



UNIVERSITY OF CALIFORNIA, BERKELEY
SCHOOL OF INFORMATION

INFO 202

“Information Organization & Retrieval”

Fall 2013

Robert J. Glushko
glushko@berkeley.edu
@rjglushko

5 December 2013
Lecture 28.1 – A Roadmap and Retrospective
for Organizing Systems



The Organizing System Lifecycle

- There is always a lifecycle, but there are times when its phases need to be more explicit and formal:
 - In institutional contexts
 - In information-intensive contexts
 - When traceability and impact analysis are necessary
- Better to be more explicit and formal than absolutely necessary than vice versa



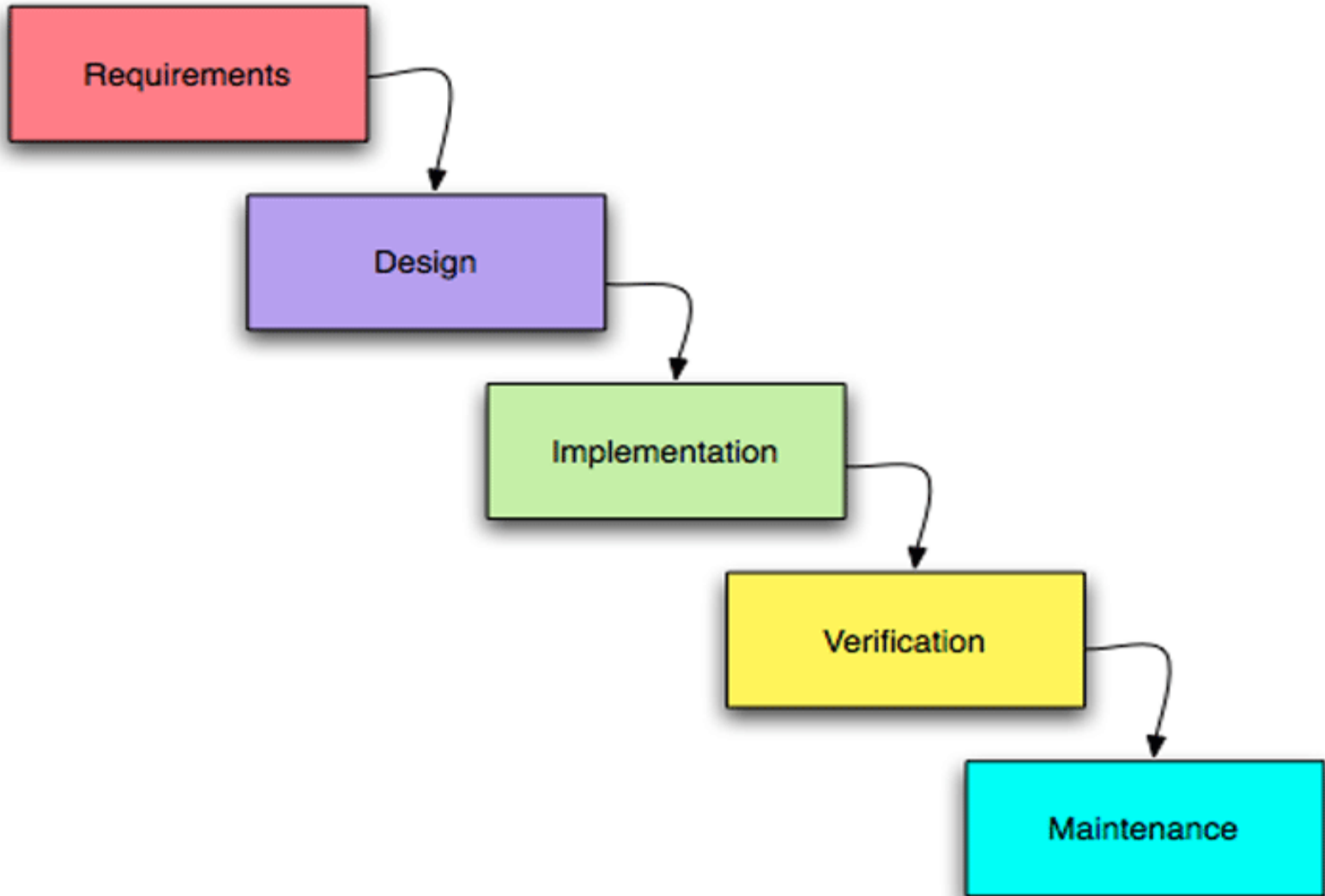
The Organizing System Lifecycle: 4 Phases

- Defining and scoping the domain
 - Identifying requirements
 - Design and implementation
 - Operations and maintenance
- These phases are brief and mostly ***inseparable*** for some simple organizing systems, more ***sequential*** for others, and more systematic and ***iterative*** for complex organizing systems

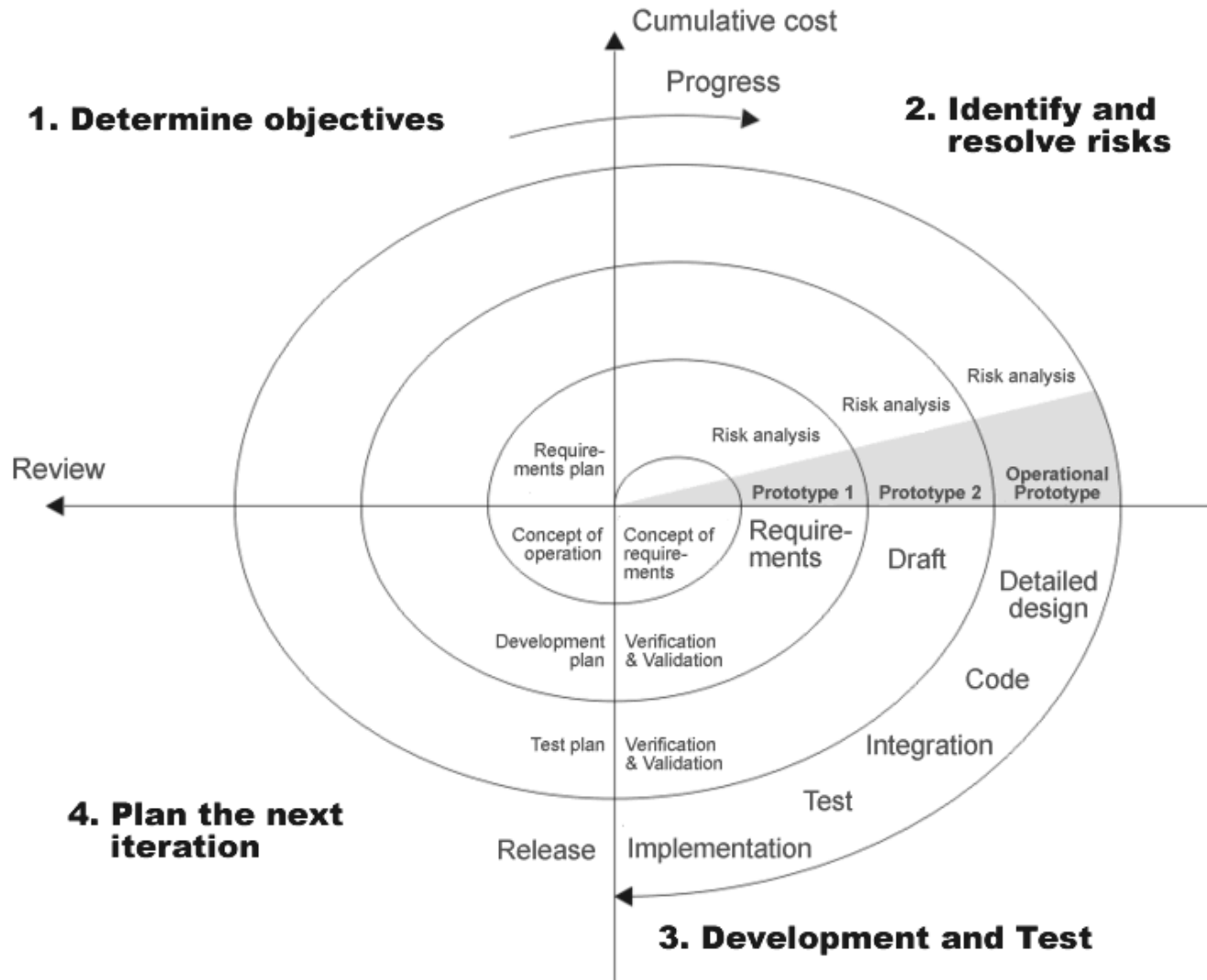
A Lifecycle with Inseparable Phases

JUST DO IT.

