

IMS Korea 표준화 포럼, 전자출판 표준화 포럼

“Open Annotation for EPUB”

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Open Annotation 향후 고려 기술

Open Annotation WG



- Open Annotations in EPUB (September 2013)
- How to apply Open Annotations (OA) in the context of EPUB
- Users and authors will be able to create, store, share, and load annotations
- Reduces interoperability across Reading Systems.
- Use cases and functional requirements (2011-12)



- W3C Open Annotation Community Group
- Open Annotation Data Model (08 February 2013)
- Annotation Ontology (AO)
- Open Annotation Collaboration (OAC)

❖ Open Annotation Data Model : <http://www.openannotation.org/spec/core/>

Open Annotation WG : 2013 OA-in-EPUB

Annotations - 'metadata on content' : sub-group

Requirements & issues

- Mechanism to guarantee that document content has not changed
- guarantee identity of document author
- guarantee that the public annotation has not changed
- **Document identifiers**
- **XML/HTML Unique Identifiers**
- **Structural Paths** (XPath Expressions)
- **Unicode** Character Offset, Unicode Character Range
- **Time** Offset, Time Range
- **Spacial** Area
- Single Annotation, **Multiple Targets**
- Annotation content can contain either/any of: audio, video, image, text.
- **Synchronized audio annotates the text**

❖ <https://github.com/IDPF>

The *EDUPUB 2014* deliverable

EDUPUB = Open Web Standards (inc. next-gen Portable Documents) + Educational Connectivity

| | Description | Status | Next Milestone | Contact |
|--------------------------------|--|--------|-----------------------------------|--------------------|
| Open Annotation in EPUB | Define how to apply Open Annotations in the context of EPUB, thereby enabling users and service providers to utilize a non-proprietary representation of annotation data. | Draft | Draft Specification Early 2015 | EPUB Working Group |

Annotations in EPUB

EPUB Adaption of W3C Open Annotation

(<http://www.openannotation.org/spec/core/>)

- Requires XHTML5 for annotation body
 - Requires JSON-LD serialization
 - Uses EPUB CFI for anchoring to target
 - Define specificity levels (release, publication and work).
 - Syntactic restrictions to allow non-RDF-aware processing
 - Allows bundling of collections of annotations (+ zip for transport)
 - … and specifying target audience (teacher, age range, etc)
 - Life: bundled with EPUB, or as separate entities
 - Required features in EDUPUB-compliant RS: import, export
-
- ❖ <http://www.idpf.org/epub/oa/>
 - ❖ <http://www.imsglobal.org/edupub/Meet%20the%20editors%20-%20EDUPUB%20Phoenix.pdf>

Open Annotation

2. 연구배경과 활용

IDPF : Open Annotation 연구 배경

❖ in EPUB & EDUBUB

정보 공유 표준

북마크, 메모, 위치 저장, 교환

상호 호환성

Share &Delivery

콘텐츠 저작권 문제

리딩 시스템간의 상호 호환성 필요

EPUB 컨텐츠와 별개로 저장, 관리

Interactivity

- ❖ EPUB Working Group Charter - Current Industry Problems : http://idpf.org/epub/30/wg-charter#pr_8
- ❖ Current IDPF Activities : <http://idpf.org/ongoing>

W3C : Open Annotation 연구 배경

❖ in Next-Web Tech. (Semantic Web)

RDF
(Resource Description Framework)

웹상의 자원의 정보를 표현하는 XML 규격

Annotation Ontology

컴퓨터에서 다룰 수 있는 형태로 표
현한 모델

Open Annotation Model

데이터 구조 모형



Device

Ubiquitous /
Collaboration

User

- ❖ Open Annotation Community Group : <http://www.w3.org/community/openannotation/>
- ❖ RDF : <http://ko.wikipedia.org/wiki/RDF>

Open Annotation의 필요성 : 전자책 분야

상호작용

Social Reading

Share to Facebook® and Twitter®

Share ideas with other reader

빅데이터

Stats with Reading Life

The average person
reads less than 100
books in their lifetime.

How many have you read?

5

Books

21 / 37

Awards

1,098

Pages Turned

34%

Of Your Library

클라우드

syncs your **bookmarks** across devices.

kindle fire HD
The ultimate
HD experience

From \$199 > [Shop now](#)



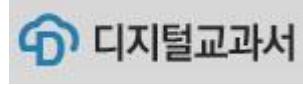
kindle
paperwhite
The world's most
advanced e-reader

From \$119 > [Shop now](#)



- ❖ Kobo Books : <http://www.kobobooks.com>

Open Annotation의 필요성 : 교육 분야



• Sharing Annotation, Note, Comments

온도는 분자 운동의 활발한 정도를 의미한다.

그리 기온이 높을 때 분자의 운동이 더 활발해진다. 온도 유도가 높을 때 물체의 분자 운동이 활발하기 때문이다. 기체를 가열하면 기체 활발해진다. 기온이 높을 때 남새가 더 잘 퍼지는 이유도 높은 온도에서 기체의 분자 운동이 더 활발하기 때문이다.

물질이 동일한 상태에 있을 때, 물체의 온도가 높다는 것은 분자의 운동이 활발하다는 것을 의미하고 물체의 온도가 낮다는 것은 분자의 운동이 활발하지 않다는 것을 의미 한다. 즉, 물체의 온도는 물체를 구성하는 분자 운동의 활발한 정도를 나타내는 물리량이다.

분자 운동이 0인 온도

온도의 분자 운동과 온도

Collaboration

Digital Book

온도는 분자 운동의 활발한 정도를 의미한다.

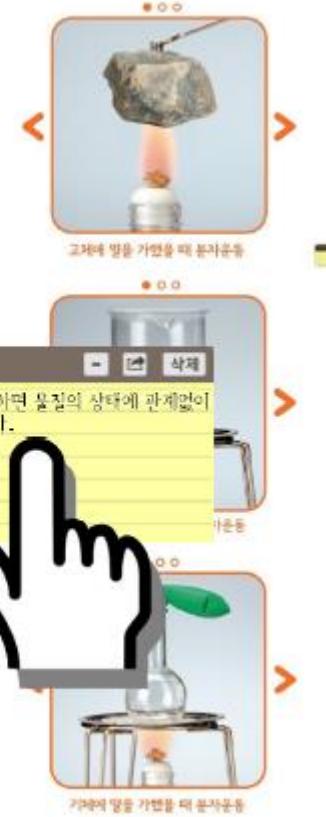
그리 기온이 높을 때 분자의 운동이 활발해진다. 온도 유도가 높을 때 물체의 분자 운동이 활발해진다. 기온이 높을 때 남새가 더 잘 퍼지는 이유도 높은 온도에서 기체의 분자 운동이 더 활발하기 때문이다.

따라서 물질이 동일한 상태에 있을 때, 물체의 온도가 높다는 것은 분자의 운동이 활발하다는 것을 의미하고 물체의 온도가 낮다는 것은 분자의 운동이 활발하지 않다는 것을 의미 한다. 즉, 물체의 온도는 물체를 구성하는 분자 운동의 활발한 정도를 나타내는 물리량이다.

분자 운동이 0인 온도

온도의 분자 운동과 온도

Scaffolding



[그림 5-9] 물질의 상태별 온도에 따른 분자 운동

- ❖ 디지털교과서 : 참고자료 영상 :
<http://serviceapi.nmv.naver.com/flash/convertIframeTag.nhn?vid=0E8826B1B4731A574FFCD26D5DE3BEA8EE5B&outKey=V129cb60483a0b7d3fb4764baedd96bed6a22deddc39392a5a7c264baedd96bed6a22&width=720&height=438>
- ❖ 디지털 교과서 학습 예시 : http://dtbook.edunet.net/st_renewal/file/디지털교과서_학습예시.pdf

Open Annotation의 필요성 : 교육 분야

▪ iTunes University



학습 컨텐츠



The screenshot shows the iTunes University app interface on an iPhone. At the top, there are two tabs: '보관함' (Favorites) on the left and '보관함' (Favorites) on the right. Below the tabs, there's a search bar and a settings gear icon. The main content area displays a course titled '[EBS+] 면접관을 사로잡는 영어인터뷰 EBS'. Below the title, there are several sections: '전체 보기' (View All), '강사' (Instructor), '개요' (Overview), and 'EBS 정보' (EBS Information). Under '강사', there's a section for '강의 소개' (Course Introduction) with a sub-section for '1강. 들어가며 - 평화와 공존의 한국 근현대사를 위하여' (1st Lecture: Introduction - For the peace and coexistence of modern Korea). There are also sections for '근대란 무엇인가?' (What is the Modernization Movement?) and '1강. 들어가며' (Introduction of Lecture 1). At the bottom of the screen, there are several navigation icons: 정보 (Information), 게시판 (Forum), 메모 (Notes), 자료 (Materials), and a repeat icon.

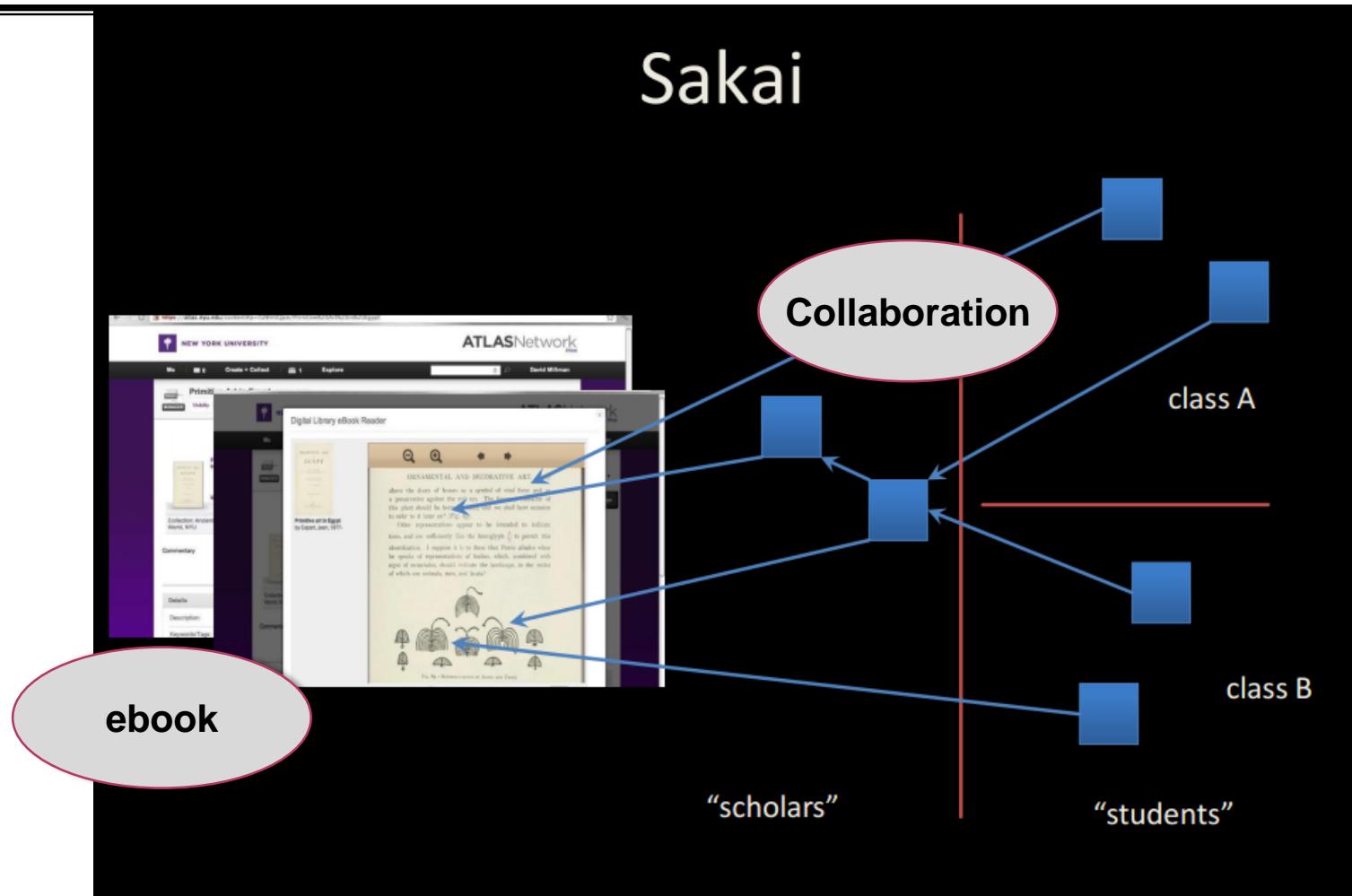
• 학습 활동 정보, 공유

북마크기술



The screenshot shows a note-taking application interface on an iPhone. At the top, there are several icons: '+', search, share, settings, and '보관함' (Favorites). Below the icons, there's a list of notes categorized by type: '모든 메모' (All Notes), '강의 메모' (Lecture Notes), '오디오/비디오 메모' (Audio/Video Notes), and '책 메모' (Book Notes). To the right of each category, there are three numbers: 66, 20, and 26 respectively. At the bottom of the screen, there are several navigation icons: 정보 (Information), 게시판 (Forum), 메모 (Notes), 자료 (Materials), and a repeat icon.

