



Evaluation of FOSS4G software projects for environmental applications.

Evaluation of gvSIG



RAFAL WAWER

Katholieke Universiteit Leuven

Spatial Applications Division



The Cascadoss Project is financed by the European Commission under the Sixth Framework Programme

Outline

- CASCADOSS project
- Evaluation methodology
- Evaluation results: GIS/RS & AE

CASCADOSS

Trans-National Cascade Training Programme on Open Source GIS & Remote Sensing Software for Environmental Applications

CASCADOSS Objectives

- Encourage (GMES) end-users in using geospatial FOSS for geomatics
 - Lower barrier to sophisticated RS/GIS functionality
 - Provide objective information on FOSS
 - Set up a trans-national cascade training programme on FOSS

Partners

KATHOLIEKE UNIVERSITEIT
LEUVEN



 **gisat**

 **GRID**
Warszawa

- K.U.Leuven (BE):
 - Coordinator
 - SADL: geospatial R&D
 - ICRI: ICT & Law
- GISAT (CZ), COMPET-TERRA (HU)
 - SME specialized in RS & GIS services in local and EU market
- UNEP/GRID-Warsaw (PL):
 - GIS/RS research and education centre



Approach

- Several Steps:
 - Study existing geospatial FOSS offerings
 - I. Technical (maturity, functionality, reliability)
 - II. Environmental applications
 - III. Business Models
 - IV. Legal issues
 - Findings presented at International symposium + workshop – Warsaw June 2008



Approach: next Steps



- National/regional workshops; SME's, service providers to end-users (researchers)
Benelux (FR, NL), Poland, Slovakia, Czech Republic, Hungary.
- Enduring distribution of information through geospatial OSS portal

Project Outputs



- Knowledge:
 - Best practices, evaluation of geospatial FOSS projects
 - Business models for FOSS for SME's
 - Evaluation of licensing issues for FOSS
- Learning materials:
 - Practice data sets, tutorials
 - liveDVD with pre-installed FOSS geospatial software
- Geospatial OSS Portal

Evaluation Methodology



Cascadoss approach to
OSS GIS evaluation

Objective of the Evaluation

- Overall objective
 - To identify Open Source GIS & RS software for environmental applications that could be used by geospatial end-users, especially those users relate to the use of GMES services

Objective of the Evaluation

• Specific Objective:
to measure the „*Adoption potential*” for the
target group

1. Market potential

- Strength of the product from market point of view

2. Technical potential

- Software quality – technical view

3. Economic potential

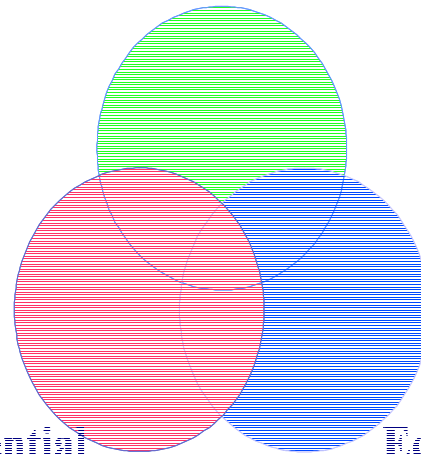
- Economical – financial view



software potentials

three independent sub-evaluations

Marketing potential



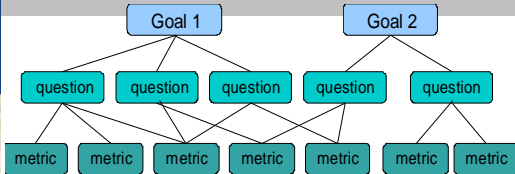
Technical Potential

Economical potential

Goal Question Metric Approach

- Goal Question Metric Approach
 - Victor Basili, NASA, Univ. Mariland
 - top-down goal-driven structure
 - defines measurement goals,
 - raises questions to address the goals,
 - identifies metrics that provide answers to the questions

Goal Question Metric Approach



<i>GOAL:</i>	<i>Purpose:</i>	<i>Identification market(ing) potential</i>
	<i>Issues:</i>	<i>Strength</i>
	<i>Objects:</i>	<i>of Communities</i>
	<i>Viewpoint:</i>	<i>End-user</i>
	<i>(Goal)</i>	<i>Strong Vendor Community</i>
<i>Question</i>		<i>What is the number of implemented projects that have adopted the SW in subject</i>
<i>Metrics</i>		<i>Number of projects (0- no 1 - one or more)</i>
..		..
	<i>(Goal)</i>	<i>Strong OSS distributor community</i>
<i>Question</i>		<i>What is the number of distribution packages that includes the software in subject?</i>
<i>Metrics</i>		<i>Number of distros (0- no 1 - one or more)</i>
...		...

