Creating An Architecture to Deploy Knowledge Management at Your Organization

Jeanne Holm
Jet Propulsion Laboratory
California Institute of Technology
NASA

KM Asia 2002
July 18, 2002

Drafting the Architecture

- Scoping the job
  - What are the drivers for knowledge management?
- Creating the blueprints
  - What constitutes a knowledge architecture?
- Finding the builders
  - How do you start a knowledge management community?
- Laying the foundation
  - How do you begin implementing the initiatives?
- Moving in
  - How do you sustain the environment?

Where are You in the Journey?

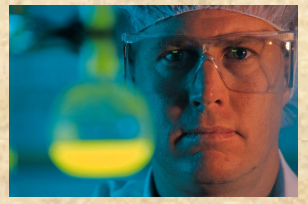
- Have you started discussions on knowledge management in your organization?
- Have you developed a plan for KM?
- Do you have KM pilots underway?
- Have you been deploying KM solutions?

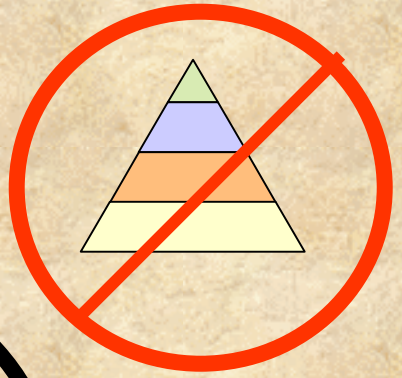
Scoping the Job: Theory, Drivers, and Culture

What is Driving KM?

- The implementation of knowledge management processes, systems, and applications has been shown to
  - Improve efficiency
    - Speed up core processes and information retrieval
    - Free up workers' time for content production
  - Avoid knowledge loss
    - Compensate for dilution or loss of experts
    - Avoid costs and consequences of relearning lessons
  - Stimulate knowledge growth and creation
    - Improve collaborative environments to promote research and cross-discipline sharing
    - Recognize and reward knowledge reuse
- Current drivers include
  - Increasing percentage of workforce is eligible for retirement
  - People spend ~30% of their time looking for information
  - Of the Fortune 500, 2/3 have KM initiatives

Generating Knowledge is Dynamic





Information

- Documents
- Drawings

- Lessons learned
- Interconnections between objects and people

Knowledge

- Raw data
- Test results

Data

The Essence of Transferring Knowledge

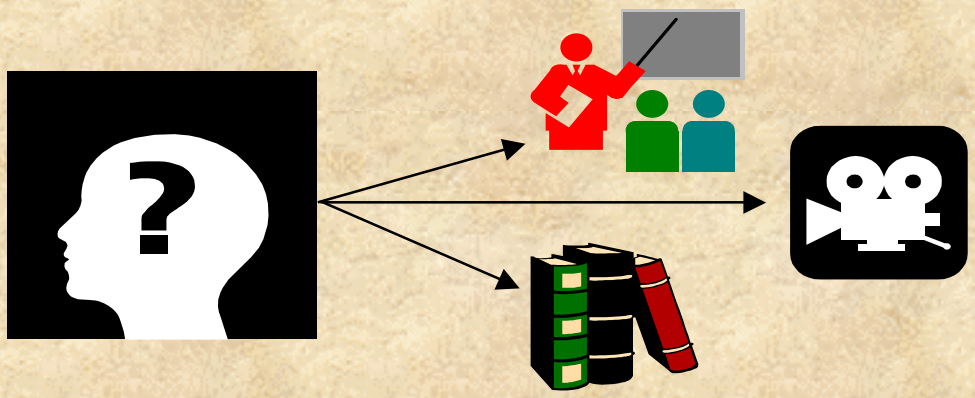
- There are two types of knowledge we deal with in an organization
  - **Tacit**: Embedded in the minds of people and difficult to write down or communicate (a musician's style, the steps a researcher follows to decide what to study)
  - **Explicit**: Captured in a persistent way (video, documents)
- Knowledge transfer occurs in one of two modes, through
  - Making tacit knowledge explicit to another person synchronously
    - Imitation (apprenticeship, mentoring)
    - Identification (familiarity)
    - Learning by doing (experience)
  - Making tacit knowledge explicit to another person asynchronously
    - Capture tacit knowledge explicitly (books, programs, or procedures)
    - Share that explicit knowledge through discussions or tools
    - Sustain access to that knowledge across generations and projects

Types of Tacit Knowledge

- Exists in individuals and groups, and is created through repeated experiences (or routines) and experiments (content + context)
- Tacit knowledge, internalized by a user, is almost impossible to put into a document or a database—we cannot codify it
  - Incorporates accrued, embedded learning
  - May not be separable from individual's actions
    - A musician's style
    - Steps a researcher follows to decide what to study
- Has been historically eased by turning it into explicit knowledge through language, printing, and collective understanding

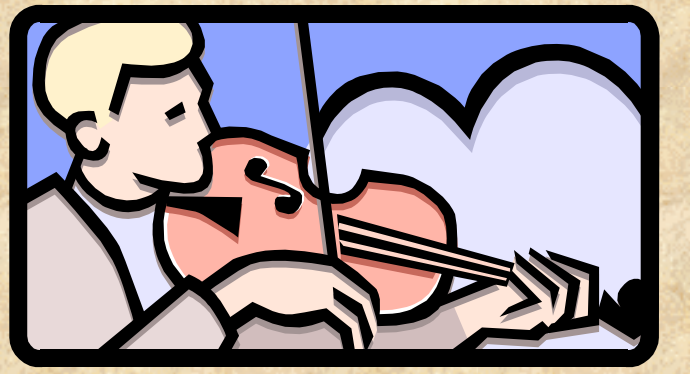
Polanyi's Theories of Knowledge

- Polanyi (1948) started the philosophical discussion of personal knowledge
- Polanyi's three theses
  - True discovery cannot be accounted for by rules or algorithms
  - Knowledge is both public and to a great extent personal (and contains emotions)
  - Knowledge that underlies explicit knowledge is either tacit or rooted in tacit knowledge



Polanyi's Hierarchy of Knowing

- Skill
  - The ability to act according to rules (typing)
- Know How
  - *Skill* + ability to act in social contexts (problem solving)
- Expertise
  - *Know How* + ability to influence the rules of the domain of knowledge (innovative solutions and new creations—doing what you *must*)



