CISCO SD-WAN Reporting

User Guide

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Overview

This guide is intended to be used for reference while using the Cisco SD-WAN Reporting Utility

To set up the utility(Using cisco_sdwan_reporting_docker.tar.gz):

- Make sure you have Docker and docker-compose installed in the system
- Please do appropriate configurations to make sure that vManage service is reachable from the docker container(eg. Docker container has access to host network and host has connectivity to vManage service)
- Use root/Crest@123 to login.
- Extract the zip file
- Inside zip file inside the cisco-sdwan-reporting directory, run "***./start.sh***" (Make sure no service is running on port 8000 or port 8080)
- Env file can be found at /cisco-sdwan-reporting/data/env/env_file. [Please refer to Environment variables used in tool]
- To stop the container, run "***./stop.sh***"

To set up the utility(Using OVA):

- Please make sure to setup network related config for the VM deployed using the OVA build so that vManage Service is reachable from the VM. (eg. default gateway, IP, etc.)
- Use root/Crest@123 to login.
- Go to the directory sdwan-reporting-docker-compose (Run cd sdwan-reporting-docker-compose)
- Run docker-compose up --detach.

To start with the utility:

- Go to the UI using http://<vmanage ip address>:8080
- Go to the vManage Access Setup (Settings) page, if not already on it.
- Configure the vManage access.
- Wait for the tool to reload after a successful save
- Go to the Manage Reports page to generate an on-demand or to schedule a report.
- Go to the View Charts page to view graphically plotted data for various parameters

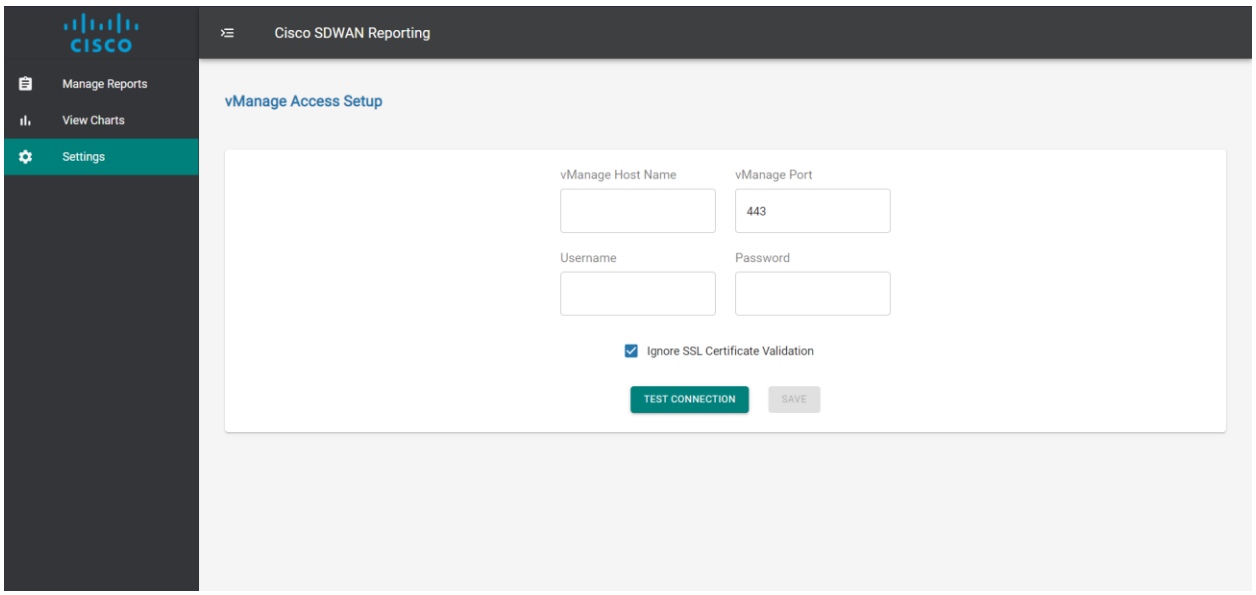
Landing page for new users will be "vManage Access Setup" and for existing users, it will be "Manage Reports".

The following sections describe how to perform the above steps. They also include the utility API details if the user wants to perform the same steps without using UI.