A “Waterfall” or Sequential Lifecycle



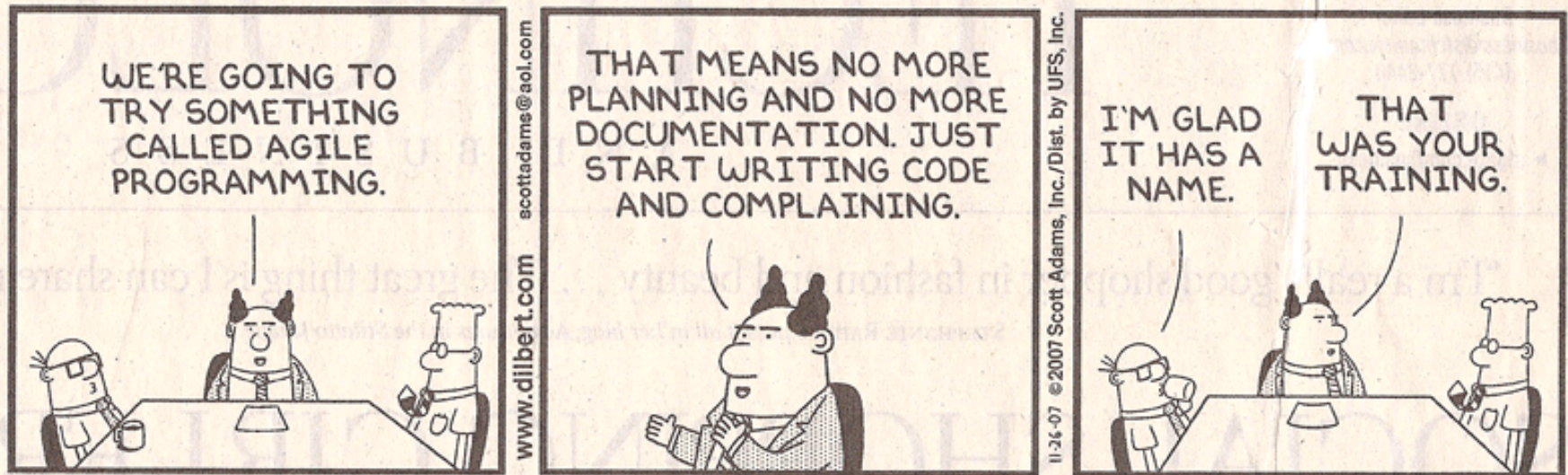
A “Spiral” or Iterative Lifecycle



Agile Methods

- "Agile" methods for software development have become very popular and are a specialized form of iterative methods used by small design teams

DILBERT Scott Adams





Defining and Scoping the Domain

- Determining scope and scale
- Nature and number of users
- Expected lifetime
- Physical and technological environment
- Relationship to other organizing systems

Scope and Scale

- SCOPE: the breadth and variety of resource types
- SCALE: the number of resource instances

- Heterogeneity of resources is more important than absolute number (Scope >> Scale)

- Handling resource heterogeneity:
 - Fewer, broader categories
 - Less description
 - Automated description and classification

An Organizing System with Global Scope and Scale

UNv91201

Search Code:

Search Title:

Search

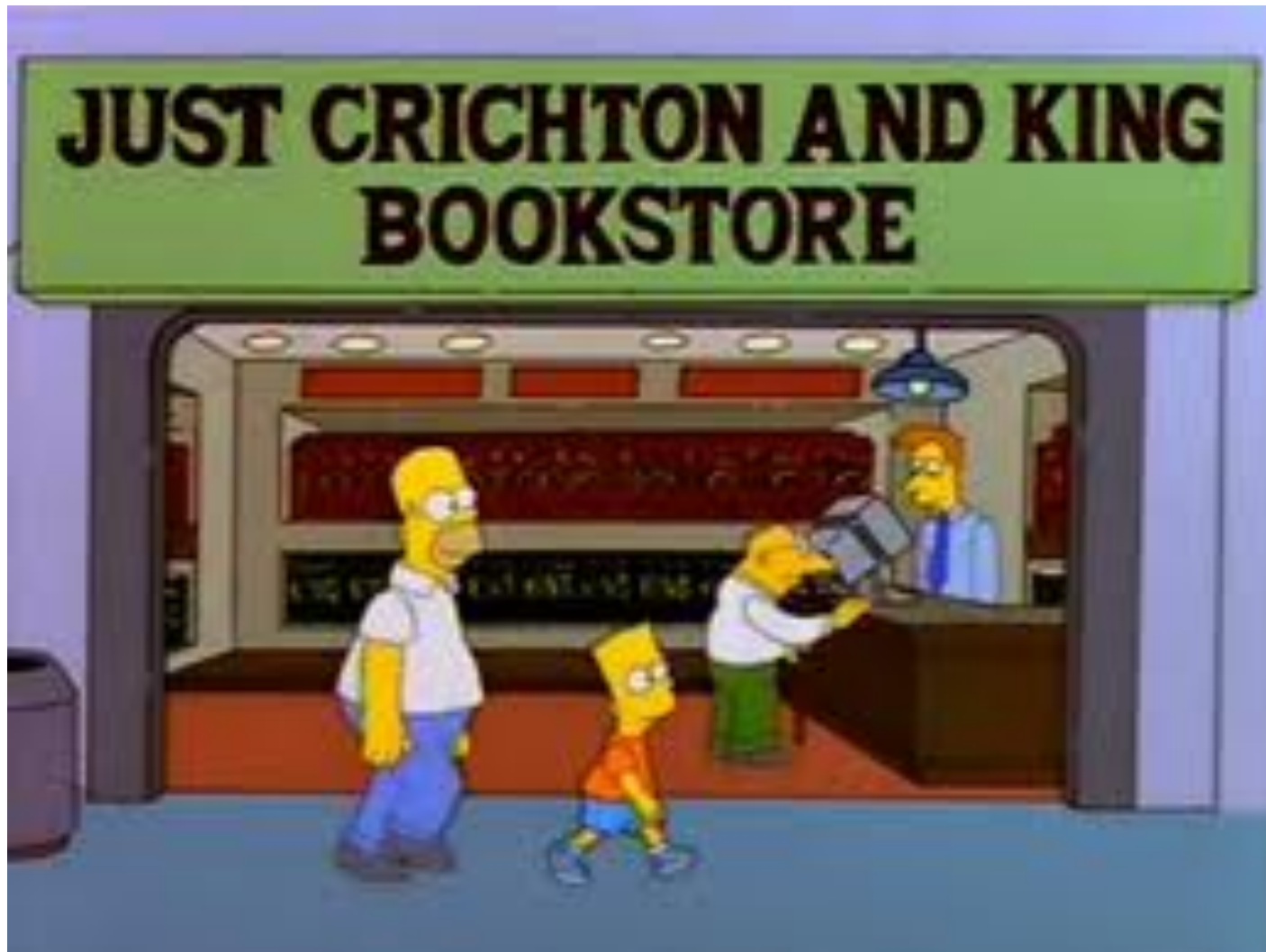
Return

Records

(Maximum 800 Records)

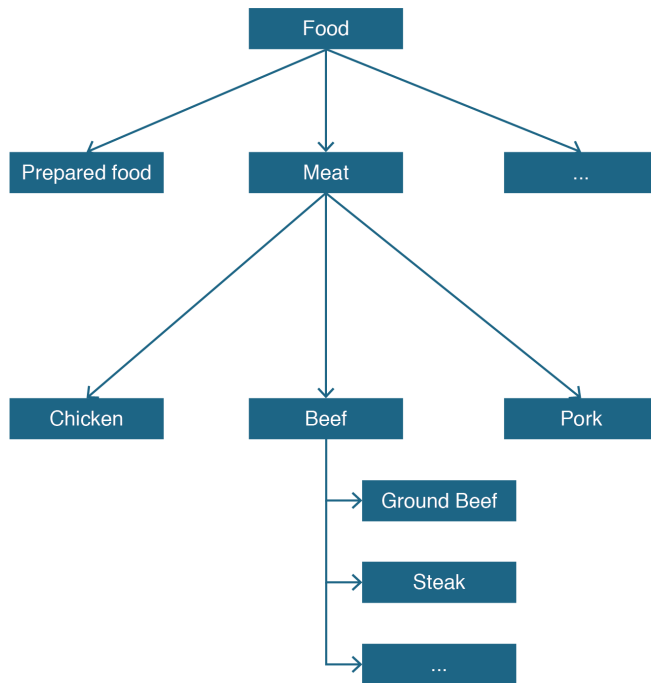
#	ID	Name
1	10101601	Live chickens
2	23220000	Chicken processing machinery and equipment
3	50111515	Chicken, minimally processed without additions
4	50111520	Chicken, minimally processed with additions
5	50112010	Chicken, processed without additions
6	50112011	Chicken, processed with additions

An Organizing System with Narrow Scope and Scale



How Broad Should Types Be?

