

Anchoring the Semantic Web— the Evolution of Dublin Core

DC-2009

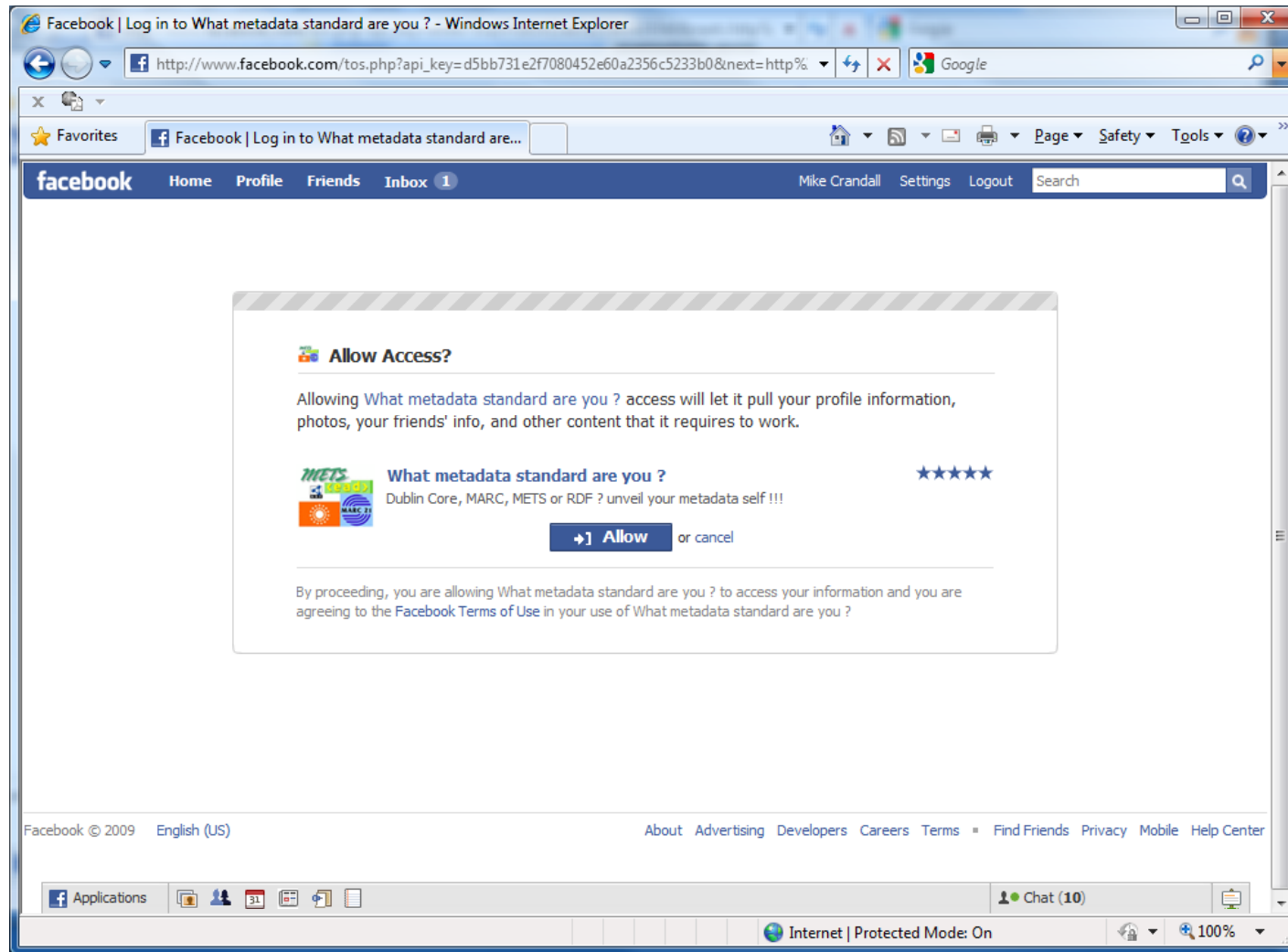
Seoul, Korea

October 13, 2009

Michael Crandall

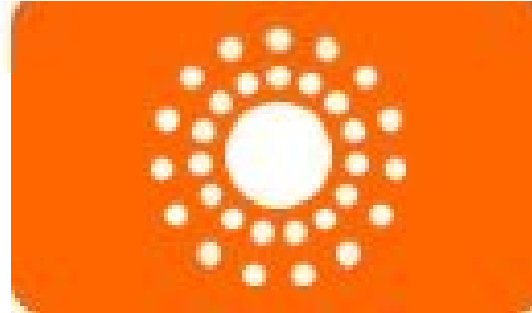
mikecran@u.washington.edu

What Metadata Standard are You?



What metadata
standard are you ?

**You're Dublin
Core !**



Simple and straightforward, you don't like to embarrass yourself with too much complexity. Your social network is wide and diverse, as you integrate easily all kinds of communities. You like travelling and building new experiences across the Web. Your only deficiency : you're sometimes a little superficial.

<http://apps.facebook.com/what-metadata/?start=1&target=home>

So What *is* Dublin Core?

Fifteen Elements?

Identifier	Definition
Title	A name given to the resource.
Creator	An entity primarily responsible for making the content of the resource.
Subject	The topic of the content of the resource.
Description	An account of the content of the resource.
Publisher	An entity responsible for making the resource available.
Contributor	An entity responsible for making contributions to the content of the resource.
Date	A date associated with an event in the life cycle of the resource.
Type	The nature or genre of the content of the resource.
Format	The physical or digital manifestation of the resource.
Identifier	An unambiguous reference to the resource within a given context.
Source	A reference to a resource from which the present resource is derived.
Language	A language of the intellectual content of the resource.
Relation	A reference to a related resource.
Coverage	The extent or scope of the content of the resource.
Rights	Information about rights held in and over the resource

Sugimoto, S., Baker, T., & Weibel, S. (2002). Dublin Core: Process and Principles. In E. Lim, S. Foo, C. Khoo, H. Chen, E. Fox, S. Urs, & T. Constantino (Eds.), *Digital Libraries: People, Knowledge, and Technology* (pp. 25-35). Berlin: Springer. Retrieved April 7, 2009 from <http://www.springerlink.com/content/9lx5fx94743269pp/>

A Standard?

The screenshot shows a web browser window displaying the ISO 15836:2009 product page. The browser's address bar shows the URL: http://www.iso.org/iso/catalogue_detail.htm?csnumber=52142. The page title is "ISO 15836:2009 - Information and documentation -- The Dublin Core metadata element set". The page content includes a navigation menu on the left, a main product description, and a sidebar with related standards.

