

OAM in RPR

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Introduction

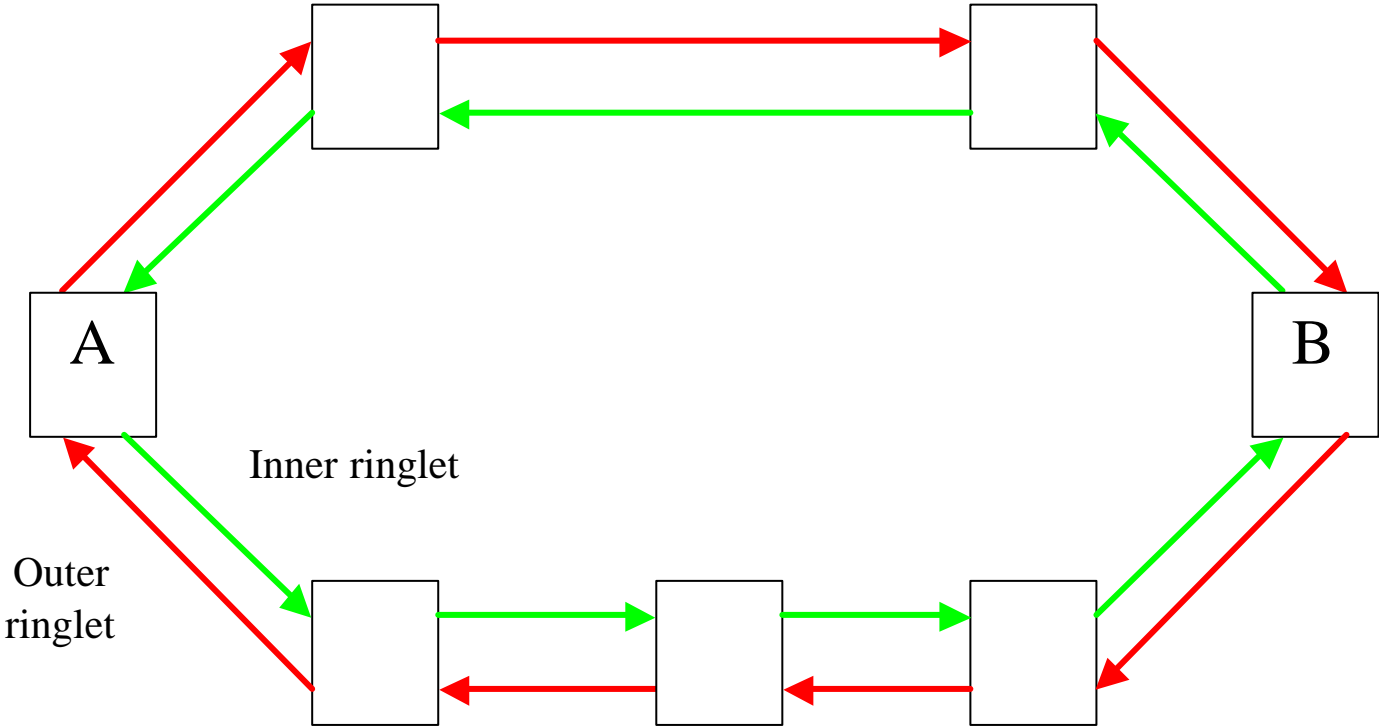


- ❖ Define some OAM mechanism that can help operators in fault management of RPR networks
- ❖ Clarify the motivation for an OAM loopback mechanism
- ❖ Describe the OAM loopback mechanism
- ❖ Define the set of messages we need to support this feature

