Fitting KM into Enterprise Architectures

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Agenda

Item
1. Welcome and Introduction
2. Enterprise Architecture: What is one and why you should use it
3. KM Theory
4. Building an Organization for Success
5. Technology: Tools and functions
6. Putting KM into EA
7. Wrap-up and Questions
8. Fill out surveys

Welcome and Introduction

Section 1

Tutorial Learning Objectives

- Using enterprise architecture to ensure successful operations
- Core KM concepts
- Modern tools and techniques
- System designs for KM intersection of people-process-technology
- Critical success factors in KM technology

Tutorial Procedures

- Interactive: Ask questions and discuss issues throughout the morning
- Knowledge Sharing: Give and take between experiences and knowledge of presenters and participants
- Informal: Free movement into and out of room as needed

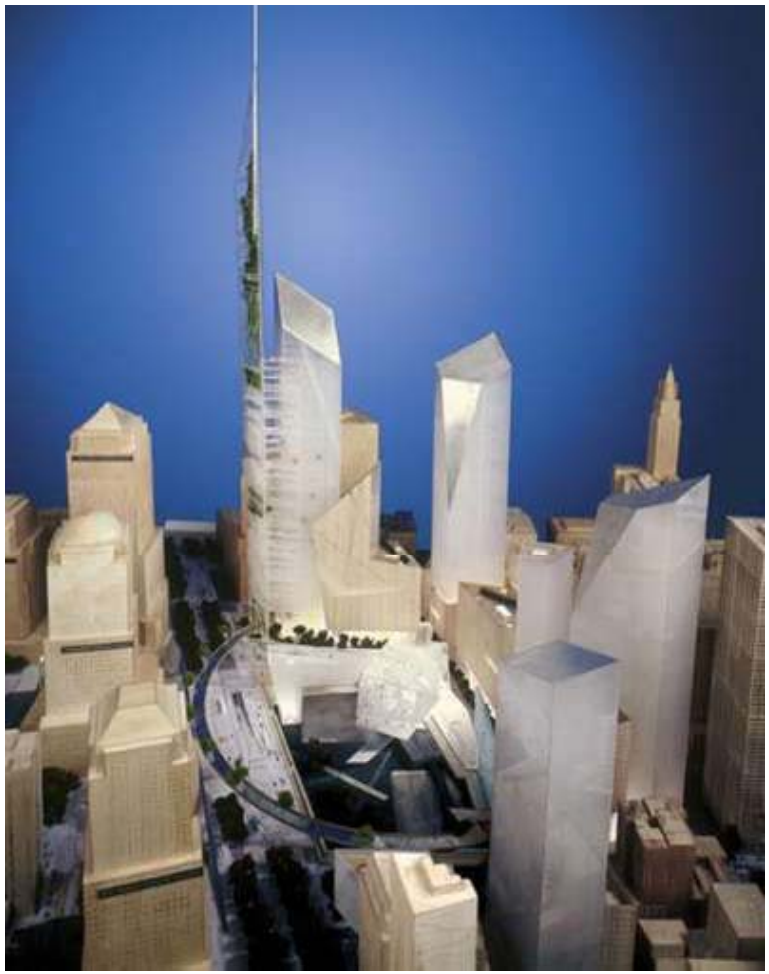
Enterprise Architecture

Section 2

Architecture

- The art & science of designing and erecting buildings.
- A style and method of design and construction
- Orderly arrangement of parts; structure: the architecture of the federal bureaucracy; the architecture of a novel.
- Computer Science: The overall design or structure of a computer system, including the hardware and the software required to run it, especially the internal structure of the microprocessor.

When We Think of Architecture..



Architecture Includes …

- Form
- Materials
- Structure
- Aesthetics
- Use patterns
- Maintenance
- Construction
- Safety

An architecture is “the structure of components, their relationships, and the principles and guidelines governing their design and evolution over time.” (IEEE Std 610.12)

Architecture for IT

- Network diagrams
- Software models
- Communication protocols
- Hardware connections

Yes, But Also…

- How, who, when, why, where, what of design, funding, decision-making, development, operation and maintenance
- Why all of these “soft” issues
  - Lessons Learned from many years of large scale IT programs
  - Organizational issues can dominate systems engineering
  - Real success depends on single system blending people, process, technology

Architecture Frameworks

- Federal Enterprise Architecture Framework (FEAF)
- Zachman framework
- The Open Group Architecture Framework (TOGAF)
- Object Management Group (OMG) Model Driven Architecture (MDA)
- Department of Defense Architecture Framework (DODAF)

Zachman Framework

Zachman's Framework for Information Systems Architecture

		What	How	Where	Who	When	Why
REQUIREMENTS ANALYSIS	Scope	List of Things Important to Business	List of Processes the Business Performs	List of Locations Important to Business	List of Organizations Important to Business	List of Events Significant to Business	List of Business Goals/Strategies
	Investor	Entity=Class of Business Thing	Function=Class of Business Process	Node=Major Business Location	Agent=Class of Agent	Time=Major Business Event	End/Means=Major Business Goal
	Enterprise Model	e.g., Entity Relationship Diagram	e.g., Function Flow Diagram	e.g., Logistics Network	e.g., Organization Chart	e.g., Master Schedule	e.g., Business Plan
	Owner	Ent=Business Entity Rel=Business Rule	Function=Business Process	Node=Business Location Link=Business Linkage	Agent=Org Unit Work=Work Product	Time= Business Event Cycle=Business Cycle	End=Business Objectives Means=Business Strategy
DESIGN	Information System Model	e.g., Data Model	e.g., Data Flow Diagram	e.g., Distributed System Architecture	e.g., Human Interface Architecture	e.g., Processing Structure	e.g., Knowledge Architecture
	Designer	Entity=Data Entity Relationship= Data Relationship	Funct=Appl Function Arg=User Views	Node=Info Sys Funct Link=Line Char	Agent=Role Work=Job	Time=Trigger Cycle=Component Cycle	End=Criterion Means=Option
DEVELOPMENT	Technology Model	e.g., Data Design	e.g., Structure Chart	e.g., System Architecture	e.g., Human/ Technology Interface	e.g., Control Structure	e.g., Knowledge Organization
	Builder	Entity=Segment/Row Relationship=Pointer/ Key	Funct=Computer Funct Arg=Screen/Device Formats	Node=Hardware/ System Software Link=Line Specification	Agent=User Work=Job	Time=Execute Cycle=Component Cycle	End=Condition Means=Action
	Components	e.g., Data Definition Description	e.g., Program	e.g., Network Architecture	e.g., Security Architecture	e.g., Timing Definition	e.g., Knowledge Definition
	Subcontractor	Ent=Fields Rel=Addresses	Funct=Language Stmts Arg=Control Blocks	Node=Addresses Link=Protocols	Agent=Identity Work=Transaction	Time=Interrupt Cycle=Machine Cycle	End= Means
	Functioning System	e.g., Data	e.g., Function	e.g., Network	e.g., Organization	e.g., Schedule	e.g., Strategy

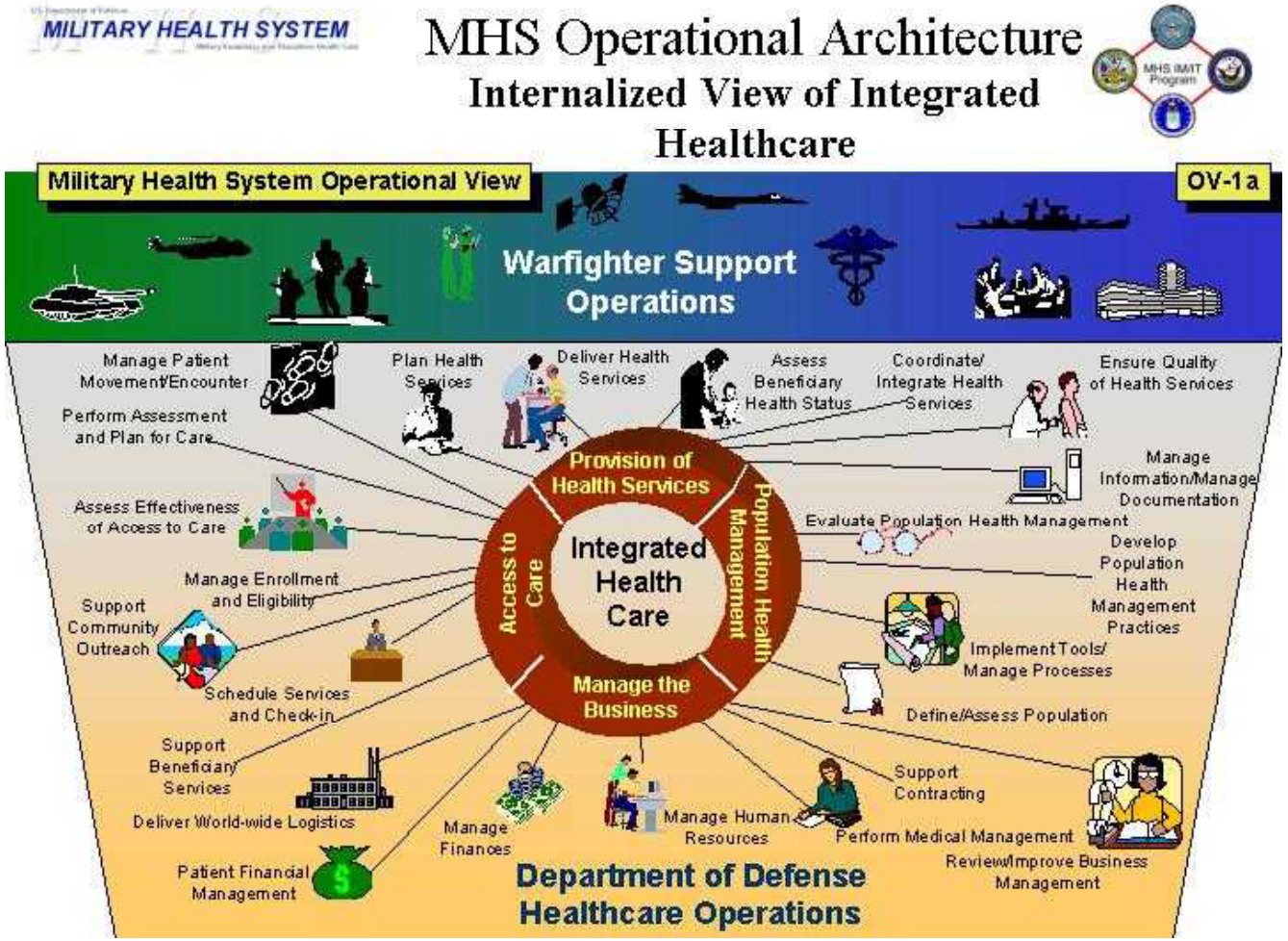
DODAF

- Defines 3 primary views
  - There is no single view of an architecture (business process, network, hardware, data management, etc.) that describes all critical components, data, and users
  - Use standardized products, terms, and definitions
- Operational View: tasks and activities of concern and the information exchanges required
- Technical View: profile of a minimal set of time-phased standards and rules governing the implementation, arrangement, interaction, and interdependence of system elements.
- System View: systems of concern and the connections among those systems in context with the operational architecture view.

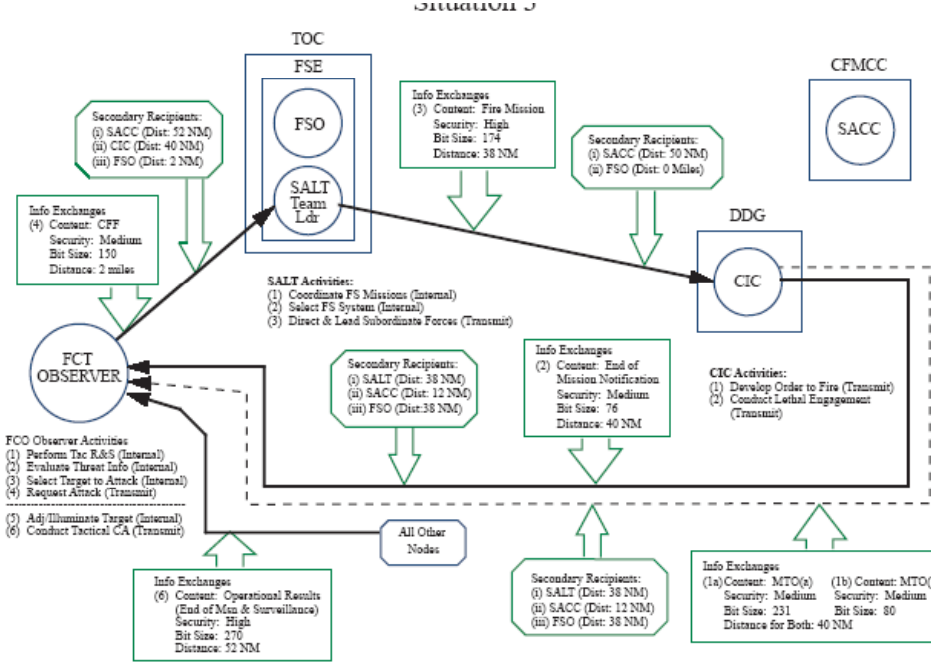
DODAF: Example Key Products

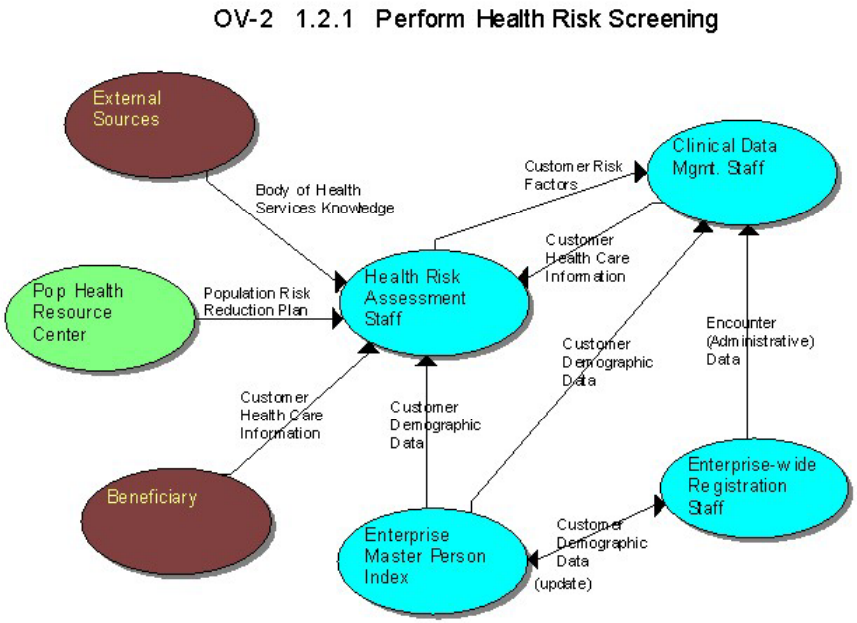
- ALL Views
  - AV-1: Overview and Summary Information
  - AV-2: Integrated Dictionary
- Operation Views
  - OV-1: High-level Operational Concept Graphic
  - OV-2: Operational Node Connectivity Description
  - OV-3: Operational Information Exchange Matrix
- System View
  - SV-1: System Interface Description
- Technical View
  - TV-1: Technical Architecture Profile

Example OV-1

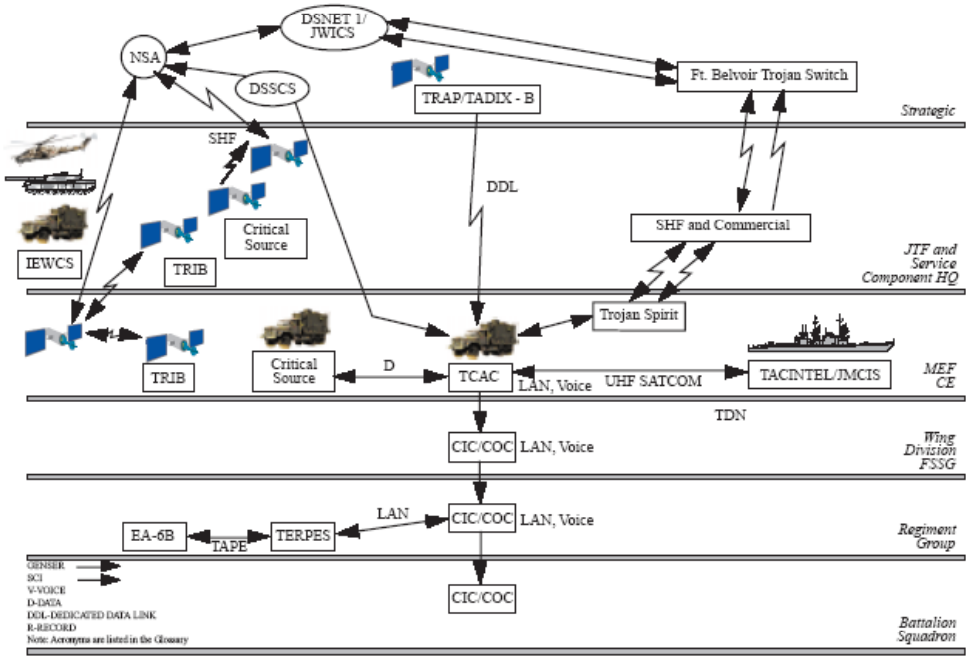

MILITARY HEALTH SYSTEM
MHS Operational Architecture
Internalized View of Integrated Healthcare
Military Health System Operational View
OV-1a
Warfighter Support Operations
Manage Patient Movement/Encounter
Perform Assessment and Plan for Care
Plan Health Services
Deliver Health Services
Assess Beneficiary Health Status
Coordinate/ Integrate Health Services
Ensure Quality of Health Services
Manage Information/Manage Documentation
Evaluate Population Health Management
Develop Population Health Management Practices
Implement Tools/ Manage Processes
Define/Assess Population
Support Contracting
Perform Medical Management
Review/Improve Business Management
Manage Human Resources
Manage Finances
Patient Financial Management
Deliver World-wide Logistics
Support Beneficiary Services
Schedule Services and Check-in
Support Community Outreach
Manage Enrollment and Eligibility
Assess Effectiveness of Access to Care
Provision of Health Services
Population Health Management
Access to Care
Integrated Health Care
Manage the Business
Department of Defense Healthcare Operations

