YumaBench User Manual

YANG-Based Unified Modular Automation Tools

YumaBench User Manual

Version 0.2.0

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Table of Contents

1 Preface....4
1.1 Legal Statements....4
1.2 Additional Resources....4
1.2.1 WEB Sites....4
1.2.2 Mailing Lists....5
1.3 Conventions Used in this Document....5
2 Introduction....6
2.1.1 YANG Based Network Management....7
2.1.2 Use Cases....7
2.1.3 Database CRUD Operation Work Flow....7
3 Setting Up YumaBench....9
3.1 Prerequisites....9
3.2 Installation and Startup....9
3.3 Entering The Product Key....9
3.4 The Main Window....10
3.4.1 Main Window - File....11
3.4.2 Main Window - Edit....12
3.4.3 Main Window - Session....13
3.4.4 Main Window - Help....14
3.5 Main Window – Select Item Types....15
3.5.1 Users....15
3.5.2 User configured with SSH Keys....18
3.5.3 User configured with SSL Certificates....19
3.5.4 Devices....20
3.5.5 Device configured for TLS....21
3.5.6 Sessions....22
3.5.7 Starting a Session....23
3.5.8 Aliases....24
3.5.9 Managing Multiple List Entries per Menu Type....25
3.5.10 Cloning List Entries....25
3.5.11 Selecting List Entries....25
3.5.12 Expand, Collapse and Zoom....26
3.5.13 Searching for Data....27
3.6 The Session Window....28
3.6.1 Session Window – File....29
3.6.2 Session Window – Edit....29
3.6.3 Session Window – Help....30
3.7 The Session Window – Tabs....31
3.7.1 tab: Configuration....31
3.7.2 Navigating Data Trees....32
3.7.3 Editing Configuration....33
3.7.4 Node Creation and Removal....36
3.7.5 tab: Monitoring....38
3.7.6 tab: Status....39
3.7.7 tab: Console log....40
3.7.8 tab: Notifications....42
3.7.9 Searching Notification Data....43
3.7.10 Advanced Filtering for Notifications....44

3.8 Configuration and Temporary Files and Debug....46
3.8.1 Configuration and Temporary Files....46
3.8.2 Debug....46

1 Preface

1.1 Legal Statements

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1.2 Additional Resources

Other documentation includes:

YumaPro Quickstart Guide

YumaPro User Manual

YumaPro netconfd-pro Manual

YumaPro yangcli-pro Manual

YumaPro ypclient-pro Manual

YumaPro yangdiff-pro Manual

YumaPro yangdump-pro Manual

YumaPro Developer Manual

YumaPro API Quickstart Guide

YumaPro ypgnmi Guide

YumaPro yp-system API Guide

YumaPro yp-show API Guide

YumaPro Yocto Linux Quickstart Guide

YumaPro yp-snmp Manual

To obtain additional support you may contact YumaWorks technical support department:

support@yumaworks.com

1.2.1 WEB Sites

- **YumaWorks**
  - https://www.yumaworks.com
  - Offers support, training, and consulting for YumaPro.
- **Netconf Central**
  - http://www.netconfcentral.org/
  - Free information on NETCONF and YANG, tutorials, on-line YANG module validation and documentation database
- **Yang Central**
  - http://www.yang-central.org
  - Free information and tutorials on YANG, free YANG tools for download
- **NETCONF Working Group Wiki Page**
  - http://trac.tools.ietf.org/wg/netconf/trac/wiki

- Free information on NETCONF standardization activities and NETCONF implementations

- **NETCONF WG Status Page**
  - http://tools.ietf.org/wg/netconf/
  - IETF Internet draft status for NETCONF documents
- **libsmi Home Page**
  - http://www.ibr.cs.tu-bs.de/projects/libsmi/
  - Free tools such as smidump, to convert SMIv2 to YANG

1.2.2 Mailing Lists

- **NETCONF Working Group**
  - https://mailarchive.ietf.org/arch/browse/netconf/
  - Technical issues related to the NETCONF protocol are discussed on the NETCONF WG mailing list. Refer to the instructions on https://www.ietf.org/mailman/listinfo/netconf for joining the mailing list.
- **NETMOD Working Group**
  - https://datatracker.ietf.org/wg/netmod/documents/
  - Technical issues related to the YANG language and YANG data types are discussed on the NETMOD WG mailing list. Refer to the instructions on the WEB page for joining the mailing list.

1.3 Conventions Used in this Document

The following formatting conventions are used throughout this document:

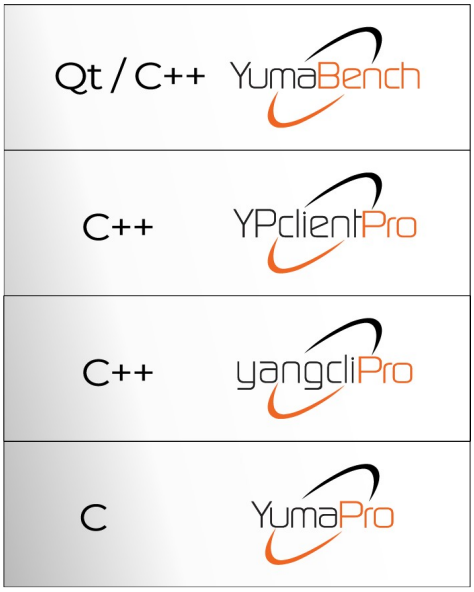
Documentation Conventions

Convention	Description
--foo	CLI parameter foo
<foo>	XML element foo
foo	**netconfd-pro** command or parameter
$FOO	Environment variable FOO
some text	Example command or PDU
some text	Plain text
Informational text	Useful or expanded information
Warning text	Warning information indicating possibly unexpected side-effects

2 Introduction

YumaBench is an intuitive graphical interface to manage, configure and monitor NETCONF servers. Increase productivity by customizing tasks to your needs. The newest tool in YumaPro SDK, YumaBench enables viewing and editing of YANG data in a natural way - no XML needed.

- Manage multiple NETCONF sessions
- Customize Session views for productivity
- Intuitively browse and edit server configurations
- Monitor telemetry and notifications with flexible filtering
- built on proven YumaPro SDK technology



The YumaBench GUI is aimed for use by developers and some network operators to manage network devices such as routers and switches. The NETCONF [RFC 6241] protocol is used to remotely control and monitor these network devices. These devices are capable of many 1,000s of configurations and options. The behavior must be setup for the specific network environment when the device is deployed by a network operator.

NETCONF uses a simple Client/Server architecture, similar to a WEB server. The client usually issues requests and the server sends responses. The server can also send messages to the client called notifications.

There are 3 basic areas of functionality for the NETCONF protocol:

1. Configuration Management: setup and provision devices in the actual network
2. Monitoring and Diagnostics: Retrieval of networking device status and remote diagnostics operations
3. Event Notifications: Asynchronous messages related to abnormal or interesting events on the networking device

The purpose of the YumaBench program is to allow the user to perform network management operations related to this functionality.

2.1.1 YANG Based Network Management

The NETCONF protocol uses data model abstractions to represent the data that can be exchanged between a client and a server. The YANG language [RFC 7950] is used for this purpose.

The YumaBench program can use the YANG data model information to automatically perform NETCONF protocol operations. A combination of command line and GUI components are data-driven from the set of YANG modules supported by each server.

Each server can support a different set of YANG modules. The YumaBench program provides a **Main Window** to launch management sessions and perform other tasks. Each management session has its own **Session Window** that is independent of all other **Session Windows**, runs in its own process and handle its own network IO with the server.

The YumaBench program provides many features to simplify and automate the NETCONF protocol operations:

- Session management (device, user, protocol, transport, reconnect, etc.)
- Data Management (hierarchy of YANG data variables)
- Operation Management (send requests to a server and process/observe the responses)
- Configuration Management (conduct YANG configuration edit transactions on a server)
- Event Management (listen for events and process them with scripts and hard-wired handlers)
- Operation Automation (bash-like scripts for automating a sequence of operations)
- Test Automation (test suites for positive and negative protocol operation testing)

2.1.2 Use Cases

YumaPro Server Development Testing: A vendor of networking devices must add support for specific YANG modules in the normal course of product development. The engineers doing this development need to design, implement, and test the new management protocol functionality during development (unit testing) and over time (regression testing). The YumaBench program can be used in the testing process to ensure the management interface defined by the YANG modules is implemented correctly.

Operator Developed Management Procedures: Operators of networking equipment that supports the NETCONF protocol can be semi-automated by using scripts and interactive operations to access the YANG-based management interface. These operators often develop their own scripts and procedures in addition to the network management systems provided by the equipment vendor.

2.1.3 Database CRUD Operation Work Flow

A typical work flow for YumaBench would be to perform Create, Retrieve, Update, and Delete operations on the YANG-based configuration data structures. The Session window allows the user to perform CRUD operations while connected to the server.

The YANG data structures are hierarchical trees, typically starting with a top-level container. The example module address.yang has a top-level container name “addresses”. This container has zero or more “address” list entries.

The user will create, update, and/or delete specific data subtrees on the server. This might need to be done in a specific order if there are cross-dependencies in the data. These operations are not much different than setting program parameters in the Preferences window, except the “Apply” button callback will cause the client to send an edit request to the server and wait for the response.

The GUI is capable of:

- zooming in or out of a user-selected sub-trees
- displaying a hybrid schema tree / data tree representing the current subtree
- creating a data subtree (such as addresses or address) if it does not exist yet
- modifying a data subtree if it already exists
- deleting a data subtree

3 Setting Up YumaBench

3.1 Prerequisites

The following platforms are supported and maintained for the YumaBench binary packages:

- Ubuntu 18.04 LTS, 20.04 LTS (64-bit x86_64)
- CentOS 8 (64-bit x86_64)
- Red Hat Enterprise Linux 8 (64-bit x86_64)
- Mac OS

3.2 Installation and Startup

Please download the “YumaBench Installation Instructions.pdf” located here:

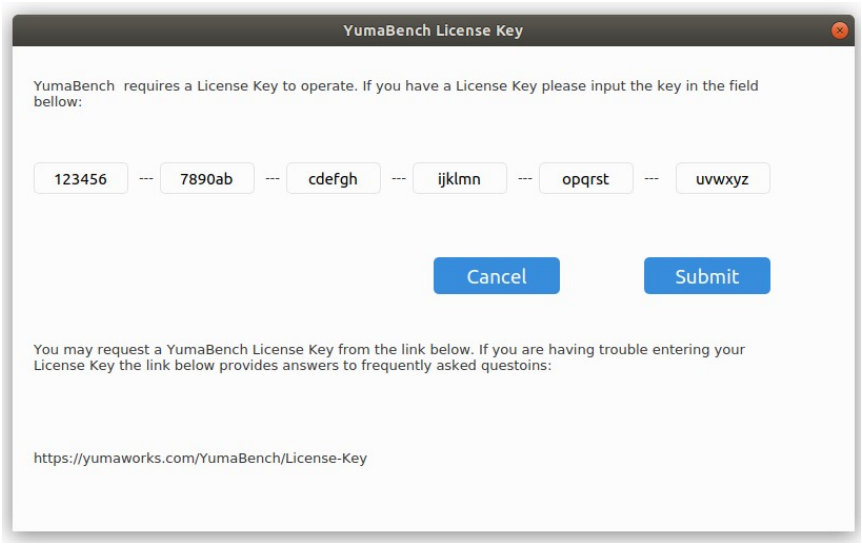
Follow the instructions.

To launch YumaBench simply type in yuma-bench in a terminal window. Depending on your operating system you may also be able to select the YumaWorks icon:

3.3 Entering The Product Key

The first time you run YumaBench you will be asked to enter your Product License Key. The YumaBench Installer Instructions provide information on how to obtain your Product License Key.

You will be presented with a screen that look like the following:



Use your system’s “Cut and Paste” function to paste the Product License Key you received into the License Key input field and then press “Submit”. YumaBench should now proceed to the Main Menu. For issues installing the YumaBench Product License Key please visit: https://yumaworks.freshdesk.com/support/home.

3.4 The Main Window

YumaBench creates **Sessions** so that authorized **Users** can monitor and edit configurations of **Devices**. To create these **Sessions** YumaBench provides the user with mechanisms to create **Users** and **Devices** and then combines them into **Sessions**.

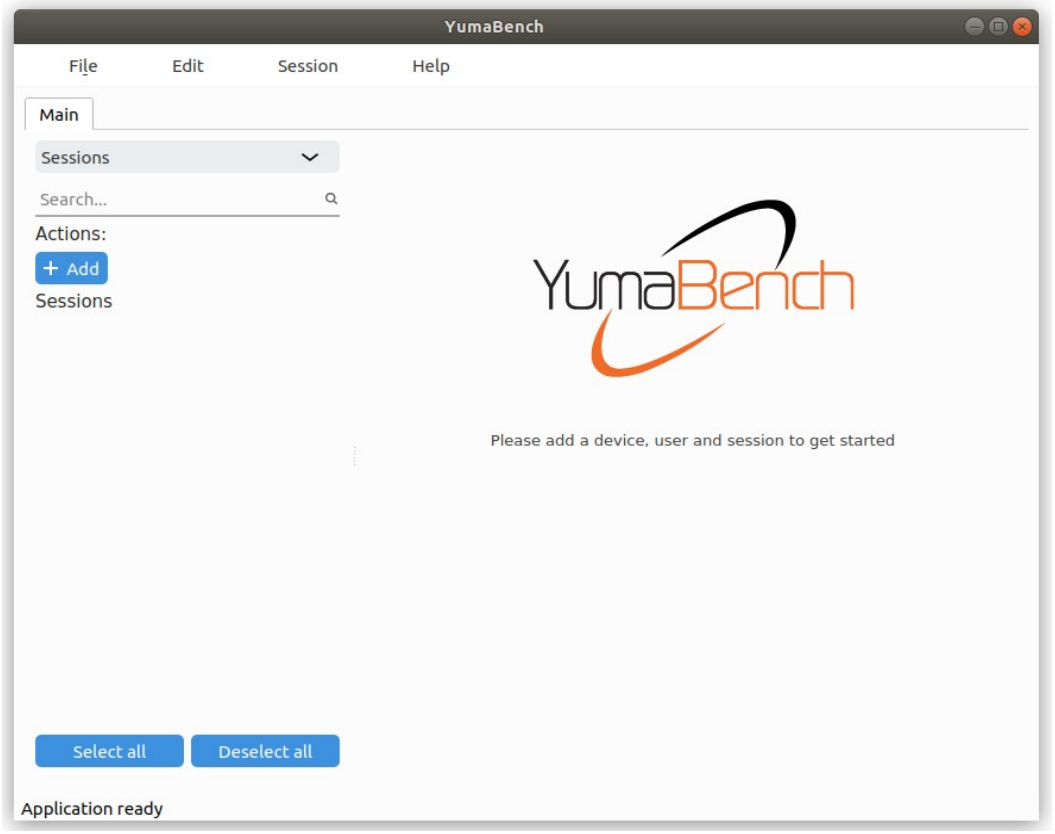
The YumaBench **Main Window** title bar contains the version number of YumaBench. This can also be found, along with other information about the YumaBench application, in Help/About.

The YumaBench **Main Window** is divided into 2 sections:

- the left panel is used to select, create and delete items from a list of valid options, such as Users, Devices, etc.

- the right panel is used to display the parameters of the selected items and allows them to be edited such as a User's name and password

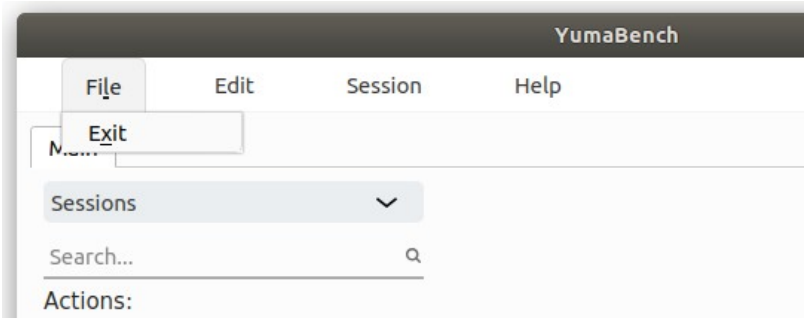
The screen can be moved and resized as usual for a graphical application. When YumaBench is next started it will retain the last size and position.



