



# **Comparison of world GIS soft wares and Seraj Software (2003-2008)**

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Shiveh Software Company

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Standards of evaluation which have been used here are based on the international reliable researches that have been done through years 2003-2007 and the information available on the GIS companies' websites. As you can see the results are presented in tables. Using these subjects and tables, standards of evaluation are defined into two groups of advantages and limitations. In some cases, there was no proper information to compare. Due to this, the question mark (?) has been inserted.

### 1. OS Platform Support

GIS software	<u>Windows</u>	<u>Mac OS</u>	<u>GNU/Linux</u>	<u>BSD</u>	<u>Unix</u>	Web	Windows CE /Mobile	Symbian
GRASS	Yes	Yes	Yes	Yes	Yes	via pyWPS	?	No
TransCAD	Yes	No	No	No	No	Yes	?	No
CARIS	Yes	No	Yes	Yes	Yes	Yes	?	No
ESRI	Yes	No	No	No	Yes	Yes	Yes	No
IDRISI	Yes	No	No	No	No	No	?	No
Intergraph	Yes	No	No	No	CLIX	Yes	Yes	No
MapInfo	Yes	No	Yes	No	Yes	Yes	Yes	No
Oracle Spatial	Yes	Yes	Yes	No	Yes	Yes	?	No
Smallworld	Yes	?	Yes	?	Yes	Yes	?	No
IBM DBII	Yes	?	Yes	Yes	Yes	Yes	?	No
Microstation	Yes	?	?	?	?	?	?	?
SQL Server2000	Yes	?	Yes	Yes	Yes	Yes	?	No
Seraj	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes

## 2. Data Formats & Model

Software	Data Format & Model
<b>ArcGIS Desktop 9.2</b>	<ul style="list-style-type: none"> <li>• Direct Read of Vector Data</li> <li>• Direct Read of CAD (DXF, DWG, DGN)</li> <li>• Direct Read of Raster (ERDAS Imagine, GIF, PEG, JPEG, TIFF, GeoTIFF, GRID)</li> <li>• Direct Read of Other Data (Geostatistical layers, TIN, DBF, TXT, INFO, ODBC, Microsoft Access)</li> </ul>
<b>MapInfo Professional 9.0</b>	<ul style="list-style-type: none"> <li>• Direct access to ESRI formats (SHP, E00, SDE, Personal GeoDB, SDTS and VPF)</li> <li>• CAD data (DWG, DXF, DGN)</li> <li>• Oracle Spatial 10G &amp; 9iR2,</li> <li>• SQL Server 2000 &amp; 2005 with MapInfo SpatialWare</li> <li>• Informix 9.4 with MapInfo SpatialWare</li> <li>• ESRI SDE v9.X and higher</li> </ul>
<b>Microstation Geographics</b>	<ul style="list-style-type: none"> <li>• CAD data (DWG, DXF)</li> <li>• ESRI formats (SHP, E00)</li> <li>• MapInfo Interchange (.mif and .mid)</li> <li>• TIFF, GeoTIFF</li> </ul>
<b>AutoCAD Map3D 2008</b>	<ul style="list-style-type: none"> <li>• ESRI Formats (SHP, Coverage, Atlas BNA)</li> <li>• AutoCAD 2000, 2000i, and 2002 DWG, DXF and AutoDesk Map 5 Project File,</li> <li>• Oracle Spatial, AutoDesk GIS Design Server, AutoDesk MapGuide Spatial Data File (SDF)</li> <li>• Data residing in OLE DB data source, Aerial photographs and satellite images in a variety of raster formats</li> <li>• Intergraph DGN /MapInfo Interchange (.mif and .mid)</li> <li>• Comma-separated values (CSV)</li> </ul>
<b>Smallworld</b>	<ul style="list-style-type: none"> <li>• CAD data (DWG, DXF)</li> <li>• Native support for all industry standard vector and raster formats including OGC Web Feature Service (WFS), Web Map Service (WMS), and Geography Markup Language (GML)</li> <li>• JPEG, TIFF, GIF</li> <li>• Intergraph DGN /MapInfo Interchange (.mif and .mid)</li> </ul>
<b>GeoMedia</b>	<ul style="list-style-type: none"> <li>• ESRI Shapefile .shp</li> <li>• AutoCAD DWG, DXF, DGN</li> <li>• Native support for all industry standard vector and raster formats including OGC Web Feature Service (WFS), Web Map Service (WMS), and Geography Markup Language (GML)</li> </ul>
<b>Seraj</b>	<ul style="list-style-type: none"> <li>• ESRI Shapefile .shp</li> <li>• AutoCAD DWG, DXF</li> <li>• Microstation DGN</li> <li>• Direct Read of Other Data ( DBF, Tab delimited TXT, )</li> <li>• Native support for all industry standard vector and raster formats including OGC Web Feature Service (WFS), Web Map Service (WMS), and Geography Markup Language (GML)</li> </ul>

