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**Information Architecture Project
Presentation to CIC Leaders
March 10, 1995**

Abstract

On March 10, 1995, members of the Laboratory's Information Architecture (IA) project presented an overview of progress-to-date to Group and Program Leaders and Deputies in the Computing, Information, and Communications (CIC) division. The presentation included progress reports from each of the seven IA teams: desktop, applications, data warehouse, data, infrastructure, financial analysis, metrics, and review. The fundamental purpose was to familiarize the CIC leaders with the IA project and to open a dialog on how CIC and the IA could better work with each other.

On April 5, 1995, the IA project held an open forum in the Physics Auditorium that re-used many of the viewgraphs from the presentation to CIC leaders.

IA Project Participation

- 117 active participants (284 total)
- 42 active groups from 21 Divisions
- 8 standards development teams (5 with CIC team leaders)

IA Funding Allocations

- 19 organizations (10 in CIC)
- Effort ranges from 5% to 50%
- Some participants support more than one team

Potential Overlaps with CIC Tactical Goals

- Achieve full network connectivity by end of FY 98, accelerating the schedule
- Develop integrated authentication system with minimal client interference
- Develop an information policy for managing Laboratory information resources
- Provide electronic access to controlled documents
- Develop plan for Center for Scientific Information
- Provide electronic access to policy information
- Establish a pilot digital image archive
- Provide Laboratory-wide access to electronically-published LA-series reports
- Build applications technology framework

Goal 1 and Strategies

Develop a Blueprint for the Components of the Information Architecture

- Develop a conceptual blueprint
- Develop strategy for providing services in the secure partition

Goal 2 and Strategies

Develop Laboratory-Wide Support for the IA

- Develop and build an aggressive marketing plan to build support for the IA
- Actively involve customers in all aspects of the IA
- Develop Cost/Benefit Analysis Capability

Goal 3 and Strategies

Initiate IA Implementation Based Upon the Blueprint

- Aggressively establish new services based upon modern technology
- Establish and complete several pilot projects that reduce operational overhead
- Establish an institutional information infrastructure
- Include Training and Education for new services that are introduced
- Define and develop the Laboratory Corporate Information Directory(LCID)
- Develop a Data Warehouse

Goal 4 and Strategies

Establish IA Operations

- Build and Maintain the IA Project Office within CIC Division and with Laboratory-wide representation throughout the IA teams
 - Funding base
 - Representation by at least 7 other LANL Divisions
 - Charter at least 5 standards teams
 - Pilot projects
 - Forums
- Provide IA teams with tools to measure the impacts of their proposals

Goal 5 and Strategies

Establish Information Policy at the Laboratory

- Develop lifecycle information policies that protect information from inception to retirement
- Determine a process for Laboratory-wide user authentication and authorization at each sensitivity level
- Define policies for data management that ensure sharing, stewardship, integrity, timeliness, accuracy, compliance, and source

Goal 5 Potential Overlaps

- Develop integrated authentication system with minimal client interference
- Develop an information policy for managing Laboratory information resources

Goal 6 and Strategies

Establish Laboratory-Wide Standards

- Success = Acceptance + Usage
- Focus standards development efforts on the most critical areas
- Establish standards development teams in areas given high priority
- Use a standard approach to developing standards

Goal 6: RFC Process

1. Subteam (or anyone) writes Request For Comment (RFC)
2. RFC posted for Review Team comment
3. If no Review Team objections, RFC posted for public comment
4. Dialog with Lab-wide community (probably 3-5 weeks); subteam strives to develop consensus, develop implementation plans, and present to Review Team
5. Review Team (a) accepts and publishes as guideline/standard, or (b) sends RFC back to subteam with comments

Goal 7 and Strategies

Develop Standards to Manage Enterprise Applications as Corporate Assets

- Analyze existing applications (and/or their data as appropriate) for potential re-engineering efforts
- Develop the requirements for a Laboratory Information Systems Plan.
- Define the methodology for lifecycle management of applications
- Develop a standard application architecture and user interface style guide.

IA Desktop Team

IA Desktop Team: Charter

Develop guidelines and standards for desktop tools for the Laboratory as a whole. *Enable interoperability required* for Laboratory citizens to share information in electronic form, to collaborate more effectively, and to produce compatible and consistent results.

