

Network Working Group
INTERNET-DRAFT
Category: Informational
<[draft-aboba-rpsl-00.txt](#)>
[21](#) November 1997

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Lightweight Directory Access Protocol (v3):
Schema for the Routing Policy Specification Language (RPSL)

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[2.](#) Abstract

This document defines a schema for the Routing Policy Specification Language (RPSL). It is expected that this schema will be useful in providing a standardized format for representation of RPSL within LDAP-based directory services.

[3.](#) Introduction

The Routing Policy Specification Language (RPSL), described in [\[6\]](#)-[\[8\]](#), provides a means for the high-level specification of routing policies. To date, efforts at representing routing policies, as described in [\[9\]](#)-[\[10\]](#), have relied on proprietary schemas. This document describes how routing policies may be represented in LDAP-based directory services.

INTERNET-DRAFT

21 November 1997

[4.](#) Object definitions

The RPSL schema includes definition of the following objects:

RPSL Person Class
RPSL Entry Class
Dictionary object
Maintainer object (mntner)
Autonomous system number objects (autNum)
Route objects (route)
Set objects (asSet, routeSet)
Router objects (inetRtr)
Tunnel objects (inetTunnel)

[4.1.](#) RPSL Person Class

```
( rpslPersonClass 1
  NAME 'rpslOrgPerson'
  SUP organizationalPerson
  STRUCTURAL
  MUST nicHdl
)
```

[4.2.](#) RPSL Entry

```
( rpsl rpslEntry 1
  NAME 'rpslEntry'
  SUP top
  ABSTRACT
  MUST (
    cn $ descr $ techC $ adminC $ mntBy $
    changed $ source
  )
  MAY (
```

```
        remarks $ notify
    )
)
```

[4.3.](#) Dictionary object

```
( rpsl rpslDictionary 1
  NAME 'rpslDictionary'
  SUP rpslEntry
  STRUCTURAL
  MUST (
    dictionaryName
  )
  MAY (
    rpAttribute $ typeDef $ protocol
  )
)
```

```
)
```

[4.4.](#) Maintainer Object Class

```
( rpsl mntner 1
  NAME 'mntner'
  SUP rpslEntry
  STRUCTURAL
  MUST (
    mntnerName $ auth $ updTo
  )
  MAY (
    mntNfy
  )
)
```

[4.5.](#) Autonomous System Number Object Class

```
( rpsl autNum 1
  NAME 'autNum'
  SUP rpslEntry
  STRUCTURAL
```

```

    MUST (
        asNumber $ asName $ autNumGuardian
    )
    MAY (
        memberOf $ asIn $ asOut $ default $ igpToEgp $
        egpToIgp
    )
)

```

[4.6.](#) Route Object Class

```

( rpsl route 1
    NAME 'route'
    SUP rpslEntry
    STRUCTURAL
    MUST (
        addressPrefix $ origin
    )
    MAY (
        withdrawn $ memberOf $ injectAt $ aggregateBy $
        exportComponents $ holes
    )
)

```

[4.7.](#) AS-Set Object Class

```

( rpsl asSet 1
    NAME 'asSet'

```

```

    SUP rpslEntry
    STRUCTURAL
    MUST (
        asSetName
    )
    MAY (
        asSetMembers $ asSetMembersByReferral
    )
)

```

[4.8.](#) Route-Set Object Class

```
( rpsl routeSet 1
  NAME 'routeSet'
  SUP rpslEntry
  STRUCTURAL
  MUST (
    routeSetName
  )
  MAY (
    routeSetMembers $ routeSetMembersByReferral
  )
)
```

[4.9.](#) Router Object Class

```
( rpsl inetRtr 1
  NAME 'inetRtr'
  SUP rpslEntry
  STRUCTURAL
  MUST (
    rtrName $ localAs $ ifAddr $
    inetRtrGuardian
  )
  MAY (
    alias $ peer
  )
)
```

[4.10.](#) Tunnel Object Class

```
( rpsl inetTunnel 1
  NAME 'inetTunnel'
  SUP rpslEntry
  STRUCTURAL
  MUST (
    TunnelName $ tunnelSource $ tunnelSink $ tunneProtocol $
    tunnelIn $ tunnelOut $ inetTunnelGuardian
  )
)
```

[5.](#) Attribute definitions

[5.1.](#) New Attribute Types Used in the RPSL Person Class

```
( rpsl rpslPersonClass 2
  NAME 'nicHdl'
  DESC 'the handle by which a person is referred to by the NIC'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString'
  SINGLE-VALUE
)
```

