

Modelarea și prelucrarea distribuită a datelor spațiale geografice și de mediu

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- Cerinte, Obiective
- Prelucrarea distribuita a datelor
- Beneficii
- Infrastructura MedioGrid
- Clasificarea imaginilor satelitare – Greenland, Waterland, Minerals
- Modelarea si prelucrararea datelor spatiale
- Modelarea si vizualizarea spatiului virtual geografic
- Concluzii



Cerinte, Obiective

- Prelucrarea paralela si distribuita a datelor masive (spatiale, aplicatie)
- Accesul simplu al utilizatorilor la informatii geografice si de mediu
- Accesul specialistilor la resurse de calcul si prelucrare de foarte mare putere
- Compatibilitatea cu tehnologiile existente (formate, unelte, baze de date etc)
- Arhitectura flexibila, distribuita cu utilizarea in comun a datelor si resurselor de calcul (Arhitectura bazata pe servicii Web, servicii Grid, servicii de Web Semantic)
- Prelucrari care necesita resurse de calcul specializate (modelarea spatiului virtual, vizualizare fotorealista, simulare situatii de criza, modelarea riscului, modelarea ecosistemica etc)

Solutii



- Utilizarea in comun a resurselor
- Prelucrarrea distribuita in arhitecturi specializate
- Cooperarea interdisciplinara
- Utilizarea tehnologiilor actuale cu directiile moderne de cercetare



Infrastructura MedioGrid

MedioGrid

– Prelucrarea grafică paralelă și distribuită pe structura grid a datelor geografice și de mediu.

Consortiu de cercetare:

- Universitatea Tehnica din Cluj-Napoca
- Universitatea Babes Bolyai Cluj-Napoca
- Administratia Nationala de Meteorologie
- Universitatea Politehnica Bucuresti
- Universitatea de Vest Timisoara
- iQuest Technologies
- Universitatea Politehnica Timisoara



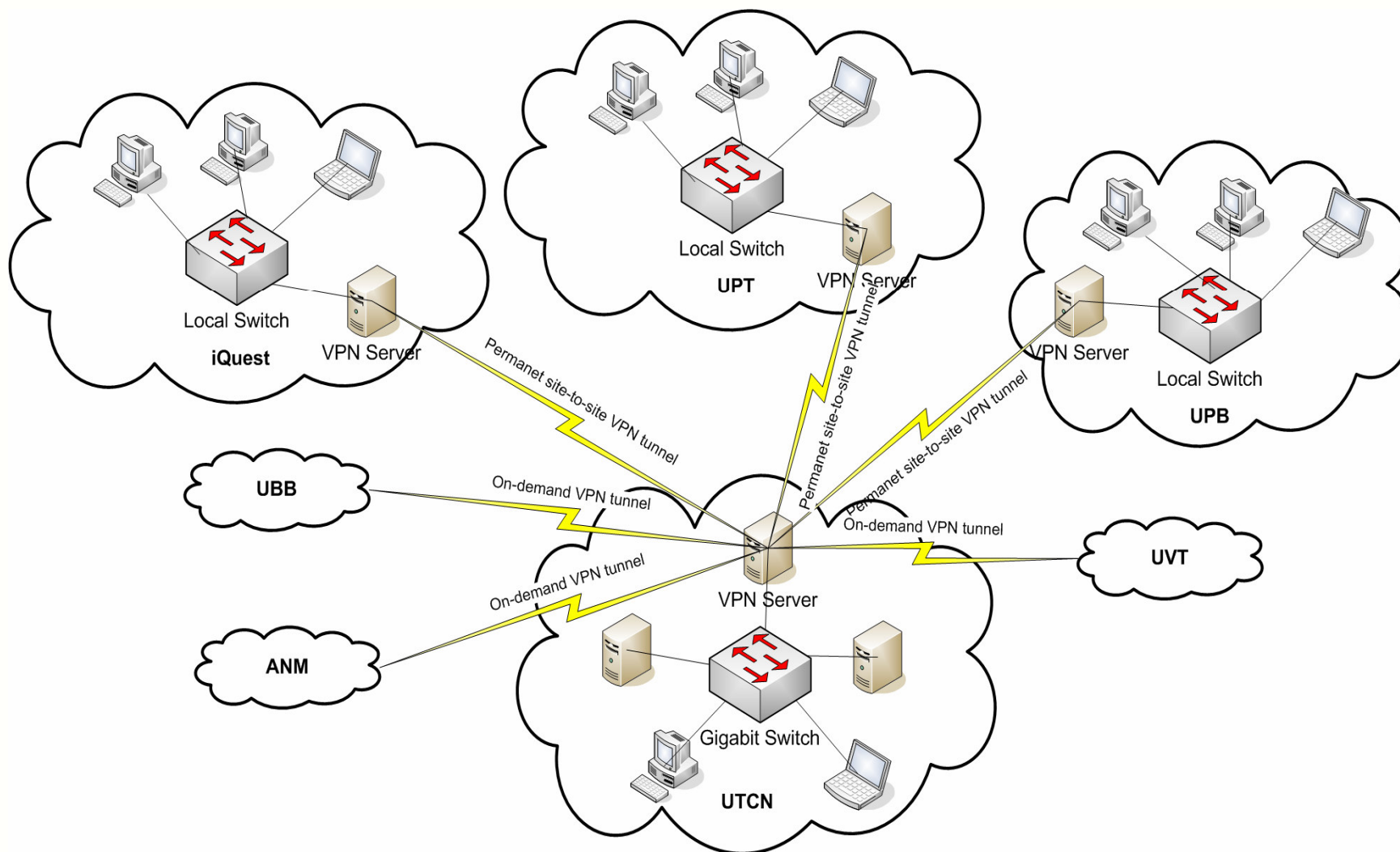
Infrastructura MedioGrid

□ Obiective

- Dezvoltarea unei structuri Grid care sa permita prelucrarea distribuita a datelor masive (geografice si de mediu)
- Dezvoltarea unor algoritmi pentru prelucarea pe Grid a imaginilor satelitare si a datelor spatiale
- Dezvoltarea si experimentarea unor aplicatii geografice si de mediu cu date extrase din emagini satelitare
- Modelarea si vizualizarea spatiului virtual geografic

