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.
Creating Databases/tables

- A database can be a new instance
- Ensure no instance name is the same as a service name.

**How do you check this?**

Checking Service Names

C:\Windows\System32\drivers\etc

Enterprise Database Unique Features

- 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 = precision (total field length)
  - n_s = scale (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/84gis.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 Instance Example

<table>
<thead>
<tr>
<th>Number of Fields</th>
<th>KB per record</th>
<th>KB for 255 records</th>
<th>Records at page size KB</th>
<th>KB浪费</th>
<th>KB浪费 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.02</td>
<td>4.5</td>
<td>255</td>
<td>5.1</td>
<td>29</td>
</tr>
</tbody>
</table>

One 8kb page
Storing Vector Coordinates in a ORDBMS

- **DB2 Spatial Extender** 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?

Questions?

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