

Internet Governance Forum
Oxford Internet Institute, May 6th 2005

Two practical examples of issues in internet governance

Norman Paskin
International DOI Foundation, Oxford
n.paskin@doi.org

Introduction

This position paper is a personal contribution, and does not necessarily represent any position endorsed by my employer, the International DOI Foundation (IDF). Nor does it propose a position on many of the internet governance issues touched upon with greater expertise by other participants at the OII Discussion Forum. However it draws from my experience in working in a body, the IDF, developing an internet-based framework for one particular set of applications (persistent identification and management) over the past seven years. It highlights two issues which I propose that any discussion of internet governance should address, and which are currently only partially satisfactorily addressed.

In considering the management of material on the internet, we can adopt the “technical” perspective of viewing all material as simply bits (0 and 1s in packages); or the semantic perspective of treating these packages as (music recordings, e-books, photographs). Both are valid for appropriate purposes, just as viewing a person as a set of molecules or as a holistic organism are valid viewpoints. Managing material as semantically meaningful objects with identifiers is a recognised need for many applications. As the applications become more sophisticated, objects may be representations of people, resources, licences, avatars, sensors, etc., which require the ability to identify them by *name* and to have these names *specify identity*(what is named).

Issue 1: Naming objects

A standard represents an agreement by a community to do things in a specified way to address a common problem. The International DOI Foundation (IDF) has developed an internet-based approach for the naming of digital objects and their management, since we believe that the naming of digital objects as first-class entities (i.e., independent of location) will be critical to the long term evolution of the Internet. The IDF has also attempted to ensure conformance with all relevant generic external formal standards¹, which do not yet specify a satisfactory approach for naming objects consistently.. There is currently considerable debate on the issue of generic standards for naming objects. DOI is designed to be capable of being used in any specification which may finally be endorsed. Until a clear consensus is reached in the Internet communities on which approach is to be preferred DOI remains agnostic as to formal registration as a generic scheme, but useable and widely implemented for millions of objects.

However the International DOI Foundation (IDF) is a strong supporter of the Handle System (www.handle.net) developed by Dr Robert Kahn (co-inventor, with Vint Cerf, of the TCP/IP protocols), and believes it offers the best infrastructure component available today for managing digital objects. The Handle System provides a general-purpose global name service enabling secure name resolution over the Internet, designed to enable a broad set of communities to use the technology to identify digital content independent of location. Importantly though, note that the Handle System is here used simply as an

illustration of some of the issues which arise in naming objects: one may envisage other such systems which would encounter similar issues.

The Handle System is described in a series of informational RFCs². Handles by themselves are necessary but not sufficient for the function of the DOI System, a framework for managing intellectual content and facilitating electronic commerce, administered by the non-profit open membership International DOI Foundation (www.doi.org). The Handle System, available for download at no cost for research or experimental use, includes an open set of protocols, a namespace, and an implementation of the protocols. The protocols enable a distributed computer system to store handles of digital resources and resolve those handles into the information necessary to locate and access the resources. This associated information can be changed as needed to reflect the current state of the identified resource without changing the handle, allowing the name of the item to persist over changes of location and other state information. Each handle may have its own administrator(s), and administration can be done in a distributed environment. The name-to-value bindings may also be secured, allowing handles to be used in trust management applications. The Handle System is an infrastructure on which applications serving many different purposes are being built. Some examples are intellectual property rights management applications, persistent identifiers for digital objects on the Web, and institutional data preservation and archiving.

The Handle System does not use DNS, but can work alongside it; if necessary Handles can be expressed as URLs (using proxy servers which understand both the Handle protocol and http). DNS can be considered as an abstraction layer providing a means of managing the IP addressing layer of the internet in a convenient way. DNS is a separate layer to TCP/IP and routers, which sit on top of lower layers, but would work quite happily if DNS evaporated tomorrow. There are also layers above³. Similarly, the Handle System can be thought of as an abstraction layer, running on TCP/IP, providing a means of managing the names of digital objects on the internet in a convenient way. The Handle System is extremely effective as a means of managing material as semantically meaningful objects with identifiers.

The Handle RFC's contain an IESG Note that "Several groups within the IETF and IRTF have discussed the Handle System and its relationship to existing systems of identifiers. The IESG wishes to point out that these discussions have not resulted in IETF consensus on the described Handle System, nor on how it might fit into the IETF architecture for identifiers. Though there has been discussion of handles as a form of URI, specifically as a URN, these documents describe an alternate view of how namespaces and identifiers might work on the Internet and include characterizations of existing systems which may not match the IETF consensus view".

The reference to ongoing debates about the nature of URIs, URNs, and URLs (which sometimes approach the character of religious wars and have been ongoing for over ten years) and the references to an undefined "IETF architecture for identifiers" suggest that improved standards of clarity and process (e.g., what is the consensus?) would be beneficial to any development which, like the DOI, attempts to build constructively on existing infrastructure.

