

ArcSDE Admin Tools

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Intro to Generic Tools

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Special Topics

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Agenda:

- **ArcSDE Fundamentals**
- **Database Design**
- **Overview of ArcSDE administration tools**



Fundamentals

- Loading Parameters
 - XY offset, Scale
 - Commit interval
 - Dbtune
 - Grid Sizing



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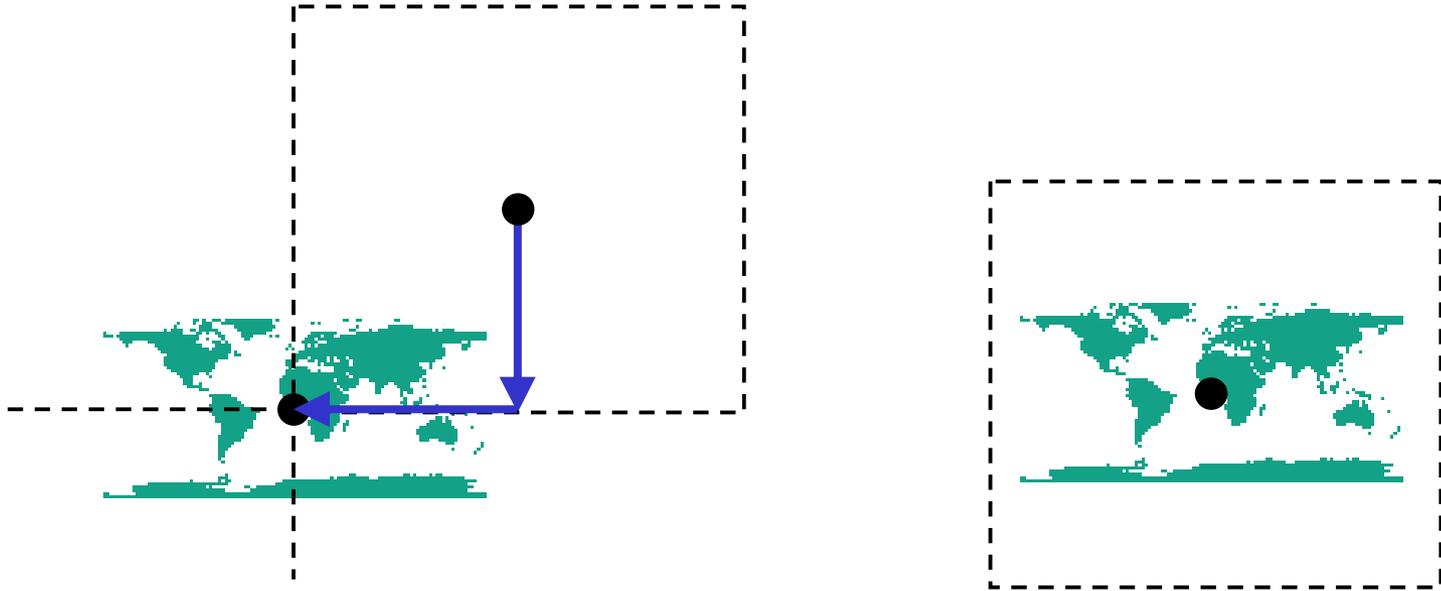
XY offset, Scale

```
shp2sde -o create
```

```
[-x <xoffset,yoffset,xyscale>]
```



XY Coordinate Offset

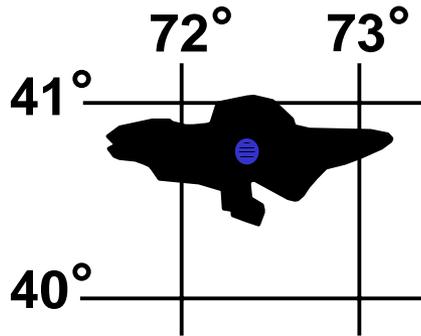


- **Goals:**
 - All data in positive coordinate space
 - Provide equal room to grow on all sides
- **Solution:**
 - Find distance between data and integer system centers
 - **Offset** coordinates by this distance



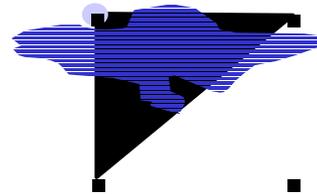
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Scale



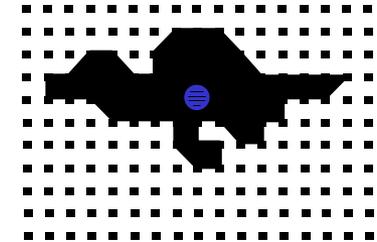
Andizhan, Uzbekistan

72.36° 40.81°



Integer - no scale

72° 41°



Integer - scale of 10

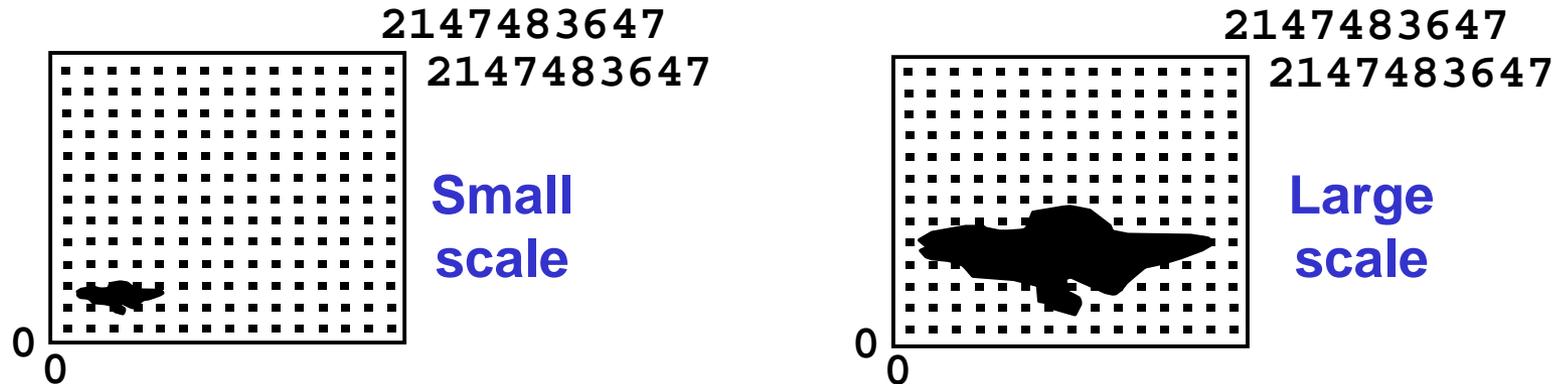
72.4° 40.8°

- **ArcSDE stores geometry in integer format**
 - Coordinates snap to nearest integer location
- **Applying **scale** avoids loss of data**
 - Larger scales allow higher resolution



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Characteristics of integer coordinates



- Finite number of possible coordinates
- Larger scale factor consumes more coordinate / storage space
- Choose smallest scale that supports data's resolution
 - Cannot alter after layer creation
 - Allow for update with higher resolution data



Commit Interval

```
shp2sde -o create
```

```
[-c <commit_interval>]
```



Populating the layer

- **RDBMS stores uncommitted work in temporary space**
- **Committing transaction frees temporary space**
- **Committing transaction takes time**
- **Delay commit as long as possible without exhausting temporary space**
- **Full temporary space causes the database to rollback the transaction (i.e., load fails).**



DBTune

```
shp2sde -o create
```

```
[-k <config_keyword>]
```



Dbtune.sde

- Controls allocation and placement of Tables

Oracle

##<KEYWORD>

| | |
|------------------|---------|
| DSET_TABLESPACE | DCW |
| TEMP_TABLESPACE | TEMP |
| INDEX_TABLESPACE | DCW_IXF |

| | |
|------------|--------|
| F_INIT | 40960 |
| F_NEXT | 40960 |
| F_IX1_INIT | 40960 |
| F_IX1_NEXT | 40960 |
| A_TBLSP | DCW |
| A_INIT | 40960 |
| A_IX1_INIT | 40960 |
| S_TBLSP | DCW_IX |

END

SQL Server

##DEFAULTS

| | |
|---------------|----|
| F_IX1_FILL | 75 |
| S_IX1_CLUSTER | 1 |
| S_IX2_CLUSTER | 0 |
| S_IX1_FILL | 75 |
| S_IX2_FILL | 75 |

END



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Building the DBtune File

(Some tools for Oracle/UNIX)

- **LI_num**: Returns the layer number from the database.
- **Layergetsize**: Analyzes the layers and returns a DBtune **KEYWORD** entry.
- **Extents**: Returns the allocated extents for each layer.

```
select segment_name,count(*) from user_extents  
group by segment_name;
```



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Grid Sizing (Spatial Index)

```
shp2sde -o create
```

```
-g <grid_size>
```

