Functional Classification
& Taxonomies
A Presentation to Calgary ARMA

April 2007

Agenda

1. **Taxonomies – What are They?**

2. **Types of Taxonomies - Function vs Subject vs Org**

3. **Relationship between Architectures & Taxonomies**

4. **How to Design a Taxonomy**

5. **Validating a Taxonomy**
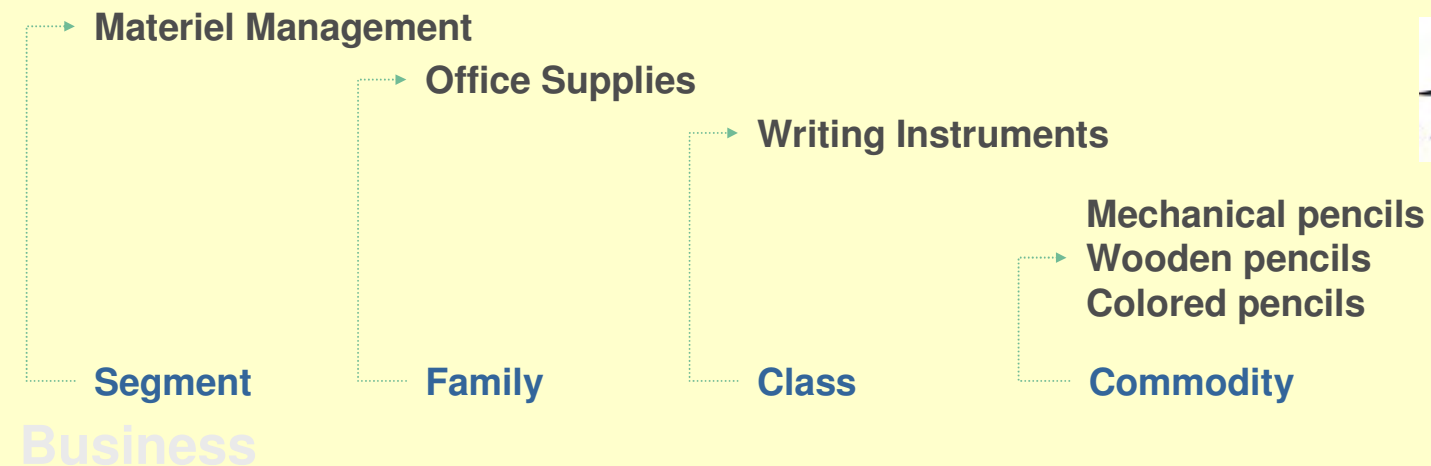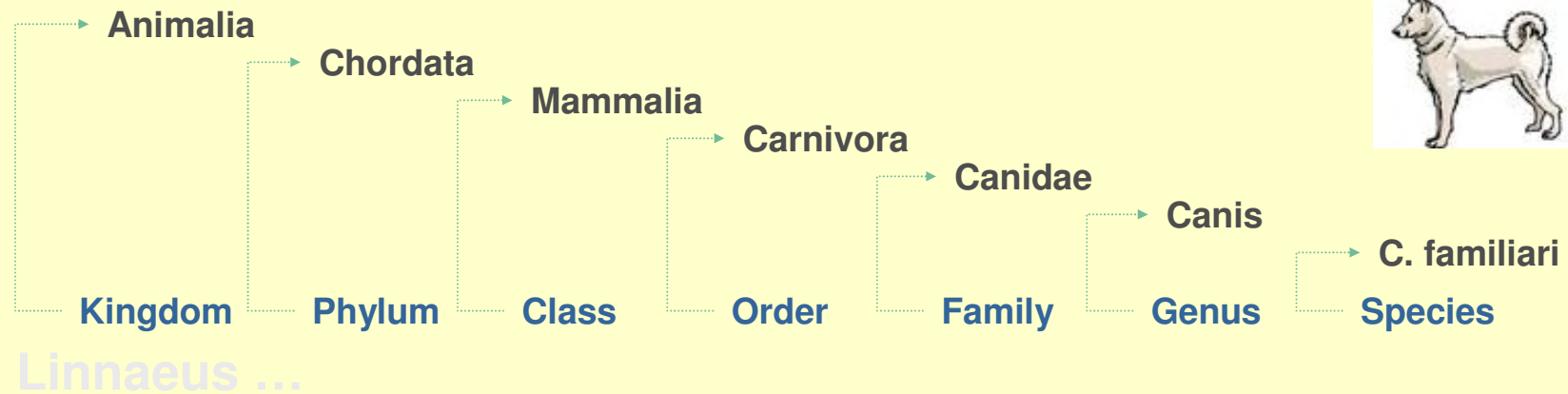
   Various Exercises

What is a taxonomy

- Taxonomy (from Greek ταξινομία (taxinomia) from the words taxis = order and nomos = law) refers to either a hierarchical classification of things, or the principles underlying the classification.

  Almost anything, animate objects, inanimate objects, places, and events, may be classified according to some taxonomic scheme.
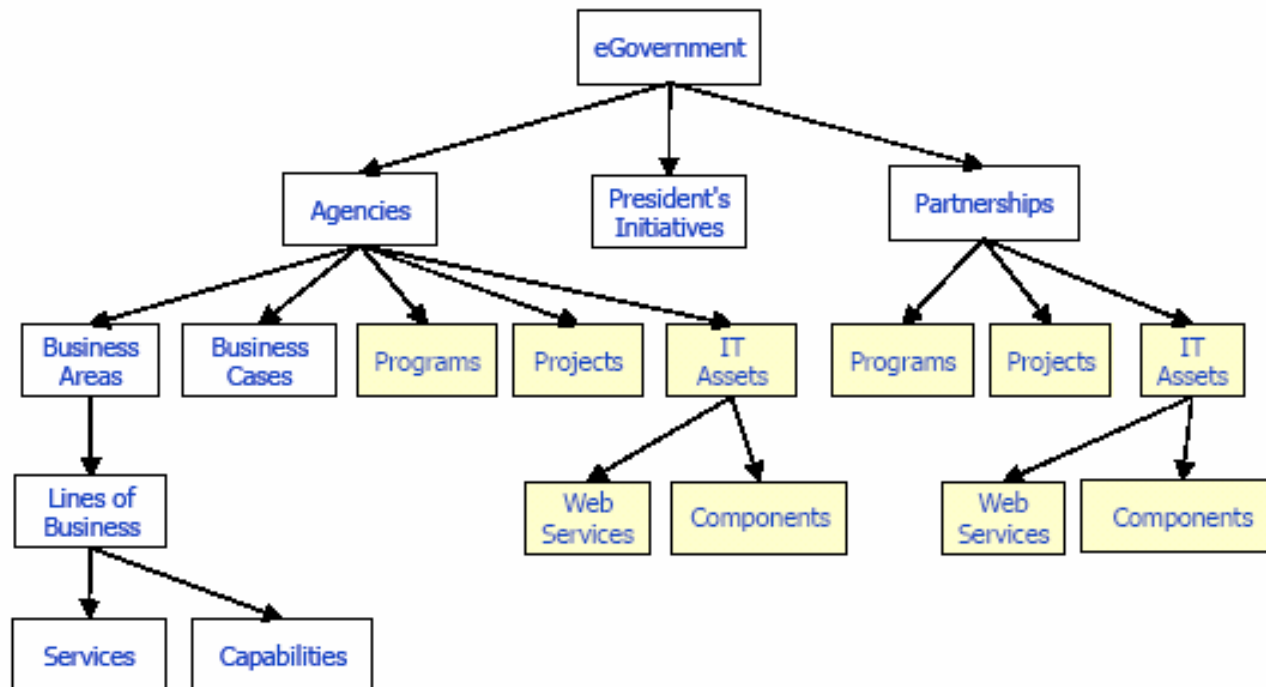
Hierarchies - Business Taxonomy

