Installation Guide for the DDoS Info Sharing (DIS) Netscout Arbor Sightline Monitor/Client

v 0.7

1. Introduction

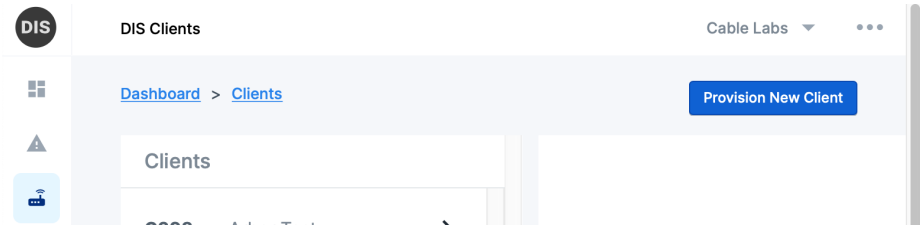
The Arbor Sightline Monitor/Client interfaces with an Arbor/NetScout Sightline 9.x system to receive notifications from the system when DDoS attacks are detected and upload the relevant metadata (most specifically the source IP addresses) into the DIS server database. From the DIS database, owners of the source IP address can determine if and how devices on their networks are contributing to DDoS attacks.

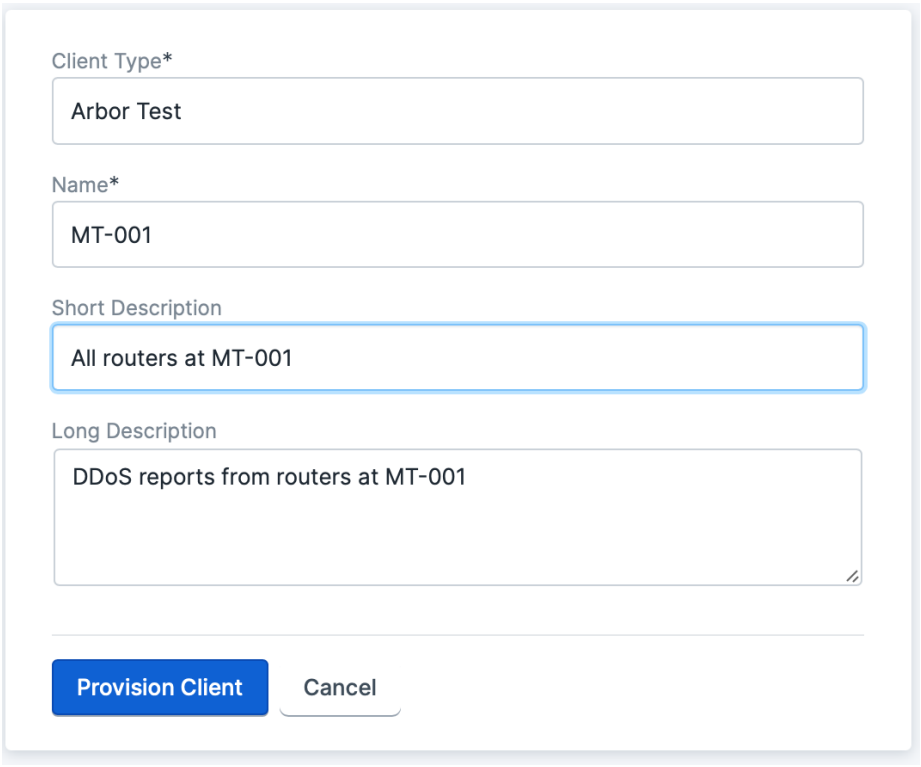
This guide details how to setup the CableLabs DDoS Information Sharing (DIS) Monitor/Client for Sightline 9.x systems.

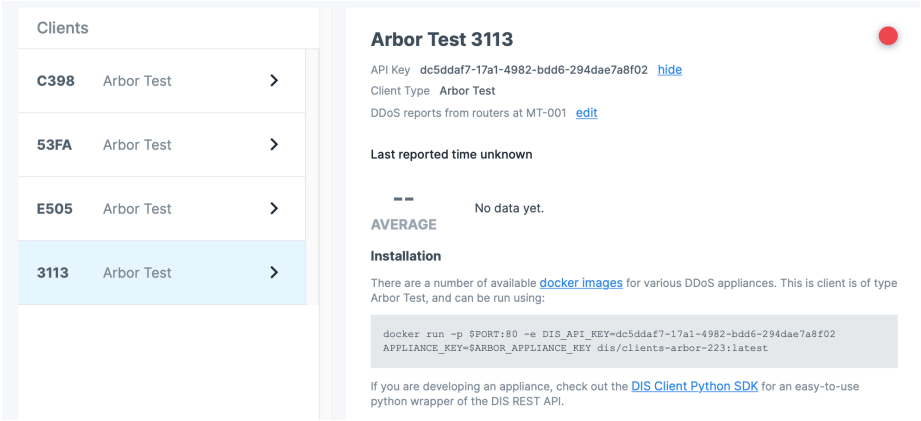
2. Create an API key for the Monitor/Client

Using the provided credentials, go to https://dis-server-hostname/clients and select "Provision New Client."