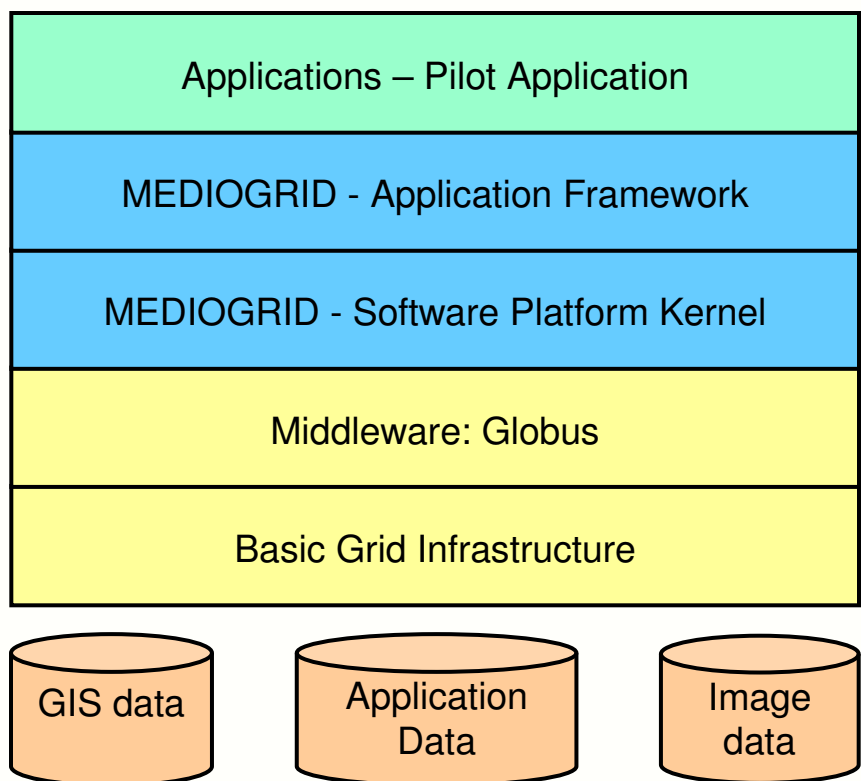


Arhitectura MedioGrid





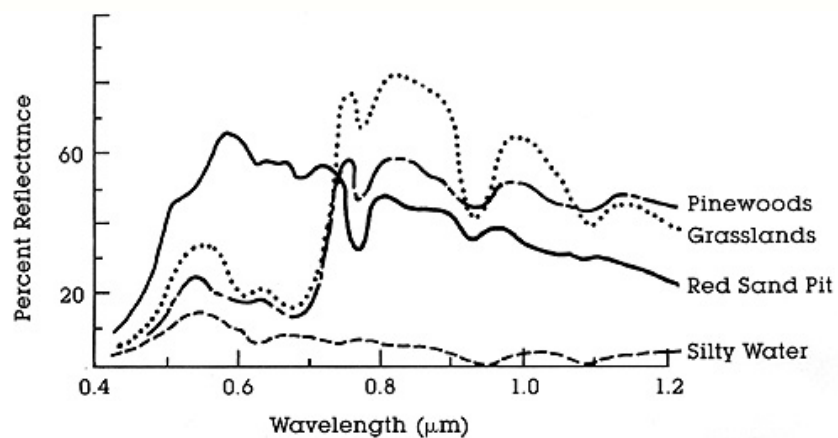
Nivelele functionale MedioGrid





Platforma Software MedioGRID - Prelucrari

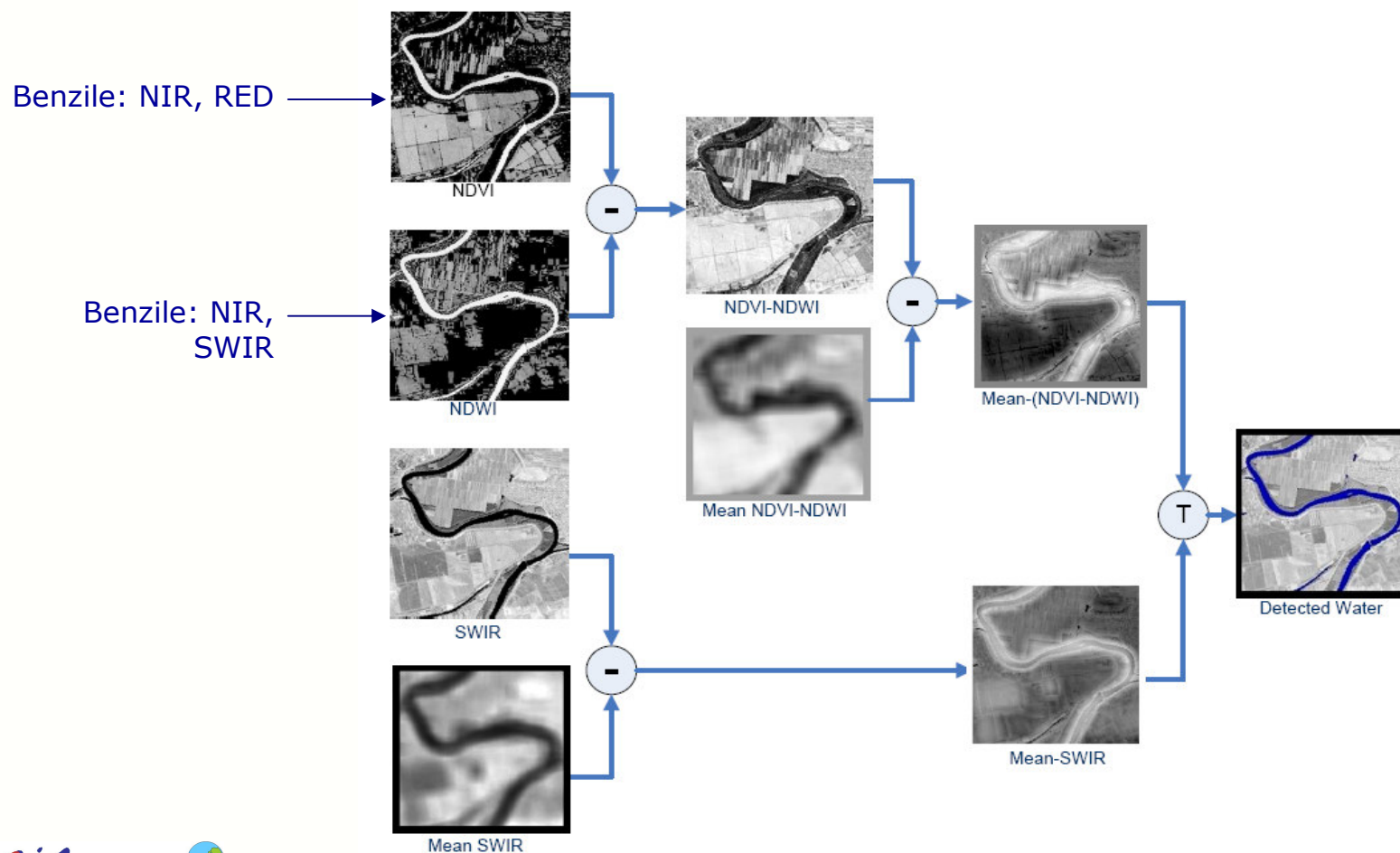
- Imagini satelitare: QuickBird, Ikonos, Modis, Aster, Landsat
- Imagini satelitare MODIS preluate on-line de pe server NASA
- Parametrii de intrare pentru prelucrare: fereastra de timp, aria geografica, tip prelucrare, ...
- Detectie si supervizare: vegetatie, inundatii, incendii forestiere, ...
- Semnatura spectrala





Algoritmii de detectie a apei

- Benzile spectrale: SWIR (5), Red (3) si NIR (4) spectral bands





gProcess – Diagrammatic Process Description

The screenshot displays the gProcess software interface with several overlapping windows:

- GRID Plan Processing:** Shows a satellite image type selection (Landsat, MODIS, ASTER, IKONOS, ALI, TM) and a physical map of the world.
- Viewer:** A table showing process execution details:

Process State	Name	Image Binded	Time Start	Time End	Result
Process not started	Process Test	romania1	5/30/2007 8:35 ...		
Successfully finish...	Test	romania1	5/31/2007 5:01 ...	5/31/2007 5:07 ...	SchedProc70.tif
- GRID Plan Processing Editor:** Shows a workflow diagram with input images B1, B2, B3, B4, B5, B6, B7 and operators: Add, Subtract, Multiply, and And.
- ProcessManager:** A form for process configuration:
 - Id:** 17
 - Name:** Process Test
 - Author:** Anca Radu
 - Secret Key Specified:**
 - Secret Key:** [Empty field]
 - Date Created:** 26/34/2007 08:34:34
 - Satellite Image Type:** Landsat (selected)
 - Latitude1:** 44 ° 10 ' 2 " 1
 - Latitude2:** 46 ° 6 ' 1 " Scheduled
 - Longitude1:** [Empty]
 - Longitude2:** [Empty]
 - Time Start:** 10/01/2007 09:01:08
 - Time End:** 10/01/2007 09:01:08
 - Image Key:** [Empty]
- Scheduler:** Shows process groups and a table of scheduled tasks:

Metadata Id	Process Groups	Process State	Time Start	Time End	Calc	Test	Result
34	{Invert-3 Add-1 Multiply-2 Subtract-4 }						
37	{Add-1 Multiply-2 Subtract-4 } {Invert-3 }						
38	{Add-1 Multiply-2 } {Invert-3 } {Subtract-4 }	Successfully finish...	5/31/2007 5:01 ...	5/31/2007 5:07 ...	Calc	Test	19
39	{Add-1 } {Invert-3 } {Multiply-2 } {Subtract-4 }				Calc	Test	19
40	{Add-1 } {Multiply-2 } {Subtract-4 } {Invert-3 }				Calc	Test	19
41	{Add-1 } {Multiply-2 } {Invert-3 } {Subtract-4 }				Calc	Test	19



Algoritmul de detectie a apei - Rezultate



Imaginea initiala Landsat (pseudocolorata).



Zonele detectate cu apa.



Aplicatia Waterland

Aplicatie disponibila pe Internet: greenland.mediogrid.utcluj.ro

1

2

3

4

ImageId	Image Name	StartTime	EndTime	Status	View Result
1	romania1	Sat Jun 09 18:21:31 EEST 2007	null	Pending	view
2	romania2	Sat Jun 09 18:21:31 EEST 2007	null	Pending	view
3	romania3	Sat Jun 09 18:21:31 EEST 2007	null	Pending	view
4	romania5	Sat Jun 09 18:21:31 EEST 2007	null	Pending	view

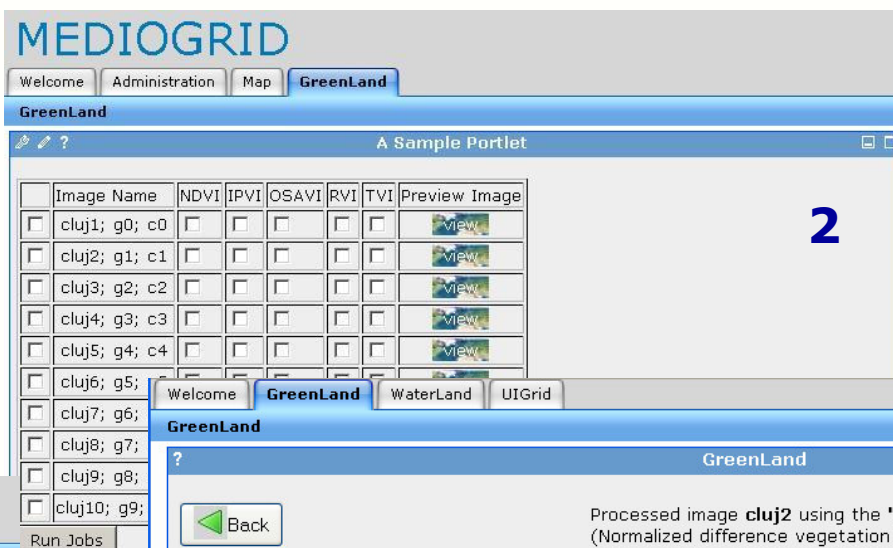


Aplicatia Greenland

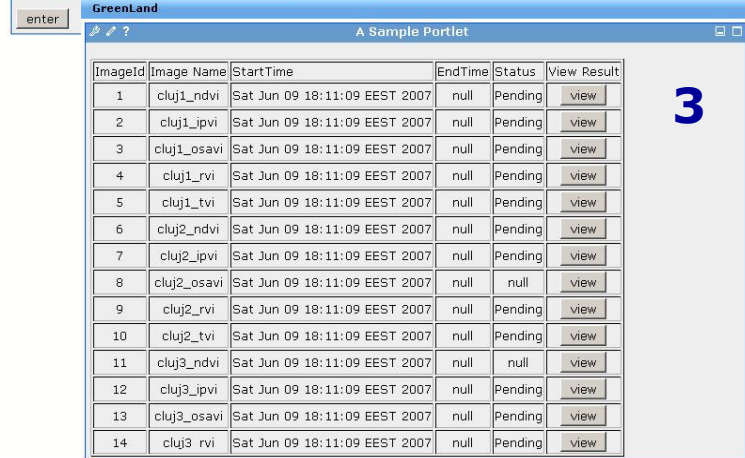
Aplicatie disponibila pe Internet: greenland.mediogrid.utcluj.ro



