



## Periodic MIB Data Collection and Transfer

---

This chapter describes how to periodically transfer selected MIB data from your router to a specified NetworkManagement System (NMS). The periodic MIB data collection and transfer feature is also known as bulk statistics.

- [MIB Data Collection and Transfer, on page 1](#)
- [SNMP Objects and Instances, on page 2](#)
- [Bulk Statistics Object Lists, on page 2](#)
- [Bulk Statistics Schemas, on page 2](#)
- [Bulk Statistics Transfer Options, on page 2](#)
- [Benefits of MIB Data Collection and Transfer, on page 3](#)
- [Configure MIB Data Collection and Transfer, on page 3](#)

## MIB Data Collection and Transfer

MIB (Management Information Base) Data Collection and Transfer is a process in network management that involves the regular gathering and transmission of performance, configuration, and fault management data from the routers. Utilizing protocols such as SNMP (Simple Network Management Protocol), the routers periodically collect data from their MIBs, which include various metrics like CPU usage, memory usage, and interface statistics. This data is then transferred to a central network management system (NMS) or server for analysis. The NMS processes the incoming data to provide insights into network performance, detect anomalies, and assist in troubleshooting. The periodic collection and transfer of MIB data enable proactive monitoring, early fault detection, capacity planning, and compliance with network policies. Configuring this process involves setting the collection intervals, selecting specific MIB variables to be monitored, and ensuring secure data transfer through proper SNMP configuration. This continuous monitoring helps maintain the health and efficiency of the network, allowing administrators to address potential issues promptly and plan for future requirements.

### Guidelines and Restrictions for MIB Data Collection and Transfer

To use MIB data collection and transfer, you should be familiar with the Simple Network Management Protocol (SNMP) model of management information. You should also know what MIB information you want to monitor on your network devices, and the OIDs or object names for the MIB objects to be monitored.

## SNMP Objects and Instances

A type (or class) of SNMP management information is called an object. A specific instance from a type of management information is called an object instance (or SNMP variable). To configure a bulk statistics collection, you must specify the object types to be monitored using a bulk statistics object list and the specific instances of those objects to be collected using a bulk statistics schema.

MIBs, MIB tables, MIB objects, and object indices can all be specified using a series of numbers called an object identifier (OID). OIDs are used in configuring a bulk statistics collection in both the bulk statistics object lists (for general objects) and in the bulk statistics schemas (for specific object instances).

## Bulk Statistics Object Lists

To group the MIB objects to be polled, you need to create one or more object lists. A bulk statistics object list is a user-specified set of MIB objects that share the same MIB index. Object lists are identified using a name that you specify. Named bulk statistics object lists allow the same configuration to be reused in different bulk statistics schemas.

All the objects in an object list must share the same MIB index. However, the objects do not need to be in the same MIB and do not need to belong to the same MIB table. For example, it is possible to group `ifInOctets` and a `CISCO-IF-EXTENSION-MIB` object in the same schema, because the containing tables for both objects are indexed by the `ifIndex`.

## Bulk Statistics Schemas

Data selection for the MIB Data Collection and Transfer Mechanism requires the definition of a schema with this information:

- Name of an object list.
- Instance (specific instance or series of instances defined using a wild card) that needs to be retrieved for objects in the specified object list.
- How often the specified instances need to be sampled (polling interval). The default polling interval is 5 minutes.

A bulk statistics schema is also identified using a name that you specify. This name is used when configuring the transfer options.

## Bulk Statistics Transfer Options

After configuring the data to be collected, a single virtual file (VFile or bulk statistics file) with all collected data is created. This file can be transferred to a network management station using FTP or TFTP. You can specify how often this file should be transferred. The default transfer interval is once every 30 minutes. You can also configure a secondary destination for the file to be used if, for whatever reason, the file cannot be transferred to the primary network management station.

The value of the transfer interval is also the collection period (collection interval) for the local bulk statistics file. After the collection period ends, the bulk statistics file is frozen, and a new local bulk statistics file is created for storing data. The frozen bulk statistics file is then transferred to the specified destination.

By default, the local bulk statistics file is deleted after successful transfer to network management station.