IA Desktop Team: Key Issues

- Commonality
- Interoperability
- Procurement
- Distribution
- Support and Training

IA Desktop Team: Considerations

- Technical
- Corporate Diversity
- Sociologic
- Economic

IA Desktop Team: Goals

- Establishment of an acceptable set of standard multiplatform tools to improve information flow across the Laboratory.
- Identification of acceptable processes that will formalize the implementation and continuation of desktop standards and foster an environment of Laboratory-wide participation.

IA Desktop Team: Objective 1

Determine the current state of desktop hardware and software used at the Laboratory.

Desktop Hardware Current State

Macintosh	8,028 Computers
IBM PCs	5,874 Computers
PC Clones	7,768 Computers
	Totaling 13,642
Workstations	3,348 Devices (Most of which are computers)

IA Desktop Team: Objective 2

Identify and monitor current and developing acquisition regulations.

IA Desktop Team: Objective 3

Obtain customer involvement and determine customer requirements for desktop hardware and software.

IA Desktop Team: Objective 4

Identify other "standards" efforts and coordinate them with the Information Architecture Project.

IA Desktop Team: Objectives

Objective 5: Define the standards, suite, and targeted platforms.

Objective 6: Develop a process to implement the standards.

Objective 7: Develop metrics to measure success.

IA Desktop Team: PDCA

IA Desktop Team: Platforms

- MACINTOSH
- IBM/PC CLONES
- UNIX

IA Desktop Team: Key Issues

- Guaranteed Support
- Price Competitive
- Easy to Acquire
- Interoperability

IA Desktop Team: Basic Mac Platform

- 68040 processor or faster (all Quadras use the 68040)
- At least 8MB physical RAM
- At least 200 MB disk space
- Ethernet transceiver
- MAC/TCP v. 2.0.4 or above (site licensed)
- IP address from the OCSR or subnet manager
- MAC OS v. 7.1 or above (site licensed)
- Basic applications needed:
 - E-mail (Eudora, VersaTerm Link, TCP/Connect II)
 - WWW Client (NCSA Mosaic, MacWeb, Netscape, TCP/Connect II)
 - Telnet Client (NCSA Telnet, VersaTerm, TCP/Connect II)
 - Word Processor (MS Word, WriteNow, WordPerfect)

IA Applications Team

IA Applications Team: Mission Statement

The IA Applications Team establishes and maintains guidelines and standards for usable and accessible Laboratory administrative, scientific, and engineering software applications.

IA Applications Team: Key Term (1)

applications: commercial or custom software that provides access to and/or processing of data in support of Laboratory operations.

Applications

- add value in helping employees perform their work;
- maintain and ensure the integrity, security, and accuracy of data; and
- enforce business rules.

IA Applications Team: Key Term (2)

usability: the ease and adaptability with which [an application] can be applied to the job for which it was designed. A high degree of usability implies ease of learning, flexibility, freedom from bugs, and good design that does not involve unnecessarily complicated procedures. (source: *MS Press Computer Dictionary*)

IA Applications Team: Mission Summary

- Administrative, Scientific, and Engineering Applications
 - Usable and Accessible
 - Commercial or Custom Software
- Applications
 - Add Value
 - Ensure Data Integrity
 - Enforce Business Rules

IA Applications Team: Strategies

- Team sets priorities and coordinates work
- Team leader manages boundary with other teams
- Form subteams for objectives
- Subteams operate with a common set of rules
- Subteams send guidelines/standards to team
- Use pilot(s) for validation

IA Applications Team: Initial Work

- Production System Lifecycle
- User Interface and Usability
- Object Libraries
- Applications Architecture

Production System Lifecycle

- Team formed and working
- Average six people at meetings, 11 on email
- Participation from BUS, CIC, DDHR-T&D, ESH, and JCI
- Current focus is review process of production systems
 - What will the review consist of?
 - Who will be involved?
 - How often will the reviews take place?
 - Who is responsible for review process?
- Standard definitions drafted for development system, production system, legacy A, legacy B, legacy C.

User Interface/Usability

- Team formed and working
- Average six people at meetings, 16 on email
- Participation from BUS, CIC, TSA, and X
- Current focus is
 - user interface style guides
 - how to encourage their use
- Recommendation of style guides has been drafted

IA Applications Team: Position in RFC Process

Object Libraries

- Team has not been formed
- Working with Los Alamos Object Oriented User Group
- Many interested, but few participants
- Is it too early for this objective?

