Proposal for High Energy Nuclear Database

Joint LBNL/LLNL Proposal

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Outline

- David Brown (10 min.):
  - Background
  - Enabling technologies
  - Timeline
  - Resource requirements
- Ramona Vogt (10 min.):
  - Evaluation and topical reviews
  - Case Study: *D* meson production

Background and Impact

- Large amount of data begs for organization
  - AGS to CERN-LHC data on proton-proton to lead-lead collisions (and other systems as needed)
  - 109+ RHIC experimental publications with tables
- Would simplify cross-experiment comparisons, better theory benchmarking
- Centralization will enable the development of systematics
  - First step in characterizing the plasma
  - Cost (in time & $$) to assemble data limits researchers
- Emerging applications for High Energy Nuclear Data: pRad, NASA, HI ICF, MINOS, NLC

Cost to community if no database

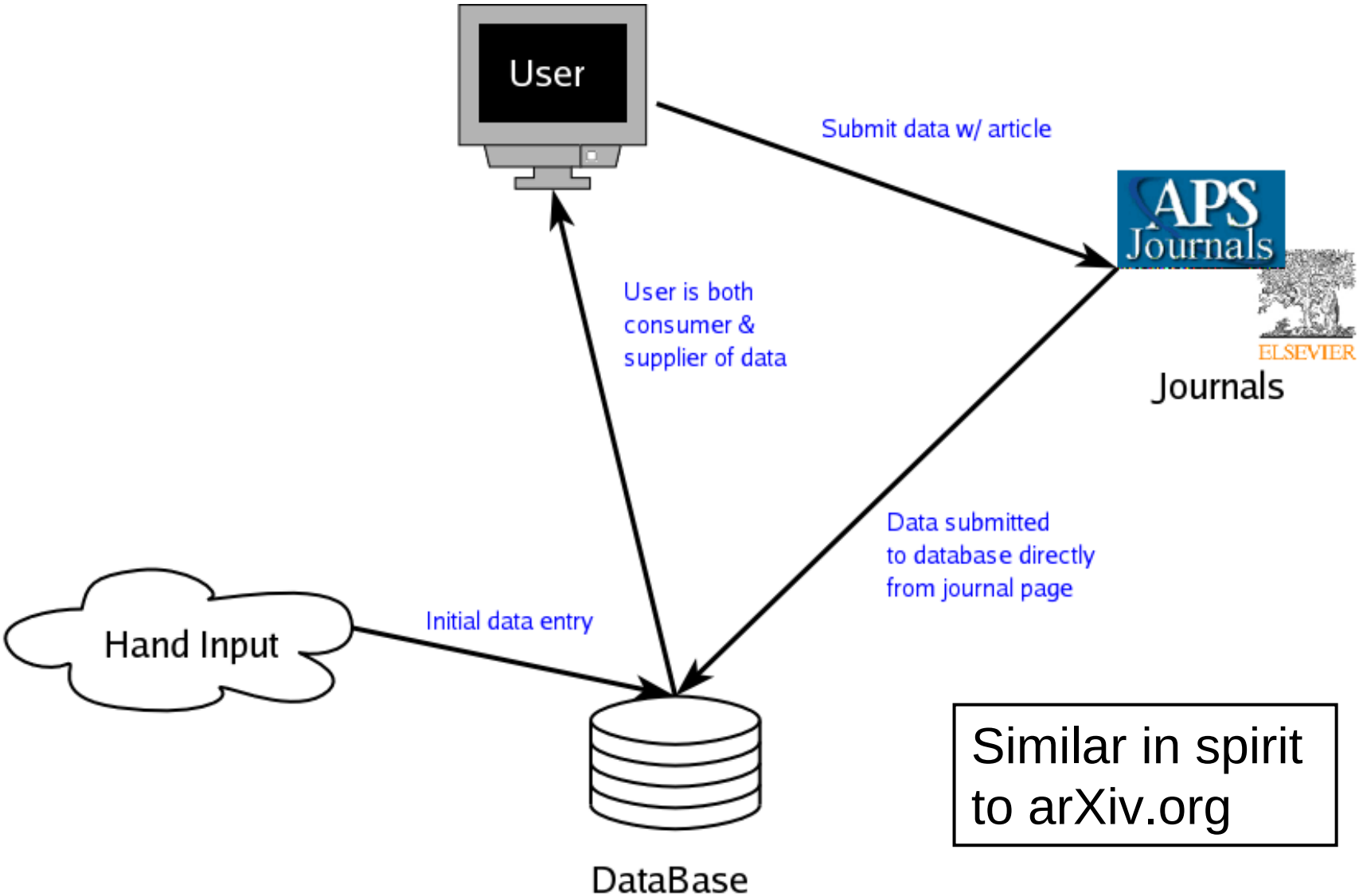
Data can be lost

- Can’t rely on experiments to save data:
  - Many RHIC experiments post data on web (e.g. PHENIX)
  - Competing formats
  - What happens when experiment ends?
- Can’t rely on community to save data:
  - Manpower and $$ limited