The toolbar at the top of the YumaBench **Main Window** has the following four pull-down menus:

- File
- Edit
- Session
- Help

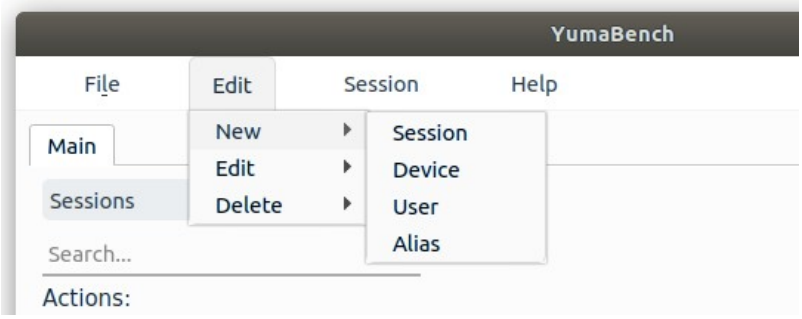
3.4.1 Main Window - File



The **File** pull-down contains one sub-item:

- **Exit** – selecting Exit closes the application. The same action can be accomplished with:
  - selecting the red “X” close button at the top right of the window
  - typing the keyboard shortcut “x” when the “File” pull-down is displayed – the Exit keyboard shortcut is denoted by the “x” in the graphical Exit button

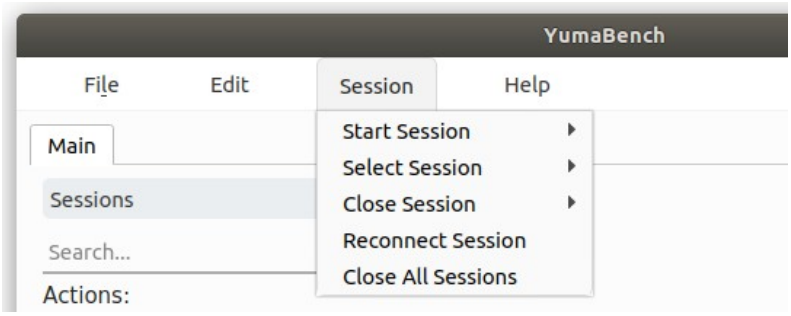
3.4.2 Main Window - Edit



The **Edit** pull-down contains four sub-items:

- **New** – contains four sub-items: **Session, Device, User** and **Alias.** Selecting one of the sub-items switches to the sub-item's screen, creates a new item and places the cursor in the right panel to start editing the new item's parameters
- **Edit** – contains four sub-items: **Session, Device, User** and **Alias.** Hovering the mouse pointer over one of the sub-items displays the instances of the selected sub-item, i.e. if you hover over **User** the menu will display all defined **Users**. Selecting one of the **Users** switches to the **Users** screen and places the cursor in the right panel to start editing the selected **User** information
- **Delete** – contains four sub-items: **Session, Device, User** and **Alias.** Hovering the mouse pointer over one of the sub-items displays the instances of the selected sub-item, i.e. if you hover over **Device** the menu will display all defined **Devices**. Selecting one of the **Devices** switches to the **Devices** screen and deletes the selected **Device**

3.4.3 Main Window - Session

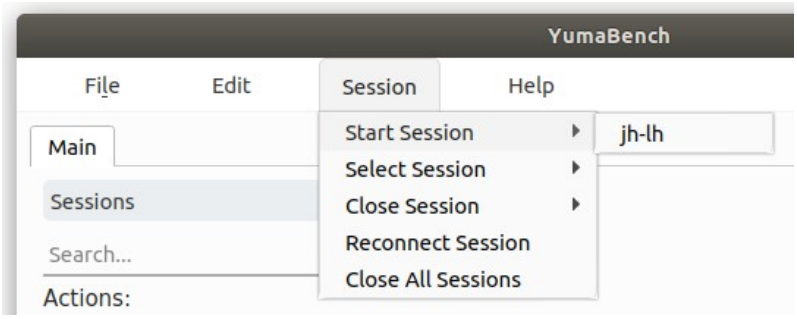


The **Session** pull-down contains five sub-items:

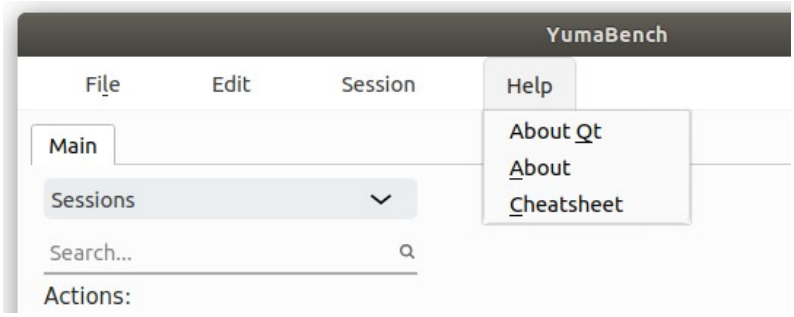
- **Start Session** - hovering the mouse pointer over **Start Session** displays all defined **Sessions**. as a sub-menu. Selecting one of the **Sessions** opens up the **Session Window** and attempts to connect the **Session's** defined **User** to the **Device**.

> Selecting a **Session** more than once opens a new **Session Window** for each selection. Each **Session Window** displays the session number in the title bar and the user name in the top right of the window.

- **Select Session** – if there are no **Sessions** active **Select Session** does not display a sub-menu and there is nothing to select. If there are **Sessions** open then the sub-menu displays all **Sessions**. Selecting one of the **Sessions** brings the selected **Session Window** to the foreground
- **Close Session** – if there are no **Sessions** active **Close Session** does not display a sub-menu and there is nothing to select. If there are **Sessions** open then the sub-menu displays all **Sessions**. Selecting one of the **Sessions** closes the selected **Session** and the **Session Window** is closed
- **Reconnect Session**– if all **Sessions Windows** are connected to their **Session**, **Reconnect Session** does not display a sub-menu and there is nothing to select. If there are **Sessions** that are disconnected then the sub-menu displays all disconnected **Sessions**. Selecting one of the **Sessions** tries to re-connect the selected **Session**
- **Close All Sessions** – closes all open **Session Windows** and their **Sessions**

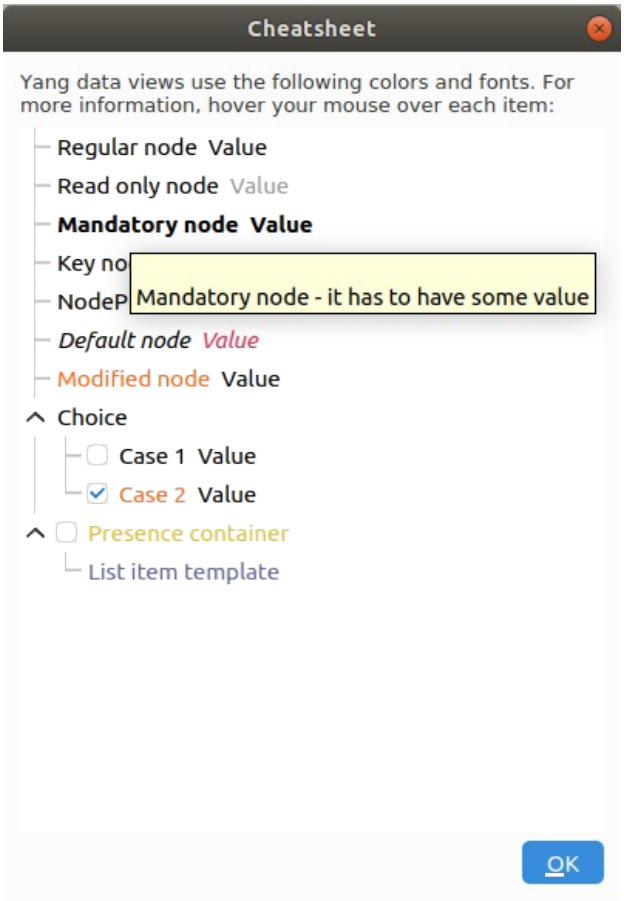


3.4.4 Main Window - Help



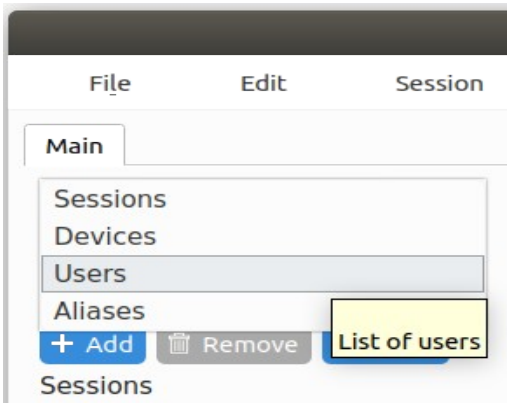
The **Help** pull-down contains three sub-items:

- **About Qt** – displays information about the Qt program used by the YumaBench Graphical User Interface
- **About** – displays information about the YumaBench Graphical User Interface
- **Cheatsheet** – displays information about what the font type and color used in a window denote



Hovering over an item provides a popup menu containing help text, as shown above for the Help menu's Cheatsheet.

3.5 Main Window – Select Item Types

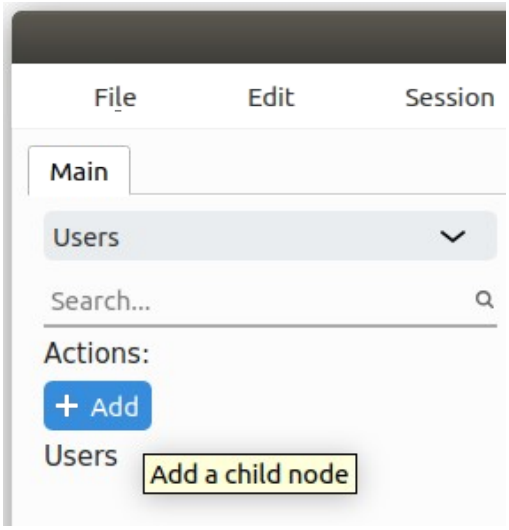


On the left side of the YumaBench **Main Window** is a list of one or more items. The type of items is selected by the pull down menu at the top. The pull down contains four types:

- Sessions – manage Sessions made up of Users and Devices
- Devices – manage Devices made up of names and IP addresses
- Users – manage Users made up of names and credentials
- Aliases – manage command aliases

To expedite getting started we will initially describe setting up one User, one Device and one Session and leave managing multiple items until a later section.

3.5.1 Users

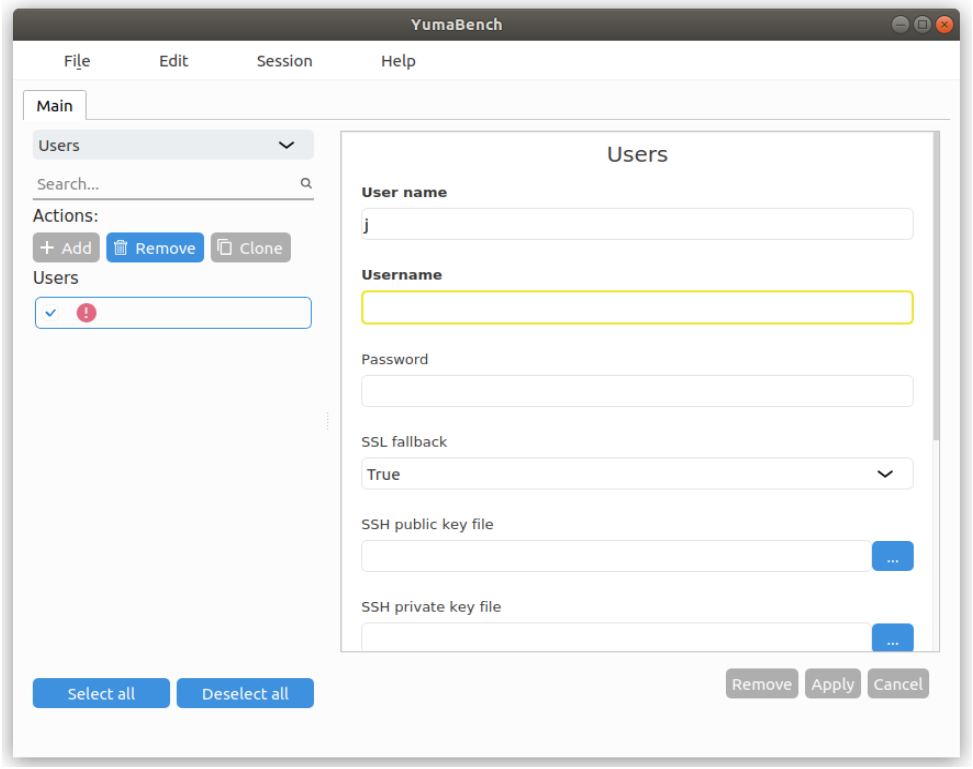


To create a new User select the “+ Add” button. This is the same as selecting Edit/New/User from the **Main Window** tool bar.

An entry will be created on the left side of the **Main Window** and will contain a red circle with an “!” inside it to indicate a User item is being setup.

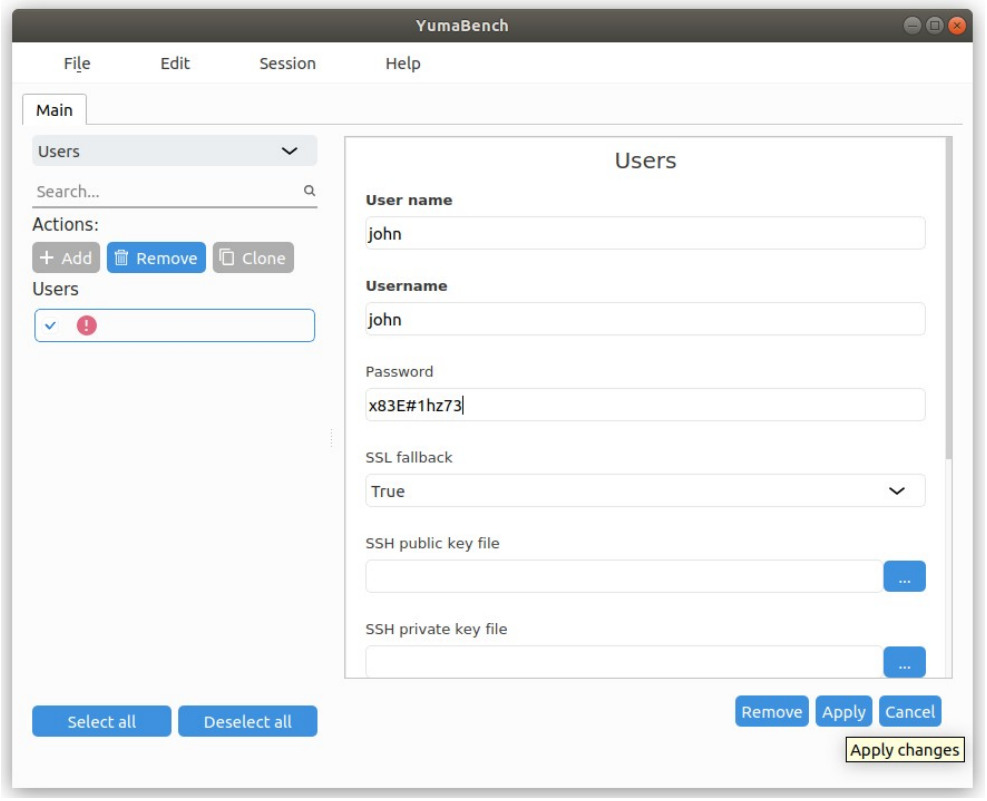
The right side of the **Main Window** will display the data entry section to enter the parameters for the User.

The cursor will be placed in the “User Name” field in the data entry section.

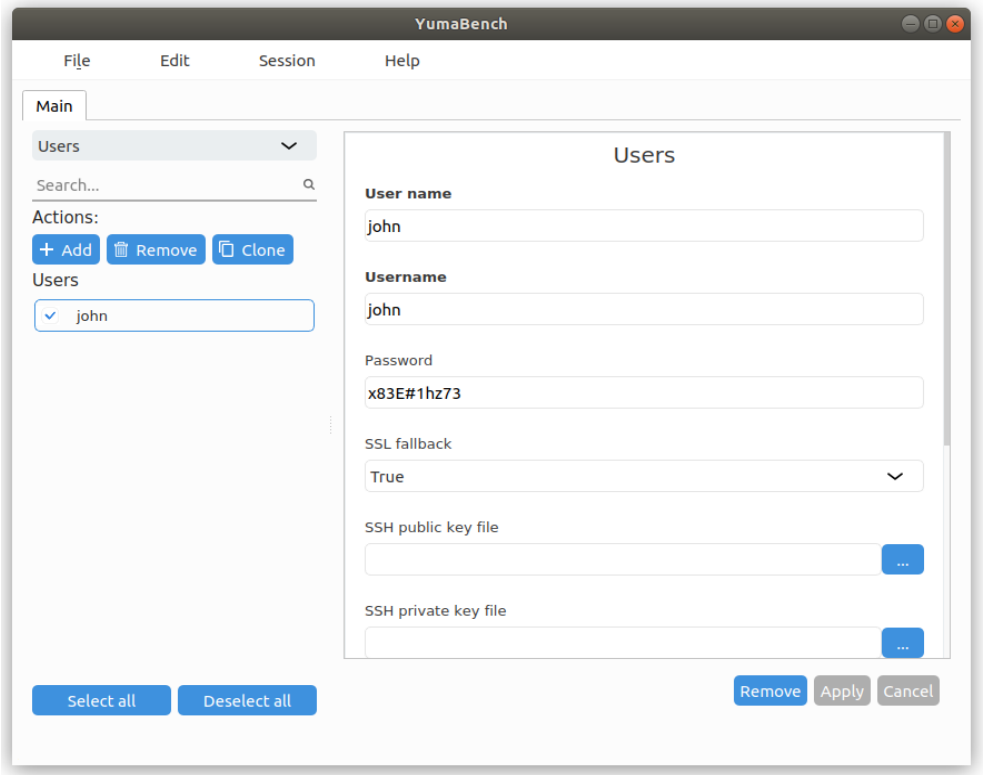


As soon as the first character is typed in the User Name filed you will notice the Username field below it becomes highlighted in yellow, as shown above. This is to indicate that this field is mandatory to be filled in.

> NOTE: Password is not mandatory as it is permissible to have a Device with no password required.



Once you have entered “User name”, Username and optionally Password select “Apply” to create this User.

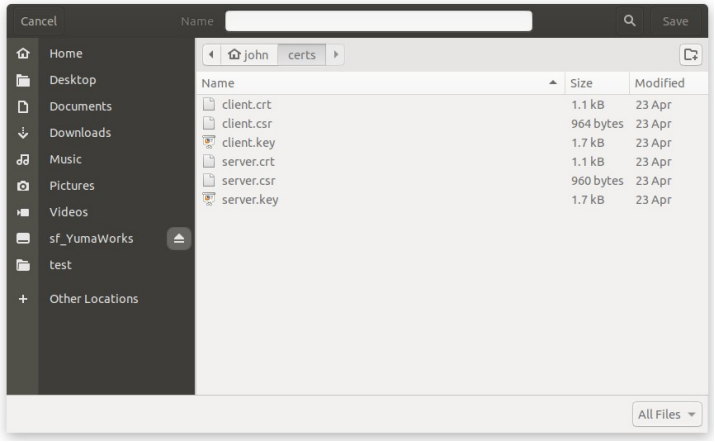


The “User name” is now added to the list of items on the left side of the **Main Window**.

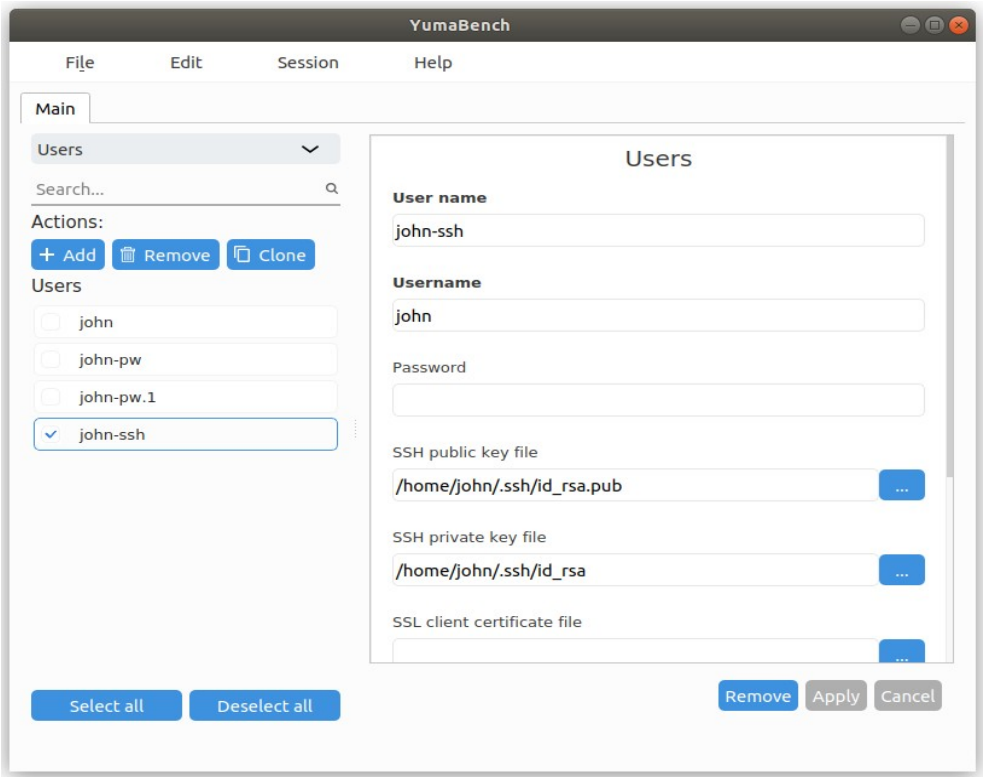
3.5.2 User configured with SSH Keys

To use SSH keys to connect to the server setup your certificates and configuration using the instructions found in YumaPro SDK Installation Guide, 3.3.1 Installing SSH keys.

Then setup a User and fill in the “SSH public key file” and “SSH private key”. When you select “...” to the right of the field for the keys a popup with a file explorer with appear looking something like the following:



The completed SSH keys should look something like the User configured below:

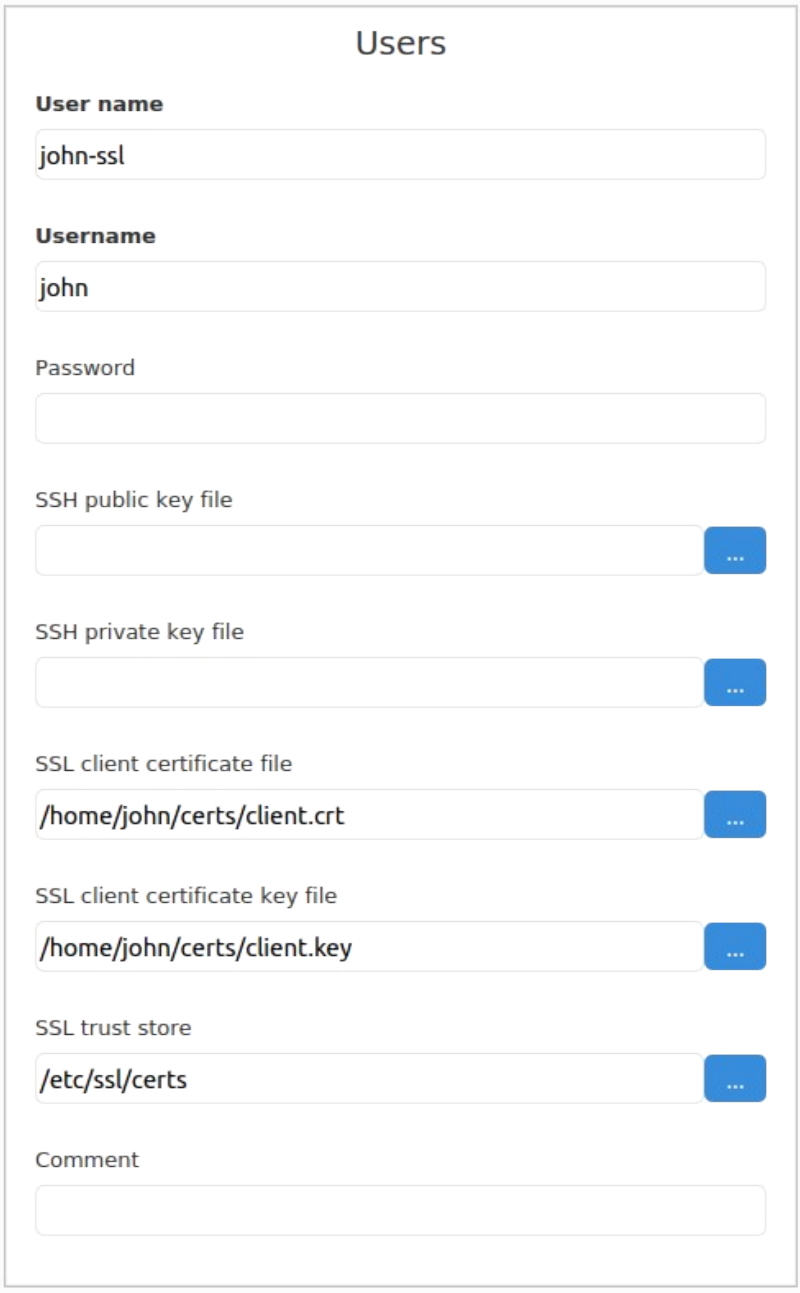


NOTE: If you created your SSH keys with a pass-phrase you will need to supply the pass-phrase in the Password: entry for the User.

3.5.3 User configured with SSL Certificates

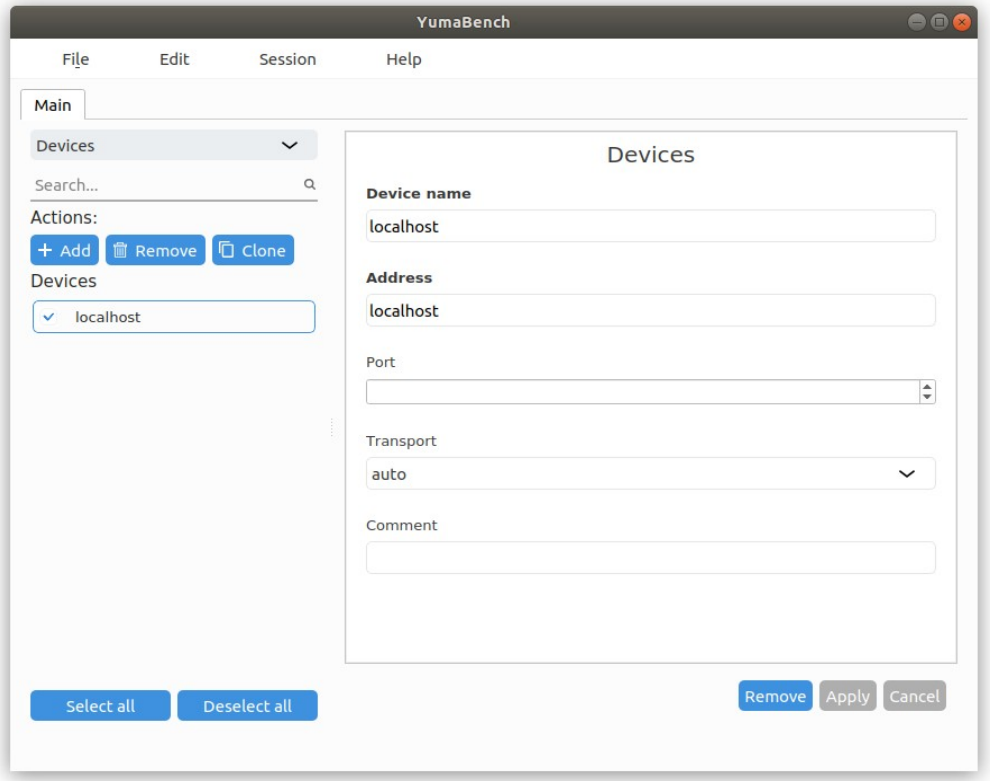
To use TLS to connect to the server setup your certificates and configuration using the instructions found in YumaPro SDK Installation Guide, section 3.8 Configure TLS.

Then setup a User with the certificates. It should look something like the User configured below:



To setup a Device to use TLS, see below, and then create a Session that uses this User and the TLS configured Device.

3.5.4 Devices



Similarly "+ Add" a Device to connect to with the User that was created in the previous step. The Device needs a "Device name" and an Address which can be a regular IP address or a DNS recognized name. Optionally a Port can be supplied that will be used to connect to the Device's NETCONF server and a Transport can be set.

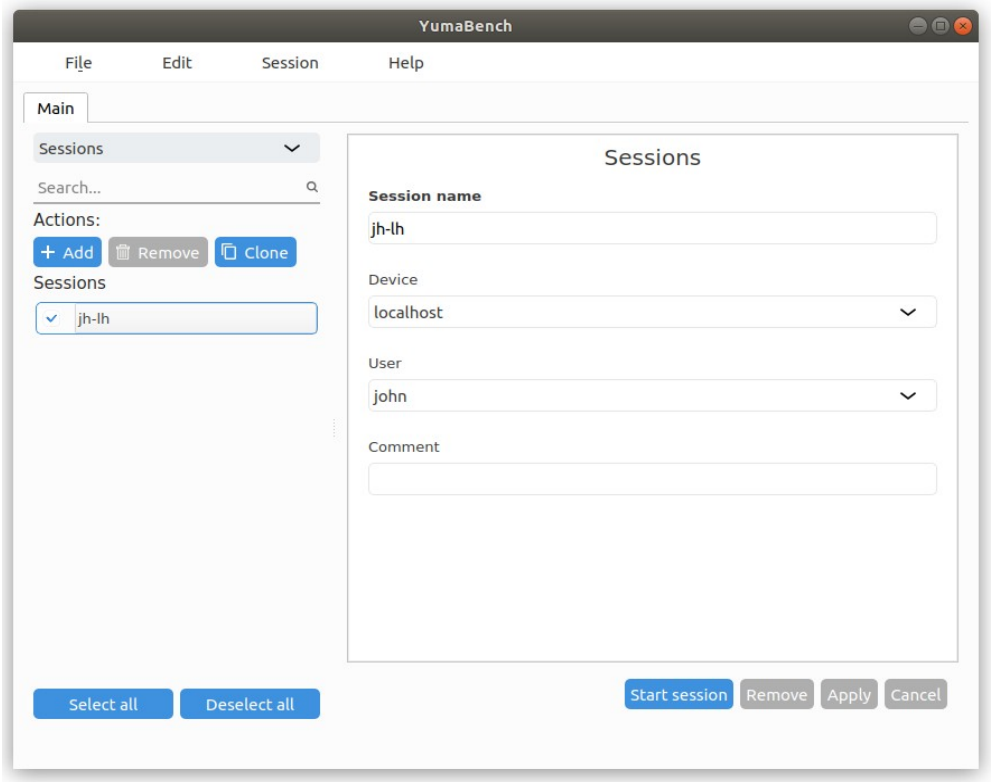
When the relevant information is added select the Apply button.

If you decide you don't want the new item or you want to enter its parameters from scratch you can select the Cancel button before selecting Apply or the right side Remove button after you select Apply to remove this new item.

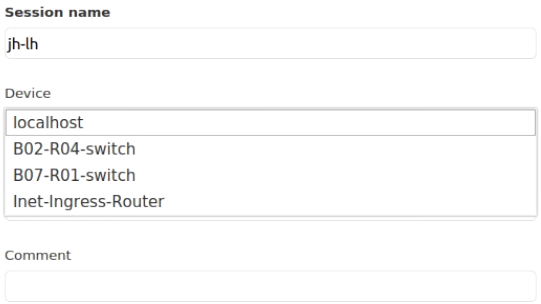
3.5.5 Device configured for TLS

If you need to use TLS to connect to the server and you have used the instructions found in YumaPro SDK Installation Guide, section 3.8 Configure TLS, setup a device using Port 6513 and Transport tls. You can select tls from the pull down menu. It should look something like:

3.5.6 Sessions



Lastly "+ Add" a Session. A Session consists of the Device where the NETCONF server is located and a User that has credentials that allow access to the Device. The parameters required to create a Session are listed on the right side of the screen. Device and User default to the available values if only one has been created.