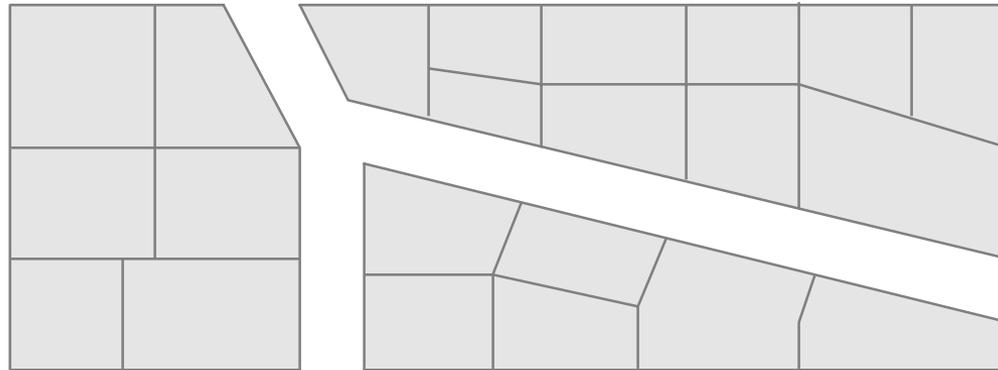


Spatial Index Grids

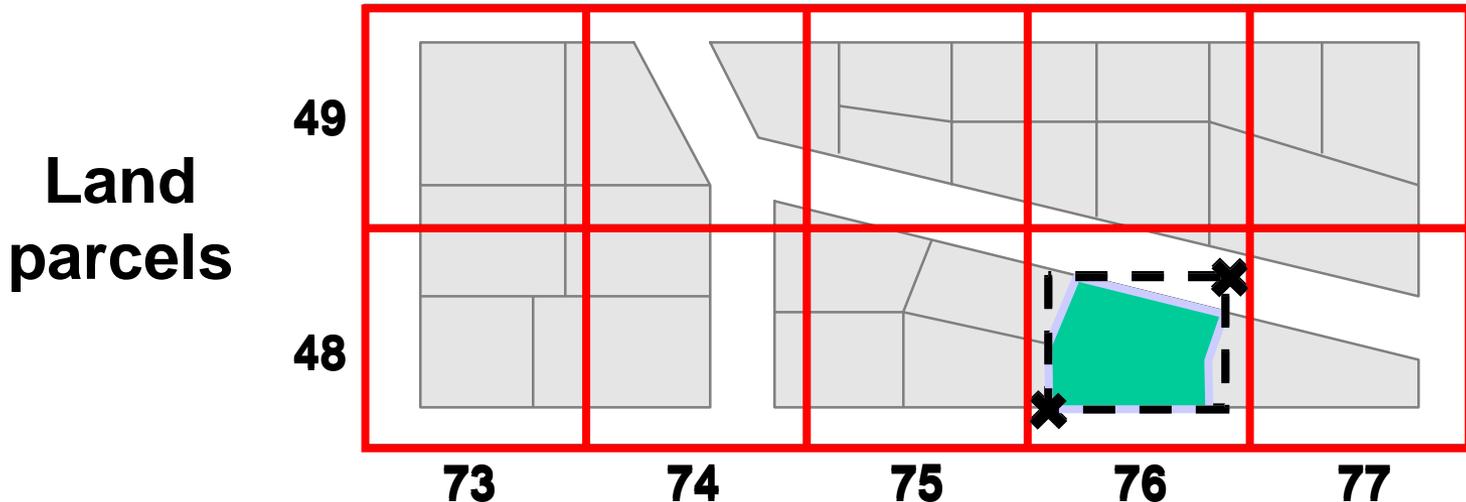
- Used by ArcSDE to speed retrieval of Features
- Ignored if viewing full extent of Layer
- Have at least one Grid entry for each feature in your Layer
- Incorrect sizing creates large index tables



Query a Land Parcels Layer



Spatial index components

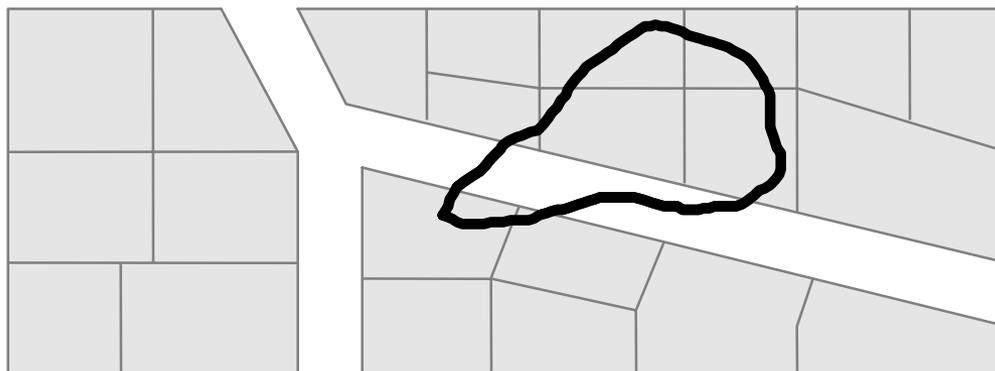


- **Grid tiles**
 - Two numbers in indexed columns
- **Shape envelope**
 - Two coordinates (four numbers) in indexed columns
- **Shape**
 - Many coordinates in binary column



Client submits a spatially-constrained query

"retrieve all land parcels that **overlap** a
ruptured storage tank's contamination plume"



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Server determines which parcels share an index grid with the plume

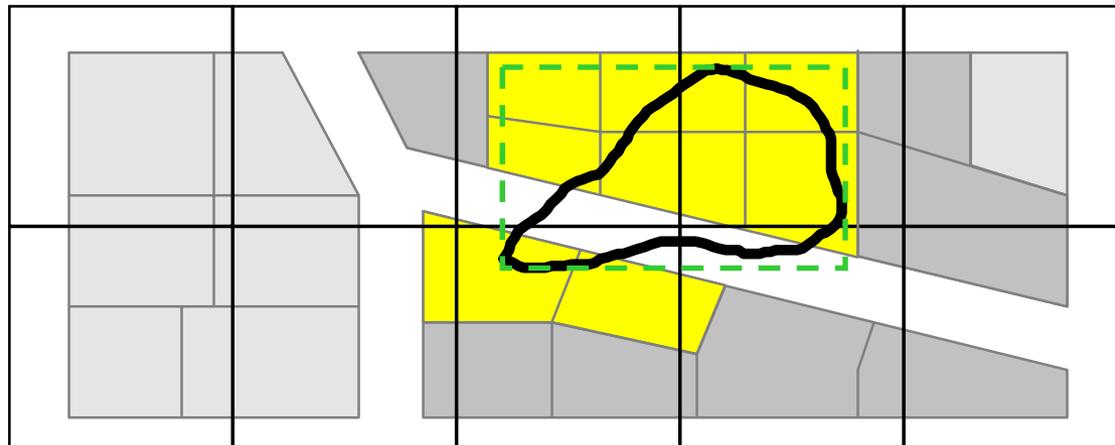
"retrieve all land parcels that overlap a ruptured storage tank's contamination plume"



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Server finds shapes with overlapping envelopes

"retrieve all land parcels that overlap a ruptured storage tank's contamination plume"



Feature shapes compared to plume shape

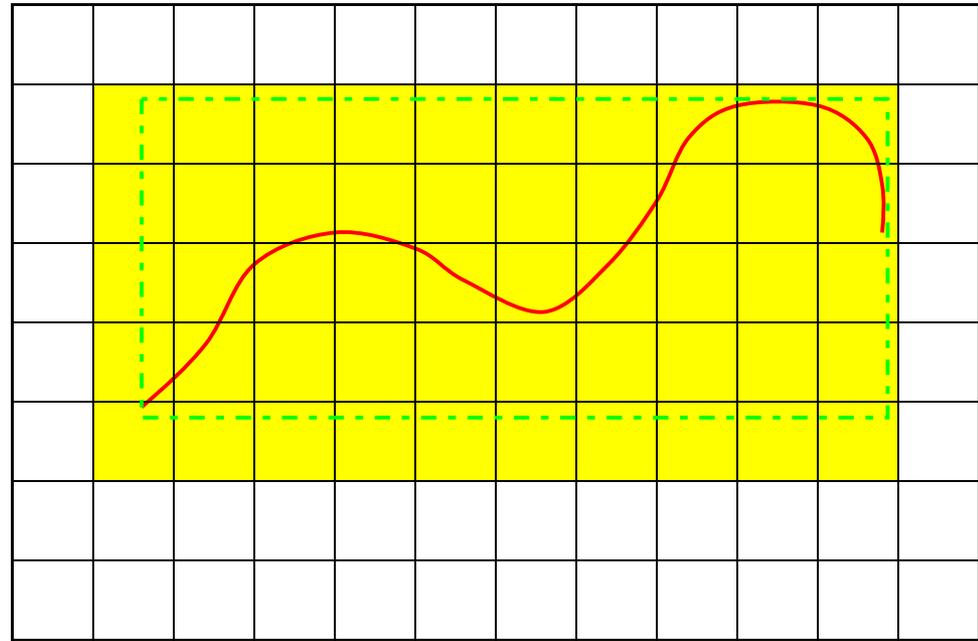
"retrieve all land parcels that overlap a ruptured storage tank's contamination plume"



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Spatial Index Grids (**creation**)

- Grid level that's too small
- Created 50 entries in Spatial Index for this feature,



 - Feature extent
 - Example Feature

 - Grid cells
 - Grids overlapped by feature extent



Spatial Index Grids (**creation**)

sdelayer -o si_stats

Layer 1 Spatial Index Statistics:

Level 1, Grid Size 200

Too Small!

Grid Records: 107061
Feature Records: 41236
Grids/Feature Ratio: 2.60
Avg. Features per Grid: 2.99
Max. Features per Grid: 33
% of Features Wholly Inside 1 Grid: 38.19

Spatial Index Record Count By Group

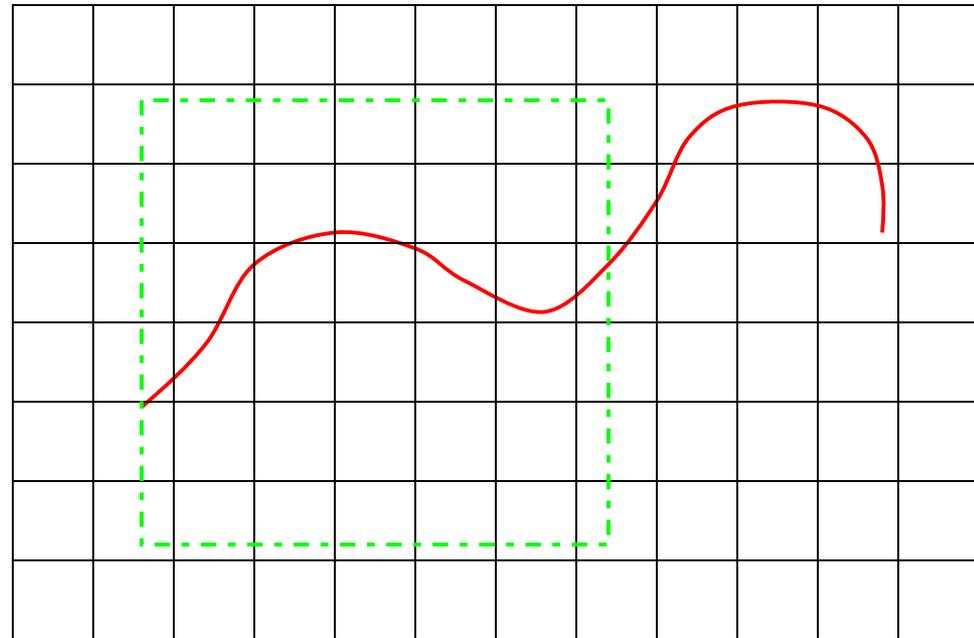
| Grids: | <=4 | >4 | >10 | >25 | >50 | >100 | >250 | >500 |
|-----------|-------|------|-----|-----|-----|------|------|------|
| Features: | 38308 | 2928 | 621 | 163 | 60 | 24 | 9 | 3 |
| % Total: | 92% | 7% | 1% | 0% | 0% | 0% | 0% | 0% |



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Spatial Index Grids (**search**)

- Grid level that's too small
- First, get all the feature entries for Grid cells in zoom extent (42)
- Then, Extract Feature data from Feature table



