



User Guide

Version 1.4

[Last edited on 05-Dec-07]

Table of Contents

1.	What is SAN Simulator?	3
2.	Prerequisites	4
3.	Create SIMDB in DB2	5
3.1.	Snapshot based simulation	6
3.2.	Configuration based simulation	11
3.2.1.	Supported Devices.....	11
3.2.2.	Steps	11
3.3.	Support for Multiple devices in the same SIMDB	17
4.	Correlate Devices	18
4.1.	Switch to Switch Connectivity	18
4.2.	Switch to Storage Connectivity	22
5.	Discover devices and correlation	30

1. What is SAN Simulator?

Large storage installations are extremely complex today and as storage capacities grow, the complexity increases. One of the primary constraints which developers face is the inability to test any SAN software against large, complex san environments for the want of hardware resources. It might not always be practically feasible to own expensive IBM and non-IBM SAN boxes just to test out the software. This creates unenviable situation where the SAN boxes have to be timeshared across geographically distributed teams for testing and development. The SAN Simulator simulates a SAN environment through software. The simulator allows the user to create a SAN configuration, add devices to the SAN and create arbitrary connections between devices. Since most of devices today expose their services through a CIMOM, the simulator creates CIM instances based on user specifications. The simulator generates various profiles like fabric, array, and disk profiles in temporal fashion. Simulator can also take snapshot of existing real live CIMOMs and replay back as required. Thus simulator can simulate a device using either of the following two mechanisms:

1. Snapshot based simulation
2. Configuration based simulation

SAN Simulator can help!

1. Don't have IBM or Non-IBM Hardware for development and test of SRM Applications
2. Slow access to non-IBM SAN Devices at SNIA Lab
3. Slow access to SAN Devices in lab across the world
4. What-if-analysis before you plan to extend or reconfigure your SAN

2. Prerequisites

Check following pre-requisites before you start the simulator installation.

1. JAVA version 1.5
 - a. on all the machines which will be hosting device CIMOMs
 - b. on the machine which will be used to run the setup wizard
2. DB2 [preferably version 8.1 or above]
 - a. on the machine(s) which will be running CIMOMs

Notes:

1. Even though written in JAVA, SAN Simulator is currently tested only on windows XP and windows 2003 machines.
2. One db2 database instance can hold data repository for multiple CIMOMs.

Following example explains a very simple setup created using SAN simulator to simulate SAN having 1 DS6k, 1 DS8k and 2 brocade switches.

Machine1: Hosts brocade CIMOM on 5988

Machine2: Hosts DS8k CIMOM on port 5988

Machine3: Hosts DS6k CIMOM on port 5988

Machine4: used to run SetupWizard

[SetupWizard can be run from any machine for following two purposes:

- a. To setup connectivity between simulated devices
- b. To generate simulated device data in db2 using snapshot based or configuration based simulation.

But practically SetupWizard will be run on all the machines to setup the device CIMOMs. So every machine described above needs SAN Simulator setup copied onto it.]

Machine 1, 2 and 3 require JAVA and DB2 installed. Machine 4 does not require DB2.

You may want to skip the machine4 from above setup and same functionality can be achieved form any of the other 3 machines. Thus you need to design your setup as per your requirements, workloads and machine configurations.

3. Create SIMDB in DB2

SIMDB is the database which is meant for storing simulated device information. So before you can start using SetupWizard to simulated SAN, you should be ready with SIMDB in DB2.

SIMDB has the schema SIM which contains four tables namely:

CIMOM_INFO: Used to store CIMOM information

NS_INFO : Used to store Namespace information

CIM_CLASS : Used to store CIM classes of simulated device

CIM_DATA : Used to store all CIM instances

CIM_ASC : Used to store association information between instances

If you are not ready with SIMDB in your DB2 installations, then follow these steps:

- 1) Log on the machine, where you have DB2 installed and want to store simulated information, with the db2 administrative privileges.
- 2) Extract the SAN Simulator setup wizard zip file and go to the folder named dbUtility.
- 3) Run CreateDatabase.bat

This procedure needs to be followed on all the machines which will be hosting a simulated device CIMOM.

Simulate a device CIMOM

3.1. Snapshot based simulation

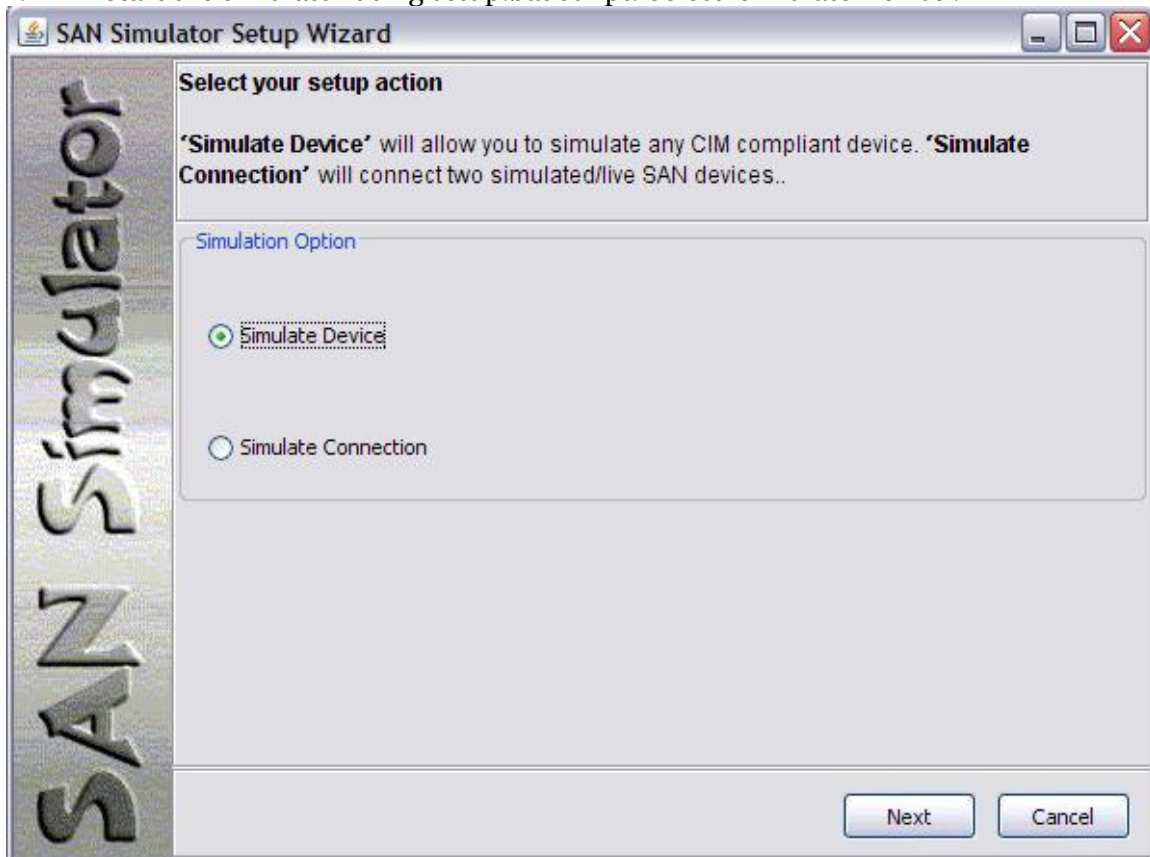
Snapshot based simulation is device agnostic and user can ideally simulate any CIM compliant device using snapshot based simulation approach.

Note: Snapshot of live CIMOM can take a long period of time. It can range from few minutes to few hours. Time to snapshot a live CIMOM is dependent upon

- a) Configuration of live CIMOM (number of CIM instances)
- b) Network latency
- c) Load on the live CIMOM

Following steps show how to simulate a device by taking a snapshot of a real live CIMOM of the device.

