

# RSVP

<p><b>RSVP Messages (I: Ingress, E: Egress, T: Transit):</b></p> <p>For scalability, Message Aggregation (30 messages per packet)</p> <p><b>- Path</b> - I -&gt; E / <b>RA!ert!</b>, <b>Dest: Tail</b>; each router creates <b>Path State Block</b></p> <p><b>- Resv</b> - E -&gt; I / <b>Destination: next hop</b> (hop by hop) from RSVP-HOP object in Path. When each router receives it, creates <b>RSVP State Block</b> and fwd it -&gt; I</p> <p><b>- PathTear</b> - IT -&gt; E (path not needed, fail), rem softstates, <b>RA!ert!</b>, dest Tail</p> <p><b>- ResvTear</b> - T -&gt; I on failure</p> <p><b>- PathErr</b> - ET -&gt; I, soft states NOT removed</p> <p><b>- ResvErr</b> - T -&gt; E, soft states NOT removed</p> <p><b>- ResvConf</b> - I -&gt; E, confirms Resv received <b>RA!ert!</b>, dest Tail</p>	<p><b>RSVP Basic Packet</b></p> <p><b>Version (1), Flags</b> - Bit 0 - message aggreg. if "1"</p> <p><b>Message Type</b> (apart from those on the left)</p> <ul style="list-style-type: none"> <li>- Bundle, Ack, Srefresh, Hello</li> <li>- Integrity Challenge, Integrity Response</li> </ul> <p><b>SendTTL</b> (TTL from IP/to detect non-RSVP rou.)</p> <p><b>Objects</b></p> <p><b>Soft State:</b></p> <ul style="list-style-type: none"> <li>- active for 3 min by default, unless hellos used if routers know</li> <li>- hello def. 9 sec. / hold 63 (9 x (2 x 3keep_multipl. + 1)) = 63</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>- Path and Resv sent at 30s(15-45s).</li> </ul>
<p><b>RSVP Objects (all have Class number/Class Type fields - some tranzitive, some not) (&lt;P&gt;: in Path, &lt;R&gt;: in Resv):</b></p>	
<p><b>IN Path Messages</b></p>	<p><b>IN Resv Messages:</b></p>
<p><b>LSP-Tunnel-IPv4 Session - &lt;P&gt;/&lt;R&gt; (mandatory in all)</b></p> <ul style="list-style-type: none"> <li>- IPv4 Tunnel Endpoint Address (egress address)</li> <li>- Tunnel ID (gen. by ingress)</li> <li>- Extended Tunnel ID (ingress address)</li> </ul>	<p><b>LSP-Tunnel-IPv4 Session (mandatory)</b></p>
<p><b>LSP-Tunnel-IPv4-Sender-Template - &lt;P&gt; (identif. Sender)</b></p> <p><b>Integrated Services Sender TSpec (Traf. Specif.) - &lt;P&gt;</b></p> <ul style="list-style-type: none"> <li>- Service Number (1),</li> <li>- Parameter ID (127), Flags, Len</li> <li>- Token Bucket Rate - BW Requested (0 = no reserv)</li> <li>- Token Bucket Size - same</li> <li>- Peak Data Rate - not USED / set infinite</li> <li>- Minimum Policed Unit (20) &lt;20 bytes, treated as 20</li> <li>- Maximum Packet Size (1500) &gt;1500, treated as 1500</li> </ul>	<p><b>LSP-Tunnel-IPv4-Filter-Spec &lt;R&gt; identif. Sender Addr</b></p> <p><b>Integrated Services Flowspec - &lt;R&gt;</b></p> <ul style="list-style-type: none"> <li>- Service Number (default 5 - controlled)</li> <li>- Parameter ID (127), Parameter Flags, Len</li> <li>- Token Bucket Rate - BW Requested (0 = no reserv)</li> <li>- Token Bucket Size - same</li> <li>- Peak Data Rate - not USED / set infinite</li> <li>- Minimum Policed Unit (20) &lt;20 bytes, treated as 20</li> <li>- Maximum Packet Size (1500) &gt;1500, treated as 1500</li> </ul>
<p><b>Label Request - &lt;P&gt; (mandatory)</b></p>	<p><b>Label - &lt;R&gt; (reply to Label Request) (mandatory)</b></p>
<p><b>IPv4 RESV-HOP - &lt;P&gt;/&lt;R&gt;</b></p> <ul style="list-style-type: none"> <li>- contains neighboring address &amp; 32 bit uniq IF handle</li> </ul>	<p><b>IPv4 RESV-HOP</b></p>
<p><b>LSP Tunnel Session Attribute - &lt;P&gt;</b></p> <ul style="list-style-type: none"> <li>- Description (string)</li> <li>- Setup Priority (priority at setup)</li> <li>- Hold Priority (priority for maintaining it)</li> <li>- Bit 0 - "1" permit tranzit rout. to change ERO (FRR link prot.)</li> <li>- Bit 1 - "1" record labels in RRO</li> <li>- Bit 2 - "1" Egress can use SharedExplicit (reroute without drop)</li> <li>- Bit 3 - "1" routers should reserve BW for FRR detours</li> <li>- Bit 4 - "1" permit downstream routers to use FRR node prot.</li> </ul>	<p><b>RSVP Session composed of:</b></p> <p>from Path: Session, Sender-Template, Session-Attr</p> <p>from Resv: Session, Filter-Spec</p> <p><b>Graceful Restart</b> uses Restart_Cap Object in Hello. After restart, router sends Restart_Cap object with non-zero "recovery-time". The neighbors send it all the labels advertised before restart &amp; everything OK.</p>
<p><b>ERO - Explicit Route Object - &lt;P&gt;</b></p> <p>ignore IGP / strict or loose / - L-bit = Loose hop</p> <p>Can contain IPv4 (supported), IPv6 and AS (not supported)</p> <p>Smaller at each hop, addresses removed by each router</p>	
<p><b>Record Route - &lt;P&gt;/&lt;R&gt;</b></p> <ul style="list-style-type: none"> <li>- adds outgoing if. - Path/ResvErr generated if loop</li> <li>- Bit 0 - "1" = next downstream link protected by FRR</li> <li>- Bit 1 - "1" = local router actively repairing path</li> <li>- Bit 2 - "1" = backup path available</li> <li>- Bit 3 - "1" = Next downstream node and link protected</li> </ul>	<p><b>Record Route</b></p>
<p><b>Time Values - &lt;P&gt;/&lt;R&gt; - has Refresh (def. 30sec)</b></p>	<p><b>Time Values</b></p>
<p><b>IPv4 Error-Spec - &lt;P&gt;/&lt;R&gt;- error node address, errcode</b></p>	<p><b>IPv4 Error-Spec</b></p>
<p><b>FRR &amp; Detour &lt;P&gt;</b> - signal protection wanted</p> <ul style="list-style-type: none"> <li>- Setup Priority</li> <li>- Hold Priority</li> <li>- Hop Limit for backup path</li> <li>- Bandwidth (default 0)</li> <li>- Include Any (colors)</li> <li>- Exclude Any (colors)</li> </ul>	<p><b>Style - &lt;R&gt;</b> - how reservations are made - <b>mandatory</b></p> <ul style="list-style-type: none"> <li>- FF - Fixed Filter (session for each Sess. and Sender) - def</li> <li>- SE - Shared Explicit (Session be shared on mult. senders)</li> <li>- WF - Wildcard Filter (not supp.)</li> </ul>