Open Annotation의 필요성 : 교육 분야



- ❖ OAC for Communities : <http://www.openannotation.org/documents/201207oacNyu-b.pdf>

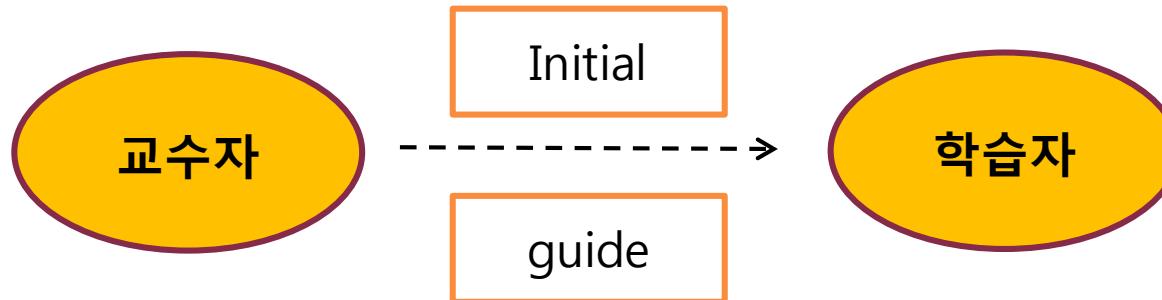
Annotation 의 필요성 : use cases

❖ 저자, 교사 측면 (In Author & Publisher's)

▪ 보조 컨텐츠 설명 (Ancillary content)

: *Included at content packaging/publication time*

- Embedded Commentary
- Long descriptions



❖ Annotations - metadata on content : https://code.google.com/p/epub-revision/wiki/Annotations#Requirements_&_issues

Annotation 의 필요성 : use cases

❖ 독자, 학습자 측면 (In User's or Students)

▪ Note, Bookmark, Highlighting

- *: by a single reader for their private use*
- Underlining/highlighting significant content
- Adding a bookmark & comment (note): 위치&영역
- Mindless drawing/doodles : 낙서
- Create a linkage between a point in a document and any other resource
- Reader annotates two distinct sections of a doc.
- Tagging a part of a publication, rather than commenting on it.
- Annotations with multiple bodies



Annotation 의 필요성 : use cases

❖ 출판물 측면 (In Contents Provider's)

- 공유, 상업적 서비스 : *share, commercial offering*
 - **Answers to a quiz** (rich media) meant for teacher.
 - Notes from a teacher to students.
 - **Notes from myself** to members of my book club.
 - **Adding a table** containing additional experimental data to an existing table in a scholarly journal.
 - Annotations from a third party for sale to students reading Huckleberry Finn.
 - **Errata** : 정오표
 - **Definitive□commentary** from an interesting voice (editor, celebrity, historical player, etc).
 - Annotations on annotations



서비스
도구

Open Annotation & EPUB

3. Open Annotation in EPUB

3.1 Data Model in W3C

3.2 Spec.

- ❖ <https://docs.google.com/document/d/1imR8GM-UobvcjvxVpLTGgX7thxGpAaHe1QLzgpb7xvU/edit?pli=1#bookmark=id.kiy6d29rasxu>

3. Open Annotation in EPUB

❖ W3C Open Annotation Data Model

❖ Packaging

- ***1. Standalone Collections :***

- ✓ The Annotation Document MUST be stored in the root of the ZIP container and MUST have the file name "annotations.json".

- ***2. Embedded Collections***

- ✓ listed in the Package Document manifest

- ***3. Local Resources***

- ✓ Local resources have to be zipped with the Annotation Document when creating a standalone distribution file

- ***4. Remote Resources***

- ✓ Remotely-hosted resources MAY be referenced from annotations

❖ Format

- be serialized in a JSON document [\[RFC4627\]](#)

- which follows the JSON-LD conventions [\[JSON-LD\]](#).

❖ Metadata

- DCMI Metadata Terms [\[DCMI\]](#)

