INF329

Presentation of

Zhao (2002)
Domain Analysis of Web Geographical Information System (Statistics Department, Iowa State University, USA, 17pp.)

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Abstract

- Apply FODA on the WebGIS domain
  - Definition of the domain, structure and context
  - Feature analysis
  - Information analysis
  - Operation analysis

The WebGIS domain

GIS = Geographical Information System

- spatial information is stored, transferred, managed, analysed and represented

WebGIS (WGIS):

- Communication platform: Internet
- Computing model: distributed computing theory
- Application model: GIS theory and technology

Definition of the WGIS domain

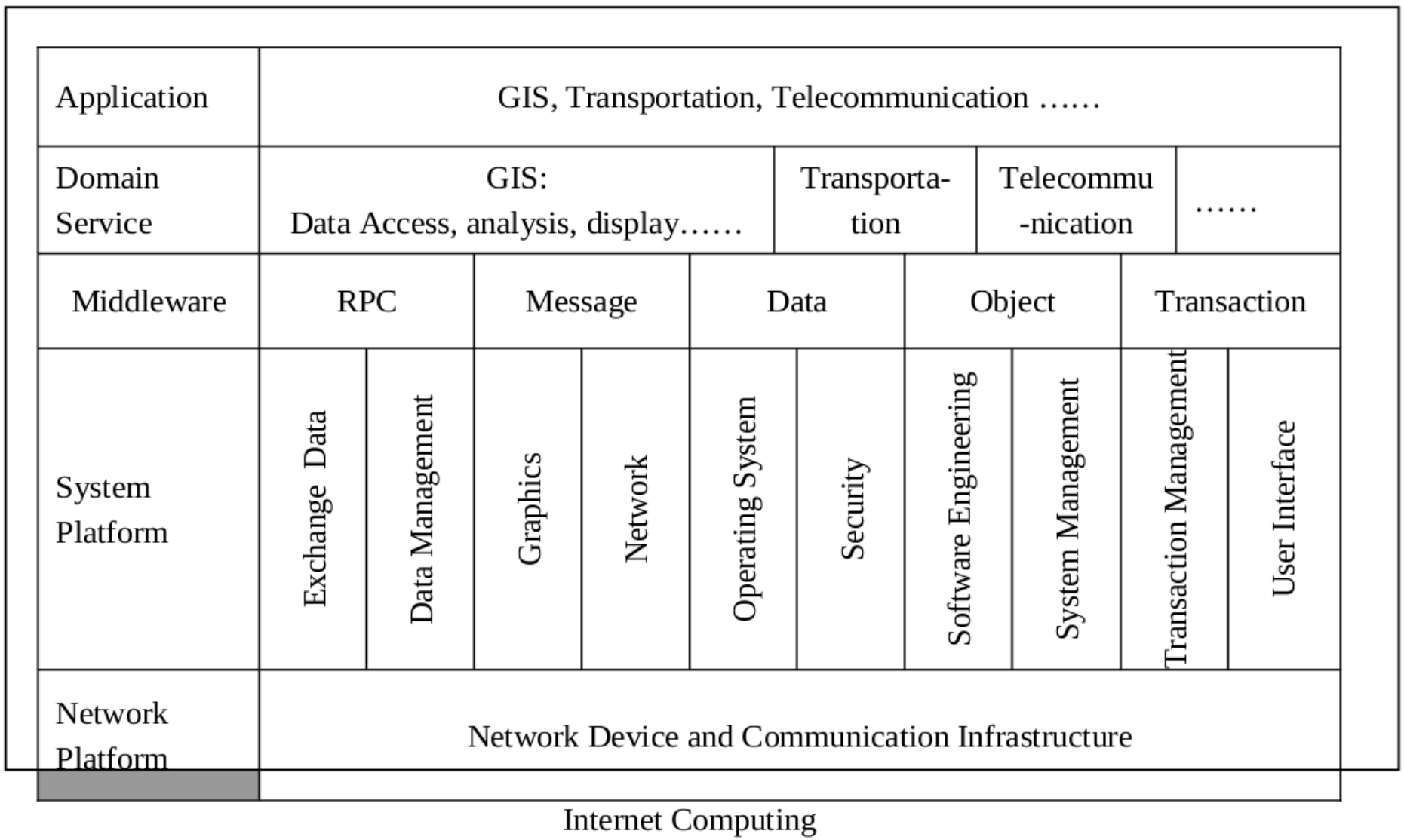
Related Applications

Current main WGIS computing model: multi-tier client/server

- Client -- interacts with the user
- Application server -- provides the spatial information services
- Data server -- storage

