

SMTP
Internet-Draft
Intended status: Best Current
Practice
Expires: January 9, 2008

C. Hutzler

D. Crocker
Brandenburg InternetWorking
P. Resnick
QUALCOMM Incorporated
E. Allman
Sendmail, Inc.
T. Finch
University of Cambridge Computing
Service
July 8, 2007

Email Submission Operations: Access and Accountability Requirements
draft-hutzler-spamops-08

Status of this Memo

By submitting this Internet-Draft, each author represents that any applicable patent or other IPR claims of which he or she is aware have been or will be disclosed, and any of which he or she becomes aware will be disclosed, in accordance with [Section 6 of BCP 79](#).

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

The list of current Internet-Drafts can be accessed at <http://www.ietf.org/ietf/lid-abstracts.txt>.

The list of Internet-Draft Shadow Directories can be accessed at <http://www.ietf.org/shadow.html>.

This Internet-Draft will expire on January 9, 2008.

Copyright Notice

Copyright (C) The IETF Trust (2007).

Internet-Draft

Email Submission

July 2007

Abstract

Email has become a popular distribution service for a variety of socially unacceptable, mass-effect purposes. The most obvious ones include spam and worms. This note recommends conventions for the operation of email submission and transport services between independent operators, such as enterprises and Internet Service Providers. Its goal is to improve lines of accountability for controlling abusive uses of the Internet mail service. To this end the document offers recommendations for constructive operational policies between independent operators of email submission and transmission services.

Email authentication technologies are aimed at providing assurances and traceability between internetworked networks. In many email services, the weakest link in the chain of assurances is initial submission of a message. This document offers recommendations for constructive operational policies for this first step of email sending, the submission (or posting) of email into the transmission network. Relaying and delivery entail policies that occur subsequent to submission and are outside the scope of this document.

The document seeks BCP status. Comments and discussion of this document should be addressed to the ietf-smtp@imc.org mailing list.

Internet-Draft

Email Submission

July 2007

Table of Contents

1.	Introduction	4
2.	Terminology	5
3.	Submission, Relaying, Delivery	5
3.1.	Best Practices for Submission Operation	6
3.2.	Transitioning to Submission Port	7
4.	External Submission	8
4.1.	Best Practices for Support of External Submissions	8
5.	Message Submission Authentication/Authorization Technologies	10
6.	Consideration	10
6.1.	Security Considerations	10
6.2.	IANA Considerations	10
7.	References	10
7.1.	References -- Normative	10
7.2.	References -- Informative	11
Appendix A.	Acknowledgments	11
	Authors' Addresses	11
	Intellectual Property and Copyright Statements	13

Internet-Draft

Email Submission

July 2007

1. Introduction

The very characteristics that make email such a convenient communications medium -- its near ubiquity, rapid delivery, low cost and support for exchanges without prior arrangement -- have made it a fertile ground for the distribution of unwanted or malicious content. Spam, fraud and worms have become a serious problem, threatening the viability of email and costing end users and providers millions of dollars in damages and lost productivity. In recent years, independent operators including enterprises and ISPs have turned to a number of different technologies and procedures, in an attempt to combat these problems. They have had varying effect and vastly different impacts on users and on the Internet mail infrastructure.

En route to its final destination, email will often travel between multiple independent providers of email transmission services. These services will generally have no prior arrangement with one another and may employ different rules on the transmission. It is therefore difficult both to debug problems that occur in mail transmission and to assign accountability if undesired or malicious mail is injected into the Internet mail infrastructure.

Many email authentication technologies exist. They provide some accountability and traceability between disparate networks. This document aims to build upon the availability of these technologies by exploring best practices for authenticating and authorizing the first step of an email's delivery, from a Mail User Agent (MUA) to a Mail Submission Agent (MSA), known as submission. Without strong practices on email submission, the use of authentication technologies

elsewhere in the service provides limited benefit.