3. Open Annotation in EPUB

3. Open Annotation in EPUB

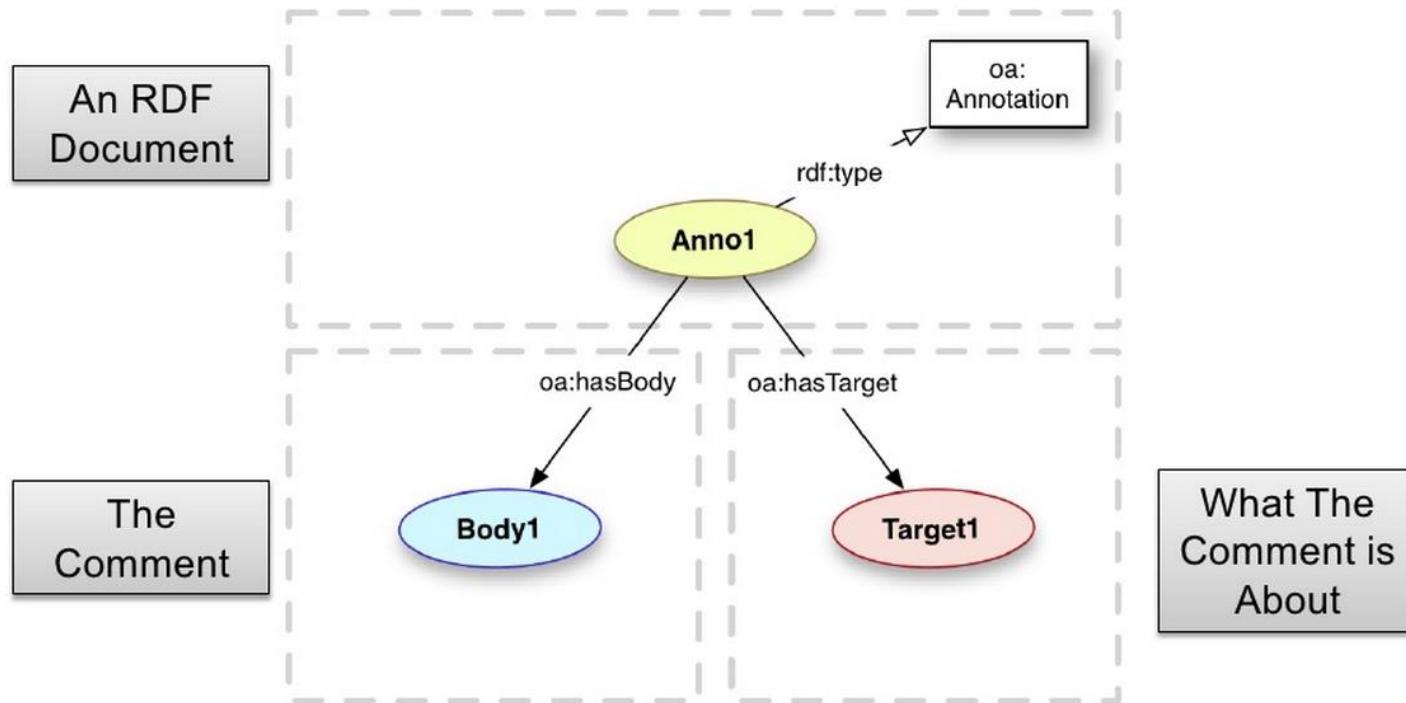
3.1 Data Model in W3C

3.2 Spec.

Open Annotation 기술 : Data Model



Basic Model



<http://www.openannotation.org/spec/core/>

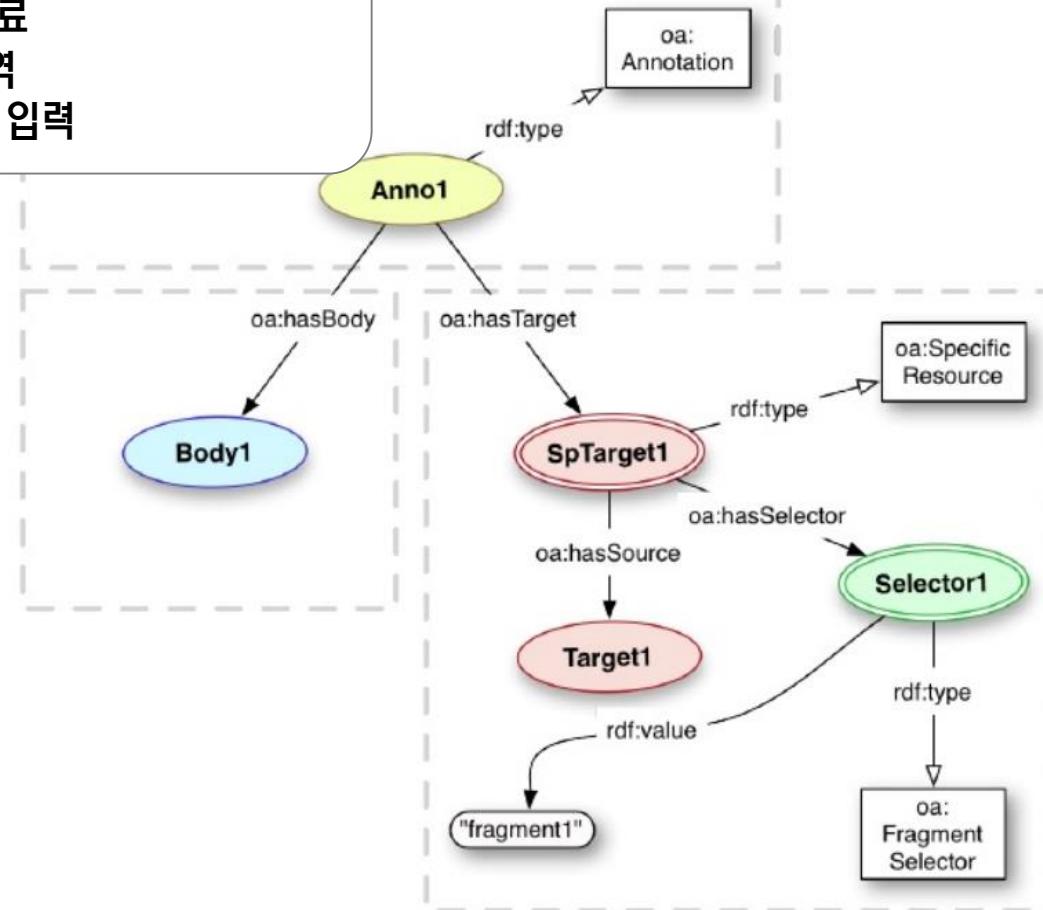
- ❖ <http://www.openannotation.org/spec/core/20130208/>
- ❖ <http://www.slideshare.net/azaroth42/open-annotation-overview>

Open Annotation 기술 : Data Model



- 콘텐츠 내부 위치 영역 지정
 - 시작, 종료
 - 선택영역
 - 코멘트 입력

Fragment Selector



Description of
Segment of
Interest via URI
Fragment
Specification

Open Annotation 기술 : Data Model



- 멀티미디어 콘텐츠 연결
 - 시작, 종료
 - 선택영역
 - 관련 자료 연결



RDF:
`<x:MyAnno> a oa:Annotation ;
oa:hasBody <http://www.youtube.com/watch?v=uPh81Lle7B8> ;
oa:hasTarget <http://en.wikipedia.org/> .`

