

RDFifying XDI

Dec. 2014

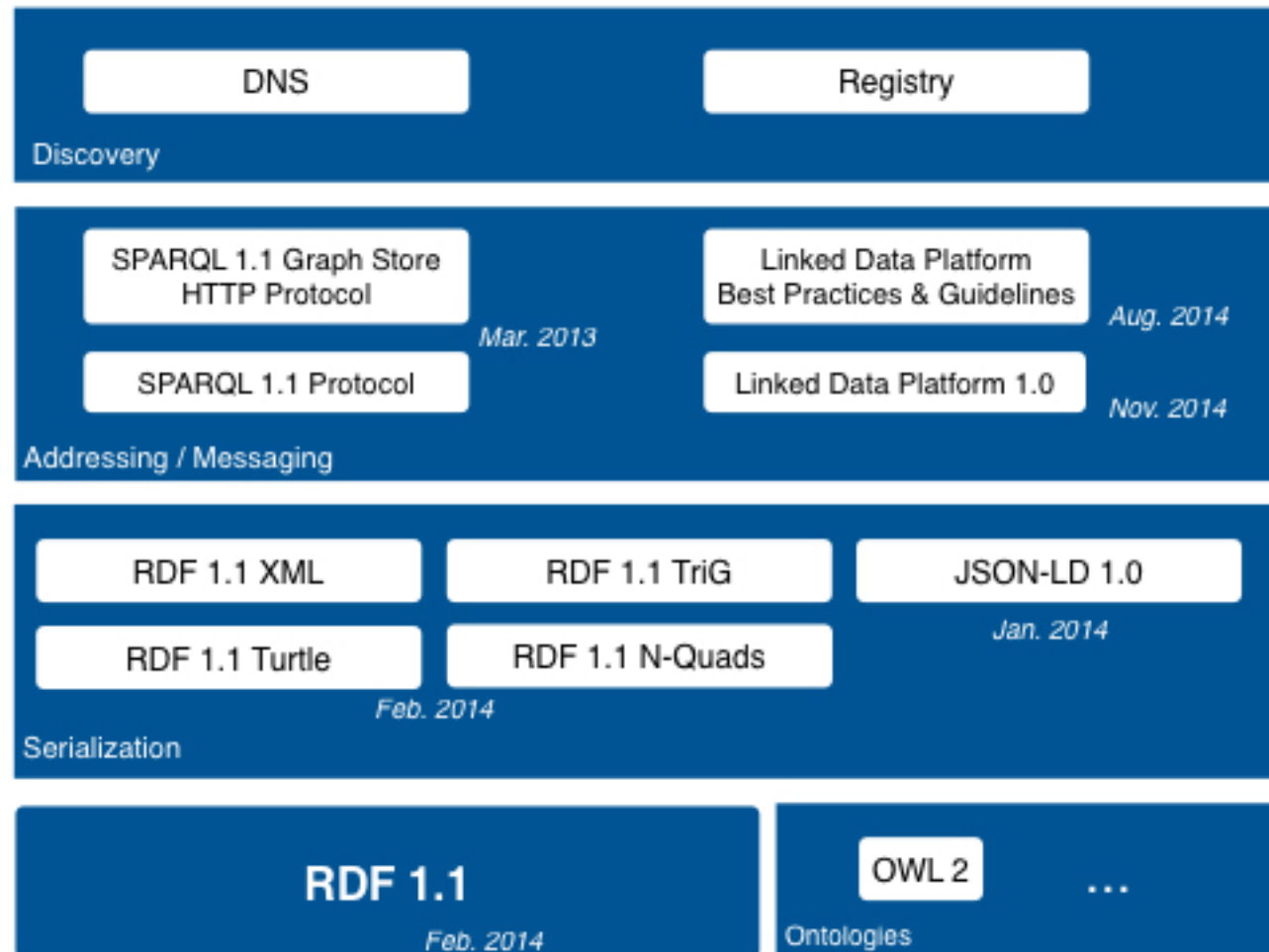


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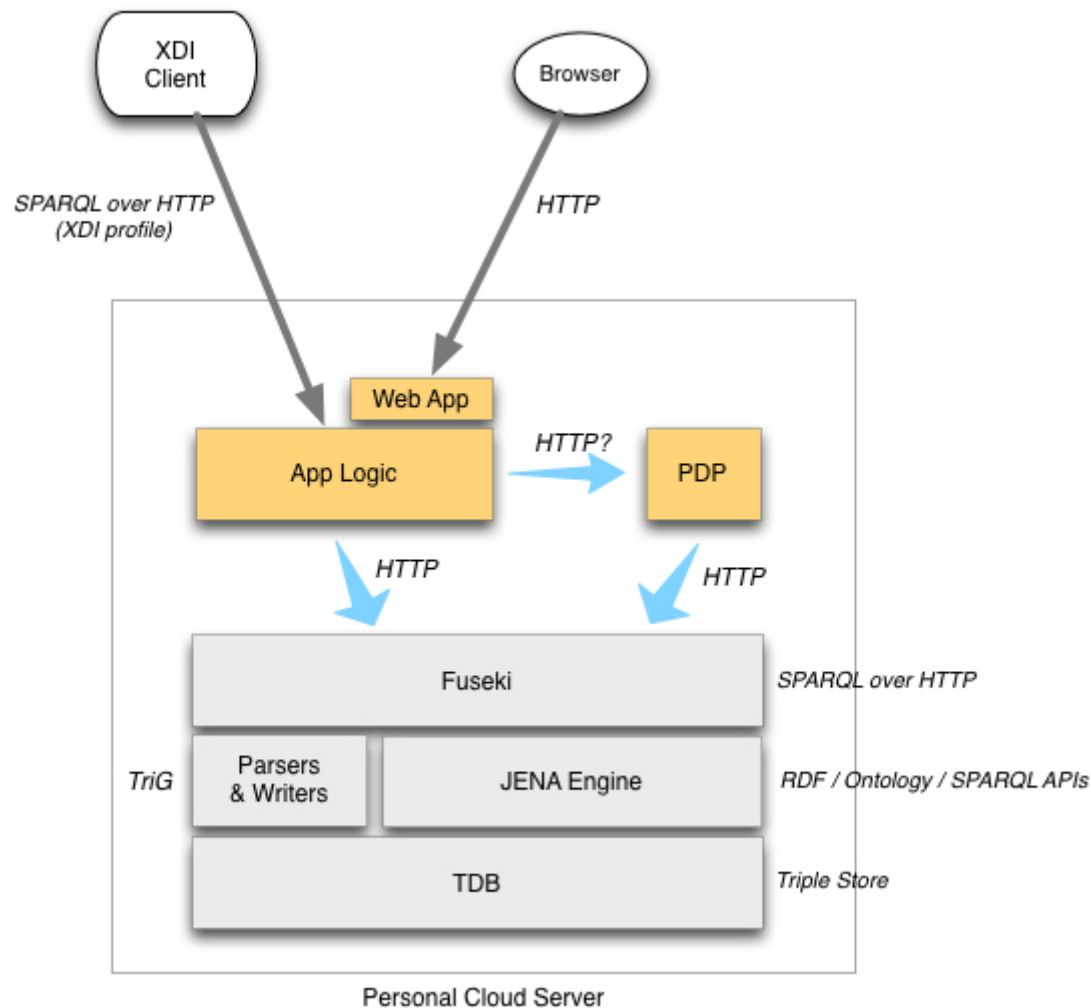
Goals & Benefits

- ▶ Standards that are increasingly adopted (beyond academia)
- ▶ Easier to get approval / support from other standard bodies
- ▶ Can leverage:
 - Existing libraries
 - Existing RDF-based platforms
- ▶ Can integrate with other Linked Data efforts and ontologies (Google, Yahoo, Microsoft, Wikipedia Foundation)
- ▶ Vast simplification of the syntax - easier for developers
- ▶ Modular architecture
 - Can leverage other technologies like DNS for Discovery

