

Ericsson NETCONF Browser Technical Product Description

TECHNICAL PRODUCT DESCRIPTION

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1 Introduction

This document describes the Ericsson NETCONF Browser (ENB).

ENB is a tool that allows Operations, Administration, and Maintenance (OAM) personnel to work with node configurations on remote systems using the NETCONF interface. The browser presents configuration data graphically, allowing users to navigate the configuration structure and perform add, modify, and delete operations on configuration elements.

ENB fully supports node configurations based on the Ericsson proprietary meta-model called Ericsson Common Information Model (ECIM). When working with ECIM compliant nodes, ENB offers the following functionality:

- Search for configuration elements based on instance values and meta-model information.
- Receive contextual information on parameters and parameter groups.
- Perform Create/Read/Update/Delete (CRUD) operations on parameters and parameter groups.
- Compare two node configurations (live-live, saved-live, saved-saved).
- Push local configuration changes to the node in XML format.
- Save a local copy of the live node configuration.
- Load a local node configuration previously saved by ENB.

If the node configuration is not ECIM compliant, ENB can read the NETCONF information, but it cannot change the configuration data. When working with these node configurations, only the following operations are supported:

- Search for configuration elements based on instance values.
- Save a local copy of the live node configuration.

2 Functional Description

ENB allows authorized personnel to perform OAM tasks on live node systems. This section describes the functionality offered by ENB.



Navigate Graphically

ENB presents configuration data in a graphical and intuitive, allowing users to visually browse the configuration of a node. See Figure 1.

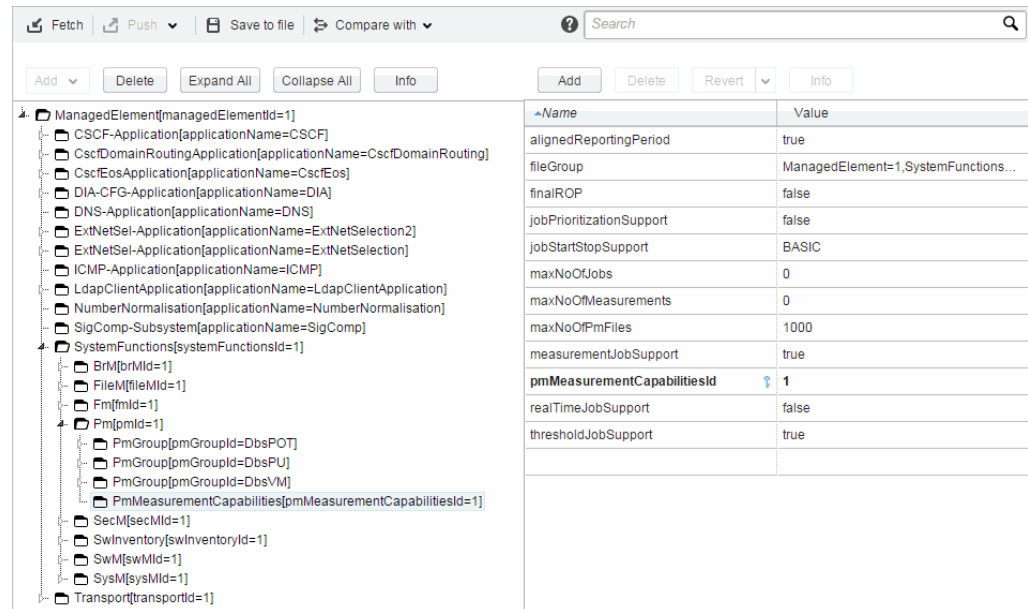


Figure 1 The Configuration Browser

Perform Add/Modify/Delete Operations

ENB can make changes to ECIM compliant node configurations. Add, modify, and delete operations can be applied to the following configuration elements:

- Parameter Groups
- Parameters
- Struct Parameters

Configuration changes can be pushed individually or consolidated and pushed as a change set. A change set is a single NETCONF transaction containing multiple updates made in ENB.