Warning

- Please do not delete any directory or its content as it may lead to loss of previously generated/scheduled reports history data

vManage Setup



Note

- The algorithm used for encryption of Passwords is **Fernet (Symmetric encryption)**, which guarantees that a message encrypted using it cannot be manipulated or read without the key. It uses URL-safe encoding for the keys. Fernet also uses 128-bit AES in CBC mode and PKCS7 padding, with HMAC using SHA256 for authentication. The IV is created from os.random(). More details about Fernet can be found on [link].
- For the 'SSL Certificate validated' connection, please make sure that vManage is hosted with a valid CA-signed certificate containing the correct and resolvable hostname of the vManage.
- No transport/network level encryption has been implemented in the tool

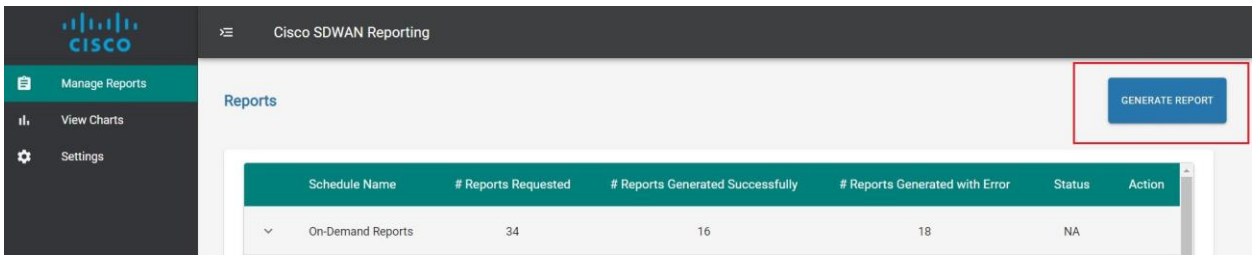
Steps

1. Enter vManage Credentials, i.e. vManage Host Name, vManage Port, vManage Username, and vManage Password (Default port has been set to 443)
2. Check the checkbox to ignore SSL Certificate validation check
3. Click on the “TEST CONNECTION” button to check if credentials are correct and vManage is accessible. This button will only test the credentials and won’t save them in the database. (User will be validated if any details are incorrect or vManage is not reachable)

