Executive Overview

With funding from The Andrew W. Mellon Foundation, the Open Library Environment project (OLE Project) convened a multi-national group of libraries to analyze library business processes and to define a next-generation library technology platform. The resulting OLE platform is predicated on Service Oriented Architecture and a community-source model of development and governance. Over 300 libraries, educational institutions, professional organizations and business participated in some phase of the project. Using input from those participants, the project planners produced an OLE design framework that embeds libraries directly in the key processes of scholarship generation, knowledge management, teaching and learning by utilizing existing enterprise systems where appropriate and by delivering new services built on connections between the library’s business systems and other technology systems.

The OLE Project met all of its objectives and was completed on time and within budget. A group of libraries has agreed to commit funds to develop the software outlined during the planning project and to seek additional funding from The Andrew W. Mellon Foundation to supplement their investment. Although this is an especially difficult time for libraries to launch new projects and commit funding for them, project planners continue to hear from the library community that it is more critical than ever to create the technology infrastructure that can help libraries serve as a primary nexus of scholarly information management.

Detailed information from all phases of the project is available at: http://oleproject.org.

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Project Goals

The goal of the Open Library Environment Project (OLE Project) was to design a next-generation library system that breaks away from print-based workflows, reflects the changing nature of library materials and new approaches to scholarly work, integrates well with other enterprise systems and can be easily modified to suit the needs of different institutions.

The project planners went beyond designing for incremental improvement of current Integrated Library Systems (ILS’s). They also viewed the role of library business technology systems to be more than purchasing and providing access to collected materials. The project planners chose to define a system that supports libraries as a central player in the research process. To better understand the future activities that OLE is intended to support, consider the following scenario.

An economist is conducting research on the housing market financial collapse. She needs raw economic data as well as secondary data, policy documents, and a host of other materials available in print and electronic form. Her campus uses OLE, which manages all campus collections and information-resource subscriptions and is also integrated into the campus learning management system (LMS), the accounting, human resources and student systems, and other major technology systems—as well as several consortia to which the library or the campus belongs, such as OCLC and the Hathi Trust.

The researcher uses her preferred library access tool (several options are supported by OLE) to perform an initial search. She finds a variety of resources in electronic and print form, which the search tool presents to her (using metadata provided by OLE) in a faceted browser. She selects the items of particular interest and adds them to her research resource portfolio for easier referral. To her, the process appears seamless and effortless, but behind the scenes, the library access tool works with OLE to obtain full-text copies of the resources (some from campus collections; some from interlibrary loan; some from Hathi Trust; some from outside subscription providers), license them if necessary, and route them for her use. One of the resources requires a payment: OLE notifies her; she approves the payment from one of her research accounts; and OLE routes the necessary information to the institutional accounting system and the resource provider. Another requires interlibrary loan. OLE uses its institutional-collaboration services to obtain delivery information instantaneously. That information is added to her portfolio as well, flagged so she will notice the delay and the reason. In a third case, she decides that she wants print-on-demand rather than an e-resource. Again, she approves the payment from her research account, and OLE licenses the resource and routes it to her local print-station for pickup.

When the researcher goes to the library to pick up the books she added to her research portfolio, her chosen interface to the library delivers her a route-map through the stacks that allows her to find what she needs quickly. If she has a GPS-aware smart phone, the directions can route her both to the correct building and then within it, even if she has never visited this particular site before. The map also uses her original search data to highlight all the areas of the stacks from which matching books were discovered, in case she wants to browse. As she walks the stacks, she activates the library app on her smart phone (another user interface into OLE), logs herself in, and preselects the books she’s picking up so that when she returns to Circulation, her check-out process will be faster. At checkout, OLE consults the human resources and student systems and notes that these resources were circulated to a member of both the Economics and Business faculties. It also updates the database of the recommendation engines.
she uses—in both cases, protecting her personal privacy while mining information that will be used to provide her and her colleagues and students with better service in future.

Returning to her online research portfolio, the researcher begins reading the full-text electronic resources, using any of a wide variety of tools (supported through OLE’s standards-based annotation interfaces) to markup the works to her needs. In the middle of her analysis, she realizes that some of the information would be useful in an undergraduate course she is teaching. Without leaving her work, she routes those resources to the campus Learning Management System with a couple of mouse-clicks and a quick cover note to explain to the students what has been added.

Moving toward a draft document, she transfers materials into a word processor. Thanks to OLE, each arrives with full bibliographic metadata attached and ready to auto-format (via tools such as Zotero) into a form suitable for the academic journal she is targeting. When she is ready to share, she stores a copy of the draft in her institutional repository (via an OLE-aware interface) and sends a link to her various academic (social) networking venues, to invite public comment.

The OLE framework is intended to support the research scenario described above when integrated with other systems and services. OLE is both more and less than a traditional ILS. OLE goes beyond an ILS through its ability to utilize other systems and deliver valuable new services. At the same time, OLE allows institutions to avoid redundancy of data, and reduce purchase and integration of add-on components to their current ILS in order to carry out library business. Finally, OLE places the library’s business in context within the fabric of the institution and the research process, rather than keeping it a separate, siloed operation.

Project Strategy

The OLE Project was a twelve month planning project carried out by a planning group interacting with the broader library community. The project planning group consisted of participants from the libraries of Columbia University, Duke University (lead), Indiana University, Lehigh University, Library and Archives Canada, National Library of Australia, OhioLink consortium, Orbis Cascade Alliance consortium, Rutgers University, University of Chicago, University of Florida, University of Kansas, University of Maryland, University of Pennsylvania and Vanderbilt University.

The project was awarded a $475,000 grant from The Andrew W. Mellon Foundation in June, 2008. Between September 2008 and June 2009, the project planners worked with representatives from over 200 libraries to analyze library business processes and to define a next-generation library technology system designed using Service Oriented Architecture and supported through a community source model of development and governance.

The planning group developed a communications strategy, hosted training sessions on Service Oriented Architecture and Business Process Modeling, conducted workshops in the U.S., Australia and Canada, held in-person and virtual meetings, presented webcasts, organized conference calls with leaders of related projects, gave conference presentations and project briefings, and gathered information from and shared ideas with hundreds of individuals and institutions. As a result of these activities, the planning group identified a set of assumptions to guide the project, produced a scope document, modeled a number of key business processes, and defined a reference model that will be the basis for a follow-on software development project.

The funded planning project is now concluded. However, key project participants are in the process of talking with senior administrators, both internal and external to OLE, to identify those
institutions that wish to develop a proposal to carry the project forward into the next phase of building the software. OLE participants also have begun discussions with selected software vendors to explore how they might participate either in software development or software hosting and support as the project continues.

Related materials:
- Appendix A: Project Activities, Timeline and Participants
- Original project proposal and rationale: http://oleproject.org/overview/full-project-description/

Assumptions That Frame the Design of OLE

Project planners engaged the library community in many discussions about the assumptions that should guide the re-conceptualizing and development of library business technology. As an outcome of those discussions, the following key ideas emerged to guide the development of the OLE framework.

1. OLE will provide services that will help academic and research institutions accomplish their core mission by improving the library's ability to deliver its content and services throughout the institution's activities.

2. OLE will provide a transformative opportunity to the institution through its support of a more collaborative approach to research, teaching and learning.

3. Libraries are core to the research institution and as such, must be more integrated with enterprise infrastructure and more embedded into the full range of research and teaching activities.

4. Adopting a model of community-source software development and a technology infrastructure based on service orientation is, in itself, a strategic innovation for libraries and universities.
   - Innovation within the library technology marketplace is exhausted and does not engage the enterprise level of research institutions. Therefore it is incumbent upon libraries to revitalize the technological underpinnings of information management services to users.
   - OLE will be developed as a service-oriented framework that can be incorporated within the fabric of a larger academic enterprise; however, OLE can stand alone as a single or consortial library automation solution.
   - A community-source development model will provide a more responsive and forward-thinking solution than the current proprietary system model.

5. Business workflows at peer libraries are more similar than they are different.
   - Shared workflows are essential for collaborative efforts and cost-effective for both design and implementation.
   - Service orientation offers flexibility, adaptability, and collaborative efficiency.
   - OLE services can be composed, configured, and orchestrated to meet a variety of business workflows, including those of partnerships and consortia.
   - Service orientation facilitates the incorporation of changes into future versions of the core or as supplemental services to enhance the development of the OLE framework.

6. Libraries need to be able to leverage a dynamic information environment to support the research and educational mission of their institutions.
   - In a rapidly changing information environment, we need to spend our time and energy on strategic initiatives.
Changes in the broader realm of publishing, information technologies, and mass digitization are key elements at the confluence in the next generation of research. Library systems need to help researchers find, access, and use all types of information, in all formats, including original materials, archives and special collections. Libraries must respond to the dynamic information environment by re-engineering its organization and the workflows carried out by its personnel.

7. Digital formats will dominate our business processes.
   - The architectures of the integrated library system are fundamentally print-centric.
   - Future library automation needs to manage collections, format, and content agnostic to delivery format.
   - The OLE framework will provide tools for a holistic approach to managing library and other institutional content.

8. Collaborative and consortial activity is increasingly as important to libraries as work at local institutions.
   - OLE will support cross-institutional processes and interact with collaborative support services from other institutions.
   - OLE will provide collaborative planning and decision-making tools.

9. Library business processes will increasingly involve interactions with external service providers and consumers.
   - Data feeds will come from many sources, some of which will be provided dynamically at point of need.
   - Services will support many participant roles.
   - Services and workflows must operate on local, peer, regional, national or international network levels.
   - Despite distributed processes, the OLE framework will respect levels of user privacy and enforce information security.
   - The user will have control over any private data that will be exposed.
   - Library staff and patrons may use tools not part of OLE that will involve services provided by OLE
   - OLE must respond to service requests from a variety of external systems and tools

Project Scope

Vision

More than ever before, educational institutions are undergoing constant change, driven by both external and internal pressures. Scholarly communication is at a crossroads between traditional models of publishing and new models that encourage peer-to-peer collaboration and sharing in an increasingly digital environment. Simultaneously, the roles of instructors and students are shifting within more collaborative and virtual teaching and learning environments. To date, libraries have operated largely outside these changing models. Nevertheless, libraries do exist as part of the broader enterprise within their host institutions. By observing both gaps and duplication of effort across that enterprise, libraries increasingly see value in injecting services into the processes and workflows of these new models.

1 For the purpose of this document, the term “libraries” generally refers to libraries within higher education institutions as well as libraries charged with national or federal responsibilities. The techniques and tools of the OLE Project can be used by other libraries with similar enterprise application needs. Versions of OLE could be created with embedded enterprise components to serve other library sectors.
However, in order to remain relevant to users and provide these services, the technology that supports the business processes of the library and, by extension, the institution as a whole, must be efficient, flexible and adaptable. For example, libraries must better integrate with and maximize the use of other campus business systems, such as identity management and accounts payable/receivable, rather than replicate those functions within library systems. Libraries that are well integrated with institutional business processes can more successfully support the information management needs of their scholarly and research communities.

In addition to better institutional integration, libraries are increasingly reaching across institutional boundaries to provide more resources and seamless services to their user communities. For example, collaborative collections and partnerships are increasingly vital to supporting the mission of libraries, both economically and strategically. A library’s technology must support that role as a member of a network of collaborating institutions.

Existing commercial library systems are not development platforms that will help support the success of our libraries and institutions into this collaborative and digital future. They were designed around the service profiles, methods and business processes of print, and lack the flexibility to go beyond those print-oriented processes. Consequently, existing systems address an ever smaller slice of today’s information resource management needs and create an increasingly challenging operating environment for libraries.

These challenges are addressed through the development of the OLE framework.

**Characteristics of the OLE Framework**

**Flexibility:** Supports a wide range of resources; accessed by a wide range of customers in a variety of contexts; provides structures for extending and adding new types of resources, customers and contexts.

**Community ownership:** Designed, built, owned, and governed by and for the library community on an open source licensing basis; sustained by the community with the assistance of a thriving vendor marketplace; evolves over time through transparent processes that enable and respond to input and innovation from the community.

**Service Orientation:** Developed using the methods of Service Oriented Architecture (SOA) and implemented with Web Services to be a modular and technology-neutral framework that ensures the interoperability of library business systems and accommodates a diversity of solutions without the risks posed by single-source providers; can be customized to support local needs.

**Enterprise-Level Integration:** Designed to adapt to and integrate with other enterprise systems such as research support, student information, human resources, identity management, fiscal control, and repository and content management.

**Efficiency:** Provides a modular application infrastructure that integrates with new and existing academic and research technologies and business processes for improved efficiency and effectiveness of the institution; meets current and future business needs of the community.

**Sustainability:** Creates a reliable and robust framework to identify, document, innovate, develop, maintain, and review the software necessary to further the operation and mission of libraries.
**Functional Scope**

OLE will deliver an open source reference implementation of a set of technology services that allow libraries to carry out their back-end business operations, and therefore to replace their current ILS. However, OLE will also support functional capabilities that go beyond the existing ILS core. Each OLE component will be highly modular and use standards-based interfaces, allowing an institution to mix-and-match OLE components with other, existing campus and library systems if desired—including both open source and commercial systems. This will allow institutions to install only selected portions of OLE, or to adopt a phased replacement strategy.

OLE will not build the front-end or resource-discovery functionality of today’s ILS’s, but will instead provide support for several open source front-end projects (e.g., eXtensible Catalog, VuFind, Blacklight), as well as any commercial alternative that is willing to use OLE’s standards-based interfaces. OLE also expects its services to be delivered through non-library interfaces such as smart phones, learning management systems, campus portals, and other institutional products that involve resources and/or support from the library.

OLE is intended to expand and evolve in step with emerging business practices, service requirements, and content offerings of libraries, universities and research institutions. Thus OLE broadens the current notion of the ILS to support directly or to integrate with systems that manage intellectual property and rights, build and maintain content repositories, link content with learning management technologies, facilitate customer authentication and authorization, manage client relationships, and integrate with institution-wide financial services. Moreover, OLE will encompass support for consortial applications of information management, as well as the means of facilitating inter-institutional cooperative programs, resource sharing, and integration with external data and registry services.

**Technology Approach**

The Open Library Environment (OLE) seeks to improve *enterprise-level productivity and efficiency* in information management by reducing redundancy with Enterprise Resource Planning (ERP), identity management, institutional repository, course management, student-customer relationship management, research administration, and unified communications systems.