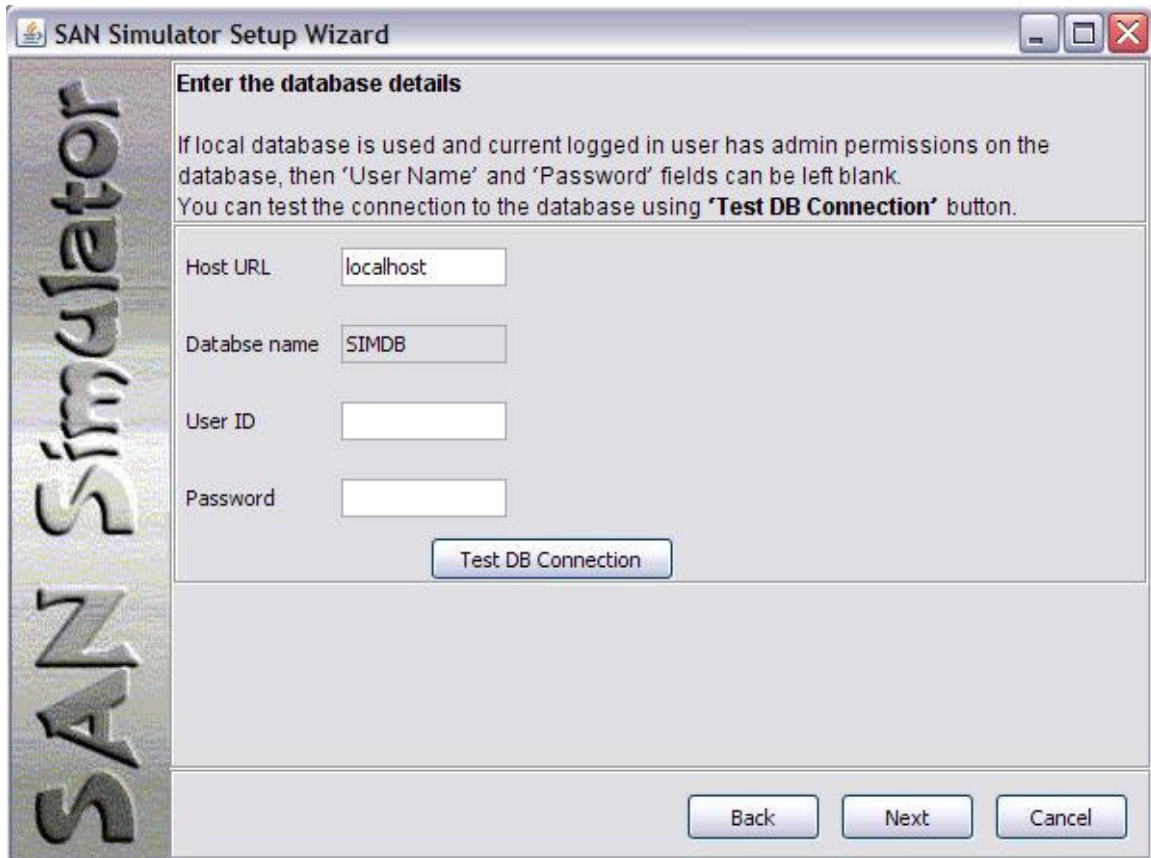
1. Start the simulator using setup.bat script. Select 'Simulate Device'.



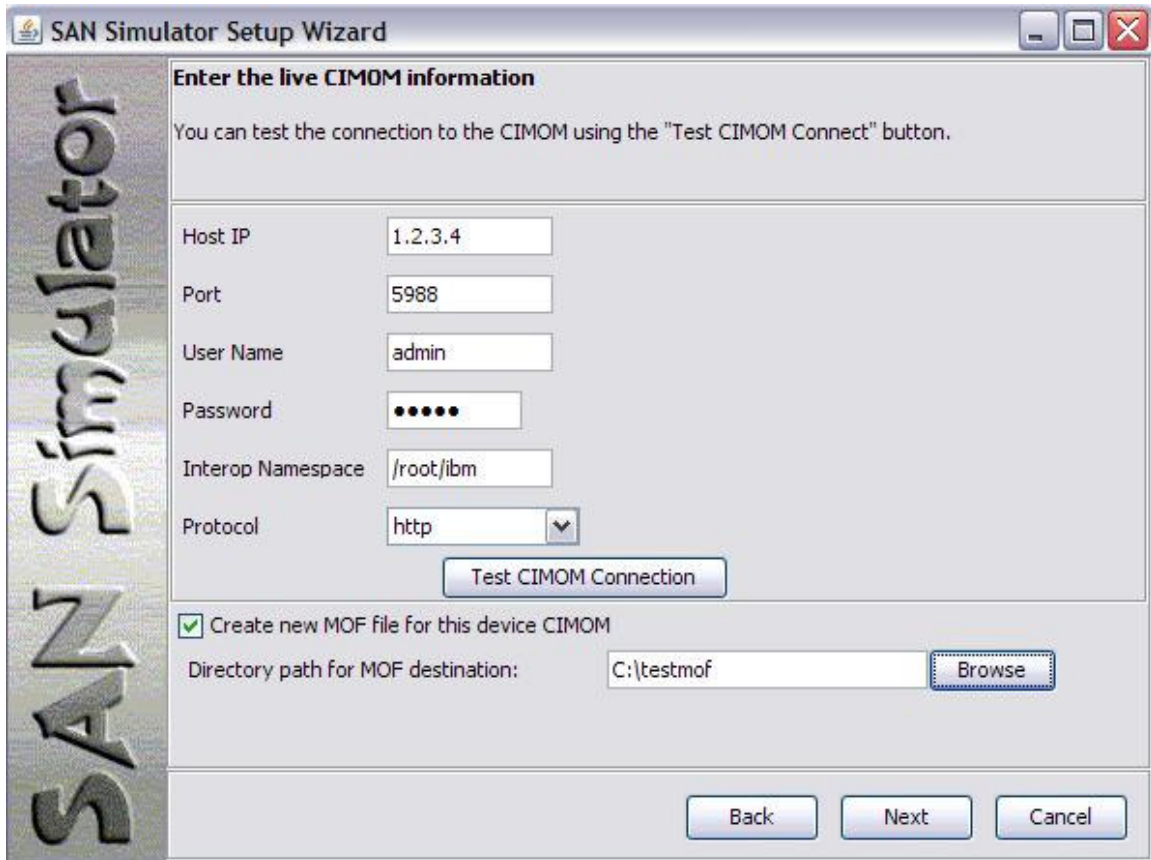
2. Select interactive mode setup with snapshot based simulation type.



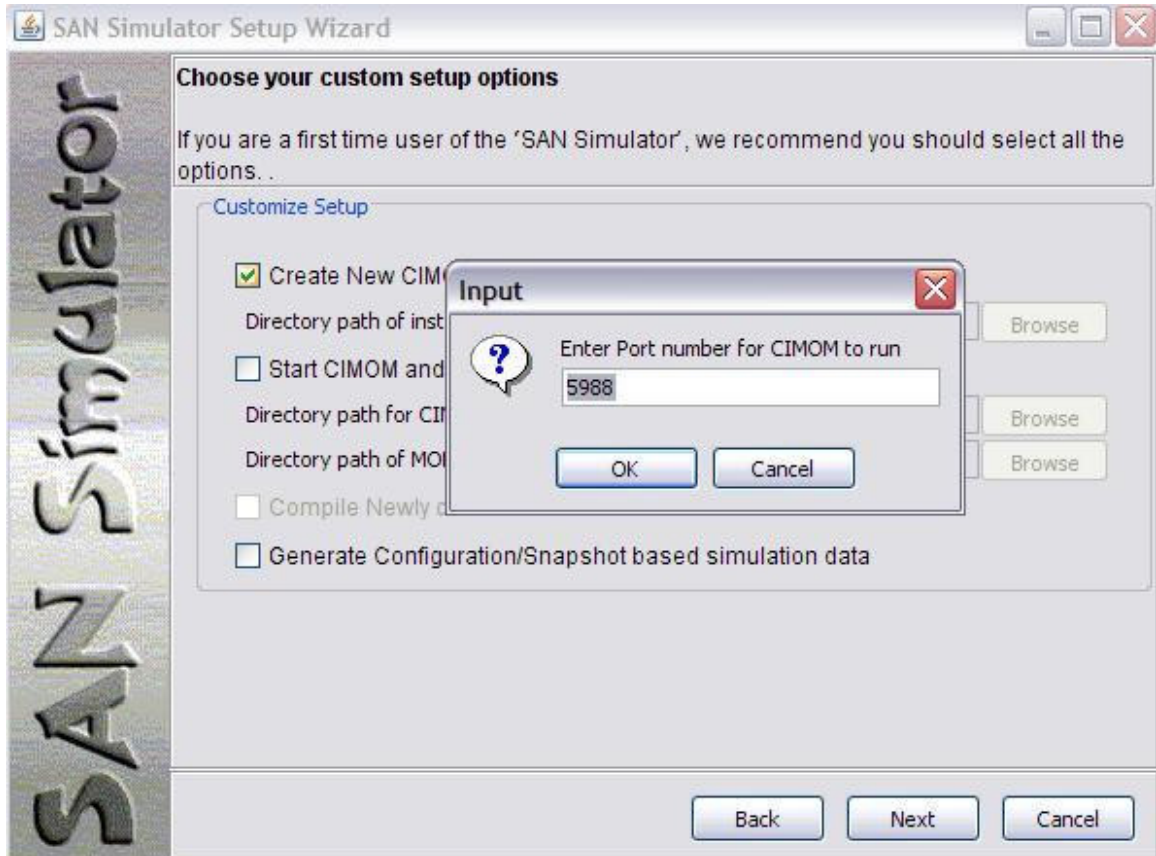
3. Enter the database details which will store the data repository of the simulated device. If local database is used and current logged in user has admin permissions on the database, then username and password fields can be left blank. Currently database name has to be SIMDB.



