Reactive Discovery of Point-to-Point Routes in Low Power and Lossy Networks

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Basic RPL Characteristics

• Basic RPL maintains routes "proactively"
  – destinations in the DAG must originate a DAO.

• Basic RPL routes only along a DAG
  – potentially leads to very suboptimal P2P routes, traffic congestion near the DAG root.
P2P: Desired Scenarios

• Source-initiated, on demand discovery of routes without constraints regarding existing DAG(s)
  – source-routes or hop-by-hop
  – discovery of one or more "good-enough" routes

• Measure end-to-end cost of existing routes
  – routes may be along-DAG or P2P
  – to be proposed in a separate document
RPL Extension for P2P Routing

• Reactive route discovery

• Use of DIO as Discovery message

• Creation of scoped, temporary DAGs for route discovery
RPL Extension for P2P Routing

• Use of good enough criteria for route discovery (OCP, metric containers)

• Option to use a subset of good enough criteria to limit the growth of the temporary DAG

• Multiple options for Discovery Reply to travel back towards the origin router
DIO as Discovery Request

• Discovery = DIO message option + temporary DAG ( + route record )

• Normal DIO propagation scope, generation
  – Outwards, link-local, trickle...

• Stricter scoping with good enough criteria
DRO as Discovery Reply

• Travels back to the request originator

  – Along discovered path if hop-by-hop state needs to be installed by reply

  – Any way otherwise: DAG, source route w. type 4 IP routing header, hop-by-hop, Fedex?