Named Graphs, Named Nodes, Named Links

Giovanni Bartolomeo[1]

[1] University of Rome Tor Vergata, Via del Politecnico 1,
00133 Rome, Italy
Giovanni.Bartolomeo@Uniroma2.it

Abstract. This paper illustrates a technique allowing contextual identification of nodes and links in Named Graphs.

Keywords: Linked Data, Named Graph, eXtensible Resource Identifier (XRI).

1 Introduction

Named Graphs [1] rigidly bound an identifier to a given "copy" of an RDF graph. However, they do not provide the ability to identify nodes and links *as parts* of a graph. The main contribution of this paper is to illustrate a technique to do this, its benefits and its backward compatibility with Named Graph and Linked Data.

2 Structured and Semantically Aware Identifiers and Contexts

Let us consider the eXtensible Resource Identifier (XRI), in its application XRI Data Interchange (XDI). The following XDI statement:

```
=John.Smith  +knows  =Alice.Doe .
```

containing three "XRIrefs" (=John.Smith, +knows, =Alice.Doe) is the "X3" representation of an equivalent N3 sentence in a RDF graph:

```
ex:John.Smith  foaf:knows  ex:Alice.Doe .
```

At a first glance, XDI misses "namespaces" which are instead in RDF; however, it provides a native concept called "context". XDI contexts work by concatenating existing XRIrefs to form new "multiple subsegmented" XRIrefs [2]. For example, property instance `+knows` under the context of subject `=John.Smith` is identified by the two subsegments XRIref `=John.Smith+knows`. In turns, object `=Alice.Doe` under the context of `=John.Smith+knows` is identified by the three subsegments XRIref `=John.Smith+knows=Alice.Doe`.

This approach caters for language element identification, a necessary condition to efficiently support reification. Additionally, it natively solves many use cases

proposed in [3]. For example, `=Rachel.Stein+mother=Lynn.Stein` and `=Lynn.Stein @MIT+professor=Lynn.Stein`, are three different XRIrefs. Being subjects of separate statements in different contexts their attributes do not mix; but, semantically, one could discover in them three different roles for the same referent[1]. Finally, a finer grained assignment of versioning, timestamps, access permissions, and metadata to nodes and links in Named Graphs is made possible.

3 Is XDI really compatible with Named Graphs and Linked Data?

Actually a XRIref is an abstract identifier and needs to be resolved into a URIref [4] by detecting a "resolution context" [2]. Consider the following Named Graph:

```
ex:myGraph{ex:John.Smith foaf:based_near ex:Alice.Doe .}
```

If the inner statement contained XRIrefs instead of URIrefs, one could assume the graph's name `http://example.org/res/myGraph` as their resolution context; for example, the object in *this* statement, would be assigned the URIref

```
http://example.org/res/myGraph/=John.Smith+knows=Alice.Doe
```

On the other hand "cross references" enable to encapsulate URIrefs into a XRIref, replacing single segment XRIrefs with corresponding "cross-referenced URIrefs". By applying this transformation and by following the encoding rules in [2] the previous reference gets rid of XRIrefs, becoming the equivalent (yet less human appealing)

```
http://example.org/res/myGraph/(http%253A%252F%252Fexample
.com%252Fresource%2523John.Smith)(http%253A%252F%252Fxmln
s.com%252Ffoaf%252F0.1%252Fknows)(http%253A%252F%252Fexam
ple.com%252Fresource%2523Alice.Doe)
```

References

1. Bizer, C., Carroll, J.J.: Named Graphs, Provenance and Trust. In: WWW 2005, May 10-14,2005, Chiba, Japan. ACM 1595930469/05/0005 (2005)
2. Reed, D. (Ed): Extensible Resource Identifier (XRI) Version 3.0 Working Draft 03 (2010) http://docs.oasis-open.org/xri/xri/v3.0/WD01/xri-syntax-3.0-wd03.pdf
3. Halpin, H, Herman, I., Hayes, P.P.: When owl:sameAs isn't the Same: An Analysis of Identity Links on the Semantic Web. In: W3C Workshop — RDF Next Steps, June 26-27, 2010, Stanford, Palo Alto, CA, USA February (2010)
4. Thompson, H.S., Orchard D. (Eds): URNs, Namespaces and Registries. (2006) http://www.w3.org/2001/tag/doc/URNsAndRegistries-50.html

---

[1] We think that this feature could provide a formal support to codify the "follow your nose" approach. This is what "structured" and "semantically aware" stands for.