Animalia

Chordata

Mammalia

Carnivora

Canidae

Canis

C. familiari

| Kingdom | Phylum | Class | Order | Family | Genus | Species |

Materiel Management

Office Supplies

Writing Instruments

Mechanical pencils
Wooden pencils
Colored pencils

| Segment | Family | Class | Commodity |

- **A hierarchical taxonomy**
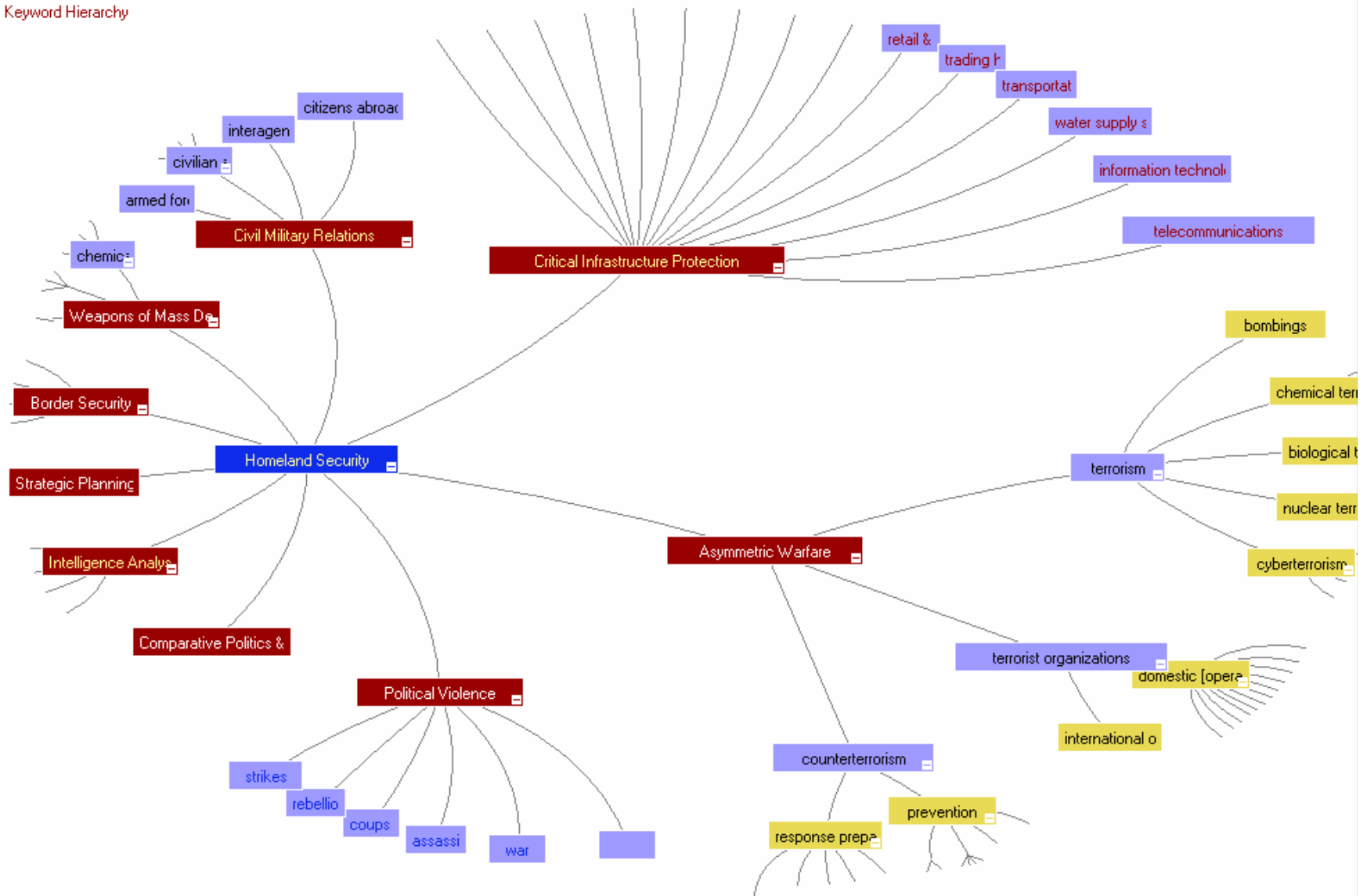 - **Provides named terms**
  - **Parent - Child relationships**

What a Taxonomy Does

- *National Archives of Australia Overview of Classification Tools . July 2003*
  - enables *identification of records over time* by ensuring records are titled in a consistent manner;
  - *assists retrieval* of all records relating to a business activity, as it provides links from previous naming/titling conventions to current business terminology;
  - establishes links between individual records … to provide a *continuous record of organisational activity*;
  - *controls the language* for titling and indexing records in specific business contexts;
  - aids in determining *security protection and access levels*, or .use. permissions, appropriate for particular sets of records; and
  - *assists in managing retention periods* and disposal actions for records.

Keyword Hierarchy

retail &
trading F
transportat
water supply s
information technol
telecommunications

citizens abroa
interagen
civilian
armed for
Civil Military Relations
chemic
Weapons of Mass De
Critical Infrastructure Protection

bombings
chemical ter
biological t
terrorism
nuclear ter
cyberterrorism

Border Security
Homeland Security
Strategic Planning
Intelligence Analy
Comparative Politics &
Asymmetric Warfare

terrorist organizations
domestic [opere
international o

Political Violence

strikes
rebellio
coups
assassi
war

counterterrorism
prevention
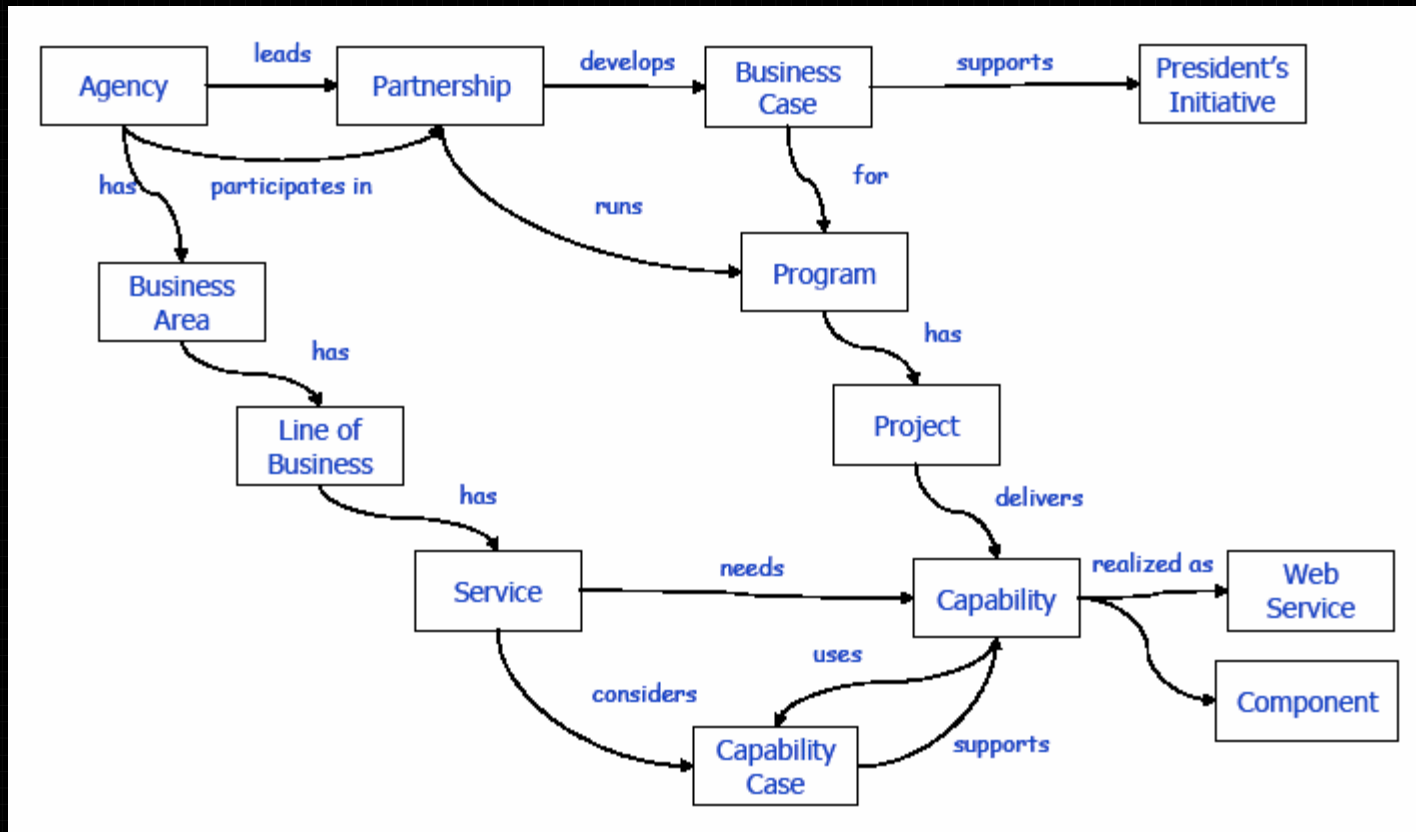response prepa

What is an ontology

- Ontologies resemble faceted taxonomies but use richer semantic relationships among terms and attributes, as well as strict rules about how to specify terms and relationships.

