NSDL

THE NATIONAL SCIENCE DIGITAL LIBRARY

Technical Network Services

Role of Technical Network Services

From the Solicitation…

- Maintain and upgrade NSDL infrastructure and NSDL.org (with RC)
- Provide technical support for NSDL tools, services, and collections accessioning
- Support *Pathways, Integrated Services*, and other projects to contribute
- Facilitate discussions to identify priorities for new services
- Marshal “collective intelligence” of larger community
- Develop business model to sustain infrastructure after grant ends

PI Team

- Carl Lagoze (PI, Cornell): Digital library architectures, eScience repositories, interoperability protocols
- Michael Wright (UCAR): Led technical development and operations for DLESE and strategic initiatives for NCAR Library
- Tamara Sumner (U of Colorado): Educational technology, cognitive and learning science, user-centered design

First 6 Months Accomplishments

- Ramp up new TNS organization (contracts and people) – *still underway*
- Understand existing infrastructure and processes – Technical Audit, TNS All Hands Retreat (with RC), Collections Audit
- Initiate strategic planning with RC
- Initiate technical services to be provided

Big Picture for TNS

- New organization, new circumstances
- Now
  - Streamlining operations
  - Ramping up community services and collaborative development processes
- Next
  - Enhanced educational services driven by grantees, RC, exemplars

Strategies & Resource Alignments

Project management and administration	1.5 FTEs
1) Maintain and operate the technical infrastructure	**4.7 FTEs**
2) Mobilize the community	**3.5 FTEs**
3) Support educational exemplars	**2 FTEs**
4) Improve NSDL.org user experience	0.5 FTE
5) Evaluation	0.3 FTE
6) Extend strategic partnerships	As needed

1) Technical Infrastructure Operations

- What is the “data center” infrastructure?
  - HW/SW Stack underpinning NSDL.org and hosted community services
  - Technical components of collection accessioning, aggregation, and curation
- Objectives
  - Lower operating costs
  - Improve maintainability and scalability

Operations: Action items

Simplification, streamlining, virtualization

- From 20+ servers down to 6 or 7
- Reduce supported software components
  - Shibboleth single sign-on to be phased out
- Refocus collections aggregated for NSDL.org
  - Current: 165 collections with 2.1 million items
  - Proposed: 96 collections with 100,000 items
- “Spin up the cloud” for hosting services
  - Instructional Architect, Strand Map Service, CAT
  - MSP2, SMILE

Operations: Action items continued

Rethink the current “handover” model for supporting community developed software

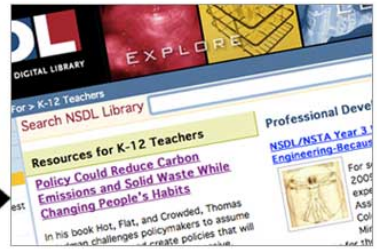
- Code
- License
- Training
- Updates
- Strategic Alignment

2) Mobilize the Community

- Who is the TNS community?
  - New NSDL Grantees; the Resource Center
  - Legacy Pathways and other NSDL projects
  - Other NSF grantees such as CCLI, ATE
  - Other: Fedora, larger ed tech community
- Objectives
  - Support cyberlearning platform vision
  - Build active developer and prosumer community

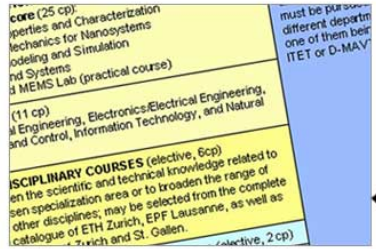
User services and applications

Example: NSDL.org



Example: Beyond Penguins & Polar Bears

Example: Curriculum Customization Service



Browse | Discover | Manage | Create | Share | Blog

- Strand Maps
- NSDL Search
- Digital Discovery Service
- NSDL Collection System
- OnRamp Content Management and Distribution System
- NSDL Media Wiki
- Expert Voices Word Press Multi-user Blogging system

NDR API

Native Fedora Interface

TNS services:

- share a common service layer
- feature open APIs
- are highly customizable
- are scalable