Other Principles

- Higher priority for Objective Criteria than Subjective Ones
- Based on standards and best practise
 - *Iso 9126 Software Quality, QSOS, ..*
- Weighted Scoring
- Iteration to refine method
 - *Trial evaluation → Evaluation*
- 3 dimensions:
 - *Market (1st), Technical (2nd), Economic (3rd)*

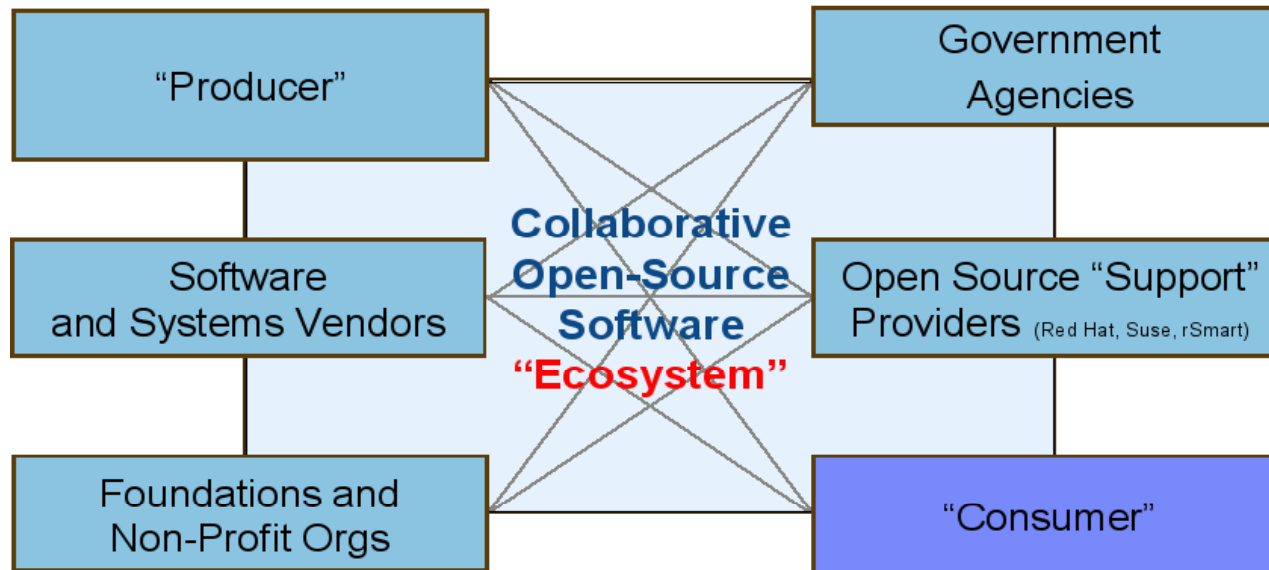
Market Potential (1st)

- The goal is to Indicate projects having high market potential for end-users which ones
 - are attractive and most probably sustainable projects
 - have strong, reliable easily accessible services covering, training, publication, help-desk, system integration, distribution network
 - have active and motivated user groups
- Viewpoint: End user level management

Market Potential (1st)

1. Strength of Communities

Developer, User, Vendor, Distributor, Non-profit, Government, “Ecosystem”



Based on: Empowering the Next Generation Of Business and Learning Applications with an "Open Approach" Patrick F. Carey, 2006)

Market Potential (1st)

2. Maturity of the project

- Version Control, Mailing list, Documentation, Testing approach, Portability

3. Market Share

- Direct or Indirect (popularity, reputation,..)

4. Synergy with other products

5. License

- Standard/non-standard, restrictions

Market Potential (1st)

<u>Max Scores</u>	<u>Aspects</u>
15	Strength of Community
15	Maturity of the project
12	Market Share
9	Legal/Licence issues
9	Collaboration
60	Total

