



Database Part I

Introduction

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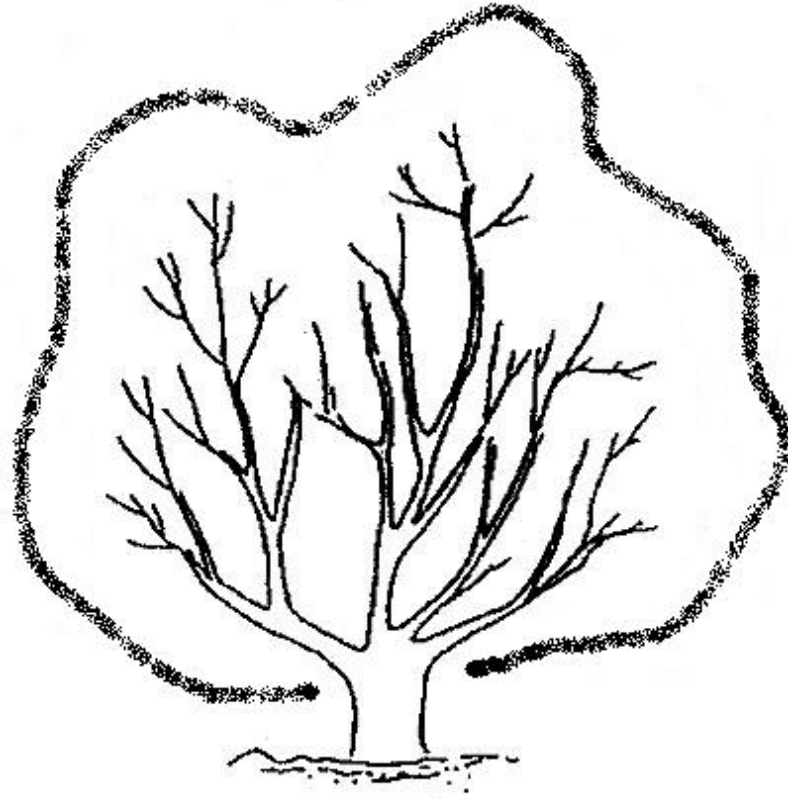
Database Part I

Introduction

- Introduction to the World of Databases – an overview
- Introduction to Database Design – Design Concepts