What Type of Data

- Measured data
  - Cross sections, particle yields, single spectra
  - Multi-particle spectra, flow, correlations
  - Whatever data is needed to characterize a high-energy heavy-ion reaction
- Evaluated data
  - Product of topical reviews
  - Crucial for applications
- Data must be cross-linked with experimental descriptions, theoretical calculation

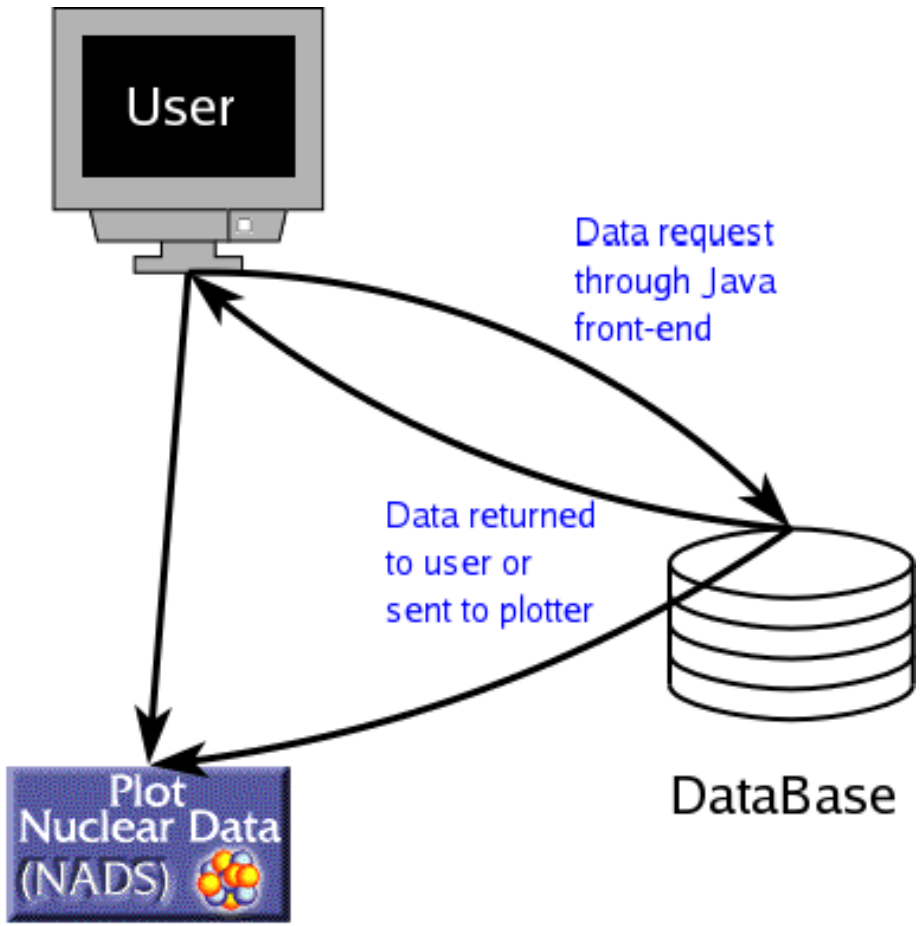
Submitting Data



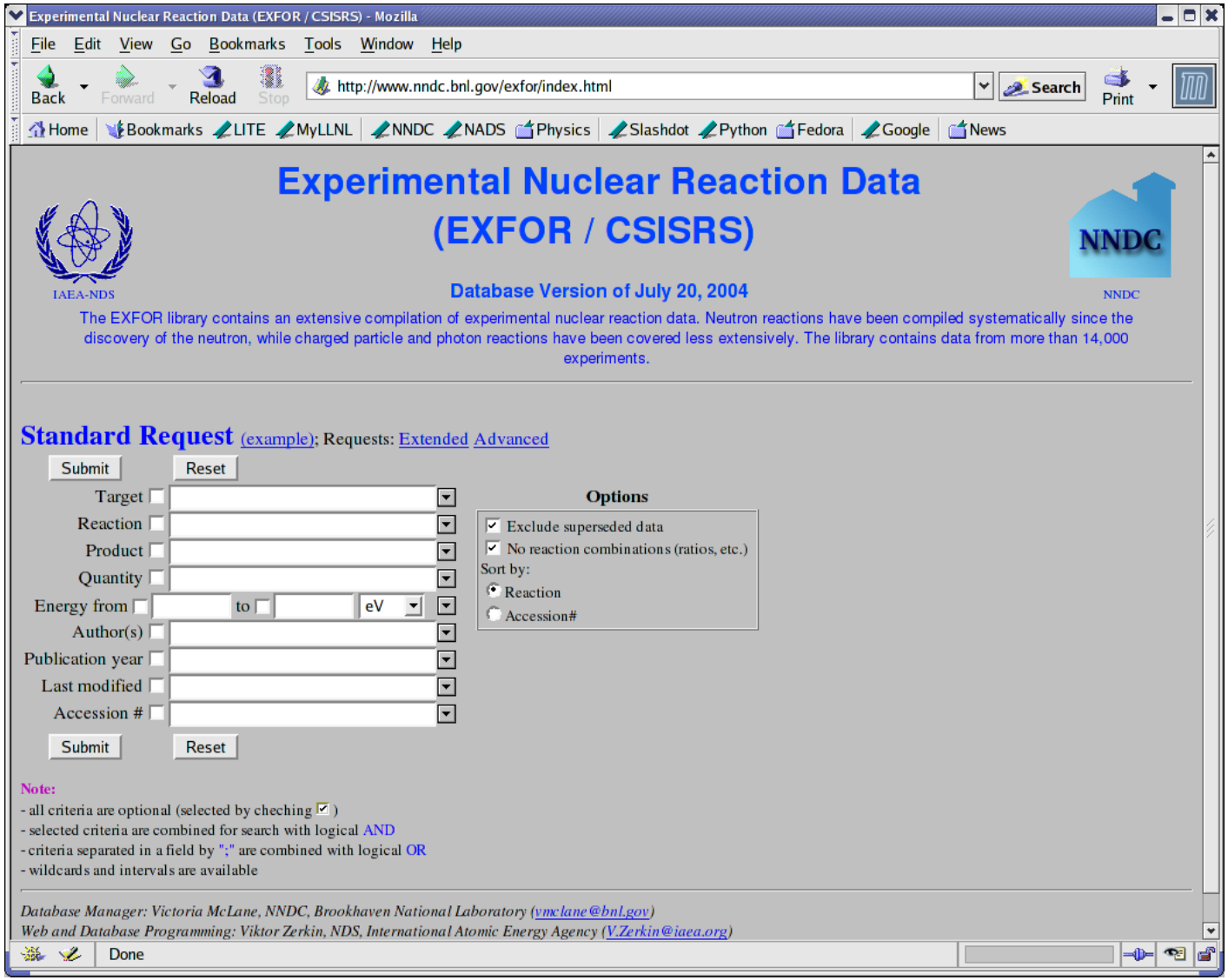
Similar in spirit to arXiv.org

Interface and Backend Technologies

- Java applet interface
- Similar to NNDC's EXFOR and ENDF/B retrievals
- Data returned through applet or to NADS
- Separate data server allows for batch retrievals



