

Revised: March 26, 2026

Raw Socket Transport on SD-Routing Devices

What's new and changed

This table lists the features available with the current release.

Table 1: What's new and changed in this release

Cisco IOS XE release	Feature Name and description	Supported platforms
Cisco IOS XE 26.1	Raw Socket Transport on SD-Routing devices The information in this article is carried forward from Cisco IOS XE Release 17.18.x, with no new features introduced in Cisco IOS XE Release 26.1. This release maintains the existing functionality and enhancements from Cisco IOS XE Release 17.18.x without adding any additional capabilities.	• Cisco Catalyst IR1101 Rugged Series Router • Cisco Catalyst IR1800 Rugged Series Routers • Cisco Catalyst IR8340 Rugged Series Router

Raw Socket transport for SD-Routing devices

Raw Socket transports serial data through an IP network. This feature helps in transportation of Supervisory Control and Data Acquisition (SCADA) data from Remote Terminal Units (RTUs) and serves as an alternative to the Block Serial Tunnel (BSTUN) protocol.

Raw Socket transport uses either TCP or UDP as the transport protocol. You can configure an interface to use one protocol at a time, but not both simultaneously. TCP transport suits control applications that require acknowledged and sequenced data delivery. For latency-sensitive applications, such as line SEL relays, UDP transport delivers serial data faster than TCP.

In Cisco IOS XE Release 17.18.1a, you can configure Raw Socket transport using Feature Parcels in Cisco Catalyst SD-WAN Manager without configuring and managing multiple commands.

Benefits of Raw Socket transport

This section outlines the various benefits associated with configuring Raw Socket transport on SD-Routing devices using Feature Parcels in Cisco Catalyst SD-WAN Manager.

- **Ease of configuration :**

The Feature Parcel support in Cisco Catalyst SD-WAN Manager offers a pre-packaged template where you can input configurations easily and provision the changes to multiple devices. This removes the overhead of configuring using multiple commands and provisioning changes per device.

- **Traffic segmentation :**

By default, the Raw Socket data is routed using the details in the global routing table without any segmentation or isolation of network traffic. But for added security, you can configure Raw Socket data to be routed through a **Service VRF** by using the

routing table dedicated for the VRF. This provides a way to manage and control network traffic for different services, ensuring that each service has its own isolated network path.

Limitations of Raw Socket transport

This section indicates the limitations in configuring a Raw Socket interface on an Cisco Catalyst Industrial Router.

Configuring a loopback interface on a Raw Socket interface is only supported on Cisco Catalyst IR8340 Rugged Series Router. A loopback interface cannot be configured on a Raw Socket interface that is used in Cisco Catalyst IR1101 Rugged Series Router and Cisco Catalyst IR1800 Rugged Series Router.

Devices for which Raw Socket transport can be configured

In Cisco IOS XE 17.18.1a release, the facility to configure Raw Socket transport using Feature Parcels is introduced. This configuration can currently only be provisioned on Cisco Catalyst IR1101 Rugged Series Router, Cisco Catalyst IR1800 Rugged Series Routers, and Cisco Catalyst IR8340 Rugged Series Routers only.

Raw Socket configuration cannot be provisioned on any other devices in the enterprise site.

Determine the topology and encapsulation for Raw Socket transport

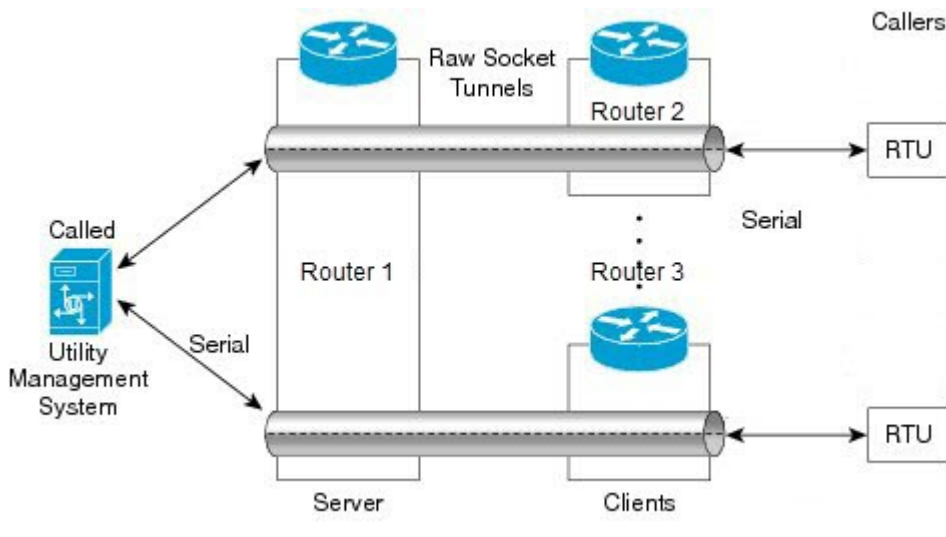
Raw Socket transport can be configured in a client-server model or a peer-to-peer topology depending on how you want data to be delivered. The data delivery is determined by how packets are encapsulated. Raw Socket transport can use either TCP or UDP as the transport protocol.

