

Leveraging PostgreSQL with ESRI's ArcGIS system



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Agenda

- ESRI – Background
- Open Source & ESRI
- Overview of Enterprise GIS
- Introduction of ArcGIS Server Enterprise
 - ArcSDE Technology
 - Enterprise geodatabase
 - Implementation on PostgreSQL
- Summary
- Exercise

ESRI – company background

- Founded in 1969; located in Redlands, CA
- A research & development company focused on GIS technology & its community
 - Software development
 - Consulting & application solutions
 - Educate & promote GIS science/technology
- U.S. & International offices



Open source & ESRI

- ESRI uses a variety of open source technology in software development
- Encourage developers to employ open source technology & interoperability for their application solutions



Open source & ESRI

- Continue work with the open source community to further GIS research & development
- Active participant in open source & interoperability standards communities



GIS is evolving towards Enterprise Information Systems

Desktop Tools & Data



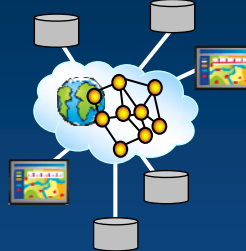
Personal
Professional
Productivity

Client / Server Systems



Workgroup
Information
Management

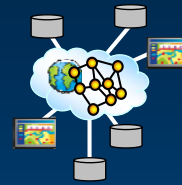
Web Services Networks



Enterprise
GIS Services

What is an Enterprise GIS system?

- Provides broad access to geospatial data & services
 - Common infrastructure to build & deploy GIS
- Generally multi-department & integrated with other enterprise systems
 - e.g., Land records management
- Helps to achieve business objectives
- Scalable, reliable, & secure
- Supports interoperability & IT standards



Bottom line: An enterprise GIS should meet an organization's needs both collectively & individually

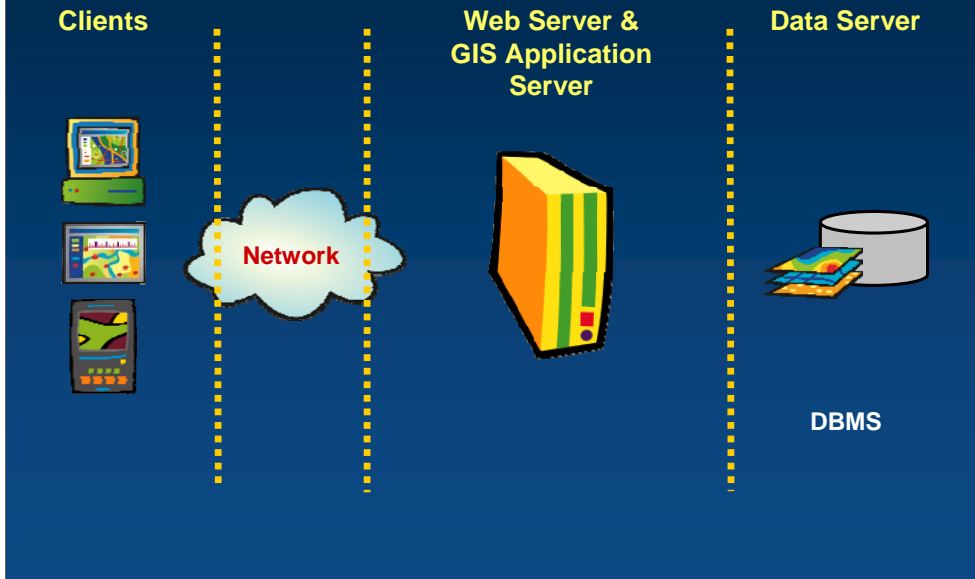
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Enterprise GIS system challenges