NOTE: If you don't already have credentials for the DIS management system, CableLabs will create one or more logins for your organization and provide initial credentials.







Once completed, make note of the "API Key" to use below.

Note: Disregard the "Installation" instructions provided in the UI for the time-being. These will be updated to reflect these installation instructions in a future update of the DIS backend.

3. Create a Arbor SightLine REST API key

If you don't already have an API key setup, generating an Arbor REST API key requires access to the Arbor Sightline CLI. This is described in the "Enabling Customers to View Sightline Data in the Web Services API" section of the *Sightline and Threat Mitigation System User Guide*.

From the Netscout CLI, enter the following command:

```
/ services aaa local apitoken generate user_name "token_description"
```

If an API token exists (or if you're not sure one exists), use:

```
/ services aaa local apitoken show
```

To show any active API tokens. Make note of the Arbor REST API token for the steps below.

4. Install the DDoS Info Sharing (DIS) Monitor/Client (v2)

The DIS Arbor Monitor/Client requires the following:

- An Arbor/Netscout Sightline 9.x (Peakflow SP 9.1+) server with:
  - Accessibility from the server hosting the DIS Arbor Monitor on port 443
  - Optionally, a https server certificate that the DIS Client can use to validate the server (when configuring the client to access the SP API using https)
  - Optionally, a root certificate that allows for validation of SP webhook calls (when configuring SP with https-based webhooks)
- A server to host the Monitor/Client with:
  - Python 3.6 (or higher) or the Docker container management system
  - Support for incoming TCP connections established from Arbor Netscout (http or https)
  - Access to the Arbor Netscout REST API (e.g. http://arbor-hostname-or-ip/)
  - A network connection allowing outbound HTTPS connections (specifically to https://dis-server-hostname)
  - Optionally, a https server certificate that the Sightline 9.x system can use to validate the server (when configuring Sightline webhooks using https)
  - Optionally, a root certificate that allows for validation of Sightline API REST calls (when configuring the DIS Client with an https URI)

For installing the DIS Arbor Monitor/Client, perform the following:

1. **Retrieve the latest Docker management script for the DDoS Info Sharing client:**

   ```
   rm -fv arbormon-container.{sh,conf}
   wget https://dissarm.net/assets/scripts/arbormon-container.{sh,conf}
   ```

2. **Install the script:**

   ```
   sudo install -v -o root -m 755 -D -t /etc/dis-arbor-monitor/ arbormon-container.*
   ```

3. **Configure the settings for your environment:**

   ```
   sudo vim /etc/dis-arbor-monitor/arbormon-container.conf
   ```

   Which should contain settings for the following variables:

   - `DOCKER_CMD` to the command to execute to invoke Docker (just "docker" if the user is already in the "docker" group or "sudo docker" if the user is not)
   - `DEF_IMAGE_LOCATION/TAG` to whatever values are provided by the DIS project integrator
   - `DEF_CONTAINER_NAME` should be set to "dis-arbor-monitor-service"
   - `DEF_DEBUG` can be set to "True" to enable debug logging. The default is for debug logging to be disabled.
   - `DEF_TLS_CERT_CHAIN_FILE/KEY_FILE` should be set to the paths containing the TLS/HTTPS certificate and private key for the server running the monitor. These should only be set if (a) the Arbor web hook is setup with an https URI, and (b) when a HTTPS web proxy isn't being used to handle the HTTPS connection (e.g. nginx)
   - `DEF_BIND_PORT/ADDRESS` need to be set in accordance with how the Arbor webhook is setup. If the webhook is "http" (with the default port) than these should be either "0.0.0.0" and "80" or to be more explicit, the IP address of the Arbor-accessible interface and "80". If a https proxy is used, these should be set to "127.0.0.1" and some arbitrary port, such as "8080".
   - `DEF_ARBOR_REST_API_PREFIX` should be set to the http or https URI prefix for the Arbor NetScout REST API. Usually this will just be set to a URI of the form "https://arbor-netscout-hostname.acme.com/"
   - `DEF_ARBOR_REST_API_TOKEN` should be set to the key setup in the previous section (see section "Create a sightline API key")
   - `DEF_REPORT_CONSUMER_API_KEY` is set to the API key created in the previous section (see section "Create an API key for the Monitor/Client")