- **Ontologies**
  - **Define the relationships**
  - **Establish multiple relationships**

Languages are Changing

- **SGML - standardized general markup language**

- **HTML - hypertext markup language**
  - **web based documents**

- **XML - eXtensible markup language**
  - **now embedded in suites (MSoffice etc.)**
  - **eXtensible forms descriptive language XFDL - e-commerce driven**

- **RDF – resource descriptive framework**

- **DML – Darpa Mark Up Language**

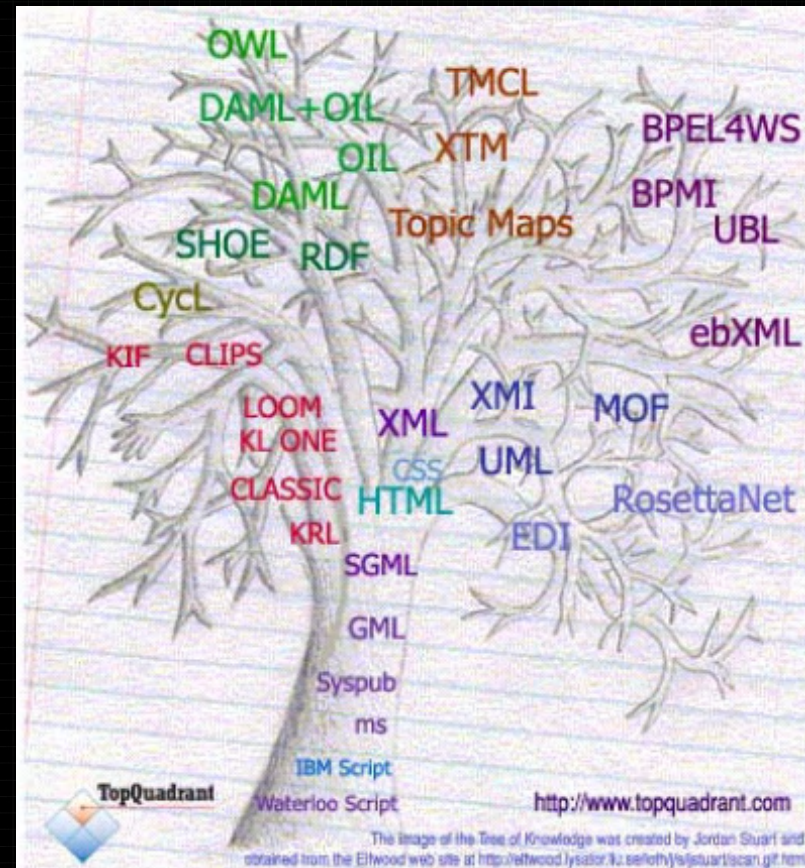- **OIL – Ontology Inference Language**

- **OWL –Web Ontology Language**

Figure 4: Tree of Knowledge Technologies

Classification is simply the assignment to a document of the *correct taxonomic location for storage and retrieval.*

- **"When records and information are properly classified, a business information system operates more efficiently.**

 **Classification tools guide users to the most appropriate classification for individual records"**

- **Classifying business activities through a functions-based classification tool is a powerful means of supporting the conduct of business, as it:**
  - **establishes and documents the relationships between the business activity and the evidence to show that it has been performed efficiently, openly and accountably;**
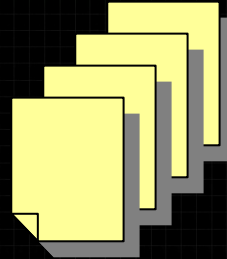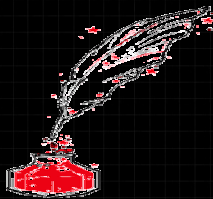
ISO 15489

How do we classify information?
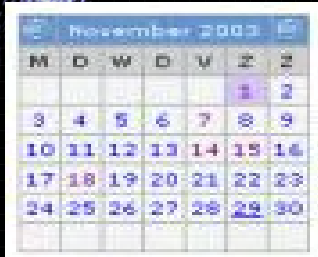
By date, e.g., chron files

By relationship, e.g., client files

By creator, e.g., org.-based codes

By content, e.g., subject files

By business purpose

e.g., conduct diplomatic relations

e.g., protect health

There are a number of ways to organize files:

Subject
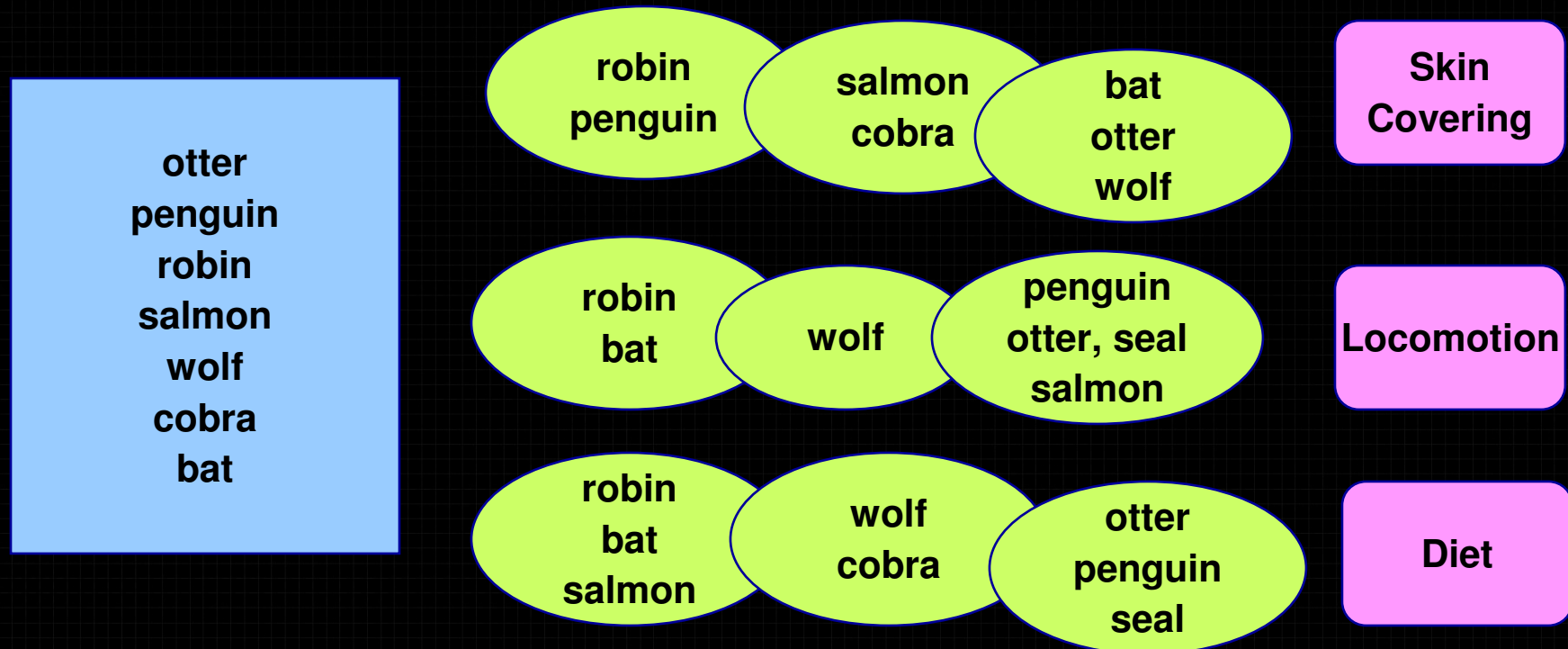
Organisation

Function

Subject

Files ordered by subject area they relate to:

e.g. Personnel; Equipment; Finance, Buildings, etc

- Advantages
  - Relationship created
  - Uses common terms
- Disadvantages
  - Confusion of terms may occur
  - Staff misfile documents (subjectivity)
  - Staff may resist using the system
  - Often no ownership
  - Greater need for cross-referencing systems