### 3. Database

software	Database
<b>ArcGIS Desktop 9.2</b>	<ul style="list-style-type: none"> <li>External Database</li> <li>Oracle, Microsoft SQL, IBM DB2, Informix through Arc SDE</li> <li>Storage Method: File Management</li> </ul>
<b>MapInfo Professional 9.0</b>	<ul style="list-style-type: none"> <li>External Database</li> <li>Support Oracle, Microsoft SQL, IBM DB2 servers</li> </ul>
<b>AutoDesk Map 3D</b>	<ul style="list-style-type: none"> <li>External Database</li> <li>Support Oracle, Microsoft SQL, MS FoxPro, Access, Excel, dBase</li> <li>Storage Method: File Management</li> </ul>
<b>Smallworld</b>	<ul style="list-style-type: none"> <li>External Database</li> <li>Support Oracle, Microsoft SQL, IBM DB2 servers</li> </ul>
<b>Microstation Geographics</b>	<ul style="list-style-type: none"> <li>External Database</li> <li>Oracle 8i and 9i</li> <li>Storage Method: File Management</li> </ul>
<b>GeoMedia</b>	<ul style="list-style-type: none"> <li>External Database</li> <li>Support Oracle, Microsoft SQL, Access, IBM DB2 servers</li> <li>Storage Method: File Management</li> </ul>
<b>Seraj</b>	<ul style="list-style-type: none"> <li>Internal Database</li> <li>Support Oracle, Microsoft SQL, IBM DB2 servers, MySQL</li> <li>Storage Method: Database Management</li> </ul>

### 4. Database Management

Software	Database Management
<b>ArcGIS Desktop 9.2</b>	Using external databases
<b>MapInfo Professional 9.0</b>	Using external databases
<b>AutoDesk Map 3D</b>	Using external databases
<b>Microstation Geographics</b>	Using external databases
<b>Smallworld</b>	Using external databases
<b>GeoMedia</b>	Using external databases
<b>Seraj</b>	<p>Tables management (object oriented)                      Layers management (object oriented)                      Zones management (object oriented)                      Supporting Persian language in all parts of database                      No limitation in interaction with other databases                      Supporting information based on GML,...standards                      Inheritance Tables Capabilities                      Supporting Distributed Databases</p>

<b>Arc SDE</b>	It acts as a GIS gateway to spatial data stored in a RDBMS, Access massively to large multi-user geographic database
<b>Oracle Spatial</b>	Supporting Distributed Databases, Self tuning memory management, Recovery & Backup
<b>DBII Spatial extender</b>	Automated system of Recovery & Backup, Space Expert gives intelligent highest performance space management, Database management system any where or in any time
<b>SQL Server 2000</b>	No spatial extender included, Use a back-end data base for GIS application, Developers to access and manipulation of data

### 5. Web-based Service

Software	Producer	Web-based Service
<b>(ArcIMS)</b>	ESRI	Slower web delivery/holds extra information/create an image of feature service/requires middle-ware XML translation
<b>(Geomedia Web Map)</b>	Intergraph	Provides raster & vector viewing/ Have initial cost & time consuming
<b>Smallworld</b>	GE	Developing specific tools/ Customization/Based on DHTML
<b>Map Guide</b>	AutoDesk	Uses SDF to deliver data & mapping/ Fast delivery/There is no built-in data editing/Based on HTML/No easy setup wizard
<b>Seraj</b>	Shiveh software Co.	Displaying information/Better speed/Users application management/Easy programming for web designing/ PHP language

### 6. Hardware Requirements

Software	Hardware Requirements
<b>ArcGIS Desktop 9.2</b>	OS: Windows 2000 Pro, Server 2003, XP Pro, XP Home CPU: Pentium III or Xeon computer with a 1 GHz Memory: 512MB RAM Disk Space: 1 GB of free disk space
<b>MapInfo Professional 9.0</b>	OS: Windows 2000 Pro SP4, XP Pro SP2, XP Home SP2, Server 2003 SP1, Windows Vista CPU: Pentium III or equivalent microprocessor - Minimum Memory : 128MB RAM Disk Space: 550MB
<b>AutoCAD Map3D 2008</b>	OS: Microsoft Windows Vista Ultimate and Business, XP Home, XP Pro, SP2, 2000 SP4 CPU: Pentium 4, 2.2 GHz or greater Memory: 512 MB RAM Disk Space: 1.5 GB free disk space for installation #AutoCAD Map 3D software does not support 64 bit operating systems
<b>GeoMedia Pro 6.0</b>	OS: Microsoft Windows NT 4.0 SP6a, 2000 SP3, ME, XP Pro SP1 CPU: Pentium III or equivalent microprocessor - Minimum Memory: 512MB RAM recommended Disk Space: 256MB
<b>Seraj</b>	OS: Microsoft Windows 2000 , ME, XP, Vista - LINUX - CPU: Pentium III or equivalent microprocessor - Minimum Memory: 512MB RAM recommended Disk Space: 500MB # support 64 bit operating systems

