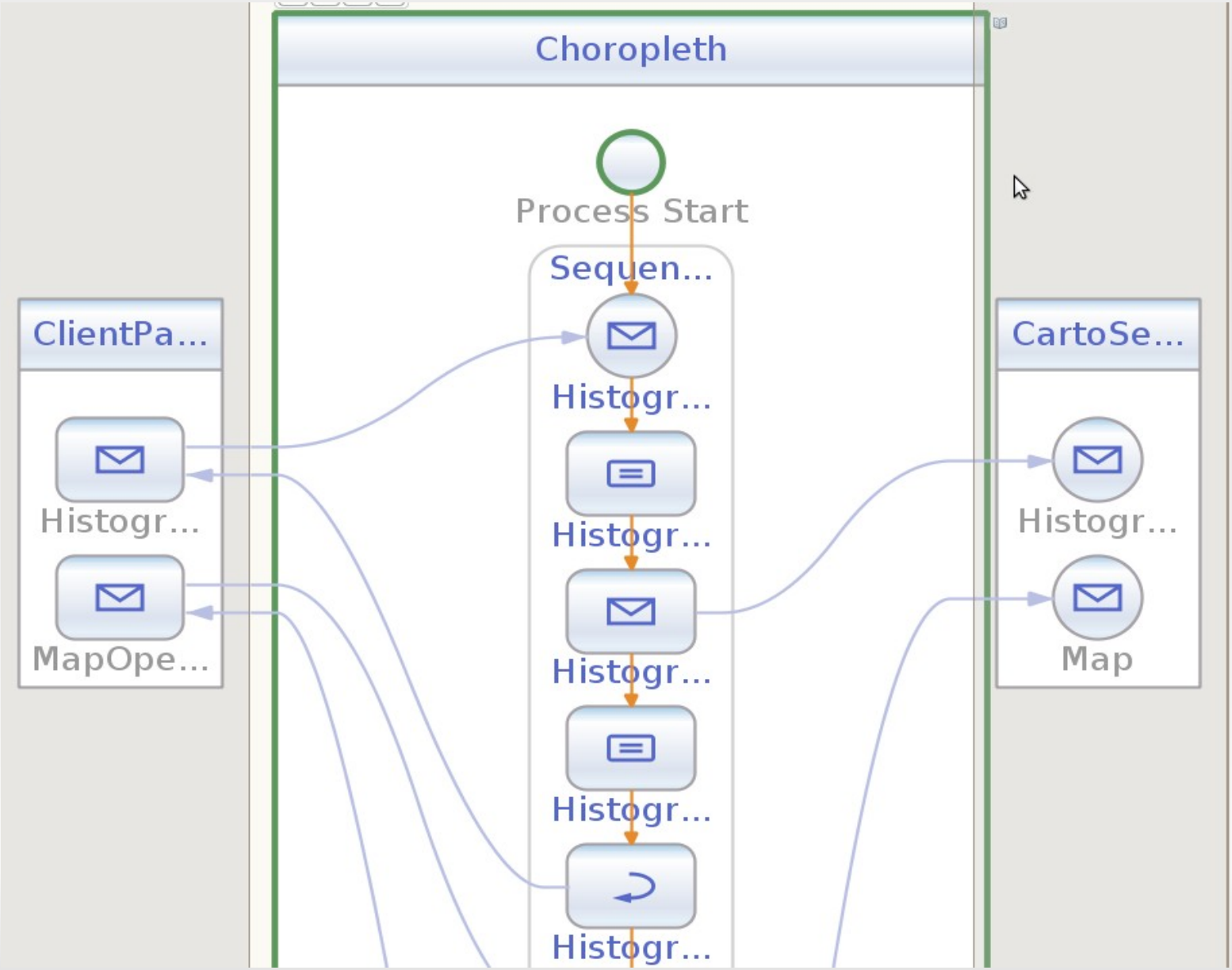
Asynchronous process