- `DEF_REPORT_CONSUMER_HTTP_PROXY` can be set to the URI of an HTTP/HTTPS proxy. (e.g. "http://10.0.1.11:1234" or "https://proxy.acme.com:8080")
- `DIS_ARBORMON_WEBHOOK_TOKEN` can be set to a random string which is provided in the webhook URI as a way to authenticate the webhook invocation. e.g. "openssl rand -hex 10"
- `DEF_MAX_QUEUED_REPORTS` is set to the number of attack reports that the client will queue if/when communication is lost with the DIS backend server. If unset, the client will queue indefinitely.
- `DEF_SYSLOG_SERVER` can be set to the hostname/address of a syslog server listening for syslog events on UDP port 514 (e.g. "logserve.acme.com") or to the port designated after a ":" (e.g. "logserve.acme.com:5514"). Any INFO-level logging (or higher) will be sent to the designated SYSLOG server via UDP (in addition to any other syslog destinations set).
- `DEF_SYSLOG_TCP_SERVER` can be set to the hostname/address of a syslog server listening for syslog events on TCP port 601 (e.g. "logserve.acme.com") or to the port designated after a ":" (e.g. "logserve.acme.com:5601"). Any INFO-level logging (or higher) will be sent to the designated SYSLOG server via TCP (in addition to any other syslog destinations set).
- `DEF_SYSLOG_SOCKET` can be set to the filename of a syslog socket file. Any INFO-level logging (or higher) will be sent to the designated SYSLOG socket (in addition to any other syslog destinations set).
- `DEF_SYSLOG_FACILITY` can be set to the desired syslog facility code (an integer). If unset any syslog logging will be logged to facility LOG_USER.
- `DEF_LOG_PREFIX` can be set to an arbitrary string that will prefix all logging messages from the client – both within the docker container and messages logged via syslog
- `DEF_LOG_REPORT_STATS` can be set to a positive integer representing the frequency (in minutes) where the client will periodically perform INFO-level logging reporting the number of attack events and source IP addresses reported during the last time period. e.g.

  ```
  STATUS REPORT: Sent 11 reports (with 1789 source IPs) in 5.00 minutes
  STATUS REPORT: Sent 9 reports (with 2312 source IPs) in 5.00 minutes
  STATUS REPORT: Sent 17 reports (with 2812 source IPs) in 5.01 minutes
  ```

- `DEF_REPORT_STORE_DIR` can be set to a directory where a local report file will be written each time an attack is processed, for local processing. If unset, report files are not generated by the client.

- `DEF_REPORT_STORE_FORMAT` can be set to either "only-source-attributes" or "all-attributes". If not set, the default is "only-source-attributes"

  The "only-source-attributes" format includes only information related to the attack source – omitting data such as the target IP, source router, and other information not related to the attack source. Here's an example of the "only-source-attributes" format:

```
{
    "attack_id": "9902",
    "start_time": "2020-12-04T08:21:52+00:00",
    "stop_time": "2020-12-04T08:27:36+00:00",
    "source_ips": [
        {
            "address": "61.54.68.28",
            "max_bps": 68
        }
    ],
    "report-format": "only-source-attributes",
    "report-version": {
        "major": 1,
        "minor": 0
    },
    "attributes": {
        "impact_bps": 60,
        "impact_pps": 0,
        "misuse_types": [
            "TCP SYN/ACK Amplification"
        ]
    }
}
```

  The "all-attributes" format includes additional attributes not related to the attack source – attributes which are not reported to the DIS backend but which may be of interest/use of local facilities. For example the attack target and relevant router names will be included in the report. Here's an example of the "all-attributes" format

```
{
    "attack_id": "9902",
    "start_time": "2020-12-04T08:21:52+00:00",
    "stop_time": "2020-12-04T08:27:36+00:00",
    "source_ips": [
        {
            "address": "61.54.68.28",
            "max_bps": 68
        }
```

```
        ],
        "report-format": "all-attributes",
        "report-version": {
            "major": 1,
            "minor": 0
        },
        "attributes": {
            "direction": "Incoming",
            "fast_detected": true,
            "host_address": "50.202.218.134",
            "impact_boundary": "LV-RTR01",
            "impact_bps": 60,
            "impact_pps": 0,
            "ip_version": 4,
            "misuse_types": [
                "TCP SYN/ACK Amplification"
            ],
            "severity_percent": 599.0,
            "severity_threshold": 10,
            "severity_unit": "bps",
            "summary_url": "/page?id=customer_summary&gid=135"
        }
    }
```