Definition of the WGIS domain

WGIS context 1: domain structure



Definition of the WGIS domain

WGIS context 2: data flow diagram

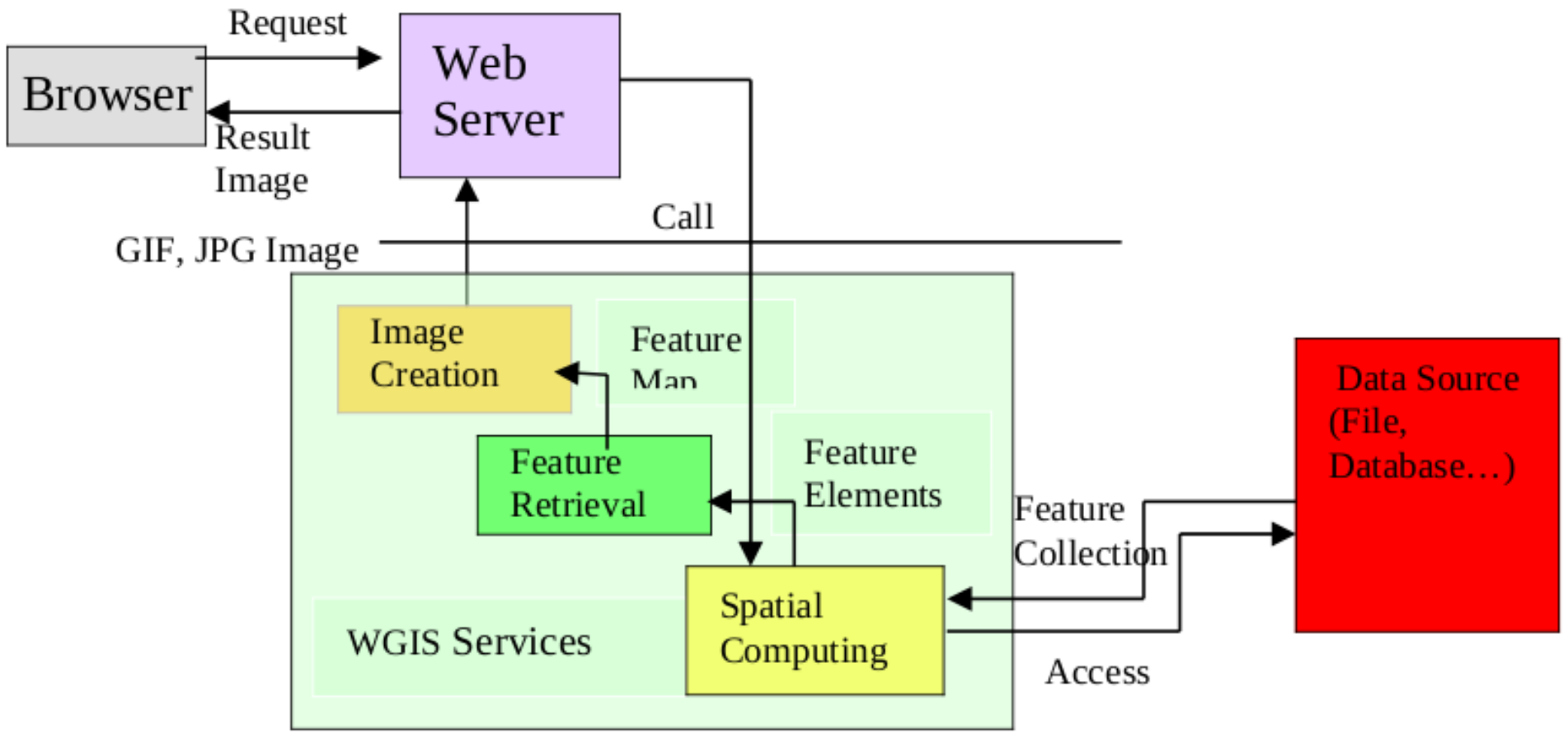
Distribution of domain services between the server and the client.

Define the context of the domain of WGIS as either thin, medium or thick client.