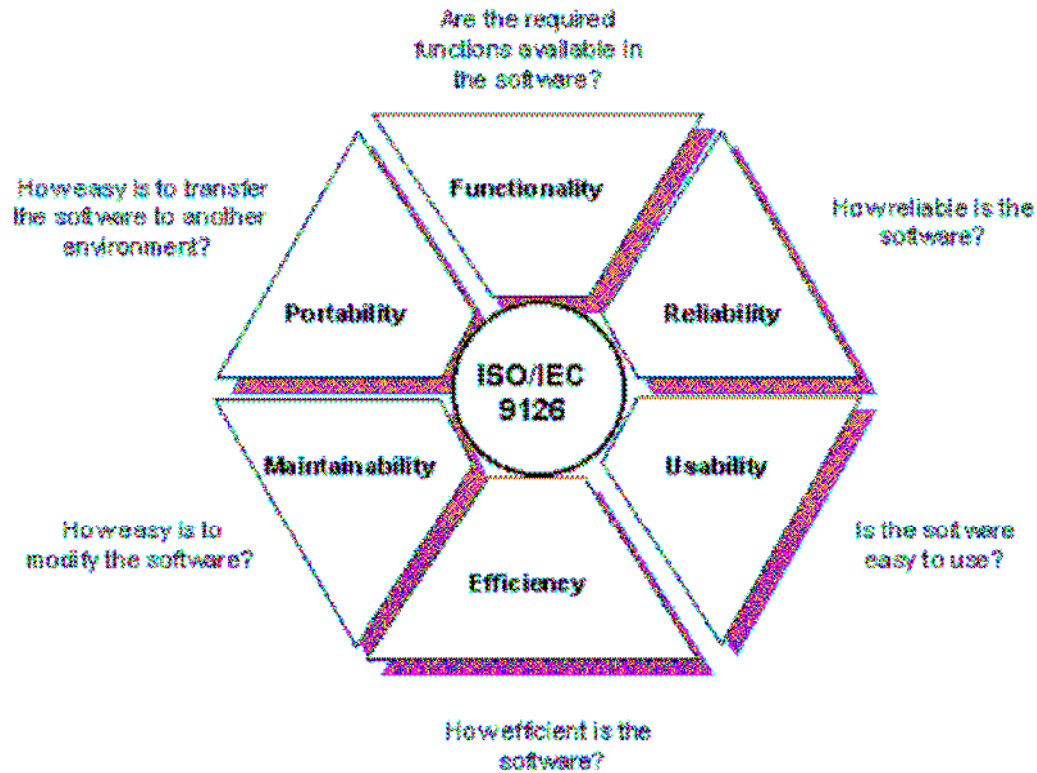


Technical Potential (2nd)

- The goal is to indicate projects that produce high quality products according ISO 9126 concept
- Viewpoint: End user level technical persons such as GIS experts and operators

Technical Potential (2nd)

ISO 9126



Technical Potential (2nd)

- Categories of Open Source GIS&RS software projects
 - General Interest
 - Development Libraries
 - GIS: Libraries
 - Remote Sensing: Libraries
 - Desktop Applications
 - GIS Applications
 - Remote Sensing: Applications
 - Metadata editors
 - Server Applications
 - Web Services
 - Web Tools

Technical Potential (2nd)

<u>Max Scores</u>	<u>Aspects</u>
15	Functionality
9	Reliability
9	Usability
9	Efficiency
9	Maintainability
9	Portability
60	Total



Economic Potential (3rd)



- The goal is to indicate most economical products created by OSS projects
- View point: End user level financial management interested in short and mid term costs of various activities such as adoption, migration and operation

Economic Potential (3rd)

- Cost of installation
 - Cost of deployment (how standard is the req architecture)
 - Cost of labour (who and how can install)
- Cost of migration
 - Specialists, labour, customisation
- Cost of operation
 - Knowledge: users, administrators, newbies
 - Cost for configuration management

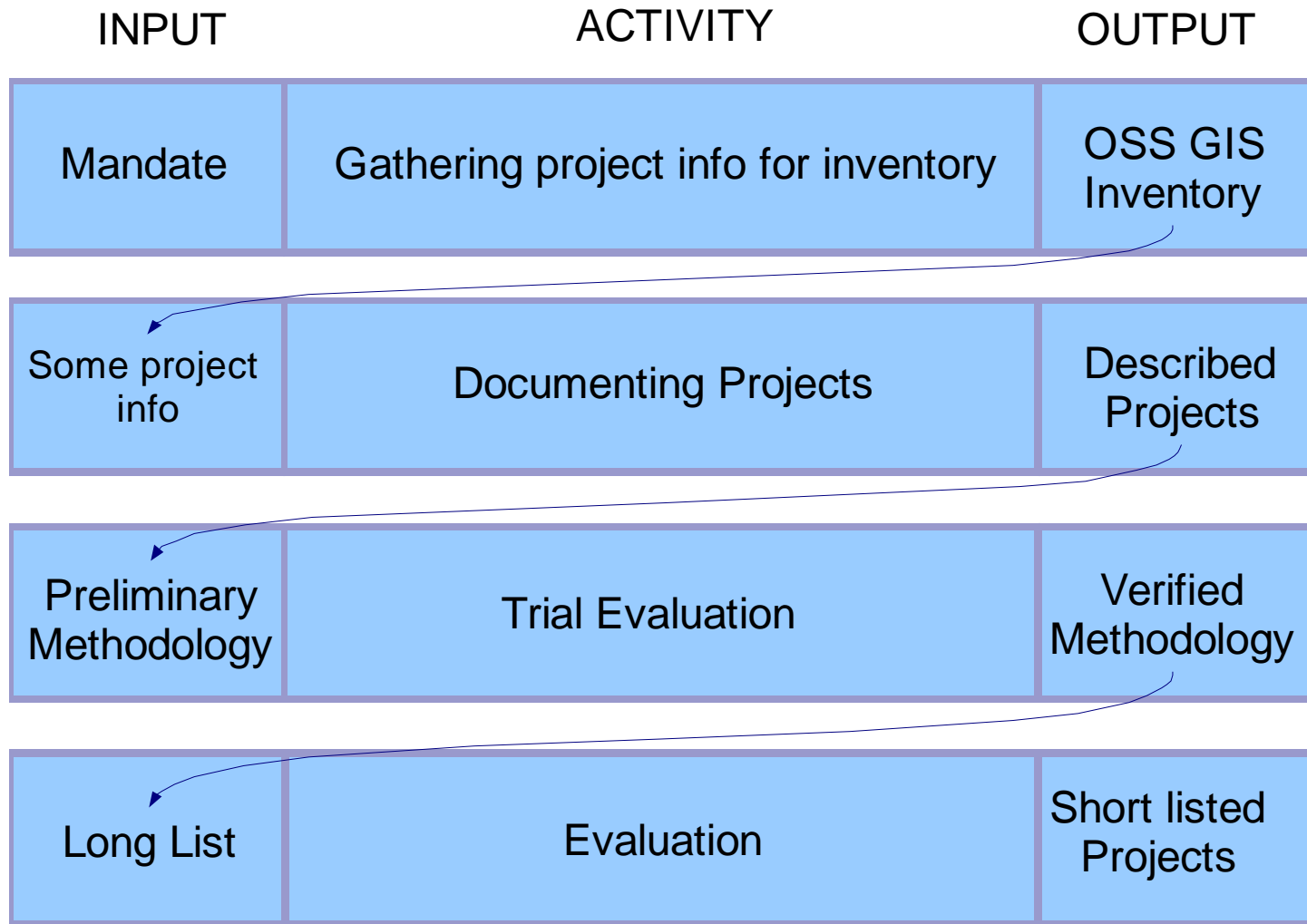
Economic Potential (3rd)



