



IGMP Snooping

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M. Baldi, P. Nicoletti, "Switched LAN", McGraw-Hill, 2002, ISBN 88-386-3426-2

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Traditional multicast transmission

Flooding

- Forward on every interface but receiving one
- Multicast traffic not bounded → no scalability

Alternative:

Knowing member's dislocation for each group

GMRP: GARP Multicast Registration Protocol

- GARP instantiation (Generic Attribute Registration Protocol)
- Defined in IEEE 802.1D
- Allow
 - Station to communicate their membership group to the switch.
 - Switch to communicate to adjacent switches from which group they must collect frames.

Same problems of multicast IP!!!

Resolved by

- IGMP (Internet Group Management Protocol)
- Multicast routing protocols

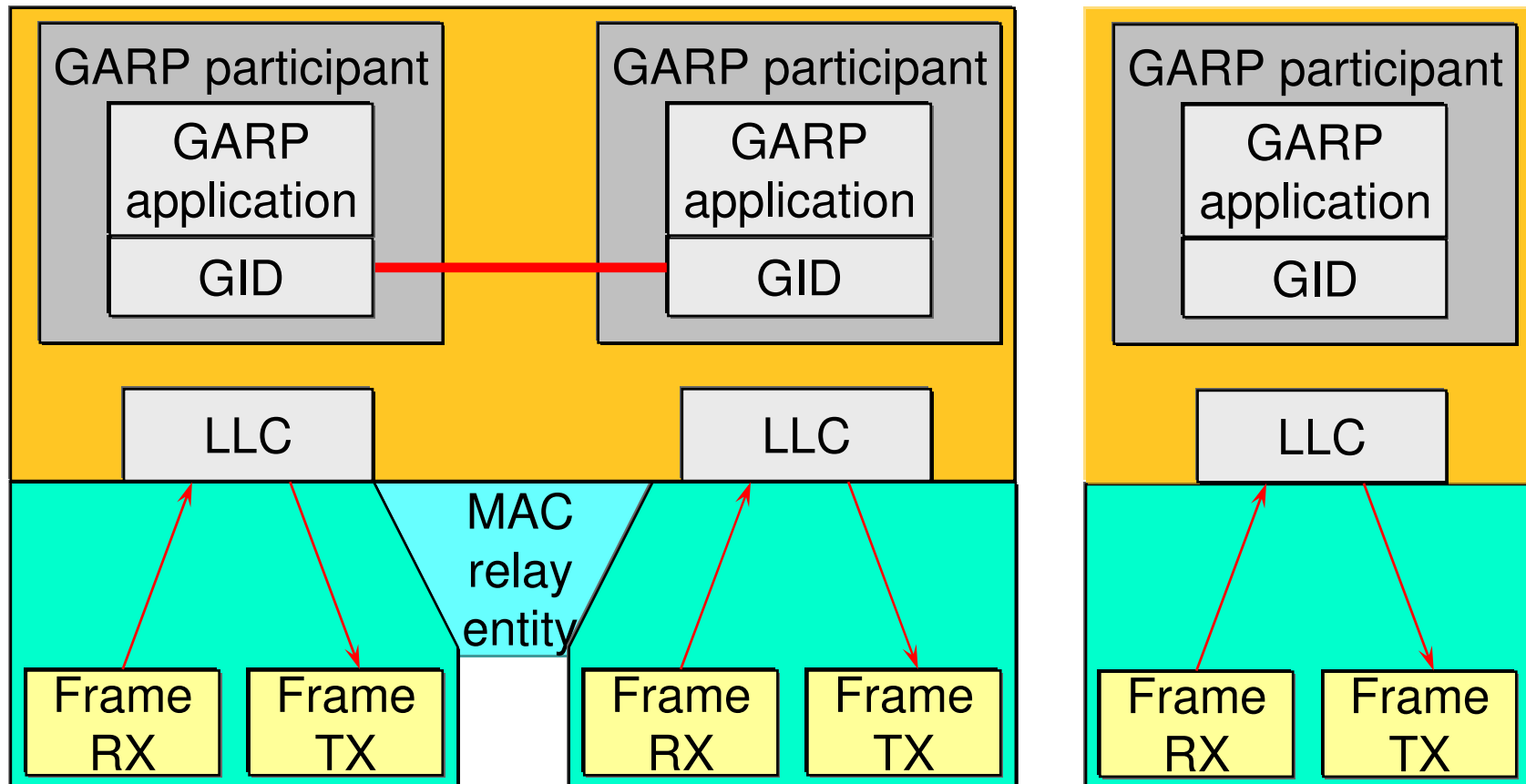
GARP: details

- Insert or delete miscellaneous attributes in equipments' internal entity called GID