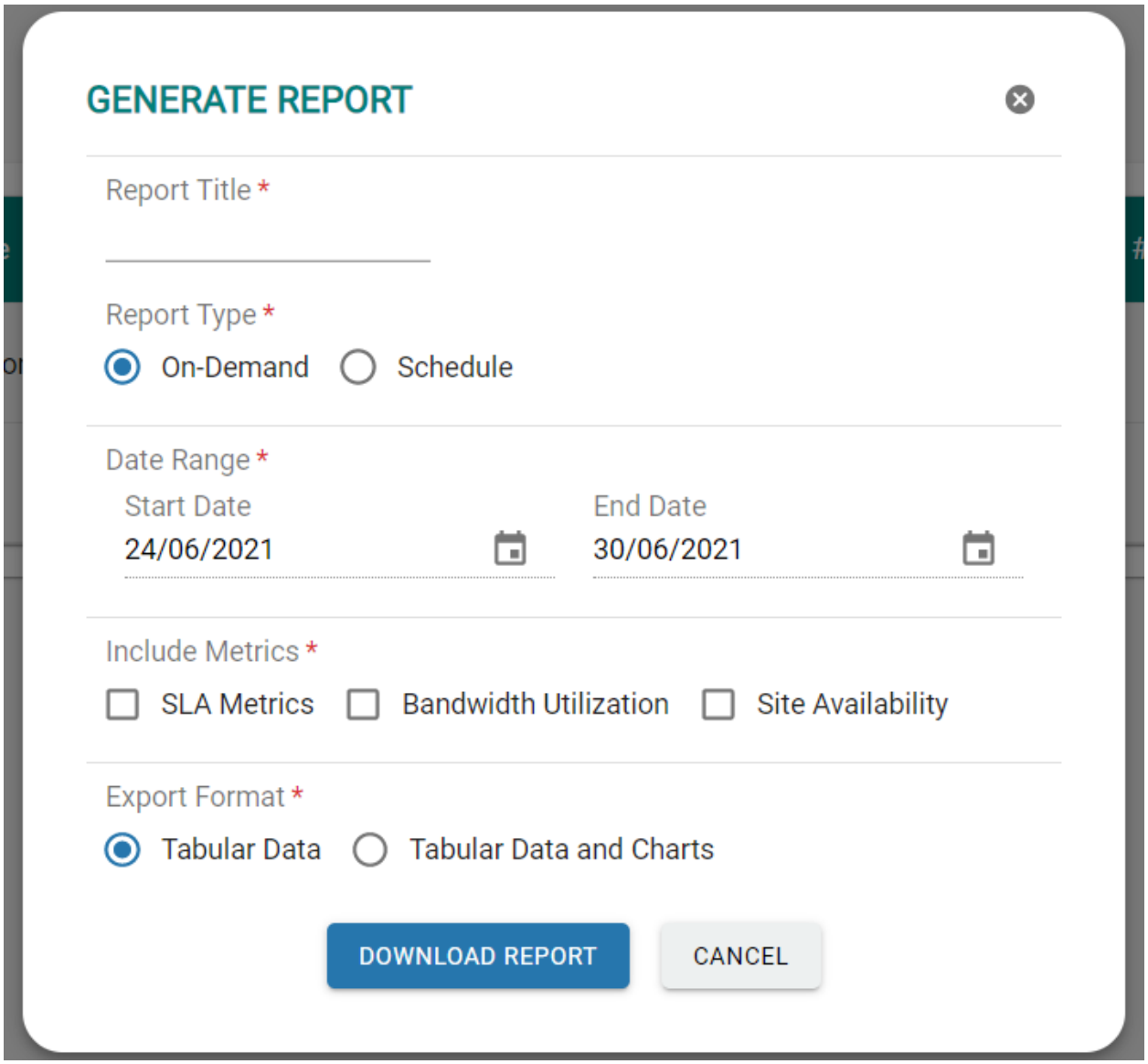
4. On successful Test response, the user can save the details to access other components of the portal. Saving the data will also first test the connection and then save the data (After successful save, the page will reload and all other components will be accessible to the user)
5. After successful save, the password in the “Password” field will be the encrypted password, so the user needs to change that if they need to Test Connection again

Manage Reports

Generate Report using:



On-Demand Report Generation



Steps

1. Enter Report Title. Report Title length should not be more than 100 characters and it should not contain the following special symbols: \ , / , : , * , ? , " , < , > , |
2. Select 'On-Demand', for on-demand report generation
3. Select Start Date and End Date for the duration of report generation. Start Date is not allowed to be before 1st Date of 6 months back from the present date. (By default a period of 1 week is selected)
4. Select the desired metrics that the user wants to include in the report
5. Select the report format (The file format of the downloaded report will be a spreadsheet)
6. Click on "DOWNLOAD REPORT" and the report generation process will start. Users will be validated when the download of the generated report starts.
7. The downloaded report's title will be <Report Title>_<start-date>_to_<end-date>.
8. If any error occurred while report generation, then the report will contain the error message inside it

Important points on ondemand API [/api/report/export]