Applications Architecture

- Team forming, initial meeting March 1, 1995
- Participation from CIC, ESH, and LANSCE
- Current focus is
 - validating action items from team
 - defining scope of work
 - strategies to accomplish objective
- Possible classification of Labwide applications
 - Los Alamos developed software (data centric)
 - Commercial Laboratory-wide (data centric)
 - Commercial Groupware (document centric)
 - WWW/Mosaic (document centric)

IA Applications Team Summary

- Administrative, Scientific, and Engineering Applications
 - Usable and Accessible
 - Commercial or Custom Software
- Applications
 - Add Value
 - Ensure Data Integrity
 - Enforce Business Rules
- Questions?

IA Data Warehouse Team

IA Data Warehouse: Definition (1)

A data warehouse is a repository for scientific, engineering, and administrative information for research, analysis, and decision making. An effective data warehouse is

- optimized for ease of ad hoc query of data from various sources
- accessible from multiple platforms through a variety of tools
- separate from but complementary to transaction systems that support Laboratory operations

IA Data Warehouse: Definition (2)

Data in the warehouse is characterized by being

- subject oriented
- "snapshots" in time, archived, historical
- non-volatile, read only
- diverse in content, format, and source
- traceable to its source and assigned to an identified steward

IA Data Warehouse Team: Mission

As an interdisciplinary team, we lead LANL in establishing an institutional, world-class data warehousing capability. We do this by

- identifying and involving potential customers
- building on Phase I in collaboration with other IA teams
- adopting technical, product, and process standards
- championing pilot projects
- leading design and implementation planning
- developing sponsorship and participation strategies

Throughout the process, we actively seek Laboratory-wide participation and evaluate the effort through metrics.

Steps to Building a Data Warehouse

1. Planning - Pilot Selection Process

- 1.1 Finalize the list of candidates
 - *1.2 Finalize the evaluation criteria
 - 1.3 Gather input
 - 1.4 Weight and evaluate input
 - 1.5 Select pilot
- Deliverable:** Pilot(s) selected w/preliminary data collected

Steps to Building a Data Warehouse

2. Data Modeling - For Warehouse

3. Technical Assessment

- *3.1 Define categories of tools necessary
- 3.2 Select refining platform
- 3.3 Select tools
- 3.4 Size the environment
- 3.5 Prepare the technical environment

Deliverable: Tool sets selected, detailed environment specified and prepared

Steps to Building a Data Warehouse

- 4. Data Warehouse Design
- 5. Populate the Data Warehouse
- 6. Install/Develop End-User Tools
- 7. In-House Initial Testing
- 8. Develop Tools Distribution Methodology
- 9. Develop End-User Training
- 10. Initial End-User Selection
- 11. Run Through Installation/Training Process
- 12. Revise Process From Initial Lessons Learned
- 13. Write the Report

IA Data Team

IA Data Team: Mission Statement

Supporting the Laboratory's vision of "science serving society" and following sound business practices, we establish standards and processes that support the management and use of information and data as corporate assets. In this effort, we involve the Laboratory community, coordinate with other IA teams, and utilize metrics to demonstrate the value of our work.

IA Data Team: Benefits

Among the benefits of our effort are:

- easier, more timely access to information
- better decision making
- an improved scientific capability
- more cost-effective use of Laboratory resources
- increased productivity
- reduced duplication of effort
- improved regulatory compliance
- better mechanisms for collaboration with industry

IA Data Team: Objectives (1)

Establish Laboratory Corporate Information Directory (LCID)

- Identify existing information resources
- Inventory subject matter experts
- Define meta-data
- Define data dictionary
- Define data categories
- Develop data model

IA Data Team: Objectives (2)

Identify Information Management Requirements

- ID information policy issues
- Develop stewardship criteria
- Define information lifecycle
- Define criteria for access permissions

IA Data Team: Objectives (3)

Define Data Format and Interchange Standards

- Define GIS standards
- Establish imaging and OCR standards
- ID markup languages
- Standards evolution