OLE has been developed using *service-oriented architecture* (SOA) principles and service orientation models to enhance interoperability at the enterprise level. SOA defines a *service taxonomy* that provides the building blocks that are orchestrated to fulfill business functionality. It is appropriate that OLE is implemented and managed at the enterprise level for performance, scalability, and robustness.

The current *service taxonomy* is intentionally incomplete. It is our expectation that the OLE Build Team will complete a full service taxonomy that will enable new methods of developing new business processes without disrupting current workflows. This will free staff from routine operations and increase capacity for innovation within the library, the institution or partnership, and the scholarly community.

*Web services* are a dominant method of the SOA implementation in OLE. Services are the well-defined, reusable building blocks used to assemble well-ordered information management and library business processes. Since processes are loosely coupled, new processes can be added without disrupting other processes, and existing processes can be re-orchestrated to discover new values and economies.
The Abstract Reference Model for OLE (below) shows the relationship between OLE middleware, OLE components, entities acted on by OLE, and third-party components, such as Identity Management, Institutional Repositories, and Course Management Systems.

The OLE Reference Model is an abstract representation of the OLE framework. As such, it describes the high-level functional components that will form OLE. Each of these components is made up of a number of workflows and/or processes. A workflow is a series of activities that involve people, business processes, and software that achieve a library business goal. For example, the OLE component Describe Entity is comprised of the processes Obtain Metadata, Create Metadata, Modify Metadata, Delete Metadata and Expose Metadata.

Additionally, the reference model shows examples of third-party components with which OLE will interoperate. These are reusable services, not developed or supplied by OLE, that fulfill an OLE business process. The components that straddle the boundary between OLE and third-party components represent the functions that will be provided partly by OLE and partly by third-party components.

The reference model also includes the entities that have so far been identified as belonging in the OLE framework. These are resources, collections, persons, organizations, and services.

Finally, the bottom portion of the Reference Model illustrates the software that will manage and connect OLE components. It is this middleware that will provide interoperability with third-party applications.

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2 A clickable version of this diagram with descriptions, workflow diagrams, and data definitions is available on the OLE Project website at: [http://oleproject.org/overview/ole-reference-model](http://oleproject.org/overview/ole-reference-model) and also in Appendix B: OLE Design Document.
The Open Library Environment is a services framework that can be differentiated from an integrated library system or a collection of information management silos. Throughout the planning project, the OLE planning group used the National Library of Australia Service Framework (https://wiki.nla.gov.au/display/LABS/3.+Service+framework) as a point of departure and then aligned our services to the E-Framework for Education and Research (http://www.e-framework.org/). The service framework assumes a Workflow Engine and a Rules/Policy Engine that can be implemented by, but is not limited to, further integration with Kuali Rice. The Workflow Engine is infrastructural middleware meant to manage modeled business processes; the Rules/Policy engine modifies workflows defined by local policies.

**Governance**

The OLE Project determined that it would save substantial time and resources by joining an existing 501(c)3 not-for-profit organization rather than developing a new 501(c)3 organization. After reviewing options, the OLE planners have recommended becoming a project within the Kuali Foundation. The Kuali Foundation, which directly supports administrative community source software projects in higher education, was designed as a lightweight administrative organization. It can provide administrative functions for OLE at a fraction of the cost of building an entirely new entity. In addition, the SOA middleware that Kuali has developed will play an important role in the OLE Build Project.

The Kuali Foundation’s governance template will create a charter for the OLE software community that sets forth the project’s mission, objectives, timeline, and partners. It will also create an independent community governing board from invested institutions that will serve as the direct connection to the Kuali Foundation and as the public face of the Kuali OLE community.

The details of the governance of the project will be determined by the investing build partners, and will address:

- providing a financial support model to sustain ongoing development;
- instituting a framework to accommodate new development and incorporate changes into the core project;
- managing communications between partners and external groups;
- establishing principles and guidelines for how developers will engage with the software;
- maintaining and protecting the intellectual property developed under the project’s auspices.

**Next steps**

The planning phase of this project is complete. The next steps are to secure funding and develop the OLE framework software. The following libraries have made the commitment to form a partnership for the next phase of the project, which will be titled The Kuali-OLE Project:

Indiana University (lead)
Florida Consortium (University of Florida, Florida International University, Florida State University, New College of Florida, Rollins College, University of Central Florida, University of Miami, University of South Florida, and the Florida Center for Library Automation)
Lehigh University
Triangle Research Libraries Network (Duke University and North Carolina State University participating)
University of Chicago
University of Maryland
University of Michigan
University of Pennsylvania
The founding partners will:

- Develop a final proposal to go to The Andrew W. Mellon Foundation for funding to supplement their institutional investment.
- Commit institutional funds and staff for a two year period.
- Apply for membership in the Kuali Foundation and establish the initial governance strategy for the project.
- Extend the design document developed during the planning phase into complete specifications.
- Define and hire the necessary staff.
- Oversee the software development.
- Pilot test software as it is developed and run components of OLE software in production within a reasonable time period after completing it.
- Participate in ongoing testing and quality assurance activities.
- Participate in governance and decision making activities.
- Interact with the broader academic and research library community to ensure that the delivered software is matched to as wide a set of needs as possible.

The total partnership cost of the OLE Project over two years is projected to be $5.2 million, a figure that includes all programming effort as well as project management and quality assurance staffing. In addition to OLE Project costs, costs of participation would include some local staff, governance and travel funding. Project partners intend to contribute half of the OLE partnership costs and seek the other half from The Andrew W. Mellon Foundation.

The projected timeline for the build phase of the project is

**October 2009** – submit full project proposal to The Andrew W. Mellon Foundation for consideration and decision making at the December 2009 board meeting.

**January 2010** – hire project staff and then begin software development.

**January 2011** – delivery to build partners of the first production functionality. This first functionality will enable an institution to replace some portion of existing ILS and ILS-add-on functionality, but will not be a complete ILS replacement.

**January 2012** – first full release to partners, consisting of the full infrastructure and basic set of services needed for ILS replacement, as well as for the enhanced functionality specified by the OLE design, and accompanied by workflow/customization templates for research universities and liberal arts colleges. This milestone will deliver the services in reference form; institutions will still need to attach user-facing services and integrate with other systems.

Thus, an institution participating in OLE from the beginning might reasonably expect to be able to replace an existing ILS with OLE in mid-2012, allowing six months after delivery of the first full product to integrate a discovery layer, migrate data and integrate with other systems. Non-partner schools would probably need to wait until mid-2013, though some ambitious institutions might be able to try implementation sooner.

The founding partners welcome inquiries from libraries, consortia or vendors who wish to learn more about the build project. For more information, contact:

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Summary assessment

In our original proposal to The Andrew W. Mellon Foundation, we listed three assessment benchmarks. We have met all three assessment benchmarks.

Assessment benchmark 1: Project activities were completed (e.g., all meetings and workshops were held, final document was written)

The project proposal called for training in Service Oriented Architecture and Business Process Modeling for the project team, workshops for the broader community and webcasts for information sharing in between face-to-face activities. The project planners completed all of these activities and more. One change from the original plan was reducing the amount of training in Service Oriented Architecture on the grounds that not everyone in the planning group needed expertise in SOA. Another change was increasing the amount of Business Process Modeling training and hiring a consultant to review BPM documents and project plans. The group added an additional full group meeting near the end of the project to consolidate and finalize plans. Finally, the group carried out far more dissemination activities than originally planned. All of these changes were funded within the existing budget. See Appendix A for a detailed list of completed project activities.

Assessment benchmark 2: Library community was involved in the process (participants gave presentations that drew feedback from others, representatives from a range of academic libraries participated in meetings, multiple individuals provided feedback on draft document)

The project drew on ideas from a wide variety of libraries, consortia, professional organizations, educational institutions and vendors. Some of the input came through a series of workshops hosted by the OLE Project planners and held in the US, Canada and Australia. These regional workshops engaged over 370 people from 125 institutions.

In addition to the workshops, the project involved the community through webcasts held at intervals throughout the project. The audience for these webcasts included over 385 individuals from 217 institutions or organizations.

OLE Project planners discussed project plans and gathered feedback at over 50 events including conference presentations, panel discussions, special interest meetings and symposia.

All project materials, including notes from regional workshops and from presentations, were posted on the project website. The website allowed open comment from anyone reading the materials. Over 360 people subscribed to updates from the website.

OLE partners actively sought out advice from and possible synergies with other projects where the mission or activities might coincide with OLE goals. The OLE Project hosted public discussions with groups such as Evergreen, E-Matrix, Kuali, CUFTS, CollectionSpace, and eXtensible Catalog; in many cases, recordings of these calls were posted for those who could not participate in real time.
Assessment benchmark 3: Design document demonstrates clearly whether an open source alternative to ILS is feasible and desirable (clear response from libraries, vendors, others indicating whether we should move forward on a proposal to carry out the design document).

The formation of a group of founding partners committed to the development of the OLE framework reflects achievement of this objective. The recent world-wide economic downturn has been challenging for libraries, with many of them experiencing cuts in budgets and staffing. Although this is an especially difficult time for libraries to launch new projects and commit funding for them, libraries recognize that it is more critical than ever for them to have the technology infrastructure necessary to accomplish their mission of serving as a primary nexus of scholarly information management.

Postscript

Although this report accurately describes the facts, it does not convey the energy and enthusiasm that characterized the OLE Project this past year. Project planners engaged in lively debate, wrote and re-wrote documents, shared and discussed readings, responded to dozens of requests for phone calls and presentations by interested groups and individuals and faced challenging questions at public events, all with good humor. They wrestled with technology and phone systems to figure out how to collaborate across thousands of miles and a 14 hour time spread. They learned to say “June” instead of “summer,” in recognition that there are two hemispheres in this world.

The response from the library community exceeded all expectations. Workshops quickly filled with participants from libraries large and small, near and far. Webcasts drew interest from around the world; project members began recording and posting the recordings for those who could not attend “live” in the middle of the night. Throughout all of these activities, individuals with deep respect and concern for libraries wrestled with difficult issues and diverse points of view.

The OLE Project completed its official goals, but beyond that, it launched a world-wide conversation about the desired future of libraries and what is needed to move libraries toward that future.
Appendix A: Project Activities, Timeline and Participants

Summary of Activities

Training and Workshops on Service Oriented Architecture and Business Process Modeling

- In September 2008, the OLE Project planners assembled at Duke University for Service Oriented Architecture training and project planning.
- A Business Process Modeling (BPM) Workshop was held in November 2008 for OLE Project planners.
- In January 2009, OLE partners met for continued work in BPM and library workflow analysis.
- OLE Partners continued developing their understanding of SOA and library workflow analysis through the workshops that were held in the US, Canada and Australia from November 2008 through March 2009.

Engaging the Library and IT Communities
OLE held a series of workshops throughout the US, Canada and Australia to provide forums for regional academic and research libraries and related institutions to discuss and provide feedback on the OLE Project planning documents. OLE partners led attendees in business process modeling to identify business processes associated with existing library businesses and workflows and also identified processes and services needed in a next generation system.

- Over 370 people from 125 institutions participated in 12 regional workshops.
- Workshops were held in the United States in Georgia, Illinois, Indiana, North Carolina, Kansas, New Jersey, Pennsylvania, Texas and Utah. Workshops were also held in Canada and Australia.
- The later workshops focused on validating and extending workflows of models developed in the earlier workshops.

Project Communication with the Community
OLE made a strong commitment to keeping the general library, academic IT and vendor community informed of its activities and progress on the OLE Project. In addition to maintaining a website and regularly posting discussion notes from all meetings and activities, OLE also held webcasts to share progress, generate discussion, invite input and answer questions. Prior to the first webcast, the project rational was posted on the website along with several articles and key discussion questions.

- Webcasts were held in October 2008, November 2008, and March 2009.
- Over 385 individuals from 217 institutions participated in the webcasts.
- Over 360 people are currently subscribed to the OLE website; subscribers come from 106 US libraries, 35 non-US libraries and 27 organizations.

OLE Partners were in on-going conversation with the community through:

- participation in 17 presentations and 11 panel discussions.
- discussion at over 30 symposiums, conventions and special interest meetings.
Interaction with other projects:
The OLE Project is based on community-source development and SOA design principles. OLE partners actively sought out other projects where the mission or activities might coincide with OLE goals.

- Public discussions were held with a variety of other projects including Evergreen, E-Matrix Kuali, CUFTS, CollectionSpace, and eXtensible Catalog.
- Project planners shared information with other community source projects at two RIT retreats hosted by The Andrew W. Mellon Foundation.

Organizations participating in OLE Project activities:
Participants included representatives from many types of libraries, from higher education IT organizations, administrators, professional organizations, consortial and businesses.

Aajan Pvt Ltd
Albert Einstein College of Medicine
American Antiquarian Society
American Theological Library Association
Appalachian State University
Argonne National Laboratory
Association of Research Libraries (ARL)
Associated Mennonite Biblical Seminary
ATSPIN Consulting
Auburn University
Augsburg College
Austrian National Library
Austrian National University
AUI (Associated Universities, Inc.)
Baker University
Ball State University
Belmont Abbey College
Bergen Community College
Black Hills State University South Dakota
Boston University Libraries
Brescia University
Brigham Young University
Brooklyn Public Library
Brooklyn College
Bryn Mawr College
Bucknell University
Burlington County College
C/W MARS, Inc. (Central/Western Massachusetts Automated Resource Sharing)
California Digital Library
CALYX Group Pty Limited
Camden County College Library
Campbell University
Canadian Museum of Civilization
Carleton University
CARLI (Consortium of Academic Research Libraries in IL)
Carnegie Mellon
Catholic University of America School of Library and Information Science
CCLA (College Center of Lib Automation FL)
Cedar Crest College
Center for Computing Sciences
Chicago State University
Chinese University of Hong Kong
Christopher Newport University of Hampton Roads VA
City of Boulder CO
City of Douglas OR
CISTI (The Canada Institute for Scientific and Technical Information)
CLAMS (Cape Libraries Automated Materials Sharing)
Clarion University
Clemson University
Colby-Sawyer College
CollectionSpace / Museum of the Moving Image
College Center for Library Automation (CCLA)
College of Saint Elizabeth
Colorado State University
Columbia University
Concordia University (Montreal)
Connecticut State University
Coppin State University-Moore Library
Cornell University
Creighton University
CUNY Brooklyn
Dechert LLP
DeSales University
Drew University
Naval Postgraduate School at Monterey CA
Dudley Knox Library
Duke University
Duquesne University
East Carolina University
East Georgia College
Eastern Illinois University
Educational Technology Group at UC Berkeley
Elon University
Emory University
Emporia State University
Environment Canada
Episcopal Divinity School
Equinox Software, Inc.
European Parliament
Evergreen
Exeter Academy NH
Ex Libris Ltd.
Fairleigh Dickinson University
Florida Center for Library Automation (FCLA)
Florida State University
Folger Shakespeare Library
Forsyth County Public Library
Free University of Bozen, Bolzano, Italy
Geneva Public Library
George Washington University
Georgia State University
Georgia Tech Library
Government of Manitoba Canada
Grand Rapids Community College
Greater Western Library Alliance
Grinnell College
Haramaya University, Ethiopia
Harvard University
Haskell Indian Nations University
Hennepin County Library
Holmes City District Library
Houston Cole Library at Jacksonville State University
Hudson County Community College
Illinois State University
iCONN.org (CT State Library)
INASP (International Network for the Availability of Scientific Publications)
Indiana State University Library
INFOLINK, The Eastern NJ Regional Library Cooperative
Innovative Interfaces, Inc.
International Labour Organization
Indiana University Purdue University Indianapolis
Johns Hopkins University
Johnson C. Smith University
Johnson County Community College
Joyner Library at Eastern Carolina University
Kansas State University
Kent State University SUS
Kentucky Community & Technical College System
Kentucky State Library
Kesavan Institute of Information and Knowledge Management, India
King Abdullah University of Science and Technology
Korean Education and Research Information Service
Lafayette College
La Trobe University
LCC International University, Klaipeda, Lithuania
Le Moyne College Library
Lehigh University
Letourneau University
Liberty University
Liblime
Library and Archives Canada
Library of Congress, USA
Library of the European Parliament
Linda Hall Library
Lipscomb University
Louisiana State University Libraries
Lucid Imagination
Luther College
McGill University
McMaster University
McNeese State University
Melbourne College of Divinity
Mercer County Community College
Meredith College
Merrill-Cazier Library, Utah State University
Metropolitan Museum of Art
Michigan Library Consortium
Middle Tennessee State University
Middlebury College
Midlands Technical College
Millersville University
Minnesota State Colleges & Universities
Mississippi State University
Montclair State University
Morehead State University
Muhlenberg College
Murdoch University Library
National Library Board Singapore
National Library of Australia
National Library of Medicine
National Library of Serbia
National Library of Sweden
National Transportation Library
New Zealand Libraries of Greater Auckland
NC LIVE
North Carolina Central University
North Carolina State University
Northeast State IN
New Jersey City University
New Jersey Institute of Technology (NJIT)
Newberry Library
NISO (National Information Standards Organization)
NITLE, National Institute for Technology in Liberal Education
NJIT (New Jersey Institute of Technology)
Northampton Community College
Northeast State Technical Community College
Northeastern Illinois University
Northeastern University
Northwestern University Library
Notre Dame
Novanet Inc.
NRCan Library (Natural Resources Canada)
NRC-CISTI (Canada Institute for Scientific and Technical Information)
Ocean County College
OCLC (OnLine Computer Library Center)
Ohio State University Libraries
OhioLINK (the Ohio Library and Information Network)
Old Dominion University Libraries
Open University, UK
Oregon Public Library, Dane County WI
Oregon State University Libraries
PALCI (The Pennsylvania Academic Library Consortium, Inc.)
Palinet
PALS (Project of MN State University and Colleges)
PASCAL
Peking University
Pellissippi State Community College
Pennsylvania State University
Philadelphia College of Osteopathic Medicine
Pittsburg State University
Plattsburgh State University of NY
Portland Community College
Princeton University
Purdue University
Qatar University
Queensland Parliament, Australia
Ramapo College of NJ
Rapid/Colorado State University
Reeves Library, Moravian College
Regis College Library
Rice University
Richard Stockton College of New Jersey
Rider University
Rowan University
Rutgers University
Saint Mary's College, Notre Dame, IN
Saint Mary's University, Patrick Power Library
Salem U Salem
Salisbury University
Samford University
Serials Solutions
SEO Library Center, SEO Library Consortium
Seton Hall University
Shaw Libraries, Ontario, Canada
Simmons College Graduate School of Library and Information Science
Simon Fraser University, British Columbia
Smithsonian Libraries
Stanford University
St. Bonaventure
St. Cloud State University
St. Mary's College of Maryland
St. Patrick's College (AU)
State Library of Ohio
Statistics Canada
Stetson University College of Law
Stevens Institute of Technology
Swarthmore College Library
Swinburne University (AU)
Takming University of Science and Technology
Talis
Tech4lib
Texas A&M University
The Art Institutes International-Kansas City
The College of New Jersey
The Metropolitan Museum of Art
Towson University
Tulane University
Turo Technology LLP
U. S. Geological Survey Library
University of California Riverside
Uintah County Library
UNAM (The National Autonomous University of Mexico)
UNC SILS (School of Information and Library Science)
Université du Québec à Montréal - UQAM
University Elbasan (Albania)
University of Alabama
University of Alberta School of Lib. & Info. Studies
University of Arkansas
University of Baltimore
University of British Columbia
University of California, Merced Library
University of Canterbury, Christ Church New Zealand
University of Central Florida
University of Chicago
University of Cincinnati
University of Colorado
University of Delaware
University of Denver
University of Florida
University of Georgia
University of Hawaii
University of Houston Libraries
University of Illinois at Chicago
University of Illinois at Urbana-Champaign
University of Indiana
University of Iowa
University of Kansas
University of Kentucky
University of Louisville
University of Maine
University of Manitoba Libraries
University of Maryland
University of Maryland, Baltimore County
University of Maryland, College Park
University of Maryland, Eastern Shore
University of Melbourne
University of Michigan
University of Minnesota
University of Minnesota, Duluth
University of Mississippi
University of Missouri
University of New Mexico
University of North Carolina - Chapel Hill
University of North Dakota, Chester Fritz Library
University of Notre Dame
University of Oklahoma
University of Oregon
University of Ottawa
University of Prince Edward Island
University of Pennsylvania
University of Pittsburgh
University of Pretoria, South Africa
University of Rochester
University of Tasmania, (AU)
University of Tennessee at Chattanooga
University of Tennessee, Knoxville
University of Toronto Library
University of Utah
University of Vermont
University of Virginia
University of Washington
University of West Indies
University of Windsor Canada
University of Wisconsin-Madison
University of Zambia Library
US Naval Academy
Utah State University
Utah Valley University
Valdosta State University
Vanderbilt University
Vastra Gotaland University (Sweden)
Villanova University
Wake Forest University
Warren Wilson College
Washington University Libraries
Western Michigan University
Western Washington University
Wheaton College
Whittier College
Wichita State University
Wilfrid Laurier University
William Paterson University of New Jersey
Wingate University
Winston-Salem State University
YBP Library Services

**OLE Project timeline**

**February 2008**
- February 28, 2008: Presentation and discussion of project plans at Research in Information Technology Program Retreat [Princeton, NJ]

**April 2008**
- April 15, 2008: Proposal submitted to The Andrew W. Mellon Foundation
- April 28, 2008: Presentation at JA-SIG Conference [St. Paul, MN]

**May 2008**
- May 8, 2008: Presentation at SAMM08 (Solinet Annual Membership Meeting) [Atlanta, GA]
- May 23, 2008: Presentation at ARL Annual Meeting [Coral Gables, FL]
OLE Project Final Report – October 20, 2009

June 2008
June 1, 2008: Funding awarded by The Andrew W. Mellon Foundation
June 4, 2008: Presentation at Duke Libraries: First Wednesday [Durham, NC]

August 2008
August 10, 2008: Presentation at International Federation of Library Associations and Institutions Conference [Quebec City, Canada]

September 2008
September 9 - 10, 2008: OLE Project Kickoff Meeting at Duke University [Durham, NC]
September 26, 2008: Presentation at Digital Library Federation Fall Forum [Providence, RI]

October 2008
October 1, 2008: OLE Project update via open webcast
October 8, 2008: OLE Project briefing for College Center for Library Automation, FL
October 24, 2008: OLE Presentation at Kansas Library Association Fall Conference [Lawrence, KS]
October 27, 2008: OLE Presentation at PALINET [Philadelphia, PA]
October 28, 2008: Presentation at EDUCAUSE Annual Conference [Orlando, FL]

November 2008
November 4, 2008: Guest Lecture - INLS 520 – Information Organization, University of North Carolina [Chapel Hill, NC]
November 6, 2008: OLE project planning meeting at Rutgers University [New Brunswick, NJ]
November 12, 2008: OLE Presentation at IDEA 2008 Conference [Melbourne, Australia]
November 12, 2008: Digital Library Federation Fall Forum [Providence, RI]
November 19, 2008: OLE project presentation at ASERL [Atlanta, GA]
November 20, 2008: OLE Project update via open webcast
November 27, 2008: Regional OLE Workshop - Swinburne University, Melbourne, Australia

December 2008
December 8 - 9, 2008: Regional Design Workshop - Rutgers University, New Brunswick, NJ
December 8, 2008: CNI Fall 2008 Meeting [Washington, D.C.]
December 9, 2008: OLE Project Webcast - Conversation with Evergreen
December 11, 2008: Regional Design Workshop – University of Chicago, Chicago, IL
December 15 - 16, 2008: Regional Design Workshop - Duke University, Durham, NC
December 15 - 16, 2008: Regional Design Workshop - Lehigh University, Bethlehem, PA
December 15 - 16, 2008: Regional Design Workshop - Rutgers University, New Brunswick, NJ
December 16 - 17, 2008: Regional Design Workshop - University of Kansas, Lawrence, KS

January 2009
January 7, 2009: Presentation at Common Solutions Group Winter 2009 meeting [Boulder, CO]
January 15, 2009: Regional Design Workshop - Ottawa, Canada
January 16, 2009: OLE Presentation for the Canadian Committee on Cataloguing [Ottawa, CA]
January 20 - 22, 2009: OLE Project planning meeting, Lehigh University, Bethlehem, PA
January 20, 2009: Information Online Conference [Sydney, Australia]
January 23, 2009: CCS Forum Midwinter ALA [Denver, CO]

February 2009
February 10, 2009: OLE Project Webinar - Conversation with the Kuali Foundation
February 11, 2009: ER&L 2009 Conference [Los Angeles, CA]
February 11, 2009: Australian Horizon Libraries Meeting [University of Tasmania]
February 12 - 13, 2009: Regional Design Workshop - Georgia Institute of Technology, Atlanta, GA
February 17, 2009: Webcast - Conversation with E-Matrix
February 25, 2009: Code(4)lib 2009 Conference [Providence, RI]

March 2009
March 9, 2009: LAUNC-CH Conference [Chapel Hill, NC]
March 16 - 20, 2009: OLE Project planning group meeting at University of Kansas
March 31, 2009: OLE Project Update Webinar

April 2009
April 7, 2009: for Networked Information (CNI) Task Force Meeting [Minneapolis, MN]
April 8, 2009: OLE Project Webinar - A Conversation with CUFTS
April 22, 2009: OLE Workshop - Indianapolis, IN
April 22, 2009: OLE Teleconference – hosted by National Library of Australia, Canberra, Australia
April 27, 2009: Internet2 Member Meeting [Arlington VA]

May 2009
May 6, 2009: EDUCAUSE Enterprise Information and Technology Conference [Indianapolis, IN]
May 21, 2009: Association of Research Libraries Members Meeting [Houston, TX]
May 28 – 29: OLE planning group meeting at Duke University [Durham, NC]
May 31, 2009: Canadian Library Association (CLA) Annual Conference [Montreal, Canada]

July 2009
July 12, 2009: OLE at ALA LITA [Chicago, IL]
July 24, 2009: Triangle Research Libraries Network Annual Meeting [Durham, NC]
Appendix B: Reference Model

The OLE Reference Model is an abstract representation of the OLE framework. As such, it describes the high-level functional components that will form OLE. Each of these components is made up of a number of workflows and/or processes. A workflow is a series of activities that involve people, business processes, and software that achieve a library business goal. For example, the OLE component Describe Entity is comprised of the processes Obtain Metadata, Create Metadata, Modify Metadata, Delete Metadata and Expose Metadata.

Additionally, the reference model shows examples of third-party components that OLE will interoperate with. These are reusable services, not developed or supplied by OLE, that fulfill an OLE business process. The components that straddle the boundary between OLE and third-party components represent the functions that will be provided partly by OLE and partly by third-party components.

The reference model includes the entities that have so far been identified as belonging in the OLE framework. These are resources, collections, persons, organizations, and services. Finally, the bottom portion of the Reference Model illustrates the software that will manage and connect OLE components. It is this middleware that will provide interoperability with third-party applications.
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Select Entity

**Process Module:** Select Entity

**Definition:** Describes the processes that support the trial and/or acquisition of an entity. This may be for temporary or permanent inclusion in the environment. Metadata to describe the entity is created and/or obtained.

**Workflow / Process Diagrams:**
- Obtain Metadata
- Create Metadata

**Use Cases:** Create list of potential resource needs, place in “shopping cart”. Could contain gifts, approval plan items, firm orders, interlibrary loan requests, reserve requests, remote location requests, publication references, trial databases.
Process Module: Select Entity

Process Title: Obtain Metadata

Definition: Process where metadata is obtained, when available. The metadata obtained will support the activity that leads to the decision to select or reject an entity for inclusion in the environment.

Use Cases: Metadata being obtained may include descriptive (e.g. a review of the entity), holdings (e.g. what is available and being considered for acquisition), authority, financial, or other types. The metadata may be harvested from or deposited by another system.

Reference(s):
• (NLA Service Framework 6.5: Describe) Process whereby resources in a collection, or that are in the process of being selected and acquired, are described. The metadata may be entered in real-time or harvested from or deposited by another agency. The description may evolve over time, as material is identified for selection, acquired, accessioned, annotated, curated and used.
Workflow / Process Diagrams:

1. **Obtain Metadata Workflow / Use Case**
   - Obtain Metadata Available
   - Select Appropriate Metadata Source
   - Import Metadata
   - Validate Metadata
   - Save / Submit
   - Obtain Metadata Process Complete
   - Need to intervene to modify or discard
   - Machine process kicked off here

2. **Create Metadata Process**
   - Create / Modify Metadata
   - Capture appropriate metadata
   - Validate Metadata
   - Save Metadata
   - Create Metadata Process Complete
   - Need to capture source of metadata, target for metadata (for synch purposes)
   - Metadata elements will vary based on activity or purpose (description, ordering, etc.)
Process Module: Select Entity

Process Title: Create Metadata

Definition: Process where metadata is created to supplement that which was obtained or when metadata is not available to be obtained. The metadata created will support the activity that leads to the decision to select or reject an entity for inclusion in the environment.