4. Enter the real CIMOM information of the device you want to snapshot. You may want to select to create a new mof files provided your device is not in our supported device list for configuration based simulation [3.2.1]. If you choose to create the new mof files, please make sure the directory you wish to create mofs in is empty.



5. On the next screen as soon as 'Create New CIMOM' is chosen, user gets a new window to choose the port number as shown. Currently only port number 5988 is supported.



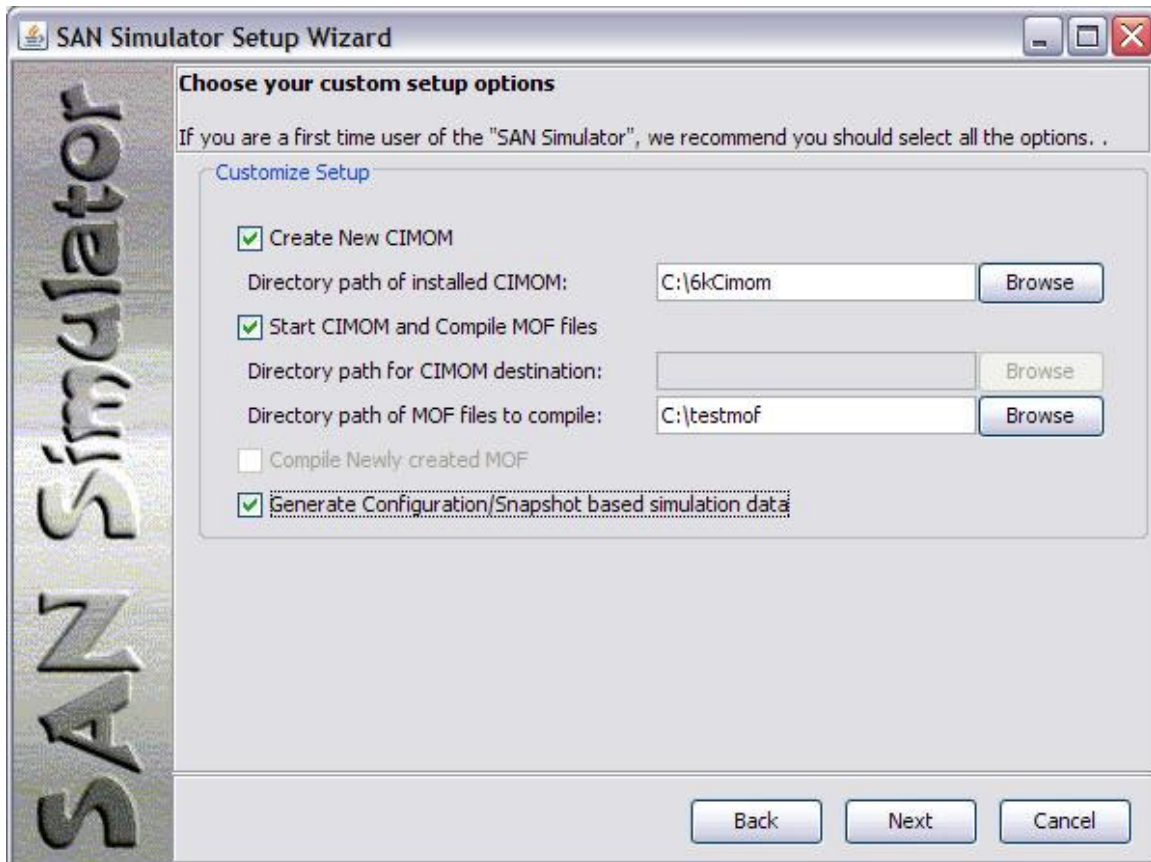
6. On the same screen mentioned above, choose all the options that you want execute.

If you already have a cimom compiled with mof files of the device being snapshotted, you may choose to deselect the option 'Create New CIMOM' and 'Start CIMOM and Compile MOF files'.

If you have a cimom created but no mof files compiled in it, then select 'Start CIMOM and Compile MOF files' but deselect 'Create New CIMOM' option. You will have to give the directory path of the cimom for the option titled 'Start CIMOM and compile MOF files'.

If you selected to create new mof files in the step 4, please give the same path mentioned in step 4 for mof file directory destination. If you are trying to snapshot the device which we already support using configuration based simulation, you will get readymade mof files in SetupWizard\SAN_Mof\. Please select the appropriate directory inside the SAN_Mof folder.

You may also select the option of only generating the data if you require doing so. It will only generate required data in SIMDB using snapshot/config based option.



7. Now you will get a confirmation screen. Please confirm all the inputs provided. If you want to modify any of the inputs, you may go back and modify it. Then press Setup.

