![RACOM - RADIO DATA NETWORKS]

Application notes

RAy3
Link state propagation

version 1.0
2024-08-21

Table of Contents

1. Introduction

Links operating at a higher frequency such as 80 GHz, or over long distances, are sensitive to weather conditions. As a rule, the ACM function reacts to deteriorated climatic conditions by reducing the modulation, which corresponds to the bandwidth of the link. Link state propagation (LSP) function allows the unit or the entire link to automatically respond to reduced radio channel throughput. This can be used to advantage in networks whose topology allows the use of a backup link or route that is less sensitive to weather.

Communication between units is maintained even when LSP is activated (provided the received signal level is above the most robust modulation sensitivity). Various LSP actions can be triggered when LSP is activated. Access to the GUI of remote unit is possible via port forwarding of the local unit (allowed ports are: 8022, 8023, 8080, 8161 and 8443).

Note

The rules defined in the VTU table override the VLAN member rules that are automatically modified by the LSP functions. For packets with VLAN IDs defined in the VTU table, the setting of the LSP function is not affected and continues to follow the rules of the VTU table.

2. Example: RSTP

The Rapid Spanning Tree Protocol (RSTP) is an evolution of the Spanning Tree Protocol (STP) designed to provide faster convergence in Ethernet networks. RSTP achieves rapid convergence by introducing several improvements over STP.

This combination can be used, for example, with a parallel backup link or in a circular topology as shown in the figures:
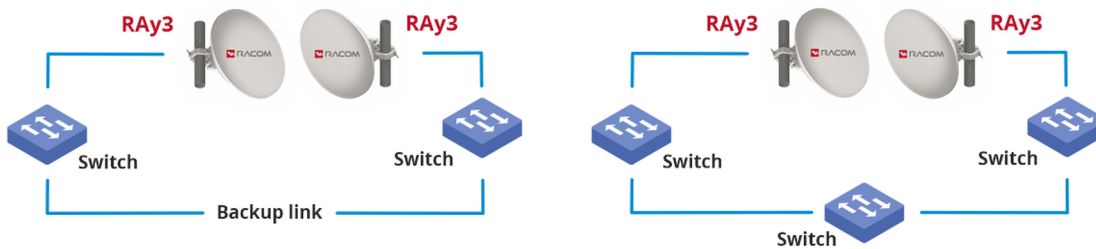

Fig. 2.1: Example of a network with external switches and the RSTP protocol for switching routes

To configure according to these schemes, it is sufficient to enable the LSP function on one side of the link and select "Disable Air" as the action. In this case, when the Tx speed on the local unit drops below 750 Mbps (it can be changed at will), the connection of the ETH1 and ETH2 ports to the port AIR is interrupted. Data will no longer pass through the link and the RSTP protocol will recognise that this link is down and stop using it.

Fig. 2.2: Example of setting the LSP function - Disable Air

ⓘ **Note**

The RSTP function must be set accordingly on the switches in the network.

ⓘ **Note**

RAy links are transparent to RSTP packets.

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3. Example: Backup link

As the RAy3 links have two ports, it is advantageous to use the second port to connect to the backup link. Switching to the backup link is handled directly by the device, which makes it possible to reduce the connection downtime to a minimum (units of milliseconds).
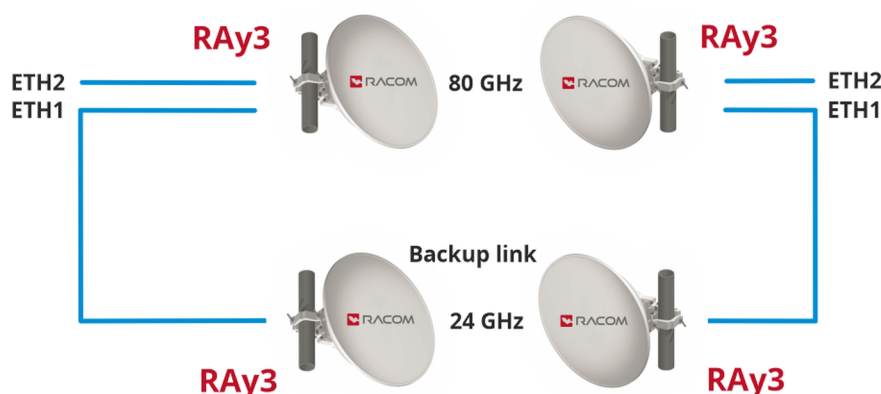

Fig. 3.1: Parallel connection example. RAy3-80 is the primary link and RAy3-24 is the backup

In a common configuration, an 80 GHz link with a capacity of 10 Gbps is connected to the ETH2 port via an optical connection, and a backup connection at a lower frequency, e.g. 18 or 24 GHz, is connected to the ETH1 port.