ISO 15836:2009
Information and documentation -- The Dublin Core metadata element set

Media and price

Language	Format	Add to basket
English	PDF (134 kB)	CHF 50,00
English	Paper	CHF 50,00

General information

Number of Pages: 5

Edition: 2 (Monolingual)	ICS: 35.240.30
Status: Published	Stage: 60.60 (2009-02-18)
TC/SC: TC 46/SC 4	

Abstract

ISO 15836:2009 establishes a standard for cross-domain resource description, known as the Dublin Core Metadata Element Set. Like RFC 3986, ISO 15836:2009 does not limit what might be a resource.

ISO 15836:2009 defines the elements typically used in the context of an application profile which constrains or specifies their use in accordance with local or community-based requirements and policies. However, it does not define implementation detail, which is outside the scope of ISO 15836:2009.

Revision information

Revises: [ISO 15836:2003](#)

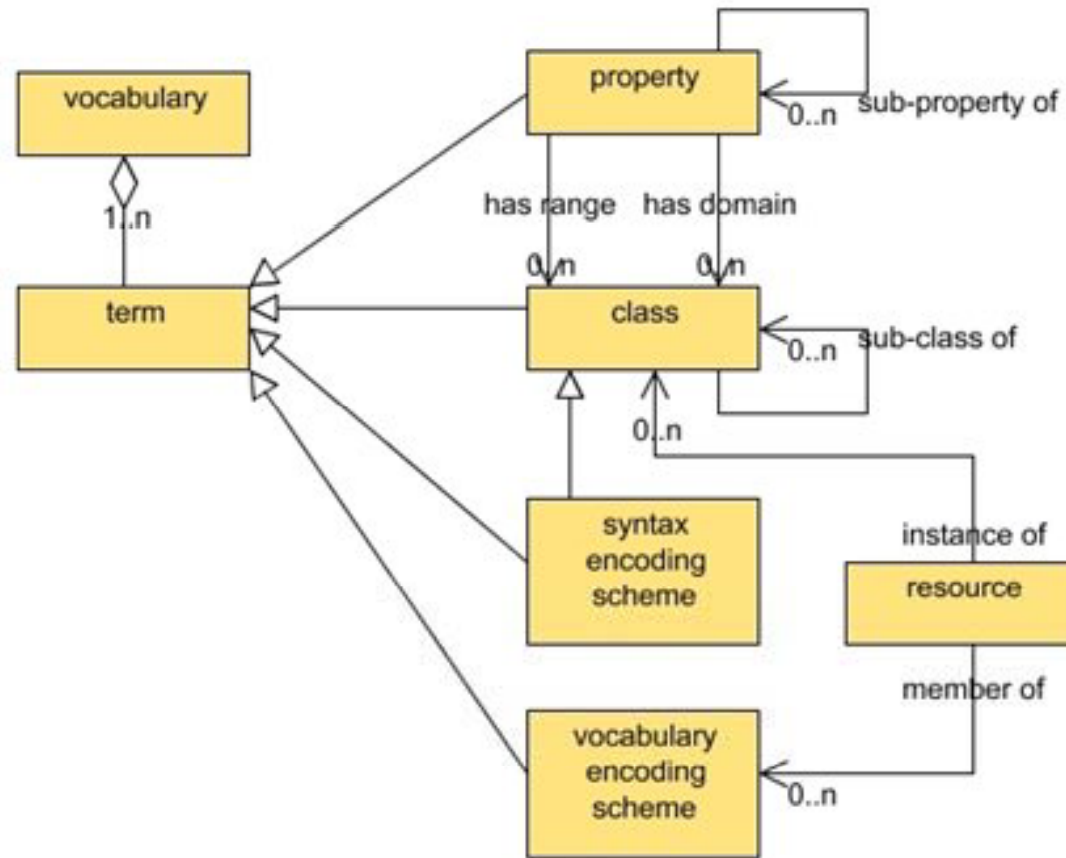
Corrigenda, Amendments and other parts

These standards could also interest you

- [ISO 8459:2009](#)
Information and documentation -- Bibliographic data element directory for use in data exchange and enquiry
- [ISO 28500:2009](#)
Information and documentation -- WARC file format
- [ISO 20775:2009](#)
Information and documentation -- Schema for holdings information

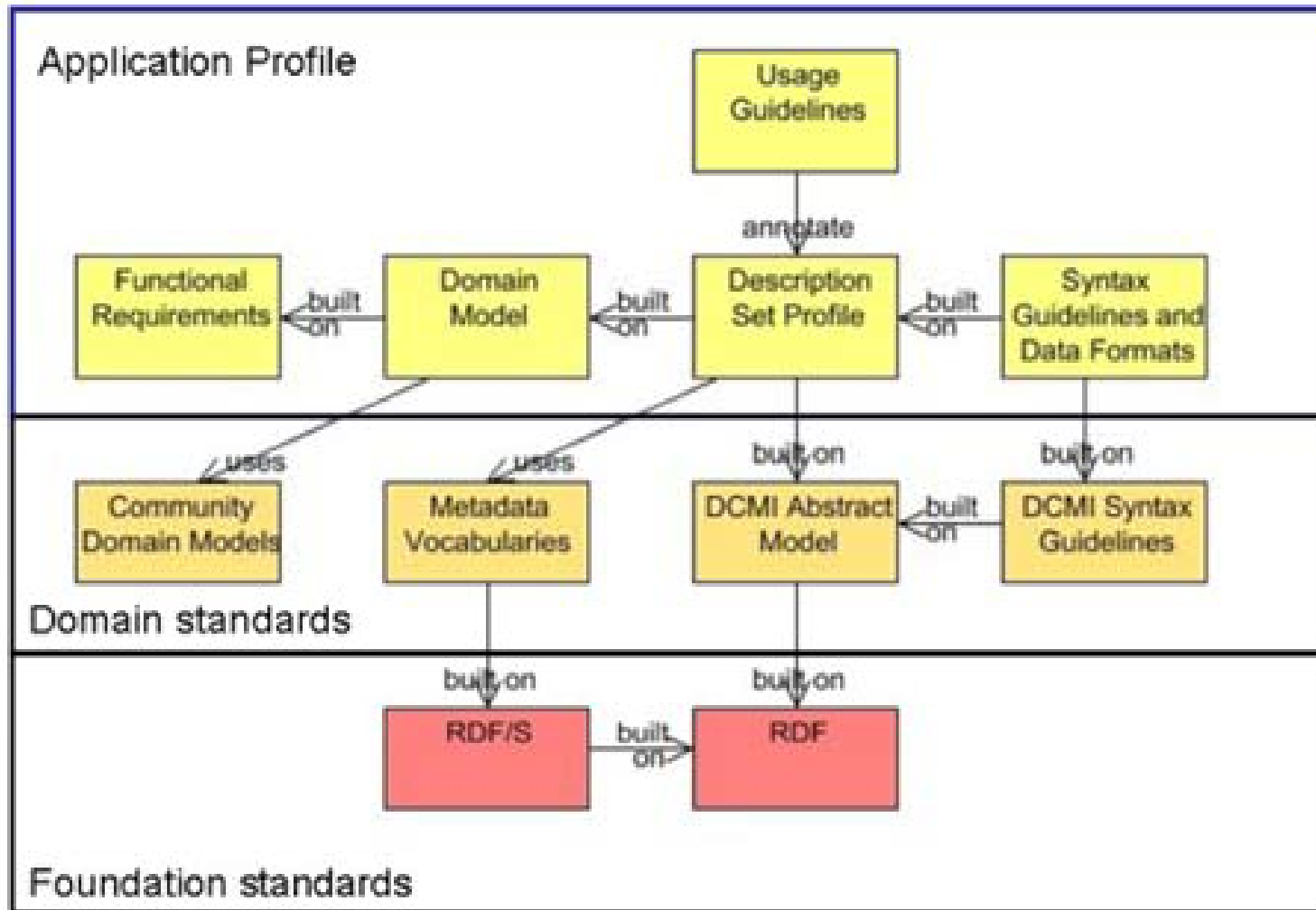
Dublin Core Metadata Initiative. (2009e). ISO 15836:2009 - Information and documentation -- The Dublin Core metadata element set. *International Organization for Standardization*. Retrieved March 20, 2009, from http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=52142