<u>Max Scores</u>	<u>Aspects</u>
24	Cost of installation
18	Cost of migration
18	Cost of operation
60	Total



Process to Prioritise OSS GIS Projects for GMES users



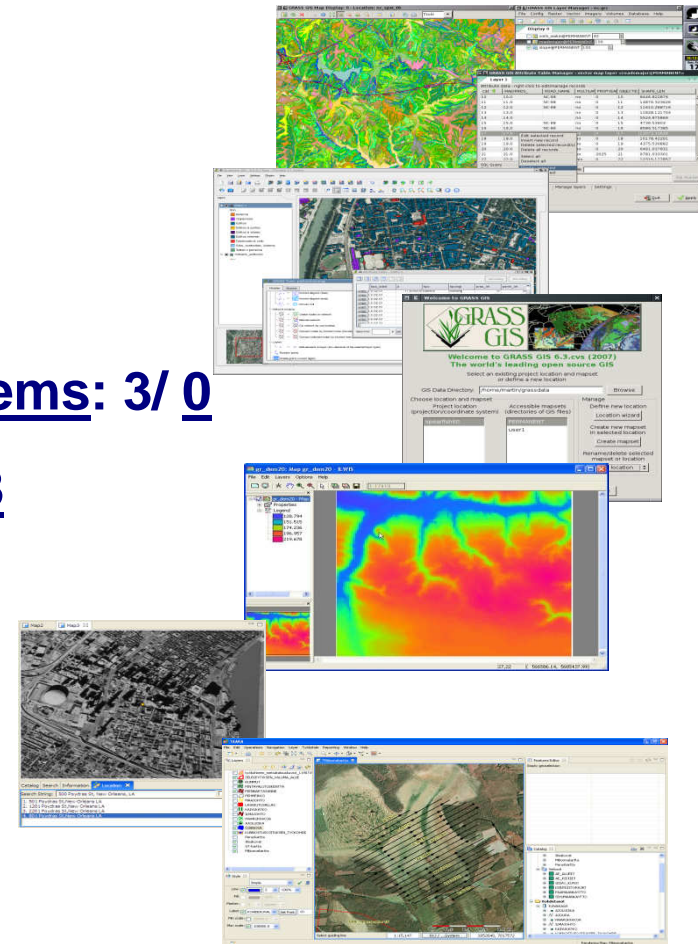
EVALUATION RESULTS

KATHOLIEKE UNIVERSITEIT
LEUVEN



CASCADOSS GIS/RS inventory

- General Interest: 11/ 3
- Development libraries: 21/ 8
- *GIS Libraries: 15*
- *Remote Sensing Libraries: 6*
- Database Management Systems: 3/ 0
- Desktop Applications: 44/ 28
- *GIS Applications: 30*
- *Remote Sensing Applications: 11*
- *Metadata Editors: 3*
- Server Applications: 15/ 12
- *Web Services: 4*
- *Web Tools: 11*