- Grid cells



- Grid cells selected by zoom



- Zoom extent



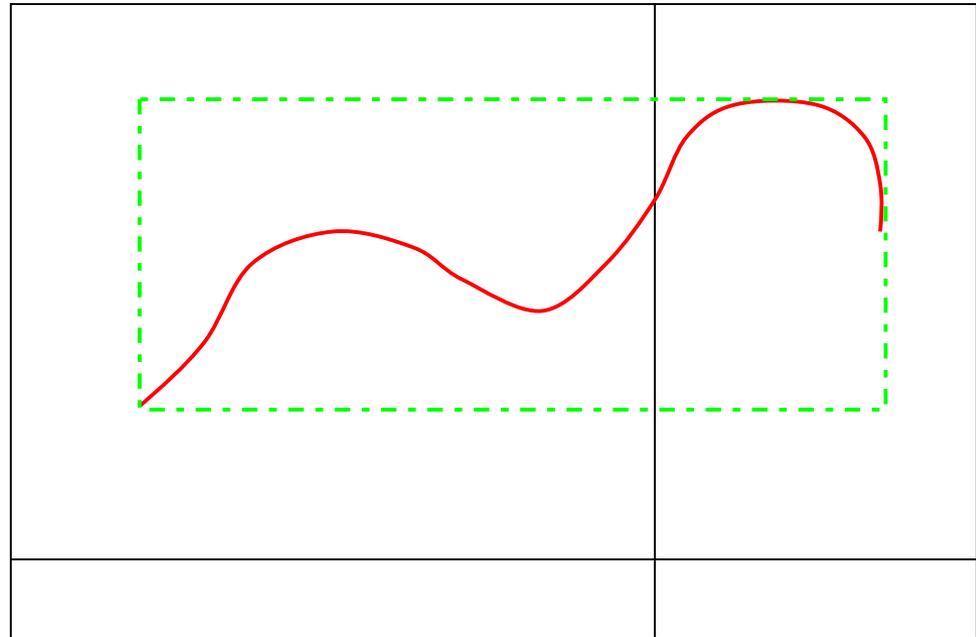
- Example Feature



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Spatial Index Grids (**resized**)

- One Grid set to larger size
- Feature has only two Grid entries
- Smaller Spatial Index size and less to sift through



- Grid cells



- Grids overlapped by feature extent



- Feature extent



- Example Feature



Spatial Index Grids (resized)

sdelayer -o si_stats

Layer 1 Spatial Index Statistics:
Level 1, Grid Size 4000

Much better!

Grid Records: 43441
Feature Records: 41236
Grids/Feature Ratio: 1.05
Avg. Features per Grid: 283.93
Max. Features per Grid: 728
% of Features Wholly Inside 1 Grid: 94.94

| Spatial Index Record Count By Group | | | | | | | | |
|-------------------------------------|-------|----|-----|-----|-----|------|------|------|
| Grids: | <=4 | >4 | >10 | >25 | >50 | >100 | >250 | >500 |
| Features: | 41235 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| % Total: | 99% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |



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Grid Recommendations

- **Experiment with Grid settings**
- **First Level Grid should be set to the LARGER of:**
 - Your layers average feature size or**
 - Your average Querying Area**
- **Never make grids smaller than your features**
- **Most of the time one Grid level is enough**



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Grid Recommendations

- **Keep average number of features per grid between 100 and 300**
- **Try not to let the max number of features per grid exceed 2000 to 4000**
- **Maintain a high % of Features wholly in 1 Grid (>90% = great, > 80% = good, <80% = change)**
- **Tuning Grids to a “general” setting works well for most queries.**



Exercise Good SQL Habits

- Index Attribute fields you query on
- Indexing both the “**where**” columns **AND** the “**select**” columns helps Business Table Queries in the same way that it helped the S table queries.
- Remember Keys are Order Dependant
- Check Application Logic



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Tuning Reality

- **You're only as fast as your slowest step.**
- **Speeding up a faster step WON'T help.**



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Tuning Focus

- **Things that make a difference:**
 - **Proper Attribute Indexing**
 - **Grid Sizing**
 - **Application Logic**
- **Things that may not make a difference:**
 - **Fragmentation**
 - **Spreading out your I/O**
 - **Oracle fine tuning**



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Don't forget:

Database Design!



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Design Guidelines

From “Modeling Our World”

- **Involve users**
- Take it one step at a time
- **Build a team**
- Be creative
- **Create deliverables**
- Keep goals and objectives in focus
- Do not add detail prematurely
- **Document carefully**
- Be flexible
- Plan from your model



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ArcSDE Admin Tools

- **Command Line Tools**
- **WebSDE**
- **ASI**
- **Excel tool**
- **SDA - ESRI Sweden**
- **FME**
- **SDEMonitor**
- **ArcCatalog**



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Default ArcSDE Admin Tools

```
MS Command Prompt

ArcSDE 8.0.2
Layer Administration Utility
-----
Usage for sdelayer:

sdelayer -o add -l <table,column> -e <entity_mask> -g <grid_size>
[{-R <SRID> | [Spatial_Ref_Opts]}] [-M <minimum_id>]
[{-f <init_features,avg_points> | -k <config_keyword>}]
[-E {empty | xmin,ymin,xmax,ymax}] [-t <storage_type>]
[-S <layer_description_str>] [-i <service>]
[-s <server_name>] [-D <database>] -u <DB_User_name>
[-p <DB_User_password>] [-q]

Where [Spatial_Ref_Opts] := [-x <xoffset,yoffset,xyscale>]
[-z <zoffset,zscale>] [-m <moffset,mscale>]
[-G {<projection_ID> | file=<proj_file_name>}]

sdelayer -o alter -l <table,column> [-e <entity_mask>] [-M <minimum_id>]
[-S <layer_description_str>]
[-k <config_keyword>] [-i <service>] [-s <server_name>]
[-D <database>] -g <new_grid_size>
[-E {empty | calc | xmin,ymin,xmax,ymax}]
[-G {<projection_ID> | file=<proj_file_name>}]
-u <DB_User_name> [-p <DB_User_password>] [-N] [-q]

sdelayer -o {grant | revoke} -l <table,column> -U <user>
-A {SELECT,UPDATE,INSERT,DELETE}
[-i <service>] [-s <server_name>] [-D <database>]
-u <DB_User_name> [-p <DB_User_password>] [-I] [-q]

sdelayer -o {describe | describe_long} [{-O <owner> | -l <table,column>}]
```



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WebSDE

The screenshot shows a Microsoft Internet Explorer browser window titled "SDE Administrator - Microsoft Internet Explorer". The address bar contains the URL "C:\jjarvis\UC2000\UC2000tools\websde\sdeadmin.html". The main content area displays "SDE Administrator 1.0" and a list of links: [dbtune](#), [sdemon](#), [sdelayer](#), [sdetable](#), [sdelog](#), [sdeversion](#), [shpinfo](#), [shp2sde](#), [sde2shp](#), [sdeimport](#), [sdeexport](#), and [sde](#). A sidebar on the left lists navigation options: [sdemon](#), [info](#), [kill](#), [pause](#), [resume](#), [shutdown](#), [start](#), and [status](#). The main content area shows the "sdemon status" section with the following configuration details:

| | |
|----------------------|---|
| Instance | <input type="text" value="sde_jekyll"/> |
| SDE Directory | <input type="text" value="%SDEHOME%"/> |
| Server | <input type="text" value="jekyll"/> |

At the bottom of the status section are two buttons: "OK" and "Reset". The taskbar at the bottom shows "My Computer".



ASI

ArctInfo Coverage to GeoDatabase Conversion

Input ArcInfo Workspaces

Count: 0
Path:
Workspaces:



Load an Access GeoDatabase **Load an SDE GeoDatabase**

Output Access Name
Name: 

Output SDE Connection
Server:
Instance:
User:
Password:

Options

Conversion Parameters File
Name: 

Current Progress:
Overall Progress:



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Excel Tool

Microsoft Excel - sde_xyscale.xls

File Edit View Insert Format Tools Data Window Help

B3 = 6175377.574

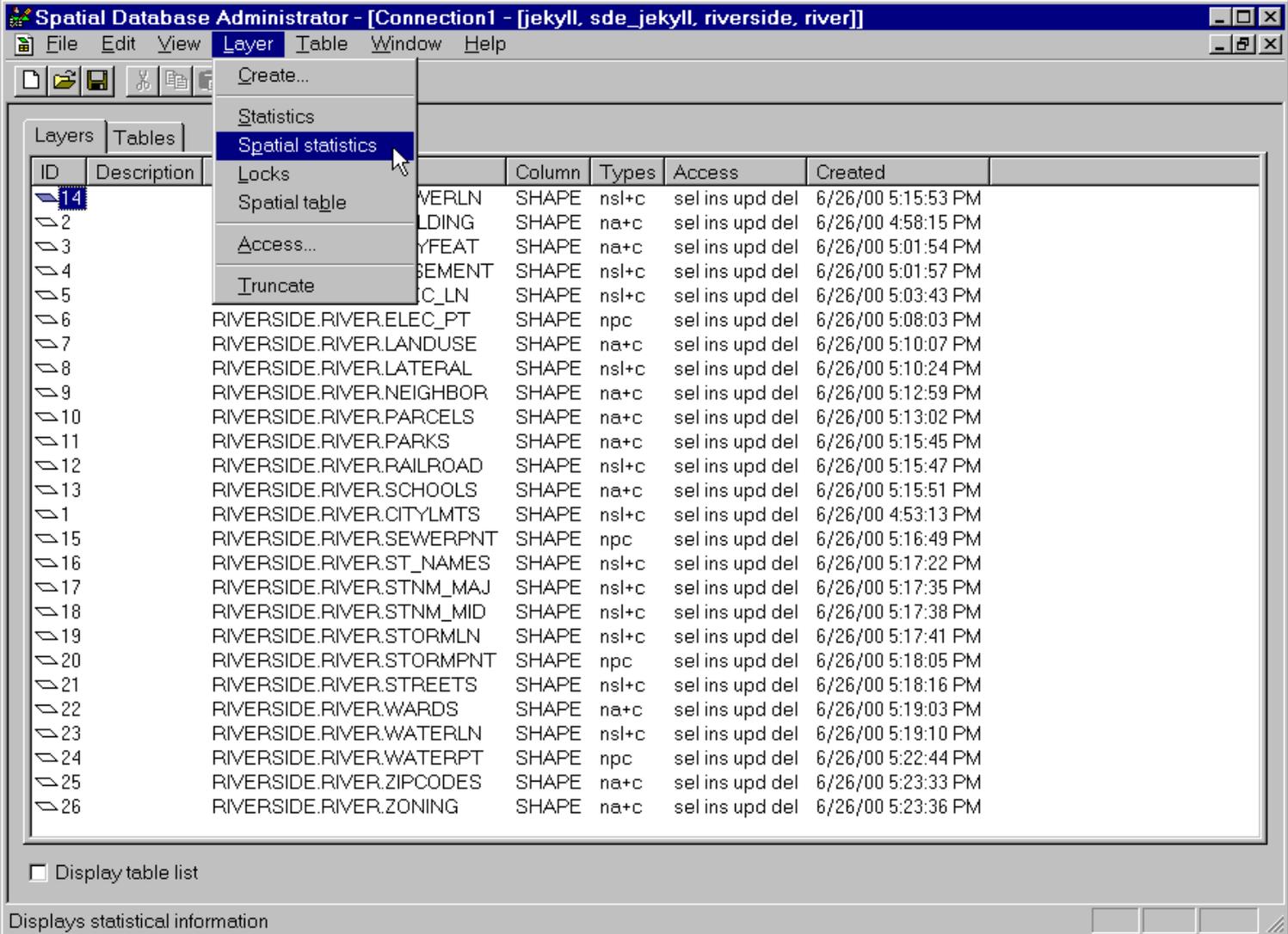
| | A | B | C | D | E |
|----|---|-------------|--------------------|-------------|--------------|
| 1 | SDE Calculations for XY Offset and Scale | | | | |
| 2 | <i>Please enter values in the yellow cells</i> | | | | |
| 3 | Min X | 6175377.574 | | X | Y |
| 4 | Max X | 6249534.749 | Original Min | 6175377.574 | 2263052.31 |
| 5 | Min Y | 2263052.31 | Original Max | 6249534.749 | 2316352.575 |
| 6 | Max Y | 2316352.575 | Offset Min | 7415.7175 | 7415.7175 |
| 7 | | | Offset Max | 81572.8925 | -2248220.875 |
| 8 | Buffer Size (%) | 20 | | x | y |
| 9 | | | Original Rectangle | 6175377.574 | 2263052.31 |
| 10 | Units Across Max Extent | 2147483648 | | 6175377.574 | 2316352.575 |
| 11 | | | | 6249534.749 | 2316352.575 |
| 12 | <i>Actual Min X</i> | 6175378 | | 6249534.749 | 2263052.31 |
| 13 | <i>Actual Min Y</i> | 2263052.31 | | 6175377.574 | 2263052.31 |
| 14 | <i>Actual Max X</i> | 6249535 | | x | y |
| 15 | <i>Actual Max Y</i> | 2316353 | Offset Rectangle | 7415.7175 | 7415.7175 |
| 16 | <i>X Extent</i> | 74157 | | 7415.7175 | 60715.9825 |
| 17 | <i>Y Extent</i> | 53300 | | 81572.8925 | 60715.9825 |
| 18 | <i>Max Extent</i> | 74157.175 | | 81572.8925 | 7415.7175 |
| 19 | <i>Buffer Width</i> | 7415.7175 | | 7415.7175 | 7415.7175 |
| 20 | <i>Buffered Extent</i> | 88988.61 | | | |
| 21 | | | | | |
| 22 | X Offset | 6167961.857 | | | |
| 23 | Y Offset | 2255636.593 | | | |
| 24 | Scale | 23166.8334 | | | |
| 25 | | | | | |
| 26 | Grid Size | 7415 | | | |
| 27 | | | | | |

XY Offset and Scale / Ready



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SDA - ESRI Sweden



The screenshot shows the Spatial Database Administrator interface. The title bar reads "Spatial Database Administrator - [Connection1 - [jekyll, sde_jekyll, riverside, river]]". The menu bar includes File, Edit, View, Layer, Table, Window, and Help. A context menu is open over table 14, with "Spatial statistics" selected. The table list below shows various tables with columns for ID, Description, Column, Types, Access, and Created.

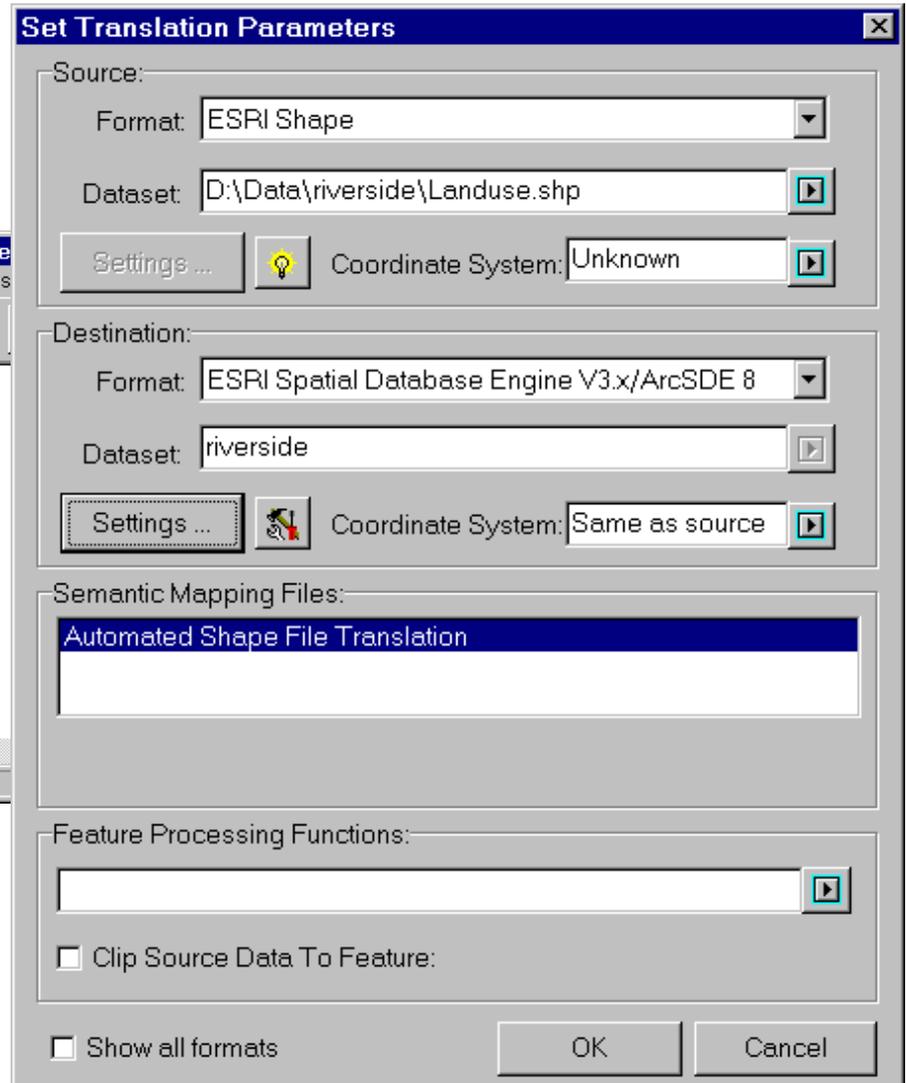
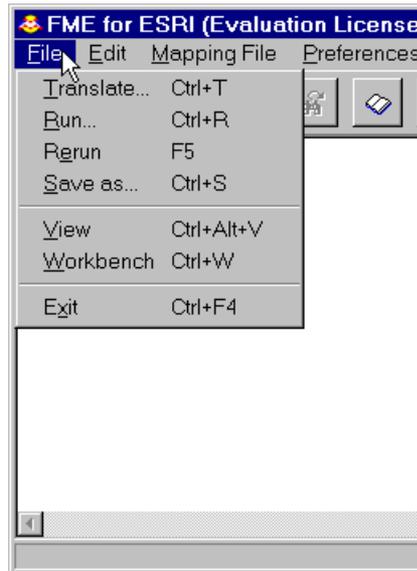
| ID | Description | Column | Types | Access | Created |
|----|--------------------------|--------|-------|--------|--------------------|
| 14 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | RIVERSIDE.RIVER.ELEC_PT | | SHAPE | npc | 6/26/00 5:08:03 PM |
| 7 | RIVERSIDE.RIVER.LANDUSE | | SHAPE | na+c | 6/26/00 5:10:07 PM |
| 8 | RIVERSIDE.RIVER.LATERAL | | SHAPE | nsl+c | 6/26/00 5:10:24 PM |
| 9 | RIVERSIDE.RIVER.NEIGHBOR | | SHAPE | na+c | 6/26/00 5:12:59 PM |
| 10 | RIVERSIDE.RIVER.PARCELS | | SHAPE | na+c | 6/26/00 5:13:02 PM |
| 11 | RIVERSIDE.RIVER.PARKS | | SHAPE | na+c | 6/26/00 5:15:45 PM |
| 12 | RIVERSIDE.RIVER.RAILROAD | | SHAPE | nsl+c | 6/26/00 5:15:47 PM |
| 13 | RIVERSIDE.RIVER.SCHOOLS | | SHAPE | na+c | 6/26/00 5:15:51 PM |
| 1 | RIVERSIDE.RIVER.CITYLMTS | | SHAPE | nsl+c | 6/26/00 4:53:13 PM |
| 15 | RIVERSIDE.RIVER.SEWERPNT | | SHAPE | npc | 6/26/00 5:16:49 PM |
| 16 | RIVERSIDE.RIVER.ST_NAMES | | SHAPE | nsl+c | 6/26/00 5:17:22 PM |
| 17 | RIVERSIDE.RIVER.STNM_MAJ | | SHAPE | nsl+c | 6/26/00 5:17:35 PM |
| 18 | RIVERSIDE.RIVER.STNM_MID | | SHAPE | nsl+c | 6/26/00 5:17:38 PM |
| 19 | RIVERSIDE.RIVER.STORMLN | | SHAPE | nsl+c | 6/26/00 5:17:41 PM |
| 20 | RIVERSIDE.RIVER.STORMPNT | | SHAPE | npc | 6/26/00 5:18:05 PM |
| 21 | RIVERSIDE.RIVER.STREETS | | SHAPE | nsl+c | 6/26/00 5:18:16 PM |
| 22 | RIVERSIDE.RIVER.WARDS | | SHAPE | na+c | 6/26/00 5:19:03 PM |
| 23 | RIVERSIDE.RIVER.WATERLN | | SHAPE | nsl+c | 6/26/00 5:19:10 PM |
| 24 | RIVERSIDE.RIVER.WATERPNT | | SHAPE | npc | 6/26/00 5:22:44 PM |
| 25 | RIVERSIDE.RIVER.ZIPCODES | | SHAPE | na+c | 6/26/00 5:23:33 PM |
| 26 | RIVERSIDE.RIVER.ZONING | | SHAPE | na+c | 6/26/00 5:23:36 PM |

