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RFC 9984
YANG Groupings for UDP Clients and UDP Servers

Abstract

This document defines two YANG 1.1 modules with reusable groupings for managing UDP clients and UDP servers.

Status of This Memo

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in Section 2 of RFC 7841.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at https://www.rfc-editor.org/info/rfc9984.

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1. Introduction

This document defines two YANG 1.1 [RFC7950] modules with reusable groupings for managing UDP clients and UDP servers [RFC768]. These modules may be used directly (e.g., define a specific UDP client or UDP server) or in conjunction with the configuration defined for higher-level protocols that depend on UDP.

1.1. Requirements Language

The key words "**MUST**", "**MUST NOT**", "**REQUIRED**", "**SHALL**", "**SHALL NOT**", "**SHOULD**", "**SHOULD NOT**", "**RECOMMENDED**", "**NOT RECOMMENDED**", "**MAY**", and "**OPTIONAL**" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

1.2. Adherence to the NMDA

This document is compliant with the Network Management Datastore Architecture (NMDA) [RFC8342]. It does not define any protocol-accessible nodes that are "config false".

1.3. Conventions

Various examples in this document use the XML [W3C.REC-xml-20081126] encoding. Other encodings, such as JSON [RFC8259], could alternatively be used.

2. The "ietf-udp-client" Module

This section defines a YANG 1.1 module called "ietf-udp-client". This YANG module defines the "udp-client" grouping for providing UDP clients with remote server information.

Section 2.1 provides the overview of the YANG module. An example of usage is illustrated in Section 2.2. Section 2.3 defines the YANG module itself.

2.1. Data Model Overview

This section provides an overview of the features and the grouping defined in the "ietf-udp-client" YANG module.

2.1.1. Features

The "ietf-udp-client" module defines the following "feature" statement:

```
Features:
+-- local-binding
```

The diagram above uses syntax that is similar to the syntax used in [RFC8340]; but the syntax from the diagram is not defined in [RFC8340].

This feature indicates that the client supports configuring local bindings (i.e., the local address and local port number) for UDP clients.

2.1.2. The "udp-client" Grouping

The following tree diagram [RFC8340] illustrates the tree structure of the "udp-client" grouping:

```
module: ietf-udp-client

  grouping udp-client:
    +-- remote-address    inet:host
    +-- remote-port?      inet:port-number
    +-- local-address?    inet:ip-address {local-binding}?
    +-- local-port?       inet:port-number {local-binding}?
```

The description of these parameters is provided below:

- The "remote-address", which is mandatory, may be configured as an IPv4 address, an IPv6 address, or a hostname. The resolved address should be compatible with the local address family, if also provided.
- The "remote-port" is defined with neither a "default" nor a "mandatory" statement. YANG modules using this grouping **SHOULD** refine the grouping with a "default" statement when the port number is well-known (e.g., a port number allocated by IANA) or with a "mandatory" statement if a port number needs to always be configured. This **MAY** be ignored when the port number is neither well-known nor mandatory to configure, such as might be the case when this grouping is used by another grouping.
- The "local-address", which is enabled by the "local-binding" feature, may be configured as an IPv4 address, an IPv6 address, or a wildcard value. In normal operation, the local and configured remote addresses **SHOULD** be from the same address family. Differences between address families may occur in abnormal or error conditions; therefore, they are allowed to be reported.
- The "local-port", which depends on the "local-binding" feature, is not mandatory. Its default value is "0", indicating that the operating system can select an arbitrary port number.

2.2. Example Usage

This section presents an example of usage of the "udp-client" grouping.

```
<!-- The outermost element below doesn't exist in the data model. -->
<!--  It simulates if the "grouping" were a "container" instead.  -->

<udp-client xmlns="urn:ietf:params:xml:ns:yang:ietf-udp-client">
  <remote-address>www.example.com</remote-address>
  <remote-port>10000</remote-port>
  <local-address>192.0.2.2</local-address>
  <local-port>12345</local-port>
</udp-client>
```