Here's an example of the */etc/dis-arbor-monitor/arbormon-container.conf* file:

```
DOCKER_CMD="sudo docker"
DEF_IMAGE_URI="https://dis-server-hostname/assets/docker-images/dis-arbor-monitor_lates
DEF_IMAGE_LOCATION="community.cablelabs.com:4567/dis-docker/dis-arbor-monitor"
DEF_IMAGE_TAG=latest
DEF_CONTAINER_NAME=dis-arbor-monitor-service
DEF_TLS_CERT_CHAIN_FILE=/etc/dis-arbor-monitor/combined.cer
DEF_TLS_PRIV_KEY_FILE=/etc/dis-arbor-monitor/private.key
DEF_BIND_PORT=8443
DEF_BIND_ADDRESS=0.0.0.0
DEF_ARBOR_REST_API_PREFIX=https://arbor-001.acme.com
DEF_ARBOR_REST_API_TOKEN=Your-Arbor-API-Token
DEF_REPORT_CONSUMER_API_URI=https://dis-server-hostname
DEF_REPORT_CONSUMER_API_KEY=Your-DIS-API-Key
DEF_REPORT_CONSUMER_HTTP_PROXY=https://proxy.acme.com:8080
DIS_ARBORMON_WEBHOOK_TOKEN=abcd1234
DEF_MAX_QUEUED_REPORTS=50
DEF_DEBUG=False
DEF_SYSLOG_SERVER=logserver.acme.com
DEF_SYSLOG_TCP_SERVER=
DEF_SYSLOG_SOCKET=/dev/log
```

```
DEF_SYSLOG_FACILITY=
DEF_LOG_PREFIX=acme-dis-client
DEF_LOG_REPORT_STATS=5
DEF_REPORT_STORE_DIR=/var/dis-arbor-monitor/reports
DEF_REPORT_STORE_FORMAT=all-attributes
DEF_DEBUG=false
```

NOTE: This conf file should have permissions set to prevent it from being world-readable if the system is multi-user (e.g. "chmod o-rw /etc/dis-arbor-monitor/arbormon-container.conf"). This will require the user executing the script to have permissions set to allow access to the file or to use "sudo" to execute the script.

4. **Download a DIS Arbor Monitor Docker image:**

   ```
   /etc/dis-arbor-monitor/arbormon-container.sh docker-get-image
   ```

5. **Start the DIS Arbor Monitor Docker container:**

   ```
   /etc/dis-arbor-monitor/arbormon-container.sh docker-run
   ```

6. **Check for successful startup:**

   ```
   /etc/dis-arbor-monitor/arbormon-container.sh docker-logs
   ```

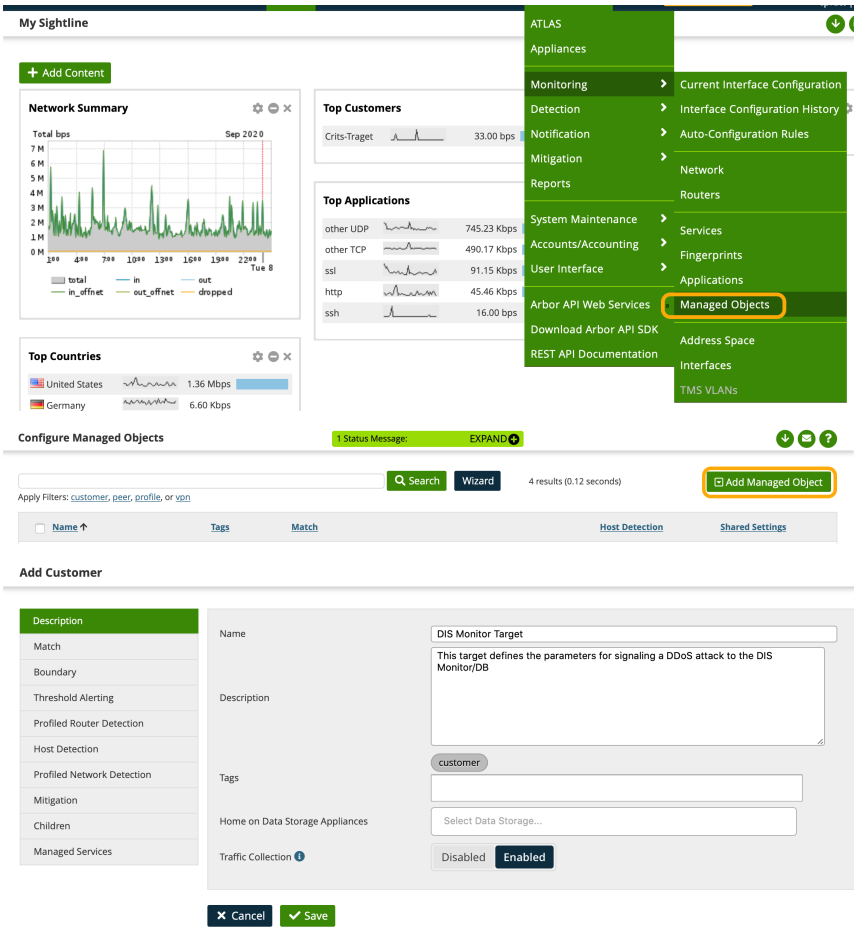
   On successful startup, the logs should start with something similar to:

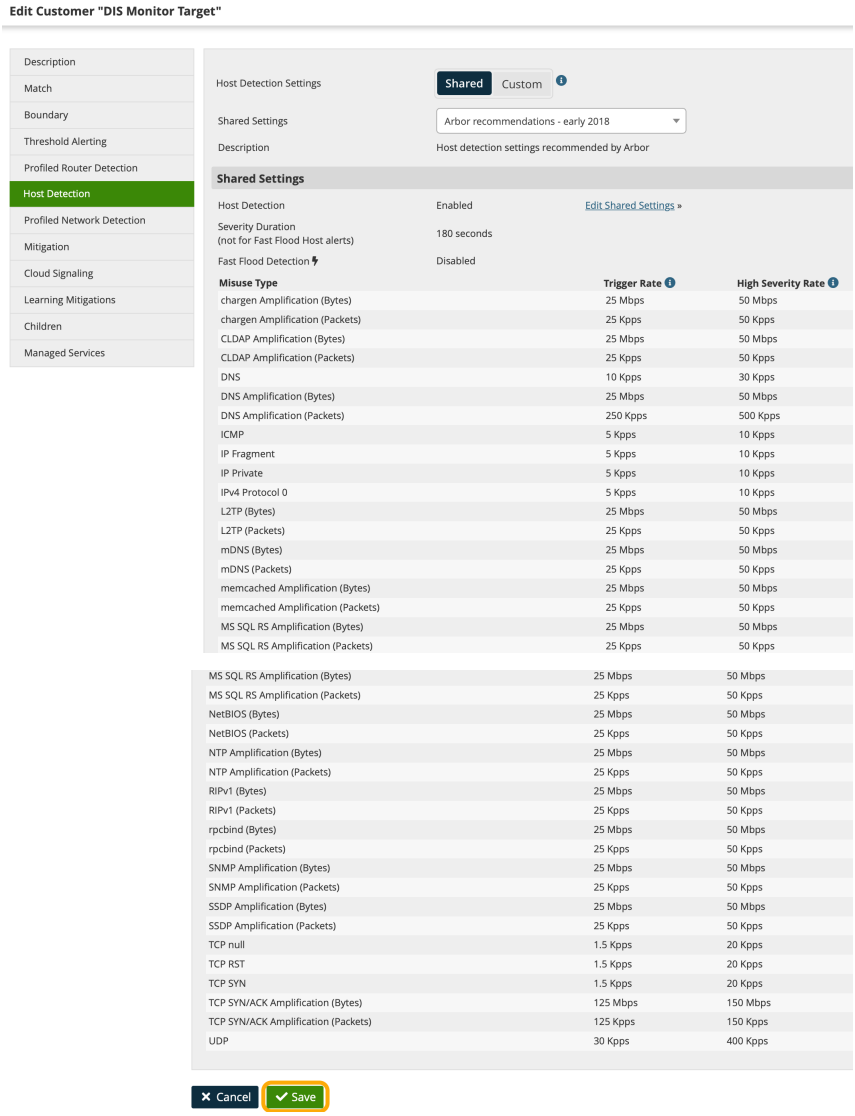
   ```
   dis-arbor-monitor: INFO Debug: False
   dis-arbor-monitor: INFO Dry run: False
   dis-arbor-monitor: INFO Bind address: 0.0.0.0
   dis-arbor-monitor: INFO Bind port: 8443
   dis-arbor-monitor: INFO Cert chain file: /app/lib/tls-cert-chain.pem
   dis-arbor-monitor: INFO Cert key file: /app/lib/tls-key.pem
   dis-arbor-monitor: INFO Arbor API prefix: https://arbor-001.acme.com
   dis-arbor-monitor: INFO Arbor API token: Your-Arbor-API-Token
   dis-arbor-monitor: INFO Consumer URL:
   dis-arbor-monitor: INFO Consumer API key:
   dis-arbor-monitor: INFO DIS client name: ACME Arbor 001
   dis-arbor-monitor: INFO DIS client organization: Acme Corp
   dis-arbor-monitor: INFO DIS client description: Data from Arbor Netscout 001
   dis-arbor-monitor: INFO DIS client contact: dis-admin@acme.com
   dis-arbor-monitor: INFO Client type name: Arbor Ingester 001
   dis-arbor-monitor: INFO Client type maker: Arbor
   dis-arbor-monitor: INFO Client type version: 0.0.0
   ```