The World of Databases





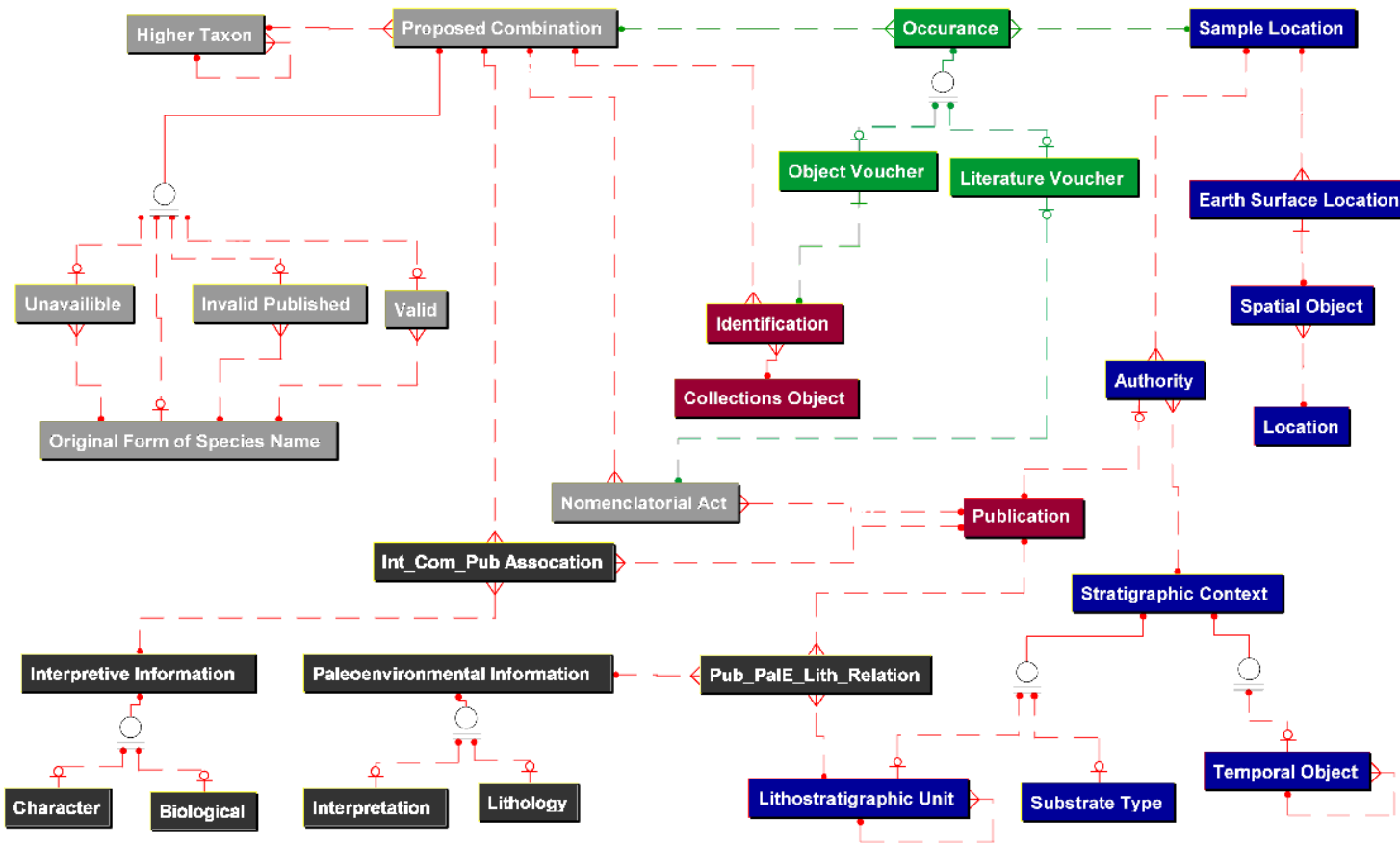
Examples of scientific DB's

- You name some first
- Science Citation Index
- OBFS Metadata Catalog