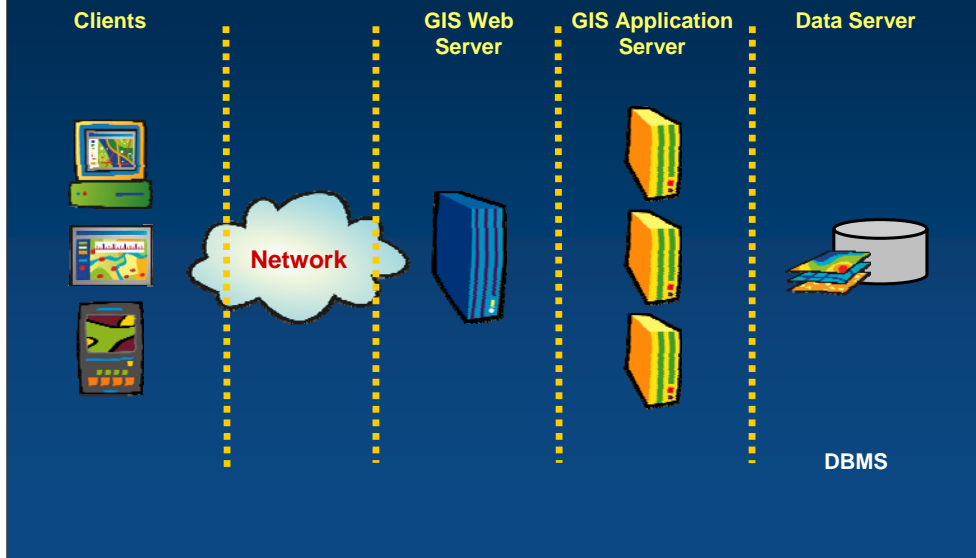
- Sharing services & information across departments
- Good design/implementation vs. quick results
- Consensus on a common set of standards & governance processes
- Not losing sight of the business strategy behind the project
- Budget constraints (\$\$\$\$)
- After establishing: Maintaining performance

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Small enterprise GIS configuration

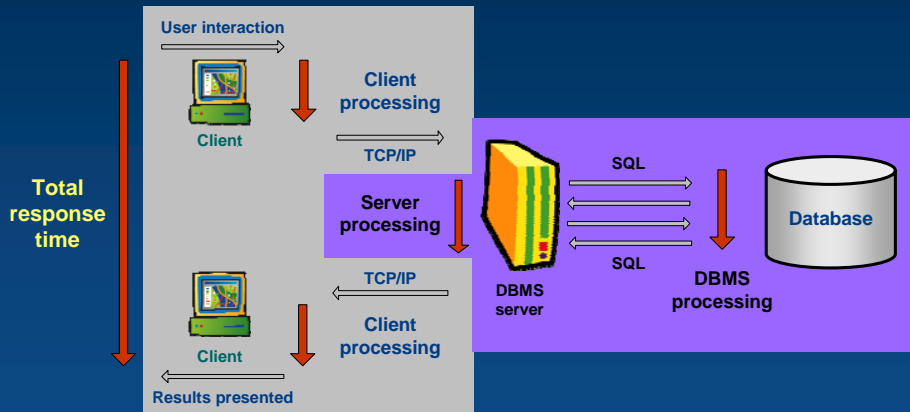


Large enterprise GIS configuration Service Oriented Architecture

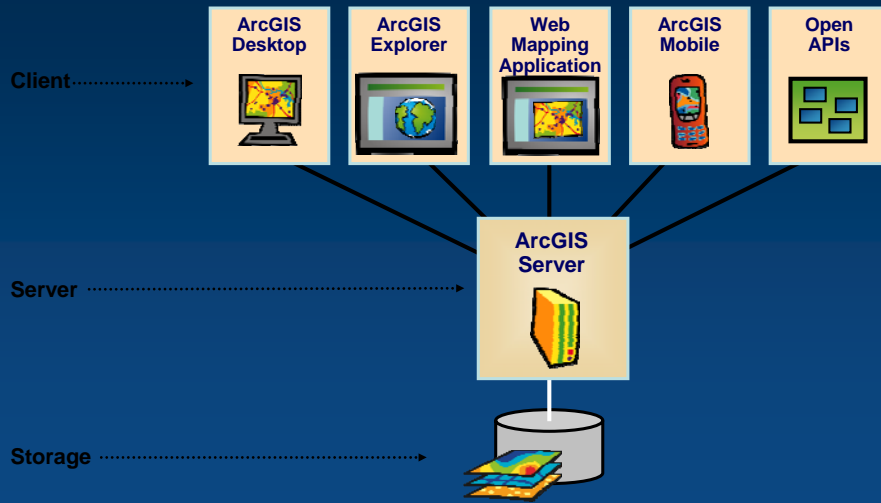


Performance model

- Response time for end user
- Total response time:
 - Based on load, # of users, & # of operations

