

Modelling Learners Interaction Preferences in dotLRN

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- Built-in support for user modelling
 - Gatherig data about users
 - Learning Styles → Felder test
 - Package to be delivered by aDeNu
 - From IMS-QTI questionnaires
 - From interactions
 - Active actions → create!
 - Passive actions → read!
 - Support specifications and standards
 - IMS-AccLIP:
 - models learners interactions preferences
 - CC/PP
 - Models devices capabilities
 - CMI
 - Models learners interactions in SCORM
 - Integration with processing mechanisms
 - Machine Learning → Weka algorithms
 - Multi-Agent sytems → JADE agents
 - RDF management → Sesame

IMS-AccLIP



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IMS LIP has elements ...

- <identification>
 - <qcl>
 - <activity>
 - <affiliation>
 - <goal>
 - <competency>
 - <interest>
 - <accessibility>
 - <relationship>
- “... used to identify the learner ...” Vcard
 - “qualifications, certificates, licences”
 - whole or any part of a course
 - can include definition of the activity and its parts
 - can include assessment, marks, credits
- IMS RDCEO
 - Motivator,

- Originally “preferences” and “capabilities”
- IMS ACCLIP agreed July 2003
 - <accessForAll> replaces <disability>
 - “all accessibility preference information”
- represents in great detail, for any user,
 - assistive hardware preferences
 - assistive software preferences
- good for transfer of user settings
- Similar format that AccMD for the resources (matching)
- now, updating AccLIP + AccMD to changes suggested by ISO



UK application profiles of IMS LIP

```
7  xmlns:xsi = "http://www.w3.org/2001/XMLSchema-instance"
8  xsi:schemaLocation = "http://www.imsglobal.org/xsd/imslip_v1p0
http://www.imsglobal.org/xsd/imslip_v1p0.xsd">
9  <comment>An example of LIP Accessibility information.</commen
10 <contenttype>
11 <referential>
12 <sourcedid>
13 <source>IMS_LIP_V1p0_Example</source>
14 <id>basic_1001</id>
15 </sourcedid>
16 </referential>
17 </contenttype>
18 <accessibility>
19 <contenttype>
20 <referential>
21 <indexid>accessibility_01</indexid>
22 </referential>
23 </contenttype>
24 <preference>
25 <typename>
26 <tysource sourcetype="imsdefault"/>
27 <tyvalue>InputTech</tyvalue>
28 </typename>
29 <contenttype>
30 <referential>
31 <indexid>preference_01</indexid>
32 </referential>
33 </contenttype>
34 <prefcode>Large Font Display Devices</prefcode>
35 </preference>
36 </accessibility>
37 </learninginformation>
38
```

```
<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" xmlns:dc
="http://purl.org/dc/elements/1.1/">
<rdf:Description rdf:about="http://dublincore.org/documents/abstract-model
<dc:title>DCMI Abstract Model</dc:title>
<dc:creator>Andy Powell</dc:creator>
<dc:description>This document specifies an abstract model for DCMI
metadata descriptions.</dc:description>
<dc:publisher>Dublin Core Metadata Initiative</dc:publisher>
</rdf:Description>
</rdf:RDF>
```

