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Name Server Control Protocol
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Abstract

This document describes the Name Server Control Protocol (NSCP). The NSCP will permit the management of diverse name server implementations. The NSCP uses NETCONF as framework.

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1. Introduction

1.1. Rationale

Operators of name servers often deploy software from multiple different vendors in order to reduce the threat from vulnerabilities found in any single implementation. However, doing so requires understanding a different control interface for each implementation. Additionally, provisioning for name server clusters does not scale well, since it often requires active lower level management of individual hosts.

This document defines a DNS name server control protocol which will permit management of multiple different name server implementations via a common interface.

The NSCP will use NETCONF [1]as framework.

1.2. Reserved Words

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 RFC 2119.

2. High level requirements

The Protocol should:

- Enable the operation of all nameserver implementations
- Allow the (un)setting of all nameserver configuration parameters
- Be able to signal which operations are supported by the implementation being controlled
- Allow the collection of any available nameserver statistics
- Be extensible to allow implementors to extend to cover new objects and methods.
- Be able to handle any dns data that might be seen on the wire, whether or not it is legal.

The requirements for the protocol are independent of the actual functions that a nameserver implementation provides. Any operation listed in this document does not require support for this function in an implementation. It is RECOMMENDED however, that functions which are supported by nameservers can be supported by this protocol, either as a core function, or as part of the extentions.

The level of feedback, such as state, or statistics that an implementation returns differs per implementation. This document

does not dictate form or grammar of this feedback, but does allow the transfer of this data. The extensibility of the protocol should be rich enough to allow for various forms and ways of aggregating this feedback.

3. Approaches to Nameserver Control

There have been several different approaches suggested for controlling nameservers. Possibilities include, but are not limited to, NETCONF, SNMP, some kind of in-band DNS based solution or a totally new protocol. Whilst any of these solutions can work we favor a solution based on NETCONF for the following reasons.

- It is based on XML.
- It operates persistent connections.
- It operates a command/response model.
- The protocol describes how error information is returned from the agent to the client.
- It is extensible.
- It allows a client to discover the set of protocol extensions supported by a server.
- It provides a separation of configuration and state data.
- It is designed to run on multiple different transports such as ssh which have built-in strong authentication and encryption.
- It provides sophisticated searching capabilities.

4. Data Model

Netconf treats the contents of its configuration elements as opaque data and assumes that the application will know what to do with it. For this reason it is necessary to define a data model to contain DNS configuration data. This data model will be required for use in NSCP and may be of use to developers of future nameserver implementations.

There are several options for doing this, two of which are presented here:

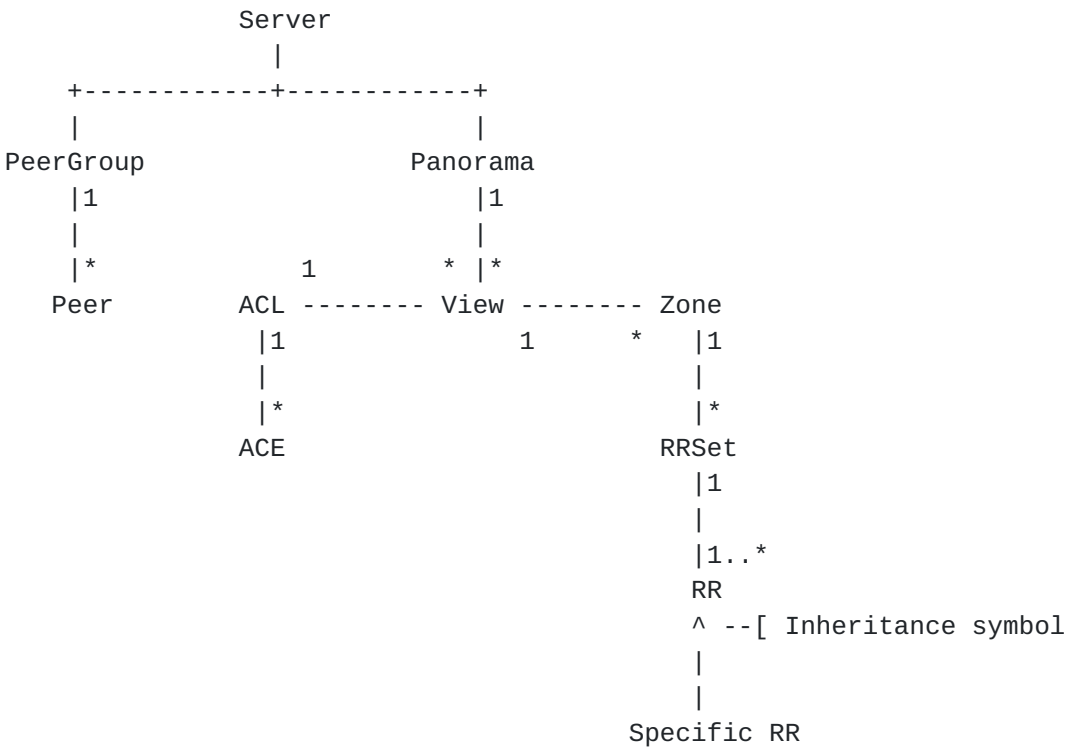
4.1. A generic model

A typical nameserver configuration file is made up of sections and configuration items. A possible representation is shown in the following fragment of XML:

```
<file name="ns.conf">
   <section name="server">
      <configitem name="ip-address">10.0.0.1</configitem>
      <configitem name="version">not available</configitem>
   </section>
   <section name="zone">
      <configitem name="name">example.com</configitem>
      <configitem name="zonfile">example.com.zone</configitem>
   </section>
</file>
```

4.2. A Structured DNS model

Analysis of a range of nameserver configurations leads to a model that is specific to DNS, such as:



In the above diagram, the names of the elements correspond to standard DNS concepts, with the following additions:

- Peer - either a master or slave of the server in question.
- PeerGroup - the collection of Peers.
- Panorama - a collection of views.

5. Security Considerations

6. Informative References

[1] Enns, R., "NETCONF Configuration Protocol", RFC 4741, December 2006.

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