An Abstract Model?



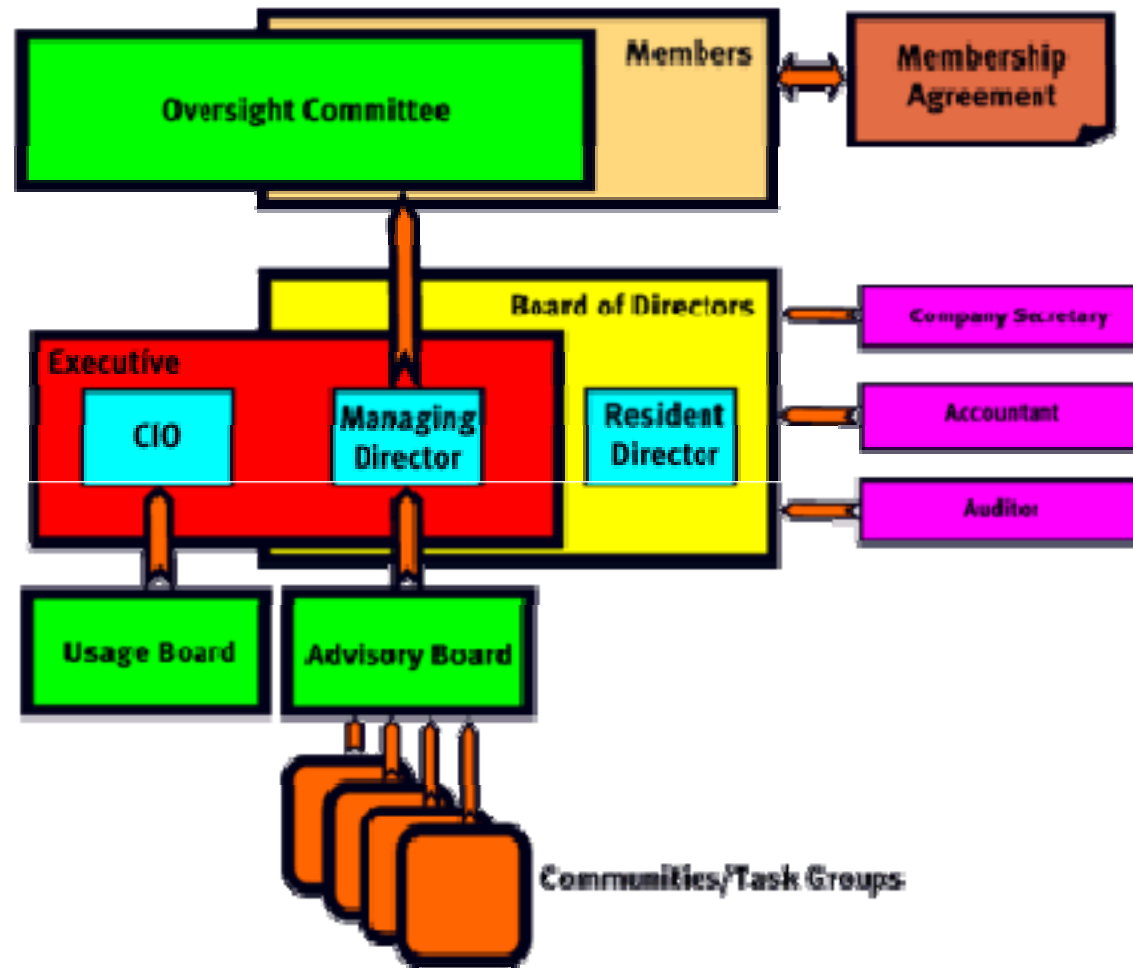
Powell, A., Nilsson, M., Naeve, A., Johnston, P., & Baker, T. (2007). DCMI Abstract Model. *Dublin Core Metadata Initiative*. Retrieved March 20, 2009, from <http://dublincore.org/documents/abstract-model/>

A Framework?



Nilsson, M., Baker, T., & Johnston, P. (2008). The Singapore Framework for Dublin Core Application Profiles. *Dublin Core Metadata Initiative*. Retrieved March 20, 2009, from <http://dublincore.org/documents/singapore-framework/>

An Organization?



Dublin Core Metadata Initiative. (2009h). DCMI By-laws. Retrieved April 7, 2009, from <http://dublincore.org/about/bylaws/>

People?



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So What *is* Dublin Core?

