From EPP to a modern registry API

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The next 45 minutes

- Introduction RESTful EPP - 15-20 minutes
- Discussion – 20-25 minutes

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History – Before 2004

- Registries develop their own unique domain name provisioning interface
- No standard, registrar needs custom integration for each registry

History - 2004

Extensible **P**rovisioning **P**rotocol (EPP)

- Published as IETF standard in 2004
  - XML-based
  - TCP transport only
  - Support for protocol extensions
  - Deployed at many registries

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Present Day

RFC5730: "*The original motivation for this protocol was to provide a standard Internet domain name registration protocol* "

- Registries are again developing non-standardized provisioning APIs
  - Creating the risk of ending up in pre EPP state
- EPP was developed when the use of REST and APIs was not yet common

RESTful EPP (aka RDAP for EPP)

A new proposed standard for EPP over a RESTful transport mechanism

- Based on HTTP using the REST architectural style
- Compatible with existing EPP standards
- Mapping of EPP objects to REST endpoints
- Includes support for JSON data format

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Why a RESTful API?

- **Deployment** challenges in modern (cloud) environments
  - Load balancing (L3/4 vs L7)
  - Rate limiting (session vs request)
  - Identity and Access Management (IAM)
  - Leverage existing HTTP traffic management solution

- **Ease of use**
  - REST is the defacto standard for API development
  - Simplifies development of registrar-registry integrations
  - Simpler and cheaper for (smaller) registrar?

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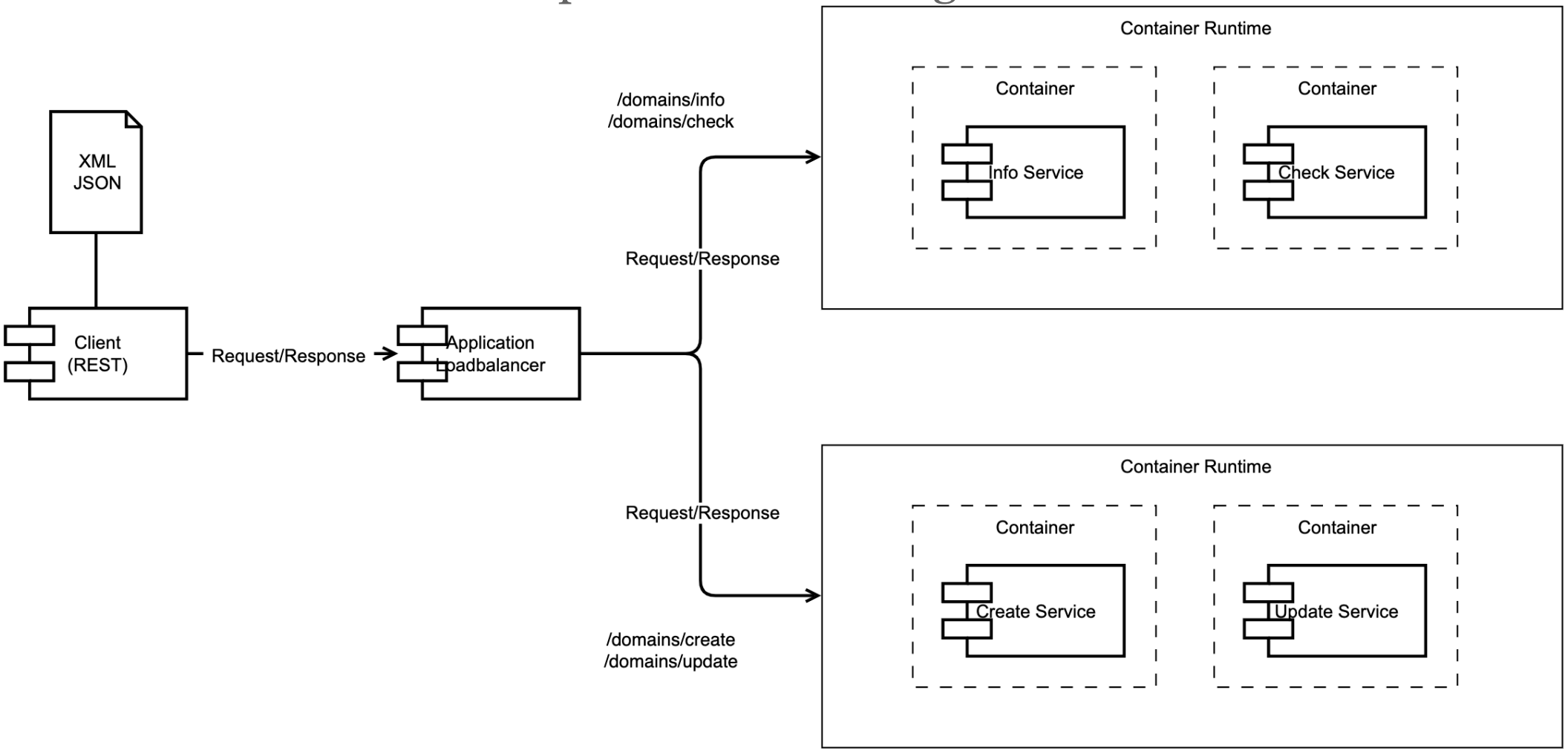
Example: Load Balancing