The current dominance in internet governance and, perhaps more importantly, in internet funding, of organisations reliant on one naming mechanism, domain naming (a mechanism which makes it particularly difficult to identify digital content independent of location) may be problematic in introducing complementary alternative naming mechanisms.

Issue 2: Specifying what is named: digital policy enforcement through the analysis of meaning

The DOI system arose from a perceived need for digital rights management infrastructure, as a tool for content management (both commercial and non-commercial). But as Mark Bide has pointed out⁴, digital rights management, even in the limited context of the management of “content” on the network, has at least four different components, a much broader definition than the one we are used to:

- A “policy metadata” layer, which allows for the structured description of policies – what permissions relate to this item of content, under what conditions of use (for example, attribution, period of use, payment), and what is not permitted (for example, adaptation);
- An “authentication, authorisation and access” layer – which allows for the structured identification and authorisation of different users (or classes of users) and the matching of their privileges with the permissions relating to content;
- An “enforcement” layer, which is the technology most commonly associated with the acronym “DRM” – the technology which allows policies relating to content to be enforced even after content has been released from a controlled local network into the (uncontrolled) global network;
- An “audit” layer, which allows activities to be recorded and compliance with policies to be monitored.

Mechanisms which would allow these layers to be created – such as “structured identification and authorisation of different users (or classes of users)” – have application far beyond content protection. The “rights” that we should manage in the network are not simply therefore those of traditional content management (such as copyright enforcement, as seen in the recent music and motion picture industry concerns over piracy). The same layers apply also to those rights which characterise civil society: personal and collective rights to privacy and protection from fraud and other crime. In the absence of a trusted infrastructure, the future potential benefits of the global network will be increasingly curtailed. The domination of spam in e-mail in boxes, and the growth of internet fraud are symptoms of problems which will affect not just copyright but wider human rights. Unless this destruction of value can be controlled – through the development of a trusted network computing infrastructure – many of the potential benefits of the network will never be realised.

This abstract plea for trust may sound like an intractable problem without any practical way forward. However one of the practical elements of a trusted infrastructure is the structured description of entities, allowing the analysis of meaning. This task is being attempted by the proponents of semantic web technologies and more traditional ontology development. There has been significant progress in technical means of contextual analysis of meaning⁵. The governance issues around the concepts of these technical means of interoperable metadata as a vocabulary for intellectual property rights are significant, since any formal analysis of meaning is underpinned by the question of “who says”: who has the right to authorise semantic mappings and to undertake analyses; who is *allowed* to say.

The IDF has an interest in this area: having recently been appointed as the Registration Authority for the MPEG 21 Rights Data Dictionary (ISO/IEC Information technology -- Multimedia framework (MPEG-21) -- Part 6: Rights Data Dictionary, ISO/IEC 21000-6), IDF will now work with ISO to establish

operational details of this function⁶. The mechanism underlying the Rights Data Dictionary is one of the most sophisticated developments of the concept of precise contextual analysis of meaning. Governance will be a key component, and one where precedent is sorely lacking.

¹ The DOI Factsheet "DOI and Internet Identifier Specifications" (<http://www.doi.org/factsheets/DOIIdentifierSpecs.html>) discusses those relevant in the Internet communities IETF and W3C. *Note that that document is currently undergoing revision as the discussions in IETF and W3C evolve.*

² Sam Sun, Larry Lannom, Brian Boesch, "Handle System Overview". Internet Engineering Task Force (IETF) Request for Comments (RFC), RFC 3650, November 2003.

Sam Sun, Sean Reilly, Larry Lannom, "Handle System Namespace and Service Definition". Internet Engineering Task Force (IETF) Request for Comments (RFC), RFC 3651, November 2003.

Sam Sun, Sean Reilly, Larry Lannom, Jason Petrone, "Handle System Protocol (ver 2.1) Specification". Internet Engineering Task Force (IETF) Request for Comments (RFC), RFC 3652, November 2003.

³ Kahn, Robert E. and Cerf, Vinton G. "What is the Internet (And What makes it Work)?", paper prepared by the authors at the request of the Internet Policy Institute, December 1999. http://www.cnri.reston.va.us/what_is_internet.html

⁴ For a more detailed discussion of this issue see [Bide M \(2004\) "Digital Rights Management: preventing or enabling access?" Serials 17:2](#) pp. 141-147

⁵ See DOI factsheet: "DOI and Data Dictionaries" <http://www.doi.org/factsheets/DOIDataDictionaries.html>

⁶ IDF appointed as Registration Authority for MPEG Data Dictionary <http://www.doi.org/news/DOINewsApr05.html#4>