What is ArcSDE?

ArcSDE technology is a core component of ArcGIS for Server. It manages spatial data in a relational database management system (RDBMS) and enables it to be accessed by ArcGIS clients. It is the technology that provides the framework to support long transactions, which facilitates the versioned editing environment in multiuser geodatabases. The geodatabase is the primary data storage model for ArcGIS; it provides a single central location to access and manage spatial data.

A multiuser geodatabase utilizes a multitier architecture that implements advanced logic and behavior in the application tier (e.g., ArcGIS software) on top of a storage tier (e.g., relational database management system [RDBMS] software). The responsibility for managing geographic data in a multiuser geodatabase is shared between ArcGIS and the RDBMS software.

A relational database management system provides a straightforward formal structure for storing and managing information in tables. Data storage and retrieval are implemented with simple tables. The multiuser geodatabase utilizes the power of the RDBMS. Certain characteristics of geographic data management, such as disk-based storage, definition of attribute types, query processing, and multiuser transaction processing, are delegated to the RDBMS.

The multiuser geodatabase uses an RDBMS to provide you with

- Flexibility to store your data in a supported RDBMS of your choice
- Ability to apply your existing IT knowledge and experience to manage the environment through common RDBMS practices
- Spatial types to enhance data storage and interoperability

ArcSDE Technology

Prior to ArcGIS 9.2, Esri sold ArcSDE as a core product. At ArcGIS 9.2, ArcSDE is no longer a separate product. It is now ArcSDE technology and integrated into ArcGIS for Desktop and ArcGIS for Server products.

ArcSDE technology serves as the gateway between GIS clients and the RDBMS. It enables you to easily store, access, and manage spatial data within an RDBMS package such as

- DB2
- Informix
- Oracle
- PostgreSQL
- SQL Server and SQL Server Express
ArcSDE technology is critical when you need to manage long transactions and versioned-based workflows such as

- Support for multiuser editing environments
- Distributed editing
- Federated replicas managed across many RDBMS architectures
- Managing historical archives

The responsibility for defining the specific RDBMS schema used to represent geographic data and for application logic is retained in ArcGIS, which provides the behavior, integrity, and utility of the underlying records.

**Geodatabase Application Logic**

While the RDBMS manages simple data types and tables and ArcSDE technology enables communication between GIS clients and the RDBMS, additional application logic is required to implement more complex object behavior and integrity constraints. ArcObjects is an example of application logic that enables the behavior in a geodatabase. ArcObjects is a library of software components that make up the foundation of ArcGIS.

**Multiuser Functionality**

**Versioning**

Versioning is the mechanism that enables the geodatabase to manage and maintain multiple states while preserving database integrity. It is the basis for multiple users accessing and editing data simultaneously. Versions explicitly record the object states of a geodatabase.

The options for versioned editing in a multiuser geodatabase are

**Versioned Editing**

- Ability to manage conflict resolution
- Supports undo/redo capability
- Supports the full geodatabase model
- Supports geodatabase archiving and replication
- Supports long transactions
- Persistent record of changes
- Versioned editing with the option to move edits to base
  - Edits made to DEFAULT version automatically migrated to base tables
  - Supports undo/redo capability
  - Supports editing simple data only
  - Not compatible with geodatabase archiving and replication
Nonversioned Editing

- Editing of source data directly
- Last edit is final
- No ability to undo/redo changes