- USDA Integrated Taxonomic Info. System
- Climate/hydrology data
- NIH GenBank





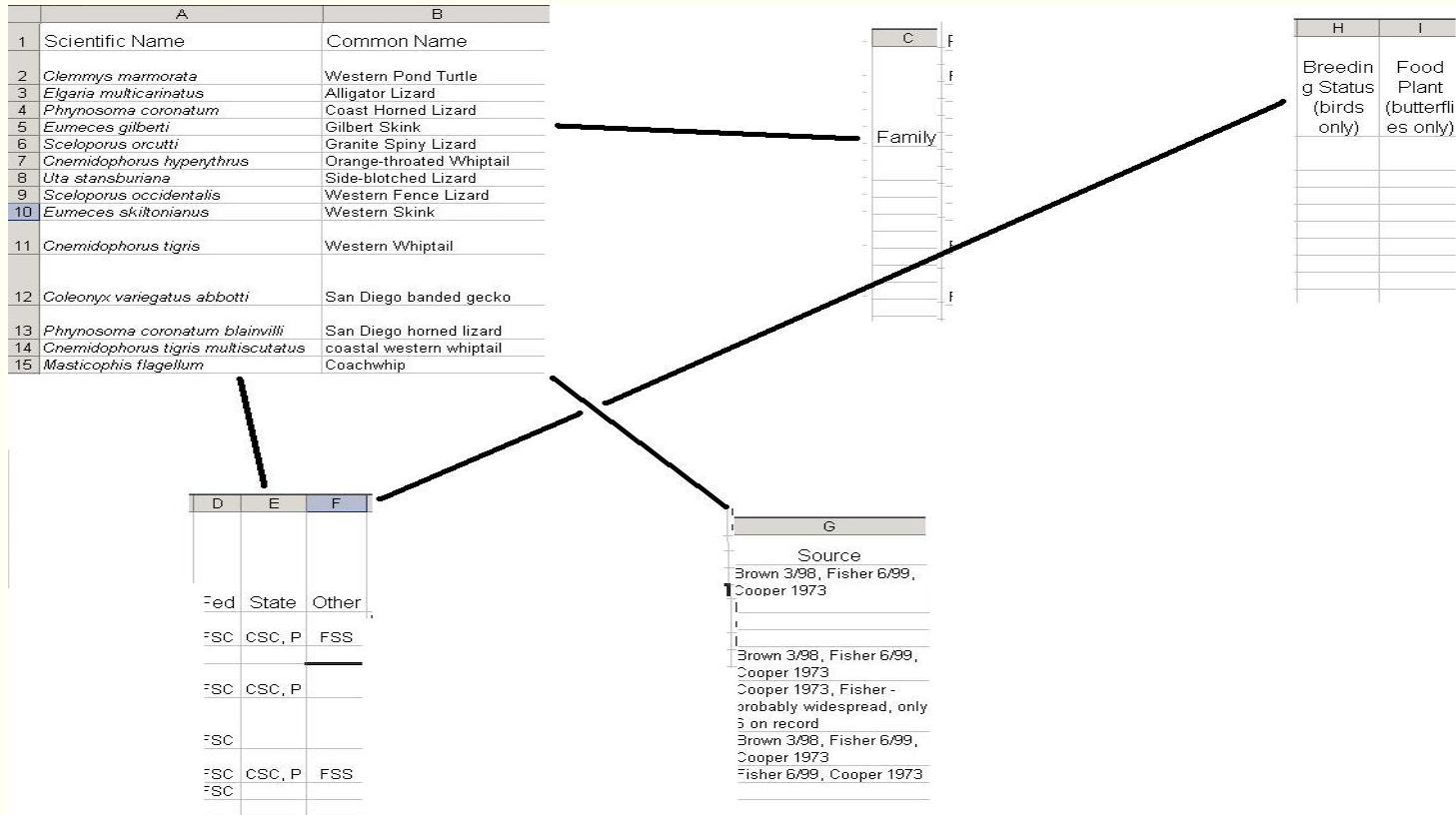
Why use databases?