RDF specifications stack



Software stack – open source example



Example #1 - Simple

(+Company-A/#acquired)+Company-B<\$t>&/&/"2013-11-30Z"



```
@prefix gr: <http://purl.org/goodrelations/v1#BusinessEntity#> .
@prefix wrk: <http://www.myonto.org/workingplace#> .

<http://www.graphrepo.org/GraphA> {
  <compA>
    a gr:BusinessEntity ;
    gr:Name "Company-A";
    wrk:acquired <compB> ;
    wrk:acquisitionDate "2013-11-30T00:00:00Z" .
  <compB>
    a gr:BusinessEntity ;
    gr:Name "Company-B" . }
```

Example #2 - Collections

```
+Company-A<#(http://purl.org/goodrelations/v1#)>[<#departments>]<@1><#Location>&/&/"San Francisco, CA"  
+Company-A<#(http://purl.org/goodrelations/v1#)>[<#departments>]<@2><#Location>&/&/"Sterling, VA"  
+Company-A<#(http://purl.org/goodrelations/v1#)>[<#departments>]<@3><#Location>&/&/"San Diego, CA"
```



```
@prefix gr: <http://purl.org/goodrelations/v1#BusinessEntity#> .  
@prefix ldp: <http://www.w3.org/ns/ldp#> .  
  
<http://www.graphrepo.org/GraphA-Detail> {  
  <departments> ldp:contains ( <Location1> <Location2> <Location3> ) .  
  <Location1> gr:Location "San Francisco, CA" .  
  <Location2> gr:Location "Sterling, VA" .  
  <Location3> gr:Location "San Diego, CA" . }
```


Example #3 – Graph Retrieval

Whole Graph: HTTP GET

```
GET /GraphA/ HTTP/1.1
Host: www.graphrepo.org
Accept: text/turtle
```

Subgraph: HTTP GET

```
GET /GraphA/?%3Cdpt1%3E HTTP/1.1
Host: www.graphrepo.org
Accept: text/turtle
```



```
HTTP/1.1 200 OK
Date: Thu, 20 Nov 2014 12:34:56 GMT
Server: Apache/2.4.10 (Unix) PHP/5.5.15
Connection: close
Content-Type: text/turtle
```


```
<GraphA/?%3Cdpt1%3E> {
<dpt1>
  a wrk:Department ;
  wrk:Director "Hubert" ;
  gr:Location "San Francisco, CA" .}
```

Example #4 – Graph Retrieval

Arbitrary content (e.g. all statements with predicate wrk:Director): HTTP GET

```
POST /Query HTTP/1.1
Host: www.graphrepo.org
Content-type: application/sparql-query
Accept: text/turtle
```

```
PREFIX gr: <http://purl.org/goodrelations/v1#BusinessEntity#>
PREFIX ldp: <http://www.w3.org/ns/ldp#>
PREFIX wrk: <http://www.myonto.org/workingplace#>
SELECT ?who ?dpt
FROM NAMED <GraphA>
WHERE { ?dpt wrk:Director ?who . }
```



```
HTTP/1.1 200 OK
Date: Thu, 20 Nov 2014 11:22:33 GMT
Server: Apache/2.4.10 (Unix) PHP/5.5.15
Connection: close
Content-Type: text/turtle
```

```
@prefix gr: <"http://purl.org/goodrelations/v1#BusinessEntity#"> .
@prefix ldp: <http://www.w3.org/ns/ldp#> .
@prefix wrk: <http://www.myonto.org/workingplace#> .

<dpt1> wrk:Director "Hubert" .
<dpt2> wrk:Director "Peter" .
<dpt3> wrk:Director "Les" .
```


Example #5 – Graph Update

Replacing an entire (sub)graph: HTTP PUT

```
PUT /GraphA/?%3Cdpt1%3E HTTP/1.1
Host: www.graphrepo.org
Content-type: text/turtle
```

```
@prefix gr: <"http://purl.org/goodrelations/
v1#BusinessEntity#"> .
@prefix wrk: <http://www.myonto.org/workingplace#"> .

<dpt1>
  a wrk:Department ;
  wrk:Director <peter> ;
  gr:Location "San Francisco, CA" .
```