The Problem With Subjects

- Most things can be classified in more than one way.
- Most classification systems do not handle this well.
- Example: Animal Classification

otter
penguin
robin
salmon
wolf
cobra
bat

robin
penguin

salmon
cobra

bat
otter
wolf

Skin
Covering

robin
bat

wolf

penguin
otter, seal
salmon

Locomotion

robin
bat
salmon

wolf
cobra

otter
penguin
seal

Diet

Files ordered by the organisational unit:

e.g. Corporate Services; Finance & Budget; IT Services…

- **Advantages**
  - Context for the files
  - Staff know where to file

- **Disadvantages**
  - Change of organization is too frequent
  - Irrelevant and does not keep material together
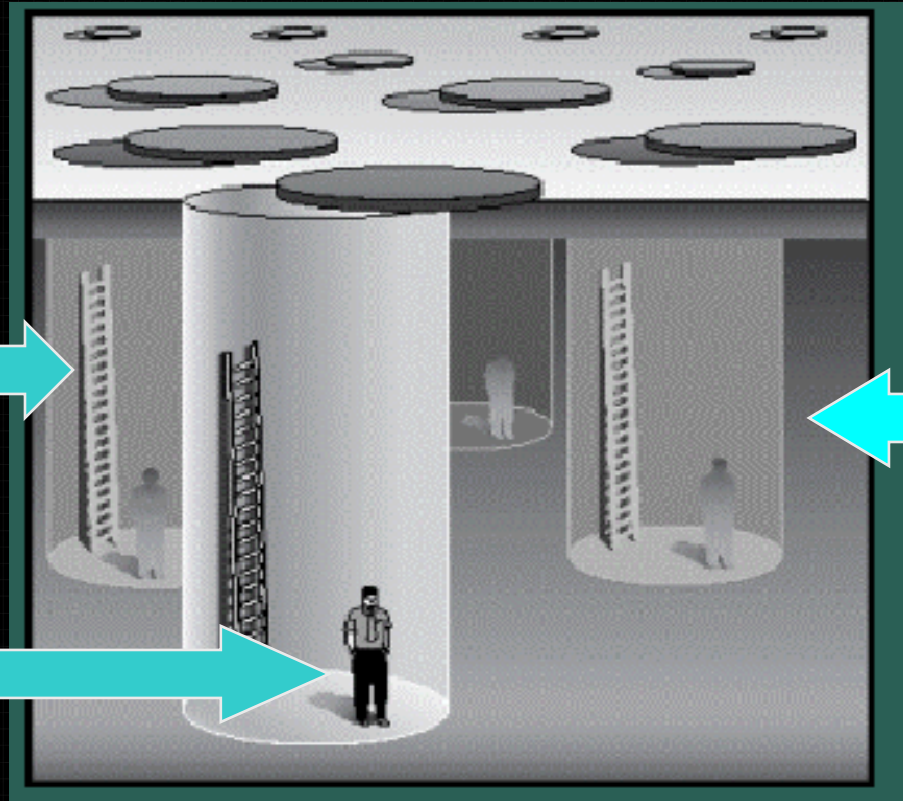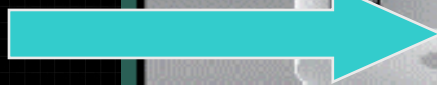 - Inherit old files … old programs
  - Out-of-date very quickly

Business Unit A

Business Unit C

Business Unit B

Files ordered by business functions

Function - Sub-function - Activity or Transaction

- **Advantages**
  - Functions don't change over time
  - Easier to define ownership and accountability
  - Better search and retrieval of information within organisations and across organisations
  - New functions easily added
  - Less need for cross-referencing/scope notes

- **Disadvantages**
  - Implementing the system
  - Users often *do not understand* the business functions
  - Misfiling

The biggest advantage of a function-based classification…

Function-based classification enables us to link **what** information we have with **why** we have it, and **how** we use it to do the work we're accountable for.

Function-based classification creates a link between information (as evidence) and ***business objectives & accountabilities***

So what are our taxonomy options?

Subjects
- Technology
- Facilities
- Security
- Logical Sequence
- Points of Similarity

Business Functions
- Hiring
- Planning
- Investment Analysis
- Accounting
- Transaction based
- Service based

Projects
- By Name
- Cross - Functional
- May support immediate needs only
- Matrix based
- Team based

Document Format
- Reports
- Forms
- Drawings
- Correspondence
- Storage
- Environment
- Lifespan

Chronology
- Simple Date Order
- Date of Receipt
- Date of Transaction
- Sequential

Source
- Governments
  - National
  - Provincial
- Companies
  - Sector
- Geographical
- Organizational

Functions are …

• any high-level purpose, responsibility, task or activity assigned to a department by legislation, policy or **mandate.**

• Functions entail a set or series of actions which, when carried out according to a prescribed sequence, will result in an organization producing the expected results in terms of the goods or services it is mandated or delegated to provide

Function relates to
purpose* as well as *process
(what is the business) as well as (*how is that business conducted ?*)

Major Function: Managing Human Resources

4/2/2007

Sub Functions are …

- ways to group business activities
- often may correlate with business units (all one function)

Major Function: Managing Human Resources

Sub Functions: Planning; Recruiting; Developing; Retaining

What does *activity* mean ?

Activities are …

- the steps that are undertaken by an organization to complete a business process (sub-function), and

- may result from the major tasks or actions performed by an organization to accomplish each step of the business process.

Major Function: Managing Human Resources

Sub Functions: Planning; Recruiting; Developing; Retaining

Activities: Selecting; Competitions; Employment Programs

What does *transaction* mean ?

Transactions are …

- the major tasks taken to accomplish each function

- Include repeatable tasks – same task … different function

- Usually identified by name and scope …or range

- Often we refer to these as "case files"

Major Function: Managing Human Resources

Sub Functions: Planning; Recruiting; Developing; Retaining

Activities: Selecting; Competitions; Employment Programs

Transactions: Postings; Evaluations; Questions; Interview Admin.

- Ferrari

- Lamborghini

- Corvette

- Porsche

- Acura

- What is the name of the series?

- Which of these doesn't quite fit?

- If one were removed what would the series now be called?

- Moon (Luna)

- Phobos

- Charon

- Ganymede

- C1995-01/Hale Bopp

- What is the name of the series?

- Which of these doesn't quite fit?

- If one were removed what would the series now be called?

- Shark

- Scallop

- Mussel

- Lobster

- Crayfish

- What is the name of the series?

- Which of these doesn't quite fit?

- If one were removed what would the series now be called?

- Data

- Jean Luc Picard

- Will Riker

- Geordi Laforge

- Deanna Troi

- What is the name of the series?

- Which of these doesn't quite fit?

- If one were removed what would the series now be called?

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- Commander Spock

- Sub Commander T'Pol

- Ambassador Sarek

- High Priestess T'Pau

- Lt. Commander Tuvok

- What is the name of the series?

- Which of these doesn't quite fit?