Definition of the WGIS domain

WGIS context 2: data flow diagram

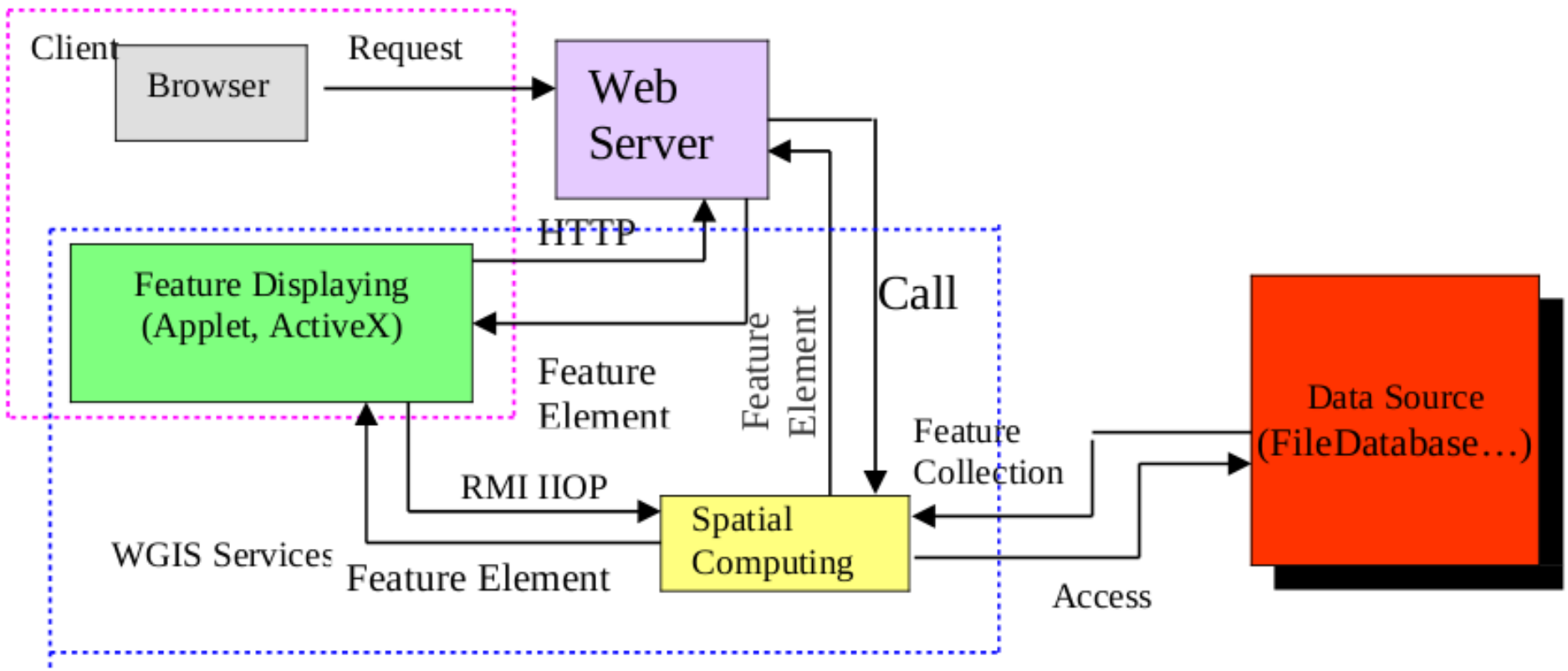
Thin client context diagram



Definition of the WGIS domain

WGIS context 2: data flow diagram

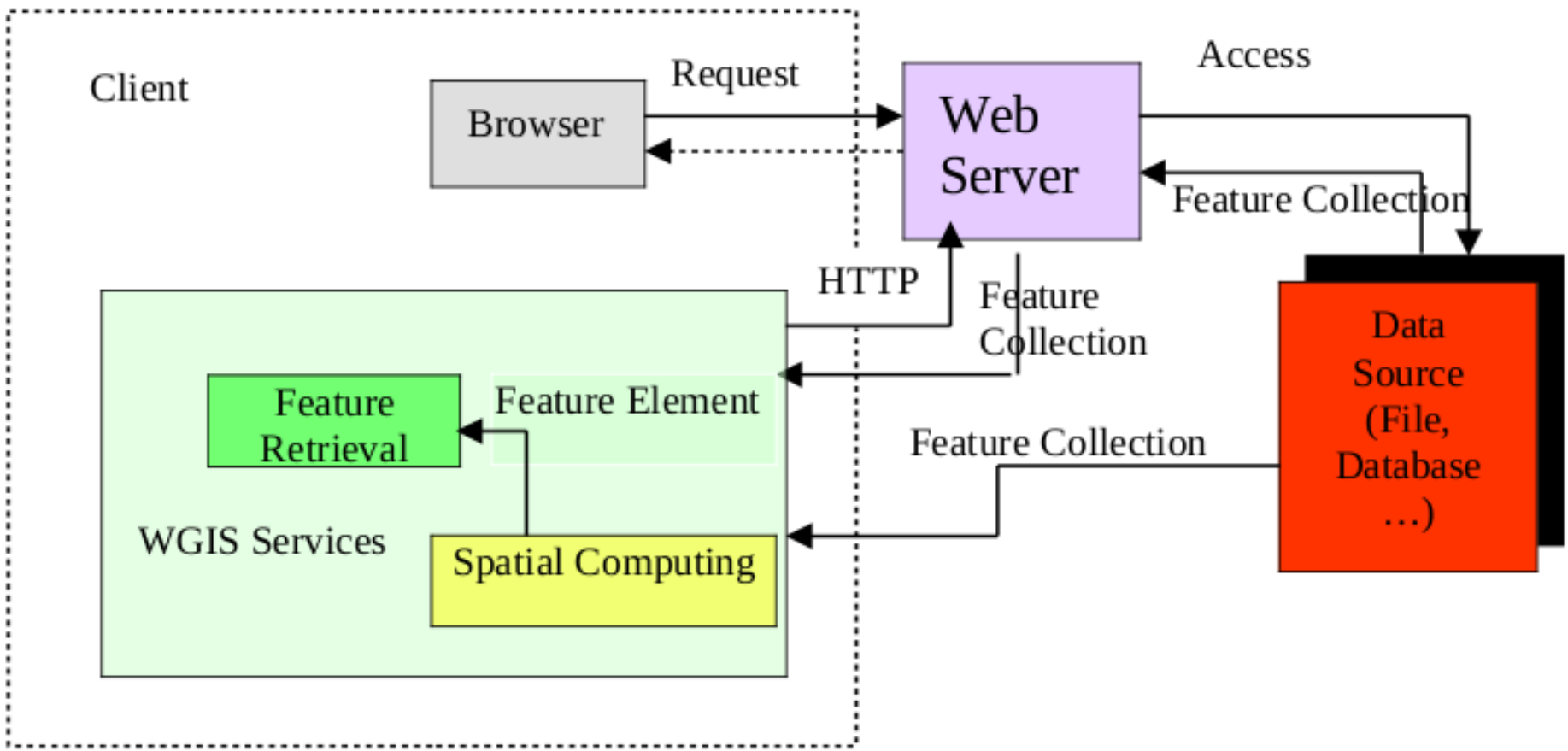
Medium client context diagram



Definition of the WGIS domain

WGIS context 2: data flow diagram

Thick client context diagram



Domain model of WGIS

Feature analysis of the domain

- Features: the common attributes and differences of the applications in a domain
- Purpose: capture end-user's understanding of the general capabilities of applications
- Features are divided into
  - context
  - representation
  - operation
- Features have to be either mandatory, optional or alternative

Domain model of WGIS

Context feature

- application tasks and using mode
- efficiency, requirement precision of system

Example:

< Mission > ::= < View > | < Decision > | < Edit >
where
< Edit > ::= < Spatial > “,” < Attribute >

Domain model of WGIS

Operational feature

- describe system functions

< Access > ::= < Retrieval > “,” < Metadata > “,” < Packaging >

where

< Retrieval > ::= < Select > “,” < Update >

< Metadata > ::= < Create > “,” < Submit >

< Packaging > ::= < Generalization > “,” < Compression > “,” < Transfer >

< Generalization > ::= < Geometry > “,” < Attribute >

< Compression > ::= < No_Losing > | < Losing >

< Transfer > ::= < File > | < Object >

Domain model of WGIS

Representation feature

- describe how data is represented to the user

< Representation_Feature > ::= < Vector > “,” < Raster > “,” < Attribute >
where

a) < Vector > ::= < Map > | < Image > | < XML >
b) < Attribute > ::= < Text > | < Graph >
c) < Text > ::= {< Annotation > | < Table >}*
d) < Graph > ::= { < Pie > “,” < Column >}*

Domain model of WGIS

Information analysis of the domain

- Purpose: capture and define domain knowledge and data requirements which are important for application implementation

