GeKon
applying novel aproaches to GIS development

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Outline

• Introduction
• Object-oriented approach
• GeKon project
• Conclusion and future work
Introduction

• GIS evolution
  – digitalization of cartography
    • points, lines and polygons
  – additional information
    • DBF files, images

• Present GIS data management

• Semantic gap
Present GIS data management

- SHP, SHX, DBF, SBN, SBX files
- SQL databases
- high level of granularity
- layered structure
- no topology
- primitive geometry
- sophisticated analyses
Semantic gap

real world

maps

points, lines, polygons

records
Object-oriented approach

• OOA as the solution of the problem
  – data and functionality are encapsulated
  – objects communicate by messages
  – objects are able to inherit properties
  – objects are collected in classes
  – objects could have relationships

• Object-oriented modelling
• GIS development projects
Object-oriented modelling

- Balovnev et al. (1999) – GeoToolKit
- Nebiker (2003) – DILAS server
- Kolbe & Goeger (2004) – CityGML
GIS development projects

• Papers
  – Michael Kofler (1998) – R-trees for visualizing and organizing large 3D GIS databases
  – Balovnev et al. (1999) – GeoToolKit
  – Lurie et al. (1997) – A Smalltalk-based extension to traditional GIS
  – Chance et al. (2000) - Smallworld GIS: An object-oriented GIS – issues and solutions
GeKon project

• student project
• under development
• primarily designed as data convertor
• could serve as a classical GIS
• Squeak Smalltalk
  – Morphic
  – Shapes
  – OmniBase
Conclusion and future work

• GIS development requirements
• Further steps in GeKon project
GIS development requirements

- separate geometric representation
- use proper indexing structure
- build the system from user interface
- let the user construct the domain model
- incorporate only pure object technologies
Further steps in GeKon

GeKon

- GeKonIndexingManager
  - IndexedTrees
  - IndexedTables
  - IndexedFiles

GeKonNetworking

GeKonDI

GeKonCore

GeKonGUI

GeKonInputDevices

GeKonVisualizationManager

- OpenGLVisualizer
- MorphicVisualizer
- PDFWriter

GeKonDataManager

- DataManipulator
- DataReader
- DataWriter

GeKonAnalysisManager

- SpaceAnalyst
- StructureAnalyst
- ShapeAnalyst

CellStore
Thanks for your attention