## Benefits of MIB Data Collection and Transfer

These are the benefits of MIB Data Collection and Transfer:

- Configurable through the CLI without needing an external monitoring application.
- Suitable for medium to high-end platforms with sufficient local storage.
- Minimizes data loss during temporary network outages by storing bulk statistics files locally.
- More powerful data selection features compared to the bulk file MIB
- Enables grouping of MIB objects from different tables into data groups (object lists).
- Offers a flexible instance selection mechanism, not restricted to fetching entire MIB tables.

## Configure MIB Data Collection and Transfer

### Before you begin

To use MIB data collection and transfer, you should be familiar with the Simple Network Management Protocol (SNMP) model of management information. You should also know what MIB information you want to monitor on your network devices, and the OIDs or object names for the MIB objects to be monitored.

### Procedure

---

- Step 1** [Configure a Bulk Statistics Object List, on page 3](#)
  - Step 2** [Configure a Bulk Statistics Schema, on page 4](#)
  - Step 3** [Configure Bulk Statistics Transfer Options, on page 5](#)
- 

## Configure a Bulk Statistics Object List

Follow these steps to configure bulk statistics object list.

### Procedure

---

- Step 1** Define an SNMP bulk statistics object list and enter bulk statistics object list configuration mode using the **snmp-server mib bulkstat object-list**.

**Example:**

```
Router# configure
Router(config)#snmp-server mib bulkstat object-list ifMib
```

- Step 2** Add a MIB object to the bulk statistics object list. Repeat as desired until all objects to be monitored in this list are added using the **add** command.

**Example:**

```
Router(config-bulk-objects)# add 1.3.6.1.2.1.2.2.1.11
Router(config-bulk-objects)# add ifAdminStatus
Router(config-bulk-objects)# add ifDescr
```

**Note**

When specifying an object name instead of an OID (using the add command), only object names with mappings shown in the **show snmp mib object** command output can be used.

---

## Configure a Bulk Statistics Schema

Follow these steps to configure bult statistics schema.

**Before you begin**

The bulk statistics object list to be used in the schema must be defined.

**Procedure**

- 
- Step 1** Name the bulk statistics schema using the **snmp-server mib bulkstat schema** command.

**Example:**

```
Router# configure
Router(config)# snmp-server mib bulkstat schema intE0
```

- Step 2** Enter the bulk statistics schema mode and specify the bulk statistics object list to be included in this schema using the **object-list** command.

**Example:**

```
Router(config-bulk-sc)# object-list ifMib
```

Specify only one object list per schema. If multiple object-list commands are executed, the earlier ones are overwritten by newer commands.

- Step 3** Specify the instance information for objects in this schema using the **instance exact** command or **instance wild** command or **instance range** command or **instance repetetion** command.

**Example:**

```
Router(config-bulk-sc)# instance wild oid 1
or
Router(config-bulk-sc)# instance exact interface FastEthernet 0/1.25
or
Router(config-bulk-sc)# instance range start 1 end 2
```

```
or
Router(config-bulk-sc)# instance repetition 1 max 4
```

Only one **instance** command can be configured per schema. If multiple **instance** commands are executed, the earlier ones are overwritten by new commands.

- Step 4** Set how often the data should be collected from the object instances specified in this schema, in minutes using the **poll interval** command.

**Example:**

```
Router(config-bulk-sc)# poll-interval 10
```

The default is once every 5 minutes. The valid range is from 1 to 20000.

---

## Configure Bulk Statistics Transfer Options

Follow these steps to configure bulk statistics transfer options.

### Before you begin

The bulk statistics object lists and bulk statistics schemas must be defined before configuring the bulk statistics transfer options.

### Procedure

---

- Step 1** Identify the transfer configuration with a name (transfer-id argument) and enter bulk statistics transfer configuration mode using the **snmp-server mib bulkstat transfer-id** command.

**Example:**

```
Router#configure
Router(config)# snmp-server mib bulkstat transfer bulkstat1
```

- Step 2** (Optional) Specify the maximum size for the bulk statistics data file, in bytes using the **buffer-size** command.

**Example:**

```
Router(config-bulk-tr)# buffersize 3072
```

The valid range is from 1024 to 2147483647 bytes. The default buffer size is 2048 bytes.