Information model 1

Domain information units (entities) and their relationships

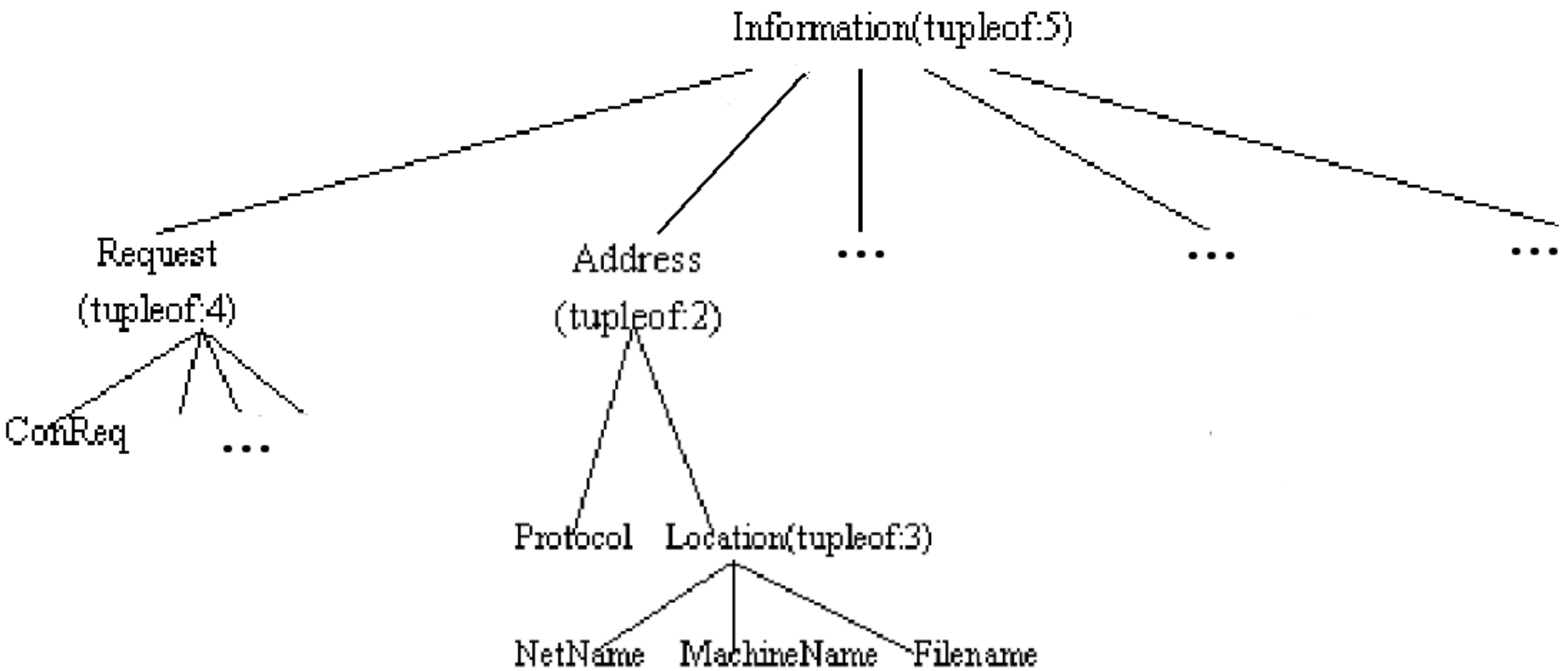
(Draw a small section of the model)

Domain model of WGIS

Information analysis of the domain

Information model 2

The different types of information -- tree structure



Domain model of WGIS

Information analysis of the domain

Information model 2

The different types of information -- defined more closely

- “Request”
  I. “ConReq”
  Relationships: is-a (Request)
  contains (Address::)
  contains (OperInfo:: (=<connect>.....))

  ...

Domain model of WGIS

Information analysis of the domain

Information model 2

- “Address”
  I. “Protocol”
     Relationships: partof (Address)
     contains (ProName:: (=<HTTP> | <IIOP> | <file> ...))
     contains (“://”)

  II. “Location”
     Relationships: partof (Address)
     may contain (NetName:: (=<IP> | <Domain> ...))
     may contain (MachineName::)
     contains (FileName::)

Domain model of WGIS

Operation analysis of the domain

- Purpose: show how the application works, help the user to understand the domain application
- Operation model: describes control structure and common behaviour of the system
- Here: state diagram of the Map Server

Thoughts

- Last part of domain analysis: Architecture model ...?
- "So how domain design uses the products of domain analysis is our further research" -- not able to find any