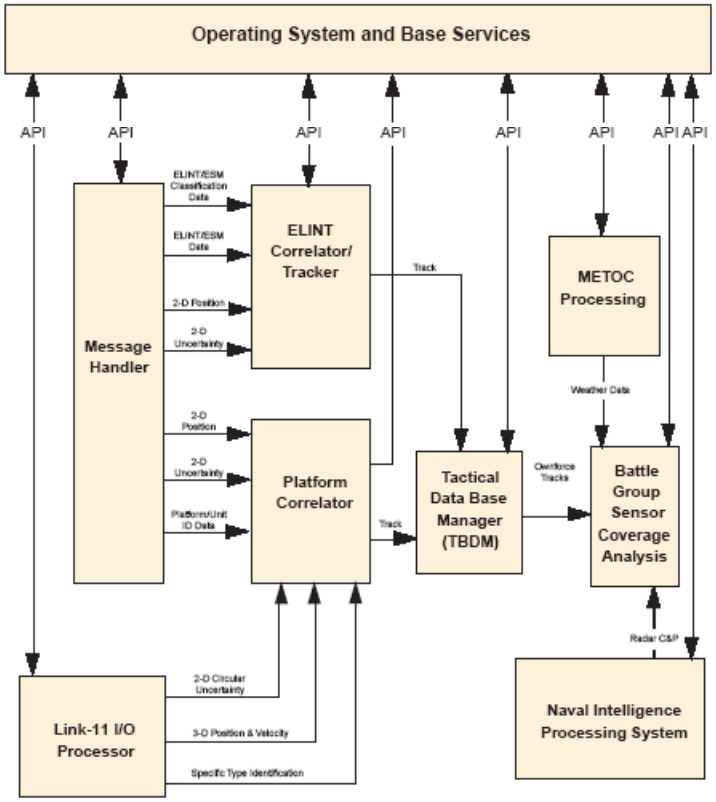
Example OV-2: Operational Nodes





Example SV-1: System Interface

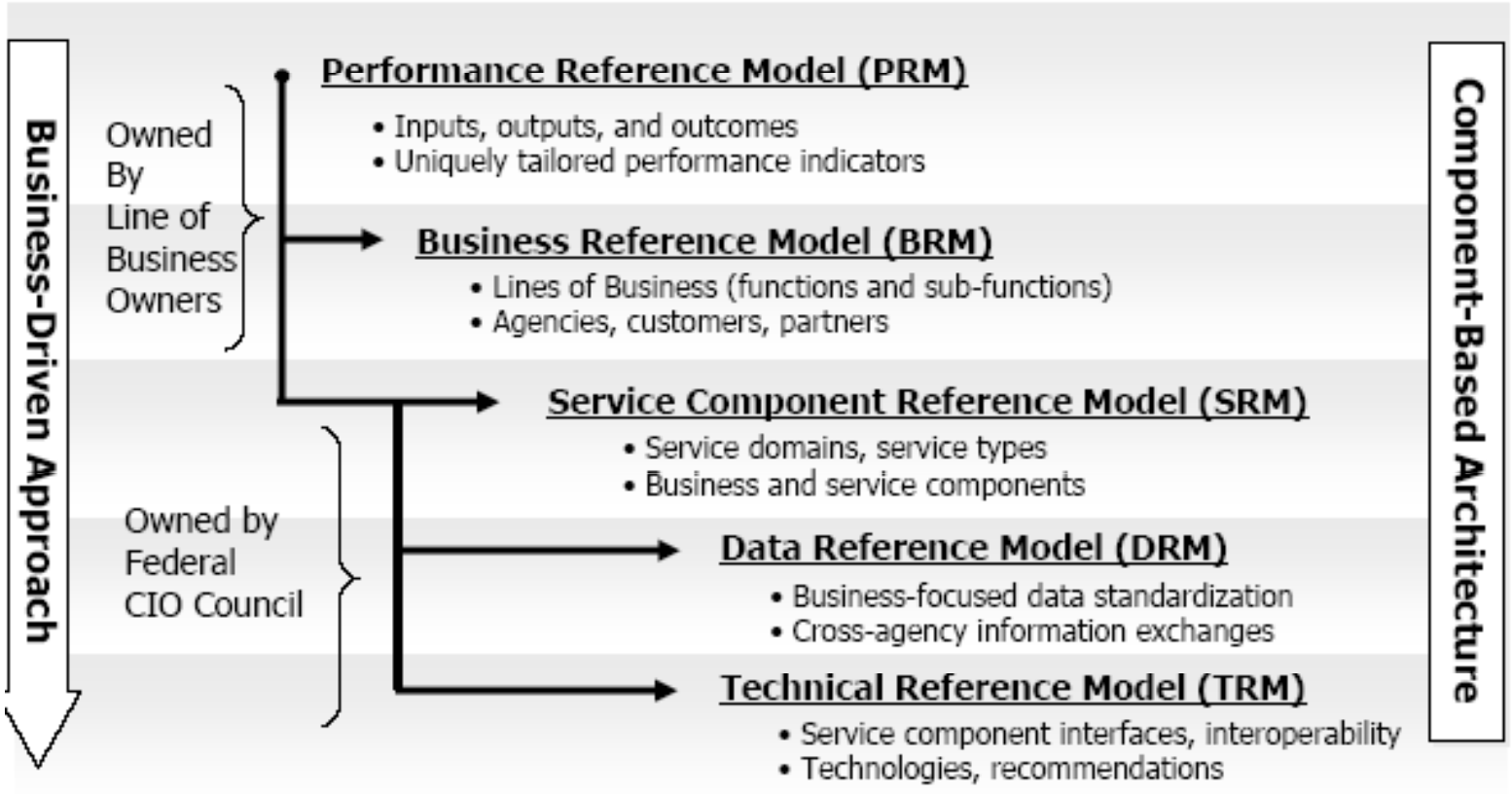




Federal Enterprise Architecture Framework (FEAF): Goals

- Define and align Federal business functions and supporting IT via a set of common models
- Identify opportunities to re-use and re-deploy IT assets across the Federal government
- Improve effectiveness of IT spending to help yield substantial cost savings and improve service delivery for citizens

FEAF: Business Driven



FEAF Components

- Business Reference Model (BRM)
  - Function-driven framework for describing business operations of the Federal government independent of the agencies that perform them
- Service Component Reference Model (SRM)
  - Business and performance-driven functional framework that classifies service components with respect to how they support business and/or performance objectives
- Performance Reference Model (PRM)
  - Standardized framework to measure the performance of major IT investments and their contribution to program performance
- Data Reference Model (DRM)
  - Model describing, at an aggregate level, the data and information that support program and business line operations
- Technical Reference Model (TRM)
  - Component-driven, technical framework used to identify the standards, specifications, and technologies that support and enable the delivery of service components and capabilities

FEAF Business Reference Model

FEAF Services Reference Model

System Design & Development: Known Hurdles

- Acquisition is structured to purchase tools based on lists of functions
- Users need support of business processes
- No single organizational group makes all necessary decisions and controls all types of funds
- Success or failure of the system and program hinges on the intangibles of usefulness, usability, relevance

Errors to Avoid

- "Wrong" group doing:
  - Requirements
  - Technical specifications
  - Program management
  - Systems engineering
- Debating the above issues across organizational roles and responsibilities
- Relying on vendor or analyst literature for technical design
- Focusing most effort on networks, hardware, software instead of business process, operational ***capabilities***

Success Factors to Promote

- Clear roles and responsibilities
- Maximize use of industry and government standards
- Business focused Measures of Effectiveness
- Constantly restate role of technology as supporting not driving design of capabilities

How does EA Help?

- Keeps people aware of need for synergy among people-process-technology
- Highlights operational capabilities as source of design and development not by-products
- Forces explicit definition of information needs, by whom, when, ….
- Requires explicit statement of organizational roles and responsibilities

Example: Who Defines Requirements

- Operational Views show the goals and major information requirements
- System Views show the layout and connections of network, hardware, software
- Which view states requirements?
- Who defines the requirements?
- Answer: Different roles for different requirements

KM Theory

Section 3

The Need

- Share and reuse knowledge
- Reduce information overload
- Minimize operation and maintenance costs
- Streamline business processes
- Enterprise system interoperability

The Challenge

- Enormous quantity of written, spoken, and visual information
- Confusion about what “knowledge” is
- Language complexity and dynamism
- Limited tool accuracy
- Multiple systems and legacy applications

What is Knowledge Management?

- Knowledge has several crucial differences from information and data, namely:
  - contains the context in which the information was created and will be used;
  - maintains the relationships among component data; is trustworthy;
  - is actionable
- KM seeks to collect, organize, store, and disseminate knowledge from members of a group across physical, organizational, topical, and temporal boundaries
- KM uses technology but is mostly concerned with enhancing operational capabilities through business processes and organizational structure.

KM is Not

- KM is not a technology system, such as a portal, digital library, search engine, or decision support system
- KM is not a new human endeavor
- KM is not an esoteric set of processes
- KM is not inherently expensive to implement and maintain
- KM is not simply giving people access to more documents and databases
- KM is not metadata
- KM is not a web site
- KM is not simple to explain
- KM is not difficult to use if targeted to realistic opportunities

What is Knowledge?

- Context: what is it about?
- Confidence: is it right?
- Relationships: what does it have to do with that?
- Priorities: what is most important?
- Types
  - Explicit knowledge is codified and can be manipulated
  - Tacit knowledge is unspoken “know-how”

Bloom Taxonomy of Knowledge

- Knowledge: remembering previously learned material, recall facts or theories; bring to mind.
- Comprehension: grasping the meaning of material; interpreting; predicting outcome and effects (estimating future trends).
- Application: ability to use learned material in a new situation; apply rules, laws, methods, and theories.
- Analysis: breaking down into parts; understanding, organization, clarifying, concluding.
- Synthesis: ability to put parts together to form a new whole; unique communication; set of abstract relations.
- Evaluation: ability to judge values far purpose; base on criteria; support judgment with reason (no guessing).

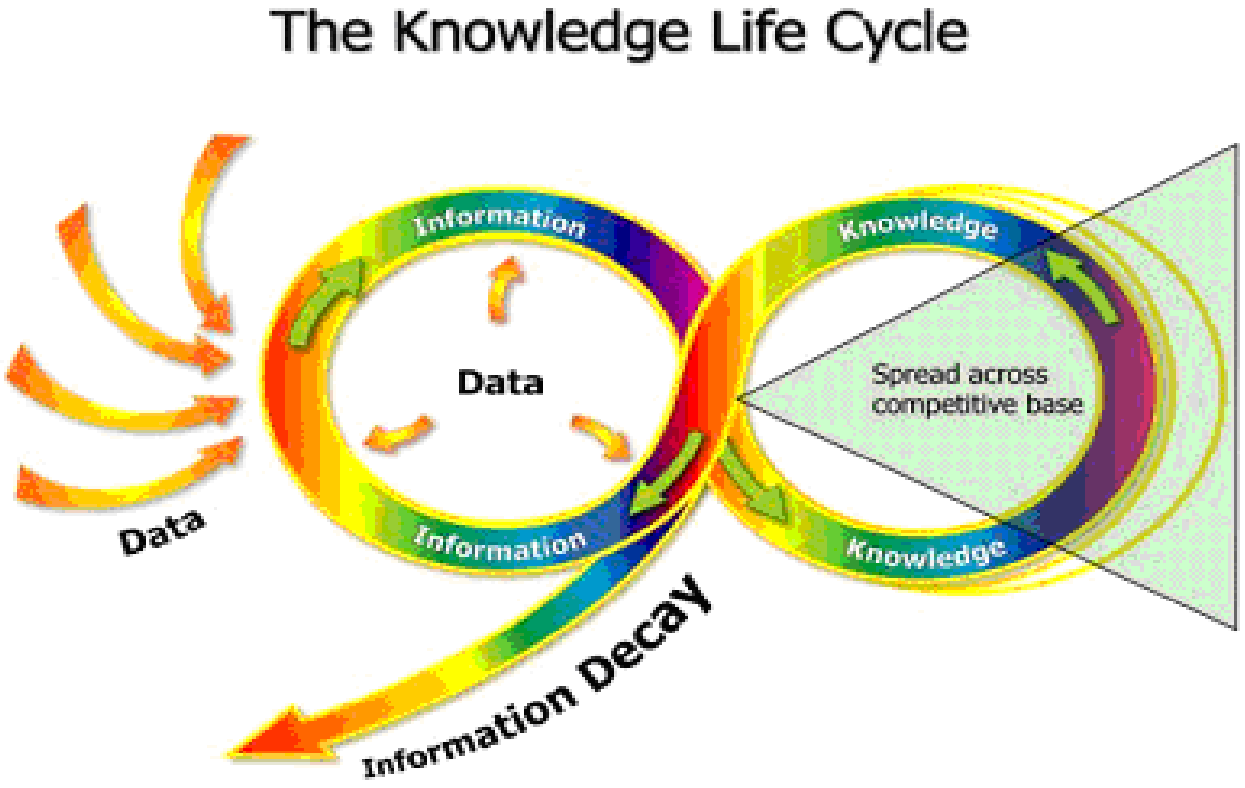
Data, Information, Knowledge

- Data is transactional information which, when presented independently, provides little contribution to the decision and action process.
- Information is content that is necessary for people to have in order to perform their jobs. Information is typically data that has been assembled in some meaningful way.
- Knowledge is a step more value-added than information in that knowledge is content which contains user experiences around it. Knowledge provides insights that move the user of that knowledge to make decisions and take action.

Knowledge is Personal

- Depends on prior knowledge, and task focus
- "Set the soldering iron to 200 degrees"
  - *information* from manual for general use
  - *knowledge* from expert for specific manufacturing process
- "10000 units shipped yesterday"
  - *data* for logistics
  - *information* for shipping manager
  - *knowledge* for competitor monitoring market share

Knowledge has a lifecycle



Building an Organization for Success

Section 4

Organizational Issues

- KM is not a core function
  - No direct funding
  - No direct high level management authority
- KM is a cross-group process
  - Challenges typical group control
  - Requires open dialogue that may lead to competitive disadvantage, even internally
- KM tasks are usually overhead and collateral duties

Organizational Factors: What We Have Learned

- KM's business value is not apparent enough to overcome barriers built & maintained by funding and control
- KM has most value (ROI) at the grass-roots level
  - Small wins but lots of them
  - People only need & want simple intuitive aids

Organizational Success Factors

- Channel top-level support into incorporating KM processes into standard operations
  - Develop and distribute concrete operating procedures for specific grass-roots level tasks
- Make tools and processes simple and low-cost to convince line managers to include
  - Show productivity and efficiently improvements to funded and required operations
- Avoid over promising results to management
- Appoint a temporary KM steward to catalyze processes

Technology: Tools and Functions

Section 5

Technology (noun)

- Science:
  - The application of science, especially to industrial or commercial objectives.
  - The scientific method and material used to achieve a commercial or industrial objective.
- Electronic or digital products and systems considered as a group: a store specializing in office technology.
- Anthropology The body of knowledge available to a society that is of use in fashioning implements, practicing manual arts and skills, and extracting or collecting materials.

From Houghton-Mifflin dictionary

What is Technology?

- What makes the Segway “a technology”?
- What does it do for people?

THE SCIENCE BEHIND THE TECHNOLOGY.

When Dean Kamen unveiled the Segway® Human Transporter (HT) on ABC's Good Morning America, he described the machine as "the world's first self-balancing human transporter." When you look at the machine in motion, you get an idea of what he's talking about. Unlike a car, the Segway only has two wheels—it looks something like an ordinary hand truck—yet it manages to stay upright by itself.

To move forward or backward on the Segway HT, the rider just leans slightly forward or backward. To turn left or right, the rider simply turns the steering grip left or right.

HOW DYNAMIC STABILIZATION WORKS

The ability to balance on its own is the most amazing thing about the Segway HT, and it is the key to its operation. To understand how this system works, it helps to consider Kamen's model for the device—the human body.

If you stand up and lean forward, so that you are out of balance, you probably won't fall on your face. Your brain knows you are out of balance, because fluid in your inner ear shifts, so it triggers you to put your leg forward and stop the fall. If you keep leaning forward, your brain will keep putting your legs forward to keep you upright. Instead of falling, you walk forward, one step at a time.

The Segway HT does pretty much the same thing, except it has wheels instead of legs, a motor instead of muscles, a collection of microprocessors instead of a brain and a set of sophisticated tilt sensors instead of an inner-ear balancing system. Like your brain, the Segway knows when you are leaning forward. To maintain balance, it turns the wheels at just the right speed, so you move forward. Segway calls this behavior **dynamic stabilization** and has patented the unique process that allows the Segway HT to balance on just two wheels.

THE BRAINS AND THE BRAWN

At its most basic, the Segway HT is a combination of a series of sensors, a control system and a motor system. In this section, we'll look at each of these elements.

What is a New Technology?

- A new way of using machines
- New machine mechanisms and methods
- New human capabilities enabled by machines

Capabilities and Functions

- People want capabilities
  - I am able to filter all my documents to find what I need quickly
- Machines provide functions
  - Search engine compares words in query to words in documents and retrieves those with a “good” match

Capabilities

- Finding the document I want from all the documents in my organization quickly and precisely
- Getting to work on time from my home
- Contacting an expert when I need one
- Learning from my colleagues' experiences

Functions

- Web-based information access
- Document search
- Threaded discussion
- Personnel directory
- Transportation
- Spreadsheet calculations
- Word processing

Developing New Technology

- Technology driven
  - Wide development portfolio
  - Many redundant efforts with latitude for individual creativity and interpretation
- Capabilities driven
  - End-users (non-technologists) define operational capabilities needed
  - Translated into technology portfolio of basic through prototype development

What Makes IT Work for KM?