Use Cases: Metadata being created may include descriptive (e.g. a review of the entity), holdings (e.g. what is available and under consideration for acquisition), authority, financial, or other types. The metadata may be entered real-time.

Reference(s):
(NLA Service Framework 6.5: Describe) Process whereby resources in a collection, or that are in the process of being selected and acquired, are described. The metadata may be entered in real-time or harvested from or deposited by another agency. The description may evolve over time, as material is identified for selection, acquired, accessioned, annotated, curated and used.
Workflow / Process Diagrams:
Acquire Entity

Process Module: Acquire Entity

Definition: Describes the OLE component whereby an entity is selected for acquisition. Associated license/registry terms are managed and documented within the system. The entity is described in the system and an order is created for acquisition. The entity is received and paid for upon receipt from the supplier.

Note: An entity order may include orders for multiple items and may be a blanket order or approval plan that is based on desired entity criteria. Entities may be acquired through donation. Entities may be acquired temporarily as on a trial basis within a set time frame.

Workflow / Process Diagrams:
- Identify Supplier
- Manage Terms of Acquisitions & Use
- Manage Funds
- Commit Funds
- Order Resource
- Schedule Event
- Track Event
- Receive Resource

Use Cases: An entity is selected for the collection. A supplier for the entity is assigned. Funds for the purchased entity are encumbered. System schedules claiming cycles and allows re-encumbering of funds at the end of the fiscal year. System tracks the order status to fulfillment or allows for an aborted order request if entity cannot be fulfilled. The invoice process and payment activity may be executed manually or electronically and interface with institutional finance system. Payment may be made by using protocols such as: EDIFACT; ANSI X12, XML EDI.
**Process Module:** Acquire Entity

**Process Title:** Identify Supplier

**Definition:** Describes the process whereby a supplier is identified for the purposes of acquiring an entity.

**Use Cases:** The supplier is assigned to an order request – could be an automated process when applied to the supplier registry or a manual process in which a new supplier is added or ingested into the systems supplier registry.
Workflow/Process Diagrams:

- Identify Supplier Solicitations/Use Case:
  - Retrieve rules for contact with supplier
  - Query list of suppliers following rules for order entity
  - Identity Suppliers
    - Multiple Suppliers? Yes
      - Order candidate verified, supplier identified
    - No
      - Supplier found? Yes
        - Locate and create new supplier
      - No
        - Select valid supplier
          - Identity supplier process complete

- Identify Supplier Process:
  - Retrieve relevant policy to identify supplier
  - Build list of potential suppliers
  - Select supplier
    - Identity supplier process complete
Process Module: Acquire Entity

Process Title: Manage Terms of Acquisitions & Use

Definition: Defines the services required to manage acquisitions processes. Documents the review process for terms of agreement associated with the usage of acquired entities.

Use Cases: Metadata for entity is created with pending status. Tracking begins as negotiations and/or evaluation of trial take place. The final selection decision is recorded and pending status is removed.

Reference(s)
1. (NLA Service Framework 2.2: Confirm) Agree (or not) to an obligation statement
2. (NLA Service Framework 6.1: Select) A service usage model that identifies and selects collection material by analyzing gaps in the collection, registering desired items (or sets of items), registering contributors of items, tracking negotiation and/or evaluation processes and recording the final selection decision.
3. (e-Framework, Service Genre – Comply) Describes compliance by a party, the process where a party is presented with a policy statement and given the opportunity to acknowledge acceptance of the policy. The policy contains information around the terms and conditions of use that the party is signing on to. The compliance process normally involves an individual agreeing to abide by certain rules when using a system. This is normally tracked so that any breaches of use by an individual can be enforced e.g., remove access, legal proceedings.
Workflow/Process Diagrams:

Documents and manages the acquisition of entities and associated information: license terms, deposit terms, gift terms, exchange terms, approval terms, etc. for acquiring collections. Includes processes for collections: permanent or temporary acquisition.
Process Module: Acquire Entity

Process Title: Manage Funds

Definition: Process supported by the system to make payment for a service or product. Included in this process is a log trigger and log response; the system records the usage of service or product for audit, reporting or billing purposes.

Use Cases: Invoice process and payment activity may be executed manually or electronically. Process whereby the invoice payment in the library system interfaces with institutional finance system. Payment made by using protocols such as: EDIFACT; ANSI X12, XML EDI. Therefore invoices may be received via EDI transfer to the library system and upon delivery be processed in the system. Print invoices received through email or mail may be processed manually in the system.

Reference(s)
1. (NLA Service Framework 1.5: Log) Record service events and transactions for audit and reporting purposes.
2. (NLA Service Framework 2.7: Pay) Make a payment for a service or product
Workflow/Process Diagrams:

- Manage Funds Workflow/Use Case:
  - Create Fund Structure
  - Interact with institution's financial system
  - Validate EDI invoice policy
  - Receive and process EDI invoice
  - Transmit payment to supplier
  - Manage funds workflow complete

- Manage Funds Process:
  - Apply Fund Structure
  - Interact with institution's financial system
  - Apply appropriate invoice policy
  - Process invoice
  - Transmit payment to supplier
  - Manage funds process complete
Process Module: Acquire Entity

Process Title: Commit Funds

Definition: Describes the process of encumbering funds from the appropriate budget for the purchase of a selected entity. The process incorporates guidelines for fund assignment when ordering an entity.

Use Cases: Authorized user may encumber funds during ordering process.
Workflow/Process Diagrams:

Commit Funds Workflow/Use Case:
- Assign Funds per guidelines
- Query Funds for sufficient budget
- Commit Funds
- Query Funding
- Assign alternate funding
- Commit Funds

Commit Funds Process:
- Assign Funds
- Query Funds
- Commit Funds
- Commit funds process complete
Process Module: Acquire Entity

Process Title: Order Resource

Definition: Obtain collection resources, with associated functions to manage providers. In the case of acquiring digital material it is a process whereby a system manages content in order to bring it into a collection. Note: includes orders for multiple resources and may be a blanket order based on policy/criteria; resources may be acquired by donation, firm order, approval plan, etc.

Use Cases: Obtain metadata for entity orders. Identify appropriate supplier for the requested entity. If the order is a purchase request, encumber the funds to cover payment for the entity. Determine appropriate means for distributing order request (EDI, email or mail).

Reference(s):
1. (NLA Service Framework 2.1: Consign) Request a service provider to undertake a task.
2. (NLA Service Framework 6.2: Acquire) Obtain collection material, with associated functions to manage providers. Note that an order can include orders for multiple items and may be a blanket order based on desired item criteria, that items may be acquired by donation and that order acquittal may be dependent on quality checks made during the accessioning process.
Workflow/Process Diagrams:

Order Resource Workflow/Use Case

1. Receive Order Request
2. Identify Supplier
3. Commit Funds
4. Transmit purchase order via EDI
5. Supplier receives order
6. Order resource process complete

Order Resource Processor

1. Import order
2. Identify Supplier
3. Commit Funds
4. Prepare and validate EDI order
5. Order resource process complete
Process Module: Acquire Entity

Process Title: Schedule Event

Definition: Schedule event process based on policy implemented by the workflow engine. Provides check interval and deadline for certain actions within the Acquire Entity, such as claim and audit.

Workflow/Process Diagrams: There are no workflow/process diagrams because this process will be taken care of by the middleware.

Use Cases: Set claim cycle for outstanding orders; set cycle to re-encumber funds for outstanding orders at end of fiscal year.

Reference(s):

1. (NLA Service Framework 2.3: Schedule) Add a task to a chronological sequence of tasks.
2. (e-Framework Service Genre: Schedule) Add a task to a chronological sequence of tasks; includes function points add, remove and change
Process Module: Acquire Entity

Process Title: Track Event

Definition: Process that enables selectors to track where resources are at any given point in acquisitions workflow. Includes circulation internally or externally, as well as the movement of items for exhibition, preservation management or repository management purposes.

Workflow/Process Diagrams: There are no workflow/process diagrams because this process will be taken care of by the middleware.

Use Cases: Manage entity through acquisitions process.

Reference(s)

1. (NLA Service Framework 2.4: Track) Monitor the status of a task.
2. (NLA Service Framework 6.6: Control) Track where collection items are at a given time. Includes circulation internally or externally, as well as the movement of items for exhibition, preservation management or repository management purposes. It also includes the control of items borrowed from other collections for exhibition or loan
**Process Module:** Acquire Entity

**Process Title:** Receive Resource

**Definition:** Describes the process of receiving, describing and paying for an entity that fulfills an order request.

**Use Cases:** Search system for order record. Confirm that the acquired entity fulfills the order request in the system. Obtain metadata for the entity if it is not already in the system. Logging receipt of an item in the system triggers the invoice payment/manage funds processes.

**Reference(s):**

1. [NLA Service Framework](#) 5.1: Add) Put a new business object into a collection
2. [NLA Service Framework](#) 6.5: Describe) Process whereby resources in a collection, or that are in the process of being selected and acquired, are described. The metadata may be entered in real-time or harvested from or deposited by another agency. The description may evolve over time, as material is identified for selection, acquired, accessioned, annotated, curated and used.
3. (e-Framework, Service Genre – Add) describes the insertions of objects into collections of like objects. This MAY also include the metadata associated with an object. An ICT architecture that offers a service of the Add genre will be able to support remote updates of items within their collections.
Add implementations will typically also offer the users the functionality to update and delete existing objects within collections. Typical implementations assign a unique identifier to objects within their collections, and also persist data in some form until it is explicitly removed. However, it is not inconceivable that other processes could consume added data very rapidly; or that a collection would be deleted at the end of a session.
As defined the Add Service Genre is not access controlled. Any client may attempt to contact an Add service end point. There are no authentication controls. The service end point is responsible for determining which clients can Add content.
4. (e-Framework, Service Genre – Generate Metadata) The generate metadata service genre defines how to generate a metadata object, encoded in an XML document, containing basic cataloging and descriptive metadata for/from a content object. The metadata object SHALL conform to an identified metadata standard. This service genre is applied to a content object which SHALL conform to an identified content object standard.
5. [CollectionSpace: Cataloging Requirements](#) The compilation and maintenance of key information, formally identifying and describing objects. It may include information concerning the provenance of objects and also collections management documentation e.g. details of acquisition, conservation, exhibition and loan history, and location history. It need not bring together in one location everything known about an object, but should provide cross references to any other relevant information source known to the organization.
Describe Entity

Process Module: Describe Entity

Definition: The processes used to obtain, create, modify, delete, or expose metadata for an entity. Entities can include resources, collections, people, organizations, services, events, courses, facilities, finances, relationships, etc. Entities can be electronic/digital or physical. Entities can be held/maintained locally or remotely. Metadata will identify the entity, and can be descriptive, structural, technical, and/or administrative. Metadata can be entered in real-time, via a batch process or harvested from another repository. Metadata may change over the entity's life-cycle as additional information is gathered or the entity's use, role, or purpose evolves. Metadata will generally be encoded using XML and will generally conform to an identified metadata content standard. The Describe Entity Process is independent of application end point, resource, data object, or underlying communications protocols and service models.

Workflow / Process Diagrams:
- Obtain Metadata
- Create Metadata
- Modify Metadata
- Delete Metadata
- Expose Metadata

Use Cases: Metadata-related activities can occur for any resource within a collection, at any point of interaction with the entity. These may include:
- Identification and selection of a new resource into the repository either with or without existing metadata;
- Addition of harvested metadata in the repository;
- Activities or life-cycle changes involving an entity that require recording or modifying information about the entity (i.e. reformatting, conservation / preservation, additional holdings, expanded description, retention decisions, provenance information, removal of either metadata or an entity with associated metadata from the repository, etc.);
- Activities identified by other Process Use Cases that require creation of or changes to existing metadata.
**Process Module**: Describe Entity

**Process Title**: Obtain Metadata

**Definition**: The process used to acquire information about an entity. Entities can include resources, collections, people, organizations, services, events, courses, facilities, finances, relationships, etc. Entities can be electronic/digital or physical. Entities can be held/maintained locally or remotely. Metadata will identify the entity and can be descriptive, structural, technical, and/or administrative. Metadata can be entered in real-time, via a batch process or harvested from another repository. Metadata will generally be encoded using XML and will generally conform to an identified metadata content standard. The Obtain Metadata Process is independent of application end point, resource, data object, or underlying communications protocols and service models.

**Use Cases**: Metadata is obtained for resource discovery, supporting the management of entities by administrators or curators, ensuring the long-term maintenance and availability of entities, recording information such as provenance, ownership, copyright, access conditions, etc. Acquiring/obtaining metadata activities can occur for any entity being added to a collection, or to obtain additional/related information for an entity already within a collection. Activities may include:

- Identification and selection of a new resource into the repository either without existing metadata; for example adding a new e-book; adding a review of an existing book to link to an existing descriptive metadata object; adding a new database; importing profile information about a new person to an organization, etc.
- Addition of harvested metadata in the repository;

Metadata can be imported through protocols such as EDI transactions, ftp transfer, OAI harvesting, etc. Metadata is captured/deposited, validated and saved in the repository. Metadata being obtained may include descriptive, holdings, authority, financial, structural, and administrative or other types of data.

**Reference(s)**:

1. (NLA Service Framework 6.5: Describe) Process where metadata for an entity that has been selected for acquisition or trial, either permanently or temporarily, is selected, imported, validated and saved.
2. (NLA Service Framework 7.1: Register) Add metadata to a registry.
3. (e-Framework: Obtain Service Genre: Obtain) Retrieve a business object from a curated collection in a specified representation. The obtain service genre provides the mechanism to request objects from a data source. It is an example of a batch-oriented, request-response process. The data source is assumed to be a managed collection of objects, each of which is retrievable through a label. Each label identifies only one object in the collection. The prime use of the service genre is retrieving one or more of the objects in the collection by specifying their retrieval labels. This service genre focuses on retrieving information from repositories and other similar data collections of content objects, making them available to external applications and end users. Typically, the data retrieved will be one or more of the objects in a repository. The service genre is applicable for retrieving any defined data representation or dissemination for any specific object(s) managed by the data source. Objects have unique labels used for retrieval. Within the service genre, these labels are scoped only to the data source. For example, there is no requirement that the label be a unique identifier which is resolvable to the item within the data source.
4. (e-Framework: Service Genre: Validate) Check whether a business object meets specified conformance requirements
Workflow / Process Diagrams:

Obtain Metadata Workflow / Use Case:

1. Obtain Metadata Available
2. Select Appropriate Metadata Source
3. Import Metadata
4. Validate Metadata
5. Save / Submit
6. Obtain Metadata Process Complete
7. Needs Intervention to modify or discard
   - Metadata Valid?
     - Yes: Proceed to next step
     - No: Return to Select Process

Create Metadata Process:

1. Create / Modify Metadata
2. Capture appropriate metadata
3. Validate Metadata
4. Save Metadata
5. Create Metadata Process Complete
6. Need to capture source of metadata, target for metadata (for sync purposes); metadata elements will vary based on activity or purpose (e.g., description, ordering, etc.)
7. No
**Process Module:** Describe Entity

**Process Title:** Create Metadata

**Definition:** The process used to generate information about an entity. Entities can include resources, collections, people, organizations, services, events, courses, facilities, finances, relationships, etc. Entities can be electronic/digital or physical. Entities can be held/maintained locally or remotely. Metadata will identify the entity and can be descriptive, structural, technical, and/or administrative. Metadata can be created in real-time or via a batch process. Metadata will generally be encoded using XML and will generally conform to an identified metadata content standard. The Obtain Metadata Process is independent of application end point, resource, data object, or underlying communications protocols and service models.