This document specifies operational policies to be used for the first step of email sending, the submission -- or posting from an MUA to an MSA as defined below -- of email into the transmission service. These policies will permit continued, smooth operation of Internet email, with controls added to improve accountability. Relaying and delivering employ policies that occur after submission and are outside the scope of this document. The policies listed here are appropriate for operators of all sizes of networks and may be implemented by operators independently, without regard for whether the other side of an email exchange has implemented them.

It is important to note that the adoption of these policies alone will not solve the problems of spam and other undesirable email. However they provide a useful step in clarifying lines of accountability and interoperability between operators. This helps raise the bar against abusers, and provides a foundation for additional tools to preserve the utility of the Internet email

infrastructure.

NOTE: This document does not delve into other anti-spam operational issues such as standards for rejection of email. The authors note that this could be a valuable effort to undertake and encourage its pursuit.

[2.](#) Terminology

The Internet email architecture distinguishes four message-handling components:

- o Mail User Agents (MUAs)
- o Mail Submission Agents (MSAs)
- o Mail Transfer Agents (MTAs)
- o Mail Delivery Agents (MDAs)

At the origination end, an MUA works on behalf of end users to create

a message and perform initial "submission" into the transmission infrastructure, via an MSA. An MSA accepts the message submission, performs any necessary preprocessing on the message and relays the message to an MTA for transmission. MTAs "relay" messages to other MTAs, in a sequence reaching a destination MDA that, in turn, "delivers" the email to the recipient's inbox. The inbox is part of the recipient-side MUA that works on behalf of the end-user to process received mail.

These architectural components are often compressed, such as having the same software do MSA, MTA and MDA functions. However the requirements for each of these components of the architecture are becoming more extensive, so that their software and even physical platform separation is increasingly common.

Normative Terms: The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [[RFC2119](#)].

[3.](#) Submission, Relaying, Delivery

Originally the MSA, MTA and MDA architectural components were considered to be a single unit. This was reflected the practice of having MSA, MTA and MDA transfers all be performed with SMTP

[RFC2821] [[RFC0821](#)], over TCP Port 25. Internet mail permits email to be exchanged without prior arrangement and without sender authentication. That is, the confirmed identity of the originator of the message is not necessarily known by the relaying MTAs or the MDA.

It is important to distinguish MUA-to-MSA email submission, versus MTA relaying, versus the final MTA-to-MDA transition. Submission typically does entail a pre-established relationship between the user of the client and operator of the server; equally, the MDA is performing final delivery and can determine that it has an existing relationship with the recipient. That is, MSAs and MDAs can take advantage of having prior relationships with users, in order to constrain their transfer activities.

Specifically, an MSA can choose to reject all postings from MUAs for

which it has no existing relationship. Similarly, an MDA can choose to reject all mail to recipients for which that MDA has no arrangement to perform delivery. Indeed, both of these policies are already in common practice.

3.1. Best Practices for Submission Operation

Submission Port Availability:

If external submissions are supported -- that is, from outside a site's administrative domain -- then the domain's MSAs MUST support the SUBMISSION port 587 [[RFC4409](#)]. Operators MAY standardize on the SUBMISSION port for both external AND LOCAL users; this can significantly simplify submission operations.

Submission Port Use:

MUAs SHOULD use the SUBMISSION port for message submission.

Submission Authentication:

MSAs MUST perform authentication on the identity asserted during all mail transactions on the SUBMISSION port, even for a message having a RCPT TO address that would not cause the message to be relayed outside of the local administrative environment.

Submission Authorization:

An operator of an MSA MUST ensure that the authenticated identity is authorized to submit email, based on an existing relationship between the submitting entity and the operator. This requirement applies to all mail submission mechanisms (MUA

to MSA).

Submission Accountability after Submission:

For a reasonable period of time after submission, the message SHOULD be traceable by the MSA operator to the authenticated identity of the user who sent the message. Such tracing MAY be based on transactional identifiers stored in the headers (received lines, etc) or other fields in the message, on audit data stored elsewhere, or on any other mechanism that supports sufficient post-submission accountability. The specific length of time, after message submission, that traceability is supported is not specified here. However issues regarding transit often occur as much as one week after submission.

