

Design Concern	PIM - ASM/Any Source Multicast	PIM - SSM/Source Specific Multicast	PIM - Bidir/Bidirectional PIM
Scalability	Moderate since the routers keep (S,G) state after SPT transition. Even before Shortest Path Tree transition, always Shortest Path Tree is created between Sources and RPs	Worst. Routers have to keep every source-multicast group pair state in the multicast routing table. Thus SSM consumes a lot of router resources and situation gets worse if there are more source and multiple groups	Very scalable since the flows always on shared tree which means routers only keep (*,G) multicast entry in their multicast routing table. That's why it is used in many to many application design.
Suitable for One to Many Applications	It is suitable but Rendezvous Points Engineering is a disadvantage. IPTV is one of the one to many applications which PIM ASM can be used	Best. It is designed for One to Many applications. Source address information should be known by the receivers though	Not so suitable, PIM Bidir is designed for many to many multicast application traffic. Sender and Receiver both can send and receive multicast traffic at the same time. It is best for many to many application traffic pattern
Optimal Traffic Flow	Moderate. Before the SPT transition, receivers and senders communicate through Rendezvous Point. When receiver discovers the sources, they join the shortest path tree and they don't use Rendezvous Point anymore but until SPT transition traffic may flow suboptimally	Its optimal flow since source is known and IGP best path is used to reach to the sources	Not good since all the traffic always have to pass through Rendezvous Point
Duplicate Multicast Traffic	Yes during SPT transition, receivers get multiple copies of same Multicast traffic	No, there is no duplicate	No, there is no duplicate
Fast Reroute Support	Yes - IP FRR and Multicast only FRR	Yes - IP FRR and Multicast only FRR	Yes - IP FRR and Multicast only FRR
Staff Experience	Well known	Well known	Less known, especially Phantom RP operation for the load balancing
Loop Avoidance	Its done via RPF Check	Its done via RPF Check	Designated Forwarder is elected per subnet
Security	Less secure since all the sources can send to any multicast group	More secure because receivers specifically states which source and group pair they are interested in	Less secure, same reason as the PIM ASM
Complexity	Complex since it requires rendezvous point, Anycast RP for the Rendezvous point redundancy, Rendezvous point engineering for the optimal multicast routing	Easy, it requires source information only. There is no Rendezvous Point in Source Specific Multicast, no RP Engineering, no Anycast RP	Complex since it requires Rendezvous point, Phantom RP for the redundancy, RP Engineering for the optimal multicast routing
Resource Requirement	Moderate among other options since routers have to keep (*,G) state between the hosts and the RP and (S,G) state between source and the RP. (*,G) state can be thought as a summarization in the IP routing. After the SPT transition, still (S,G) state though	Worst. In PIM SSM all the routers every source-group address state. Thus it requires more memory and CPU on the devices, there is no (*,G) state in PIM SSM, only (S,G)	Best since PIM Bidir enabled routers only keep (*,G) states. Only shared tree is used in Bidirectional PIM.
Troubleshooting	Easy	Very easy	Easy