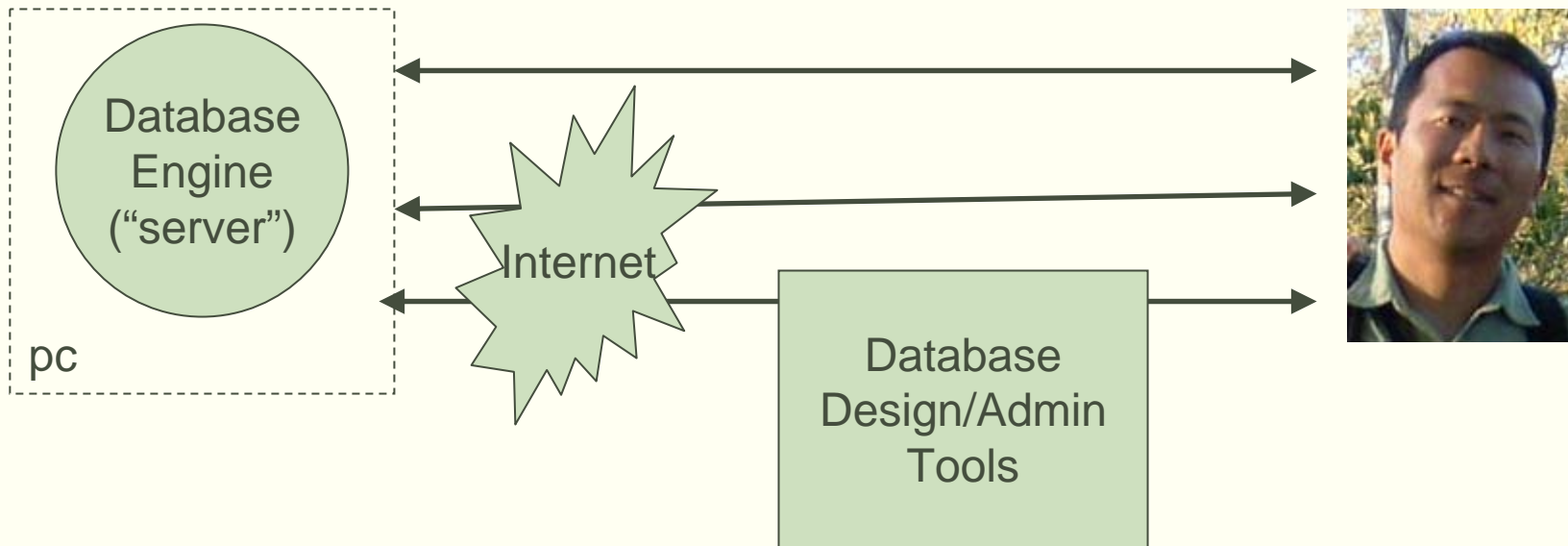
What is a database?