LCID Objectives

- Directory of information/data collections at the Laboratory
- Contains basic location/attribute information
- Directory of hardware, software, utilities at the Laboratory
- Evaluations of hardware, software, utilities
- Leading to eventually directly linking users to information

LCID Issues to be Addressed:

- Stewardship
 - Define
 - Flesh out ramifications
 - Identify steward responsibilities
- Access
 - Maintain IA principle of sharing
 - Access is the rule not the exception
 - Linking data/systems may change the access level

LCID Tasks

- Apply LCID approach to Pilot Project
- Design LCID template
- Align efforts with current data resources inventorying efforts
 - Site-Wide Environmental Impact Statement (SWEIS)
 - Active & Inactive Records Inventory (CIC-10)
 - Nuclear Weapon Archiving Project (NWAP)
- Plan Laboratory-wide implementation

Geographic Information Systems (GIS) Subject Area

Objective:

Supporting the Laboratory Information Architecture Project and the mission of the IA Data Team, we establish standards and processes that allow for the development and integration of GIS Tools and spatial data in the Laboratory information structure.

GIS Tasks to Date:

- Survey and Interviews to existing GIS users
- GIS Seminar Series
- Pilot Project

GIS Issues/Problems to be Addressed:

- Standards (Both platform and data)
- Data Compatibility
- Status Quo
- Expandability

GIS Future Tasks:

- GIS White Paper
- Develop Selection Criteria
- RFC (Request for Comment)

IA Infrastructure Team

IA Infrastructure Team: Mission

Lead the Laboratory in defining, developing, and promoting guidelines, standards, and procedures for the information infrastructure at Los Alamos.

Infrastructure: Definition

The information infrastructure comprises the connection, equipment, software, services, security, protocols, management, and consistent support that provide and maintain the connections among Laboratory citizens' and external stakeholders' desktops, central computers, and other information resources, both local and remote

IA Infrastructure Team: Guiding Principles

- Maintain alignment with NII, IA, and LANLnet
- Follow IA principles and standards process
- Provide a forum for Laboratory citizens and others to present and discuss issues
- Attempt to ensure that team composition is adequate and represents Laboratory-wide perspective

IA Infrastructure Team: Strategies

- Form subject area teams to address objectives
- Time the formation of subject area teams according to priority (i.e., high priority items addressed first)
- Collaborate with existing CIC and Laboratory teams to leverage work already being done (e.g., LANLnet, Computer Security Working Group, Authentication Project)
- Use the IA Standards Process to gain Laboratory-wide acceptance for existing standards

IA Infrastructure Team: Objectives Connectivity

Coordinate with LANLnet to establish guidelines and standards for connectivity to the infrastructure

- Establish network management standards
- Roll out basic services with network connection

IA Infrastructure Team: Objectives Services

Address specific infrastructure services (news, email, backups/recovery, web/gopher, database access, online documents, distributed file systems, naming services)

- Establish levels of support for services
- Develop structural lifecycle for services

IA Infrastructure Team: Objectives Security

Coordinate with ongoing efforts to define and develop an approved security architecture for unclassified networks

- Provide standards for encryption and authorization, including digital signature
- Define guidelines for security testing procedures

IA Infrastructure Team: Objectives Operations

Team Work

- Develop a training plan and strategy for implementation
- Develop a consistent policy and procedure for team formation and operation
- Provide guidelines for collaborative knowledge sharing

IA Infrastructure Team: Accomplishments

- Defined scope of work and a direction for accomplishing objectives
- Drafted charters for subject area teams
- Subject area teams forming and beginning to meet
- Coordinating efforts with other teams
- First RFC ready for posting (LANLnet topology)

IA Financial Analysis Team

IA Financial Analysis Team: Mission

Provide a decision-support framework for
IA proposals that integrates

- financial analysis
and
- adherence to IA principles

IA Financial Analysis Team: Objectives

- Develop the decision-support framework
- Apply the decision-support framework
 - Conduct financial analyses
 - Support IA teams in evaluating adherence to IA principles
- Adapt the decision-support framework as needed

IA Financial Analysis Decision Tree

IA Financial Analysis Team: Work Underway

Develop the decision-support framework

- Financial analysis tools: PRICE models, life-cycle costs, parametric approaches
- Quantify adherence to IA principles: Multiattribute Evaluation

IA Financial Analysis Team: Work Underway

- If you have thoughts or opinions on this evaluation process,
or
- If you would like to participate in the weighting process,
please contact ges@lanl.gov.