A PARTIAL TAXONOMY OF FOOD



Because of the diversity of resources for a sale in a department store, a broad classification is necessary to accommodate everything in the store. Kitchen goods will be grouped together in a few aisles on a single floor. But a specialty kitchen store or a wholesale kitchen supply store for restaurants would classify much more precisely. An entire section might be dedicated just to knives, organized by knife type, manufacturer, quality of steel, and other categories that are not used in the kitchen section of the department store. (TDO 7.2.1.1).



Nature and Number of Users

- As with resources, the heterogeneity of users is more important than absolute number
- Handling user heterogeneity:
 - More generic interactions
 - Segment-specific interactions
 - Multiple organizing principles
 - Personalization (information-intensive domains where user modeling is feasible)



Nature and Number of Users

- How precisely a collection of resources can be described and organized depends on well user types and requirements are known
- In some contexts, user types and individual users can be controlled and identified
- In others, types and users aren't known until the organizing system is in operation

Employee Segmentation & Interactions

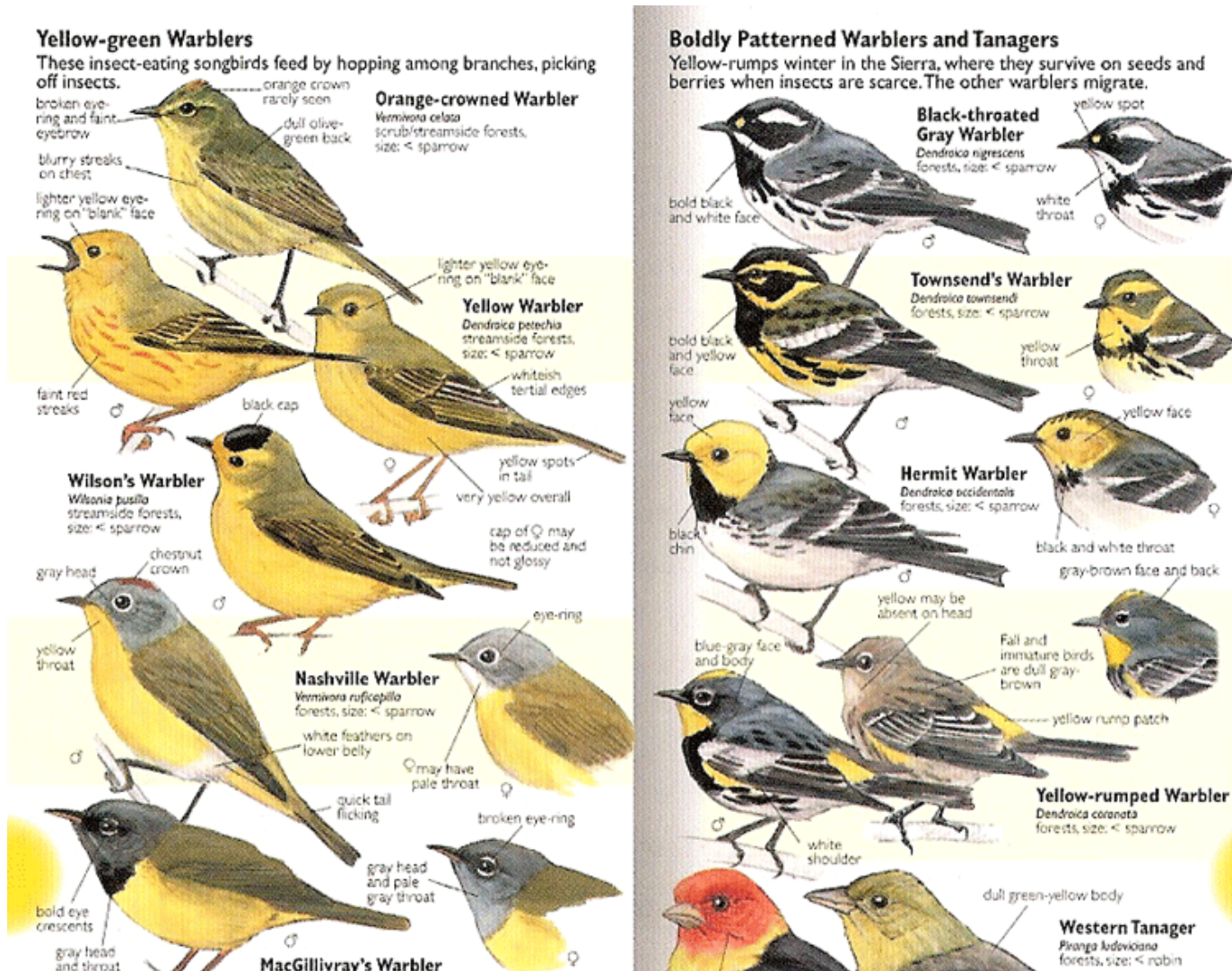
	Device availability	Employee mobility	Primary physical environment	Level of computer literacy	Alternative self-service channels
Desktop connected employees	At desktop	Low	Conducive to computer-related work	High	Personal computer access at home
Dispersed employees (e.g., convenience store)	Limited to point-of-sale (POS) systems or manager	Low	Shared space with customers	Varied	Fax machine; kiosk; personal computer access at home
Mobile employees (e.g., delivery personnel)	Personal computer usage limited to visits to home office/depot; access to mobile phones as part of the job	Constant movement between locations	Primarily in vehicle	Varied	Mobile telephone, personal computer access at home
Shop floor employees (e.g., assembly workers)	Personal computers may be available in home or break room; potential kiosk availability	Low	Production materials, noise and privacy issues may impact usage	Varied	Kiosk, personal computer access at home

Organizing Birds for Scientists

Order Name	Family Name Scientific	Family Name Common	Subfamily Name Scientific	Subfamily Name Common
------------	------------------------	--------------------	---------------------------	-----------------------

<u>Anseriformes</u>	Anatidae	Waterfowl	Dendrocygninae Anatinae Cygninae Anserinae Aythyinae Oxyurinae Merginae	Whistling Ducks Geese Swans Marsh Ducks Diving Ducks Stifftails Mergansers
<u>Falconiformes</u>	Cathartidae Pandionidae Accipitridae Falconidae	Vultures Ospreys Hawks Falcons	Elaninae & Milvinae Accipitrinae Buteoninae Circinae Caracarinae Falconinae	Kites Accipiters Buteos/Eagles Harriers Caracaras Falcons
<u>Galliformes</u>	Cracidae Phasianidae Odontophoridae	Curassow Pheasants Quail	N/A	
<u>Gruiformes</u>	Rallidae Aramidae Gruidae	Rails Limpkins Cranes	N/A	
<u>Charadriiformes</u>	Charadriidae Haematopodidae Recurvirostridae Scolopacidae Laridae	Plovers Oystercatchers Stilts/Avocets Sandpipers/Phalaropes Gulls/Terns	Stercorariinae	Jaegers/Skuas