 - GID (GARP Information Distribution) is a finite state machine which defines the registration and declaration current state for each attribute's value
 - Attribute's registration or deletion takes place only in the port receiving the GARP PDU holding the declaration
 - Registration can take place in the ports that STP has Blocked
- GIP (GARP Information Propagation)
 - Entity responsible for information propagation between GARP Participant
 - internally in single bridge
 - between different bridges (based on type 1 LLC)

GARP: entities and architecture

Bridge

End Station



IGMP Snooping: prelude

- GMRP barely used
 - Defined years ago, supported by most of switches
 - Why should we complicate network operativeness and management with an additional protocol?
- It's preferred to use existent protocols: IGMP

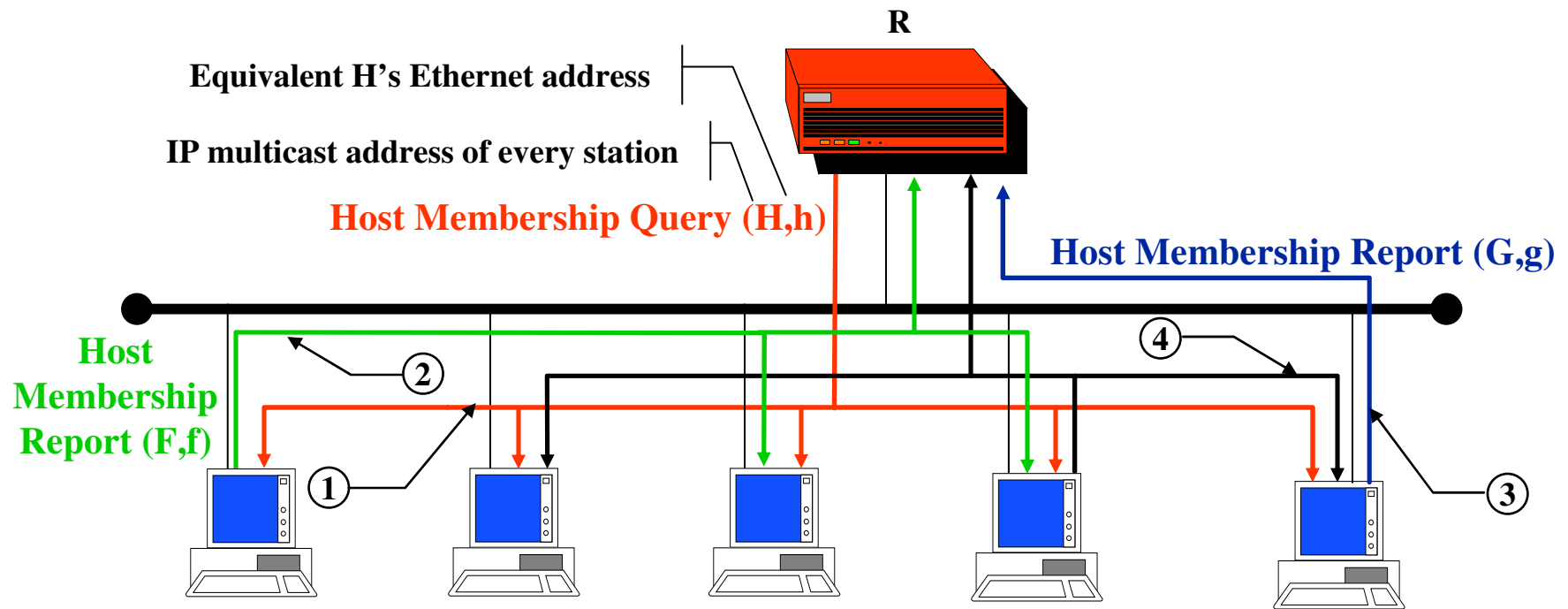
Assumption:

Level 2 multicast frame exchange is used nearly exclusively to send multicast IP packets