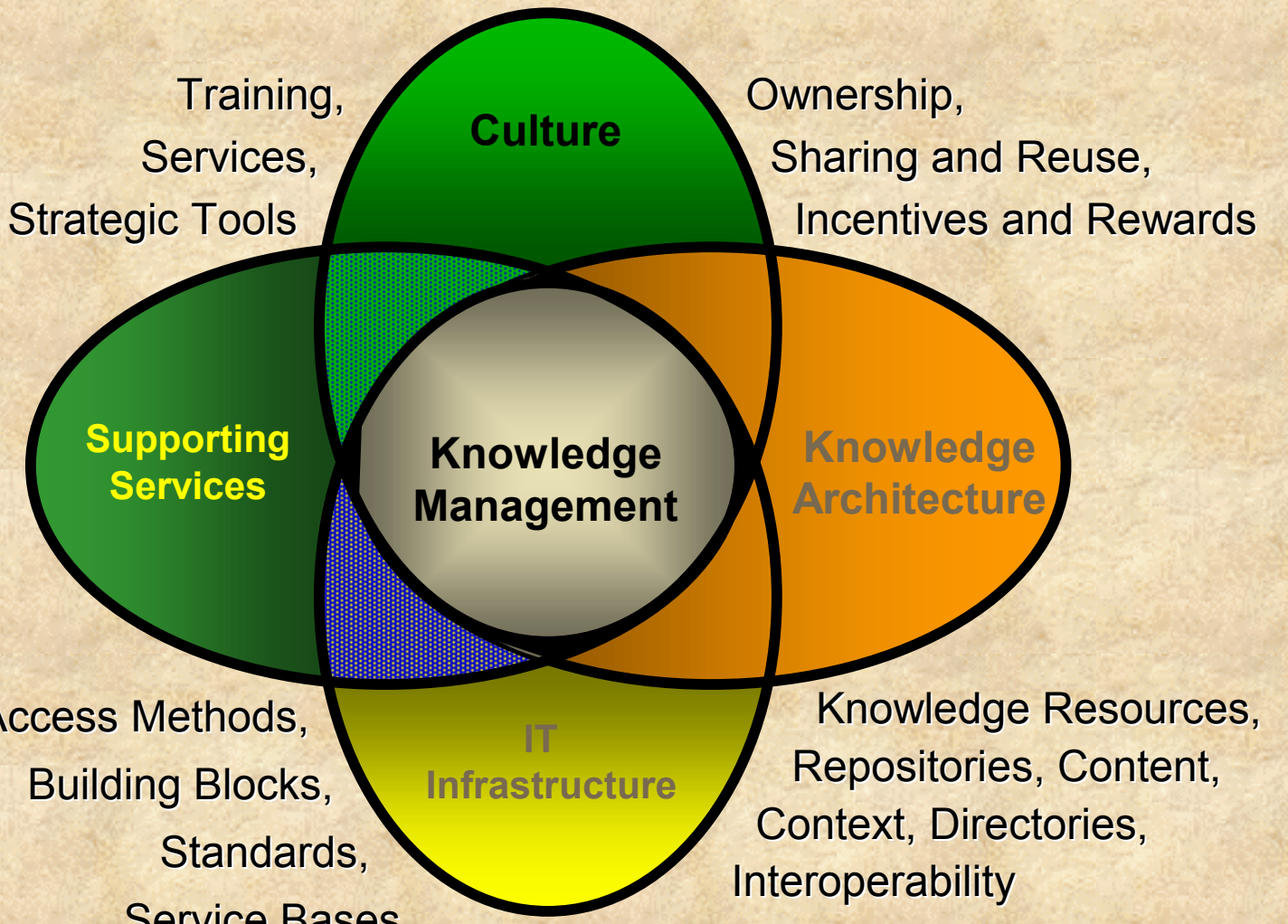
Other Theorists on Knowledge

- **Sveiby** looked at the implications and Polanyi and noted that knowledge is an *activity* that would be better described as a process of knowing (to know ***is*** to do)
  - Acquiring knowledge is *action*-oriented
  - A medical diagnostician's skill is as much an art of doing as of knowing
- **Barnard** notes knowledge is skills + mental processes and attempts to combine logical (explicit) and non-logical (tacit)
- **Simon** develops "information processing theory", stresses keeping information within company and dismisses tacit knowledge
- **Weick's** "sensemaking" theory emphasizes that knowledge is created by individuals sharing and debating ideas and experiences

Benchmarking

- In 1998, the Jet Propulsion Laboratory (JPL) KM team reviewed 43 published case studies and visited 6 organizations to understand what others were doing in KM
  - Standard set of questions, which generally devolved into long conversations
  - Analyzed for critical success factors or reasons why implementations failed or stumbled
  - Has held up over the test of time in ongoing benchmarking
- These organizations succeeded at KM when they were
  - Recognizing and rewarding people for sharing knowledge
  - Encouraging and supporting communities of practice
  - Balancing their long-term corporate needs (capturing knowledge) with short-term local needs (completing a task quickly)
- ***Culture*** was the most important factor: recognize, reward, and acknowledge the importance of knowledge sharing throughout the organization

KM Critical Success Factors



Recognizing the Importance of Culture

- The most critical factor in the success of a KM implementation is cultural acceptance
  - Recognizing issues of data ownership
    - Individual vs. organization
    - Individual vs. team
  - Acknowledging the appropriateness and acceptance of knowledge sharing and reuse
    - Knowledge reuse is not always perceived by the individual to be "good" (innovation or creation is "better")
  - Rewarding individuals and teams for promoting KM when they
    - Capture team discussions and decisions
    - Create a supportive environment for mentoring
    - Document and share lessons learned
    - Make tacit knowledge explicit

Cultural Differences in Sharing

- Nonaka and Takeuchi (1995) studied knowledge-creating companies

Japanese

- *Information* is a resource that can be bought both internally or externally
- Value *tacit* knowledge

American

- *Information* is to be guarded and legally protected
- Ignore outside sources of knowledge
- Value *explicit* knowledge

Mentoring Study at JPL

- In an effort to understand cultural issues at JPL, we investigated how mentoring was occurring
- We asked…
  - Can shared interests be transmitted between mentor and protégé?
  - What characteristics of the mentor affect the protégé's perspective of the mentoring relationship?
  - What encourages a protégé to model the mentor's behavior?
- Respondents were from across the organization—55% from administrative and management, 45% from technical areas

Importance of Mentoring (continued)

- Benefits to the protégé
  - Stimulating environment to develop intellectually and creatively
  - Advancement of career
  - Development of a personal ethic and increase in confidence
  - Protégés hold a greater influence on their organizations and are more apt to control resources than workers without a mentor
- Benefits to the mentor
  - Assistance in completion of work
  - Work and personal stimulation
  - Personal satisfaction
  - Continued life of their ideas
- Benefits to the organization
  - Mentoring leads both parties to greater levels of job satisfaction
  - Increase in organizational loyalty

Significant Findings on Mentoring

- Mentor's primary method of conveying message is oral and/or written communication vs. modeling
  - Protégées reported that when their mentor used modeling, as opposed to oral/written communication, they were more apt to attribute their interests to them
- Protégés are most likely to attribute their interests to the influence of their mentor when they felt
  - They shared their work-related interests or were working on specific projects with their mentor
  - The mentor supported their personal growth
- Protégés report that one of the most important things their mentor did was related to socialization within JPL
- 60% were mentoring for personal satisfaction, a total of 97% for primarily intrinsic rewards

How We Changed

- In an environment where most people mentor for personal satisfaction and work stimulation, monetary rewards are only part of the answer
  - Recognition of individuals
  - Recognition of the importance of the community
- Formalizing or documenting mentoring relationships allows us to recognize good teams of mentors and protégés and to start understanding the paths through which knowledge is shared
- Recognition of the different ways mentors communicate and protégés learn was incorporated into mentoring orientation or training to help both to communicate more effectively
- The use of stories was significant and stories told by a mentor were passed on to the protégé's protégés (next-generation storytelling)

Cultural Reflections

- What are some of the barriers to people easily sharing knowledge?
  - **Culture**: Trust, competitiveness, and ownership?
  - **Infrastructure**: Information technology, standards, or policies?
  - **Services**: Training, access, and tools and techniques?
- What are some of the broader cultural issues that would have to be dealt with in your organization?
  - Personal, professional, or societal?
- What are some of the barriers to forming a knowledge management team or community?
  - Management support?
  - Funding people's time or building the infrastructure?

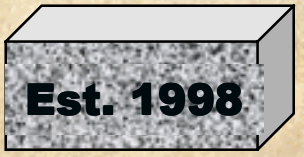
Creating Architectural Approaches to Knowledge Management

Guiding Principles

- When selecting a KM solution to implement, it needs to be tied to the core issues and business drivers for that company or field
- KM solutions are not "one-size-fits-all" and need to be tailored for each organization
- Beware of easy solutions
  - Implementing a single software system does not give an organization "knowledge management"
    - It may provide good information management within a single function such as accounting
  - Starting KM in a single department can be a good start, but is not a final state
    - Knowledge exists everywhere and must touch many departments and processes

KM Architectural Cornerstones

- Realize success requires cultural acceptance
- Provide access to knowledge
- Ensure knowledge is secure and validated
- Standardize only what's necessary
- Build complete service base and capabilities that are *operational* and can support mission-critical data
  - Interoperability
  - Migration tools
  - Application support and refreshment
  - Training