5. Configure Arbor Netscout to notify the Monitor/Client

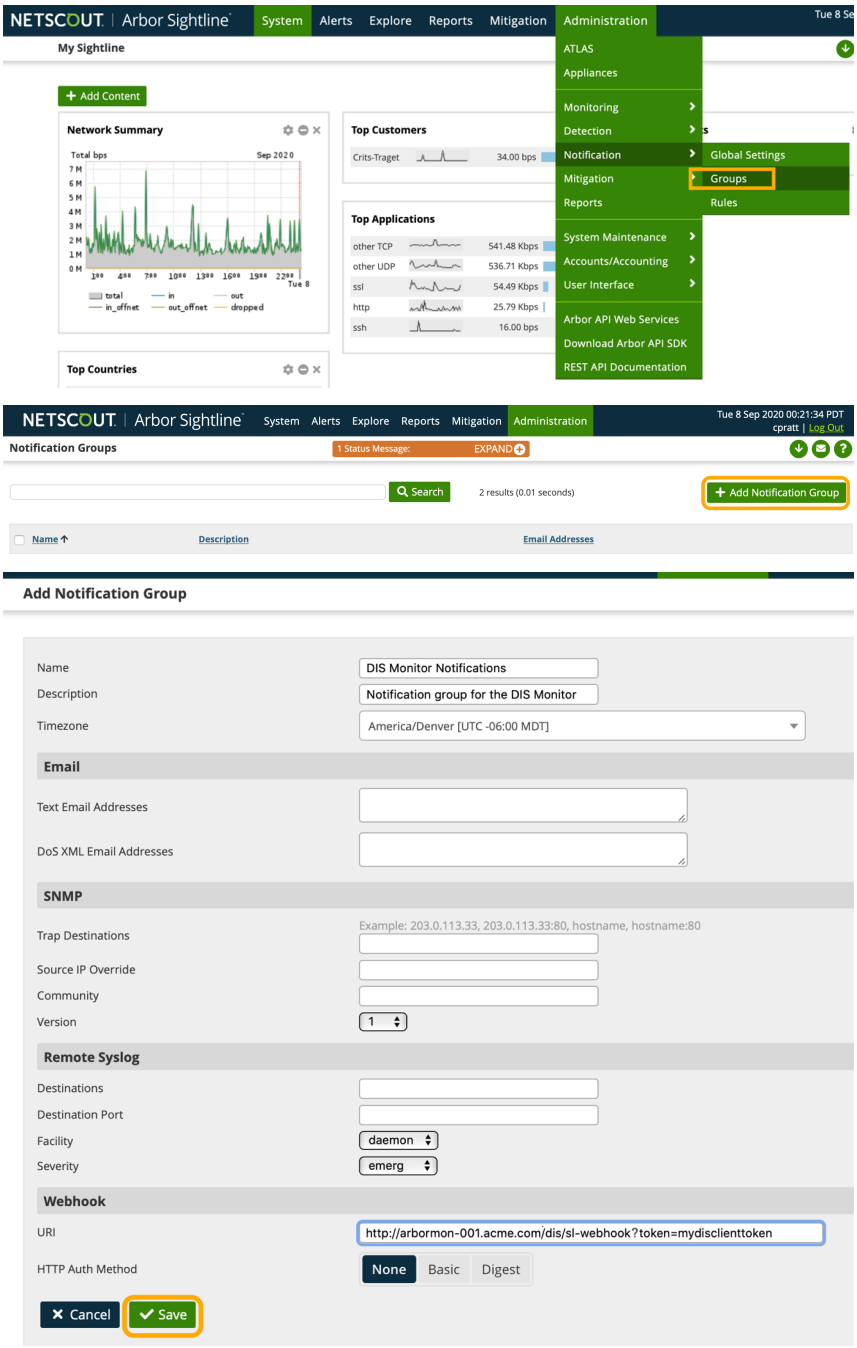
To configure Arbor NetScout to notify the DIS monitor/client, perform the following:

1. **Setup a Managed Object with suitable DDoS notification limits:**


My Sightline
ATLAS
Appliances
Monitoring
Detection
Notification
Mitigation
Reports
System Maintenance
Accounts/Accounting
User Interface
Arbor API Web Services
Download Arbor API SDK
REST API Documentation
Current Interface Configuration
Interface Configuration History
Auto-Configuration Rules
Network
Routers
Services
Fingerprints
Applications
Managed Objects
Address Space
Interfaces
TMS VLANs
Add Content
Network Summary
Top Customers
Top Applications
Top Countries
Configure Managed Objects
Search
Wizard
Add Managed Object
Add Customer
Description
Match
Boundary
Threshold Alerting
Profiled Router Detection
Host Detection
Profiled Network Detection
Mitigation
Children
Managed Services
Name
DIS Monitor Target
This target defines the parameters for signaling a DDoS attack to the DIS Monitor/DB
customer
Home on Data Storage Appliances
Select Data Storage...
Traffic Collection
Disabled
Enabled
Cancel
Save



2. **Create a notification group:**



Webhook "URI" provided here is just an example. This field must be coordinated with the configuration of the DIS Monitor/Client as described in Section 4 (Install the DDoS Info Sharing (DIS) Monitor/Client (v2)).

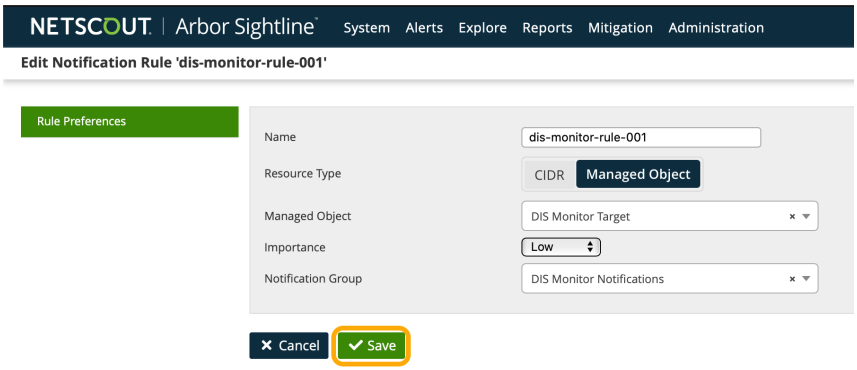
If the DIS client is setup to listen for http notifications (with no TLS cert configured), then an URI of the form "http://fqdn-or-ip/dis/sl-webhook" will be an appropriate Webhook URI. If https is desired, then the form must be "https://fqdn-or-ip/dis/sl-webhook" where the host/service handling the webhook call has a TLS cert registered for the fqdn and signed by a CA trusted by the Arbor Netscout server (the service's cert is signed directly or indirectly by a CA trusted by the server). Note than in either case the default http/https port can be over-ridden by appending ":portnum" to the webhook URI.

In addition to configuring the protocol and URI path, the DIS client can be configured to authenticate webhook invocations via a "token" parameter. For example a webhook URI of the form:

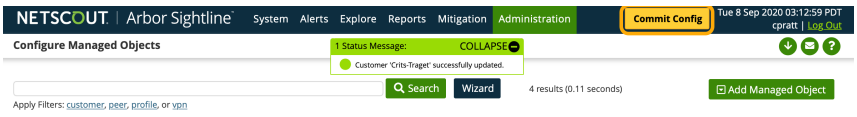
`https://fqdn-or-ip/dis/sl-webhook?token=03240717821fe3531b13`