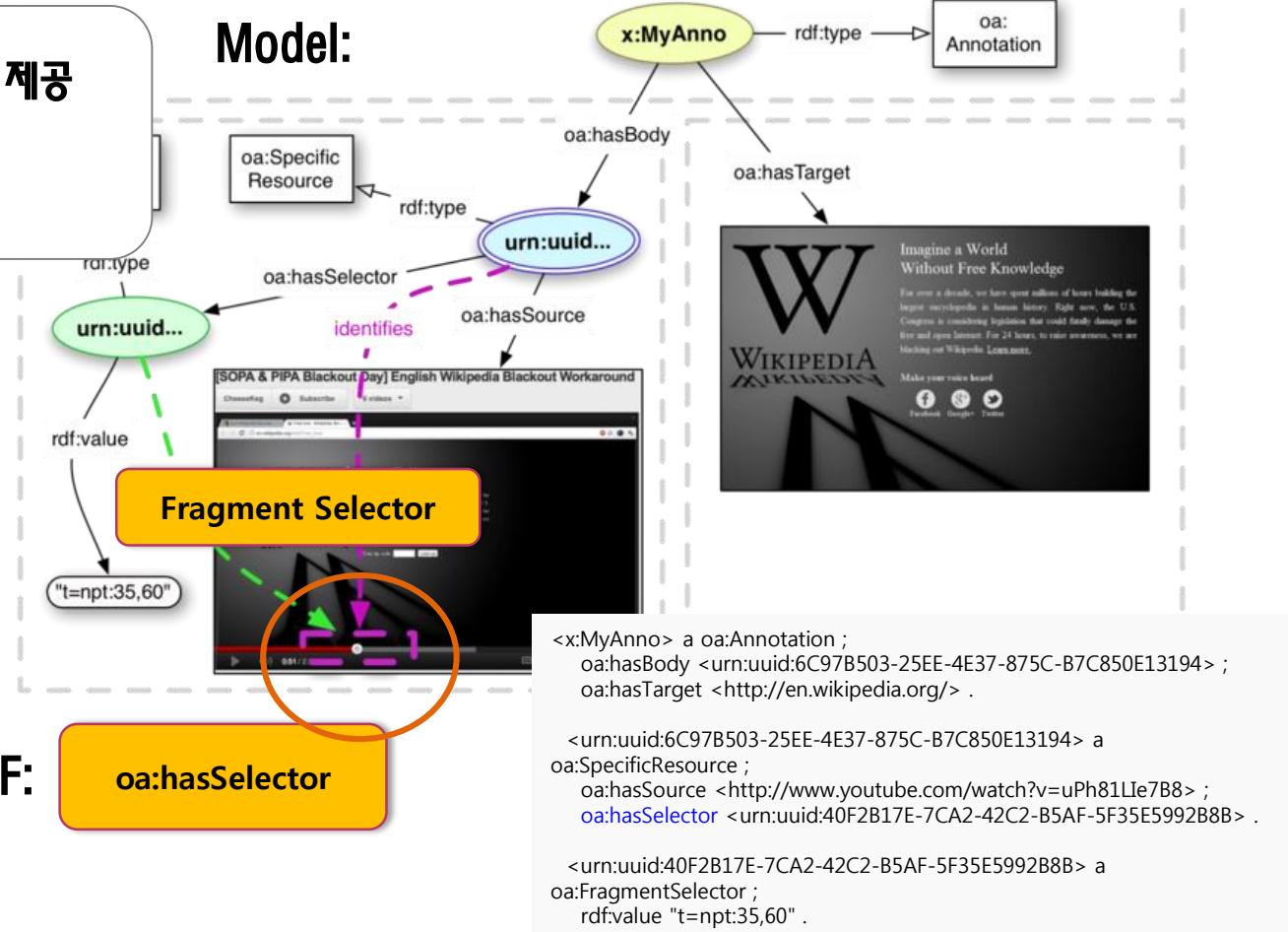
❖ http://www.w3.org/community/openannotation/wiki/Sopa_Basic

Open Annotation 기술 : Data Model



- 콘텐츠의 부가 자료 제공
- 특정 영역
- 관련 자료 제시

Model:



❖ http://www.w3.org/community/openannotation/wiki/Sopa_Selector

Open Annotation 과 EPUB

3. Open Annotation in EPUB

3.1 Data Model in W3C

3.2 Standard Spec.

3. Open Annotation in EPUB

❖ Structure & Metadata

```
{  
    "@context": "http://idpf.org/epub/oa/1.0/context.json",  
    "@id": "http://example.org/epub/annotations.json",  
    "@type": "epub:AnnotationCollection",  
    "dc:title": "Alice in Wonderland Annotations",  
    "dc:publisher": "Example Organization",  
    "dc:creator": "Anne O'Tater",  
    "dcterms:modified": "2014-03-17T12:30:00Z",  
    "dc:description": "Anne's collection of annotations on Alice in Wonderland",  
    "dc:rights": [  
        {"@value": "Quelques droits en Français", "@language": "fr"},  
        {"@value": "Some Rights in English", "@language": "en"}  
    ],  
    "annotations": [ ... ],  
}
```

주석 구조

출판정보
DCMI

주석항목
(JSON Data)

3. Open Annotation in EPUB

❖ hasTarget & audience

```
{  
  "@id": "http://example.org/epub/annotation/1.json",  
  "@type": "oa:Annotation",  
  "motivatedBy": "oa:commenting",  
  "annotatedBy": {  
    "@id": "mailto:Anne@example.org",  
    "@type": "foaf:Person",  
    "name": "Anne O'Tater"  
  },  
  "annotatedAt": "2014-03-20T09:32:30Z",  
}
```

```
"audience" : {  
  "@type" : "schema:EducationalAudience",  
  "schema:educationalRole" : "teacher"  
}
```

대상자 지정

```
"hasTarget": { ... },  
"hasBody": { ... }  
}
```

❖ <http://www.idpf.org/epub/oa/#id.j2oi2sytvuu6>

Commentary Annotation on Publication with URI

ex) Contents

```
{  
  "@context": "http://www.idpf.org/epub/oa/1.0/context.json",  
  "@id": "http://example.org/epub/annotations.json",  
  "@type": "epub:AnnotationCollection",  
  "annotations": [  
    {  
      "@id": "urn:uuid:E7E3799F-3CD5-4F69-87C6-5478B22873D6",  
      "@type": "oa:Annotation",  
      "hasTarget": {  
        "@type": "oa:SpecificResource",  
        "hasSource": {  
          "@id": "http://www.example.org/ebooks/A1B0D67E-2E81-4DF5/v2.epub",  
          "@type": "dctypes:Text" },  
        },  
      "hasBody": {  
        "@type": "dctypes:Text",  
        "format": "application/xhtml+xml",  
        "chars": "<div xml:lang='en' xmlns='http://www.w3.org/1999/xhtml'>I love Alice in Wonderland</div>",  
        "language": "en" ,  
        "motivatedBy": "oa:commenting"  
      }  
    }  
  ]  
}
```