Community content and collections

A platform comparison

Cyberlearning Report

- Centralized cloud
- Open APIs
- Gold-standard open source components
- Vibrant developer community
- Robust data mining services
- Well-defined standards for plugging data into apps

NSDL Platform

- Distributed
- Open APIs
- Gold-standard open source components
- Emerging developer community
- Data mining research beginning to take off
- Scientific data plug-n-play research in Pathways

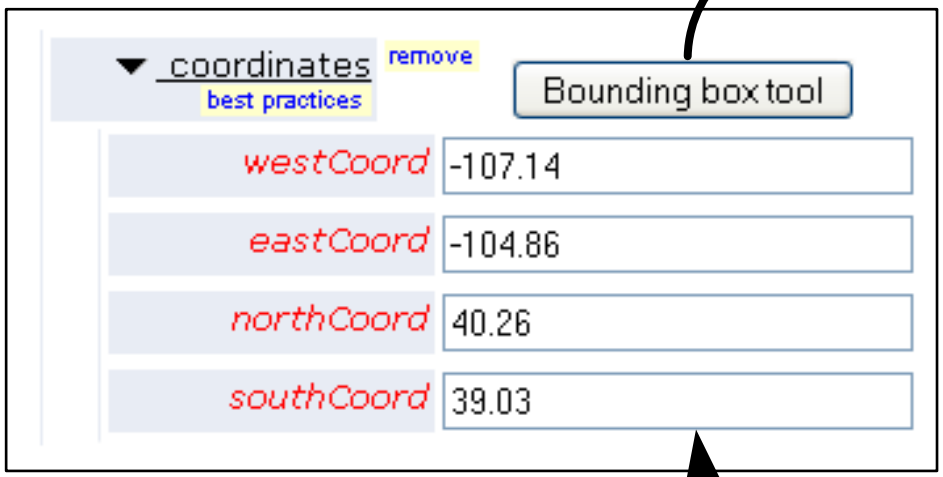
Mobilizing: Action Items

- Training Program – Use cases and individual platform components
- Open Solution Community approach – Invest *all* TNS platform development resource in a collaborative, co-development model
- Partner with Fedora Commons – Leverage their community and open source knowledge and cache

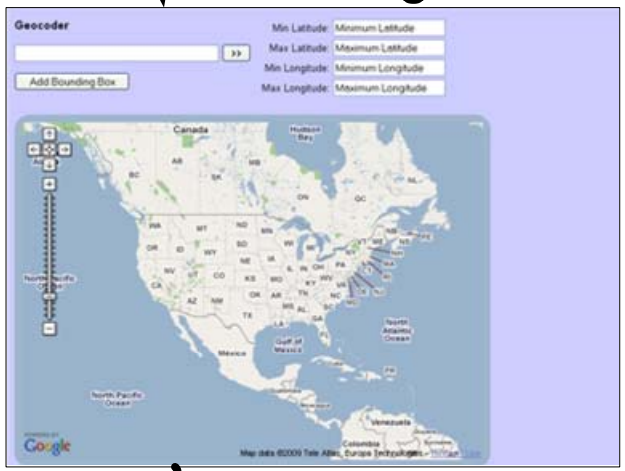
Co-Development Example with SMILE

Widget
activates
boundingBox Tool

NCS Metadata Editor



BoundingBox Tool



Callback
inserts values from
BoundingBox tool
into metadata

Open Solution Community

- Roadmap Process – collaborative development of priorities and collective resource allocation
  - Nucleate around *core* capabilities
  - EduPak released with Fedora Commons
  - Series of mini-Technical Summits to engage NSDL developers
- Contributor Process – mechanisms for integrating community-developed software into codebase

