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Telemetry Data Export capability
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Abstract

This document proposes a YANG module for telemetry data export capability which augments system Capabilities model and provide additional telemetry data export attributes associated with system capability for transport dependent capability negotiation.

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Table of Contents

1.	Introduction	2
1.1.	Terminology	2
2.	Data Export capability	3
2.1.	Tree Diagram	4
3.	YANG Module	4
4.	IANA Considerations	9
4.1.	Updates to the IETF XML Registry	9
4.2.	Updates to the YANG Module Names Registry	10
5.	Security Considerations	10
6.	References	11
6.1.	Normative References	11
6.2.	Informative References	12
	Authors' Addresses	12

[1.](#) Introduction

Notification capability model defined in [I-D.netconf-notification-capabilities] allows a client to discover a set of capabilities supported by the server (e.g., basic system capability and YANG-Push related capabilities) both at implementation-time and run-time. These "capabilities" permit the client to adjust its behavior to take advantage of the features exposed by the device.

However pre-configuration for some transport specific parameters (e.g., transport protocol, encoding format, encryption by the client is still inevitable, which may cause unexpected failure and additional message exchange between client and server.

This document proposes a YANG module for telemetry data export capability which augments System Capabilities model and provide additional data export attributes for transport dependent capability negotiation.

[1.1.](#) Terminology

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.

2. Data Export capability

The YANG module `ietf-notification-capabilities` defined in [I-D.netconf-notification-capabilities] specify the following server capabilities related to YANG Push:

- o A set of capabilities related to the amount of notifications the server can send out
- o Specification of which data nodes support on-change notifications.
- o Capability values can be specified on server level, datastore level or on specific data nodes (and their contained sub-tree) of a specific datastore. Capability values on a smaller, more specific part of the server's data always override more generic values.
- o On-change capability is not specified on a server level as different datastores usually have different on-change capabilities. On a datastore level on-change capability for configuration and state data can be specified separately.

These server capabilities are transport independent and session level capabilities and can be provided either at implementation time or reported at run time.

This document augments system Capabilities model and provides additional data export attributes associated with system capabilities:

- o Specification of transport protocol the client can use to establish transport connection;
- o Specification of encoding selection(e.g., XML or JSON, to binary) of Data Modeled with YANG;
- o Specification of secure transport mechanisms that are needed by the client to communicate with the server;
- o Specification of the type of data compression algorithm (e.g., lossless data compression) the client can use for file compression and decompression
- o Specification of Maximum number of data nodes that can be sent in a group of data node with the same characteristics;

- o Specification of the number of sensors group. A sensor group represents a reusable grouping of multiple paths and exclude filters.
- o Specification of the notification message encapsulation type, either one notification per message or multiple notifications per message.
- o Specification of the type of subscription, e.g., periodic subscription, on-change subscription, bulk subscription, adaptive subscription.
- o Specification of the time length of sampling interval.

2.1. Tree Diagram

The following tree diagram [[RFC8340](#)] provides an overview of the data model.

```

module: ietf-data-export-capabilities
augment /sysc:system-capabilities:
  +--ro data-export-capabilities
    +--ro transport-protocol          transport-protocol
    +--ro encoding-format             encoding-format
    +--ro secure-transport             secure-transport
    +--ro compression-mode            compression-mode
    +--ro max-nodes-per-sensor-group   uint32
    +--ro max-sensor-group-per-update  uint32
  augment /sysc:system-capabilities/inc:subscription-capabilities:
    +--ro message-bundling-support     boolean
    +--ro subscription-mode            subscription-mode
  augment /sysc:system-capabilities/sysc:datastore-capabilities/ +
    sysc:per-node-capabilities:
      +--ro sampling-interval*         centiseconds
      +--ro threshold-support          boolean

```

3. YANG Module

```

<CODE BEGINS> file "ietf-data-export-capabilities.yang"
module ietf-data-export-capabilities {
  yang-version 1.1;
  namespace urn:ietf:params:xml:ns:yang:ietf-notification-data-export-
capabilities;
  prefix dec;
  import ietf-system-capabilities { prefix sysc ; }
  import ietf-notification-capabilities { prefix inc; }
  organization
    "IETF NETCONF (Network Configuration) Working Group";
  contact

```


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description

"This module defines an extension to System Capability and YANG Push Notification Capabilities model and provides additional data export attributes for transport dependent capability negotiation.