Display table list
Displays statistical information

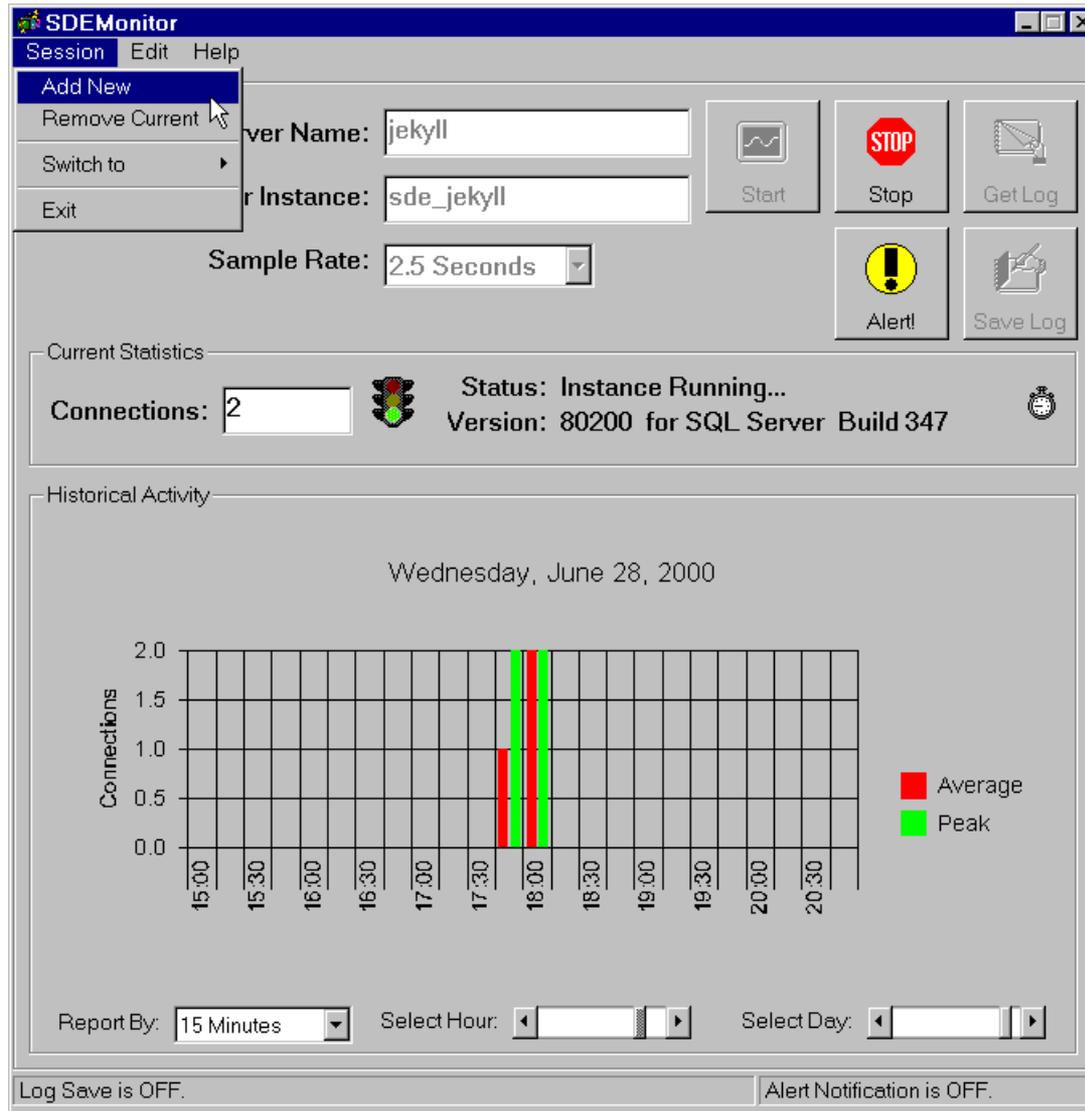


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FME-Safe Software



SDE Monitor



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ArcCatalog

The screenshot displays the ArcCatalog interface with the 'Shapefile to Geodatabase' dialog box open. The background shows a tree view of database connections and a list of feature classes. The dialog box is open over the 'river.STREETS' feature class.

ArcCatalog - Database Connections\Connection to jekyll.sde

File Edit View Go Tools Help

Location: Database Connections\Connection to jekyll.sde

Stylesheet: ESRI

Shapefile to Geodatabase

Input shapefile:
D:\Data\riverside\STREETS.shp

Output Geodatabase:
C:\WINNT\Profiles\jim2276\Application Data\ESRI\ArcC

Select an existing feature dataset or enter a new one:
river.Transportation

Enter the name of the new feature class:
river.STREETS

Output settings

Coordinate System: Unknown

Grid Size: 979.098000000231

Item Names: Same items as input

Configuration Keyword:

Change Settings...

OK
Cancel
Help
Batch

Contents

| Name | Type |
|----------------|-------------------|
| river.sde | SDE Feature Class |
| river.STREETS | SDE Feature Class |
| river.WARDS | SDE Feature Class |
| river.WATERLN | SDE Feature Class |
| river.WATERPT | SDE Feature Class |
| river.ZIPCODES | SDE Feature Class |
| river.ZONING | SDE Feature Class |



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Utility locations

Free ArcSDE resources at:

<http://www.esri.com/devsupport/devconn/sde>



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ArcSDE Admin Tools

**Special Administration Tasks:
ArcIMS, Replication/Failover,
Oracle 8i Spatial**

ArcSDE 8.1 Highlights

Alan Jackson-Internet Services

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ArcSDE and ArcIMS



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ArcIMS Is a Multitier System

Presentation Tier

Client Viewers



Business Logic Tier

Web Server
ArcIMS Application Server
ArcIMS Application Server Connectors



Data Storage Tier

ArcIMS
Spatial
Server

Data Sources



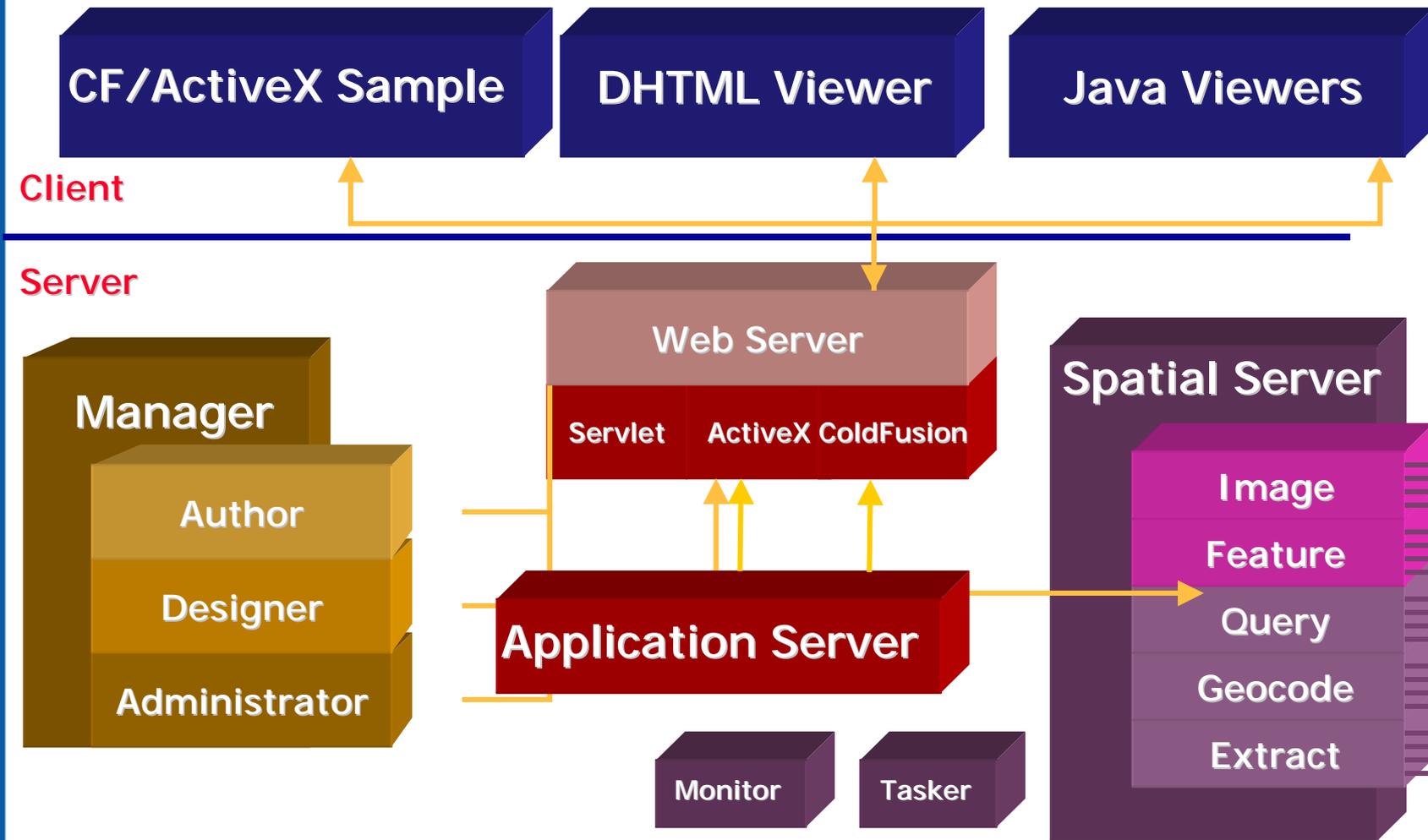
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ArcXML

- **ArcXML is ArcIMS's XML interface.**
It provides a common interface into the services provided by ArcIMS.
- **MapService**
A collection of AXL commands that create a map. Similar to a project file in ArcView.