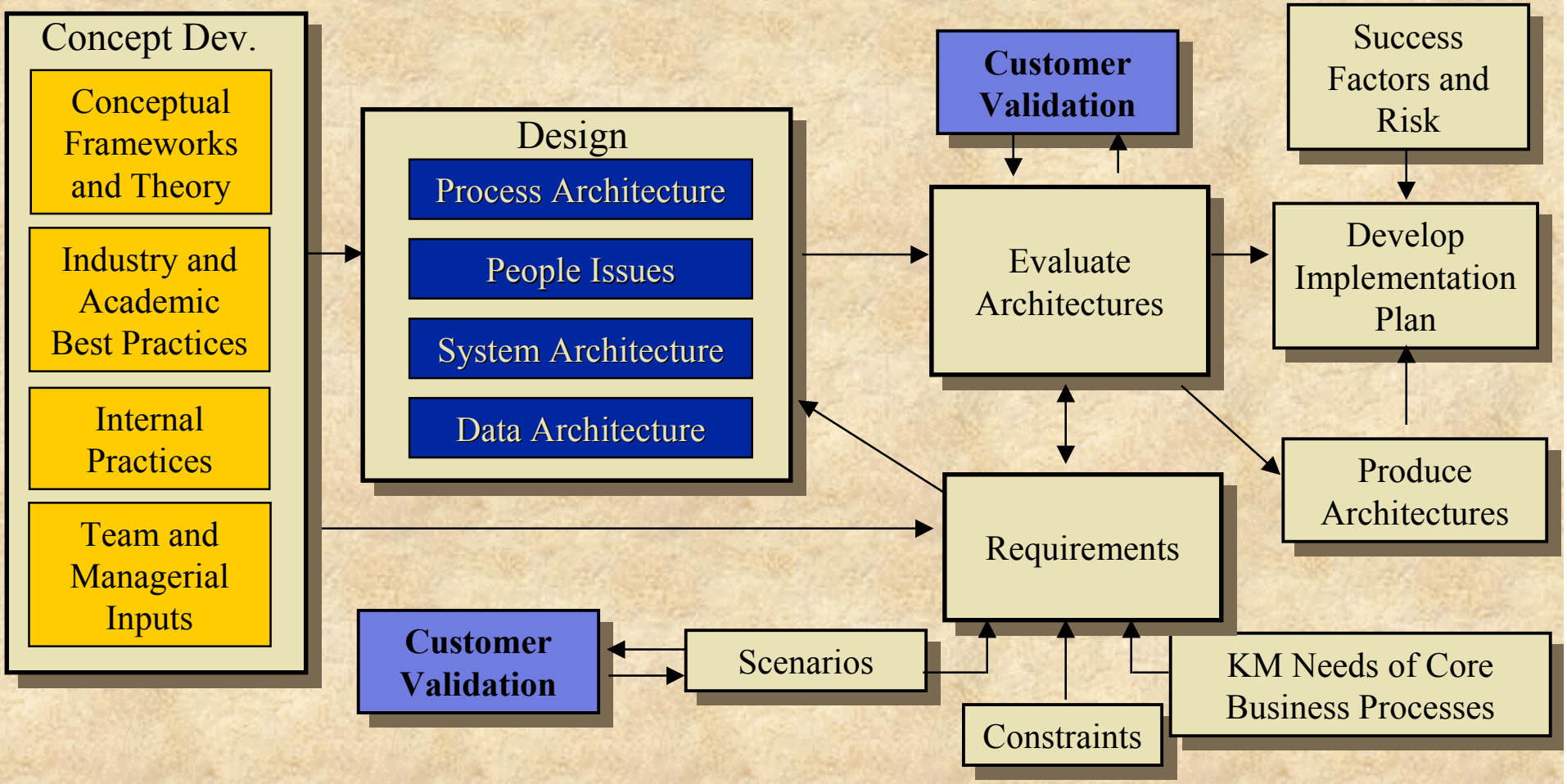


Creating a Knowledge Architecture

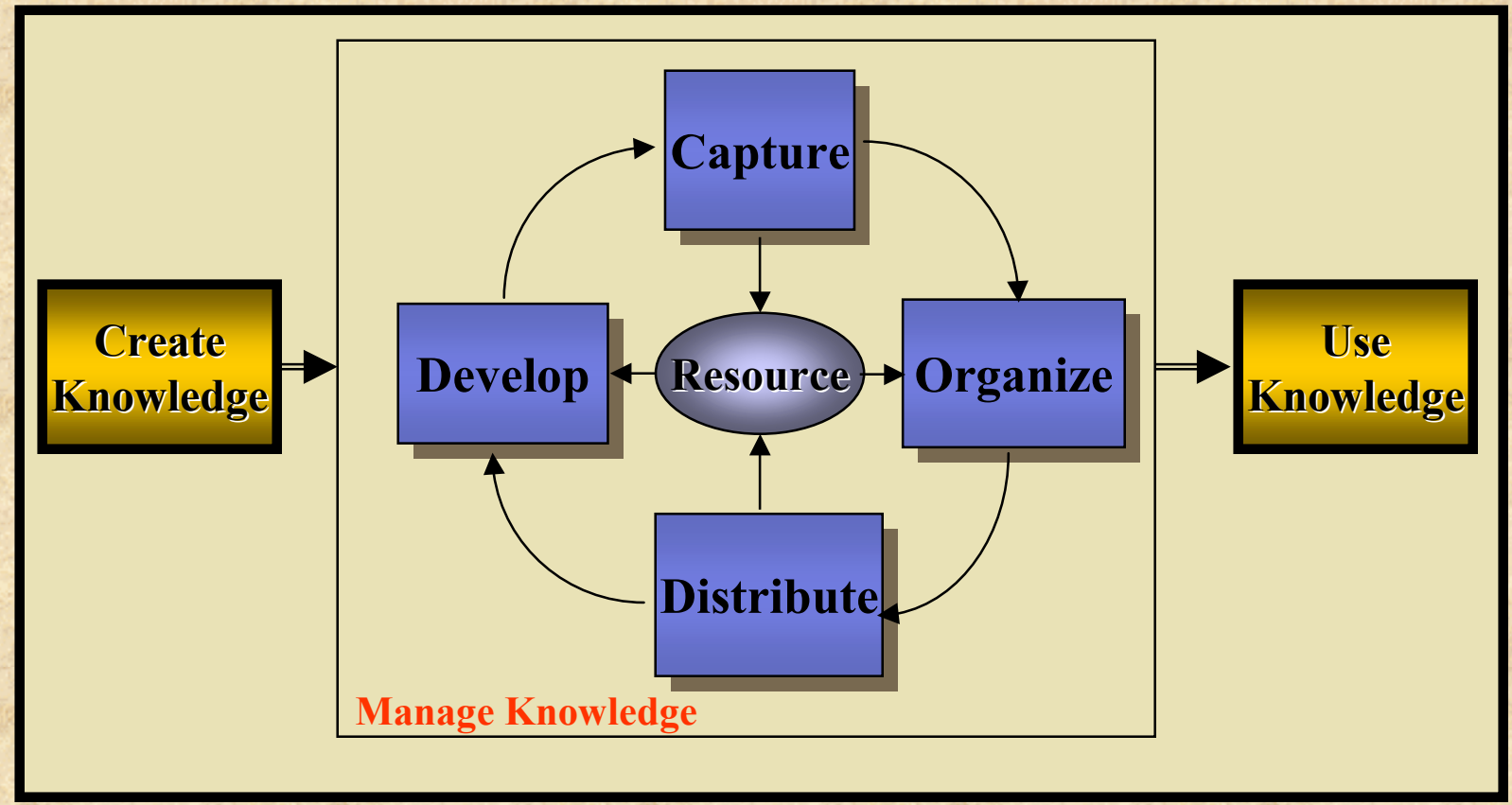
- There are three ways to look at architecting a KM program
  - *Process*: Oriented on the way in which people do their day-to-day work in the organization (the *how* and *why*)
  - *Services*: Focused on who will help people share their knowledge and who will maintain tools and processes (the *who*)
  - *Systems*: Are the IT infrastructure and tools necessary to deliver the processes and services efficiently and effectively to the end users (the *what* and *where*)