Organizing Birds for Birdwatchers



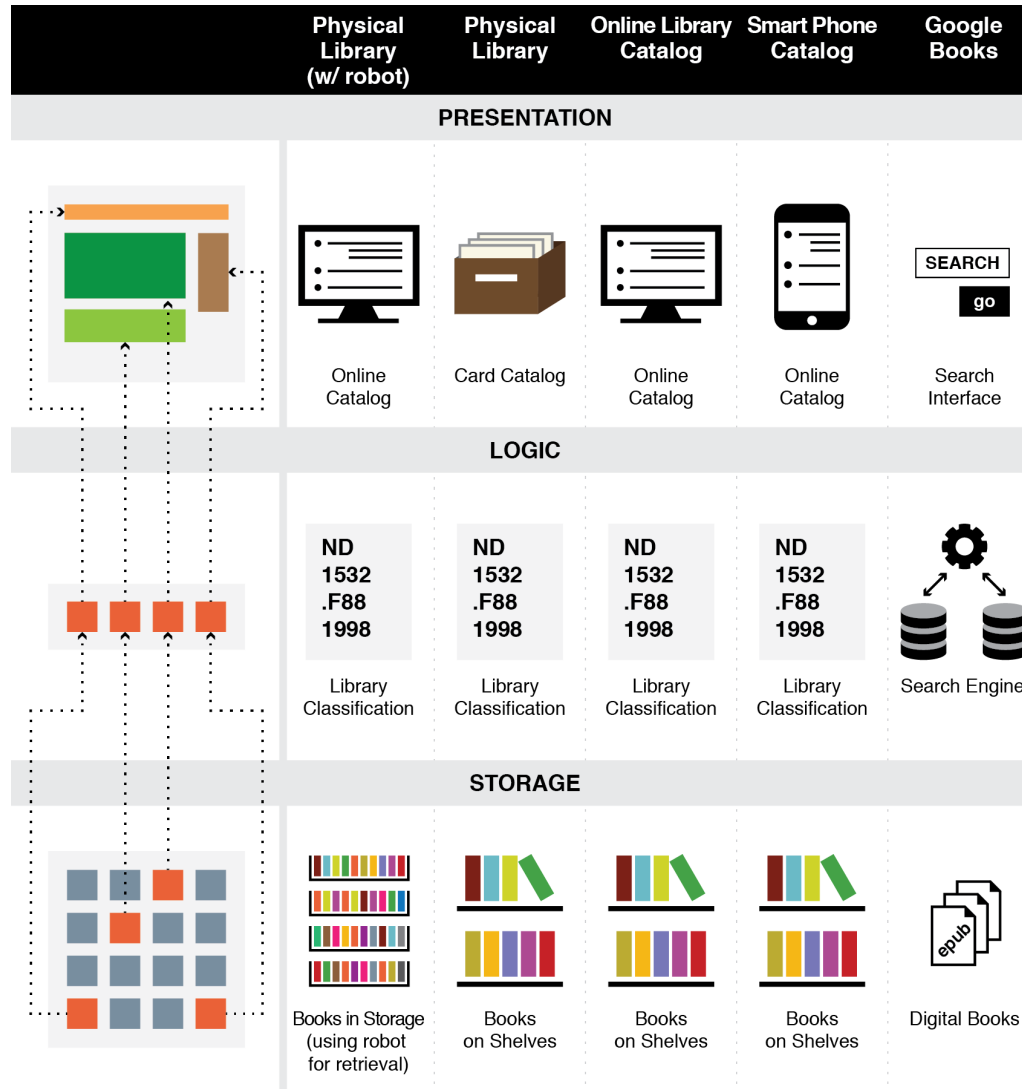
The Laws Field Guide to the Sierra Nevada is available at www.johnmurlaws.com and many independent booksellers.



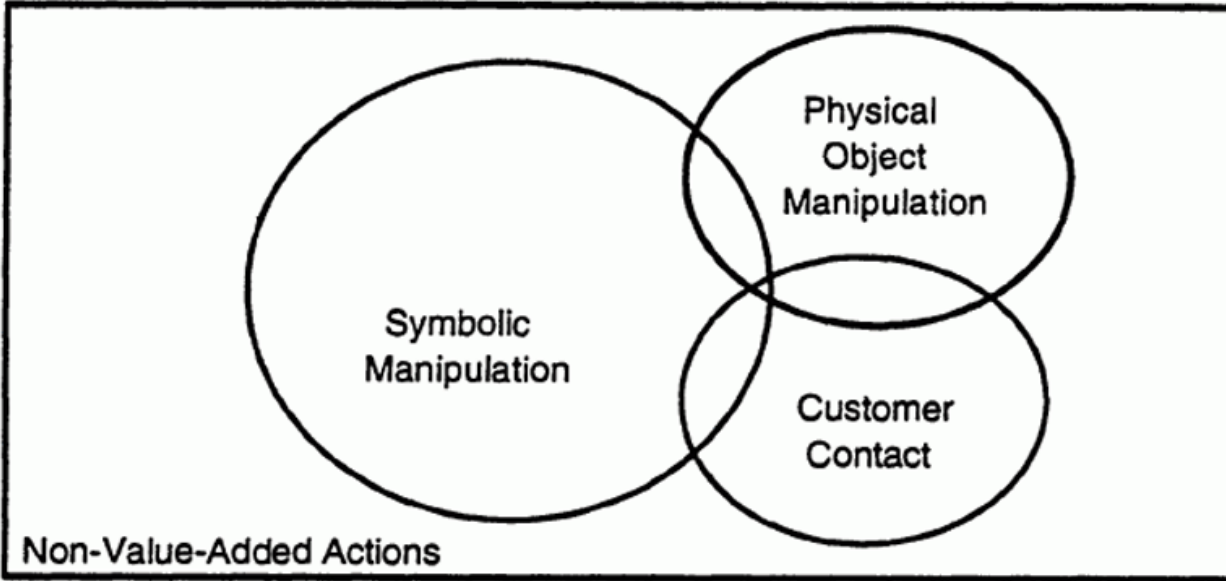
Expected Lifetime

- Usually correlated with number of users and resources; small collections with single users are often ad hoc and don't outlive the specific tasks for which they were created
- Think architecturally to enable more robustness and flexibility wrt changes in technology or business contexts