**Use Cases:** Metadata is created (using templates, extraction tools, mark-up tools, conversion tools) for: resource discovery (what is available, where it is located and how it is used), supporting the management of resources by administrators or curators, ensuring the long-term maintenance and availability of resources, recording provenance, ownership, copyright, access conditions, etc. Metadata being created may include descriptive, holdings, authority, financial, structural, and administrative or other types of data.

**Reference(s):**

1. (NLA Service Framework 6.5: Describe) “Process where metadata for an entity that has been selected for acquisition or trial, either permanently or temporarily, is selected, imported, validated and saved. [https://wiki.nla.gov.au/display/LABS/3.+Service+framework](https://wiki.nla.gov.au/display/LABS/3.+Service+framework) (v. 0.91, p. 35/46)


3. (e-Framework Service Genre: Add) “This Service Genre has been prepared from a number of disparate projects and work. This Service Genre has been developed to provide a description of the behaviors required when a service wishes to offer functionality allowing for the creation, update and deletion of data items within collections of like data.” [http://www.e-framework.org/Services/ServiceGenres/ServiceGenreRegistry/Add11/tabid/843/Default.aspx](http://www.e-framework.org/Services/ServiceGenres/ServiceGenreRegistry/Add11/tabid/843/Default.aspx)

4. (e-Framework, Service Genre – Generate Metadata) “The generate metadata service genre defines how to generate a metadata object, encoded in an XML document, containing basic cataloging and descriptive metadata for/from a content object. The metadata object SHALL conform to an identified metadata standard. This service genre is applied to a content object which SHALL conform to an identified content object standard.” This is a general description of a generate metadata service genre, independent of application end point, resource, data object, or underlying communications protocols and service models. The service genre includes the notion of generating metadata for different types of objects, in different metadata schemes and in different file formats; it is not otherwise dependent on a data model. The service genre includes a mechanism to authenticate clients. The service genre does not include authorization methods to control the return and filtering of results.


6. (CollectionSpace: Cataloging Requirements) “The compilation and maintenance of key information, formally identifying and describing objects. It may include information concerning the provenance of objects and also collections management documentation e.g. details of acquisition, conservation, exhibition and loan history, and location history. It need not bring together in one location everything known about an object, but should provide cross references to any other relevant information source known to the organisation.”
Workflow / Process Diagrams:

[Diagram of metadata workflow process]

Create Metadata Workflow / Use Case:
- Select Appropriate Metadata Workform(s) & Template(s)
- Populate Workform / Template Fields
- Validate Metadata
- Save / Submit

Create Metadata process:
- Capture appropriate Metadata
- Validate Metadata
- Save Metadata

Additional notes:
- Worksforms / templates for any valid metadata format including MARC, EAD, Dublin Core, VRA, financial holdings, etc.
- This can include linking out to external resources for authoritative access point information such as authoritative headings.
- Needs intervention to modify or discard.
- Can error be resolved?
- Metadata Valid?
- Metadata needed?

Need to capture source of metadata, target for metadata (for synch purposes), metadata elements will vary based on activity or purpose, ex. description, ordering, etc.
Process Module: Describe Entity

Process Title: Modify Metadata

Definition: The process used to alter information about an entity. Entities can include resources, collections, people, organizations, services, events, courses, facilities, finances, relationships, etc. Entities can be electronic/digital or physical. Entities can be held/maintained locally or remotely. Metadata will identify the entity and can be descriptive, structural, technical, and/or administrative. Metadata can be modified in real-time or via a batch process. Metadata will generally be encoded using XML and will generally conform to an identified metadata content standard. The Modify Metadata Process is independent of application end point, resource, data object, or underlying communications protocols and service models.

Use Cases: Metadata is modified for resource discovery, supporting the management of entities by administrators or curators, ensuring the long-term maintenance and availability of entities, recording information such as provenance, ownership, copyright, access conditions, etc. Metadata alteration activities can occur for any entity in a collection, to add additional/related information, or to delete incorrect or outdated information not needed for historical/audit purposes. Metadata can be added to or revised by creators/users at various stages in an existing metadata object’s life-cycle. Metadata can be updated on an object-by-object basis or in batch processes modifying large quantities of metadata. Metadata being modified may include descriptive, holdings, authority, financial, structural, and administrative or other types of metadata.

Reference(s):
1. (NLA Service Framework 3.2: Update) “The act of update results in a changed business object which may replace the original object in a data store or be registered as a new object depending on data store policies. Generally the Library replaces metadata with the updated version but adds updated content as a new object associated with the original object.” https://wiki.nla.gov.au/display/LABS/3.+Service+framework (v. 0.91, p. 19/46)
2. (NLA Service Framework 7.4: Change) Change metadata in a registry based on a set of algorithms or business rules.
Process Module: Describe Entity

Process Title: Delete Metadata

Definition: The process used to remove information about an entity. Entities can include resources, collections, people, organizations, services, events, courses, facilities, finances, relationships, etc. Entities can be electronic/digital or physical. Entities can be held/maintained locally or remotely. Metadata will identify the entity and can be descriptive, structural, technical, and/or administrative. Metadata can be deleted in real-time or via a batch process. Metadata will generally be encoded using XML and will generally conform to an identified metadata content standard. The Delete Metadata Process is independent of application end point, resource, data object, or underlying communications protocols and service models.

Use Cases: Metadata of any type is permanently removed, supporting the management of entities by administrators or curators. Metadata deletion activities can occur for any entity in a collection, to delete incorrect or outdated information not needed for historical/audit purposes. Metadata deletion occurs at the end of an entity’s life-cycle. System should allow for metadata to be removed manually or in batch processes, removing either single metadata objects or large numbers of metadata objects. Metadata being deleted may include descriptive, holdings, authority, financial, structural, and administrative or other types of metadata.

For example, a library withdraws a portion of its serial print collection due to online availability. The metadata for the print collection is permanently removed from the system—item records are deleted, holdings records are deleted and bibliographic records are removed.

Reference(s):
Workflow / Process Diagrams:

Delete Metadata Workflow / Use Case:
- Metadata Deletion Required
- Select Metadata to Delete
- Save / Submit for Deletion
- Delete Metadata Process Complete

Delete Metadata Process:
- Delete Metadata
- Capture appropriate metadata
- Delete Metadata Object
- Delete Metadata Process Complete

Need to capture source of metadata, target for metadata (for search purposes); metadata elements will vary based on activity or purpose, e.g., description, ordering, etc.
Process Module: Describe Entity

Process Title: Expose Metadata

Definition: Process where metadata has been made available for capture.

Use Cases: Metadata being exposed could be 1) financial, 2) information about physical resources (e.g. which computers are open for use; which group study rooms are open for use), or 3) information about your staff member's expertise. It could also include bringing information back into the system (e.g. a book description is exposed, patron adds a review which goes back into the system, and book description is re-exposed including the review.)

Reference(s):
1. (NLA Service Framework 5.9: Syndicate) Make available a business object for consumption at any location.
2. (e-Framework Service Genre: Syndicate) Makes representations of objects available for consumption by services or applications in a consistent and standardised way. The archetypical example of syndication is that of a news feed, where representations (summaries) of news items are published by a provider. Requesters MAY then pull the summaries from the news feed and request the full stories. Representations MAY be pushed as well as pulled. Syndication SHOULD NOT reproduce the original object – the original object SHOULD be requested separately by consumers of the syndicated representation, who use syndication to discover that original object. As defined, the syndicate service genre is not access controlled. Any client may attempt to contact the Syndicate Service end point. There are no authentication controls. The Service End Point is responsible for the determining which representations it will return and from which clients it will accept requests. As defined, the syndicate service genre does not specify how new representations of objects are made available to be syndicated. Service Expressions MAY specify how new representations of objects are made available for syndication.
Deliver Entity

Process Module: Deliver Entity

Definition: The Deliver Entity component describes processes that track the request and supply of a resource. It includes processes that initiate and receive the request, identify the user requesting the resource, check and verify the user’s credentials, and determine availability and terms of use of the resource requested. A message is sent to the user whenever a condition is not met. The resource is supplied if all conditions are met.

Workflow / Process Diagrams:
- Request Service
- Identify User
- Identify Terms of Use
- Supply Entity

Use Cases: Request being created will take into account the completeness of the request, user eligibility, and preconditions of use.

A user placing the request is authenticated and authorized. The user could be a person using a computer, the computer itself, or a computer program and could use protocols such as LDAP, Shibboleth, Secure Shell Keys, and Certificates.

The resource could be print or electronic, both returnable and consumable, an original or a copy, local, consortial, purchased on demand or external to institutional ownership, retrieved from the library and checked-out onsite or delivered to another location (library, office, desktop, off-campus site.)

The requested resource is checked for availability, access attributes, and usage fees. For example, do the resource attributes allow access by the requestor, such as enrollment in a course or membership in a university or consortium? Must the resource be returned within a specified timeframe or used in the library? Are there other preconditions such as copyright, usage fees, or limits on number of simultaneous uses?
**Process Module:** Deliver Entity

**Process Title:** Request Service

**Definition:** Describes the process where a user submits a request for a service or resource. The user may submit the request in person at a circulation desk, directly from a metadata record in a licensed or open access database, or by filling out a free text web form.

**Use Cases:** A user is conducting research in a bibliographic database and identifies an article she would like to read. The full text of the article is not available online in the database. She clicks on a request button and submits a request for access to the entire article.

A professor recommends an article to a student. The student goes to his library’s website, locates and fills out an interlibrary loan web request form, and submits a request for the article.

A student is searching his library’s catalog and locates a book that’s located in a remote storage facility. He clicks on a request button and submits a request to have the book delivered to his local campus library.

A student is searching WorldCat and locates a resource that is not owned by his college library. He clicks on a request button and submits a request to have another copy of the resource delivered to his local campus library.

A professor is searching a regional consortia catalog with holdings from other college and university libraries in his state. He identifies a copy of a resource owned by his university library but it is checked out to another borrower. He clicks on a button and submits a request to have another library’s copy delivered to his local campus library.

A student is searching Google and discovers a restricted audio resource in another university’s digital repository. He clicks on a request button and submits a request to gain online access to the resource.

An alumnus pulls a book from his college’s book stacks, takes it to the circulation desk, and asks to check it out.

**Reference(s):**

(NLA Service Framework 7.9: Request) Lodge a request for a wanted resource with a resource provider, taking into account availability, access and use policies and any conditions and obligations these impose on the requester
Workflow / Process Diagrams:

- DELIVER ENTITY

Since this workflow/use case does not require a new process, no corresponding process model is needed.

Is Request metadata available electronically?

- Person has a need for an entity or resource

- Obtain Metadata

- Capture metadata from metadata source; validate metadata

- Populate workflow or template; validate metadata

- Create Metadata

- Service Request Created

- Service Needed

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Process Module: Deliver Entity

Process Title: Identify User

Definition: Identify User describes the process where a user requesting a resource or service is identified and their credentials checked and verified. First, the user's identity is authenticated. Next the user is authorized to access an application or resource based on attributes tied to their identity.

The Identify Manager that maintains the user's credentials is also validated as a trusted system. The user could be a person using a computer, the computer itself, or a computer program and could use protocols such as LDAP, Shibboleth, Secure Shell Keys, and Certificates.

Use Cases: An alumnus visits his college's library and uses a public access computer to search a licensed resource (IP filtering).

At the beginning of a session, a student logs in with user name and password to access the complete range of resources offered by his library (LDAP).

A professor from a member library of a consortium that uses Shibboleth requests access to a licensed commercial video from a video repository. A student requests access to a lecture in the video repository. (Shibboleth)

An emeritus professor logs in with user name and password to use his university's interlibrary loan request service. (LDAP)

Reference(s):
1. (NLA Service Framework 1.1: Authenticate) Verify whether an identity claim made by an individual or entity (the principal) is true. The principal may be a person using a computer, the computer itself, or a computer program.
2. (NLA Service Framework 1.2: Authorise) Establish if an authenticated principal is permitted to perform a specific operation based on policy.
3. (e-Framework Service Genre: Authenticate) Describes authentication, the process of uniquely identifying an individual or entity (the principal) based on objects provided for verification (credentials). Credentials should be difficult to falsify or forge, either by keeping them secret or by making them difficult to replicate. Authentication seeks to ensure that the principal is who they claim to be. The degree of certainty varies according to implementation and business context. Authentication typically verifies the principal’s association with an electronic identifier. Authentication may also determine that the principal has certain attributes or is a member of specified or predetermined groups. In security systems, authentication is distinct from authorization, which is the process of establishing what a principal is permitted to do, their access rights to system objects based on their identity.
4. (e-Framework Service Genre: Authorise) Process of establishing what a principal is permitted to do. Authorisation typically occurs after authentication so that the principal can be identified. Authorisation may also use a principal’s attributes, information about what the principal is intending to do (the target), and environment information to make authorisation decisions.
5. (CollectionSpace Functional Requirements: Rights Management) The management and documentation of the rights associated with the objects and information for which the organization is responsible for, in order to benefit the organization and to respect the rights of others.
Workflow / Process Diagrams:
**Process Module:** Deliver Entity

**Process Title:** Identify Terms of Use

**Definition:** Process where a resource that has been requested is checked for terms of access and preconditions of use. The resource’s metadata or an attribute store is checked for rights and requirements, for example, copyright status; user attributes required to access the resource; licenses, contracts, or agreements for use of the resource; and controls such as time limits, number of simultaneous users, and fees.

