# ECDL 2009

13th european conference on digital libraries

# EIAH Data Model

## Introducing the Building Blocks of the Information Architecture

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY

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EIAH Team

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- Dspace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# Introduction to EIAH

- EIAH
  - Founded at 2007
  - Nonprofit Organization
  - Head director of the project: Mohammad Beheshti the Former head of Iranian Cultural Heritage Organization
- Partners
  - National Library & Archive of Iran
  - Polytechnic University of Iran
  - Shahid Beheshti University of Iran

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- Dspace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# Goals and objectives

- EIAH Goals
  - Increasing the quantity and improve the quality of information on Iranian culture
  - Facilitating the recovery of vernacular identity
  - Presenting the joint heritage of the countries in the region for further interaction and focusing on cultural unity
- Objectives
  - Providing varied types of resources
  - Providing eligible and accurate resources
  - Providing accessible resources

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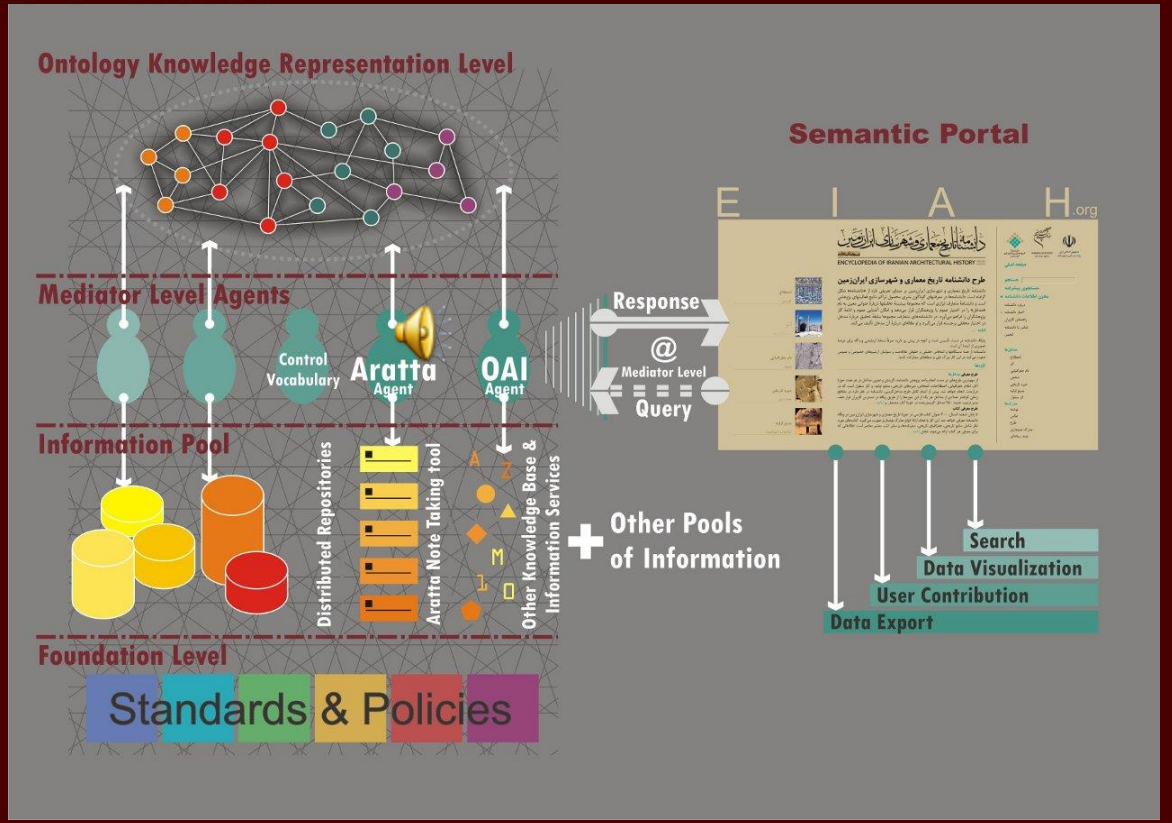
- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- Dspace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# Entry and Document

- Two Core Concepts in EIAH Information Architecture
  - Entry
    - Every topic or concept in domain which information accumulates around it (Terms, Monuments,...)
  - Document
    - Any kind of resource which provides information regarding history of Iranian architecture (Text, Photo,...)

- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# EIAH Information Architecture Objectives

- Three Main Objectives
  - Facilitate the access to the resources and documents
  - The ability to represent conceptual relations between topics of Iranian architecture
  - The ability to establish relations between topics and their related resources

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# EIAH Information Architecture

- Three-layer architecture
  - Information pool
  - Ontology – knowledge representation level
  - The mediator level

+

- Foundation layer
  - Standards and policies

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# Standards and Policies

- A Foundation Layer
  - open and international standards and guidelines
  - homogenized and optimized products
  - Governing on all work-flows and procedures

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# Standards and Policies

- Software Standard Policies
- Hardware and Network Standard Policies
- Technical Tracking Standard Policies
- Information Storage and Exchange Standard Policies
- Content Legal and licensing Standard Policies
- Security Standard Policies
- Resource Description and metadata Standard Policies

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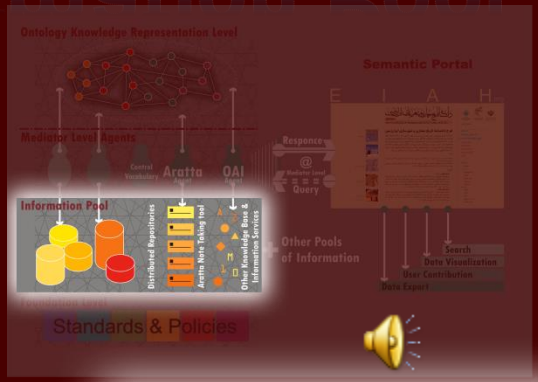
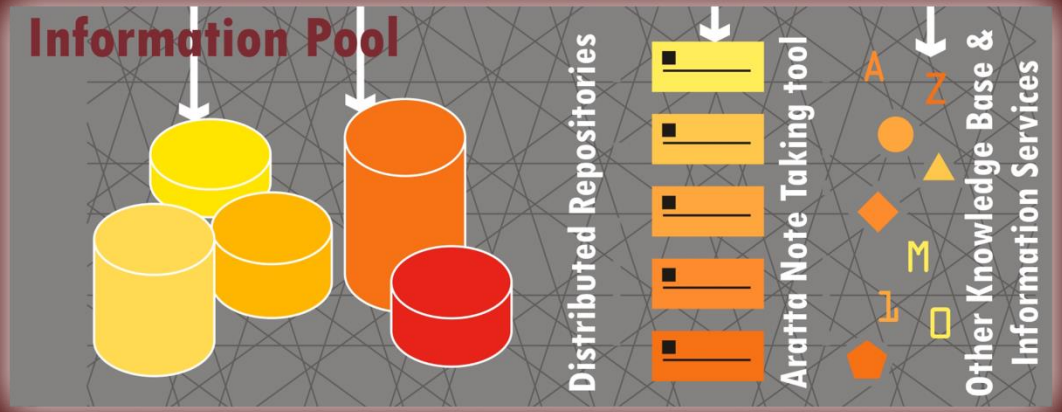
# Information Pool


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# Information Pool

- A network of digital repositories, containing various types of resources related to Iranian architecture
- To establish a grid of digital repositories, a powerful Open source solution was necessary.

- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# DSpace

DSpace institutional repository platform was chosen after evaluating and reviewing twenty other solutions.

- Open Source Software
- The community around DSpace
- Using crosswalk plug-ins
- Can customize UI for end user
- Uses Java, JSP, servlet JSTL
- Uses Oracle and Postgresql
- Uses Apache Lucene

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# Dspace @ EIAH

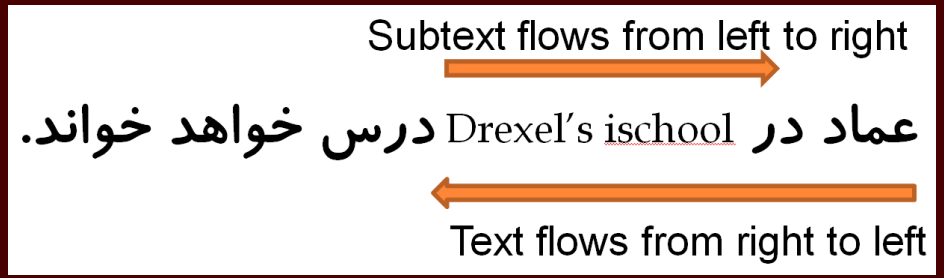
- EIAH customized and localized DSpace for the institution's needs. These modifications include:
- Persian user interface;
- Persian Calendar;
- Right to left text rendering;
- Enhancement of its search engine, Apache Lucene for Persian texts.

- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# Persian localization issues

- Right to left writing system (like Arabic and Hebrew)


- Bi-directional text



ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# Persian localization issues

- Different characters for numbers

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
| ۱ | ۲ | ۳ | ۴ | ۵ | ۶ | ۷ | ۸ | ۹ | ۰ |

- Different punctuation

| | | | | | |
|---|---|---|---|---|---|
| $ | , | ; | “ ” | / | ? |
| ﷼ | ، | ؛ | « » | / | ؟ |

- Non-joiners

- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# Persian calendar

- Iranian calendar based on Jalali calendar
- 33-year algorithm
- Standard time and date representation

| مفصل | عادی | کوتاه | کوتاه با صفر اضافی |
|---|---|---|---|
| ۷:۳۰:۴۰/۶۷ | ۷:۳۰:۴۰ | ۷:۳۰ | ۰۷:۳۰ |
| ۱۶:۰۰:۰۰/۰۰ | ۱۶:۰۰:۰۰ | ۱۶:۰۰ | ۱۶:۰۵ |
| ۱:۱۰:۱۵/۰۹ | ۱:۱۰:۱۵ | ۱:۱۰ | ۰۱:۱۰ |
| ۲۴:۵۹:۵۹/۹۹ | ۲۴:۵۹:۵۹ | ۲۴:۵۹ | ۲۴:۵۹ |

| مفصل | کوتاه | خیلی کوتاه | کوتاه با فاصلهٔ اضافی | خیلی کوتاه با صفر اضافی |
|---|---|---|---|---|
| ۱۲ فروردین ۱۳۵۸ | ۱۳۵۸/۱/۱۲ | ۵۸/۱/۱۲ | ۱۳۵۸/ ۱/۱۲ | ۵۸/۰۱/۱۲ |
| ۱ اسفند ۱۳۸۵ | ۱۳۸۵/۱۲/۱ | ۸۵/۱۲/۱ | ۱۳۸۵/۱۲/ ۱ | ۸۵/۱۲/۰۱ |
| ۶ مرداد ۱۳۰۴ | ۱۳۰۴/۵/۶ | ۰۴/۵/۶ | ۱۳۰۴/ ۵/ ۶ | ۰۴/۰۵/۰۶ |
| ۶ مرداد ۱۴۰۴ | ۱۴۰۴/۵/۶ | ۵/۶/۰۴ | ۱۴۰۴/ ۵/ ۶ | ۰۴/۰۵/۰۶ |

- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# Persian search issues

- Some Arabic characters

| Arabic characters | Persian characters |
|---|---|
| فيزيك | فیزیک |
| معماري | معمار |
| مقبرة شيخ | مقبرهٔ شیخ |

Arabic letter Yeh ي
Arabic letter Kaf ك
Arabic letter Teh Marbuta ة

- Joiners and non-joiners

كتاب خانه
U+0020 SPACE

كتاب‌خانه
U+200C ZWNJ

كتابخانه

- diacritics

بِسْمِ ٱللهِ ٱلرَّحْمٰنِ الرَّحِيمِ

بسم الله الرحمن الرحيم

- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# Lucene search engine (developed)

- Persian language approximate search

| | |
|---|---|
| Diacritics | آل مُهَلّبْ / آل‌مهلب / آل مهلب / أل مهلب |
| Non-joiners | بی‌بی‌خاتون / بی بی‌خاتون / بی بی خاتون |
| Arabic characters | فیزیک / فیزیك |
| Wild cards | مسجد جامع* |

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A

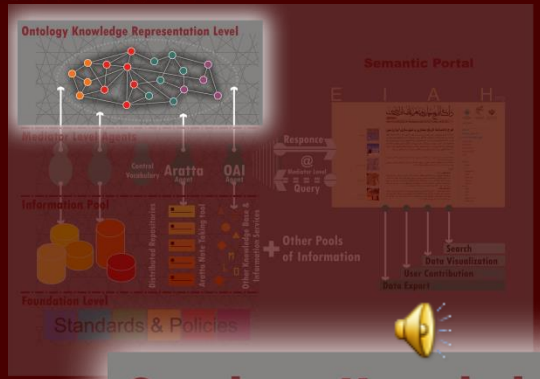

# Aratta (http://eiah.org/aratta)

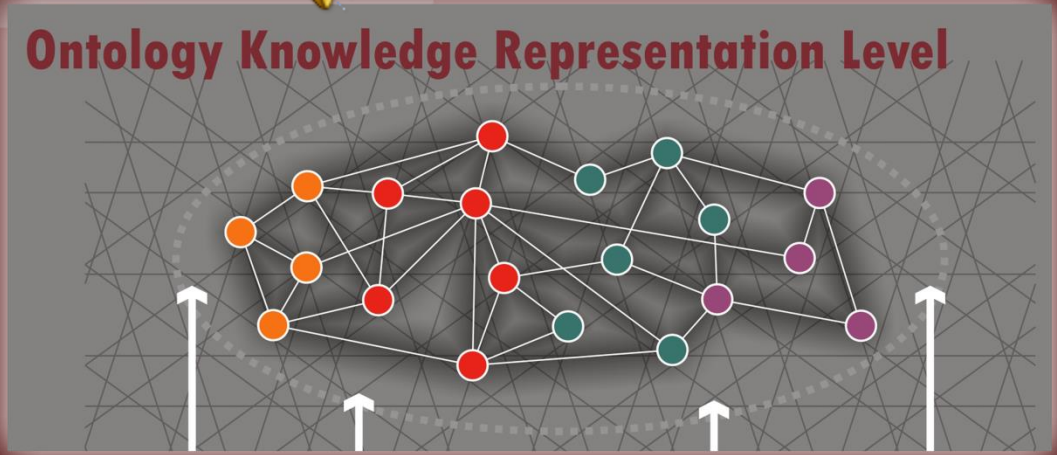
- A collaborative research tool (semantic note taking tool)
- developed as a web-based research tool
- Semantic relations between notes
- Reference management services
- Deploys the conceptual model of the EIAH and defines its relational tags based on this model

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY

# Ontology


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- Dspace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- Dspace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# Ontology

- A specification of a conceptualization and a formal representation of a set of concepts within a domain and the relationships between those concepts (Tom Gruber, 1992).
- In the domain of Iranian architecture , the ontology gives us an overall picture of Iranian history of architecture with all its concepts and all their relations.

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# EIAH Ontology

- Our viewpoint for the history of Iranian architecture can not be pictured with a single regular ontology.
- There are three major views in EIAH ontology:
  - Context (environment)
  - Structure and form (physical properties)
  - Life and human behavior
- This is not practiced before in this field
- So we almost started from scratch
- And it is under development and in progress.

- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# EIAH Ontology (Architectures' view)

- Architecture is far beyond of construction, material, sketches and plans;
  - People's life is a great factor
  - The environment and condition are effective
  - And architecture is what we see as the output

Four main causes of change in nature
- The Material cause
- The Formal cause
- The Efficient cause
- The Final cause

Ancient classic element systems
- Earth
- Water
- Air
- Fire

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A

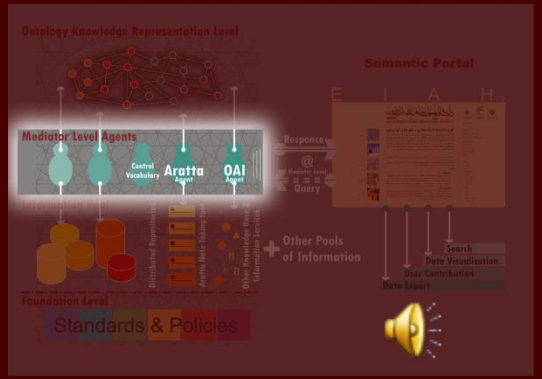

# EIAH Ontology (development process)

- Theoretical foundations of our ontology
- Bibliography of architecture resources
- Designing the ontology using a chosen methodology
  - Defining concepts and constraints
  - Conceptualization
  - Formalization
  - ...

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY

# The Mediator Level


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- Dspace
- Aratta
- Ontology
- EIAH Ontology
- **The Mediator Level**
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# The Mediator Level

- Detects relations between two layers (ontology and repository)
- Collects and links resources to concepts (entries)
- Integrates data from other services (e.g. Aratta)
- Applies controlled vocabulary to improve search quality

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# The Mediator Level (current implementation)

- Note retrieval tool
  - Uses human annotation in notes and relates them to entries
  - Stores notes metadata (annotations) in a relational database
- Document retrieval tool
  - Uses OAI-PMH for harvesting metadata from repository
  - Stores harvested metadata in a relational database

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY


- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# Controlled Vocabulary

- Required for accurate search results (recall and precession)
- Needed for efficient resource description
- Expansion of users by multilingual controlled vocabularies.
- Promoting a broader global overview respecting translation /Culture
- Three main fields are in our focus: architectural terms, geographical names and united list of people name

- Introduction to EIAH
- Goals and objectives
- EIAH Cake
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Semantic Portal
- Distributed Repositories
- OAI-PMH
- The Current Implementation
- Future Works
- Q&A


# Controlled Vocabulary

- Currently in Persian (planned to be bilingual)
- Extracted from accredited resources for Iranian architecture
- Approved by team of experts in the field of architecture
- Is implemented in Dspace and Lucene search engine is using it for better results

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- EIAH Information Architecture
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- DSpace
- Aratta
- Ontology
- EIAH Ontology
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# Metadata Model

- Customized and based on the Dublin Core (simple & qualified)
- Uses relational elements as refinements of subject
- Compliance with EIAH ontology
- Enables semantic interoperability among different services

| Term Name: Is related to Geographical Name | | Term Name: Is related to Historical Period | |
|---|---|---|---|
| URI | Http://eiah.org/en/Entries#Geographical_Name | URI | Http://eiah.org/en/Entries#Historical_Period |
| Label: | Is related to Geographical Name | Label: | Is related to Historical |
| Definition: | An entity responsible for correlating a geographical name to the resource | Definition: | An entity responsible for correlating a historical period to the resource |
| Types of term: | Property | Types of term: | Property |
| Refines: | http://purl.org/dc/elements/1.1/subject | Refines: | http://purl.org/dc/elements/1.1/subject |