Think Architecturally

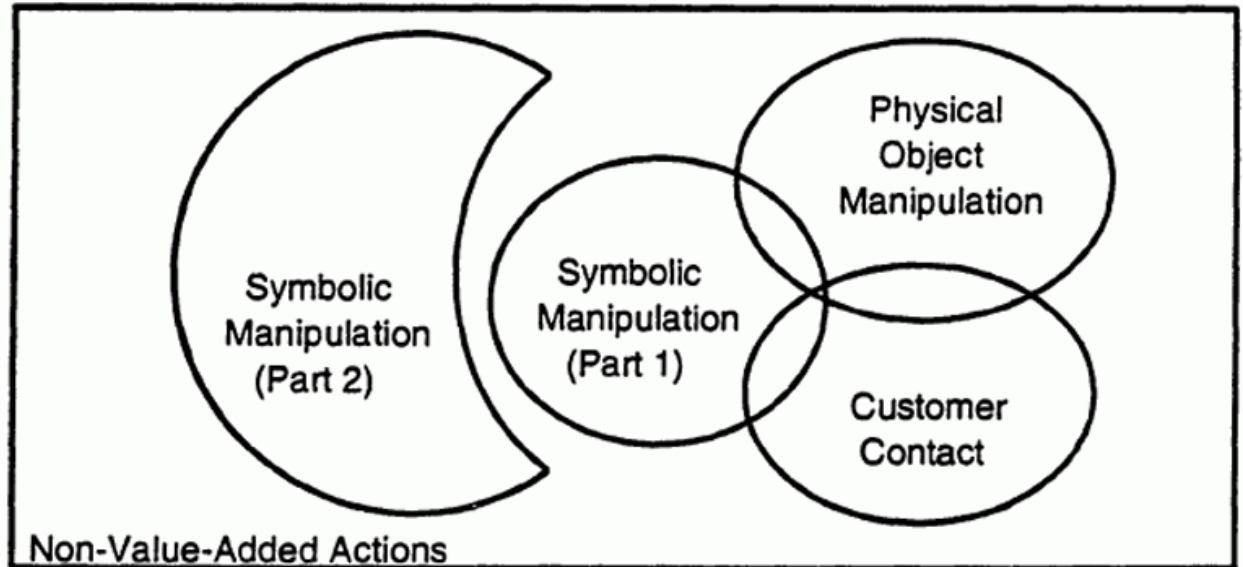


A. Original Activity



Think Architecturally

B. Reengineered Activity



Don't Confuse Lifetime of Resources with that of the Organizing System





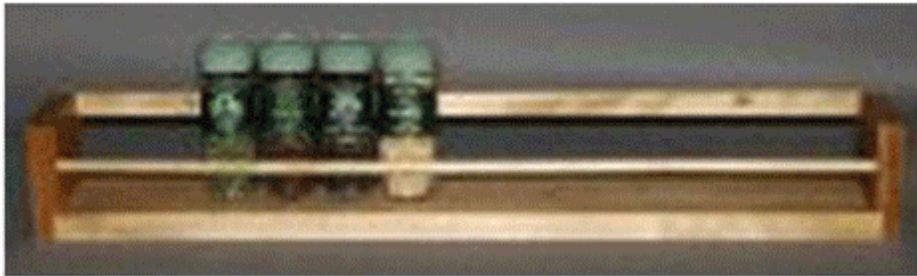
Physical or Technological Environment

- There might be affordances that create possibilities
- But there might be constraints that limit them
- Estimating the ultimate size of a collection at the beginning of an organizing system's lifecycle can reduce scaling issues related to storage space for the resources or for their descriptions (flashback to "warrant" goes here)

Affordances or Constraints?



Affordances or Constraints?

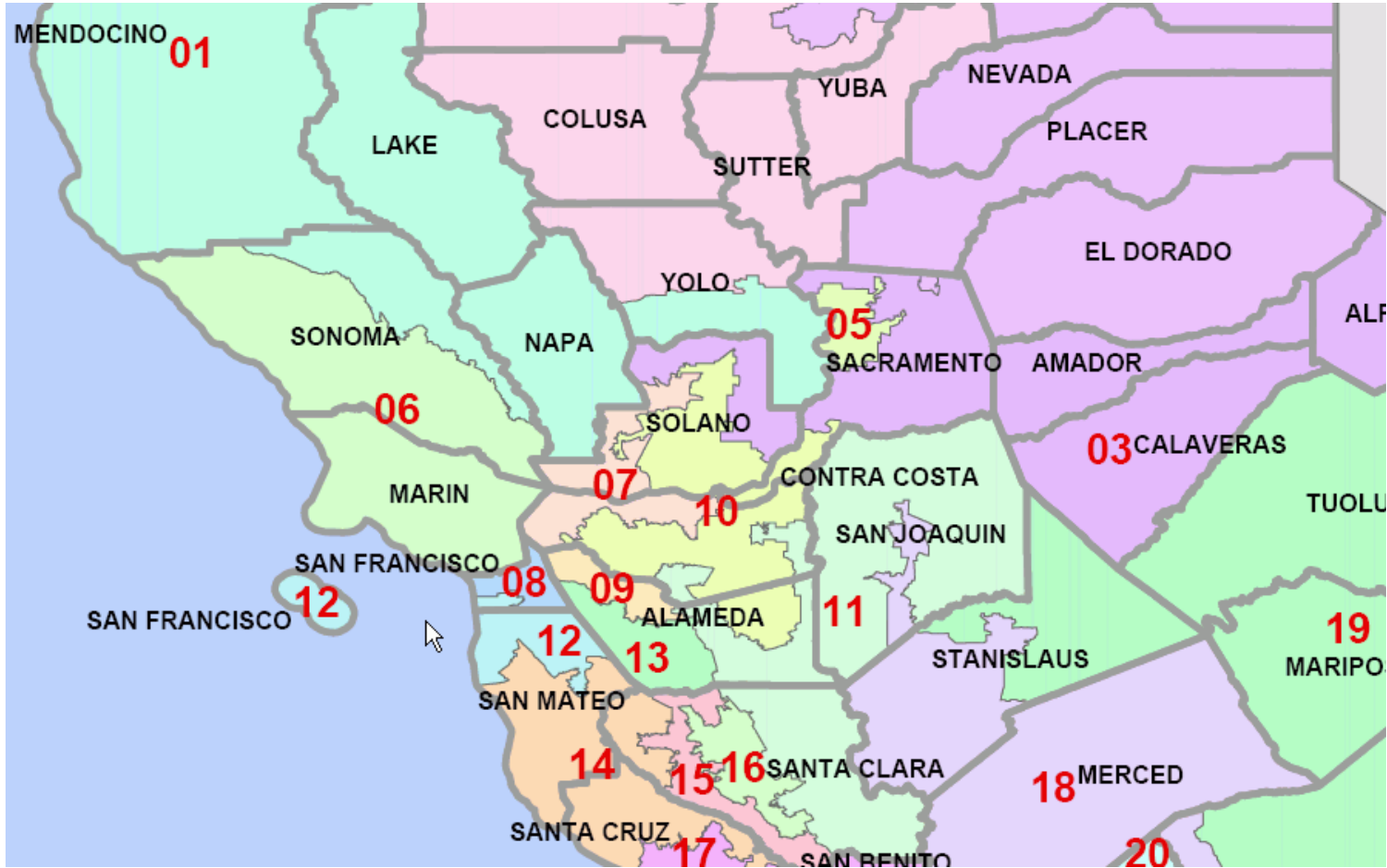




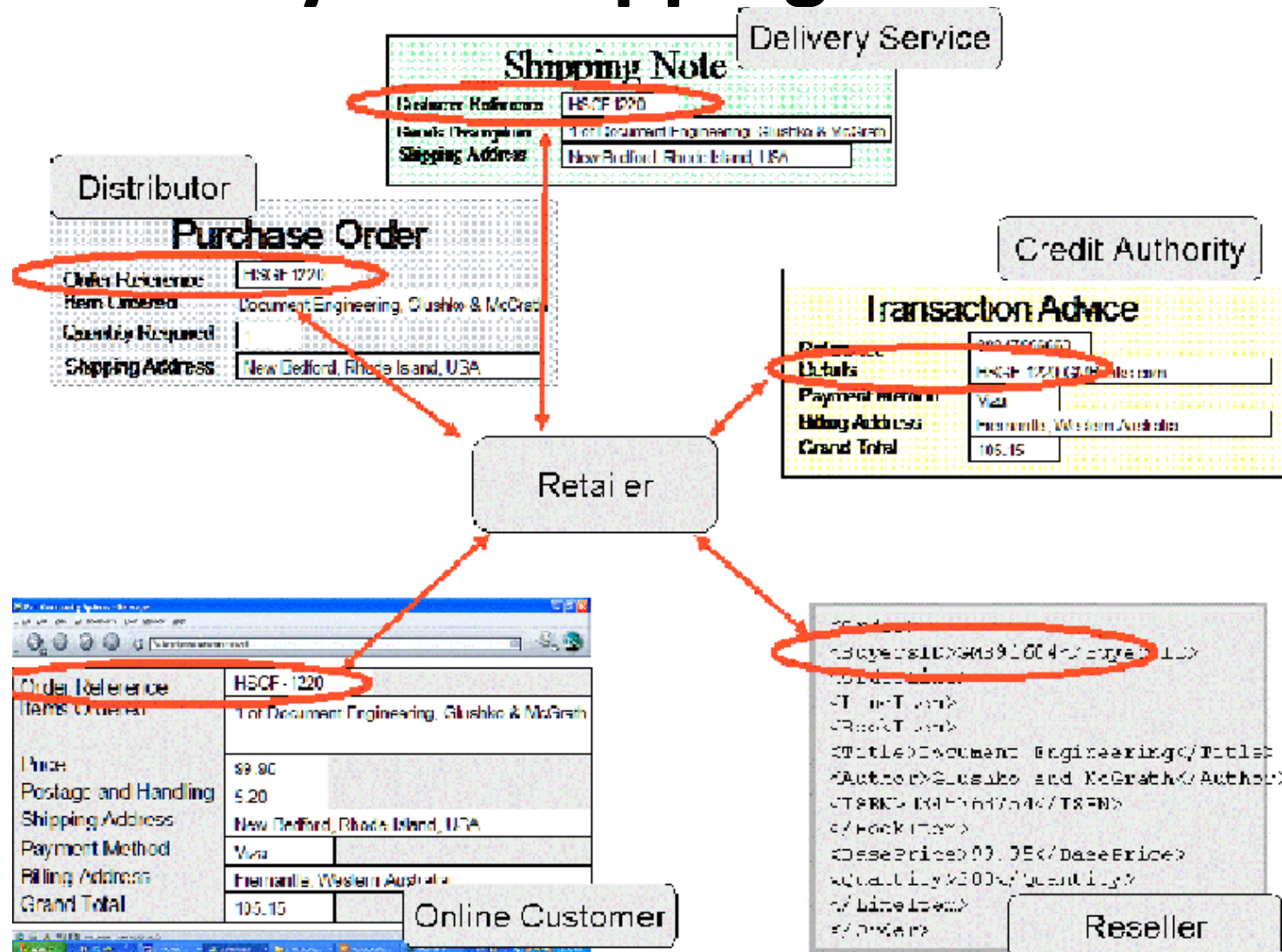
Relationships with Other Organizing Systems

