

RITA -- The Reliable Internetwork Troubleshooting Agent

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Abstract

A Description of the usage of Nondeterministic Troubleshooting and Diagnostic Methodologies as applied to today's complex nondeterministic networks and environments.

1. Introduction

Increasingly, IETF efforts have been devoted to aiding network management, troubleshooting, and diagnosis. Results have included SNMP, cflowd, and RMON, and ongoing projects at the time of this writing include Universal Logging Protocol and Distributed Management. These tools work well within the horizon of deterministic situations in which the configuration of the network or relevant components is known or can be relatively easily determined. They do not well address many problems that are related to the complex internetworks we have today, such as:

- o Networks where the root bridge for a world-wide bridged network is suboptimally located, such as under the desk of a secretary who kicks off her shoes when she arrives in the morning.
- o Networks where a hub is located adjacent to a monitor that emits disruptive RF when displaying certain graphics.
- o Networks where an ISP and several of their customers use network 10.0.0.0 internally and do not hide RIP broadcasts from one another.
- o Networks where gateways are data-sensitive
- o Networks where vendors inadvertently ship units with duplicate MAC addresses to the same end-user or where all users have a tool for changing MAC addresses.

In this document we introduce a new hardware-based tool for diagnosis and repair of network related hardware and software problems. This tool is best suited to addressing nondeterministic problems such as those described above. This tool has broad areas of application at all levels of the OSI model; in addition to uses in the physical, network, transport and application layers, it has been used to successfully address problems at the political and religious layers as well. RITA, the Reliable Internet Troubleshooting Agent, was developed initially at The Leftbank Operation (now known as Cohesive Network Systems, New England Division) based on a hardware platform supplied by Archie McPhee (Reference [1]). A typical RITA unit is depicted in Figure 1.

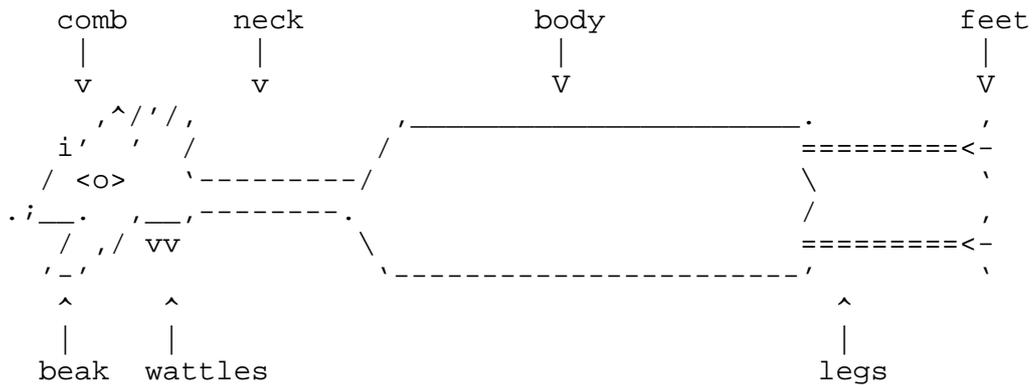


Figure 1.

## 2. Specification

A typical RITA is 51.25 cm long and yellow-orange in color. Either natural or artificial substances may be used for construction. RITA has very flexible characteristics, and thus can interoperate within fairly broad parameters. Unlike most other tools described in forthcoming RFC's, RITA does not require any IANA namespace management. It is not anticipated that versions will be incompatible, thus no versioning field is present. Interoperability testing may be conducted at a future meeting of the IETF.

## 3. Diagnostic Usage:

RITA may be applied in two diagnostic fashions, however only one of these methods, described below in 3.1, has been refined to a state such that we feel comfortable publishing the methodology.

3.1 The first method provides a broad-spectrum evaluation of quality of the entity tested, and is thus known as the BS eval test. This method can be used with great success on both deterministic and non-deterministic problems. Testing is performed by placing the RITA unit on top of a suspect piece of hardware, or, in the case of software, placing the unit on a packaged copy of the program, or hard copy of the source code.

If the RITA does not get up and fly away, the hardware or software being tested is misconfigured, fubar, or broken as designed. While this method does identify all equipment and software as sub-optimal, Sturgeon's Law (see reference [5]) indicates that at least 90% of these results are accurate, and it is felt that a maximum 10% false positive result is within acceptable parameters.