- If one were removed what would the series now be called?

– Function

- **Sub-function**
  - **Activity**
    - **Transactions task relates to…**
    - **Transactions**

Functions:
What functions are you mandated to provide?

Sub-Functions
Why is the work done?
How is the work grouped?

Activities
How do you do that task?
What steps are involved?
What starts it?
What do you do next?
How is the task completed?
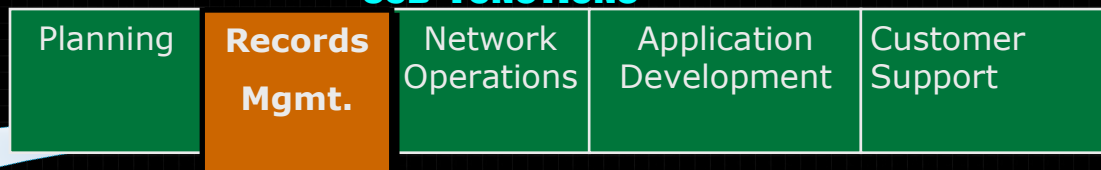
Example of a Common Function

Functions can be grouped into:

➤ **Core business functions** that *fulfill* an organization's mandate

➤ **Common governance functions** that *sustain* the management of the organization's mandate

➤ **Common administrative functions** that *support* the organization's mandate

Common Admin- FUNCTIONS

INFORMATION MANAGEMENT	HUMAN RESOURCE MGT.	MATERIEL MGT.	FINANCE MGT.

SUB- FUNCTIONS

Planning	Records Mgmt.	Network Operations	Application Development	Customer Support

ACTIVITIES

Advisory Services	Disposition	Retention Scheduling	Training
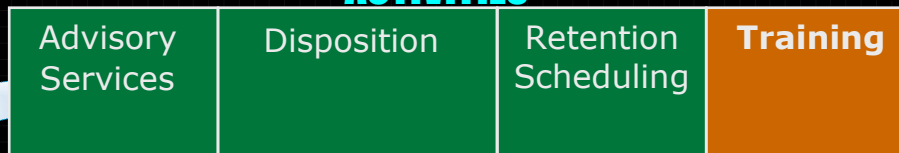
Cascading through lower levels of activity analysis

Sample Function Breakdown

- **Function**
  - **Sub-function**

  - **Activity**

    - **Transactions**
    - **Transactions**

- **Information**
  - **Records Management**

  - **Training**

    - **Requirements**
    - **Planning**
    - **Delivery**
    - **Evaluation**

•Information & Communication
  •Records Management

  •Training

    • **Requirements**
    • **Planning**
    • **Delivery**
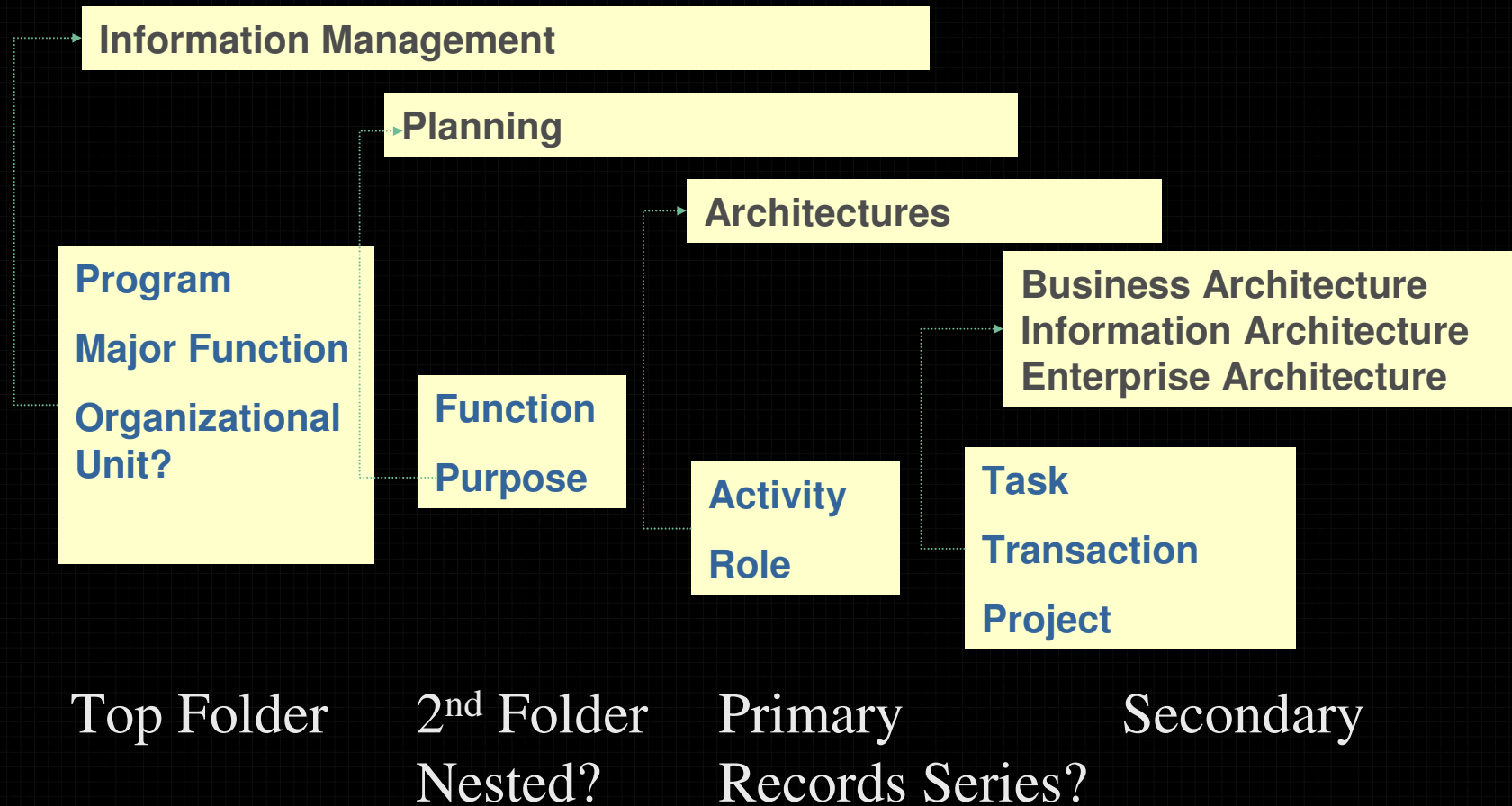   • **Evaluation**

Email – direction
Needs Analysis
Surveys

Previous Presentations;
Internet &
Secondary Research;
Outlines

Emails; Bookings, Equipment;
Hospitality; Handouts;
Presentations

Feedback forms;
Evaluations; reports

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Information Management

Planning

Architectures

Business Architecture
Information Architecture
Enterprise Architecture

Program

Major Function

Organizational Unit?

Function

Purpose

Activity

Role

Task

Transaction

Project

Top Folder   2nd Folder   Primary   Secondary
Nested?   Records Series?

