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Experience of Designing Network Management System
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Abstract

This document describes our experiences from designing and implementing a large-scale local area network management system using mainly NETCONF. We designed the data models for device configurations and implemented NETCONF client to centrally control multiple devices of various vendors. The document provides insight on strong and weak points of current NETCONF approach. The document also makes some recommendations about NETCONF and future network management protocols.

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1. Introduction

This document discuss our experiences from designing and implementing a large-scale local area network management system. In this document, the large-scale local area network is supposed to be composed by multiple network intelligent network devices of several vendors.

We mainly used NETCONF[RFC6020][[RFC6241](#)][RFC6242] to get and edit configurations of network devices. NETCONF, however, is a developing protocol on model layer, therefore there are several data model designs by vendors. We designed the unified data models for device configurations to manage multiple devices of various vendors. Furthermore we implemented NETCONF client to control multiple devices asynchronously.

This document evaluates the NETCONF protocol design and makes some recommendations about NETCONF and future network management protocols to support large-scale network management.

2. Implementing NETCONF Client

2.1. Transport protocol

- * The tune of transport layer is often required on large scale systems
- * NETCONF requires SSH implementation; however this protocol makes it difficult to create high-performance implementation

2.2. Exchanging hello message

- * NETCONF does not define procedure to invoke errors on hello message exchange.
- * The error handling is different between vendors.
- * NETCONF should support hello fail message.

2.3. lock and commit mechanism

Lock mechanism of NETCONF is useful on control multiple devices safely.

3. Designing Data Models

3.1. YANG

The approach of YANG is to express various configuration format; however it makes the issue of complexity of data model schema.

3.2. RPC

Some bad patterns in XML schema.

4. conclusion

5. Security Considerations

6. IANA Considerations

7. Normative References

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