- Seamless integration
- Intuitive navigation
- Rapid and precise information retrieval and discovery
- Ease-of-use
- Contextual connections and relevance

Types of Technology for KM

- Supporting
  - Automates existing processes
  - Transfers work to machines from humans
- Enabling
  - Creates new capabilities
  - Expands human abilities

Supporting Technologies

- Portals: Combines multiple information and data sources into one electronics access point
- Digital Library: Contains large number of documents and multimedia items in electronic form in a centrally accessible, and possibly managed, system

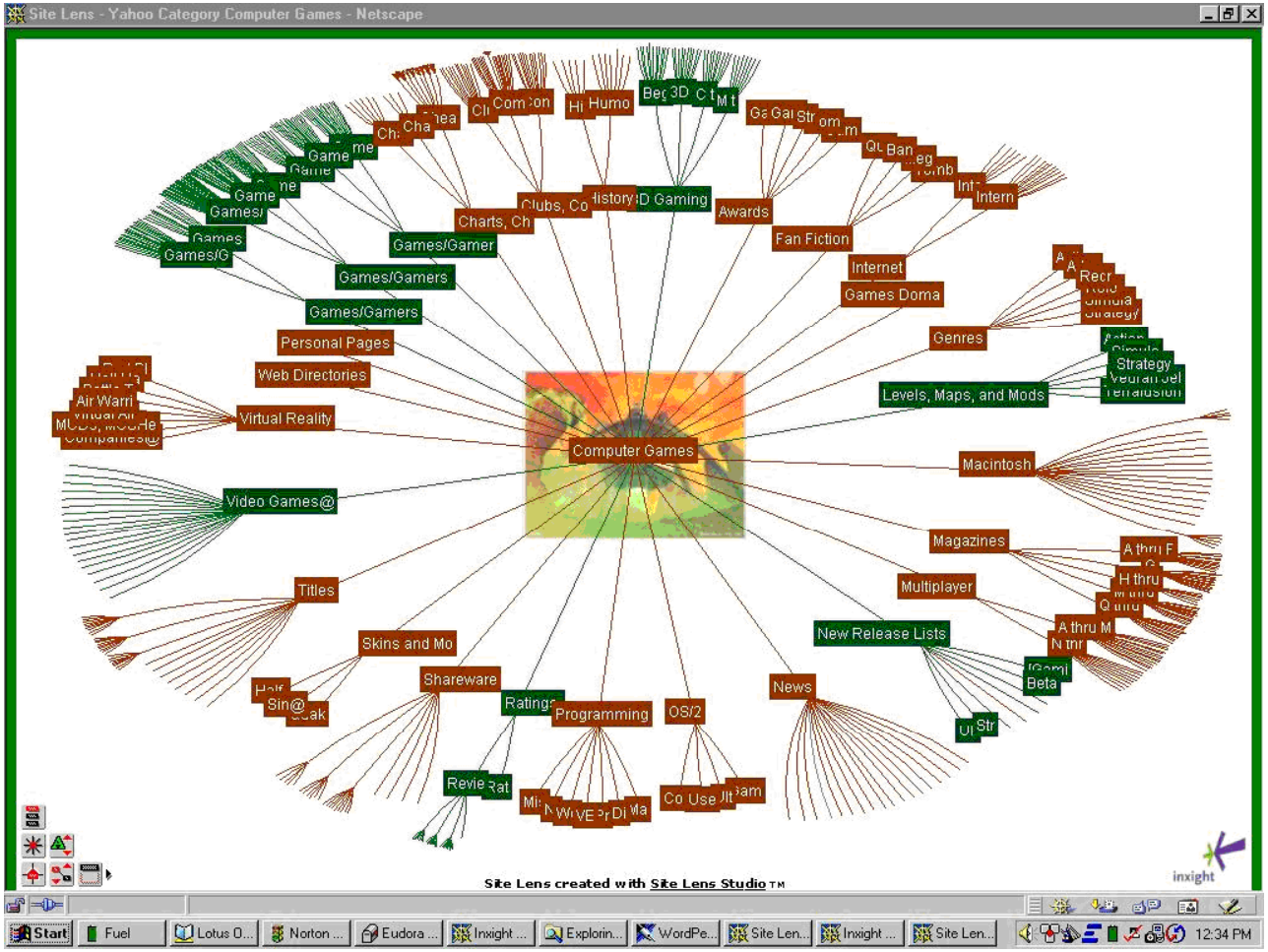
Enabling Technology

- Email: allowed widespread inexpensive exchange of messages instantly
- Internet: globally accessible low-cost exchange of information with open standards
- Datamining: sophisticated algorithms based on rules and probability theory to find “needle in a haystack”
- Intelligent agents: Constantly roaming network collecting, assessing, information

KM Technology Examples

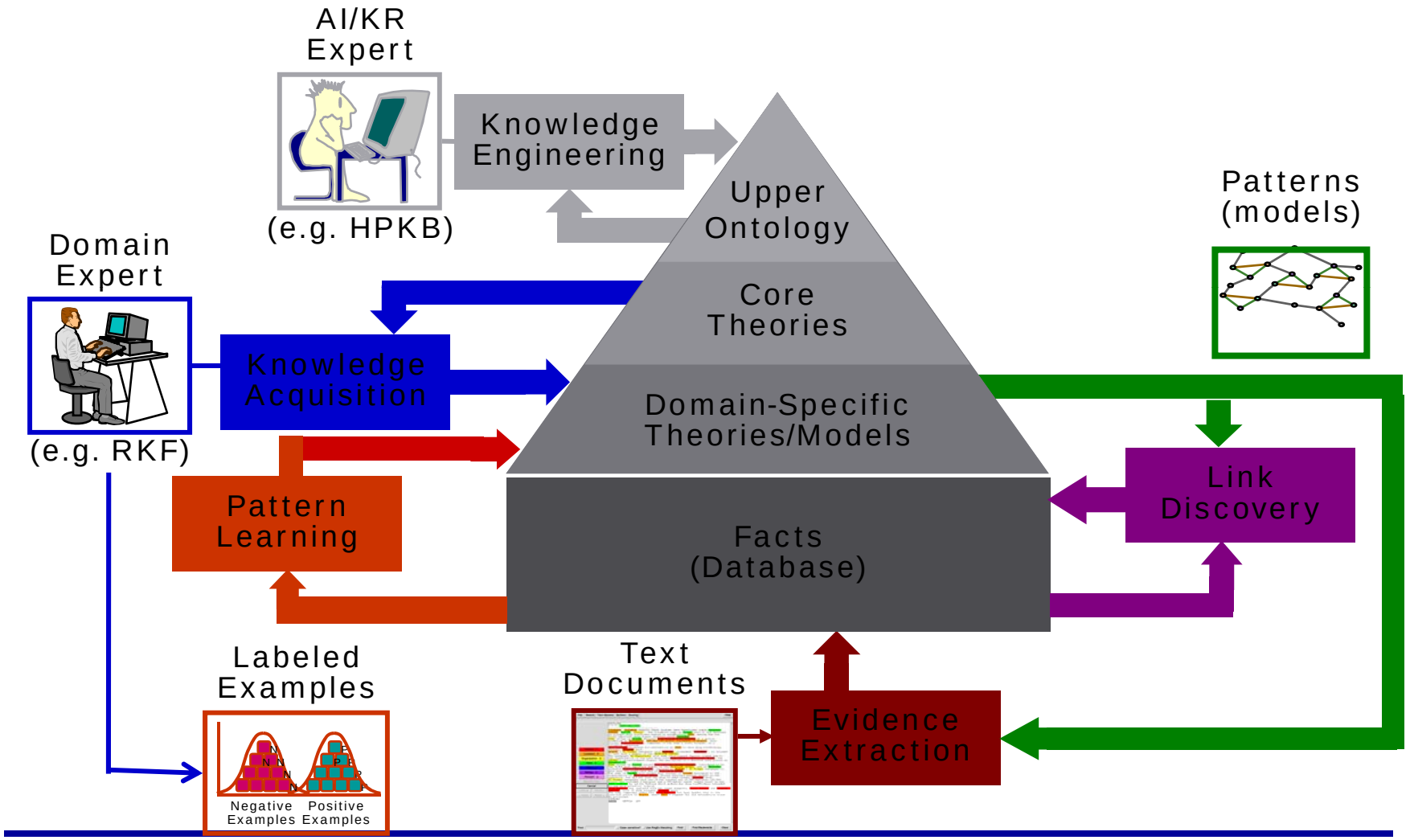
- Search engines
- Metadata categorizers
- Portals
- Collaboration
  - Instant Messaging
  - Threaded discussion
  - Web conferencing
- Expertise location
- Visualization

Visualizing Content



Interactive Maps

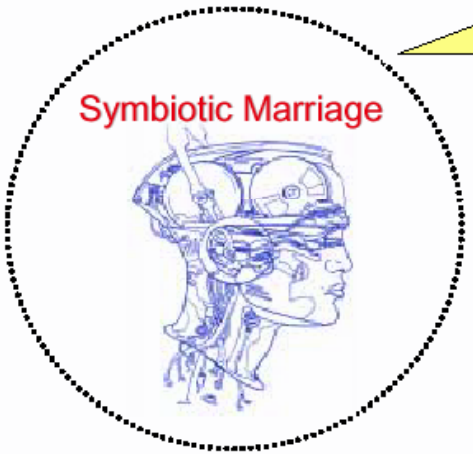
Knowledge Creation Technologies

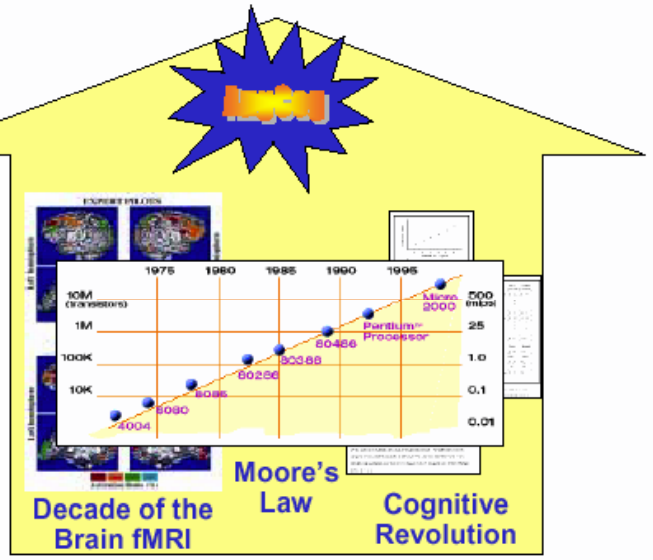


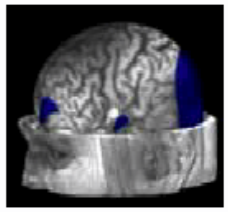
DARPA Augmented Cognition

Objective:

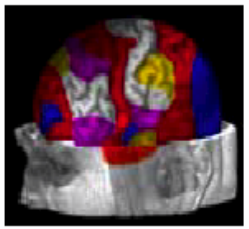
1, 2, or 3 Order of Magnitude Improvement in Net Human-Machine Information Capacity, Symbiotic Marriage







A Brain on Today's HCI



A Brain on Augmented Cognition

This Will Improve and Enhance the Quality of Military Decision Making

Portals

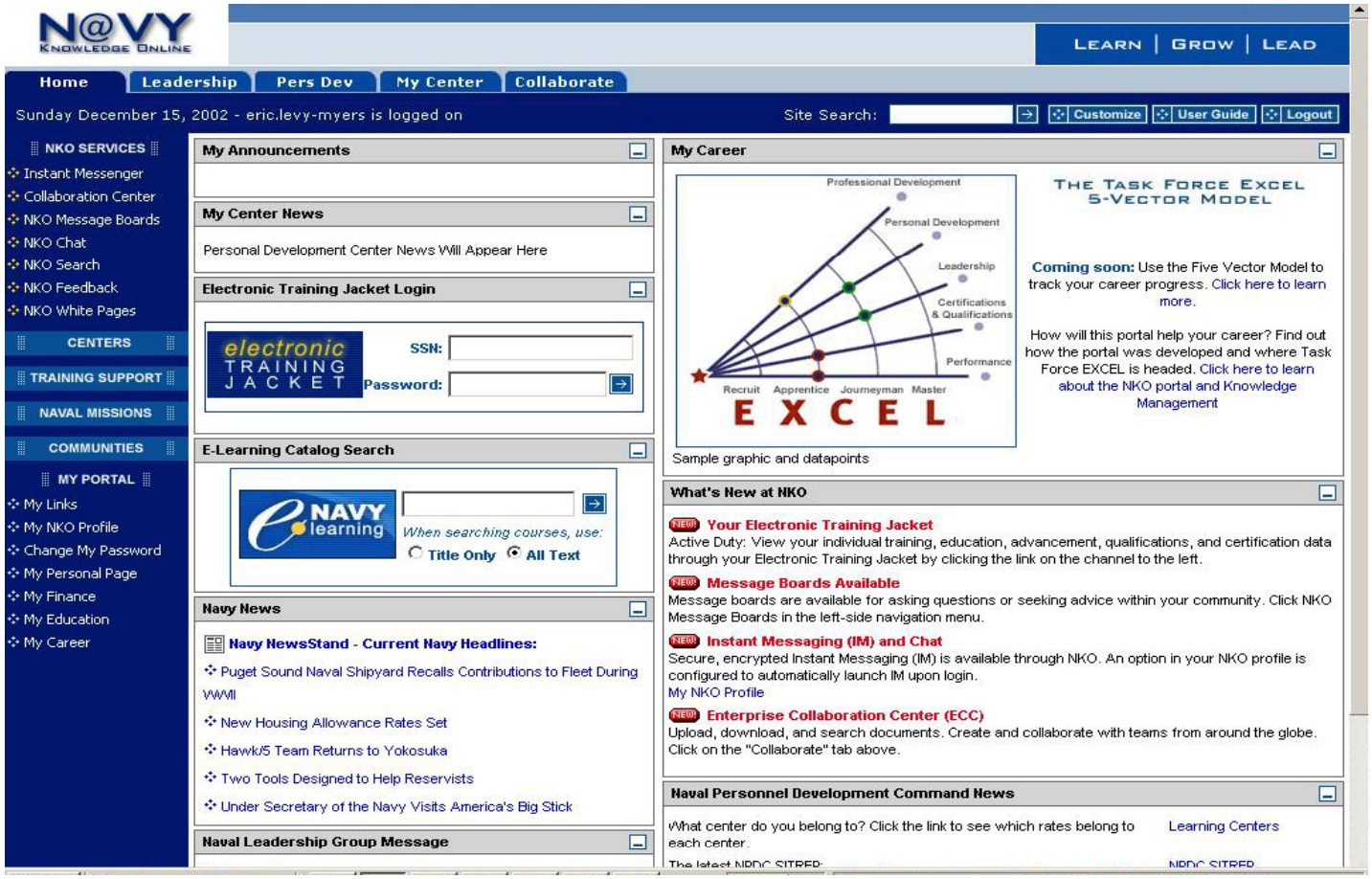
Definition of a Portal

- Network accessible web-based IT systems that provide a single point of access to multiple systems and information resources.
- Combine targeted links with dynamic and personalized information analysis and retrieval.
- Commonly include functions for posting news, calendars, personnel directories, storing documents, accessing other systems, collaboration, and full-text search.
- Differ from websites by their level of dynamic information aggregation and presentation, and integration to other web-enabled systems.

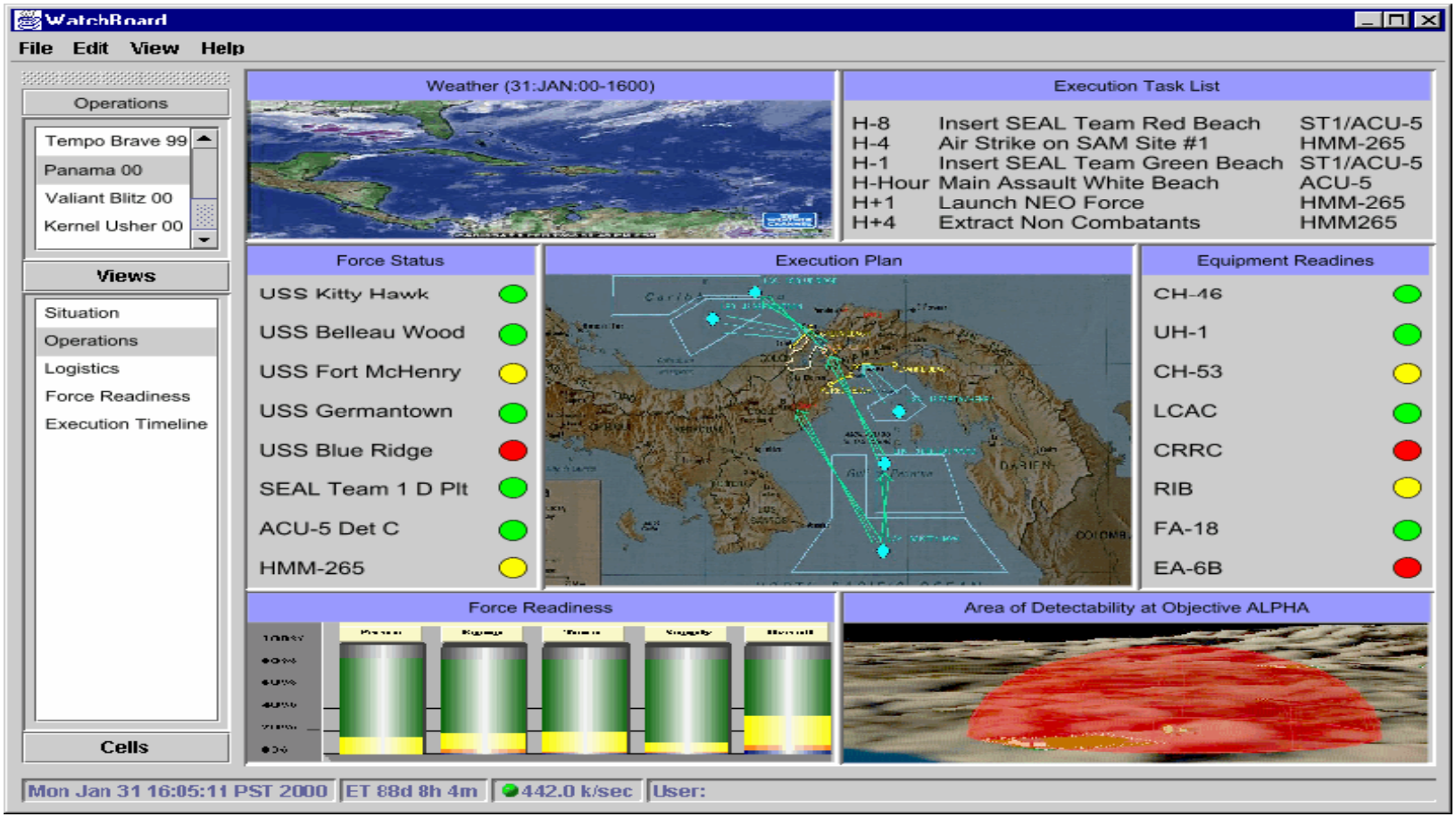
Portal: Public website

Portal: Enterprise Intranet

Navy Knowledge Online



Portal: Military Operations



Portal Business Value

- Information aggregation
- Application integration
- Standardization
- Interoperability
- Consistency
- Usability
- Information quality
- Lower total cost of ownership
- Extensibility

Portal: Information Aggregation

- One place to go to for all “relevant” information
  - News
  - Policy
  - Reports
  - Program management
  - Discussion threads
  - External (which ones?)

