



## 8th Assignment: Network Protocols and Architectures WS 11/12

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

- Read the following RFC 1149 and explain due to which characteristics of IP it would work.
- State on what transmission delay, propagation delay and packet loss are depending on. How does this affect TCP's flow control?
- Check your findings from (b) in a real-world experiment. Please respect the animal protection guidelines!
- If you are interested in this topic, you may want to additionally read the RFC 2549:  
<http://rfc.net/rfc2549.html>.

Network Working Group  
Request for Comments: 1149

D. Waitzman  
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 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-

Waitzman

[Page 1]

RFC 1149

IP Datagrams on Avian Carriers

1 April 1990

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.

**Due Date: Thursday, January, 5th 2012 only until 13:55 h s. t.**

- **As PDF files (no MS Office or OpenOffice files):** Uploaded via ISIS (<https://www.isis.tu-berlin.de/course/view.php?id=5258>)
- **On paper:** Postbox in the Telefunkenhochhaus (basement, behind the doorman right)
- Put your name, StudentID number (Matrikelnummer) **and** the name of your tutor on your solution.