Netconf XML Schema Query
draft-scott-netconf-schema-query-00.txt

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Abstract

This document defines a mechanism to retrieve a list of XML Schemas supported by a NETCONF server. This is an optional capability built on top of the base NETCONF definition. This document defines the capabilities and operations necessary to support this service.

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1. Introduction

The [NETCONF] protocol defines the capability mechanism to discover at run-time what protocol features are supported by a particular NETCONF server. This memo defines a mechanism to be able to discover all possible data models (XML Schemas) dynamically from a [NETCONF] server.

This memo introduces Schema query as a capability into [NETCONF] protocol.

1.1. Requirements

1.1.1. Requirements notation

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119]. The following will be introduced in [NETCONF] protocol.

- a means to advertise the list of supported Schema
- a means to advertise the versions of supported Schema
- a means to advertise the availability/location of support Schema
2. Capability Identifier

   urn:ietf:params:netconf:capability:list-schema:1.0
3. Options

3.1. New Operation

3.1.1. <list-schema>

The <list-schema> operation allows the client to request the list of available schema on the managed device. The response data can be used to determine the available schema and their versions. The schema itself (i.e., schema content) is not returned in the response. A URI to the schema is returned which is used to facilitate the retrieval of the schema using a supported mechanism on the device such as a NETCONF operation or ftp.

Parameters:

Identifier:

Unique identifier of the specific schema for retrieval. The parameter is optional. A missing parameter or empty target will retrieve all available schemas.

Example: Query all schema on device <list-schema> operation

```xml
<rpc message-id="101"
     xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <list-schema>
    <identifier></identifier>
  </list-schema>
</rpc>
```

The NETCONF server returns a list of XML schema available for retrieval: Notification schema in this example.

```xml
<rpc-reply message-id="101"
           xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <data>
    <schemaList xmlns="rn:ietf:params:xml:ns:netconf:base:1.0">
      <schema>
        <identifier>ietf:params:xml:ns:netconf:notification"</identifier>
        <version>&lt;1.0&lt;version>
        <location>ftp://some.accessible.location</location>
      </schema>
    </schemaList>
  </data>
</rpc-reply>
```
Example: Query a specific schema on device using `<list-schema>` operation

```xml
<rpc message-id="101"
     xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
   <list-schema>
     <identifier>urn:ietf:params:xml:ns:netconf:notification</identifier>
   </filter>
</list-schema>
</rpc>
```

The NETCONF server returns a list of XML schema available for retrieval: Notification schema in this example.

```xml
<rpc-reply message-id="101"
            xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <data>
    <schemaList xmlns="rn:ietf:params:xml:ns:netconf:base:1.0">
      <schema>
        <identifier>"ietf:params:xml:ns:netconf:notification"</identifier>
        <version>1.0</version>
        <location>ftp://some.accessible.location</location>
      </schema>
    </schemaList>
  </data>
</rpc-reply>
```

3.2. Design Alternative: Retrieve using existing operations

3.2.1. `<get>`

3.2.1.1. XML Schema Discovery

A NETCONF client retrieves the list of supported XML Schema from a NETCONF server using the `<get>` RPC request.

3.2.1.1.1. XML Schema list retrieval using `<get>` operation

The list of available XML Schema is retrieved by requesting the `<schema>` subtree via a `<get>` operation. Available schema for the requesting session are returned in the reply containing the `<identifier>`, `<version>` and `<location>` elements, where `<identifier>` and `<version>` elements are mandatory and their values are unique. The returned list must only include the names of those schema for which the NETCONF session has sufficient privileges. The NETCONF
session privileges are determined via access control mechanisms which are beyond the scope of this document. An empty reply is returned if there are no available schema.

Example: Retrieving available XML schema list using <get> operation

```xml
<rpc message-id="101"
    xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <get>
    <filter type="subtree">
    </filter>
  </get>
</rpc>
```

The NETCONF server returns a list of XML schema available for retrieval: Notification schema in this example.

```xml
<rpc-reply message-id="101"
    xmlns="urn:ietf:params:xml:ns:netconf:base:1.0">
  <data>
    <schemaList xmlns="rn:ietf:params:xml:ns:netconf:base:1.0">
      <schema>
        <identifier>ietf:params:xml:ns:netconf:notification</identifier>
        <version>&lt;1.0</version>
        <location>ftp://some.accessible.location</location>
      </schema>
    </schemaList>
  </data>
</rpc-reply>
```
4. Security Considerations

Although there are no direct security concerns with this operation, schemas themselves may provide information about a system that could be used to aid an attack on that system. Care should be taken to restrict access to the schema information as appropriate.
5. Normative References


[RFC2119] Bradner, s., "Key words for RFCs to Indicate Requirements Levels", RFC 2119, March 1997.


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Acknowledgment

Funding for the RFC Editor function is provided by the IETF Administrative Support Activity (IASA).