2.3. YANG Module

This module imports types defined in [RFC9911].

```
<CODE BEGINS> file "ietf-udp-client@2026-05-13.yang"
```

```
module ietf-udp-client {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-udp-client";
  prefix udpc;

  import ietf-inet-types {
    prefix inet;
    reference
      "RFC 9911: Common YANG Data Types";
  }

  organization
    "IETF NETCONF (Network Configuration) Working Group";
  contact
    "WG Web:   <https://datatracker.ietf.org/group/netconf/>
     WG List:  <mailto:netconf@ietf.org>

     Authors:  Alex Huang Feng
               <mailto:alex.huang-feng@insa-lyon.fr>
               Pierre Francois
               <mailto:pierre.francois@insa-lyon.fr>";
  description
    "Defines a generic grouping for UDP-based client applications.

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     (https://trustee.ietf.org/license-info).

     All revisions of IETF and IANA published modules can be found
     at the YANG Parameters registry group
     (https://www.iana.org/assignments/yang-parameters).

     This version of this YANG module is part of RFC 9984; see
     the RFC itself for full legal notices.

     The key words 'MUST', 'MUST NOT', 'REQUIRED', 'SHALL', 'SHALL
     NOT', 'SHOULD', 'SHOULD NOT', 'RECOMMENDED', 'NOT RECOMMENDED',
     'MAY', and 'OPTIONAL' in this document are to be interpreted as
     described in BCP 14 (RFC 2119) (RFC 8174) when, and only when,
     they appear in all capitals, as shown here.";

  revision 2026-05-13 {
    description
      "Initial revision";
    reference
      "RFC 9984: YANG Groupings for UDP Clients and UDP Servers";
  }

  feature local-binding {
    description
      "Indicates that the UDP client supports configuring local
       bindings (i.e., the local address and local port number)
```

```
        for UDP clients.";
  }

  grouping udp-client {
    description
      "A reusable grouping for UDP clients.

       Note that this grouping uses fairly typical descendant
       node names such that a stack of 'uses' statements will
       have name conflicts.  It is intended that the consuming
       data model will resolve the issue (e.g., by wrapping
       the 'uses' statement in a container called
       'udp-client-parameters').  This module purposely does
       not do this itself so as to provide maximum flexibility
       to consuming models.";
    leaf remote-address {
      type inet:host;
      mandatory true;
      description
        "The IP address or hostname of the remote UDP server.";
    }
    leaf remote-port {
      type inet:port-number;
      description
        "The port number of the remote UDP server.";
    }
    leaf local-address {
      if-feature "local-binding";
      type inet:ip-address;
      description
        "The local IP address to bind to when sending UDP
         datagrams to the remote server. INADDR_ANY ('0.0.0.0') or
         INADDR6_ANY ('0:0:0:0:0:0:0:0' a.k.a. '::') may be used
         so that the client can bind to any IPv4 or IPv6 address.
         In normal operation, the local and configured
         remote addresses SHOULD be from the same address family.
         Differences between address families may occur in
         abnormal or error conditions; therefore, they are allowed to
         be reported.";
    }

    leaf local-port {
      if-feature "local-binding";
      type inet:port-number;
      default "0";
      description
        "The local port number to bind to when sending UDP
         datagrams to the remote server. The port number '0',
         which is the default value, indicates that any available
         local port number may be used.";
    }
  }
}

<CODE ENDS>
```

3. The "ietf-udp-server" Module

This section defines a YANG 1.1 module called "ietf-udp-server". This YANG module defines the "udp-server" grouping for managing UDP servers.

Section 3.1 provides an overview of the "ietf-udp-server" YANG module. An example of usage is illustrated in Section 3.2. Section 3.3 defines the YANG module itself.

3.1. Data Model Overview

This section provides an overview of the grouping defined in the "ietf-udp-server" module.

3.1.1. The "udp-server" Grouping

The following tree diagram [RFC8340] illustrates the tree structure of "udp-server" grouping:

```
module: ietf-udp-server

  grouping udp-server:
    +-- local-bind* [local-address]
       +-- local-address    inet:ip-address
       +-- local-port?      inet:port-number
```

The description of these parameters is provided below:

- The "local-address", which is mandatory, may be configured as an IPv4 address, an IPv6 address, or a wildcard value.
- The "local-port" is defined with neither a "default" nor a "mandatory" statement. YANG modules using this grouping **SHOULD** refine the grouping with a "default" statement when the port number is well-known (e.g., a port number allocated by IANA) or with a "mandatory" statement if a port number needs to always be configured. This **MAY** be ignored when the port number is neither well-known nor mandatory to configure, such as might be the case when this grouping is used by another grouping.

3.2. Example Usage

This section presents two examples of usage of the "udp-server" grouping.