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY

# Semantic Portal


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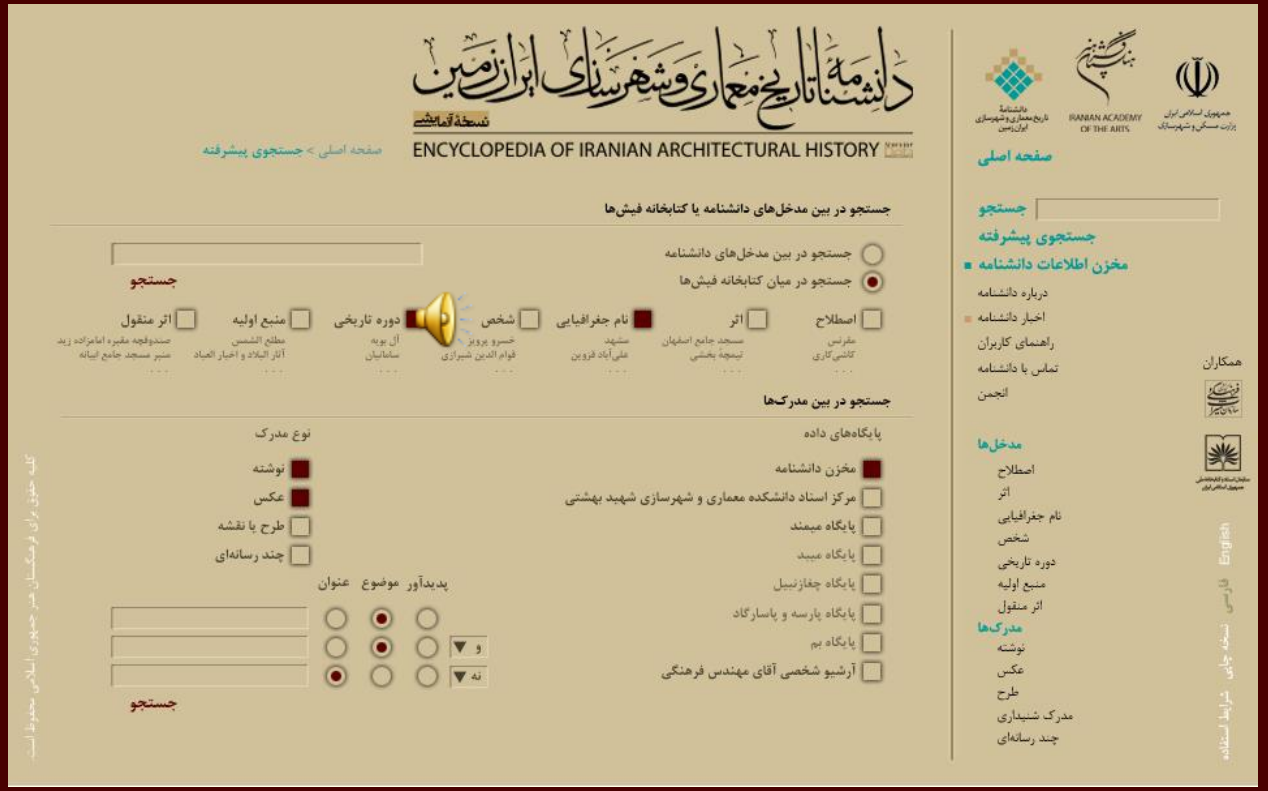

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# Distributed Repositories

- Widespread cultural heritage centers
- Huge amount of resources
- Promoting digital preservation

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- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
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# OAI-PMH

- Open Protocol for Metadata Harvesting
- HTTP and XML
- Built-in for DSpace
- Dublin Core friendly

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- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
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# Current Implementation

- Repository Level: DSpace
- EIAH Metadata and Application Profile
- Ontology Level: Semantic Mediawiki tools
- Mediator Level: Semantic Mediawiki extensions

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- Aratta
- Ontology
- EIAH Ontology
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# Future Works

- Launch of more digital repositories in other cultural heritage centers;
- Development of EIAH ontology;
- Development of EIAH controlled vocabulary;
- Implementing of DSpace XML UI framework (Manakin) to increase adaptability;
- Enhancement of EIAH application profile based on DCAP Singapore framework;
- Development of more data visualization tools.

ENCYCLOPAEDIA OF IRANIAN ARCHITECTURAL HISTORY

# The End

## Thank you!

EIAH Team

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