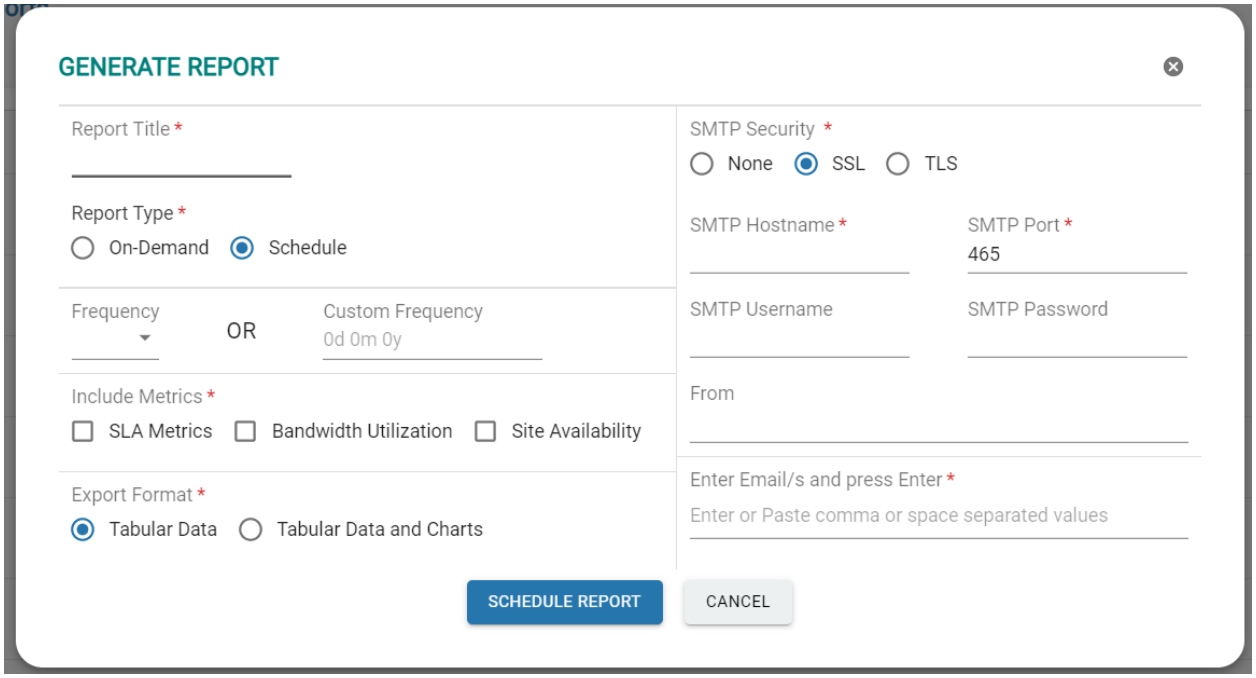
- If the user provides the same field more than one time in the request body, it will override the last entered field for example,

```
{
 "report_title": "sample_1",
 "report_title": "sample_2",
 "start_date": "<start_date>",
 "end_date": "<end_date>",
 "report_metrics": [
  "sla_metrics",
  "bandwidth_utilization",
 ],
 "export_format": "excel"
}
```

So the value of report_title will be "sample_2".

- If the user provides a start date and end date without seconds e.g **2020-12-01T10:32** it will be considered as 2020-12-01T10:32:00 by default.
- If the user provides the same field more than one time in the request body, it will generate the report for only one time and also the report will not have data multiple times.

Schedule Report Generation



Steps:

1. Enter Report Title. Report Title length should not be more than 100 characters and it should not contain => (\ , / , : , * , ? , " , < , > , |)
2. Select Schedule, to schedule report generation
3. Select either default frequencies for report generation or give custom frequency in the format “0d 0m 0y” with at least one non-zero value (In case of custom frequency given, the schedule field of report history will have frequency in the same format as specified in form)
4. Select the desired metrics that the user wants to include in the report
5. Select the report format. (the file format of the report will be spreadsheet) (By default Export Format is “Tabular Data”)
6. Enter SMTP Details of the organization/individual (Any trailing or leading space will be considered as it is) (By default SMTP Security and port values are SSL and 465 respectively)
7. Enter or paste the list of email addresses to send the generated report on selected frequency (*If manually entering, press ‘Enter” key after each email to add the email address, and if pasting, paste comma or single space separated email addresses*)
8. If the email length is more than the input field, the email address will get wrapped inside the chip and overflown text will be shown with an ellipsis (...)

9. Click on “Schedule Report” to schedule the report (User will be validated on successful request and with the time of next report generation)

Note

- If the user schedules report on 29/30/31 dates of any month, the next report generation will be on 28th day of the next report generation month as per the selected schedule frequency
- If the user pastes email addresses and if they are already present in the list, then those email addresses will be skipped.
- If the user cancels the request after a few seconds, history will be displayed and the user will receive mail.
- All the generated reports will contain error message/reason if any occurred while generating report