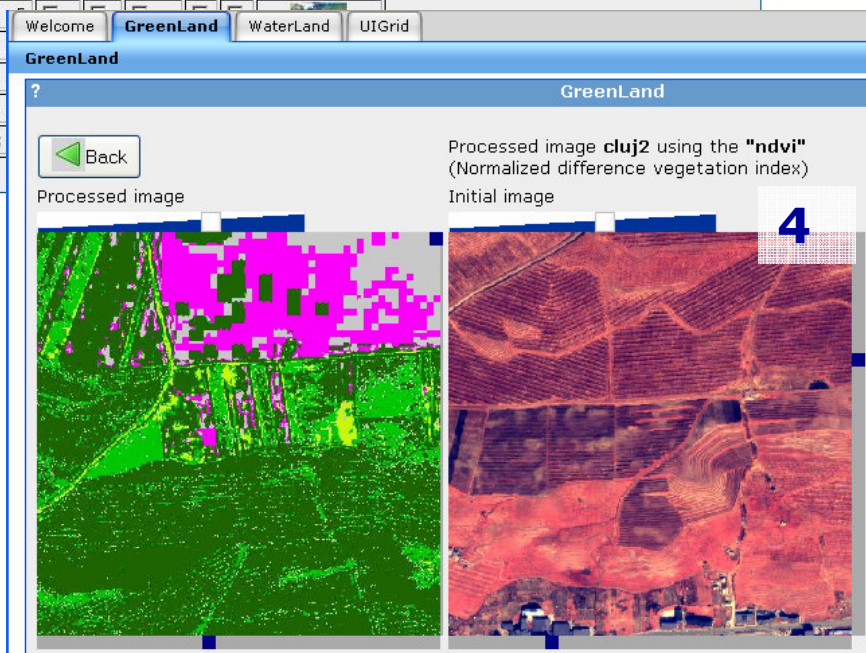
1



2



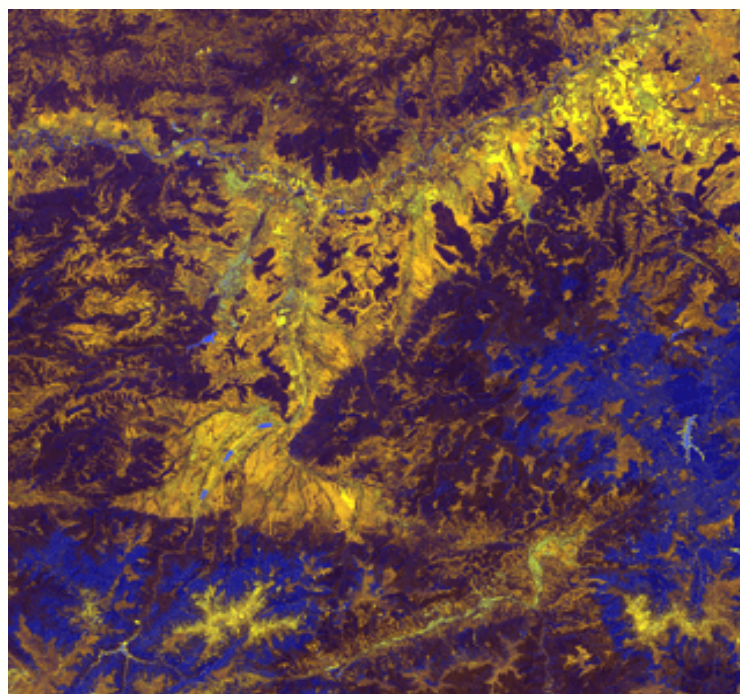
3



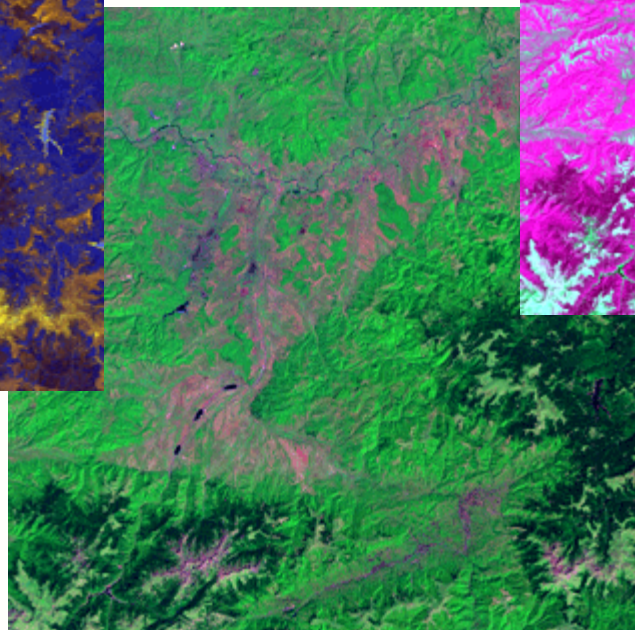
4



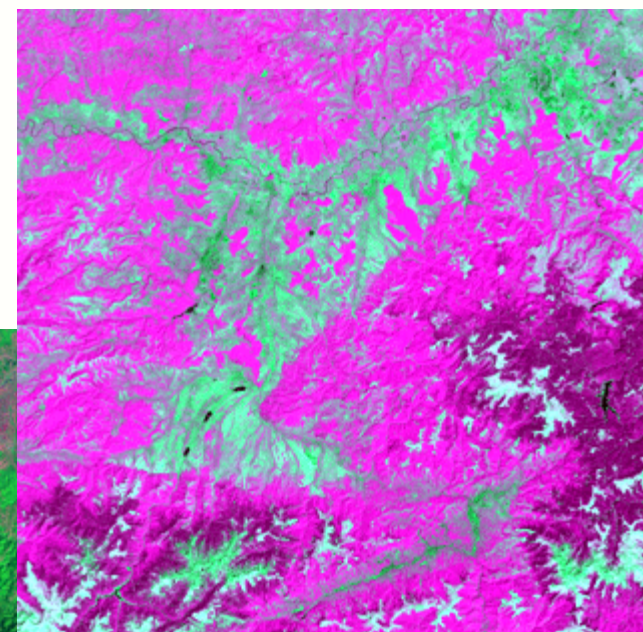
Aplicatia Minerals



Zone alterate hidrotermal.



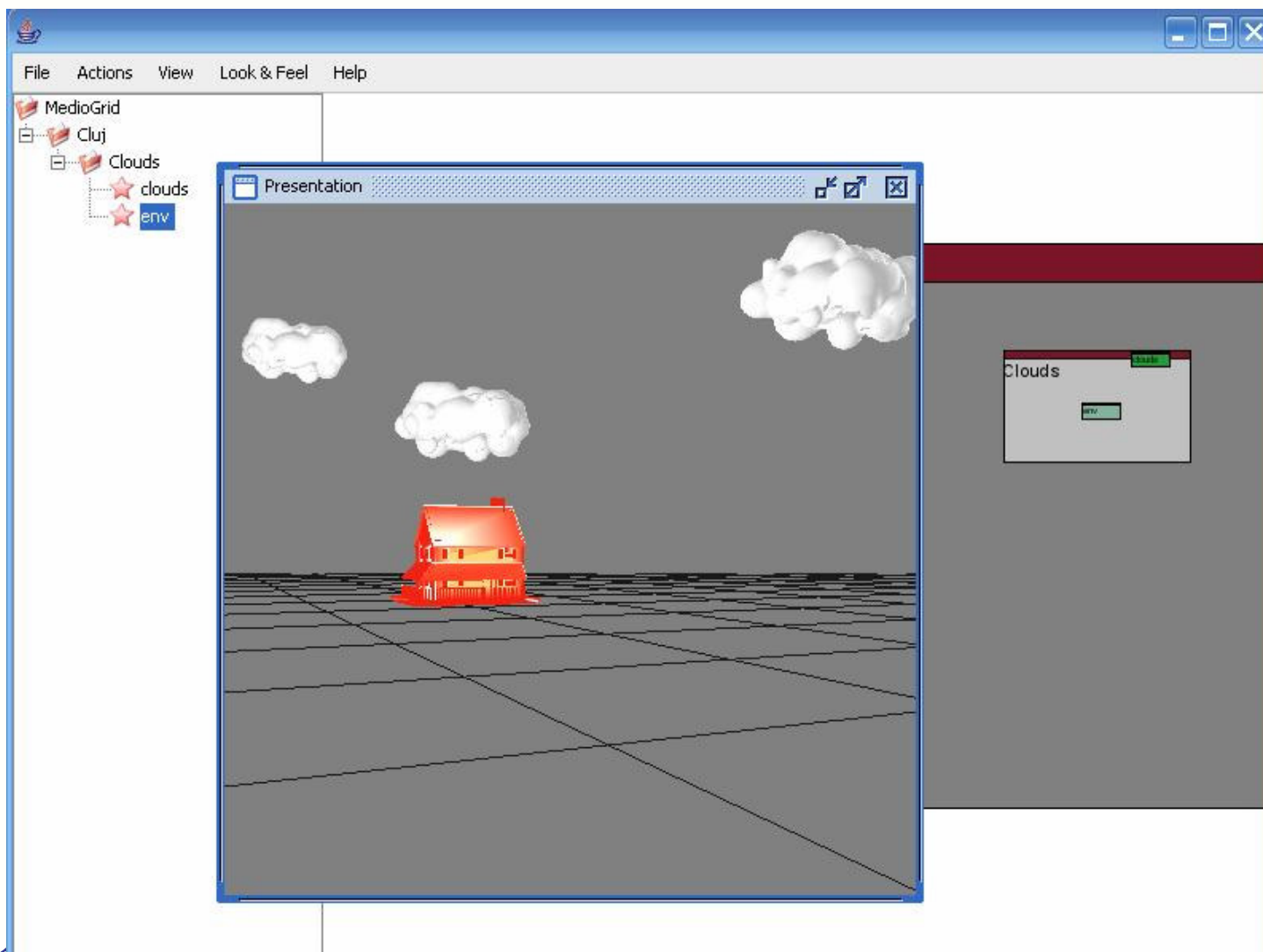
Muntii Metaliferi.
Imagine pseudocolorata folosind
benzile spectrale: 7 R, 4 G si 2 B.



Zone cu oxizi de fier.