Fig. 3.2: Example of setting the LSP function - Switch to backup link

Note

It is necessary to set "Loop prevention". This port will not be connected to the port Air and will not form a loop.

(i) **Note**

Switching to the backup route is not hitless. The switching speed is slightly faster on the slave side (by a few milliseconds), so it is more advantageous to set the slave unit on the connectivity side.

(i) **Note**

The configuration shown in *Fig. 3.2, "Example of setting the LSP function - Switch to backup link"* does not allow in band management to the backup link. It is possible to set the "Loop prevention" parameter on only one side of the link. However, for correct operation, it is necessary to set static entries in the ATU table for the units of the backup link and for the devices on this side of the link. Please see *Fig. 3.4, "Example of setting the LSP function - Switch to backup link"* and *Fig. 3.5, "Example of a static entry in the ATU table"*. The appropriate MAC addresses of the backup link units must be associated with both the AIR port and the ETH port to which they are connected. The MAC address of the router (or all MACs on that side of the link) must be set as static for the SFP port.
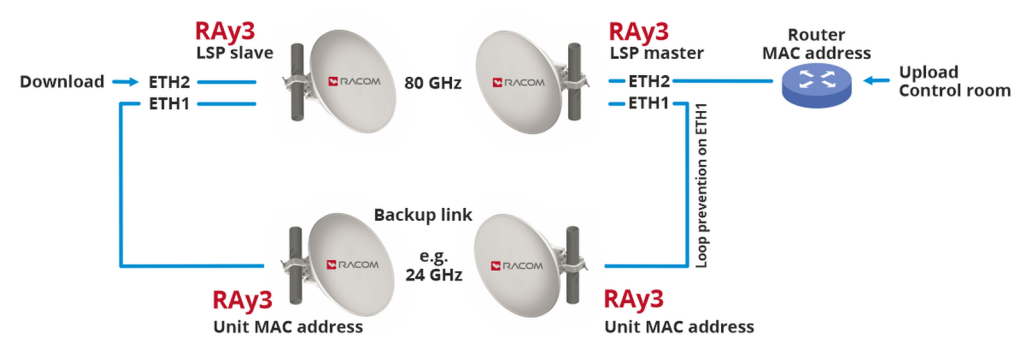
Fig. 3.3: Example of a suitable configuration

Fig. 3.4: Example of setting the LSP function - Switch to backup link

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FID	MAC	Label	Entry state	Priority	Destination type	Port association / Trunk id
0	00:02:9a:ff:a7:fe	int_peer	static	off	port association	Air (p10)
0	00:02:9a:ff:a7:ff	int_local	static	off	port association	CPU (p0)
0	00:02:a9:20:08:88	MAC backup radio 1	static	off	port association	Eth1 (p1), Air (p10)
0	00:02:a9:20:08:92	MAC backup radio 2	static	off	port association	Eth1 (p1), Air (p10)
0	00:02:a9:20:a0:28		dynamic	off	port association	Air (p10)
0	00:02:a9:20:a0:48	local	static	off	port association	CPU (p0)
0	a4:4c:c8:69:c8:93	MGMT	static	off	port association	Eth2 (p9)
0	ff:ff:ff:ff:ff:ff	broadcast	static	off	port association	Eth1 (p1), Eth2 (p9), CPU (p0), Air (…

Add entry   Edit / Copy   Delete   Flush all and use default   Flush non-static   Refresh

Fig. 3.5: Example of a static entry in the ATU table

Revision History

Revision 1.0   2024-08-21
   First issue: FW 2.0.19.0 (10-24 GHz), 1.1.7.0 (80 GHz)