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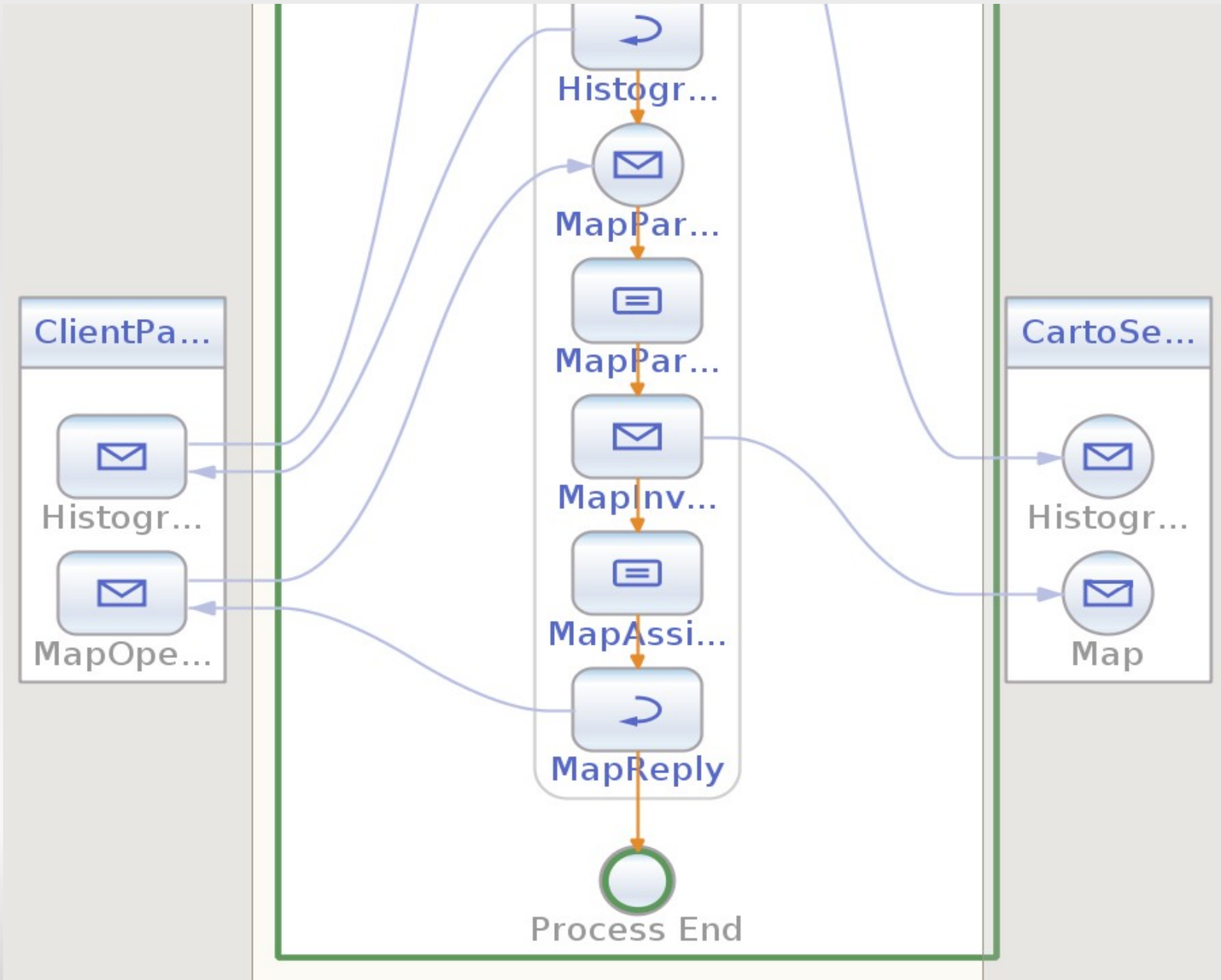