If multiple Users or Devices have been created then the User and /or Device entry fields provides a selectable pull down menu listing the options as shown above.

When the Device and User are set to their desired values select Apply to create the Session.

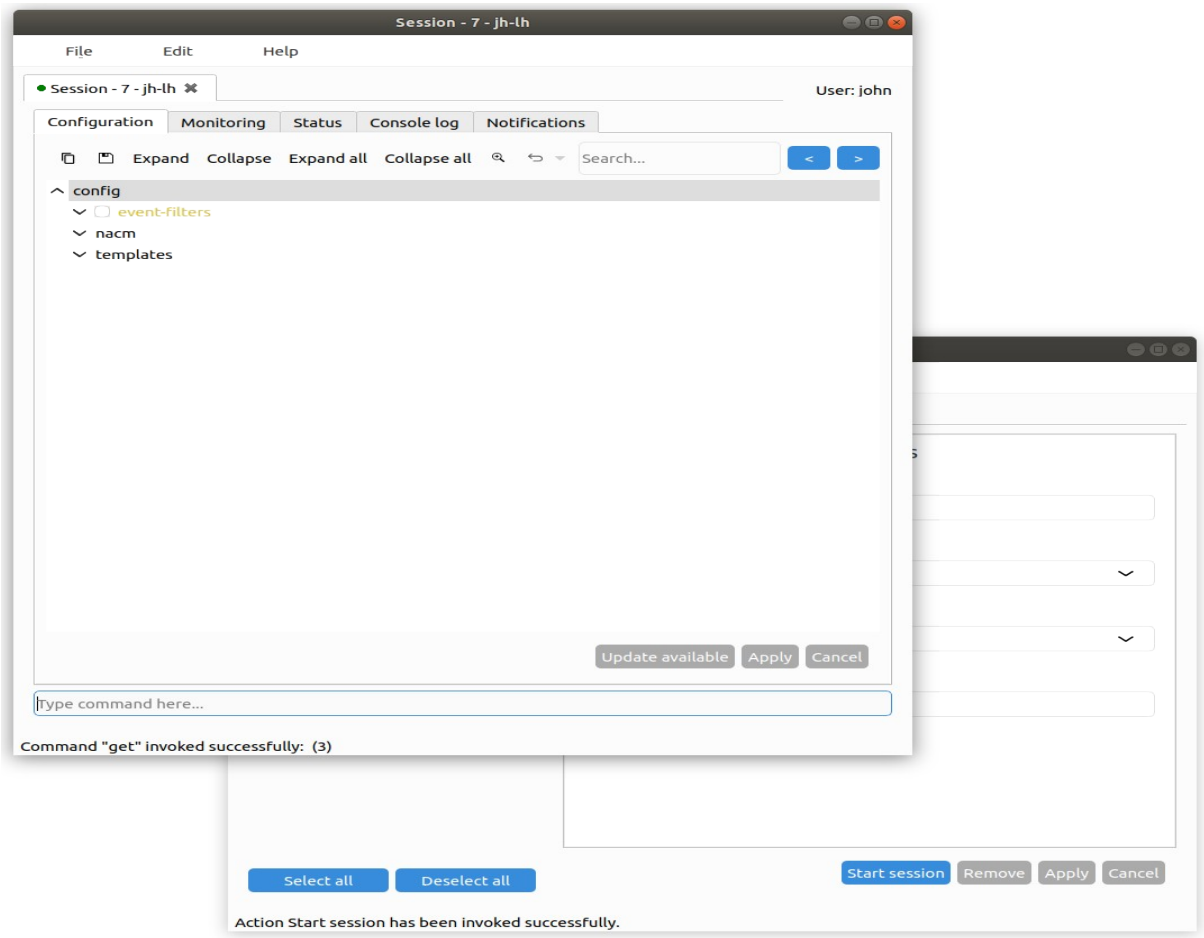
3.5.7 Starting a Session

If you are using the YumaPro netconfd-pro server, start the server from a terminal window with:

```
netconfd-pro log-level=debug4 access-control=off factory no-config
```

In YumaBench's **Main Window** if the desired Session is highlighted select the "Start session" button. Alternatively select Session/Start Session/jh-lh from the **Main Window** tool bar.

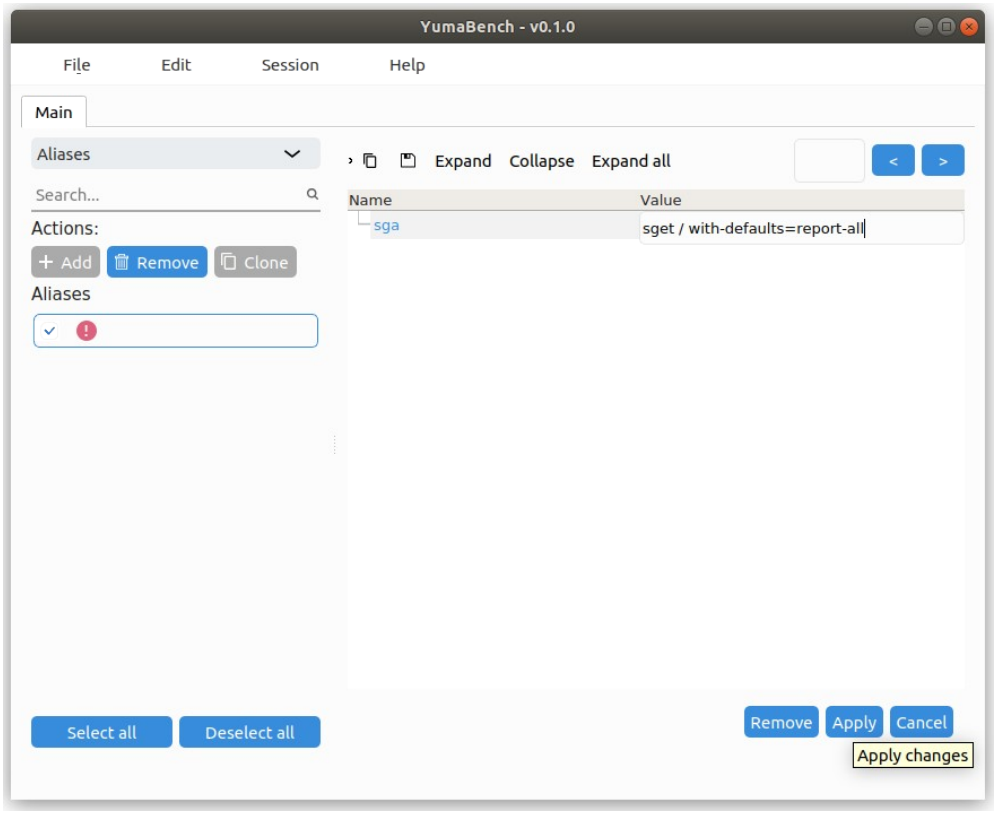
The jh-lh **Session Window** should open up and look something like:



The title bar for the Session window contains the Session number and the Session name.

Re-selecting "Start session" again opens a new Session window with a new session, and new session number, to the same server.

3.5.8 Aliases



This menu allows creating and managing command aliases. Creating an alias consists of the name you choose for the alias and the value of the alias. The example above sets sga=”sget / with-defaults=report-all”. In any active session “sga” can be typed in the command prompt area and acts exactly as if ”sget / with-defaults=report-all” had been typed (without the quotes).

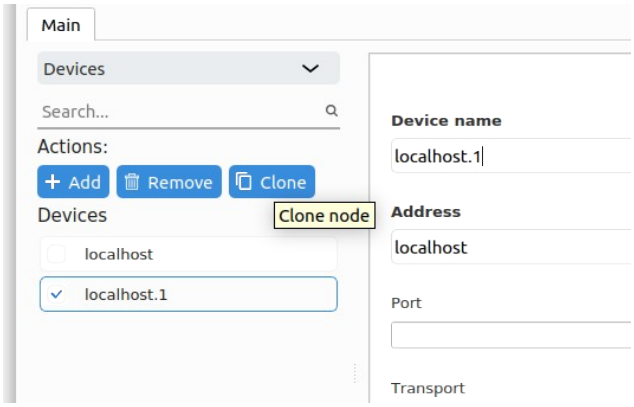
All aliases apply to all open **Session Windows**.

3.5.9 Managing Multiple List Entries per Menu Type

So far we have only set one of each type of item for User, Device, Session and Aliases. You will have noticed additional buttons in the **Main Window** and these are provided to manage multiple list items in each type. We will go through their uses demonstrating with multiple Device items though the same process applies to all the **Main Window** types, that is Users, Sessions and Aliases as well.

3.5.10 Cloning List Entries

Multiple list entries can all be individually create using the "+ Add" button. If you have many list items that are primarily the same with only minor differences you can clone the list entries.



The Clone button makes an exact copy of the one or more selected list entries. All the information is copied and the "Device name" has a ".1" appended to it. If the name already has a .1 instance then the next available instance is created. For example if name, name.2, name.2 and name.3 already exist and you select name and select Clone name.4 will be created. If you now Remove name.2 and select name.4 and then select Clone name.2 will be created.

When an item is Cloned it is automatically created so you do not need to select Apply.

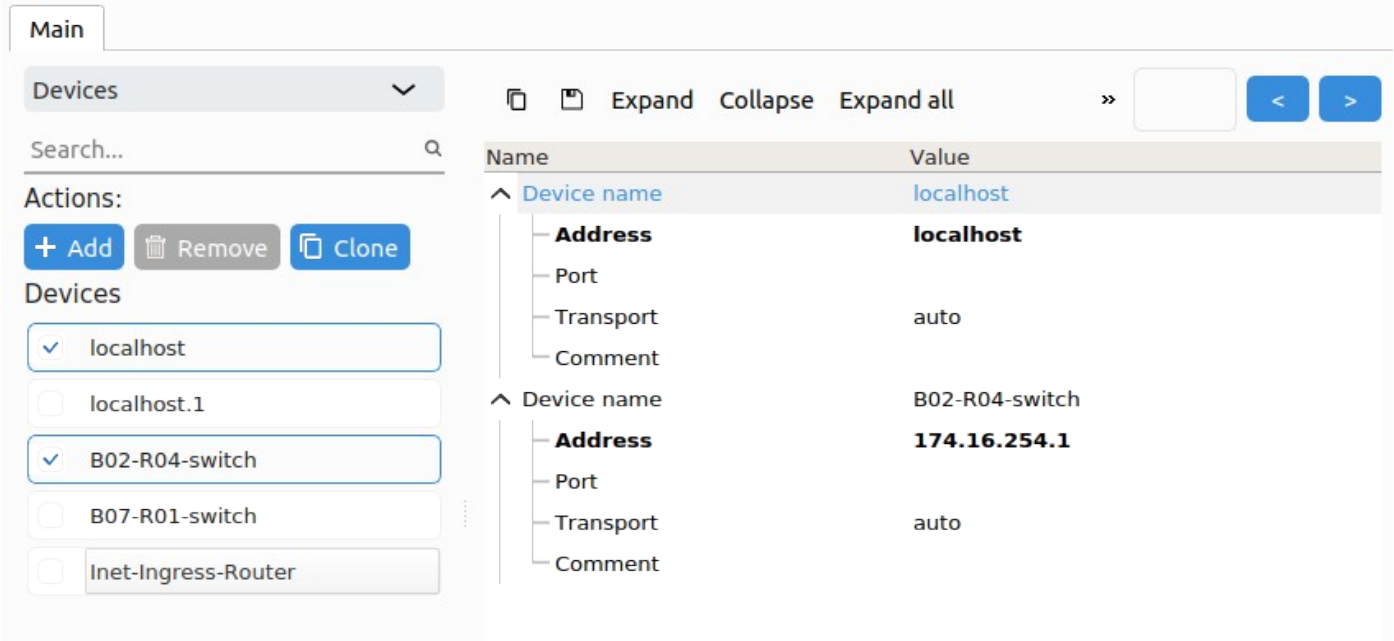
3.5.11 Selecting List Entries

If an item on the left side on the **Main Window** is selected the right side of the **Main Widnow** displays its details. There are two buttons are the bottom of the left side:

- Select all
- Deselect all

Depending which is selected either all the items are selected or all are deselected. The right side of the **Main Window** displays the list items details in a list if all the items are selected. If "Deselect all" is selected then no items are displayed and the screen reverts to its initial state and the YumaBench logo splash screen is displayed.

Each item in the list on the left side of the Main Menu has a radio button so that an arbitrary set of items can be selected and displayed as shown below:



As you can see from the screen shot above two Devices are selected in the list view on the left side and their details are displayed on the right side. Only 1 Device's details, the top one, is selected on the right side. You can use your mouse to select other Device details. If you select the Remove button on the right side it deletes the Devices that are selected in the right side pane. If you select the Remove button above the Device's list on the left side it deletes the Devices that are selected in the list.

```
NOTE: If a Session is currently running and it uses a specific User and Device
you will not be able to Remove either in use User or Device until the Session has
finished. The Remove buttons will be greyed out until the Session ends.
```

3.5.12 Expand, Collapse and Zoom

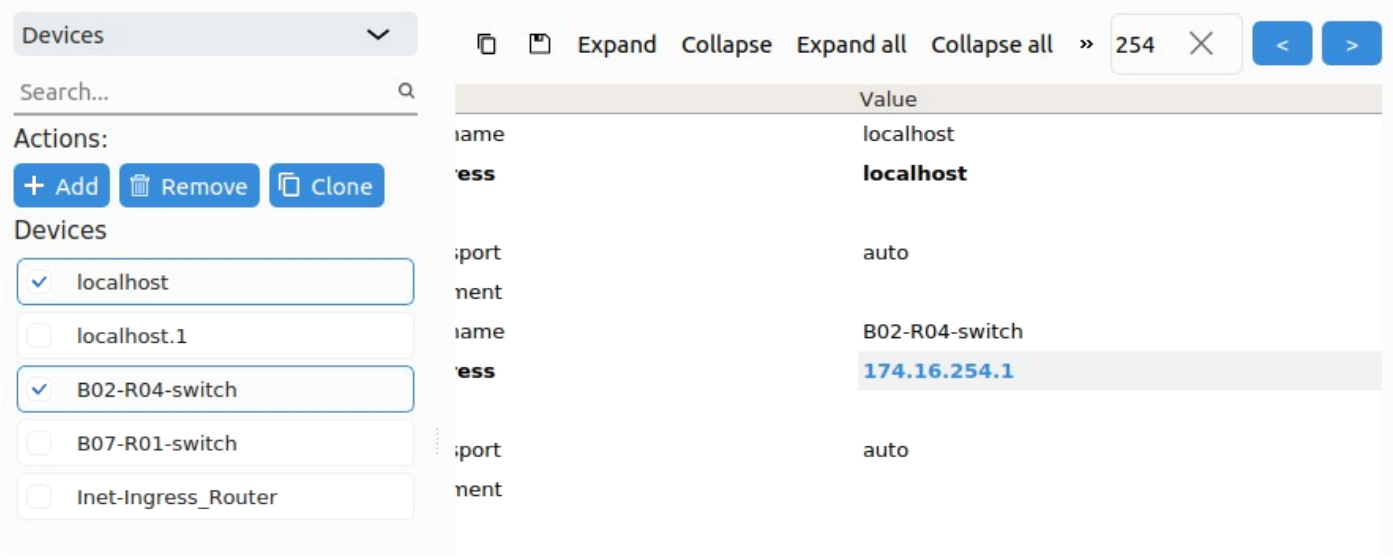
Above the Device parameters being displayed on the right side of the screen there are several buttons:

- Expand - expand (open up) the display of the selected node(s)
- Collapse - collapse (close) the display of the selected node(s)
- Expand all - expand (open up) the display of all nodes
- Collapse all - collapse (close) the display of all nodes

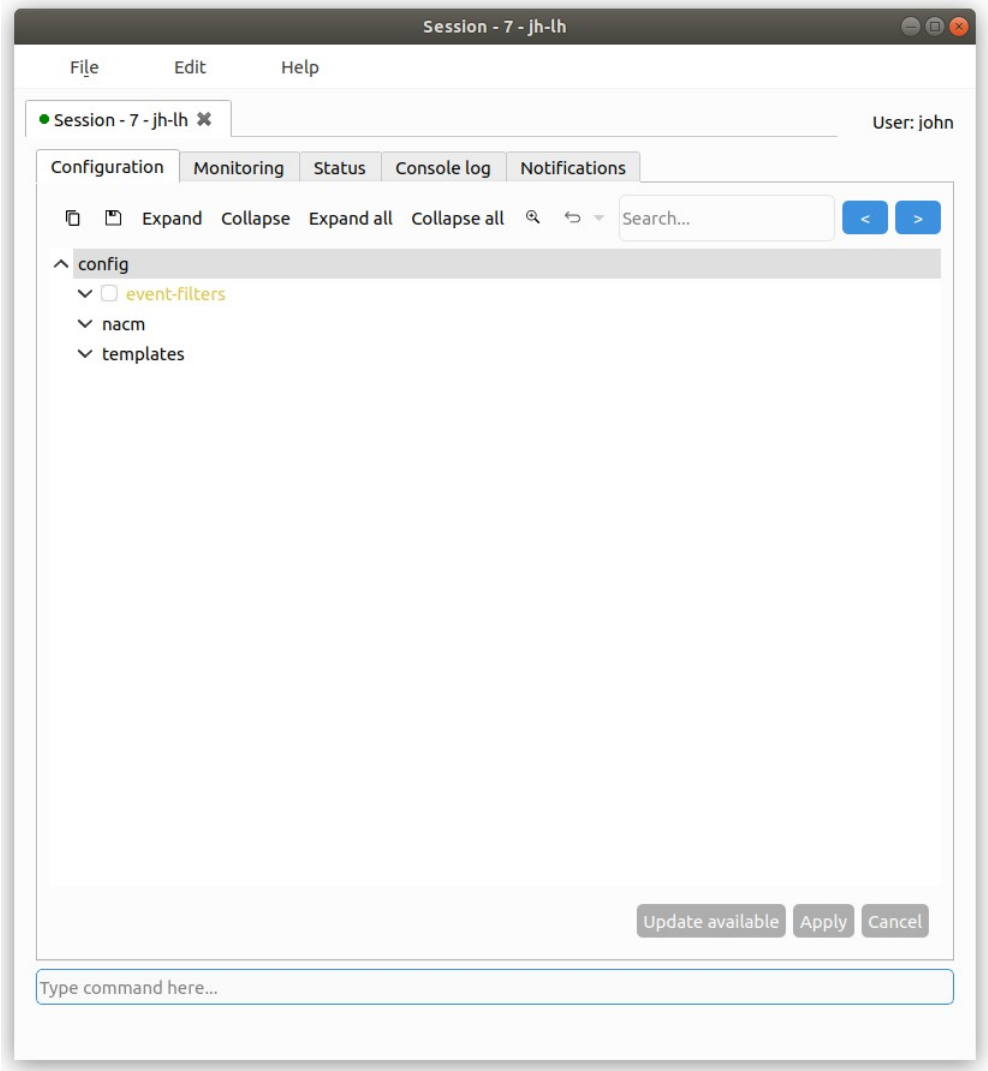
Note: depending on the size of the Main Window some, or all, of the buttons mentioned above may be hidden under the ">>", indicating "more", symbol on the right of the buttons.

3.5.13 Searching for Data

To the right of the Expand and Collapse buttons is a rectangular input box and two buttons "<" and ">". This is the search function. You can enter the text you want to search for which can be the displayed name of the item or anything in the parameters such as the IP address or part of it. Selecting "<" or ">" searches backwards or forwards. The search is conducted in the selected items only. If the text is found inside a collapsed node the node will be expanded and the cursor will highlight the found item.



3.6 The Session Window

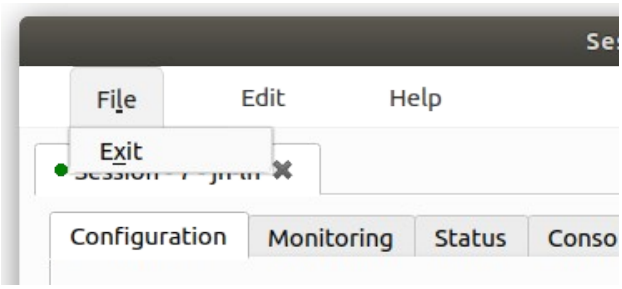


When the Session window starts up it connect to the server specified in the Device and with the credentials specified in the User used to create the Session in the Main Menu. The dot in the left of the tab for the Session will turn green indicating it has successfully connected to the server. The Session then requests the configuration from the server.

The toolbar at the top of the YumaBench **Session Window** has the following three pull-down menus:

- File
- Edit
- Help

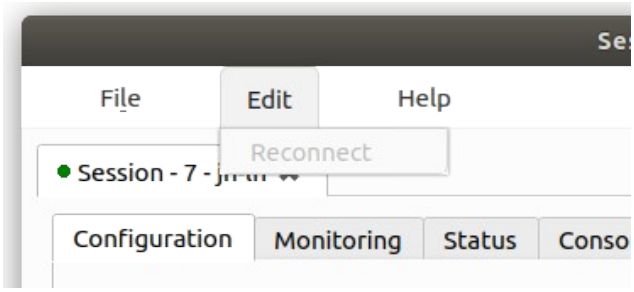
3.6.1 Session Window – File



The **File** pull-down contains one sub-item:

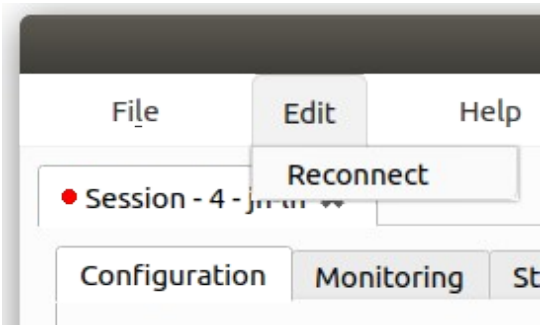
- **Exit** – selecting Exit closes the Session window but no the Main Menu. The same action can be accomplished with:
  - selecting the red “X” close button at the top right of the window
  - typing the keyboard shortcut “x” when the “File” pull-down is displayed – the Exit keyboard shortcut is denoted by the “x” in the graphical Exit button

3.6.2 Session Window – Edit

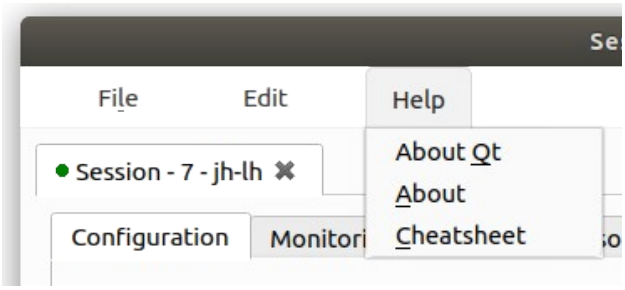


The **Edit** pull-down contains one sub-item:

- **Reconnect** – this will be greyed out and not selectable when the Session window is connected normally to the server. Should the server connection be lost for whatever reason the Reconnect option will become available to try and reconnect with the server. When the connection is broken the green dot on the left of the Session tab turns from green to red (see screen shot below)



3.6.3 Session Window – Help



The **Help** pull-down contains three sub-items and is the same as the one in the Main Menu:

- **About Qt** – displays information about the Qt program used by the YumaBench Graphical User Interface
- **About** – displays information about the YumaBench Graphical User Interface
- **Cheatsheet** – displays information about what the font type and color used in a window denote

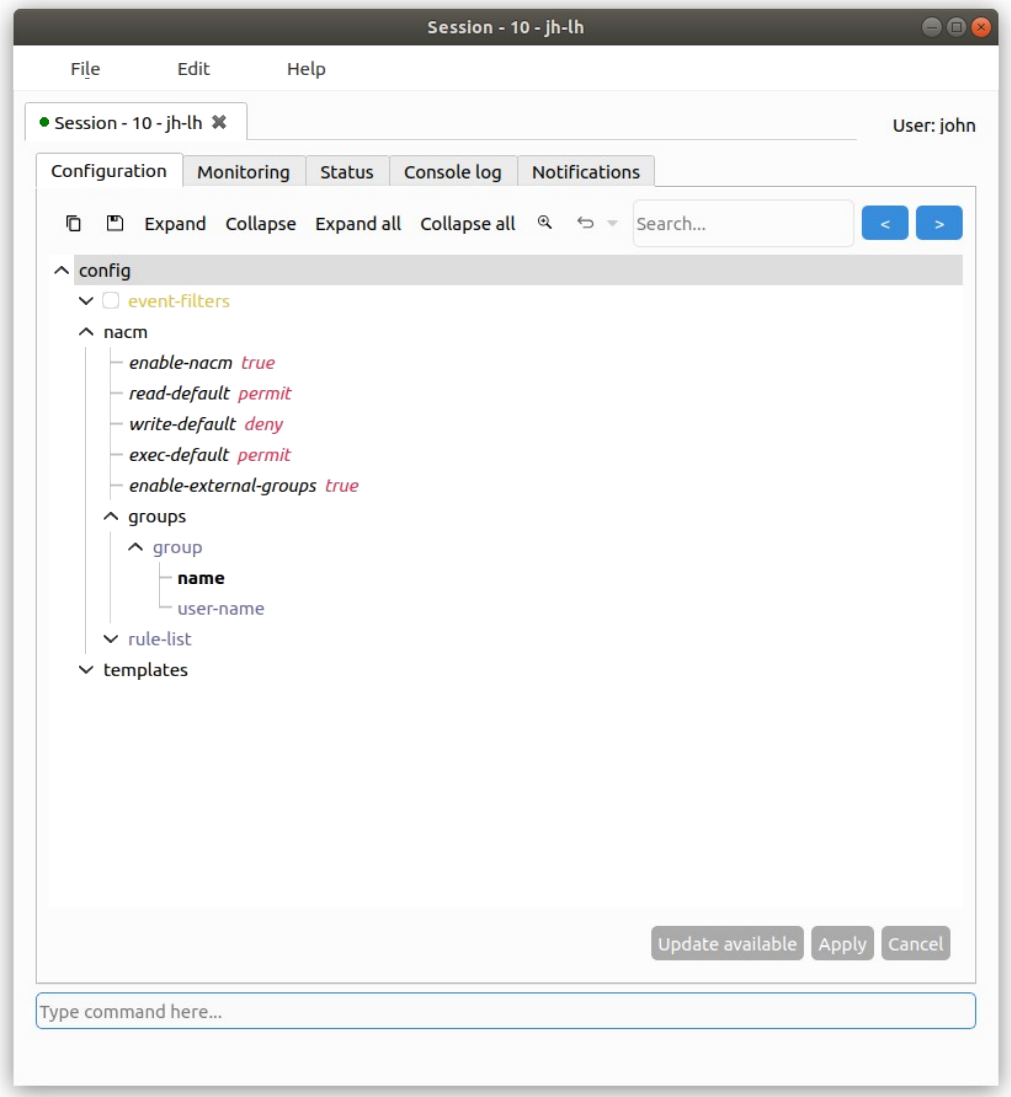
3.7 The Session Window – Tabs

The Session window consists of five Tabs that categorize the different aspects of a NETCONF Session with a server:

- Configuration – view and manage the server's YANG configuration
- Monitoring – display the server's telemetary data
- Status – displays the ongoing status of the Session
- Console log – displays the Session messages and allows provides a command line interface
- Notifications – displays the notifications from the server

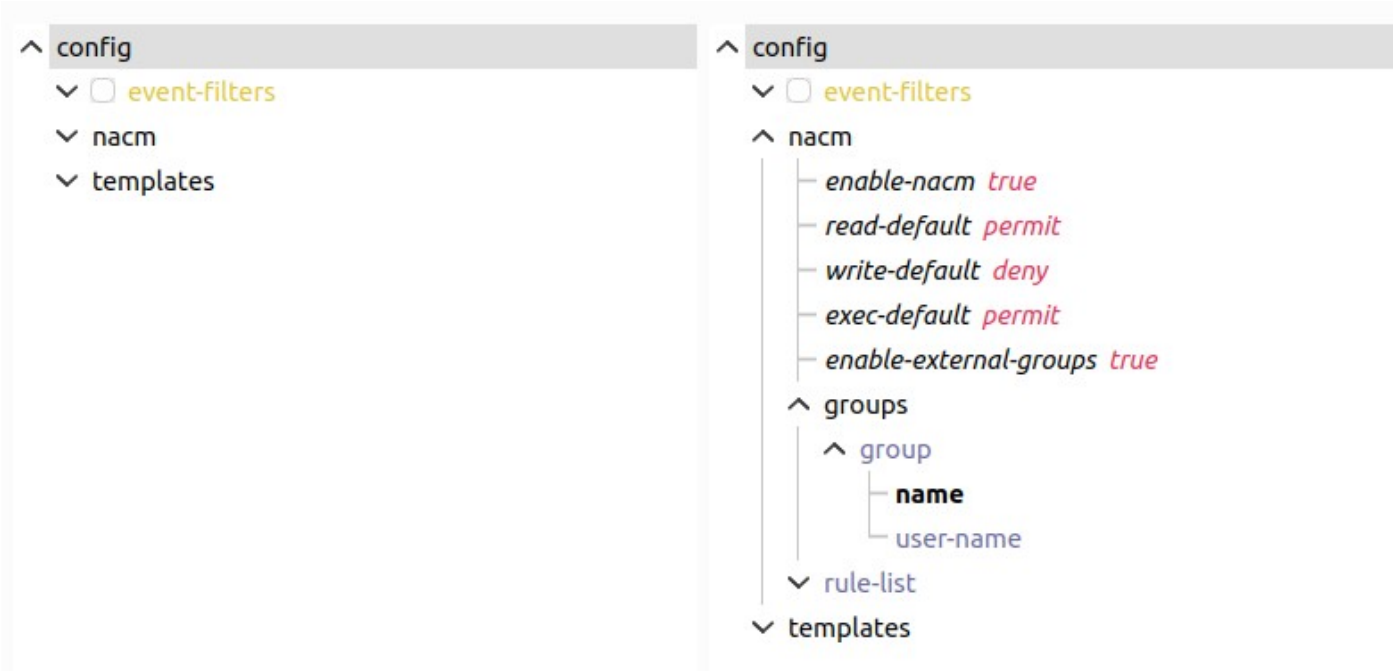
3.7.1 tab: Configuration

The Configuration tab displays the server's YANG configuration as a tree and allows the user to edit the configuration.



3.7.2 Navigating Data Trees

YumaBench data trees are displayed with the common practice of having a “v” to the left of a node denote that the node contains sub-nodes. Those sub-nodes may themselves have sub-nodes. Selecting the “v” expands the node to display the next level of sub-nodes. Similarly a “^” to the left of a node indicates that the sub-sub-nodes are being displayed and selecting the “^” collapses the display of the node.

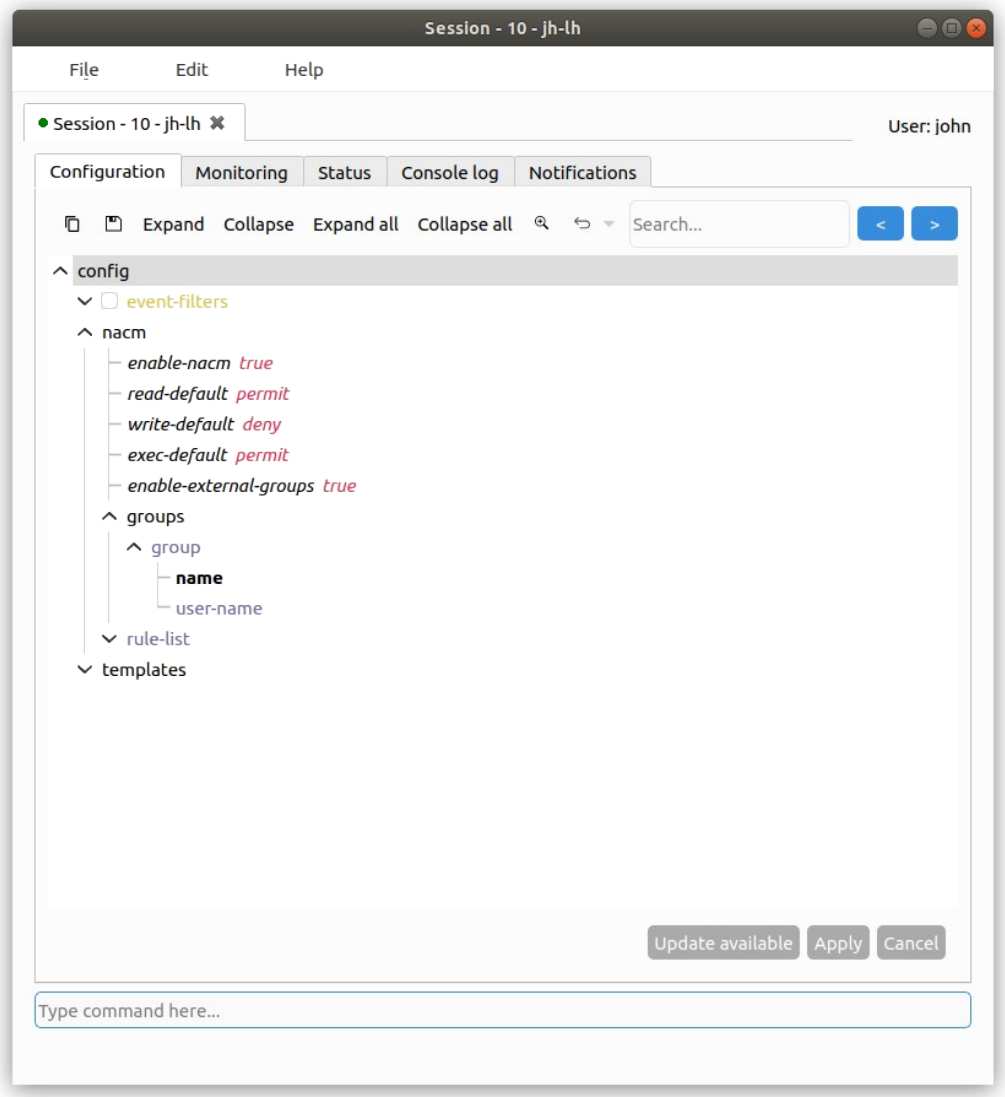


In addition to the individual node controls of “^” and “v” there are also the buttons at the to of the tree display:

If a node is selected and then the above buttons are selected:

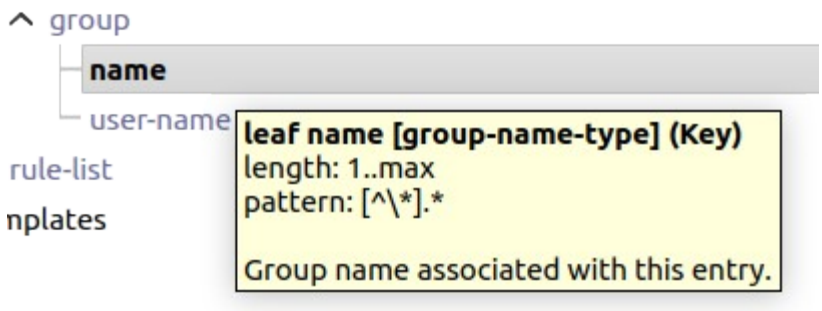
- Expand – will expand the display of all the sub-nodes of the node selected
- Collapse – closes all the sub-nodes and leaves the display with just the selected node
- Expand all – will expand and display all the nodes of the configuration tree
- Collapse all – closes all the nodes and leave the display with just the config node

3.7.3 Editing Configuration

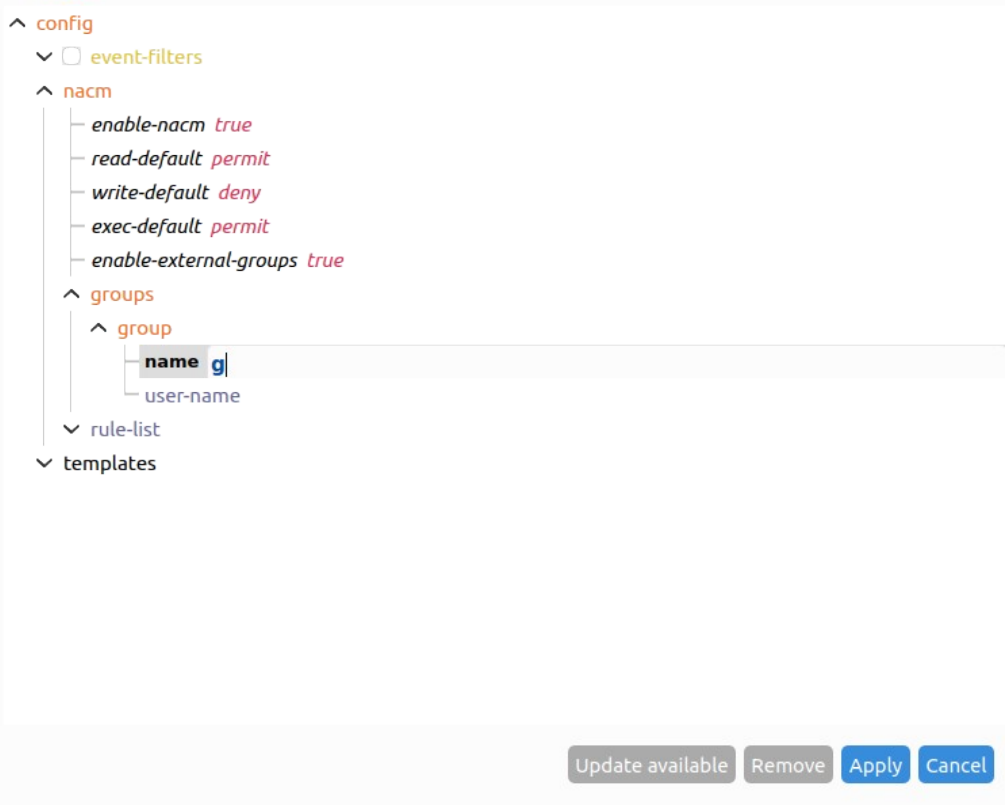


To introduce editing in YumaBench we will create a group in the NACM groups list. Open the NACM node, then open “groups” and then “group”. The display should look something like the screen above.

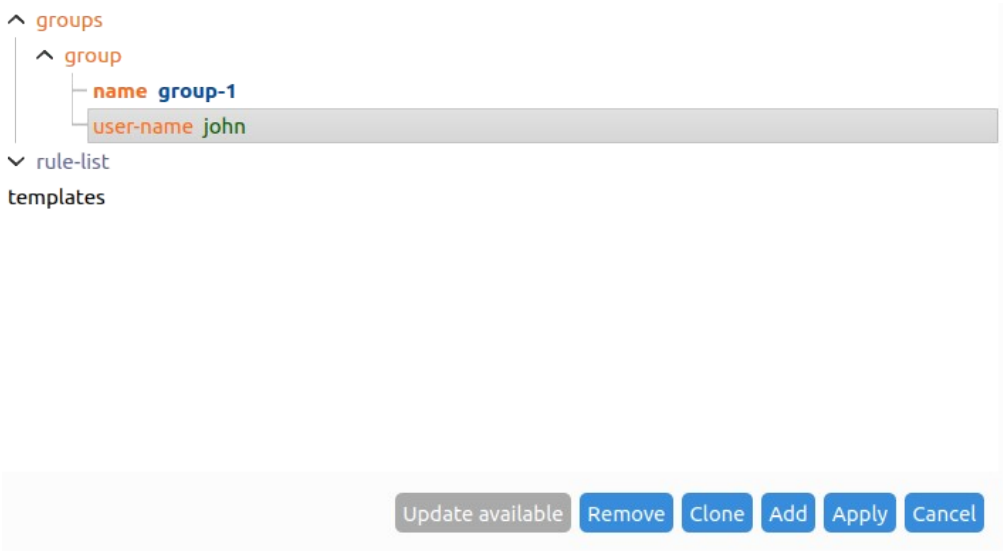
Select the “name” node. If you pause your cursor over a node a help “hover over” popup menu appears and provides information on that node such as the type of node, the values that the node can be set and the node’s description.



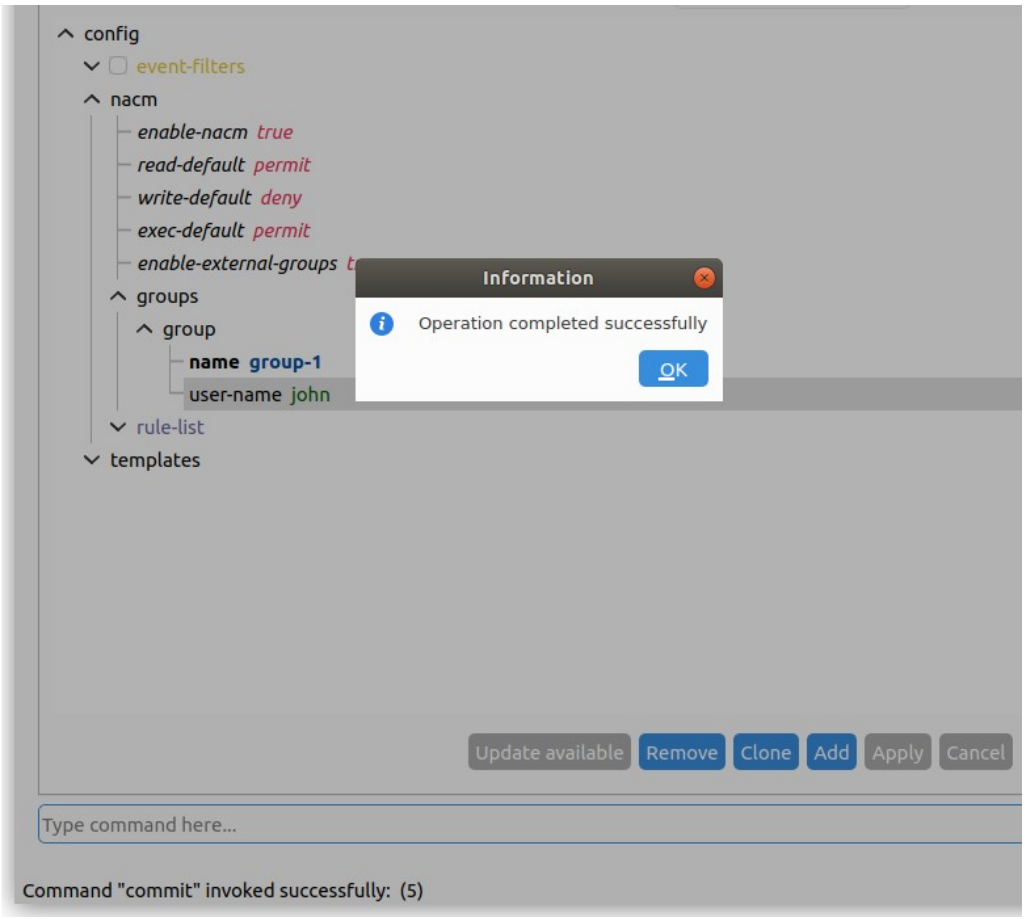
Select the “name” input field to the right of the node and type one character of the name for this new “group”. You will notice that the path to the node “name”, that is config/nacm/groups/group, have all changed color. This indicates that this path to the node “name” has been modified. Notice that the Apply and Cancel button are now available as there is something that can be Applied and the whole edit can be Canceled.



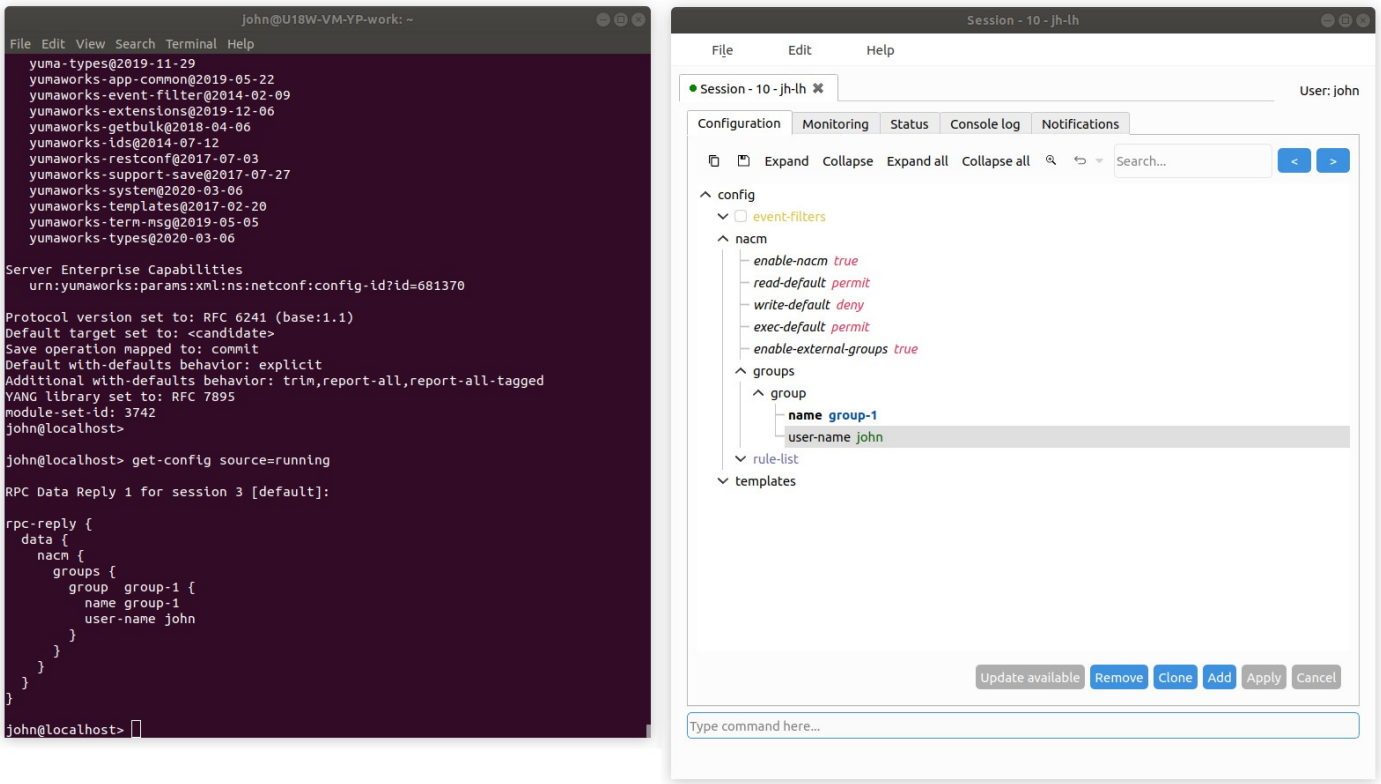
If you select the **Session Window’s** Help/Cheastsheet it shows what different colors means and also that bold means the node, in this case “name”, is mandatory. Mandatory is a YANG attribute that means this node must be specified for the “group” to be valid. The associated “user-name” is optional. Finish typing in a “group” “name” and a “user-name”.



Now select Apply.



The Apply should be successful and you now have your first configuration change applied to the server.



If you run yangcli-pro and connect to the same server as the YumaBench Session you can see that this configuration has been applied.

3.7.4 Node Creation and Removal

At the bottom of the configuration data display there are several buttons. The screen above shows the display after a configuration edit just added a NACM group with a successful Apply. There are three buttons highlighted. These can Remove the current node, clone the current node with a copy of the data or add another blank template group to the end of the list which will be ready to fill in.

These buttons change depending on the context of what is displayed and what is selected:

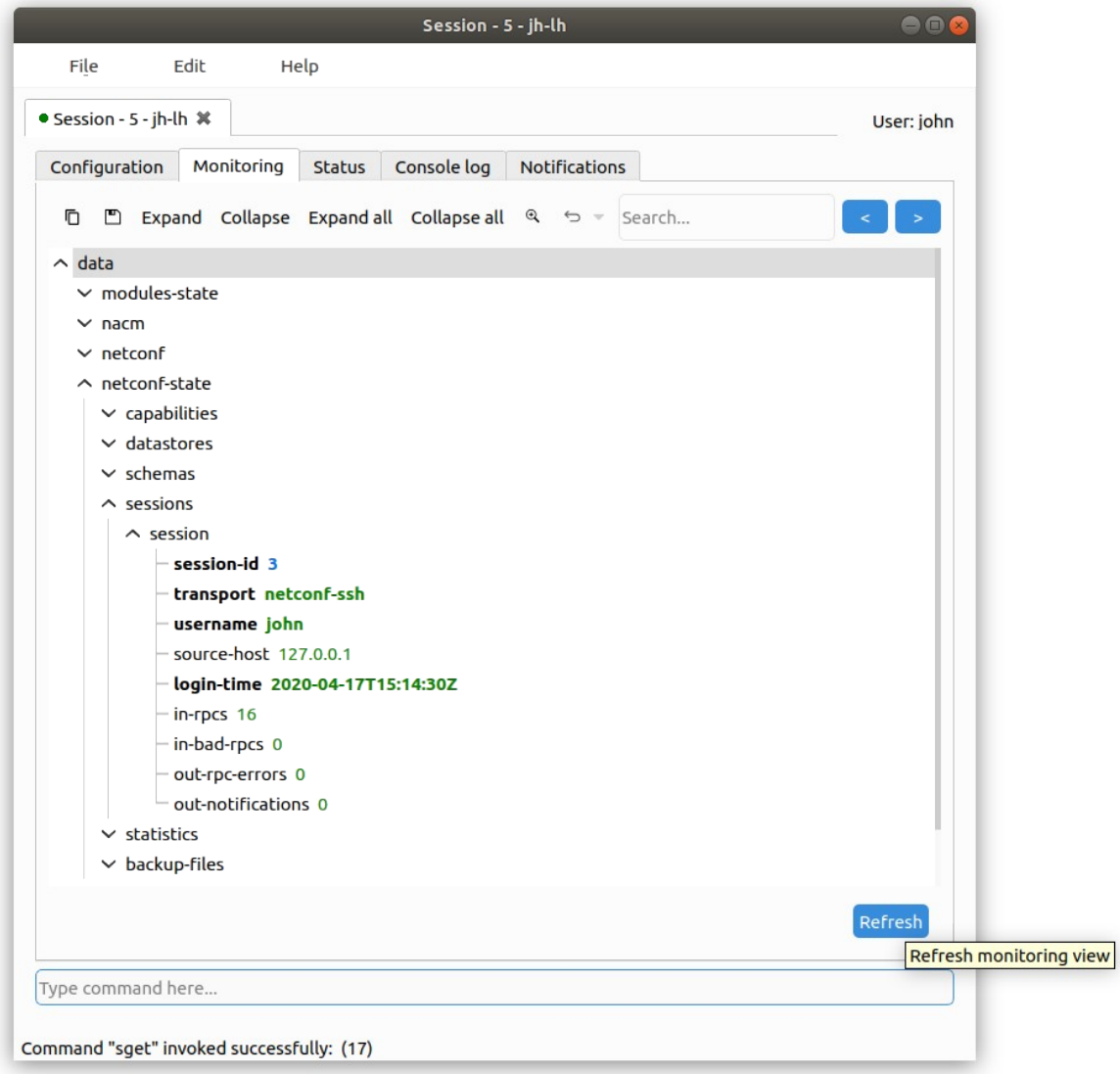
- Update available – indicates that the configuration on the server has changed from the current content displayed in the tab. This would be caused by another Session to the server changing the configuration. Selecting “Update available” retrieves and displays the new configuration

```
NOTE:  This action may erase data that is in the middle of being edited.
```

- Remove - the currently selected node
- Clone - the currently selected node, copying the data and appending a .1 to the node name, its key. If there is already another name with .1 the next available number is used
- Add- a sibling node to the end of the list of the currently selected node
- Add below - add a sibling node after the currently selected node in the user ordered list
- Add above- add a sibling node before the currently selected node in the user ordered list
- Apply – the current changes
- Cancel – discard the current edited data

```
NOTE:  Currently anydata and anyxml are not supported. They will be displayed but
are not editable.
```

3.7.5 tab: Monitoring



The Monitoring tab displays the telemetary data from the server, that is YANG data marked “config false”.

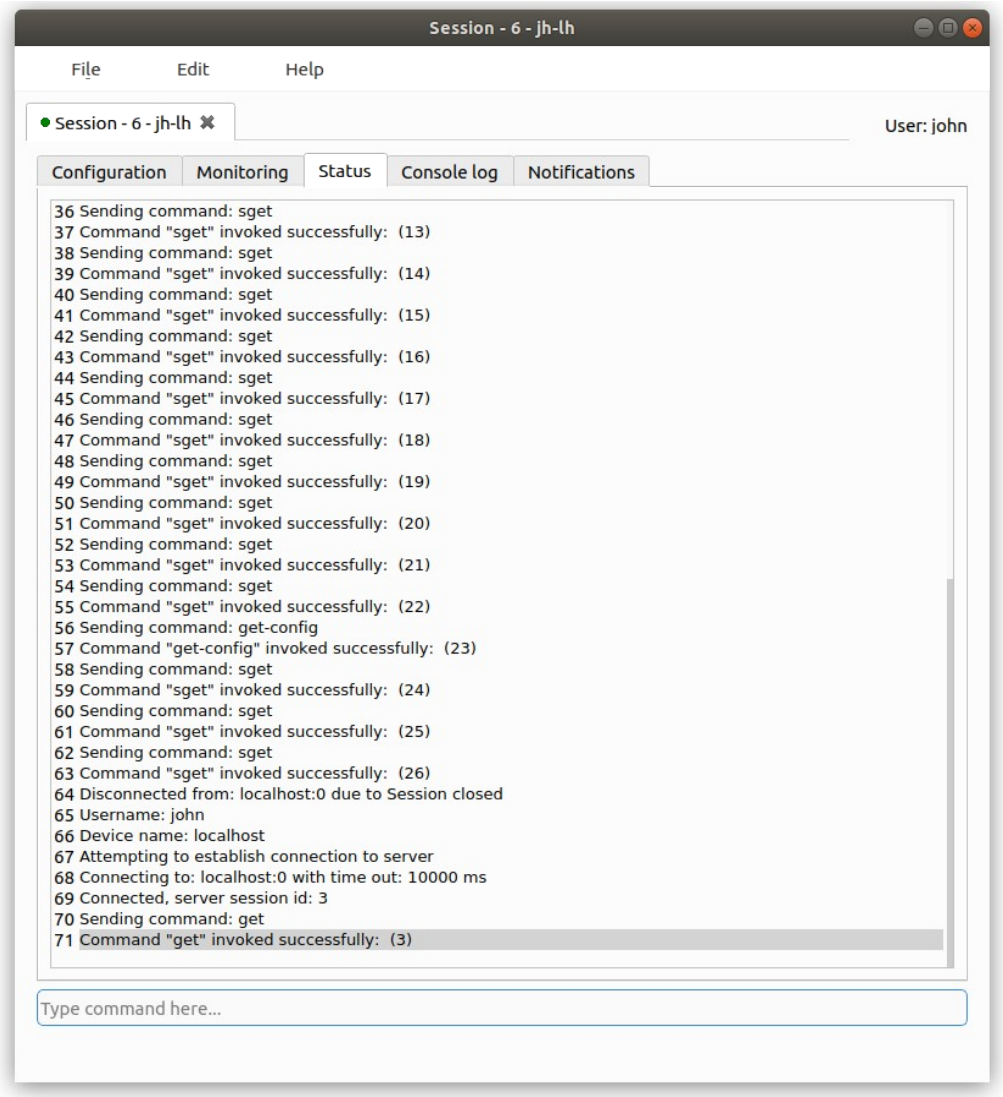
There is one button in the bottom right: Refresh which initiates a request for the telemetary data from the server. If you open up the netconf-state/sessions/session and select Refresh you can see the in-rpcs count increment with each Refresh. Other data in your YANG model such as interface counts would most likely increment more rapidly.

In the “Type command here...” you can issue a command and the telemetary parts of the result will be displayed. The Monitoring tab will display the response to commands typed in to any command line entry box, such as the one on this tab and also the ones on the Configuration tab and the Console tab.

For example typing in: sget /nacm with-defaults=report-all will display the NACM data node including the defaults.

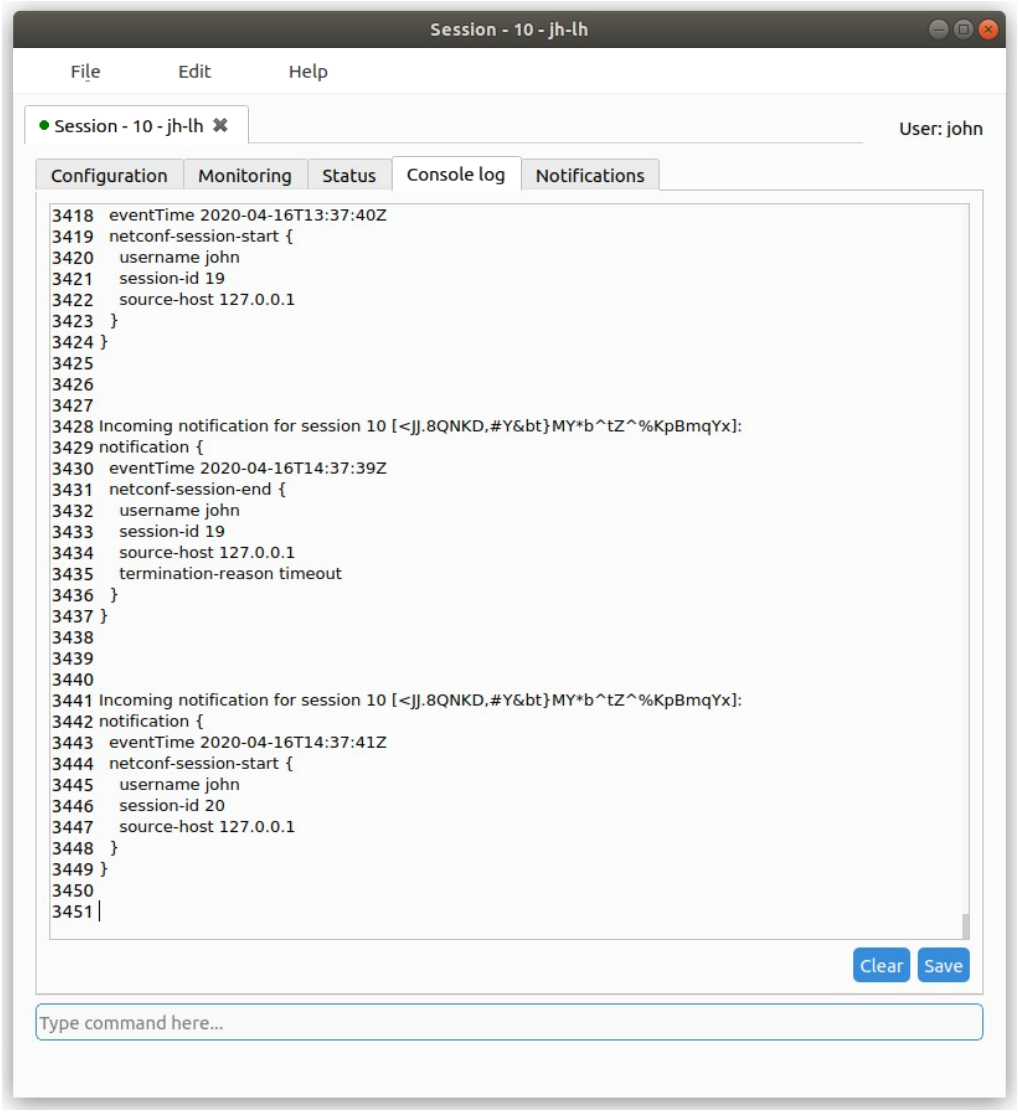
To customize your data view you can use expand or zoom into specific areas see the Configuration tab section on 3.7.2 - Navigating Data Trees.

3.7.6 tab: Status



The Status tab displays the ongoing status of the Session, the status of each message sent and the status of communications with the server. In the above screen shot you can see the status of multiple messages and then near the bottom the connection with the server is lost. Reconnection is attempted (manually selecting Edit/Reconnect) and succeeds.

3.7.7 tab: Console log



The Console tab displays the content of the messages between the Session window and the server. Each line of the messages is displayed with a line number. There are two buttons at the bottom right of the window:

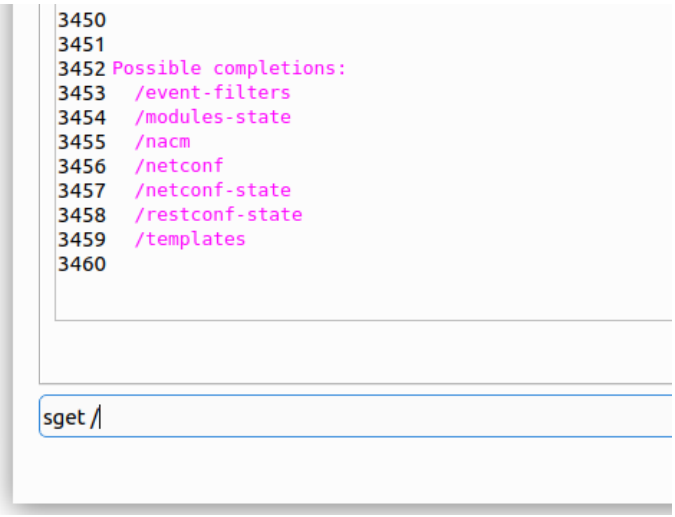
- Clear – clears the screen/buffer of all messages
- Save – saves all the currently displayed messages to a text file. The file name and location is requested

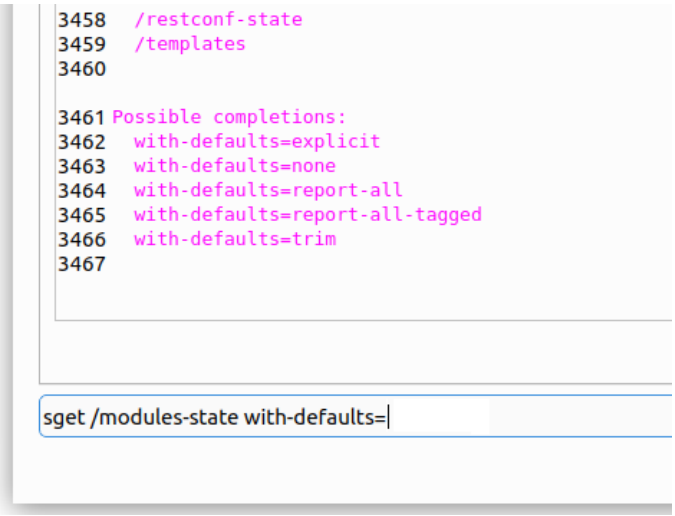
The Console tab also allows the user to enter commands in the command entry box at the bottom of the screen. Command completion works the same way as YumaPro SDK's client yangcli-pro:

- <Tab> by itself – displays possible commands
- text<Tab> - displays
    - a list of possible completions if there are multiple completions

- "No known completions" if the text is unknown
- completes the text, for example "sget /na<Tab>" become "sget /nacm"

Below are some examples of completions where <Tab> is entered after the screen cursor "|":

