OSPF FAST NOTIFICATIONS

IETF79 (BEIJING) – NOV 7-12, 2010
SRIGANESH KINI, WENHU LU, ALBERT TIAN

MOTIVATION

› Convergence time is dependent on several factors, some of which are orthogonal to others

› Improvements in one area result in other areas becoming (relatively) more significant contributors to convergence delays

  – Improvements in hardware, forwarding-architecture and network-design are making FIB installation delays lesser of an issue.

› Hop by hop control-plane processing introduces non-determinism

MOTIVATION (CONTD)

› Area wide multicasting of control protocol information needs to be examined for potential gains

› A fast, network-wide (scoped) notification mechanism is useful to trigger recovery mechanisms

DESIGN CONSIDERATIONS

› Design a fast-notification (**FN**) mechanism that can be used by any potential application

› Use a widely deployed protocol

› Use multicasting as much as possible

FN USING OSPF – DESIGN CONSIDERATIONS

› LSA can (re-)used to convey the fast-notification

› Lacks (area-wide) multicasting of control information (LSAs) that does not involve hop-by-hop control plane processing

› Problem can be split into two parts
  − Choice of path to multicast **FN**
  − Ensuring that LSA carrying **FN** conforms to OSPF flooding procedures

DESIGN CHOICES

› Provide a mechanism to choose the type of flooding paths. Useful to provide right tradeoff between information duplication and reliability

› Define a multicast address to deliver **FN**

› Retain existing (hop-by-hop control-plane) flooding when doing **FN** so that any errors in **FN** flooding are recovered.

CHOICE OF FLOODING PATH - SPANNING TREE

› Simple to compute

› Most topologies/failures FN reaches all routers

› For some specific cases of types of topologies/failure/spanning-tree the FN may not reach some routers

CHOICE OF FLOODING PATHS - MAXIMAL REDUNDANT TREES

› http://www.ieee-iscc.org/2009/program.html
  – "On finding maximally redundant trees in strictly linear time"
    › Andras Csaszar, et al

› Can cover all failure conditions

ENSURING CONSISTENCY WITH LSA FLOODING

› Generate FN along the path to flood FN quickly (preferably in hardware)

› Use the same LSA comparison algorithm but treat copy of LSA received by FN as a temp to do any processing earlier

› Acknowledgements

  – Atlas Alia, Dave Allan, Acee Lindem, Joel Halpern

› Comments welcome