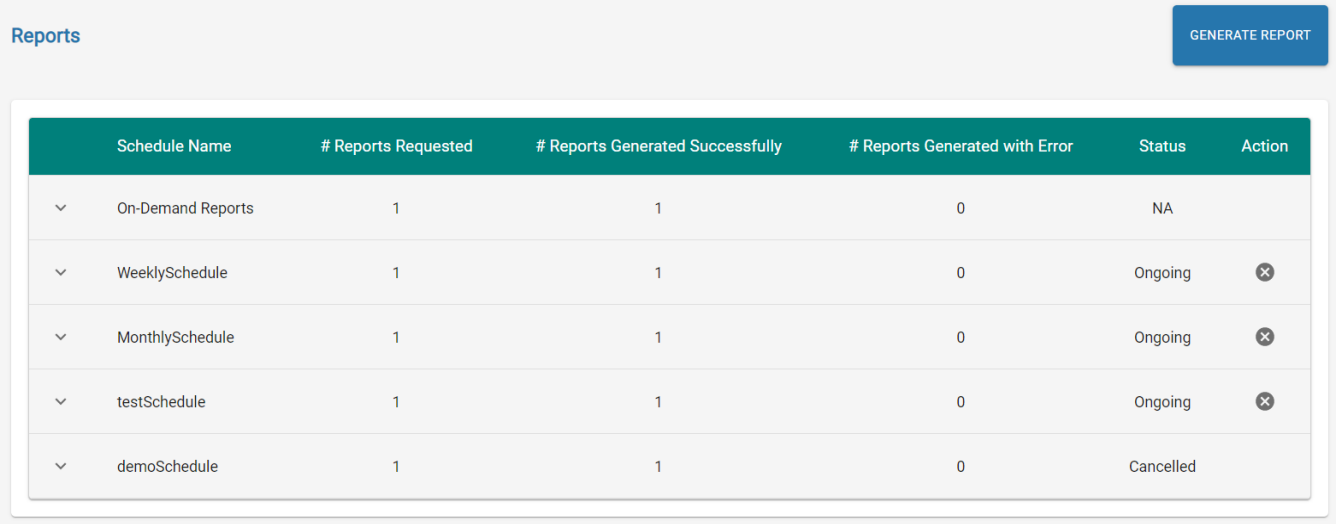
Important points on schedule API [/api/report/schedule]

- If the user sets the “is_custom”: true then remove “frequency” and add “custom_frequency” with value in the form of “1d 1m 1y”.
- It will count the number of days for that period and set the schedule for calculated days in custom frequency.
  For example, if user enters custom_frequency: “10d 2m” count the days based on:
  total_days = day * 1 + month * 30 + year*365 = 10*1 + 2*30 + 0*365 = 70 days
- There are some undocumented status codes when we request any API other than the common status code. So for that, It will show the correct error message with the sign of “Undocumented”. For example:

- Here the email field allows the same email address multiple times but from the UI, users can’t enter the same email address multiple times.

- In the API request body as well as in the response body, all the times are shown in UTC timezone as per the docker container, but from the UI, it will display the local browser time in the history table.

Report History

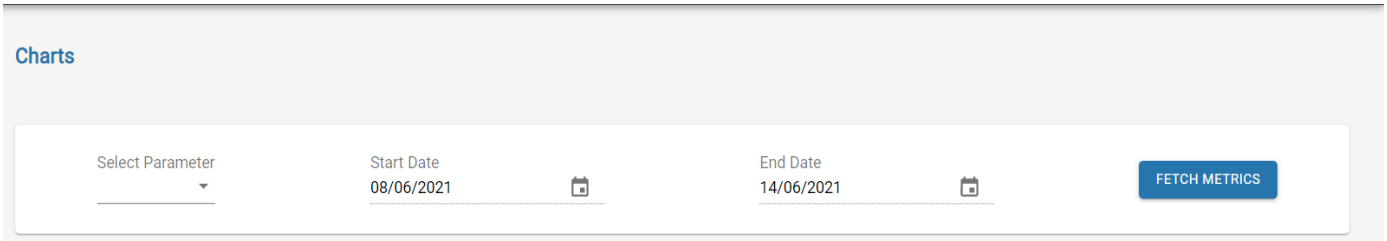


- The user can view details of currently ongoing schedules, previously deleted schedules, on-demand generated reports.
- The User can cancel any going schedules from the report History table
- The history is displayed in the order of:
    a. On-demand Reports
    b. On-going Schedules
    c. Cancelled Schedules
- All the sections are sorted in the order of newest to oldest requested report. That means if any two schedules are cancelled, then the schedule requested first will be displayed on top of Cancelled Schedules, regardless of the order of cancellation.
- The status field in the inner table will display the status of the generated report and will display the cause of error (If any) when the user hovers on the field.

