

Reducing EPP traffic volume with the Related Objects extension

Gavin Brown, Technical Fellow, CentralNic Group PLC

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Fundamentals of EPP

- EPP is a stateful request/response protocol with pipelining.
- EPP commands always apply to exactly one object*.
- There is a many-to-many relationships between objects. Domains can have:
 - 0-4 contact objects;
 - Zero or more host objects.
 - Zero or more other objects**.
- Contact and host objects may be associated with multiple domains***.
- Registrars maintain their own copy of the registration data for the domains under their sponsorship****.

* (apart from <check>).

** such as organizations (RFC 8544)

*** see "Contact Object Management by Registrars", ROW#6, 2017

**** for example, to respond to RDDS queries

Problem statement

- In order to maintain their own database, registrars must synchronize their data with the registry's, especially to account for out-of-band changes (the Change Poll extension helps here).
- The complete set of registration data for a domain name cannot be retrieved in a single request/response transaction with the registry EPP server.

Problem statement

- To synchronize a single domain requires:
 - 1x domain <info> transaction;
 - Zero or more domain <info> transaction for IDN variants;
 - 0-4 contact <info> transactions (*most likely 4 for a thick registry given the "cattle" model of contact object usage*);
 - Zero or more host <info> transactions (*the average number of nameservers is 2.3 in the CentralNic system*);
 - Zero or more <info> transactions for other objects (organizations, etc.);
 - On average, about **7.3 <info> transactions per domain**.
- While query commands are usually relatively cheap for a server to handle, for a large, "thick" registry, the above represents a significant volume of network traffic and compute, on both the client and server side.

The Related Objects extension

- The Related Objects (RO) extension allows EPP clients to request the inclusion of related objects in responses to <info> commands.
- This allows the full set of registration data for a domain name to be retrieved in a single <info> transaction.
- The extension provides a simple syntax for specifying which objects should be included in the response.

Extension elements

- In `<info>` commands, the `<ro:include>` element may be used to specify which objects should be included in the response. It can include one or more of the following:
 - `<ro:registrant/>`
 - `<ro:contacts/>`
 - `<ro:orgs/>`
 - `<ro:ns/>`
 - `<ro:hosts/>`
 - `<ro:other/>`
- In `<info>` responses, the `<ro:infData>` element contains `<infData>` elements corresponding to the related objects the server wishes to include.

Examples

```
C:<?xml version="1.0" encoding="UTF-8" standalone="no"?>
C:<epp xmlns="urn:ietf:params:xml:ns:epp-1.0">
C:  <command>
C:    <info>
C:      <domain:info xmlns:domain="urn:ietf:params:xml:ns:domain-1.0">
C:        <domain:name hosts="all">example.com</domain:name>
C:      </domain:info>
C:    </info>
C:    <extension>
C:      <ro:info
C:        xmlns:ro="urn:ietf:params:xml:ns:epp:relatedObjects-1.0">
C:        <ro:include>
C:          <ro:registrant/>
C:          <ro:ns/>
C:          <ro:other/>
C:        </ro:include>
C:      </ro:info>
C:    </extension>
C:    <clTRID>ABC-12345</clTRID>
C:  </command>
C:</epp>
```

Examples

```
S: <extension>
S:   <ro:infData
S:     xmlns:ro="urn:ietf:params:xml:ns:epp:relatedObjects-1.0">
S:     <contact:infData
S:       xmlns:contact="urn:ietf:params:xml:ns:contact-1.0">
S:       <contact:id>jd1234</contact:id>
S:       <contact:roid>JD1234-REP</contact:roid>
S:       <contact:status s="linked"/>
S:       <contact:status s="clientDeleteProhibited"/>
S:       <contact:postalInfo type="int">
S:         <contact:name>John Doe</contact:name>
S:         <contact:org>Example Inc.</contact:org>
S:         <contact:addr>
S:           <contact:street>123 Example Dr.</contact:street>
S:           <contact:street>Suite 100</contact:street>
S:           <contact:city>Dulles</contact:city>
S:           <contact:sp>VA</contact:sp>
S:           <contact:pc>20166-6503</contact:pc>
S:           <contact:cc>US</contact:cc>
S:         </contact:addr>
S:       </contact:postalInfo>
S:       <contact:voice x="1234">+1.7035555555</contact:voice>
S:       <contact:email>jdoe@example.com</contact:email>
S:       <contact:clID>ClientY</contact:clID>
S:       <contact:crID>ClientX</contact:crID>
S:       <contact:crDate>1999-04-03T22:00:00.0Z</contact:crDate>
S:     </contact:infData>
S:     <host:infData
S:       xmlns:host="urn:ietf:params:xml:ns:host-1.0">
S:       <host:name>ns1.example.com</host:name>
S:       <host:roid>NS1_EXAMPLE1-REP</host:roid>
S:       <host:status s="linked"/>
S:       <host:addr ip="v4">192.0.2.2</host:addr>
S:       <host:clID>ClientY</host:clID>
S:       <host:crID>ClientX</host:crID>
S:       <host:crDate>1999-04-03T22:00:00.0Z</host:crDate>
S:     </host:infData>
S:     <host:infData
S:       xmlns:host="urn:ietf:params:xml:ns:host-1.0">
S:       <host:name>ns1.example.net</host:name>
S:       <host:roid>NS1_EXAMPLE2-REP</host:roid>
S:       <host:status s="linked"/>
S:       <host:addr ip="v4">192.0.2.29</host:addr>
S:       <host:clID>ClientY</host:clID>
S:       <host:crID>ClientX</host:crID>
S:       <host:crDate>1999-04-03T22:00:00.0Z</host:crDate>
S:     </host:infData>
S:   </ro:infData>
S: </extension>
```


This is a work-in-progress

- I'm working on this document on GitHub:

github.com/gbxyz/epp-related-objects-extension

Where next?

- Is this problem significant enough to justify the work to solve it?
- If yes, is this the right solution to the problem?

Questions and answers

Email: gavin.brown@centralnic.com

Mastodon: [@gbxyz@noc.social](https://noc.social/@gbxyz)