

Increasing Performance with IGMPv2



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Agenda



Why do we need IGMPv2?

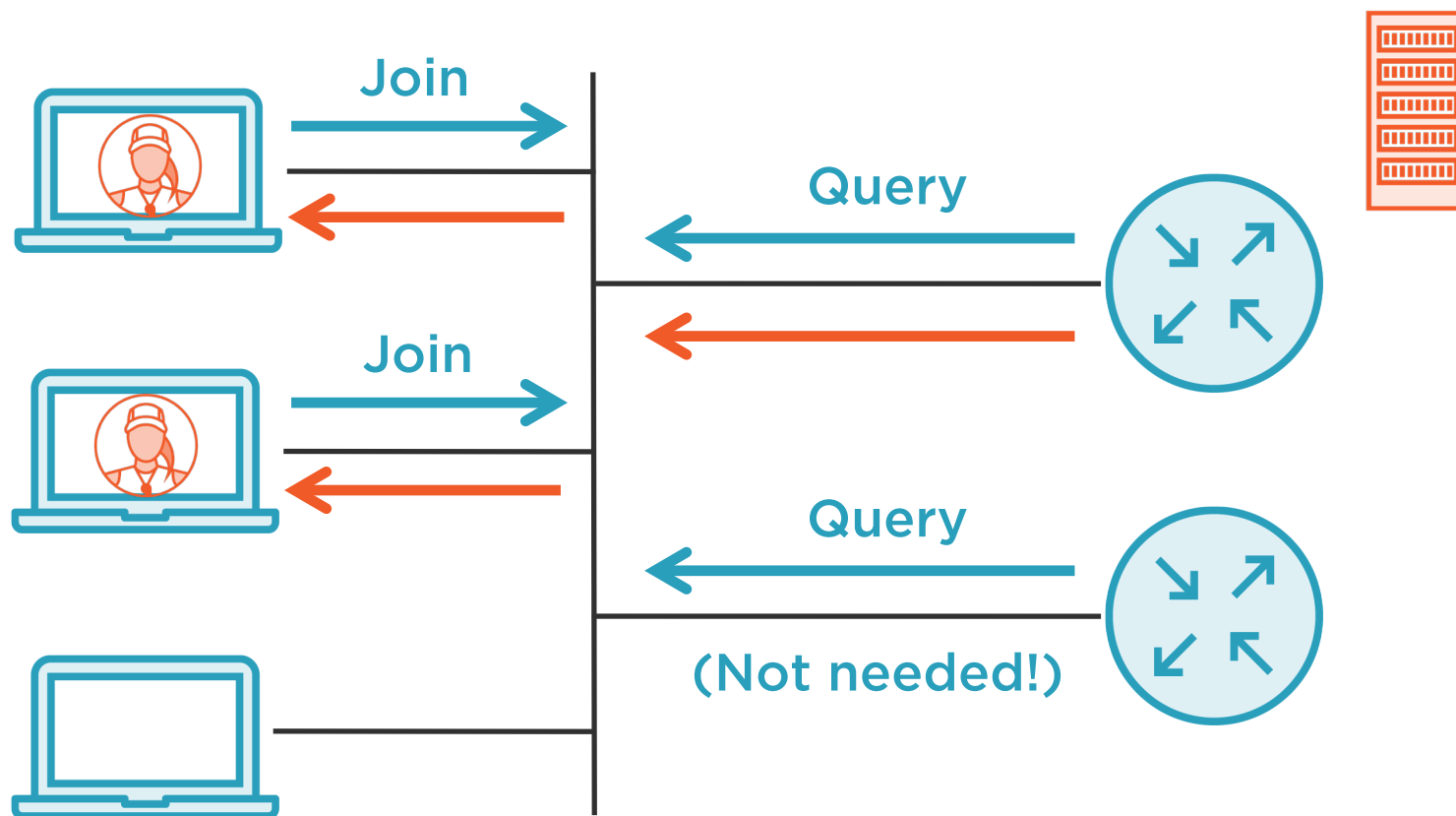
New IGMPv2 capabilities

IGMPv2 in action

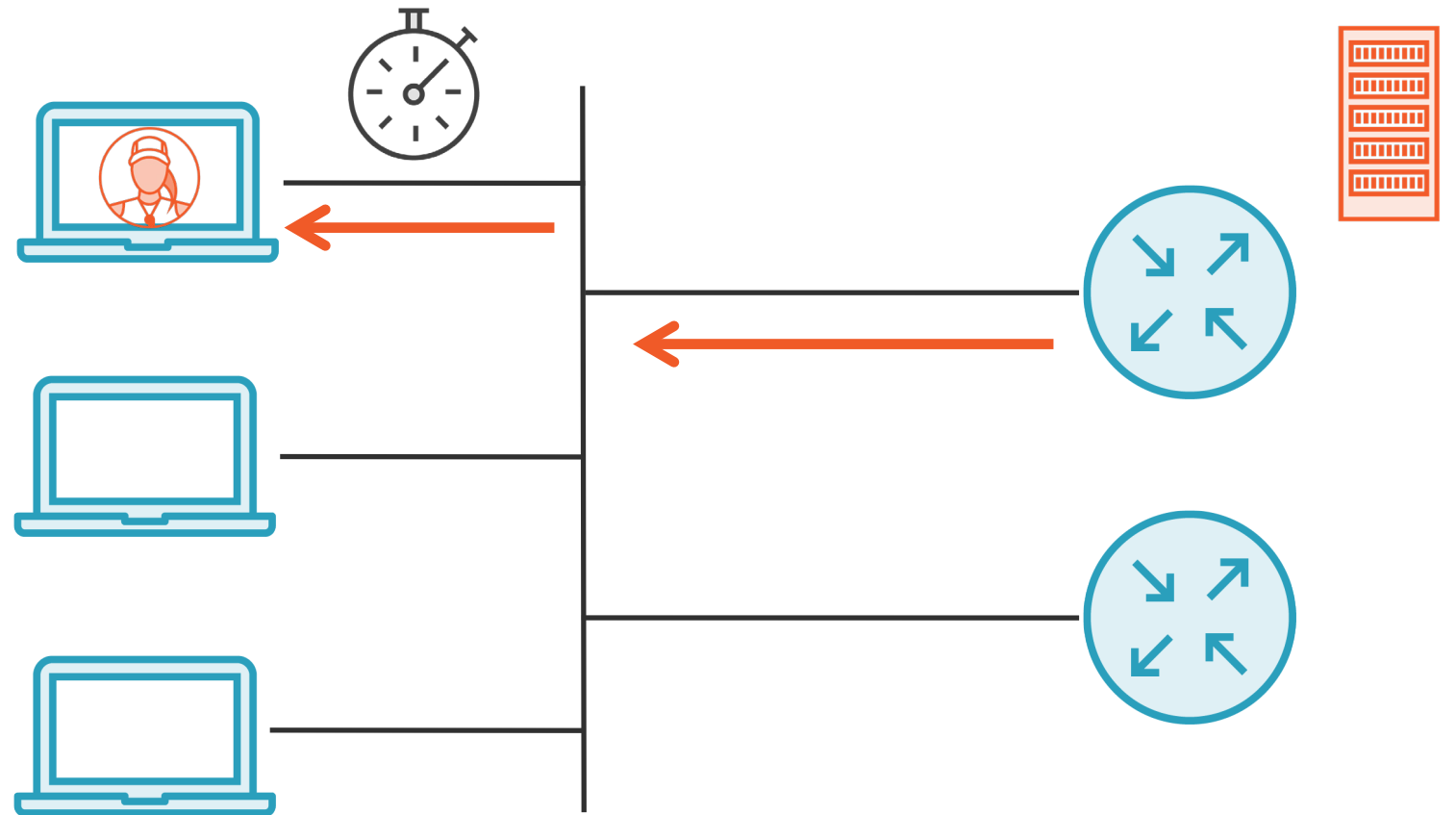
Packet analysis



Small IGMPv1 Problem



Big IGMPv1 Problem



IGMPv2 Solutions

Many tunable timers

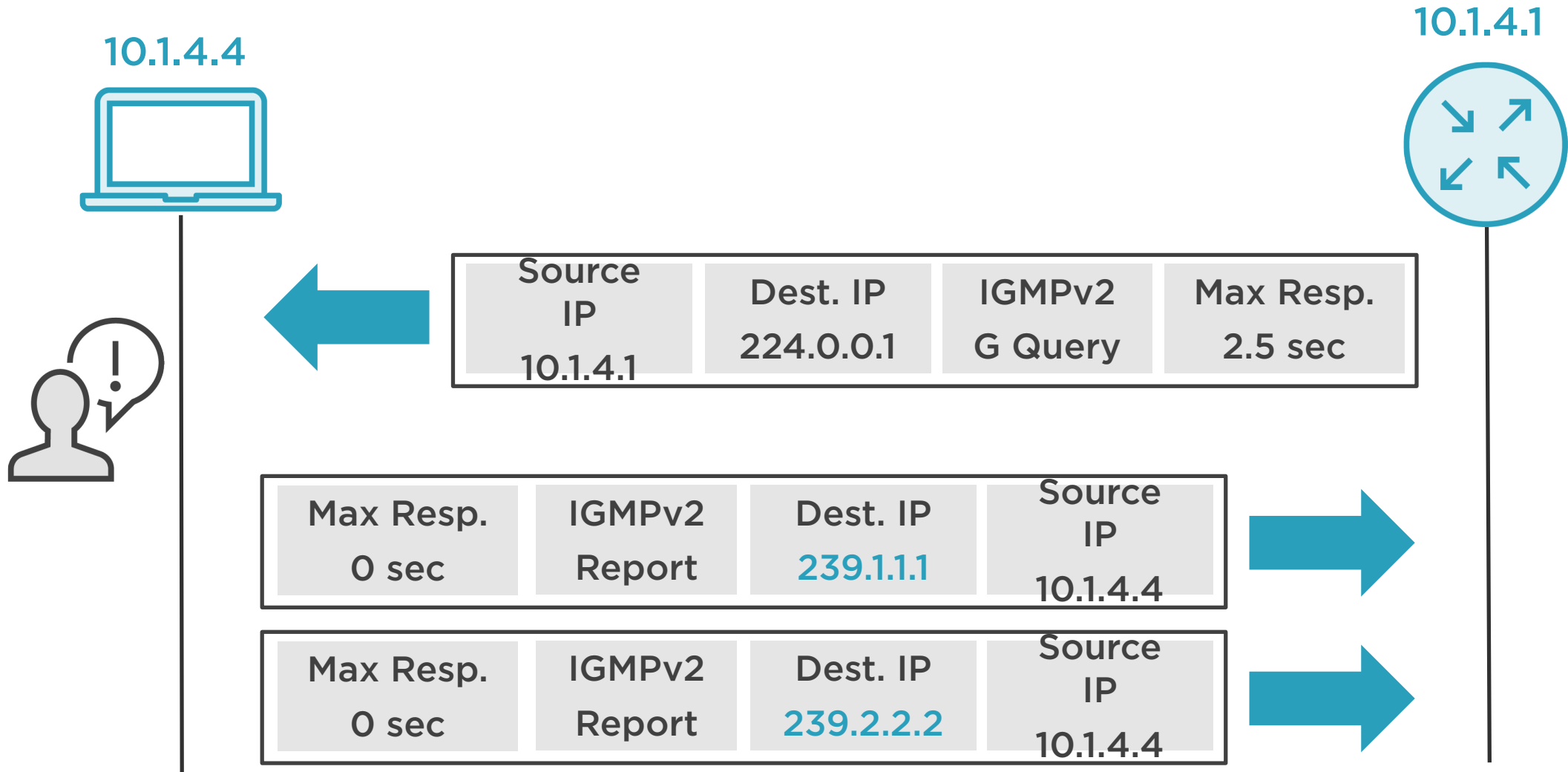
Querier Election

Leave Group Message

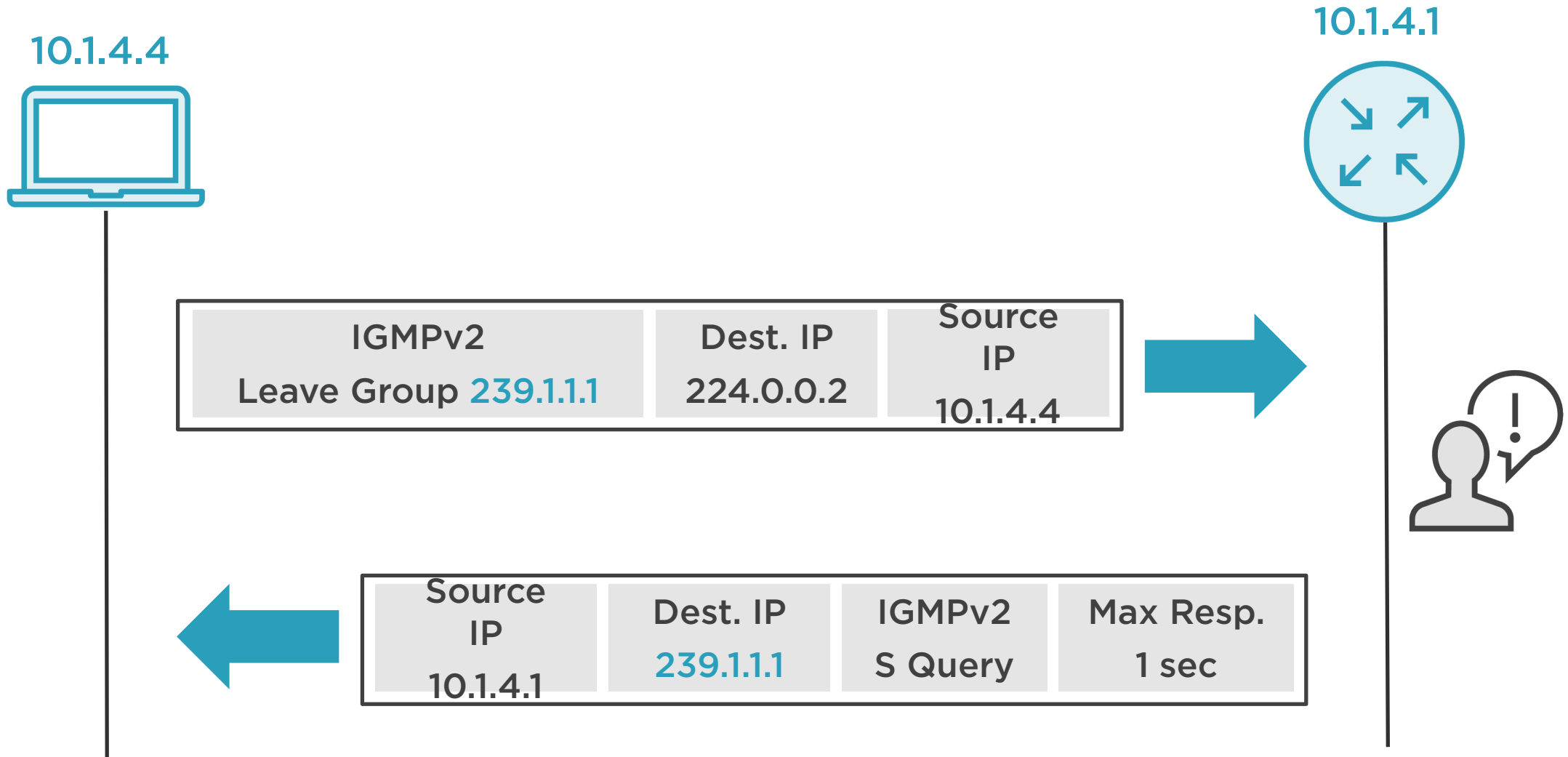
Group-Specific Queries



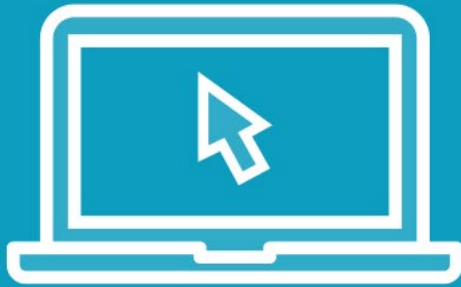
IGMPv2 Join Process



IGMPv2 Leave Process



Demo



IGMPv2 in Action



IGMPv2 General Query

No.	Time	Source	Destination	Protocol	Info
1	0.000000	10.1.4.1	224.0.0.1	IGMPv2	Membership Query, general
2	1.415279	10.1.4.4	239.2.2.2	IGMPv2	Membership Report group 239.2.2.2
3	2.011492	10.1.4.4	239.1.1.1	IGMPv2	Membership Report group 239.1.1.1
4	9.479824	10.1.4.4	224.0.0.2	IGMPv2	Leave Group 239.1.1.1
5	9.483019	10.1.4.1	239.1.1.1	IGMPv2	Membership Query, specific for group 239.1.1.1

- ▶ Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0
- ▶ Ethernet II, Src: 00:00:a6:16:00:01, Dst: 01:00:5e:00:00:01
- ▶ Internet Protocol Version 4, Src: 10.1.4.1, Dst: 224.0.0.1
- ▼ Internet Group Management Protocol

[IGMP Version: 2]
Type: Membership Query (0x11)
Max Resp Time: 2.5 sec (0x19)
Checksum: 0xeee6 [correct]
[Checksum Status: Good]
Multicast Address: 0.0.0.0

- ← Type 0x11 (17) means "Query"
Non-zero max resp. means "not IGMPv1"
- ← No specific group means
"General Query"



IGMPv2 Membership Report

No.	Time	Source	Destination	Protocol	Info
1	0.000000	10.1.4.1	224.0.0.1	IGMPv2	Membership Query, general
2	1.415279	10.1.4.4	239.2.2.2	IGMPv2	Membership Report group 239.2.2.2
3	2.011492	10.1.4.4	239.1.1.1	IGMPv2	Membership Report group 239.1.1.1
4	9.479824	10.1.4.4	224.0.0.2	IGMPv2	Leave Group 239.1.1.1
5	9.483019	10.1.4.1	239.1.1.1	IGMPv2	Membership Query, specific for group 239.1.1.1

- ▶ Frame 2: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0
- ▶ Ethernet II, Src: 00:00:a6:16:00:04, Dst: 01:00:5e:02:02:02
- ▶ Internet Protocol Version 4, Src: 10.1.4.4, Dst: 239.2.2.2
- ▼ Internet Group Management Protocol

[IGMP Version: 2]

Type: Membership Report (0x16)

Max Resp Time: 0.0 sec (0x00)

Checksum: 0xf8fa [correct]

[Checksum Status: Good]

Multicast Address: 239.2.2.2



Type 0x16 (22) means "IGMPv2 Join"
Max resp. set to 0



Specific group means
"I want traffic for 239.2.2.2"



IGMPv2 Leave Group

No.	Time	Source	Destination	Protocol	Info
1	0.000000	10.1.4.1	224.0.0.1	IGMPv2	Membership Query, general
2	1.415279	10.1.4.4	239.2.2.2	IGMPv2	Membership Report group 239.2.2.2
3	2.011492	10.1.4.4	239.1.1.1	IGMPv2	Membership Report group 239.1.1.1
4	9.479824	10.1.4.4	224.0.0.2	IGMPv2	Leave Group 239.1.1.1
5	9.483019	10.1.4.1	239.1.1.1	IGMPv2	Membership Query, specific for group 239.1.1.1

- ▶ Frame 4: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0
- ▶ Ethernet II, Src: 00:00:a6:16:00:04, Dst: 01:00:5e:00:00:02
- ▶ Internet Protocol Version 4, Src: 10.1.4.4, Dst: 224.0.0.2
- ▼ Internet Group Management Protocol

[IGMP Version: 2]
Type: Leave Group (0x17)
Max Resp Time: 0.0 sec (0x00)
Checksum: 0xf8fc [correct]
[Checksum Status: Good]
Multicast Address: 239.1.1.1



Type 0x17 (23) means "Leave"
Max resp. set to 0



Specific group means
"I no longer want traffic for 239.1.1.1"



IGMPv2 Group-specific Query

No.	Time	Source	Destination	Protocol	Info
1	0.000000	10.1.4.1	224.0.0.1	IGMPv2	Membership Query, general
2	1.415279	10.1.4.4	239.2.2.2	IGMPv2	Membership Report group 239.2.2.2
3	2.011492	10.1.4.4	239.1.1.1	IGMPv2	Membership Report group 239.1.1.1
4	9.479824	10.1.4.4	224.0.0.2	IGMPv2	Leave Group 239.1.1.1
5	9.483019	10.1.4.1	239.1.1.1	IGMPv2	Membership Query, specific for group 239.1.1.1

- ▶ Frame 5: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0
- ▶ Ethernet II, Src: 00:00:a6:16:00:01, Dst: 01:00:5e:01:01:01
- ▶ Internet Protocol Version 4, Src: 10.1.4.1, Dst: 239.1.1.1
- ▼ Internet Group Management Protocol

[IGMP Version: 2]
Type: Membership Query (0x11)
Max Resp Time: 1.0 sec (0x0a)
Checksum: 0xfef2 [correct]
[Checksum Status: Good]
Multicast Address: 239.1.1.1



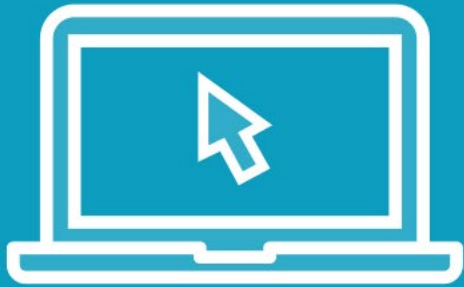
Type 0x11 (17) means "Query"
Faster max resp. time



Specific group means
"Who wants traffic for 239.1.1.1?"



Demo



Stopping the flow



Comparing IGMPv1 and IGMPv2

IGMPv1

RFC 1112, Appendix 1

High "leave latency"

General query only

No usage of code field

IGMPv2

RFC 2236

Introduced "Leave Group"

Group specific queries

Code used for max response time