[5.2.](#) New Attribute Types Used in the RPSL Entry Object Class

```
( rpsl rpslEntry 2
  NAME 'descr'
  DESC 'a description of the object'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString'
  SINGLE-VALUE
)

( rpsl rpslEntry 3
  NAME 'techC'
  DESC 'the technical contact of the resource'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString' )

( rpsl rpslEntry 4
  NAME 'adminC'
  DESC 'the administrative contact of the resource'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString' )

( rpsl rpslEntry 5
  NAME 'remarks'
  DESC 'An explanation or clarification'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString' )
```

```
( rpsl rpslEntry 6
  NAME 'notify'
  DESC 'the email address of the entity to notify in case of
        Problems with the resource'
```

INTERNET-DRAFT

21 November 1997

```
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString' )
```

```
( rpsl rpslEntry 7
  NAME 'mntBy'
  DESC 'Distinguished Name of maintainer object'
  EQUALITY distinguishedNameMatch
  SUBSTRINGS distinguishedNameMatch
  SYNTAX DN
)
```

```
( rpsl rpslEntry 8
  NAME 'changed'
  DESC 'the email name of who last changed the resource and
        the date of when it was changed'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString' )
```

```
( rpsl rpslEntry 9
  NAME 'source'
  DESC 'the registry name from which the information came'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString'
  SINGLE-VALUE
)
```

[5.3.](#) New Attribute Types Used in the Dictionary Object Class

```
( rpsl rpslDictionary 2
  NAME 'dictionaryName'
  DESC 'the name of the dictionary'
  EQUALITY caseIgnoreMatch
```

```

        SUBSTRINGS caseIgnoreSubstringsMatch
        SYNTAX 'DirectoryString'
        SINGLE-VALUE
    )

    ( rpsl rpslDictionary 3
      NAME 'rpAttribute'
      DESC 'routing policy attribute or feature extension'
      EQUALITY caseIgnoreMatch
      SUBSTRINGS caseIgnoreSubstringsMatch
      SYNTAX 'DirectoryString'
    )

    ( rpsl rpslDictionary 4
      NAME 'typeDef'
      DESC 'dictionary defined type'
      EQUALITY caseIgnoreMatch
      SUBSTRINGS caseIgnoreSubstringsMatch
    )

```

```

        SYNTAX 'DirectoryString'
    )

    ( rpsl rpslDictionary 5
      NAME 'protocol'
      DESC 'protocol set and peering options'
      EQUALITY caseIgnoreMatch
      SUBSTRINGS caseIgnoreSubstringsMatch
      SYNTAX 'DirectoryString'
    )

```

[5.4.](#) New Attribute Types Used in the Maintainer Object Class

```

    ( rpsl mntner 2
      NAME 'mntnerName'
      DESC 'the name of the maintainer'
      EQUALITY caseIgnoreMatch
      SUBSTRINGS caseIgnoreSubstringsMatch
      SYNTAX 'DirectoryString'
      SINGLE-VALUE
    )

```



```

( rpsl mntner 3
  NAME 'auth'
  DESC 'The scheme that will be used to identify and authenticate
        Update requests'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString' )

( rpsl mntner 4
  NAME 'updTo'
  DESC 'an email address to notify on an unauthorized
        update of the resource'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString' )

( rpsl mntner 5
  NAME 'mntNfy'
  DESC 'An email address to notify whenever an object is
        added, changed or deleted'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString' )

```

[5.5.](#) New Attribute Types Used in the Autonomous System Number Object Class

```

( rpsl autNum 2
  NAME 'asNumber'
  DESC 'the autonomous sytem number'

```

```

    EQUALITY caseIgnoreMatch
    SUBSTRINGS caseIgnoreSubstringsMatch
    SYNTAX 'DirectoryString'
    SINGLE-VALUE
  )

( rpsl autNum 3
  NAME 'asName'
  DESC 'the autonomous system name'
  EQUALITY caseIgnoreMatch