❖ <http://www.idpf.org/epub/oa/#h.ndhjxgxlz87>

주석

연결 대상

내용

Text Selection Highlighting

ex) Highlight

```
"@context": "http://www.idpf.org/epub/oa/1.0/context.json",
"@id": "http://example.org/epub/annotations.json",
"@type": "epub:AnnotationCollection",
"annotations": [
    {
        "@id": "http://example.org/epub/annotation/1.json",
        "@type": "oa:Annotation",
        "hasTarget": {
            "@type": "oa:SpecificResource",
            "hasSelector": {
                "@type": "oa:FragmentSelector",
                "value": "epubcfi(/6/4[chap01ref]!/4[body01]/10[para05]/3:10)"
            }
        },
        "hasSource": {
            "@type": "dctypes:Text",
            "uniqueIdentifier": "isbn:123456789x",
            "originURL": "http://www.example.com/publisher/book/",
            "dc:identifier": "urn:uuid:A1B0D67E-2E81-4DF5-9E67-A64CBE366809",
            "dcterms:modified": "2011-01-01T12:00:00Z"
        }
    },
    {
        "motivatedBy": "oa:highlighting"
    }
]
```

선택 영역

내용

Open Annotation 향후 고려 기술

4.1 Data Model의 표현 방식 소개

Open Annotation 기술 : RDF/XML

```
<?xml version="1.0" encoding="UTF-8"?><rdf:RDF  
xmlns:cnt="http://www.w3.org/2008/content#" xmlns:dc="http://purl.org/dc/elements/1.1/"  
xmlns:dcterms="http://purl.org/dc/terms/" xmlns:dms="http://dms.stanford.edu/ns/"  
xmlns:exif="http://www.w3.org/2003/12/exif/ns#" xmlns:foaf="http://xmlns.com/foaf/0.1/"  
xmlns:oac="http://www.openannotation.org/ns/"  
xmlns:ore="http://www.openarchives.org/ore/terms/"  
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#">  
  
<rdf:Description rdf:about="urn:uuid:377a6417-3629-49e6-a0fe-d2dcbf7b3818">  
  <oac:hasTarget rdf:resource="http://www.shared-canvas.org/impl/demo1/res/Canvas-f32r"/>  
  <oac:hasBody rdf:resource="http://www.shared-canvas.org/impl/demo1/res/image-f32r.jpg"/>  
  <rdf:type rdf:resource="http://dms.stanford.edu/ns/ImageAnnotation"/>  
  <rdf:type rdf:resource="http://www.openannotation.org/ns/Annotation"/> </rdf:Description>  
</rdf:RDF>
```

- ❖ Over view Of Open Annoatation : lib.stanford.edu/files/oac-dmss_0.ppt
- ❖ <http://www.slideshare.net/azaroth42/open-annotation-overview>

Open Annotation 기술 : RDF

```
ex:Anno a oax:Annotation ;
  oa:hasTarget <http://www.w3.org/community/openannotation/> ;
  oa:hasBody ex:uuid ;
  oa:annotatedBy ex:Person1 ;
  oa:annotatedAt "2012-02-12T15:02:14Z" ;
  oa:serializedBy ex:Software1 ;
  oa:serializedAt "2012-02-12T15:02:14Z" .
```

```
<http://www.w3.org/community/openannotation/>
  dc:format "text/html" .
```

```
ex:uuid a cnt:ContentAsText ;
  cnt:chars "This is the result of the merging process of Annotation Ontology (AO) and
  Open Annotation Collaboration (OAC)" ;
  cnt:characterEncoding "utf-8" .
```

```
ex:Person1 a foaf:Person ;
  foaf:mbox "john.doe@example.org" ;
  foaf:name "John Doe" .
```

```
ex:Software1
  foaf:name "ExAnnotator" .
```

- ❖ http://www.w3.org/community/openannotation/wiki/Annotating_a_Webpage_with_a_Textual_Note
- ❖ RDFa is a specification for attributes to express structured data in any markup language

Open Annotation 기술 : HTML5+RDFa

HTML<note> element

Embed 형태1
- 별도 내용 추가

```
<note id="annotation1">
  <p>
    <a property="annotatedBy" href="http://example.com/people/shepazu">Shepazu</a>
  </p>
  <time datetime="2014-01-14T01:28:22-0500">
    <a href="http://example.com/annotations/shepazu-1389680902"
       title="1:28 AM - 14 Jan 2014">A few minutes ago</a>
  </time>

  <blockquote cite="http://example.com/sourcedoc.html"
             data-prefix="essential feature of the memex. "
             data-suffix=" When the user is building a tra">
    <p>The process of tying two items together is the important thing.</p>
    <footer>
      - <cite>
        <a href="http://en.wikipedia.org/wiki/Vannevar_Bush">Vannevar Bush</a>
      </cite>
    </footer>
  </blockquote>
  <p>Annotations are at the Web's core.</p>
  <ul>
    <li property="tag">annotations</li>
    <li property="tag">web</li>
    <li property="tag">standards</li>
  </ul>
</note>
```

- ❖ <http://www.w3.org/community/openannotation/wiki/Serializations>
- ❖ http://www.w3.org/TR/2008/PR-rdfa-syntax-20080904/#s_xhtmlrdfa

Open Annotation 기술 : HTML

Standard HTML <a>

Embed 형태2
- 내용에 포함

Vannevar Bush described about the increased complexity, publication, and specialization of scientific disciplines. He proposed a new machine for linking and sharing different sources of information, which he called a memex.

```
<p>
...
<note id="annotation1">
  <cite>Bush, Vannevar (Jul 1945),
    <a href="http://www.theatlantic.com/magazine/archive/1945/07/as-we-may-think/3881/">"As
  We May Think"</a>,
    <i>The <a href="http://www.theatlantic.com/" title="Atlantic Monthly">Atlantic
  Monthly</a></i>
    <b>176</b> (1): 101–8
  </cite>
</note>
```

- ❖ <http://www.w3.org/community/openannotation/wiki/Serializations>
- ❖ http://www.w3.org/TR/2008/PR-rdfa-syntax-20080904/#sec_D.2.