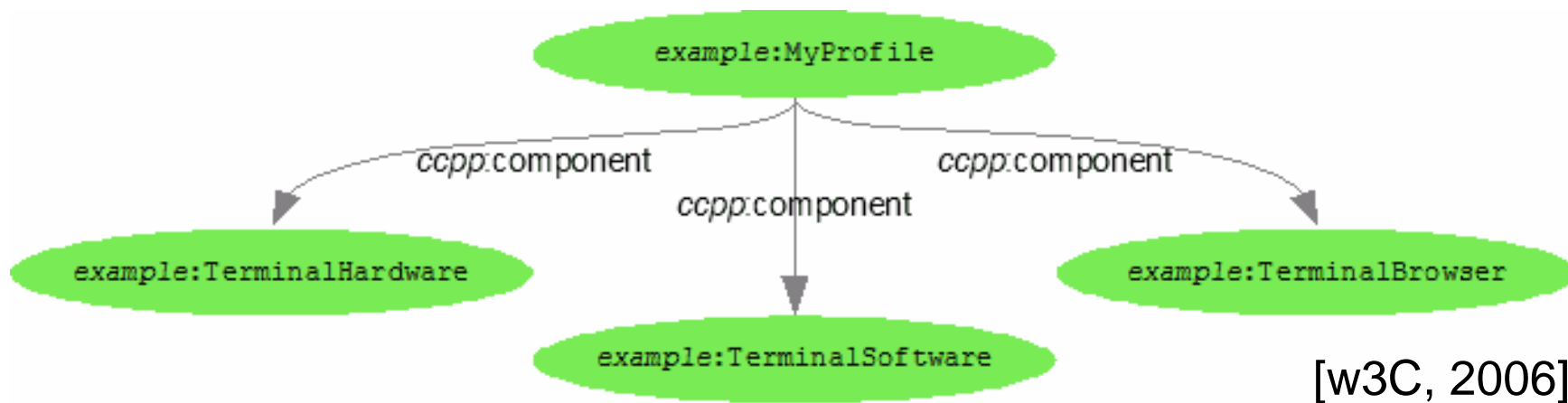
CC/PP



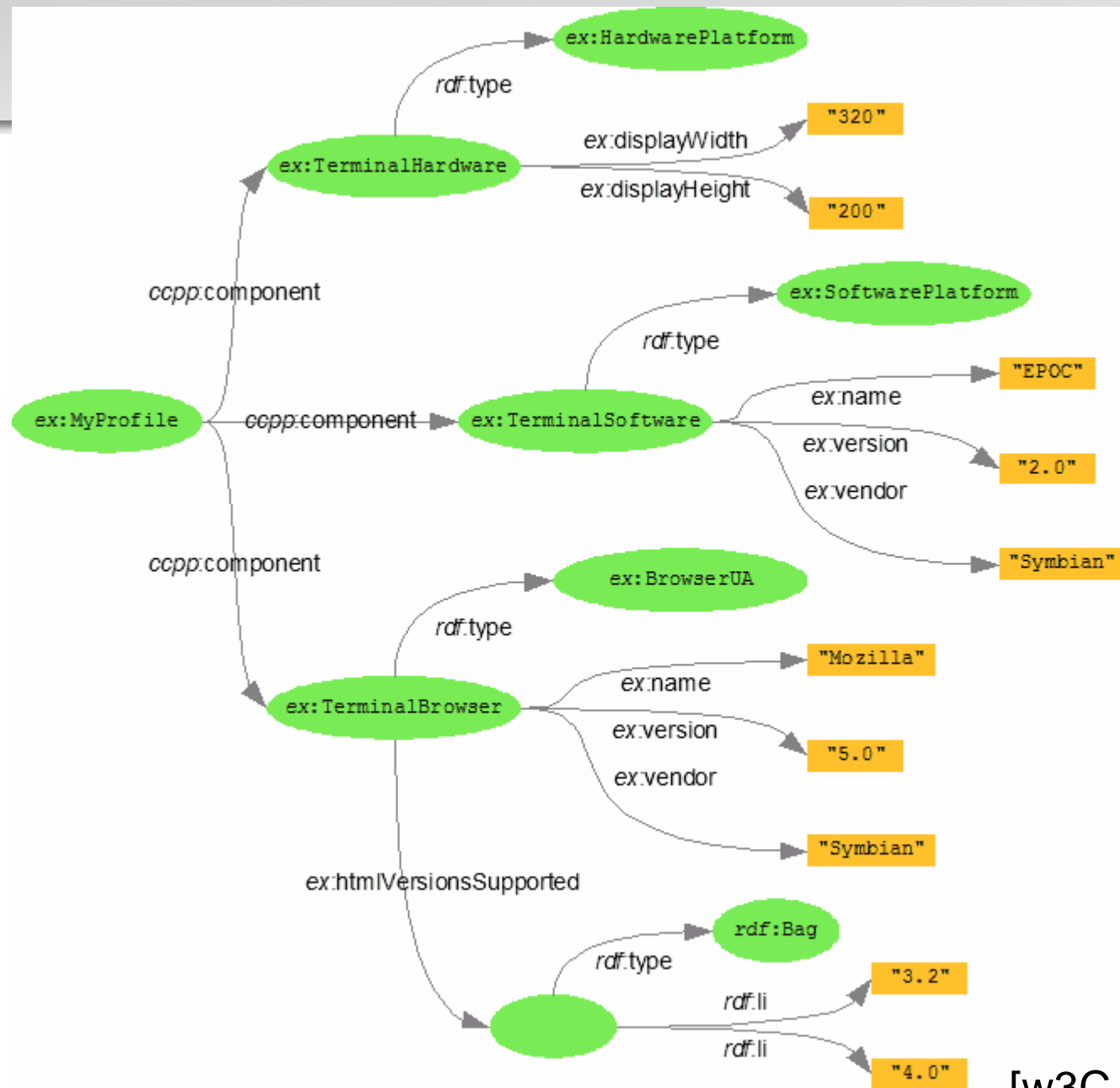
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- A CC/PP profile is a description of device capabilities and user preferences. This is often referred to as a device's delivery context and can be used to guide the adaptation of content presented to that device (W3C, 2006)
- CC/PP is based upon RDF (Resource Description Framework).