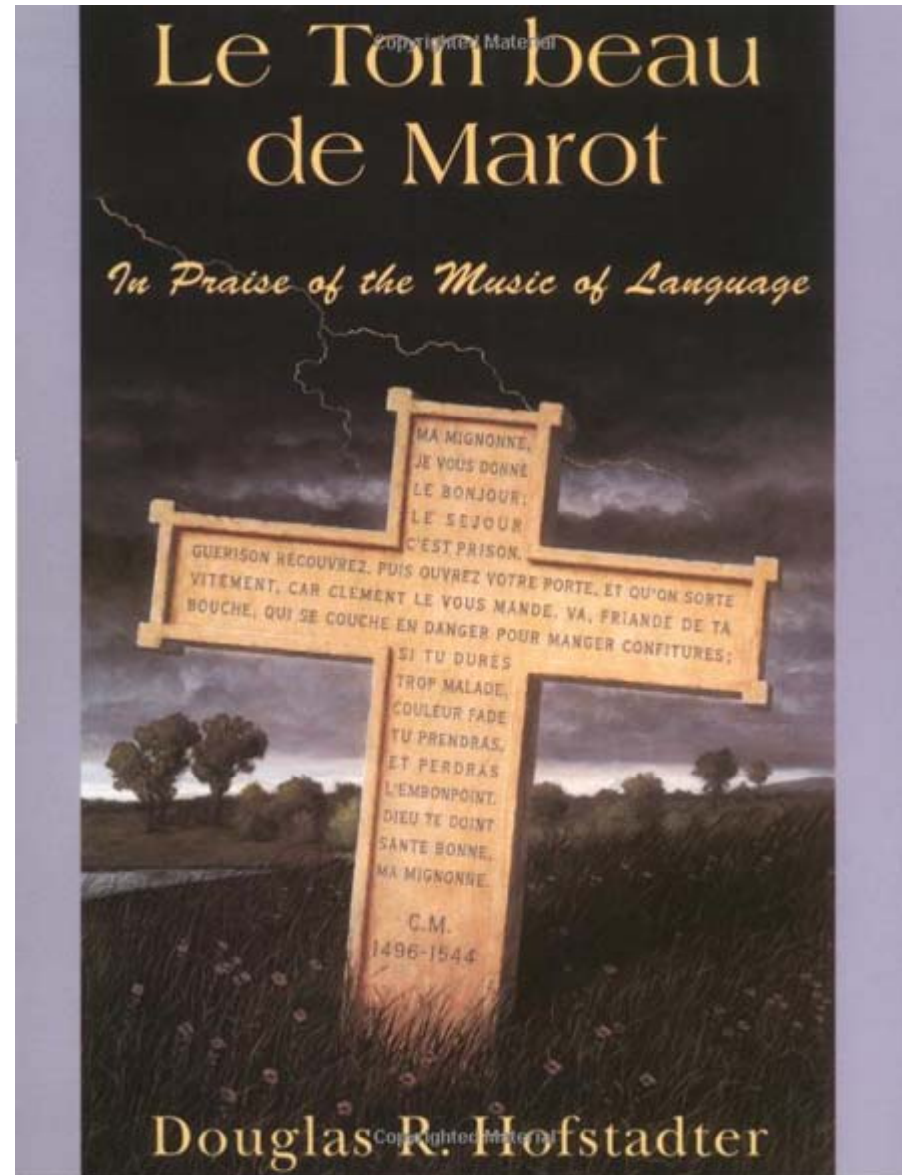
- 15 elements?
- A metadata standard?
- An abstract model?
- A framework?
- An organization?
- People?

A Pause

- Before we answer that question, I want to explore two aspects of DCMI's evolution over the years
 - First, the technical evolution that has been occurring since the initiative first started
 - Second, the organizational structure that has been created along with that technical underpinning
- Both are critical to what Dublin Core is and might become, and I think together bring up some important questions that we need to address in the near term

An Analogy

Douglas Hofstadter, College Professor of
Cognitive Science and Computer Science at
Indiana University, Director of Fluid Analogies
Research Group in the Center for Research on
Concepts and Cognition
<http://www.cogs.indiana.edu/people/homepages/hofstadter.html>



A Une Damoysele Malade

a short poem
by Clement Marot
early 16th century



*Ma mignonne,
Je vous donne
Le bon jour;
Le sejour
C'est prison.
Guerison
Recouvrez,
Puis ouvrez
Votre porte
Et qu'on sorte
Vitement,
Car Clement
Le vous mande.
Va, friande
De ta bouche,
Qui se couche
En danger
Pour manger
Confiture;
Si tu dures
Trop malade,
Couleur fade
Tu prendras,
Et perdras
L'embonpoint.
Dieu te doint
Sante bonne,
Ma mignonne.*

*Ma mignonne,
Je vous donne
Le bon jour;
Le sejour
C'est prison.
Guerison
Recouvrez,
Puis ouvrez
Votre porte
Et qu'on sorte
Vitement,
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Et perdras
L'embonpoint.
Dieu te doint
Sante bonne,
Ma mignonne.*

October 13, 2009

To a Sick Damsel

a “standard” (lossy)
translation

DC-2009: Seoul, Korea

*My sweet,
I bid you
A good day;
The stay
Is prison.
Health
Recover,
Then open
Your door,
And go out
Quickly,
For Clement
Tells you to.
Go, indulger
Of thy mouth,
Lying abed
In danger,
Off to eat
Fruit preserves;
If thou stay'st
Too sick,
Pale shade
Thou wilt acquire,
And wilt lose
Thy plump form.
God grant thee
Good health,
My sweet.*

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Touchstones

reduction to the
metadata basics

Vous: *Cuteness; hail.*
Quarantine, cure.
Egress; speed.
Clement; insistence.

Tu: *Epicurism; threat.*
Appetite; jams.
Pallor; gauntness.
Prayer; cuteness.

My Sweet/Cute [One] (Feminine)

a rule-based
translation-
making the
semantics explicit

*My sweet/cute [one] (feminine),
I [to] you (respectful) give/bid/convey
The good day (i.e., a hello, i.e., greetings)
The stay/sojourn/visit (i.e., quarantine)
[It] is prison.
Cure/recovery/healing (i.e., [good] health)
Recover (respectful imperative)*

*Your (respectful) door,
And [that one (i.e., you (respectful)) should] go out
Fast[ly]/quick[ly]/rapid[ly]
For/because Clement
It (i.e., thusly) [to] you (respectful) commands/orders.
Go (familiar imperative), fond-one/enjoyer/partaker
Of your (familiar) mouth,
Who/which herself/himself/itself beds (i.e., lies down)
In danger;
For/in-order-to eat
Jams/jellies/confectionery.
If you (familiar) last (i.e., stay/remain)
Too sick/ill,
[A] color pale/faded/dull
You (familiar will take [on],
And [you (familiar)] will waste/lose
The plumpness/stoutness/portliness (i.e., well-fed look).
[May] God [to] you (familiar) give/grant
Health good,
My sweet/cute [one] (feminine).*

My Nice

getting
machines to do
the work

*My nice,
I give you
The hello.
The stay,
It is prison.
Cure
Cover,
Then open
Your door,
Vivement
Kind
For Clement
You it mande.
Goes, fond of delicacies
Of your mouth,
Which lie down
In danger,
To eat
Jams.
If you hard
Too sick,
Insidid couleur
You will take,
And lose
The embonpoint.
God you doint
Good health,
My nice.*

Pieces of the Puzzle

- Clearly, a poem is more than words
- But it can be represented in many ways
- Rules are necessary, but not always sufficient
- Machines may need more help than we thought, but....
 - People need to understand the results of our translation as well
- And elegance should be part of the solution

What Does This Have to Do With DCMI?