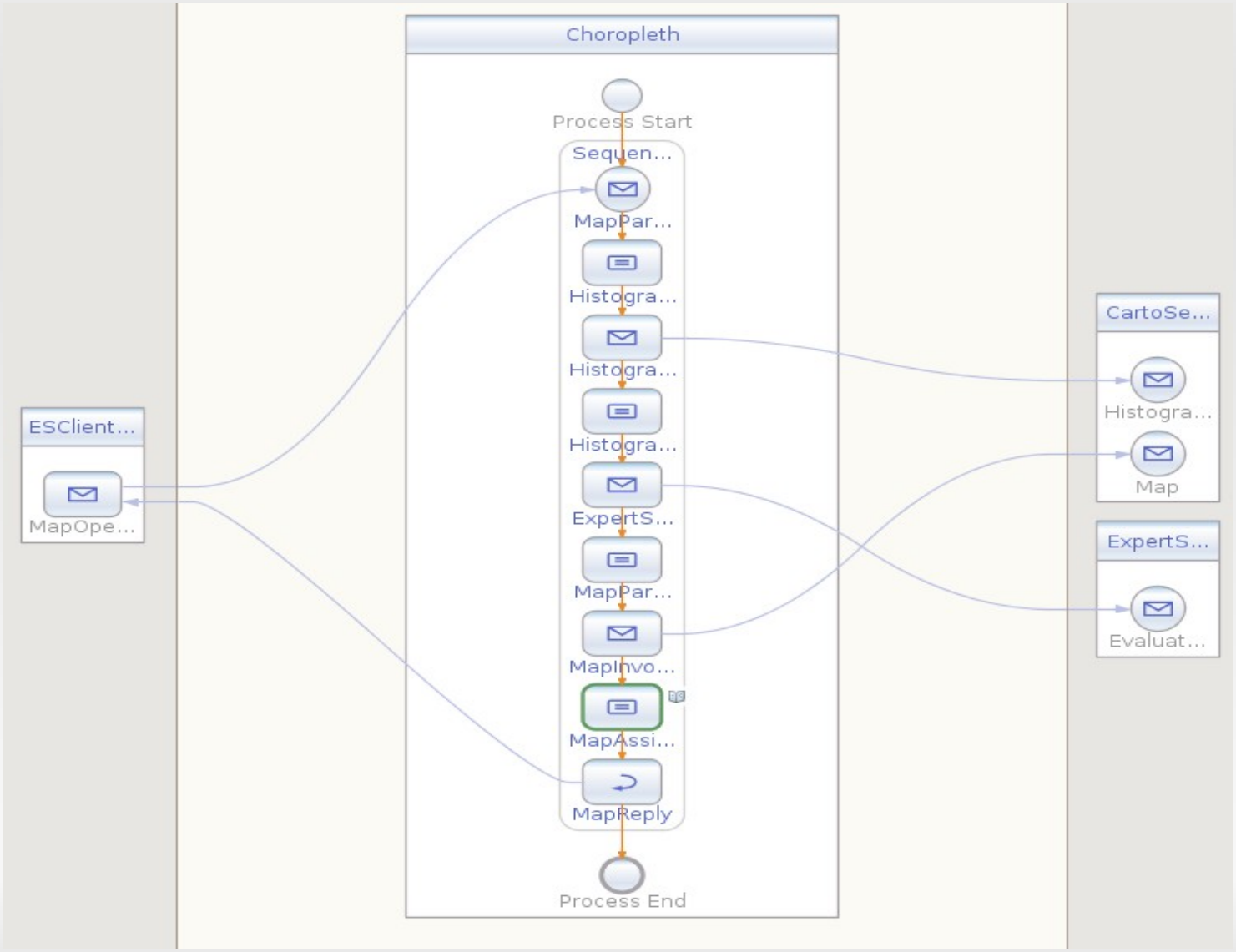
Asynchronous process



