NDR API v2.0 Overview

Overview of the next-generation NDR API
Background

• NSDL Data Repository (NDR)
  – The repository system behind NSDL.org and related NSDL services such as search and OAI
  – A downloadable repository system software package that can be used for a variety of applications

• NDR Features
  – Apps can read and write to the repository using a REST API
  – Provides abstractions for basic Digital Library objects and actions

• NDR Development
  – A new version of the NDR API, v2.0, is under development…
Why a New API?

• Support community member’s feature requests
  – Annotations – Support the sharing of comments, star ratings, user tags, etc.
  – Richer metadata – Support for ‘native’ metadata frameworks (beyond nsdl_dc)
  – Sharing, displaying, reusing annotations and metadata from other groups

• Address known issues
  – Make the API more efficient and easier to use for core use cases

• Address NSF cyberlearning report
  – Going beyond Digital Libraries to support “learning applications”
API Development Overview

• Current NDR API v1.0 provides low-level methods for operating over base objects in the NDR model
  – Resource, Metadata, Aggregation, MetadataProvider, Agent

• The new NDR API v2.0 will provide higher level abstractions, and add new functionality
  – Collections, metadata, resources, annotations, content
  – Enforces consistent use of the base objects and simplifies primary use cases: managing and accessing collections, metadata, and accessing a resource-centric view
  – Provides new functionality for annotations and content
Collections in API v2.0

• A container for collecting groups of metadata (or any XML)
  – A collection in the NDR does not necessarily equate to a library collection

• API operations:
  – Add, modify, delete collections
  – Add, modify, delete the metadata that describes the collection
  – Group collections into aggregate collections
    • Example: Collection A and B make up collection C
    • Example: Collection C, D, E, etc. make up the NSDL.org library
Metadata in API v2.0

• An XML record that describes a resource
  – Support for any XML framework
  – nsdl_dc is the canonical format used by NSDL
  – The resource described by the metadata is referenced in the XML record by URL

• API operations
  – Add, modify, delete metadata records in a collection
Resources in API v2.0

• An object with a URL, for example an educational resource available on the Internet

• API operations
  – View all metadata about a resource from all sources using a single method call (a “resource-centric view”)
    • Returns each metadata record and annotation associated with a resource and information about the collections they are a member of
Content in API v2.0

• A binary or textual piece of content that is stored in the repository
  – The repository generates a resource URL for the content
  – Content resides in a collection
  – Metadata that describes the content is stored in a separate collection, same as other metadata
  – Example: Storing user contributed resources (PowerPoints, PDFs, etc.) that are saved and shared by users in a learning application

• API Operations
  – Add, modify, delete content objects in a collection
Annotations in API v2.0

- Metadata or content that describes a resource or another piece of metadata
  - Examples include comments, star ratings, education standards, user tags
  - Annotation records reside in a collection just like metadata records do
  - The resource or metadata described by the annotation is referenced in the XML record by URL or ID

- API Operations
  - Add, modify, delete annotations in a collection
NDR Networked Applications for NSDL

Diagram depicts how the NDR supports NSDL network applications and partners

**Key**

- NSDL networked applications
- NSDL service APIs
- Public view applications

**Diagram Explanation**

- **CMS (Drupal, CWIS, others)**
  - Creates collections
  - Writes metadata and annotations into collections

- **NCS (Metadata Editor)**
  - Creates collections
  - Writes metadata and annotations into collections

- **OAI/RSS (Harvest/Feed Ingest)**
  - Reads application meta-metadata
  - Writes metadata to collections

- **Search (DDS)**
  - Reads collections
  - Reads resource-centric metadata/annos from collections

- **NSDL.org**
  - Library search and browse UI
  - Performs searches, retrieves resource-centric metadata and annotations
  - Reads application meta-metadata
  - Writes metadata to collections

- **Learning Apps**
  - Science Literacy Maps, CCS, others
  - Creates collections
  - Writes metadata, annotations, content into collections
  - Reads application meta-metadata, metadata, annotations, content