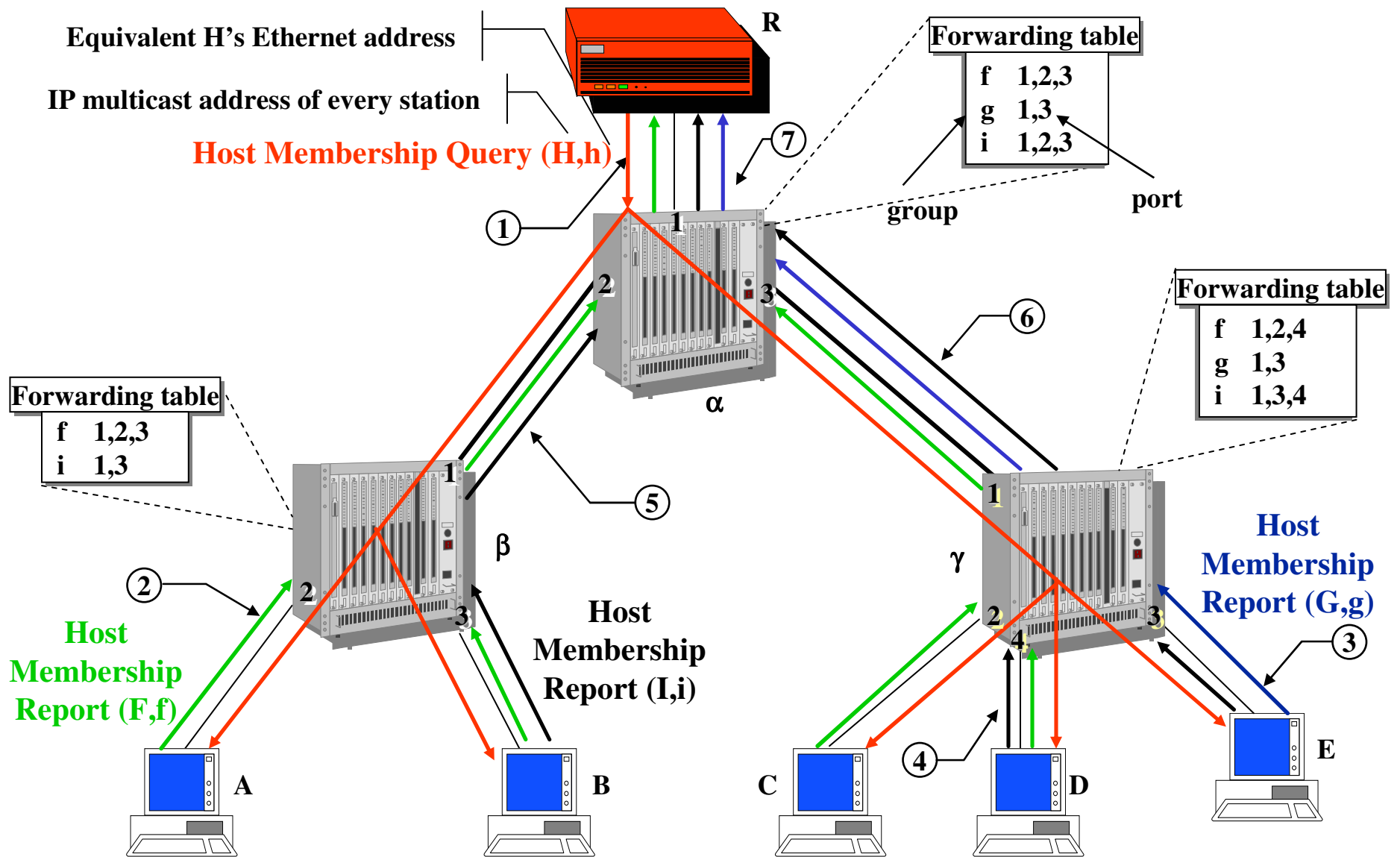
IGMP Snooping: mechanics

- Sending and receiving multicast packet must be preceded by the *registration* to the group identified by its IP address G
 - Send IGMP **host membership report** message
 - Transmitted in level 2 multicast frame addressed to multicast MAC g of G IP address
- Switches snoop **host membership report** messages
 - Learn on which interfaces are present members of g group
- Update their multicast forwarding tables