Services Processes Systems

KM Study Approach Followed at JPL

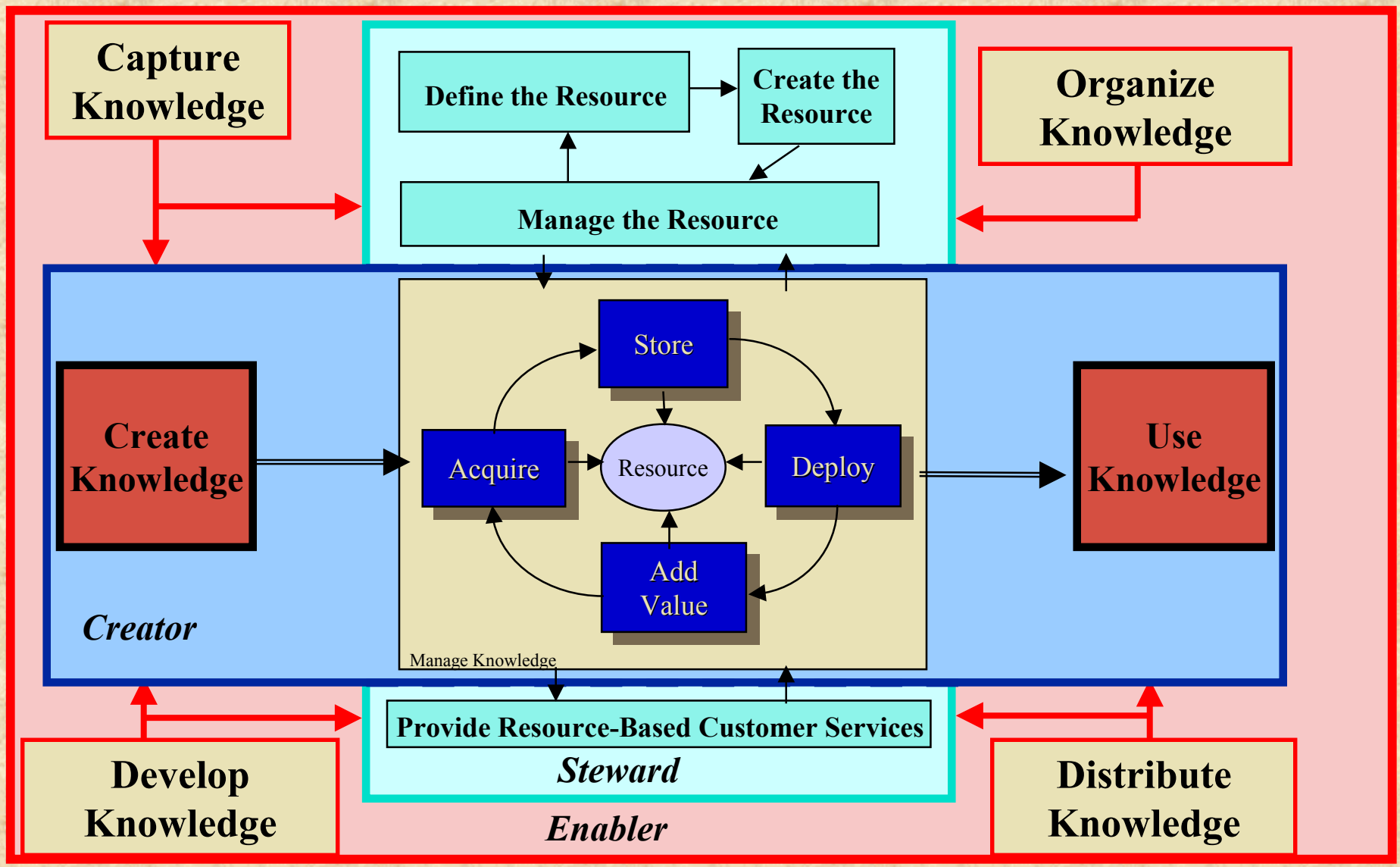


Step 1. Creating KM Processes



Adapted From Ernst and Young

Integrated Process View

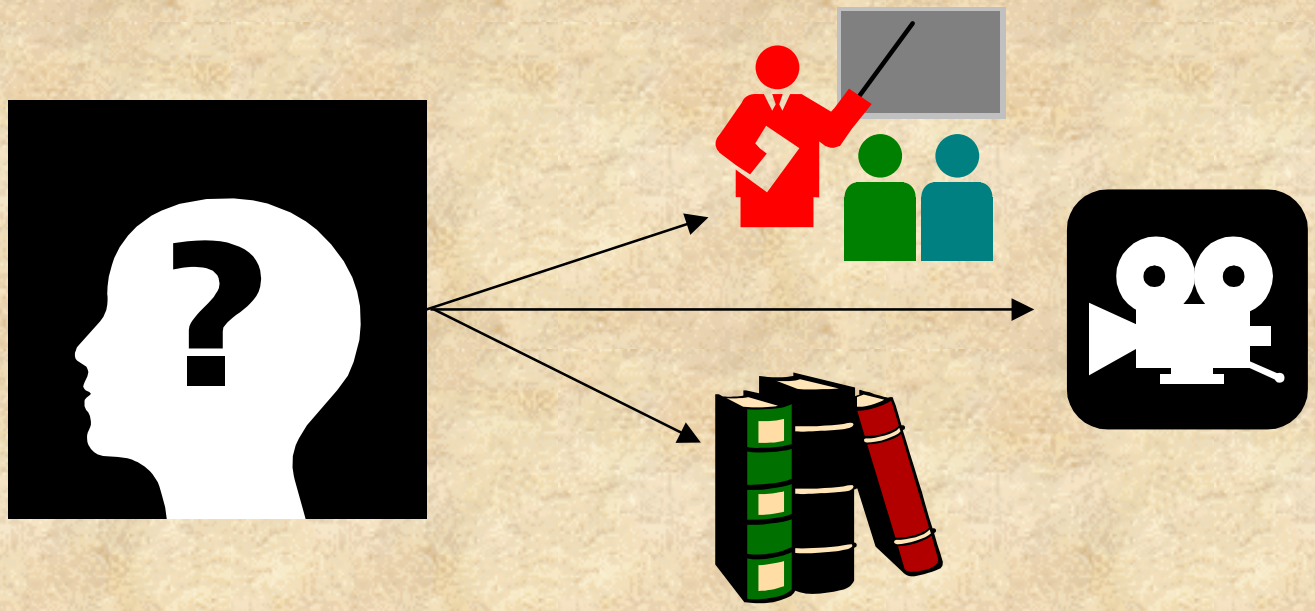


People Make the Process Work

- A steward (someone tied to the business process)
  - Defines the resource
    - Purpose, audience, content, context, policies, operations, metrics, and access method
  - Manages the resource (can be jointly done with KM)
    - Measures performance
    - Identifies needs and opportunities
    - Applies and enforces policies
    - Oversees daily operations
- A knowledge management project then is an enabler to creating the environment in which the processes can occur

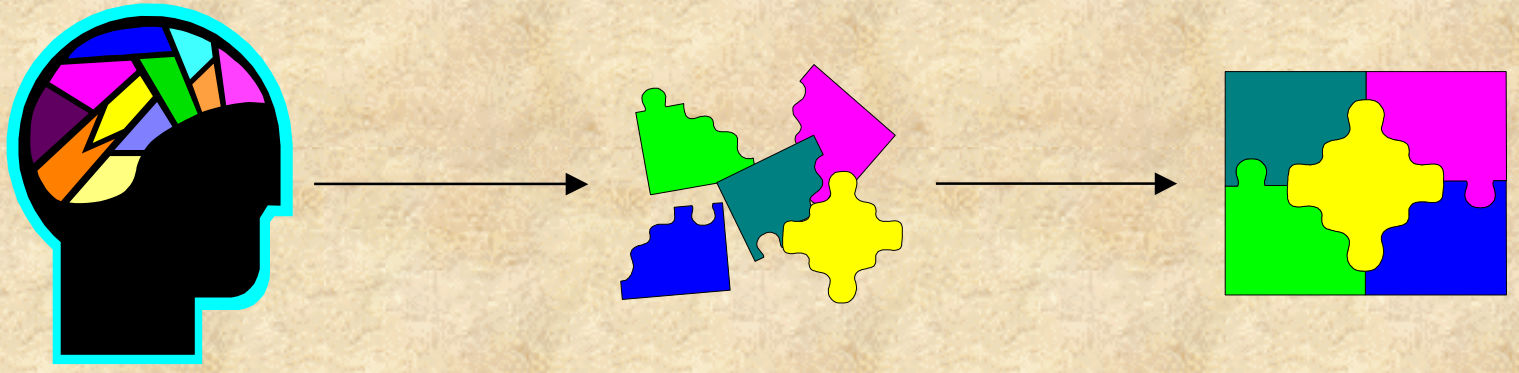
Capture Knowledge

- Helping people articulate knowledge that which can be easily shared and reused
- Supporting people in moving tacit knowledge to explicit knowledge



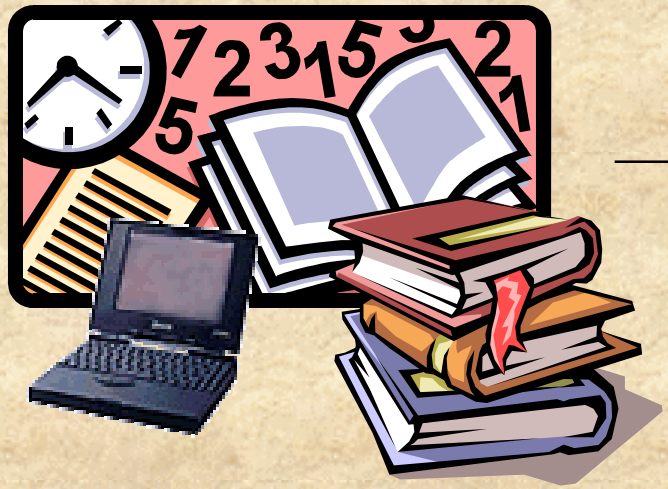
Organize Knowledge

- Organize information so that people can easily share it, find it, and use it once it's found
- Structure information in standardized ways for use by others