Emerging Roadmap Areas

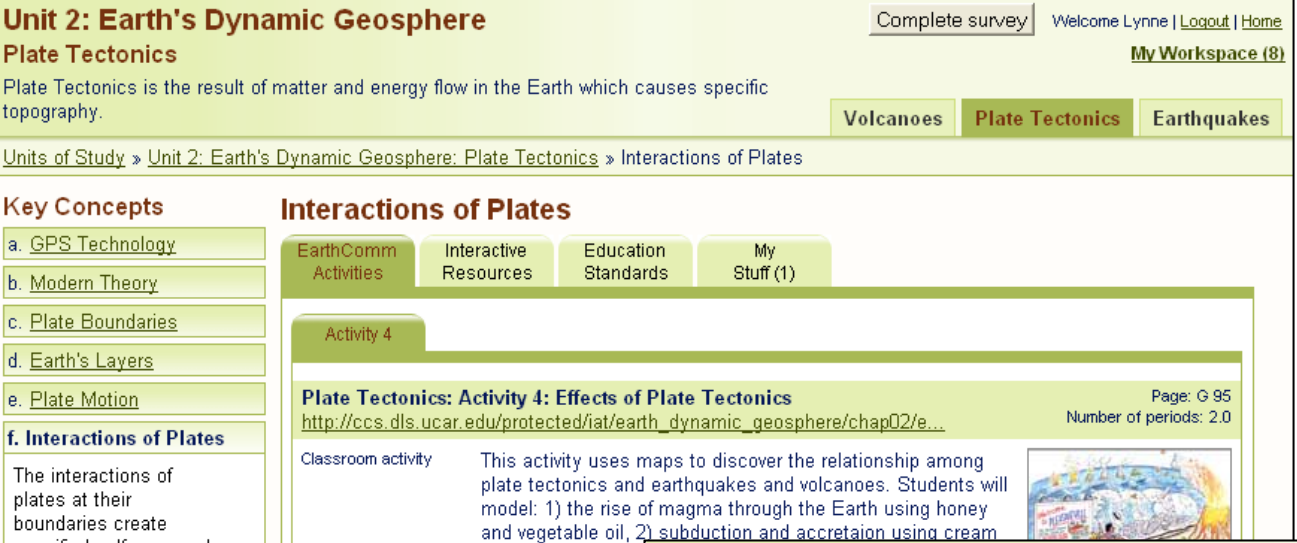
- Phase 1 priorities (2009): NCS hosting and customization; custom framework consulting; custom metadata in NDR; configuring search services; web feed ingest; automated collection monitoring and reporting