Desktop Applications



Marketing potential

Type	Software	Maturity of the project	Strength of Community	Market Share	Legal/Licence issues	Collaboration with other projects	Total
	<i>maximum score</i>	<i>15</i>	<i>15</i>	<i>12</i>	<i>9</i>	<i>9</i>	<i>60</i>
GIS/RS app,	GRASS	15,0	14,3	12,0	9,0	9,0	59,3
	OSSIM	11,7	9,0	12,0	9,0	9,0	50,7
	OpenEV	10,7	9,4	12,0	9,0	9,0	50,1
	gvSIG	12,8	9,0	10,0	9,0	9,0	49,8
	Saga GIS	11,3	5,6	10,0	9,0	9,0	44,9
	FMaps	3,6	0,8	4,0	9,0	0,0	17,4
GIS app,	QuantumGIS	14,0	11,6	12,0	9,0	9,0	55,6
	Thuban	14,0	13,1	10,0	9,0	9,0	55,1
	OpenMap	14,0	11,1	7,9	6,0	9,0	48,0
	uDig	12,5	5,8	6,0	9,0	9,0	42,3
	JUMP	10,5	6,8	0,0	9,0	9,0	35,3
	Kosmo	6,8	3,0	2,0	9,0	9,0	29,8
RS app,	Octave	11,7	15,0	12,0	9,0	9,0	56,7
	ILWIS	6,7	12,0	6,0	9,0	9,0	42,7
	RAT	9,8	4,1	10,0	9,0	0,0	32,9
	ISIS	6,2	6,8	4,0	6,0	0,0	23,0
	IVICS	4,0	4,5	0,0	9,0	0,0	17,5
Metadata editors	GeoNetwork OS	14	13,88	12	9	9	57,88
	CatMDEdit	4,5	10,5	8	9	0	32
	ISO Metadata Editor	3	8,25	6	0	0	17,25



Desktop Applications

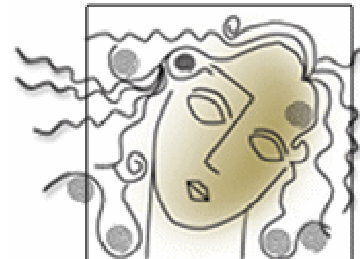
Technical Potential								
Type	Software	Functionality	Reliability	Usability	Efficiency	Maintainability	Portability	Total
	<i>maximum score</i>	<i>15</i>	<i>9</i>	<i>9</i>	<i>9</i>	<i>9</i>	<i>9</i>	<i>60</i>
GIS/RS app,	GRASS	11,7	4,2	8,2	6,9	7,4	8,4	46,9
	gvSIG	8,8	4,2	5,6	7,9	6,4	6,9	39,8
	OSSIM	8,6	3,6	5,0	6,4	6,7	6,4	36,7
	SAGA GIS	5,6	1,8	5,4	6,9	5,6	5,1	30,4
	OpenEV	4,7	1,2	4,3	5,8	4,5	6,6	27,1
	FMaps	1,9	3,0	1,5	6,4	1,2	1,9	15,8
GIS app,	QuantumGIS	8,6	3,3	7,4	7,5	7,2	6,7	40,8
	uDig	5,4	1,5	7,1	5,6	4,6	6,4	30,6
	Thuban	6,4	2,4	4,7	6,8	4,0	6,0	30,2
	Kosmo	8,1	0,6	4,4	5,4	6,0	4,1	28,6
	JUMP	4,2	1,4	3,7	5,4	4,9	6,0	25,6
	OpenMap	5,7	3,2	3,5	4,5	4,2	4,2	25,4
RS app,	ILWIS	5,8	1,8	6,4	6,4	3,9	3,8	28,0
	ISIS	3,3	3,0	4,9	4,1	7,8	3,6	26,7
	Octave	3,1	1,8	3,4	3,6	5,4	6,2	23,4
	RAT	3,0	1,2	3,0	4,7	5,6	5,1	22,6
	IVICS	2,2	3,6	2,1	6,4	2,2	5,8	22,3
Metadata editors	GeoNetwork OS	8,8	1,1	6,1	3,7	4,2	6,0	29,8
	CatMDEdit	5,8	0,8	3,4	3,9	2,8	4,9	21,7
	ISO Metadata Editor	4,5	0,6	3,4	3,4	1,3	4,6	17,7

Desktop Applications

Economical Potential					
Type	Software	Cost of installation	Cost of migration	Cost of operation	Total
	<i>maximum score</i>	<i>24</i>	<i>18</i>	<i>18</i>	<i>60</i>
GIS/RS app,	penEV	24,0	5,9	10,8	40,7
	GRASS	24,0	7,1	9,0	40,1
	OSSIM	24,0	5,9	7,2	37,1
	gvSIG	24,0	5,9	7,2	37,1
	SAGA GIS	24,0	4,8	7,2	36,0
	FMaps	18,0	4,8	5,4	28,2
GIS app,	QuantumGIS	24,0	14,0	12,6	50,6
	JUMP	24,0	15,0	10,8	49,8
	Thuban	24,0	13,0	10,8	47,8
	OpenMap	24,0	13,0	10,8	47,8
	Kosmo	24,0	9,1	10,8	43,9
	uDig	24,0	13,0	5,4	42,4
RS app,	RAT	24,0	4,8	10,8	39,6
	ILWIS	24,0	4,8	7,2	36,0
	Octave	24,0	4,8	5,4	34,2
	IVICS	18,0	3,6	9,0	30,6
	ISIS	18,0	3,6	5,4	27,0
Metadata editors	CatMDEdit	24,0	11,5	10,8	46,3
	ISO Metadata Editor	24,0	10,0	10,8	44,8
	GeoNetwork OS	24,0	12,7	7,2	43,9

CASCADOSS EA inventory

- SagaGIS
- Geovista Studio
- Survex
- Virtual Terrain Project
- Vis5d+
- TerraFlow
- ILWIS
- HidroSIG
- BASINS
- WHEAM 2000
- Kalypso SP
- DIVA GIS