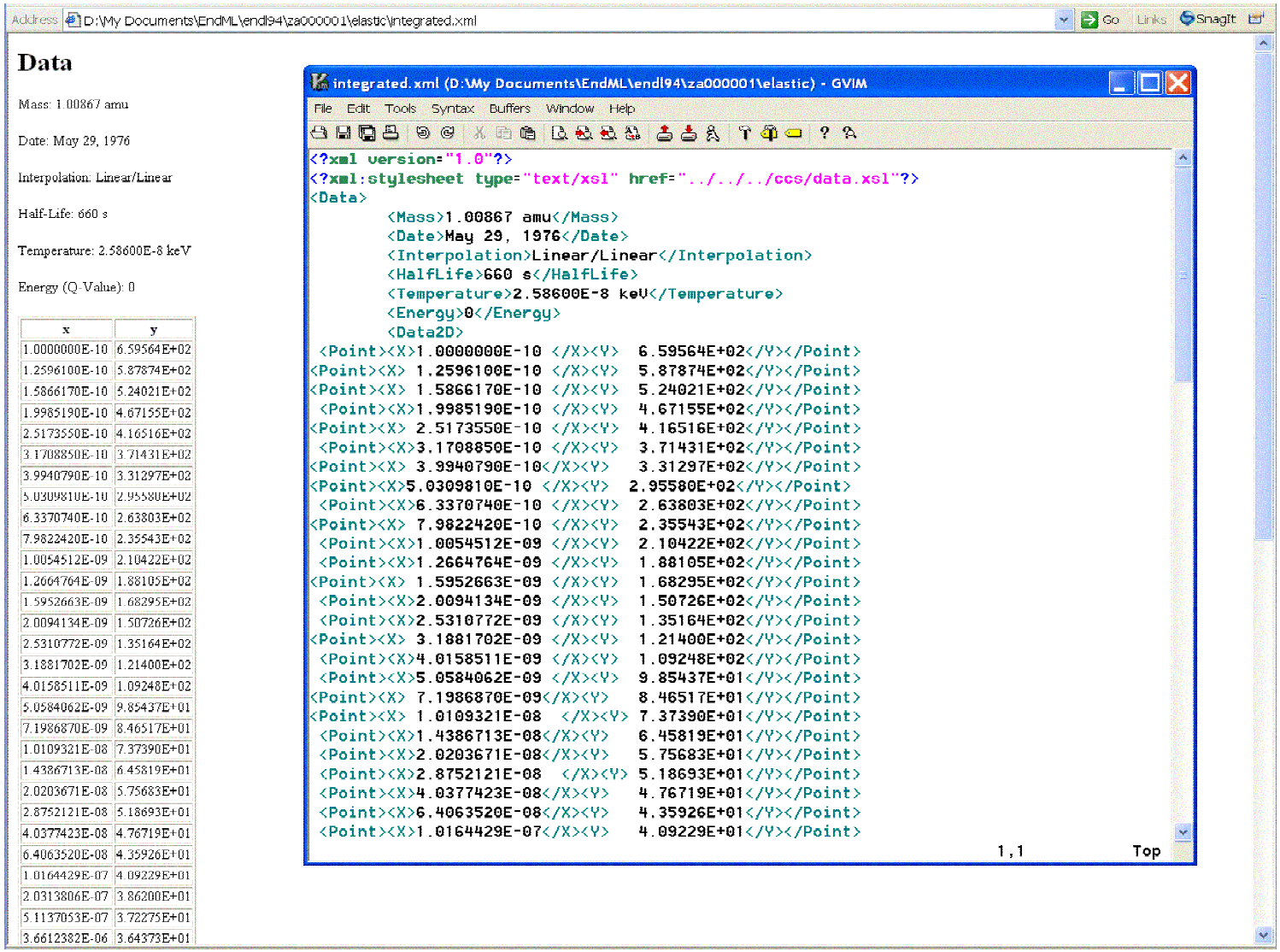
Model user interface (NNDC)