- There are (at least) two problems Hofstadter was dealing with
 - The granular matching of language to language while preserving meaning
 - The bigger picture that gives those granular matchings human meaning
- DCMI has the same problems– and we might think of the technical work that we have been doing as an exploration of these problems
- The DCMI Recommended Resource “Interoperability Levels for Dublin Core Metadata” published in May or this year is a good representation of the results of that exploration, and encapsulates the evolution of the DCMI thinking

Interoperability Levels for Dublin Core Metadata

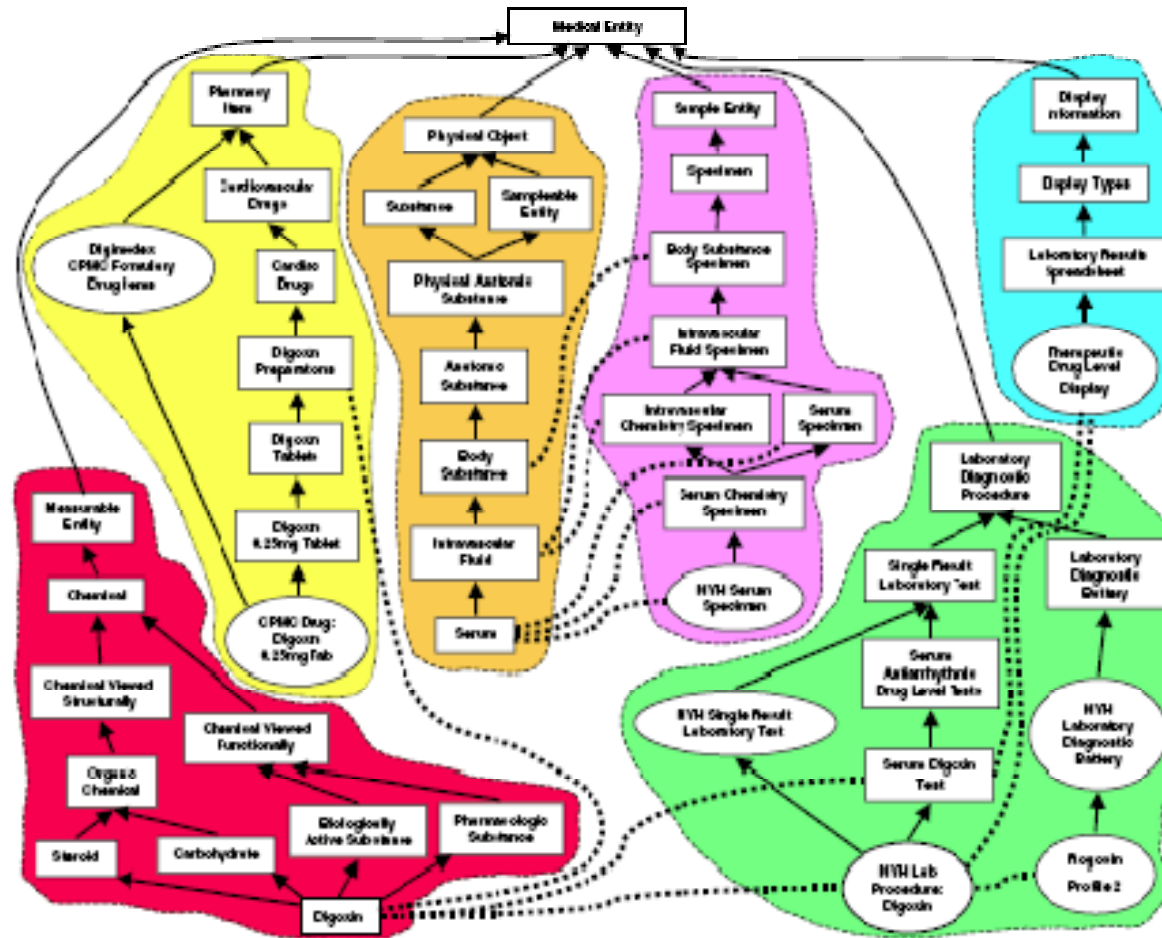
- 4: Description Set Profile Interoperability
 - Shared formal vocabularies and constraints in records
- 3: Description Set syntactic interoperability
 - Shared formal vocabularies in exchangeable records
- 2: Formal semantic interoperability
 - Shared vocabularies based on formal semantics
- 1: Shared term definitions
 - Shared vocabularies defined in natural language

<http://dublincore.org/documents/interoperability-levels/index.shtml>

Next Steps

- How do record-centric models fit with data-centric models?
 - Tom Baker tutorial: *Interoperability options in a complex Web of data* (Mon 11-12:30)
 - Many presenters in a special session on functional issues related to linked data (Tue 14:00-15:30)
 - Tom Baker and many others in a special session: *Technical Aspects of Linked Data* (Wed 14:00- 5:30)
 - Eric Miller special session: *Strategic aspects of Linked Data*. (Thu 14:00-16:00)
- How do we engage with other disciplines interested in much the same area, but coming from very different backgrounds?
 - Alistair Miles keynote: *Towards Semantic Web Deployment: Experiences with Knowledge Organisation Systems, Library Catalogues and Fruit Flies* (Thu 9:30-10:30)

Columbia University/New York Presbyterian Hospital Medical Entities Dictionary (MED)



J.J. Cimino (2006). In defense of the Desiderata. *Journal of Biomedical Informatics* 39 (2006) 299–306

Some Other Opportunities

- How do we get people to understand what's happening behind the scenes?
 - Emma Tonkin paper: *Multilayered paper prototyping for user concept modeling*. (Thu 11:00-13:00)
- How can we help implementers manage metadata projects?
 - Paul Walk, Emma Tonkin & Talat Chaudhri workshop: *Agile development, application profiles and the Singapore Framework*. (Wed 16:00-17:00)
- How can we make it possible for developers to build compliant code?
 - Karen Coyle, Stuart Sutton, Tom Baker discussion on DC-Architecture: *Design patterns for Application Profiles*

Show Me How To Do It

apDesigns - Windows Internet Explorer

http://dublincore.org/dcmirdataskgroup/apDesigns

length of time to read pages of text out loud

File Edit View Favorites Tools Help

length of time to read pages ... New Tab - apDesigns

Dublin Core Metadata Initiative®
Making it easier to find information.

> **apDesigns**

Some Application Profile Design Patterns

These design patterns are based on the Dublin Core Description Set Profile (DSP). The DSP structure is a single description set that contains one or more descriptions, each of which contains one or more metadata statements. Both the description and the metadata statements can define constraints on usage.