Example #6 – Graph Update

Replacing a set of triples: HTTP PATCH

```
PATCH /GraphA/ HTTP/1.1
Host: www.graphrepo.org
Content-type: application/sparql-query
```

```
PREFIX gr: <http://purl.org/goodrelations/v1#BusinessEntity#>
PREFIX ldp: <http://www.w3.org/ns/ldp#>
PREFIX wrk: <http://www.myonto.org/workingplace#>
```

DELETE DATA

```
{ GRAPH <GraphA> {
  <compA> ldp:contains (<dpt1> <dpt2>) .
  <compB> ldp:contains <dpt3> } } ;
```

INSERT DATA

```
{ GRAPH <GraphA> {
  <compA> ldp:contains <dpt1> .
  <compB> ldp:contains (<dpt2> <dpt3>) } }
```

Messaging

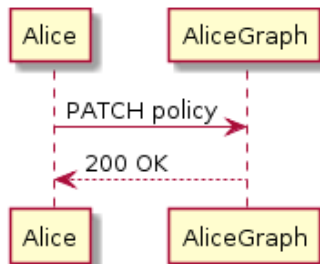
Client Side: use HTTP Prefer header & set its value to "respond-async"

```
POST /GraphA/ HTTP/1.1
Host: www.graphrepo.org
Content-Type: application/sparql-query
Prefer: respond-async
```

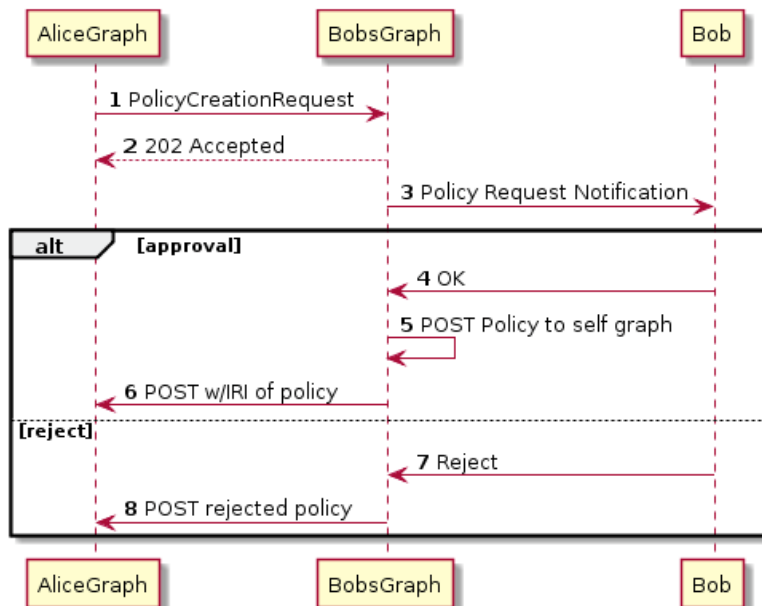
Server side: respond HTTP 202 *Accepted* status code & a pointer (i.e. a URI) to a status monitor.

Policy

Synchronous



Asynchronous



```

@prefix dcterms: <http://purl.org/dc/terms/>.
@prefix p: <http://neustarlab.biz/ontology/policy/>.
    
```

```

<https://perma.net/graph/1234/>
{<p/policy1/>
  a p:policy;
  p:hasRule <r/r1/>;
  p:resource <https://perma.net/graph/1234/?%3Calice%3E>;
  p:hasRule <r/r2/> .
<r/r1/>
  a p:rule;
  p:obligation p:TransmitEncrypted;
  p:obligation p:StorageEncryption .
<r/r2/>
  a p:rule;
  p:condition <c/c1/> .
<c/c1/>
  a p:condition;
  p:memberOf <friends/> . }
    
```