Portal: Application Integration

- Combine “relevant” applications with information
  - Business intelligence
  - Human Resources
  - Content Management
  - Project management
  - Task
  - Collaboration
  - Document management
  - Search

Portal uses within a KM environment

- Information Relationships
- Document Profiling
- Categorization
- Index creation
- Taxonomy/Ontology Development
- Meta-data
- Search
- Expertise Location (tracking SMEs)

KM Portals: Key Issues

- KM portals MUST present pre-analyzed, validated, contextually integrated information packages to users
- Shifts the level of effort to finding the “right information” to the system and administrators away from the end-users

Portal Core Functions

- Database access
- File repository
- Controlled information presentation
- Independent user interface regions
- Collaboration
- Links
- Data & information retrieval: search, discovery, navigation
- Application access (single sign-on)
- Web administration (users, content)

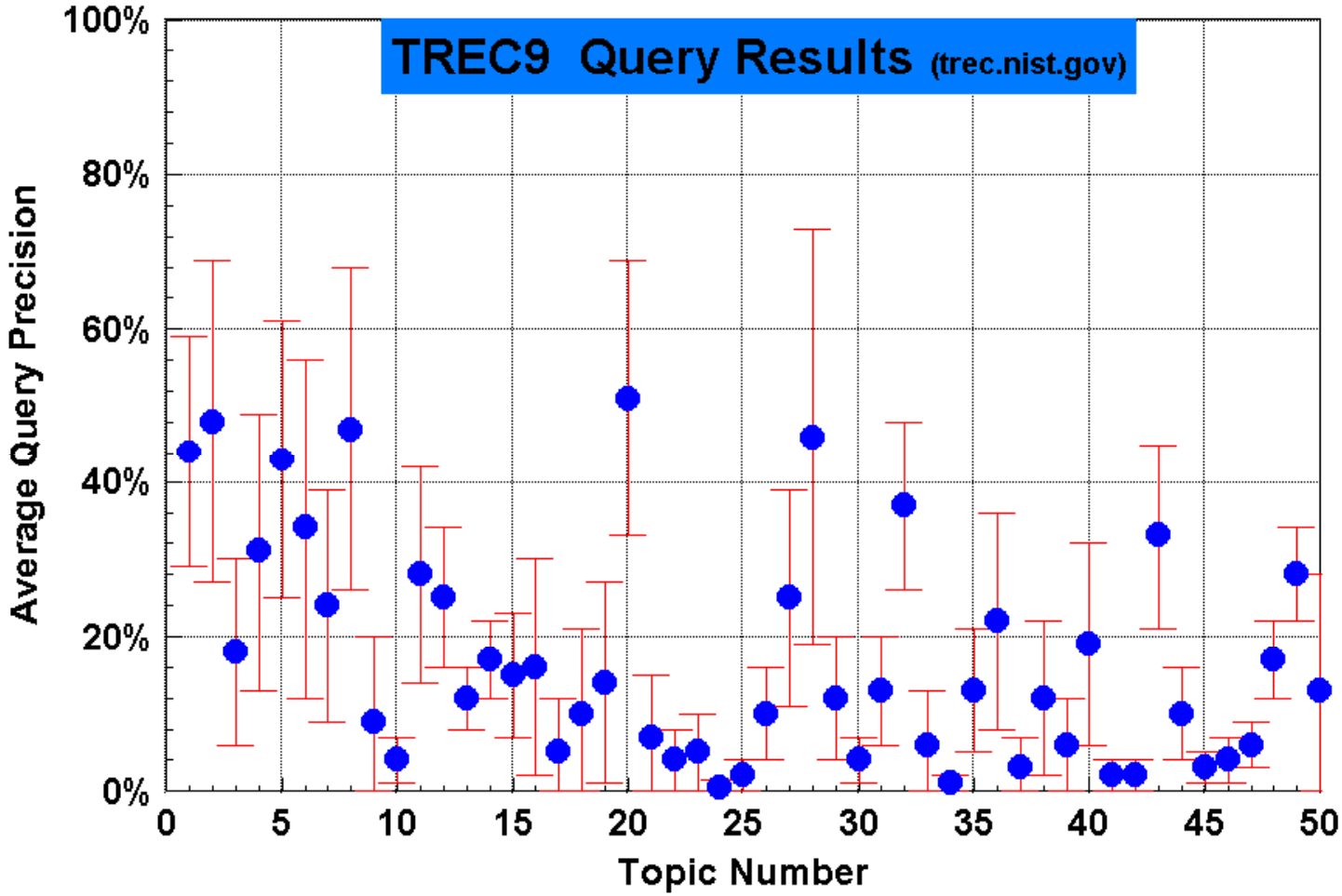
Portal Components

Tool	Function	KM value
Portal engine	Web browser display of information & applications	Collated access of related & relevant information
File storage	Store documents in secure central folders	Collated validated and easy to find key documents
Instant messaging	Rapid short communication among pre-defined group	Quick-response distributed terse comments between trusted group members
Threaded discussion	Organized topic discussions available over time	Focused commentary from members distributed in space and time on key issues
Search & discovery	Ad hoc queries of web, database, and file content	Find relevant information from total stored resources **quickly** and **precisely**
Application integration	Connect multiple applications & databases	Collated secure & seamless access to key applications

What Makes IT Work for KM?

- Seamless integration
- Intuitive navigation
- Rapid and precise information retrieval and discovery
- Ease-of-use
- Contextual connections and relevance

Modern Search is Good but Not Quite Enough



Portal Usability

- Portal usability types
  - Functional: can it do something
  - User experience: is it easy to use; do I get what I need
- Intangible measures control user satisfaction
  - Easy (to do what, when, for whom?)
  - Fast (when, network vs application, external ?)
  - Precise (who defines, information fusion – what are rules?)
- Technology is not the answer
  - Business process metrics needed
  - Technology supports process
  - Integrating technology-process-organization is the answer

Portal Usability Precepts

Intranet Usability: The Trillion-Dollar Question Summary, Jakob Nielsen, 11Nov02, http://www.useit.com/alertbox/

- Need executive support and budget
- "Poor search was the greatest single cause ...."
- "…lack of consistent navigation was a big issue."
- Content Usability:
  - "Search and navigation exist for one reason: to help users find content.
  - Many intranets were good at providing updated news about the company…
  - {but} substantially less successful at dealing with old news, archiving it, and integrating it with the main intranet areas.

Case Study: Functionality Problems

- Group chat sessions need to be organized, scheduled, and actively managed
- Instant messaging user access is too restrictive (accessibility)
- Polls are not always relevant and targeted to a specific intent
- Need expertise locator (yellow pages)
- Inadequate personalization of information delivery

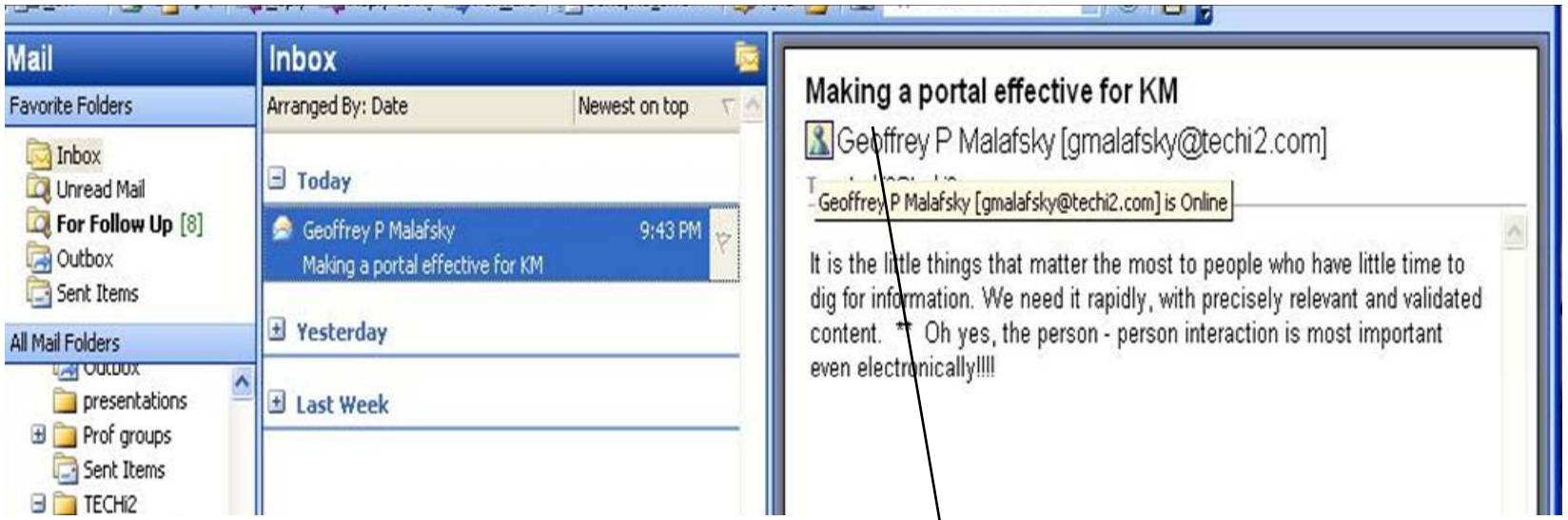
Case Study: Content Quality

- Uneven across groups
- Content management is too laborious
- Too many general and untargeted links
- Message boards are effective tools but need to be actively managed
- Need more Frequently Asked Questions (FAQs) about all subjects including performing jobs, training, known problems

Case Study: Findings

- Content Organization and Layout
  - The organization of content needs to be homogenous
    - Inconsistent file repository and web site navigation
    - Inconsistent web page design quality
- Performance and speed
  - Bandwidth is still a concern
  - Performance has degraded with additional users

Examples: Usability aids

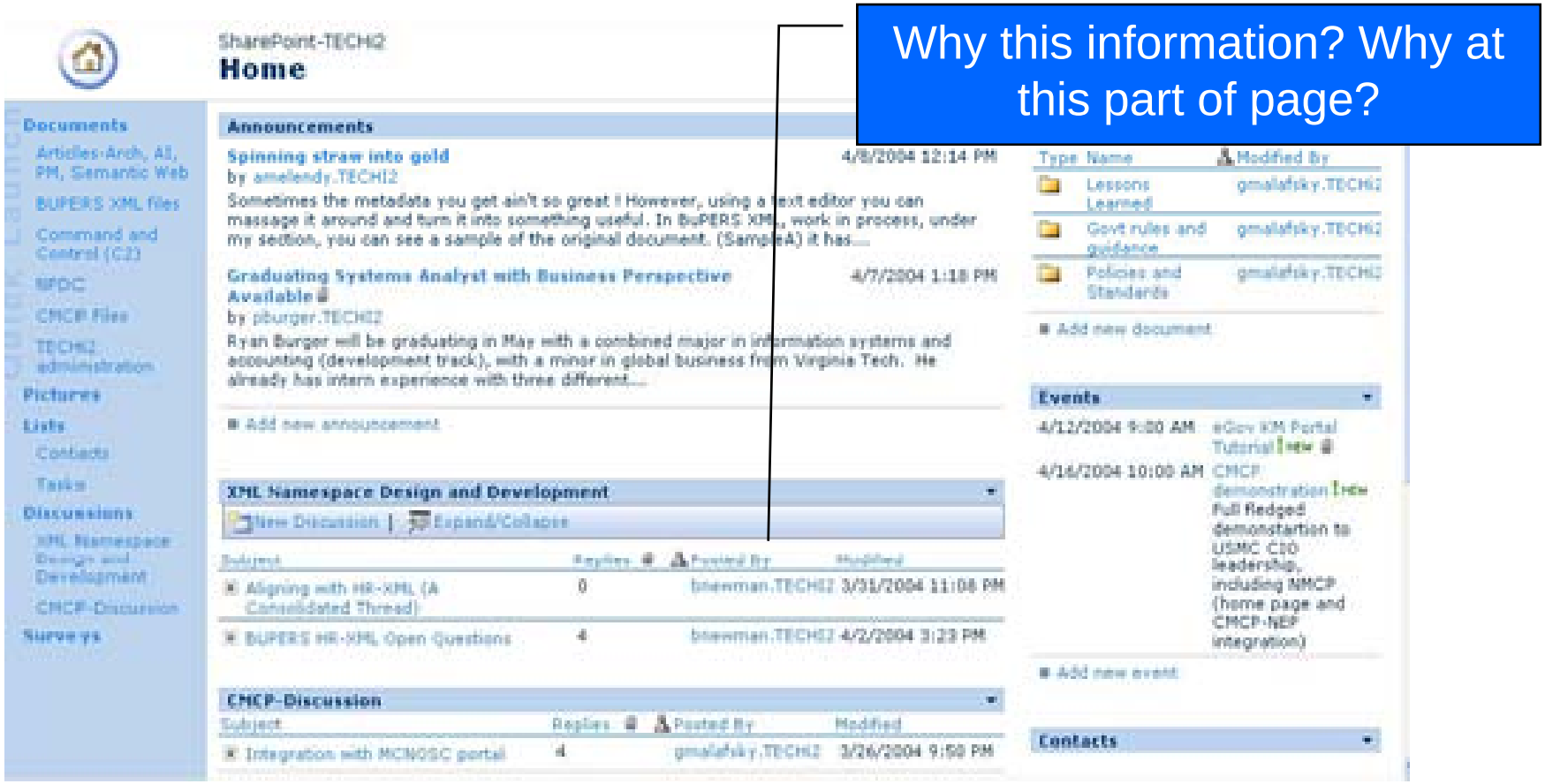


Live Instant Messenger status is part of email address

Examples: Linkages

Direct connection to alternate form of communication

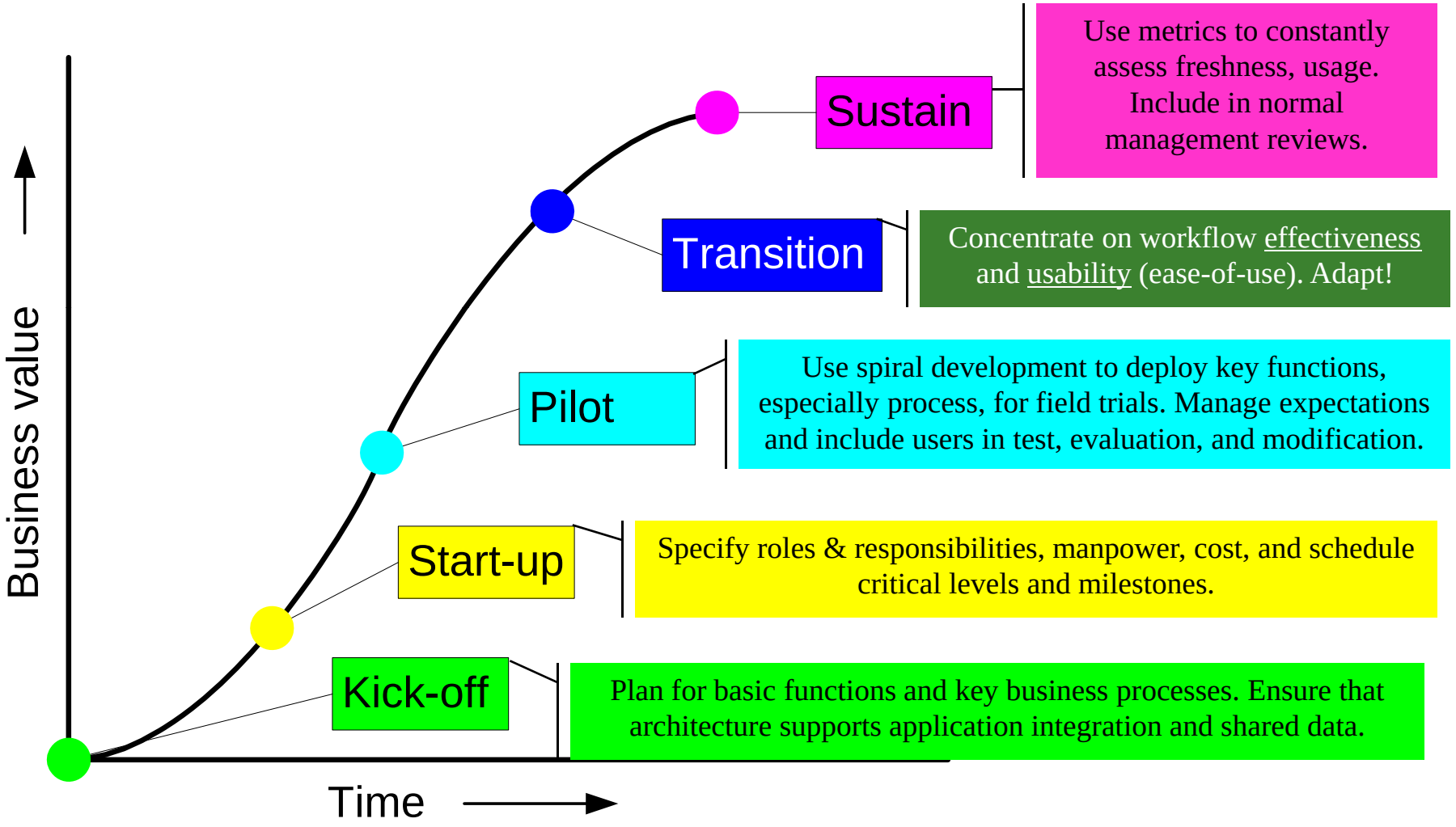
Content is King: Quality, Relevance



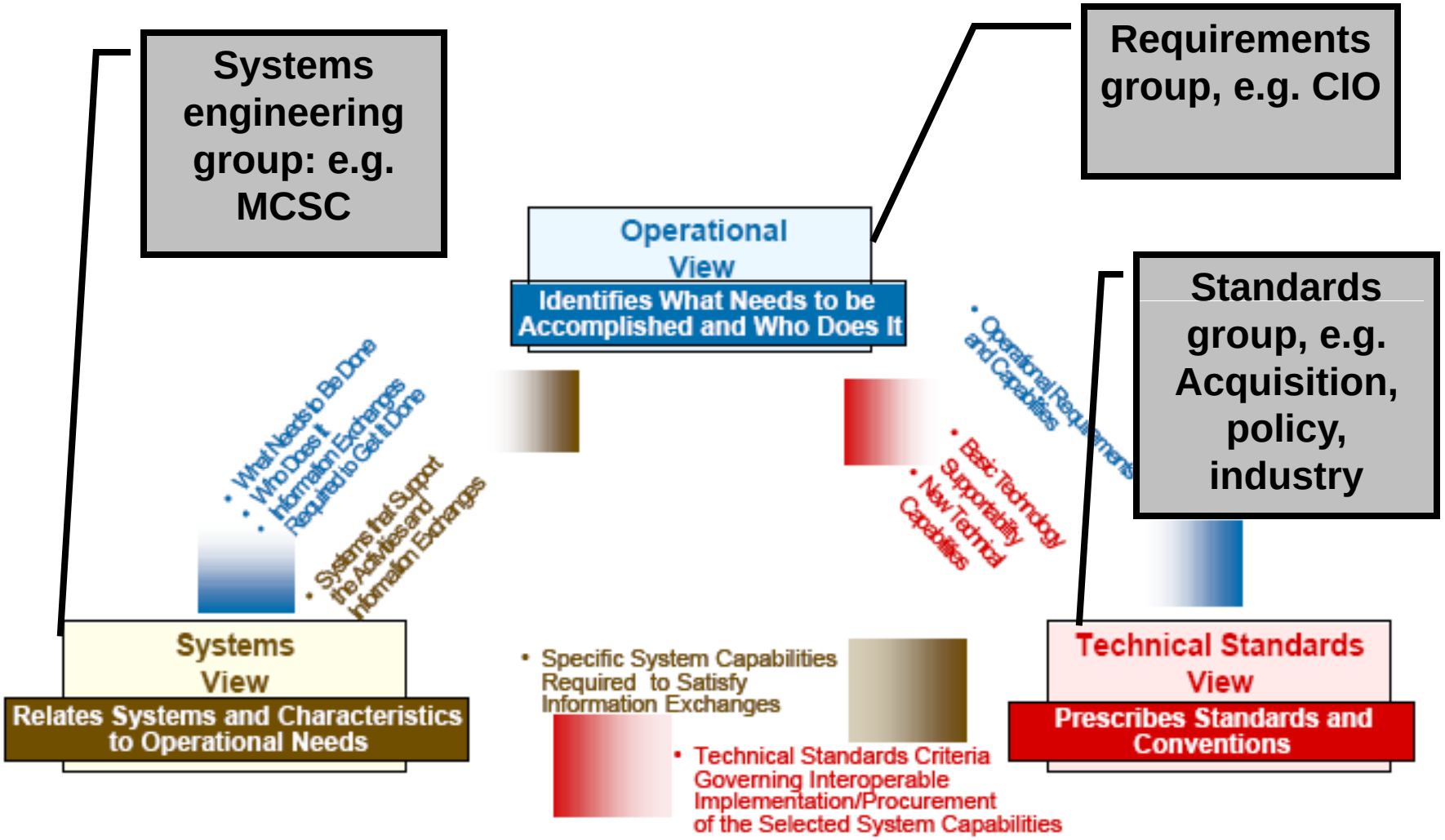
Using EA for KM Success – or- Putting KM into EA