□ Conceptually...



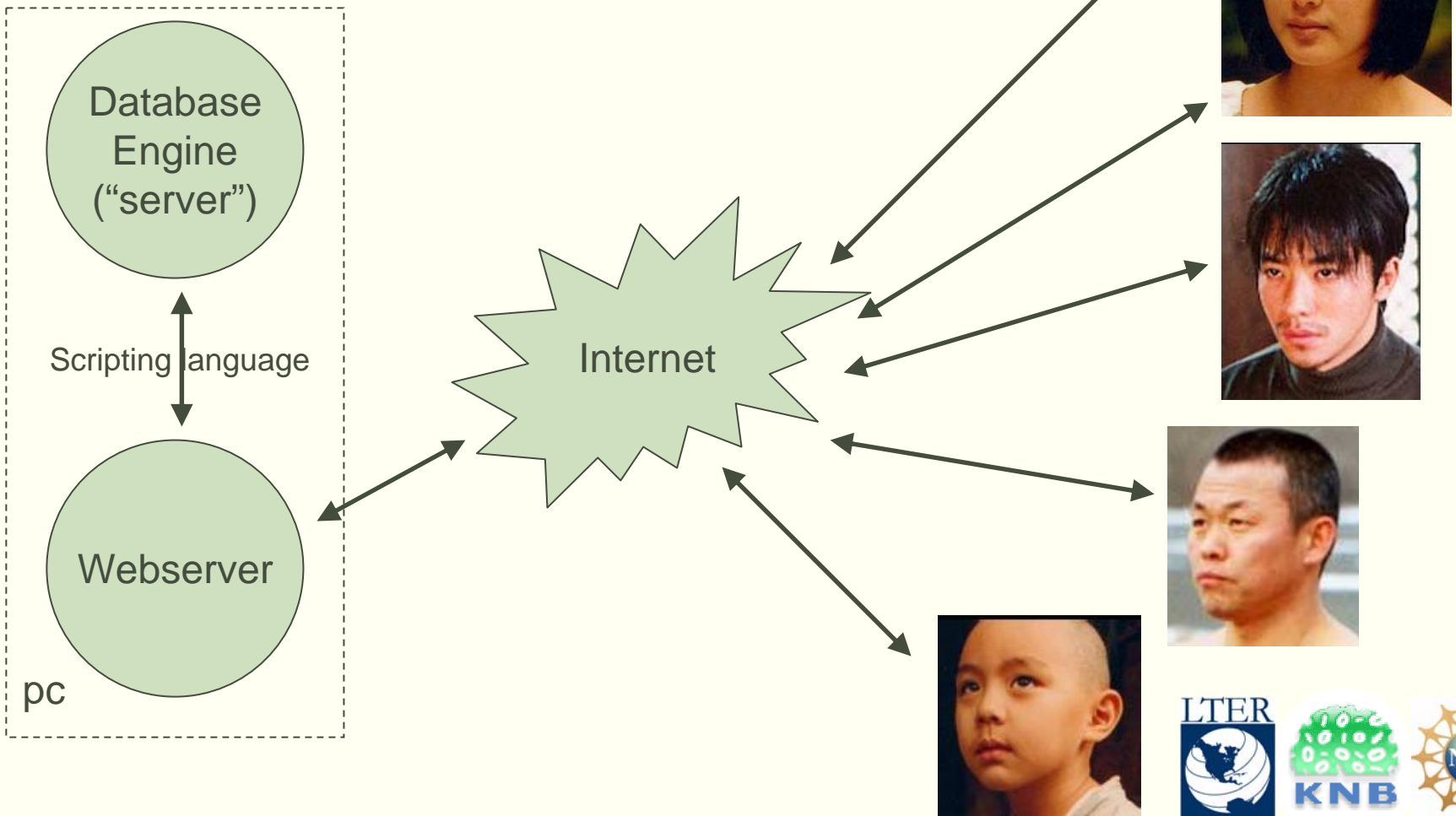
What is a database?

- In terms of software for setting up & managing...