**Use Cases:** A requested resource is checked for availability, access attributes, and usage fees. Do the resource attributes allow access by the requestor, such as an enrollment in a course or membership in a university or consortium? Are there preconditions on use such as copyright, usage fees, or limits on number of simultaneous users?

**Reference(s):**

1. *(NLA Service Framework 1.1: Authenticate)* Verify whether an identity claim made by an individual or entity (the principal) is true. The principal may be a person using a computer, the computer itself, or a computer program.

2. *(NLA Service Framework 1.2: Authorise)* Establish if an authenticated principal is permitted to perform a specific operation based on policy.

3. *(e-Framework Service Genre: Authenticate)* Describes authentication, the process of uniquely identifying an individual or entity (the principal) based on objects provided for verification (credentials). Credentials should be difficult to falsify or forge, either by keeping them secret or by making them difficult to replicate. Authentication seeks to ensure that the principal is who they claim to be. The degree of certainty varies according to implementation and business context. Authentication typically verifies the principal’s association with an electronic identifier. Authentication may also determine that the principal has certain attributes or is a member of specified or predetermined groups. In security systems, authentication is distinct from authorization, which is the process of establishing what a principal is permitted to do, their access rights to system objects based on their identity.

4. *(e-Framework Service Genre: Authorise)* Process of establishing what a principal is permitted to do. Authorisation typically occurs after authentication so that the principal can be identified. Authorisation may also use a principal’s attributes, information about what the principal is intending to do (the target), and environment information to make authorisation decisions.

5. *(CollectionSpace Functional Requirements: Rights Management)* The management and documentation of the rights associated with the objects and information for which the organization is responsible for, in order to benefit the organization and to respect the rights of others.
**Process Module:** Deliver Entity

**Process Title:** Supply Entity

**Definition:** Supply Entity describes the process where an appropriate entity is supplied to a valid requestor subject to conditions or constraints on use. Restrictions on use may be actively enforced by software applications, for example the ability to read, download, print; number of simultaneous users; a time limit; payment of a fee or royalty. Conditions may be determined by copyright, set by the author or by the rights holder.

**Use Cases:** Entity can be retrieved from the library for check-out onsite or delivered to another location (library, office, desktop, off-campus site). Entity may be supplied by the local library, a consortial library, another institution, or a document supplier. Entity is delivered with conditions of use, for example it must be returned within a specified timeframe, the resource must be used in the library, the resource may not be duplicated, or there is a fee associated with use of the resource.

This applies to print and electronic. Both returnables and consumables. May be local, consortial, purchased on demand or external to institutional ownership. Can be an original or a copy.

**Reference(s)**

1. ([NLA Service Framework](#) 1.1: Authenticate) Verify whether an identity claim made by an individual or entity (the principal) is true. The principal may be a person using a computer, a computer itself or a computer program.

2. ([NLA Service Framework](#) 1.2: Authorise) Establish if an authenticated principal is permitted to perform a specific operation based on policy.

3. ([NLA Service Framework](#) 6.10: Supply) Supply an appropriate copy of a resource once conditions have been met.

4. ([NLA Service Framework](#) 7.9: Request) Lodge a request for a wanted resource with a resource provider, taking into account availability, access and use policies and any conditions and obligations these impose on the requester (Service Usage Model).

5. (e-Framework Service Genre: Authenticate) Describes authentication, the process of uniquely identifying an individual or entity (the principal) based on objects provided for verification (credentials). Credentials should be difficult to falsify or forge, either by keeping them secret or by making them difficult to replicate. Authentication seeks to ensure that the principal is who they claim to be. The degree of certainty varies according to implementation and business context. Authentication typically verifies the principal’s association with an electronic identifier. Authentication may also determine that the principal has certain attributes or is a member of specified or predetermined groups. In security systems, authentication is distinct from authorisation, which is the process of establishing what a principal is permitted to do, their access rights to system objects based on their identity.

6. (e-Framework Service Genre: Authorise) Process of establishing what a principal is permitted to do. Authorisation typically occurs after Authentication so that the principal can be identified. Authorisation may also use a principal’s attributes, information about what the principal is intending to do (the target), and environment information to make authorisation decisions.

7. (CollectionSpace Functional Requirements: Loans and Dispatch)
   - Loans In: Managing and documenting the borrowing of objects for which the organization is responsible for a specific period of time and for a specified purpose, normally exhibition/display, but including research, conservation, education or photography/publication.
   - Loans Out: Documenting and managing the loan of objects to other organizations or individuals for a specific period of time and for a specific purpose, normally exhibition/display, but including research, conservation, photography and education.
Workflow / Process Diagrams:

Supply Entity Process

Valid request placed by authenticated user for available item

Do preconditions of use exist?

Yes

Apply conditions

No

Deliver Entity

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Manage Entity

Process Module: Manage Entity

Definition: Describes the processes that track the life-cycle of an entity including preservation, curation, evaluation, retention, relocation, duplication, version preference, rights management, binding, repair, reformat, replacement, and withdraw. Access and descriptive metadata may be normalized and updated in this process according to established rules.

Workflow / Process Diagrams:
- Preserve/Conserve Resource
- Manage Inventory
- Configure Metadata
- Manage Rights
- Reformat Resource

Use Cases: Management activities can occur for any resource within a collection, at any point of intersection with that resource (e.g. Deliver Resource). These may include 1) binding loose issues of a periodical or a paperback, 2) reformatting a resource so that the original is not subject to normal wear and tear, 3) repairing a damaged resource (physical or digital), 4) weeding, 5) relocation, 6) reformatting, 7) withdrawal, 8) convert analog to analog (photocopy), 9) convert analog to digital, 10) convert digital to digital (access copy, migration), 11) automated standardization of authority controlled metadata, 12) transforming metadata in one schema to another schema, 13) providing digital rights management, 14) rights clearance, or 15) informing authors of rights (e.g. upon submission to a depository).
Process Module: Manage Entity

Process Title: Preserve/Conserve Entity

Definition: Process that tracks the preservation and curation of an entity that needs attention in regard to preservation/conservation activities including evaluation, binding, repair, reformat, replacement, and withdraw. Access and descriptive metadata may be updated in this process. Determine whether the item should be relocated to archives/special collections.

Use Cases: Preservation/conservation activities can be activated for any resource within a collection, at any point of intersection with that resource (e.g. Deliver Resource). Preservation/conservation activities may include 1) binding loose issues of a periodical or a paperback, 2) reformatting a resource so that the original is not subject to normal wear and tear, or, 3) repairing a damaged resource (physical or digital).

Reference(s):
1. (NLA Service Framework 6.8: Preserve) Manage content in a repository to ensure future access. Note that a preservation event can include a risk assessment and that reboxing or binding of physical items is a preservation event.
2. (NLA Service Framework 6.6: Control) Track where collection items are at a given time. This includes the circulation of items to internal and external users, as well as the movement of items for exhibition, preservation management or repository management purposes. It also includes the control of items borrowed from other collections for exhibition or loan.
3. (CollectionSpace Functional Requirements: Conservation)
   - Object Condition Checking and Technical Assessment: The management and documentation of information about the make-up and condition of an object, and recommendations for its use, treatment and surrounding environment.
   - Conservation and Collections Care: The documentation and management of information about interventive and preventive conservation activities.
Workflow / Process Diagrams:
Process Module: Manage Entity

Process Title: Manage Inventory

Definition: Process where entity is evaluated and tracked for retention and version preference. The entity may be considered for retention either in its current format or to be reformatted or might be withdrawn. Metadata may be modified to track its status through the process and to reflect decisions.

Use Cases: This service could be used in resource weeding, relocation, reformatting, or withdrawal. Space allocation is under consideration for a particular collection and those resources move through a process in which each is selected for withdrawal, relocation, and/or digitization.

Reference(s):
1. (NLA Service Framework 6.6: Control) Track where collection items are at a given time. This includes the circulation of items to internal and external users, as well as the movement of items for exhibition, preservation management or repository management purposes.
2. (NLA Service Framework 6.7: Archive) Transfer a business object (or copy of) to a data store governed by specific (archival) management policies.
3. (E-Framework: Archiving) This Service Genre describes systems that support the long-term preservation, management and managed disposal, if appropriate, of digital materials. The goal of such a system is to allow retrieval of the materials by members of a designated community of potential users. Long term preservation requires active decisions to be made about ways of ensuring that technological changes, such as new media and data formats and obsolescence of old ones, do not prevent retrieval in future. Long term planning to prevent degradation of the storage medium is also required.
4. (CollectionSpace Functional Requirements: Location and Movement Control Requirements) The management and documentation of information concerning the current and past locations of all objects or groups of objects in the organization’s care to ensure the organization can locate any object at any time. A location is a specific place where an object or group of objects is stored or displayed.
Workflow / Process Diagrams:
**Process Module:** Manage Entity

**Process Title:** Configure Metadata

**Definition:** Process where metadata is normalized and processed according to established rules.

**Use Cases:** Automated standardization of authority controlled metadata; transforming metadata in one schema to another schema.

A resource is being lent to another institution via interlibrary loan. To accompany the resource, metadata is extracted in the MARC format which the borrowing library might use to load into their local system to enable lending to their user who requested the resource.

An authority record is entered in the system which includes references to the old version of the authorized heading. When metadata is found which matches the old version, they are upgraded to the authorized version.

**Reference(s):**

1. (NLA Service Framework 3.5: Generate) Make a new business object or data value through a defined algorithmic or rule-driven process. [ex. A record has an authority-controlled heading. The heading is noted in a 4XX field of an authority record. The rule provides for an automated change from the current heading to the authorized heading]

2. (NLA Service Framework 3.8: Transform) Convert a business object from one form to another. Strategies: Note that transform includes augmentation of records to support discovery at the conversion stage. Our strategy is to provide support for multiple input and output formats but with priority given to MARCXML, MODS, (MADS?), DCMI, EAD and EAC. We have tested and decided not to map to a single internal storage format but have still not settled on exactly how data for different resource types will be stored internally. One strategy will be to build up expertise in RDF and to be actively involved in processes to map RDA data elements to the DCMI Information Model.


4. (NLA Service Framework 7.2: Match) Associate a new business object being added to a registry with one or more business objects already registered that describe the same content. Strategies: Currently we apply match and merge algorithms to incoming data to create a single merged record. Match and merge rules are similar to those we would apply to FRBRise result sets.

5. (NLA Service Framework 7.3: Merge) Create a new business object from two or more objects in a registry that describe the same content.

6. (NLA Service Framework 7.4: Change) Change metadata in a registry based on a set of algorithms or business rules.

7. (e-Framework Service Genre: Generate) Make a new business object or data value through a defined algorithmic or rule-driven process.

8. (e-Framework Service Genre: Transform) Convert a business object from one form to another form.

9. (e-Framework Service Genre: Translate) Convert natural language expression from one natural language to another while preserving as much meaning as possible.

10. (CollectionSpace Functional Requirements: Data Management; Metadata Configuration) Metadata Configuration: The system should include metadata configuration tools that will allow the user to assign metadata standards to each field in the database. The tool will allow for the incorporation of emerging and future standards.
**Process Module:** Manage Entity

**Process Title:** Manage Rights

**Definition:** Process where information is maintained (collected, stored, updated) regarding rights of entities. Information is consulted and disseminated as necessary.

**Use Cases:** Information maintained through Manage Rights supports activities throughout the organization including providing digital rights management, rights clearance, informing authors of rights (e.g. upon submission to a depository).

An author submits a resource to a depository and, during the process of registering the resource, the system displays the text of an agreement that informs the author of their rights regarding the submission. The author must check a box to confirm they have read and understood their rights. This transaction is recorded in the system.

A new subscription is initiated that provides online access to 100 journal titles. The license agreement is scanned and stored and information about rights and use are entered for access on demand.

A staff member receives a request through interlibrary loan for a journal article found in an online journal to which the library subscribes. After retrieving the journal title's entry in the system, the staff member is able to review the lending policy and complete the transaction.

A request is made to digitize a print resource for online availability. The system is consulted to confirm whether this is possible under copyright protections.

A professor wants students to see a film as a class assignment. Rights are verified regarding whether the film can be digitized for delivery as streaming media and the length of time this can be performed.

**Reference(s):**

1. **(NLA Service Framework 2.2: Confirm)** Agree (or not) to an obligation statement. Not agreeing will mean that the user cannot complete the workflow. To automate the conformance process as much as possible by documenting policies in machine-readable form. The Rights Management System Project will enable this.

2. **(NLA Service Framework 6.10: Supply)** Supply an appropriate copy of a resource once conditions have been met. Note that the workflow may be interrupted due to the need for the requester to get permission from the rights holder. Strategies: Single business approach to the supply of items from our collections; enhancement of Copies Direct to utilise rights management information including current copyright status to simplify the requesting process for users and support a more automated process for getting permissions when these are required. Digitisation on demand.

3. **(NLA Service Framework 7.9: Request)** Lodge a request for a wanted resource with a resource provider, taking into account availability, access and use policies and any conditions and obligations these impose on the requester.

4. **(NLA Service Framework 7.10: Resolve)** Get disambiguating attributes of a business object from an identifier. Strategies: Enhancement of the NLA Resolver Service to utilise rights management information including current copyright status to simplify the resolution process for users and to support a more automated process for getting permissions when these are required.
5. (e-Framework Service Genre: Comply) Describes compliance by a party, the process where a party is presented with a policy statement and given the opportunity to acknowledge acceptance of the policy. The policy contains information around the terms and conditions of use that the party is signing on to. The compliance process normally involves an individual agreeing to abide by certain rules when using a system. NOTE: Comply is noted on the original Service Genre list but is not included on the most recent list.

6. (CollectionSpace Functional Requirements: Policy/Legal/Insurance: Rights Management) The management and documentation of the rights associated with the objects and information for which the organization is responsible for, in order to benefit the organization and to respect the rights of others.
Process Module: Manage Entity

Process Title: Reformat Resource

Definition: Process where, after a resource is selected, it is retrieved and converted to a new format. The content is duplicated though the new format is different from the original. Access and descriptive metadata are updated to reflect the new resource.

Use Cases: A print resource cannot be replaced with an exact duplicate and so a photocopy is made to act as a replacement (analog to analog reformatting).

A print resource is scanned and TIFF files are created to store the scanned images. The print resource may be withdrawn with the new TIFF files acting as a replacement (analog to digital reformatting).

TIFF files are converted to JPG files. The TIFF files are retained for archive and the JPG files are used for an online exhibition (digital to digital reformatting).