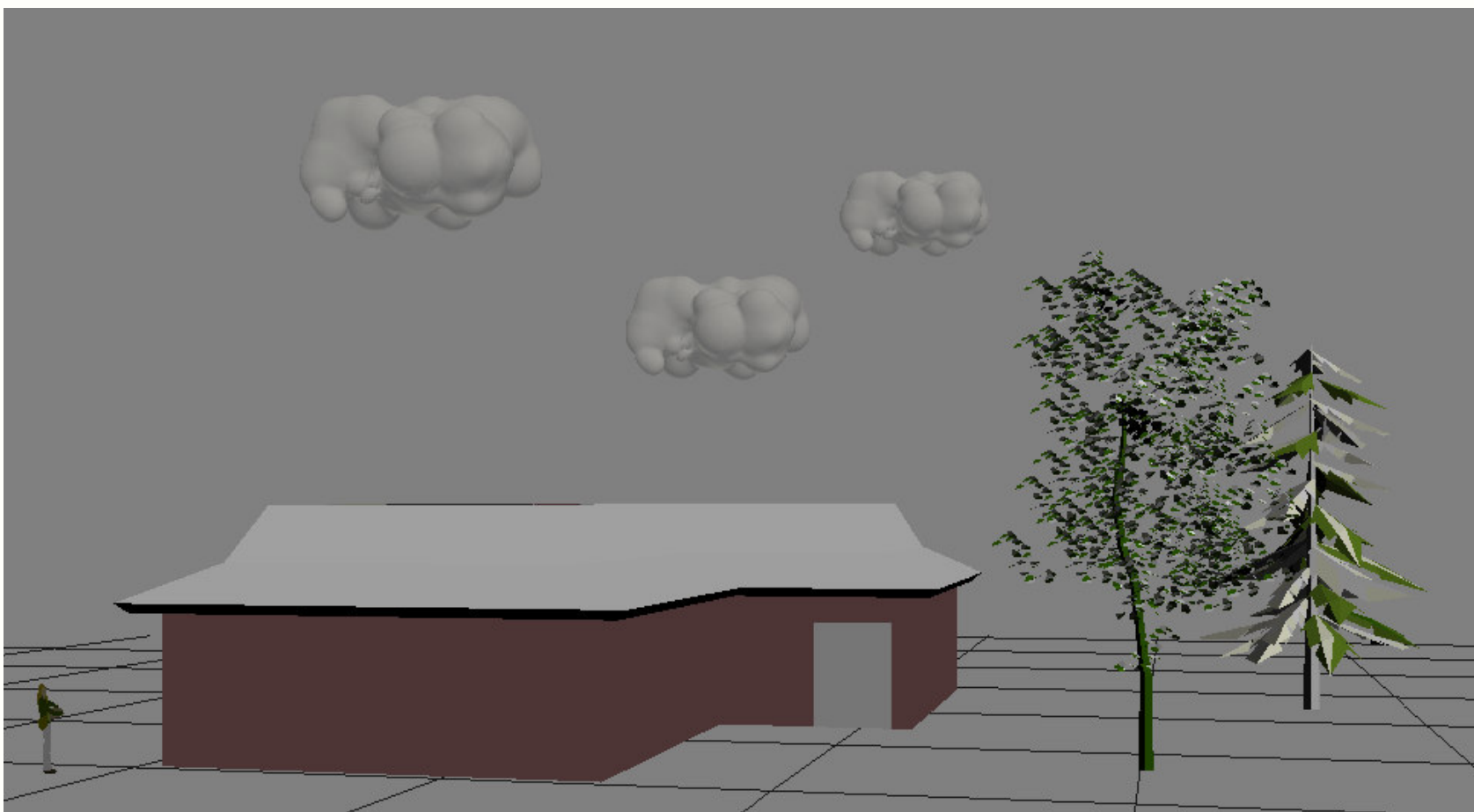


Modelarea spatiului virtual geografic



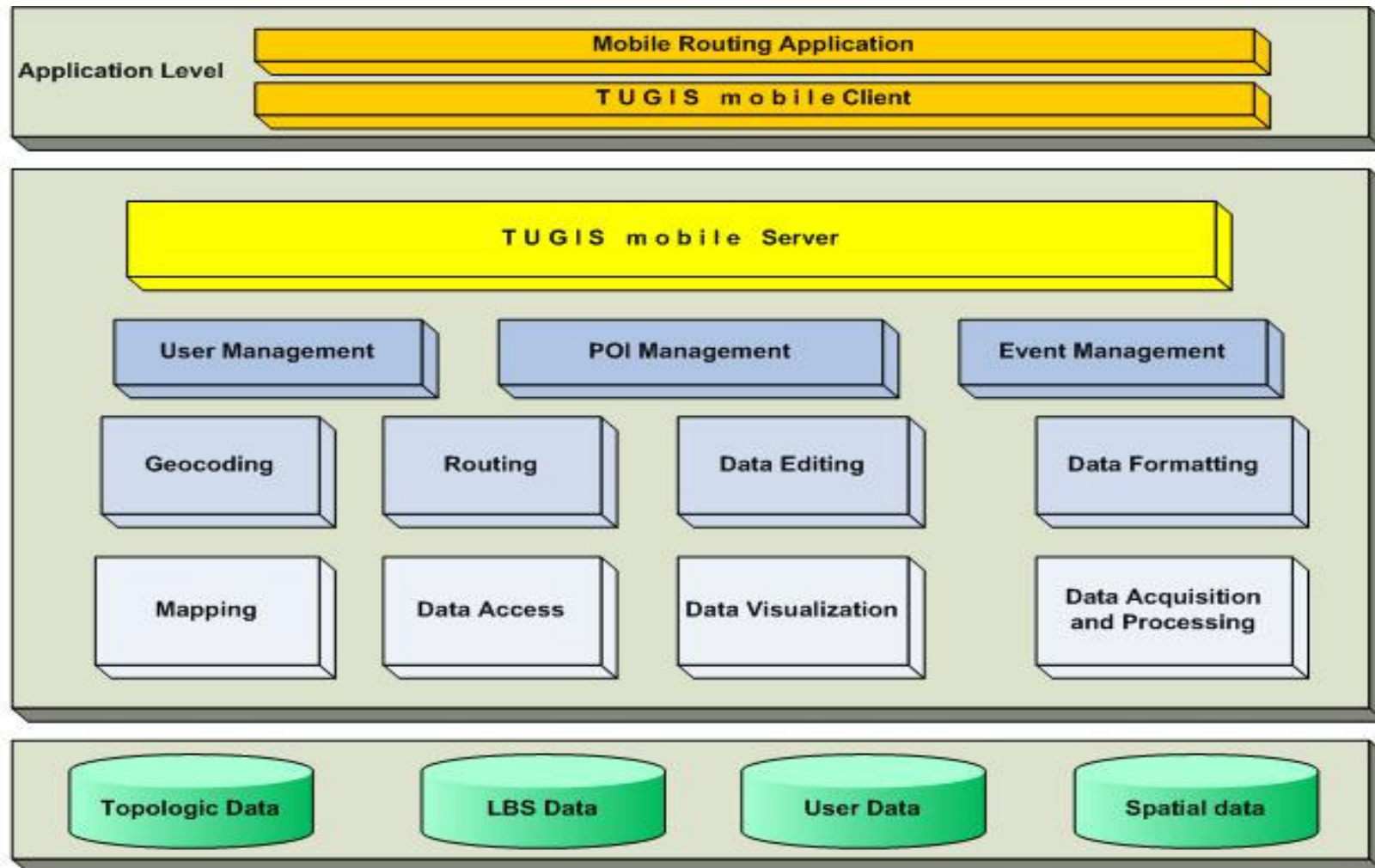




Vizualizarea spatiului virtual de catre utilizator





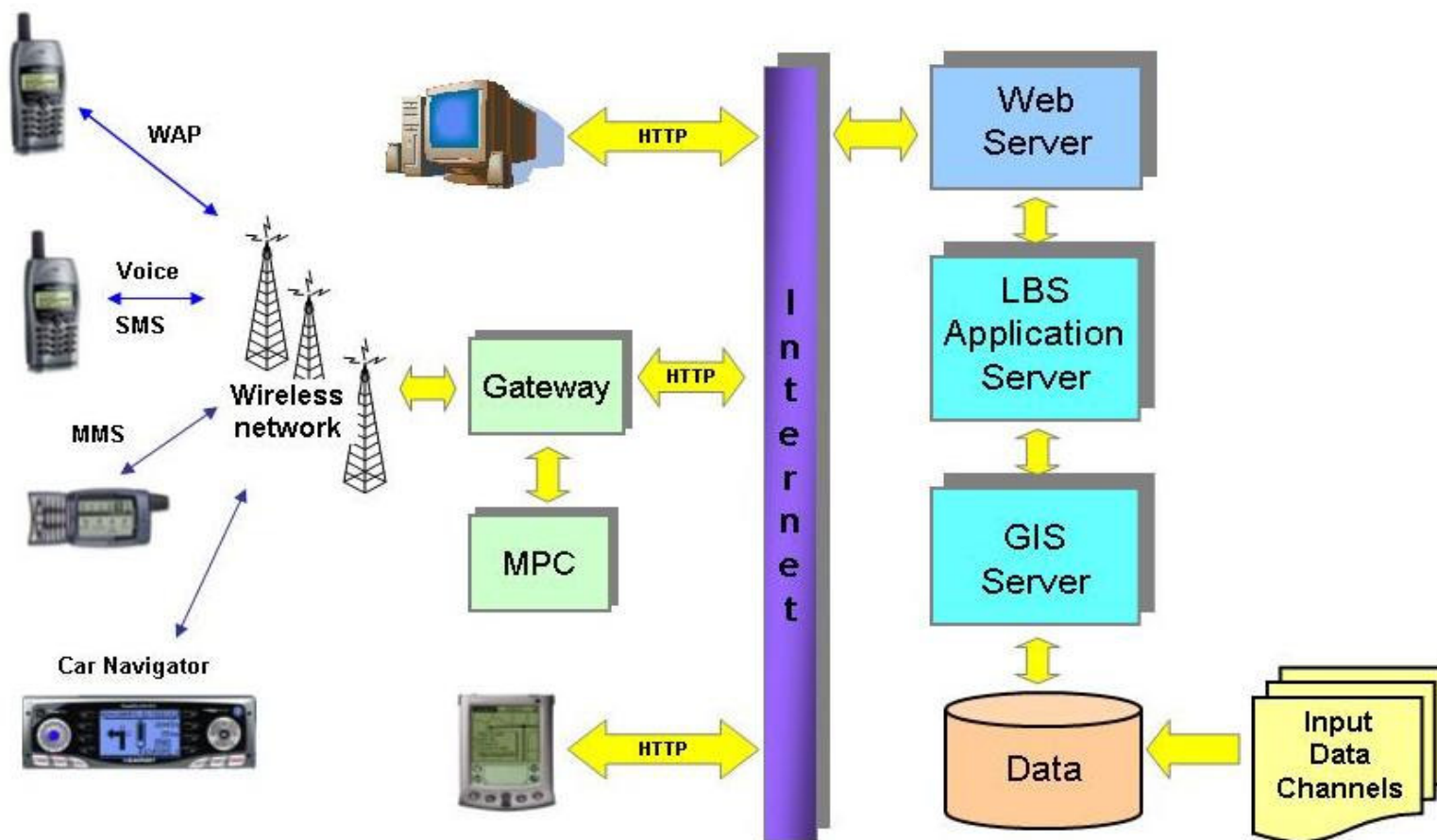