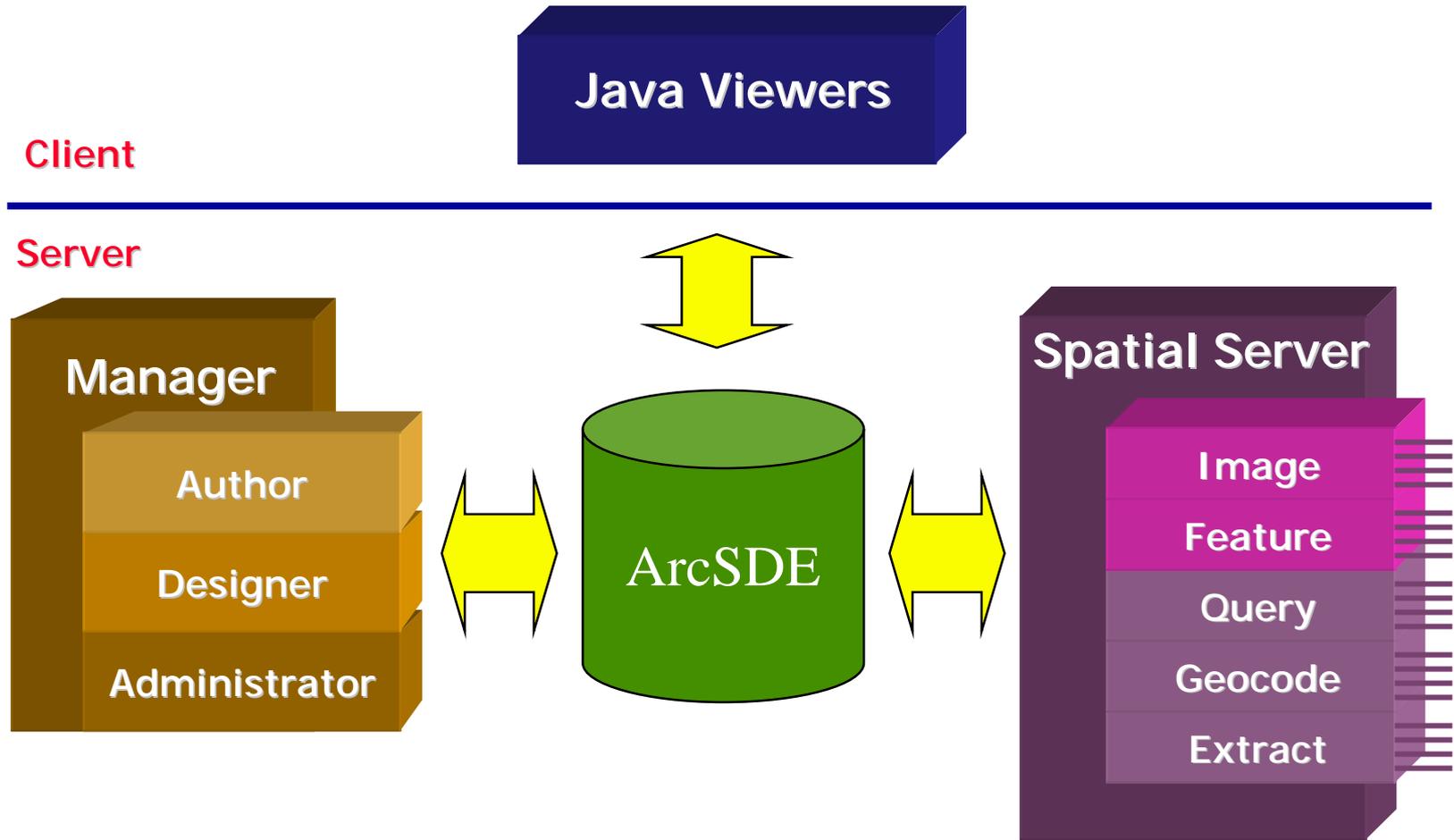


ArcIMS Components



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ArcIMS Components with ArcSDE



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Spatial Servers & ArcSDE

- Uses ArcSDE for Coverages and ArcSDE as data sources
- ArcIMS is a read-only client of ArcSDE.
 - Reads SDE 3.x vector layers
 - Reads ArcSDE 8.x vector and raster layers
 - Does not currently read geodatabases
- One ArcSDE connection is needed for each instance of an ArcIMS spatial server.
- ArcSDE connections are persistent
- Multiple connections can be shared.



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Loading ArcSDE layers

The screenshot shows the ArcIMS Manager interface in Microsoft Internet Explorer. The browser window title is "ArcIMS Manager - Microsoft Internet Explorer" and the address bar shows "http://griot/Manager/frame.htm". The main content area displays the ArcIMS logo and a navigation menu with options: "Set Up Web Site", "Author MapService", "Design Web Site", "Administer Site", and "Help". A "Legend" and "Layers" panel is visible, with "ArcSDE" selected in the "Data Sources" list. An "ArcSDE Connection" dialog box is open, prompting for connection details:

- Server: griot
- Instance: esri_sde
- Database (optional):
- Account: User name: wilson, Password: ****

The dialog box includes a "Test Connection" button and "OK" and "Cancel" buttons at the bottom. The status bar at the bottom of the browser window indicates "Applet started." and "Local intranet".



Loading Images from ArcSDE

All image loading is through AXL

ArcIMS 3.0 supports ArcSDE Raster data in version 8.0.2

For ArcSDE images specify:

SDEWORKSPACE: the user/password values are actually for the owner of the raster data within SDE

LAYER: Specify that the layer is an image type

DATASET: Specify the proper SDE Workspace. The name value must be in the format "*<Owner>.<Table_Name>.<Raster_Column>*". Type:

select owner,table_name,raster_column from SDE.Raster_Columns

to find the owner, table name, and name of the raster column.

ENVELOPE: The extent that will initially be drawn from the raster table you specify. ArcIMS will use this extent to query for appropriate rasters from the raster table. If there are spatially contiguous tiled rasters within the raster table, only the necessary parts of those tiles will be retrieved to draw the raster.



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Creating a Service Using Images from ArcSDE

```
<?xml version="1.0" encoding="Cp1252"?>
<ARCXML VERSION="1.0.1">
  <CONFIG>
    <MAP>
      <PROPERTIES>
        <ENVELOPE minx="7500179" miny="511214" maxx="7827281"
maxy="833584"/>
      </PROPERTIES>
      <WORKSPACES>
        <SDEWORKSPACE name="sde_ws-0" server="entropy" instance="esri_sde"
database="" user="metro_vectors" encrypted="true" password="UIUX" />
      </WORKSPACES>
      <LAYER type="image" name="SDERASTER" visible="true" >
        <DATASET workspace="sde_ws-0" name="RASTER.OREGON.IMAGE" />
      </LAYER>
    </MAP>
  </CONFIG>
</ARCXML>
```



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Creating a Service Using Images from ArcSDE

The screenshot displays the ArcIMS Administrator interface. A 'New MapService' dialog box is open, showing the following configuration:

| MapService Name | Virtual Server | Status |
|-----------------|----------------|---------|
| iouga_demo | ImageServer1 | Running |
| rastest | ImageServer1 | Running |
| sderas | | |

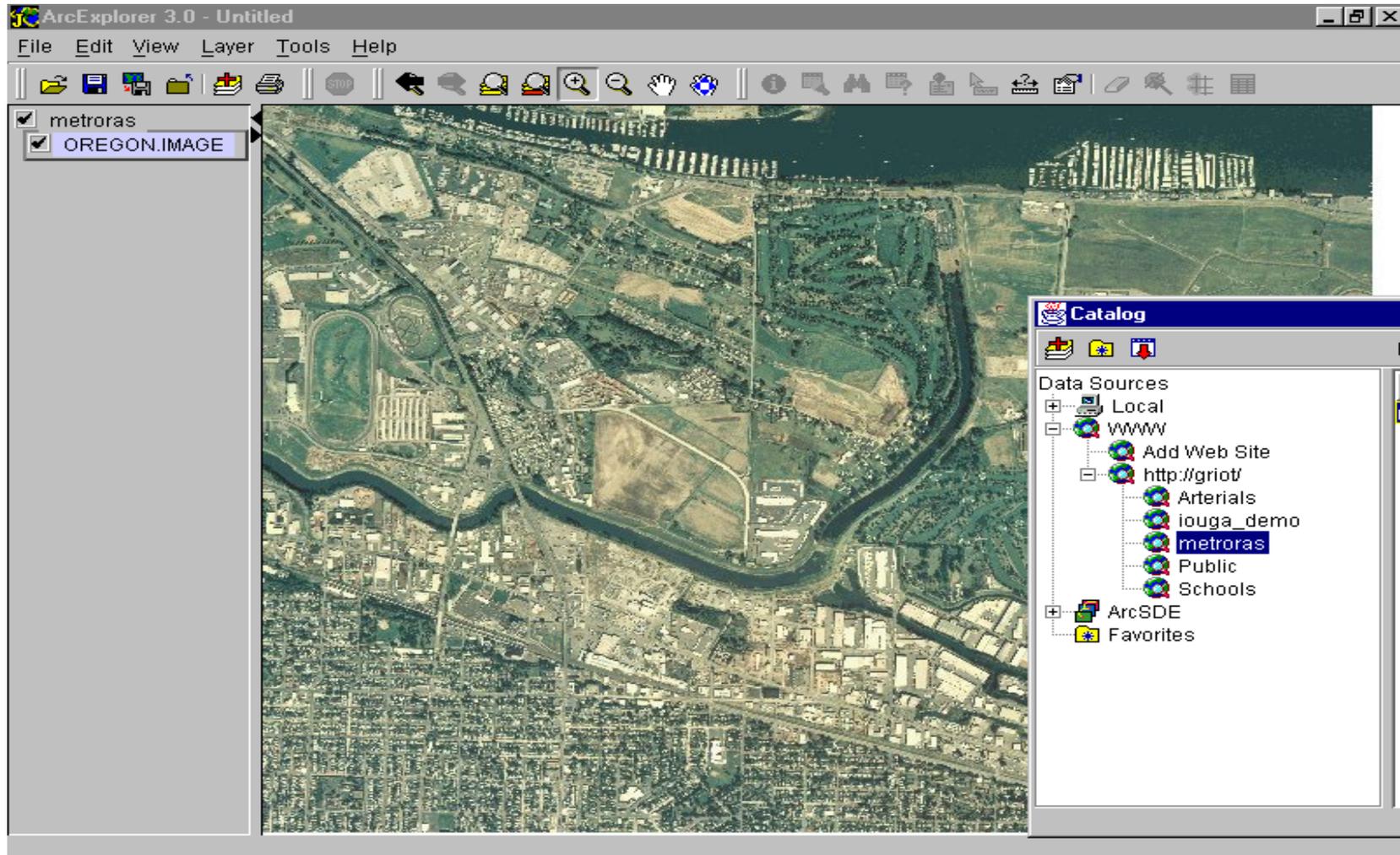
New MapService dialog details:

- MapService Name: ArcSDEraster
- Map File: C:\ArcIMS\AXL\sderas.axl
- Virtual Server: ImageServer1
- Server Output HTTP Location (URL): http://griot/output
- Directory Location: C:\ArcIMS/output
- Image Type: Joint Photographic Experts Group - JPEG (*.JPG)
- Server cleanup: 10 (slider from None to 60 min.)

The background shows a cityscape and a taskbar with ESRI Dial-Up and Netscape Communicator. The status bar at the bottom reads 'Initializing Complete.'



Displaying Images in ArcSDE



How Many Connections?