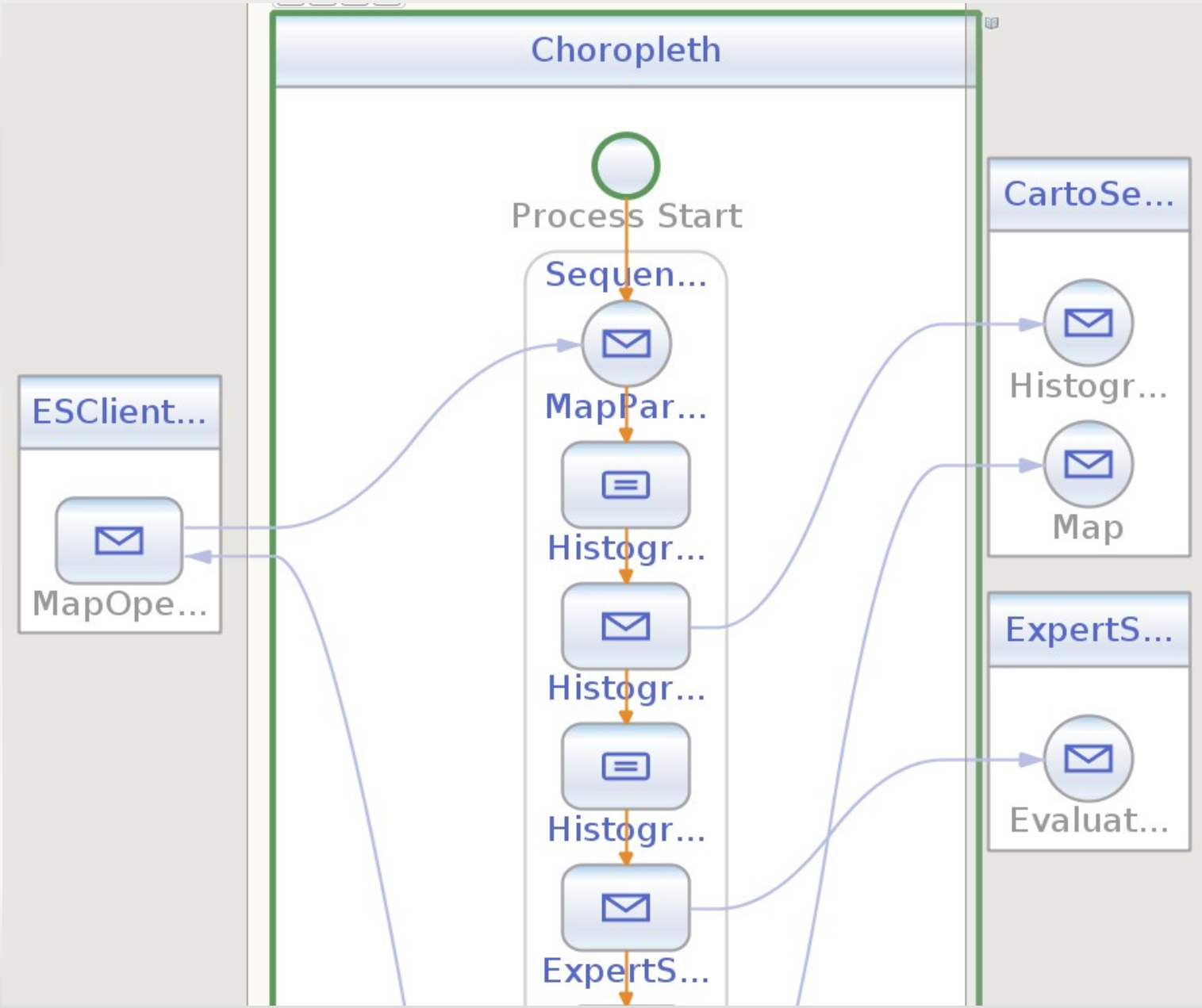
Synchronous process

- Model of the possible future situation
- One set of steps
  - Receive an input from the user
  - Invoke web service that generates a histogram.
  - Invoke web service that evaluates histogram and generates parameters for map creation.
  - Invoke web service that generates a map.
  - Reply the map to the user