OAM Loopback description

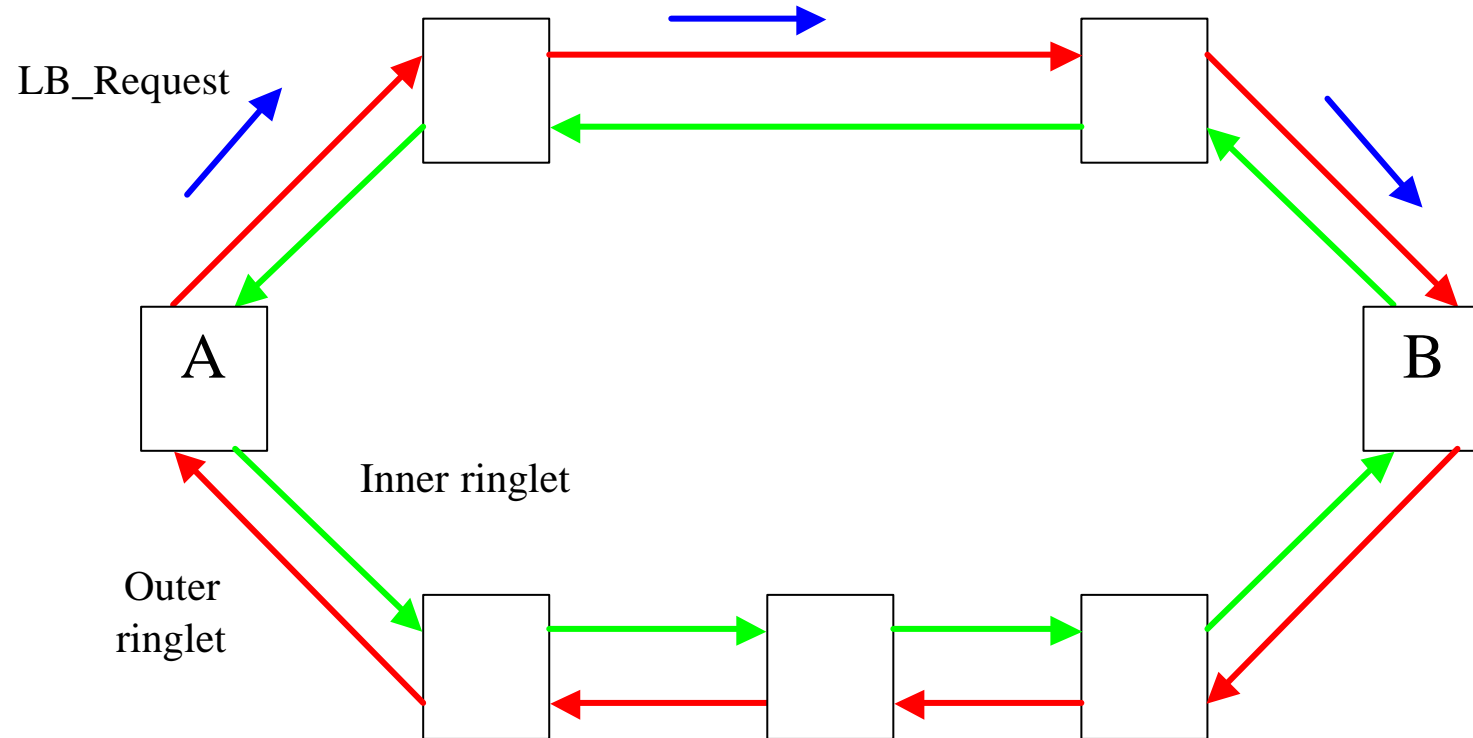


- ❖ RPR is a connectionless technology
- ❖ No sophisticated OAM features (like AIS, RDI, ...) are envisaged because they require setting up a connection in the intermediate points
- ❖ Only an on-demand keep alive mechanism (**Loopback**) can be defined
 - ◆ It allows RPR operators to check the reachability, at the MAC level, between two RPR stations on a ring
 - ◆ It is triggered on operator requests, through a traditional operator/NE interface (e.g. a CLI or a MIB interface)
 - ◆ It requires exchanging only two type of messages
- ❖ This mechanism is very similar to already existing mechanisms for connectionless networks, like the Ping in IP networks
 - ◆ Some enhancements are introduced for dual counter rotating ring topologies



- ❖ Problem to be solved – check the connectivity at the RPR MAC layer between the two stations A and B

