



# Introduction to Ecological Databases

John Kim

Field Station Programs  
San Diego State University





# talk outline

- 1) Database conceptual overview
- 2) Examples of Databases
- 3) Database System configurations





# What is a db?

	A	B
1	Scientific Name	Common Name
2	<i>Clemmys marmorata</i>	Western Pond Turtle
3	<i>Elgania multicarinatus</i>	Alligator Lizard
4	<i>Phrynosoma coronatum</i>	Coast Horned Lizard
5	<i>Eumeces gilberti</i>	Gilbert Skink
6	<i>Sceloporus orcutti</i>	Granite Spiny Lizard
7	<i>Cnemidophorus hyperythrus</i>	Orange-throated Whiptail
8	<i>Uta stansburiana</i>	Side-blotched Lizard
9	<i>Sceloporus occidentalis</i>	Western Fence Lizard
10	<i>Eumeces skiltonianus</i>	Western Skink
11	<i>Cnemidophorus tigris</i>	Western Whiptail
12	<i>Coleonyx variegatus abbotti</i>	San Diego banded gecko
13	<i>Phrynosoma coronatum blainvilli</i>	San Diego horned lizard
14	<i>Cnemidophorus tigris multiscutatus</i>	coastal western whiptail
15	<i>Masticophis flagellum</i>	Coachwhip

C
Family

H	I
Breeding Status (birds only)	Food Plant (butterflies only)

D	E	F
Fed	State	Other
SC	CSC, P	FSS
SC	CSC, P	
SC		
SC	CSC, P	FSS
SC		

G
Source
Brown 3/98, Fisher 6/99, Cooper 1973
Brown 3/98, Fisher 6/99, Cooper 1973
Cooper 1973, Fisher - probably widespread, only 3 on record
Brown 3/98, Fisher 6/99, Cooper 1973
Fisher 6/99, Cooper 1973

- A set of tables
- Relationships
- A command language





# db features

- Explicit control over data (column) types

Date	Site	Height	Diameter
<dates only>	<text only>	< real numbers only>	< real numbers only>

- accuracy
- quality control
- performance
- ease of use (commands)





## db features

- Explicit or implicit relationship between tables

Date	Site	Height	Diameter
	A		
	B		
	A		
	C		

Site	Latitude	Longitude
A		
B		
C		
D		

Allows on-the-fly mix-n-matching of tables  
Avoid orphan rows





# db features

- Powerful command language

Date	Site	Height	Diameter

- Select specific rows
- Perform calculations
- Update columns
- Insert new rows
- Delete specific rows
- Create/copy/delete tables
- Mix-n-match tables on the fly

SQL = Sequential Query Language





## other/advanced features

- Views
- Triggers & Stored Procedures
- Transactions





# Advantages

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ISC	CSC, P	FSS
ISC	CSC, P	
ISC		
ISC	CSC, P	FSS
ISC		

Modularity + command language =

- Complex analysis
- Better accuracy & quality
- Better Interoperability
- Multi-user
- Improved performance