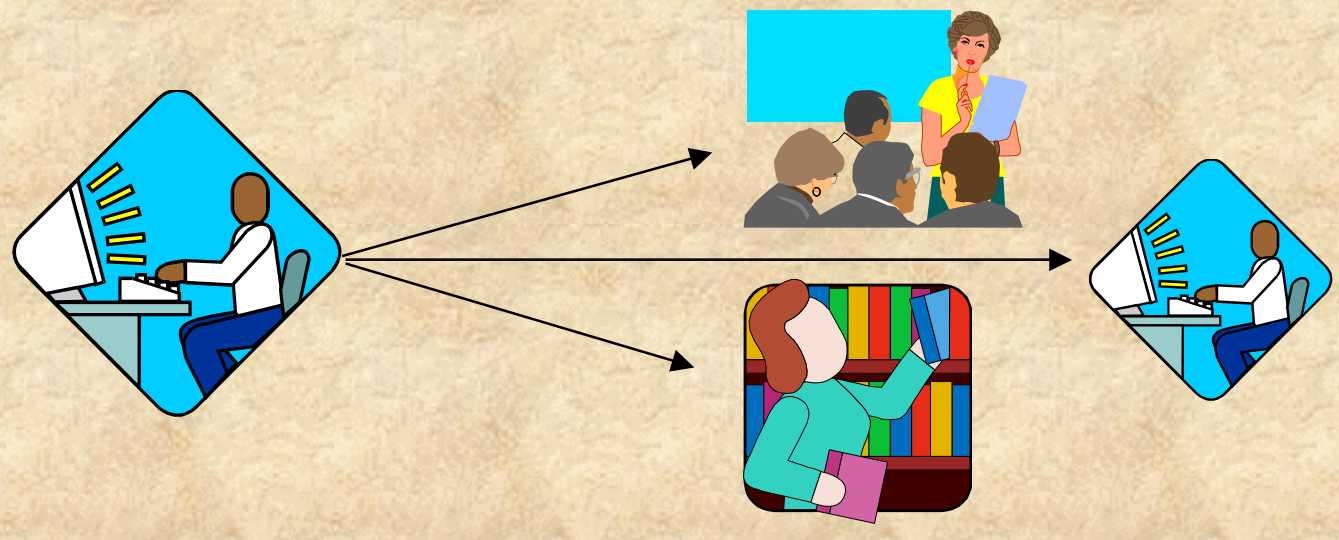
Develop Knowledge

- Refining knowledge so that it can be easily reused by others (such as others on your team, future teams, or in your discipline)
- Selecting which knowledge will be most useful based on the question asked or the need defined



Distribute Knowledge

- Helping people get access to knowledge
- Encouraging people to use and reuse knowledge
- Training people in how to use the knowledge management tools



Step 2. Establishing KM Services

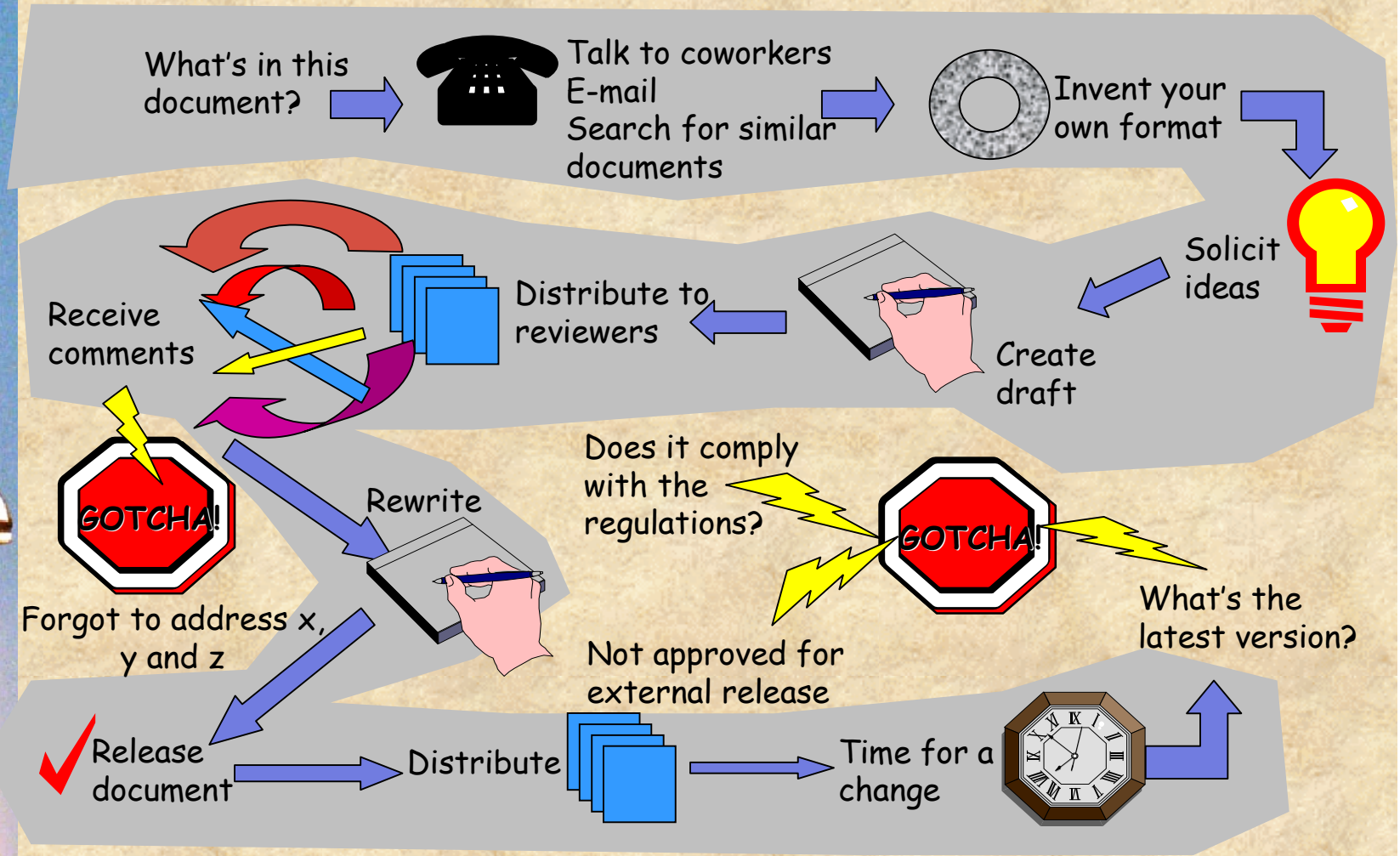
- The way in which people in an organization interact with knowledge management activities is through a *service*
  - A set of methods and tools that are supported by a team and used by people throughout the organization (such as accounting)
- Services integrate processes, people, and systems into a cohesive support structure for how people actually do their work
- The "build it and they will come" mentality doesn't work in the deployment of content-rich, enterprise-wide systems
  - Users need to be an active part in order to keep content refreshed, accurate, and relevant

Services Provide Support to People

Design → Initialize → Operate → Iterate

- Products packaged for cost-efficient reuse of processes, software, and information within the system
  - Balance project and institutional needs
  - Create building blocks
- People trained to
  - Help customers select most appropriate product
  - Set up and start knowledge resource
  - Provide “buy-by-the-yard” operations for current and legacy knowledge
  - Provide user support and help
- Training in working through KM principles and practices

Writing a Document Today…



Writing a Document in a KM-Enabled World…

What's in this document?

?

Template with all required areas

Subject matter experts

Good examples

Review and release

Collaboration tools

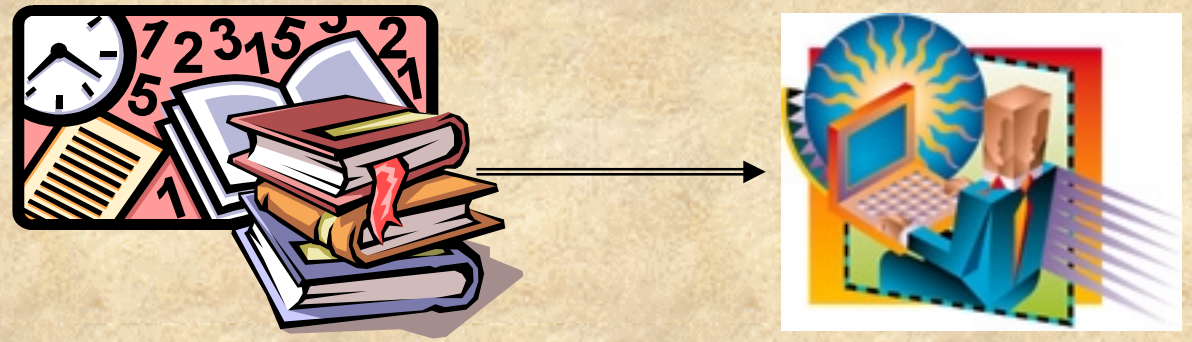
Regulatory compliance

Policies

Routing and distribution

A Sample Service: Document Management

- Document management is about much more than a shared, accessible repository enabled by workflow:
  - Authoring environment (templates that include content guidelines and samples of good material)
  - Information lifecycle (how do objects move from stage to stage and how are they reused?)
  - People providing a service base (where and who do you go to for support today, tomorrow, and in two years?)
  - *A one-stop shop for all information publishing needs*



Typical KM Services

- Knowledge Capture (Capture)
  - Improve the quality, methods, and rate of capturing the knowledge created at and for the organization
  - Understand and benchmark with industry and academia to find best practices in encouraging and rewarding people to create and share knowledge
- Collaborative Environments (Develop)
  - Improve collaboration and knowledge sharing with partners
    - Tools for virtual spaces and synchronous collaboration
    - Training for virtual team leaders
    - Support for virtual team members
- Experts' Directories (Develop)
  - Help people locate internal or outside experts
    - Online directory of *willing* experts and expertise with fields of expertise, sample documents, and contact information

Typical KM Services (continued)