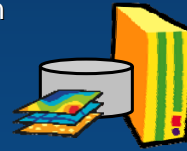


ArcGIS: a complete GIS



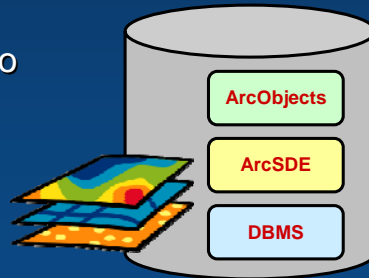
ArcGIS Server Enterprise

- Consists of 4 components:
 - Server Object Manager, Server Object Container, ArcSDE Technology, & Web App Dev Framework
- **ArcSDE Technology**
 - The gateway between GIS clients & DBMS
 - Enables users to easily store, access, & manage spatial data on the leading DBMS platforms
 - Essential component to set-up & maintain an enterprise geodatabase
 - Supports:
 - Multi-user editing environment
 - Complex GIS workflows
 - Geospatial data integration with IT systems

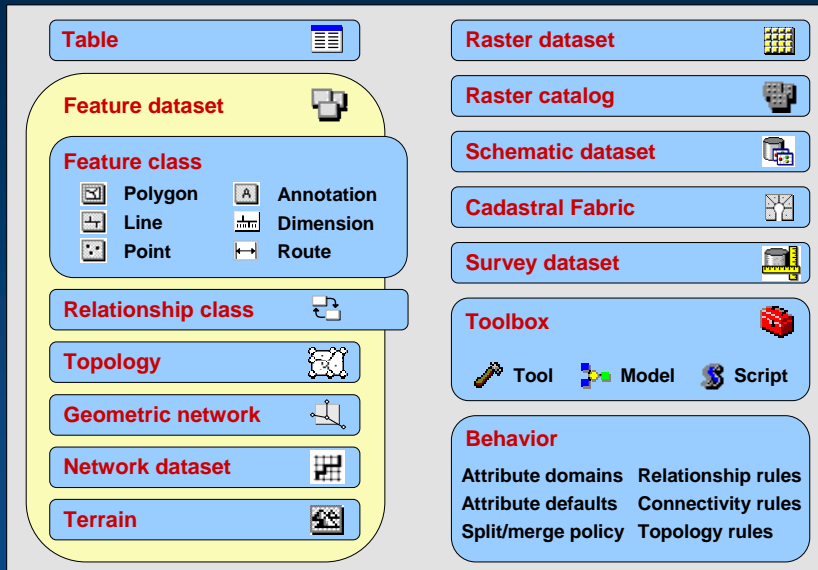


Introducing the Enterprise Geodatabase

- A container for spatial & attribute data
 - GIS data stored in a DBMS using ArcSDE Technology
 - Leverages existing DBMS functionality with ArcObjects functionality
 - Capable of modeling complex spatial relationships
 - Supports data integrity with business rules
 - Scalable
- ArcGIS has suite of tools to migrate existing GIS data



Geodatabase elements



ArcSDE Technology for PostgreSQL

- Next ArcGIS release in 2008
- Standard Enterprise ArcSDE install
 - Will include PostgreSQL database
- Supported platforms:
 - Windows, Linux (Red Hat & SuSe), & Sun Solaris
- Geometry storage managed through spatial types
 1. **ESRI spatial type** (`ST_Geometry`)
 - Conformance with the ISO/OGC simple feature specifications
 2. **PostGIS** – Open source spatial type (`Geometry`)
- Complete geodatabase data model enabled