Scalable, shareable, longer-lived

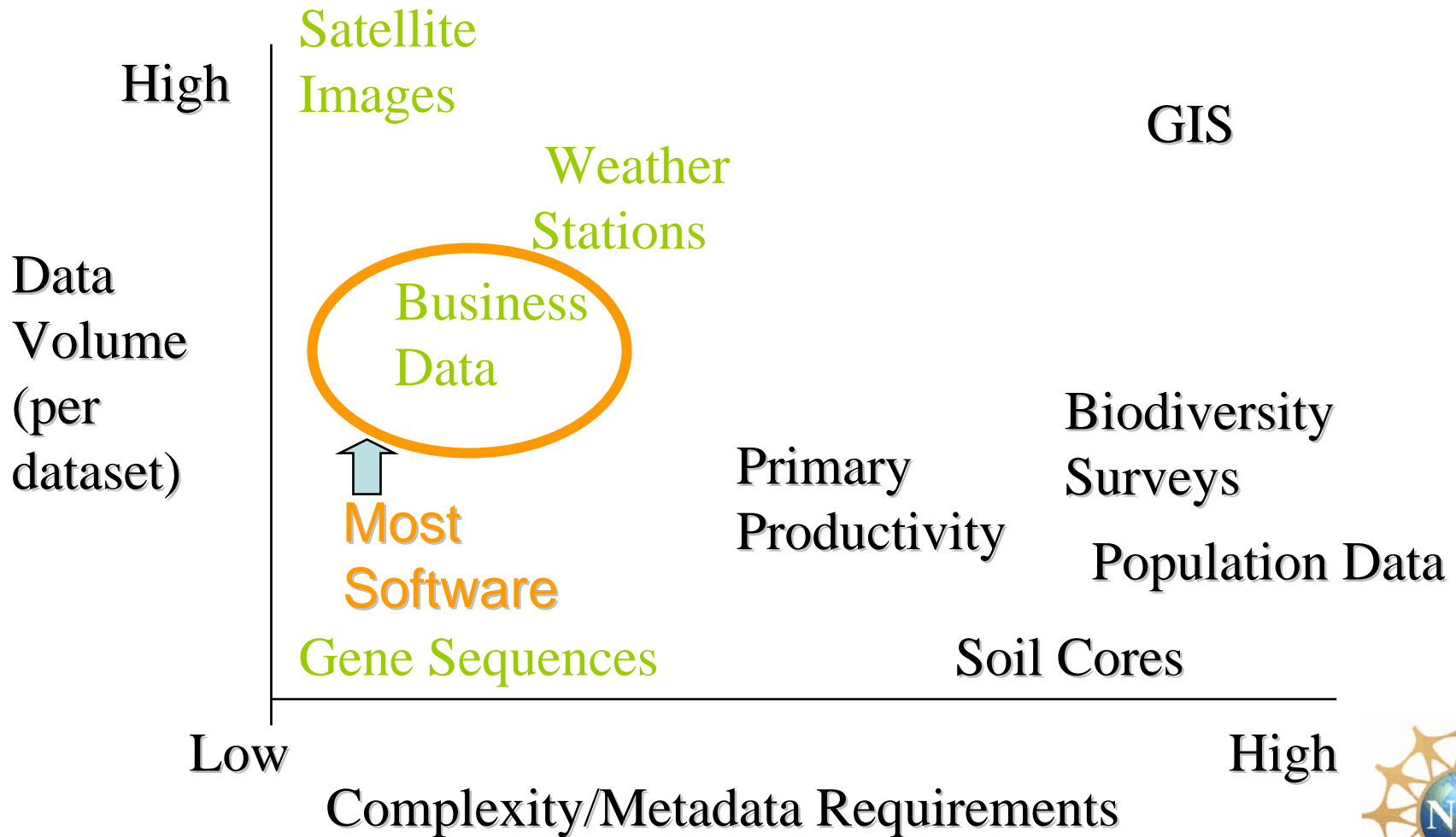






# Characteristics of Databases

(John Porter, UVA)





# Examples of databases

Low volume, low complexity:

- Realtime Meteorology/Hydrology sensor data
- Vegetation sampling

High volume, low complexity

- USDA Integrated Taxonomic Information System
- NIH GenBank

High volume, higher complexity (metadata)