```

```

        SUBSTRINGS caseIgnoreSubstringsMatch
        SYNTAX 'DirectoryString'
        SINGLE-VALUE
    )

( rpsl autNum 4
    NAME 'memberOf'
    DESC 'the as-set object name of which this as is a member'
    EQUALITY caseIgnoreMatch
    SUBSTRINGS caseIgnoreSubstringsMatch
    SYNTAX 'DirectoryString'
    SINGLE-VALUE
)

( rpsl autNum 5
    NAME 'asIn'
    DESC 'import policy specification'
    EQUALITY caseIgnoreMatch
    SUBSTRINGS caseIgnoreSubstringsMatch
    SYNTAX 'DirectoryString' )

( rpsl autNum 6
    NAME 'asOut'
    DESC 'export policy specification'
    EQUALITY caseIgnoreMatch
    SUBSTRINGS caseIgnoreSubstringsMatch
    SYNTAX 'DirectoryString' )

( rpsl autNum 7
    NAME 'default'
    DESC 'default policy specification'
    EQUALITY caseIgnoreMatch
    SUBSTRINGS caseIgnoreSubstringsMatch
    SYNTAX 'DirectoryString' )

( rpsl autNum 8
    NAME 'igpToEgp'
    DESC 'specification for how routes from the interAS routing protocols
        are injected into the IGP protocol'
    EQUALITY caseIgnoreMatch
    SUBSTRINGS caseIgnoreSubstringsMatch
    SYNTAX 'DirectoryString' )

( rpsl autNum 9

```

```
    NAME 'egpToIgp'
    DESC 'specification for how routes from the IGP protocol are inject
        into the interAS routing protocol.'
    EQUALITY caseIgnoreMatch
    SUBSTRINGS caseIgnoreSubstringsMatch
    SYNTAX 'DirectoryString' )

( rpsl autNum 10
    NAME 'autNumGuardian'
    DESC 'the e-mail address of the guardian of the resource'
    EQUALITY caseIgnoreMatch
    SUBSTRINGS caseIgnoreSubstringsMatch
    SYNTAX 'DirectoryString'
    SINGLE-VALUE
)
```

[5.6.](#) New Attribute Types Used in the Route Object Class

```
( rpsl route 2
    NAME 'addressPrefix'
    DESC 'the address prefix for the route'
    EQUALITY caseIgnoreMatch
    SUBSTRINGS caseIgnoreSubstringsMatch
    SYNTAX 'DirectoryString'
    SINGLE-VALUE
)

( rpsl route 3
    NAME 'origin'
    DESC 'the AS number in which the route originates'
    EQUALITY caseIgnoreMatch
    SUBSTRINGS caseIgnoreSubstringsMatch
    SYNTAX 'DirectoryString'
    SINGLE-VALUE
)

( rpsl route 4
    NAME 'withdrawn'
    DESC 'the date at which the route was withdrawn'
    EQUALITY caseIgnoreMatch
    SUBSTRINGS caseIgnoreSubstringsMatch
    SYNTAX 'DirectoryString'
    SINGLE-VALUE
)

( rpsl route 5
```

```
NAME 'memberOf'  
DESC 'the date at which the route was withdrawn'  
EQUALITY caseIgnoreMatch  
SUBSTRINGS caseIgnoreSubstringsMatch  
SYNTAX 'DirectoryString'  
SINGLE-VALUE  
)
```

INTERNET-DRAFT

21 November 1997

```
( rpsl route 6  
  NAME 'injectAt'  
  DESC 'specifies static routes to inject'  
  EQUALITY caseIgnoreMatch  
  SUBSTRINGS caseIgnoreSubstringsMatch  
  SYNTAX 'DirectoryString' )  
  
( rpl route 7  
  NAME 'aggregateBy'  
  DESC 'specifies component routes used to form the aggregate'  
  EQUALITY caseIgnoreMatch  
  SUBSTRINGS caseIgnoreSubstringsMatch  
  SYNTAX 'DirectoryString'  
  SINGLE-VALUE  
)  
  
( rpsl route 8  
  NAME 'exportComponents'  
  DESC 'a filter matching the routes that need to be exported'  
  EQUALITY caseIgnoreMatch  
  SUBSTRINGS caseIgnoreSubstringsMatch  
  SYNTAX 'DirectoryString'  
  SINGLE-VALUE  
)  
  
( rpsl route 9  
  NAME 'holes'  
  DESC 'component address prefixes not reachable through the  
    aggregate route'  
  EQUALITY caseIgnoreMatch  
  SUBSTRINGS caseIgnoreSubstringsMatch  
  SYNTAX 'DirectoryString'  
  SINGLE-VALUE  
)
```