3.2. Configuration based simulation

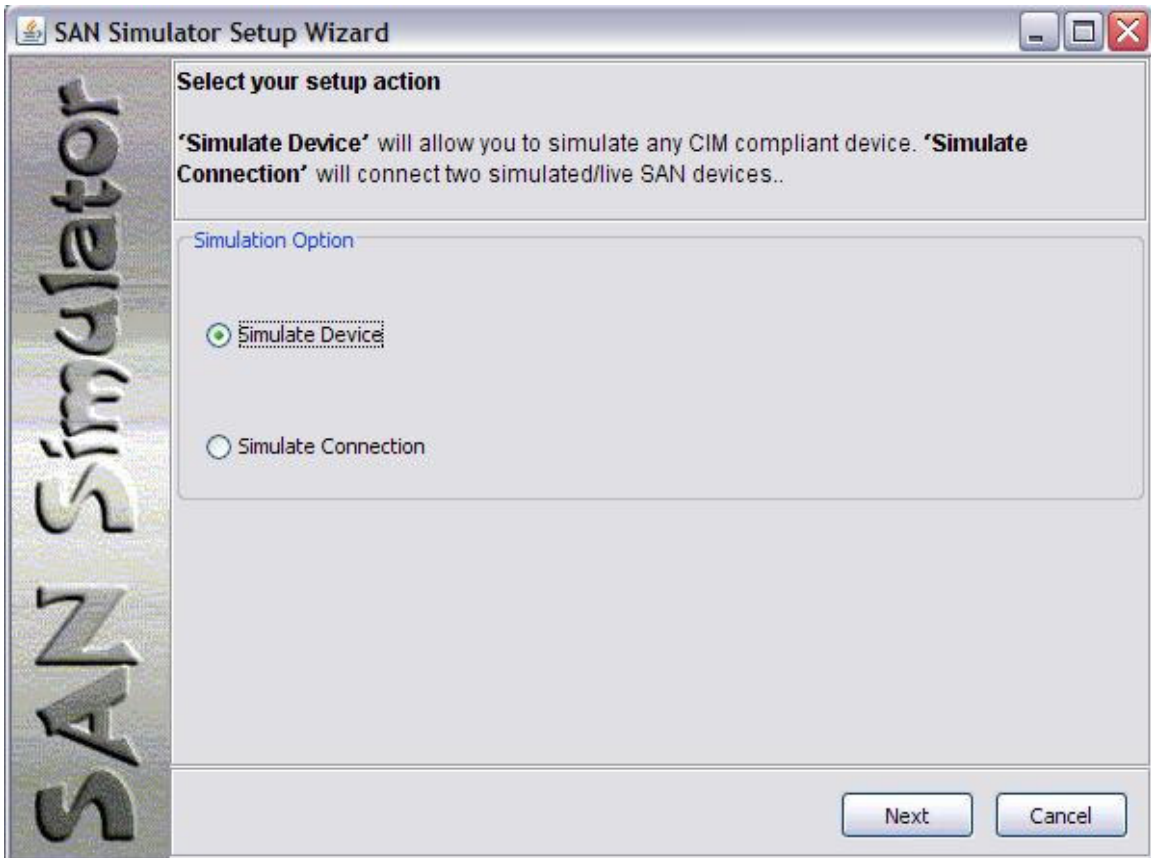
3.2.1. Supported Devices

We currently support following devices using configuration based simulation:
 DS4000 [CIMOM version 9.16.Go.06],
 DS6000 [CIMOM version 5.1.0.40],
 DS8000 [CIMOM version 5.1.0.40],
 Brocade Switches [CIMOM version 110.4.0a]

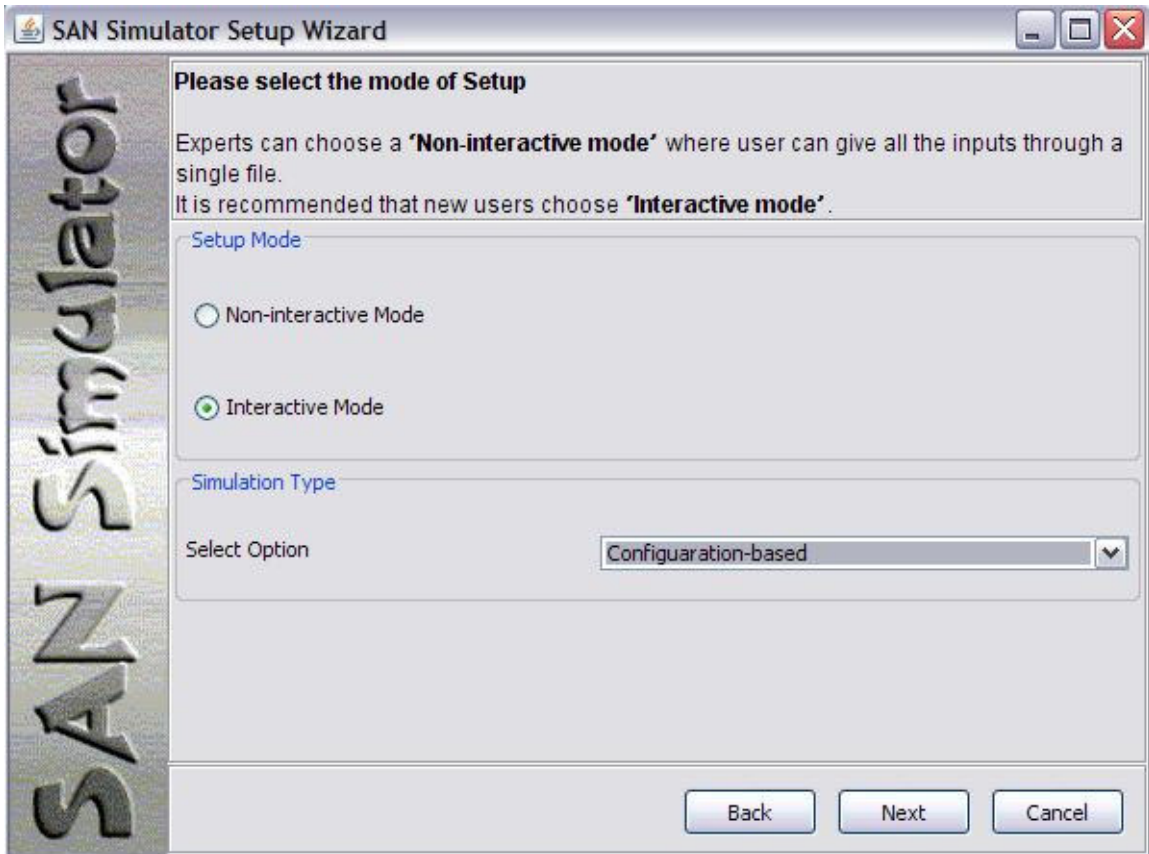
3.2.2. Steps

Follow the below mentioned steps for simulating the device using configuration based approach.

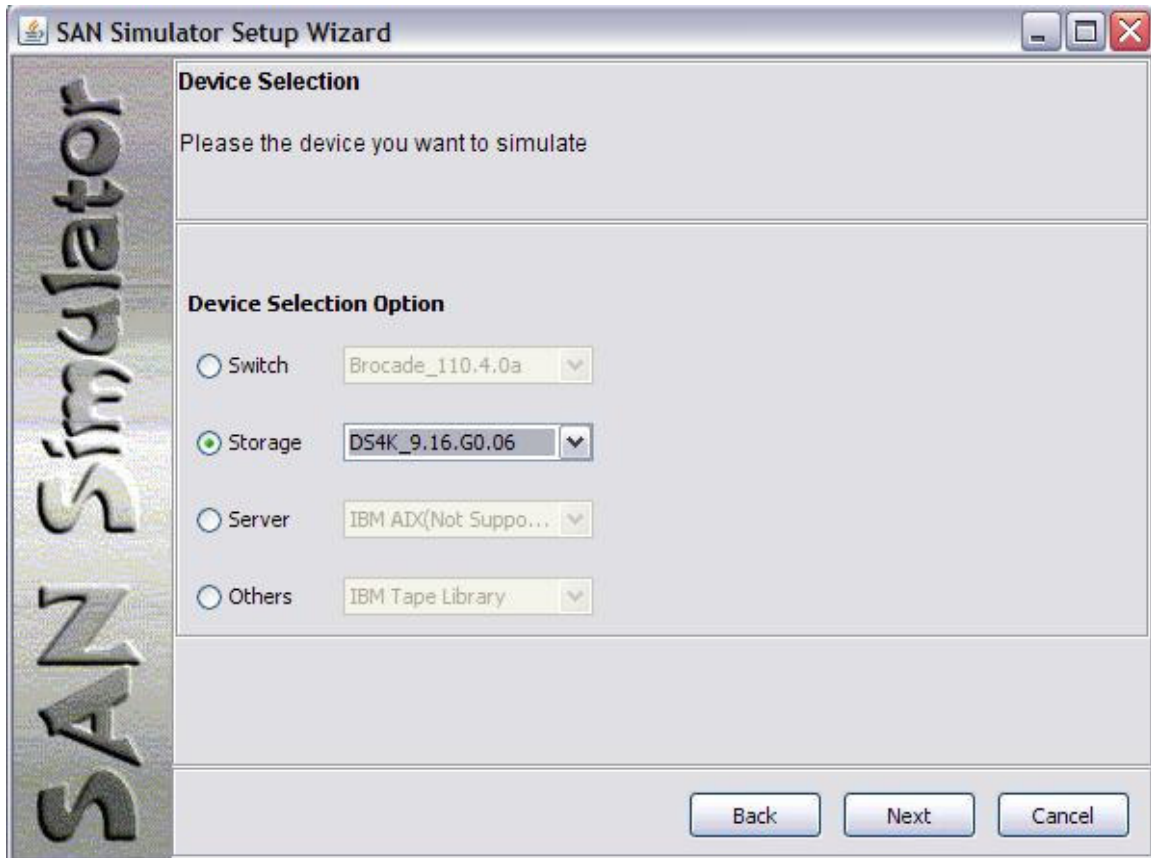
1. Start the simulator using setup.bat script. Select 'Simulate Device'.