Discovery

DNS-based

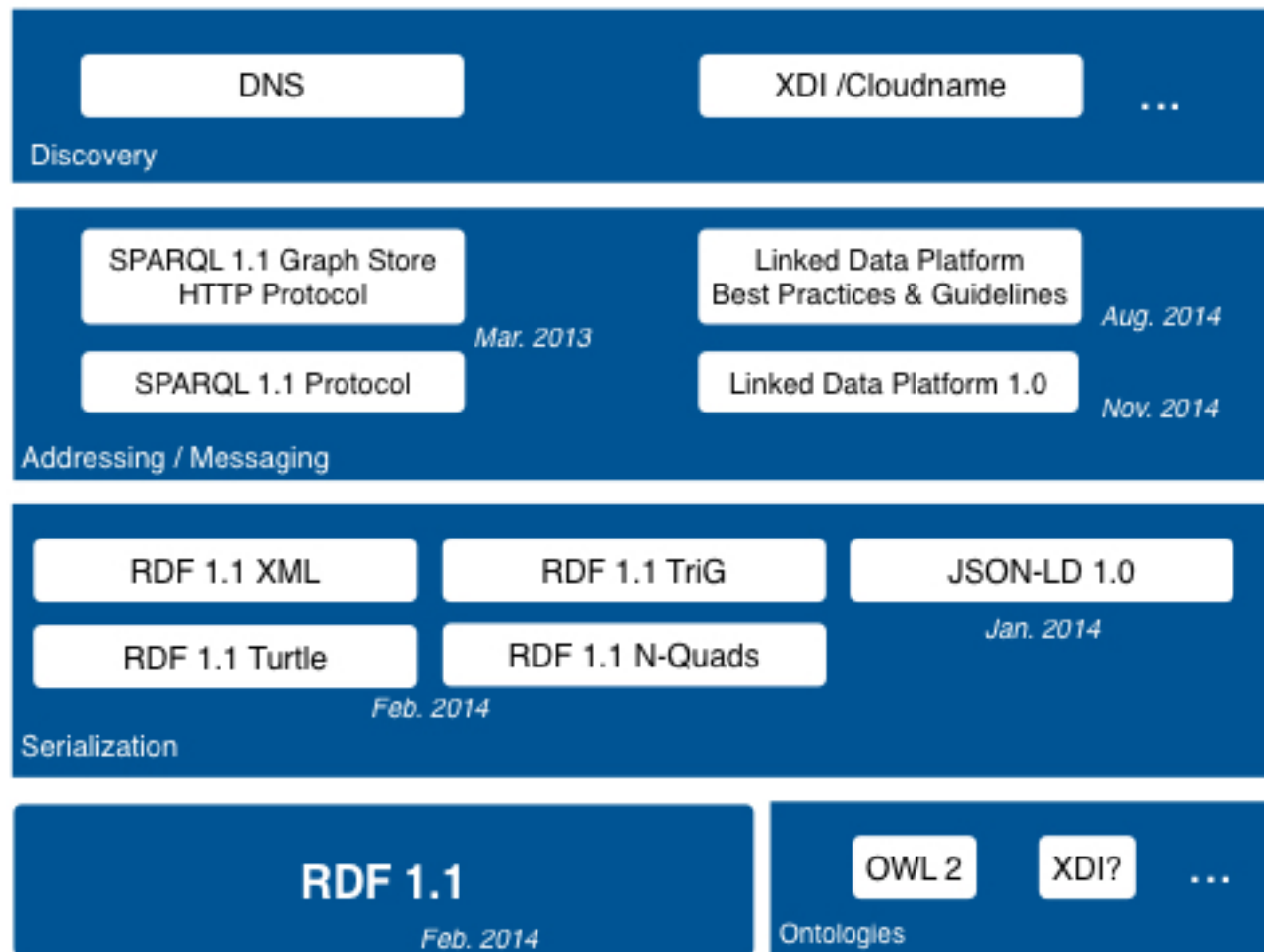
```
_PersonalCloud._https._tcp.Company-A.US 86400 IN SRV 0 5 443 www.graphrepo.org/GraphA
```

Registry-based

```
GET /discovery?PersonalCloud=Company-A HTTP/1.1  
Host: www.graphregistry.biz
```



```
HTTP/1.1 302 FOUND  
Date: Thu, 20 Nov 2014 11:22:33 GMT  
Server: Apache/2.4.10 (Unix) PHP/5.5.15  
Connection: close  
Content-Type: text/plain  
Location: http://www.graphrepo.org/GraphA
```



OASIS T.C.

Define new specification if needed (e.g. discovery service)

&

Profile existing standards to address XDI requirements

Q & A