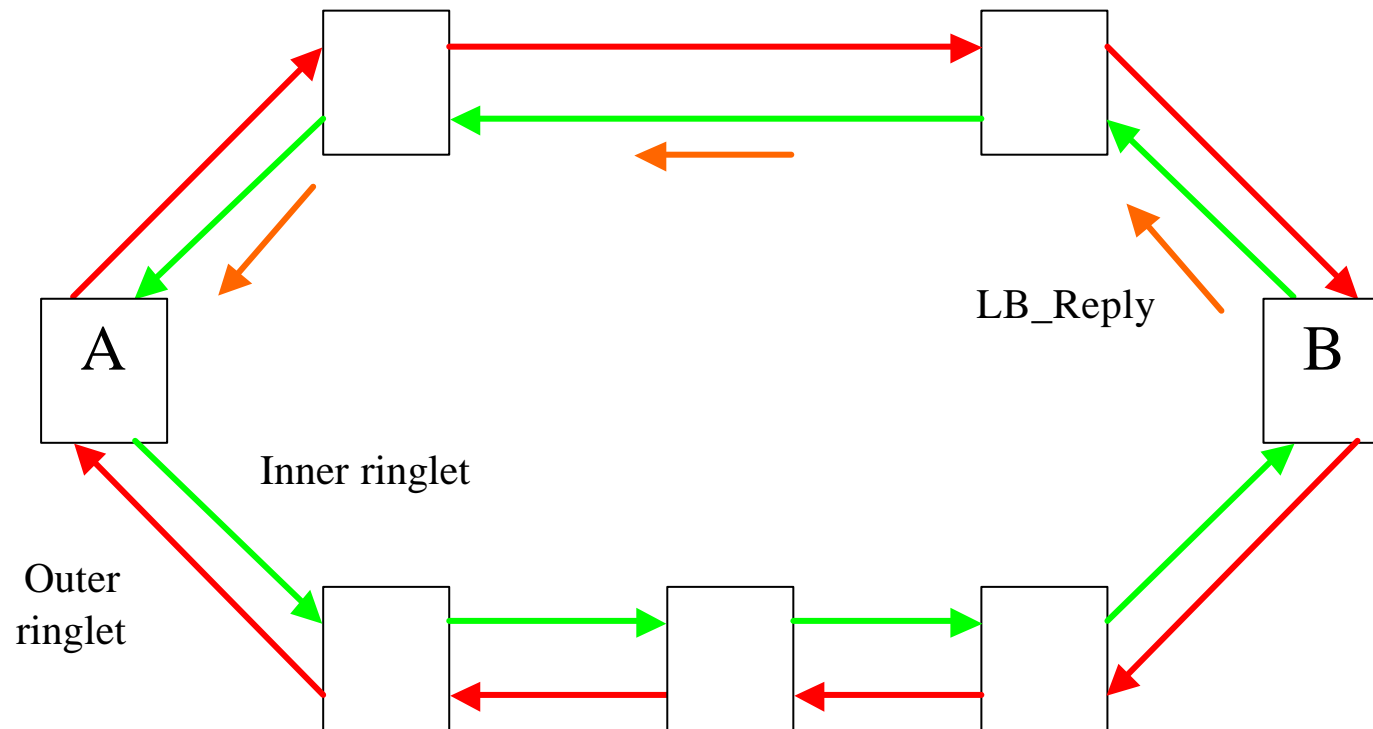
Loopback request



- ❖ Operator asks node A to check reachability of node B
- ❖ Node A sends a Loopback Request to node B



- ❖ When asking for a loopback, the operator can specify the following options
 - ◆ How the loopback request OAM RPR frame should be sent:
 - Through the shortest path (selected using the topology discovery information) – default
 - On the outer ringlet
 - On the inner ringlet
 - ◆ The CoS value to use for the loopback request (the highest priority – default)
 - ◆ How the looped station should respond with the loopback reply OAM RPR frame
 - Through the shortest path (selected using the topology discovery information) – default
 - On the outer ringlet
 - On the inner ringlet



- ❖ When node B receives the Loopback Request, it generates the Loopback Reply to node A