Push a Local NETCONF File

A local XML file, containing node compatible NETCONF configuration changes, can be loaded into ENB and pushed to the node.

Visualize ECIM Meta-Model Information

ENB can present the meta-model information for parameters and parameter groups in an ECIM compliant configuration. This information describes the



constraints on configuration elements, such as value patterns, data types, cardinality, dependency rules, and so on.

Search Configuration Elements

ENB can search a configuration for specific parameters and parameter groups by name and value. When working with ECIM compliant configurations, ENB is also able to perform a search on meta-model information. The use of logical operators (AND, OR, NOT) and parenthesis grouping are supported, allowing for complex search criteria.

Save and Load Configurations

ENB can save a local copy of a live node configuration, allowing users to take a snapshot of the configuration at a specific point in time. These files contain all the necessary information to be loaded back into the ENB tool.

Saved configuration files can be shared. Receivers of a saved configuration can open it in ENB and navigate the node configuration as if they were connected to the node. Loading a saved configuration is also useful for comparison.

Compare Two Configurations

ENB can compare two node configurations in the following ways:

- Live Node Configuration - Live Node Configuration
- Saved Node Configuration - Live Node Configuration
- Saved Node Configuration - Saved Node Configuration

Comparison results are displayed graphically, clearly highlighting differences and using color coding patterns to allow quick identification of the differences between two configurations. See Figure 2.

CSCF vIMS (CBA) 20150508-1537 MODIFIED.zip		CSCF vIMS (CBA)	
Name	Value	Name	Value
▼ ManagedElement[managedElementId=1] (12)		▼ ManagedElement[managedElementId=1] (12)	
▶ DIA-CFG-Application[applicationName=DIA] (6)		▶ DIA-CFG-Application[applicationName=DIA] (6)	
▼ SystemFunctions[systemFunctionsId=1] (6)		▼ SystemFunctions[systemFunctionsId=1] (6)	
▼ Fm[fmid=2] (6) m		▼ Fm[fmid=1] (6) m	
fmid	2	fmid	1
heartbeatInterval	55	heartbeatInterval	60
lastChanged	2015-02-18T19:11:42Z	lastChanged	2015-02-12T18:37:45Z
lastSequenceNo	10356688	lastSequenceNo	10356687
sumMinor	10	sumMinor	1
sumWarning	[missing]	sumWarning	5

Figure 2 ENB Comparison Results

ENB has the ability to map (define as identical) two instances of the same class that have different values to compensate for differences in site specific values and provide a greater impression of the scope of difference between the configurations.

3 Interworking

After establishing a connection, ENB retrieves information about the node including its capabilities, the ECIM meta-model (if applicable) and the node configuration.

Main Flow

The following flow diagram describes a scenario where ENB connects to a node for the first time:

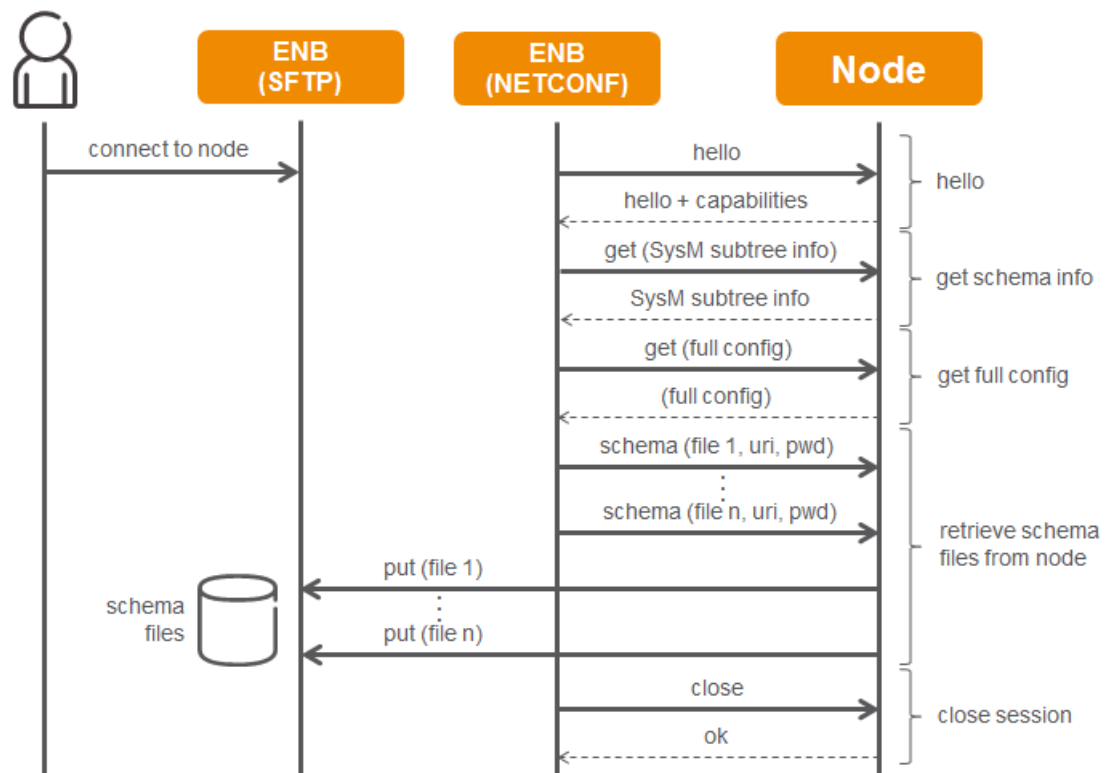


Figure 3 ENB Main Flow

ENB performs the following operations when connecting to an ECIM compliant node for the first time:



1. Establish the NETCONF connection and session.
2. Use NETCONF to obtain the list of schema files (files containing ECIM meta-model information).
3. Request the schema files. This request triggers a process in which the node pushes the schema files to ENB over SFTP.

After the schema files have been successfully transferred to ENB, they are stored locally for reuse. See Section 3.1 on page 5.

4. In parallel with the request for schema files, ENB downloads the node configuration using NETCONF.
5. After obtaining the schema files and the configuration, ENB closes the NETCONF session.
6. Schema and configuration data is processed by ENB and presented to the user in the configuration browser.

3.1 Reuse of Schema Files

Because the retrieval of schema files over SFTP can take a significant amount of time, ENB has the ability to store these files for future reuse. This process minimizes the time it takes to reestablish a connection to live nodes.

Note: The same schema files are reused across multiple nodes types.

ENB keeps the schema files under revision control and is able to determine the correct version required by a specific node. If ENB has already downloaded the required schema files, they are reused. If ENB does not have the required version, it is requested from the node.

4 Architecture

ENB runs outside Ericsson nodes on a Microsoft Windows or Linux client machine. For more information on supported Operating System (OS) versions, refer to the Ericsson NETCONF Browser User Guide, 1/1553-LXA 119 1714.



5 Interfaces and Protocols

Table 1 describes the protocols used by ENB.

Table 1 ENB Protocols

Protocol	Description
NETCONF	ENB communicates with the node using NETCONF to perform the following tasks: <ul style="list-style-type: none">• Pull configuration data• Push configuration changes• Request schema files (meta-model files)
SFTP	ENB receives meta-model files from the node using SFTP. ENB hosts an SFTP server to enable the file transfer.
SSH	ENB uses SSH as the underlying transport of NETCONF communications. When the target not is not reachable from the client machine, ENB can establish a SSH tunnel to establish communication.

Depending on the network setup in the live node environment, ENB supports the following connection types:

Direct connection

When ENB and the target node are part of the same subnet or can reach each other without further routing, ENB connects to the node using NETCONF and the node pushes the schema files to ENB through SFTP. See Figure 4.