You can configure an interface to use one protocol at a time, but not both simultaneously. TCP transport suits control applications that require acknowledged and sequenced data delivery and uses a client-server model. For latency-sensitive applications, such as line SEL relays, UDP transport delivers serial data faster than TCP transport and uses a peer-to-peer model.

TCP Encapsulation

TCP encapsulation for Raw Socket transport uses a client-server model. At most one server and multiple clients can be configured on a single asynchronous serial line. In a client mode, the Industrial Router can initiate up to 32 TCP sessions to raw socket servers, which can be other Industrial Routers or third-party devices. This figure shows a sample Raw Socket using TCP encapsulation.

Figure 1: Client-Server model in TCP transport



In this example, serial data is transferred between RTUs and a utility management system across an IP network that includes several Industrial Routers. One Industrial Router (Router 1) acts as a raw socket server, listening for TCP connection requests from the other Industrial Router (Router 2 and Router 3), which are configured as raw socket clients.

A raw socket client receives streams of serial data from the Remote Terminal Units (RTUs) and accumulates this data in its buffer, then places the data into packets, based on user-specified packetization criteria. The Raw Socket client initiates a TCP connection with the Raw Socket server and sends the packetized data across the IP network to the Raw Socket server, which retrieves the serial data from the packets and sends it to the serial interface, and on to the utility management system.



Note

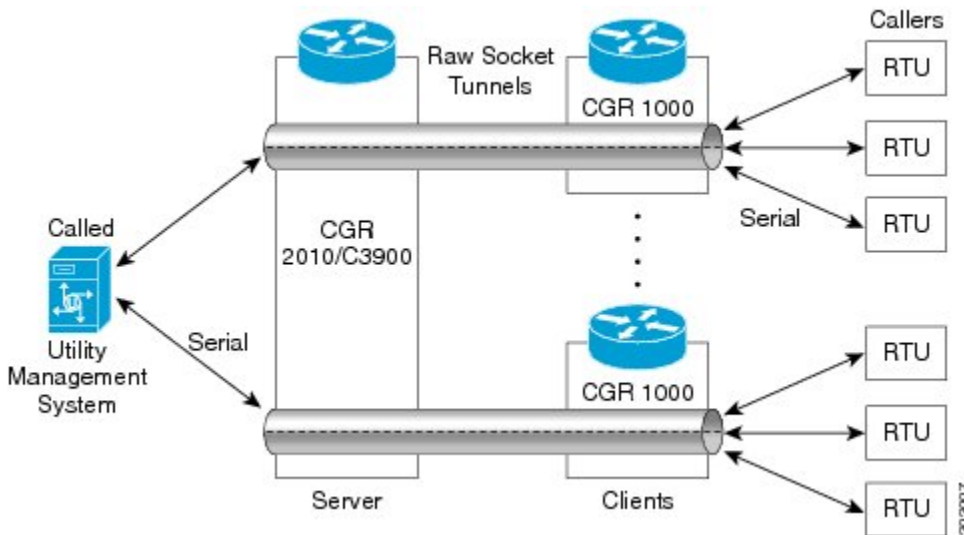
When you configure the router's serial link interface as a server, the client router's serial link interface acts as its peer, and vice versa.

UDP Encapsulation

UDP transport uses a peer-to-peer model. Multiple UDP connections can be configured on an asynchronous serial line.

This figure shows a sample Raw Socket UDP configuration.

Figure 2: Raw Socket transport in an IP network



In this example, serial data is transferred between RTUs (Remote Terminal Unit) and a utility management system across an IP network that includes two routers (Router 1 which is an IR1800 and Router 2 which is an IR1101) that are configured as Raw Socket UDP peers.

In this example, the Raw Socket UDP peer receives streams of serial data from the RTUs and accumulates this data in its buffer, then places the data into packets, based on user-specified packetization criteria. The Raw Socket UDP peer sends the packetized data across the IP network to the raw socket peer at the other end, which retrieves the serial data from the packets and sends it to the serial interface, and on to the utility management system.

Determine how the traffic from the Raw Socket should be routed

By default, the Raw Socket data is routed using the details in the global routing table without any segmentation or isolation of network traffic. But for added security, you can configure Raw Socket data to be routed through a **Service VRF** by using the routing table dedicated for the VRF.

This provides a way to manage and control network traffic for different services, ensuring that each service has its own isolated network path.

Determine how serial data is packetized

Packetization in networking is the process of dividing data into small, manageable units called packets, which are then transmitted over a network. This involves encapsulating the data with a header that contains control information like source and destination addresses. At the receiving end, these packets are reassembled to reconstruct the original data.

During Raw Socket configuration specify a character that triggers the device to packetize the data in its buffer and forward it to the Raw Socket peer. For example, to indicate end of transmission, a special character, such as carriage return (CR, ASCII 13) or line feed (LF, ASCII 10), can be used.