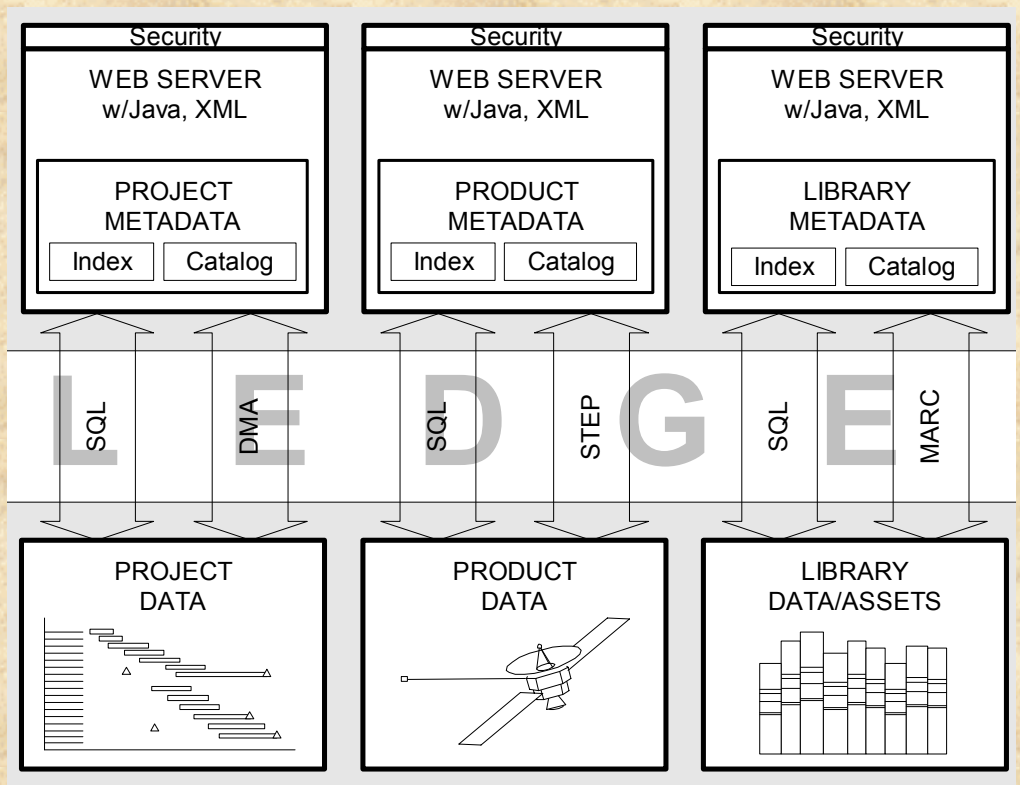
- Interoperable Libraries (Organize)
  - Cover authoring through archiving
  - Reduce cost and schedule to complete required documentation
    - Templates and "trees" for documentation
    - Create an organizational "memory" of accessible documentation
  - Create enterprise-wide archive for easy access to institutional information
  - Provide centralized transfer of inactive and end-of-project records requiring archive
- Concurrent Engineering (Distribute)
  - Improve processes by providing standard design structures, policies and processes, and interfaces to help knowledge reuse
- Web Governance (Distribute)
  - Policies for dissemination of information
  - Procedures for publication and easy distribution
  - Creation of tools to support these, such as portals (customizable Web gateways to an organization's knowledge resources), content management, and search engines

Step 3. Develop a System Architecture

- A layered approach, building upon already existing infrastructure and services, KM provides
  - User interface
    - Enterprise portal or web sites with data channels for roles, interests, and disciplines
  - KM functions
    - Virtual team environments (sharing and collaborating)
    - Taxonomies for browsing
    - Robust search capability
  - Application infrastructure services
    - Document management
    - Content management
    - Standards for documentation
    - Metadata management

Step 3. System Architecture (continued)

- Knowledge resources
  - Existing resources
  - Experts profiles
  - Question and answer databases
- Infrastructure services
  - Network
  - Messaging
  - File
  - Desktop support
  - Data access
  - Security



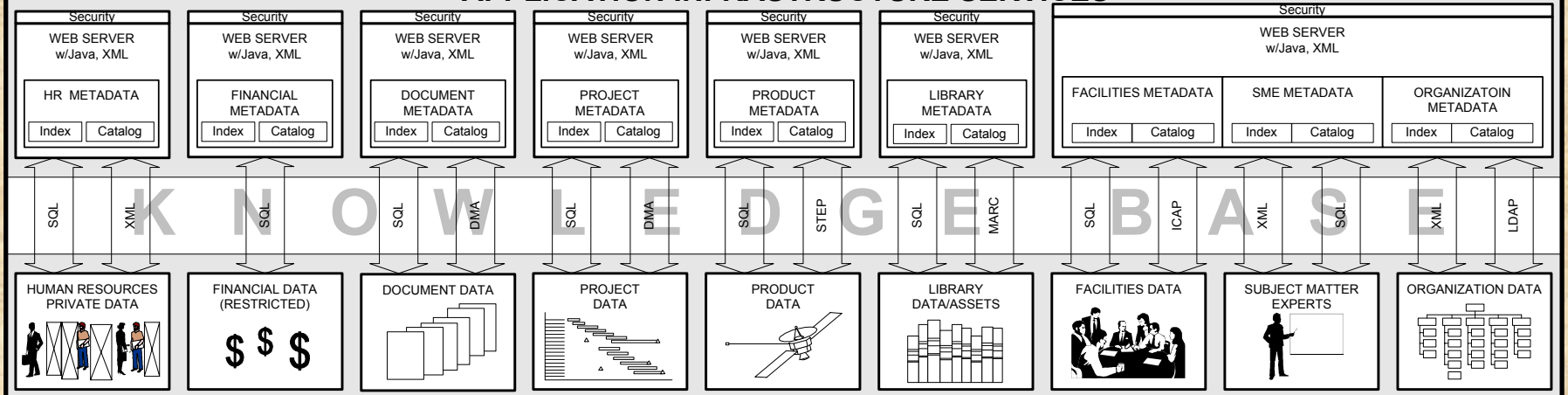
INFORMATION SYSTEM ARCHITECTURE

"What do you want to do?" | **"Who are you?"** | **"How do you want it?"**

KNOWLEDGE MANAGEMENT FUNCTIONS

Search, Browse, Retrieve, Create, Add Value (metadata), Update, Archive, Index, Filter, Catalog, Analyze, Validate, Associate

APPLICATION INFRASTRUCTURE SERVICES



KNOWLEDGE RESOURCES

INFRASTRUCTURE SERVICES

Security, Networks, File Service, Database Service, Messaging

Checklist for Successful KM Systems

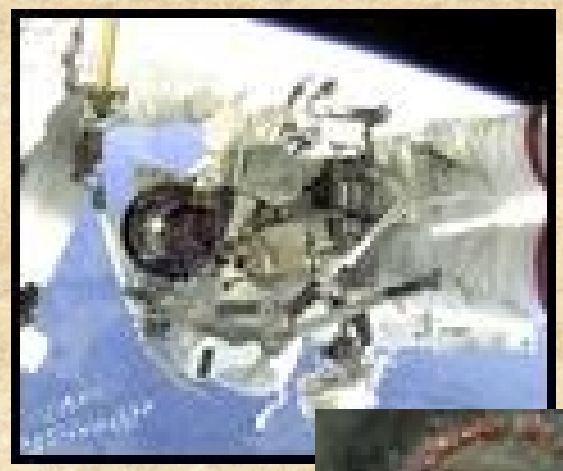
- In looking at best practices in technology implementation, KM choices should judge success by ensuring
  - ✓ High accessibility, searchability, and ease of use
  - ✓ Potential to save a large amount of work
  - ✓ Potential to help avoid expensive problems
  - ✓ Richness of the data repository
  - ✓ Features such as online help, help desk, and frequently asked questions
  - ✓ Openness to unsolicited submissions of information
  - ✓ Information that is maintained and accurate

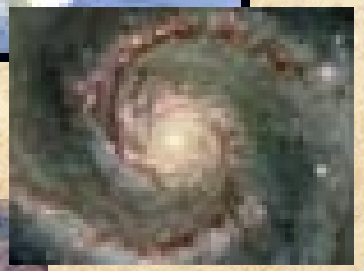
Architecture Summary

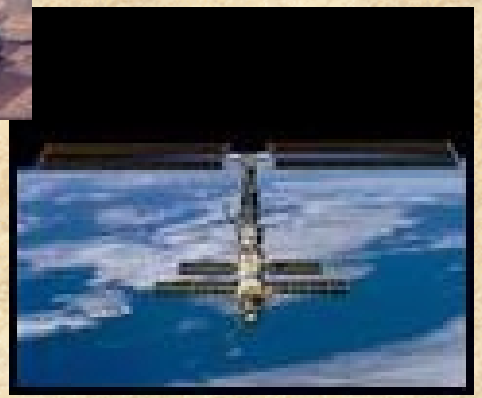
- Any architectural approach must have an overall strategy behind it that reflects on
  - The key business drivers
  - Cultural implications within the organization
  - Knowledge creators and users and their role in the organization
- A federated knowledge architecture comprises
  - Processes
    - Integrating the way people complete their tasks into the way KM creates an enabling environment
  - Services
    - Where people help other people to achieve their goals
  - Systems
    - In the tools and technology that support the processes and services to meet the organization's long-term needs

Architectural Questions

- Some organizations choose to focus on one or two components (just systems or just processes)
  - What are the potential failings and strengths of a focused approach?
  - How will this work in the long-run?
  - What about a phased implementation?
- Does this represent the key areas that would need to be changed to enable knowledge management to occur?
  - How can an architecture be used to gain management support and sponsorship?
  - Does this address the cultural issues?
- Is it as easy as 1-2-3?







