

CLI/TUI for SDC

Students

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Introduction: Modern networks consist of many interconnected devices from different vendors, all of which must be configured correctly to ensure reliable communication. Today, this configuration work is often done manually, directly on the device using command line interfaces (CLIs) or using vendor-specific solutions. As illustrated in Figure 1, these approaches are time-consuming, error-prone, and make it difficult to maintain a consistent overview across heterogeneous network environments. Schema Driven Configuration (SDC) aims to improve this situation by defining the desired configuration of devices in a structured and vendor-neutral way, see Figure 2. Rather than configuring devices step by step, engineers specify the desired end state of the network in a vendor-independent way, by writing the configuration into a file.

Problem: However, in practice, working with SDC is still challenging. Configuration files are usually written by hand, require detailed background knowledge, and the relevant information is spread across multiple systems, which limits usability.

Result: This project addresses these challenges by introducing a generic Terminal User Interface (TUI) for working with SDC, shown conceptually in Figure 2. The TUI is a text-based interface that combines command-line interaction with visual structure inside a terminal, see Figure 3. The interface combines a familiar command-line style input with a visual representation of available configuration options and the current device state. By presenting this information side by side, the tool allows engineers to explore configurations, understand their impact, and define configuration intents within a single, vendor-independent interface. The TUI also supports autocompletion to reduce

typing effort and common mistakes. Using this interface, engineers can generate configuration files within a single tool and apply them through SDC. The result is a minimum viable product that demonstrates how a unified TUI/CLI can simplify and standardize network configuration workflows across different vendors.

Figure 1: Configuration approaches without using the SDC. Designed with: draw.io

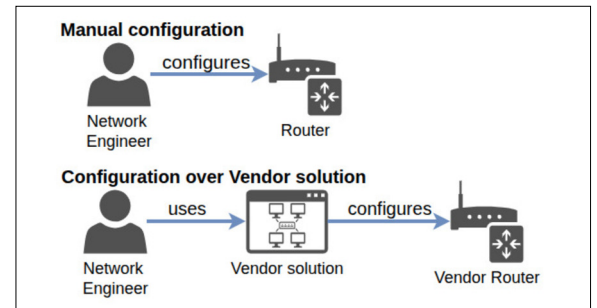


Figure 2: Configuration approaches using the SDC and the SDC TUI.

SDC Logo: <https://docs.sdco.dev/>, designed with: draw.io

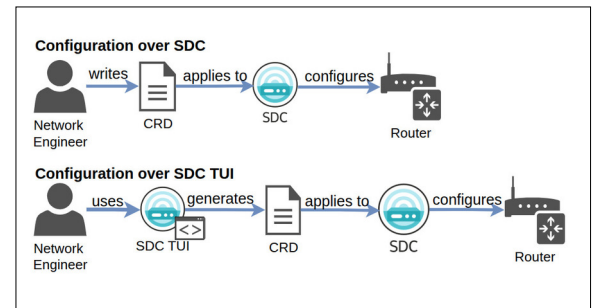


Figure 3: Screenshot of the SDC TUI.

Own presentation

```
Datastore: default.dev1  Vendor: srl.nokia.sdco.dev  Version: 24.10.1
* Left/Right Arrow Keys or Tab, switch focus between windows
* Enter, lock focus on the currently selected window

Enable a datastore to begin with the configuration see
'show datastores' for available datastores.

See "help" for further information.
Type "quit" or press ctrl+c to exit.

> show datastores
Datastores:
Datastore: default.dev1
Intents:
  - default.intent1.dev1
  - default.test
  - running
Schema:
Vendor: srl.nokia.sdco.dev
Version: 24.10.1
Target:
Type: gnmi
Address: 172.21.0.200
Status: CONNECTED

> enable default.dev1
```

```
Schema Blame
srl_nokia-igmp-snooping
srl_nokia-igmp-types
srl_nokia-interfaces
  interface
    adapter
    breakout-mode
    ethernet
      crc-monitor
      dot1x
      exponential-port-dampening
      flow-control
      hold-time
      llcp-transparency
      ptp-timestamping
      statistics
      storm-control
      symbol-monitor
      sync
    lag
    linux
    p4rt
    packet-link-qualification
    pci
    sflow
    statistics
    subinterface
```

Locking status: locked | Active window: schema-tab
Server status | Schema server: ■ connected | Data server: ■ connected

Advisor
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Subject Area
Network and Cloud
Infrastructure,
Application Design

Project Partner
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