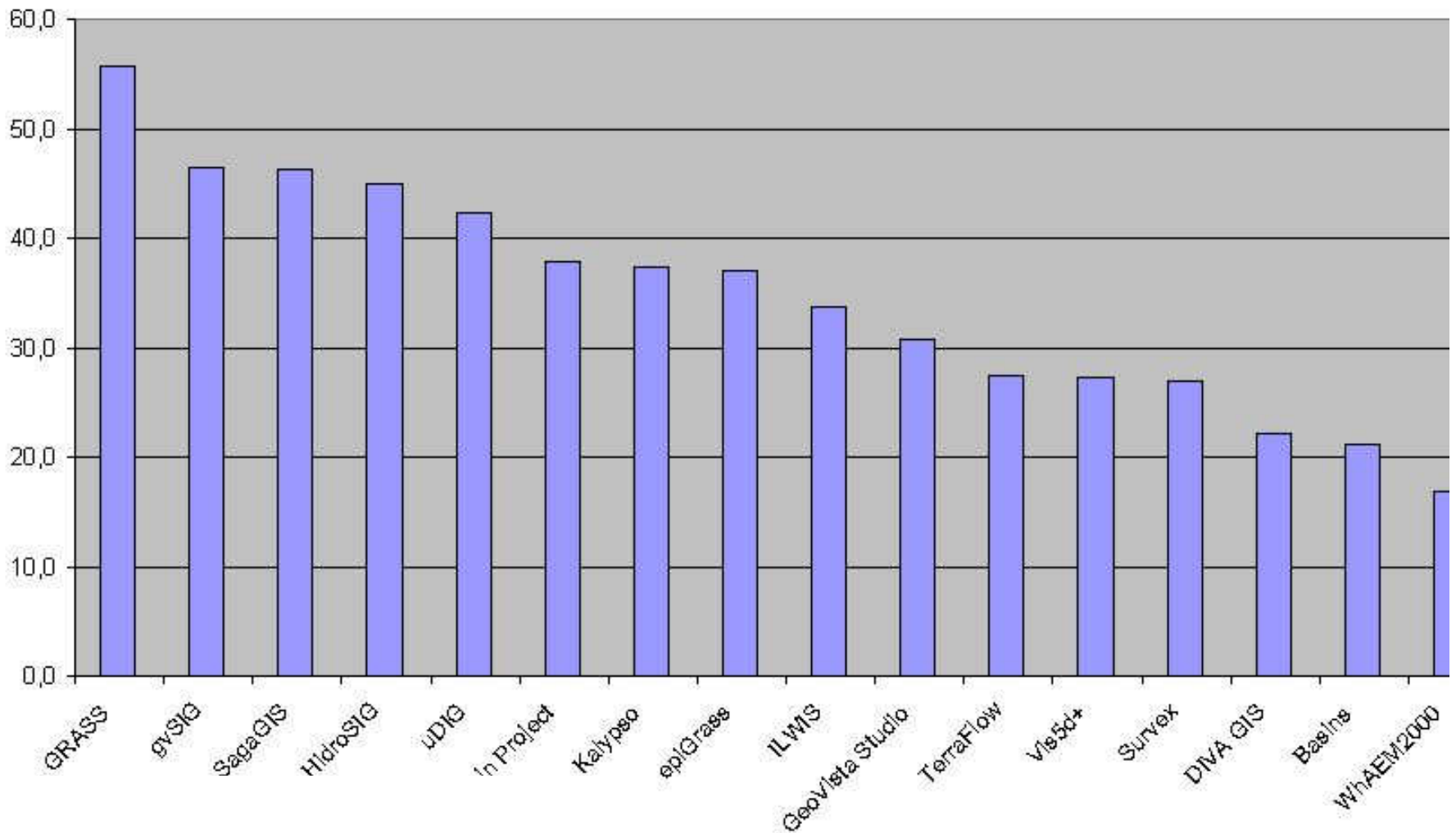


- GRASS
- gvSIG
- uDig

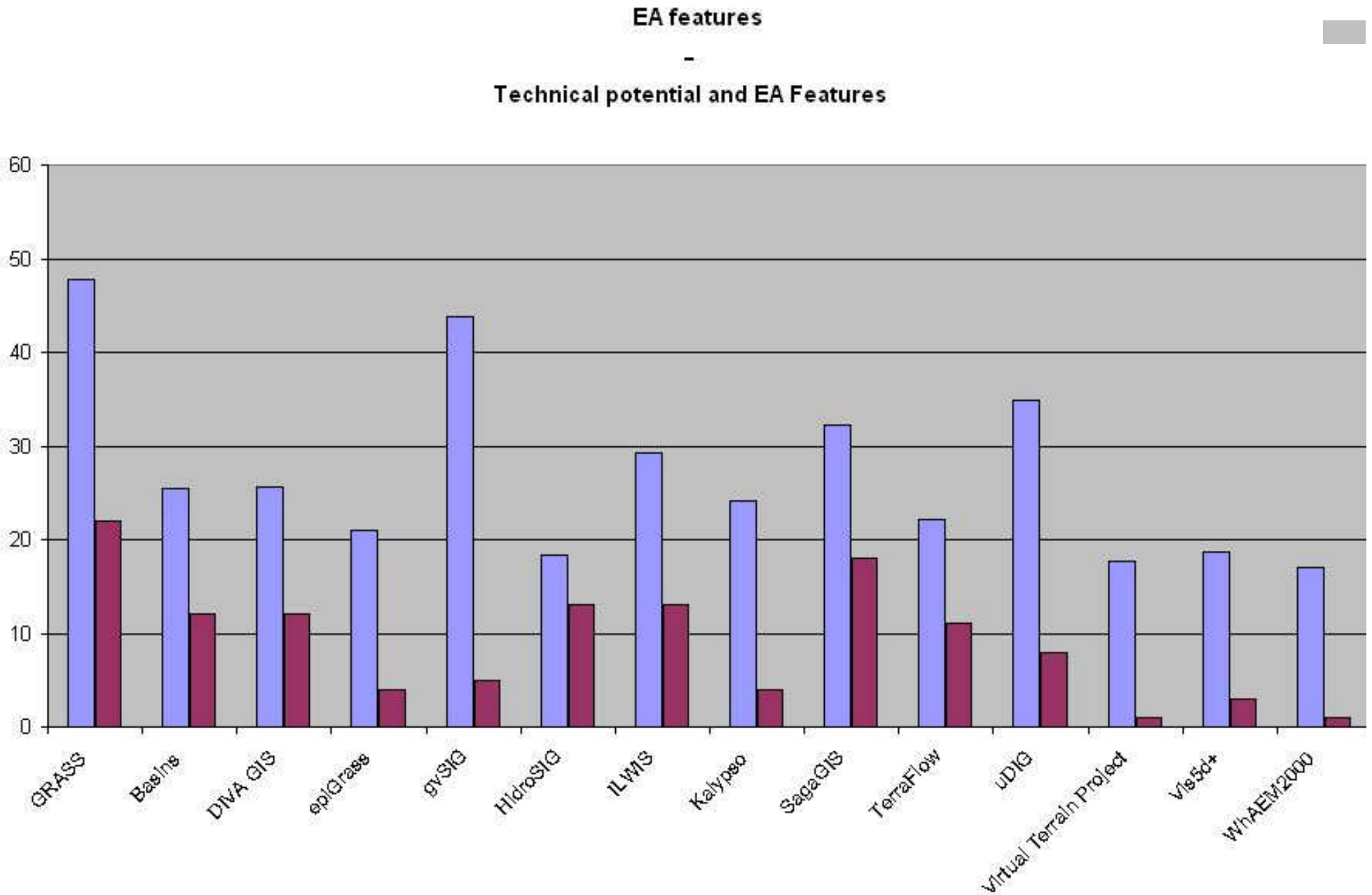


Evaluation of potential

Marketing potential

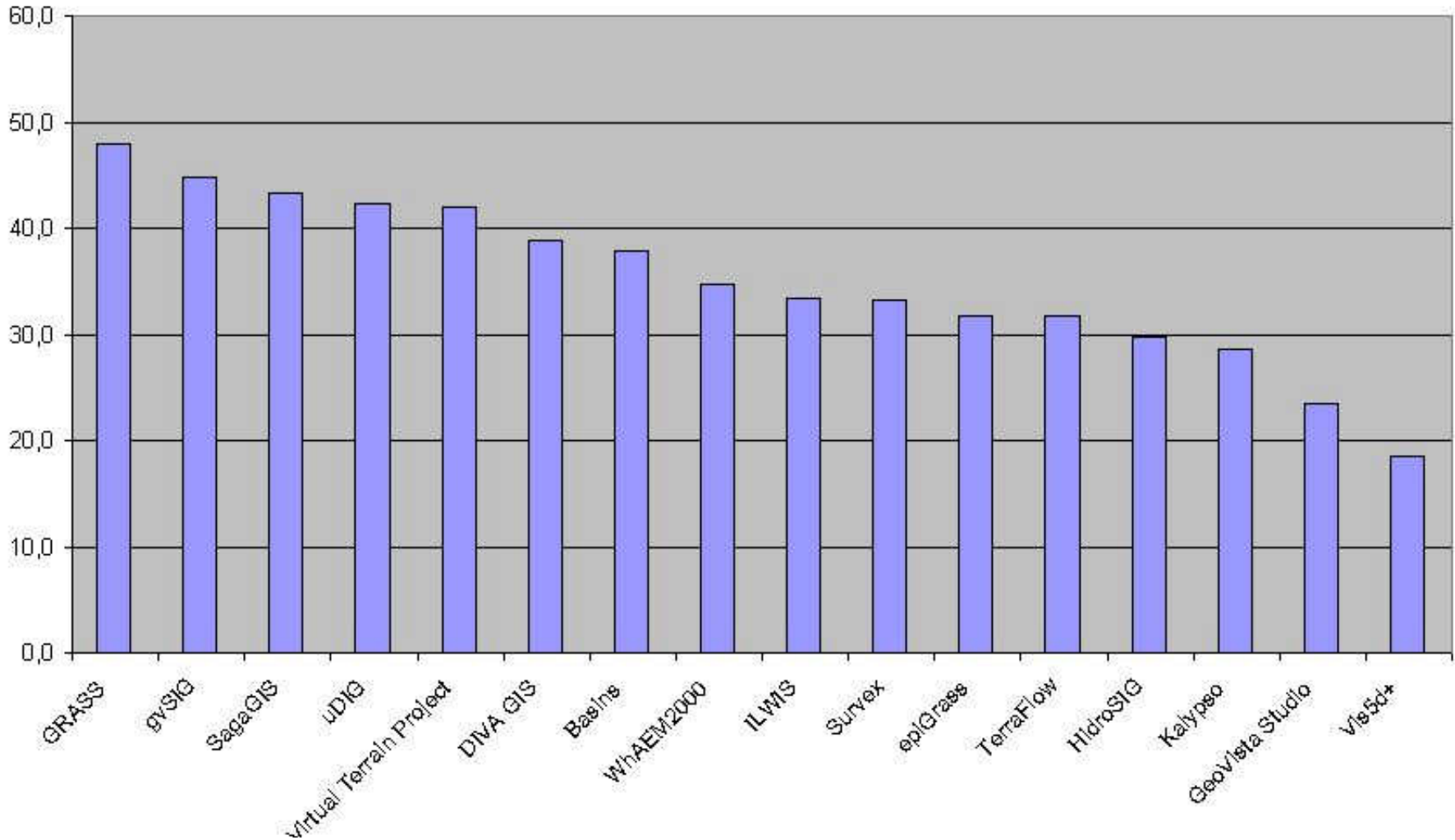


Technical potential



Economical potential

Economical potential



DETAILED RESULTS

	Marketing potential						Technical potential						Economical potential				Overall	
	<i>Maturity of the project</i>	<i>Strength of Community</i>	<i>Market Share</i>	<i>Legal/Licence issues</i>	<i>Collaboration with other projects</i>	<i>Total</i>	<i>Functionality</i>	<i>Reliability</i>	<i>Usability</i>	<i>Efficiency</i>	<i>Maintainability</i>	<i>Portability</i>	<i>Total</i>	<i>Cost of installation</i>	<i>Cost of migration</i>	<i>Cost of operation</i>	<i>Total</i>	score
Maximum score	15	15	12	9	9	60	15	9	9	9	9	9	60	24	18	18	60	180
GRASS	13.8	13.9	10	9	9	55.7	12.6	4.2	8.2	6.9	7.4	8.4	47.8	24	7.1	10.8	47.9	151.4