Implementing a Knowledge Architecture at NASA

NASA's Approach for KM

- Understand the driving forces and business plan
- Develop a strategy based on those forces
- Learn about existing processes and integrate KM into them
- Supplement existing systems and services
- Monitor progress
- Implement new systems and services

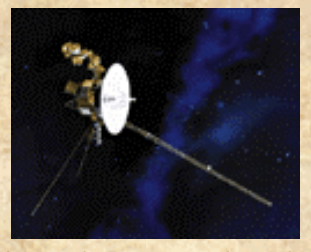
What is Knowledge Management?

- *Knowledge management (KM) is getting the right information to the right people at the right time, and helping people create knowledge and share and act upon information in ways that will measurably improve the performance of NASA and its partners*
- Driving forces at NASA
  - Less experienced project teams need to see key information quickly
  - Highly specialized and compartmentalized knowledge
  - Management drivers
    - *Better Mechanisms Needs for Sharing Lessons Learned* (GAO) recommends linkage between KM and lessons learning at NASA
    - Administrator O'Keefe: Make NASA a leader in e-Government
    - *NASA Integration Action Team:* Promote the continuous capture, dissemination and utilization of knowledge

KM's Goal is to Unite Knowledge Seekers with Knowledge Resources

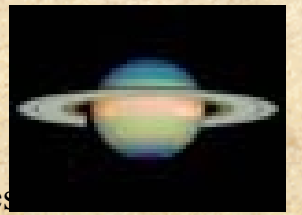
Key Areas for NASA's KM Strategy

- To sustain NASA's knowledge across missions and generations
  - KM will identify and capture the information that exists across the Agency



- To help people find, organize, and share the knowledge we already have
  - KM will efficiently manage NASA's knowledge resources

- To increase collaboration and to facilitate knowledge creation and sharing
  - KM will develop techniques and tools to enable teams and communities to collaborate across the barriers of time and space



Framework for KM at NASA

Sharing and Using Knowledge

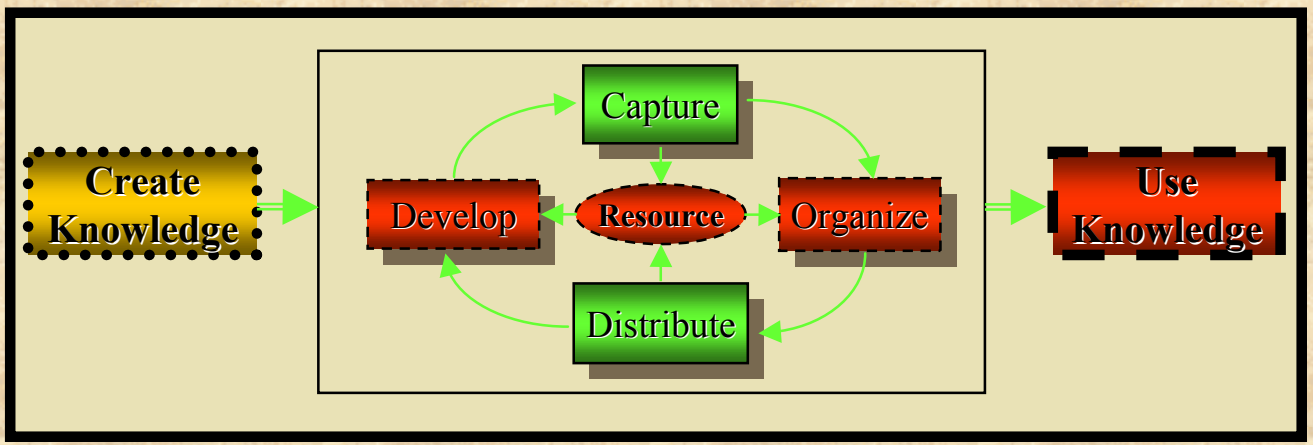
People	Process	Technology
• Enable remote collaboration • Support communities of practice • Reward and recognize knowledge sharing • Encourage storytelling	• Enhance knowledge capture • Manage information	• Enhance system integration and data mining • Utilize intelligent agents • Exploit expert systems

Supporting Activities

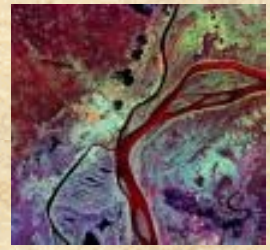
Education and Training	IT Infrastructure	Human Resources	Security

Creating a Process Architecture in 2001

- The NASA KM Team first focused on three pilot activities to prove the viability of KM at NASA
  - **Knowledge Navigation**: enabling access to information
  - **Lessons Learned Information System**: improving the capture of key knowledge and infusion into engineering processes for better decision making
  - **Experts Directory Service**: helping to find scientists and engineers to facilitate collaboration across boundaries



Deploying Systems and Services in 2002



- Information portals
  - For the public, scientists, and employees to streamline access to NASA's 4,000,000 web pages
  - Identifying content and publishing processes
  - Building framework and technology for distributed use
  - Creating taxonomies and metadata standards for ease of interoperability
- Collaborative environments for missions
  - Creating access to tools, training, and venues for managing virtual teams
  - Quick start environment for proposals and tasks
- Capture design knowledge
  - Creating a service and tools to capture in-process design decisions for use on current and future missions

Portal in Development

NASA Mockup:
http://km.jpl.nasa.gov/portal/insidenasa

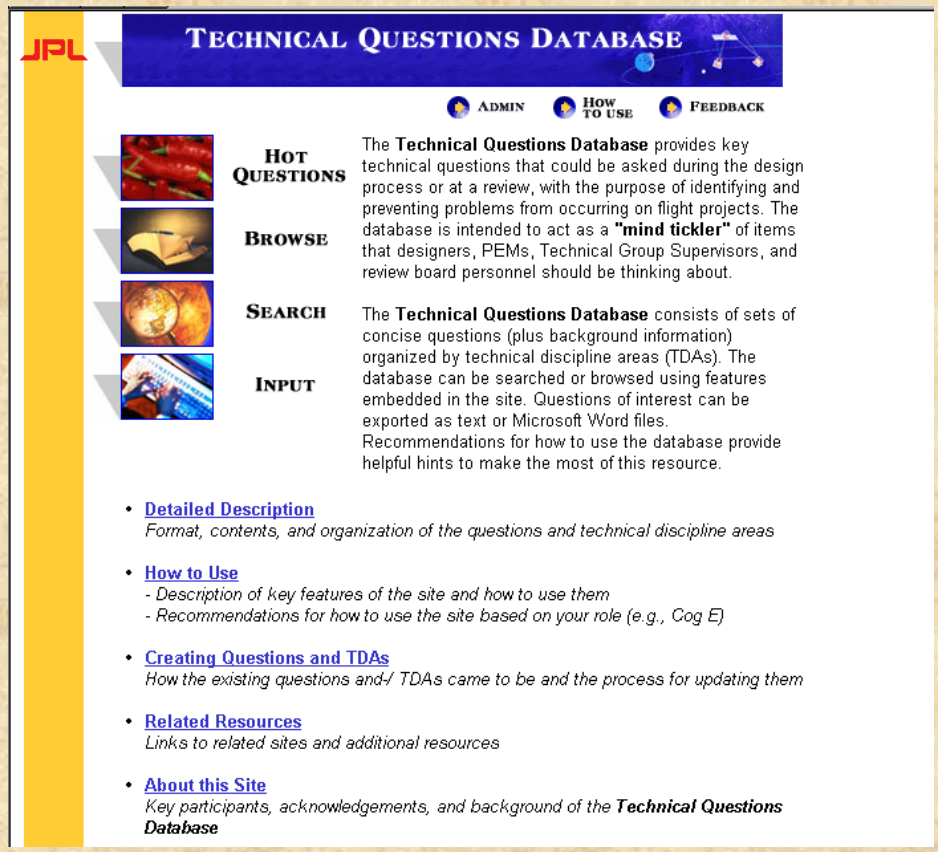
JPL Prototype:
http://insidejpl.jpl.nasa.gov

