



Development of National Digital Library of India

Towards Building a National Asset



NDL: VISION & MISSION

**DR ZAKIR HUSAIN LIBRARY (CENTRAL LIBRARY)
JAMIA MILLIA ISLAMIA, NEW DELHI**

NMEICT
National Mission on Education Through ICT

**NMEICT: National Mission on
Education Through Information and
Communication Technology**



MHRD

Government of India
Ministry of Human Resource
Development



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Joint PI, NDL Project, NME-ICT, MHRD
Indian Institute of Technology, Kharagpur

21-OCT-2016



NDL Vision

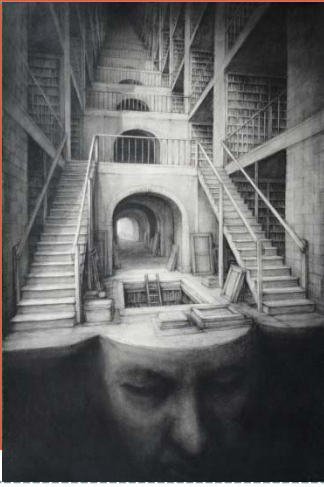
2



BUILD UP

NATIONAL DIGITAL LIBRARY OF INDIA
AS A NATIONAL KNOWLEDGE ASSET –

THE KEY DRIVING FORCE FOR EDUCATION,
RESEARCH, INNOVATION, AND
KNOWLEDGE ECONOMY IN INDIA



NDL Mission

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TO CREATE A 24X7-ENABLED INTEGRATED NDL
AS A UBIQUITOUS DIGITAL KNOWLEDGE
SOURCE OF THE NATION – CATERING TO
IMMERSIVE E-LEARNING FOR
ALL LEARNERS AT ALL LEVELS IN ALL AREAS

TO INITIATE A MOVEMENT FOR INTEGRATED
DIGITAL LEARNING ACROSS INDIA



NDL Motto

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INCLUSIVE
&
OPEN





National Digital Library of India

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Issues, Architecture And Use Models

Libraries are more important to the education system than the institutions such as schools, colleges and universities
– Rabindranath Tagore





National Digital Library: Issues

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User-side

- Wide geographic expanse & Large population
- Huge number of students
- Large number of institutions
- Varied linguistic diversity
- Severe lack of Teachers



Provider-side

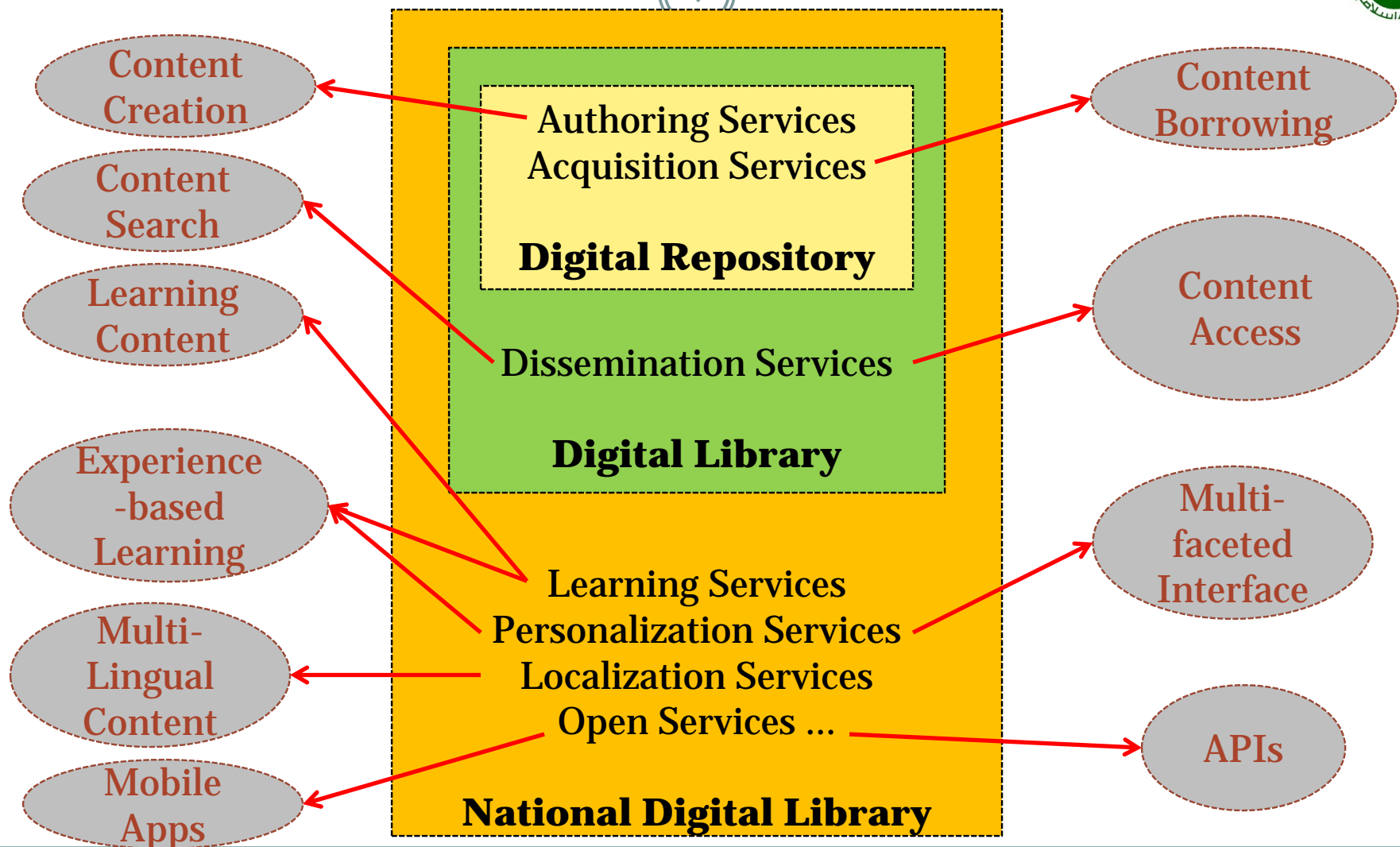
- **Wealth of digital content**
 - Books and Articles
 - ETD
 - Question Papers and Solutions
 - Video Lectures - MOOCs
 - Simulations & Animations
 - NMEICT Projects
 - Data
 - ...
- **No single-window search**
- **Google search uses keyword – no metadata search**
- **Widely varied DL technology**
- **Lack of Interactivity, Vernacular support**
- **Low integration between content and learning system**
- **Weak ecosystem between learners and teachers**



National Digital Library: Service Architecture



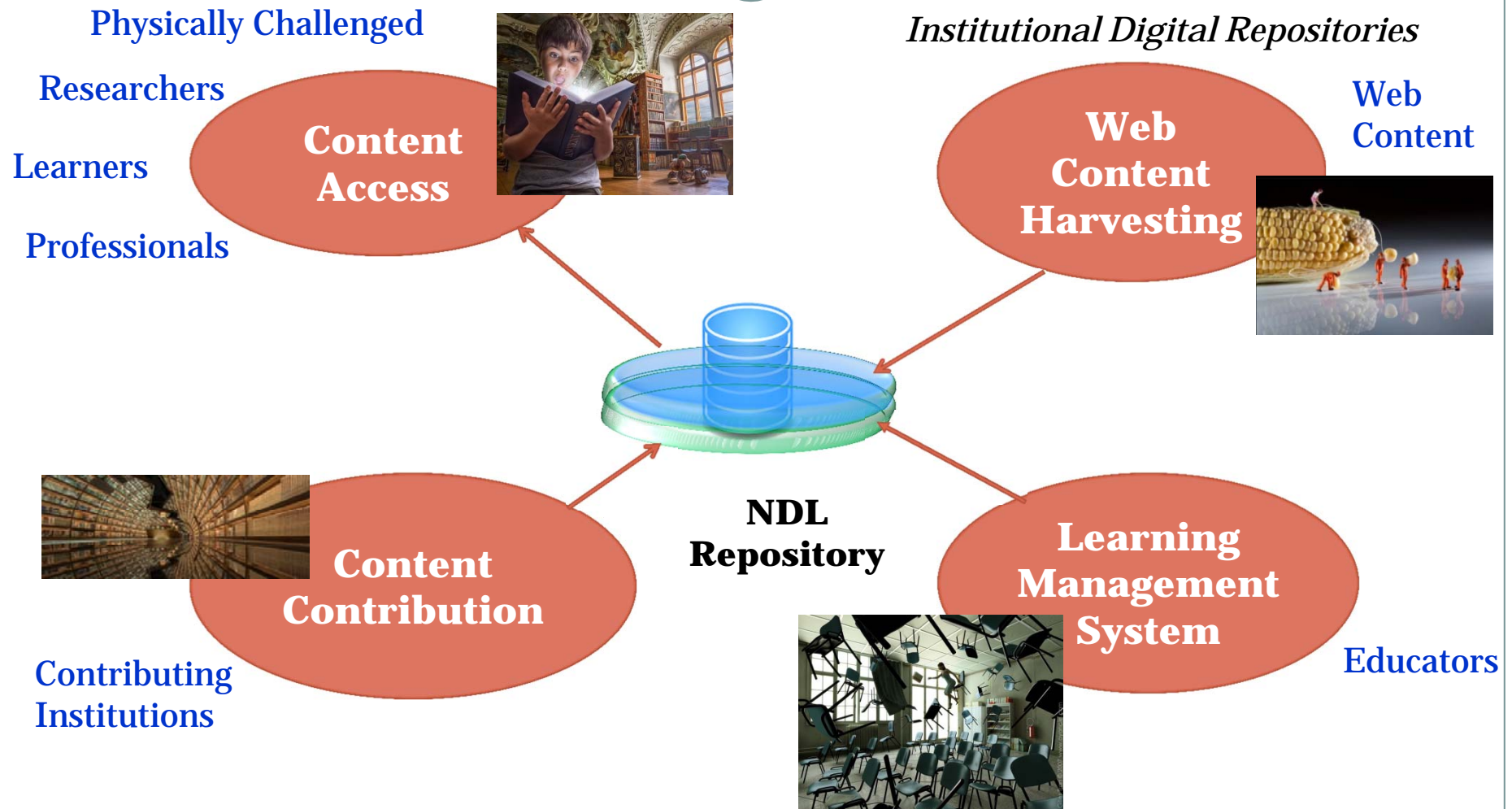
7





Use Models

8





Presentation Model

9

- Not a new library – an umbrella
- Collects and ingests metadata only
- Presents full-text from source view
- Provides:
 - Search
 - Browse



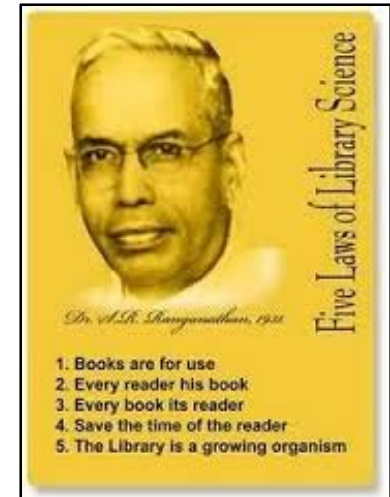


Objective and Scope

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TARGETS

CONTENTS,
STAKEHOLDERS,
CONTRIBUTORS,
USERS,
ARCHITECTURE, AND
THE BIG PICTURE



S R Ranganathan Laws

- **Books are for use**
- **Every reader his [or her] book**
 - **Every book its reader**
- **Save the time of the reader**
- **The library is a growing organism**



Objectives

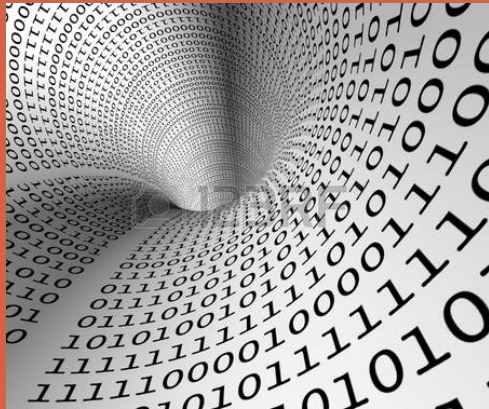
11

- **Create a 24X7-enabled Infrastructure** for NDL with single window search facility – To include h/w systems, networks, s/w tools, applications and interoperability standards
- **Harvest IDRs** (Institutional Digital Repository) across institutions of the nation to provide integrated access
- Facilitate select institutes to **disseminate existing content** and **create new digital content**
- Provide support for **immersive E-learning environments** at multiple levels spanning across
 - All academic levels – school to college to university to life-long learning
 - All disciplines – Science, Arts, Humanities, Engineering, Medical, Law, and
 - All languages (vernacular) used as medium of instruction.
- Support **interfaces in vernacular & for differently abled users**



Digital Contents

Digital, Surrogate
Digital, Metadata
Digital, etc.



- 7679334-abstract-image-of-tunnel-with-binary-language.jpg
- https://www.123rf.com/profile_carloscastilla
- 450 pixels X 376 pixels
- 72 dpi
- Royalty Free

- Content at NDL
 - Born-digital object
 - Digital surrogate of a physical object
 - Digital metadata of physical object
- Metadata at NDL
 - NDL does not store contents
 - NDL only ingests metadata for Search & Browse
 - Content (Full-text) is delivered from Source

A content is included (metadata ingested) in NDL if it is expected to have educational value



Faculty Publications, ETD (Electronic Thesis & Dissertation): DSc-PhD-Masters-Undergrad, Research Projects

Books & Periodicals, Open Access Journals, E-Books & Subscribed E-Resource

Annual Reports, Project Reports, Convocation, Working Papers, Others

Encyclopaedia Dictionaries Directories Others

Lecture Slides, Videos, Class Notes, Courseware

Term Papers, Assignments, Solutions

Lab Experiments, Manuals, Case Studies

Question Banks (JEE / GATE / NET / CAT), Model Answers

Institutions of School & Higher Education, Boards

Research and Professional Institutions, Central / State University

Institutional Digital Repository of Contributing Institutes

Range of Contents

Institutional and Open Contributions. Multi-modal, Multi-faceted

Datasets, Benchmarks, Models, Maps, Software

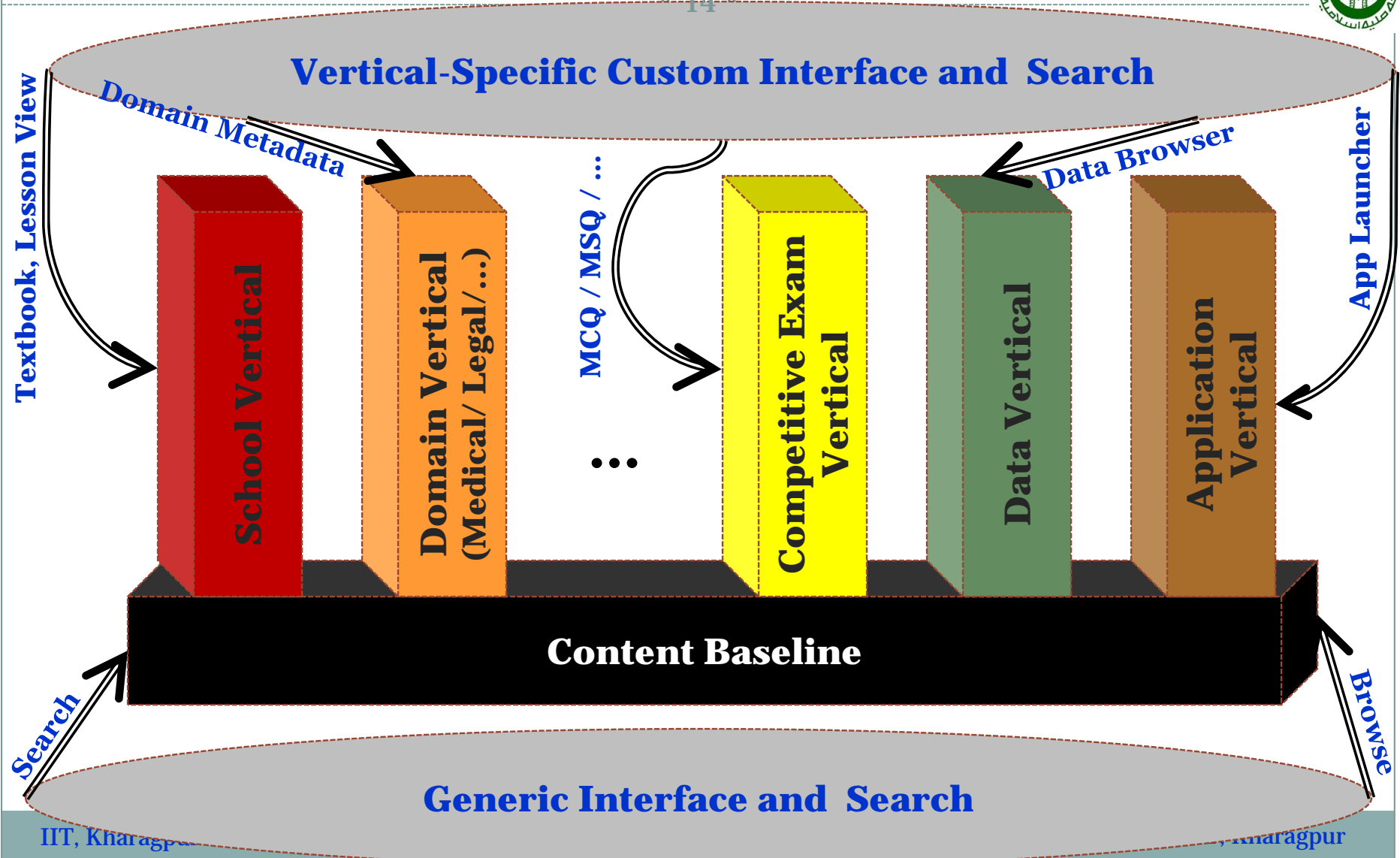
Manuscripts, Painting, Sculpture, Music, Dance, Drama

Audio & Video Content



Content View Architecture

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Stakeholders

Roles and Responsibilities

Stakeholder	Roles and Responsibility
Government	<ol style="list-style-type: none">1. Sponsor and facilitator2. Content Contributor<ul style="list-style-type: none">• Ministries / Departments• R & D Labs
Institutions <ul style="list-style-type: none">• Public / Private• Academic / R & D / Educational	<ol style="list-style-type: none">1. Host Institution – IIT Kharagpur2. Contributing Institution – Supporting IDRs3. Participating Institution – Providing Users & Feedback
Public <ul style="list-style-type: none">• NGOs• Individuals	<ol style="list-style-type: none">1. Use and Feedback2. Metadata by Crowd Sourcing3. Content by Crowd Sourcing
Industry	<ol style="list-style-type: none">1. Technology Providers
Publishers	<ol style="list-style-type: none">1. Metadata Provider2. Content Provider (under various licensing schemes)



Contributors

CFTI, State and Central Universities, R & D Labs, Govt. Depts, Free Portals, Publishers, etc.



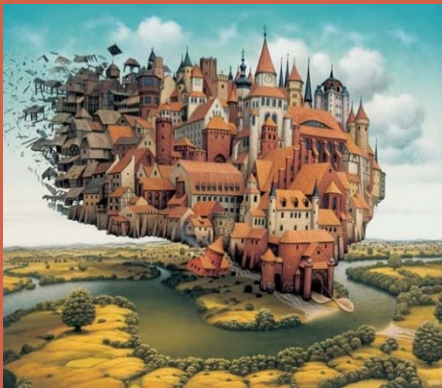


Users & Access

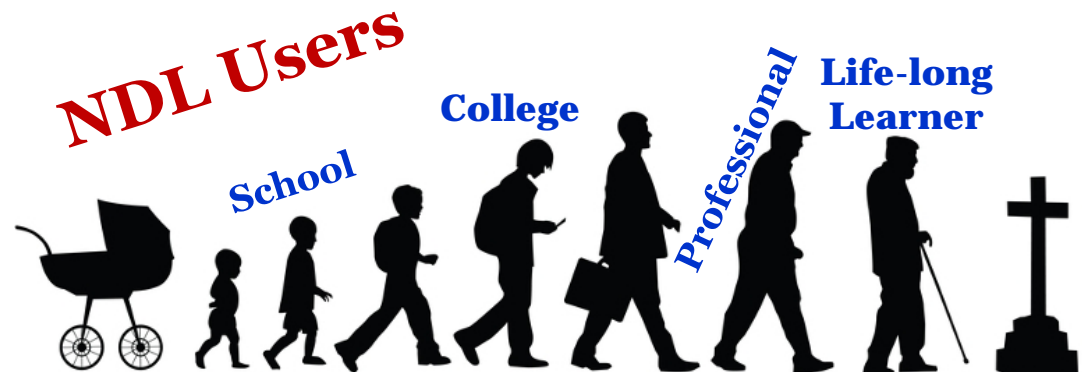
Individual



Institutional



- Registration is **Open to all**
- Registration by invitation:
 - **Individual**
 - ✦ Members of Institutions – by Institution
 - ✦ Holding an email in official domain – .gov.in, .ac.in, .ernet.in, ...
 - **Institutional**
 - ✦ By request from Institution
 - ✦ Managed by authenticated Nodal Person





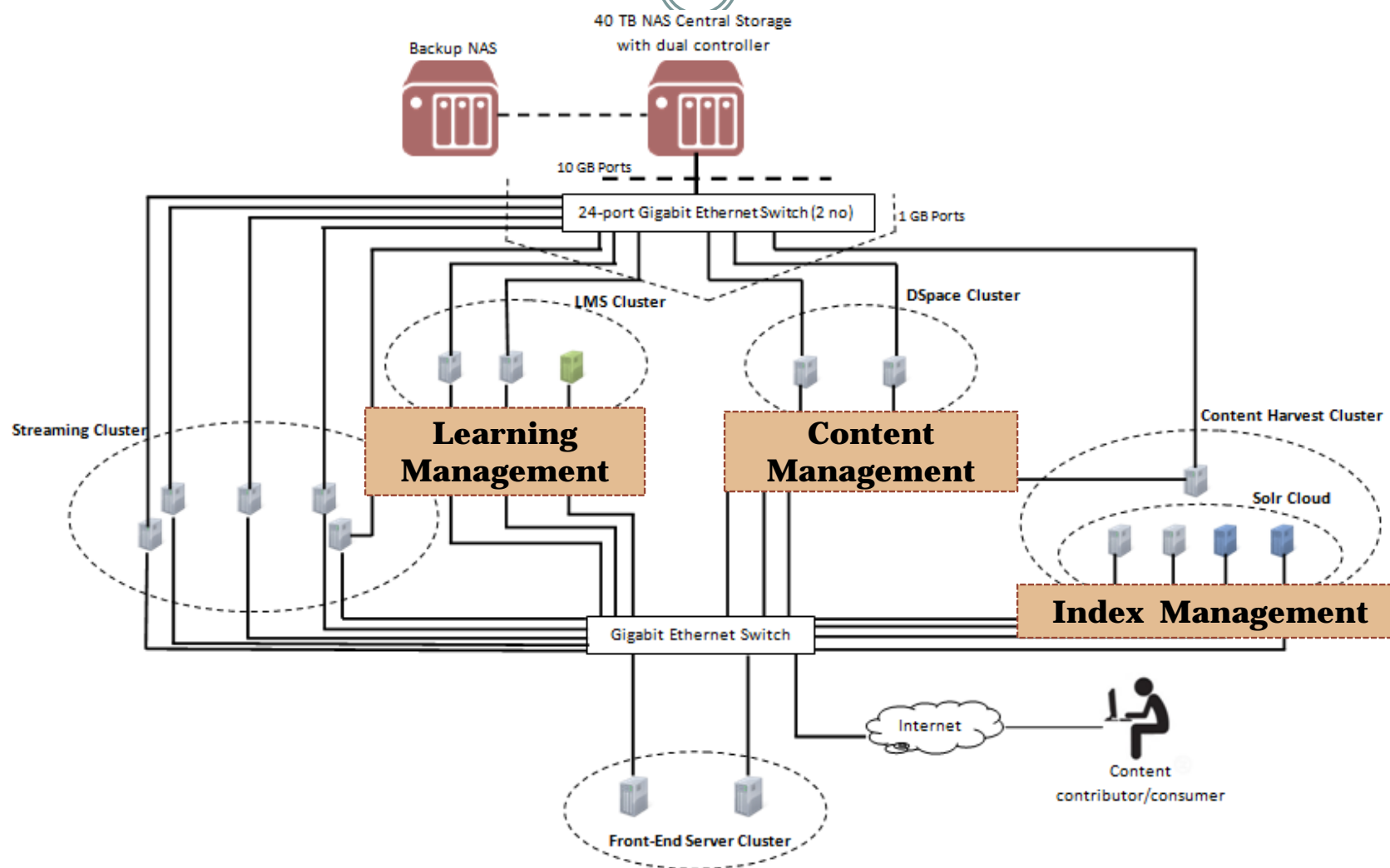
Architecture

- **Index Management**
 - Ingestion of Metadata
 - Indexing of Metadata for Search
- **Content Management**
 - Dissemination of local contents
- **Learning Management**
 - Creation of Content
 - Handling learning interactions



System Architecture

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NDL Portal

*Where the mind is without fear and the head is held high
Where knowledge is free
Where the world has not been broken up into fragments
By narrow domestic walls
Where words come out from the depth of truth
Where tireless striving stretches its arms towards perfection
Where the clear stream of reason has not lost its way
Into the dreary desert sand of dead habit
Where the mind is led forward by thee
Into ever-widening thought and action
Into that heaven of freedom, my Father, let my country awake.*

– **Rabindranath Tagore**





The Big Picture

NDL:

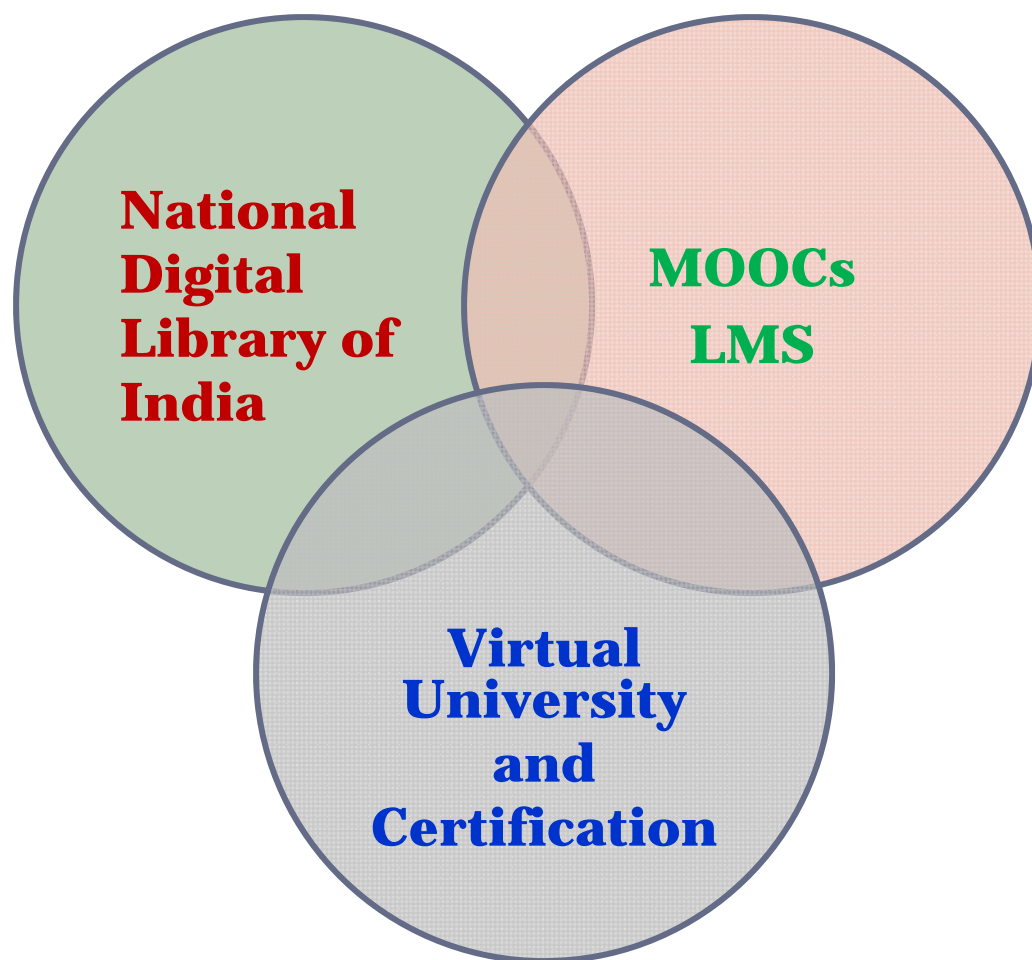
Content Repository

LMS:

Content Delivery for Learning

VUC:

Certification & Credit Transfer





Institutional Roles and Responsibilities

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TERMS OF REFERENCE TO CONTRIBUTE TO NDL



The worth of a librarian should be gauged by his power of attracting and looking after such circles by acting as the intermediary of an intimacy of relationship between reader and the library. – Rabindranath Tagore



Roles and Responsibilities



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Host Institution

- **IDR**
 - Support for Setting up IDR
 - Installation CD
 - Manual
 - Training
 - IDR Service, if needed
- **Metadata**
 - NDL Metadata Standard
 - Creation, Curation Workflow
- **User**
 - Institutional Registration for Nodal Person
 - Bulk Addition of Users
- **Ongoing Support**
 - Over email, phone
 - Hands-on at NDL, if needed

Contributing or Participating Institution

- **IDR (CI only)**
 - Setup IDR in Institutional LAN
 - Register with OPENDOAR / ROADMAP
 - OAI-PMH compliance for harvesting
 - OAI-ORE compliance for full-text access
 - Allow external access & Update regularly
- **Content (CI only)**
 - Add Content
 - Encourage faculty, students, staff to contribute
 - Create and Curate Metadata
- **User**
 - Register as an Institution
 - Add users in bulk or send to NDL
- **Promote**
 - Organize Workshop
 - Identify and Integrate Source



Technology of NDL

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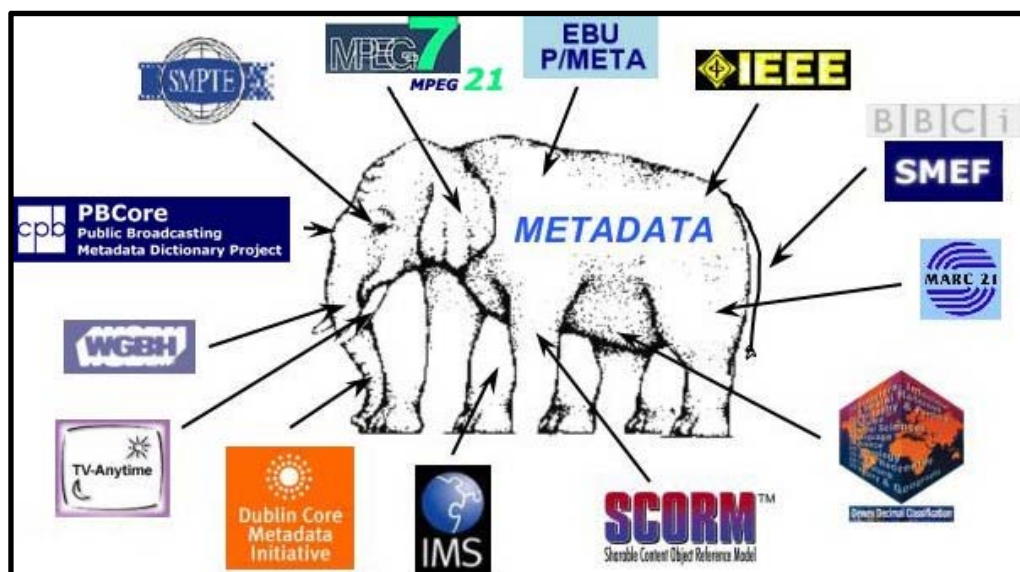
METADATA ENGINEERING

USER INTERFACE & EXPERIENCE TRACKING





Metadata Standard



Source: <http://courseweb.ischool.illinois.edu/~butler9/LIS501b/current.html>



Metadata Standard

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- **Metadata**

- Is primarily **textual information** relating to Content
- Includes information that enables users to **identify, discover, search, browse, interpret, or manage** Content
- Includes **hyperlinks** that direct users to Content on the Source
- May include an **expressive description** of the Content

- **Metadata Standard**

- Defines **common understanding of the semantics** of the data
- Ensures **correct and proper use** and interpretation of the data
- Defined through a **set of fields, vocabs (optional), and instructions** for fill-up



NDL Metadata Design Challenges

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- **Wide** category of resources
 - Generic metadata or domain specific?
- **Openness** of repository
 - Closed metadata standard may fail to describe a new resource
- **Scale** is enormous
 - Manual annotation is infeasible
 - Automatic annotation guided by crowd sourcing?





Metadata Requirements Specs

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- **To describe any digital resource**
 - Generic content metadata
 - ✦ Contributor, Description, Language, Format etc.
- **To describe domain specific resources**
 - Educational content metadata
 - ✦ Educational level, ToC, Type of learning material etc.
 - Thesis metadata
 - ✦ Institution, advisor, degree, researcher



NDL Metadata Standard

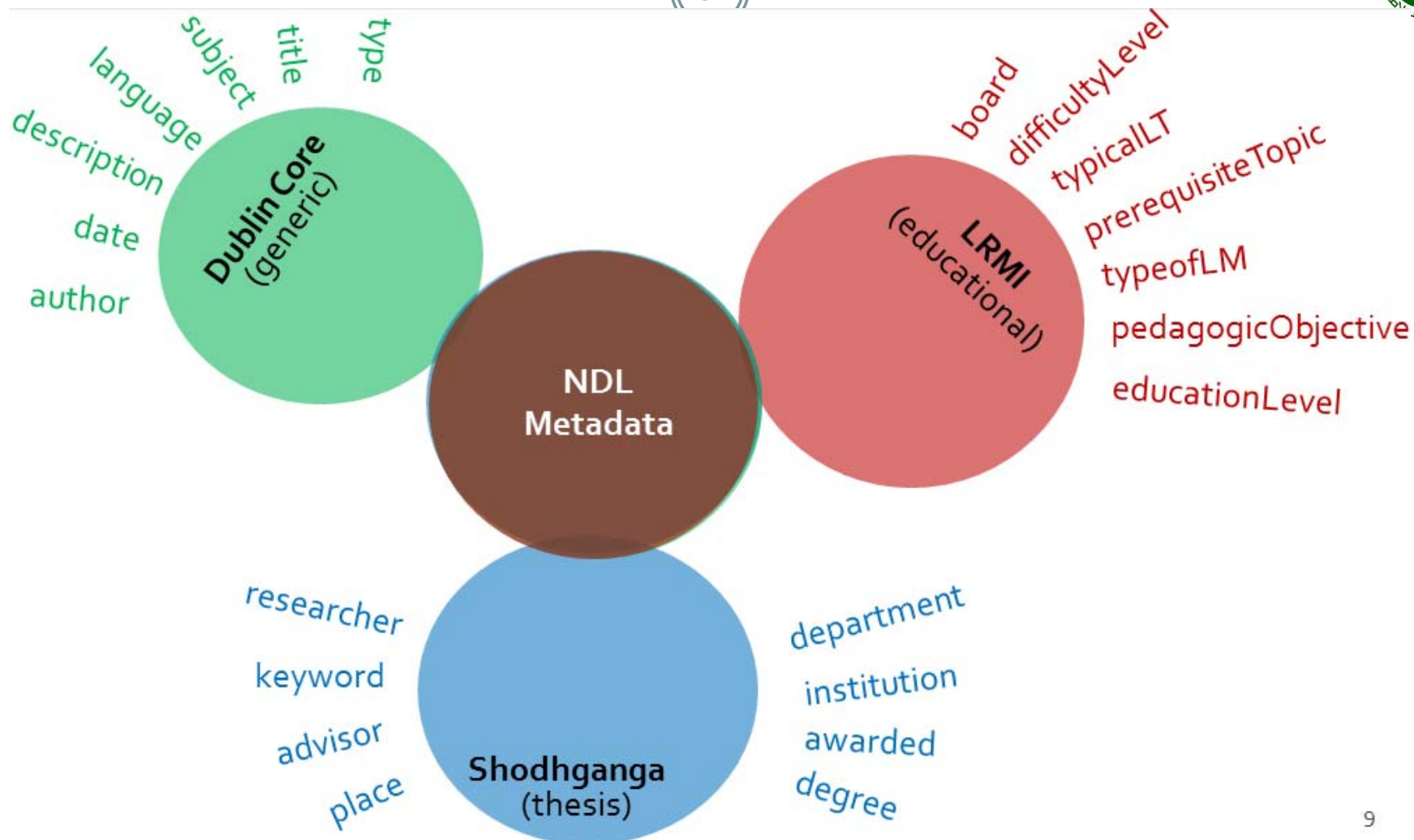
30

- NDL Metadata Standard v 1.0 is an **Open Virtual Standard**
 - URL:
<http://www.ndlproject.iitkgp.ac.in/ndl/header.php?mname=Metadata%20Schema>
- Schema is categorized into three profiles:
 - **Generic Metadata:**
 - ✦ Describes general attributes of the contents
 - ✦ Adopted from **Dublin Core Metadata Standard**
 - **Educational Metadata:**
 - ✦ Describes the educational attributes of the resources and helps in enumerating properties of the contents relevant to teaching-learning process
 - ✦ Adopted from **Learning Resource Metadata Initiative (LRMI)**
 - **Thesis Metadata:**
 - ✦ Describes dissertation or thesis related metadata fields
 - ✦ Adopted from **Shodhganga Thesis Metadata Standard**
 - More profiles may be added in future
- Uses the **namespace of Dublin Core (dc.)**



Metadata Envelop

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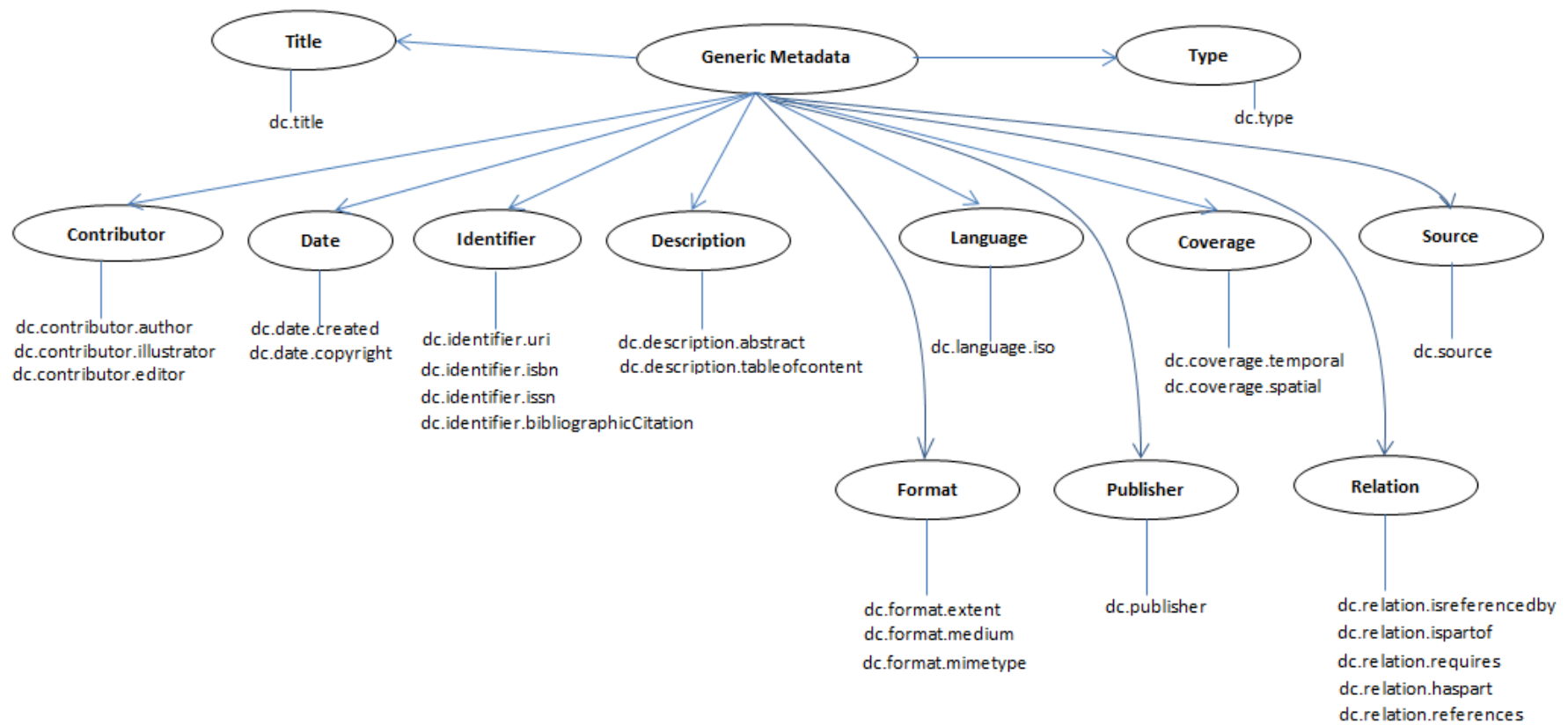


9



Generic Metadata

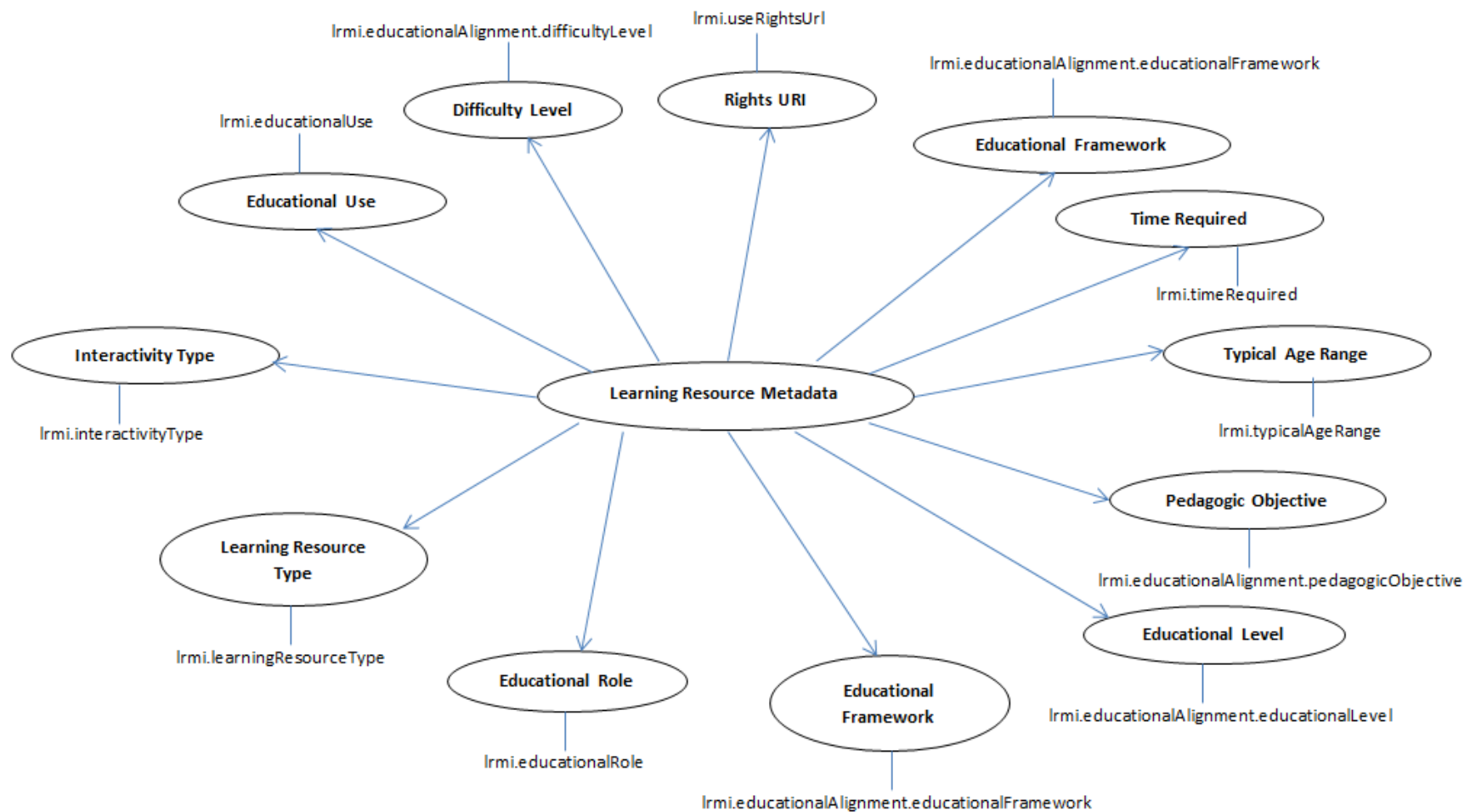
32





Learning Resource Metadata

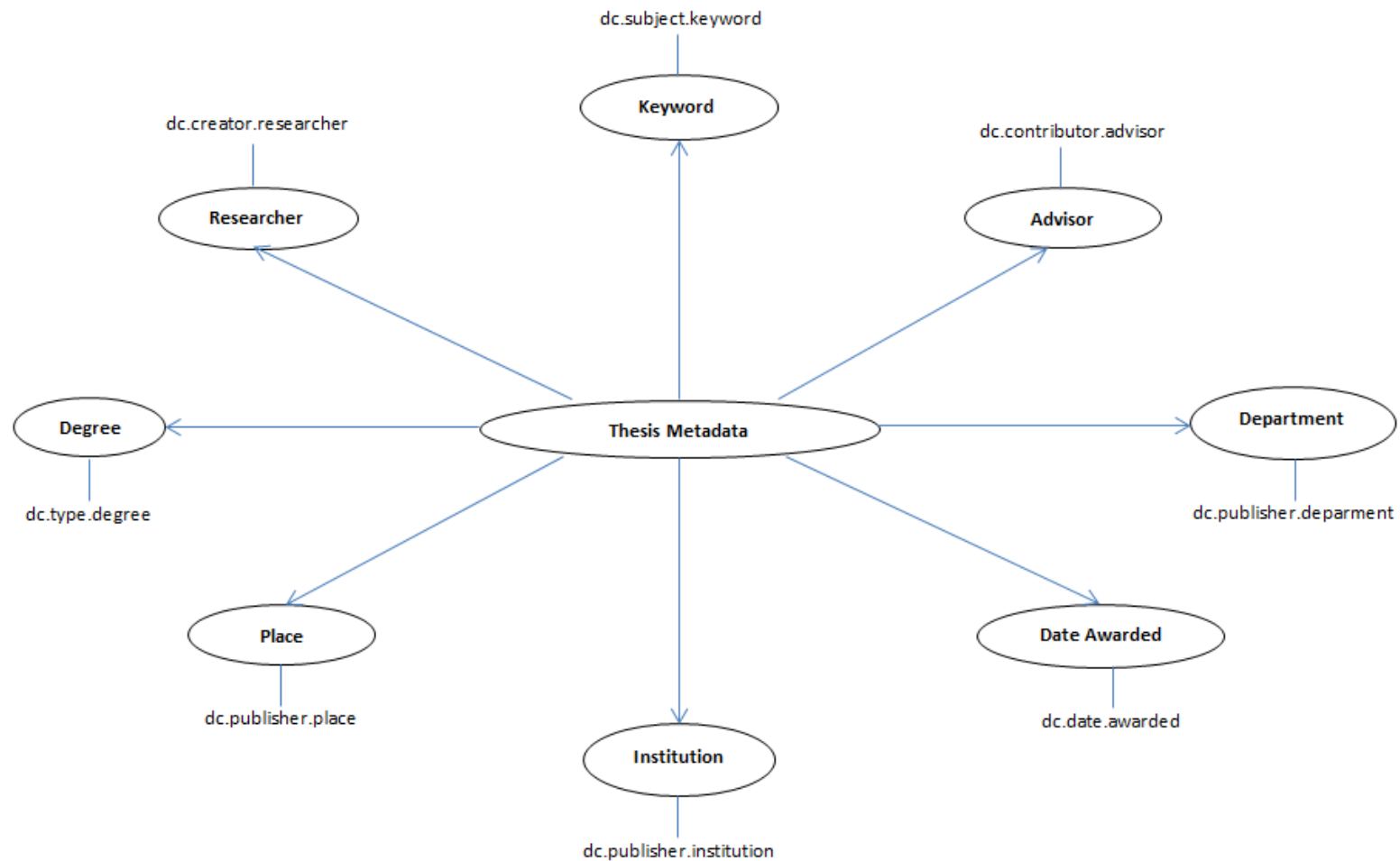
33





Thesis Metadata

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Metadata Acquisition



Acquisition Scenarios



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Locate Content

- Harvest Institutional IDRs
- Crawl Websites
- In Bulk – from Publishers
- Donated by Source
- Source-supported API
- ...

Acquire Metadata

- Creation
 - Manual
 - Automated
- Translation
 - Format
 - Standard / Schema
- Curation
 - Manual
 - Assisted
- Ingestion



Challenges in Metadata Acquisition



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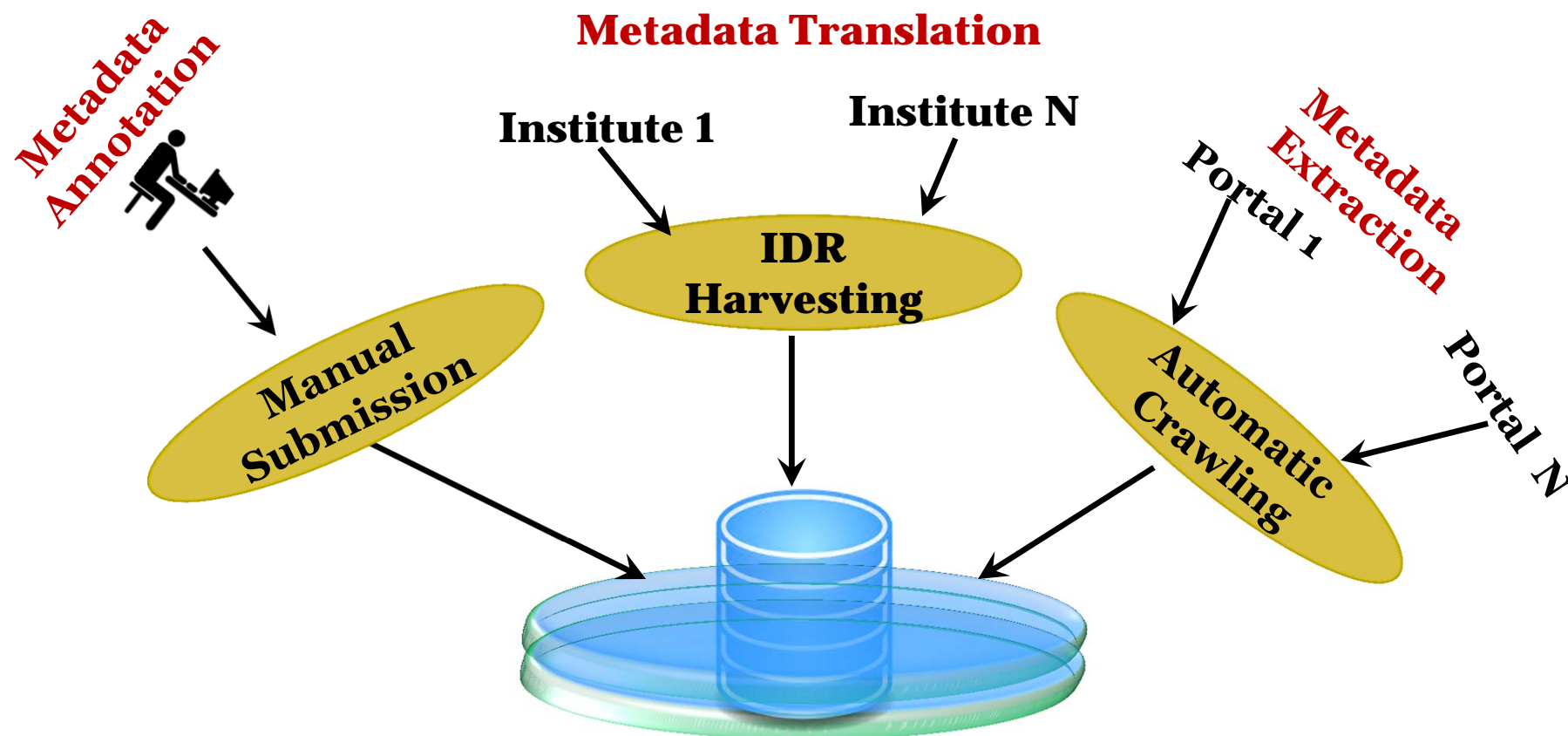
- Different sources follow different norm in annotation
 - Automation of curation
- Errors in sourced data
 - Error listing
 - Manual curation
- Errors in manual annotation
 - Review step before actual submission in database
 - Manual curation
- Set up norm/guideline
 - Controlled vocabulary



Specifying Metadata Values

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How do we ingest contents?





Multi-format Translator

Creation

Manual
Automated

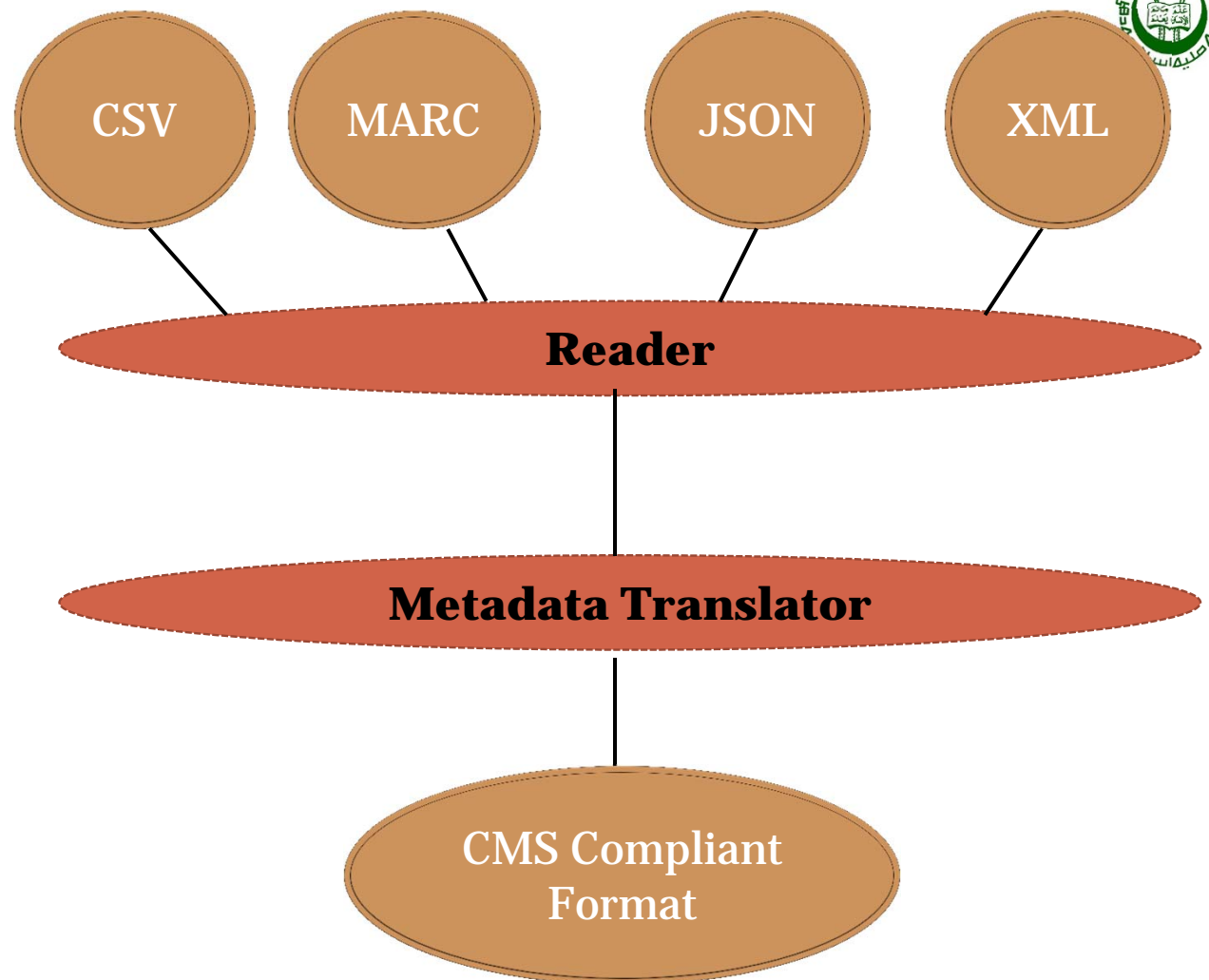
Translation

Format
Standard / Schema

Curation

Manual
Assisted

Ingestion





IDR Harvesting

Creation

Manual
Automated

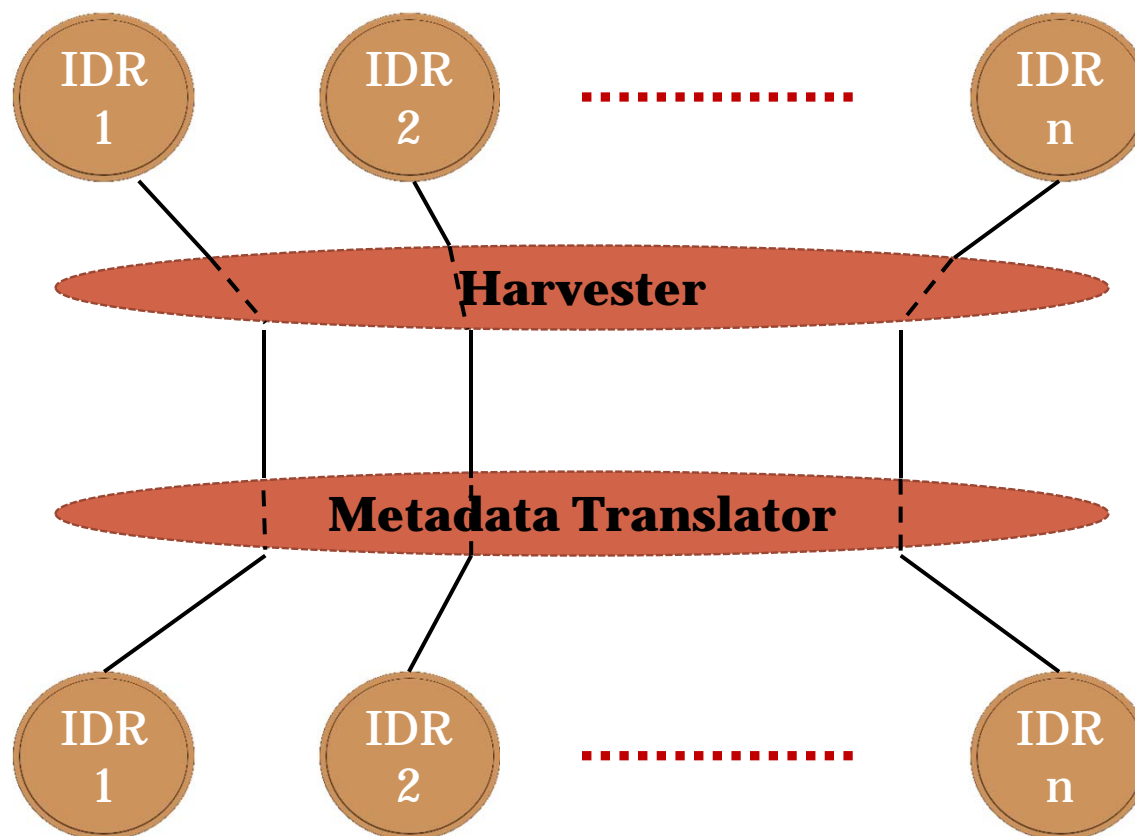
Translation

Format
Standard / Schema

Curation

Manual
Assisted

Ingestion





Web Crawling

Creation

Manual

Automated

Translation

Format

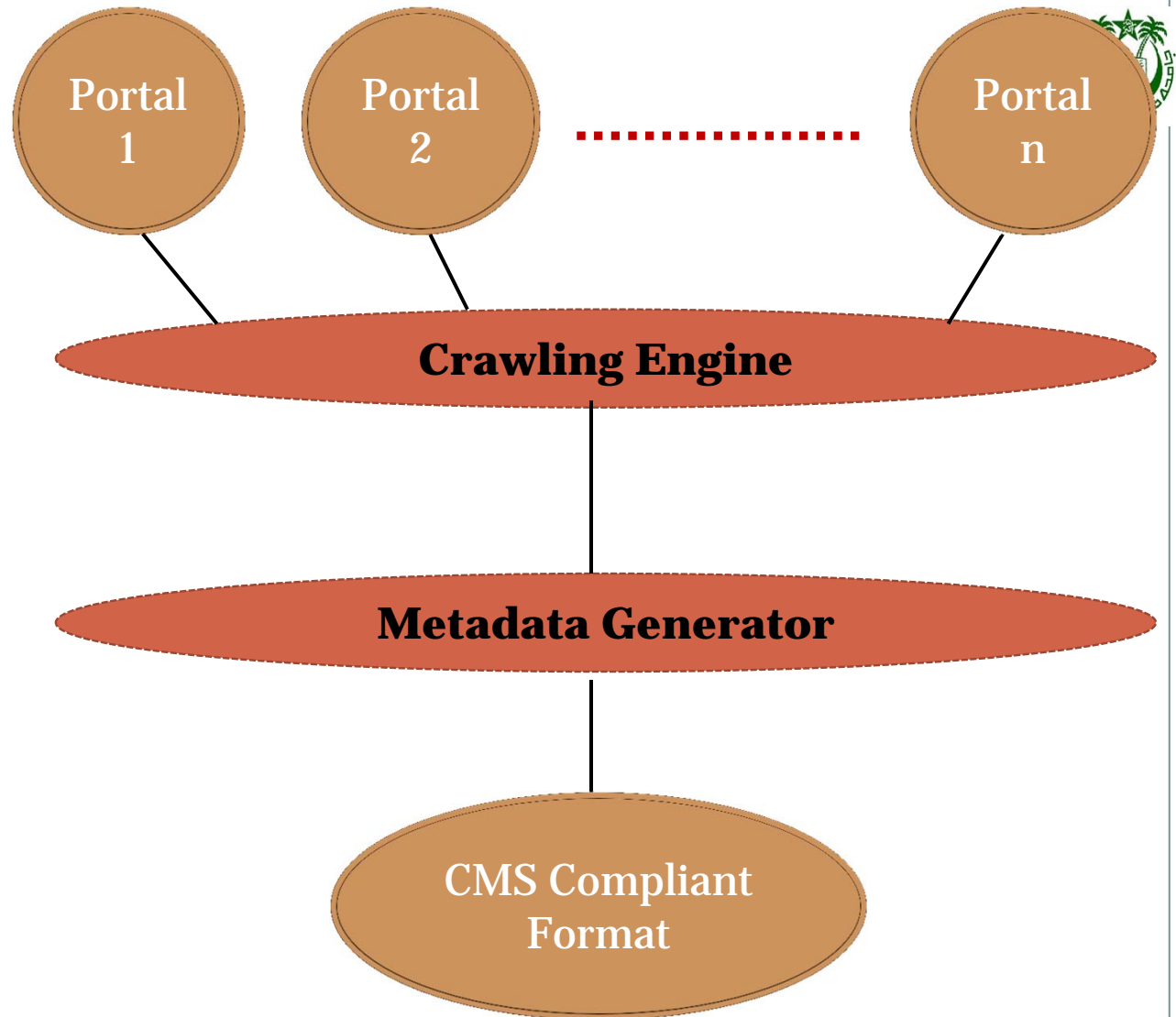
Standard / Schema

Curation

Manual

Assisted

Ingestion





Translation Issues

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- Variation in Subject classification standards
 - Dewey Decimal Classification (DDC)
 - Library of Congress Classification (LCC)
 - Library of Congress Subject Headings (LCSH)
- Mapping terminology for different languages
 - **Translate** when equivalent terminology is present
 - **Transliterate** otherwise



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Automated Metadata Extraction

Creation

Manual

Automated

Translation

Format

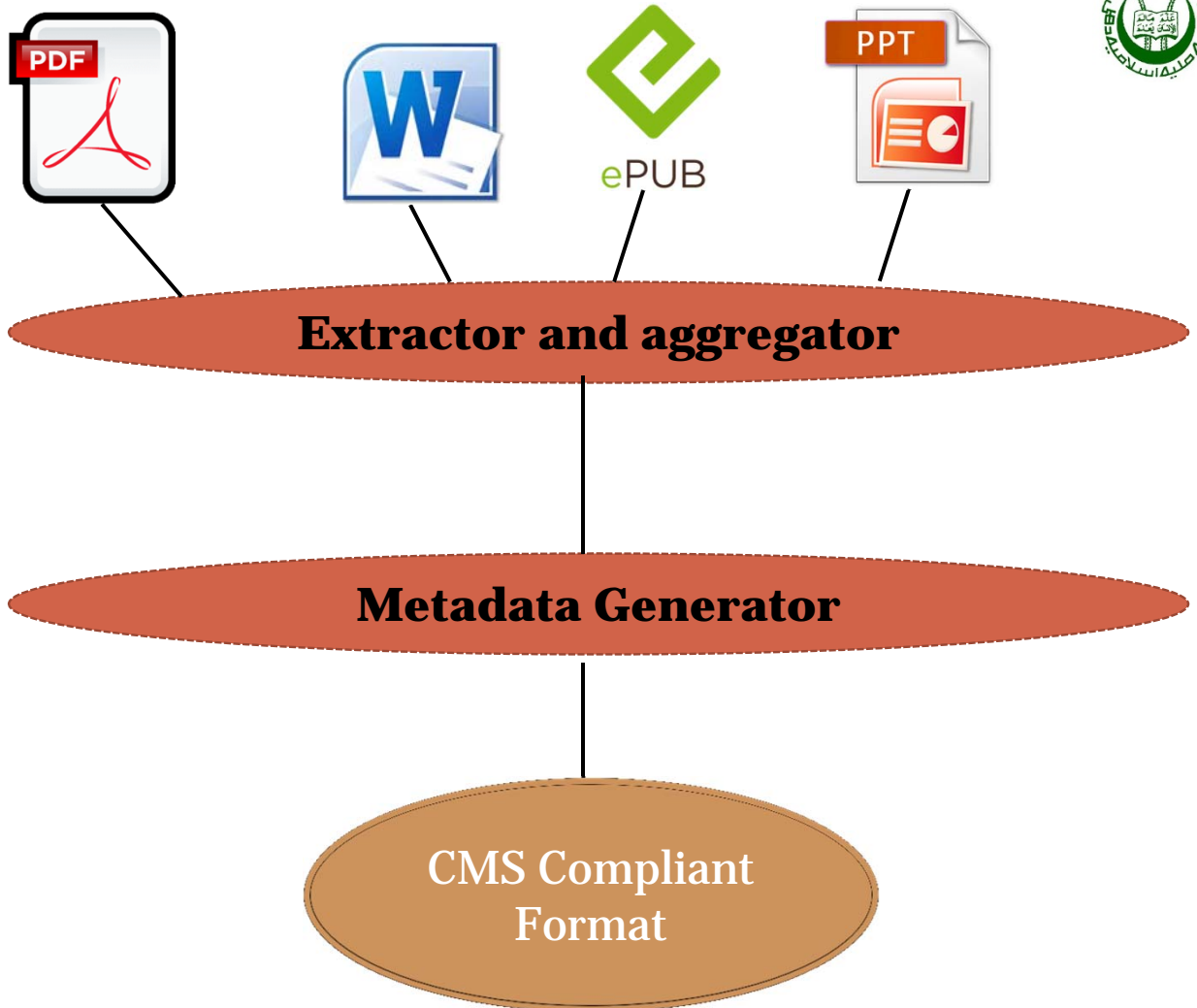
Standard / Schema

Curation

Manual

Assisted

Ingestion





NDL Metadata Extraction Toolkit



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- Automated metadata extraction workflow
- Syntactic metadata extractor
 - Author name, ISBN, Publisher, dates etc.
- Table of content extractor
- Wikification for keyword extraction
- Learning resource metadata
- Toolchain for metadata extraction

Once completed and tested, the toolkit will be released to public and open-sourced



Experience Tracking and UI

- Experience Tracking
 - To offer customized search results
- Multi-lingual Support
 - Reduce cognitive load for native use
- Personalization
 - Customized UI to suit user grade



Source: <http://www.brandquarterly.com/tracking-customer-experience-essential>



Experience Tracking Technology

Record:

Partha searched 'tiger'

Partha navigated to Tiger Wiki

Partha studied Wiki (3 min)

Partha downloaded tiger image (4 images)

Partha checked tiger map (2 min)

Partha enlarged map at Sunderbans (twice)

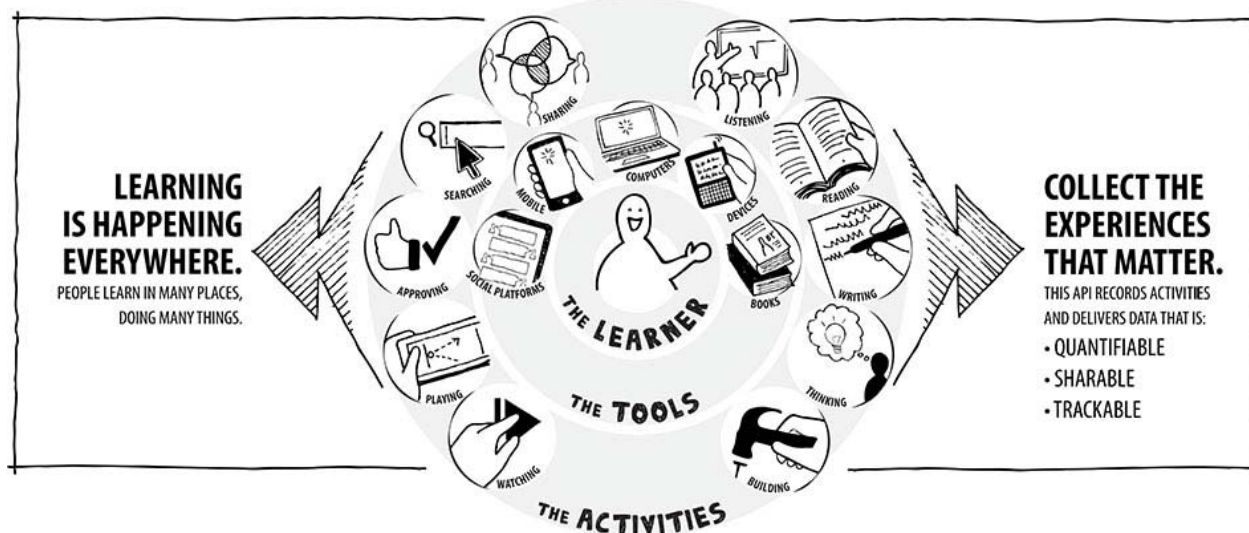
Partha searched 'national animal of India'

Infer:

Partha learnt – tiger is the national animal (of India)

... possibly

- **Experience API (xAPI) / Tin Can API**
 - Connects **learning content** and **learning systems** to record and track all types of learning experiences
- **Learning Record Store (LRS)**
 - Stores learning experiences

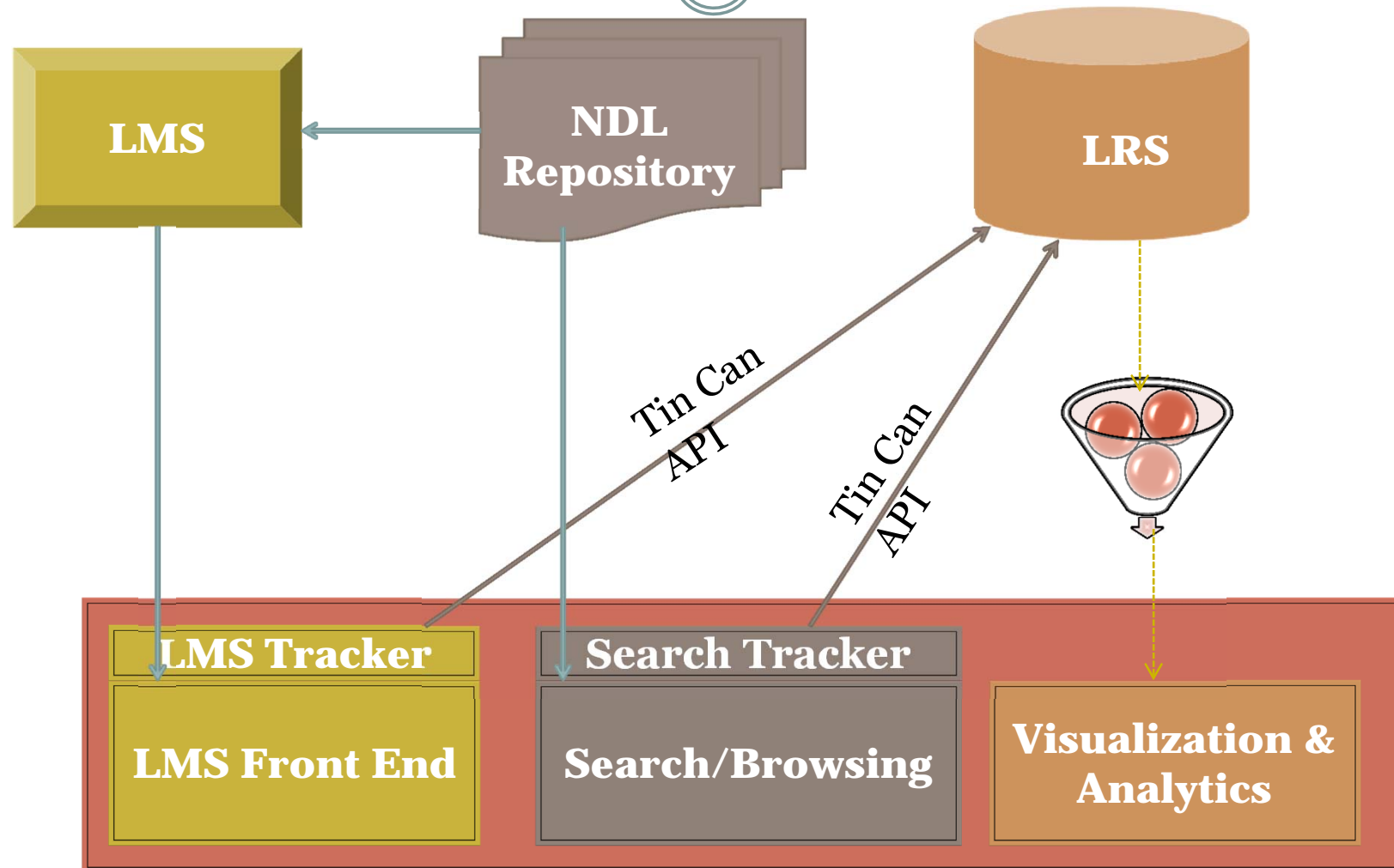


Source: <https://tincanapi.com/overview/>



UI Technology: Experience Tracking

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UI Technology: Web Interface

API End Points:

RestFul API endpoint

- CMS API, Index API
and LMS API

Parameterized access to the index

API Sandbox

- Web interface is an app using NDL API
- Extended Search Features
 - Facet based search result refinement
 - DDC Topic tree based content browsing
 - Tag, comment on a content
 - Target group specific interface
 - Bookshelf
 - Rating and sharing
- NDL-Specific Features
 - Multi-lingual enablement
 - ✦ Multi-lingual query interface powered by Google transliteration
 - ✦ Cross-lingual search
 - Personalization





Copyright & License

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HOW DOES NDL COPE WITH COPYRIGHT AND LICENSING ISSUES





Copyright Act, 1957 (Amendment 2012)

Is metadata copyrighted?

Yes / No / May be

Copyright of Metadata is contested

Source:

<http://ij.libraryjournal.com/2013/02/opinion/peer-to-peer-review/metadata-and-copyright-peer-to-peer-review/>



- Copyright is a bundle of rights given by the law to
 - Creators of literary, dramatic, musical and artistic works and
 - Producers of cinematograph films and sound recordings
- Rights are:
 - reproduction of the work,
 - communication of the work to the public,
 - adaptation of the work and,
 - translation of the work
- Creator / Author is the first Owner
- Ownership (Title) can be transferred (assigned)



Copyright of Metadata

- **NDL principles as follows:**
 - Vast Majority of Metadata is Not Subject to Copyright Restrictions
 - NDL's Partners Share the NDL's Commitment
 - NDL Asserts No Rights Over its Database of Metadata and Dedicates its Contributions to the Public Domain
 - Free and Unencumbered Access to Metadata

Adapted from: <https://dp.la/info/wp-content/uploads/2013/04/DPLAMetadataPolicy.pdf>



License Mechanisms

- Content Access Views in NDL
 - Metadata View
 - ✦ This shows the metadata of the item – as maintained in NDL
 - Full Text View
 - ✦ This shows the view and provides access to full text – offered by the content source

A license encapsulates the rights & privileges that a copyright holder grants to someone else vis-a-vis something they have created



Content Access View: Metadata




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Indian Institute of Technol x Zimbra: Inbox (912) x National Digital Library x NDL: Partha x Transport, magnetic, and x Parthapratim

ndi.iitkgp.ac.in/content.php?id=MTIzNDU2Ny83NmZMDQ=

Apps dance.osu.edu/sites/d C++ Other bookmarks

National Digital Library Content **Metadata** Tag Comment Language Partha

 IIT Bombay

Transport, magnetic, and Sn-119 Mossbauer studies on magnetically ordered valence fluctuating compound SmRuSn3

Author	Mazumdar, C. ♦ Hossain, Z. ♦ Nagarajan, R. ♦ Godart, C. ♦ Dhar, S. K. ♦ Gupta, L. C. ♦ Padalia, B. D. ♦ Vijayaraghavan, R.
Source	IIT Bombay
Content type	Text
Publisher	AMER INST PHYSICS
File Format	HTM / HTML
Language	English
Subject Other	cerus3
Abstract	SmRuSn3 is a unique compound among the known Sm-based valence fluctuation (VF) systems. Its crystallographic structure has two inequivalent Sm sites and Sm ions at only one of them are in VF state while the Sm ions in the other site orders magnetically. Our (119)Mossbauer studies show a quadrupolar splitting at the Sn site, consistent with the noncubic symmetry of the Sn site. A broadening of the Mossbauer spectrum is seen due to magnetic ordering of the material. The transferred hyperfine field at Sn site at 4.2 K is small. (C) 1996 American Institute of Physics.
Other Identifier	JOURNAL OF APPLIED PHYSICS,79(8)6349-6351 0021-8979 http://dx.doi.org/10.1063/1.361996 http://hdl.handle.net/100/1441

Source Page is rendered within NDL showing free Metadata

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Content Access View: Full Text



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Indian Institute of Technology Kharagpur | Zimbra: Inbox (912) | National Digital Library | NDL: Partha | Transport, magnetic, and | Parthapratim

ndl.iitkgp.ac.in/content.php?id=MTIzNDU2Ny83NjMzMMDQ=

Apps | dance.oregonu/sites/d | C++ | Other bookmarks

National Digital Library | **Content** | Metadata | Tag | Comment | Language | Partha

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Transport, magnetic, and Sn-119 Mossbauer studies on magnetically ordered valence fluctuating compound SmRuSn₃

[Show full item record](#)

Title: Transport, magnetic, and Sn-119 Mossbauer studies on magnetically ordered valence fluctuating compound SmRuSn₃

Author: MAZUMDAR, C; HOSSAIN, Z; NAGARAJAN, R; GODART, C; DHAR, SK; GUPTA, LC; PADALIA, BD; VIJAYARAGHAVAN, R

Abstract: SmRuSn₃ is a unique compound among the known Sm-based valence fluctuation (VF) systems. Its crystallographic structure has two inequivalent Sm sites and Sm ions at only one of them are in VF state while the Sm ions in the other site orders magnetically. Our (119)Mossbauer studies show a quadrupolar splitting at the Sn site, consistent with the noncubic symmetry of the Sn site. A broadening of the Mossbauer spectrum is seen due to magnetic ordering of the material. The transferred hyperfine field at Sn site at 4.2 K is small. (C) 1996 American Institute of Physics.

URI: <http://dx.doi.org/10.1063/1.361996>
<http://dspace.library.iitb.ac.in/xmlui/handle/10054/14612>
<http://hdl.handle.net/100/1441>

Date: 1996

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☐ This Collection
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Access Options

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- NDL presents a content with following options:
 - **Open and Free**
 - ✦ User can access from anywhere without any payment
 - **Selectively Subscribed**
 - ✦ User can access from subscribed institutional network
 - **Subscribed / Purchased**
 - ✦ User needs to pay / subscribe to get the content
 - **Source Registered**
 - ✦ User needs to register with the Source institute
 - **Author Consensual**
 - ✦ User needs to approach the Author to get the content



National Licensing



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- An initiative by eSS:
 - **e-ShodhSindhu**: Consortium for Higher Education Electronic Resources

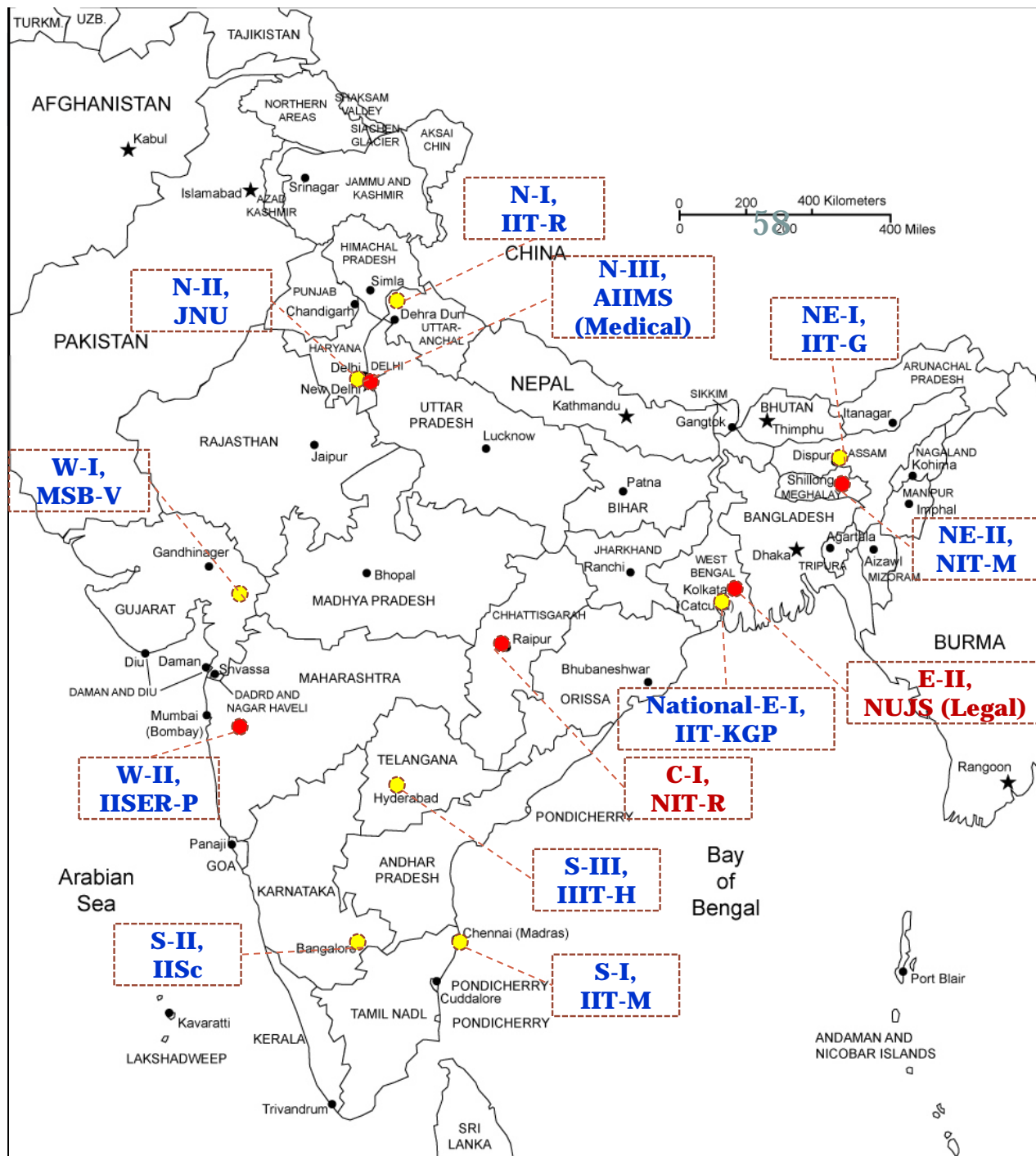


- Licensing being negotiated with Publishers
 - **Institutional License**:
 - ✦ Accessible from within designated institutional network: **IP filtered**
 - **NDL Supported License**:
 - ✦ Accessible if requested from NDL: **Concurrent use-basis**



Project Status

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NDL IDR Workshops



Completed:
Events: 11
Institutes: 400
Individuals: 800

Scheduled:
Events: 2
Institutes: 80
Individuals: 150



Prof. P P Das, CSE, IIT, Kharagpur



NDL Events

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- **Workshop @ INDEST Meet @ Mohali, 29/30-Apr-15**
- National (East -I) IDR WS @ IIT Kharagpur, 15/17-June-15
- Regional (North-East) IDR WS @ IIT Guwahati, 04/05-July-15
- **National Seminar on “Emerging Trends in Academic Libraries” @ IIT Kharagpur, 21-Aug-15**
- Regional (North-I) IDR WS @ IIT Roorkee, 24/25-Aug-15
- **ETD 2015 India @ JNU New Delhi, 05/06-Nov-15**
- **4th NKN Annual WS @ JNTU Hyderabad, 21/22-Jan-16**
- Regional (West) IDR WS @ M S University, 28/29-Jan-16
- **National VC Address over NKN, 03-Feb-16**
- Regional (South-I) IDR WS @ IIT Madras, 25/26-Mar-16
- Regional (South-II) IDR WS @ IISc, Bangalore, 20/21-May-16
- **National Workshop for Open-Source Software for Library Management (OSSLM 2016) @ IIT Kharagpur, 13/18-Jun-16**
- Regional (South-III) IDR WS @ IIIT, Hyderabad, 01/02-Jul-16
- Regional (North-II) IDR WS @ JNU, New Delhi, 01/02-Sep-2016
- Regional (North-East-II) IDR WS @ NIT, Meghalaya, 23/24-Sep-2016
- **National VC Address over NKN, 26-Sep-16**
- **IDUAI 2016, UNESCO New Delhi, 28-Sep-16: <http://en.unesco.org/iduai2016>**
- Regional (West-II) IDR WS @ IISER, Pune, 05/06-Oct-2016
- Regional (North-III, Medical) IDR WS @ AIIMS, New Delhi, 20/21-Oct-2016
- **Lecture @ Jamia Millia Islamia, New Delhi, 21-Oct-2016**
- **NDL WS, PLANNER 2016 @ NEHU, Shillong, 09-Nov-2016**
- Regional (Central) IDR WS @ NIT, Raipur, 18/19-Nov-2016
- Regional (East-II, Legal) IDR WS @ NUJS, Kolkata, 02/03-Dec-2016
- **NDL WS, ICDL 2016, New Delhi, 14/16-Dec-2016**
- **International Conference on Digital Library, May/Jun-17 (tentative)**



NDL Live:
<https://ndl.iitkgp.ac.in/>

NDL on Facebook:
<https://web.facebook.com/NDLIndia/>

NDL on YouTube:
<https://www.youtube.com/watch?v=LEwAyHGKeLw>
<https://www.youtube.com/watch?v=qIZB-G9ywF0>

NDL Project:
<http://www.ndlproject.iitkgp.ac.in/ndl/>



Publications

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- **National Digital Library: Building a National Asset**, YOJANA, vol. 60, pp 19-23, Jan. 2016. Also in Hindi, Bangla, Marathi, Gujarati, Punjabi, Urdu, Telugu, Kanada, Malayalam, and Tamil.

- **National Digital Library: A Platform for Paradigm Shift in Education & Research in India**, Science and Culture (published by: Indian Science News Association), vol. 82, No. 1-2, pp. 4-11, Jan.–Feb. 2016.

EXPLORING E-RESOURCES

PARADIGM SHIFT

National Digital Library: Building a National Asset

Team NDL, IIT Kharagpur



NDL will open several opportunities for new-age techniques in learning, solve many of the long-standing bottlenecks in education and research, facilitate systematic crowd-sourcing in education, and become a true national asset

The concept of Library is undergoing a paradigm shift as more and more contents are made available in electronic form and information and communication technology (ICT) tools and services facilitate easy discovery and location independent access of library resources. There have been many digital library initiatives in the world including in India. In India, the digital library initiatives have been sponsored by several Ministries, notably Ministry of Human Resource Development (MHRD) under its National Mission on Education through Information and Communication Technology (NMEICT) Mission. In spite of several such initiatives in the country, most of the challenges faced by students, teachers, and general users in using digital content remain unaddressed to a large extent. Users still have to visit individual websites to access e-resources, need to learn retrieval / search techniques separately, face the lack of researcher access and limited contents. Further, there is hardly any integration of learner-learner, teacher-teacher and teacher-learner communication within the learning environment.

In this background, MHRD initiated the National Digital Library

(NDL) pilot project under NMEICT in April 2015 to address the above issues and bridge the gaps that exist in the wide range from literacy to advanced knowledge discovery and development of knowledge. It will enable integrated knowledge gathering on diverse topics in various sectors including economic, technical, strategic, and social sectors and will help personalized self-paced, new-age multi-media education at all levels. To avoid duplication, NDL will not be a new Library, but will be a deftly crafted umbrella over the existing ones.

Besides being a large pan-India repository of knowledge, NDL is envisaged as a platform that will bring fundamental shift in the paradigms of education and research. It will help students to prepare for entrance and competitive examinations. It will enable people to learn and prepare from best practices from all over the world and adopt them. It will help researchers to perform inter-linked exploration from multiple sources and carry out new analysis of text, audio, image, and video data to create new knowledge. Finally, it will support the continual evolution of new pedagogy of learning and new opportunities to leverage ICT in education.

The NDL Project is led by Dr. Partha Pratim Das and Dr. Partha Pratim Chakrabarti, Director, IIT Kharagpur. The Team NDL comprises Dr. Palash Bhattacharya, Dr. Anindya Ghose, Dr. Anindya Ghose, Dr. B. Srinivasan, Dr. Subrata Chakrabarti, Mr. Manish Ghosh, Dr. Anupam Basu, and Mr. Nanda Ojha Chakrabarti.

YOJANA January 2016

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SCIENCE AND CULTURE

VOLUME 82 JANUARY-FEBRUARY 2016 NOS. 1-2

EDITORIAL

NDL PROJECT — DIVIDEND PAYOUT OF DIGITAL TECHNOLOGY



I attended a workshop on National Digital Library (NDL) at IIT Kharagpur last June. The objective of the NDL project, as I could understand, is to integrate all existing digital and digital contents of all educational institutions of India and bring them under a single umbrella. This will then allow users like students (of all levels), teachers, researchers, professionals and other lifelong learners access to this portal for their educational needs.

Initiated by the MHRD, Govt. of India under its National Mission on Education through Internet and Communication Technology (NMEICT) programme, IIT Kharagpur has been entrusted with the responsibility to set up this National Digital Library towards building a national asset. The pilot project is scheduled to be launched sometime early this year.

Considering the importance of the program, a proposal came from IIT Kharagpur to publish a Cover Article on the subject in our esteemed journal. The article has been authored by the persons who are directly involved in the pilot project.

The NDL programme complements well India's education policy to make more people educated. According to the United Nations Educational, Scientific and Cultural Organisation (UNESCO) report published last year, India tops the list of countries in the race to reduce dropout of

school-going children. Globally, just one third of countries have achieved all of the measurable 'Education for All' (EFA) goals set by UNESCO in 2000. Even then India has the highest population of illiterate adults. There is no doubt that a higher literacy rate is the requirement for any country to progress and the government is conscious about it. The Supreme Court, in a ruling in 1993, announced that children have a fundamental right to free education, and thus in the year 2005 the 'Right to Education' policy was incorporated in the Constitution via its 85th Amendment. In spite of this, the country has not been able to provide free and compulsory education to children up to fifteen years of age till date.

Education has different meanings to different people and is probably one of the most discussed subjects to interpret the real meaning of education. I am not going into that discussion here (In fact I wrote an editorial on education in Science and Culture a few years back). However, at its most elementary level, we know that literacy is the first step to education or to be educated. Literacy, conventionally, means the ability to read and write. For the present discussion it may suffice to restrict ourselves to the workable meaning of literacy as has been defined by UNESCO.

"Literacy is the ability to identify, understand, interpret, create, communicate and compute using printed and written materials associated with varying contexts. Literacy involves a continuum of learning in enabling individuals to achieve their goals to develop their knowledge and potential and to participate fully in their community and wider society".

PUBLISHED 1-2

1



Status ...

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- **Items: 15 lakh+**
- **Metadata: Version 1.0 of Standard Published**
- **Sources: 106 (IDRs: 70+)**
- **Registered Users: 2.5 lakh+**
- **Nature of contents**
 - Subject domain: Most of the major educational areas (except medical and law)
 - Language: 10+
 - Learning Resource type: 15+
 - Educational Level: School Level (Class-I to XII) UG and PG
- **Nature of Sources: 106 (IDRs: 70+)**
 - Featured: 7 (DLI, Shodhganga, Shodhgangotri, Spoken Tutorial, SNLTR, OECD, Satyajit Ray Archives, JEE / GATE Questions & Solutions, South Asia Archives)
 - Crawled Repositories: 5 (NPTEL, Khan Academy, PhET, Project-OSCAR, LibriVox (audio books))
 - Manually-annotated sources: 6 (NCERT, CBSE, Boards of WB, Tripura, AP, Karnataka)
 - MARC data from Publishers: 2 (CRC Press, Springer)
 - Through API: 1 (INFLIBNET N-LIST)



Status ...

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- Upcoming
 - Integration Underway
 - ✦ IEEE
 - ✦ World eBook
 - ✦ PubMed
 - Advanced Stage of Negotiation
 - ✦ Various publishers under eSS
 - Exploration
 - ✦ UNESCO
 - ✦ Gandhi Heritage Portal
 - ✦ Digital Herbarium (BSI)



Summary

The only thing that you absolutely have to know (may use Google, though), is the URL of NDL:

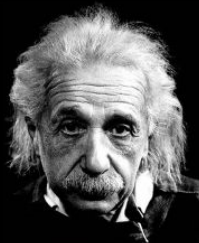
ndl.iitkgp.ac.in

Rest you find in NDL

Why are you waiting?

'The only thing that you absolutely have to know, is the location of the library.'

Albert Einstein



- An umbrella over all IRs of India
- User-Centric Design
 - Multi-lingual Indic Interface
 - Multi-faceted Search
 - Multi-modal Filters
 - User Experience Tracking for Personalization
- Rich Set of Contents
 - National Licensing
 - Domain / Usage -focused Verticals
- Metadata Engineering
 - Metadata Standard
 - Open Source Toolkit
- NDLServices
 - Open APIs for 3rd party development
- Platform for Educational Ecosystem where all stakeholders participate, contribute and benefit
- Spearheads **NDL Movement**



Jai Hind!



Join

NDL Movement

to

Make-in-India



IDR Service

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- **What is IDR Service?**
 - NDL will provide hosting for IDR, if needed
 - Details on NDL Project Page
 - Hosting service is based
 - ✦ Virtual servers loaded with 64-bit Ubuntu 14.04
 - ✦ DSpace (V5.2) Content Management System (Default interface)
 - ✦ PostgreSQL database engine and default DSpace User Interface.
 - ✦ Metadata registry as per NDL metadata schema
 - ✦ OAI-PMH (V2) is enabled to support harvesting of metadata
 - ✦ External connectivity is rendered through NKN
- **Scope**
 - Available for limited number of small institutions
 - Limited to 5 GB space to upload e-contents and metadata
 - No Shell access or customizable UI (logo & header allowed)
 - Available for 2 years only



IDR Service

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- **Institutional Eligibility**

- Is affiliated with or accredited by a Central or State education body
- Has at least 500 learning e-contents with metadata
- Agrees to populate metadata as per NDL metadata schema
- Permits access of its IDR to NDL for harvesting metadata
- Extends archiving rights to NDL (harvested metadata & contents)
- Allows searching, browsing & downloading for educational purpose
- Maintains backup of all metadata and contents

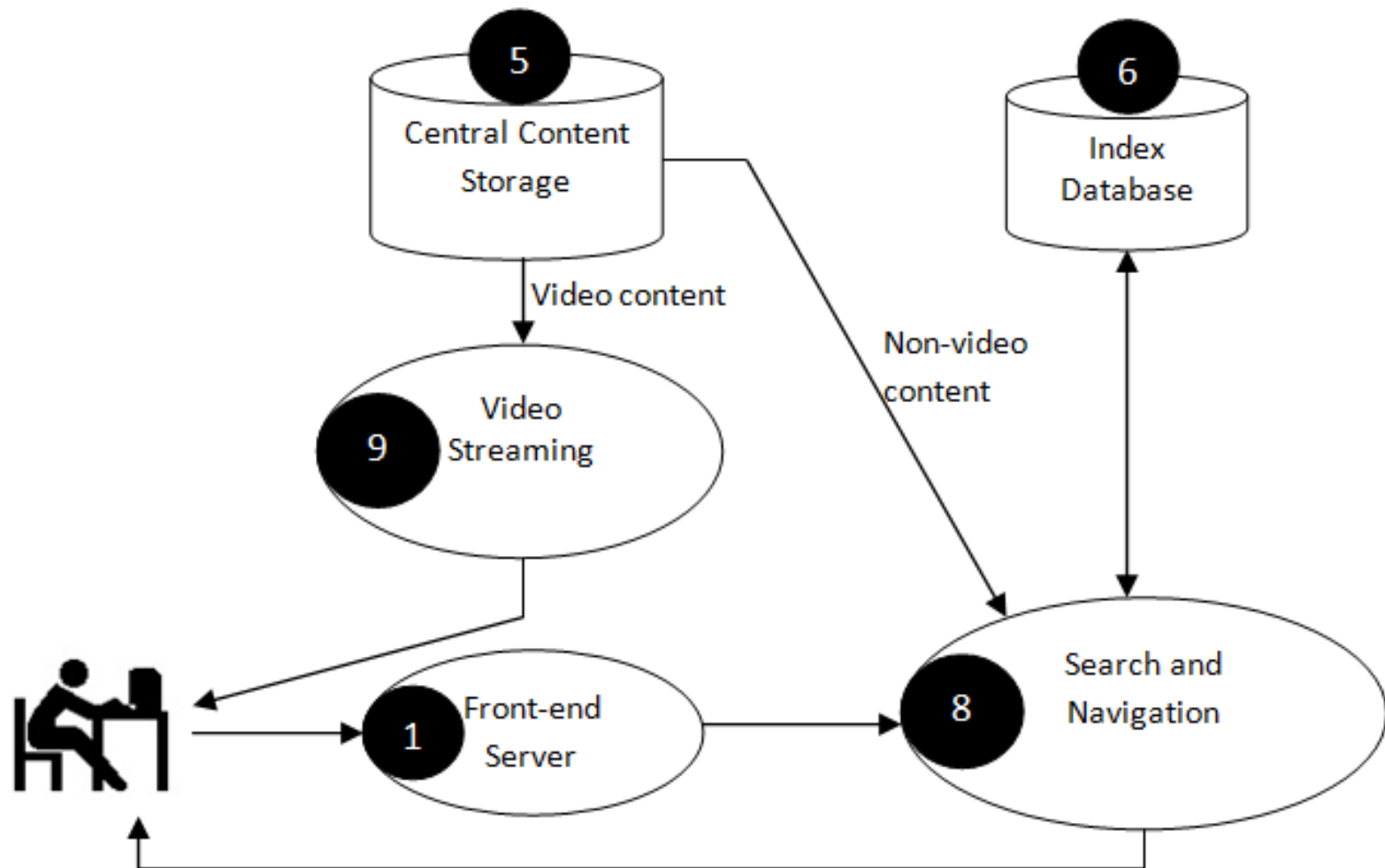
- **How to Apply?**

- Download form from NDL Project
- Head of the Institute to identify and assign anodal officer to coordinate with the Team NDL
- Agreement to be signed by the Institute with NDL



Use Case: Content Access

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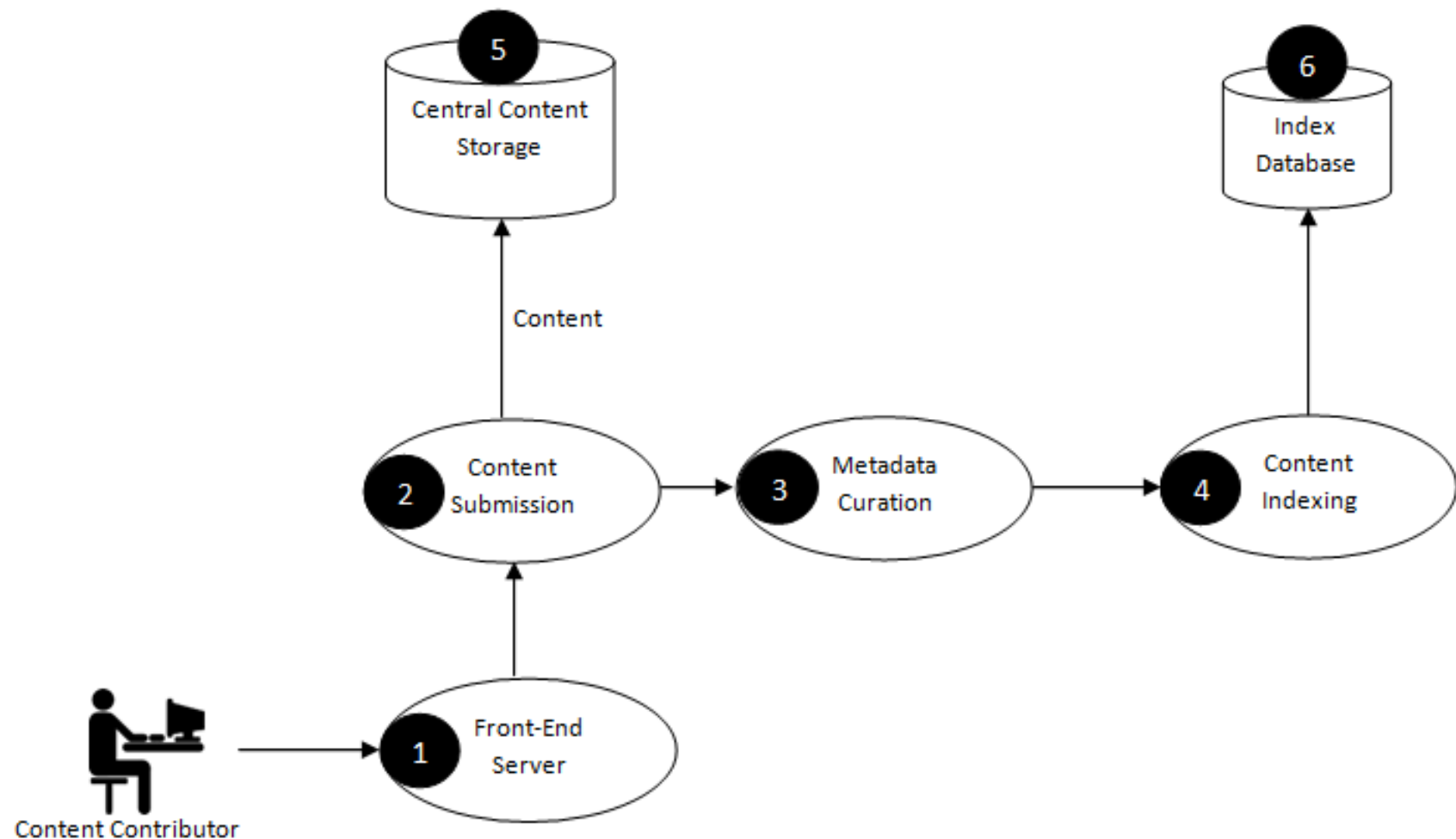




Use Case: Content Contribution



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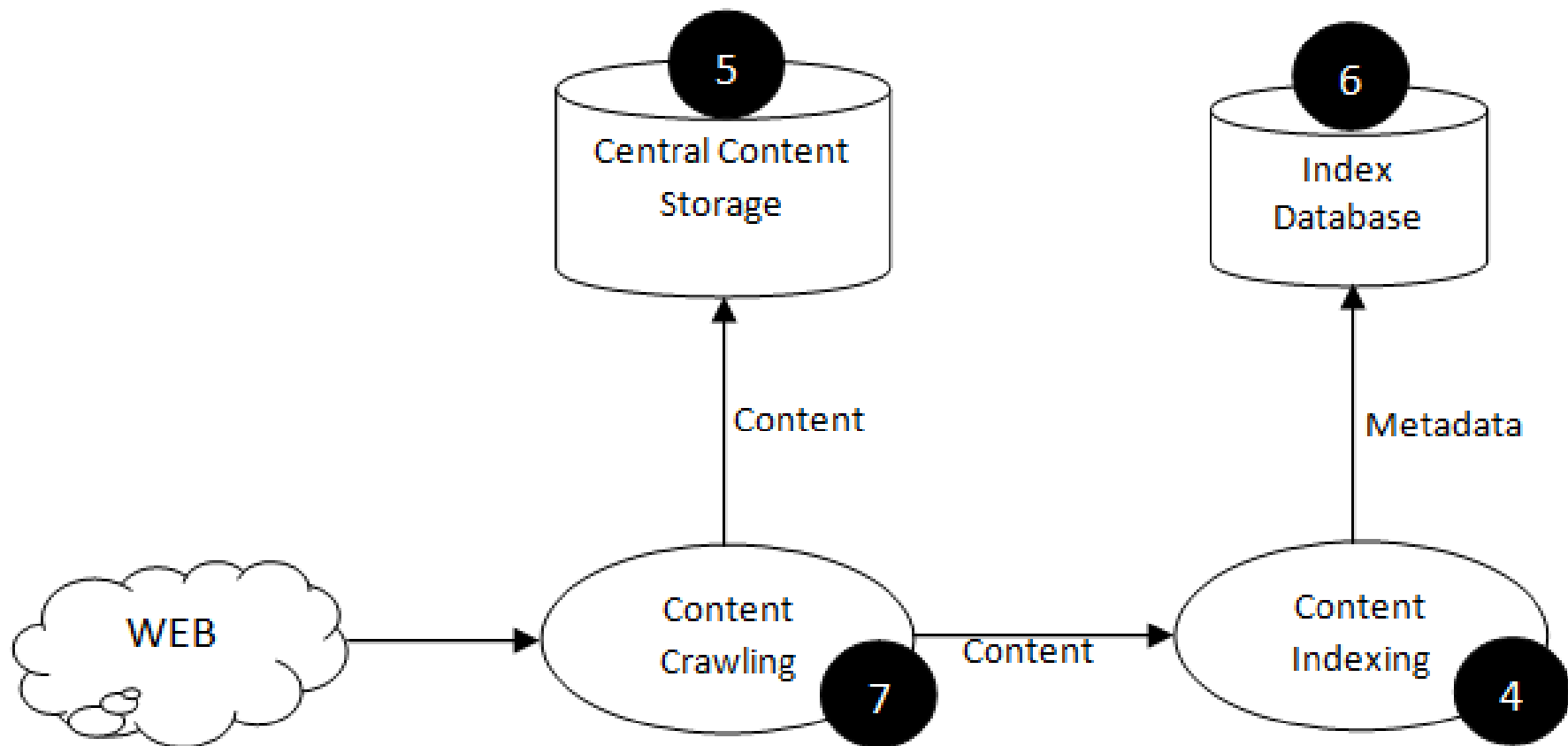




Use Case: Web Content Harvesting



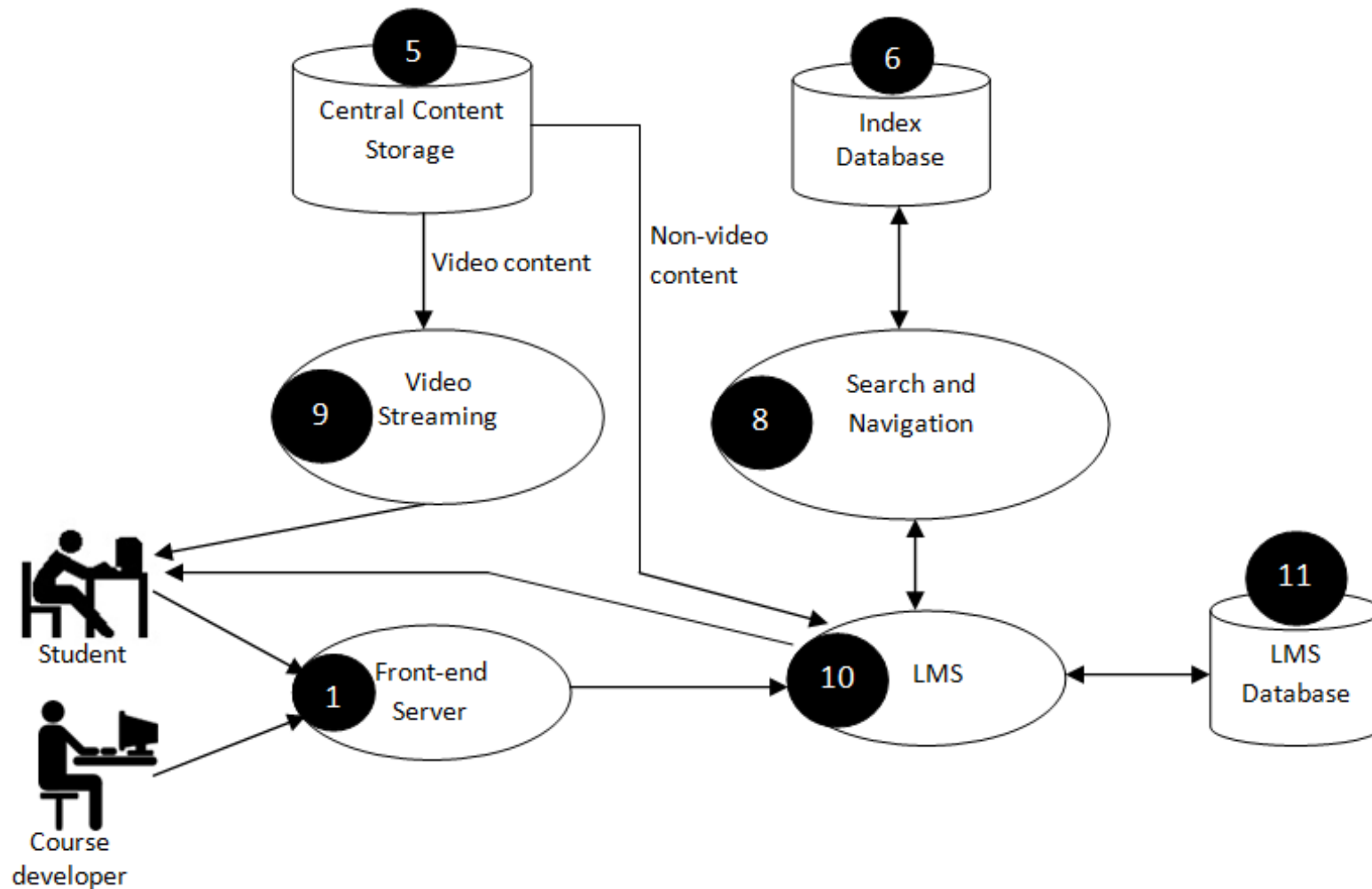
70





Use Case: LMS

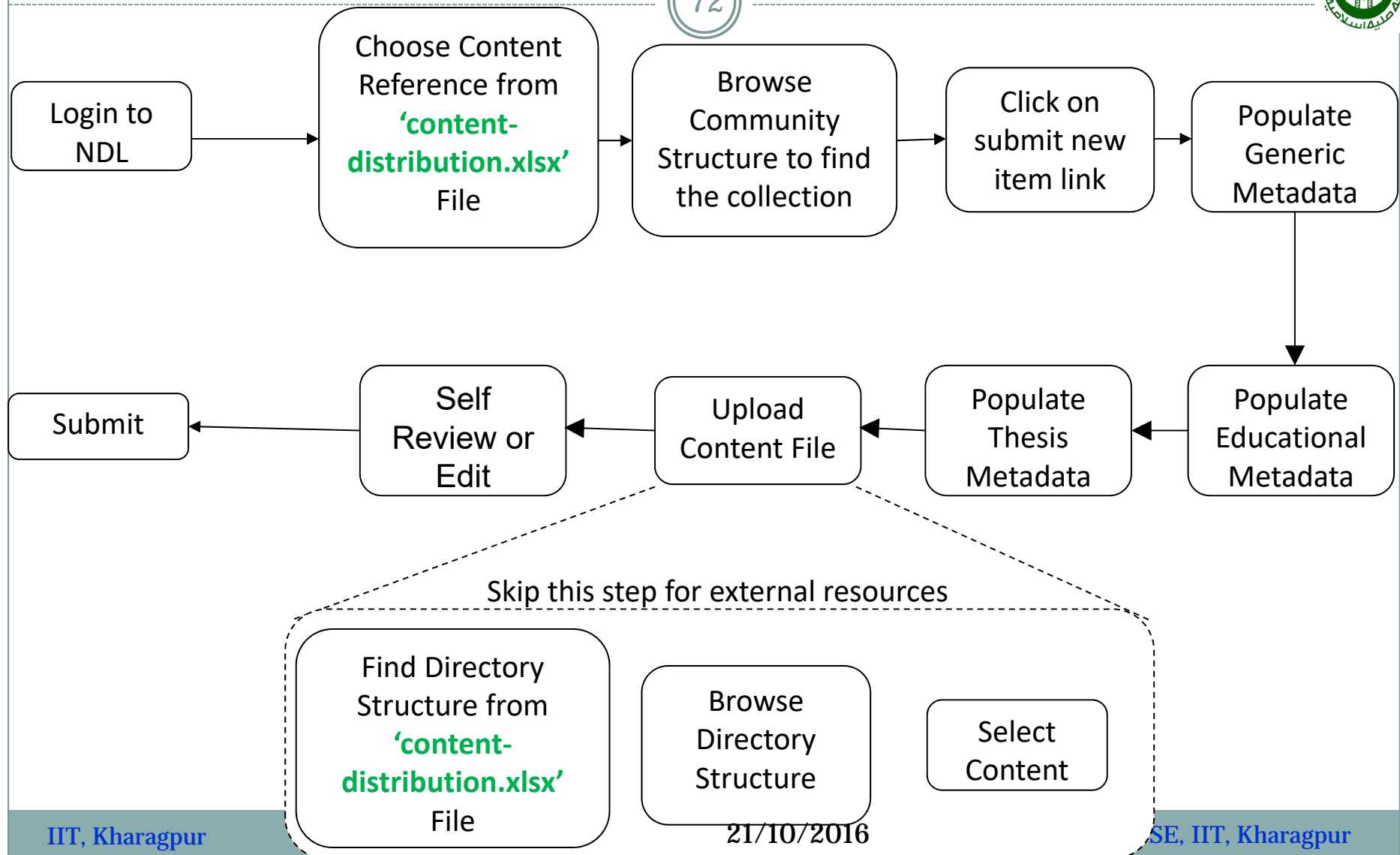
71





Manual Annotation Workflow

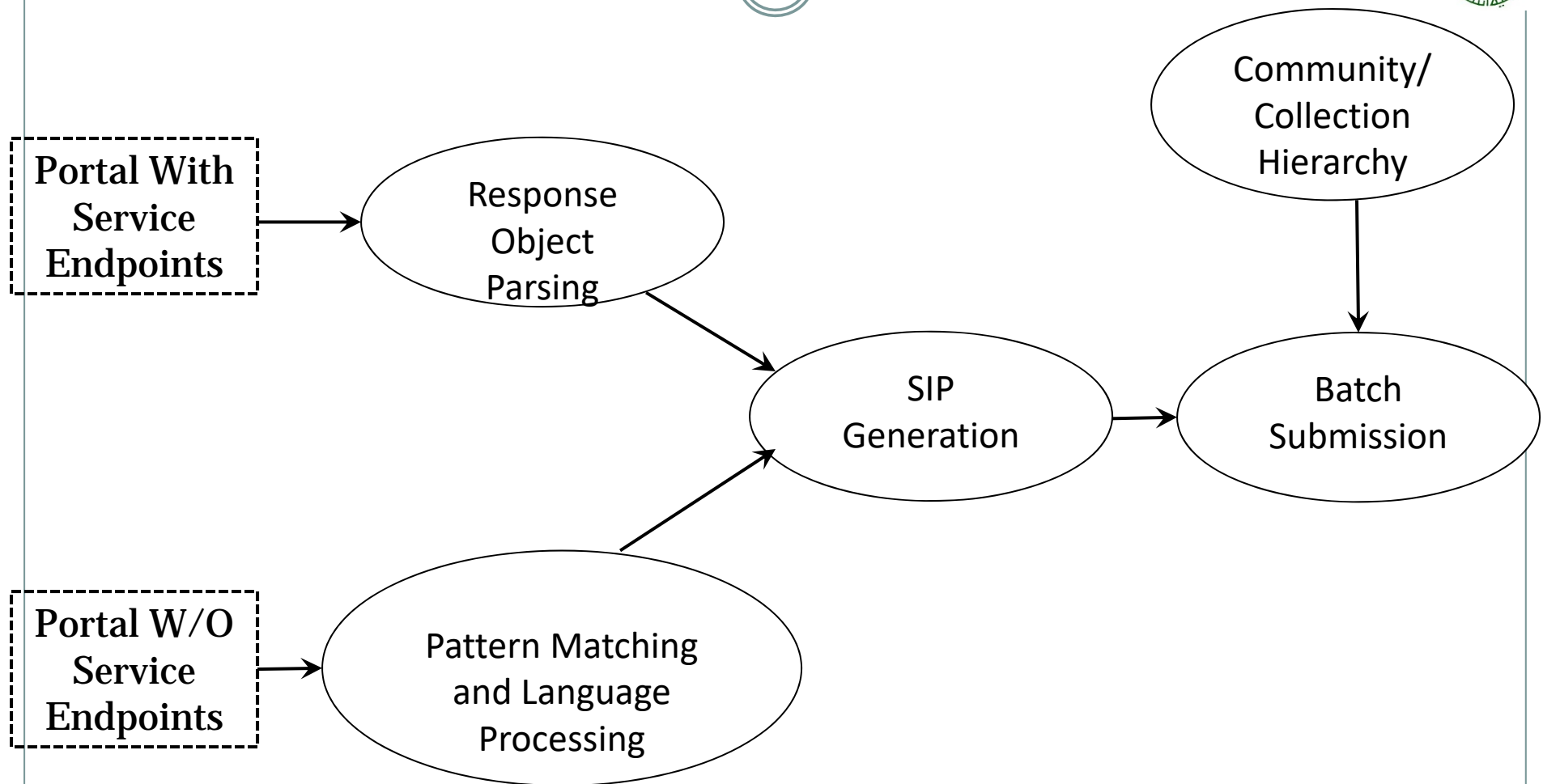
72





Automatic Crawling Workflow

73

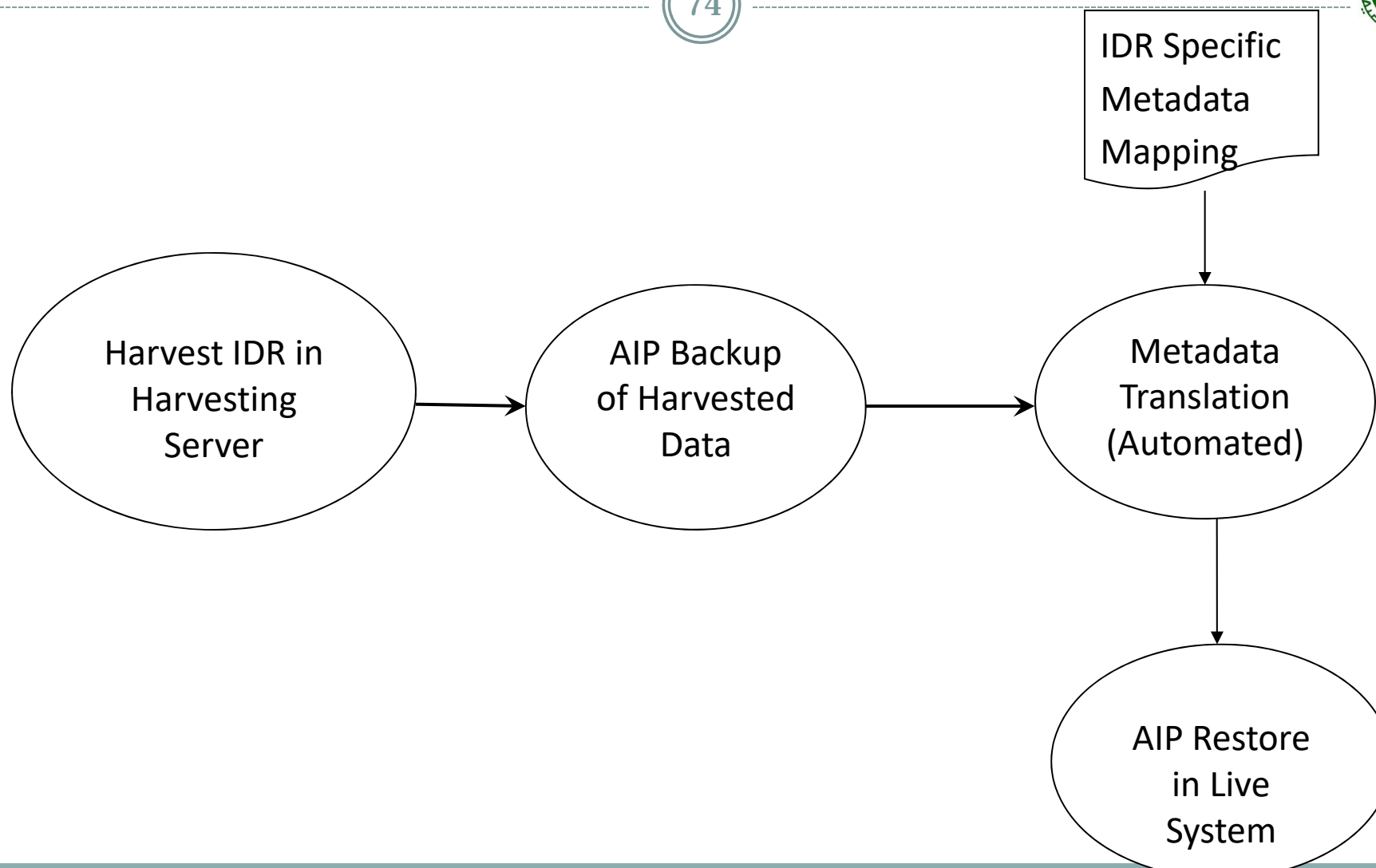




Metadata Translation Workflow



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Automatic Metadata Extraction Workflow

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