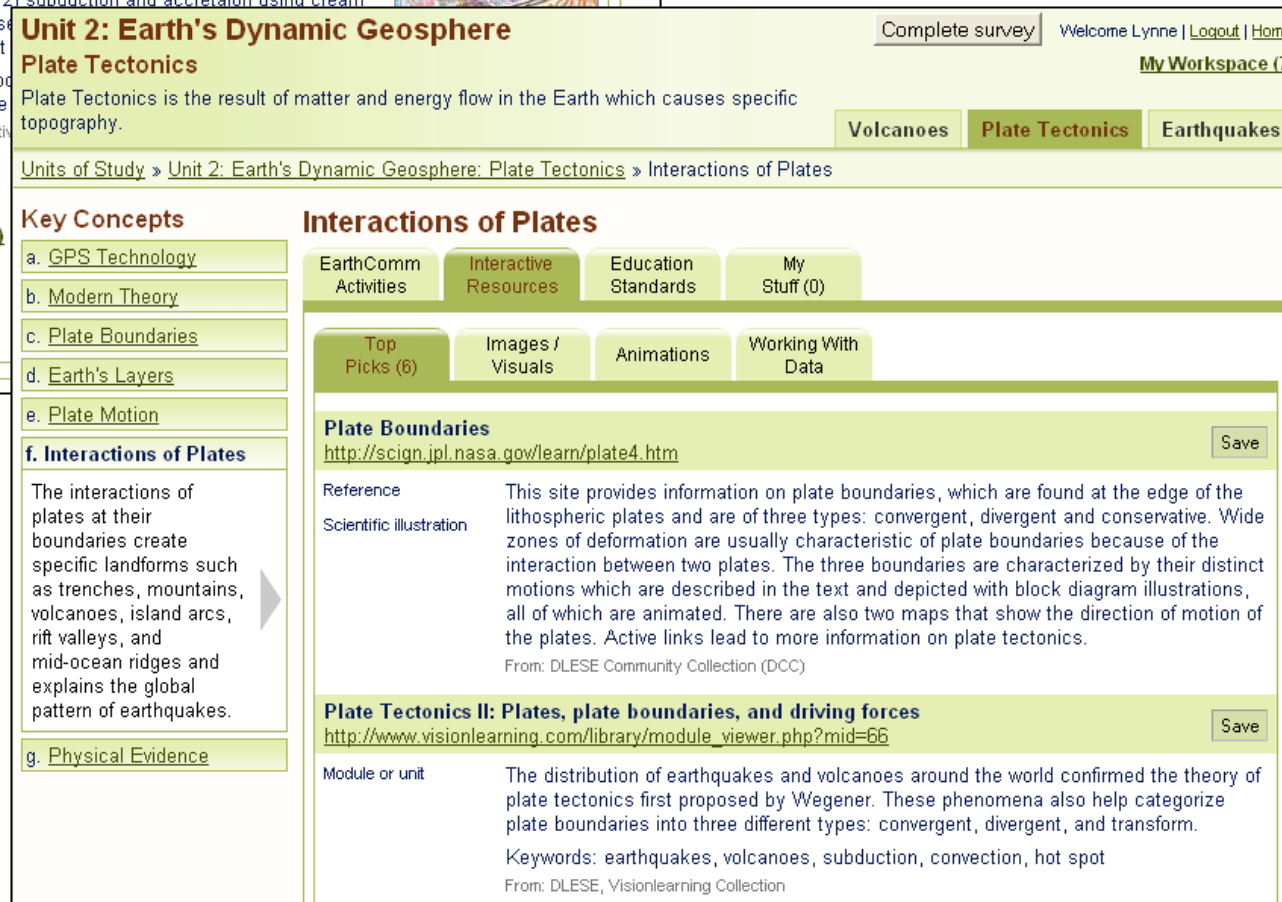
- Phase 2 topics (09/10): Extensions to Strand Map Service to support state standards, annotations, and custom maps; widgets/tools to enable faculty to create and share instructional activities; interoperability via OAI-ORE or SIF; state standards mappings and standards interoperability

3) Support Educational Exemplars

- Objectives
  - Use NSDL infrastructure and collections to create and evaluate a small number of exemplars
  - Support NSDL grantees, NSF grantees, and other community members in this endeavor
- Criteria for selecting exemplars
  - Potential for increasing usage and/or demonstrating impact

Curriculum Customization with Denver Public Schools





Created with EduPak

What will success look like for TNS?

- Contribute to shared NSDL goals
  - Technical advances and operations to increase usage and demonstrate impact
- TNS-specific goals
  - **NSDL infrastructure and collections used in new teaching and learning experiences**
  - Vibrant community of co-developers and contributors
  - Business model to sustain “data center” technical operations

Several Major Challenges

- Shifting from an R&D shop to a technical service provider organization
- Streamlining the organizational footprint for sustainability
- Rethinking the current “handover” model
- Balancing short-term community service efforts with long-term strategic goals

Discussion

4) Improve NSDL.org User Experience

- Who is the user?
  - Still very broad

"a unique educational and scholarly resource for innovative STEM learning materials and research on STEM learning"

- Objectives
  - Refocus NSDL.org collections and interfaces to increase educative value
  - Instrument NSDL.org to characterize usage and provide rich behavioral data
  - Preserve (?), feature, and disseminate STEM learning products from NSF funding

5) Evaluation

- Two modest strands of effort
  - Supporting Resource Center through infrastructure instrumentation
  - Community satisfaction measures around technical customer support, technical operations, and roadmap processes and outcomes

6) Extend Strategic Partnerships

- Mostly purview of Resource Center
- Two exceptions
  - Project 2061/AAAS -> Co-leads on Strand Map Service, Owners of content IP
  - Fedora Commons -> Critical partnership for jumpstarting and extending the proposed Open Solution Community approach