Open Annotation 기술 : JSON , JSON-LD

Annotation in Client & Server Side

- Using client-side **JavaScript** into HTML
- Updates to **web pages** via XHR **or sockets**

```
{  
  "@context": "http://www.w3.org/ns/oa.json",  
  "@type": "Annotation",  
  "annotatedAt": "2014-01-14T01:28:22-0500",  
  "annotatedBy": {  
    "@id": "http://example.com/people/shepazu",  
    "name": "Shepazu",  
    "@type" : "Person"  
  },  
  "hasBody": [  
    {  
      "chars" : "Annotations are at the Web's core."  
    },  
    {  
      "@type": "Tag",  
      "chars": [  
        "web",  
        "standards",  
        "annotations"  
      ]  
    }  
  ],  
  "hasTarget": "http://example.com/sourcedoc.html"  
}
```

- ❖ <http://www.w3.org/community/openannotation/wiki/Serializations>
- ❖ <http://www.w3.org/ns/oa.json>

Open Annotation 향후 고려 기술

- 콘텐츠 간의 연결을 위한 기술
 - EPUB CFI
 - XPATH
 - EPUB-Link
- 정보 전달과 공유를 위한 표준

콘텐츠 간의 연결을 위한 기술 – EPUB-CFI

❖ EPUB CFI : 콘텐츠 내부 위치 정보 식별

#epubcfi(/2/6/4!/2/4/16) : img element

```
<?xml version="1.0"?>
<package version="2.0" unique-identifier="bookid" xmlns:dc="http://purl.org/dc/elements/1.1/" xmlns="http://www.idpf.org/2007/opf" xmlns:opf="http://www.idpf.org/2007/opf">
  <metadata>
    <dc:title>...</dc:title>
    <dc:identifier id="bookid">...</dc:identifier>
    <dc:creator>...</dc:creator>
    <dc:language>en</dc:language>
  </metadata>
  <manifest>
    <item id="ncxtoc" href="toc.ncx" media-type="application/x-dtbresource+xml"/>
    <item id="titlepage" href="titlepage.xhtml" media-type="application/xhtml+xml"/>
    <item id="chapter01" href="chapter01.xhtml" media-type="application/xhtml+xml"/>
    <item id="chapter02" href="chapter02.xhtml" media-type="application/xhtml+xml"/>
    <item id="chapter03" href="chapter03.xhtml" media-type="application/xhtml+xml"/>
    <item id="chapter04" href="chapter04.xhtml" media-type="application/xhtml+xml"/>
  </manifest>
  <spine toc="ncxtoc">
    <itemref idref="titlepage"/>
    <itemref idref="chapter01"/>
    <itemref idref="chapter02"/>
    <itemref idref="chapter03"/>
    <itemref idref="chapter04"/>
  </spine>
</package>
```

.opf file

chapter01.xhtml

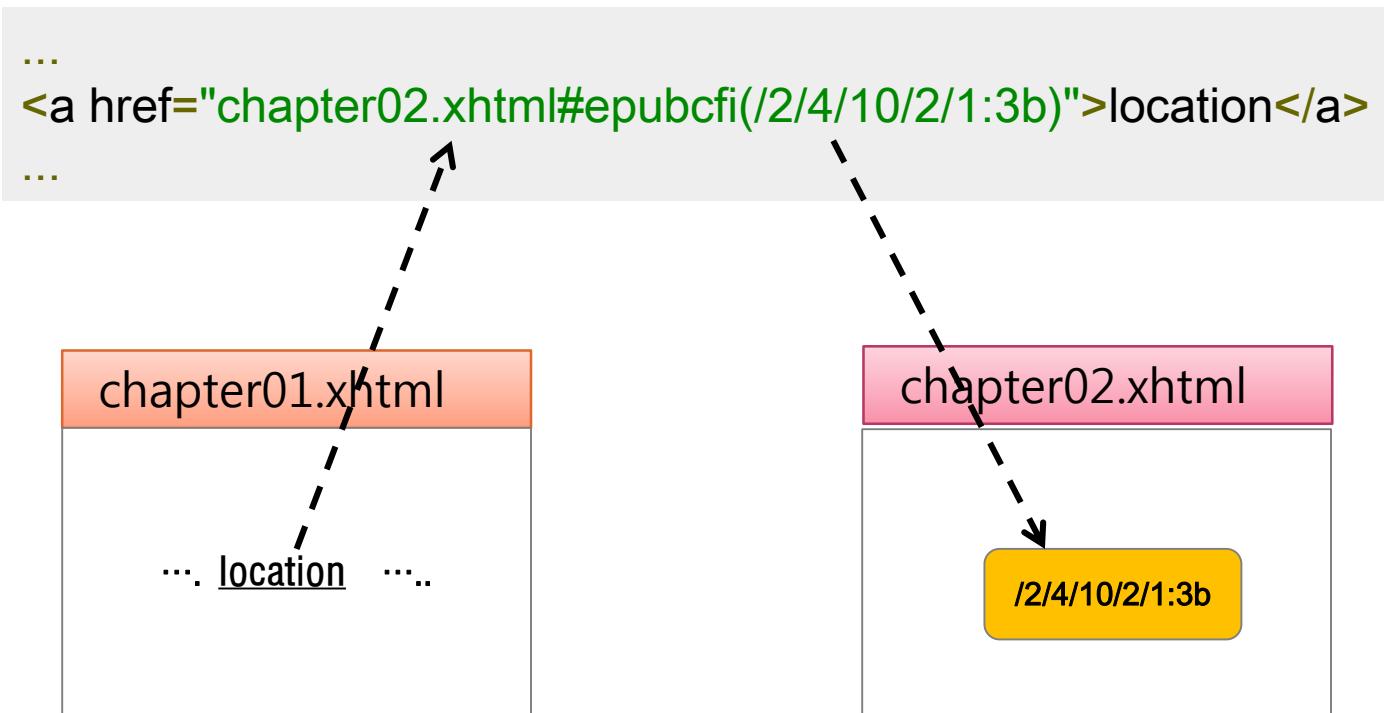
```
<html xmlns="http://www.w3.org/1999/xhtml">
  <head>
    <title>...</title>
  </head>
  <body>
    <p>...</p>
    <p>...</p>
    <p>...</p>
    <p>...</p>
    <p>aaa <em>bbb</em>0123456789</p>
    <p>...</p>
    <p>...</p>
    
    <p>...</p>
    <p>...</p>
  </body>
</html>
```