[5.7.](#) New Attribute Types Used in the AS-Set Object Class

```
( rpsl asSet 2
  NAME 'asSetName'
  DESC 'the AS-SET name'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString'
  SINGLE-VALUE
)

( rpsl asSet 3
  NAME 'asSetMembers'
  DESC 'list of address prefixes'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString'
  SINGLE-VALUE
)
```

```
)

( rpsl asSet 4
  NAME 'asSetMembersByReferral'
  DESC 'list of maintainer classes'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString'
  SINGLE-VALUE
)
```

[5.8.](#) New Attribute Types Used in the Route-Set Object Class

```
( rpsl routeSet 2
  NAME 'routeSetName'
  DESC 'the route set name'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString'
  SINGLE-VALUE
)
```

```

)

( rpsl routeSet 3
  NAME 'routeSetMembers'
  DESC 'list of address prefixes'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString'
  SINGLE-VALUE
)

( rpsl routeSet 4
  NAME 'routeSetMembersByReferral'
  DESC 'list of maintainer classes'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString'
  SINGLE-VALUE
)

```

[5.9.](#) New Attribute Types Used in the Router Object Class

```

( rpsl inetRtr 2
  NAME 'rtrName'
  DESC 'the name of the router'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString'
  SINGLE-VALUE
)

( rpsl inetRtr 3

```

```

  NAME 'alias'
  DESC 'other names by which the router is known'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString' )

( rpsl inetRtr 4
  NAME 'localAs'

```

```

DESC 'the local AS in which the router resides'
EQUALITY caseIgnoreMatch
SUBSTRINGS caseIgnoreSubstringsMatch
SYNTAX 'DirectoryString'
SINGLE-VALUE
)

( rpsl inetRtr 5
  NAME 'ifAddr'
  DESC 'a string describing an interface address on the router'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString' )

( rpsl inetRtr 6
  NAME 'peer'
  DESC 'a string describing relationships with peer routers'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString' )

( rpsl inetRtr 7
  NAME 'inetRtrGuardian'
  DESC 'the e-mail address of the guardian of the resource'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString'
  SINGLE-VALUE
)

```

[5.10.](#) New Attribute Types Used in the Tunnel Object Class

```

( rpsl inetTunnel 2
  NAME 'tunnelName'
  DESC 'the name of the tunnel'
  EQUALITY caseIgnoreMatch
  SUBSTRINGS caseIgnoreSubstringsMatch
  SYNTAX 'DirectoryString'
  SINGLE-VALUE
)

( rpsl inetTunnel 3
  NAME 'tunnelSource'
  DESC 'the source of the tunnel'
  EQUALITY caseIgnoreMatch

```

```
        SUBSTRINGS caseIgnoreSubstringsMatch
        SYNTAX 'DirectoryString'
        SINGLE-VALUE
    )

( rpsl inetTunnel 4
    NAME ' tunnelSink'
    DESC 'the sink of the tunnel'
    EQUALITY caseIgnoreMatch
    SUBSTRINGS caseIgnoreSubstringsMatch
    SYNTAX 'DirectoryString'
    SINGLE-VALUE
)

( rpsl inetTunnel 5
    NAME 'tunnelProtocol'
    DESC 'the protocol to be run inside the tunnel. Values include
        BGP, RIPv6, DVMRP, PIM-DM, and PIM-SM'
    EQUALITY caseIgnoreMatch
    SUBSTRINGS caseIgnoreSubstringsMatch
    SYNTAX 'DirectoryString'
    SINGLE-VALUE
)

( rpsl inetTunnel 6
    NAME 'tunnelIn'
    DESC 'a string describing the inbound routing policy'
    EQUALITY caseIgnoreMatch
    SUBSTRINGS caseIgnoreSubstringsMatch
    SYNTAX 'DirectoryString' )

( rpsl inetTunnel 7
    NAME 'tunnelOut'
    DESC 'a string describing the outbound routing policy'
    EQUALITY caseIgnoreMatch
    SUBSTRINGS caseIgnoreSubstringsMatch
    SYNTAX 'DirectoryString' )

( rpsl inetTunnel 8
    NAME 'inetTunnelGuardian'
    DESC 'the e-mail address of the guardian of the resource'
    EQUALITY caseIgnoreMatch
    SUBSTRINGS caseIgnoreSubstringsMatch
    SYNTAX 'DirectoryString'
    SINGLE-VALUE
)
```


[6.](#) Acknowledgments

Thanks to Gurdeep Singh Pall and Narendra Gidwani of Microsoft for useful discussions of this problem space.

INTERNET-DRAFT

21 November 1997

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[Page 14]

INTERNET-DRAFT

21 November 1997

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