IA Financial Analysis Team: Applications

- Human Resources Desktop Issue
- IA Pilot Projects

IA Financial Analysis Team: Initial Application

Issues:

- Desktop platform support
 - PC/Windows
 - PC/Windows and Macintosh
 - PC/Windows, Macintosh, and UNIX
- Availability/functionality/cost of HR client-server packages

IA Financial Analysis Team

APPROACH

- Analysis will focus on LIFE CYCLE COST using a constant term: 3-5 years.

IA Financial Analysis Team

IA Financial Analysis Team

APPROACH

- Most expensive system to procure and install may have lowest life cycle cost.
- Operations, support, and maintenance costs are often far greater than initial procurement costs.

IA Financial Analysis Team

APPROACH

- Life cycle cost analysis allows the possibility of incorporating savings for productivity improvements.
- PRICE cost models with LCC are available and will be used for IA.

IA Financial Analysis Team

What is PRICE?

- PRICE is a family of parametric cost models marketed by Martin Marietta.
- PRICE stands for "Programmed Review of Information for Costing and Evaluation"

IA Financial Analysis Team

IA Financial Analysis Team

PRICE At Los Alamos

- PRICE has been at Los Alamos since SEP 91.
- LANL has an annual site license allowing unlimited copies and use of all four models.
- 16 LANL employees were trained on PRICE H in JAN 1995; 2 were trained on PRICE HL in SEP 94.
- PRICE is the de facto government contracting industry standard parametric cost model, with over 6,500 people trained worldwide.

IA Financial Analysis Team

- Financial Analysis Methodology
- **Hardware Perspective:** Infrastructure/Networks and Software Applications
- **People Perspective:** Job Function & Organization
- **Net Life Cycle Cost (NLCC) Benefit Perspective:**
 - Model current system LCC as dynamic baseline
 - Model proposed system LCC and compare to baseline LCC

IA Metrics Team

IA Metrics Team: Goal

The Metrics Team will provide data to measure progress of Information Architecture Team goals.

IA Metrics Team: Objectives

- To determine a baseline of where the Laboratory stands with regard to information architecture.
- To measure whether IA makes a positive difference for Laboratory computer users.
- To provide continuing feedback to architecture teams on progress and directions for future work.

IA Metrics Team: Metrics Already Being Gathered

- Email
- Web servers
- Remedy call tracking system

IA Metrics Team: Survey Schedule

January 10:	Provide strawman survey to IA team leaders
January 27:	All questions due from teams
February 3-21:	Publish a draft survey Give to IA teams for comment Revise based on their comments
February 22-23:	Give survey to test audience
February 24 - March 3:	Revised Survey based on test audiences' comments and fine tune
March 3:	Survey in the mail.
March 15:	Survey to be returned
March 24:	Analysis of results

IA Metrics Team: The Information Architecture Survey

- Sent to 635 employees
- Encompassed questions from all IA teams
- Aggressive schedule

IA Review Team

IA Review Team: Near-Term Goals

IA Review Team: Goal Alignment

Excuses Not to Participate

- IA has limited funding
- IA seen as a competitor
- IA moves at glacial speeds
- IA has no stick to compel compliance or cooperation

Reasons to Participate

- IA goals overlap with mission and interest of group
- IA goals are cultivated through customer involvement
- IA seeks coherence throughout the lab
- IA seeks cost savings
- IA process tracks evolving missions and solutions
- IA, like glaciers, can move mountains
- IA has carrots--solutions for common problems
(Karl-Heinz is buying pizza and good German beer for breakthroughs)

Potential Pilot Projects

• Groupware, email, LotusNotes,....	• Financial info for projects
• Proposal preparation	• Weapons data archive
• Issue compliance	• Space recharge
• GIS	• Library without walls
• Performance metrics	• Pollution control management
• CIC information system	• Records controls
• Science and tech base	• Facility management

Pilot Themes

- Project managers
 - resource tools
 - groupware tools
- Facility managers
 - data warehouse
 - multiple databases
 - MOSAIC front end

What's next?

- support your participating staff
- browse the WWW server
- use the IA principles
- attend IA activities
 - Forum meeting on April 5