- No organizing system exists in isolation
- There are always overlapping and adjacent systems from the user's perspective
- Sometimes it is possible to design these to work together to achieve integration and interoperability, or standards / ecosystem can emerge
- At very least, try not to make this difficult

Overlapping Categories



“Drop Shipment” Business Model Enabled by Overlapping Data Models





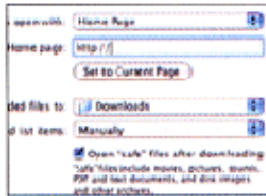
Requirements for Interactions

- All organizing systems have some common interactions, but most of the time we want to pay attention to the more resource-specific interactions that create the most value
- The priorities of different interactions are often determined by decisions about intended users
- An essential requirement is ensuring that the supported interactions can be discovered and invoked by their intended users

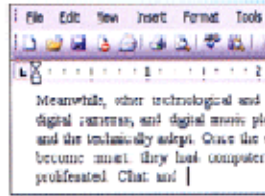
"Information Architecture" and Organizing Systems

- An architecture describes a system's components (or "building blocks") and their relationships with each other
- "IA is designing an abstract and effective organization of information and then exposing that organization to facilitate navigation and information use"

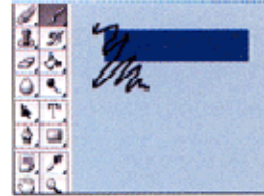
User Interface Design Idioms



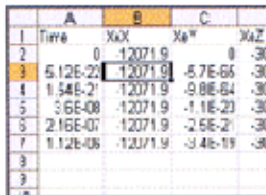
Forms



Text editors



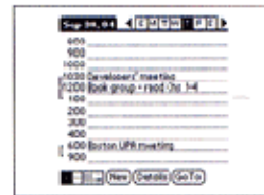
Graphic editors



Spreadsheets



Browsers



Calendars



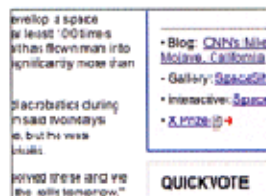
Media players



Information graphics



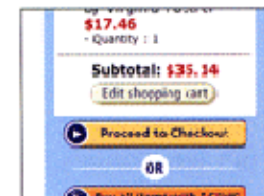
Immersive games



Web pages



Social spaces



E-commerce sites

Tidwell, Jenifer.