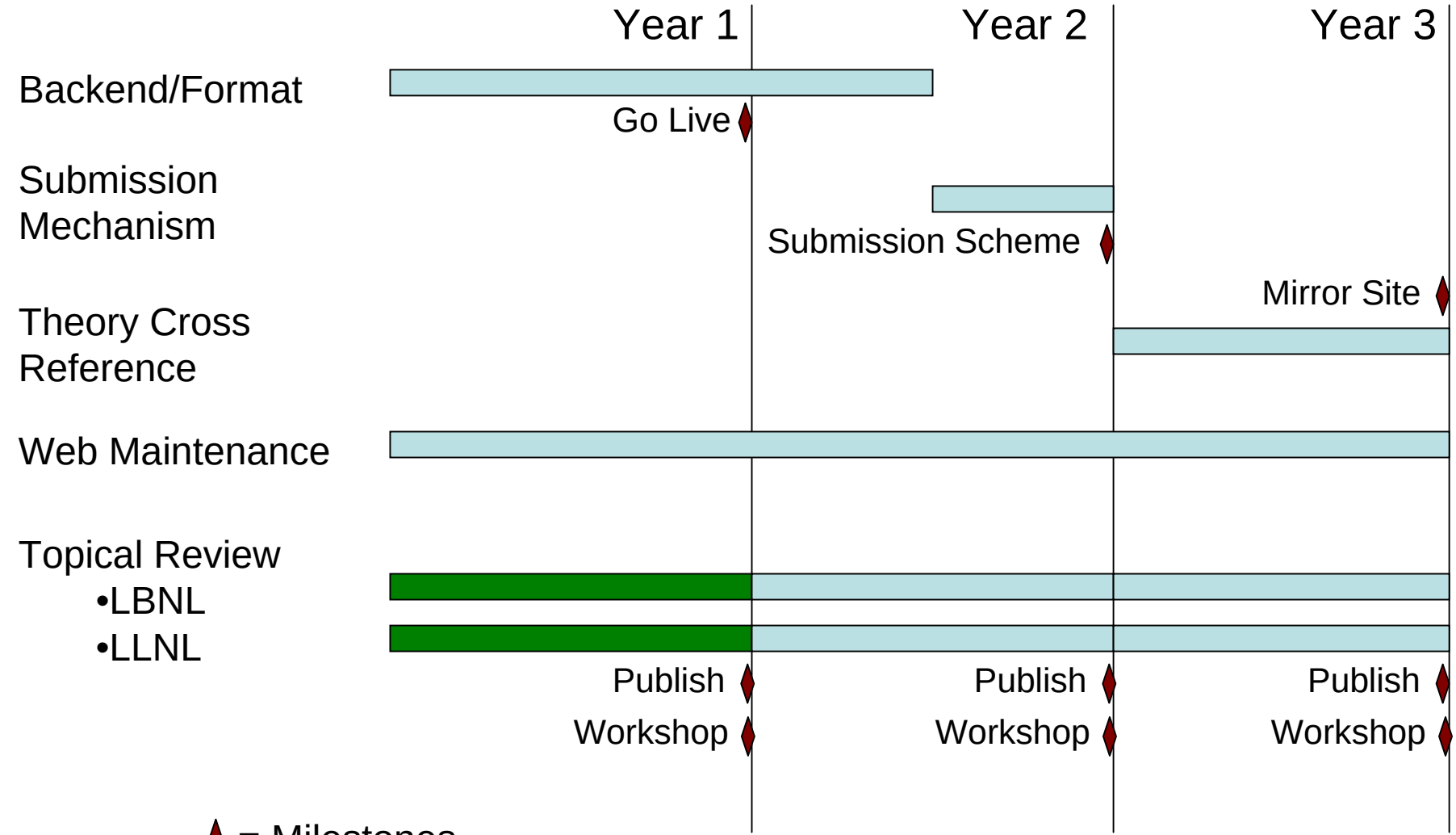
Data stored in XML format

- **Key Features:**
  - Self describing
  - Open, standard, license-free, platform-neutral
  - Transformable (see next page)
  - Unicode support
  - Human readable
  - Hierarchical structure
- **Lots of Freeware:**
  - Editors
  - Checkers
  - Converters
  - Storing
  - Publishing
  - Parsing (C/C++, Java, Python)

XML Feature: Stylesheets



Project Timeline



Resource Requirements

	Year 1	Year 2	Year 3	Out Years
Backend Technology Development	0.5 FTE (LLNL)	0.25 FTE (LLNL)		
Data Collection	0.25 FTE (LBNL)	0.5 FTE (LLNL/LBNL)	0.5 FTE (LLNL/LBNL)	As needed
Theory Cross Reference Scheme			0.5 FTE (LLNL/LBNL)	Continuing
Topical Review		1.5 FTE (LLNL/LBNL)	1.5 FTE (LLNL/LBNL)	1.5 FTE (LLNL/LBNL)
Workshop	$5K	$5K	$5K	$5K
Website Maintenance	0.1 FTE	0.1 FTE	0.1 FTE	0.1 FTE

Related Funding (Year 1):

- LBNL *D* Meson LDRD pays 100% of an FTE for R. Vogt
- LLNL MIPP LDRD pays 50% of an FTE for D. Brown

LBNL and LLNL Strengths

Hard probe expert
Widely known in field

Two particle correlation expert
Transport theory
Nuclear data evaluator

HBT Expert
LLNL's PHENIX Grp. leader
Convenor Hadronic Physics Working Grp.

Soft hadron expert
LBNL's Soft hadron Grp. leader
Serves on several STAR committees

XML, Java
NADS Developer

High energy nuclear astrophysics
XML, Java
ENDL Maintainer