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

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 = 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 \& 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 Records</th>
<th>10</th>
<th>50</th>
<th>200</th>
<th>255</th>
</tr>
</thead>
<tbody>
<tr>
<td>Records per Page</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Size per Record</td>
<td>5.1</td>
<td>5.1</td>
<td>5.1</td>
<td>5.1</td>
</tr>
<tr>
<td>Used KB per Page</td>
<td>40</td>
<td>200</td>
<td>5.1</td>
<td>5.1</td>
</tr>
<tr>
<td>Wasted KB per Page</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2.9</td>
</tr>
<tr>
<td>Wasted MB per Page</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0002</td>
</tr>
</tbody>
</table>

Each record contains 15 fields. Each record needs 5 bytes (5.1 KB). How many records will fit into a 4KB page?

What percentage of a page is written?

Based on available space?

Based on available records?
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?

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
  – You have time to get started on this now
• But first, time for another 2-minute Write!