Note

- Only the latest 100 entries based on their generation time, will be displayed which can be modified using env vars. [Please refer to Environment variables used in tool].
- The maximum number of report history is shared between all types of reports. So whichever is the oldest report history regardless of its type(i.e. On-demand, scheduled, cancelled) will be deleted after the number of history entries exceeds the configured number.
- As the history entries increase after 100 entries, the oldest histories will get deleted. If there are multiple reports generated with the same generation time, and all are oldest, then multiple entries will get deleted as comparison is done based on generation time.

View Charts



- Users can plot charts for parameters like:
    - SLA Metrics (Jitters, Latency, Packet Loss)
    - Bandwidth Utilization
    - Site Availability Alarms

Steps

1. Select the desired parameter from the "Select Parameter" dropdown
2. Select or search by typing the desired "Tunnel/Interface" if and where required
3. Select the desired date range (By default a period of 1 week is selected)
4. Click on the "Fetch Metrics" button
5. The graph will be plotted and displayed if the data is available for the asked time frame

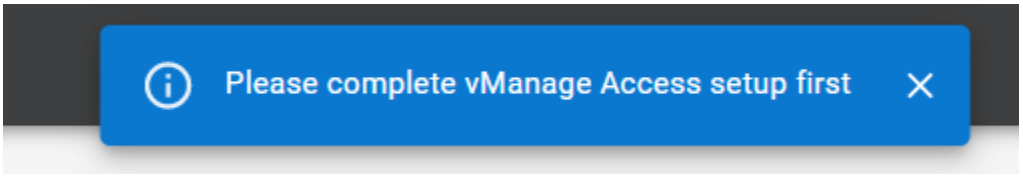
Graph Features

- Users can save the plotted graph as PNG
- Users can Zoom In or Out the graph and double click to reset it
- Users can Pan on the graph
- Users can hover on the plotted points to see the details
- Users can toggle Spike Lines to view the plotted points on axes
- If more than one line is plotted on the graph (i.e. in the case of Bandwidth Utilization graph) user can disable any line by clicking on the legend of that line displayed on the right side of the plotted graph and enable it again by clicking on it again

Troubleshooting

1. vManage Access Setup incomplete

Error Message

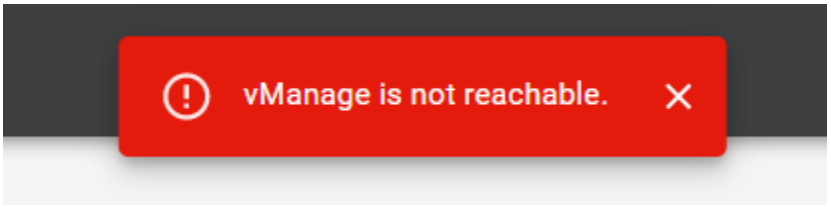


Resolution

- Check whether vManage Credentials are saved or not on the "**Settings**" page

2. vManage is not reachable

Error Message

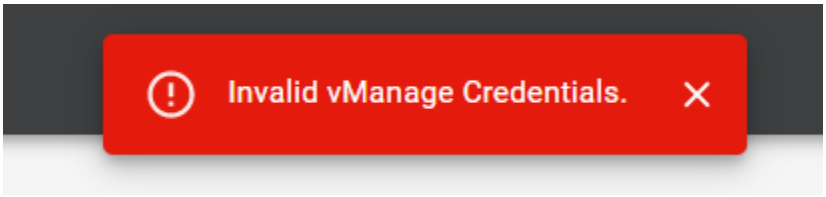


Resolution

- Make sure you are connected to the Cisco vManage Portal and/or the Host Name and port of vManage is correctly entered on the "**Settings"** page

