TECHNISCHE UNIVERSITÄT BERLIN
Fakultät IV – Elektrotechnik und Informatik
Fachgebiet Intelligente Netze und Management verteilter Systeme
Prof. Anja Feldmann, Ph. D.
Bernhard Ager, Vinay Aggarwal, Fabian Schneider

9th Assignment: Network Protocols and Architectures WS 07/08

New additional place for solutions! From now on you may put your solutions in our post box in the Telefunkenbuilding (ground floor, enter from Ernst-Reuter-Platz turn right after the porters lodge and find the postboxes in the right wall). We will clear this box at 09:50 AM every wednesday.

Question 1: $(15 + 15 + 0 + 0 = 30$ points) *RFC 1149*

(a) Read the following RFC 1149 and explain due to which characteristics of IP it would work.

(b) State on what transmission delay, propagation delay and packet loss are depending on. How does this affect TCP's flow control?

(c) Check your findings from (b) in a real-world experiment. Please respect the animal protection guidelines!

(d) If you are interrested in this topic, you may want to additionally read the RFC 2549: `http://rfc.net/rfc2549.html`.

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Network Working Group                                        D. Waitzman
Request for Comments: 1149                                       BBN STC
                                                           1 April 1990


      A Standard for the Transmission of IP Datagrams on Avian Carriers

Status of this Memo

      This memo describes an experimental method for the encapsulation of
      IP datagrams in avian carriers.  This specification is primarily
      useful in Metropolitan Area Networks.  This is an experimental, not
      recommended standard.  Distribution of this memo is unlimited.

Overview and Rational

      Avian carriers can provide high delay, low throughput, and low
      altitude service.  The connection topology is limited to a single
      point-to-point path for each carrier, used with standard carriers,
      but many carriers can be used without significant interference with
      each other, outside of early spring.  This is because of the 3D ether
      space available to the carriers, in contrast to the 1D ether used by
      IEEE802.3.  The carriers have an intrinsic collision avoidance
      system, which increases availability.  Unlike some network
      technologies, such as packet radio, communication is not limited to
      line-of-sight distance.  Connection oriented service is available in
      some cities, usually based upon a central hub topology.

Frame Format

      The IP datagram is printed, on a small scroll of paper, in
      hexadecimal, with each octet separated by whitestuff and blackstuff.
      The scroll of paper is wrapped around one leg of the avian carrier.
      A band of duct tape is used to secure the datagram's edges.  The
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bandwidth is limited to the leg length. The MTU is variable, and paradoxically, generally increases with increased carrier age. A typical MTU is 256 milligrams. Some datagram padding may be needed.

Upon receipt, the duct tape is removed and the paper copy of the datagram is optically scanned into a electronically transmittable form.

Discussion

Multiple types of service can be provided with a prioritized pecking order. An additional property is built-in worm detection and eradication. Because IP only guarantees best effort delivery, loss of a carrier can be tolerated. With time, the carriers are self-regenerating. While broadcasting is not specified, storms can cause data loss. There is persistent delivery retry, until the carrier drops. Audit trails are automatically generated, and can often be found on logs and cable trays.

Security Considerations

Security is not generally a problem in normal operation, but special measures must be taken (such as data encryption) when avian carriers are used in a tactical environment.

Author's Address

David Waitzman
BBN Systems and Technologies Corporation
BBN Labs Division
10 Moulton Street
Cambridge, MA 02238

Phone: (617) 873-4323

EMail: dwaitzman@BBN.COM

Due Date: Wednesday, January, 9th 2008, 10:05 a. m. s. t. on paper in the lecture. (Look out for the solution box!) Or in our postbox in the Telefunkenbuilding at latest 09:50 a. m. s. t..

Please ensure to put your name, student ID number (Matrikelnummer) and the name of your tutor on your solution.