❖ <https://code.google.com/p/epub-revision/wiki/ImplementationProposalFragmentIdentifier>

콘텐츠 간의 연결을 위한 기술 – EPUB-CFI

❖ EPUB CFI : 콘텐츠 문서간의 연결

- CFI can be also used to cross-reference XML content inside the EPUB package



콘텐츠 간의 연결을 위한 기술 – EPUB-CFI

❖ EPUB CFI : 한계점과 과제

- 별도의 에디터로만 인식 가능

- ✓ 기계가 인식하는 문서내부 위치 식별 기술
 - ✓ 가독성 제한

- 콘텐츠 제작 경험 부족

- ✓ 전문 기술 경험 부족
 - ✓ 콘텐츠 제작 도구, 기술 환경 부재

- 표준 환경 부재

- ✓ 각 업체 독자적인 서비스 개발
 - ✓ 활용 방안을 다양하나 활용 사례 부족

Open Annotation 향후 고려 기술

- 콘텐츠 간의 연결을 위한 기술
 - EPUB CFI
 - XPATH
 - EPUB-Link
- 정보 전달과 공유를 위한 표준

XPATH

Xpath Expression

```
@XPath("/book")
@XPath("/")
@XPath("//*[@name() = 'book']")
@XPath("///*/*/..")
@XPath("//child::*/parent::book")
```

jQuery

```
$(context).xpath(expression, resolver)
$.xpath(context, expression, resolver)
```

```
$(document.body).xpath("preceding-sibling::element()");
$(document).xpath("//*[parent::html][last()]")
```

❖ <https://github.com/ilinsky/jquery-xpath>

EPUB Link

Uniform Resource Identifiers (URI) in RFC2396:
`<scheme>://<authority><path>?<query>`



`epub://urn%3Auuid%335d750c0-184f-2c4f-2ce2-1f9b7a7b891e/OEBPS/Introduction.xhtml#toc-anchor-2`

- ❖ <http://blog.threepress.org/2010/10/21/developing-an-epub-linking-spec/>
- ❖ <http://tools.ietf.org/html/rfc2396>

정보 전달과 공유를 위한 표준

부가 정보 전달

정보 공유

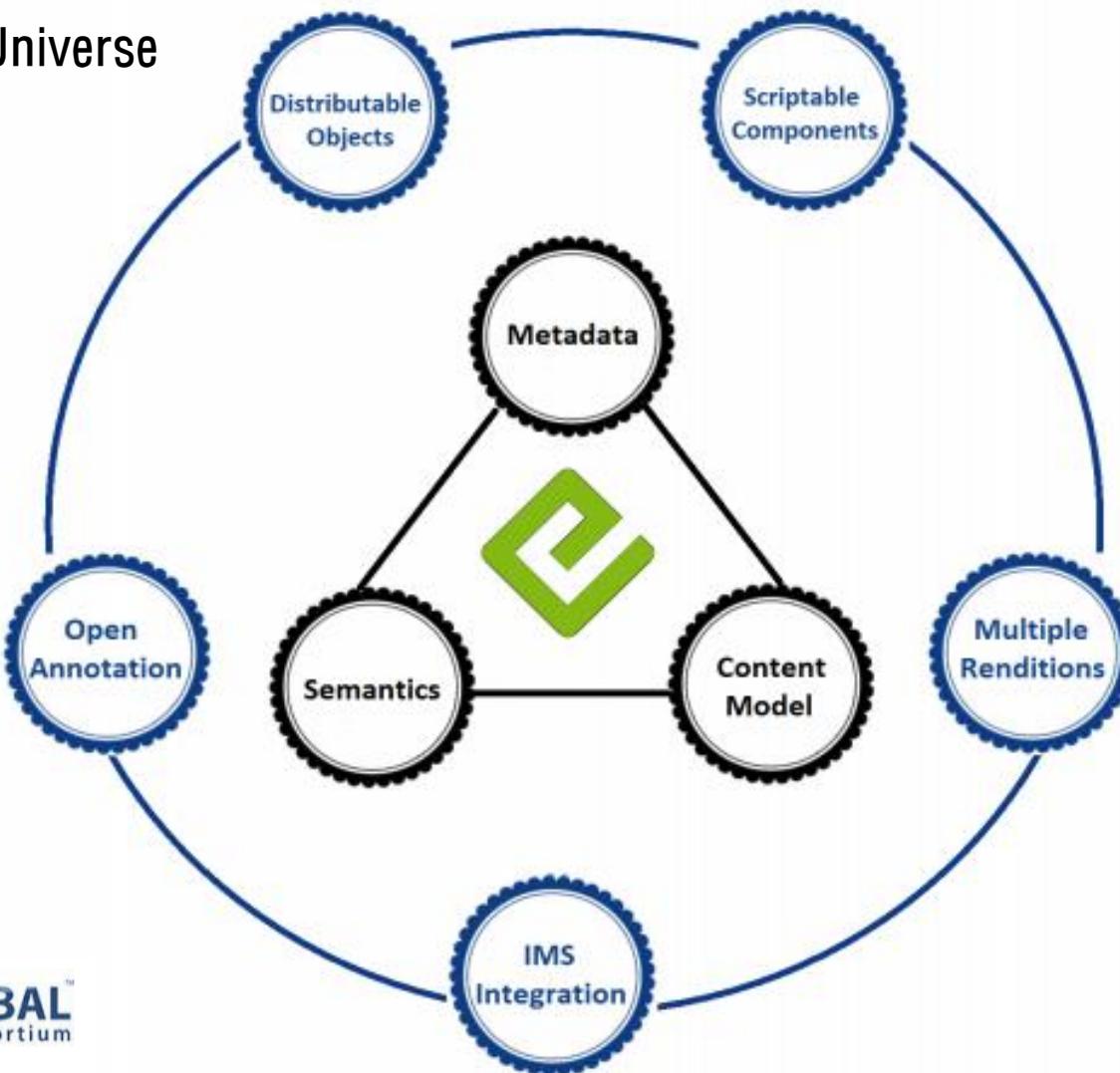
콘텐츠 제작

협업 환경



정보 전달과 공유를 위한 표준

❖ EDUPUB Universe



EDUPUB

Contents

Service

Culture

Techonology

Civilization



감사 합니다.

Q & A

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