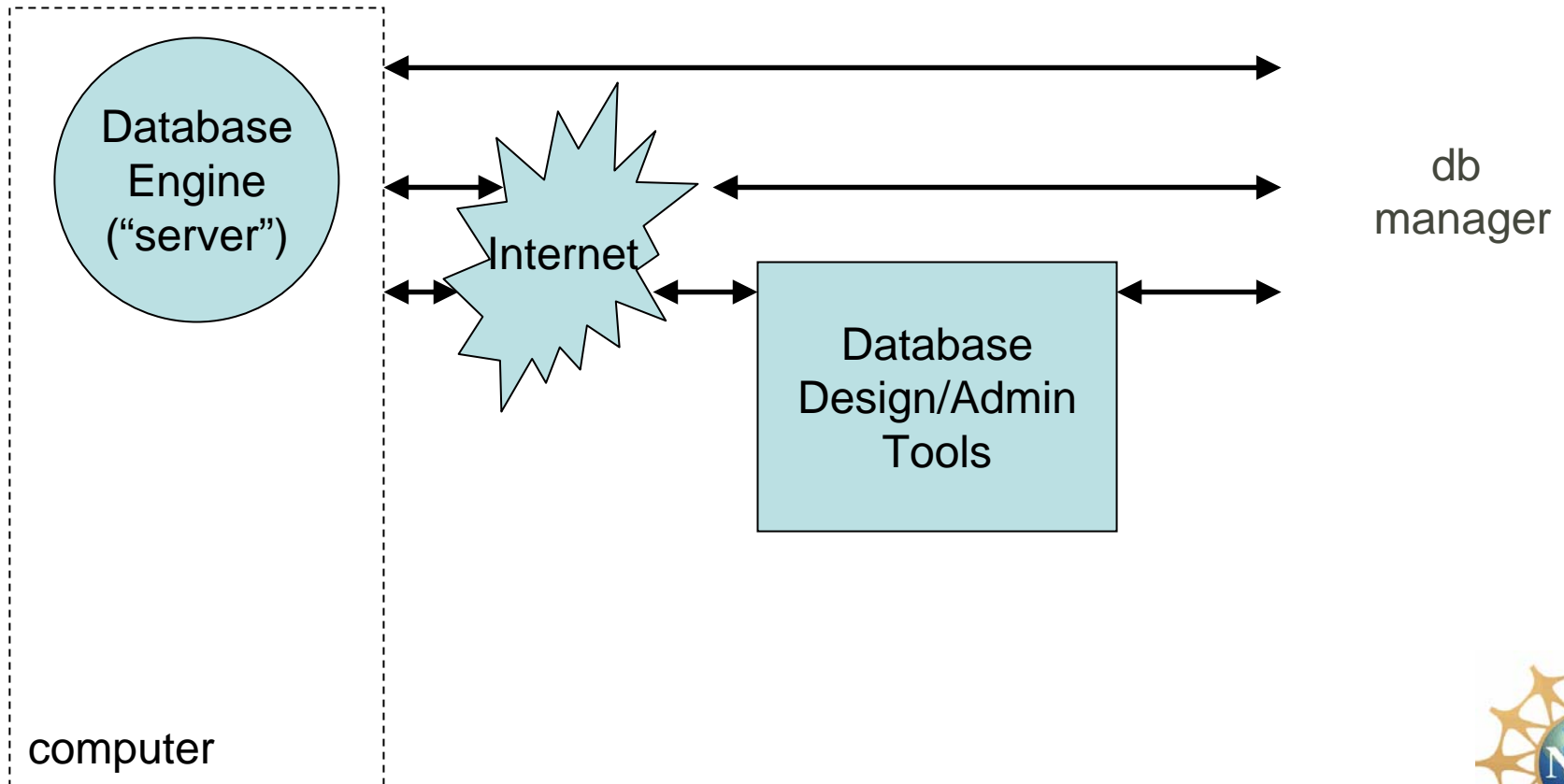
- Science Citation Index
- OBFS Metadata Catalog

Your db?