- Connections to ArcSDE are used for
 - Query Server-required with ImageServer
 - Geocoding Server-if used in MapService
 - Extraction Server-if used in MapService
 - 4 ImageServer instances → 4 ArcSDE connections
 - 4 QueryServer instances → 4 ArcSDE connections
-
- 8 ArcSDE connections



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Connection Sharing

- For Image Server only
- Use connection sharing to reduce the number of ArcSDE connections
- Sharing is set to 2 by default
- To share connections
 1. **Edit the aimsms.cfg file.**

The file is located at <ArcIMS Installation Directory>\Server\etc on NT and \$AIMSHOME/Server/etc on UNIX.
 2. **Set the connectionsharing variable**
connectionsharing = "3"
 3. **Stop and restart ArcIMS for the change to take effect.**
- Originally developed for users with limited number of ArcSDE connects.
- ArcSDE connects are now unlimited.
- Connections are shared on threads in services.
 - Connections are not shared between services
 - Only similar connects are shared.



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Monitoring Performance

The screenshot shows the ArcIMS Manager web interface in Microsoft Internet Explorer. The browser address bar shows `http://griot/Manager/frame.htm`. The main page title is "ArcIMS MANAGER" with the ESRI logo. A navigation menu on the left includes "Set Up Web Site" (with sub-items: Author MapService, Design Web Site, Administer Site) and "Help".

The "Virtual Servers" section displays a table with the following data:

| Virtual Server | Type | Properties | Statistics | Remove |
|----------------|---------------|------------|------------|--------|
| FeatureServer1 | FeatureServer | | | |
| ImageServer1 | ImageServer | | | |

Below the table are buttons for "Back", "New", and "Save Site Configuration". A "Statistics: ImageServer1" window is open, showing:

- Time: 7.595
- Change in Response Time:
- Users: 1
- Change in Number of Users:

At the bottom of the statistics window, there are three summary sections:

| Response Time | Server Totals | Client Totals |
|------------------|-----------------|----------------------|
| Maximum: 32.6... | Registered: 2 | Waited for server: 0 |
| Minimum: 0.18 | Idle Servers: 1 | Timed out: 0 |
| Average: 7.595 | Invoked: 18 | |

The browser status bar at the bottom indicates "Local intranet".



Monitoring Messages

\$ARCIMSHOME/Server/log directory:

- Shows the ArcXML requests and response information
- Includes error messages from ArcSDE

sde.errlog

- Error messages from ArcSDE are always reported in the ArcSDE errorlog file

giomgr.log

Messages from the giomgr.

RDMBS logs

- SQL Server: mssql7/log/errorlog
- Oracle:ORCALRT for alerts
- DB2: db2diag.log
- Informix: ol_<database name>.log



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ArcIMS Server log contents

[Tue Jun 13 09:14:51 2000][462 489 INFO1] SERVICE: reg

[Tue Jun 13 09:14:51 2000][462 489 INFO2] AXL Parse Time: 0.010000s

There are 3 steps in parsing the Axl

- **Build a tree from the AXL**
- **Create objects AXL needs**
- **Interpret the AXL objects. The objects are made available to the Spatial Server**

The AXL Parse time is the total time to complete all three steps

[Tue Jun 13 09:14:51 2000][462 489 INFO2] RENDERER SETUP: 0.000000s

[Tue Jun 13 09:14:51 2000][462 489 INFO2] FEATURE LAYER: KERRMCGEE.VALID_PIPES

[Tue Jun 13 09:14:52 2000][462 489 INFO2] DATA SEARCH TIME: 0.701000s

Time to prepare and send the query with it's attribute and spatial constraints.

[Tue Jun 13 09:15:09 2000][462 489 ERROR] SE_stream_fetch : The specified coordinate exceeds the valid coordinate range

[Tue Jun 13 09:15:09 2000][462 489 INFO2] SR FEATURES PROCESSED: 8478

[Tue Jun 13 09:15:09 2000][462 489 INFO2] DATA RETRIEVAL TIME: 17.385000s

Time to fetch and draw the data

[Tue Jun 13 09:15:09 2000][462 489 INFO2] TOTAL PROCESSING TIME: 18.086000s

Total to prepare, send, fetch and draw the data.

[Tue Jun 13 09:15:09 2000][462 489 INFO2] OUTPUT TIME: 0.060000s

Time spent to generate image file.

[Tue Jun 13 09:15:09 2000][462 489 INFO3] RESPONSE:

```
<?xml version="1.0"?>
```

```
<ARCXML version="1.0">
```

```
<RESPONSE>
```

```
<IMAGE>
```

```
<ENVELOPE minx="344816.831000000470000" miny="5743678.860000000300000" maxx="741447.900999999610000"
maxy="5923965.710000000000000" />
```

```
<OUTPUT file="C:\ArcIMS\output\reg_GRIOT4624894.jpg" url="http://griot/output/reg_GRIOT4624894.jpg" />
```

```
</IMAGE>
```

```
</RESPONSE>
```

```
</ARCXML>
```



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Spatial Server and ArcSDE Reviewed

- ArcSDE connections equal the number of Spatial Server instances.
- Additional connections to ArcSDE are needed for the Query, Geocoding, and Extract Servers.
- Use connection sharing to reduce the number of ArcSDE connections.
- Raster images in ArcSDE are supported through AXL



Replication

Oracle and SQL Server



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Replication

“...is the process of copying and maintaining database objects, such as tables, in multiple databases that make up a distributed database system.””

Introduction to Replication, *Oracle 8i Replication*

http://technet.oracle.com/docs/products/oracle8i/doc_index.htm



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Replication: Oracle

Oracle: OnmiReplicator by LakeView.

<http://www.lakeviewtech.com/>

Tested with Oracle 8.1.5

Is able to replicate:

Simple feature classes

Geometric networks with complex and simple edges



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Replication: SQL Server

“...allows you to make duplicate copies of your data, move those copies to different locations, and synchronize the data automatically so that all copies have the same data values.”

Overview of Replication, SQL Server Books OnLine



Replication: SQL Server

ArcSDE 8.0.x supports snapshot replication.

Subscribers are read only

Refresh is periodic (high latency)

Advantages:

Gives users autonomy

Moves processing off read/write servers

Requires:

Entire snapshot sent across the network

Individual tables must have user assigned

Tables must not be locked

Setup:

Wizard in SQL Server Enterprise Manager->Tools->Wizards-> Replication

Use Data Transformation Services Wizard to setup tables to be replicated



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Failover

- **Oracle and SQL Server**



Failover: SQL Server

Defined as:

Two servers (nodes) and a shared disk appear as one server on the network. One node is defined as primary and the other is secondary.

Requirements:

Microsoft Cluster Server/Microsoft Distributed Transaction Coordinator

ArcSDE on primary node in shared disk

One copy of license manager on each node

One copy of sentinel key on each node

ArcSDE and license manager must be registered as cluster resources

Result:

Cluster aware applications will run properly



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Failover: Oracle

Oracle Parallel Server

We have done preliminary work with Oracle Parallel Server

At ArcSDE 8.0.2 the support is readonly

At ArcSDE 8.1 the support will be read/write

We are working in the Unix environment

We are encouraged by the results so far



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Oracle 8i Spatial



Oracle 8i Spatial

- Supports an object type of Spatial at 8.1.5/8.1.6
- Stores each “feature” in one row
- Stores geometry for each feature in one column
- Layer information is stored in one row of a metadata table
- Data can be loaded through:
 - SQL
 - shp2sde using SDO_GEOMETRY keyword
 - cov2sde using SDO_GEOMETRY keyword
 - ArcTool Box using SDO_GEOMETRY keyword
 - ArcCatalog using SDO_GEOMETRY keyword
- Use Oracle Enterprise Manager to administrate
- Layers are indexed using SQL or (at Oracle 8.1.6) the Spatial Index Advisor



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Oracle 8i Spatial

The screenshot shows the Oracle DBA Studio interface. On the left, a tree view displays the database structure, with the 'PARKS' table selected under the 'SDE816' schema. The main window shows the 'Spatial' tab for the 'PARKS' table. The table is located in the 'TEST' schema and 'EXTERNAL' tablespace. It is a 'Standard' table. The columns are:

| Name | Schema | Datatype | Size | Scale | Ref |
|----------|--------|--------------|------|-------|-----|
| NAME | <None> | VARCHAR2 | 32 | | ✗ |
| SHAPE | MDSYS | SDO_GEOMETRY | | | ✗ |
| ESRI_KEY | <None> | NUMBER | 0 | 0 | ✗ |
| E_KEY | <None> | NUMBER | 0 | 0 | ✗ |
| | | | | | ✗ |

At the bottom of the window, there are buttons for 'Apply', 'Revert', 'Show SQL', and 'Help'.



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Oracle 8i Spatial

Oracle DBA Studio

File View Object Tools Help

ORACLE

General Constraints Storage Options Spatial Statistics

Spatial Column: GEOMETRY

Dimension

| Name | Lower Bound | Upper Bound | Tolerance |
|------|-------------|-------------|-----------|
| X | 440356.874 | 645907.858 | 0.0050 |
| Y | 5743678.86 | 5923965.71 | 0.0050 |
| M | 0.0 | 1000000.0 | 0.0050 |

Apply Revert Show SQL Help

Table Type Trigger View Security



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Oracle 8i Spatial

The image shows a screenshot of the Oracle Spatial Index Advisor interface. The main window displays a map with a grid overlay, showing a network of roads and points. The map is divided into a 4x4 grid of tiles. The text in the main window reads: "Fixed sized tiles are used to approximate the geometries. The tiles displayed below help you understand how many geometries are associated with each tile. If you think too many geometries are associated with a fixed tile, you can make the tiles smaller by reindexing with a smaller tile size (i.e., add 1 to the current tiling level)." The map shows a network of roads and points, with a legend indicating that green represents F42, yellow represents F40, and black represents fixed tiles. The current layer is set to F40. The status bar at the bottom indicates "Drew 616 geometries".

An "Edit Index" dialog box is open, titled "WILSON.F40_IDX - wilson@Default Database". The dialog has tabs for "General", "Storage", "Spatial", and "Statistics". The "Spatial" tab is selected. The "Hybrid Index" radio button is selected, and the "Fixed Index" radio button is also selected. The "Initial tiling level" is set to 6, with an "Estimate..." button next to it. The "Commit Interval" section has the "After all the rows have been processed. (requires adequate rollback segment space)" radio button selected. The "Every" field is empty, and the "rows" label is present. The "The spatial column contains only Point data" checkbox is unchecked. A warning icon is present, with the text: "Spatial indices can take a very long time to create or rebuild. The preferred method of creating or rebuilding spatial indices is to submit a job. In order to submit a job, you need to be connected to an Oracle Management Server." A "Submit Job..." button is located at the bottom right of the dialog. The dialog also has "OK", "Cancel", "Apply", "Show SQL", and "Help" buttons at the bottom.



ArcSDE 8.0.2 Patch

A patch for Arcinfo/ArcSDE 8 will be released in August.