**Note**

If the maximum buffer size for a bulk statistics file is reached before the transfer interval time expires, all additional data received is deleted. To correct this behavior, you can decrease the polling frequency, or increase the size of the bulk statistics buffer.

- Step 3** Specify the format of the bulk statistics data file (VFile) using the **format** command.

**Example:**

```
Router(config-bulk-tr)# format schemaASCII
```

The default is schemaASCII.

**Note**

Transfers can only be performed using schemaASCII (cdcSchemaASCII) format. SchemaASCII is a human-readable format that contains parser-friendly hints for parsing data values.

**Step 4** Specify the bulk statistics schema to be transferred using the **schema** command.

**Example:**

```
Router(config-bulk-tr)# schema ATM2/0-IFMIB
Router(config-bulk-tr)# schema ATM2/0-CAR
Router(config-bulk-tr)# schema Ethernet2/1-IFMIB
```

Repeat this command as desired. Multiple schemas can be associated with a single transfer configuration; all collected data are placed in a single bulk data file (VFile).

**Step 5** (Optional) Specify how often the bulk statistics file are transferred, in minutes using the **transfer interval** command.

**Example:**

```
Router(config-bulk-tr)# transfer-interval 20
```

The default value is once every 30 minutes. The transfer interval is the same as the collection interval.

**Step 6** (Optional) Specify the network management system (host) that the bulk statistics data file is transferred to, and the protocol to use for transfer using the **url primary** command.

**Example:**

```
Router(config-bulk-tr)# url secondary tftp://10.1.0.1/tftpboot/user/bulkstat1
```

The destination is specified as a Uniform Resource Locator (URL). FTP or TFTP can be used for the bulk statistics file transfer.

**Step 7** (Optional) Specify the number of transmission retries using the **retry** command.

**Example:**

```
Router(config-bulk-tr)# retry 1
```

The default value is 0 (in other words, no retries). If an attempt to send the bulk statistics file fails, the system can be configured to attempt to send the file again using this command.

One retry includes an attempt first to the primary destination then, if the transmission fails, to the secondary location. For example, if the retry value is 1, an attempt is made first to the primary URL, then to the secondary URL, then to the primary URL again, then to the secondary URL again. The valid range is from 0 to 100.

If all retries fail, the next normal transfer occurs after the configured transfer-interval time.

**Step 8** Specify how long the bulk statistics file should be kept in system memory, in minutes, after the completion of the collection interval and a transmission attempt is made **retain** command.

**Example:**

```
Router(config-bulk-tr)# retain 60
```

The default value is 0. Zero (0) indicates that the file is deleted immediately after the transfer is attempted. The valid range is from 0 to 20000.

**Note**

If the retry command is used, you should configure a retain interval larger than 0. The interval between retries is the retain interval divided by the retry number. For example, if **retain 10** and **retry 2** are configured, two retries are attempted once every 5 minutes. Therefore, if retain 0 is configured, no retries are attempted.

**Step 9** Begin the bulk statistics data collection and transfer process for this configuration using the **enable** command.

**Example:**

```
Router(config-bulk-tr)# enable
```

- For successful execution of this action, at least one schema with non-zero number of objects must be configured.
- Periodic collection and file transfer begins only if this command is configured. Conversely, the **no enable** command stops the collection process. A subsequent **enable** starts the operations again.
- Each time the collection process is started using the **enable** command, data is collected into a new bulk statistics file. When the **no enable** command is used, the transfer process for any collected data immediately begins (in other words, the existing bulk statistics file is transferred to the specified management station).

---

## Monitor MIB Data Collection and Transfer

Follow this step to monitor MIB data collection and transfer:

### Procedure

---

Monitor MIB Data Collection and Transfer using the **show snmp mib bulkstat transfer** command.

**Example:**

```
Router# show snmp mib bulkstat transfer
```

```
Transfer Name : ifmib  
Retained files
```

```
File Name                : Time Left (in seconds)  :STATE  
-----  
ifmib_Router_020421_100554683 : 173 : Retry (2 Retry attempt(s) Left)
```

---