The following shows an example of a server configured for listening to an IPv4 address:

```
<!-- The outermost element below doesn't exist in the data model. -->
<!--  It simulates if the "grouping" were a "container" instead.  -->

<udp-server xmlns="urn:ietf:params:xml:ns:yang:ietf-udp-server">
  <local-bind>
    <local-address>192.0.2.2</local-address>
    <local-port>49152</local-port>
  </local-bind>
</udp-server>
```

The following shows an example of a server configured for listening to an IPv4 and IPv6 together:

```
<!-- The outermost element below doesn't exist in the data model. -->
<!--  It simulates if the "grouping" were a "container" instead.  -->

<udp-server xmlns="urn:ietf:params:xml:ns:yang:ietf-udp-server">
  <local-bind>
    <local-address>192.0.2.2</local-address>
    <local-port>49152</local-port>
  </local-bind>
  <local-bind>
    <local-address>2001:db8::0</local-address>
    <local-port>49153</local-port>
  </local-bind>
</udp-server>
```

3.3. YANG Module

This module imports types defined in [RFC9911].

```
<CODE BEGINS> file "ietf-udp-server@2026-05-13.yang"

module ietf-udp-server {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-udp-server";
  prefix udps;

  import ietf-inet-types {
    prefix inet;
    reference
      "RFC 9911: Common YANG Data Types";
  }

  organization
    "IETF NETCONF (Network Configuration) Working Group";
  contact
    "WG Web:   <https://datatracker.ietf.org/group/netconf/>
     WG List:  <mailto:netconf@ietf.org>

     Authors:  Alex Huang Feng
               <mailto:alex.huang-feng@insa-lyon.fr>
```

```
              Pierre Francois
              <mailto:pierre.francois@insa-lyon.fr>";
  description
    "Defines a generic grouping for UDP-based server applications.

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     Relating to IETF Documents
     (https://trustee.ietf.org/license-info).

     All revisions of IETF and IANA published modules can be found
     at the YANG Parameters registry group
     (https://www.iana.org/assignments/yang-parameters).

     This version of this YANG module is part of RFC 9984; see
     the RFC itself for full legal notices.";

  revision 2026-05-13 {
    description
      "Initial revision";
    reference
      "RFC 9984: YANG Groupings for UDP Clients and UDP Servers";
  }

  grouping udp-server {
    description
      "A reusable grouping for managing UDP servers.

       Note that this grouping uses fairly typical descendant
       node names such that a stack of 'uses' statements will
       have name conflicts.  It is intended that the consuming
       data model will resolve the issue (e.g., by wrapping
       the 'uses' statement in a container called
       'udp-server-parameters').  This module purposely does
       not do this itself so as to provide maximum flexibility
       to consuming models.";
    list local-bind {
      key "local-address";
      min-elements 1;
      description
        "A list of bind (listen) points for this server
         instance.  A server instance may have multiple
         bind points to support, e.g., the same port number in
         different address families or different port numbers
         in the same address family.";
      leaf local-address {
        type inet:ip-address;
        mandatory true;
        description
          "The local IP address to listen on for incoming
           UDP datagrams.  INADDR_ANY ('0.0.0.0') or
           INADDR6_ANY ('0:0:0:0:0:0:0:0' a.k.a. '::') may be used
           so that the server can listen to any IPv4 or IPv6
```

```
            address.";
        }
        leaf local-port {
          type inet:port-number;
          description
            "The local port number to listen on for incoming UDP
             datagrams.";
        }
      }
    }
  }

<CODE ENDS>
```

4. Security Considerations

This section uses the template described in Section 3.7.1 of [RFC9907].

The "ietf-udp-client" and "ietf-udp-server" YANG modules define a data model that is designed to be accessed via YANG-based management protocols, such as Network Configuration Protocol (NETCONF) [RFC6241] and RESTCONF [RFC8040]. These YANG-based management protocols (1) have to use a secure transport layer (e.g., SSH [RFC4252], TLS [RFC8446], and QUIC [RFC9000]) and (2) have to use mutual authentication.

The Network Configuration Access Control Model (NACM) [RFC8341] provides the means to restrict access for particular NETCONF or RESTCONF users to a preconfigured subset of all available NETCONF or RESTCONF protocol operations and content.

These YANG modules define a set of identities, types, and groupings. These nodes are intended to be reused by other YANG modules. The modules by themselves do not expose any data nodes that are writable, data nodes that contain read-only state, or RPCs. As such, there are no additional security issues related to the YANG modules that need to be considered.

Modules that use the groupings that are defined in this document should identify the corresponding security considerations. For example, reusing some of these groupings will expose privacy-related information (e.g., 'remote-address', 'remote-port', 'local-address', or 'local-port').

5. IANA Considerations

This document describes the URIs from the "IETF XML Registry" and the registration of two new YANG module names.

5.1. The "IETF XML Registry"

IANA has assigned two new URIs from the "IETF XML Registry" [RFC3688]:

URI: urn:ietf:params:xml:ns:yang:ietf-udp-client

Registrant Contact: The IESG.
XML: N/A; the requested URI is an XML namespace.

URI: urn:ietf:params:xml:ns:yang:ietf-udp-server
Registrant Contact: The IESG.
XML: N/A; the requested URI is an XML namespace.