Platforma LBS (Location Based Services)



Legend:  contribution on the client side
 contribution on the server side

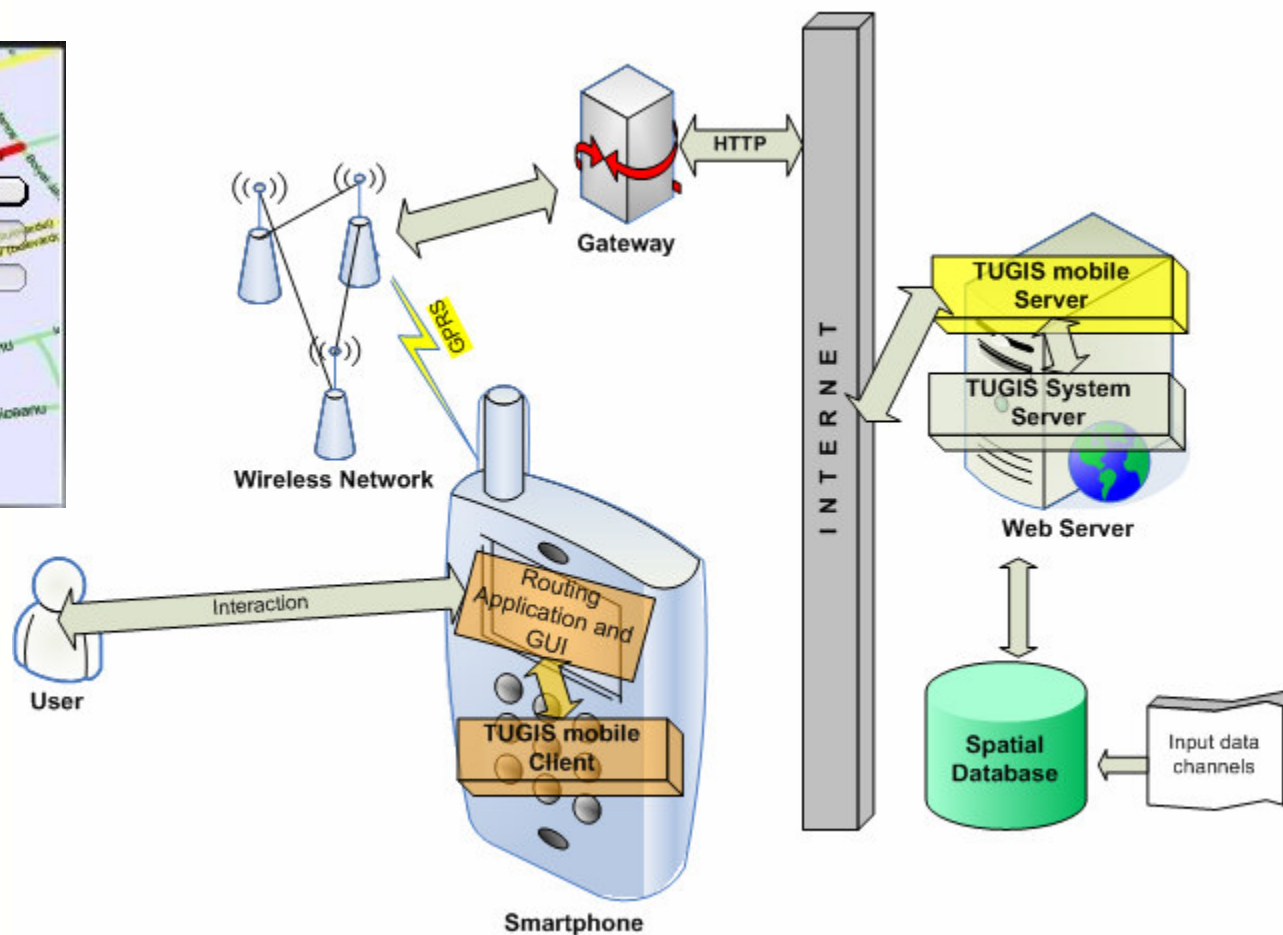
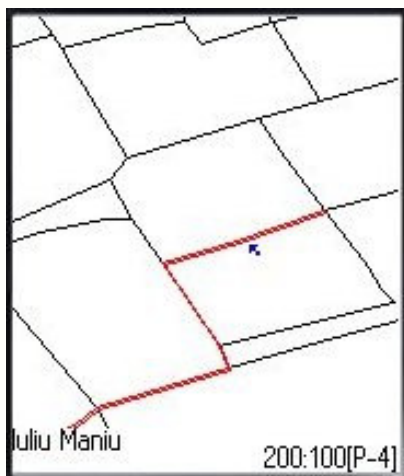
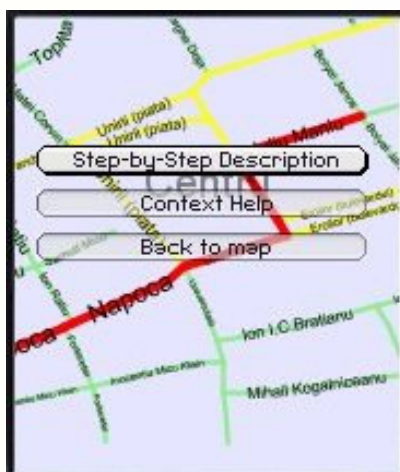