Section 6

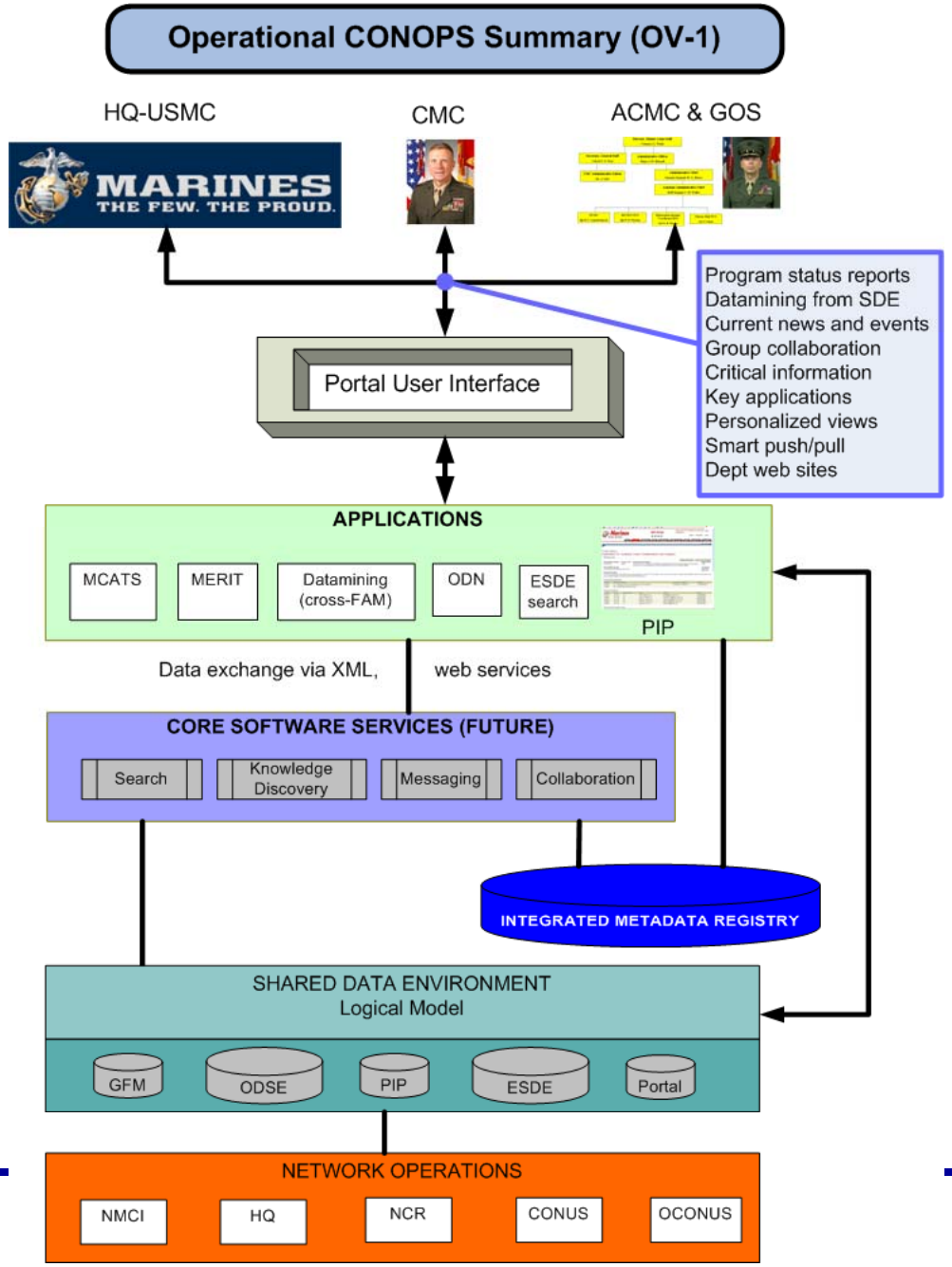
KM Lifecycle: Development



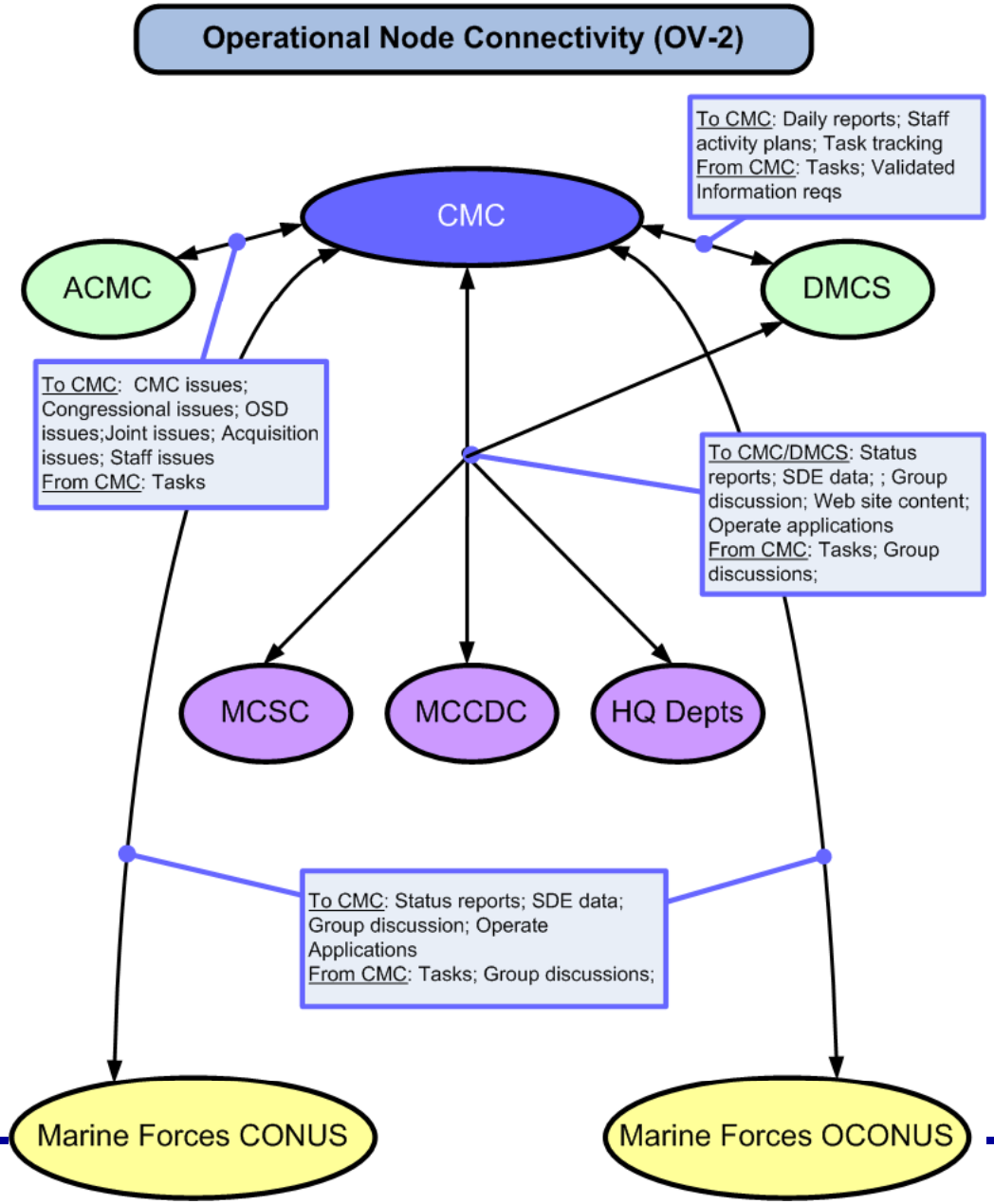
DODAF Views


Systems engineering group: e.g. MCSC
Requirements group, e.g. CIO
Standards group, e.g. Acquisition, policy, industry
Operational View
Identifies What Needs to be Accomplished and Who Does It
• What Needs to Be Done
• Who Does It
• Information Exchanges Required to Get It Done
• Systems that Support the Activities and Information Exchanges
• Operational Requirements and Capabilities
• Basic Technology Supportability
• New Technical Capabilities
Systems View
Relates Systems and Characteristics to Operational Needs
• Specific System Capabilities Required to Satisfy Information Exchanges
Technical Standards View
Prescribes Standards and Conventions
• Technical Standards Criteria Governing Interoperable Implementation/Procurement of the Selected System Capabilities

As an example, a portal was designed for the Commandant of the Marine Corps (CMC). As this OV-1 shows, the intent of the portal is not to deploy just a portal but to provide the Marine Corps senior leadership with one secure tool bringing together applications, databases, and metadata to provide key information and data.



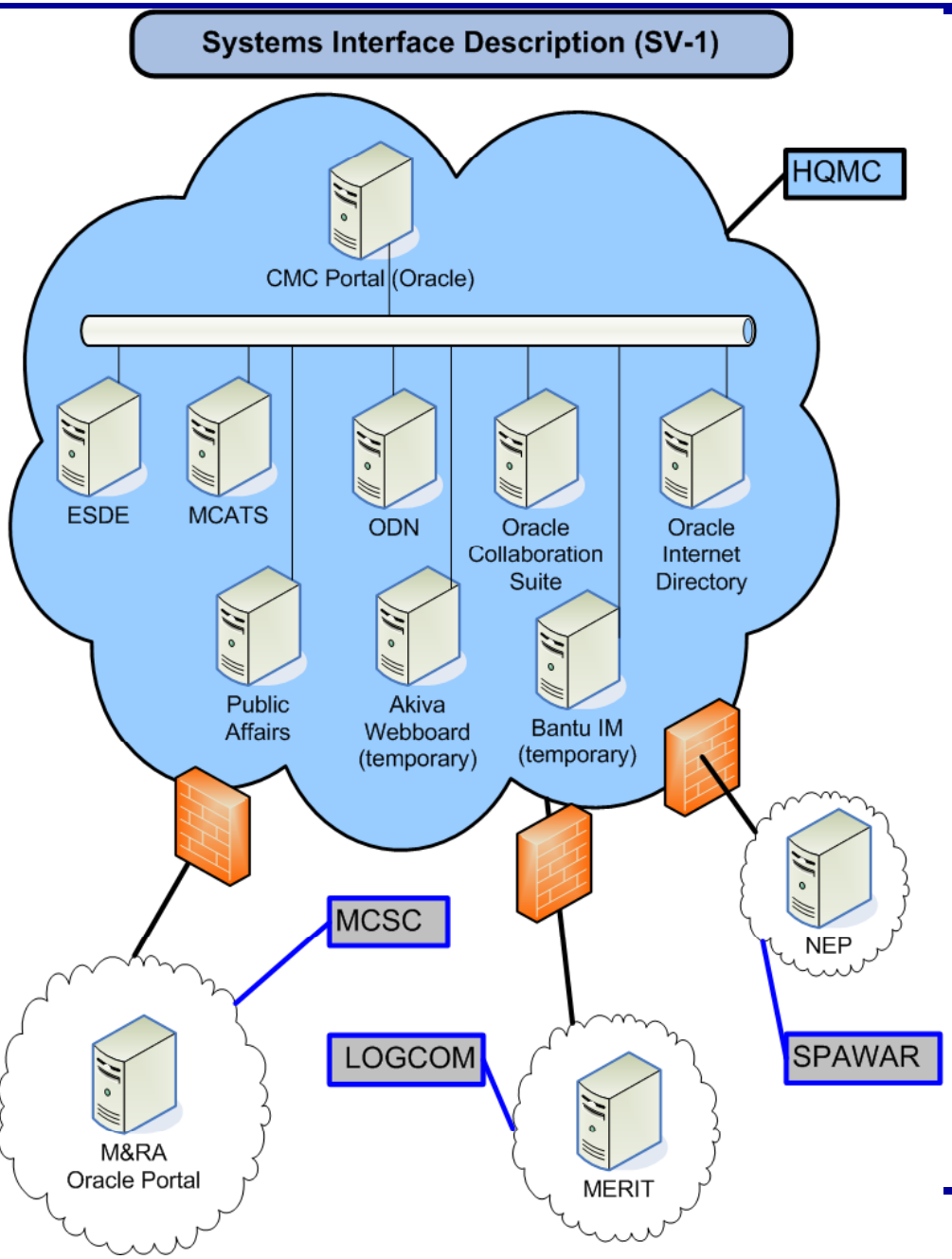
The OV-2 for the Commandant's portal shows the major stakeholders and how they are connected in terms of *information* needs. A separate product (i.e. SV) will show how the system components are connected for each stakeholder.



CMC Portal OV-3: Information Exchange Requirement

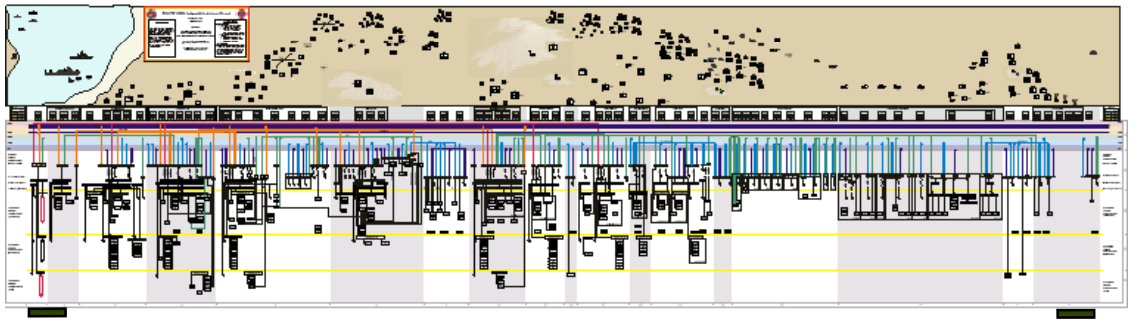
Need Line ID	Info Exch ID	Content	Scope	Media Type	Acc	Produce r	Cons	Security Class	Time	Crit	Freq	IA
A (ACMC-CMC)												
	A-1	CMC Issues	Maintains Organizational awareness at same level as CMC in role as Assistant	Data, Text, Graphics, Audio, Video	High	ACMC	CMC	U, SBU	minutes-weeks	High	Event Driven	High
	A-2	Congressional Issues	Keeps CMC informed of Congressional activities that affect USMC	Data, Text, Graphics, Audio, Video	High	ACMC	CMC	U, SBU	hours-days	High	Event Driven	High
	A-3	OSD Issues	Keeps CMC informed of OSD issues that affect USMC	Data, Text, Graphics, Audio, Video	High	ACMC	CMC	U, SBU	hours-days	High	Event Driven	High

The SV-1 for the Commandant's portal shows the major system components and how they are connected in terms of *hardware* needs.

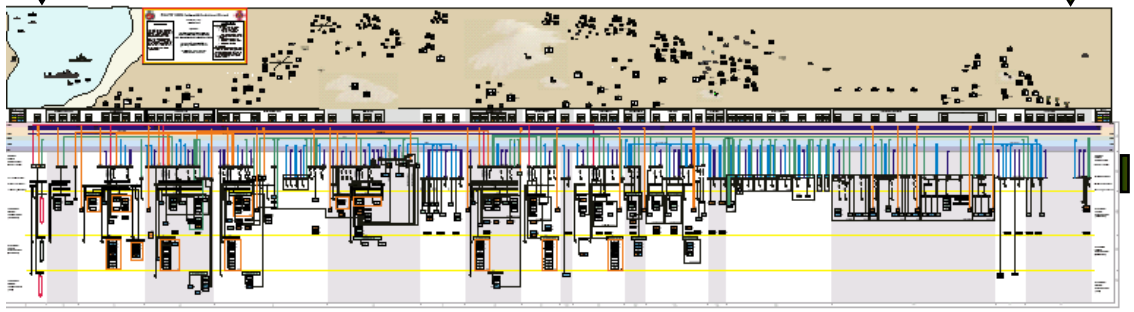


Example: Marine Corps System Command

***Takes the…*Baseline Architecture**



***Utilizes…* an Integration Plan**



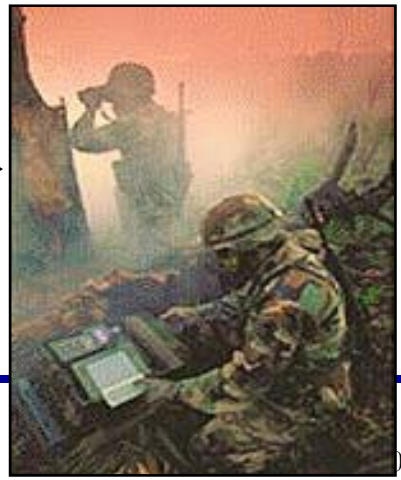
***To develop…*a Target Architecture**

Enterprise Architecture –

•Is a discipline for assessing and recommending candidate Information Technology solutions in an integrated context with business and mission operations

Translates to –

•Significant increase in the Warfighting Capability



EA Guides Operational Requirements

Provides the basis from which we define operational capabilities

➢Describes the linkages among systems, which turn separate systems into Warfighting Capabilities.








EA is the disciplined approach to achieve a Network Centric Warfare Capability

EA Guides Systems Engineering

- It provides a tool for systems engineers to communicate so that the separate system designs become integrated to produce required Operational Capabilities.