2. Select interactive mode setup with configuration based simulation type.



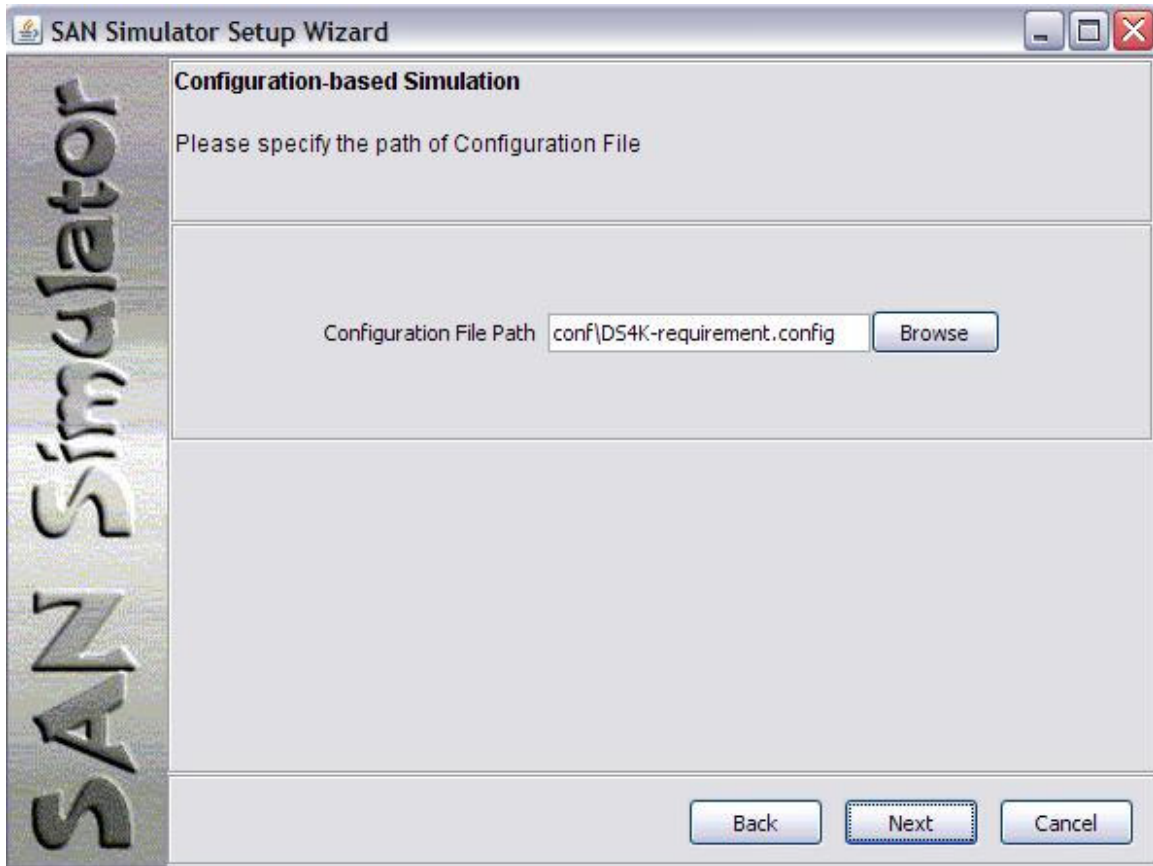
3. Choose the device to be simulated from the drop down menus.



4. Enter the database details which will store the data repository of the simulated device. If local database is used and current logged in user has admin permissions on the database, then username and password fields can be left blank. Currently database name has to be SIMDB.



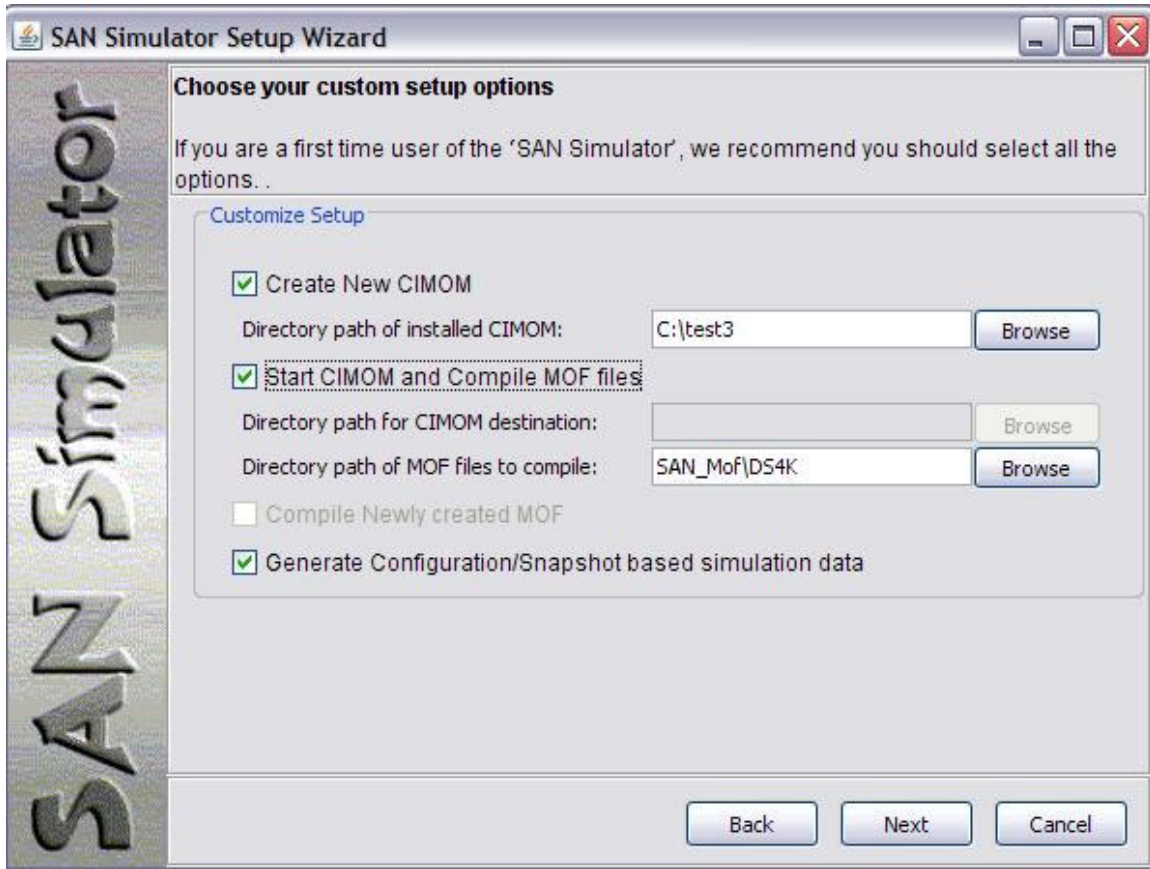
5. Specify the configuration file name and path now. All the default configuration files reside in conf directory. You will be presented with the default file path automatically. You have to select the config file as per your device requirement. You can also edit these config files, if you want to change the configuration of the device from the default one.



Following is an example DS6k config file.

```
#Name of storage system
STORAGE_SYSTEM=DS6K
#Number of storage system
NUMBER_OF_STORAGE_SYSTEM=1
# Number of processor in the system
NUMBER_OF_PROCESSOR=2
# Number of ports
NUMBER_OF_PORTS=8
# Total number of storage pools
NUMBER_OF_POOLS=2
# Total number of volumes
NUMBER_OF_VOLUMES=4
# Total number of disk/ extents
NUMBER_OF_EXTENTS=4
# Mapping between pool and extents, number of extents for each
pool,
# in given each pool has 1 extent, hence value is 1 1.
# (the values should be space •eparated)
MAPPING_DISK_TO_POOL=2 2
# Mapping between pool and •eparat, number of •eparat for
# each pool, in given each pool has 1 volume, hence value is 1 1.
# (the values should be space •eparated)
MAPPING_POOL_TO_VOLUME=2 2
```

6. You will get the screen to customize your setup same as in steps 5 and 6 of 3.1. Please choose the appropriate options as described in steps 5 and 6 of 3.1. Here directory path for mof files will be automatically displayed.



7. Now you will get a confirmation screen. Please confirm all the inputs provided. If you want to modify any of the inputs, you may go back and modify it. Then press Setup.