3.2 The second method involves applications of traditional techniques of haruspication (see reference [3]) and to date has been practiced with much greater success using implements other than RITA. The absence of entrails in the RITA unit may contribute to this; future design enhancements may address this issue by the addition of artificial giblets.

An alternative approach that has been discarded involved cleromantic principles (see reference [3]), and was known as "flipping the bird".

#### 4. Corrective Usage:

Corrective usage of RITA is most successful in dealing with the most difficult class of networking problems: those that seem to exhibit sporadic, non-deterministic behavior.

RITA units enhance normal corrective measures of these problems, methods such as rebooting, reseating of components and connectors, changing tabs to spaces or vice-versa in configuration files, blaming third-party vendors, and use of ballistic implements to effect wholesale displacement of systems and software, to at least 100% of their normal efficacy.

##### Specific Problem Methodologies:

- o Physical Layer: Wave RITA unit towards malfunctioning components.
- o Network Layer: Wave RITA unit towards malfunctioning components.
- o Transport Layer: Wave RITA unit towards malfunctioning components.

- o Application Layer: Strike product vendor representative (or programmer, if available) with RITA, preferably on the top of the skull, while shouting, "Read The Fine RFC's comma darn it!"
- o Political Layer: Strike advocates of disruptive or obstructive policies with RITA, preferably on the top of the skull. In extreme cases insertion of RITA into bodily apertures may become necessary. WARNING: subsequent failure to remove RITA may cause further problems.
- o Religious Layer: Strike advocates of disruptive or obstructive religions, and their vendor representatives, with RITA, preferably on the top of the skull. In extreme cases, the RITA may be used as a phlactory, funerary urn, or endcap for bus-and-tag cables.

5. Further Work

A RITA MIB is under development. This may require adding interface technology and hardware to RITA; a prototype is depicted in Figure 2.

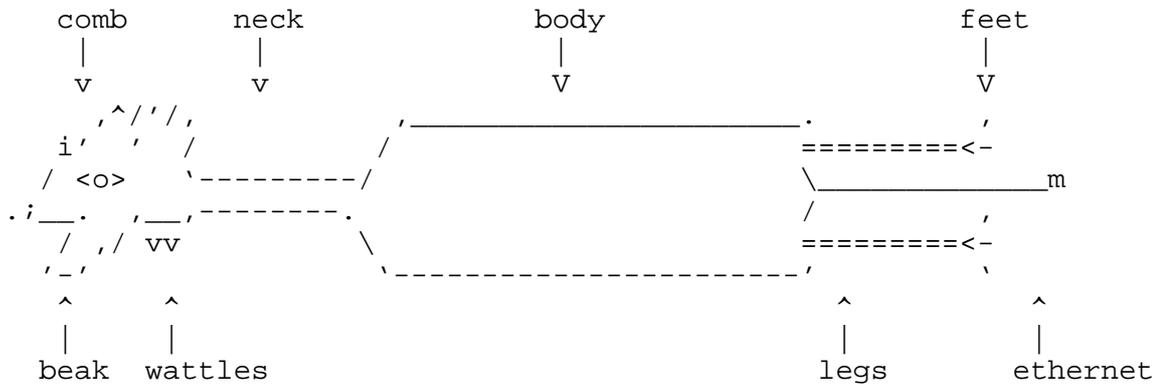


Figure 2.

There has been to date no investigation of the possible use of RITA to implement RFC 1149.

Additionally, this tool has been used with some success for dealing with non-network problems, particularly in the debugging of SCSI bus malfunctions.

## 6. Security Considerations

The RITA will only have serious impact on system security facilities if it is filled with lead shot. It does however, increase the personal security of system administrators; few network toughs are willing to face down a sysadmin armed with a RITA and a confident demeanor.

## 7. Citations and References

[1] Postel, J., and J. Reynolds, "Instructions to RFC Authors", RFC 2223, October 1997.

[2] McPhee, A., <http://www.mcphee.com>

[3] <http://www.clix.net/5thworld/no-osphere/3e/manteia.html>

[4] Waitzman, D., "Transmission of IP Datagrams on Avian Carriers" RFC 1149, April 1990.

[5] Raymond, E. (editor), "The New Hacker's Dictionary" 2nd ed., MIT Press, September 1993. ISBN 0-262-18154-1

## 8. Acknowledgments

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