- The initial branches of the CC/PP profile tree describe major components of the client. Examples of major components are:
 - the hardware platform upon which software is executing,
 - the software platform upon which all applications are hosted, or
 - an individual application, such as a browser.



- A CC/PP profile describes client capabilities and preferences in terms of a number of "CC/PP attributes" for each component.

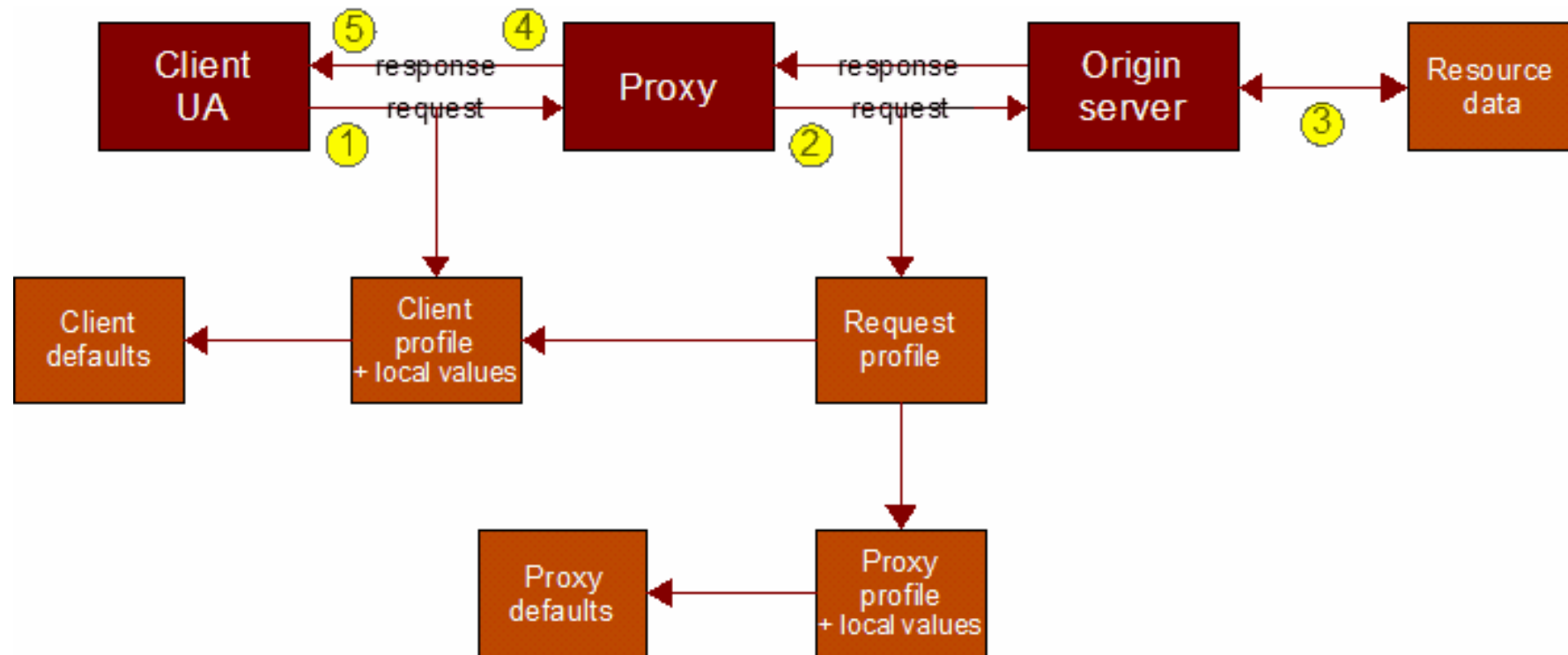


[w3C, 2006]

- The CC/PP framework does not define by itself a vocabulary to represent user or device profiles.
- UAProf, implementation for modelling mobile devices, defines:
 - **HardwarePlatform**: This includes the type of device, model number, display size, input and output methods, etc.
 - **SoftwarePlatform**: Attributes provide information on the operating system software, video and audio encoders supported by the device, and the user's language preference.
 - **BrowserUA**: A set of attributes to describe the HTML browser application.
 - **NetworkCharacteristics**: Information about the network-related infrastructure and environment. These attributes can influence the resulting content, due to the variation in capabilities and characteristics of various network infrastructures in terms of bandwidth and device accessibility.