3.3. Support for Multiple devices in the same SIMDB

Using SAN Simulator we can generate data for multiple devices in the same SIMDB. We can have multiple DS4K's, DS6K's, DS8K's and Brocade in the same database. In case of configuration based simulation of storage boxes (DS4k, DS6k, DS8k), for simulating 'n' devices we need to run the setup Wizard 'n' times. In case of configuration based simulation of brocade switches, you can specify multiple numbers of switches in the same configuration file, so you need not run the setup wizard multiple times to generate multiple switches in the same SIMDB.

When using the configuration based simulation option, one can change the configuration of the device to be simulated as required (by changing the conf file in the conf folder).

4. Correlate Devices

Currently SAN Simulator supports correlation of following types

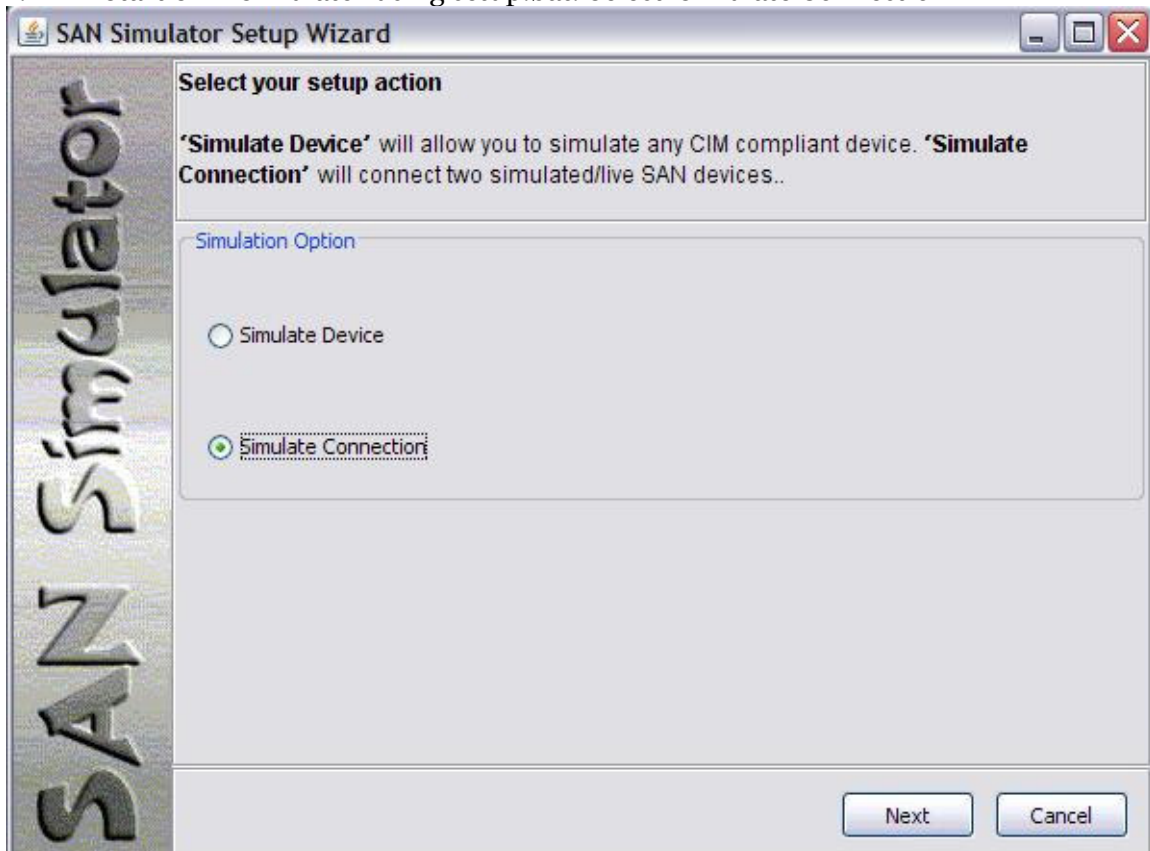
- a.) Switch1 – Switch2 (Switch1 and Switch2 need to be from the same fabric)
- b.) Storagebox – Switch

In both the above cases, additional classes are required to be added on the switch CIMOM. So user needs to provide SIMDB information where Switch data repository is kept. Also regarding storagebox user can specify either SIMDB access details or simulated CIMOM access details.

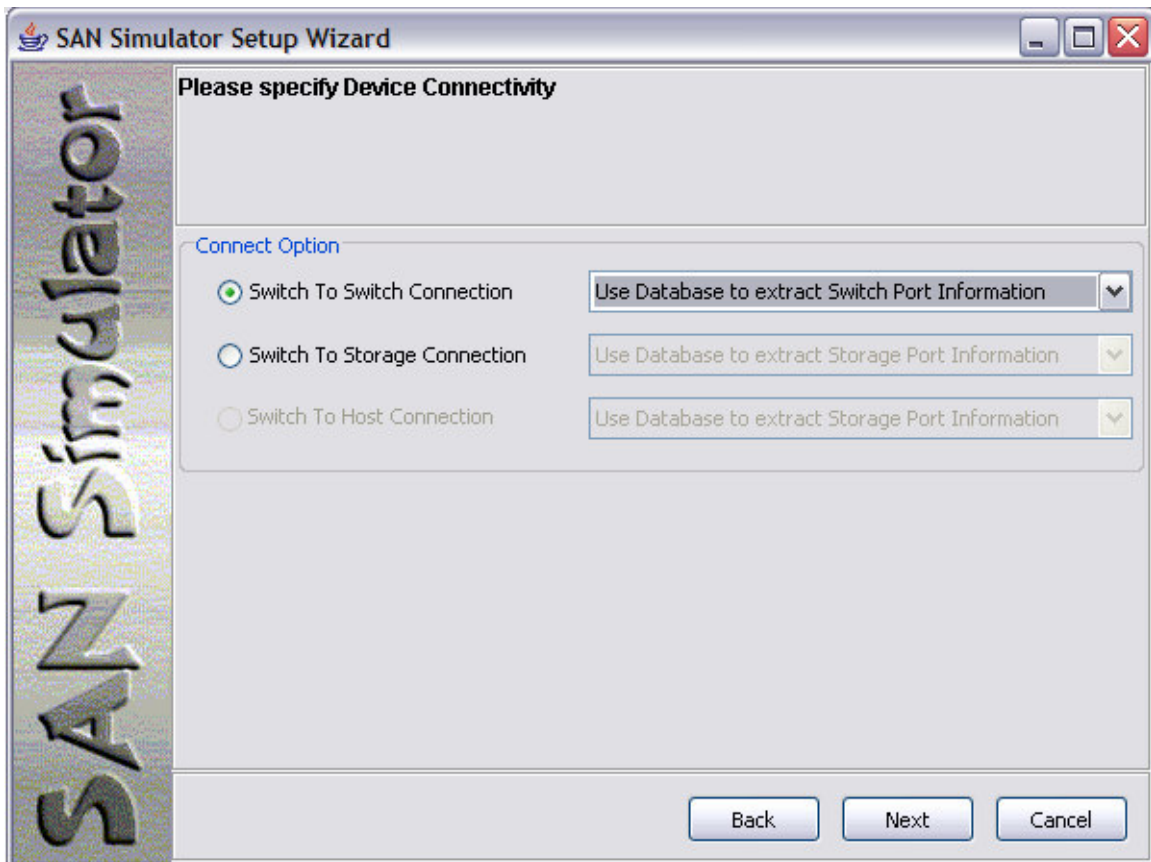
4.1. Switch to Switch Connectivity

Following steps explain how to connect two switches to each other.