Reference(s):
1. (NLA Service Framework 3.2: Update) Alter a business object; The act of update results in a changed business object which may replace the original object in a data store or be registered as a new object depending on data store policies. Generally the Library replaces metadata with the updated version but adds updated content as a new object associated with the original object.
2. (NLA Service Framework 3.8: Transform) Convert a business object from one form to another.
3. (NLA Service Framework 6.6: Control) Track where collection items are at a given time. This includes the circulation of items to internal and external users, as well as the movement of items for exhibition, preservation management or repository management purposes.
Workflow / Process Diagrams:

1. Request to reformat
2. Retrieve Entity
3. Identify Form of Use
4. Can entity be reformatted?
5. Identify format to convert to
6. Create New Entity
7. Store New Entity
8. Describe Entity
9. Decide retention strategy of original entity

Since this workflow instance does not require new process, no corresponding process model is needed.
Manage Entity Relationship

**Process Module:** Manage Entity Relationship

**Definition:** This module allows the creation, modification and deletion of relationships between any 2 or more entities. Entities can include resources, people, courses, facilities, organizations, finances, etc.

**Workflow / Process Diagrams:**
- Create Entity Relationship
- Modify Entity Relationship
- Delete Entity Relationship

**Use Cases:** While this functionality is abstract, potential uses include:
- Creation of virtual collections. This would allow grouping of like resources whether they are a subset of a single collection or a grouping across multiple collections.
- This functionality could be used to link resources to academic courses managed in a learning management system.
- Bibliographic relationships. Create real, actionable links between bibliographic records. For example, these could be FRBR relationships or relationships expressed as linking entry tags in MARC21.
- Management of exhibitions. Manage exhibitions in an integrated way by linking resources, facilities and people.
- Relationships between people. For example, this would allow clients to be linked to experts.
- Circulating item. Create links between resources and the people who use them. These relationships could potentially be used in conjunction with bibliographic relationships to make recommendations to clients.
Process Module: Manage Entity Relationships

Process Title: Create Entity Relationships

Definition: Create a link between 2 or more entities. Entities can include resources, people, courses, facilities, organizations, finances, etc.

Use cases:
1. Virtual collections
2. Link resources to courses
3. Bibliographic relationships (e.g. FRBR, Linking entries)
4. Exhibitions (resources, facilities, people)
5. Person to person (e.g. expertise)
6. Circulating item

Reference(s):
1. (NLA Service Framework 4.4: Associate) Link a business object with another business object using a defined relationship.
2. (e-Framework Service Genre: Associate)
Workflow / Process Diagrams:
**Process Module:** Manage Entity Relationships

**Process Title:** Modify Entity Relationship

**Definition:** Modify a link between 2 or more entities. Entities can include resources, people, courses, facilities, organizations, finances, etc.

**Use cases:**
1. [Virtual collections](#)
2. [Link resources to courses](#)
3. [Bibliographic relationships](#) (e.g. FRBR, Linking entries)
4. Exhibitions (resources, facilities, people)
5. Person to person (e.g. expertise)
6. Circulating item

**Reference(s):**
1. (NLA Service Framework 4.4: Associate) Link a business object with another business object using a defined relationship.
2. (e-Framework Service Genre: Associate)
Workflow / Process Diagrams:
Process Module: Manage Entity Relationships

Process Title: Delete Entity Relationship

Definition: Remove a link between 2 or more entities. Entities can include resources, people, courses, facilities, organizations, finances, etc

Use cases:
1. Virtual collections
2. Link resources to courses
3. Bibliographic relationships (e.g. FRBR, Linking entries)
4. Exhibitions (resources, facilities, people)
5. Person to person (e.g. expertise)
6. Circulating item
Workflow / Process Diagrams:

Delete Entity Relationship Workflow:

1. Identify Relationship Parameters
2. Select Entity
3. Delete Relationship

- Relationship exists
- E.g. virtual collection, people, facilities, finances, organizations, etc.
Process Module: Manage Entity Relationships

Process Title: Create, Modify, and Delete Entity Relationships

Use Case: Virtual Collections
Process Module: Manage Entity Relationships

Process Title: Create, Modify, and Delete Entity Relationships

Use Case: Link Resources to Courses
**Process Module:** Manage Entity Relationships  

**Process Title:** Create, Modify, and Delete Entity Relationships  

**Use Case:** Bibliographic Relationships
Manage User Relationship

Process Module: Manage User Relationship

Definition: Describes processes to handle CRM (customer relationship management) including a user’s initiation for request of service to the fulfilling of that request.

Workflow / Process Diagrams:
- Request Service
- Schedule Event
- Track Event

Use Cases:
A user submits a request for service in-person, via online form, or via real-time chat. The request is logged, triaged, and tracked for timely response. System will have automated methods to present user with a knowledge base of answers or to assign a service provider. If a service provider is assigned but a response has not been made in a predetermined amount of time, the service provider is automatically notified.

A user asks how to create an inter-library request. System logs and triages request and then automatically presents user with ILL documentation web page.

A user submits search queries for desired research materials. System recommendation function analyzes queries and presents user a list of other materials in similar research area.

A user wishes to be routinely notified of new resources acquired by the institution in their area of interest. System has automated methods to capture and store this information and respond with email or RSS feed listing new acquisitions.

A user has borrowed materials that are now overdue. System notifies user based on user’s preference such as 1) paper notice sent via traditional mail, 2) electronic notice sent via email, or 3) electronic notification via automated phone call. Resolution of overdue materials including such things as overdue fines, replacement fees, and patron claims-returned are also tracked by system.
**Process Module:** Manage User Relationships

**Process Title:** Request Service

**Definition:** Process where user initiates a request for service and the request is filled.

**Use Cases:** Authentication may be optional, depending on factors such as service being requested or local policy. System may contact the user automatically when: 1. their need does not require immediate, or any, human intervention (a predefined response fills the need); 2. a human is not available to provide a direct response but some type of response is required.

**Reference(s):**

1. **(NLA Service Framework 1.1: Authenticate)** Verify whether an identity claim made by an individual or entity (the principal) is true. The principal may be a person using a computer, a computer itself or a computer program.
2. **(NLA Service Framework 1.7: Alert)** Notify a user or system as to the occurrence of an event. The trigger may be time-based or generated as the outcome of an audit.
3. **(NLA Service Framework 1.9: Contact)** Push a message into a message transport system / get a message from a message transport system. Strategies: Messaging services are essential to most aspects of the Library’s business and may be a way in which business services such as online and real-time reference services are implemented.
4. **(e-Framework: Authenticate)** Describes authentication, the process of uniquely identifying an individual or entity (the principal) based on objects provided for verification (credentials). Credentials should be difficult to falsify or forge, either by keeping them secret or by making them difficult to replicate. Authentication seeks to ensure that the principal is who they claim to be. The degree of certainty varies according to implementation and business context. Authentication typically verifies the principal’s association with an electronic identifier. Authentication may also determine that the principal has certain attributes or is a member of specified or predetermined groups.
5. **(e-Framework: Alert)** Details the notion of notifying a user or system as to the occurrence of an event. The event itself could be extra-ordinary (such as a fire alarm), or it could be something more mundane (such as informing students of a cancelled lecture). The important notion in alerting is that the alert data itself is actively propagated to receivers rather than passively propagated. Alerts MUST be pushed.
6. **(e-Framework: Receive)** Fetch a message from a message transport system
7. **(e-Framework: Send)** Push a message into a message transport system.
Workflow / Process Diagrams:

MANAGE USER RELATIONSHIP
REQUEST SERVICE

User or system has a service need

Service Needed

Request Service

Receive Service Request

Staff receives service request

Route Request

Delegate?

Fulfill Request

Yes

No

Request Service (CRM) Workflow/Use Case

Request Service (CRM) Process

Receive Request

Evaluate Request

Route Request

Reply

Service Request Fulfilled
**Process Module:** Manage User Relationship

**Process Title:** Schedule Event

**Definition:** Process that manages the scheduling of events based on policy implemented by the workflow engine. Provides check interval and deadline for certain actions within this process module.

**Workflow/Process Diagrams:** There are no workflow/process diagrams because this process will be taken care of by the middleware.

**Use Cases:** Service requests not fulfilled in a predetermined number of days could be escalated to a separate process queue.

**Reference(s):**

1. (NLA Service Framework 2.2: Schedule) Add a task to a chronological sequence of tasks.
2. (e-Framework Service Genre: Schedule) Add a task to a chronological sequence of tasks; includes function points add, remove and change.
Process Module: Manage User Relationships

Process Title: Track Event

Definition: Process that enables service providers to track where service requests are at any given point in the workflow.

Workflow/Process Diagrams: There are no workflow/process diagrams because this process will be taken care of by the middleware.

Use Cases: Service providers could produce report showing the state of outstanding service requests. Metadata attached to requests could be used to gather metrics on how quickly service requests are fulfilled.

Reference(s):
1. (NLA Service Framework 1.5: Log) Record service events and transactions for audit and reporting purposes.
2. (NLA Service Framework 2.4: Track) Monitor the status of a task.
Data Dictionary

3rd Party Component: a reusable service, not developed or supplied by OLE, that fulfils an OLE library business process.

Acquire Entity: an OLE component whereby an entity is selected, obtained and the license/registry terms associated with the entity are documented; the entity is described and added to the collection.
- (NLA Service Framework 1.5: Log)
- (NLA Service Framework 2.1: Consign)
- (NLA Service Framework 2.2: Confirm)
- (NLA Service Framework 2.3: Schedule)
- (NLA Service Framework 2.4: Track)
- (NLA Service Framework 2.7: Pay)
- (NLA Service Framework 5.1: Add)
- (NLA Service Framework 6.1: Select)
- (NLA Service Framework 6.2: Acquire)
- (NLA Service Framework 6.5 Describe)
- (NLA Service Framework 6.6 Control)
- (e-Framework Service Genre: Comply)
- (e-Framework Service Genre: Generate Metadata)
- (e-Framework Service Genre: Schedule)
- (CollectionSpace Functional Requirements: Cataloging)

Archive: governed by specific archival management policies, the process by which an entity or the copy of one can be stored or transferred to data storage.
- (NLA Service Framework 6.7: Archive
- (e-Framework Service Genre: Archiving)

Authenticate: process by which a system verifies the identity of a user. The user may be a person using a computer, a computer itself, or a computer program.
- (NLA Service Framework 1.1: Authenticate)
- (e-Framework Service Genre: Authenticate)

Authorize: process by which a system validates that a known individual or entity has the authority to perform specific actions within the system.
- (NLA Service Framework 1.2: Authorise)
- (e-Framework Service Genre: Authorise)
- (e-Framework Service Genre: Validate)
- (CollectionSpace Functional Requirements: Object Exit)

Business Process Engine: an OLE infrastructural middleware tool, the business process engine manages and executes library business processes defined by OLE

Business Process Modeling: a design approach used by OLE to document core library processes. The start and end points, step by step descriptions of how functions are performed, and contingencies are written down, and duplicate processes identified.

Capture: process by which exposed data/metadata from an agency/source is harvested or deposited into the collection
- (NLA Service Framework 6.5: Describe)
- (e-Framework Service Genre: Harvest)
Collection: an OLE entity, a collection is a group of managed relationships. Collections are not necessarily formal library collections, and may be virtual collections, hierarchical relationships, relationships across formats, or a collection of people and services.

- (e-Framework Service Genre: Assemble)
- (e-Framework Service Genre: Associate)
- (CollectionSpace Functional Requirements: Collections)

Commit Funds: process allows purchase price for entity to be encumbered from the appropriate fund; incorporates selector guidelines for assigning funds to order.

Component: a set of functional library business processes defined by OLE

Configure Metadata: process where metadata is normalized and processed according to established rules.

- (NLA Service Framework 3.5: Generate).
- (NLA Service Framework 3.8: Transform)
- (NLA Service Framework 3.9: Translate)
- (NLA Service Framework 7.2: Match)
- (NLA Service Framework 7.3: Merge)
- (NLA Service Framework 7.4: Change)
- (e-Framework Service Genre: Transform)
- (e-Framework Service Genre: Translate)
- (CollectionSpace Functional Requirements: Data Management)

Create Entity Relationships: process that creates a link between two or more entities. Entities can include resources, people, courses, facilities, organizations, finances, etc.

- (NLA Service Framework 4.4: Associate)
- (e-Framework Service Genre: Associate)

Create Metadata: Process where descriptive, structural, and/or administrative information about an entity is generated.

- (NLA Service Framework 6.5 Describe)
- (NLA Service Framework 7.1: Register)
- (e-Framework Service Genre: Add)
- (e-Framework Service Genre: Validate)

Data Models: OLE infrastructural middleware tools, data models define how data is represented, accessed, and exchanged. Data models are independent of OLE components and databases.

Delete Entity Relationship: process that removes a link between two or more entities. Entities can include resources, people, courses, facilities, organizations, finances, etc.

- (NLA Service Framework 5.4: Remove)
- (e-Framework Service Genre: Remove)

Delete Metadata: process where descriptive, structural, and/or administrative information about an entity is removed.

- (NLA Service Framework 5.4: Remove)
- (e-Framework Service Genre: Remove)
**Deliver Entity**: OLE component that tracks the request and supply of a resource including the resource availability, the terms of access, the preconditions of use, and whether the user requesting the resource has been identified and their credentials checked and verified.

- (NLA Service Framework 1.1: Authenticate)
- (NLA Service Framework 1.2: Authorise)
- (NLA Service Framework 6.10: Supply)
- (NLA Service Framework 7.9: Request)
- (CollectionSpace Functional Requirements: Loans and Dispatch)
- (CollectionSpace Functional Requirements: Rights Management)

**Describe Entity**: OLE component where metadata for an entity is obtained, created, modified and deleted

- (NLA Service Framework 6.5: Describe)
- (CollectionSpace: Cataloging)
- (e-Framework Service Genre: Generate Metadata)

**Discovery Tool(s)**: 3rd party components in OLE, discovery tools provide search and discovery functionality and may include features such as relevance ranking, spell checking, tagging, enhanced content, search facets. Discovery tools may be proprietary or open source.

- (NLA Service Framework 5.5: Search)
- (NLA Service Framework 5.8: Harvest)
- (NLA Service Framework 7.6: Lookup)
- (NLA Service Framework 7.7: Locate)
- (e-Framework Service Genre: Harvest)
- (e-Framework Service Genre: Lookup)
- (e-Framework Service Genre: Search)

**Enterprise Level Integration**: using a defined relationship, process by which a system allows linking of services and business entities across applications to promote unrestricted data sharing

- (NLA Service Framework 4.4: Associate)
- (e-Framework Service Genre: Assemble)
- (e-Framework Technical Model: version for review by e-Framework Partners, 2009-04)

**Entity**: OLE entities are resources, collections, persons, organizations, and services with separate identifies. Entities can be created, ingested, managed in relationships, described, and composed into a collection.