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

/* Identities */

```
identity transport-protocol {  
  description  
    "Base identity for transport protocol type.";  
}
```

```
identity tcp {  
  base transport-protocol;  
  description  
    "Identity for tcp transport protocol.";  
}
```

```
identity udp {  
  base transport-protocol;  
  description  
    "Identity for udp transport protocol.";  
}
```

```
identity grpc {  
  base transport-protocol;  
  description  
    "Identity for grpc transport protocol.";  
}
```

```
identity security-protocol {
```



```
    description
      "Base identity for security protocol type.";
  }

  identity tls {
    base security-protocol;
    description
      "Identity for tls security protocol.";
  }

  identity ssh {
    base security-protocol;
    description
      "Identity for ssh transport protocol.";
  }

  identity encoding-format {
    description
      "Base identity for encoding format type.";
  }

  identity xml {
    base encoding-format;
    description
      "Identity for xml encoding format.";
  }

  identity json {
    base encoding-format;
    description
      "Identity for json encoding format.";
  }

  identity gpb {
    base encoding-format;
    description
      "Identity for gpb encoding format.";
  }

  identity cbor {
    base encoding-format;
    description
      "Identity for cbor encoding format.";
  }

  identity compression-mode {
    description
      "Base identity for compression mode.";
  }
```



```
identity gzip {
  base security-protocol;
  description
    "Identity for gzip compression mode.";
}

identity deflate {
  base security-protocol;
  description
    "Identity for deflate compression mode.";
}

identity subscription-mode {
  description
    "Base identity for subscription mode.";
}

identity periodic {
  base subscription-mode;
  description
    "Identity for periodic subscription mode.";
}

identity on-change {
  base subscription-mode;
  description
    "Identity for on change subscription mode.";
}

identity event {
  base subscription-mode;
  description
    "Identity for event based subscription mode.";
}

augment /sysc:system-capabilities {
  description "Add system level capability.";
  container data-export-capabilities {
    description "Capabilities related to transport dependent capability
negotiation.";
    leaf transport-protocol {
      type identityref {
        base transport-protocol;
      }
      description
        "Type of transport protocol.";
    }
    leaf encoding-format {
      type identityref {
        base encoding-format;
      }
    }
  }
}
```

}

```
        description
            "Type of encoding format.";
    }
    leaf security-protocol {
        type identityref {
            base security-protocol;
        }
        description
            "Type of secure transport.";
    }
    leaf compression-mode {
        type identityref {
            base compression-mode;
        }
        description
            "Type of compression mode.";
    }
    leaf max-nodes-per-sensor-group {
        type uint32 {
            range "1..max";
        }
        description
            "Maximum number of selected data nodes that can be sent
            per sensor group.";
    }
    leaf max-sensor-group-per-update {
        type uint32 {
            range "1..max";
        }
        description
            "Maximum number of sensor groups that can be sent
            in an update.";
    }
}

augment /sysc:system-capabilities/inc:subscription-capabilities {
    description "Add subscription level capability.";
    leaf message-bundling-support {
        type boolean;
        default false;
        description
            "Enables message bundling support.";
    }
    leaf subscription-mode {
        type identityref {
            base subscription-mode;
        }
        description
```



```
        "Type of subscription mode.";
    }
}
augment /sysc:system-capabilities/sysc:datastore-capabilities/sysc:per-
node-capabilities {
    description "Add datastore and node level capability.";
    leaf-list sampling-interval {
        type uint32;
        units "centiseconds";
        description "Time-based start and stop triggers
are used to define the Sampling intervals. All packets
are selected that arrive at the Observation Point within
the time intervals defined by the start and stop triggers
(i.e., arrival time of the packet is larger than the start
time and smaller than the stop time).";
        reference
        "RFC 5475: Sampling and Filtering Techniques for IP Packet
Selection";
    }
    leaf threshold-support {
        type boolean;
        default false;
        description
        "Set to true if the subscription mode is event based
subscription mode. Set to false
if event based subscription mode is not supported.";
    }
}
}
}
<CODE ENDS>
```

[4.](#) IANA Considerations

[4.1.](#) Updates to the IETF XML Registry

This document registers a URI in the "IETF XML Registry" [[RFC3688](#)]. Following the format in [[RFC3688](#)], the following registration has been made:

URI:

urn:ietf:params:xml:ns:yang:ietf-data-export-capabilities

Registrant Contact:

The IESG.

XML:

N/A; the requested URI is an XML namespace.

4.2. Updates to the YANG Module Names Registry

This document registers one YANG module in the "YANG Module Names" registry [[RFC6020](#)]. Following the format in [[RFC6020](#)], the following registration has been made:

```
name:
  ietf-data-export-capabilities
namespace:
  urn:ietf:params:xml:ns:yang:ietf-data-export-capabilities
prefix:
  dec
reference:
  RFC XXXX (RFC Ed.: replace XXX with actual RFC number and remove
  this note.)
```

5. Security Considerations

The YANG module specified in this document defines a schema for data that is designed to be accessed via network management protocols such as NETCONF [[RFC6241](#)] or RESTCONF [[RFC8040](#)]. The lowest NETCONF layer is the secure transport layer, and the mandatory-to-implement secure transport is Secure Shell (SSH) [[RFC6242](#)]. The lowest RESTCONF layer is HTTPS, and the mandatory-to-implement secure transport is TLS [[RFC8446](#)].

The NETCONF 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.

There are a number of data nodes defined in this YANG module that are writable/creatable/deletable (i.e., config true, which is the default). These data nodes may be considered sensitive in some network environments. Write operations (e.g., edit-config) to these data nodes without proper protection can have a negative effect on network operations. These are the subtrees and data nodes and their sensitivity/vulnerability:

- o /sysc:system-capabilities/dec:transport-protocol
- o /sysc:system-capabilities/dec:encoding-format
- o /sysc:system-capabilities/dec:secure-transport
- o /sysc:system-capabilities/dec:compression-mode
- o /sysc:system-capabilities/dec:max-nodes-per-sensor-group

- o /sysc:system-capabilities/dec:sensor-group-count
- o /sysc:system-capabilities/inc:subscription-capabilities/
dec:message-bundling-support
- o /sysc:system-capabilities/inc:subscription-capabilities/
dec:subscription-mode
- o /sysc:system-capabilities/sysc:datastore-capabilities/sysc:per-
node-capabilities/dec:sampling-interval

6. References

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