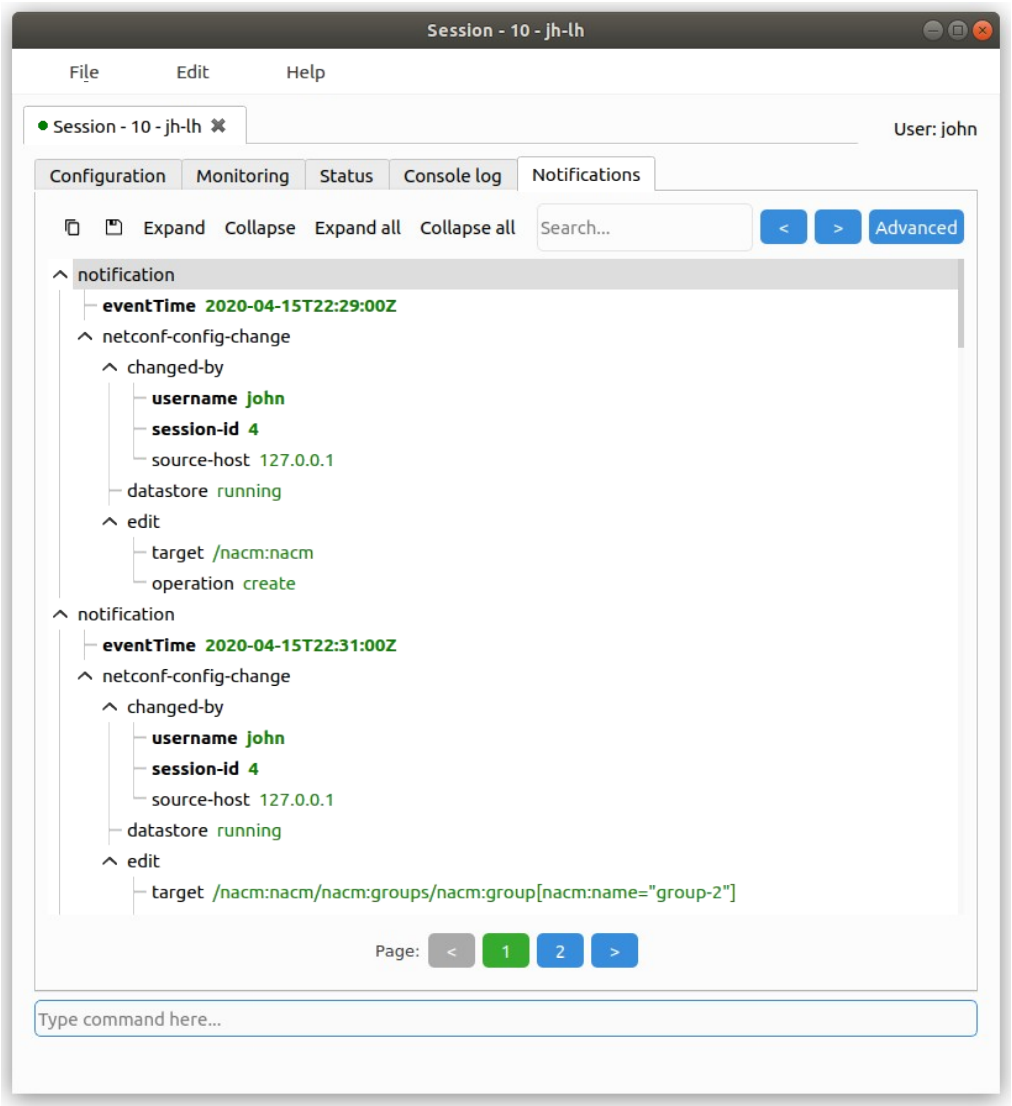




The Configuration and Monitoring tabs also have a command entry box. While they both have command completion they do not display "Possible completion:" lists.

3.7.8 tab: Notifications

When the Session window starts up and connects to the designated server it also creates a subscription with the server for all server notifications. The server notifications are displayed in the Notification tab.



The notifications are displayed in pages.

Above the displayed notifications there are several buttons:

- Copy – the selected notification to the clipboard
- Save – save the selected notification to a file. The default extension is .xml. Other extensions and the location of the file can be specified

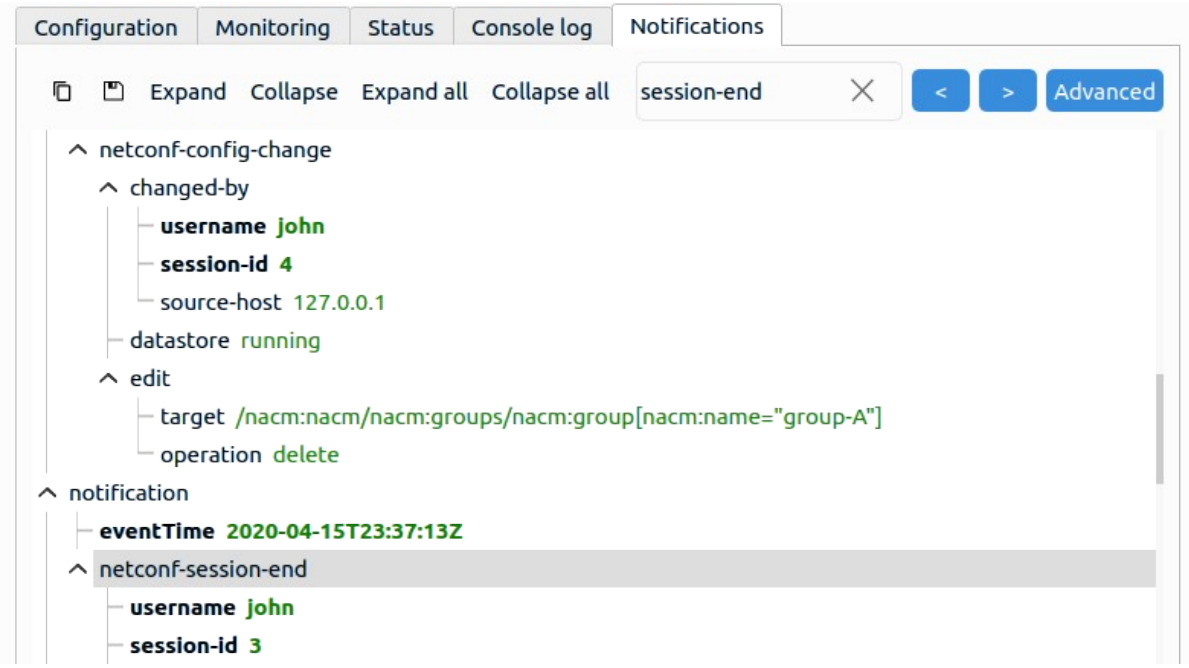
- Expand - expand (open up) the display of the selected node(s)
- Collapse - collapse (close) the display of the selected node(s)
- Expand all - expand (open up) the display of all nodes
- Collapse all - collapse (close) the display of all nodes

At the bottom of the display there are several buttons:

- "<" - select to view previous page (valid only when page 2 or higher is being displayed)
- 1,2,3… - the page number being displayed indicated in green. Other pages can be selected
- ">" - select to view next page (valid only if not displaying the last page)

3.7.9 Searching Notification Data

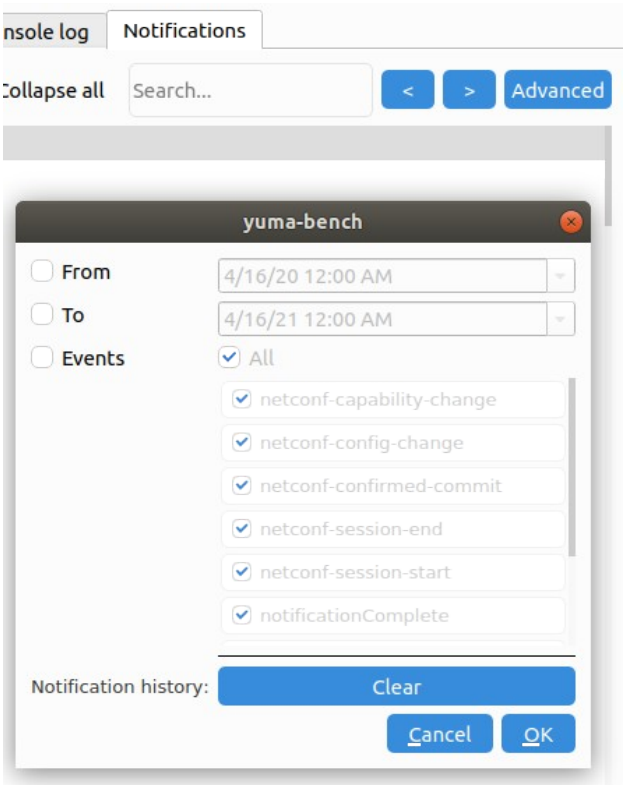
To the right of the Expand and Collapse buttons is a rectangular input box and two buttons "<" and ">". This is the search function. You can enter the text you want to search for in the notifications. Selecting "<" or ">" searches backwards or forwards. The search is conducted in the selected notifications only.



3.7.10 Advanced Filtering for Notifications

The Notifications displayed can be filtered by time and type.

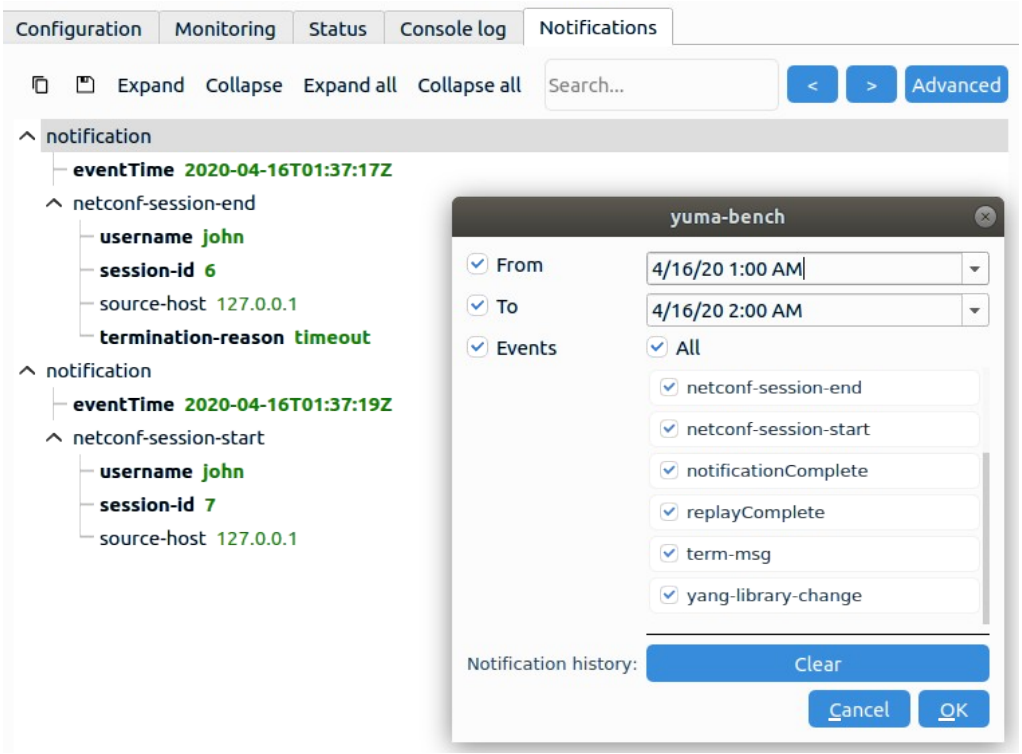
Selecting the Advanced button to the right of the Expand and Collapse buttons displays the popup window below.



The filter option fields are:

- From - specifies the time for the first Notification that is displayed. If this is not enabled, the default, then the notification are displayed from the first notification that the Session window received
- To - specifies the time for the last Notification that is displayed. If this is not enabled, the default, then the notification are displayed up till the latest notification that the Session window has received
- Events – if this is enabled the list of Notification event types is displayed. Initially all event types are displayed, that is they are all checked/enabled. Event types can be individually selected. There is also an “All” radio button that toggles between selecting all even types or selecting no event types to be displayed

The screen below shows an example of the From, To and Events fields:



At the bottom of the Advanced widow contains three buttons:

- OK – enable the filters that were selected
- Cancel – does not enable any of the changes to the filtering and closes the Advanced window. Changes made to the filters are retained but not implemented
- Clear – clears the current notifications from the buffer. A confirmations is requested before the buffer is cleared

3.8 Configuration and Temporary Files and Debug

3.8.1 Configuration and Temporary Files

Various configuration files that contain the attributes of various windows used by YumaBench such as their last positions and sizes and the definitions of created users, devices, sessions, etc. are stored in $HOME/.config/YumaWorks. An example of the files is shown below:

```
~$ ls -al $HOME/.config/YumaWorks/
total 16
drwxr-xr-x  3 john john 4096 Jun 13 11:12 ./
drwx------ 31 john john 4096 May 25 13:53 ../
drwx------  5 john john 4096 Jun 13 11:10 yuma-bench/
-rw-r--r--  1 john john  732 Jun 13 11:12 yuma-bench.ini
~$
~$ ls -al $HOME/.config/YumaWorks/yuma-bench
total 36
drwx------ 5 john john 4096 Jun 13 11:10 ./
drwxr-xr-x 3 john john 4096 Jun 13 11:12 ../
drwx------ 2 john john 4096 Jun 13 11:08 recordtest/
drwx------ 3 john john 4096 Jun 13 11:08 tmp/
drwx------ 2 john john 4096 Jun 13 11:08 .yangcli_cache/
-rw-r--r-- 1 john john   10 Jun 13 11:10 .yangcli_pro_aliases
-rw-r--r-- 1 john john  100 Jun 13 11:09 .yangcli_pro_devices.conf
-rw-r--r-- 1 john john  182 Jun 13 11:10 .yangcli_pro_sessions.conf
-rw-r--r-- 1 john john  108 Jun 13 11:12 .yangcli_pro_users.conf
```

3.8.2 Debug

Each time YumaBench is launched it creates a log file, yuma-bench-current.log, that by default is located in $HOME/Documents. The log file from the previous run is saved as yuma-bench-previous.log.

```
$ ls -al $HOME/Documents/
total 368
drwxr-xr-x 2 john john   4096 Jun 13 14:27 .
drwxr-xr-x 5 john john   4096 Jun 12 16:48 ..
-rw-r--r-- 1 john john   5418 Jun 13 14:27 yuma-bench-current.log
-rw-r--r-- 1 john john 359104 Jun 10 10:37 yuma-bench-previous.log
```

There are several parameters that can be set in the yuma-bench.ini mentioned in section 3.8.1 above. There are also various parameters that can be supplied to YuamBench when running the GUI from the command line. Running YumaBench with the –help option lists the options as shown below:

```
~$ yuma-bench --help
Usage: yuma-bench [options]
GUI for YANG data handling using Yuma SDK.

By default, application prints logs to terminal only, using "warning" log
level.

yuma-bench will set logging options using this priority list:

  1. Flags passed via command line.
  2. Configuration set in $HOME/.config/YumaWorks/yuma-bench.ini
  3. Default values (may depend on release/ debug build type).

If a flag can be controlled via config file (yuma-bench.ini), it's description
below will mention it.

Options:
  -h, --help                      Displays this help.
  -v, --version                   Displays version information.
  --log-to-file, -f               Enable logging to file. Logs will be saved in
                                  user documents folder.
                                  Config file option: core/logToFile
  --log-dir-path, -p <Path>       Specify path to directory where application
                                  logs should be saved. When path is defined, -f
                                  is implicitly defined as well.
                                  Config file option: core/logDirectory
  --log-level, -l <Level>         Sets log verbosity. Available values are:
                                  * off
                                  * write
                                  * dev0
                                  * error
                                  * warn
                                  * info
                                  * dev1
                                  * debug
                                  * debug2
                                  * debug3
                                  * debug4
                                  Config file option: core/logLevel
  --set-selector, -s <Selector>   Preselect selector in main window after
                                  startup
  --detailed-sdk-messages, -d     Enables detailed log messages from Yuma SDK.
                                  Best combined with "debug4" log level.
                                  Config file option: core/detailedSdkLogs
  --no-detailed-sdk-messages      Disables detailed log messages from Yuma SDK.
                                  Using this flag will override any existing
                                  setting from the config file.
                                  Config file option: core/detailedSdkLogs
  --no-grab-focus, -n             When set, application will not grab mouse or
                                  keyboard focus when it starts.
                                  Config file option: core/grabFocusWhenStarting
  --qss <Stylesheet>              Use this to override the default application
                                  style (skin). Provide a path to QSS file to
                                  load a custom style, or use 'none' to disable
                                  stylesheet (default platform look will be
                                  loaded. 'default' will load the default style,
                                  same as when no style flag is supplied at all
~$
```