4/2/2007

Function versus Use Model

Original UK/OZ Model

- **Function**
  - Sub Function
- **A**ctivity
  - Sequential Process
  - **S**ub-Activity
  - Sub Process
- **T**ask - transaction

Business Analysis Process in Sequence

- **F= Materiel Management**
- **Purchasing**
  - **A=** Needs analysis
    - **S=** Interviews
    - **S=** Questionnaires
      - **T:** By dept.
  - A= Market analysis (RFI)
  - A= Tender (RFP)
  - A= Assess – Justification
  - A= Acquire - Negotiations
  - A= Contracting

How Information is Used

- **Materiel Management**
  - **Purchasing**
  - Contracts
    - (by department)
  - Requests
    - RFIs & RFPs
      - Needs Analysis
      - Issued Docs
      - Analysis
      - Justification
  - (by name & #)
  - Vendor Liaison
    - (by name)

Function versus Process

- Contracting can be viewed as a function that may cross 4 business processes
  - **Procurement requirements**
    - managing business unit requests
    - managing RFP process – fairness
  - **Legal requirements**
    - due diligence
    - contract wording review
  - **Finance requirements**
    - expenditure tracking - invoices
  - **Business Unit requirements**
    - monitoring, activity tracking
- Organization may file by process in 4 locations
- Organization could also track through metadata – e.g. contract number

IM Framework & Taxonomy Relationship

Info. Mgmt. Framework

Contains strategies for
- Principle Implementation
- Policies & Standards
- Directives & Procedures
- Integration of DM, RM, IT
- Security of Information

Corporate Taxonomy

High level framework for managing both structured and unstructured information that takes into account
- Mission & business processes
- Stakeholders
- Major Applications
- Usually cluster or taxa

Business Unit Taxonomy

Detailed design within the overall framework
- Specific business processes
- Meets user needs
- Primary secondary tertiary

Vision & Strategy

Scalable Approach

Supports Goals

Status of Implementation

Development Direction

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Architectures & Taxonomies

Business

All business events & processes
- All process relationships

Application

Core applications
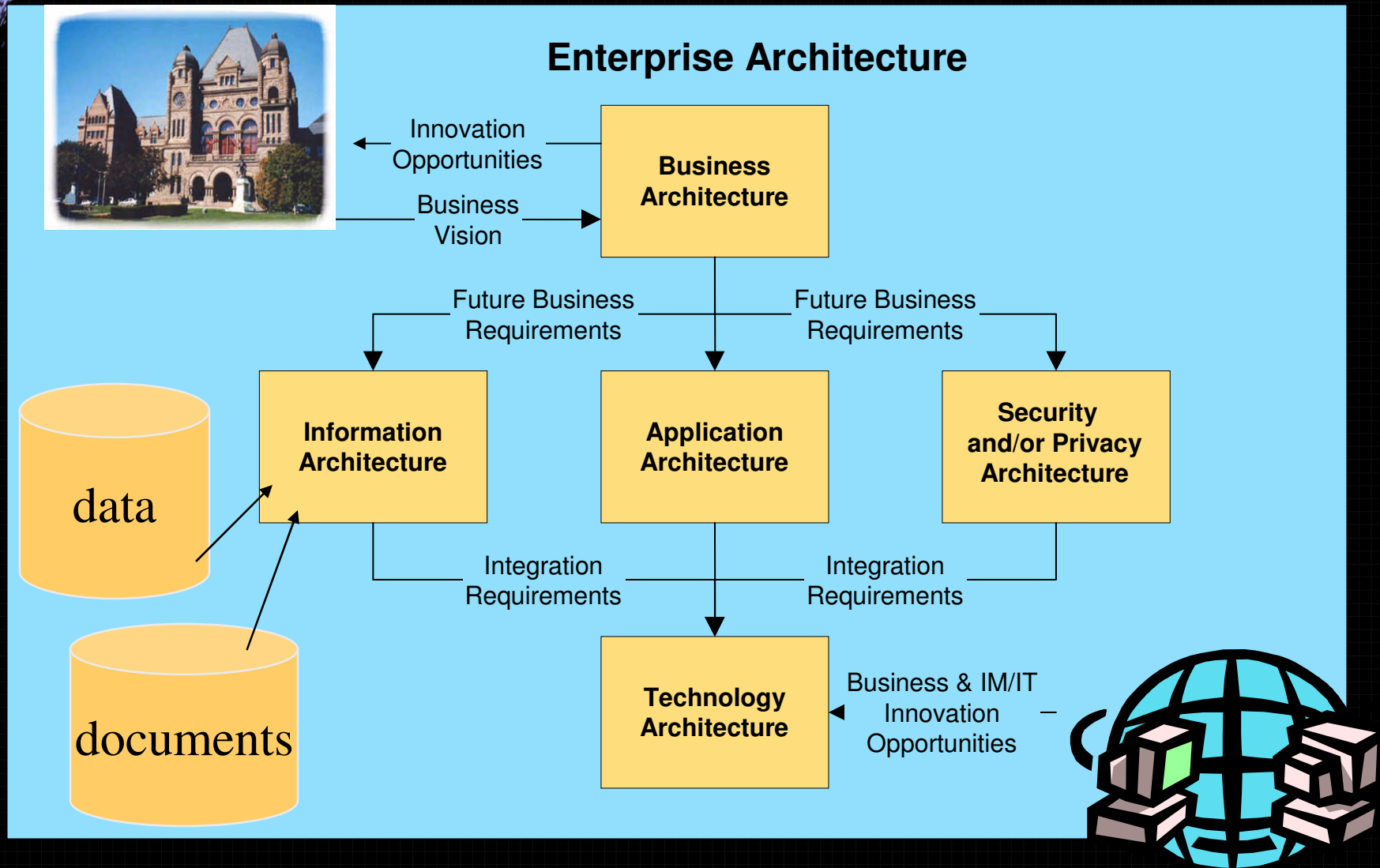- Other applications, legacy systems

Technical

Platforms & networks
- Operating systems
- Storage & distribution systems

Information

Categories or types of information
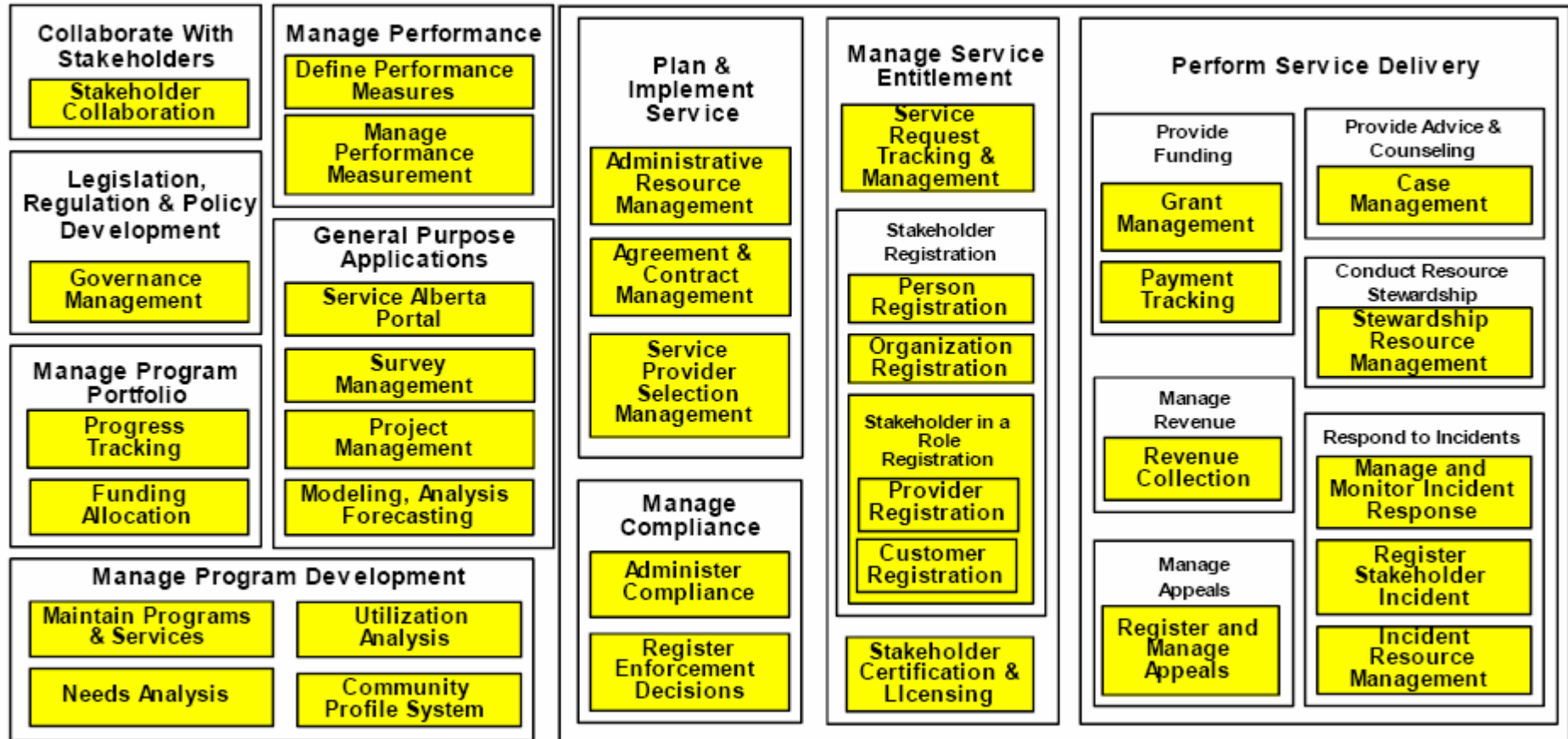- Structured - databases & warehouses
- Unstructured - Taxonomies

How do architectures fit together?