 - **WapCharacteristics**: A set of attributes pertaining to WAP capabilities supported on the device.
 - **PushCharacteristics**: A set of attributes pertaining to Push specific capabilities supported by the device.

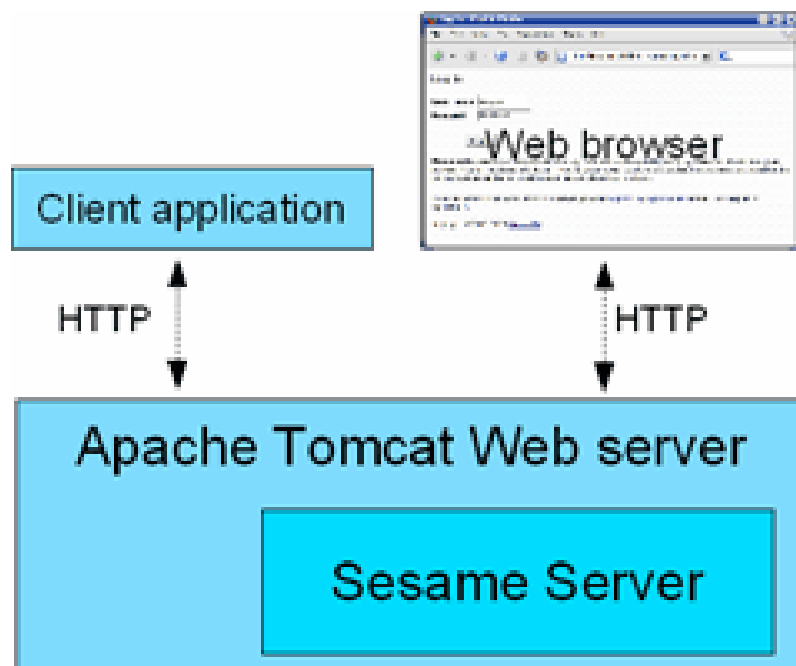
- Implementation for universal access to Information systems (Velasco, 2004):
 - **HardwarePlatform.** Includes InputDevices and OutputDevices, where assistive technology elements such as input switches, **head-mice, biosensor-control systems, eye-gaze trackers, Braille-lines**, etc., may be included.
 - **SoftwarePlatform.** Includes subcomponents to group InputSoftware, and OutputSoftware, e.g., **speechrecognition, on-screen keyboard, screen-reader**.
 - **UserAgent.** Information about the browser manufacturer and version, markup supported, styling and scripting languages, and MIME-type rendering capabilities. Information about plug-ins and media players linked to the agent is also contained.
 - **NetworkCharacteristics.** Global information about the network to access the Internet application: bandwidth, proxies and firewalls, WAP-related info, etc.