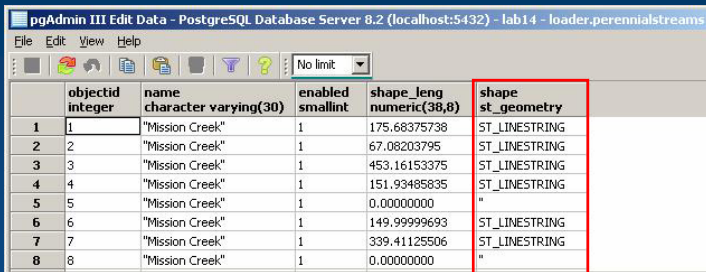


Note: ALL CONTENT NOT FINALIZED

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Geometry storage in PostgreSQL

- Geometry stored as a custom DBMS data type
- SQL spatial functions are defined for all operations on the geometry object
- OGC compliant operators supported

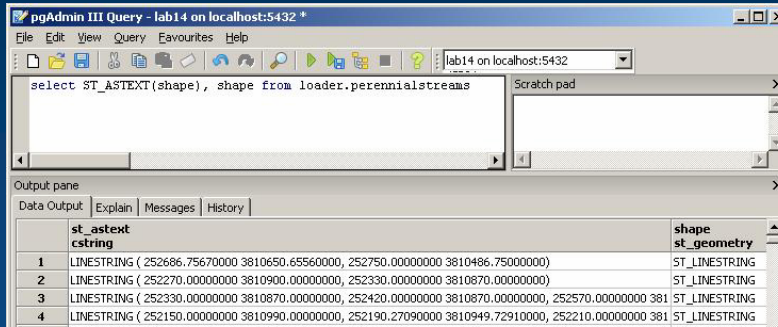


The screenshot shows the pgAdmin III interface displaying a table with 8 rows. The columns are: objectid (integer), name (character varying(30)), enabled (smallint), shape_leng (numeric(38,8)), and shape_st_geometry. The 'shape_st_geometry' column is highlighted with a red border. The data in the table is as follows:

	objectid integer	name character varying(30)	enabled smallint	shape_leng numeric(38,8)	shape st_geometry
1	1	"Mission Creek"	1	175.68375738	ST_LINESTRING
2	2	"Mission Creek"	1	67.08203795	ST_LINESTRING
3	3	"Mission Creek"	1	453.16153375	ST_LINESTRING
4	4	"Mission Creek"	1	151.93485835	ST_LINESTRING
5	5	"Mission Creek"	1	0.00000000	"
6	6	"Mission Creek"	1	149.99999693	ST_LINESTRING
7	7	"Mission Creek"	1	339.41125506	ST_LINESTRING
8	8	"Mission Creek"	1	0.00000000	"

Geometry storage in PostgreSQL

- Contents of spatial type attribute field



Advantages of spatial types

- Ability to integrate spatial types throughout the enterprise GIS
 - Share data between ArcGIS & other applications
 - SQL access to spatial data implies that you do not need ArcGIS to view geometry
 - Perform spatial operations at the SQL level using spatial operators

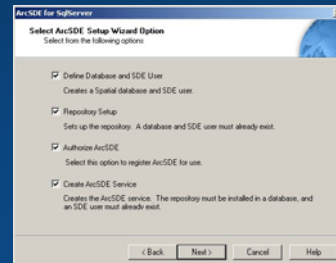
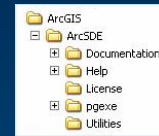


Available SQL functions

- Spatial functions defined on the spatial type
 - **Constructor functions**
 - Build a geometry object
 - **Accessor functions**
 - Access properties of a geometry object
 - **Transformation functions**
 - Construct new geometry objects from existing geometry objects
 - **Relationship functions**
 - Test the spatial relationship between 2 geometry objects

Installation of ArcSDE for PostgreSQL

- **Install PostgreSQL software**
 - Included with ArcGIS Server Enterprise
- **Install ArcSDE Technology software**
 - Create `SDEHOME` directory
 - Post-install wizard (4 steps)
 1. Create database & 'sde' user
 2. Create repository tables
 3. Authorize software
 4. Create ArcSDE service (Windows only)



Summary

- ESRI – brief company profile
 - Its relationship with open source community
- Enterprise GIS
- ArcGIS Server Enterprise
 - ArcSDE Technology
 - Enterprise geodatabase
 - Implementation on PostgreSQL
- Looking for ArcSDE on PostgreSQL beta program participants