



IT Specifications

**Hardware/Software
Prepared by:**

GAA-SC

Business Case: In many organizations IT and GIS departments are separate entities competing for identical funding for identical networking, hardware and personnel. It has become increasingly important to insure that cohesive development and deployment of IT/GIS projects that, if compartmentalized, each understand the needs of the other. As GIS matures in organizations, the next phase will be for management to expect to see the business intelligence data presented from the spatial perspective. The demand from users who require GIS on the desktop (either client or web based) will impact the entire organization.

As GIS grows within an organization issues generally managed and governed by the IT Department are impacted in numerous ways. To maintain and disseminate GIS information to users, resources become redundant (if IT and GIS are different departments) or GIS services begin to negatively impact other applications. It is important to understand that issues such as security, bandwidth utilization, patch management, hardware support, OS management, access to auxiliary databases, virtualization, system redundancy, backups and recovery and integration with other systems, database management effect both IT and GIS staffs.

It is therefore important that both sides of the equation, IT and GIS understand the needs of the other. This project focuses on the schematics of the network, hardware and software requirements, but will at times also interject skillsets necessary to be successful. It is also important to note, that when IT related tasks are described herein, it refers to the skillset generally associated with IT organizations that must be handled by IT departments or GIS personnel with similar skillsets.

Audience: Managers of IT or GIS Organizations or IT/GIS organizations responsible for decision making and strategic planning for development and growth of GIS.

Purpose: To provide basic guidelines for IT and/or GIS organizations of various sizes and disciplines, enabling effective planning of resources. It is understood that GIS organizations vary in size (number of users (viewers/editors) as well as purpose (creation/maintenance or view/analysis of spatial data) yet the purpose of this project is to provide basic requirements from an IT perspective to support GIS within organizations. Some of the requirements will also address skillsets necessary to support GIS functions. This project can also be viewed as a migration plan as organizations move from level to level in complexity.

The document will provide requirements based on the purpose and needs as described. It is arranged in order from a simple stand alone agency to a complex enterprise organization. It is presented as recommendations and has been developed based on the requirements and designs to support GIS organizations using ESRI's Arc software components.

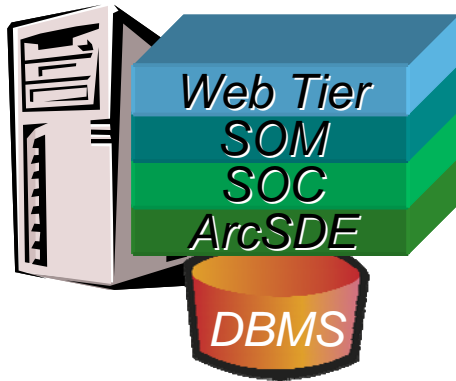
Standalone Workgroup—is defined as departmentally focused or a startup organization. It would have a limit of 10 editors. The amount of data to be maintained is limited to 4GB, and does not require a DBMS such as SQL server or Oracle. This solution would allow for minimal Intranet/Internet access to the spatial data, but such access would have an impact on performance. This solution requires the least IT staff support to setup and maintain and would not require a DBA to maintain databases. It also requires the lowest denominator of hardware and software licensing, but does require network connectivity between workstations.

Intel Xeon 1 CPU (Duo Core) 3.0GHz (4MB L2 cache)

Target Capacity

Map Server = 250dpm (15,000dph)

Up to 25 Concurrent Users (Geodata connections limited to 10)



Hardware Requirements:

Server
Desktop
WebServer

Software:

Workgroup SDE
SQL Express
ArcEditor (for all Editors)
ArcView
ArcIMS (web presence is included).

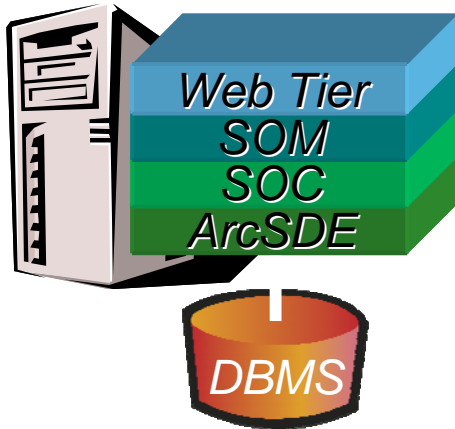
Small Enterprise—system is defined as an organization with intra departmental users and editors exceeding 10. The workgroup also moves to the small enterprise level when the database grows beyond the 4GB limitation of workgroup. This level also supports a growing intranet and internet presence. This configuration would require IT management to be involved with all setup, configuration and maintenance of multiple servers necessary to support production and viewing environments. It will also be necessary to have the services of a DBA skilled in the DBMS selected by management. The small enterprise will require advanced server and a licensed DBMS (such as SQL Server or Oracle). A web tier will also be required for Inter/Intranet access.

Intel Xeon 2 CPU (Duo Core) 3.0GHz (4MB L2 cache)

Target Capacity

Map Server = 550dpm (33,000dph)

Up to 50 Concurrent Browsers (Additional 25 ArcMap connections)



Hardware Requirements:

Server
 Desktop
 WebServer

Software:

Advance ArcSDE
 SQL Express
 ArcEditor (for all Editors)
 ArcView
 ArcIMS (web presence is included).