Designing
Interfaces:
Patterns for
Effective
Interaction Design

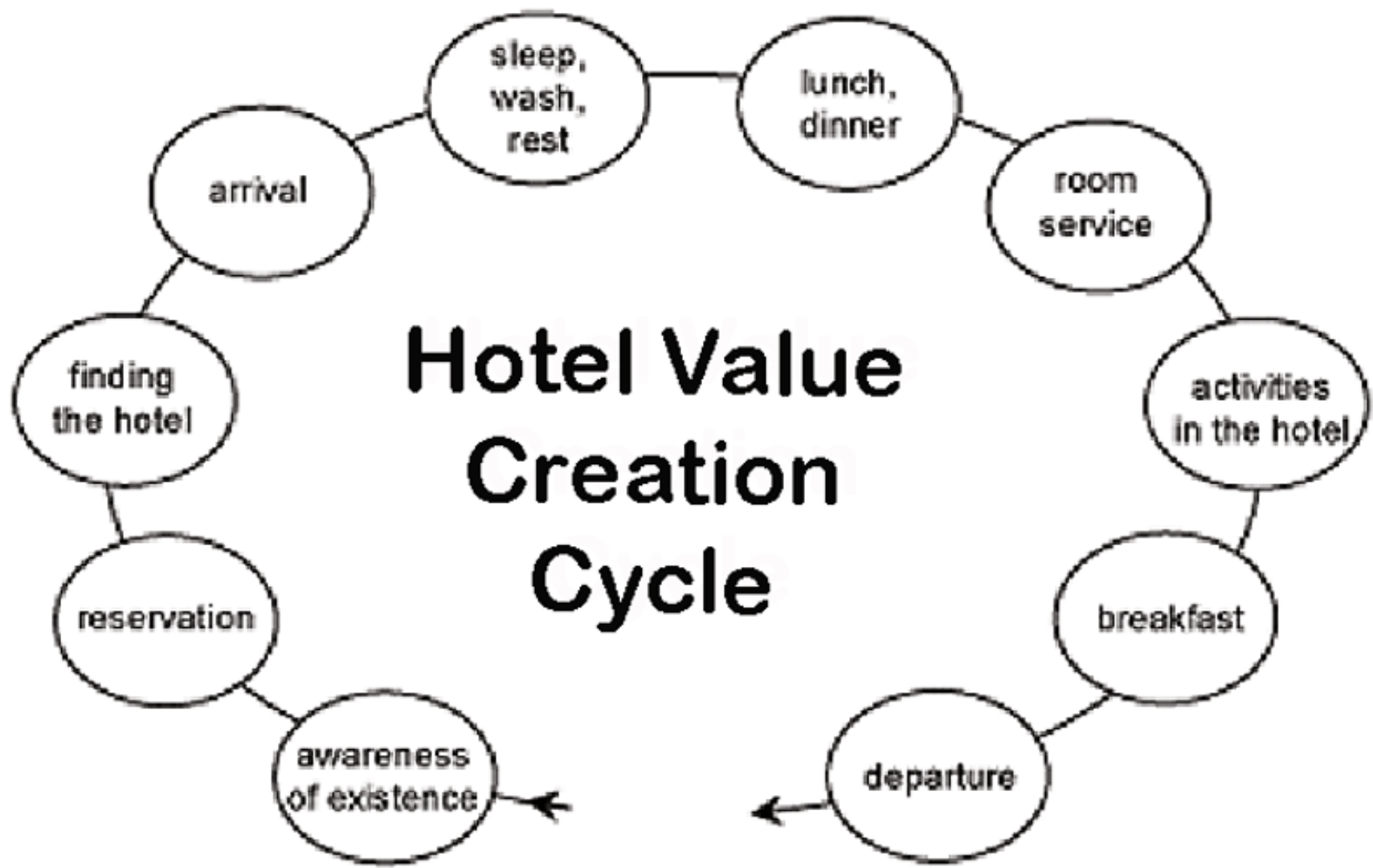
www.amazon.com/dp/1449379702



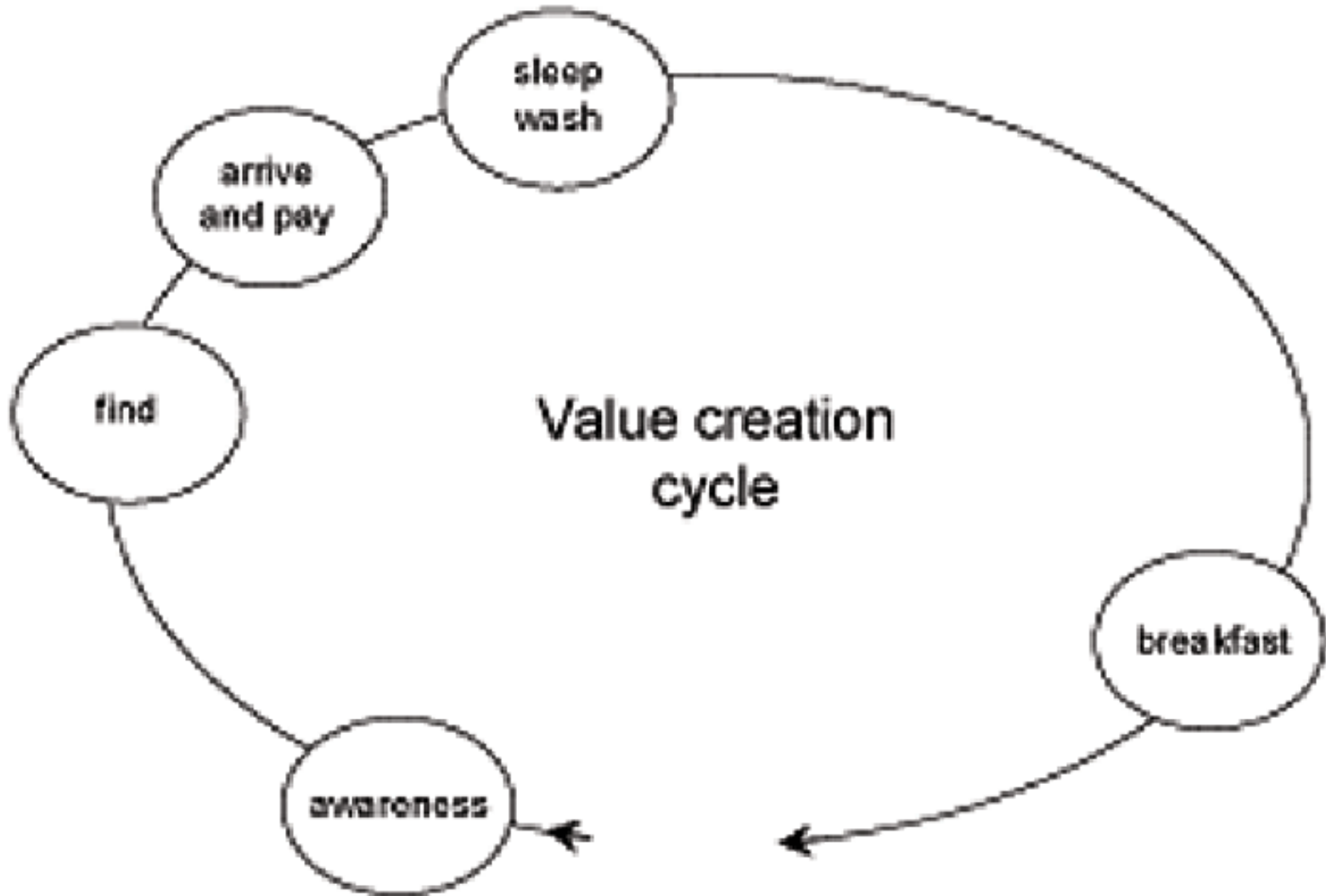
Requirements for Interactions

- For most organizing systems other than personal ones, the set of interactions that are implemented in an organizing system is strongly determined by business model considerations, funding levels, or other economic factors
- Businesses differentiate themselves by the number and quality of the interactions they support with their resources

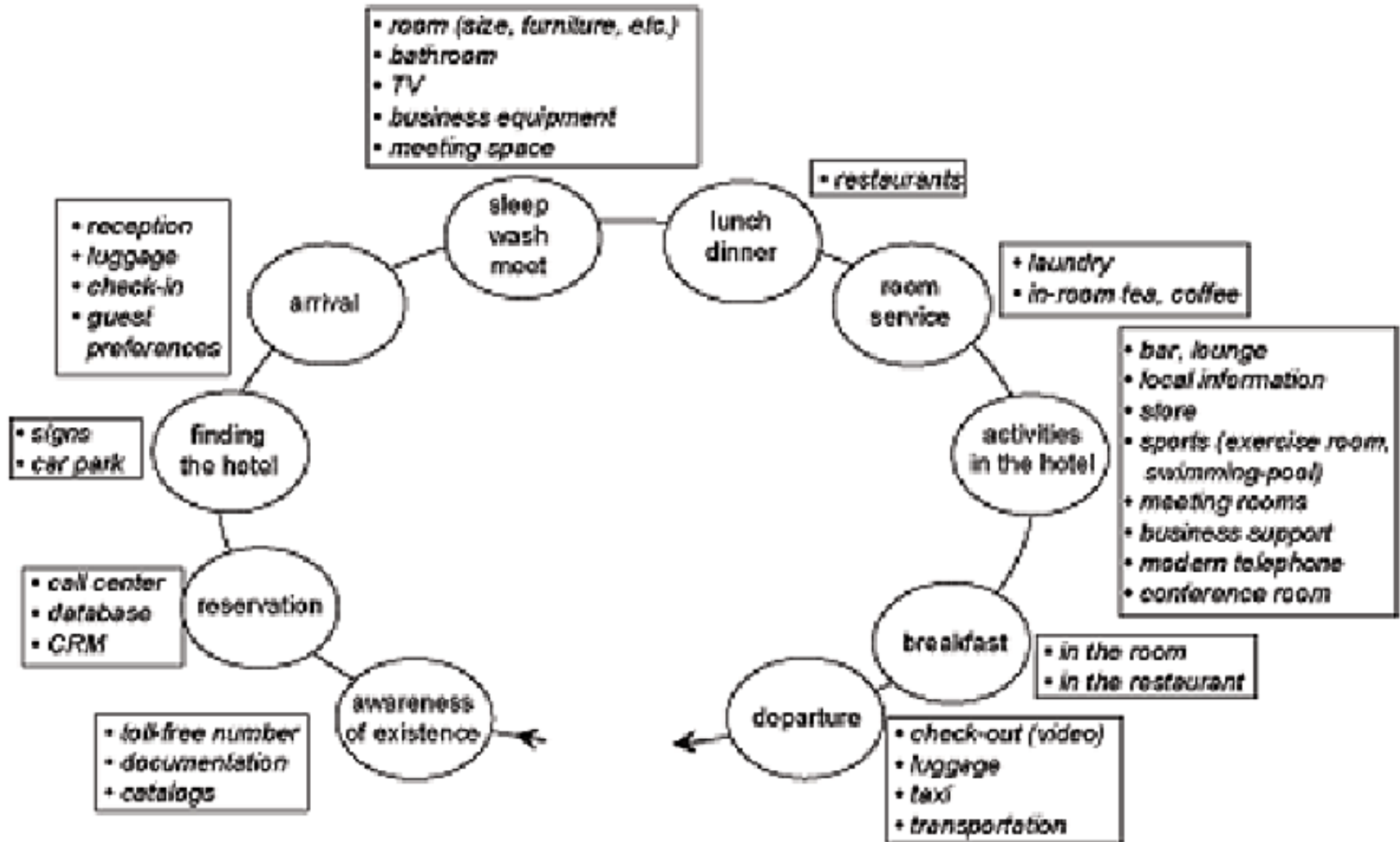
A “Generic” Hotel as a Design Pattern



A “Budget” Hotel with Fewer Interactions



A “Luxury” Hotel with More Interactions





Interaction Alternatives Accommodate User Preferences



FULL SERVICE



SELF SERVICE



Requirements about Resource Description

- The most generic interactions use descriptions that can be associated with almost any type of resource, such as the name, creator, and date
- Different types of resources must have differentiating properties, otherwise there would be no reason to distinguish them



Requirements about Resource Description

- Business strategy and economics strongly influence the extent of resource description and the use of technology for automatic description
- The tradeoffs imposed by the extent and timing of resource description arise throughout the lifecycle, with the tradeoff between recall and precision being the most salient