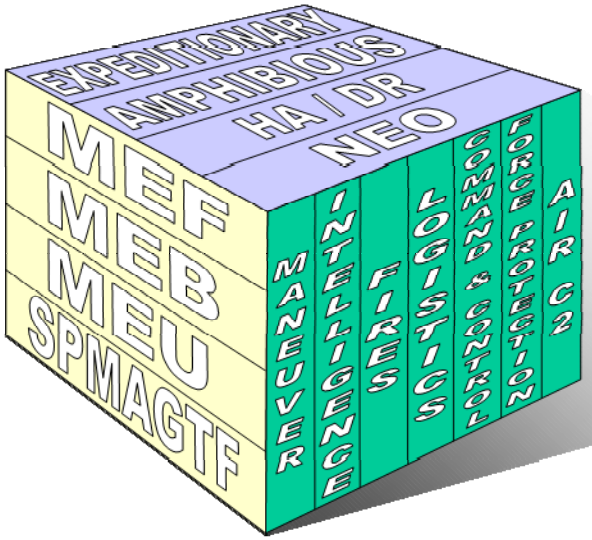


TECHi2

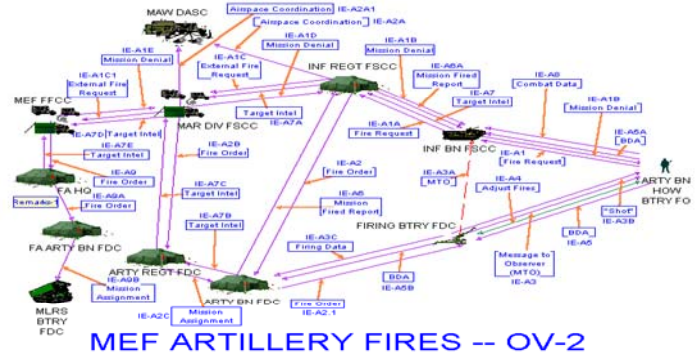
EA Guides Modeling and Testing

- It provides a tool for test engineers to develop scripts which are operationally relevant and doctrinally sound that goes beyond architecture modeling.

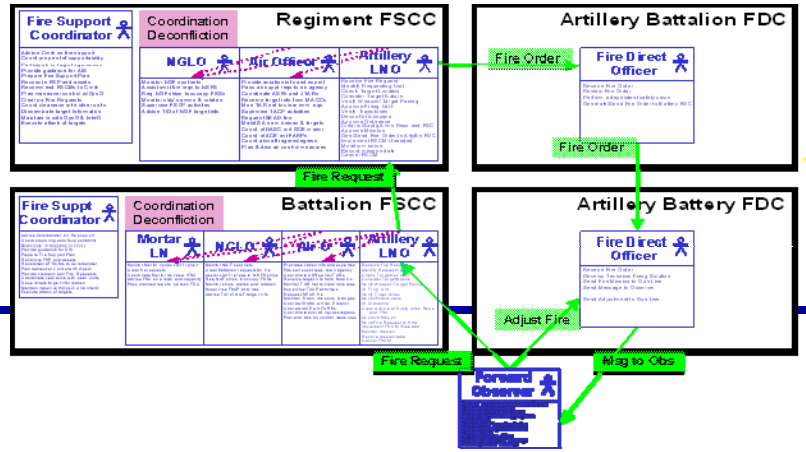
Architecture Cube



Agency-Level View (OV-2)



Roles & Chores (Composite View)



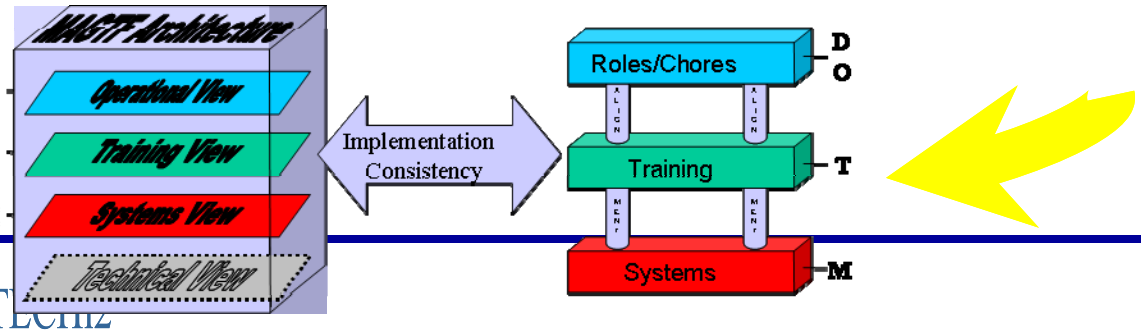
EA is Analysis and Process

- It provides a common framework to evaluate, analyze and report linkages and sensitivities among the DOTMLPF factors.

Map Roles & Chores to Systems

Map Chores to System-Operator Steps

Assess Consistency of Doctrine, Organization, Training, and Materiel



Roles and Responsibilities MOA

HQMC, C4 CIO

- Define and issue IT standards and policies
- Participate in the collaborative environment
- Develop the Roadmap for enhancing the EITA
- Address architectures in AIS/IT requirements

MCCDC

- Develop and maintain the operational architectures and concepts
- Participate in the collaborative environment
- Address architectures in AIS/IT requirements

MCSC

- Develop and maintain systems and technical architectures
- Create a collaborative environment to develop and maintain the EITA
- Ensure all IT programs are compliant with the EITA
- Lead the resolution of conflicts between operational, systems, and technical views

Enterprise Architecture: The So What

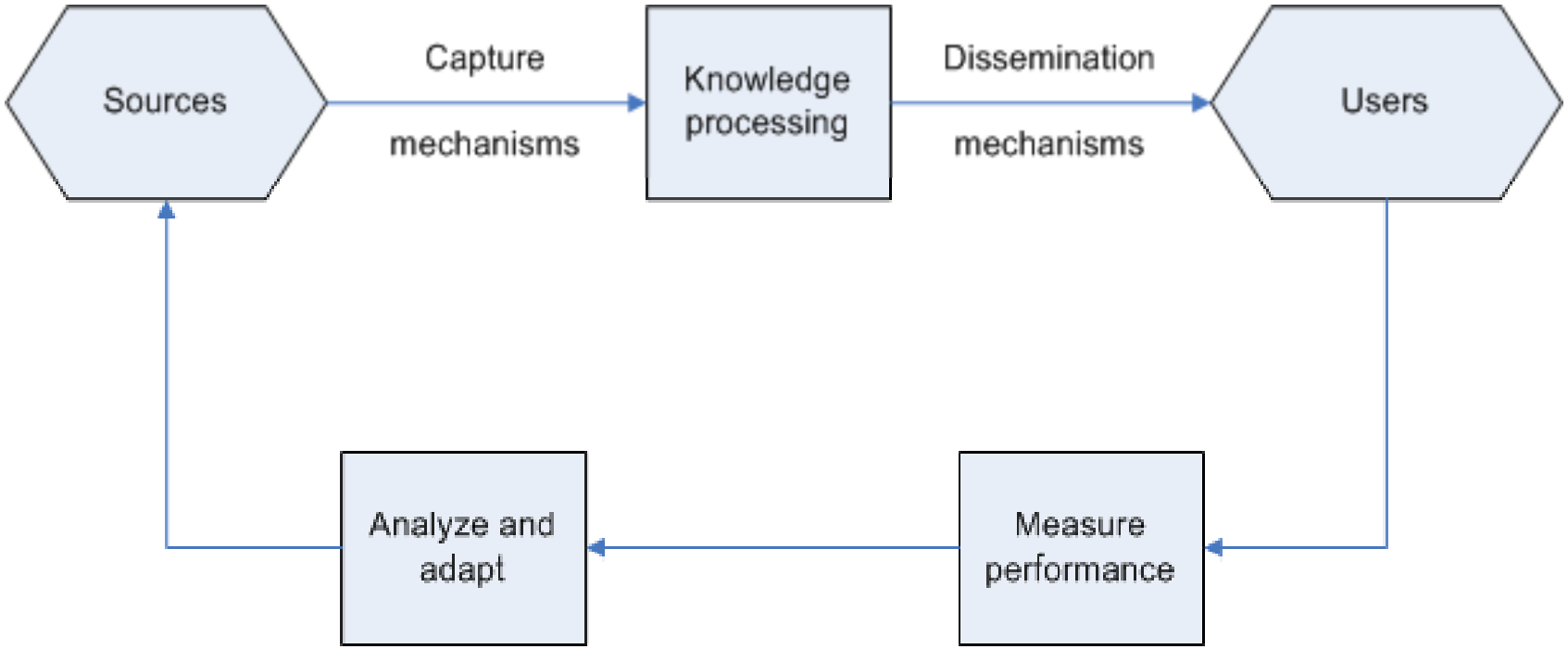
- Forcing function for creating system interoperability, integration and training
  - System identification and interfaces
  - NCES/NII/OSD requirements
  - Organizational processes
  - Program alignment and interoperability

KM Procedures

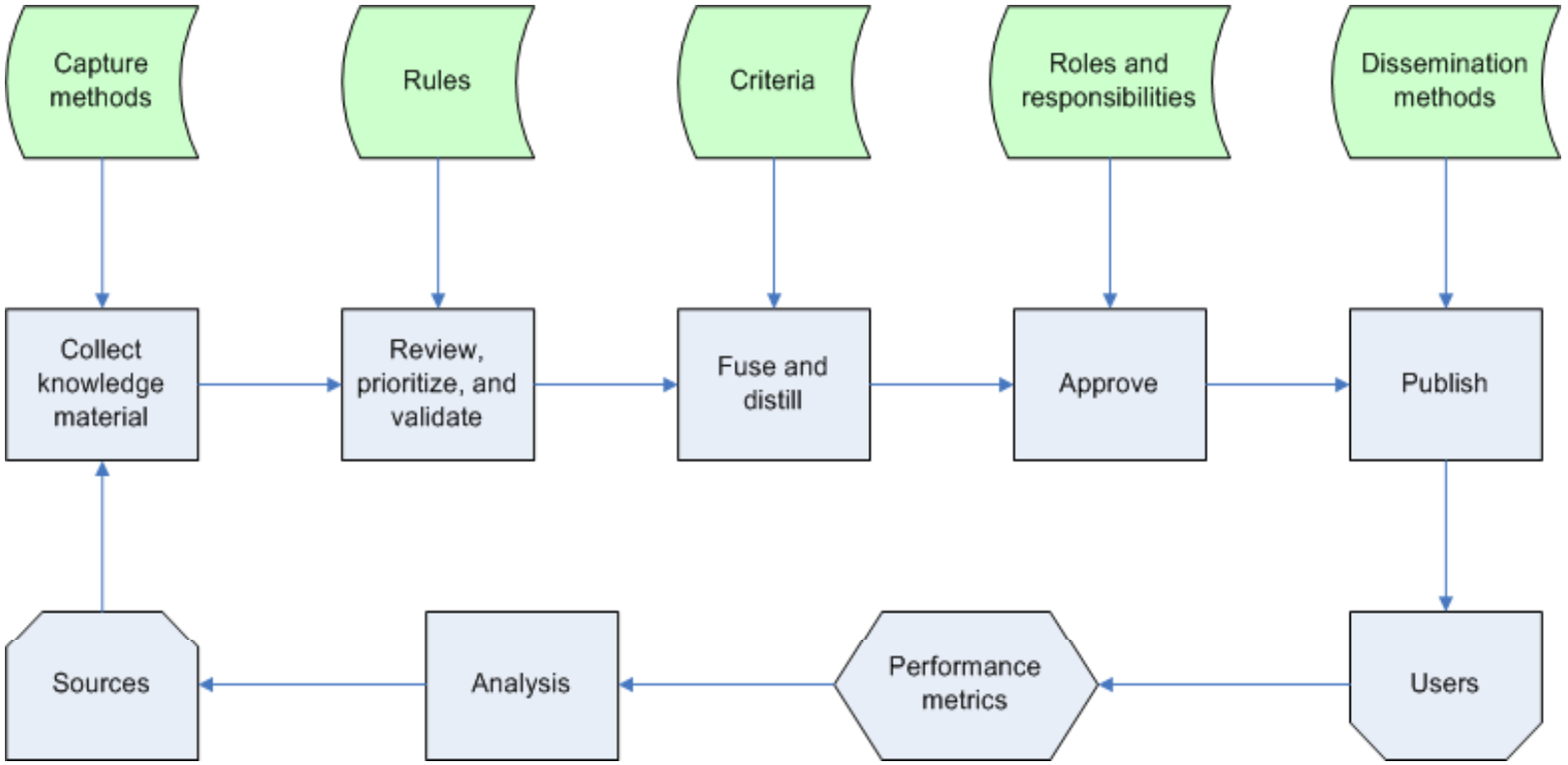
KM Procedures: Purpose

- Provide a guide for business units' personnel to capture, transform, disseminate and use key knowledge assets.
- Focus on concrete procedures to process knowledge where the highest concentration of information and data are used in daily operations.
- Capitalize on the many grass-roots opportunities to increase efficiency, effectiveness, and quality in these situations and to multiply these successes across the enterprise.

Knowledge Process Design



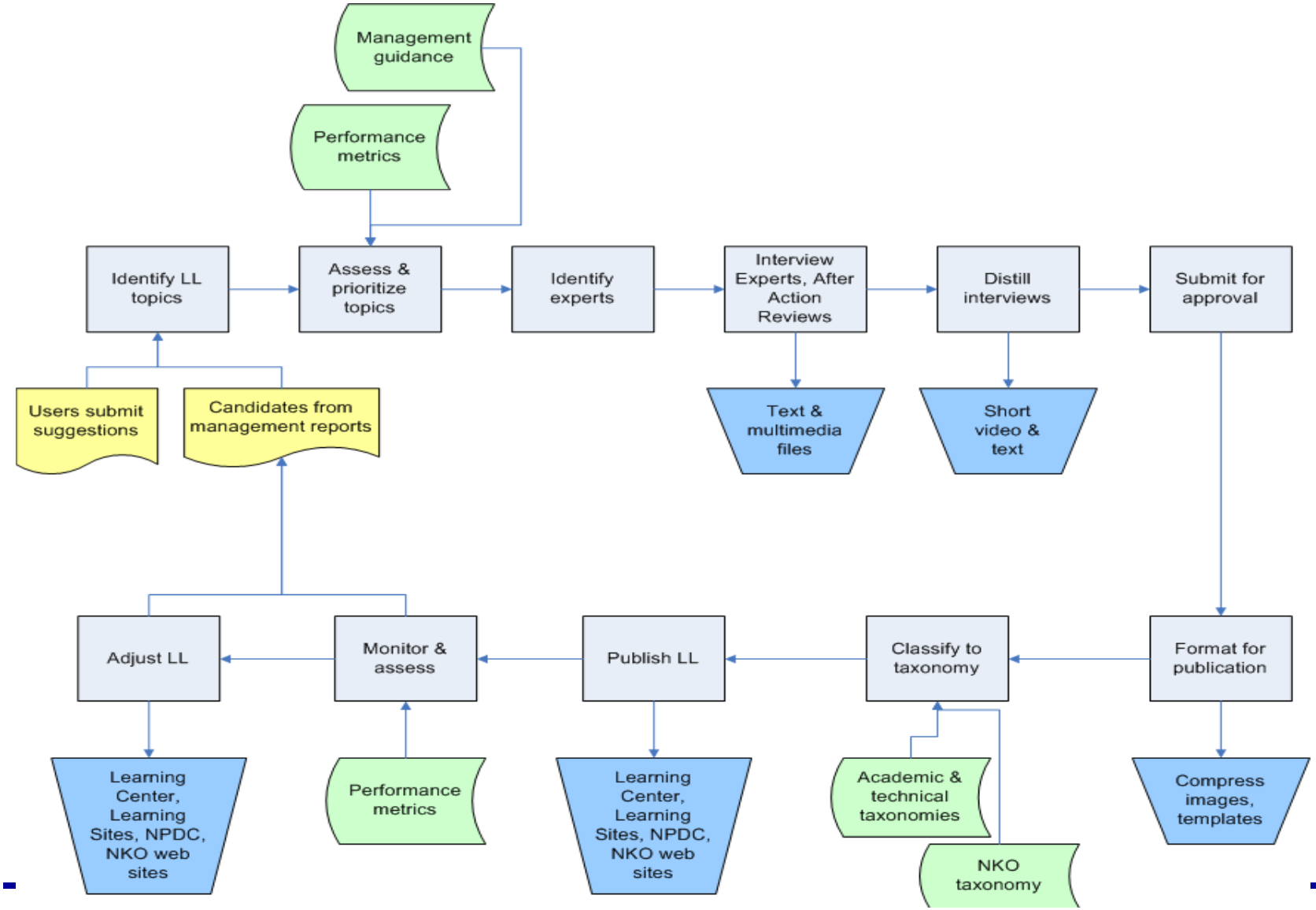
Knowledge Procedures



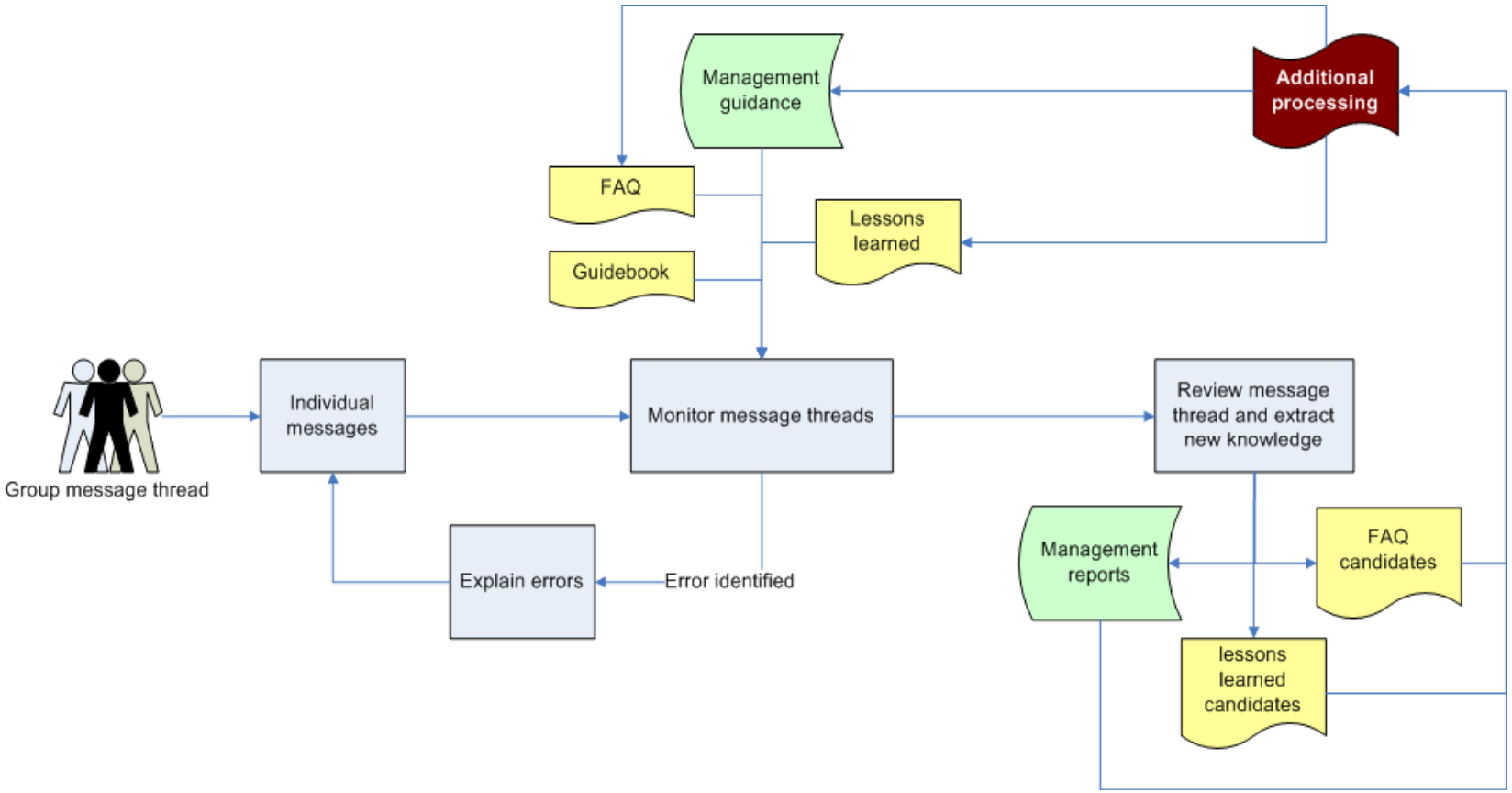
Procedures

#	Title	Knowledge
1	Lessons learned	Succinct and targeted commentary from trusted experts on select topics with established benefits to daily operations
2	FAQ	Questions and answers on common issues and problems encountered during key operation activities and on important topics
3	Guidebooks	Guidebooks produced by SMEs and experienced personnel explaining key topics and fine points that are important to activities and topics
4	Storytelling	Personal knowledge and ideas transferred to other people in a narrative conveying context and trust
5	Real-time group chat	Online text, image, and audio conversations among a small group of people sharing stories, information, targeted knowledge similar to an in-person meeting
6	Discussion boards	Online threaded messages focused on a single topic with personal knowledge and opinions
7	Conferences	Formal and informal exchange of individual and group knowledge in a large gathering of people centered on a related set of topics
8	Course web sites	Central web site for a course with current and validated awareness and knowledge on plans, issues, people, events, and general purpose best practices, and lessons learned
9	File sharing	Common access to stored files that have been filtered, named, and classified to maximize relevance, timeliness, and accuracy to known information needs of colleagues
10	Metrics analysis	Analysis of performance measures that are strongly linked to key objectives of knowledge processes with conclusions and resulting plans of action