Configure Raw Socket transport using Transport and Management Profile

By default, the Raw Socket data is routed using the details in the global routing table without any segmentation or isolation of network traffic.

- Step 1** On the Cisco Catalyst SD-WAN Manager, select **Configuration > Configuration Groups**. Select the solution type as **SD Routing**.
- Step 2** Select a configuration group from the list that is displayed. Create a new **Transport and Management profile** or select an existing profile. Select the profile, click **Edit**.
- Step 3** Select **Global VRF**. Click **Add New** to configure the **Global VRF**. Specify a name to identify the **Global VRF**. Optionally, add a description for the **Global VRF**.
- Step 4** Click the + icon and select **Raw Socket**. Click **Add New** to configure Raw Socket transport. Specify a name to identify the Raw Socket interface. Optionally, add a description for the Raw Socket. Specify these details:

Option	Description
Field	Description
Loopback configuration	You can enable or disable the loopback configuration. Note Configuring a loopback interface on a Raw Socket interface is only supported on Cisco Catalyst IR8340 Rugged Series Router. A loopback interface cannot be configured on a Raw Socket that is used in Cisco Catalyst IR1101 Rugged Series Router and Cisco Catalyst IR1800 Rugged Series Router.
Interface name	Enter a name for the interface.
Packet length	Specify the length of the packet. Range: 2 to 1400 bytes.
Packet time	Define the time duration in minutes to send packets. Range: 3 to 1000 minutes
Special character	Define a specific character that triggers the router to send all buffered data to the Raw Socket peer.
Encapsulation	Choose TCP or UDP as the protocol to encapsulate and transport serial data. If you select TCP , configure the following options: • Set the Local Port • Specify the Local IP • Choose the TCP Mode Configure any Advanced TCP options as needed. If you select UDP , configure the relevant UDP connection fields.

- Step 5** Click **Save**.

What to do next

For added security, you can configure Raw Socket data to be routed through a **Service VRF** by using the dedicated routing table for the VRF. See, [Configure Raw Socket transport using Service profile, on page 6](#).

Configure Raw Socket transport using Service profile

For added security, you can configure Raw Socket data to be routed through a **Service VRF** by using the dedicated routing table for the VRF.

- Step 1** On the Cisco Catalyst SD-WAN Manager, select **Configuration** > **Configuration Groups**. Select Solution as **SD Routing**.
- Step 2** Create a new **Service Profile** or edit an existing one. Click **+Add New Feature**, select **VRF**. For details on values for each field, see [Configure a VRF in Service Profile](#).
- Step 3** Click **+**, select **Raw Socket**. Refer Step 4 of [Configure Raw Socket transport using Transport and Management Profile](#) for details.
- Step 4** Click **Save**.

Associate and deploy the Configuration Group to an SD-Routing device

This task involves associating the **Configuration Group** to one or more devices and provisioning the configuration changes.

Ensure that the configuration group you select is created for SD-Routing devices.

- Step 1** On Cisco Catalyst SD-WAN Manager, select the **Configuration Group** created earlier.
- Step 2** Click **+ Add** and select the devices from the list. Click **Save** to attach the configuration group to the selected devices.
- Step 3** To provision the configuration changes, click **Deploy**.
 - a) Select the device on which you want to provision the configuration changes. Click **Next**.
 - b) For each device, review or update the **IP address**, **hostname**. Specify the **password** to access these devices. Click **Next**.
 - c) If you want to review the configuration changes, click **Preview CLI**. Select the device to view the configuration changes either inline or side by side. The configurations that are removed are highlighted in red and the new configuration is highlighted in green. To remove or add any device from the list of selected devices, click **Edit Device List**.
 - d) Click **Deploy** to provision the configuration changes on the devices.

Monitor Raw Socket on SD-Routing devices using Cisco Catalyst SD-WAN Manager

This section provides details on how to monitor Raw Socket transport using Cisco Catalyst SD-WAN Manager.

Monitor Raw Socket using Monitor dashboard

This section provides details on how to monitor Raw Socket transport using Monitor dashboard in Cisco Catalyst SD-WAN Manager.

- Step 1** On the Cisco Catalyst SD-WAN Manager, select **Monitor** > **Devices**. Select a device from the list.
- Step 2** Select **Real Time**. From **Device Options**, select one among the session details:
 - **Raw Socket UDP Statistics**
 - **Raw Socket TCP Statistics**

- **Raw Socket UDP Session**
- **Raw Socket TCP Session**
- **Raw Socket UDP Sessions Local**
- **Raw Socket TCP Session Local**

Monitor Raw Socket using commands

Use these commands to monitor Raw Socket sessions information. These commands can be executed using **Tools > SSH** terminal in Cisco Catalyst SD-WAN Manager:

- **show raw-socket udp sessions**
- **show raw-socket udp detail**
- **show raw-socket udp statistics**
- **show raw-socket tcp sessions**
- **show raw-socket tcp detail**
- **show raw-socket tcp statistics**
- **show raw-socket udp sessions local**
- **show raw-socket tcp sessions local**