### 7. Market Price

Software	Single	Server	Database	1 Year Support
ArcGIS ArcView 9.2 ArcEditor 9.2 ArcInfo 9.2 ArcReader 9.2	\$ 1,500 \$ 5,600 \$ 7,100 Free	Arc SDE & ArcIMS each start at \$10,000	Oracle 9i \$40,000 per processor  Oracle spatial \$10,000 per processor	\$ 500
AutoCAD 3D Map Auto Desk (Mapguide server)	\$ 5,295	\$ 11,000 (10 licence) \$ 50,000 (100 licence)	DBII \$33,125 per processor +Spatial Extender \$9,250	\$ 495
MapInfo Professional	\$ 1,495		SQL Server2000 \$10,594 per processor	\$ 299
GeoMedia Pro 6.0 GeoMedia WebMap	\$ 7,495 \$ 9,995	\$ 24,000		\$ 1,200
Microstation Geographics V.8 (Web-based Server)	\$ 4,795	\$ 50,000		N/A
Seraj	**	\$ 40,000 – \$ 85,000	Internal Database	Free

\*\* windows Mobile/CE , Symbian

## 8. Advantages & Limitations

Software	Advantages	Limitations
<b>GeoMedia</b>	Direct access to information, Significantly reduced GIS learning curve	Customization may add to initial cost, Time consuming and laborious, Only windows and Internet Explorer based software
<b>MapInfo Professional</b>	Inclusion of Locational intelligence empowers even non-GIS experts to create highly detailed maps to enhance presentations and to make more insightful everyday decisions.	Windows based operating system, Relatively few customization tools available
<b>AutoCAD3D Map</b>	Open source FDO Data Access Technology to directly & natively access data, Multi- user editing capabilities, Import- Export engine interoperates with all major GIS software, so it is possible to read, write & transform industry-standard formats	Windows based operating system, High learning curve
<b>ArcGIS</b>	Leader in industry, Supporting a wide range of GIS functions & analytical extensions, Easy to use features	With several extensions the capabilities of Arc view have mushroomed and it can be difficult to know what can and cannot be done with Arcview. Its functionality depends on users' knowledge of the existence of Arcview's extensions as well as its limitations.
<b>Smallworld</b>	Easy to use /Easy to learn/ Simple settings/Export information	Windows based operating system, Not supporting all the spatial information formats
<b>Seraj</b>	Reducing learning curve/ Developing different tools based on users requirements/Distinct approach to spatial information management/ Integration of spatial & tabular data as a real/ Simple programming	Developing some geographical analysis, Developing some internal database capabilities

### 9. Standards

Database System	Standards
<b>IBM DB2 spatial extender</b>	ISO SQL/MM Spatial Standard - OpenGIS Consortium's (OGC's)
<b>ArcSDE</b>	OpenGIS simple features and SQL statements.
<b>Oracle Spatial</b>	OpenGIS Consortium Simple Features - Geographic Markup Language (GML)
<b>Seraj</b>	International standards (GML & OGC) have the ability to develop

### 10. Server & Network

Software	Spatial Data Type	Scalability
<b>IBM DBII Spatial extender</b>	<ul style="list-style-type: none"> <li>• Points</li> <li>• Lines</li> <li>• Polygons</li> </ul>	?
<b>ArcSDE</b>	Support all the ESRI geometry types	?
<b>Oracle Spatial</b>	<ul style="list-style-type: none"> <li>• Points.</li> <li>• Line Strings</li> <li>• Polygons</li> </ul>	?
<b>Seraj</b>	<ul style="list-style-type: none"> <li>• Point, Multipoint</li> <li>• Line, Multiline</li> <li>• Polygon, Multipolygon</li> </ul>	yes