What is a database?

- In terms of software for sharing...





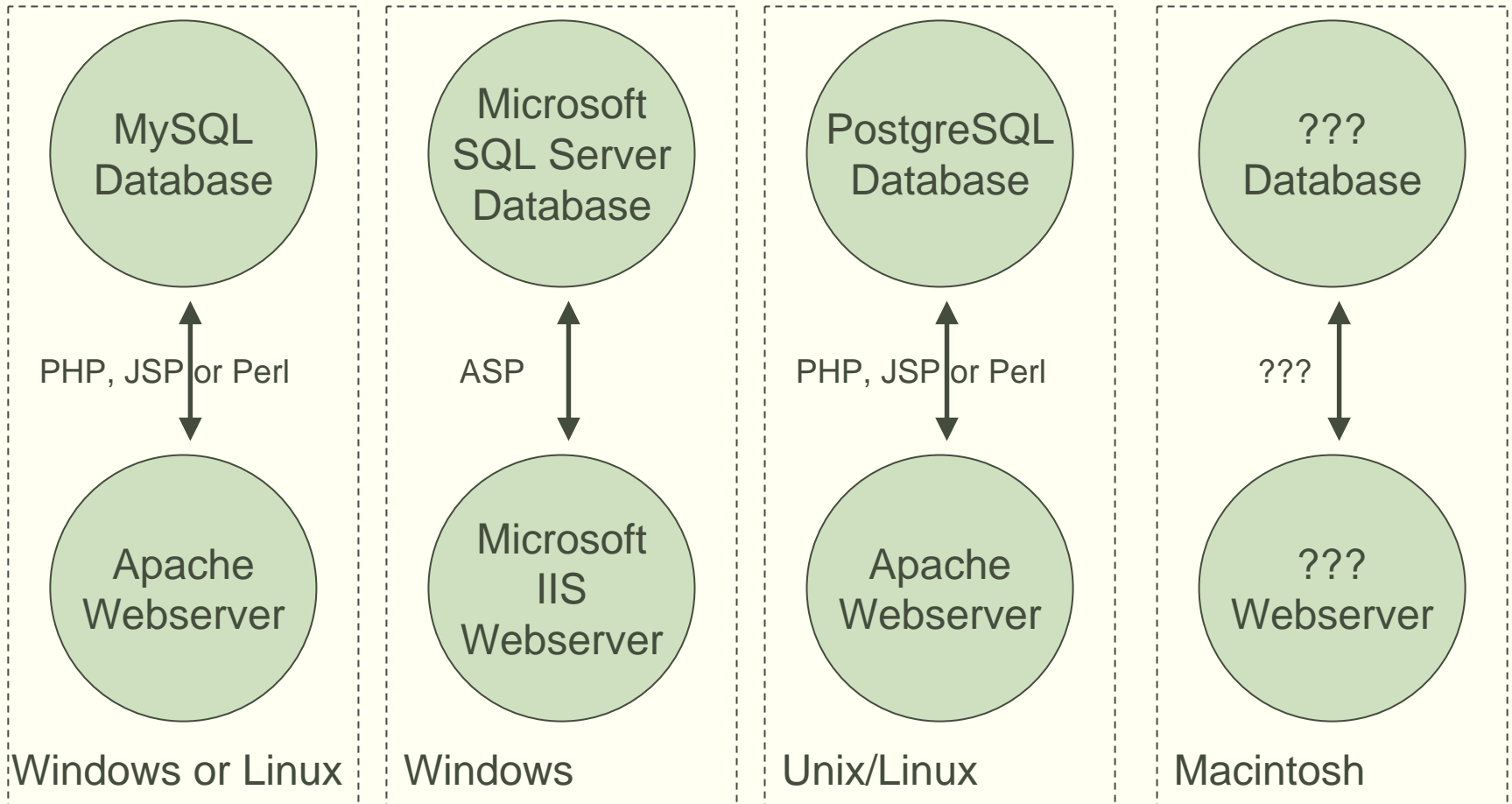
What is a database?

- ❑ "SQL" = Sequential Query Language
- ❑ How to pronounce?