3. Invalid vManage Credentials

Error Message

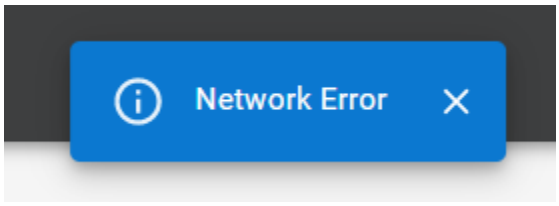


Resolution

- Check and make sure the vManage Credentials used are valid and correct

4. Network Error

Error Message

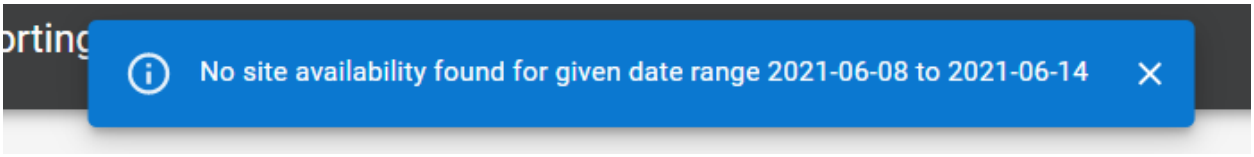


Resolution

- Check your internet connectivity, or/and VPN connection if your organization uses one

5. No data found

Error Message

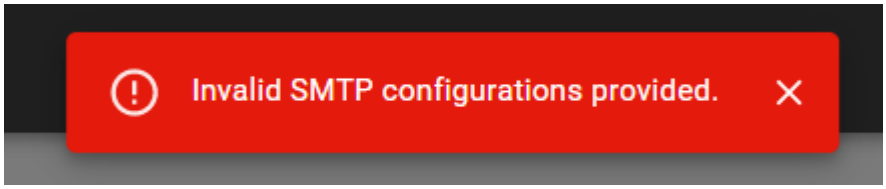


Resolution

- No data was found to display for the selected parameters, either try changing date-range and if still above message is being displayed, it means there were no changes in Sites and no Alarms went off for the specified period (In case of the plot for Site Availability Alarms)

6. Invalid SMTP configurations

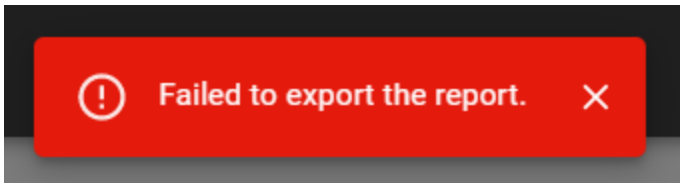
Error Message



Resolution

- Check if the correct option for “SMTP Security” is selected
- Check the SMTP configurations entered and make sure they are correct

7. Failed to export the report (Schedule Report)



Resolution

- Check and make sure all the details filled in form are correct
- If using a custom frequency, make sure the frequency given is in the correct format. Below are some correct and incorrect formats for custom frequency
    - Correct:
        - 1d1m1y
        - 1d 0m 0y
        - 0m 1y 1d
        - 0y 1m 0d
        - 1y 1d 1m
    - Incorrect:
        - ymd
        - y1m1d
        - 0y0m0d
        - 0ymd
        - 1ymd

Environment variables used in tool

Name	Description	Default Value
VMANAGE_KEY	The password encryption key that is used to encrypt the password.	4VNvJnZMrX617cHcgdTvfME8wA3_zIqJDlbB865-j10=
MAX_WORKERS	No. of thread workers that run in parallel at a time.	25
CHUNK_SIZE	Size of device chunks	15
SLA_INTERVAL	Interval for SLA metrics aggregation	24
SLA_TYPE	SLA metrics aggregation histogram type	hour
BANDWIDTH_UTILIZATION_INTERVAL	The interval for bandwidth utilization aggregation	24
BANDWIDTH_UTILIZATION_TYPE	Bandwidth utilization histogram type	hour
TOP_MAX	No. of the entity that displays on the graph	10
LOG_LEVEL	Log level	WARNING
LOG_MAX_BYTES	Allow the log file to roll over at a predetermined size.	1000000
LOG_BACKUP_COUNT	Backup counts for log file	10
MAX_REPORT_ENTRY	No. of maximum report history entries to store	100

Note:

- If the user needs to change any of the above variables, the user can edit or create (*if not already present*) "***sdwan-reporting-docker-compose/data/env/env_file***". Sample *env_file* has been provided at "*sdwan-reporting-docker-compose/data/env/env_file*"
- The env variables changed after the tool service has been started by "***docker-compose up --detach***", the changes will be only visible in the next ***"****Scheduled Reports*", to apply the changes to other services, the user needs to stop the container by "***docker-compose***

down", make sure all the changes have been made to the "**env_file**", and restart the container using "***docker-compose up --detach***"

