This document describes an LDAP operational attribute named "numSubordinates". The purpose of this attribute is to allow clients to determine efficiently the number of entries immediately below (in the DIT), any particular directory entry.

Experience has shown that where an LDAP client wishes to "browse" the Directory Information Tree (DIT), it is useful to be able to determine how many entries exist which are immediate subordinates of a particular entry. Knowledge of this information allows the client to display UI to the effect that "there are too many entries in this container to display". Only by waiting for some timeout interval would it be possible to come to this conclusion without knowing the subordinate count in advance. Such a timeout leads to poor user experience. Similarly, UI which displays the DIT complete with the content count of each container...
entry becomes feasible. In addition, easy and efficient access to sub-
ordinate count information permits client tools to analyse the DIT, for example to determine where special server indices or precomputed search result sets should be maintained to give optimum performance.

The key words "MUST", "SHOULD", and "MAY" used in this document are to be interpreted as described in [Bradner97].

4. Attribute Definition

The numSubordinates attribute is defined as follows in RFC2252 then X.520 ASN.1 format:

```
numSubordinates ATTRIBUTE ::= {
  WITH SYNTAX             INTEGER
  USAGE                   directoryOperation
  SINGLEVALUED            TRUE
  NO USER MODIFICATION    TRUE
  ID                      {dod internet(1) private(4)
                           enterprises(1) isode-consortium(453)
                           ic-dsa(16) ic-dsa-at(2) 103}
}
```

Every entry in the DIT MAY have a numSubordinates operational attribute the contents of which indicate how many immediate subordinates that entry has. For example, a leaf entry would have numSubordinates equal to "0". Entry "ou=People, o=ace industry, c=us" in a DIT where the contents of that container comprises 1000 leaf entries, would have numSubordinates equal to "1000".

Server support for the numSubordinates attribute is on a per-entry basis. That is, the presence of the attribute indicates that its value is correct, while the absence of the attribute indicates nothing other than the lack of support for the attribute. Consequently, absence of the numSubordinates attribute does not imply that there are no subordinates.

5. Client-Server Interaction

Clients may read the value of the numSubordinates attribute by perform-
ing a regular LDAP search operation[LDAPv3], while specifying numSubor-
dinates as one of the requested attributes. Note that an operational attribute such as numSubordinates will not be returned to the client unless explicitly requested.
Clients cannot modify the contents of the numSubordinates attribute. Servers MUST refuse to allow such modifications and SHOULD return the unwilling to perform status code.

Servers MUST ensure that the value returned in the numSubordinates attribute to clients is consistent with the view that client has of other server contents. For example, is it NOT permissible to delay updating the numSubordinates count for some container entry until some time after subordinates have been added or deleted. This would lead to the potential for a client to see an inconsistency between the numSubordinates value reported for an entry and the number of entries that same client had added as subordinates.

6. Relationship to hasSubordinates

The X.500 hasSubordinates operational attribute[ITU-X501] can be regarded as indicating whether numSubordinates has a non-zero value for the same entry. This leads to the potential for optimization in a server implementation, in that it isn't necessary to store both values.

7. Security Considerations

Any client which is able to read the numSubordinates attribute may be able to discover more about the contents of the DIT than would be possible without access to that attribute. Consequently server implementers are advised to provide an access control mechanism which can be used to restrict access to numSubordinates. For servers which already have an attribute-level access control facility, this might involve no more than ensuring that numSubordinates falls within that existing scheme.

8. References

[ITU-X501]

[LDAPv3]

[RFC2252]

[ITU-X520]

Boreham and Kille
9. Authors’ Addresses

David Boreham                 Steve Kille
Bozeman Pass, Inc.            Isode
1106 W. Park St #200          5 Castle Business Village
Livingston, MT 59047, USA     36 Station Road
+1 406 222 7093               Hampton
david@bozemanpass.com         Middlesex, TW12 2BX, UK
                              +44 (20) 8783 0203
                              S.Kille@ISODE.COM

This document expires on 19 April 2004