Note that [\[RFC3848\]](#) defines a means of recording submission-time information in Received header fields. This component mechanism can be useful for accountability assessment by receive-side analysis software to identify senders' MSAs and therefore apply appropriate policies to the various hops of a message transmission.

[3.2.](#) Transitioning to Submission Port

In order to promote transition of initial message submission from port 25 to port 587, MSAs MUST listen on port 587 by default and SHOULD have the ability to listen on other ports. MSAs MUST require authentication on port 587 and SHOULD require authentication on any other port used for submission. MSAs MAY also listen on other ports. Regardless of the ports on which messages are accepted, MSAs MUST NOT permit relaying of unauthenticated messages to other domains. That is, they must not be open relays.

As a default, MUAs SHOULD attempt to find the best possible submission port from a list of alternatives. The ordering of that list SHOULD try the SUBMISSION port 587 first. Since most MUAs available today do not permit falling back to alternate ports, sites SHOULD pre-configure or encourage their users to connect on the

4. External Submission

An MUA might need to submit mail across the Internet, rather than to a local MSA, in order to obtain particular services from its home site. Examples include active privacy protection against third-party content monitoring, timely processing, and being subject to the most appropriate authentication and accountability protocols. Further the privacy requirement might reasonably include protection against monitoring by the operator of the MUA's access network. This requirement creates a challenge for the provider operating the IP network through which the MUA gains access. It makes that provider an involuntary recruit to the task of solving mass-effect email problems: When the MUA participates in a problem that affects large numbers of Internet users, the provider is expected to effect remedies and is often expected to prevent such occurrences.

A proactive technique used by some providers is to block all use of Port 25 SMTP for mail that is being sent outbound, or to automatically redirect this traffic through a local SMTP proxy, except for hosts that are explicitly authorized. This can be problematic for some users, notably legitimate mobile users attempting to use their "home" MSA, even though those users might already employ legitimate, Port 25-based authentication.

This document offers no recommendation concerning the blocking of SMTP Port 25 or similar practices for controlling abuse of the standard anonymous mail transfer port. Rather, it pursues the mutually constructive benefit of using the official SUBMISSION Port 587 [[RFC4409](#)].

NOTE: Many established practices for controlling abuse of port 25, for mail that is being sent outbound, currently do exist. These include the proxy of smtp traffic to local hosts for screening combined with various forms of rate limits. The authors suggest that a separate document on this topic would benefit the email operations community.

4.1. Best Practices for Support of External Submissions

Open Submission Port:

Access Providers MUST NOT block users from accessing the external Internet using the SUBMISSION port 587 [[RFC4409](#)].

Within the MSA's network, the alternative of using Port 587 or Port 25 is shown. This document makes no recommendations about the use of Port 25 for submission. The diagram merely seeks to note that it is in common use and to acknowledge that this can be accomplished with

sufficient accountability within an organization's network.

Figure 1: Example of Port 587 Usage Via Internet

[5.](#) Message Submission Authentication/Authorization Technologies

There are many competent technologies and standards for authenticating message submissions. Two component mechanisms that have been standardized include SMTP AUTH [[RFC2554](#)] and TLS [[RFC3207](#)]. Depending upon the environment, different mechanisms can be more or less effective and convenient. Mechanisms might also have to be used in combination with each other to make a secure system. Organizations SHOULD choose the most secure approaches that are practical.

This document does not provide recommendations on specific security implementations. It simply provides a warning that transmitting user credentials in clear text over insecure networks SHOULD be avoided in all scenarios as this could allow attackers to listen for this traffic and steal account data. In these cases, it is strongly suggested that an appropriate security technology MUST be used.

[6.](#) Consideration

[6.1.](#) Security Considerations

Email transfer between independent administrations can be the source of large volumes of unwanted email and email containing malicious content designed to attack the recipient's system. This document addresses the requirements and procedures to permit such exchanges while reducing the likelihood that malicious mail will be transmitted.

[6.2.](#) IANA Considerations

This document has no actions for IANA.

[7.](#) References

[7.1.](#) References -- Normative

- [RFC2821] Klensin, J., "Simple Mail Transfer Protocol", [RFC 2821](#), April 2001.
- [RFC4409] Gellens, R. and J. Klensin, "Message Submission for Mail", [RFC 4409](#), April 2006.