Statement: A Simple String

The simplest metadata statement describes a property that takes a simple string value ("literal"), with no constraints.

```
<?xml version="1.0" encoding="UTF-8"?>
<DescriptionSetTemplate xmlns="http://dublincore.org/xml/dc-dsp/2008/01/14" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xsi:schemaLocation="http://dublincore.org/xml/dc-dsp/2008/01/14
C:\dcmi\dcmi-dsp.xsd">
  <DescriptionTemplate ID="resource" >
    <StatementTemplate ID="title" type="literal">
      <Property>http://RDVocab.info/Elements/title</Property>
    </StatementTemplate>
  </DescriptionTemplate>
</DescriptionSetTemplate>
```

Mandatory and Repeatable

Both description templates and statement templates can be coded as mandatory/optional and repeatable/not

User

UserPreferences

Site

- [FrontPage](#)
- [RecentChanges](#)
- [FindPage](#)
- [HelpContents](#)

Page

- [Edit](#)
- [View](#)
- [Diffs](#)
- [Info](#)
- [Subscribe](#)
- [Raw](#)
- [Print](#)

Actions

- [AttachFile](#)
- [DSP2XML](#)
- [DeletePage](#)
- [LikePages](#)
- [LocalSiteMap](#)
- [SpellCheck](#)

Done Internet 100%

<http://dublincore.org/dcmirdataskgroup/apDesigns>

Scholarly Works Application Profile

The screenshot shows a Windows Internet Explorer browser window displaying the SWAP - DigiRepWiki website. The browser's address bar contains the URL: http://www.ukoln.ac.uk/repositories/digirep/index/Eprints_Application_Profile. The page title is "SWAP - DigiRepWiki". The main content area features a navigation menu on the left with categories like "Repositories", "Research", "About", "News", "Events", "Info and activities", "Projects", "Clusters", "Scenarios/use cases/UML", "Workflows", "Deposit API/SWORD", "Application Profiles", "CRIG", "FAQs", "Links", "Recent changes", "Sandbox", and "Help". Below the navigation menu is a search box with "Go" and "Search" buttons. The main content area has a "Contents [hide]" section with a list of numbered items: 1 Introduction, 2 Scholarly Works Application Profile, 3 Objectives, 4 Deliverables (with sub-items 4.1 Functional requirements, 4.2 Model, 4.3 Application profile and Description Set Profile, 4.4 Community Acceptance Plan, 4.5 Vocabularies and Terms, 4.6 Mappings, 4.7 Syntax encoding guidelines, 4.8 Other documents), 5 Workplan, 6 Working group (with sub-item 6.1 Feedback group), 7 Key supporting resources, 8 Background, 9 Meetings, 10 Presentations and tutorials (with sub-item 10.1 Dublin Core 2006 Mexico). The browser's status bar at the bottom shows "Internet" and "100%".

http://www.ukoln.ac.uk/repositories/digirep/index/Eprints_Application_Profile

And More Opportunities

- How can we share knowledge with newbies?
 - Challenge to newcomers– how do you absorb 15 years of history in a short time?
 - The amount of knowledge to cover is huge
 - Opportunities in graduate programs for students to work on problems
- How can we share with other audiences who need to know about the work DCMI is doing (and might be supporters)?
 - We're good at working within the semantic web community, but less so in the practitioner world

A New Language

If `mythes:paris-concept` is a `skos` concept for Paris, and `dbpedia:Paris` is the city itself, then if we use a relationship (eg. a new `foaf:` or `skos:property`, "it") to link from the former to the latter, what inferences can we draw?

if `doc1 dcterms:subject mthes:paris-concept & mythes:paris-concept foaf:it dbpedia:Paris ...`

can we conclude that `doc1 dcterms:subject dbpedia:Paris ?`

Dan Brickley, DC-Architecture Forum, 9/22/2009.

Metadata In the Classroom

The screenshot shows a web browser window with the URL <https://courses.washington.edu/lis538/assignments.shtml>. The page content includes a navigation menu on the left, a main heading 'Assignments & Grading', and an 'Overview' section. The 'Overview' section contains a paragraph and a table of assignments.

Font Size
normal | large | largest

LIS 538

- Home
- Course Overview

Coursework:

- Calendar & Modules
- Assignments & Grading
- Readings

Communication:

- Course Communications
- Instructor Information
- Student Directory

Miscellaneous:

- Course Resources
- Library & Tech Tips
- Course Evaluations

Assignments & Grading

Overview • My Domain
Exercise 1 • Exercise 2 • Exercise 3 • Exercise 4
Final Project • Grading

Overview

There are four exercises and a final project required in this course. A passing grade requires submission of **all** assignments (i.e., no assignment triage).

Assignment Name	Related module	Due Date	Percent of Grade
<i>Your Community of Practice</i>	Modules 1 - 6	9/22 through 9/26 (Online discussion)	--
<i>General and Domain Models</i>	Module 2	9/29 through 10/05 (Online discussion)	--
<i>Exercise 1: Functional Requirements & Domain Model</i>	Module 2	10/13 through 10/15	20
<i>Exercise 2: Term Declarations</i>	Modules 3 & 4	11/10 through 11/12	20
<i>Exercise 3: Description Set Profile</i>	Module 5	11/24 through 11/26	20
<i>Exercise 4: Syntactic Binding</i>	Module 6	12/01 through 12/03	15