Expert Connections

- Finding people to get answers or work on a project, includes profiles of 1100 technical experts
- Linked to other systems
  - Publications database
  - Caltech experts
- Search or browse

Technical Questions Database

- Best questions asked at technical reviews
- Helps to create a virtual presence when key people cannot be there
- Over 700 questions
- 42 subject areas



KM Embeds Methods and Technology Into The Way People Work

KM Project

Individuals

- **Finding information**
  Taxonomies and portals
- **Finding people**
  Know Who
- **Capturing information**
  Technical Questions and design decisions
- **Sharing information**
  Portals

Teams

- **Sharing information**
  Project Libraries online
- **Collaborating**
  Collaborative tools and rooms and portals

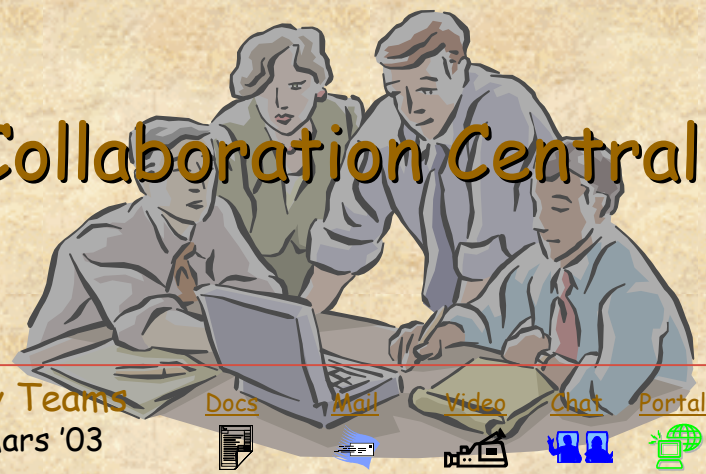
Projects

- **Preparing for reviews**
  Technical Questions
- **Making design decisions**
  Knowledge capture
- **Ensuring easy collaboration**
  Standards for engineering

Moving Ahead: Supporting Communities of Practice

- Enabling remote collaboration to support virtual teams and communities of practice
  - We are asking projects, teams, and research groups:
    - What services and infrastructure do virtual teams need to efficiently do their work?
    - How can we capture the "mobile" knowledge of a virtual team?
- Sample solution: Team collaboration kits
  - A welcome kit of collaborative tools and techniques, integrating new and pre-existing services
    - Integrated and engineered suite of collaborative tools
    - Integration with operational service bases
    - Proactive approach to infusing the solutions into projects
    - Shared access to specific tools, such as risk management and action item tracking

Collaboration Central



My Lessons Learned
- Mars '03 LL
- ISS LL
- NASA LLIS
- Thermal engineering
- Calibration

Experts at NASA
- Search:
- Browse
- Partners on contract

Team Training
- Mars '07 Required
- Recommended
- Management courses
- NASA APPL
- Team course reviews

Best of the Rest
- STI Manager's ViTS
- NGST Implementation Plan
- MER Preliminary Design Review

Help
- How do I start a team?
- How do I get help for an existing team?
- Help me now! <chat>
- 1-800-358-TEAM

Search:

My Teams

	Docs	Mail	Video	Chat	Portal
Mars '03					
ISS					
eNASA					

My Colleagues

SEs				
Cog Es				
Research Team				
Brian				
Julie				

My Project
- Risk
- Budget
- Schedule
- 7120 status
- Implementation Plan
- Next Review (CDR: September 10, 2001)

Task Support

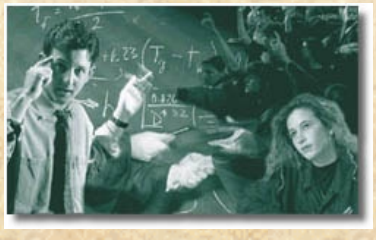
Services
- Risk management services
- Scheduling services
- Resource tracking services
- Team training services

Tools
- Microsoft Project
- CA SuperProject (GRC)
- Welcom OpenPlan
- Primavera
- iTeamwork
- Doors
- RequisitePro (JPL)
- DekkerTracker (Stennis)
- Artemis
- Milestones
- FastTrak

Management Community
- PPM Newsgroup
- Hot topics and solutions
- Events and workshops

Set Up and Tools
- New Team kit
- Teleconference
- Dataconference
- Videoconference
- Chat
- Documentation systems
- Training

JPL Knowledge Management Roadmap



Sharing Knowledge

- Adaptive knowledge infrastructure is in place
- Knowledge resources identified and shared appropriately
- Timely knowledge gets to the right person to make decisions
- Intelligent tools for authoring through archiving
- Cohesive knowledge development between JPL, its partners, and customers

Enables sharing of essential knowledge to complete Agency tasks

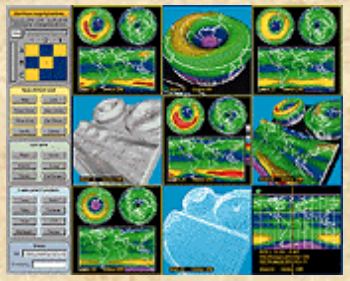
- MarsNet
- Europa Orbiter
- SIM

Integrating Distributed Knowledge

- Instrument design is semi-automatic based on knowledge repositories
- Mission software auto-instantiates based on unique mission parameters
- KM principals are part of Lab culture and supported by layered COTS products
- Remote data management allows spacecraft to self-command

Enables seamless integration of systems throughout the world and with robotic spacecraft

- Europa Lander/Submersible
- Titan Organics: Lander/Aerobot
- Neptune Orbiter/Triton Observer

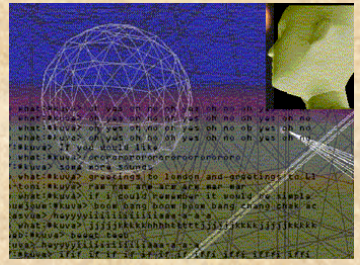


Capturing Knowledge

- Knowledge gathered anyplace from hand-held devices using standard formats on interplanetary Internet
- Expert systems on spacecraft analyze and upload data
- Autonomous agents operate across existing sensor and telemetry products
- Industry and academia supply spacecraft parts based on collaborative designs derived from JPL's knowledge system

Enables capture of knowledge at the point of origin, human or robotic, without invasive technology

- Mars robotic outposts
- Comet Nucleus Sample Return
- Saturn Ring Observer
- TPF



Modeling Expert Knowledge

- Systems model experts' patterns and behaviors to gather knowledge implicitly
- Seamless knowledge exchange with robotic explorers
- Planetary explorers contribute to their successor's design from experience and synthesis
- Knowledge systems collaborate with experts for new research

Enables real-time capture of tacit knowledge from experts on Earth and in permanent outposts

- Interstellar missions
- Permanent colonies

2003 2007 2010 2025

Sharing Knowledge (2003)

- Adaptive knowledge infrastructure in place
- Knowledge resources identified and shared appropriately
- Timely knowledge gets to the right person to make decisions
- Intelligent tools for authoring through archiving
- Cohesive knowledge development between NASA, its partners, and customers

Enables sharing of essential knowledge to complete Agency tasks

=

MarsNet
Europa Orbiter
Space Interferometry

Architecture Summary

- There are many architectural approaches, but the best create a knowledge architecture that take into account the organization's
  - Culture
    - Incentives and recognition
  - Infrastructure
    - Systems to facilitate access to information
  - Supporting services
    - People to help use the methods and tools
- Help executives to state the commitment to knowledge sharing
- Develop a well-defined business plan for your approach
- Facilitate communities of practice based around common interests
- Beware of single vendor solutions—they may help in the short-term, but are difficult to sustain over time for capturing and sharing knowledge
  - They force changes in people's behavior

Thanks!

- Many thanks to my JPL and NASA colleagues and our academic partners who contributed to these ideas and to the excellent work they are doing in implementing knowledge management solutions at JPL and NASA
- If you have any additional questions, please contact me:

Jeanne Holm, Jet Propulsion Laboratory/NASA
4800 Oak Grove Drive, Mail Stop 202-204, Pasadena, CA 91109
Jeanne.Holm@jpl.nasa.gov (818) 354-8282

- More information can be found at
  - NASA's KM program: http://km.nasa.gov
  - NASA's missions: http://www.nasa.gov

Defining KM Issues for Your Community

Identifying KM Opportunities

- Separate into small groups of 5-8 people based on your organization
  - Academia, government, manufacturing, services…
- Identify specific issues that are keeping your organization from beginning or continuing the KM journey
  - Culture
  - Management support
  - Economic issues (external or internal)
  - Infrastructure
  - Uncertainty of how to proceed
- Identify 2-3 good solutions that are already in place
  - Specific systems or services (such as training)
  - Cultural acceptance or encouragement to share
- Share your ideas with the group