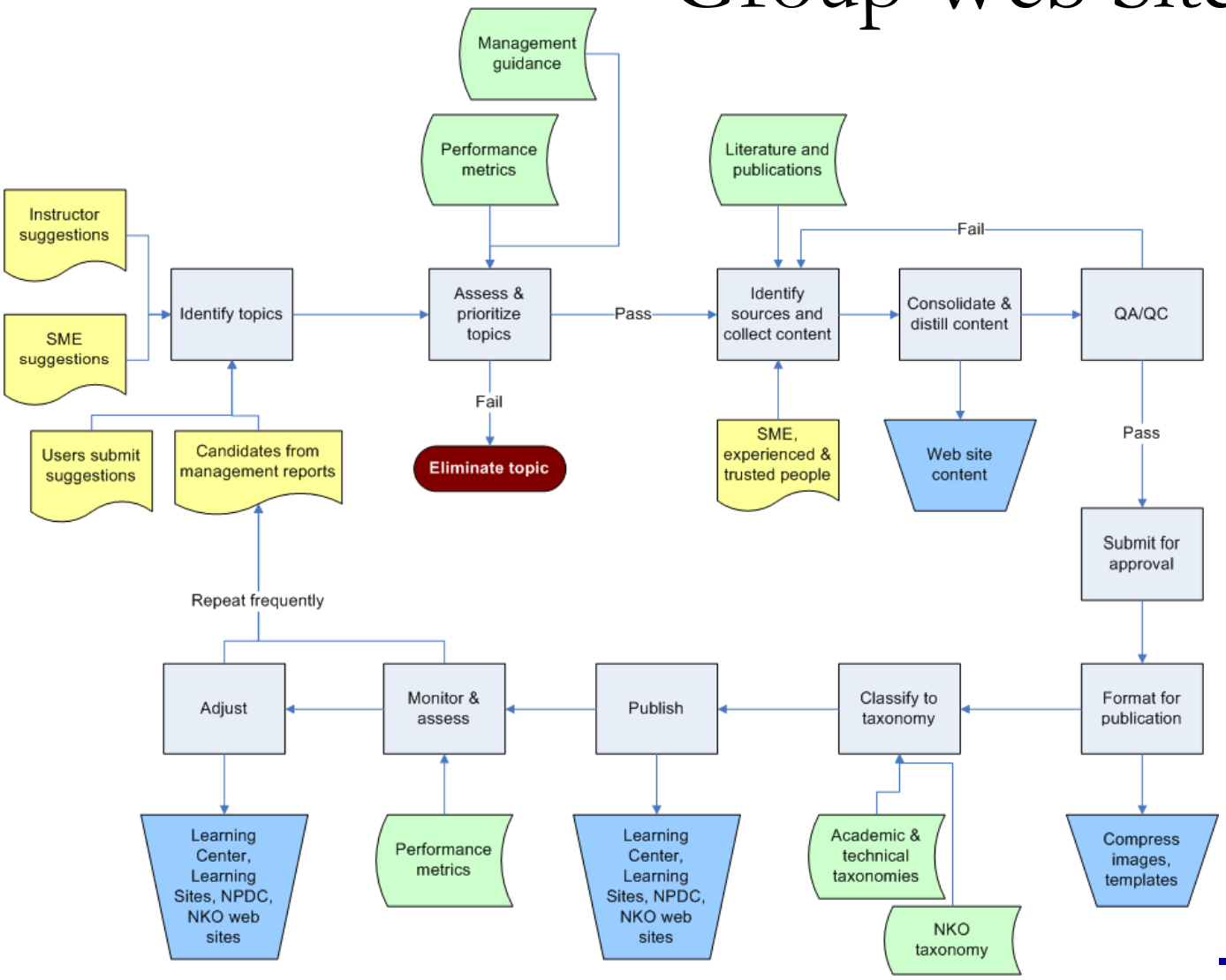
Lessons Learned



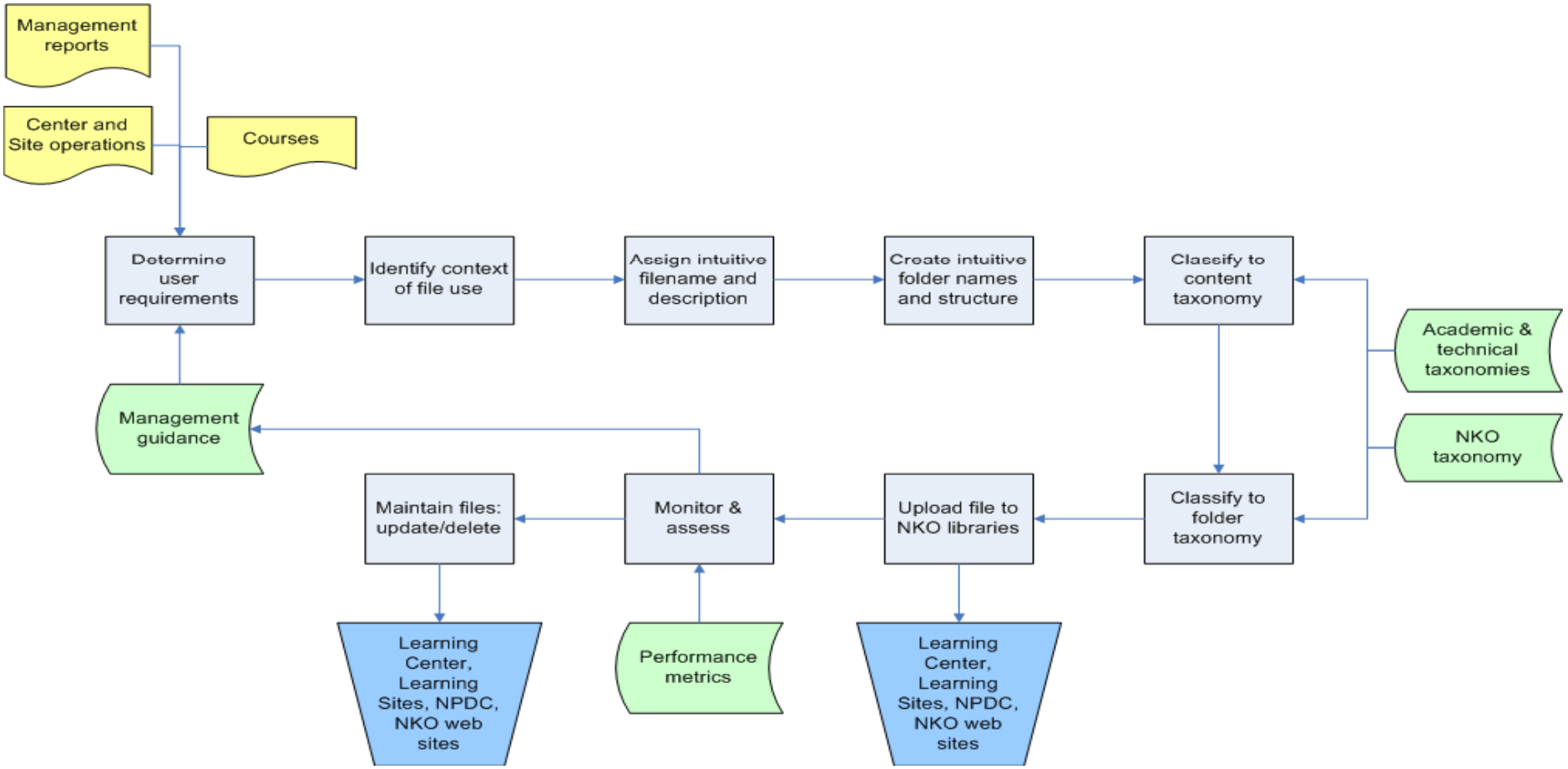
Discussion Boards



Group Web Sites



File Sharing



Designing Systems for Success: The Information Architecture

Organizing Information

- Ontologies and taxonomies
  - concepts and descriptions
- Develop enterprise architecture for organizational taxonomies
  - Every workgroup naturally develops its own most efficient schema
- People mentally organize in multiple ways based on task and interest

Taxonomy Definition: APQC

- A classification scheme for the knowledge accessible through a given system or interface (ultimately multi-dimensional)
- Facilitates effective retrieval, capturing, and recognition of content that is important to target users
- A taxonomy typically includes:
  - A navigable hierarchy of concepts and terms
  - Information "tags" that further identify and categorize content elements
- Links from the taxonomy lead to resources (e.g., people, documents, and events)
  - May or may not also include a thesaurus

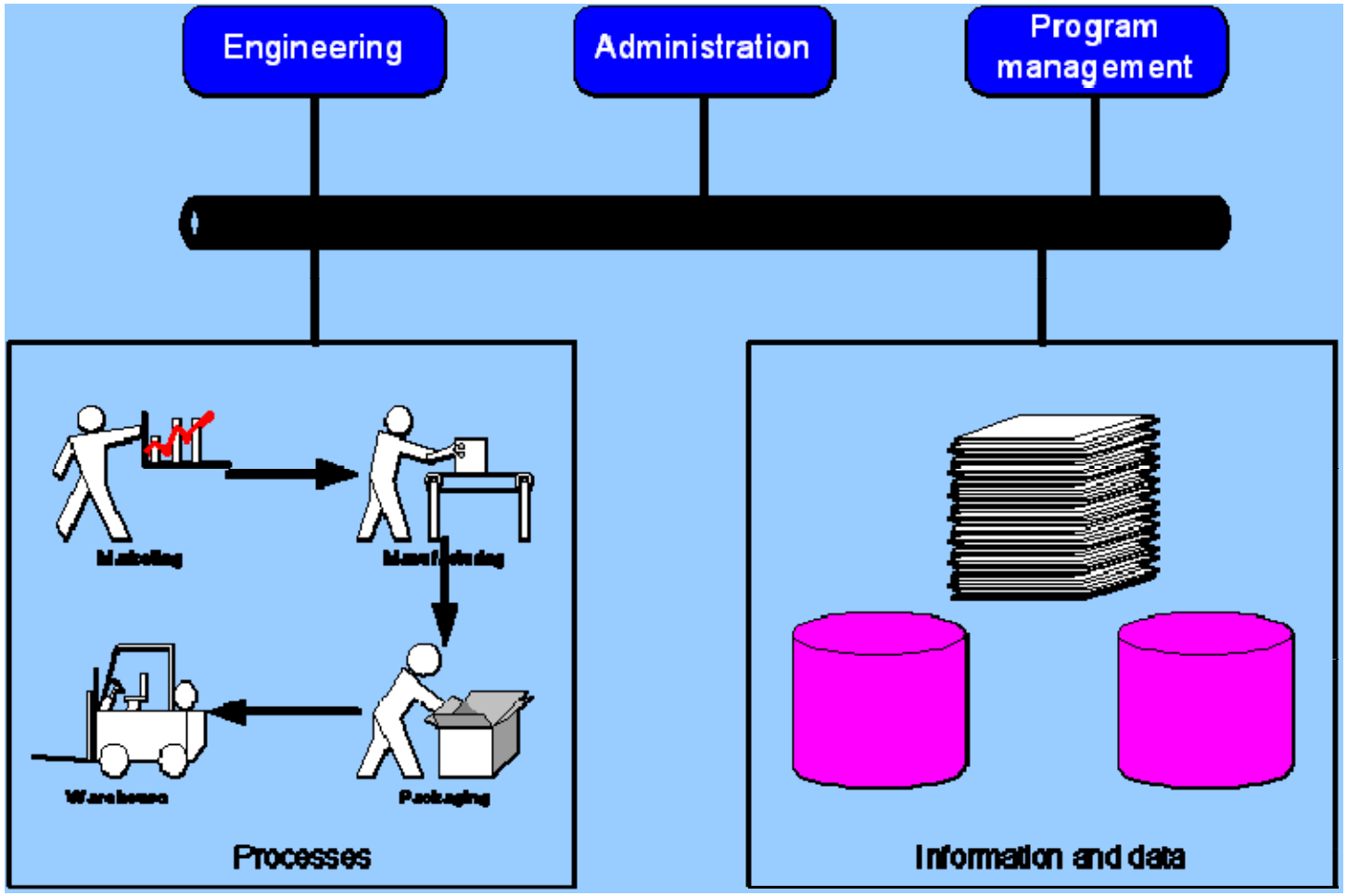
Taxonomy Complexity

80. INTERDISCIPLINARY PHYSICS AND RELATED AREAS OF SCIENCE AND TECHNOLOGY

81. Materials science

81.05.Ft	Specific materials: fabrication, treatment, testing and analysis
∀∀∀∀	*Superconducting materials, see 74.70 and 74.72*
∀∀∀∀	*Magnetic materials, see 75.50*
∀∀∀∀	*Optical materials, see 42.70*
∀∀∀∀	*Dielectric, piezoelectric, and ferroelectric materials, see 77.80*
∀∀∀∀	*Colloids, gels, and emulsions, see 82.70.D, G, K respectively*
∀∀∀∀	*Biological materials, see 87.14*
81.05.Bx	Metals, semimetals, and alloys
81.05.Cy	Elemental semiconductors
81.05.Dz	II–VI semiconductors
81.05.Ea	III–V semiconductors
81.05.Gc	Amorphous semiconductors
81.05.Hd	Other semiconductors
81.05.Je	Ceramics and refractories (including borides, carbides, hydrides, nitrides, oxides, and silicides)
81.05.Kf	Glasses (including metallic glasses)
81.05.Lg	Polymers and plastics; rubber; synthetic and natural fibers; organometallic and organic materials
81.05.Mh	Cermets, ceramic and refractory composites
81.05.Ni	Dispersion-, fiber-, and platelet-reinforced metal-based composites

Organization Requires Context



WordNet: “Search” as a Noun

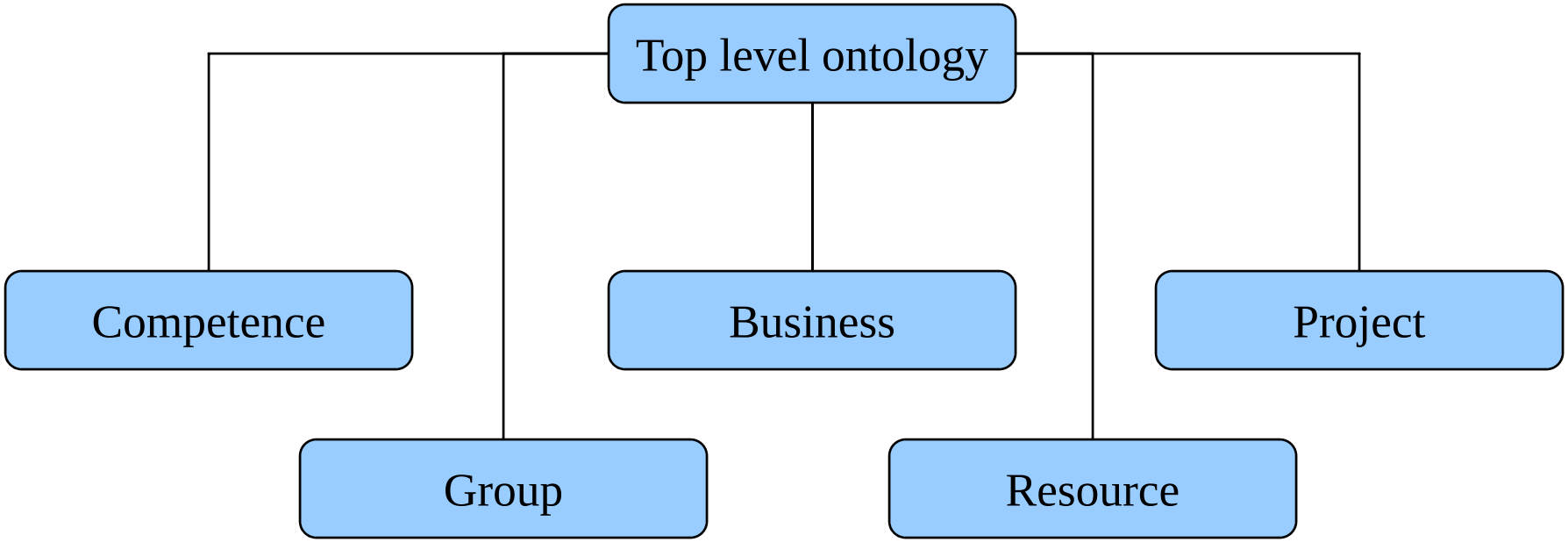
1. search, searching, hunt, hunting -- (the activity of looking thoroughly in order to find something or someone)
2. search -- (an investigation seeking answers; "a thorough search of the ledgers revealed nothing" or "the outcome justified the search")
3. search, lookup -- (an operation that determines whether one or more of a set of items has a specified property; "they wrote a program to do a table lookup")
4. ……