<https://courses.washington.edu/lis538/assignments.shtml>

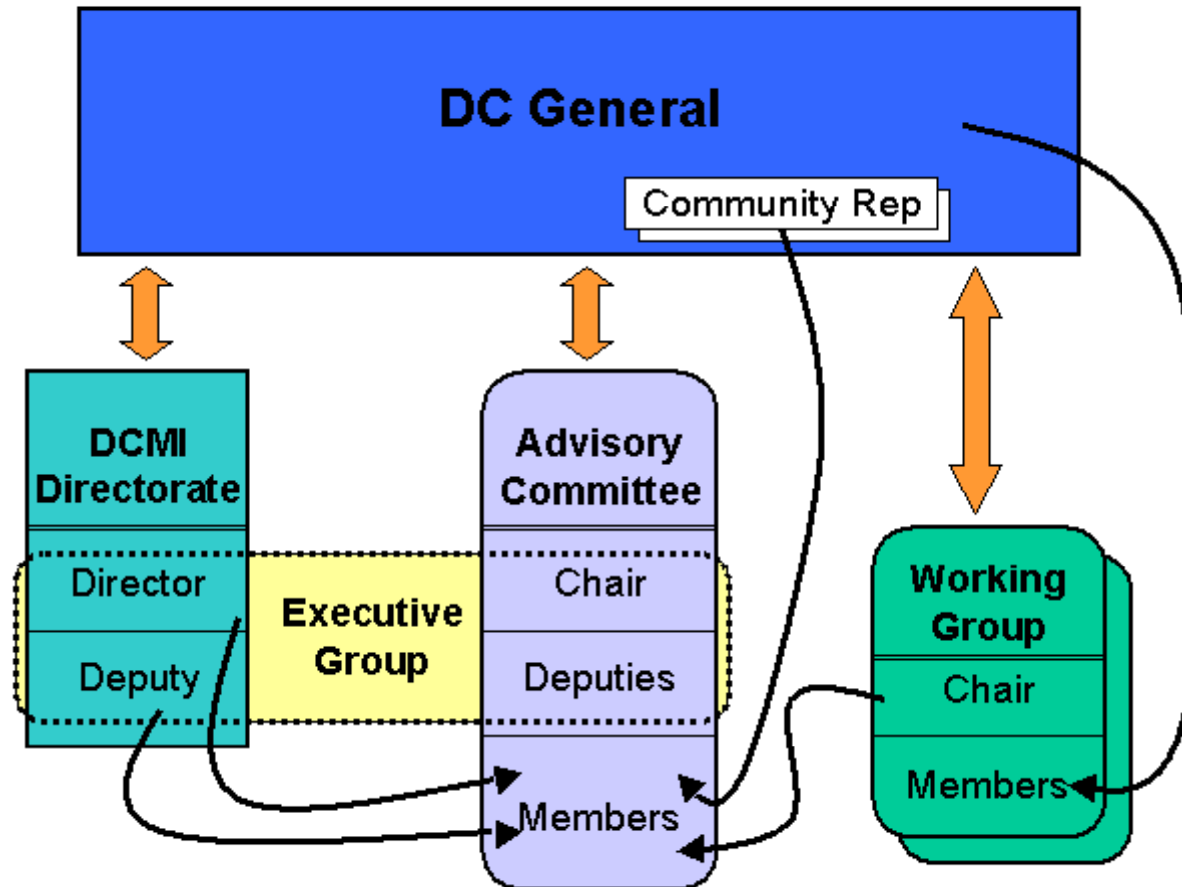
And A Challenge

- The previous examples are only some of the technical and practical opportunities that DCMI currently has
- But no matter what technical solutions we come up with, humans are still the ones that need to use the products of this work
- And DCMI as an *organization* has the responsibility (and privilege!!) to continue evolving to meet both the technical and human needs

The Organizational Challenge

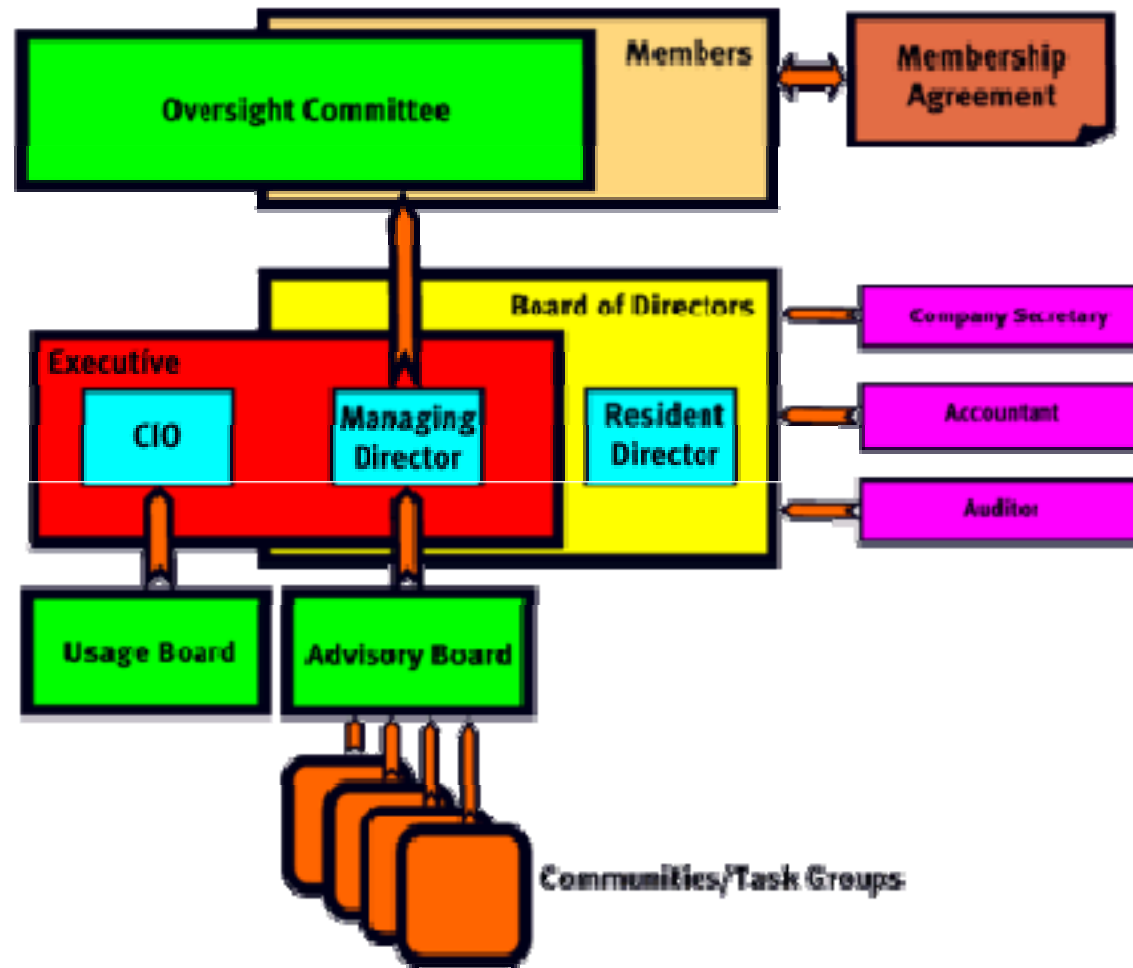
- We are moving from a sponsor supported organization to a member supported organization
- The problems that we are working on are more complex and more varied than in the beginning
- We've reached a stage where implementation is becoming real, in spite of the complexity
 - This means a different set of products and different audiences to engage
- We are a broader community, with different needs and drivers than the original membership of DCMI

The Old



<http://dublincore.org/documents/1999/05/31/dcmi-structure/>

DCMI Today



Dublin Core Metadata Initiative. (2009h). DCMI By-laws. Retrieved April 7, 2009, from <http://dublincore.org/about/bylaws/>

