

List Pagination Mechanisms for NETCONF and RESTCONF

draft-ietf-netconf-list-pagination-02
draft-ietf-netconf-list-pagination-nc-02
Draft-ietf-netconf-list-pagination-rc-02

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On behalf of NETCONF List Pagination Design Team
Kent Watsen <kent+ietf@watsen.net>, Qin Wu <bill.wu@huawei.com>,
Olof Hagsand <olof@hagsand.net>, Hongwei Li <flycoolman@gmail.com>,
Per Andersson <perander@cisco.com>

List Pagination Suite Overview

- List Pagination for YANG-driven Protocols (LP)
 - draft-ietf-netconf-list-pagination-02
 - Standard mechanism to control filtering, and retrieval of entries of list or leaf-list.
- NETCONF Extensions to support List Pagination (LP-NC)
 - draft-ietf-netconf-list-pagination-nc-02
- RESTCONF Extensions to support List Pagination (LP-RC)
 - draft-ietf-netconf-list-pagination-02

Current status

- Cursor pagination finalized
- Snapshot support for “config false” added
 - Possible to indicate snapshot support and enable it per request
- Locale-aware collating added
 - Possible to select wanted, and signal used, locale when collating
- Editorials
 - Missing definitions in ietf-list-pagination model
 - Clarifying error identities and showing by example
 - Added YANG Security Considerations template text

Cursor based pagination

- A server SHOULD support cursor based pagination
- Offset a list resource by key
 - Thus, conformance list
- Augmenting ietf-system-capabilities with “cursor-supported” leaf
 - Indicating support for cursor
 - Opt-in now, should it instead be opt-out?

Cursor based pagination

```
GET /restconf/data/example-social:members/member?\  
cursor=YWxpY2UK&limit=2
```

```
{ "example-social:member":  
  [ { "member-id": "alice", ... },  
    { "member-id": "lin", ... } ],  
  "@example-social:member":  
    { "ietf-list-pagination:remaining": 1,  
      "ietf-list-pagination:previous": [null],  
      "ietf-list-pagination:next": "am9lCg==" // joe  
    }  
}
```

POLL

Should cursor based pagination
Be opt-out or opt-in?

Pagination with snapshots

- A server MAY support snapshots
- Augmenting ietf-system-capabilities with “snapshot”
 - Indicating support for snapshot for targeted “config false” list node
- “snapshot” query parameter

Pagination with snapshots

- “snapshot” query parameter
 - Enabling snapshot per request
 - Allowed values “true” and “false”
 - Conformance lists and leaf-lists
 - “snapshot-not-supported” error identity in error-app-tag if unsupported

Locale aware sorting

- Server support
 - MUST for “config true”
 - SHOULD for “config false”
 - MAY disable for “config false” with “constrained” leaf in ietf-system-capabilities
- Code points can be collated differently depending on locale
- Enabling users to select locale and become informed of locale used, for collating
- References: RFC 5646 and RFC 6365

Locale aware sorting

- “sort-locale-collate” query parameter
 - Allowed value is free form string but SHOULD follow language sub-tag (RFC 5646) e.g. “sv_SE”
 - If omitted server chooses locale
 - If locale is unknown or invalid, “unknown-locale” error identity should be produced in error-app-tag
- “sort-locale-collated” metadata value
 - Always included in response if target is not constrained

Locale aware sorting

```
GET /restconf/data\  
/example-social:member/member?sort-locale-collate=sv_SE
```

```
{"example-social:member":  
  [{"member-id": "alice", ...},  
   {"member-id": "bob", ...},  
   ...],  
 "@example-social:member":  
  {  
    "ietf-list-pagination:sort-locale-collated": "sv_SE"  
  }  
}
```

Editorials

- Added text from YANG Security Considerations Template
 - draft-moriarty-yangsecuritytext-02
 - Should this be used?

Next steps

- Fix a few editorials
- WGLC

Thank you!

Questions?

Locale aware sorting

```
$ cat data.txt
```

```
aa_bb_cc
```

```
aa_b_ee
```

```
ana
```

```
aña
```

```
anna
```

```
o
```

```
ö
```

```
p
```

Locale aware sorting

```
$ LC_COLLATE=C \  
  sort data.txt  
aa_b_ee  
aa_bb_cc  
ana  
anna  
aña  
o  
p  
ö
```

```
$ LC_COLLATE=es_ES.UTF-8 \  
  sort data.txt  
aa_bb_cc  
aa_b_ee  
ana  
anna  
aña  
o  
ö  
p
```


Locale aware sorting

```
$ LC_COLLATE=en_US.UTF-8 \  
  sort data.txt  
aa_bb_cc  
aa_b_ee  
ana  
aña  
anna  
o  
ö  
p
```

```
$ LC_COLLATE=sv_SE.UTF-8 \  
  sort data.txt  
aa_bb_cc  
aa_b_ee  
ana  
aña  
anna  
o  
p  
ö
```