                 Sieve Email Filtering: Relational Extension

Status of This Memo

   This document specifies an Internet standards track protocol for the
   Internet community, and requests discussion and suggestions for
   improvements. Please refer to the current edition of the "Internet
   Official Protocol Standards" (STD 1) for the standardization state
   and status of this protocol. Distribution of this memo is unlimited.

Abstract

   This document describes the RELATIONAL extension to the Sieve mail
   filtering language defined in RFC 3028. This extension extends
   existing conditional tests in Sieve to allow relational operators.
   In addition to testing their content, it also allows for testing of
   the number of entities in header and envelope fields.

   This document obsoletes RFC 3431.

Table of Contents

1. Introduction

   The RELATIONAL extension to the Sieve mail filtering language [Sieve]
   provides relational operators on the address, envelope, and header
   tests. This extension also provides a way of counting the entities
   in a message header or address field.

   With this extension, the Sieve script may now determine if a field is
   greater than or less than a value instead of just equivalent. One
   use is for the x-priority field: move messages with a priority
   greater than 3 to the "work on later" folder. Mail could also be
   sorted by the from address. Those userids that start with 'a'-'m' go
   to one folder, and the rest go to another folder.

   The Sieve script can also determine the number of fields in the
   header, or the number of addresses in a recipient field, for example,
   whether there are more than 5 addresses in the to and cc fields.

   The capability string associated with the extension defined in this
   document is "relational".

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 BCP 14, RFC 2119.

   Conventions for notations are as in [Sieve] section 1.1, including
   the use of [Kwds] and the use of [ABNF].

3. Comparators

   This document does not define any comparators or exempt any
   comparators from the require clause. Any comparator used must be
   treated as defined in [Sieve].

   The "i;ascii-numeric" comparator, as defined in [RFC4790], MUST be
   supported for any implementation of this extension. The comparator
   "i;ascii-numeric" MUST support at least 32-bit unsigned integers.

   Larger integers MAY be supported. Note: the "i;ascii-numeric"
   comparator does not support negative numbers.

4. Match Types

   This document defines two new match types. They are the VALUE match
   type and the COUNT match type.

   The syntax is:

   MATCH-TYPE =/ COUNT / VALUE

   COUNT = ":count" relational-match

   VALUE = ":value" relational-match

   relational-match = DQUOTE
           ("gt" / "ge" / "lt" / "le" / "eq" / "ne") DQUOTE
           ; "gt" means "greater than", the C operator ">".
           ; "ge" means "greater than or equal", the C operator ">=".
           ; "lt" means "less than", the C operator "<".
           ; "le" means "less than or equal", the C operator "<=".
           ; "eq" means "equal to", the C operator "==".
           ; "ne" means "not equal to", the C operator "!=".

4.1. Match Type VALUE

   The VALUE match type does a relational comparison between strings.

   The VALUE match type may be used with any comparator that returns
   sort information.

   A value from the message is considered the left side of the relation.
   A value from the test expression, the key-list for address, envelope,
   and header tests, is the right side of the relation.

   If there are multiple values on either side or both sides, the test
   is considered true if any pair is true.

4.2. Match Type COUNT

   The COUNT match type first determines the number of the specified
   entities in the message and does a relational comparison of the
   number of entities, as defined below, to the values specified in the
   test expression.

   The COUNT match type SHOULD only be used with numeric comparators.

   The Address Test counts the number of addresses (the number of
   "mailbox" elements, as defined in [RFC2822]) in the specified fields.
   Group names are ignored, but the contained mailboxes are counted.

The Envelope Test counts the number of addresses in the specified
envelope parts. The envelope "to" will always have only one entry,
which is the address of the user for whom the Sieve script is
running. Using this test, there is no way a Sieve script can
determine if the message was actually sent to someone else. The
envelope "from" will be 0 if the MAIL FROM is empty, or 1 if MAIL
FROM is not empty.

The Header Test counts the total number of instances of the specified
fields. This does not count individual addresses in the "to", "cc",
and other recipient fields.

In all cases, if more than one field name is specified, the counts
for all specified fields are added together to obtain the number for
comparison. Thus, specifying ["to", "cc"] in an address COUNT test
compares the total number of "to" and "cc" addresses; if separate
counts are desired, they must be done in two comparisons, perhaps
joined by "allof" or "anyof".

5. Interaction with Other Sieve Actions

This specification adds two match types. The VALUE match type only
works with comparators that return sort information. The COUNT match
type only makes sense with numeric comparators.

There is no interaction with any other Sieve operations, nor with any
known extensions. In particular, this specification has no effect on
implicit KEEP, nor on any explicit message actions.

