Introduction to Enterprise ORDBMS

IT4GIS
Keith T. Weber, GISP
GIS Director
ISU-GIS Training and Research Center

Concurrent Clients
- GIS for the Enterprise
  - Focus on current/potential concurrent clients

Database Administration (e.g., IBM DB2)
- GUI based database administration
- Alternatively, command prompt can be used.
- Do you know what the command prompt is?
Creating Databases/tables

- A database can be a new instance of the RDBMS running on a server.
- Ensure no instance name is the same as a service name.

How do you check this?

Checking Service Names

C:\Windows\System32\drivers\etc

Unique Features of an Enterprise Database

- Pre-fetch
- Buffer pools
- Table data pages
Numeric Data Types

- FOR BIT DATA (boolean)
- BYTE (0-255)
- SMALLINT (-32,768 to 32,767)
- INTEGER (-2,147,483,648 to 2,147,483,647)
- FLOAT <n>
- DOUBLE PRECISION <n_p,n_s>

Data Type Parameters Used in ArcGIS

- FLOAT <n_p,n_s>
  - n_p (total field length)
  - n_s (decimal places)
  - n must be between 1-6 (larger n values need to use DOUBLE)
  - n_p,n_s = 5,3 → 26.589 is OK, 256.381 is not
  - Five (5) total characters 2 6 . 5 8 9

Parameters (cont’d)

- DOUBLE PRECISION <n_p,n_s>
  - n_p ≥ 7 or more
  - n_s ≥ 0 or more
Character Data Types

- CHARACTER<n>
- VARCHAR<n>

Parameters (cont’d)

- CHARACTER<n>
  - (AKA, String or Text)
  - Example a field named “URL” with n = 46
  - “http://giscenter.isu.edu/training/it4gis.htm”

Special Data Types

- DATE
- TIME
- TIMESTAMP
Special Data Types (cont’d)

- Stored in special System managed tables
  - BLOB<n[K|M|G]>
  - CLOB<n[K|M|G]>
  - DBCLOB<n[K|M|G]>
  - GRAPHIC<n>
  - VARGRAPHIC<n>

Table Data Pages

- All fields with standard data types for each record are contained within a single data page.
- There is a maximum of 255 records stored on each page.
- The ART of efficient data modeling is to minimize wasted space on a page while maximizing the proportion of each page written.

An Example

<table>
<thead>
<tr>
<th>Number of Fields</th>
<th>15 Fields</th>
<th>10 Fields</th>
<th>6 Fields</th>
<th>4 Field(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page Size (KB)</td>
<td>5.1</td>
<td>5.1</td>
<td>5.1</td>
<td>5.1</td>
</tr>
<tr>
<td>Records per Page</td>
<td>255</td>
<td>255</td>
<td>255</td>
<td>255</td>
</tr>
<tr>
<td>Page Efficiency</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Page Space Wasted</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

An Example for 4KB Pages

<table>
<thead>
<tr>
<th>Records per Page</th>
<th>Page Size (KB)</th>
<th>Page Efficiency</th>
<th>Page Space Wasted</th>
</tr>
</thead>
<tbody>
<tr>
<td>255</td>
<td>5.1</td>
<td>100%</td>
<td>0</td>
</tr>
</tbody>
</table>

An Example for 8KB Pages

<table>
<thead>
<tr>
<th>Records per Page</th>
<th>Page Size (KB)</th>
<th>Page Efficiency</th>
<th>Page Space Wasted</th>
</tr>
</thead>
<tbody>
<tr>
<td>255</td>
<td>5.1</td>
<td>100%</td>
<td>0</td>
</tr>
</tbody>
</table>
Storing Vector Coordinates in a ORDBMS

- **DB2 Spatial Extender** (and other spatially enabled databases) lets you integrate geographic data with your existing business data. It includes:
  - Data types such as points, lines, and polygons
  - Functions such as area, endpoint, and intersect
  - An indexing scheme for spatial data
- What about Oracle, MS SQL Server, and PostgreSQL?

Key Concepts

- Understand that while data is stored in tables, these tables span TABLE PAGES
- Understand what PRE-FETCH and CACHE are...and how they differ.
- Understand data types

Your Assignment

- Complete the exercise
  - Design table pages with the “Database Administration” exercise
  - You have time to get started on this now
- But first, time for another 2-minute Write!
Professional Hints and Tips

• Working toward a security clearance