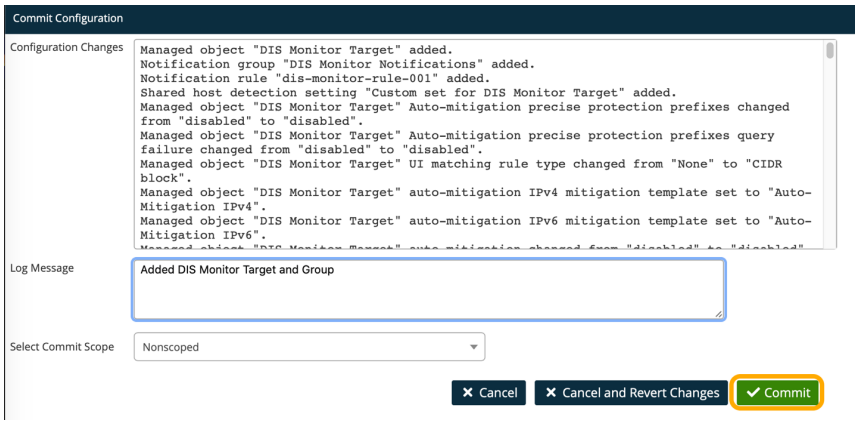
Would be required to invoke the DIS client webhook if it's configured to only allow webhook invocations with the provided token. Note that this form is only reliable when used with https – since the URI (including the token) will not be encrypted on http connections.

3. **Setup a notification rule for the Managed Object setup above to utilize the Notification Group containing the webhook:**



Commit the config once the changes are complete:





4. **Configure webhook notification limits to prevent excessive queuing of webhook notifications.**

   Arbor Sightline will only consider a webhook "invoked" if it's able to POST the webhook notification body to the configured webhook endpoint URI(s) and the endpoint returns a HTTP 200 (success) status code. If the webhook isn't successfully invoked, Sightline will attempt to invoke the endpoint again, after a period, and will continue to do so until the endpoint is successfully invoked.

   If there's a concern that Sightline won't be able to connect to the DIS client due to network connectivity issues or regular maintenance, you may want to configure Sightline to limit its retry behavior – since it can impact the memory usage and performance of the system.

   The following options can be set to control the notification behavior via the Arbor Sightline API:

   - The "notification webhooks retry_count_limit" and "notification webhooks retry_count_max set" variables will limit the number of times a webhook will be invoked for a particular attack report
   - The "notification webhooks retry_seconds_limit" and "notification webhooks retry_seconds_max" will control the retry frequency for webhook notifications for a particular attack report

   For example, to set the webhook notification to perform no more than 10 notifications per attack – with 1 minute between notifications, the following commands can be invoked on the Sightline CLI:

```
/ services sp notification webhooks retry_count_limit enable
/ services sp notification webhooks retry_count_max set 10
/ services sp notification webhooks retry_seconds_limit enable
/ services sp notification webhooks retry_seconds_max 60
```

6. Validation

Confirmation of the invocation of the configured webhook can be performed by examining the DIS Arbor Monitor/Client log. The log can be retrieved by running the following command:

```
/etc/dis-arbor-monitor/arbormon-container.sh docker-logs
```

When an attack is detected, the first indication you will see in the DIS Arbor monitor/client log will be an entry of the form:

```
INFO Received notification of ONGOING attack (ID: 6831)
```

Then once the attack is completed – and the attack metadata and source IP addresses have been determined – you should see log entries of the form:

```
INFO Received notification of COMPLETED attack (Attack ID: 6831)
INFO Attack ID 6831: Misuse Types: None
INFO Attack ID 6831: Start/stop time: 2020-09-08T22:51:19+00:00/2020-09-08T22:56:36+00:00
INFO Attack ID 6831: Found 19 source IPs
INFO Attack ID 6831: Source IPs (first 50): ['45.129.33.9', '45.129.33.12', '45.129.33.15',
INFO Attack ID 6831: Staged event IDs: ['de5bf4d3-e753-4d98-bdec-730c3c270491']
INFO Attack ID 6831: Sending report
INFO Attack ID 6831: Report sent
```

If Arbor Netscout indicates that a DDoS attack was detected, and there's no corresponding log entry, then check the configuration. Or to verify the webhook address is correct, you can use curl to perform a GET on the webhook URI and verify the monitor/client can be contacted. For example:

```
curl http://arbormon-001.acme.com
```

or if custom certs are being used with https on a custom port:

```
curl --insecure https://arbormon-001.acme.com:8443
```

If the URI is correct, the DIS Arbor Monitor log should print an entry when it rejects the GET request:

```
10.80.50.24:52142 GET / 2 405 137 2388
quart.serving: INFO 10.80.50.24:52142 GET / 2 405 137 2388
```

If not, check the monitor configuration values and if using https with a custom CA certs, use the curl "—cacert" to ensure the CA cert is valid and matches the one running on the monitor server. If it does validate, ensure the CA cert is added to the Arbor Monitor trust store.