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A "Null MX" No Service Resource Record for Domains That Accept No Mail

Abstract

Internet mail determines the address of a receiving server through the DNS, first by looking for an MX record and then by looking for an A/AAAA record as a fallback. Unfortunately, this means that the A/AAAA record is taken to be mail server address even when that address does not accept mail. The No Service MX RR, informally called "null MX", formalizes the existing mechanism by which a domain announces that it accepts no mail, without having to provide a mail server; this permits significant operational efficiencies.

Status of This Memo

This is an Internet Standards Track document.

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1. Introduction

This document defines the No Service MX, informally called "null MX", as a simple mechanism by which a domain can indicate that it does not accept email.

SMTP clients have a prescribed sequence for identifying a server that accepts email for a domain. Section 5 of [RFC5321] covers this in detail; in essence, the SMTP client first looks up a DNS MX RR, and, if that is not found, it falls back to looking up a DNS A or AAAA RR. Hence, this overloads a DNS record (that has a different primary mission) with an email service semantic.

If a domain has no MX records, senders will attempt to deliver mail to the hosts at the addresses in the domain's A or AAAA records. If there are no SMTP listeners at the A/AAAA addresses, message delivery will be attempted repeatedly for a long period, typically a week, before the sending Mail Transfer Agent (MTA) gives up. This will delay notification to the sender in the case of misdirected mail and will consume resources at the sender.

This document defines a null MX that will cause all mail delivery attempts to a domain to fail immediately, without requiring domains to create SMTP listeners dedicated to preventing delivery attempts.

2. Conventions Used in This Document

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].

The terms "RFC5321.MailFrom" and "RFC5322.From" are used as defined in [RFC5598].

3. MX Resource Records Specifying Null MX

To indicate that a domain does not accept email, it advertises a single MX RR (see Section 3.3.9 of [RFC1035]) with an RDATA section consisting of preference number 0 and a zero-length label, written in master files as ".", as the exchange domain, to denote that there exists no mail exchanger for a domain. Since "." is not a valid host name, a null MX record cannot be confused with an ordinary MX record. The use of "." as a pseudo-hostname meaning no service available is modeled on the SRV RR [RFC2782] where it has a similar meaning.

A domain that advertises a null MX MUST NOT advertise any other MX RR.

4. Effects of Null MX

The null MX record has a variety of efficiency and usability benefits.

4.1. SMTP Server Benefits

Mail often has an incorrect address due to user error, where the address was mistranscribed or misunderstood, for example, to `alice@www.example.com`, `alice@example.org`, or `alice@example.com` rather than `alice@example.com`. Null MX allows a mail system to report the delivery failure when the user sends the message, rather than hours or days later.

Senders of abusive mail often use forged undeliverable return addresses. Null MX allows Delivery Status Notifications (DSNs) and other attempted responses to such mail to be disposed of efficiently.

The ability to detect domains that do not accept email offers resource savings to an SMTP client. It will discover on the first sending attempt that an address is not deliverable, avoiding queuing and retries.

When a submission or SMTP relay server rejects an envelope recipient due to a domain's null MX record, it SHOULD use a 556 reply code [RFC7504] (Requested action not taken: domain does not accept mail) and a 5.1.10 enhanced status code (Permanent failure: Recipient address has null MX).

A receiving SMTP server that chooses to reject email during the SMTP conversation that presents an undeliverable RFC5321.MailFrom or RFC5322.From domain can be more confident that for other messages a subsequent attempt to send a DSN or other response will reach a recipient SMTP server.

SMTP servers that reject mail because a RFC5321.MailFrom or RFC5322.From domain has a null MX record SHOULD use a 550 reply code (Requested action not taken: mailbox unavailable) and a 5.7.27 enhanced status code (Permanent failure: Sender address has null MX).

4.2. Sending Mail from Domains That Publish Null MX

Null MX is primarily intended for domains that do not send or receive any mail, but have mail sent to them anyway due to mistakes or malice. Many receiving systems reject mail that has an invalid return address. Return addresses are needed to allow the sender to handle message delivery errors. An invalid return address often signals that the message is spam. Hence, mail systems SHOULD NOT publish a null MX record for domains that they use in RFC5321.MailFrom or RFC5322.From addresses. If a system nonetheless does so, it risks having its mail rejected.

Operators of domains that do not send mail can publish Sender Policy Framework (SPF) "-all" policies [RFC7208] to make an explicit declaration that the domains send no mail.

Null MX is not intended to be a replacement for the null reverse-path described in Section 4.5.5 of RFC 5321 and does not change the meaning or use of a null reverse-path.

5. Security Considerations

Within the DNS, a null MX RR is an ordinary MX record and presents no new security issues. If desired, it can be secured in the same manner as any other DNS record using DNSSEC.

6. IANA Considerations

IANA has added the following entries to the "Enumerated Status Codes" subregistry of the "Simple Mail Transfer Protocol (SMTP) Enhanced Status Codes Registry".

Code: X.1.10
Sample Text: Recipient address has null MX
Associated basic status code: 556
Description: This status code is returned when the associated address is marked as invalid using a null MX.
Reference: This document
Submitter: Authors of this document
Change controller: IESG

Code: X.7.27
Sample Text: Sender address has null MX
Associated basic status code: 550
Description: This status code is returned when the associated sender address has a null MX, and the SMTP receiver is configured to reject mail from such sender (e.g., because it could not return a DSN).
Reference: This document
Submitter: Authors of this document
Change controller: IESG

7. References

7.1. Normative References

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