Recent Results on Path Accumultion
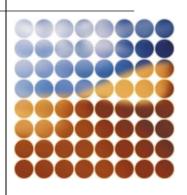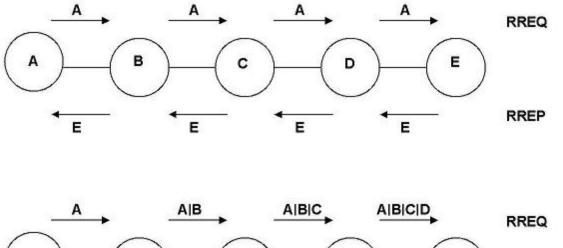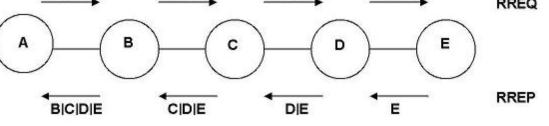
Charles E. Perkins

(with Karim Seada, Cedric Westphal, and Mahesh Sivakumar)

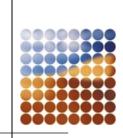IETF 67

Path accumulation, schematic

- Equip RREQ and RREP with more topology data
- Longer routes allow acquisition of more data
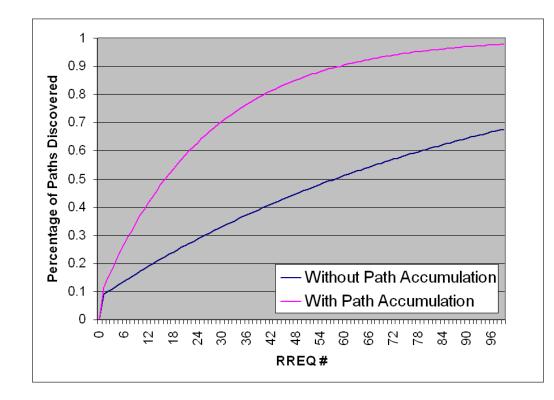
Path accumulation

- DYMO specifies an extension for this purpose
- Results show improvements in some scenarios, sometimes no change, and sometimes slight deterioration
- When basic signaling gives very high PDR, then path accumulation will not improve it
- Reducing RREQ will allow higher node density without producing congestion

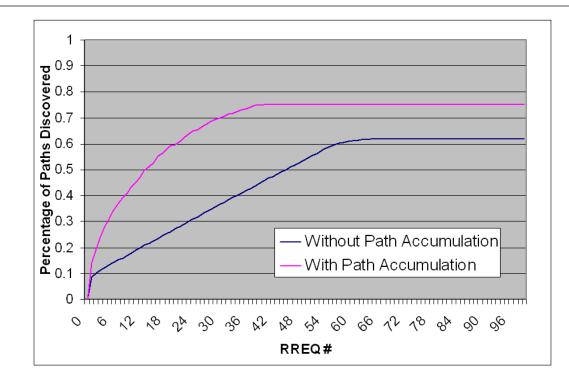# Evaluating path accumulation (results by Karim Seada et al.)

- How well does path accumulation help to discover the network topology?

- First analysis has been for static case

- How many RREQs are needed to discover the entire network topology?
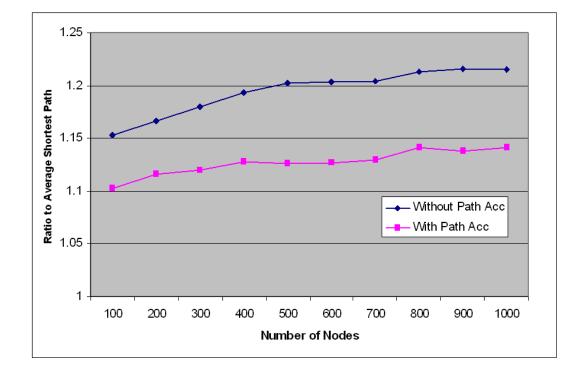
Pre-empting Route Discovery (analytical result)

Pre-empting route discovery (simulation results)

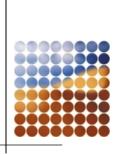- TODO: debug simulation artifact causing nonconvergence to 1.0

Route length reduced

- Another benefit from intermediate node RREP
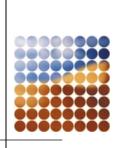
What about overall performance?

- Path accumulation definitely reduces the number of RREQs
- However, it also increases the packet size
- And, the benefit is reduced if newly discovered routes are not used before being purged from the routing cache
- Packet size is often a burden that negates some of the benefit of path accumulation
  - Heed this as a warning against packet bloat!!

Reliable flooding – needed by CDS for better PDR

- SMURF algorithm: request retransmission when failure noticed

- No explicit NACK

- Checksums periodically advertised (thus enabling failures to be noticed)

- Further investigation on rough idea
  - Last year yielded ambiguous results

Preliminary results (more @ IETF68)

- Usually, in small test networks, significant improvement is noticed (but not always!!)
- Benefits from better algorithm design
  - e.g.: neighbor discovery || checksum advert

Continuing work/future work

- Need to identify precise failure mechanisms!
- Likely culprit: increased neighborhood congestion
- Broadcast classification
  - Do some apps need faster reaction times?
  - No reliability mechanism at all needed?
- If PDR is already good, extra signaling is bad
  - Indicates need for adaptive design