Hutzler, et al.

Expires January 9, 2008

[Page 10]

Internet-Draft

Email Submission

July 2007

[7.2.](#) References -- Informative

- [RFC0821] Postel, J., "Simple Mail Transfer Protocol", STD 10, [RFC 821](#), August 1982.
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC2554] Myers, J., "SMTP Service Extension for Authentication", March .
- [RFC3207] Hoffman, P., "SMTP Service Extension for Secure SMTP over Transport Layer Security", February 2002.
- [RFC3848] Sun Microsystems, "ESMTP and LMTP Transmission Types Registration", [RFC 3848](#), July 2005.

[Appendix A.](#) Acknowledgments

These recommendations were first formulated during informal discussions among members of Anti-Spam Technical Alliance (ASTA) and some participants from the Internet Research Task Force's Anti-Spam Research Group (ASRG).

Later reviews and suggestions were provided by: M. Allman, L.H. Aestrand, N. Borenstein, S. Bortzmeyer, K. Chon, R. Clayton, B. Cole, W. Dnes, V. Duchovni, E. Edelstein, F. Ellermann, M. Elvey, J.D. Falk, N. Freed, J. Glube, A. Herzberg, J. Klensin, J. Levine, S. Moonesamy, K. Moore, R. Nelson, C. Newman, C. O'Malley, S. Ramasubramanian, R. Rognlie, J. St. Sauver, W. Schlitt, B. Shein, B. Sullivan.

Authors' Addresses

C. Hutzler
2512 Freetown Drive
Reston, VA 20191

Phone: 703-915-6862
Email: cdhutzler@aol.com
URI: <http://carlhutzler.com/blog/>

Hutzler, et al.

Expires January 9, 2008

[Page 11]

Internet-Draft

Email Submission

July 2007

D. Crocker
Brandenburg InternetWorking
675 Spruce Dr.
Sunnyvale, CA 94086
USA

Phone: +1.408.246.8253
Email: dcrocker@bbiw.net
URI: <http://bbiw.net>

P. Resnick
QUALCOMM Incorporated
5775 Morehouse Drive
San Diego, CA 92121-1714
USA

Phone: +1 858 651 4478
Email: presnick@qualcomm.com
URI: <http://www.qualcomm.com/~presnick/>

E. Allman
Sendmail, Inc.
Emeryville, CA

USA

Phone: +1 510 594 5501

Email: eric+iETF-smtp@sendmail.org

T. Finch

University of Cambridge Computing Service

New Museums Site

Pembroke Street

Cambridge CB2 3QH

ENGLAND

Phone: +44 797 040 1426

Email: dot@dotat.at

URI: <http://dotat.at/>

Hutzler, et al.

Expires January 9, 2008

[Page 12]

Internet-Draft

Email Submission

July 2007

Full Copyright Statement

Copyright (C) The IETF Trust (2007).

This document is subject to the rights, licenses and restrictions contained in [BCP 78](#), and except as set forth therein, the authors retain all their rights.

This document and the information contained herein are provided on an "AS IS" basis and THE CONTRIBUTOR, THE ORGANIZATION HE/SHE REPRESENTS OR IS SPONSORED BY (IF ANY), THE INTERNET SOCIETY, THE IETF TRUST AND THE INTERNET ENGINEERING TASK FORCE DISCLAIM ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Intellectual Property

The IETF takes no position regarding the validity or scope of any Intellectual Property Rights or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; nor does it represent that it has made any independent effort to identify any such rights. Information on the procedures with respect to rights in RFC documents can be found in [BCP 78](#) and [BCP 79](#).

Copies of IPR disclosures made to the IETF Secretariat and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementers or users of this specification can be obtained from the IETF on-line IPR repository at <http://www.ietf.org/ipr>.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights that may cover technology that may be required to implement this standard. Please address the information to the IETF at ietf-ipr@ietf.org.

Acknowledgment

Funding for the RFC Editor function is provided by the IETF Administrative Support Activity (IASA).