CyC Merged Ontology

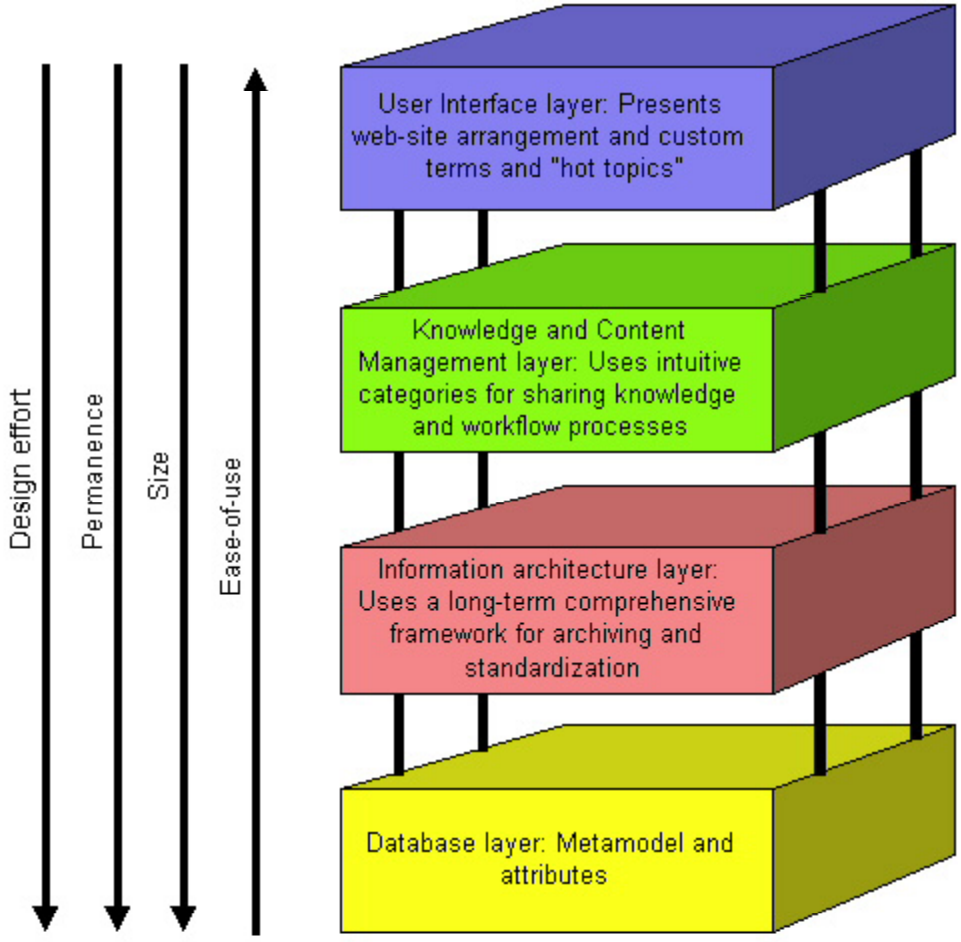
;;; #$satisfiesDescription
(#$isa #$satisfiesDescription #$TernaryPredicate)
(#$arg1Isa #$satisfiesDescription #$CycSystemList)
(#$arg2Isa #$satisfiesDescription #$CycSystemList)
(#$arg3Isa #$satisfiesDescription #$Microtheory)
(#$comment #$satisfiesDescription "ARG1 is a list of things (item1, item2, ...) which, taken together, satisfy the descriptions in the MT ARG3 of the roles listed in ARG2 (role1, role2, ...). For example, we might see (#$satisfiesDescription (Joe Jane) (TheHusband TheWife) #$HumanSocialLifeMt).")

Different Perspectives

A Group Memory System for Corporate Knowledge Management:An Ontological Approach, José Vasconcelos, et al, September 2000,



Types of Taxonomies



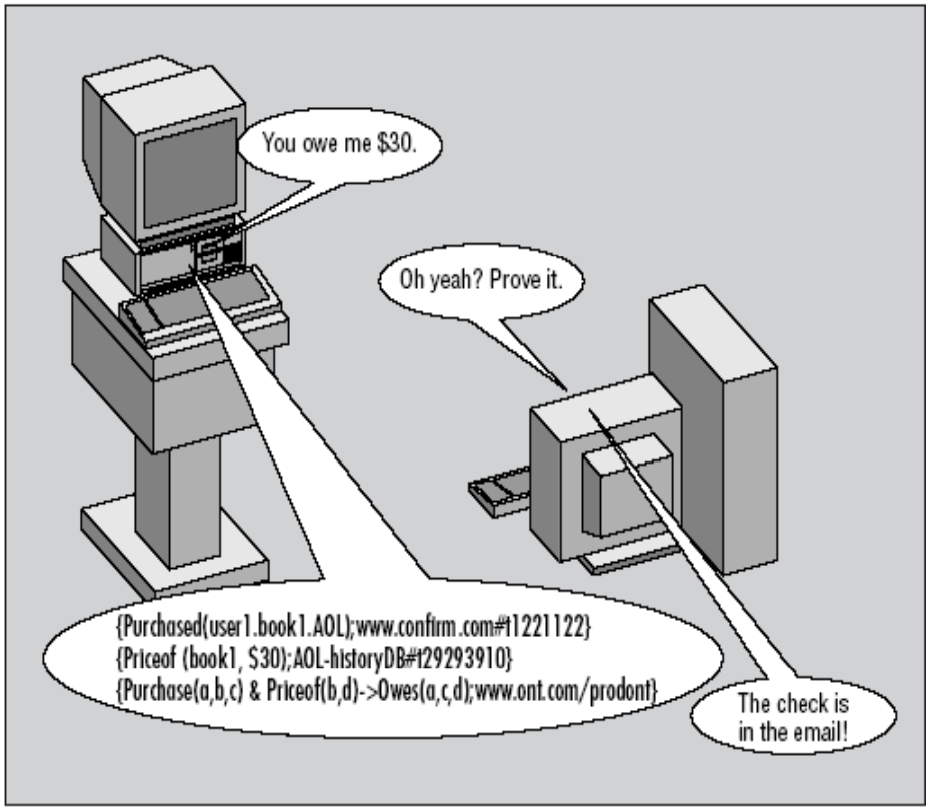
What is Metadata?

- Metadata provides additional information on context and characteristics of data and information items
- Types of metadata (what is it describing)?
  - Administrative: author, title, date, security, ..
  - Subject: METOC forecasting, Sonar LOFARGRAM analysis
  - Process: in edit, approved for publication, student taking course, on page 4,….

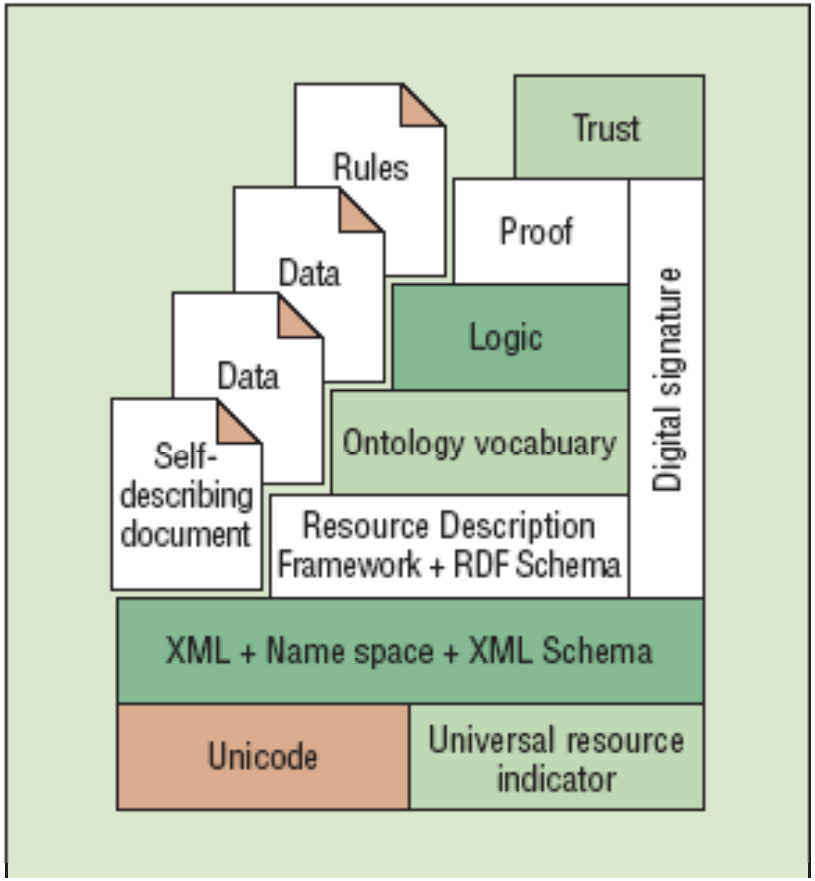
Metadata Value

- Metadata enables high quality search and information retrieval
  - Semantic Web: when is a tank for fish and when is it for desert warfare?
- Metadata enables knowledge discovery
  - "I need to find information from N1 about Costs from last month"
- Metadata enables intelligent applications
  - "Business rules" and models of our organization, e.g. 5VM
  - Automated machine-machine reasoning
- Metadata promotes interoperability
  - Describes disparate data format, content, usage, constraints

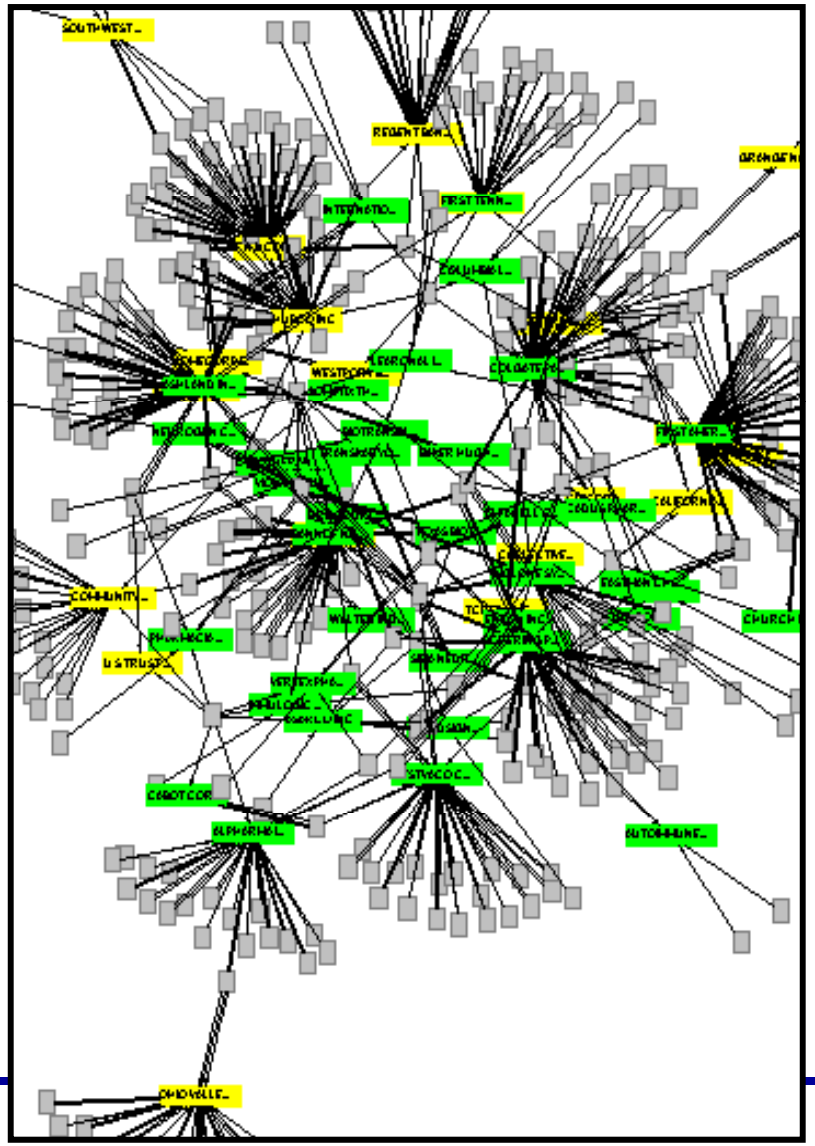
Getting the Right Information Automatically



From James Hendler, Agents and the Semantic Web, IEEE Intel Sys, Mar/Apr 2001



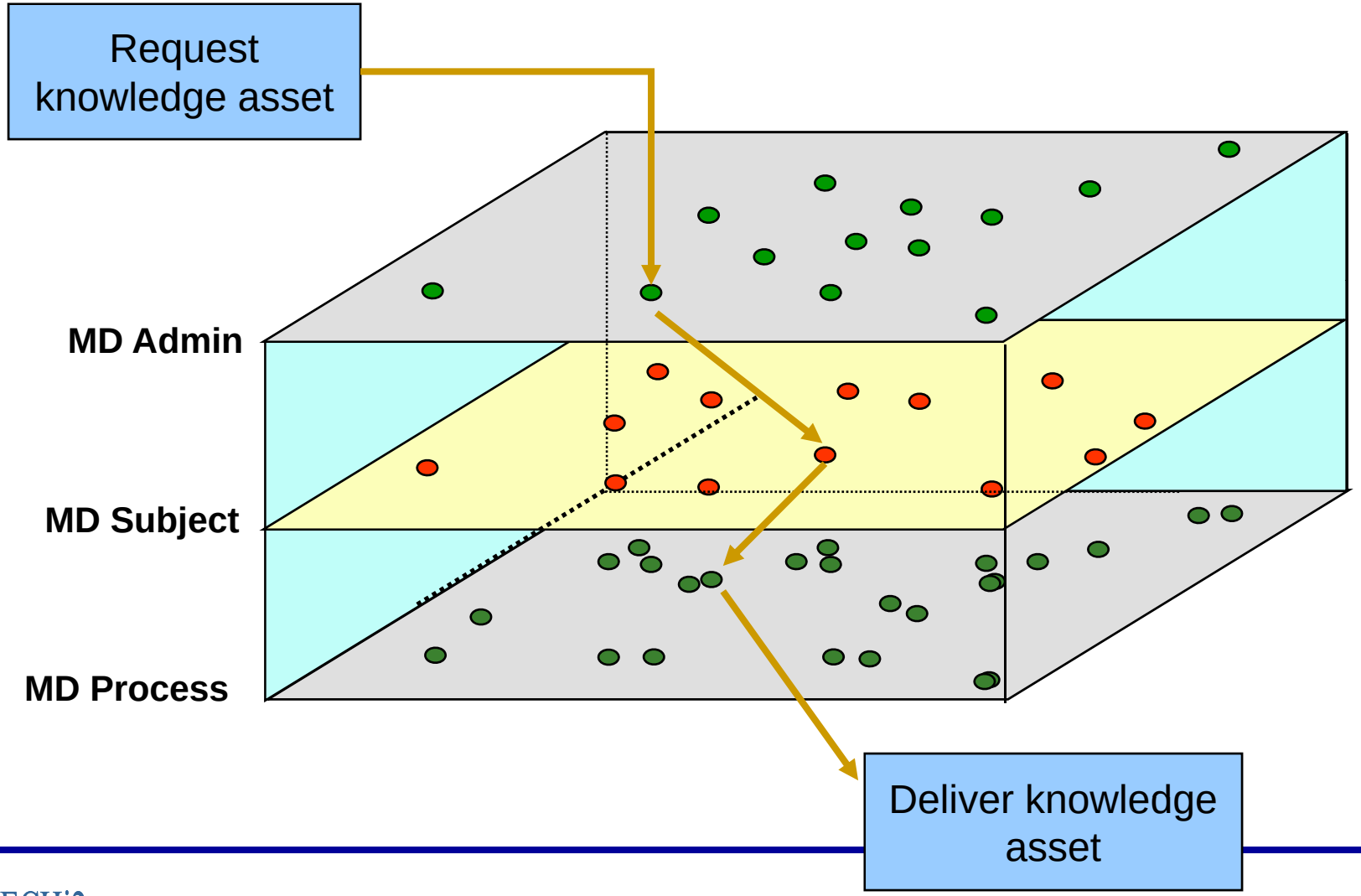
Intertwined Information



Making the Problem Simpler

- Independent Metadata Modules
  - Chunk Lessons Learned
  - Tag Lessons, abstract, body, etc separately
- Use standards
  - Taxonomies: SSIC, IEEE, industry
  - Specifications: SCORM, DoN/DoD XML, DoD web services
- Define administrative, subject matter, process taxonomies for each module
- Business rules not for every person-activity-content combination but for reduced set of module use cases
  - Orders of magnitude reduction in number and complexity of "rules"

Metadata Layers



Wrap Up and Questions?

Section 8

Take-aways

- KM is much more than electronic access to information. KM is proactive and constantly filtering, consolidating and validating information
- Portals are expensive and time consuming to build. Most vendor tools supply all the basic functions. Value comes from integrating the portal effectively into daily workflow which is an iterative development process.
- Strong program management is crucial to keep the focus on business effectiveness and to limit the seductive nature of up-scoping IT projects

Tutorial Abstract

- KM seeks to empower people with shared and reusable knowledge. Despite advances in sophisticated IT like search, classification engines, technology is unable to completely automate key KM processes. Thus, designing a KM system entails finding the sweet spot in the triad of people-process-technology. KM systems are being built in many government organizations as a way to provide an integrated view of relevant information for support and mission-critical tasks, contain functions for real-time collaboration, knowledge storage, and information fusion. A system's primary KM metric is the value of the content to the user, including its relevance and usability. Yet, most systems provide a wealth of information but in a manner poorly organized and presented to effectively support real business processes and operational needs. Converting it into a true knowledge sharing environment requires adapting the system architecture, workflow, and navigation to human centered priorities. This talk describes current technology tools and techniques and the lessons learned from many KM systems on how and when to use these tools for effective KM, and what to avoid. This include portals, taxonomies, metadata, web services, datawarehouses, search, collaboration, and intelligent agents. In add KM links technology and business processes tightly commonly leading to programs becoming mired in complexity. Enterprise Architecture approaches are important to use, such as FEAF and DODAF, to explicitly design infrastructure system, and business processes as components and with their interdependencies.

Dr. Geoffrey P. Malafsky

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- Consultant to multiple US Federal agencies and Fortune 500 firms
- Over 20 years as Research Scientist in advanced technologies
- Tutorial Lecturer, E-Gov Knowledge Management; Session Lead Enterprise Architecture, eLearning Conferences
- Education: PennState (Ph.D, Chemistry), Cornell (BA)
- Naval Research Laboratory, SAIC, TECHi2
- Author of numerous management and technical publications in KM, innovative technologies, technology development and transition