Architectura LBS





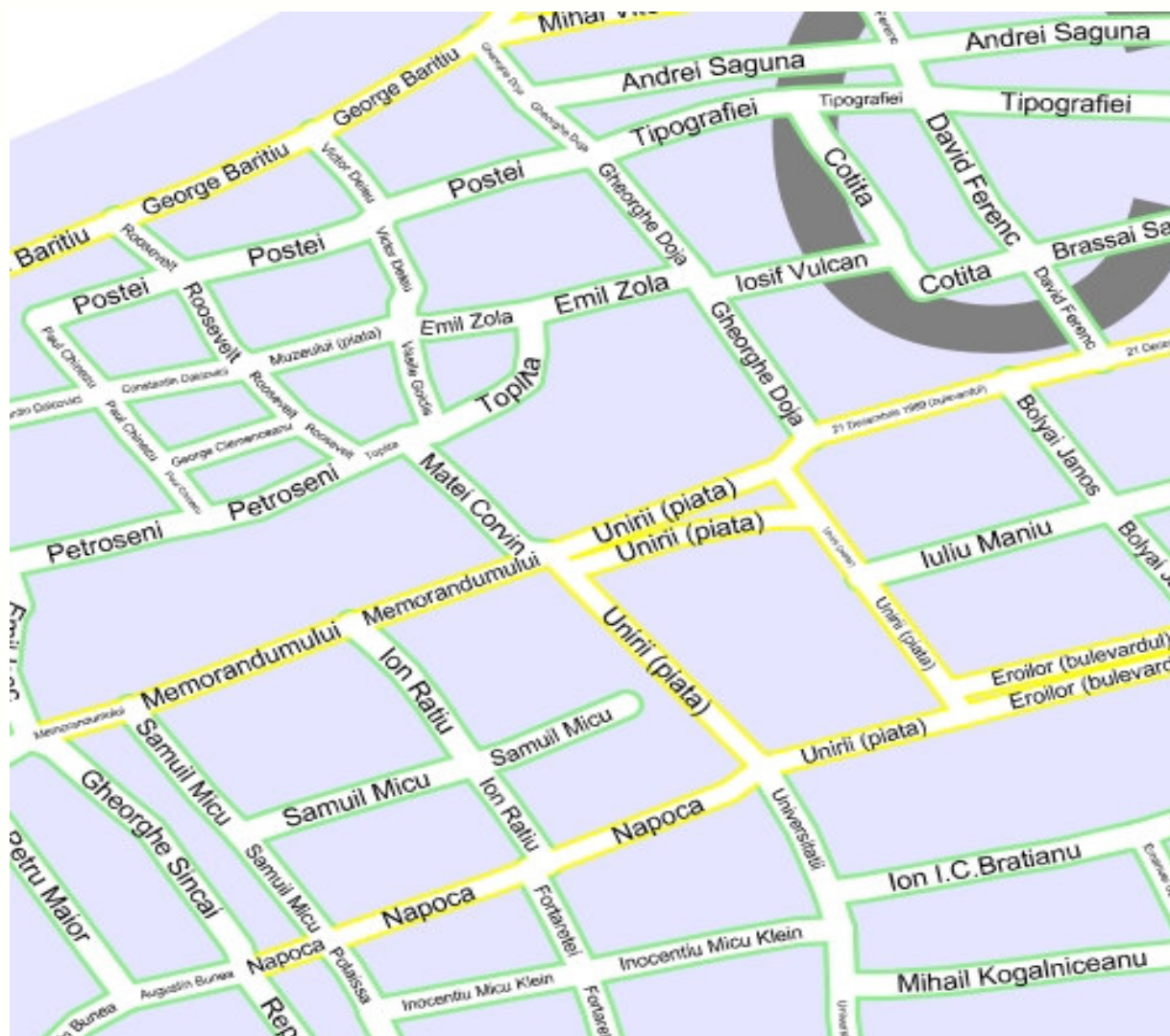
Aplicatii Wireless



Extension of the TUGIS platform by a software package based on SVG and JavaScript to support the development of the interactive web applications