Enterprise Architecture

Innovation Opportunities

Business Vision

Business Architecture

Future Business Requirements

Future Business Requirements

Information Architecture

Application Architecture

Security and/or Privacy Architecture

data

documents

Integration Requirements

Integration Requirements

Technology Architecture

Business & IM/IT Innovation Opportunities

Application Groups - Primary Business Activities

Collaborate With Stakeholders
- Stakeholder Collaboration

Legislation, Regulation & Policy Development
- Governance Management

Manage Program Portfolio
- Progress Tracking
- Funding Allocation

Manage Program Development
- Maintain Programs & Services
- Needs Analysis
- Utilization Analysis
- Community Profile System

Manage Performance
- Define Performance Measures
- Manage Performance Measurement

General Purpose Applications
- Service Alberta Portal
- Survey Management
- Project Management
- Modeling, Analysis Forecasting

Plan & Implement Service
- Administrative Resource Management
- Agreement & Contract Management
- Service Provider Selection Management

Manage Compliance
- Administer Compliance
- Register Enforcement Decisions

Manage Service Entitlement
- Service Request Tracking & Management

Stakeholder Registration
- Person Registration
- Organization Registration

Stakeholder in a Role Registration
- Provider Registration
- Customer Registration

- Stakeholder Certification & Licensing

Perform Service Delivery

Provide Funding
- Grant Management
- Payment Tracking

Manage Revenue
- Revenue Collection

Manage Appeals
- Register and Manage Appeals

Provide Advice & Counseling
- Case Management

Conduct Resource Stewardship
- Stewardship Resource Management

Respond to Incidents
- Manage and Monitor Incident Response
- Register Stakeholder Incident
- Incident Resource Management

Government of Alberta – (GAEA) Architecture

City of Edmonton Architecture
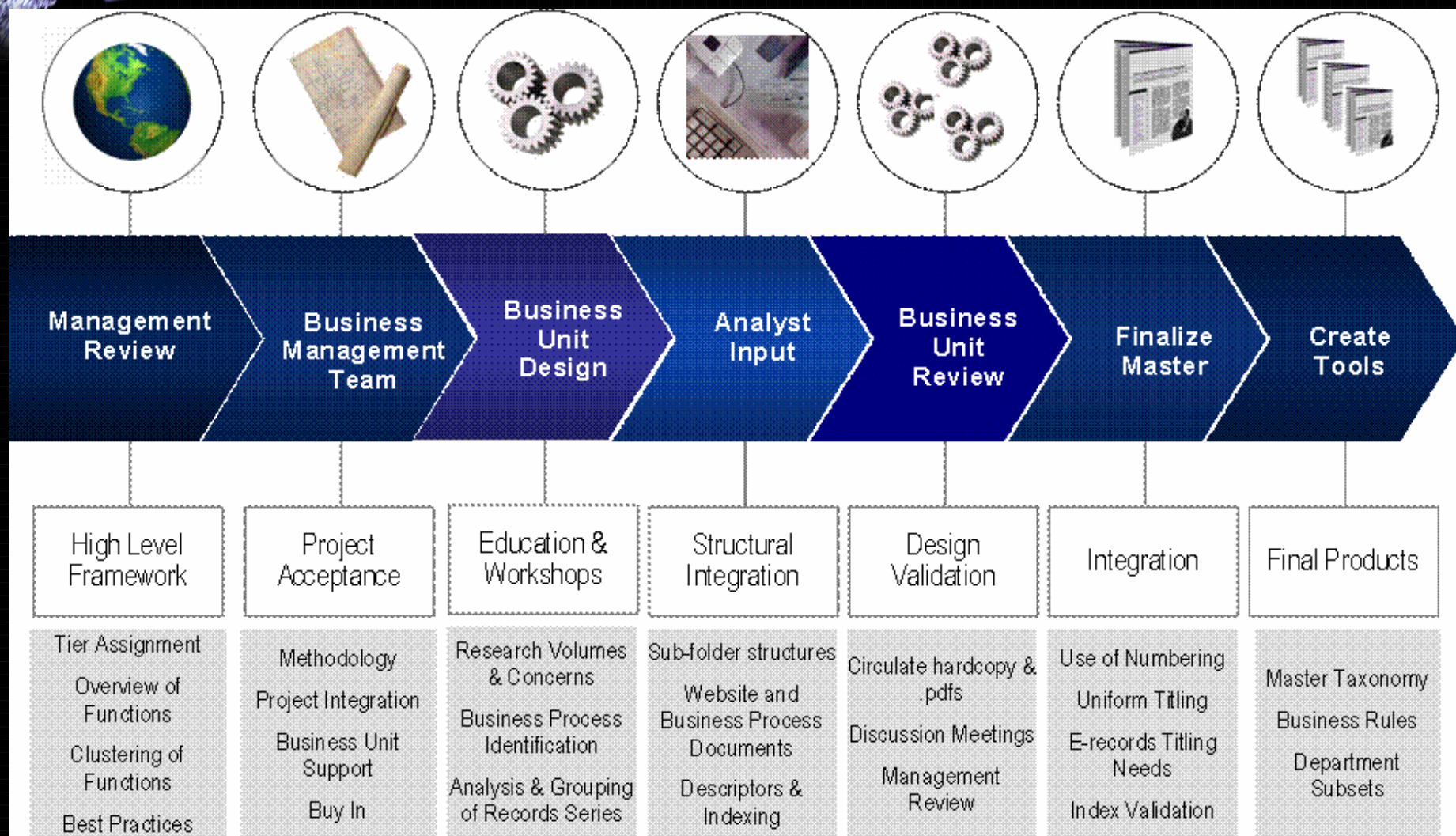
DIRKS Methodology

The "Designing & Implementing Records Keeping Systems" (DIRKS) methodology is an eight-step process

- Step A – Preliminary investigation
- Step B – Analysis of business activity
- Step C – Identification of recordkeeping requirements
- Step D – Assessment of existing systems
- Step E – Strategies for recordkeeping
- Step F – Design of a recordkeeping system
- Step G – Implementation of a recordkeeping system
- Step H – Post-implementation review

http://www.naa.gov.au/recordkeeping/dirks/dirksman/dirks.html

Taxonomy Design Methodology

Management Review	Business Management Team	Business Unit Design	Analyst Input	Business Unit Review	Finalize Master	Create Tools
High Level Framework	Project Acceptance	Education & Workshops	Structural Integration	Design Validation	Integration	Final Products
Tier Assignment Overview of Functions Clustering of Functions Best Practices	Methodology Project Integration Business Unit Support Buy In	Research Volumes & Concerns Business Process Identification Analysis & Grouping of Records Series	Sub-folder structures Website and Business Process Documents Descriptors & Indexing	Circulate hardcopy & .pdfs Discussion Meetings Management Review	Use of Numbering Uniform Titling E-records Titling Needs Index Validation	Master Taxonomy Business Rules Department Subsets

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Taxonomy Design Tools

Aka software at www.synercon.com.au/
One 2 One software at www.one2onetraining.com/