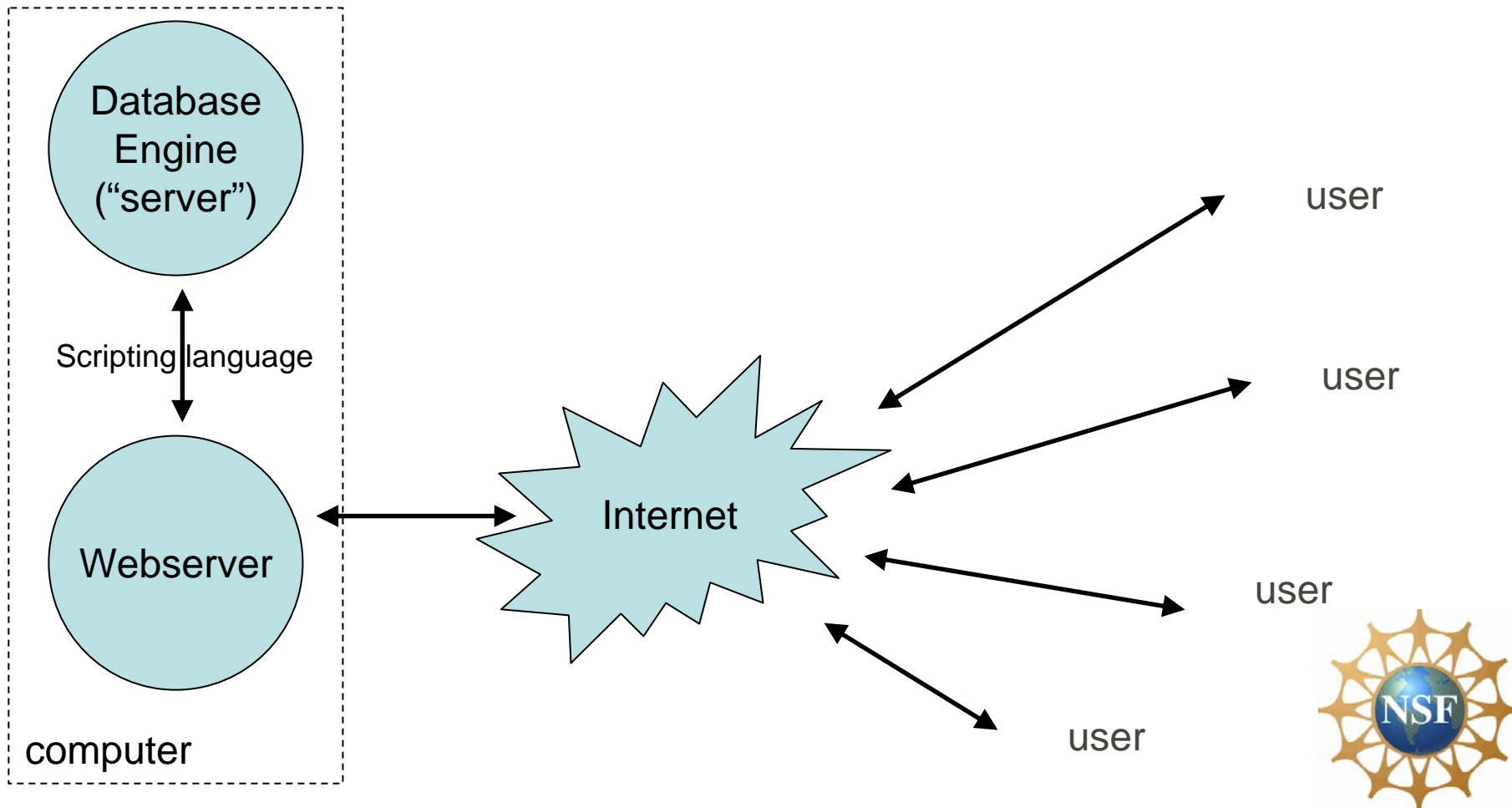


# System configuration for management



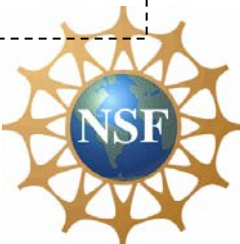