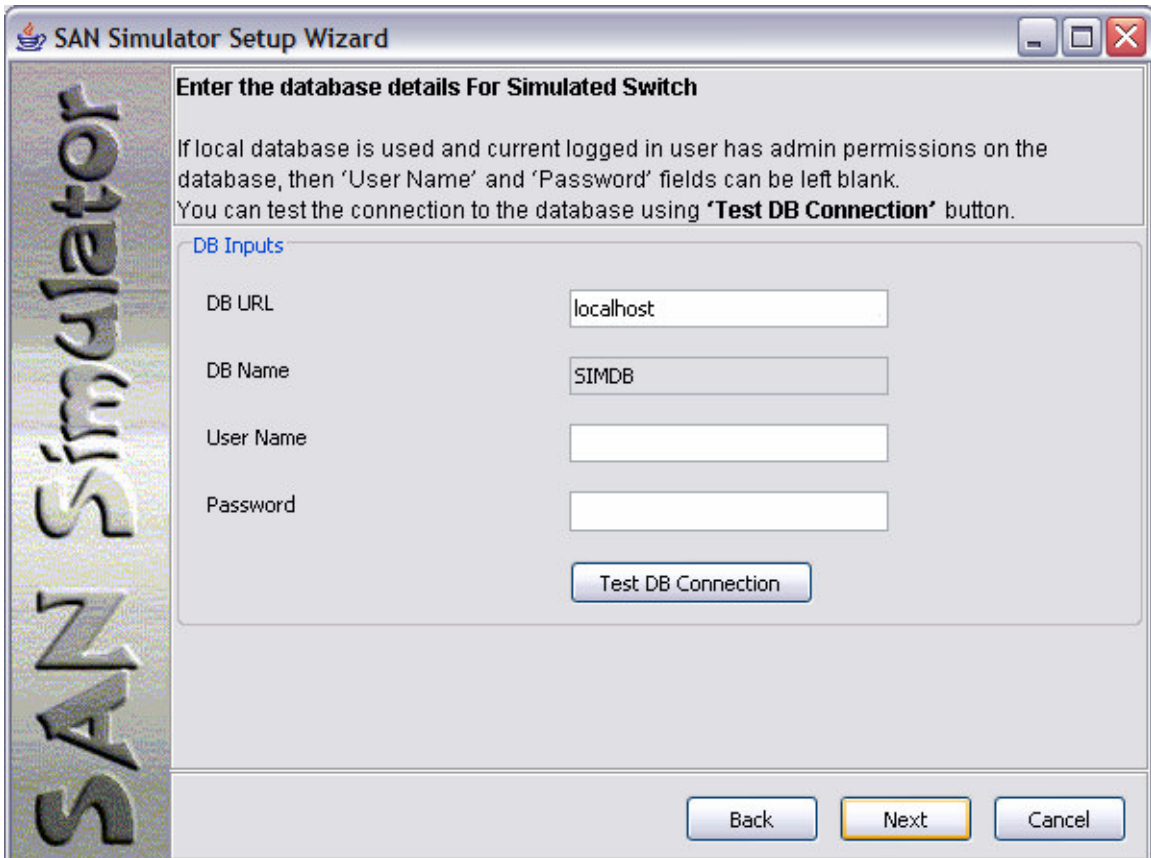
1. Start SAN Simulator using setup.bat. Select 'Simulate Connection'



2. Choose Connect option as 'switch to switch connection'



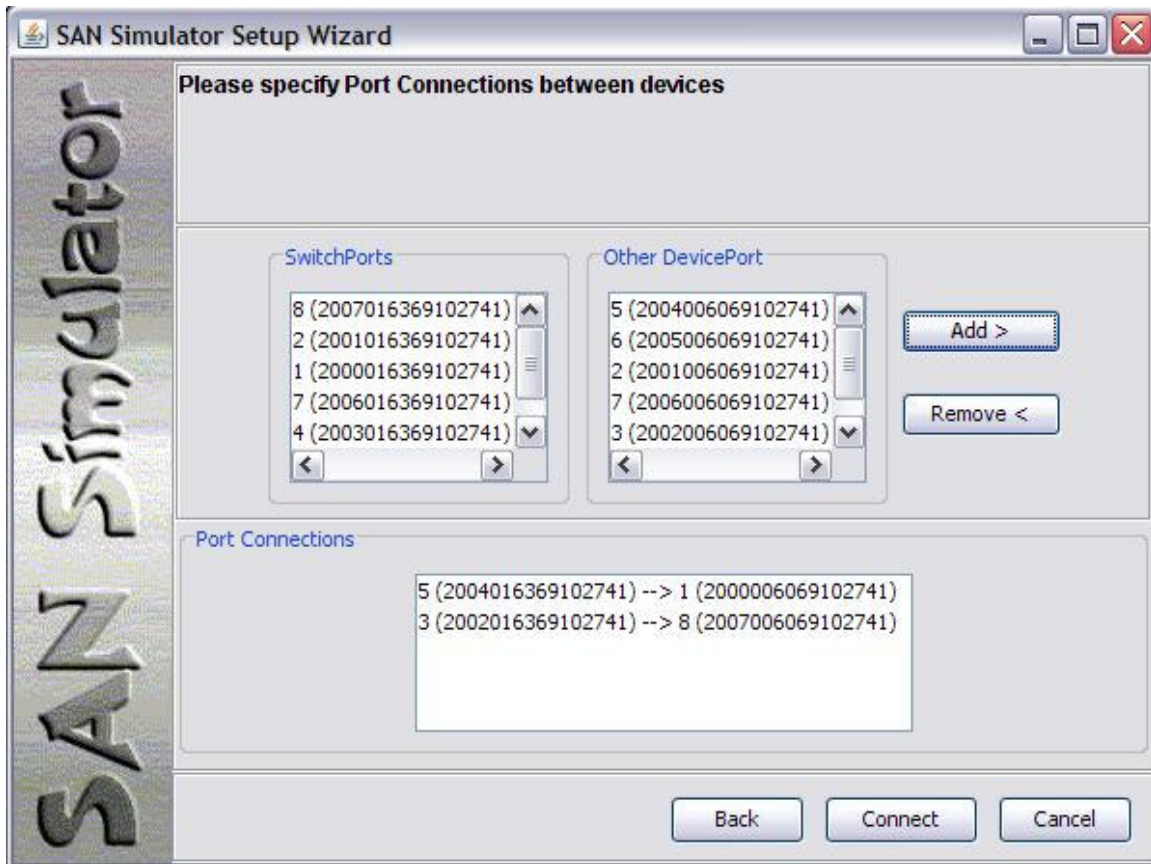
3. Enter database details for the simulated switch cimom



4. Select the fabric name, source and destination switches from it.



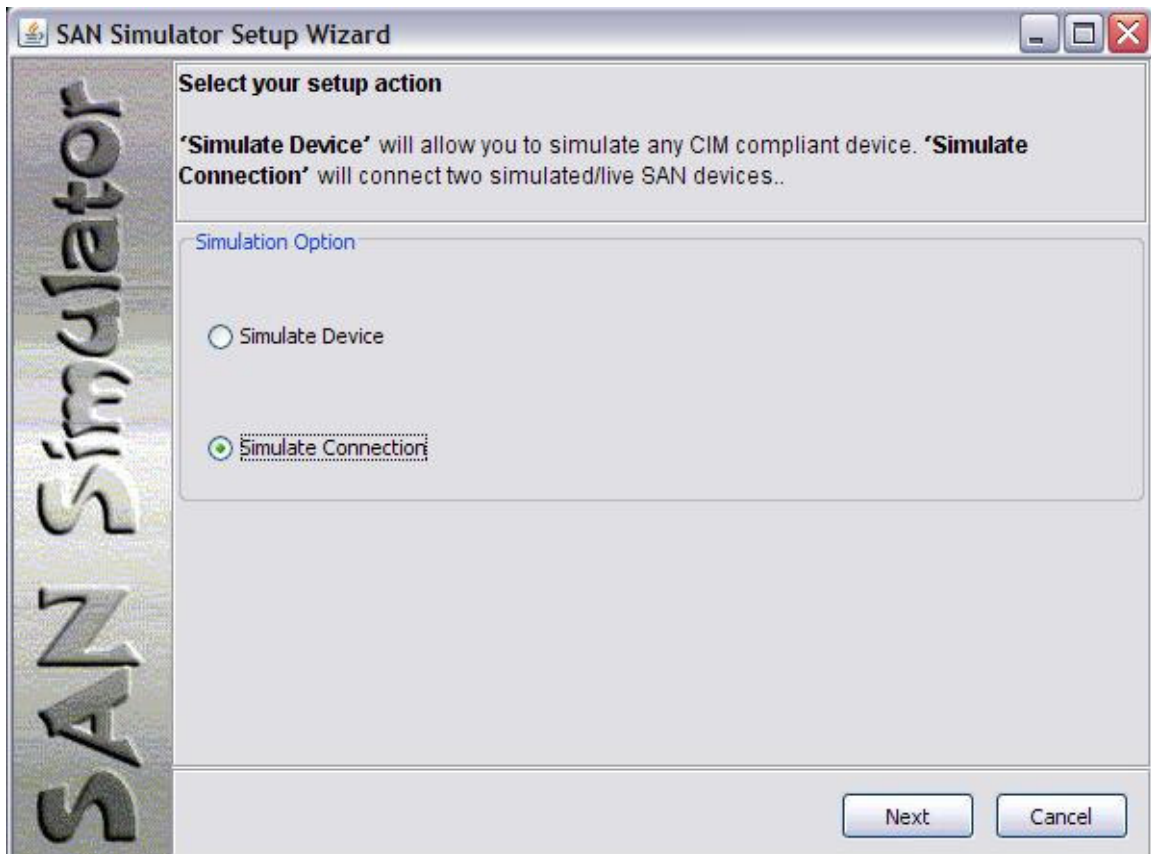
5. Select the ports of the switches that you want to connect to each other. Then press 'Connect'



