



# ConfD NETCONF

## XML Based Configuration Management for Network Equipment

ConfD is a production-ready on-device management software solution for network equipment vendors. Using ConfD, such vendors can reduce development costs and speed time-to-market while supporting the latest and most advanced network management capabilities in their products.

Traditionally, network equipment (e.g. routers and switches) in service provider networks or high-end enterprise networks included management interfaces such as SNMP, CLI and HTTP (Web). SNMP is primarily used for monitoring data rather than for configuration management. Automated configuration management is commonly performed by writing scripts that use the network device's command line interface (CLI). However, such scripts are costly to develop and maintain in an environment of ever-changing systems and requirements.

### About NETCONF

In contrast to a CLI or Web Interface, which are intended for human operations, NETCONF is defined to provide a programmatic interface enabling management applications to configure and monitor networking devices.

NETCONF is defined by the IETF and provides standardized mechanisms to install, retrieve, manipulate, and delete the configuration of network devices. NETCONF uses XML both for data specification and for protocol messages.

NETCONF allows network operators to carry out complex configuration changes with built-in safeguards that minimize network outages.

### ConfD NETCONF Functionality

Tail-f Systems' NETCONF agent is part of the ConfD on-device management solution, but can also be deployed as a stand-alone product. In addition to NETCONF, ConfD also provides CLI, Web interface, and SNMP agents. The XML-centric management back-plane in ConfD implements the operations of all agents. All management agents interface to the same AAA subsystem, configuration storage, and data model.

The ConfD NETCONF agent is based on the NETCONF protocol in RFCs 4741 and 4742. The configuration data exported by ConfD are described by an XML schema. Device developers describe their data models in an XML-based language. This significantly increases productivity when developing the configuration management system of a network device. Developers can individually specify their configuration data which later are linked into a single data model schema.

The ConfD NETCONF agent provides an implementation of the NETCONF protocol, as well as a complete mapping from NETCONF operations to configuration database operations (either using the ConfD built-in fault-tolerant configuration database or some external configuration storage). For example, a complex NETCONF edit-config operation is mapped to a minimal set of database read and write operations.

The ConfD NETCONF agent provides support for operating on candidate configurations, where all changes are committed to an active state in one atomic transaction. If the commit fails, a rollback to the previous configuration is performed.

### ConfD NETCONF Supports:

- NETCONF protocol – RFCs 4741 and 4742
- Full NETCONF implementation including optional capabilities
- Support for transaction validations and rollbacks
- Support for event notifications
- NETCONF agent is auto-rendered from the ConfD XML data model
- Exported configuration data is described by an XML schema
- Optimized XML data modeling language
- Separation between NETCONF agent and data model
- Telnet and SSH v2 as transport protocol
- Mapping of NETCONF operations to database operations
- API for integration with any configuration data storage
- Integrated with AAA servers (direct support for Linux PAM)
- All data is streamed allowing large configurations to be installed or retrieved

### Supported NETCONF Operations

- <get-config>
- <edit-config>
- <delete-config>
- <lock>
- <unlock>
- <get>
- <close-session>
- <kill-session>
- <commit>
- <discard-changes>



Candidate configurations can also be committed to several devices within a network using a single atomic transactional operation. If the commit on any of the devices fails, then all updated devices roll back to the previous configuration.

## Deployment Scenarios

For customers building a new network device, Tail-f offers a complete solution with all required components needed to build a carrier-grade on-device management system. For customers who have an existing on-device management system and just want to add NETCONF there are several alternatives available for integrating the ConfD NETCONF agent.

Figure 1

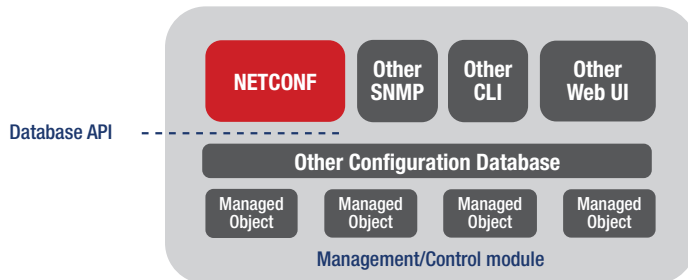


Figure 1 depicts the ConfD NETCONF management agent integrated into an existing configuration database. This alternative is suitable when there is an API available to the configuration data storage.

Figure 2

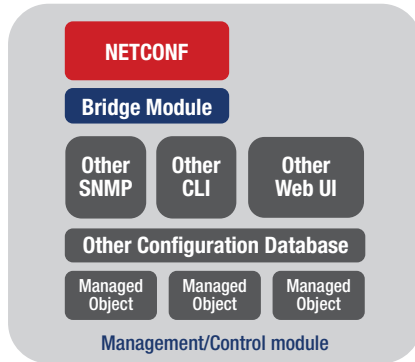
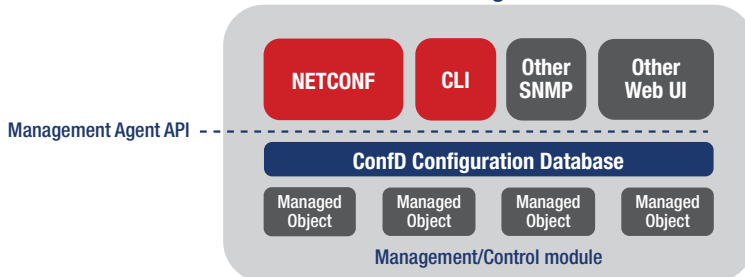


Figure 2 shows the ConfD NETCONF management agent integrated into an existing management system using a bridge module to the CLI or SNMP management agent. This alternative is suitable if there is no API available towards the configuration data storage.

Figure 3



In Figure 3, the ConfD NETCONF and CLI management agents are integrated with other existing management agents. This alternative is suitable if the user wants to benefit from the ConfD built-in configuration database.

- <copy-config>
- <validate>

## Supported NETCONF Capabilities

- :writable-running
- :candidate
- :confirmed-commit
- :rollback-on-error
- :validate
- :startup
- :url
- :xpath
- :notifications
- :partial-lock

## Supported Platforms

- Linux
- NetBSD
- FreeBSD
- QNX
- Solaris

tail-f

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