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An Acceptable Use Policy for New ICMP Types and Codes
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Abstract

Some recent proposals to add new Internet Control Message Protocol (ICMP) types and/or codes have highlighted a need to describe policies for when adding new features to ICMP is desirable and when it is not. In this document we provide a basic description of ICMP's role in the IP stack and some guidelines for the future.

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Internet-Draft

ICMP AUP

July 2012

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Table of Contents

1.	Introduction	3
2.	ICMP's role in the internet	4
3.	Management vs control	5
4.	Where ICMP fits	6
5.	Security considerations	7
6.	IANA considerations	8
7.	Informative references	9
	Authors' Addresses	10

Internet-Draft

ICMP AUP

July 2012

1. Introduction

There have been some recent proposals to add new message types and codes to ICMP [[RFC792](#)] (see, for example, [[templin](#)]). Not all of these proposals are consistent with the design and intent of ICMP, and so we attempt to lay out a description of when (and when not) to move functionality into ICMP.

This document is the result of discussions within the IETF Operations area "ICMP Society," and concerns expressed by the OPS area leadership.

2. ICMP's role in the internet

ICMP was originally intended to be a mechanism for routers to report error conditions back to hosts [[RFC792](#)]. The word "control" in the protocol name did not describe ICMP's function (i.e. it did not "control" the internet), but rather that it was used to communicate about the control functions in the internet. For example, even though ICMP included a redirect message type, it was and is not used as a routing protocol.

Most likely because of the presence of the word "control" in the protocol name, ICMP is often understood to be a control protocol, borrowing some terminology from circuit networks and the PSTN. That is probably not correct - it might be more correct to describe it as being closer to a management plane protocol, given the data plane/ control plane/ management plane taxonomy often used in describing telephony protocols. However, layering in IP networks is not very clean and there's often some intermingling of function that can tend to lead to confusion about where to place new functions.

This document provides some background on the differences between control and management traffic, and finishes by proposing that any future additional ICMP types or codes be limited to what in telephony networks would be considered management plane traffic.

[3.](#) Management vs control

In this section we attempt to draw a distinction between management and control planes, acknowledging in advance that this may serve to muddle the differences even further. Ultimately the difference may not matter that much for the purpose of creating a policy for adding new types to ICMP, but because that terminology has become ubiquitous, even in IETF discussions, and because it has come up in prior discussions of ICMP policies, it seems worthwhile to take a few paragraphs to describe what they are and what they are not.

The terms "management plane" and "control plane" came into use to describe one aspect of layering in telecommunications networks. It is particularly important, in the context of this discussion, to understand that "control plane" in telecom networks almost always refers to 'signaling,' or call control and network control information. This includes "call" establishment and teardown, route establishment and teardown, requesting QoS or other parameters, and so on.

"Management," on the other hand, tends to fall under the rubric "OAM," or "Operations, Administration, and Management." typical

functions include fault management and performance monitoring (Service Level Agreement [SLA] compliance), discovery, etc.

[4.](#) Where ICMP fits

The correct answer to the question of where ICMP fits into the management/control/data taxonomy is that it doesn't, at least not neatly. While some of the message types are unambiguously management message (ICMP type 3, or "unreachable" messages), others are less clearly identifiable. For example, the "redirect" (ICMP type 5) message can be construed to contain control (in this case, routing) information, even though it is in some very real sense an error message.

At this time,

- o there are many, many other protocols that can be (and are) used for control traffic, whether they're routing protocols, telephony

signaling protocols, QoS protocols, middlebox protocols, AAA protocols, etc.

- o the transport characteristics needed by control traffic can be incompatible with the ICMP protocol standard -- for example, they may require reliable delivery, very large payloads, or have security requirements that cannot be met.

and because of this we propose that any future message types added to ICMP must stay within the "management plane" domain, and in particular that it would not be appropriate or desirable for control (or signaling) messages to be conveyed by ICMP.

[5.](#) Security considerations

This document attempts to describe a high-level policy for adding ICMP types and codes. While special attention must be paid to the security implications of any particular new ICMP type or code, specific security considerations are outside the scope of this paper.

There are no actions required by IANA.

7. Informative references

- [RFC792] Postel, J., "INTERNET CONTROL MESSAGE PROTOCOL", [RFC 792](#), September 1981.
- [templin] Templin, F., "Asymmetric Extended Route Optimization (AERO)", [draft-templin-aero-08](#) (work in progress), February 2012.

Internet-Draft

ICMP AUP

July 2012

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