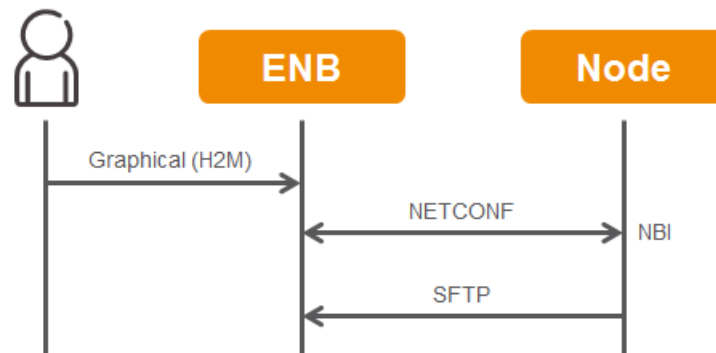


Figure 4 ENB Direct Connection

Tunneling

When ENB cannot reach the target node directly, it is able to implement a bidirectional tunnel so that ENB reaches a tunnel end point and the tunnel end point reaches the node. Available ports on the target node are found automatically for each connection. See Figure 5.

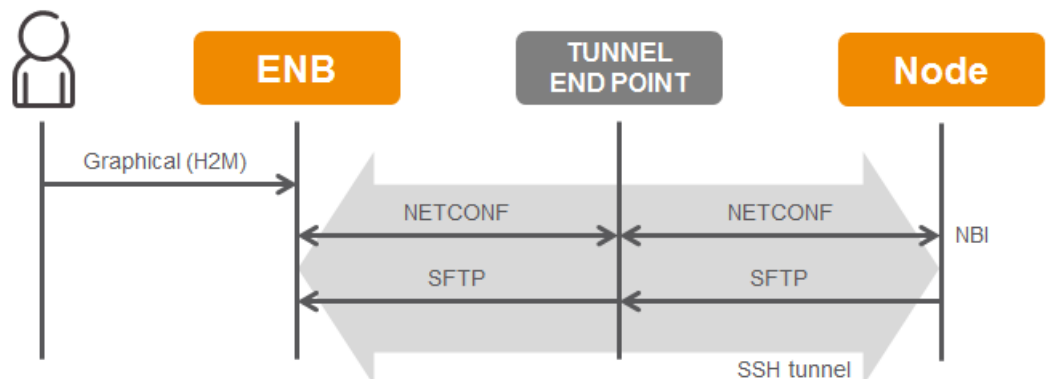


Figure 5 ENB Tunneling Connection

6 Standards

The following standards are used by ENB:



ECIM

The Ericsson Common Information Model (ECIM) is a standardized, unified management model that describes how Ericsson products behave from an OAM perspective. The operator is presented with a Managed Element (ME) that represents the node. Each ME behaves as a single element from a management topology/administrative view.

ENB works with ECIM compliant nodes. Node that are not ECIM compliant are partially supported.

7 Operations and Maintenance

This section describes the Operations and Maintenance (O&M) of ENB.

Configuration Management

All node connections defined in ENB are persisted across installations on a separate path.

Errors and warnings

ENB provides graphical queues for errors and warnings that occur while the tool is in use.

Logging

ENB keeps a debug information in a log file that can be used to investigate the cause of a malfunction or issues connecting to a node.

Upgrades

ENB can be upgraded in-place on Microsoft Windows and Linux platforms. Saved node connections and settings persist between installations.

Backup and Restore

Because saved node connections and settings persist between installations, a regular backup of ENB is not required.

Security

Saved node connections contain server passwords. These passwords are encrypted so access to the settings file does not reveal the password information.



All interactions between ENB and live nodes are conducted over secure protocols (SSH, NETCONF, SFTP).

ENB is a non-invasive tool that only interacts with nodes through their approved Northbound Interface (NBI) to retrieve configuration data and push changes.