Simple Mid Size Capacity Enterprise—Very similar to the Small Enterprise with regard to database size, editor limitations, DBA requirements, but would include active intranet websites and a growing internet presence. This configuration would require active IT involvement in that key components may require DMZ separation and increased security requirements. Depending on the complexity of the network infrastructure and levels of security implemented will impact the configuration of the system.

This configuration would be providing substantial GIS information to multiple departments and would possibly included integration with numerous IT systems. The Editing functions could be spread over a number of different departments. The complexity of the editing environment (including versioning, archiving and replication) would also require a DBA with extensive ArcSDE skillsets. As the enterprise grows, GIS organizations will feel the need to deploy significant web presences, both internal and external to offset the need to provide desktop licensing and to meet the needs of users demanding more and more information.

2 - Intel Xeon 2 CPU (Duo Core) 3.0GHz . (4MB L2 cache)
Target Capacity
Map Server = 550dpm (33,000dph)
Up to 75 Concurrent Browsers (Additional 50 ArcMap connections)



Hardware Requirements:

Server
 Desktop
 WebServer

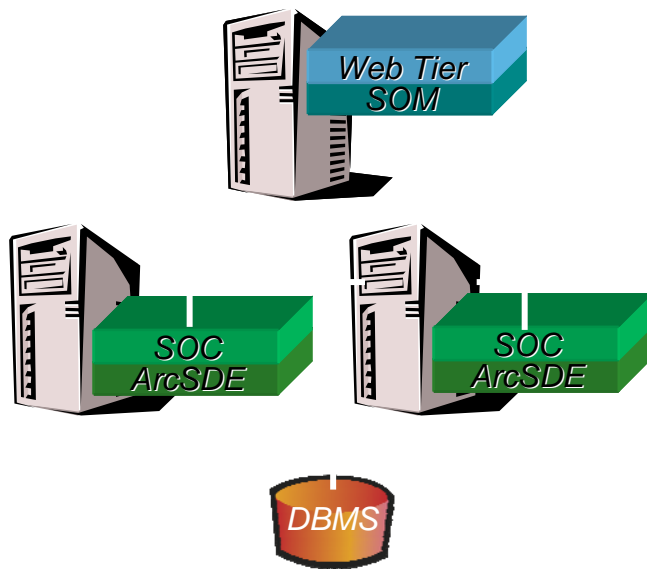
Software:

Advance ArcSDE
 SQL Express
 ArcEditor (for all Editors)
 ArcView
 ArcIMS

Complex High Capacity Enterprise—This enterprise implementation will require substantial hardware, network, bandwidth and management expertise to successfully deploy. The High Capacity Enterprise may cross more than departments, but may also need to provide GIS data to multiple buildings, maybe multiple jurisdictions and have a significant web presence to provide GIS data to external customers. The database management requirements will also increase as the quantity of data also increases.

At this level of implementation integration with core business systems may also be required by users. This would require a close relationship with IT management to provide access to business systems. Users will require real time connectivity to external databases and prefer that such relationships not be scheduled export processes.

3 - Intel Xeon 2 CPU (Duo Core) 3.0GHz . (4MB L2 cache)
Target Capacity
Map Server = 1,470dpm (88,200dph)
Up to 145 Concurrent Browsers (Additional 60 ArcMap connections)



Hardware Requirements:

Server
Desktop
WebServer

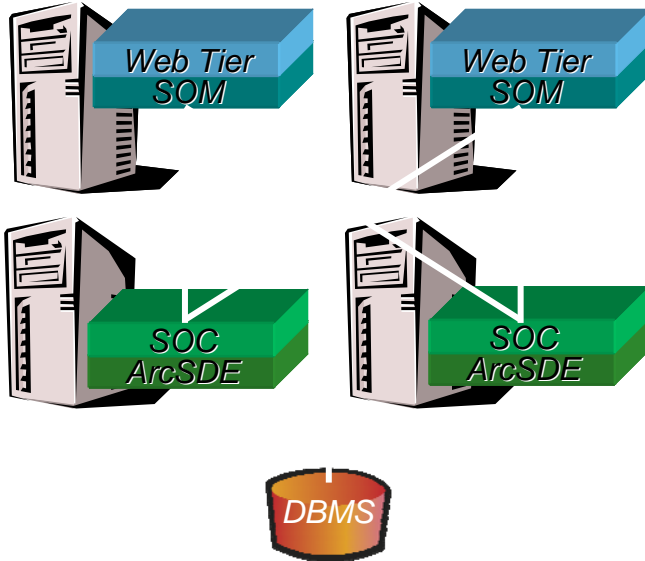
Software:

Enterprise SDE
SQL Express
ArcEditor
ArcView
ArcIMS

High Availability Enterprise—Design is for organizations who provide substantial data to end users. This would especially include organizations requiring replicated databases for security purposes and that have numerous browser based applications or integration to mission critical systems. This configuration also is load balanced to provide unhindered editing requirements for numerous client based editors.

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Target Capacity

**Map Server = 1,470dpm (88,200dph)
Up to 145 Concurrent Browsers (Additional 60 ArcMap connections)**



Hardware Requirements:

**Server
Desktop
WebServer**

Software:

**Enterprise SDE
SQL Express
ArcEditor
ArcView
ArcIMS**

Additional Notes:

Operation Systems for GIS Databases exceeding 2TB require 64 bit operating systems. All configurations represented do not reflect additional business systems hardware configurations.

GIGe ethernet connections would be a minimum requirement for network configurations passing substantial GIS data.