Popular Configurations



Free

\$\$\$

Free

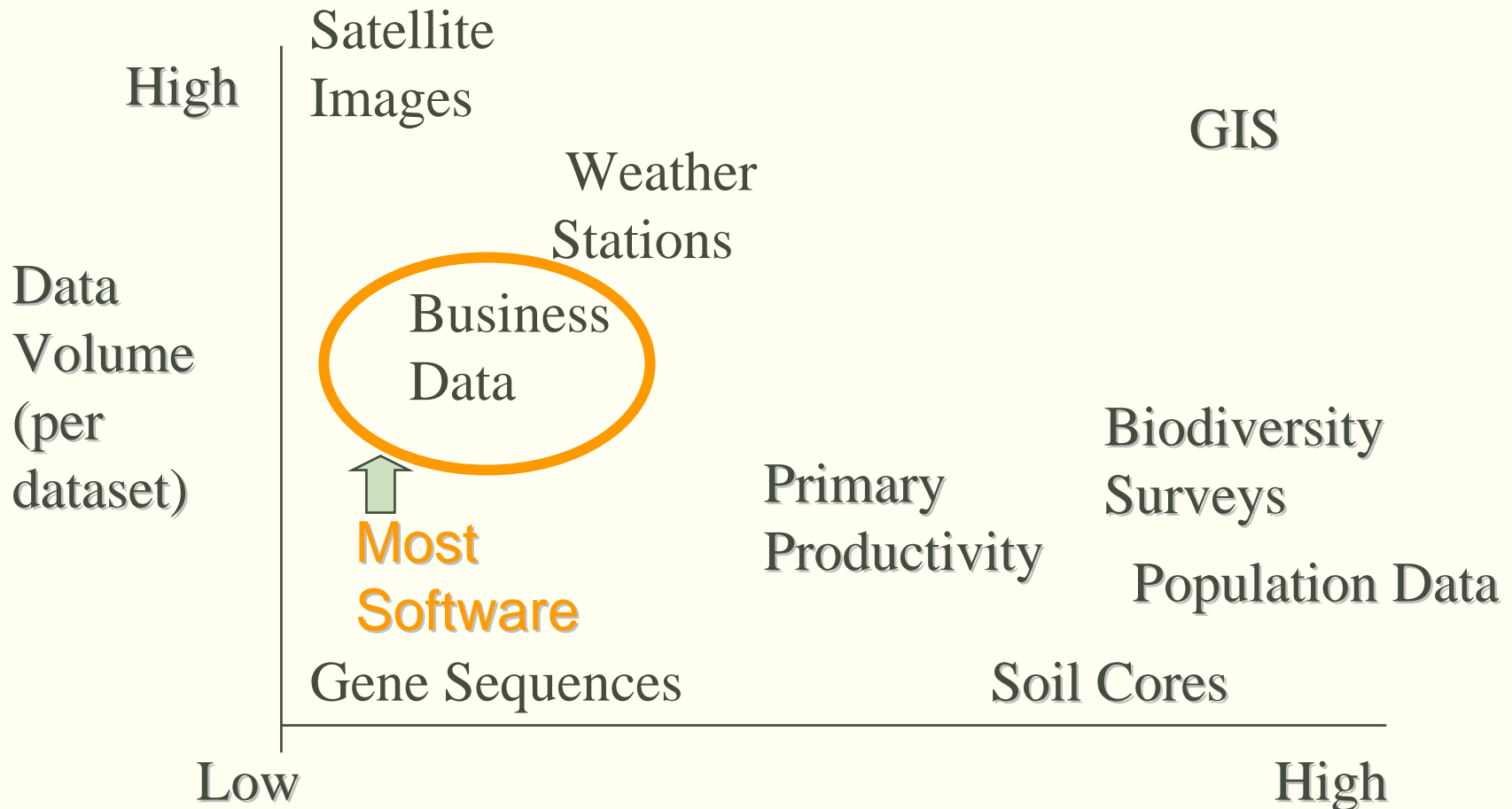
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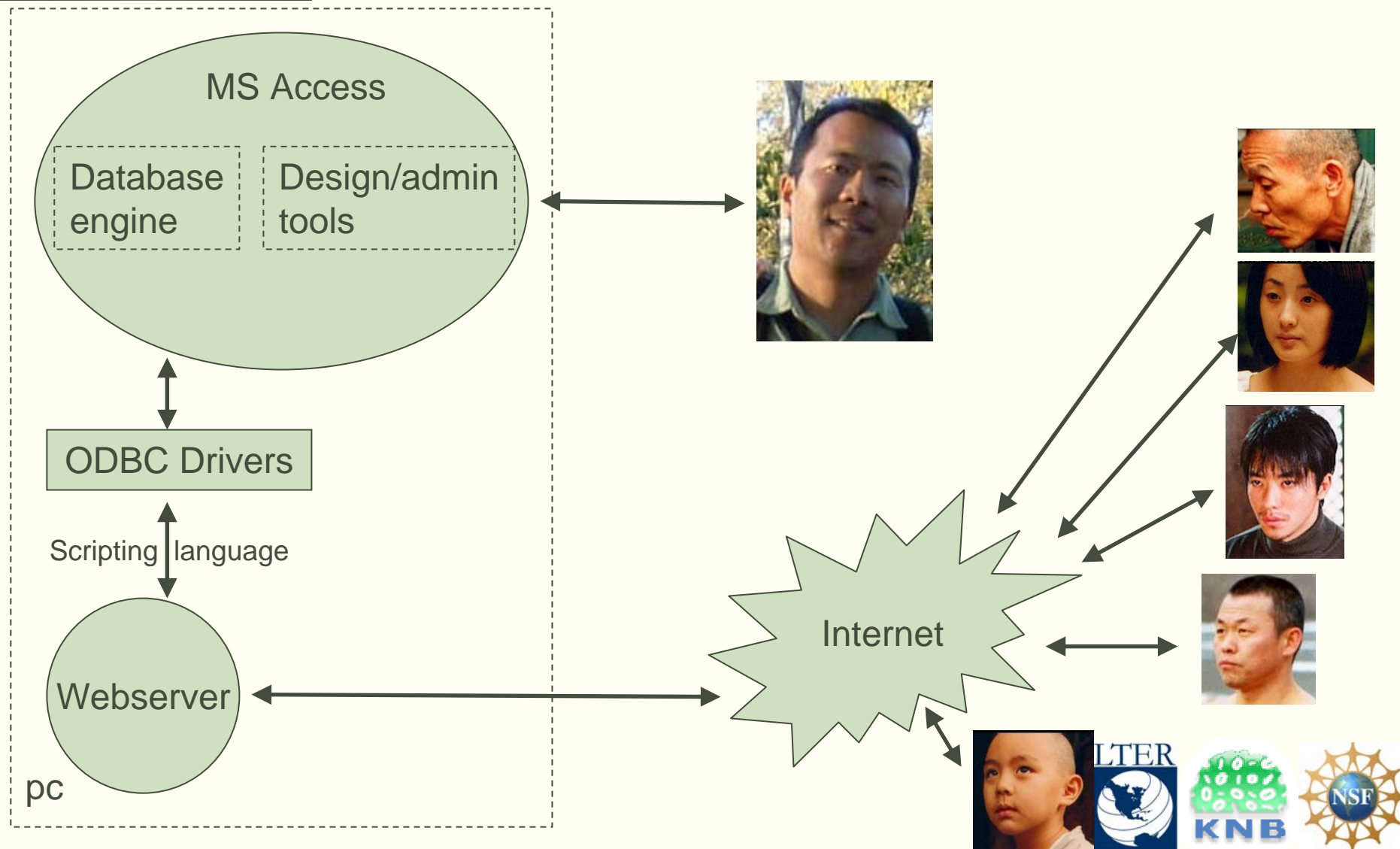
Characteristics of Ecological Data