### 11. Key features & functions

Software	Key features & functions
<b>ArcGIS</b>	High-quality cartography /Advanced editing tools /Support DLL to develop third party Interface /Address Geocoding /Object oriented development /Support for metadata standards using XML
<b>Auto Desk / AutoCAD 3D Map</b>	Mobile Device Support /XML Support /Raster to Vector conversion /Multi-user editing & directly access live data sources /Supporting.Net / Analyzing DEM & Raster
<b>MapInfo Professional</b>	Time-base analysis/ overlaying vector & raster layers/Better visualization
<b>Microstation Geographics V.8</b>	Support 2D & 3D spatial /Flexible customization/ Support all formats of information/ Support raster & vector view

<b>Intergraph - GeoMedia Pro 6.0</b>	Spatial analysis tools /Intelligent tool for print / Buffer zones / Easy to use /Coordinate transformation /Spatial overlays /Spatial Aggregation
<b>Seraj</b>	Integrating spatial and tabular data as a real/ Quality assurance/ Speed & accuracy in data retrieve/ Smart task manager in console/ Support network of services in mesh- hierarchy topologies/ Distributed Services/Concurrent users in manipulation/ User friendly desktop application/ Query within geographical analysis tool/ Buffering zones

### 12. Data Interoperability

Most of these systems in GIS industry have the compatibility and interoperability with other file formats from various databases without conversion.

### 13. Data Convert

Most of these systems in GIS industry have this ability to read and convert other GIS formats (vector or raster) directly or indirectly such as Shape (ESRI), DWG/DXF (AutoCAD), DGN (Microstation) ,....

### References:

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## Comparison of GIS Products

Criteria	Seraj	AutoDesk AutoCAD 3D Map	Intergraph Geomedia	Microstation	Mapinfo	Smallworld	ESRI ArcGIS
<b>Software</b>	✓	✓	✓	✓	✓	✓	✓
<b>Advantages</b>	✓	✓	✓	✓	✓	✓	✓
Products Diversity	✓	✓	✓	✓	✓	✓	✓
Better Support	✓	✓	✓	✓	✓	✓	✓
Supporting Persian Language	✓	✓	✓	✓	✓	✓	✓
Integration of spatial & tabular data as a real	✓	✓	✓	✓	✓	✓	✓
Internal Database	✓	✓	✓	✓	✓	✓	✓
Interaction with other systems	✓	✓	✓	✓	✓	✓	✓
Interoperability	✓	✓	✓	✓	✓	✓	✓
Coordinate System Transformation	✓	✓	✓	✓	✓	✓	✓
Number of Operating Systems Supported	7	1+?	3	1+?	5	4	4
Independent from other systems	✓	✓	✓	✓	✓	✓	✓
Supporting Distributed Database	✓	✓	✓	✓	✓	✓	✓
Reducing Learning Curve	✓	✓	✓	✓	✓	✓	✓
Overlay Analysis	✓	✓	✓	✓	✓	✓	✓
Topology	✓	✓	✓	✓	✓	✓	✓
Buffering Zones	✓	✓	✓	✓	✓	✓	✓
Simple Setup & Installation	✓	✓	✓	✓	✓	✓	✓
Easy to develop specific tools	✓	✓	✓	✓	✓	✓	✓
Supporting International Standards	*	✓	✓	✓	✓	✓	✓
Developing Specific Systems	✓	?	?	?	?	?	?
Easy to use	✓	✓	✓	✓	✓	✓	✓
Supporting Spatial Analysis	✓	✓	✓	✓	✓	✓	✓
System Scalability	✓	?	?	?	?	?	?
Raster Support	✓	✓	✓	✓	✓	✓	✓
Services on Web	✓	✓	✓	✓	✓	✓	✓
Capability to communicate with DBMSs	✓	✓	✓	✓	✓	✓	✓
<b>Limitations</b>	✓	✓	✓	✓	✓	✓	✓
Not acquired in the world market	✓	✓	✓	✓	✓	✓	✓
Time consuming and laborious	✓	✓	✓	✓	✓	✓	✓
High Cost Customization	✓	✓	✓	✓	✓	✓	✓
New Product	✓	✓	✓	✓	✓	✓	✓
File Management	✓	✓	✓	✓	✓	?	✓
High Learning Curve	✓	✓	✓	✓	✓	✓	✓
Commodity Sanction	✓	✓	✓	✓	✓	✓	✓
Not being supported in Iran	✓	✓	✓	✓	✓	✓	✓
O.S. Limitation	✓	✓	✓	✓	✓	✓	✓
Slower Web Delivery	✓	✓	✓	✓	✓	✓	✓
Non-Integration of data	✓	✓	✓	✓	✓	✓	✓
Not supporting all common formats	✓	✓	✓	✓	✓	✓	✓
Great Software price	✓	✓	✓	✓	✓	✓	✓

\* Under Development