IGMP on traditional LAN



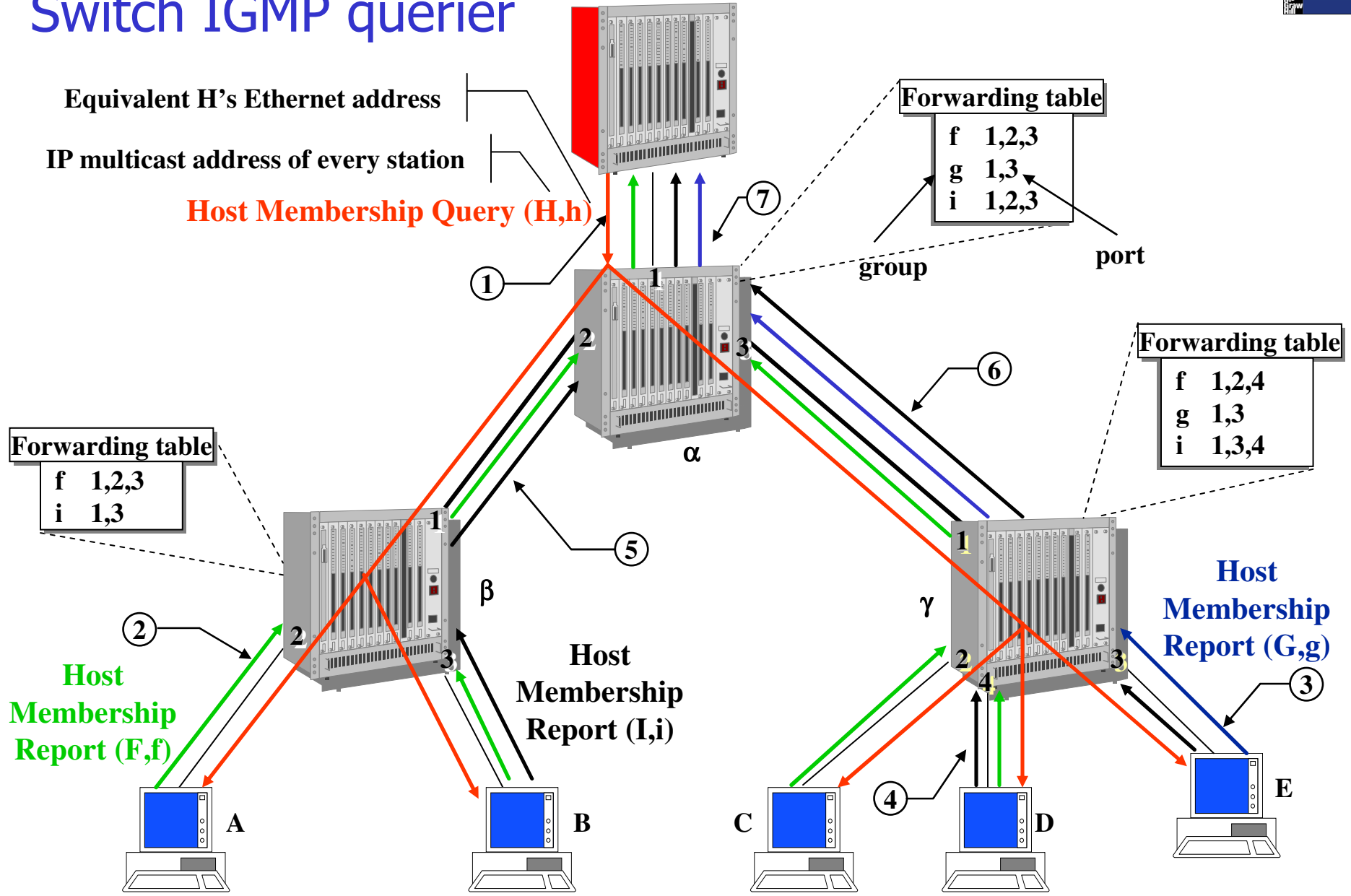
IGMP on IGMP Snooping LAN



IGMP querier function

- “*IGMP querier*” function, which is normally carried by Mrouter, can be achieved by a Switch in the network which supports this function
 - The switch periodically sends query IGMP which are used by the other switches in the network for the *IGMP snooping* function

Switch IGMP querier



Cisco switch configuration example

- Switch with *IGMP querier* function
 - Switch(config)# **interface vlan** *vlan_ID*
 - Switch(config-if)# **ip address** *ip_address subnet_mask*
 - Switch(config-if)# **ip igmp snooping querier**
- Switch with *IGMP snooping* function
 - Global level configuration
 - Switch(config)# **ip igmp snooping**
 - Interface level configuration
 - Switch(config)# **interface vlan** *vlan_ID*
 - Switch(config-if)# **ip igmp snooping**