Synchronous process



Synchronous process



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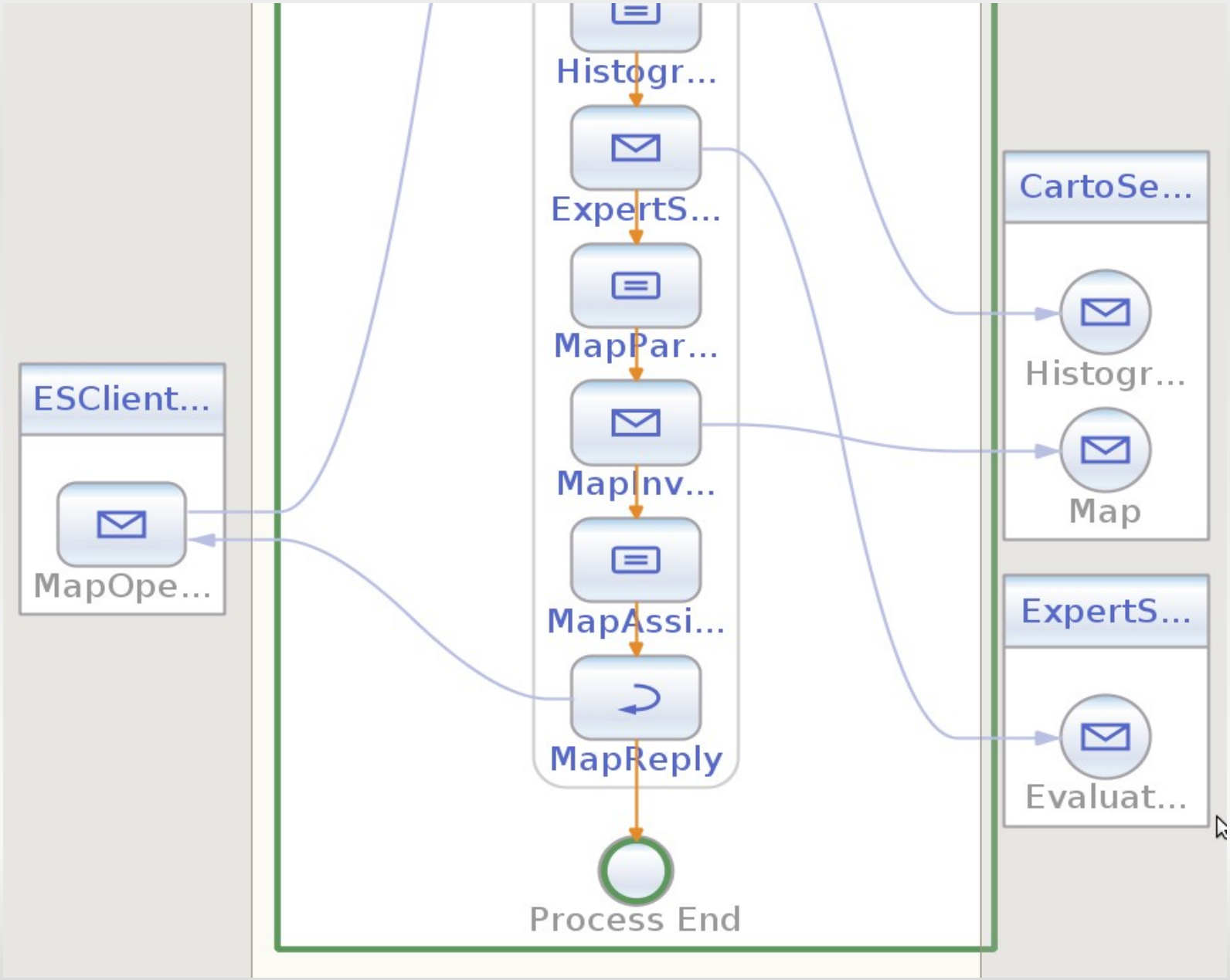
Synchronous process



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Conclusion

- We can use BPEL to describe process of map creation
- In a case where steps of the process can be solved by web services the whole process can be deployed as a software component

Thank you for your attention

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Used sources

- http://www.pro-party.cz/cs/tematicke-party-plany/piratska-party/omalovanky-k-vytisknuti/
- http://inspire.jrc.ec.europa.eu/
- http://klic-nastroj.navajo.cz/
- http://kokos.vsb.cz/wiki
- Prager, M.; Klímek, F.; Růžička, J. GeoWeb Services Orchestration Based on BPEL or BPMN? In Proceedings from symposium GIS Ostrava 2009, Ostrava, 2009, ISSN 1213-239X.