The data directory

The "*data*" directory consists of all the db entries, logs, crontabs configurations and previously generated report histories, so it is not advisable to delete any of it's content or it may lead to unexpected behaviour of the tool.
Following are the directories inside "*data*" directory:

- ***cisco-sdwan-db:*** It contains "*sdwan-reporting.sql*" file which consists of all the DB tables and entries used in the tool
- ***cron:*** It contains "*config*", "*crontabs*", "*logs*" which contains Configurations of scheduled cron jobs, commands for crontabs and logs of cron jobs respectively.
- **env:** It contains the "*env_file*" from where the user can manipulate env variables used in the tool. After changing env variables, make sure you restart the tool by doing "*docker-compose down*" and "*docker-compose up --detach*"
- **logs:** It contains the log file for the tool
- **reports:** It contains all the previously generated report files.

Minor differences across browsers

- Safari and Firefox may let the user input letters and special characters in integer fields like Port Number fields but it won't let the user submit the form, so please make sure only valid port numbers are being used as input
- There can be minor layout/design changes in the "Generate Report" modal across different browsers
- The "Schedule/Generate" report fields may get vertically aligned in Error cases in the Safari browser.

Known Issues

- In Firefox, the "Schedule Report" modal form elements may get aligned vertically after 4-5 lines of the "Enter Email/s" field has been used, due to an open issue with Material-UI nested Grid (ReactJS Framework used for development)
- In Safari, cancel button may require multiple clicks to cancel ongoing process

Appendix

API Swagger (vManage Setup)

Method	Endpoint	Description

POST	/api/config/test	Test vManage configuration
		Sample Request body:
		{
		"vmanage_host": "<vmanage_host>",
		"vmanage_port": <vmanage_port>,
		"vmanage_user": "<vmanage_username>",
		"vmanage_pass": "<vmanage_password>",
		"ignore_ssl_certificate_validation": **false**
		}

POST	/api/config	Add vManage configurations
		Sample Request body:
		
		{
		"vmanage_host": "<vmanage_host>",
		"vmanage_port": <vmanage_port>,
		"vmanage_user": "<vmanage_username>",
		"vmanage_pass": "<vmanage_password>",
		"ignore_ssl_certificate_validation": **false**
		}

GET	/api/config	Get vManage configurations

API Swagger (On-Demand Report)

Method	Endpoint	Description

POST	/api/report/export	API to export the report in different formats.
		
		Sample Request body:
		{
		"report_title": "<report_title>",
		"start_date": "<start_date>",
		"end_date": "<end_date>",
		"report_metrics": [
		"sla_metrics",
		"bandwidth_utilization",
		],
		"export_format": "excel"
		}
		
		date_sample: **2020-12-01T10:32:42.380Z**

GET	/api/report/download	API to download the exported report. **Query param:** *file_path*: path returned in the /api/report/export **Note:** - This API does not require vManage configurations.
GET	/api/report/status	API to check the status of the exported report. **Query param:** *file_path*: path returned in the /api/report/export **Note:** - This API does not require vManage configurations.

API Swagger (Schedule Report)

Method	Endpoint	Description

POST	/api/report/schedule	API to schedule reports.
		
		Sample Request body:
		
		{
		"report_title": "<report_title>",
		"is_custom": **false**,
		"frequency": "daily",
		"report_metrics": [
		"sla_metrics",
		"bandwidth_utilization",
		],
		"export_format": "excel",
		"smtp_config": {
		"smtp_host": "<smtp_host>",
		"smtp_port": <smtp_port>,
		"smtp_user": "<smtp_user>",
		"smtp_pass": "<smtp_pass>",
		"smtp_connection": "<smtp_connection>",
		"smtp_send_from": "<smtp_send_from>"
		},
		"email":[
		<email_list>
		]
		}
		Undocumented status code: **406**

DELETE	/api/report/schedule	API to delete a schedule. **Query param:** *report_title:* name of the report title. Undocumented status code: **404**

API Swagger (Report History)

Method	Endpoint	Description
GET	/api/report/history	API to get the history of report generations.