(John Porter, UVA, SEEK Training 2004)

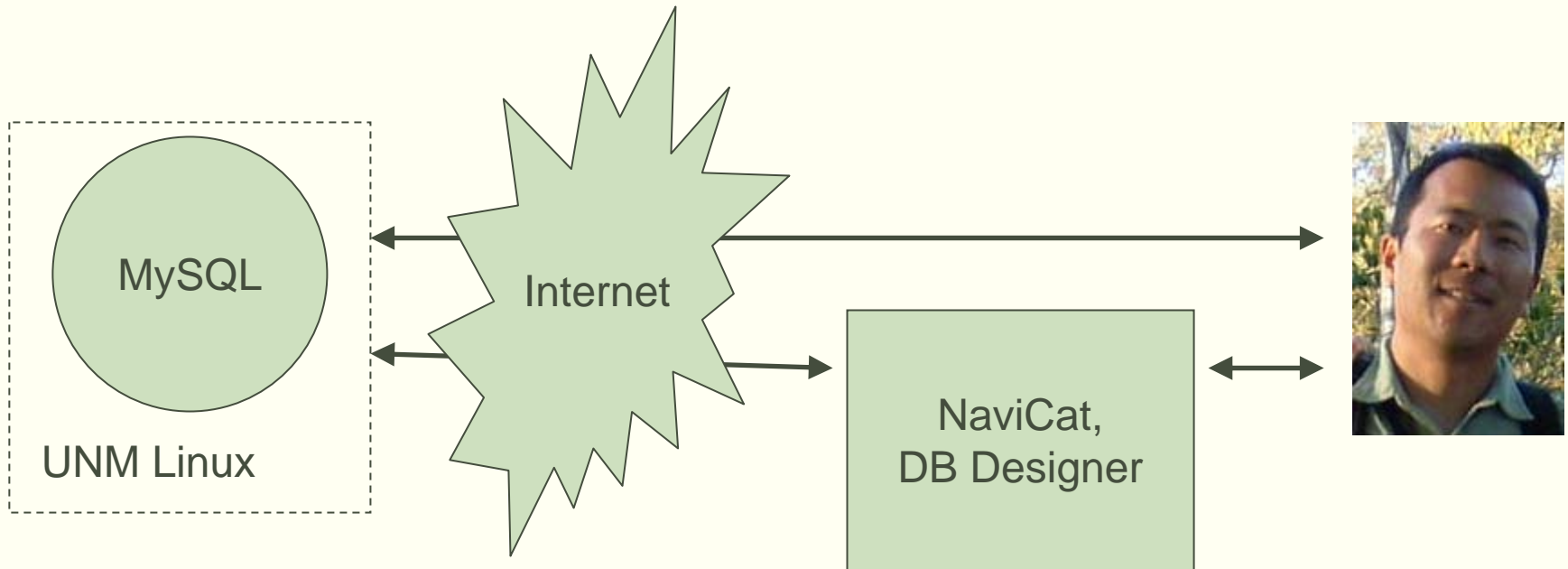




What about MS Access?



Our configuration



ARE WE READY TO GO ON ?



DB Design Concepts

□ What is a database?

MonitoringProject

Transects

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Plots

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DB Design Concepts

- What does it look like in MySQL?

```
mysql> show databases;
+-----+
| Database |
+-----+
| MonitoringProject |
| my_test_proj |
| NPP |
| NPP2 |
| speciesLists |
+-----+
```




DB Design Concepts

- What is a table?

Plots

| Plot_id | type | lat | lon | notes |
|---------|------|-----|-----|-------|
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DB Design Concepts

- What is a table?

Species

| Species_id | name | common_name | protected |
|------------|------|-------------|-----------|
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DB Design Concepts

- What does it look like in MySQL?

```
mysql> use MonitoringProject;  
Database changed
```

```
mysql> show tables;
```

```
+-----+  
| Tables_in_MonitoringProject |  
+-----+  
| Plots                        |  
| Species                     |  
| Transects                   |  
+-----+
```



DB Design Concepts

- What are the differences between tables in Excel & db's?

Species

| Species_id | name | common_name | protected |
|------------|------|-------------|-----------|
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DB Design Concepts

- What does it look like in MySQL?

```
mysql> SELECT * FROM Species;
```

| Species_id | name | common_name | protected |
|------------|---------------------|----------------------|-----------|
| 0 | Rana catesbeiana | bullfrog | N |
| 1 | Icteria virens | yellow-breasted chat | Y |
| 2 | Oreotyx pictus | mountain quail | N |
| 3 | Cyanocitta stelleri | Steller's jay | N |
| 4 | Passerella iliaca | fox sparrow | N |

How to get data from several tables at once?





DB Design Concepts

- But there is more behind the scenes:

```
mysql> describe Species;
```

| Field | Type | Null | Key | Default | Extra |
|-------------|---------------|------|-----|---------|----------------|
| Species_id | int(11) | | PRI | | auto_increment |
| name | varchar(80) | | | | |
| common_name | varchar(80) | YES | | | |
| protected | enum('Y','N') | | | N | |

DB Design Concepts

□ Review: What is a database?