**Event Manager**: OLE middleware that analyzes and reports system event data, for example actions performed by users, changes in status.

**Expose Metadata**: process where metadata has been made available for capture

- (NLA Service Framework 5.9 Syndicate)
- (e-Framework Service Genre: Syndicate)

**Identify Supplier**: process that retrieves policy for contact with supplier and allows query of potential supplier list

**Identify Terms of Use**: process where a resource that has been requested has been checked for terms of access and preconditions of use.

- (NLA Service Framework 1.1 Authenticate)
- (NLA Service Framework 1.2 Authorise)
- (e-Framework Service Genre: Authenticate)
• (e-Framework Service Genre: Authorise)
• (CollectionSpace Functional Requirements: Rights Management)

**Identify User**: process where user requesting resource has been identified and their credentials checked and verified
• (NLA Service Framework 1.1 Authenticate)
• (NLA Service Framework 1.2 Authorise)
• (e-Framework Service Genre: Authenticate)
• (e-Framework Service Genre: Authorise)
• (CollectionSpace Functional Requirements: Rights Management)

**Identity Management**: process where user are identified and their credentials checked and verified. The users could be a person using a computer, the computer itself, or a computer program and could use protocols such as LDAP, Shibboleth, Secure Shell Keys, and Certificates. Identity management may be performed by an OLE or 3rd party component.
• (NLA Service Framework 1.1: Authenticate)

**Inventory**: process by which an entity is evaluated and tracked for retention and version preference, and access and descriptive metadata updated. May be used to manage weeding, reformatting, or relocation.
• (NLA Service Framework 6.6: Control)
• (NLA Service Framework 6.7: Archive)
• (e-Framework Service Genre: Archiving)
• (CollectionSpace Functional Requirements: Location and Movement Control Requirements)
• (CollectionSpace Functional Requirements: Inventory Control)
• (CollectionSpace Functional Requirements: Transport)
• (CollectionSpace Functional Requirements: Audit)

**License**: a right that gives a person or entity permission to do something that would be illegal if the person or entity did not have such permission. Usually the scope of the permission excludes ownership rights or privileges.
• (Liblicense: Licensing Digital Information: A Resource for Librarians)

**Manage Entity**: OLE component that describes the processes that track the life-cycle of an entity including preservation, curation, evaluation, retention, relocation, duplication, version preference, rights management, binding, repair, reformat, replacement, and withdraw. Access and descriptive metadata may be normalized and updated in this process according to established rules.
• (NLA Service Framework 2.2: Confirm)
• (NLA Service Framework 3.2: Update)
• (NLA Service Framework 3.5 Generate)
• (NLA Service Framework 3.8: Transform)
• (NLA Service Framework 3.9: Translate)
• (NLA Service Framework 6.6: Control)
• (NLA Service Framework 6.7: Archive)
• (NLA Service Framework 6.8: Preserve)
• (NLA Service Framework 6.10: Supply)
• (NLA Service Framework 7.2: Match)
• (NLA Service Framework 7.3: Merge)
• (NLA Service Framework 7.4: Change)
• (NLA Service Framework 7.9: Request)
• (NLA Service Framework 7.10: Resolve)
• (e-Framework Service Genre: Comply)
• (e-Framework Service Genre: Generate)
• (e-Framework Service Genre: Transform)
Manage Entity Relationship: OLE component that allows for the creation, modification and deletion of relationships between any two or more entities. Entities can include resources, people, courses, facilities, organizations, finances, etc.
- (NLA Service Framework 4.4: Associate)
- (e-Framework Service Genre: Associate)

Manage Funds: process supported by the system to make payment for a service or product. Included in this process is a log trigger and log response; the system records the usage of services or product for audit, reporting or billing purposes.
- (NLA Service Framework 1.4: Log)
- (NLA Service Framework 2.7: Pay)

Manage Inventory: process where entity is evaluated and tracked for retention and version preference, and access and descriptive metadata updated.
- (NLA Service Framework 6.6: Control)
- (NLA Service Framework 6.7: Archive)
- (e-Framework Service Genre: Archiving)
- (CollectionSpace Functional Requirements: Location and Movement Control)

Manage Rights: process where information is maintained (collected, stored, updated) regarding rights of entities. Information is consulted and disseminated as necessary.
- (NLA Service Framework 2.2: Confirm)
- (NLA Service Framework 6.10: Supply)
- (NLA Service Framework 7.9: Request)
- (NLA Service Framework 7.10: Resolve)
- (e-Framework Service Genre: Comply)
- (CollectionSpace Functional Requirements: Rights Management)

Manage User Relationship: an OLE or 3rd party component that describes processes to handle CRM (customer relationship management) including a user’s initiation for request of service to the fulfilling of that request.
- (NLA Service Framework: 1.1 Authenticate)
- (NLA Service Framework: 1.7: Alert)
- (NLA Service Framework: 1.9: Contact)
- (NLA Service Framework: 2.2: Schedule)
- (NLA Service Framework: 2.4: Track)
- (e-Framework Service Genre: Authenticate)
- (e-Framework Service Genre: Alert)
- (e-Framework Service Genre: Receive)
- (e-Framework Service Genre: Send)
- (e-Framework Service Genre: Schedule)

Manage Terms of Acquisitions & Use: documents and manages acquisitions entities and associated information license terms (e-resources, gift, deposit, exchange, approval, etc.) selected for the collection; record is created with pending status; tracking begins as negotiations and/or evaluation of trial take place; final selection decision is recorded and pending status removed.
- (NLA Service Framework 2.2: Confirm)
- (NLA Service Framework 6.1: Select)
Metadata: ‘data about data,’ metadata defines, describes and manages information and may include descriptive, holdings, authority, financial, or other types of data.

Middleware: software that manages and connects OLE components and provides interoperability with 3rd party applications and components; consists of a number of functions which can be called upon by multiple components

Modify Entity Relationships: process that modifies a link between two or more entities. Entities can include resources, people, courses, facilities, organizations, finances, etc.

- (NLA Service Framework 4.4: Associate)
- (NLA Service Framework 3.2: Update)
- (e-Framework Service Genre: Associate)
- (e-Framework Service Genre: Update)

Modify Metadata: process where descriptive, structural, and/or administrative information about an entity is altered

- (NLA Service Framework 3.2: Update)
- (NLA Service Framework 7.4: Change)
- (e-Framework Services Genre: Update)
- (e-Framework Service Genre: Validate)

Obtain Metadata: process where descriptive, structural, and/or administrative information about an entity is acquired.

- (NLA Service Framework 6.5: Describe)
- (NLA Service Framework 7.1 Register)
- (e-Framework Service Genre: Obtain)

Order Resource: obtain collection resources, with associated functions to manage providers. In the case of acquiring digital material it is a process whereby a system manages content in order to bring it into a collection.

- (NLA Service Framework 2.1: Consign)
- (NLA Service Framework 6.2 Acquire)

Organization: an OLE entity, an organization is an administrative structure, for example a college or university, library, institution, society, consortium, or association.

Person: an OLE entity, a person is an individual represented in the environment. A few examples of persons include a user of a resource (such as a library user), a creator of a resource (such as an author), or a creator of metadata (such as a library staff member).

Pluggable Framework: OLE infrastructural middleware that allows separately installable software modules to interact seamlessly in the environment. This provides for increasing functionality of the system with components that are not built-in.

Policy/Business Rules: OLE infrastructural middleware, Policy/Business Rules modifies workflows based on locally defined policies

Preserve/Conserve Entity: process that tracks the preservation and curation of an entity that needs attention in regard to preservation/conservation activities including evaluation, binding, repair, reformat, replacement, and withdraw. Access and descriptive metadata may be updated in this process. Determine whether the item should be relocated to archives/special collections.

- (NLA Service Framework 6.8: Preserve)
- (NLA Service Framework 6.6: Control)
- (CollectionSpace Functional Requirements: Conservation)

**Process**: a loosely coupled series of operations or activities that achieve a library business goal.

**Receive Resource**: process where a resource or service is received in response to request, for example an order request, a request for a service or resource, a gift.

- (NLA Service Framework 5.1: Add)
- (NLA Service Framework 6.5: Describe)
- (e-Framework Service Genre: Add)

**Reference Model**: provides an abstract view of how the environment functions and the relationships between the various components, entities, and middleware. The reference model provides a foundation upon which the architecture of the system, and the concrete details, will be built.

**Reformat Resource**: process where resource is selected, retrieved and converted; content is duplicated; access and descriptive metadata are updated.

- (NLA Service Framework 3.2: Update)
- (NLA Service Framework 3.8: Transform)
- (NLA Service Framework 6.6: Control)
- (e-Framework Service Genre: Update)

**Report Management**: a 3rd party component to OLE that aids in the creating, viewing, and printing of reports. The software may provide an interface that will assist with the selection and extraction of data. This component may communicate with OLE through the report manager in the OLE middleware.

- (e-Framework Service Genre: Report)

**Report Manager**: OLE infrastructural middleware reporting application that provides a connection between OLE, its data, and 3rd party report management software. The report manager may assist with the selection and extraction of data according to a particular type of report, as specified through the 3rd party report management software or through the policy/business rules middleware in OLE.

- (NLA Service Framework 1.8: Report)

**Repository**: the OLE middleware which provides a registry of services. The repository manages the services to support their development, discovery, and use. Information about the services can be found here which could assist potential users with determining whether a service will meet their particular need, who maintains that service, etc.

- (NLA Service Framework 6.9: Obtain)
- (e-Framework Service Genre: Obtain)
- (e-Framework Service Genre: Read)

**Repository Management**: an OLE 3rd party component that performs ingest, storage and basic integrity checks and preservation of entities stored in a repository.

**Request Service**: process where resource is requested from a resource provider or data source, or where a user initiates a request for service. The process will take into account whether the resource or service is available and can be requested by the user based on access and use policies.

- (NLA Service Framework 7.9: Request)
- (NLA Service Framework 1.1: Authenticate)
- (NLA Service Framework 1.7: Alert)
- (NLA Service Framework 1.9: Contact)
- (e-Framework Service Genre: Authenticate)
- (e-Framework Service Genre: Alert)
- (e-Framework Service Genre: Receive)
- (e-Framework Service Genre: Send)

**Resource**: an OLE entity, a resource is an item that may be collected and/or made available by an organization. Common examples of resources include books, journals, maps, and websites.

**Rights Management**: process where information regarding rights of entities is collected, stored, and updated. For example, the license terms of an entity that is acquired are reviewed, approved, and retained. Rights information is consulted and disseminated as necessary, for example, a resource that has been requested is checked for terms of access and preconditions of use. Rights management may be performed by an OLE component or 3rd party component.
- (NLA Service Framework 6.10: Authorise)
- (NLA Service Framework 7.9: Supply)
- (NLA Service Framework 7.10: Request)
- (NLA Service Framework 7.10: Resolve)
- (e-Framework Service Genre: Authorise)
- (e-Framework Service Genre: Comply)
- (CollectionSpace Functional Requirements: Insurance and Indemnity)
- (CollectionSpace Functional Requirements: Rights Management)
- (CollectionSpace Functional Requirements: Roles and Permissions)

**Rules Engine**: See: Policy/Business Rules

**Schedule Event**: process that manages the scheduling of events based on policy implemented by the workflow engine. Provides check interval and deadline for certain actions such as claim, audit, renew, review, deliver.
- (NLA Service Framework 2.2: Schedule)
- (e-Framework Service Genre: Schedule)

**Select Entity**: describes the processes where metadata for an entity that has been selected for acquisition or trial, either permanently or temporarily, are created or obtained.
- (NLA Service Framework 6.5: Describe)
- (NLA Service Framework 6.5: Describe)

**Service**: a well-defined, reusable set of operations, services are independent software pieces that are the building blocks used to assemble library business processes in OLE.

**Service Mediator**: as part of the OLE middleware, the service mediator aids communication between system-level service consumers and service providers. As consumers request services, the mediator negotiates between the consumer and the provider to manage the service request and its delivery.

**Service Oriented Architecture (SOA)**: the design approach that will be used to develop OLE. Service Oriented Architecture provides for loosely coupled, reusable services, and methods for allowing different applications to exchange data. By using SOA design architecture, OLE will describe a system that can add new functionality and communicate with other systems.

**Service Taxonomy**: an index and classification of the services used in OLE. The taxonomy provides definitions of the services, helping to build a common and accepted language among OLE users.

**Supply Entity**: process where an appropriate entity is supplied subject to conditions or constraints on use.
- (NLA Service Framework 1.1: Authenticate)
- (NLA Service Framework 1.2: Authorise)
- (NLA Service Framework 6.10: Supply)
- (NLA Service Framework 7/9: Request)
- (e-Framework Service Genre: Authenticate)
- (e-Framework Service Genre: Authorise)
- (CollectionSpace Functional Requirements: Loans and Dispatch)

**Track Event:** process that enables tracking the status of an event, a resource, a request, or a task at any given point in the workflow.
- (NLA Service Framework 1.5: Log)
- (NLA Service Framework 2.4: Track)
- (NLA Service Framework 6.6: Control)

**Use Case:** an example that illustrates the potential application of OLE, its components, and its processes. Use cases might be abstract or concrete. They help provide meaning to the functionalities of OLE.

**Web Services:** a software component that supports machine-to-machine transactions over a network, in particular, over the Internet.

**Workflow:** a series of activities that involve people, business processes, and software that achieve a library business goal.

**Workflow Engine:** See Business Process Engine.
Symbol Dictionary

- Start of a process

- End of a process

- End step in a process that yields an error condition

- Question or decision point in a process; use when there is only one possible task that follows the previous task

- Individual task within a process that represents a step performed by a person or a computer

- Subprocess that refers to an already modeled process; use when there is an existing BPM diagram

- Individual task within a process that receives data from another process
- Task that sends the process to another OLE component (e.g. Select Entity). The workflow will use one or more of the component's subprocesses (e.g. Create Metadata, Obtain Metadata).

- Contains the steps in one process model or one workflow/use case; use when the interdependent roles of individuals or departments do not need to be separately identified.

- Contains the steps in a process model or workflow/use case; use when the interdependent roles of individuals or departments need to be separately identified.