Tradeoffs involving Description

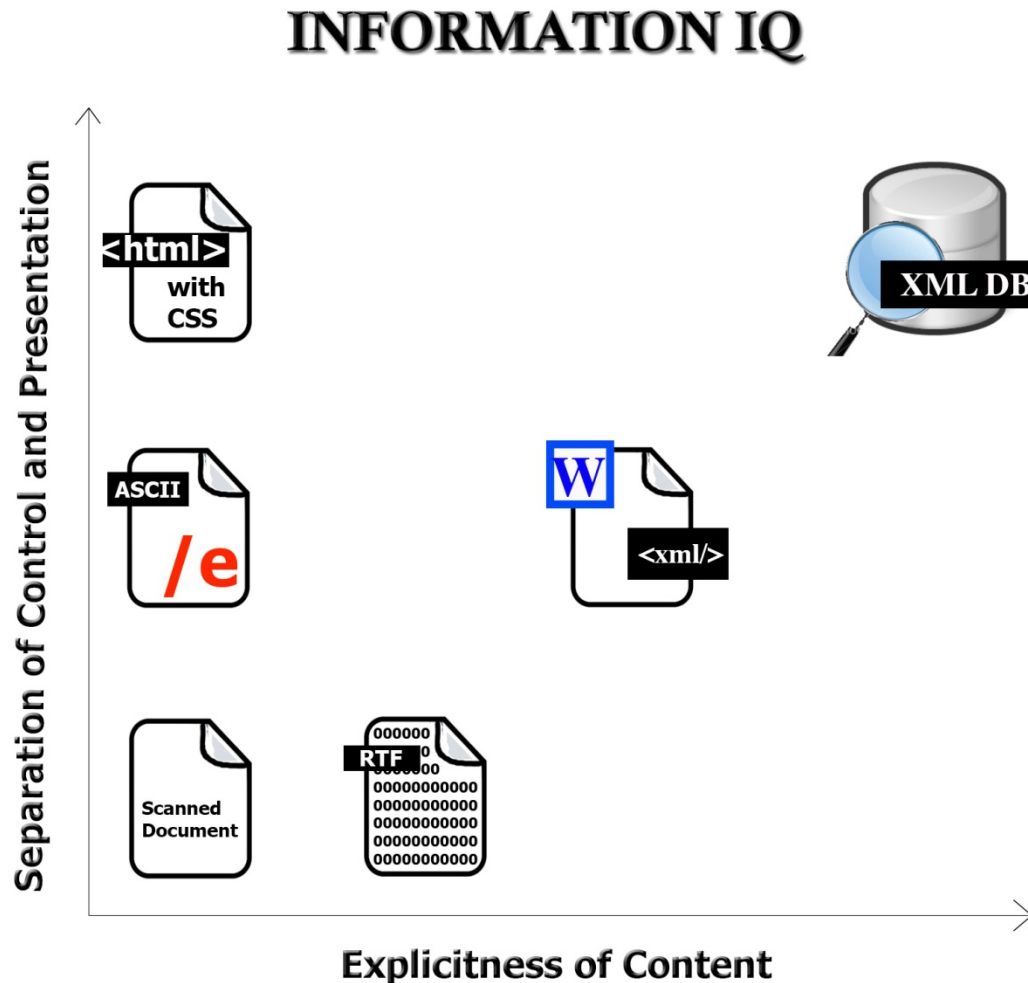
- Someone designs or selects a structure for the description... or not
- Someone determines the content of the description .. or not
- How much structure or how detailed a description?



Tradeoffs involving Description

- Is it easier to create structured or unstructured descriptions?
- If we want to combine information from many different authors or sources, what are the implications for description and organizing decisions?
- Is it easier to combine information from different authors or sources if it is structured or unstructured?

Two Dimensions of “Information IQ”





The Fundamental Tradeoff in an Organizing System

- There is a tradeoff between the amount of work that goes into describing and organizing a collection of resources and the amount of work required to find and use them
- The more effort we put into describing and organizing resources, the more effectively they can support interactions
- The more effort we put into retrieving resources, the less they need to be organized first



The Fundamental Tradeoff in an Organizing System

- We need to think in terms of investment, allocation of costs and benefits between the describer/organizer and user
- The allocation differs according to the relationship between them; who does the work and who gets the benefit?

Even Comic Strips Know The Tradeoff

Zits Jerry Scott & Jim Borgman



Even Comic Strips Know The Tradeoff



HOME ORGANIZATION TIP:
JUST GIVE UP.



Requirements about Intentional Arrangement

- Specifying requirements for the intentional arrangement of resources is analogous to specifying why and how resource categories can be created
- There is a continuum of category formation that ranges from minimal use of resource properties to more rigorous use of multiple properties, and finally to statistical or composite use of multiple properties



Principles for Creating Categories

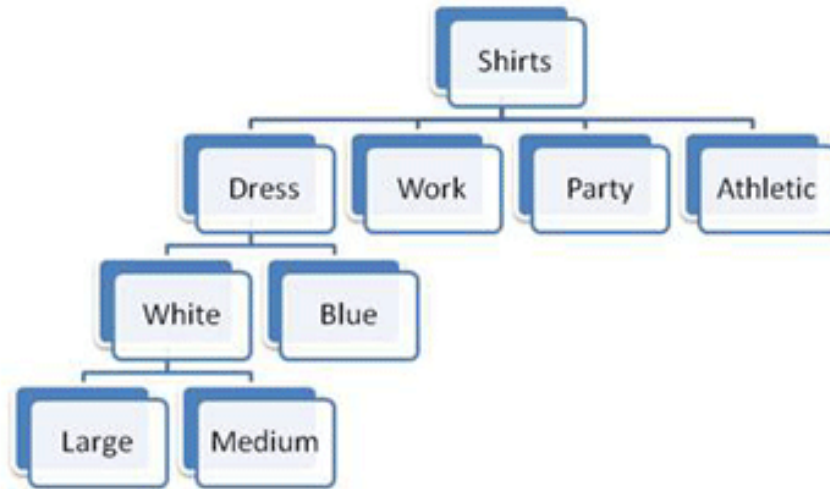
- Enumeration
- Single Properties
- Multiple Properties
- Family Resemblance
- Similarity
- Theory-Based
- Goal-Derived



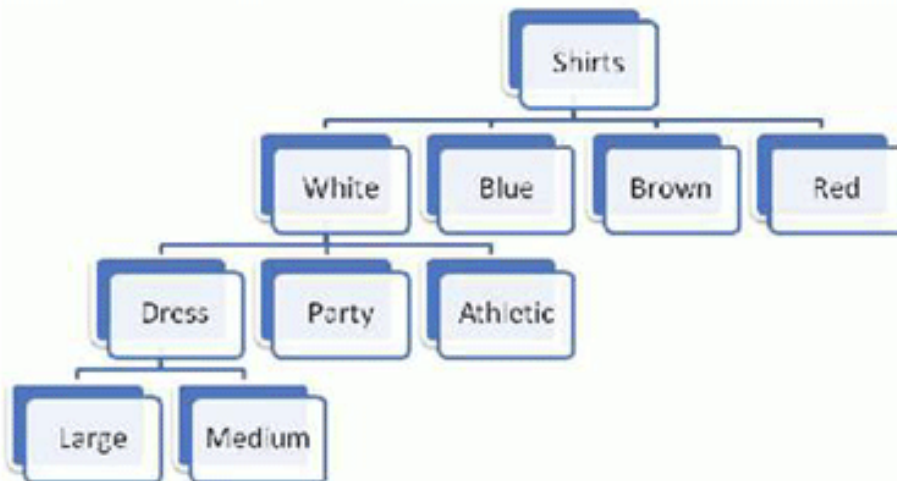
The Choice of Properties Matters!

- Organization using behavior or preferences can make interactions highly efficient for some users and the opposite for those who act differently
- When multiple properties are used to organize resources, their order determines the arrangement and the ease of interactions
- This implies the need to prioritize user and interaction types

Multiple Properties in Different Order



Style – Color - Size



Color – Style - Size



Operating and Maintaining an Organizing System

- It is critical to determine an appropriate mix of methods for creating and maintaining resource descriptions, because their cost, quality, consistency, completeness, and semantic richness depends on which human or computational agents do the work



Small Changes to Organizing Systems

- Incremental changes in description vocabularies and classification schemes needed when new instances or contexts require additional properties
- Subdivision and extension to create new subcategories
- Technology upgrades to improve capacity or performance that don't change any interactions



Larger Changes to Organizing Systems

- Changes in resource description and classifications mandated by new laws or regulations
- “All at once” changes to the principles for arranging resources along with changes in the implementing technology because incremental change is infeasible



The Road Ahead

- Tuesday December 10 – Alumni Day
- Thursday December 12 – Review for Final Exam
- Tuesday December 17, 9-1 – Early Final (Sign up!)

- Wednesday December 18, 9-1 – FINAL EXAM