- ❖ When station A receives back the Loopback Request within a predefined timeout value it notifies the operator that the loopback procedure has succeeded
- ❖ Otherwise, the loopback procedure is declared as failed and the operator is notified about this failure

Loopback Messages Definition



- ❖ An OAM RPR frame format is defined
 - ◆ This allows IEEE 802.17 to easily update OAM functionality
- ❖ Proposed values for the **OAM Type** are defined in the next slide
- ❖ The format, structure and syntax of the **Specific Fields** are defined for each OAM frame type
- ❖ The **Checksum** is the CRC-16 calculated on all the OAM payload (from the OAM field)

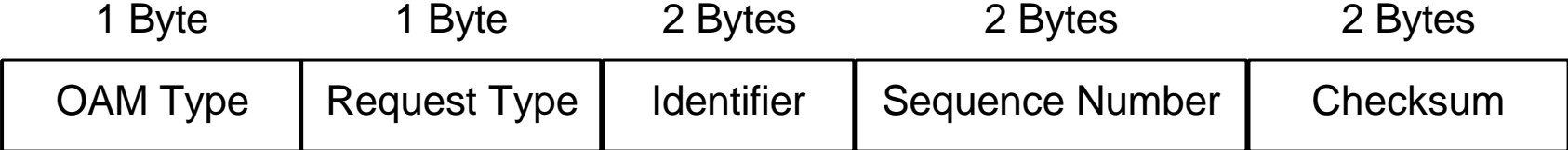
OAM Type Proposed Values



OAM Type	Description
0x00	Loopback Request
0x01	Loopback Reply
All the others	Reserved for future use

All the received RPR OAM frames that are addressed to the station and have a reserved OAM Type must be discarded

Loopback Request OAM RPR Frame



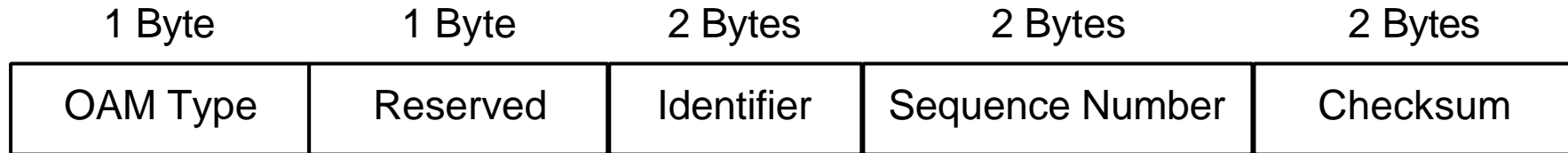
- ❖ **OAM Type** – 0x00 value is assigned
- ❖ **Request Type** – Signal to the looped station how it has to respond
 - ◆ Proposed values are defined in the next slide
- ❖ **Identifier and Sequence Number** – Used to correlated requests with replies.
 - ◆ How to use them is left to the implementation.

Request Type Proposed Values

Request Type	Description
0x00	The echoed station replies on the ringlet chosen by the shortest path (via topology discovery)
0x01	The echoed station replies on the inner ringlet
0x02	The echoed station replies on the outer ringlet
0x03	The echoed station replies on the same ringlet it has received the request
0x04	The echoed station replies on the opposite ringlet it has received the request
All the others	Reserved for future use

All the received RPR OAM loopback request frames that have a reserved Request Type must be discarded

Loopback Reply OAM RPR Frame



- ❖ **OAM Type** – 0x01 value is assigned
- ❖ **Reserved** – It is set to 0x00 in transmission and ignored in reception
- ❖ **Identifier and Sequence Number** – They are copied from the request message

Conclusion



- ❖ The OAM loopback can allow operators to check the reachability, at the MAC level, between two RPR stations on the ring
- ❖ This mechanism is very simple, implying the exchange of only two messages
- ❖ It is very similar to already existing mechanisms, like the IP Ping
 - ◆ It adds some particular testing features targeted to a dual counter rotating ring topology (RPR Rings)
- ❖ It is proposed to adopt this mechanism as an OAM functionality for the IEEE 802.17 RPR MAC Standard