5.2. The "YANG Module Names" Registry

IANA has registered the following YANG modules in the "YANG Module Names" registry [RFC6020] within the "YANG Parameters" registry group:

Name: ietf-udp-client
Maintained by IANA? N
Namespace: urn:ietf:params:xml:ns:yang:ietf-udp-client
Prefix: udpc
Reference: RFC 9984

Name: ietf-udp-server
Maintained by IANA? N
Namespace: urn:ietf:params:xml:ns:yang:ietf-udp-server
Prefix: udps
Reference: RFC 9984

6. References

6.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

[RFC3688] Mealling, M., "The IETF XML Registry", BCP 81, RFC 3688, DOI 10.17487/RFC3688, January 2004, <https://www.rfc-editor.org/info/rfc3688>.

[RFC6020] Bjorklund, M., Ed., "YANG - A Data Modeling Language for the Network Configuration Protocol (NETCONF)", RFC 6020, DOI 10.17487/RFC6020, October 2010, <https://www.rfc-editor.org/info/rfc6020>.

[RFC768] Postel, J., "User Datagram Protocol", STD 6, RFC 768, DOI 10.17487/RFC0768, August 1980, <https://www.rfc-editor.org/info/rfc768>.

[RFC7950] Bjorklund, M., Ed., "The YANG 1.1 Data Modeling Language", RFC 7950, DOI 10.17487/RFC7950, August 2016, <https://www.rfc-editor.org/info/rfc7950>.

[RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <https://www.rfc-editor.org/info/rfc8174>.

[RFC8341] Bierman, A. and M. Bjorklund, "Network Configuration Access Control Model", STD 91, RFC 8341, DOI 10.17487/RFC8341, March 2018, <https://www.rfc-editor.org/info/rfc8341>.

[RFC9911] Schönwälder, J., Ed., "Common YANG Data Types", RFC 9911, DOI 10.17487/RFC9911, December 2025, <https://www.rfc-editor.org/info/rfc9911>.

6.2. Informative References

[RFC4252] Ylonen, T. and C. Lonvick, Ed., "The Secure Shell (SSH) Authentication Protocol", RFC 4252, DOI 10.17487/RFC4252, January 2006, <https://www.rfc-editor.org/info/rfc4252>.

[RFC6241] Enns, R., Ed., Bjorklund, M., Ed., Schoenwaelder, J., Ed., and A. Bierman, Ed., "Network Configuration Protocol (NETCONF)", RFC 6241, DOI 10.17487/RFC6241, June 2011, <https://www.rfc-editor.org/info/rfc6241>.

[RFC8040] Bierman, A., Bjorklund, M., and K. Watsen, "RESTCONF Protocol", RFC 8040, DOI 10.17487/RFC8040, January 2017, <https://www.rfc-editor.org/info/rfc8040>.

[RFC8259] Bray, T., Ed., "The JavaScript Object Notation (JSON) Data Interchange Format", STD 90, RFC 8259, DOI 10.17487/RFC8259, December 2017, <https://www.rfc-editor.org/info/rfc8259>.

[RFC8340] Bjorklund, M. and L. Berger, Ed., "YANG Tree Diagrams", BCP 215, RFC 8340, DOI 10.17487/RFC8340, March 2018, <https://www.rfc-editor.org/info/rfc8340>.

[RFC8342] Bjorklund, M., Schoenwaelder, J., Shafer, P., Watsen, K., and R. Wilton, "Network Management Datastore Architecture (NMDA)", RFC 8342, DOI 10.17487/RFC8342, March 2018, <https://www.rfc-editor.org/info/rfc8342>.

[RFC8446] Rescorla, E., "The Transport Layer Security (TLS) Protocol Version 1.3", RFC 8446, DOI 10.17487/RFC8446, August 2018, <https://www.rfc-editor.org/info/rfc8446>.

[RFC9000] Iyengar, J., Ed. and M. Thomson, Ed., "QUIC: A UDP-Based Multiplexed and Secure Transport", RFC 9000, DOI 10.17487/RFC9000, May 2021, <https://www.rfc-editor.org/info/rfc9000>.

[RFC9907] Bierman, A., Boucadair, M., Ed., and Q. Wu, "Guidelines for Authors and Reviewers of Documents Containing YANG Data Models", BCP 216, RFC 9907, DOI 10.17487/RFC9907, March 2026, <https://www.rfc-editor.org/info/rfc9907>.

[W3C.REC-xml-20081126] Bray, T., Ed., Paoli, J., Ed., Sperberg-McQueen, C.M., Ed., Maler, E., Ed., and F. Yergeau, Ed., "Extensible Markup Language (XML) 1.0 (Fifth Edition)", W3C Recommendation, 26 November 2008, <https://www.w3.org/TR/2008/REC-xml-20081126/>. Latest version available at <https://www.w3.org/TR/xml/>.

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