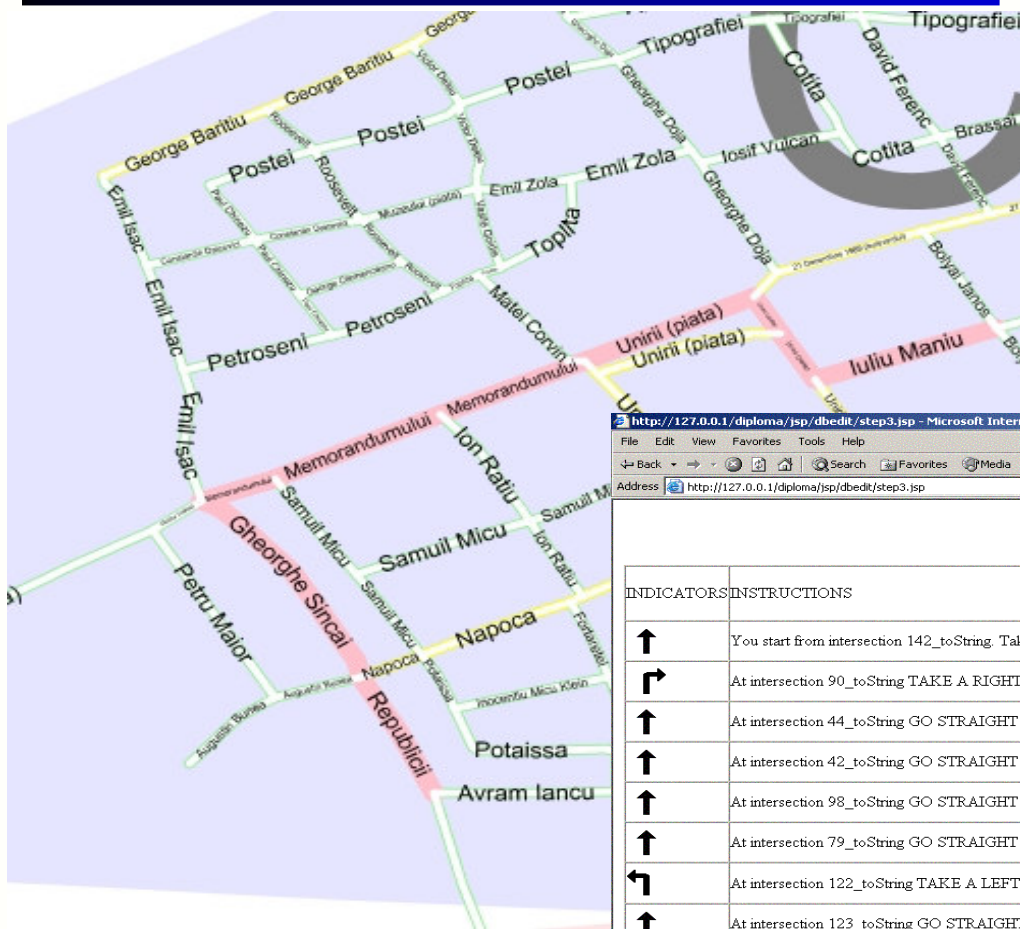


Generare si afisare harti





Calculare traseu optim in retea stradală din Cluj



Microsoft Internet Explorer
 Address: http://127.0.0.1/diploma/jsp/dbedit/step3.jsp

INDICATORS	INSTRUCTIONS	TOTAL LENGTH	SEGMENT LENGTH
↑	You start from intersection 142_toString. Take Street Republicii Segment 0	0.0 KM	
↻	At intersection 90_toString TAKE A RIGHT TO STREET Napoca Segment 0	5.95227972809711E-4 KM	5.95227972809711E-4 KM
↑	At intersection 44_toString GO STRAIGHT TO STREET Napoca Segment 1	55.59045909283922 KM	55.58986386486641 KM
↑	At intersection 42_toString GO STRAIGHT TO STREET Napoca Segment 2	192.48404751167098 KM	136.89358841883177 KM
↑	At intersection 98_toString GO STRAIGHT TO STREET Napoca Segment 3	204.0063949212933 KM	11.522347409622313 KM
↑	At intersection 79_toString GO STRAIGHT TO STREET Unirii (piata) Segment 4	357.0526386299531 KM	153.0462437086598 KM
↶	At intersection 122_toString TAKE A LEFT TO STREET Unirii (piata) Segment 5	488.44316965466146 KM	131.39053102470837 KM
↑	At intersection 123_toString GO STRAIGHT TO STREET Unirii (piata) Segment 6	509.428954410059 KM	20.98578475539756 KM
↻	At intersection 124_toString TAKE A RIGHT TO STREET Iuliu Maniu Segment 0	609.6005525944942 KM	100.17159818443514 KM
↑	Follow street Iuliu Maniu Segment 0 until You arrive at destination 143_toString	609.6012582573827 KM	7.05662888549341E-4 KM

Start Tomcat routing results ma... 16:04



Vizualizare si navigare intr-un sit arheologic

http://193.226.5.246 - 5.wrl (x-world/x-vrml Object) - Mozilla Firefox

Archaeologic Sites

Map Satellite Hybrid Romania

Take a virtual tour of your browser.

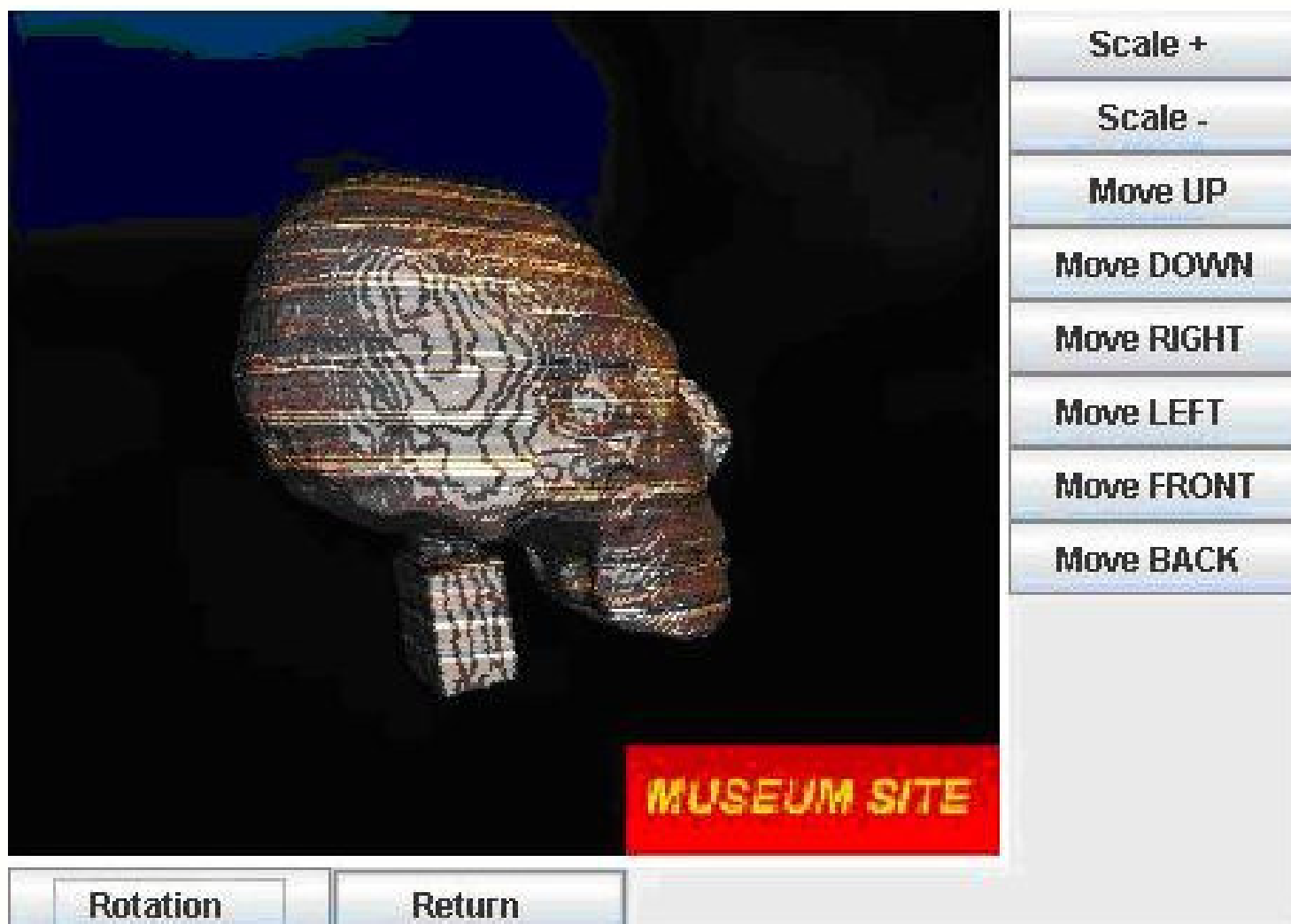
Latitude: 24.2578125 Longitude: 47.204642388766935 Zoom Level: 10

Transferring data from maps.google.com...

start Virtual Archaeologi... http://193.226.5.246... Macromedia Firework... EN 22:44 marți 13.06.2006



Piesa de muzeu



Mulumesc. Intrebari?

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