6. Example

Using the message:

```
received: ...
received: ...
subject: example
to: foo@example.com, baz@example.com
cc: qux@example.com
```

The test:

```
address :count "ge" :comparator "i;ascii-numeric"
              ["to", "cc"] ["3"]
```

would evaluate to true, and the test

```
   anyof ( address :count "ge" :comparator "i;ascii-numeric"
                    ["to"] ["3"],
           address :count "ge" :comparator "i;ascii-numeric"
                    ["cc"] ["3"] )
```

would evaluate to false.

To check the number of received fields in the header, the following
test may be used:

```
   header :count "ge" :comparator "i;ascii-numeric"
                    ["received"] ["3"]
```

This would evaluate to false. But

```
   header :count "ge" :comparator "i;ascii-numeric"
                    ["received", "subject"] ["3"]
```

would evaluate to true.

The test:

```
   header :count "ge" :comparator "i;ascii-numeric"
                    ["to", "cc"] ["3"]
```

will always evaluate to false on an RFC 2822 compliant message
[RFC2822], since a message can have at most one "to" field and at
most one "cc" field. This test counts the number of fields, not the
number of addresses.

7. Extended Example

```
require ["relational", "comparator-i;ascii-numeric", "fileinto"];

if header :value "lt" :comparator "i;ascii-numeric"
          ["x-priority"] ["3"]
{
   fileinto "Priority";
}

elsif address :count "gt" :comparator "i;ascii-numeric"
           ["to"] ["5"]
{
   # everything with more than 5 recipients in the "to" field
   # is considered SPAM
   fileinto "SPAM";
}

elsif address :value "gt" :all :comparator "i;ascii-casemap"
           ["from"] ["M"]
{
   fileinto "From N-Z";
} else {
   fileinto "From A-M";
}

if allof ( address :count "eq" :comparator "i;ascii-numeric"
                   ["to", "cc"] ["1"] ,
           address :all :comparator "i;ascii-casemap"
                   ["to", "cc"] ["me@foo.example.com"] )
{
   fileinto "Only me";
}
```

8. Changes since RFC 3431

   Apart from several minor editorial/wording changes, the following
   list describes the notable changes to this specification since RFC
   3431.

   o Updated references, including changing the comparator reference
      from the Application Configuration Access Protocol (ACAP) to the
      "Internet Application Protocol Collation Registry" document
      [RFC4790].

   o Updated and corrected the examples.

    o Added definition comments to ABNF for "gt", "lt", etc.

    o Clarified what RFC 2822 elements are counted in the COUNT test.

    o Removed the requirement to strip white space from header fields
       before comparing; a more general version of this requirement has
       been added to the Sieve base spec.

9. IANA Considerations

    The following template specifies the IANA registration of the
    relational Sieve extension specified in this document:

    To: iana@iana.org
    Subject: Registration of new Sieve extension

    Capability name: relational
    Description: Extends existing conditional tests in Sieve language
                      to allow relational operators
    RFC number: RFC 5231
    Contact address: The Sieve discussion list <ietf-mta-filters@imc.org>

10. Security Considerations

    An implementation MUST ensure that the test for envelope "to" only
    reflects the delivery to the current user. Using this test, it MUST
    not be possible for a user to determine if this message was delivered
    to someone else.

    Additional security considerations are discussed in [Sieve].

11. Normative References

    [ABNF]   Crocker, D., Ed. and P. Overell, "Augmented BNF for Syntax
               Specifications: ABNF", RFC 4234, October 2005.

    [Kwds]   Bradner, S., "Key words for use in RFCs to Indicate
               Requirement Levels", RFC 2119, March 1997.

    [RFC2822] Resnick, P., "Internet Message Format", RFC 2822,
               April 2001.

    [RFC4790] Newman, C., Duerst, M., and A. Gulbrandsen, "Internet
               Application Protocol Collation Registry", RFC 4790,
               March 2007.

    [Sieve]   Guenther, P., Ed. and T. Showalter, Ed., "Sieve: An Email
               Filtering Language", RFC 5228, January 2008.

Authors' Addresses

   Wolfgang Segmuller
   IBM T.J. Watson Research Center
   19 Skyline Drive
   Hawthorne, NY 10532
   US

   Phone: +1 914 784 7408
   EMail: werewolf@us.ibm.com

   Barry Leiba
   IBM T.J. Watson Research Center
   19 Skyline Drive
   Hawthorne, NY 10532
   US

   Phone: +1 914 784 7941
   EMail: leiba@watson.ibm.com