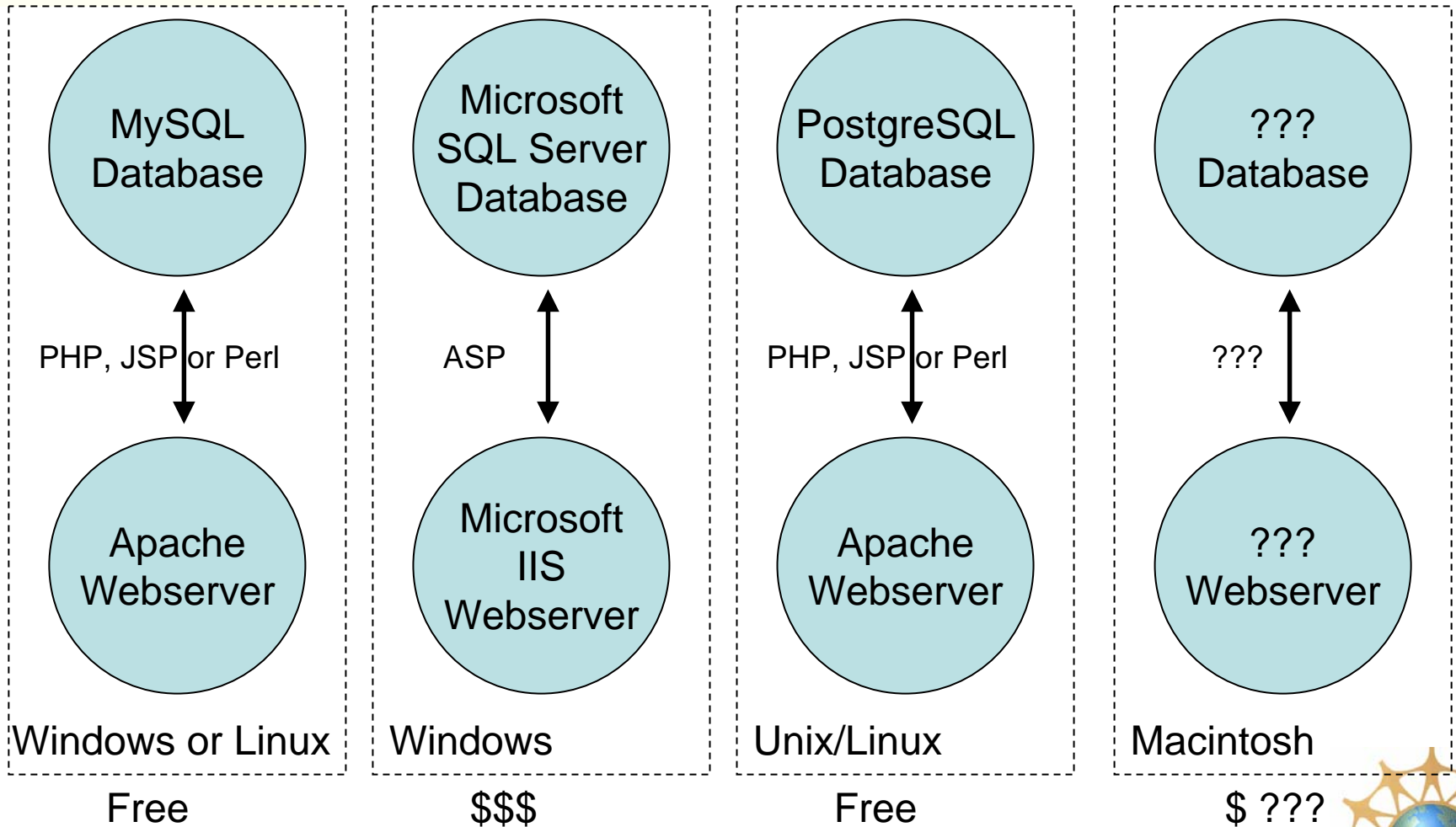


# System configuration for sharing





# Popular Configurations





# What about MS Access?

