**Scoring of candidate**

**Permanent Unique Identifiers (PUIDs)**

**in the context of the Global Information System (GLIS)**

Please score candidates as follows: **1**=Poor/Not supported, **2**=Good, **3**=Best

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| **#** | **Requirement** | **ARK** | **DOI** | **LSID** | **Comments** |
| 1 | **Uniqueness** | 2 | 3 | 3 | DOI, thanks to its central registry, is the only one that truly ensures uniqueness. Surprisingly, ARK allows for the same identifier to point to (potentially) different objects [3]. |
| 2 | **Permanence** | 3 | 3 | 1 | Permanence is rather an organizational issue. All three PUID types rely on some form of indirection to ensure permanence. However, LSID's solution is more cumbersome [2] |
| 3 | **Opacity** | 2 | 3 | 1 | DOI is the most opaque [6]. ARK slightly less so because of the way object variants and hierarchies are allowed in the identifier. LSID includes the Authority identification in the PUID |
| 4 | **Resolvability** | 3 | 3 | 1 | LSID resolution procedure is cumbersome and requires knowledge of the resolver service [11] |
| 5 | **Discoverability** | 3 | 3 | 3 | This is rather a metadata issue |
| 6 | **Security** | 3 | 3 | 3 | None poses security risks |
| 7 | **Scalability** | 2 | 3 | 2 | DOI is the only one that specifically includes scalabilty as one of the design priorities [8] |
| 8 | **Interoperability** | 2 | 3 | 2 | DOI specifically mandates interoperability with other existing identifiers [9][10] |
| 9 | **Compatibility** | 3 | 3 | 3 | This is rather a metadata issue |
| 10 | **Content negotiation** | 1 | 3 | 1 | DOI fully supports content negotiation [12]. As of 2015-03-06, the ARK resolver does not support Content Negotiation. LSID provide no guidance in the technical specifications |
| 11 | **Accepted standard** | 1 | 3 | 1 | DOI is registered as standard ISO 26324 |
| 12 | **Acquisition and maintenance costs** | 2 | 1 | 3 | Registering one million DOI per year costs USD$ 2500 [13]. The same for ARK costs USD$ 1,500 [13]. LSID, not being based on a central registry, is free of charge. No maintenance cost is foreseen for any of the three PUID types |
| 13 | **Acceptance by publishers** | 2 | 3 | 2 | DOI originated in the publishing sector and still is by far the most widely accepted PUID type |
| 14 | **Popularity** | 2 | 3 | 1 | LSID does not have much traction, ARK is improving, but DOI is the most widely used PUID type |
| 15 | **Availability of tools** | 3 | 3 | 1 | LSID Java development ceased in 2006 [14], PERL development has continued for about one year [15]. For ARK and DOI, excellent software is available from GBIF [16] and, thanks to the EZID service, both can be registered easily and cheaply |
| 16 | **Resolution service and multiple resolution** | 2 | 3 | 1 | DOI resolution service is globally redundant [5] and proved to be extremely reliable. ARK is not as redundant as DOI [4]. LSID, oddly, leaves the implementation of the critical Discovery Resolution Service as optional [2]. All three, eventually, rely on a global registry of names to perform the necessary redirection. LSID resolution service is unreliable [7] |
| 17 | **Framework design** | 2 | 3 | 2 | DOI clearly outclasses the others because of its very formalized logical framework and its status as international standard |
| 18 | **Metadata** | 3 | 3 | 1 | All three allow for different metadata descriptions to be associated to the PUID. ARK and DOI indicate metadata standards. LSID does not provide any guidance on the metadata structure returned by the resolution service. [1] |
| 19 | **Relations** | 3 | 3 | 3 | This is rather a metadata issue |
| 20 | **Identification of fragments** | 3 | 3 | 1 | Both ARK and DOI support identification of fragments, although ARK does in a way that reduces opacity [17]. LSID technical specification provides no details on this feature. |

**References**

[1] LSID Final adopted specification, p.9-12, http://www.omg.org/cgi-bin/doc?dtc/04-05-01.pdf

[2] LSID Final adopted specification, p.25, http://www.omg.org/cgi-bin/doc?dtc/04-05-01.pdf

[3] www.cdlib.org/services/uc3/arkspec.pdf, sect. 2.1

[4] http://n2t.info points to a California Digital Library web page stating that "Resolver replicaton for N2T is underway.

[5] http://www.doi.org/announce.html, section "Additions to DOI infrastructure"

[6] http://www.doi.org/doi\_handbook/2\_Numbering.html#2.2

[7] http://iphylo.blogspot.it/2013/11/catalogue-of-life-and-lsids-catalogue.html. The COL LSIDs *still* did not resolve as of 2015-03-04

[8] http://www.doi.org/doi\_handbook/3\_Resolution.html#3.5

[9] http://www.doi.org/doi\_handbook/2\_Numbering.html#2.7

[10] http://www.doi.org/doi\_handbook/2\_Numbering.html#2.8

[11] http://wiki.tdwg.org/twiki/bin/view/GUID/TechnologyComparison, see "Resolution"

[12] http://www.doi.org/doi\_handbook/5\_Applications.html#5.4.1

[13] http://ezid.cdlib.org/home/pricing

[14] http://sourceforge.net/projects/lsid/files/LSID%20Java%20Toolkit/

[15] http://sourceforge.net/projects/lsids/files/LSID%20Perl%20Toolkit/

[16] http://www.gbif.org/infrastructure/tools

[17] www.cdlib.org/services/uc3/arkspec.pdf, sect. 2.5.1