You will be able to download the patch from:

<http://arconline.esri.com>

QFE's (Quick Fix Engineering) will also be available from this site
however download the QFE only if you MUST have the fixes in the patch. DO NOT DOWNLOAD QFE's in any other case.

Descriptions of the fixes included in the QFE's are on this site.



ArcSDE 8.1



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ArcSDE 8.1

Procedure for upgrading from 8.0.x to 8.1 betas ONLY

Oracle

run **sdesetupora8i (Oracle 8i) or sdesetupora80 (Oracle 80x)**

SQL Server

run **sdesetupmssql**

At final release the upgrade will be automatic.



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ArcSDE 8.1

Direct connect to RDBMS, no ArcSDE middleware

Support for transaction based replication in SQL Server

Planned support for replication and failover in Oracle

Support both **long raw and binary lobs** as storage types

Support for replication and failover in Informix

DBTUNE is a table in the RDBMS

Support for Red Hat linux 6.5 (client and server)

Imagery

LZ77 compression (2:1 ratio)

Image loader in ArcToolbox

ArcToolBox->Import to Geodatabase->Raster to Geodatabase

64 bit pixel depth

image mask

color table

statistics and histograms

Native Java client



Image Conversion

Raster to Geodatabase

Input Raster: F:\1N1EA.TIF

Output Geodatabase: C:\WINNT\Profiles\alanj.000\Application Data\ESRI\Arc

Select an existing raster table or create a new one: test.1N1EA

Select an existing raster or create a new one: test.1N1EA.1N1EA

Output settings

Coordinate System: Unknown

Tile Size: 128 x 128

Pyramids Option: Build pyramids and skip first level

Change Settings...

Single

| | Input Raster | Output GeoDatabase | Output Raster Table | Output Ra |
|---|--------------|-------------------------|---------------------|------------|
| 1 | F:\1N1EA.TIF | C:\WINNT\Profiles\alanj | test.1N1EA | test.1N1EA |

Output Settings

Spatial Ref Storage

Storage Properties

Update mode: Append to existing data

Statistics option: Build statistics

Tile size: Width: 128 Height: 128

Pyramids options

Do not build pyramids

Build pyramids and skip first level

Build pyramids and do not skip first level

Resample method: bilinear interpolation

nearest neighbor

bilinear interpolation

cubicconvolution

OK Cancel



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Image Conversion

New administration commands for imagery stored in ArcSDE 8.1

sderaster. A utility for describing and managing rasters. Works much like sdelayer and sdetable except that it is for raster layers.

sde2bsq. A utility for exporting raster images in ArcSDE 8.1 to bsq.



Image Conversion

```
D:\raster viewer> sderaster -o describe -l oregon,image -i esri_sde -s entropy -u  
raster -p go -V
```

Connecting to server entropy, instance esri_sde, as user raster

Raster Layer Description: <None>

Table Name: RASTER.OREGON

Raster Column: IMAGE

Raster Layer ID: 1

Minimum Raster ID: 1

Creation Date: Wed Mar 29 17:54:20 2000

User Privileges: SELECT, INSERT, DELETE, UPDATE

Raster Layer Configuration ..: DEFAULTS

Coordinate System:

```
PROJCS["WGS_1984_UTM_Zone_11N",GEOGCS["GCS_WGS_1984",DATUM["D_WGS_1984",SPHEROID["WGS_1984",6378137,298.257223563]],PRIME_M["Greenwich",0],UNIT["Degree",0.017453292519943295]],PROJECTION["Transverse_Mercator"],PARAMETER["False_Easting",500000],PARAMETER["False_Northing",0],PARAMETER["Central_Meridian",117],PARAMETER["Scale_Factor",0.9996],PARAMETER["Latitude_Of_Origin",0],UNIT["Meter",1]]
```



Direct Connect

How does it work ?

- The server functionality is running "in process" within ArcMap/ArcCatalog
- No intermediate application server process runs between ArcCatalog/ArcMap and the RDBMS
- ArcSDE code/technology is used to accomplish the connection

How do I get it ?

- All ESRI products that support a Geodatabase connection will ship with direct connect. Oracle 8i and SQL Server 7.x initially, Informix and DB2 at beta 2,
- Users will always be able to obtain a READONLY connection if the application license requirements are satisfied (Requires an ArcSDE server license.)
- ArcSDEConnects are not checked out when direct connect is used.

What happens to ArcSDE ?

- Existing ArcSDE application server architecture is still supported
- To obtain a READ/WRITE connection, the ArcSDE Server Package must be purchased.
- Direct connect works only with ArcInfo/ArcSDE 8.1.



Direct Connect

Can I run the ArcSDE server and use direct connect on the same instance simultaneously ?

- **Yes.**

Does direct connect support vector and raster data ?

- **Yes.**

How are applications affected ?

- **Application programs are affected only in the way that instance information is specified. No other changes are required.**

Where are error messages sent ?

- **Error messages are sent to sde.errlog. Direct Connect will find an etc directory under ArcSDE or Arcexe81 and write messages into the sde.errlog file.**



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Setting up direct connect

Oracle

- The Net8 Configuration Assistant can be used to setup a service.
- The service points to the Oracle instance on a remote machine
- Use the service name in place of the Oracle instance name in applications
 - For example when connecting to an Oracle instance in the password field type: **password@servicename** and in instance name type: **sde:oracle**

To create the service

On NT:

Oracle -> Network Administration -> Net8 Configuration Assistant

On Unix type:

\$ORACLE_HOME/bin/netca

Then select

Local Net Name Service Configuration

Type any name for a Service name

Select TCP as the protocol

Type the host name (the name of the server on which the Oracle instance resides)

Test the connection. Always test the connection.



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Oracle Service Setup

Net8 Configuration Assistant: Welcome

Welcome to the Net8 Configuration Assistant.
This tool takes you through the following common configuration steps:

Choose the configuration you would like to do:

- Listener configuration
- Naming Methods configuration
- Local Net Service Name configuration
- Directory Service Access configuration

Back Next >

Enterprise Login Assistant
Microsoft ODBC Administrator
Net8 Assistant
Net8 Configuration Assistant
Oracle ODBC Help
Oracle ODBC Test
Wallet Manager

Windows 2000 Professional

Start | Entire Ne... | \\Griot\gr... | \\Install... | Windows... | Control P... | 8:49 AM



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Setting up direct connect

SQL Server

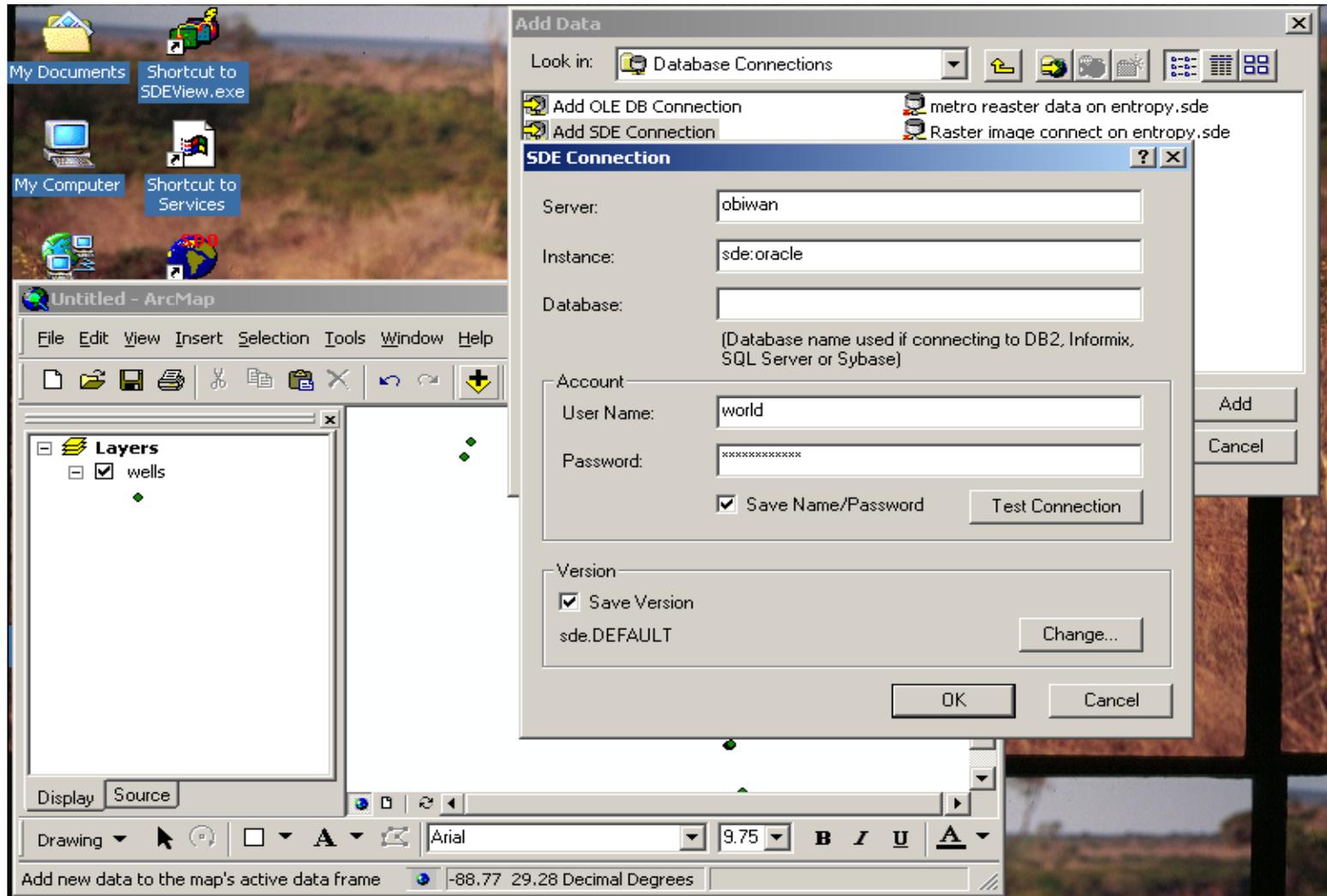
No special setup.

Type: **sde:sqlserver:servername** as instance name



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Login using Direct Connect



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For more information

Arcinfo Island

System Integration island

ArcSDE online:

http://www.esri.com/devsupport/arcsde/samples/arcsde_online/sdehelp.htm

ArcIMS Online:

<http://arconline.esri.com/arconline/index.cfm?PID=6>

Oracle 8i Spatial

Booth 952 in the Exhibit Pavilion

<http://www.oracle.com/database/options/spatial/>

OmniReplicator

www.lakeviewtech.com

Microsoft:

Booth 232 in the Exhibit Pavilion

<http://www.microsoft.com/sql/default.htm>

LZ77 compression:

<http://users.anderson.edu/~spoon/compression.htm>



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