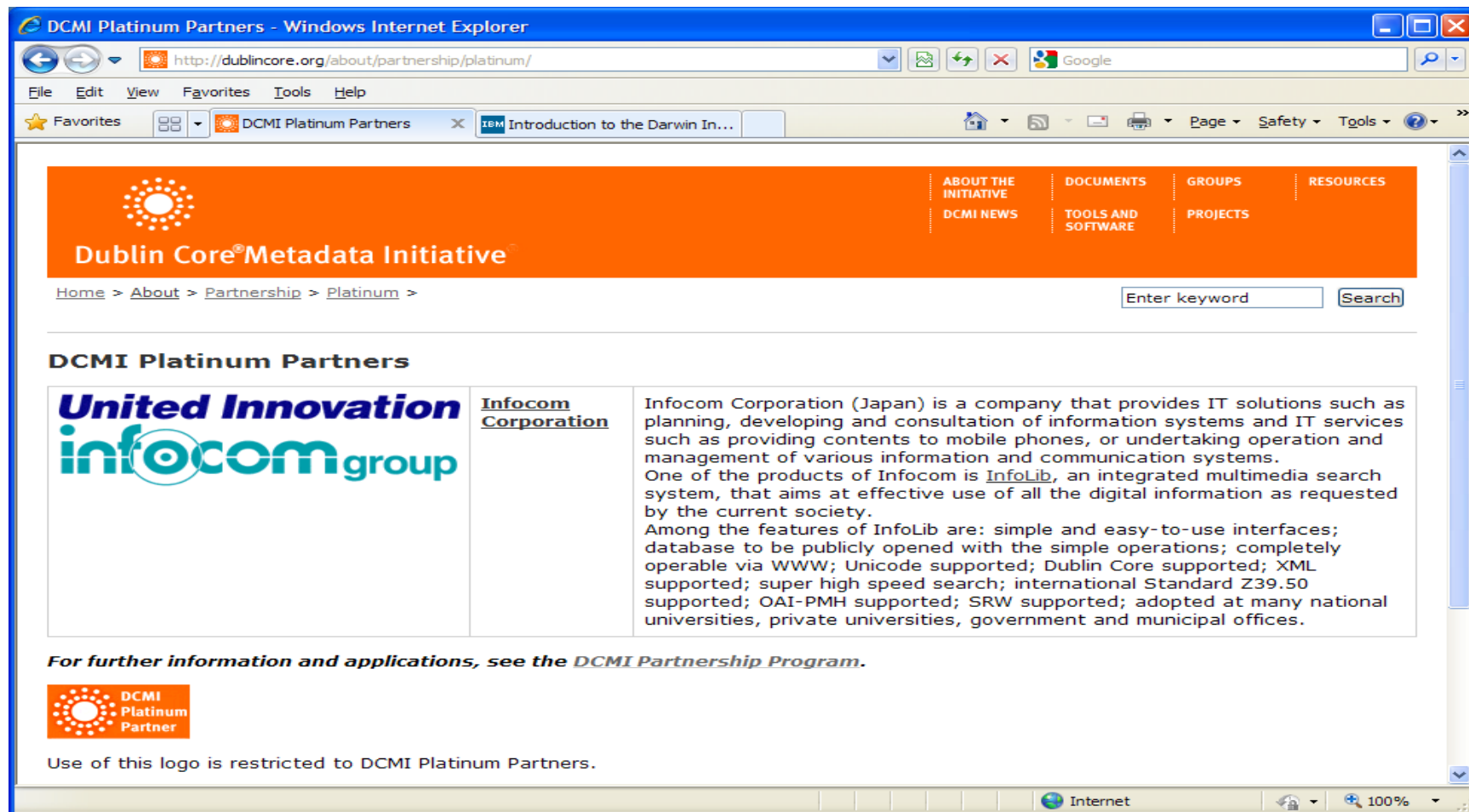
A Valuable Organization

- Value of DCMI is its focus on interoperability of metadata
- With multiple stakeholders contributing ideas and criticisms
- And an organization that supports that conversation
- And brings the work together for those who are new and learning
- It's a unique space in the world, and one that I would argue is the anchor point for solid work in the future on the semantic web and metadata in general

DCMI Needs You...

- If you can produce examples, patterns, case studies, and educational material to help others understand the complexities of what DCMI is doing, do it now
- If you're working on something that could help move the technical agenda forward, share it with the community now
- If you're in a position to move your country or region into member status, do it now
- If you're in a position to move your organization into a partnership status, do it now

DCMI Partners



<http://dublincore.org/about/partnership/>

DCMI Local Tutorial Partners

DCMI Local Tutorial Partners - Windows Internet Explorer

http://dublincore.org/about/partnership/tutorial/

File Edit View Favorites Tools Help

DCMI Local Tutorial Partn... X IBM Introduction to the Darwin In...


Home > About > Partnership > Tutorial >

Enter keyword Search

DCMI Local Tutorial Partners

Fondazione Rinascimento Digitale

About the partner

	<p>Fondazione Rinascimento Digitale</p> <p>The "Fondazione Rinascimento Digitale" (Digital Renaissance Foundation) was created in 2004 to promote the use of the new Information and Communication Technologies for cultural heritage applications. One of the purpose of the Foundation is to spread international open standards, methodologies and tools for long-term preservation of digital memory. The main projects of the Foundation are:</p> <ul style="list-style-type: none">• "Access to Digital Libraries": on the use of metadata in Italian Digital Libraries;• "Pinakes 3.0": an open source application, based on the Dublin Core metadata element, for the integration of databases of cultural heritage contents;• "Magazzini Digitali": creating a large infrastructure for the long-term storage of digital materials.
--	---

About the event

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<http://dublincore.org/about/partnership/>

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For further information and applications, see the [DCMI Partnership Program](#).

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The DCMI Registry is hosted by the [Research Center for Knowledge Communities](#) at the University Of Tsukuba, Japan.

Internet 100%

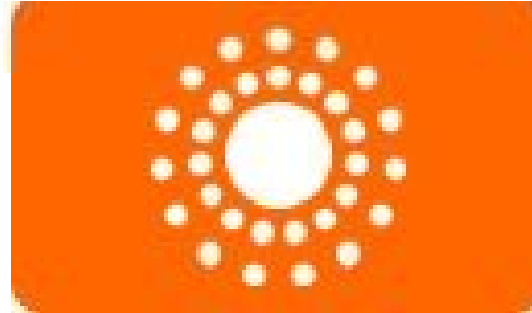
<http://dublincore.org/about/partnership/>

The Future

- Explaining what DCMI is– not just a set of terms, but a way of describing the world in linked data, so that we can build the semantic web
- Helping legacy users move into the future while still ensuring their continuing support and engagement
- Bringing the members of the community together and continuing the discussion
- Building tools and examples that help implementers use the fruits of DCMI's thought and labor
- Educating the public about all this
- Gaining support for the organization so it can continue the work

What metadata
standard are you ?

**You're Dublin
Core !**



Simple and straightforward, you don't like to embarrass yourself with too much complexity. Your social network is wide and diverse, as you integrate easily all kinds of communities. You like travelling and building new experiences across the Web. Your only deficiency : you're sometimes a little superficial.

<http://apps.facebook.com/what-metadata/?start=1&target=home>

Dublin Core is:

- 15 elements
- A metadata standard
- An abstract model
- A framework
- An organization
- Geeks, freaks and people in sensible shoes

All of These and More

- DCMI is the anchor point for thoughtful work on the underpinnings of the semantic web
- A place to take ideas and turn them into practice
- A community of developers, practitioners and implementers
- Smart people pushing hard boundaries and advancing learning
- An organization that supports ongoing dialog among the thinkers and doers in a complex space

And

- A producer of *elegant* solutions to the really hard problems in building interoperable linked data

.....

For another 15 years!!!

(It's not as "simple and straightforward" as it seems)

Thank You All!!



Questions?