



Merlin – Integration with Radiflow iSID

Advanced Intrusion Detection System

AN-008-WIE



Hardware Models	Merlin Series
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Brief description	Merlin– Radiflow iSID Integration Guide Using Smart Connector Probes

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1 Overview

Radiflow iSID is an industrial cybersecurity monitoring platform designed for OT and ICS networks. It passively analyses network traffic, builds an asset inventory, detects anomalies and policy violations, and identifies potential security risks without interfering with operational systems. iSID provides continuous visibility into industrial processes to help operators maintain a secure and compliant OT/IT environment. When applied to large and distributed systems, iSID can integrate with remote collectors, allowing data from remote sites to be forwarded for analysis over smart connections to collector interfaces.

The Merlin device can be used as a remote collector and, as an industrial gateway, is an ideal solution for performing local traffic filtering and monitoring, data collection (tapping) and data distribution.

This application note demonstrates how to integrate a Merlin device (Data Collector) with Radiflow's iSID application (IDS). The example scenario illustrates a basic port mirroring setup, commonly known as encapsulated remote SPAN (ERSPAN), where traffic is duplicated and forwarded to an external IDS for analysis. This document outlines all the steps required to integrate both systems.

1.1 Firmware information

Firmware version: **25.05.31.000** or newer.

1.2 Assumptions

This application note document can be applied to all routers in the Westermo Ireland - Merlin Series and Virtual Access - GW Series, for the purpose of this document all devices will be referred as Merlin Device.

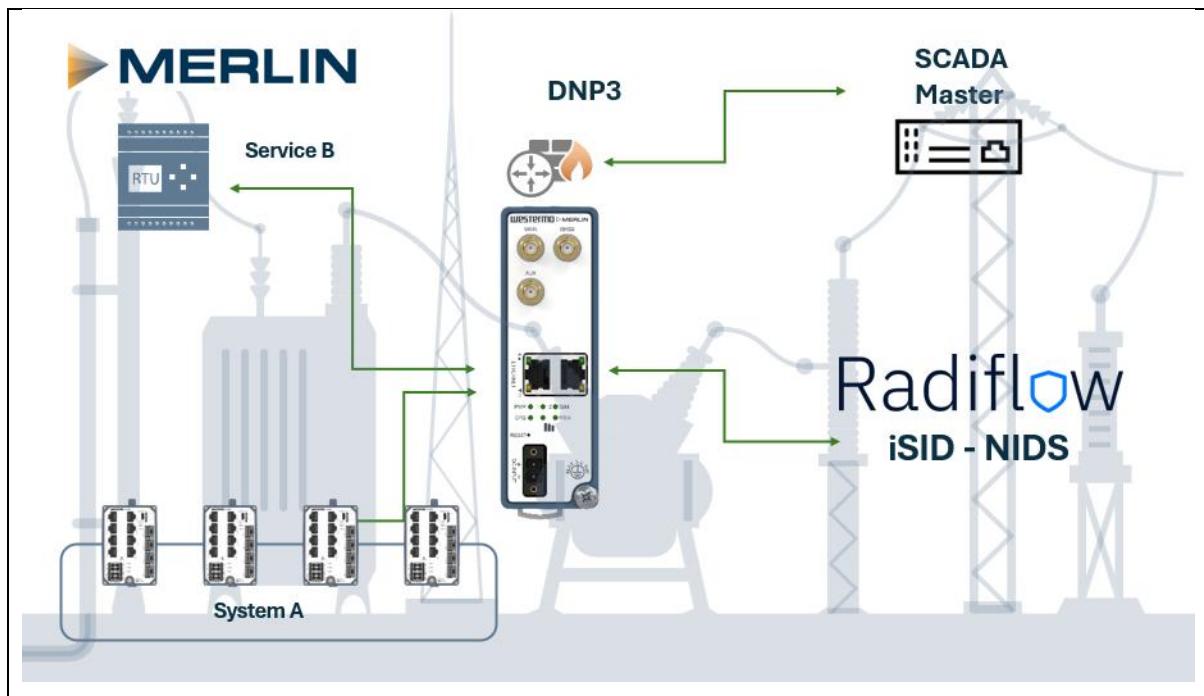
It is assumed that device has been configured and provide communication for intended service and the communication between devices is operational, this document will focus on explaining how to configure traffic mirroring port to duplicate the traffic from one physical port and forward this to IDS.

Application note does not focus on configuring and finetuning Radiflow's iSID application, for all queries of this nature please contact Radiflow directly at support@radiflow.com

1.3 Corrections

Requests for new application notes related to Merlin products, corrections or amendments to this application note are welcome and should be addressed to support.ie@westermo.com

2 Operational environment



2.1 Overview

The Merlin series of versatile cellular routers provides high-speed data connectivity for demanding industrial and smart grid applications. Device offers a complete solution for service delivery, remote access, and security monitoring, and when coupled with the Radiflow iSID application, it can offer an advanced solution for Network Intrusion Detection System (NIDS) of the remote substation.

The illustration above represents a typical remote site where a Merlin device delivers radio communication services for specialised industrial applications and networks. While the Merlin device includes robust, industry-grade security features, it is not designed to perform full traffic flow analysis, advanced malware detection, or deep inspection across a wide variety of protocols. These capabilities fall within the domain of specialised intrusion detection systems such as Radiflow's iSID which would typically be deployed in centralised locations. In such scenarios, Merlin device act as a data collector and forwarder.

3 Configuring Smart Collector

3.1 Introduction

The Smart Collector feature configuration is straightforward, but it does require several steps. It is assumed that the Merlin device is already configured and operational.

Configuration steps summary:

- On Radiflow – Add a new Smart Collector interface
- On Radiflow – Add a Smart Collector probe
- On Merlin Device – Create a new probe interface (e.g., **SCProbe**)
- On Merlin Device – Add parent interface to the probe
- On Merlin Device – Configure the mirroring service

Networking overview:

The Smart Collector interface is configured with a dedicated monitoring subnet. On the Merlin device, this subnet may be assigned to either a physical interface (when the IDS is connected locally) or a virtual interface (when the IDS is deployed remotely), further referred as forwarding interface. For the purpose of this document, configuration on a physical interface is described.

Radiflow's monitoring architecture uses a one-way passive capture interface to ingest mirrored OT/IT traffic without transmitting or interacting with the network. Remote traffic, from Merlin, is delivered through an Ethernet GRE over IPv4 (**GRETAP**) tunnel, where the router mirrors the required traffic and sends GRE-encapsulated frames to the Smart Collector Interface IP.

The iSID system decapsulates the GRE payload and feeds the inner Ethernet frames into the monitoring pipeline as if they arrived directly on the passive interface. This design provides secure, unidirectional traffic ingestion with no risk to operational systems. It is recommended to follow the same principle on the Merlin device by restricting inbound traffic on the probe interface using firewall rules.

3.2 Configuring Smart Collector Interface on iSID

The screenshot shows the Radiflow Configuration interface. The left sidebar has a 'Configuration' menu item highlighted with a red box. The main 'Configuration' page has a 'Interfaces' tab selected, also highlighted with a red box. In the 'Physical interfaces' section, there is a 'New smart collector interface' button highlighted with a red box. A callout '2.' points to the 'Interfaces' tab, '3.' points to the 'New smart collector interface' button, and '4.' points to the 'Add smart collector interface' dialog box. The dialog box shows fields for 'Name' (ens33), 'IP' (172.16.10.124), 'Subnetwork' (24), and 'Data' settings (Alert on traffic start, Alert on traffic end, Inactive range (seconds) 20). An 'Apply' button is at the top right of the dialog.

1. Access **Configuration** from side menu
2. Go to **Interfaces**
3. Click + next to Physical interfaces and select **New smart collector interface**
4. Select your interfaces and configure **Smart Collector Network**

Once configured, new network interface tile will appear. Green light indicates correct operations, whereas a warning triangle denotes that no traffic is being received.

The screenshot shows a detailed view of a configured 'Interface' (ens33). The interface is a 'smart collector interface' with IP 172.16.10.124 and Subnetwork 24. It has 'Data' settings: Inactive range (seconds) 20, Alert on traffic start (on), Alert on traffic end (on). Under 'Data Encryption', 'Encrypted' is off and 'Listening port' is 7776. A green light icon is shown above the interface details, with a large blue arrow pointing to it from the left.

3.3 Configuring Smart Probe Connection on iSID

The screenshot shows the Radiflow Configuration interface. On the left, a sidebar lists various sections: Dashboard, Insights, Alerts, Map, Reports, Network visibility, Asset management, Policy monitor, Cyber attack rules, Operational Scheduling, and User activity. The 'Configuration' section is selected. The main area is titled 'Configuration' and contains two main sections: 'Physical interfaces' and 'Smart collector (probe) connections'. The 'Physical interfaces' section shows two entries: 'Interface' (ens34, management interface) and 'Interface' (ens33, smart collector interface). The 'Smart collector (probe) connections' section shows a single entry: 'Merlin3100' (IP 172.16.10.17, Key 1.2.3.4). A red box highlights the '+' button in the 'Smart collector (probe) connections' section, labeled '5.'. A red box highlights the 'Add smart collector connection' dialog box, labeled '6.'.

5. Click + to create new **Smart collector probe connection**

6. In popup window:

- Add custom name
- Add IP address of forwarding interface from Merlin Device
- Add 32bit unique key in form of IP address.

Note: Each device requires its own dedicated interface for connecting the Smart Collector probe.

After configuration is complete, a new Connection interface tile will be displayed. A green indicator signifies proper operation, whereas a warning triangle denotes that no traffic is being received.

The screenshot shows the 'Smart collector (probe) connections' section. It displays a single connection entry: 'Merlin3100' (Type: smart collector connection, Key: 1.2.3.4, IP: 172.16.10.17). A red arrow points to the green indicator light next to the connection entry. The connection entry includes fields for Inactive range (seconds) (20), Alert on traffic start (disabled), and Alert on traffic end (disabled).

3.4 Configuring SCProbe Interface on Merlin

PT-Generic

Interfaces

Interface Overview

Interface	Up/Down	Status
loopback	Up	Uptime: 23h 6m 15s MAC Address: 00:00:00:00:00:00 RX: 1.12 MB (5019 Pkts.) TX: 1.12 MB (5019 Pkts.) IPv4: 127.0.0.1/8 IPv6: ::1/128
mgmt	Up	Uptime: 22h 20m 45s MAC Address: 00:E0:C8:9A:E6:B9 RX: 413.57 KB (3958 Pkts.) TX: 39.90 MB (288268 Pkts.) IPv4: 172.16.10.17/24
wan	Up	Uptime: 23h 2m 5s MAC Address: 00:E0:C8:1A:E6:B9 RX: 27.89 MB (271695 Pkts.) TX: 5.31 MB (24292 Pkts.) IPv4: 10.100.229.17/24

ADD NEW INTERFACE...

1. Go to **Network** Tab and click **Interfaces**
2. Click **Add New Interface**

Create Interface

Name of the new interface: SCProbe

Protocol of the new interface: Ethernet GRE over IPv4

BACK TO OVERVIEW **SUBMIT**

3. Create new name for the interface e.g. "SCProbe"
4. Select **Ethernet GRE over IPv4** (GRETAP) as protocol interface
5. Click **Submit**

Interfaces - SCProbe

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and enter the names of several network interfaces separated by spaces. You can also use VLAN notation INTERFACE.VLANnR (e.g. eth0.1).

Common Configuration

General Setup Advanced Settings Firewall Settings

Uptime: 0h 0m 56s
RX: 4.00 B (0 Pkts, 0 Errors, 0 Dropped, 0 Overruns, 0 Frame)
Tx: 640.00 B (7 Pkts, 0 Errors, 0 Dropped, 0 Overruns, 0 Carrier, 0 Collisions)
Status: IPv4: 1.1.1.1/30

Protocol: Ethernet GRE over IPv4

Tunnel IP Address: 1.1.1.1 6.
Mask Length: 30
Remote IP Address: 172.16.10.124 7.

Local Interface: SCPProbe wan 8.
 loopback
 mgmt
 wan

TTL: 128

MTU: 1472

Keepalive Enabled:

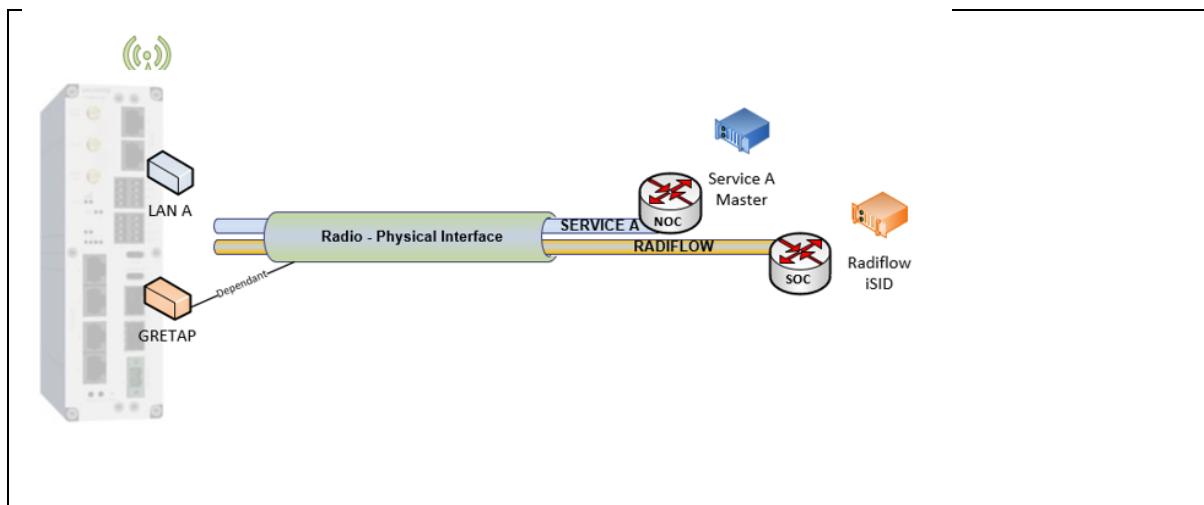
BACK TO OVERVIEW 9. **SAVE & APPLY**

6. Configure with a dummy IP and Mask (e.g. 1.1.1.1/30)
7. Configure with IP address of **Smart Collector Interface on Radiflow**
8. Configure the 32bit key as in Radiflow configurations
9. Click **Save & Apply**

3.5 Configuring SCProbe Parent Interface on Merlin

Important notes:

- The main parent interface must be a physical interface.
- The parent interface's traffic cannot be mirrored back to the SCProbe (GRETAP) to avoid loops.
- When using a radio interface for traffic delivery, as illustrated below, it is essential to consider both its throughput and bandwidth.



To configure SCProbe Parent interface, go to **Network > Interface** settings on Merlin Device.

The screenshot shows the Merlin Device interface under the 'Network > Interface' section. The 'mgmt' interface is selected and highlighted with a red box. The 'Actions' section for the 'mgmt' interface includes 'RECONNECT', 'STOP', 'EDIT', and 'DELETE' buttons.

1. Click **EDIT** in the action section of the selected parent interface.

Note: the Smart Collector Probe Connection on Radiflow was configured with IP address of this physical interface.

The screenshot shows the Merlin Device interface under the 'Advanced Settings' tab. The 'Dependant interfaces' section is highlighted with a red box. The 'Dependant interfaces' dropdown shows 'SCProbe: (no interfaces attached)'. The 'loopback', 'mgmt', and 'wan' interfaces are listed below with checkboxes.

2. Go to **Advanced Settings**

3. Add **SCProbe** as **Dependant Interface**

Click **Save& Apply** at the bottom of the page

After configuration, the SCProbe interface appears in the list with a green light to show it's operational.

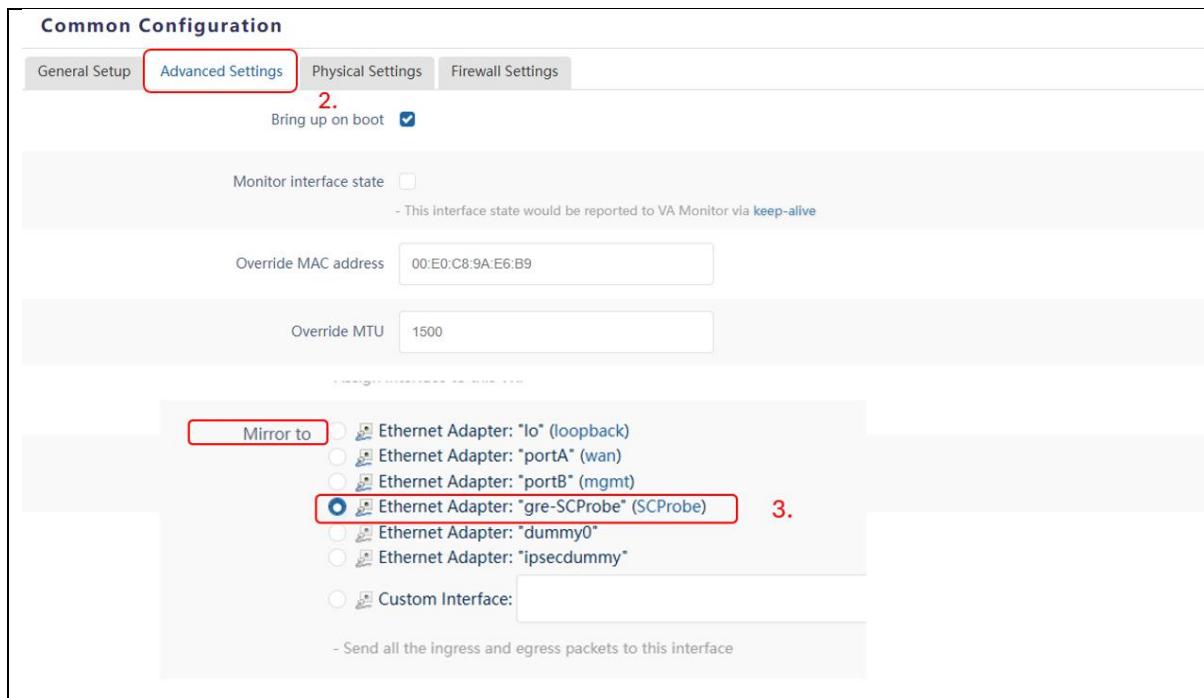
Interface Overview		
Interface	Up/Down	Status
SCProbe gre-SCProbe	●	Uptime: 0h 0m 56s RX: 0.00 B (0 Pkts.) TX: 56.00 B (1 Pkts.) IPv4: 1.1.1.1/32
loopback lo	●	Uptime: 23h 44m /s MAC Address: 00:00:00:00:00:00 RX: 1.13 MB (5061 Pkts.) TX: 1.13 MB (5061 Pkts.) IPv4: 127.0.0.1/8 IPv6: ::/128
mgmt portB	●	Uptime: 0h 2m 49s MAC Address: 00:E0:C8:9A:E6:B9 RX: 421.04 KB (4002 Pkts.) TX: 39.90 MB (288286 Pkts.) IPv4: 172.16.10.17/24
wan portA	●	Uptime: 23h 39m 57s MAC Address: 00:E0:C8:1A:E6:B9 RX: 30.58 MB (283703 Pkts.) TX: 8.66 MB (31953 Pkts.) IPv4: 10.100.229.17/24
ADD NEW INTERFACE...		

3.6 Configuring port mirroring feature on Merlin

In this simple example scenario, all traffic from the interface used for Service A will be mirrored to the SCProbe interface.

Interface Overview			
Interface	Up/Down	Status	Actions
SCProbe gre-SCProbe	●	Uptime: 0h 0m 56s RX: 0.00 B (0 Pkts.) TX: 56.00 B (1 Pkts.) IPv4: 1.1.1.1/32	RECONNECT STOP EDIT DELETE
loopback lo	●	Uptime: 23h 44m 7s MAC Address: 00:00:00:00:00:00 RX: 1.13 MB (5061 Pkts.) TX: 1.13 MB (5061 Pkts.) IPv4: 127.0.0.1/8 IPv6: ::/128	RECONNECT STOP EDIT DELETE
mgmt portB	●	Uptime: 0h 2m 49s MAC Address: 00:E0:C8:9A:E6:B9 RX: 421.04 KB (4002 Pkts.) TX: 39.90 MB (288286 Pkts.) IPv4: 172.16.10.17/24	RECONNECT STOP EDIT DELETE
wan portA	●	Uptime: 23h 39m 57s MAC Address: 00:E0:C8:1A:E6:B9 RX: 30.58 MB (283703 Pkts.) TX: 8.66 MB (31953 Pkts.) IPv4: 10.100.229.17/24	RECONNECT STOP EDIT DELETE
ADD NEW INTERFACE...			

1. Click EDIT in the action section of the Service A interface.



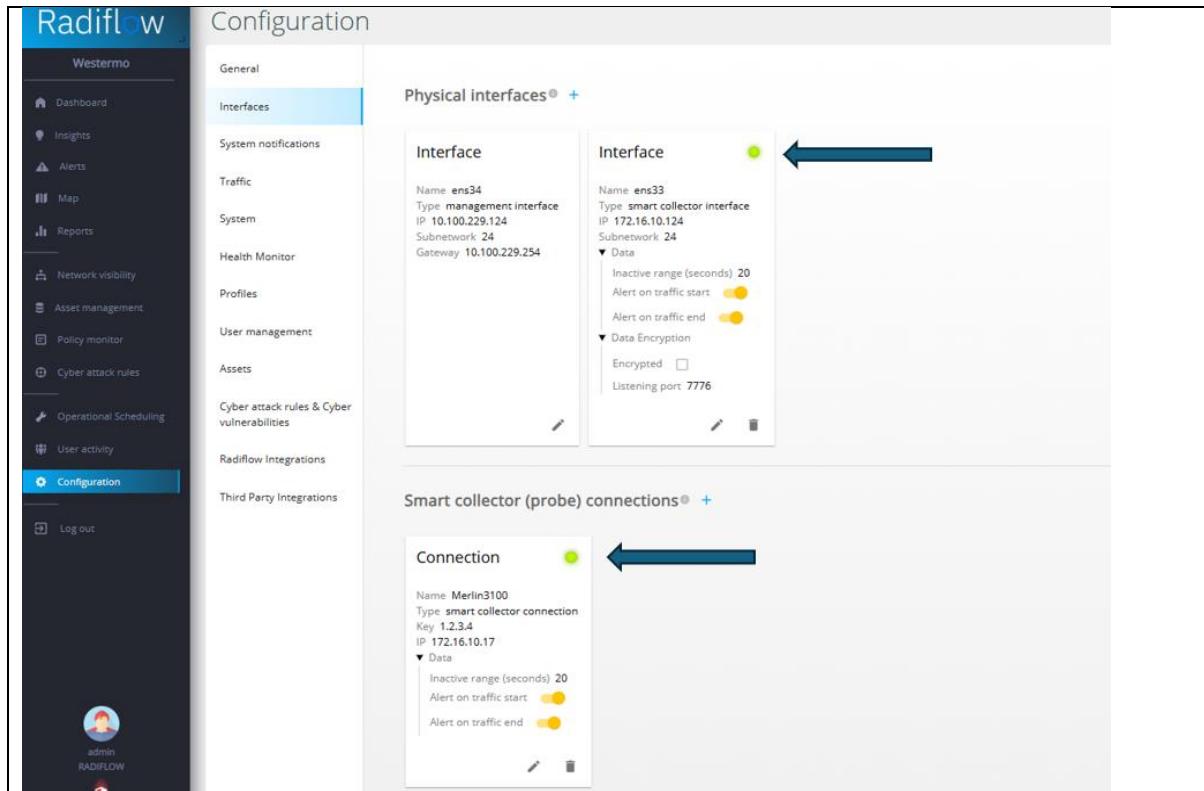
2. Go to **Advanced Settings**

3. Add **SCProbe** interface in **Mirror to** section (Mirror section is at the bottom)

Click **Save& Apply** at the bottom of the page

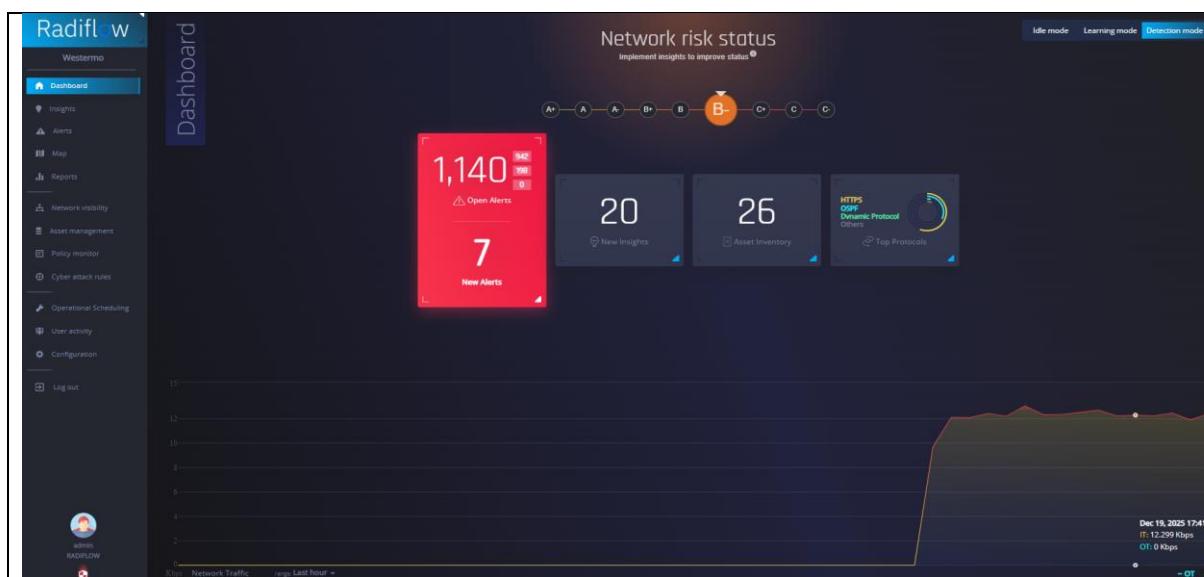
4 Summary and system verification

Under iSID **Configurations > Interfaces**, both Smart Collector and Smart Collector (probe) interfaces should stay green. The warning triangle should no longer be visible, which shows that traffic is now being received.



The screenshot shows the Radiflow iSID Configuration interface. On the left is a sidebar with various navigation options. The main area is titled 'Configuration' and contains two main sections: 'Physical interfaces' and 'Smart collector (probe) connections'. In the 'Physical interfaces' section, there is a table with one row for 'Interface'. The interface is named 'ens33' and is described as a 'smart collector interface' with IP 172.16.10.124, Subnetwork 24, and Gateway 10.100.229.254. The status is green. In the 'Smart collector (probe) connections' section, there is a table with one row for 'Connection'. The connection is named 'Merlin3100' and is described as a 'smart collector connection' with IP 172.16.10.17. The status is green. Both sections have a blue arrow pointing to the green status indicator.

Once fully configured, the iSID's dashboard should start to produce indicators and metrics.



The screenshot shows the Radiflow iSID Dashboard. The left sidebar is identical to the Configuration interface. The main area is titled 'Network risk status' and includes a 'Network risk status' card with a red background showing '1,140 Open Alerts' and '7 New Alerts'. Below this are three smaller cards: '20 New Insights', '26 Asset Inventory', and 'HTTPS, OSPF, Dynamic Protocol, Other... Top Protocols'. At the bottom of the dashboard is a large graph showing 'Network Traffic' over the 'Last hour'. The graph shows a significant spike in traffic starting around the 8-hour mark. A blue arrow points to the green status indicator in the top right corner of the dashboard area.