- **NDR (API v2.0)**
  - Reads and creates collections
  - Writes application meta-metadata

- **NSDL Dashboard**
  - View items in the NDR. Manage collections and agents (webapp)
Appendix: API Details

Comparison of API v1.0 and v2.0
NDR API v1.0 Methods

- Agent requests
  - addAgent, modifyAgent

- Aggregator requests
  - addAggregator, modifyAggregator, countMembers, listMembers

- Metadata requests
  - addMetadata, modifyMetadata

- MetadataProvider requests
  - addMetadataProvider, modifyMetadataProvider, countMembers, listMembers

- Resource requests
  - addResource, modifyResource, findResource

- All objects
  - delete, describe, get, find
API v1.0 Base Objects

• Resource
  – Represents a URL to and educational resource, book, journal article, video, etc. The fundamental information unit in the NDR

• Metadata
  – An XML record that contains information about a resource or group (collection) of resources

• Aggregator
  – Represents a grouping of Agents, Agents, or other Aggregators.

• MetadataProvider
  – A grouping of metadata that comes from a particular source. The provenance of any Metadata object in the NDR may be determined by its MetadataProvider

• Agent
  – Represents an institution or other entity providing information to the NDR. Allows for restriction by group of objects
API v1.0 Base Relationships

- **memberOf** (Subject:{Resource, Aggregator, Agent}; Object: Aggregator)
  - Indicates that the given object is a member of an aggregation. A Resource, Aggregator, or Agent may have any number of memberOf relationships.

- **metadataFor** (Subject: Metadata; Object: {Resource, Aggregator, Agent})
  - Indicates that a Metadata object contains metadata about another. A Metadata object must have at least one metadataFor relationship.

- **metadataProvidedBy** (Subject: Metadata; Object: MetadataProvider)
  - Indicates that a given Metadata object came from a particular source. A Metadata object must have exactly one metadataProvidedBy relationship.

- **aggregatorFor** (Subject: Aggregator; Object: Agent)
  - Indicates that a particular aggregation was created by or belongs to a specific Agent. An Aggregator object must have exactly one aggregatorFor relationship.

- **associatedWith** (Subject: Aggregator; Object: Resource)
  - Indicates that a particular resource is representative of a given aggregation. In other words, the contents of the Resource are in some way indicative of the nature of the contents of the Aggregation.

- **metadataproviderFor** (Subject: MetadataProvider; Object: Agent)
  - Indicates that a particular source of Metadata is attributed to an Agent.
NDR API v2.0 Methods: Enforce and Simplify

- **Collection requests**
  - Methods: `addCollection`, `modifyCollection`, `deleteCollection`, `getCollectionRecord`, `listCollectionRecords`, `findCollections`
  - Operates over base objects: `Aggregator`, `MetadataProvider`, `Metadata` (for collection)

- **Metadata requests (metadata-centric view)**
  - Methods: `addMetadata`, `modifyMetadata`, `deleteMetadata`, `getMetadata`, `listMetadata`
  - Operates over base objects: `Resource`, `Metadata`

- **Resource requests (resource-centric view) (read-only)**
  - Methods: `getResourceMetadata`, `listResourceMetadata`
  - Operates over base objects: `Resource`, `Metadata`
NDR API v2.0 Methods
New Functionality

• Annotation requests
  – Methods: `addAnnotation`, `modifyAnnotation`, `deleteAnnotation`, `listAnnotations`
  – Operates over base objects: `Annotation (new)`, `Resource`, `MetadataProvider`, `Aggregation`

• Content requests
  – Methods: `addContent`, `modifyContent`, `deleteContent`
  – Operates over base objects: `Content`, `Resource`
References

• API v1.0 Documentation:

• API v2.0 Documentation:
  – Overview of current API v2.0 proposal: http://wiki.nsdl.org/index.php/Community:NDR/API/2.0/ProposedSpecifications
  – API v2.0 proposal, first take: http://wiki.nsdl.org/index.php/Community:NDR/API/2.x/APIRequestsByObject
Feedback

• Please provide feedback via the NDR community forum: