

Source-Specific Multicast (IPv4)



Tim McConaughy
Solutions Architect

@juangolbez carpe-dmvpn.com

Agenda



Topics:

- Basic Operation of PIM-SSM

Demos:

- Source-Specific Multicast Traffic Flow

Packet Analysis:

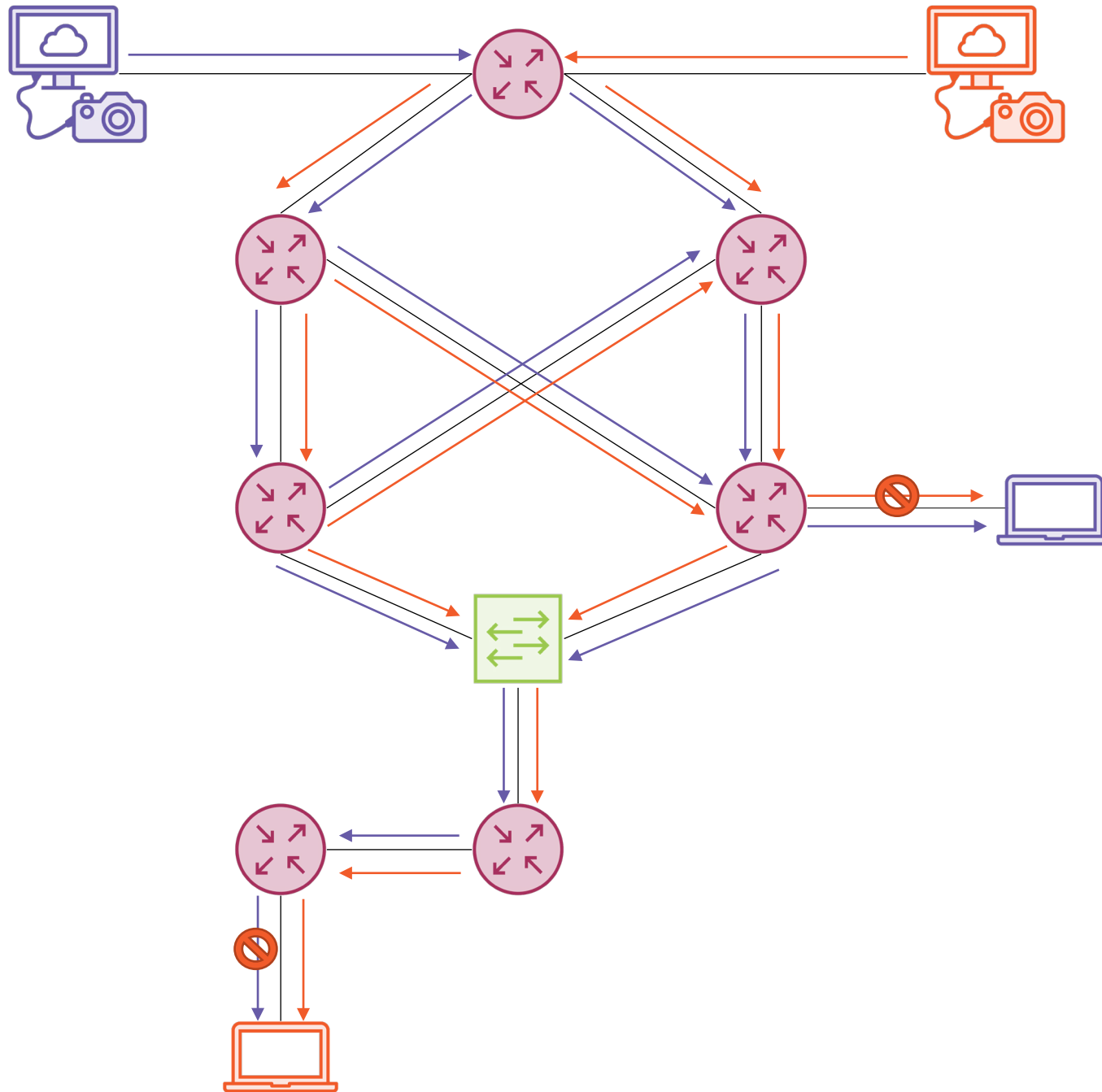
- IGMPv3 Join/Prune
- PIM Join/Prune for SSM



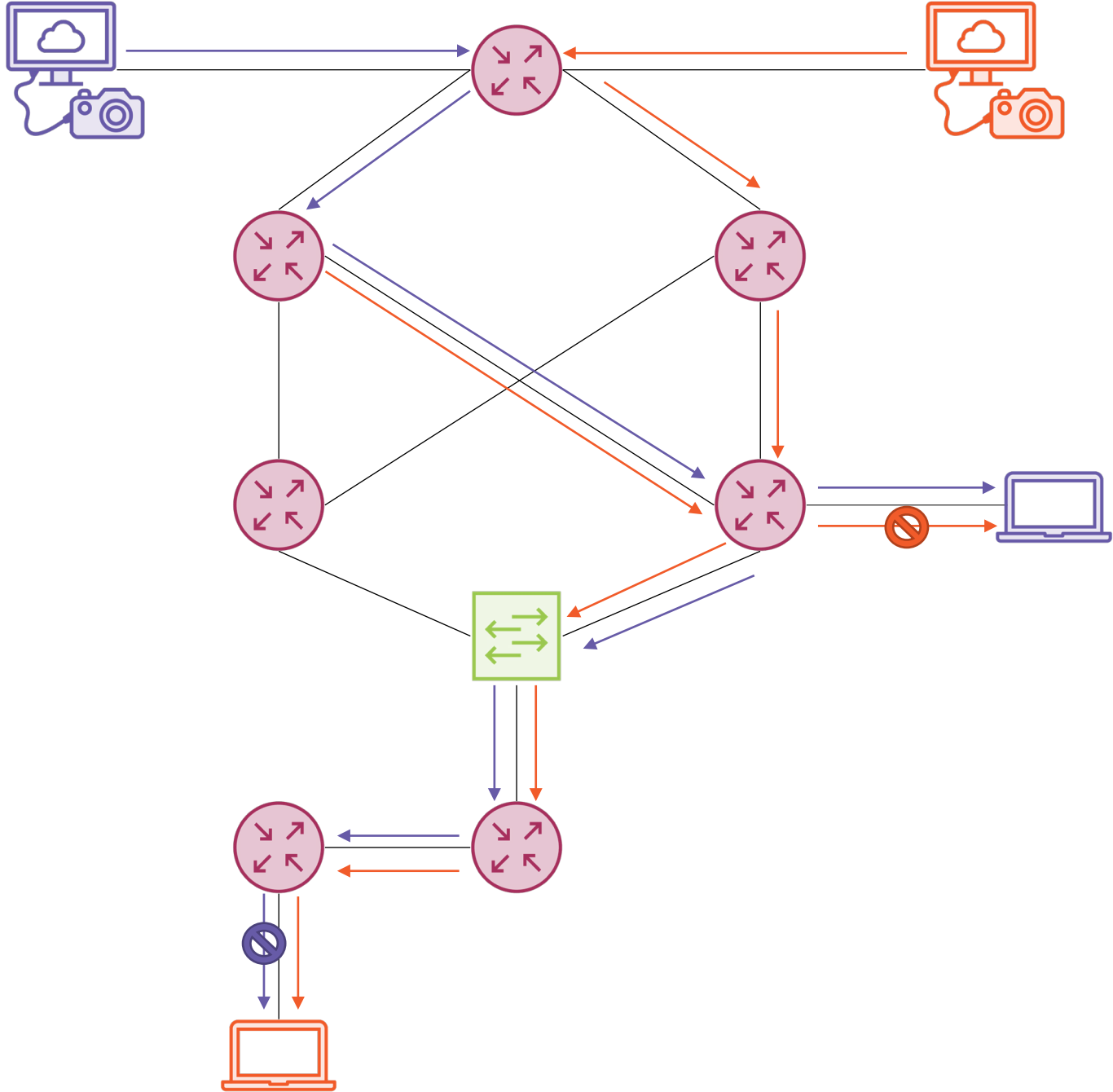
Globomantics Multicast Deployment Continues



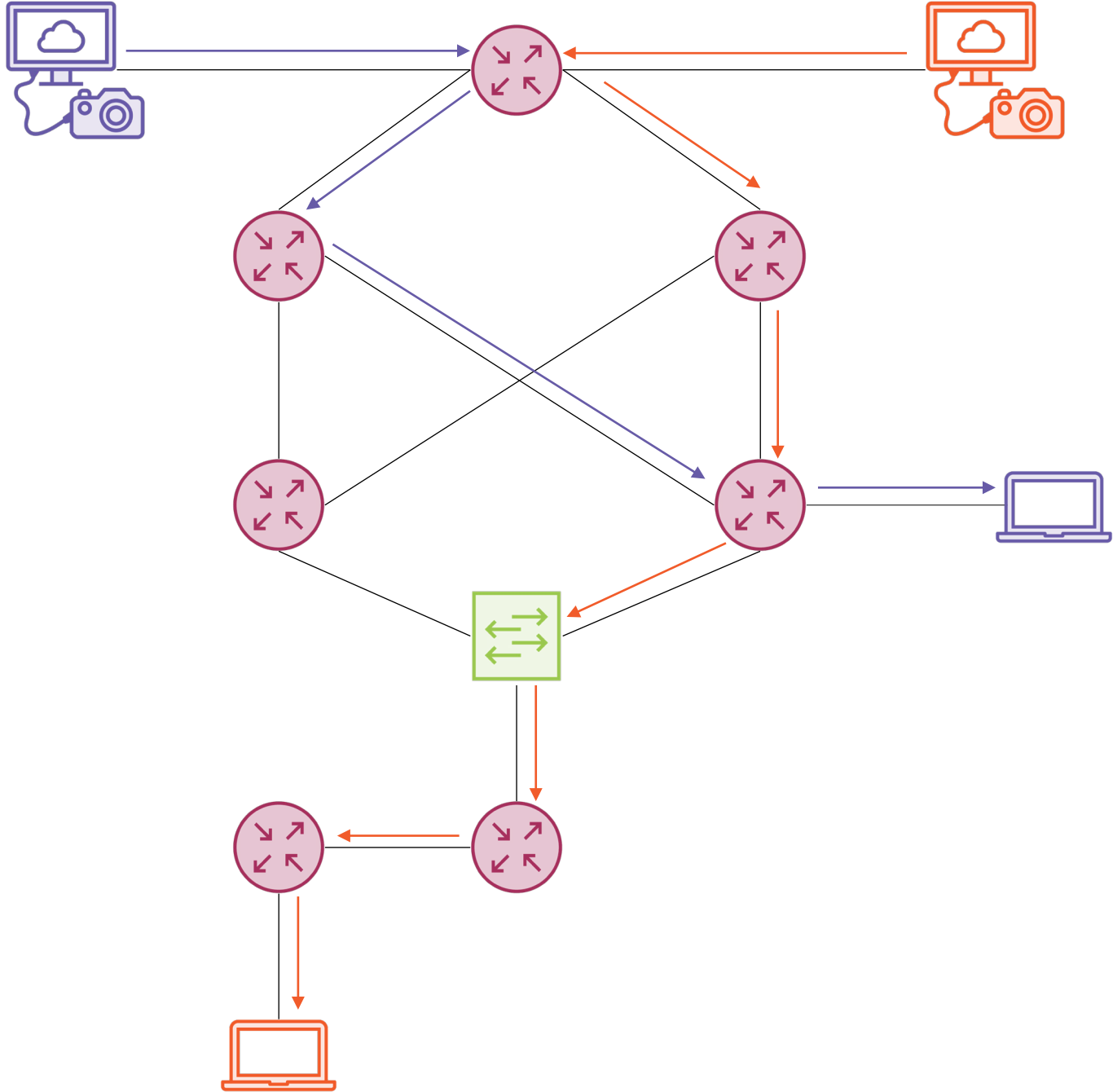
Flooded Multicast



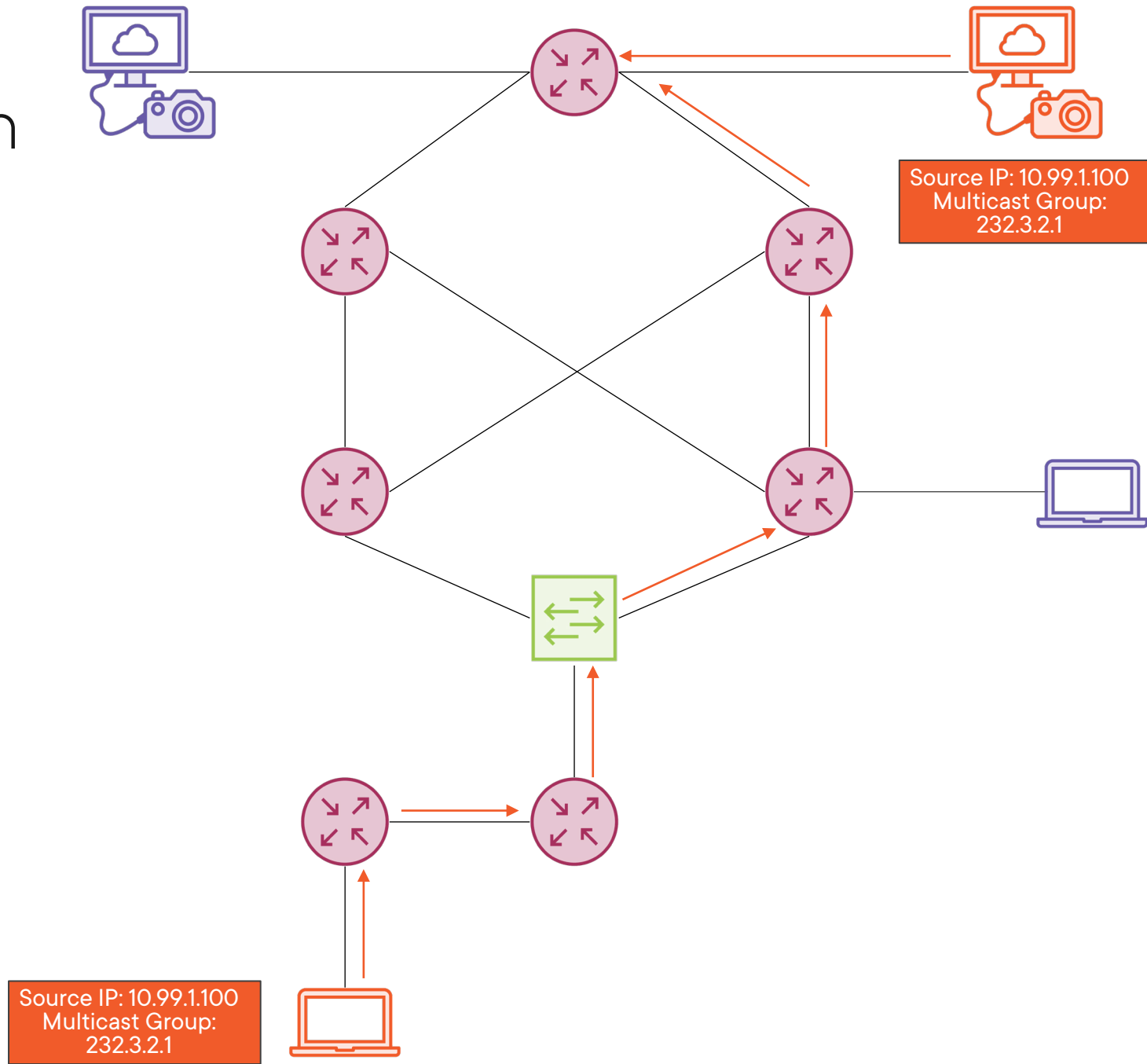
Any-Source Multicast



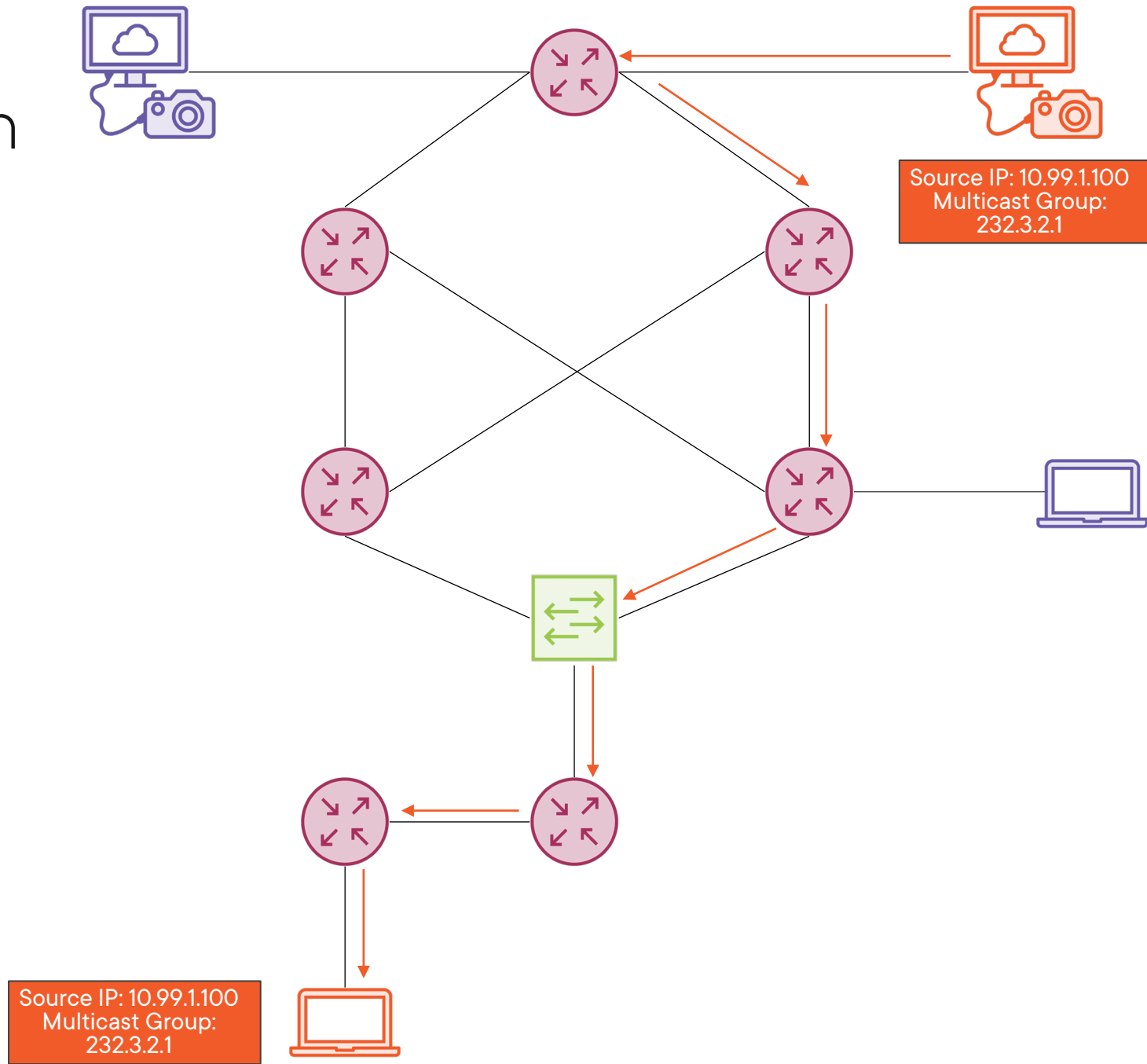
Source Specific Multicast



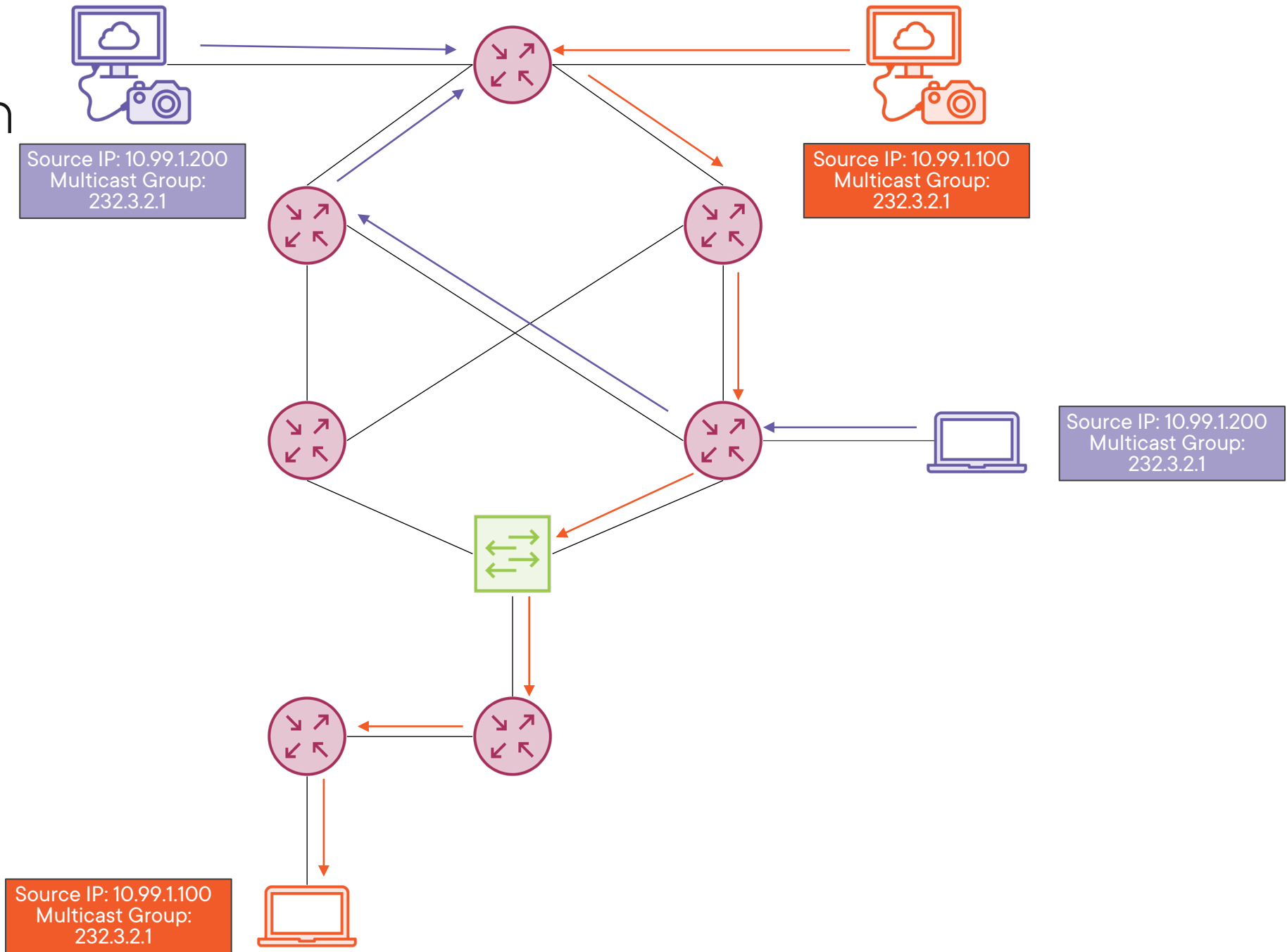
PIM-SSM Operation



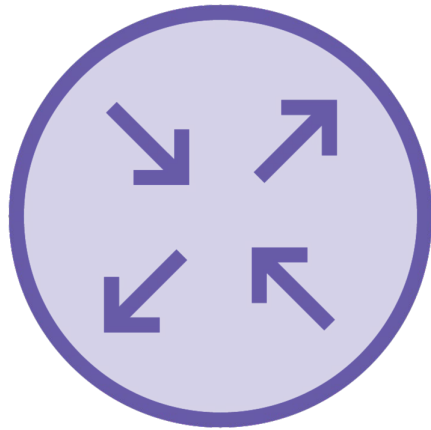
PIM-SSM Operation



PIM-SSM Operation



PIM-SSM Requirements



Network
Must Support SSM
Groups



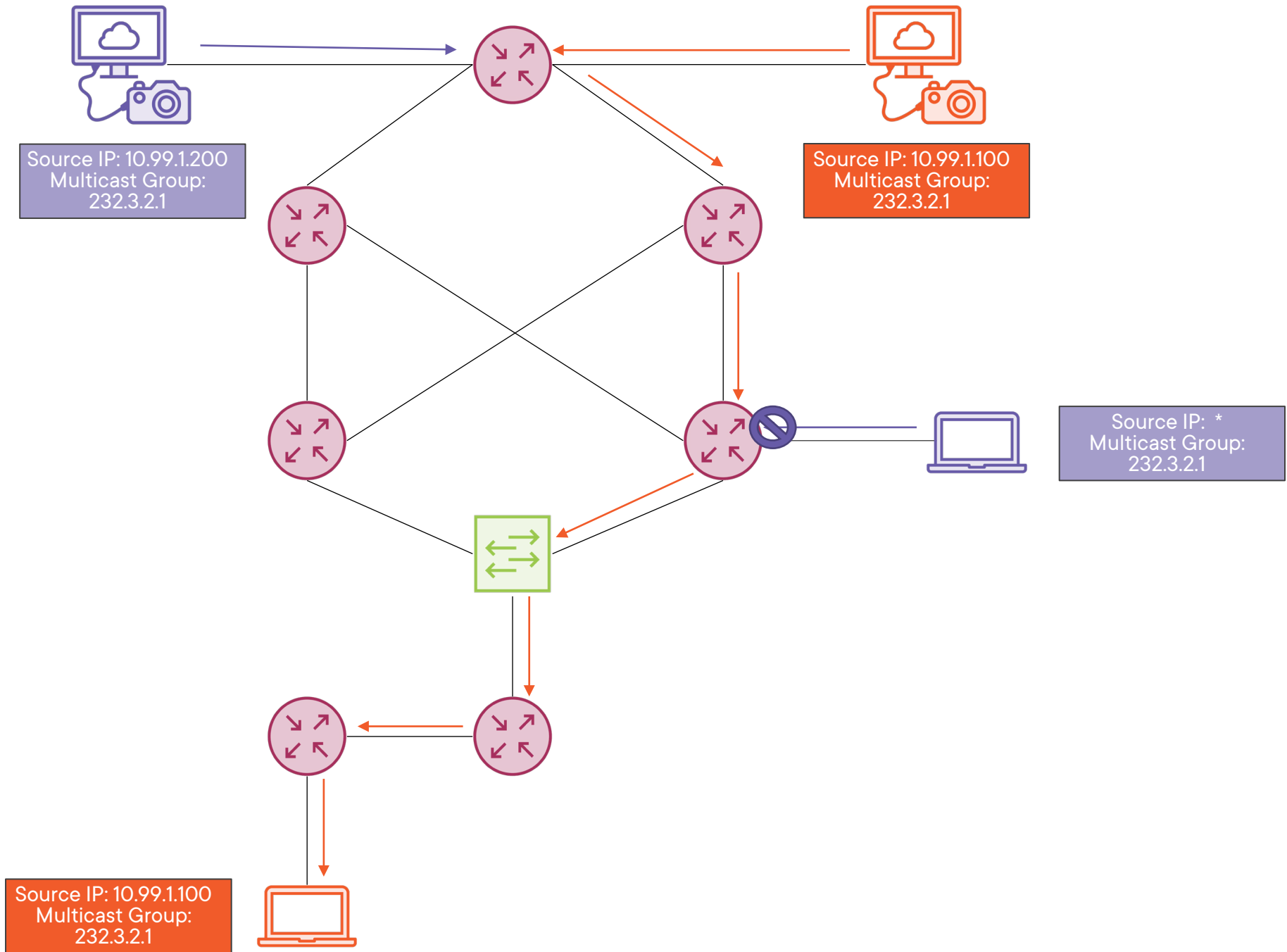
Receiver
Must Support
IGMPv3/MLDv2



Sources
Receiver Must Know
Sources to Request



PIM-SSM Support



PIM-SSM is NOT on by default!

SSM uses PIM-SM but is a
completely different
RFC/Implementation.

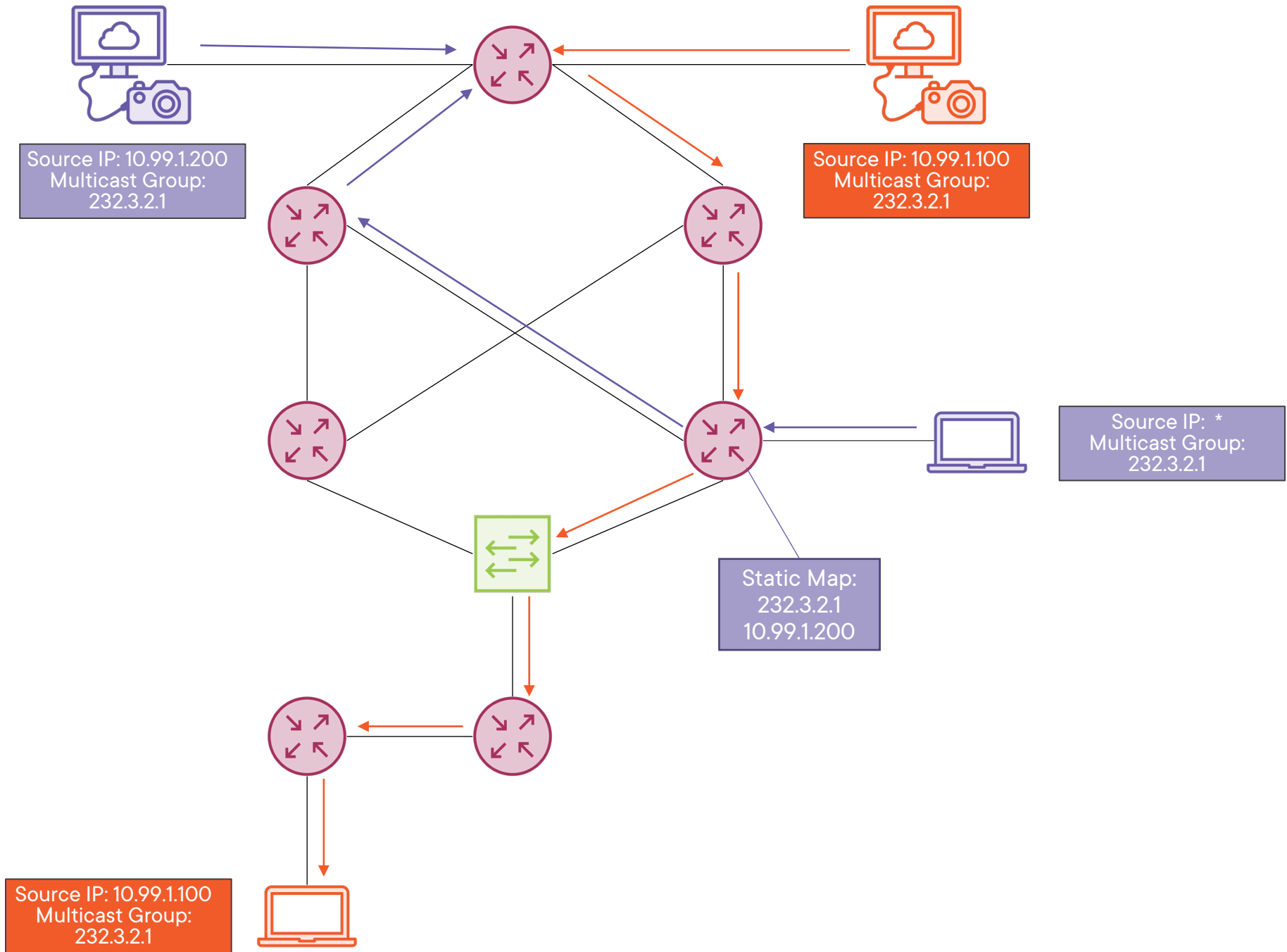


Every Rule Has Exceptions

We can statically map ASM
Reports to SSM PIM Joins



ASM to SSM Mapping



Demo

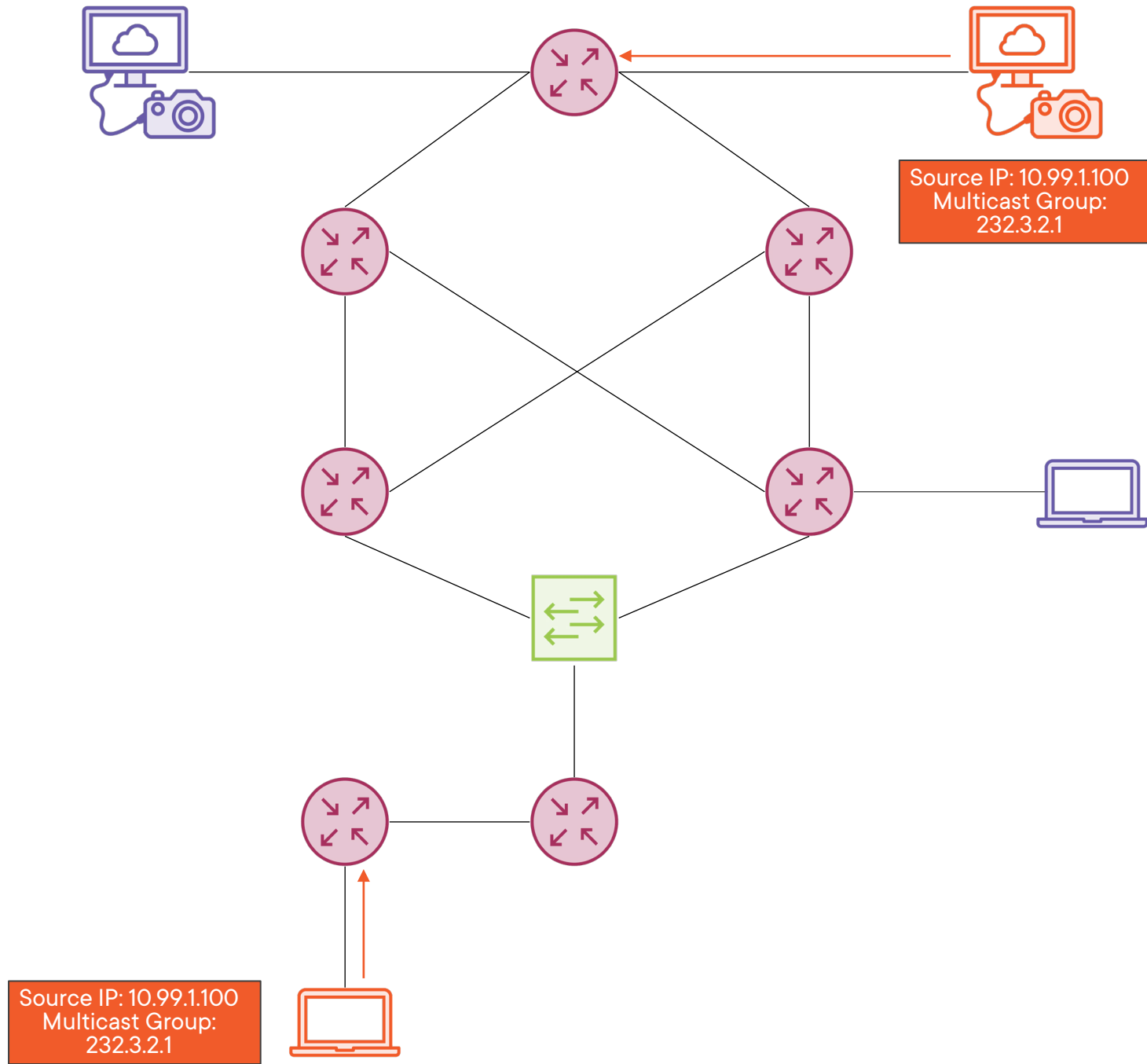


PIM-SSM Join Process

- Configure PIM-SSM
- Use IGMPv3 to request multicast
- Check PIM Joins and traffic flow



IGMPv3 Report



IGMPv3 Report

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	10.10.1.100	224.0.0.22	IGMPv3	60	Membership Report / Join group 232.3.2.1 for source {10.99.1.100}


```
> Frame 1: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface eth0, id 0
> Ethernet II, Src: aa:bb:cc:00:08:00 (aa:bb:cc:00:08:00), Dst: IPv4mcast_16 (01:00:5e:00:00:16)
v Internet Protocol Version 4, Src: 10.10.1.100, Dst: 224.0.0.22
  0100 .... = Version: 4
  .... 0110 = Header Length: 24 bytes (6)
  > Differentiated Services Field: 0xc0 (DSCP: CS6, ECN: Not-ECT)
    Total Length: 44
    Identification: 0x0665 (1637)
  > Flags: 0x00
    Fragment Offset: 0
    Time to Live: 1
    Protocol: IGMP (2)
    Header Checksum: 0x3223 [validation disabled]
    [Header checksum status: Unverified]
    Source Address: 10.10.1.100
    Destination Address: 224.0.0.22
  > Options: (4 bytes), Router Alert
v Internet Group Management Protocol
  [IGMP Version: 3]
  Type: Membership Report (0x22)
  Reserved: 00
  Checksum: 0xe731 [correct]
  [Checksum Status: Good]
  Reserved: 0000
  Num Group Records: 1
  v Group Record : 232.3.2.1 Mode Is Include
    Record Type: Mode Is Include (1)
    Aux Data Len: 0
    Num Src: 1
    Multicast Address: 232.3.2.1
    Source Address: 10.99.1.100
```



PIM-SSM Join/Prune

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	10.10.255.2	224.0.0.13	PIMv2	68	Join/Prune


```
> Frame 1: 68 bytes on wire (544 bits), 68 bytes captured (544 bits) on interface eth0, id 0
> Ethernet II, Src: 50:00:00:09:00:01 (50:00:00:09:00:01), Dst: IPv4mcast_0d (01:00:5e:00:00:0d)
> Internet Protocol Version 4, Src: 10.10.255.2, Dst: 224.0.0.13
v Protocol Independent Multicast
  0010 .... = Version: 2
  .... 0011 = Type: Join/Prune (3)
  Reserved byte(s): 00
  Checksum: 0xd613 [correct]
  [Checksum Status: Good]
v PIM Options
  v Upstream-neighbor: 10.10.255.1
    Address Family: IPv4 (1)
    Encoding Type: Native (0)
    Unicast: 10.10.255.1
    Reserved byte(s): 00
    Num Groups: 1
    Holdtime: 210
  v Group 0
    v Group 0: 232.3.2.1/32
      Address Family: IPv4 (1)
      Encoding Type: Native (0)
      > Flags: 0x00
      Masklen: 32
      Group: 232.3.2.1
    v Num Joins: 1
      v IP address: 10.99.1.100/32 (S)
        Address Family: IPv4 (1)
        Encoding Type: Native (0)
        > Flags: 0x04, Sparse
        Masklen: 32
        Source: 10.99.1.100
    Num Prunes: 0
```



Summary



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