Fast Track Design Method

– Step 1 – Communication & change management

– Step 2 – Preliminary investigation

– Step 3 – Identification of scope and volumes

– Step 4 – Program assessment

– Step 5 – Taxonomy high level framework

– Step 6 – Business unit taxonomy design

– Step 7 – Iterative Review

– Step 8 - Validation

Step 1 Communication & Change Management

- Analyse business culture – environment
- Identify concerns
  - Stakeholders, Sr. Mgmt., Mgmt, RM, IT, users
  - Visions, surveys etc.
- Use of websites – newsletters - posters
- Selection and orientation of project team
- Project Champion
- Project kick-off
- Change & the Creation of Conflict

– Organization website

– Intranet information

– Prior Reports

– Organization charts (functional)

– Business Analysis &/or Architecture

– Job Descriptions

– Shelf, Application, & Server Inventory

- Hard copy volumes
- Document applications & architecture
- Server volumes & structure

– Identify exceptions – external organizations

– Existing standards & policies

– ISO gap analysis

– Information security analysis

– Existing classification plans e-doc & paper

– Existing retention schedules

– Top Tiers

  • Management – Administration – Business

  • Governance – Housekeeping – Programs

– Limit clusters of functions (7 – 10)

– Align with business architecture

– Obtain senior management agreement

Functional Classification
Municipal Government Example

Administration

General – Organization; Administrative Planning
Office Services – Accommodation; Supplies; Mail & Courier; Travel
Human Resources - Recruitment, Employees, Training;
Information – Records Management; Library; Networks; Applications
Finance – Accounts; Expenses; Budget; Payroll

City - Corporate

Governance – Elections, Committees, Mayor's Office, Council, Bylaws
Legal Services – Appeals, Claims, FOIP, Litigation
Liaison – Associations; Governments; Partnerships
Agreements & Contracts – Admin, Community, Property, Infratsructure
Economic Development – Marketing & Tourism
Planning – Strategic Planning, Surveys, IT Plan, Business Recovery
Public Relations – Media; Speeches; News Releases

Municipal Services

Licensing – Permits, Animal Licences, Business Licences, Cemetery
Transit – Bus Service, Fares, Schedules, Stations & Garage Operations

Infrastructure

Planning – Municipal Dev. Plan, Intermun. Dev Plan,
Land Development – Acquisition, Development, Subdivisions
Engineering – Streets, Traffic Control, Airports
Environment – Sewage, Solid Waste, Air Quality, Soils, Pest Control
Parks & Facilities – Maintenance, Bookings,
Utilities – Water, Telephones, Gas, Cablevision

Community Services

Home Services – FCSS Programs
Community – Organizations, Programs
Recreation – Programs, Events
Culture – Programs. Theatre
Protective Services – Fire, Ambulance– Bylaw Enforcement
Policing – MHPS – incidents – programs -

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Administration

Common Functions or Groups

General – Organization; Administrative Planning
Office Services – Accommodation; Supplies; Mail & Courier; Travel
Human Resources - Recruitment, Employees, Training;
Information – Records Management; Library; Networks; Applications
Finance – Accounts; Expenses; Budget; Payroll; Assessment/Taxation?

City - Corporate

Governance – Elections, Committees, Mayor's Office, Council, Bylaws
Legal Services – Appeals, Claims, FOIP, Litigation
Liaison – Associations; Governments; Partnerships
Agreements & Contracts – Admin, Community, Property, Infrastructure
Economic Development – Marketing & Tourism
Corporate Planning – Strategic Plan, Surveys, IT Plan, Business Recovery
Public Relations – Media; Speeches; News Releases

Unique Business Functions or Groups

Municipal Services

By law Enforcement – Animal Control, Weeds, Noise etc.
Licensing – Permits, Animal Licences, Business Licences, Cemetery
Transit – Bus Service, Fares, Schedules, Stations & Garage Operations
Facilities Use – Bookings

Community Services

Home Services – FCSS Programs
Community – Organizations, Programs
Recreation – Programs, Events, Artists
Culture – Programs – Theatre, Visual Arts; Events – Festivals

Protective Services

Protective Services – Policing – RCMP
Fire Services – Responses, Ambulance, Prevention Programs, Inspections

Planning

Urban Planning – Mun. Dev. Plan, Inter-municipal Dev Plan, Land Use Bylaw
Land Development – Acquisition, Development, Subdivisions
Transportation –Traffic Control, Airports
Environment – Water Quality, Air Quality, Soil Quality, Pest Control
Capital Projects – Project management, Scheduling,
Drawings & Reports – Construction Commercial Consultant repts.
Inspections – Commercial, Construction

Public Works

Facilities Maintenance– Security, Maintenance, manuals & Specifications
Parks – Maintenance, Trees, Shrubs,
Utilities – Water & Sewers, Waste Management

- Prepare design orientation
  - Conflict – awareness of the problem - volumes
  - Taxonomy overview
  - Design method
  - Identification schemes & metadata
- Conduct abridged version of session with management
- Conduct session
  - Selection of participants
  - 2 analysts tag team – 60 - 90 minutes
  - Limit to 2-3 sessions per day – limit of 3 days per week
  - Use of the elevator speech
  - Facilitation only – users must become designers
  - Develop a withdrawal strategy
- Feedback & review sessions
  - Increase the level of detail – descripters, naming conventions

– Create format – primary list, descriptions, index

– Circulate – hard copy or pdf for comment

– Meet again for discussion

  • Especially if concerns are raised

–

– Has anyone ever tested if functional systems work?

– Anecdotally systems are hard to use – even with training

– Use of card validation

Validation Card – High Level System

- 1.0 Human Resources
  - Employees
  - Benefits
  - Pensions
  - Compensation
  - Employment
  - Labour Relations
  - Organization Effectiveness
  - Payroll
  - Safety & Wellness
  - Training

Validation Card – Scenarios

- I am a supervisor looking for an old job description for a warehouse worker… as I am considering creating a summer position and want to see examples

- I need to see some past attendance records as an employee wants to question whether or not she still has some leave coming to her … she says she only took 5 days leave in 2005 etc. etc.

- I am looking to see how effective a supervisory course is – Flogging 101 - before sending one of my staff on it. Would like to see if a post evaluation was done.

Validation Card – High Level System

- 1.0 Human Resources
  - Employees …………………
  - Benefits ……………………..
  - Pensions ……………………
  - Compensation ……………..
  - Employment ………………..
  - Labour Relations …………...
  - Organization Effectiveness..
  - Payroll………………………..
  - Safety & Wellness …………
  - Training ……………………...

Validation Card – 2nd Level 1.01

- 1.01 Employees
  - Employee Records – Master
  - Employee Records - Worksite

?

Validation Card – 2nd Level 1.02

- 1.02 Benefits
  - Procedures & Guidelines
  - Committees
  - Inquiries
  - Planning
    - Surveys
    - Financial analysis
    - Group bargaining & liaison
    - Major Benefit programs
    - Minor Benefit programs

?

Validation Card – 2nd Level 1.03

- 1.03 Pensions
  - Programs
  - Actuarial Reviews

`?`

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- 1.04 Compensation

  ?

  - Job Descriptions

  - Job Evaluations

  - Class Specifications

  - Pay Administration

- 1.06 Labour Relations

  – Disputes & Resolutions

  – Negotiations

  – Issues & Jurisdictions

  – Interpretations

  – Agreements

?

Validation Card – 2nd Level 1.08

- 1.08 Payroll
  - Procedures & Guidelines
  - Systems
  - Attendance
  - Attendance – Provisional
  - Employee Inquiries
  - Payroll Processing

- 1.09 Safety & Wellness
  - Health Services
    - Wellness
    - Ergonomics
    - Industrial Hygiene
    - Medical Services
  - Occupational Health & Safety
    - Partnerships
    - Emergency Response Plan
    - Training & Orientation
    - Audits
    - Material Safety Data Sheets
    - Manuals
    - Procedures & Guidelines
    - Programs
    - Incident Investigations

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Validation Card – 2nd Level 1.10

- 1.10 Training
  - Procedures & Guidelines
  - Certification
  - Courses – Internal
  - Courses – External
  - E-Learning
  - Reports & Statistics
  - Resource Library
  - E-City (intranet)
  - Travel