

# Introduction to Enterprise ORDBMS

IT4GIS

Keith T. Weber, GISP

GIS Director

ISU-GIS Training and Research Center

Pocatello | Idaho Falls | Meridian | Twin Falls

Idaho State UNIVERSITY

---

---

---

---

---

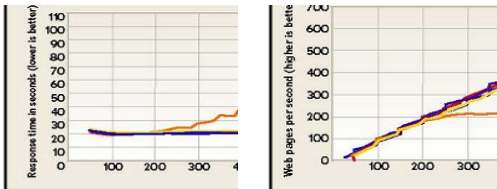
---

---

---

## Concurrent Clients

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



Pocatello | Idaho Falls | Meridian | Twin Falls

Idaho State UNIVERSITY

---

---

---

---

---

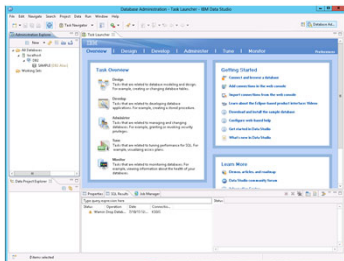
---

---

---

## Database Administration (e.g., IBM DB2)

- GUI based database administration
- Alternatively, command prompt can be used.
- **Do you know what the command prompt is?**



Pocatello | Idaho Falls | Meridian | Twin Falls

Idaho State UNIVERSITY

---

---

---

---

---

---

---

---

### 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?**

---

---

---

---

---

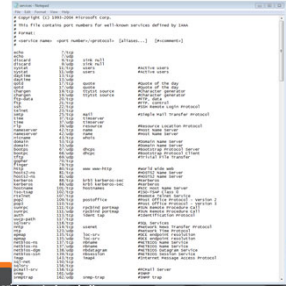
---

---

---

### Checking Service Names

C:\Windows\System32\drivers\etc




---

---

---

---

---

---

---

---

### Unique Features of an Enterprise Database

- Pre-fetch
- Buffer pools
- Table data pages




---

---

---

---

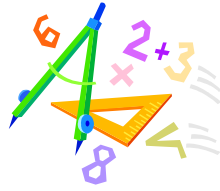
---

---

---

---

### 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<sub>p</sub>,n<sub>s</sub>>

Pocatello | Idaho Falls | Meridian | Twin Falls

Idaho State  
UNIVERSITY

---

---

---

---

---

---

---

---

### Data Type Parameters Used in ArcGIS

- FLOAT < n<sub>p</sub>,n<sub>s</sub> >
  - n<sub>precision</sub>(total field length)
  - n<sub>scale</sub> (decimal places)
  - n must be between 1-6 (larger n values need to use DOUBLE)
  - n<sub>p</sub>,n<sub>s</sub> = 5,3 → 26.589 is OK, 256.381 is not
  - Five (5) total characters 26.589

Pocatello | Idaho Falls | Meridian | Twin Falls

Idaho State  
UNIVERSITY

---

---

---

---

---

---

---

---

### Parameters (cont'd)

- DOUBLE PRECISION <n<sub>p</sub>,n<sub>s</sub>>
  - n<sub>p</sub> = 7 or more
  - n<sub>s</sub> = 0 or more

Pocatello | Idaho Falls | Meridian | Twin Falls

Idaho State  
UNIVERSITY

---

---

---

---

---

---

---

---

## Character Data Types

- CHARACTER<n>
- VARCHAR<n>



Pocatello | Idaho Falls | Meridian | Twin Falls

Idaho State  
UNIVERSITY

---

---

---

---

---

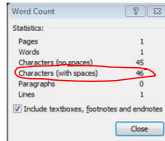
---

---

---

## Parameters (cont'd)

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



Pocatello | Idaho Falls | Meridian | Twin Falls

Idaho State  
UNIVERSITY

---

---

---

---

---

---

---

---

## Special Data Types

- DATE
- TIME
- TIMESTAMP



Pocatello | Idaho Falls | Meridian | Twin Falls

Idaho State  
UNIVERSITY

---

---

---

---

---

---

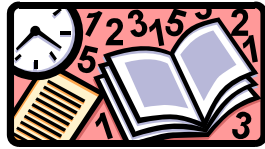
---

---

## 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>
- VARCHAR<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.

---

---

---

---

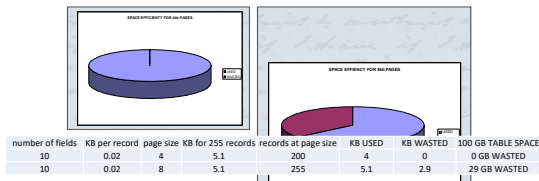
---

---

---

---

## An Example



Each record contains 10 fields  
 Each record needs 20 bytes (0.02kb)  
 How many records will fit into a 4kb page?

What percentage of a page is written?  
 -based on available space?  
 -based on available records?

one 8kb page

---

---

---

---

---

---

---

---

## 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?

Pocatello | Idaho Falls | Meridian | Twin Falls

Idaho State  
UNIVERSITY

---

---

---

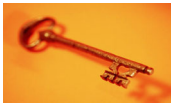
---

---

---

---

---



## 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

Pocatello | Idaho Falls | Meridian | Twin Falls

Idaho State  
UNIVERSITY

---

---

---

---

---

---

---

---

## 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!

Pocatello | Idaho Falls | Meridian | Twin Falls

Idaho State  
UNIVERSITY

---

---

---

---

---

---

---

---

## Professional Hints and Tips

- Working toward a security clearance

Pocatello | Idaho Falls | Meridian | Twin Falls

Idaho State  
UNIVERSITY

---

---

---

---

---

---

---

## Questions?



Pocatello | Idaho Falls | Meridian | Twin Falls

Idaho State  
UNIVERSITY

---

---

---

---

---

---

---