gvSIG	8.5	12	8	9	9	46.5	10.9	6	6.4	7.5	5.4	7.5	43.7	24	10	10.8	44.8	135.1

Examples of use



- DIVA GIS – 4 examples (species distribution, crop modelling)
- SAGA – 4 examples (3D modelling, soil degradation)
- ILWIS – 3 examples (water management and monitoring, risk assesment)
- gvSIG - 2 examples (water monitoring, coastal management)
- GRASS – 2 examples (research on desertification, ground water modelling)

Current and further results...

The screenshot shows the website for the Cascadoss Project, an environmental application. The page features a navigation menu with 'ABOUT', 'EVENTS', and 'EVALUATION'. The 'EVALUATION' section is active, displaying a table titled 'Marketing potential' for various software projects. The table includes columns for Software, Maturity of the project, Strength of Community, Market Share, Legal/Licence issues, Collaboration with other projects, and Total score. The 'Environmental Application' and 'Best Practices OS GIS&RS' menu items are circled in red.

Software	Maturity of the project	Strength of Community	Market Share	Legal/Licence issues	Collaboration with other projects	Total
<i>maximum score</i>	15	15	12	9	9	60
GRASS	15.0	14.25	12.0	9.0	9.0	59.3
gvSIG	12.8	9.0	10.0	9.0	9.0	49.8
HidroSIG	8.8	8.3	10.0	9.0	9.0	45.0
SAGA GIS	11.3	5.6	10.0	9.0	9.0	44.9
ILWIS	6.7	12.0	6.0	9.0	9.0	42.7
uDIG	12.5	5.8	6.0	9.0	9.0	42.3
Virtual Terrain Project	9.5	6.4	4.0	9.0	9.0	37.9
Kalypso	10.0	7.3	2.0	9.0	9.0	37.3
epiGrass	8.8	2.3	8.0	9.0	9.0	37.0
TerraFlow	2.5	4.9	2.0	9.0	9.0	27.4
DVA GIS	1.5	5.6	6.0	9.0	0.0	22.1



Thank you for your attention!

Information workshop on
Open Source
GIS&RS Software
for environmental applications
Leuven, Belgium, February 5th – 6th 2009
FR, NL

www.cascadoss.be

Other regional workshops:
PL, CZ, SK, HU

www.cascadoss.eu