1. **The client sends an HTTP request**, with an accompanying CC/PP client profile. The client profile may contain references to default profiles describing a range of common capabilities for the client concerned, and values that are variations from the default profile.
2. **The HTTP request may pass through a firewall/proxy** that (a) imposes constraints on the kinds of content that can be accessed, or (b) can adapt other forms of content to the capabilities of the requesting client.
3. **The origin server receives the request** and interprets the CC/PP profile. It selects and/or generates content that matches the combined proxy and client capabilities described in the profile.
4. **If required, the proxy applies any content adaptations**, and any other functions it is designed to perform.
5. **The client receives the HTTP response** and presents the content it contains.



[w3C, 2006]

- Sesame is an open source Java framework for storing, querying and reasoning with RDF and RDF Schema. It can be used as a database for RDF and RDF Schema, or as a Java library for applications that need to work with RDF internally. (OpenRDF.org, 2006)



- a) read a RDF file,
- b) find the relevant information in it
- c) use that information to process request.

- ... the right .LRN content for the right target (user+terminal+network)
 - Access for people with functional diversity, making use of specific assistive technologies
 - Access for people using different terminal settings:
 - users with specific Hardware/software settings (display, plug-ins, etc.):
 - Mobile terminals, Digital Television, etc.

- W3C (2006) Composite Capability/Preference Profiles (CC/PP): Structure and Vocabularies 2.0. Retrieved from: <http://www.w3.org/TR/CCPP-struct-vocab2/#CCPPArchitecture>
- Velasco, C. A. , Mohamad, Y., Gilman, A.S., Viorres, N., Vlachogiannis, E., Arnellos, A., Darsenitas, J.S. (2004) Universal access to information services—the need for user information and its relationship to device profiles. Universal Access in the Information Society, Publisher Springer Berlin / Heidelberg, ISSN 1615-5297, Issue Volume 3, Number 1 / pp 88-95.
- OpenRDF.org (2006) User Guide for Sesame. Retrieved from <http://www.openrdf.org/doc/sesame/users/index.html>

CMI (SCORM)



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User preferences in SCORM CMI

- Some Relevant attributes
 - cmi.learner_id
 - cmi.learner_name
 - cmi.learner_preference._children
 - (audio_level,language,delivery_speed,audio_captioning, RO)
 - Listing of supported data model elements
 - cmi.learner_preference.audio_level
 - (real(10,7), range (0..*), RW)
 - Specifies an intended change in perceived audio level
 - cmi.learner_preference.language
 - (language_type (SPM 250), RW)
 - The learner's preferred language for SCOs with multilingual capability
 - cmi.learner_preference.delivery_speed
 - (real(10,7), range (0..*), RW)
 - The learner's preferred relative speed of content delivery
 - cmi.learner_preference.audio_captioning
 - (state (-1,0,1), RW)
 - Specifies whether captioning text corresponding to audio is displayed

- RUSTICI:
 - SCORM 2004 3rd edition Data Model:
 - <http://openacs.org/storage/view/openacs-dotlrn-conference-2007-spring%5C/RusticiSCORMPoster.pdf>

Open Questions



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- Extend
User Tracking
- Extend
Data Model
- Web Services
Exec. calls
...

- Is the community interested in collaborate?
- In which areas?
 - User modelling
 - Competences
 - Device Modelling
 - Data mining
 - Java integration
 - ...
- Are there developments that can be used?
- Ideas?
- Questions?

http://openacs.org/xowiki/Modelling_Learners