Resource allocation & request based routing



IETF Draft

1) **RESTful EPP**: Create a new standard for EPP over RESTful transport

- Mapping EPP to RESTful API
- Focus on scalability, performance, security and usability
- Limit use of XML/JSON messages where possible

See: https://github.com/SIDN/ietf-epp-restful-transport

2) **JSON**: Mapping EPP XML schema to JSON schema

- Reuse established semantics for existing XML object mappings (domain, host, contact ...)

See: https://github.com/SIDN/ietf-epp-restful-json

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Command Mapping

- Command is mapped to:
  - **HTTP method**
  - Resource
  - Request message

Command	Method	Resource	Request	Response
Hello	OPTIONS	/	No	Yes
Login	POST	/session	Yes	Yes
Logout	DELETE	/session	N/A	Yes
Check	HEAD	/{c}/{i}	No	No
Info	GET	/{c}/{i}	Optional	Yes
Poll Request	GET	/messages	No	Yes
Poll Ack	DELETE	/messages/{i}	No	Yes
Create	POST	/{c}	Yes	Yes
Delete	DELETE	/{c}/{i}	Optional	Yes
Renew	POST	/{c}/{i}/renewal	Optional	Yes
Transfer Reques	POST	/{c}/{i}/transfer	Optional	Yes
Transfer Query	GET	/{c}/{i}/transfer	Optional	Yes
Transfer Cancel	DELETE	/{c}/{i}/transfer	Optional	Yes
Transfer Approv	PUT	/{c}/{i}/transfer	Optional	Yes
Transfer Reject	DELETE	/{c}/{i}/transfer	Optional	Yes
Update	PATCH	/{c}/{i}	Yes	Yes

Note: The API is still very much under development. A Login/Logout command may not be required for REPP

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Transfer Request	POST	/{c}/{i}/transfer	Optional	Yes
Transfer Query	GET	/{c}/{i}/transfer	Optional	Yes
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Example: Standard Domain Check

Standard XML request

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<epp xmlns="urn:ietf:params:xml:ns:epp-1.0">
  <command>
     <check>
       <domain:check
        xmlns:domain="urn:ietf:params:xml:ns:domain-1.0">
         <domain:name>example.org</domain:name>
       </domain:check>
     </check>
     <clTRID>ABC-12345</clTRID>
 </command>
</epp>
```

Processing is relatively expensive: create, serialize, transmit, parse, deserialize, validation all take CPU cycles

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Example: Simplified Domain Check

RESTful Request

```
HEAD /repp/v1/domains/example.nl HTTP/2
Host: repp.example.nl
Authorization: Bearer <token>
Accept: application/epp+xml
Accept-Language: en
REPP-Cltrid: ABC-12345
```

Response

```
HTTP/2 200 OK
Date: Wed, 24 Jan 2024 12:00:00 UTC
Server: Example REPP server v1.0
REPP-Cltrid: ABC-12345
REPP-Svtrid: XYZ-12345
REPP-Check-Avail: 0
REPP-Check-Reason: In use
REPP-result-code: 1000
Content-Length: 0
```

No request message required
Request encoded in:
- Method
- URL
- Headers

No response message
Response encoded in:
- Headers

Open Questions

- Stateless vs Stateful EPP layer?
- Authentication?
- Converting XML to JSON?
- Extensions?

Alternative concepts

- Extensible Provisioning Protocol (EPP) Mapping over **HTTP**
  - HTTP Transport
  - Single endpoint
  - Stateful
- Extensible Provisioning Protocol (EPP) Mapping over **QUIC**
  - QUIC Transport
  - TCP-like
  - Stateful

IETF – Your input matters

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Discussion

- Open discussion
- Mentimeter questions (Optional)


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