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NETCONF Monitoring Schema
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Internet-Draft

NETCONF Monitoring Schema

February 2007

Abstract

This document defines Netconf content via XML Schema to be used to monitor the Netconf protocol. It provides information about Netconf sessions and subscriptions.

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NETCONF Monitoring Schema

February 2007

1. Introduction

[NETCONF] can be conceptually partitioned into four layers:

Layer	Example
Content	Configuration data
Operations	<get-config>, <edit-config> <notification>
RPC	<rpc>, <rpc-reply>
Transport Protocol	BEEP, SSH, SSL, console

This document defines Netconf content via [XML Schema] to be used to monitor the Netconf protocol. It provides information about Netconf sessions and subscriptions.

Figure 1

1.1. Definition of Terms

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].

Element: An [XML] Element.

Managed Object: A collection of one or more Elements that define an abstract thing of interest.

Subscription: A concept related to the delivery of notifications (if any to send) involving destination and selection of notifications. It is bound to the lifetime of a session.

Operation: This term is used to refer to NETCONF protocol operations. Specifically within this document, operation refers to NETCONF protocol operations defined in support of NETCONF notifications.

[1.2.](#) XML Schema to Monitor Netconf

```
<xs:schema
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns=
"urn:ietf:params:xml:ns:netconf:state:1.0"
  xmlns:netconf="urn:ietf:params:xml:ns:netconf:base:1.0"
  targetNamespace=
"urn:ietf:params:xml:ns:netconf:state:1.0"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified">
  <xs:annotation>
    <xs:documentation xml:lang="en">
      NetConf Monitoring Schema.
      All elements in this Schema are read-only.
    </xs:documentation>
  </xs:annotation>

  <xs:import namespace="urn:ietf:params:xml:ns:netconf:base:1.0"
    schemaLocation="urn:ietf:params:xml:ns:netconf:base:1.0"/>
  <xs:import
    namespace="urn:ietf:params:xml:ns:netconf:notification:1.0"
    schemaLocation="urn:ietf:params:xml:ns:netconf:notification:1.0"/>

  <xs:element name="netconfState">
    <xs:complexType>
```

```

<xs:sequence>

  <xs:element name="capabilities">
    <xs:annotation>
      <xs:documentation xml:lang="en">
        List of NETCONF capabilities supported
        by this device.
      </xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:sequence>
        <xs:element name="capability"
          type="xs:anyURI" minOccurs="0"
          maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>

  <xs:element name="sessions">

```

```

  <xs:annotation>
    <xs:documentation xml:lang="en">
      List of NETCONF sessions currently
      active on this device.
    </xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="session"
        type="NetconfSessionInfo"
        minOccurs="0"
        maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="configurations">
  <xs:annotation>
    <xs:documentation xml:lang="en">
      List of NETCONF configuration datastores (e.g. running,
      startup, candidate) supported on this device and related
      information.
    </xs:documentation>
  </xs:annotation>

```

```

    </xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="config" type="ConfigurationDatastoreInfo"
        minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

<xs:element name="subscriptions">
  <xs:annotation>
    <xs:documentation xml:lang="en">
      List of NETCONF notification subscriptions
      active on this device and related information.
    </xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="subscription"
        type="NetconfSubscriptionInfo"
        minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

```

```

  </xs:sequence>
</xs:complexType>
</xs:element>

```

```

<!-- Complex Types -->

```

```

<xs:complexType name="NetconfSessionInfo">
  <xs:sequence>
    <xs:element name="sessionId" type="netconf:SessionId"/>
    <xs:element name="username" type="xs:string"/>
    <xs:element name="loginTime" type="xs:dateTime"/>
  </xs:sequence>
</xs:complexType>

```

```

<xs:complexType name="ConfigurationDatastoreInfo">
  <xs:sequence>
    <xs:element name="name" type="netconf:configNameType"/>
    <xs:element name="lockStatus" type="LockStatus"/>
  </xs:sequence>
</xs:complexType>

<xs:complexType name="LockStatus">
  <xs:annotation>
    <xs:documentation>
      An indication of whether a resource is locked or unlocked.
      If locked, additional information about the locking such as
      user and time stamp is provided.
    </xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="lock-state">
      <xs:simpleType>
        <xs:restriction base="xs:string">
          <xs:enumeration value="locked"/>
          <xs:enumeration value="unlocked"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
    <xs:element name="lockedBySession"
      type="netconf:SessionId" minOccurs="0">
      <xs:annotation>
        <xs:documentation>
          The session ID of the session that has locked this resource.
        </xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>

```

```

</xs:element>
<xs:element name="lockedTime"
  type="xs:dateTime" minOccurs="0">
  <xs:annotation>
    <xs:documentation>
      The date and time of when the resource was locked.
      If the resource is currently unlocked, this element
      will not be present.
    </xs:documentation>
  </xs:annotation>

```

```

        </xs:documentation>
    </xs:annotation>
</xs:element>
</xs:sequence>
</xs:complexType>

<xs:complexType name="NetconfSubscriptionInfo">
  <xs:annotation>
    <xs:documentation>
      Information about Netconf Notification Subscriptions.
    </xs:documentation>
  </xs:annotation>
  <xs:sequence >
    <xs:element name="session-id"
      type="netconf:SessionId" >
      <xs:annotation>
        <xs:documentation xml:lang="en">
          The session id associated with this
          subscription.
        </xs:documentation>
      </xs:annotation>
    </xs:element>

    <xs:element name="stream"
      type="xs:string" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">
          The stream associated with this subscription.
        </xs:documentation>
      </xs:annotation>
    </xs:element>

    <xs:element name="filter"
      type="netconf:filterInlineType" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">
          The filters associated with this subscription.
        </xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence >

```

```

<xs:element name="associatedNamedProfile" minOccurs="0">

```



```

<xs:annotation>
  <xs:documentation xml:lang="en">
    The named profile associated with this
    subscription. Note that the contents of the
    named profile may have changed since it was
    last applied.
  </xs:documentation>
</xs:annotation>
</xs:element>

<xs:element name="lastModified" type="xs:dateTime" >
  <xs:annotation>
    <xs:documentation xml:lang="en">
      The last time this subscription was modified. If
      it has not been modified since creation, this is
      the time of subscription creation.
    </xs:documentation>
  </xs:annotation>
</xs:element>

<xs:element name="messagesSent"
  type="xs:unsignedInt" minOccurs="0">
  <xs:annotation>
    <xs:documentation xml:lang="en">
      A count of event notifications sent along
      this connection since the subscription was
      created.
    </xs:documentation>
  </xs:annotation>
</xs:element>

<xs:element name="key">
  <xs:key name="uniqueSubscription">
    <xs:selector xpath="./subscription"/>
    <xs:field xpath="sessionId"/>
  </xs:key>
</xs:element>

</xs:sequence>
</xs:complexType>

</xs:schema>

```

[2.](#) Security Considerations

The information in this Schema provides information about Netconf system that could be used to aid an attack on that system. Care should be taken to restrict access to this information as appropriate.

[3.](#) Acknowledgements

Thanks to the Netconf working group for providing a much earlier draft of Schema to manage Netconf and Netconf Notifications that were cannibalized to produce this draft.

4. Normative References

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