4.2. Switch to Storage Connectivity

Following steps explain how to connect a switch to a storage box.

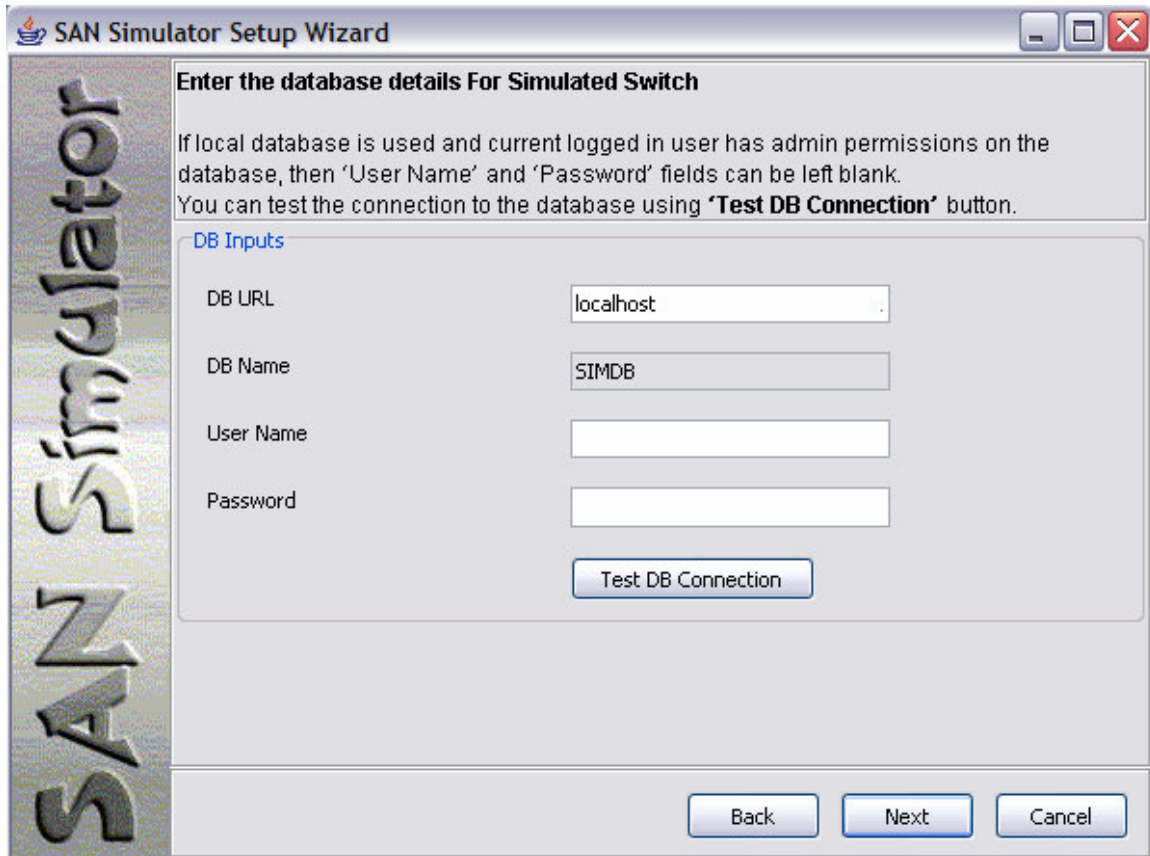
1. Start SAN Simulator using setup.bat. Select 'Simulate Connection'



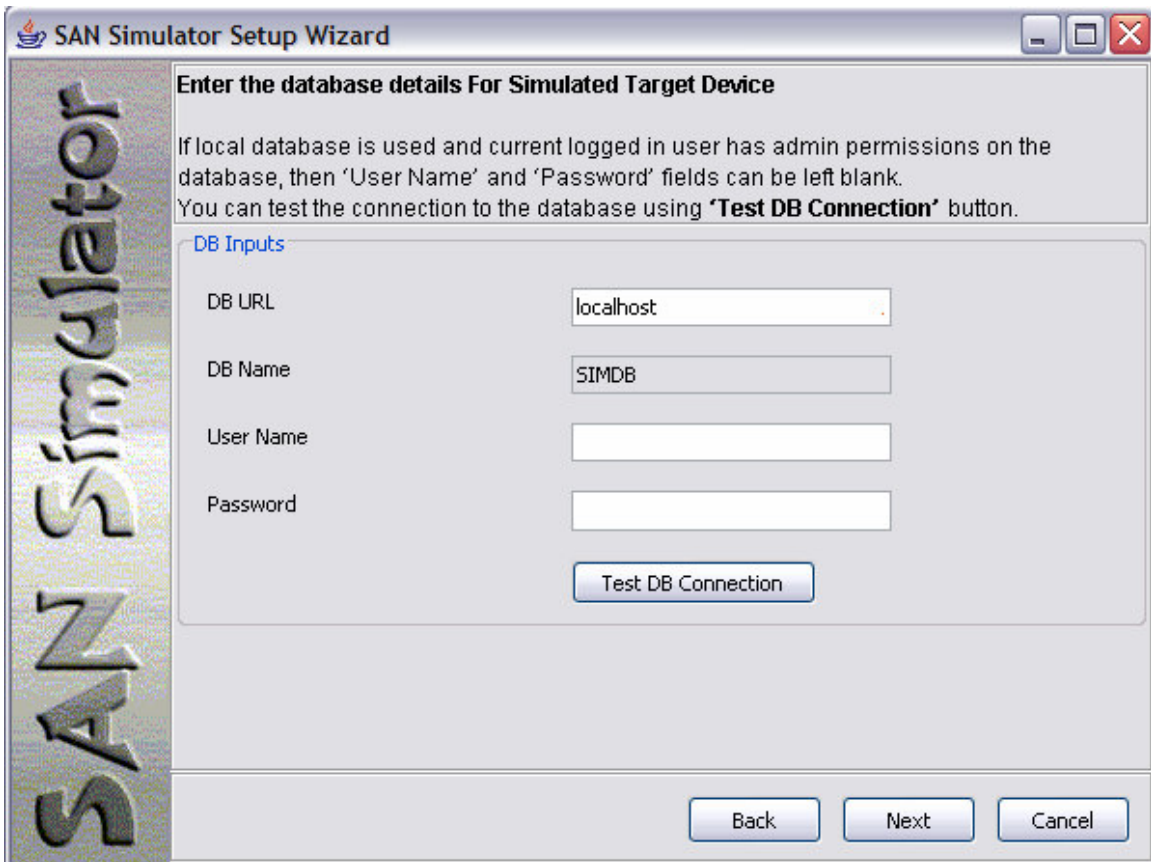
2. In connect option choose 'Switch to Storage Connection'. To extract storage port information, two options have been provided. a.) Using storage box's SIMDB b.) Using storage box's simulated cimom. You can choose either of options. If you choose option b.), then the cimom should be running.



3. Enter DB details for the simulated switch



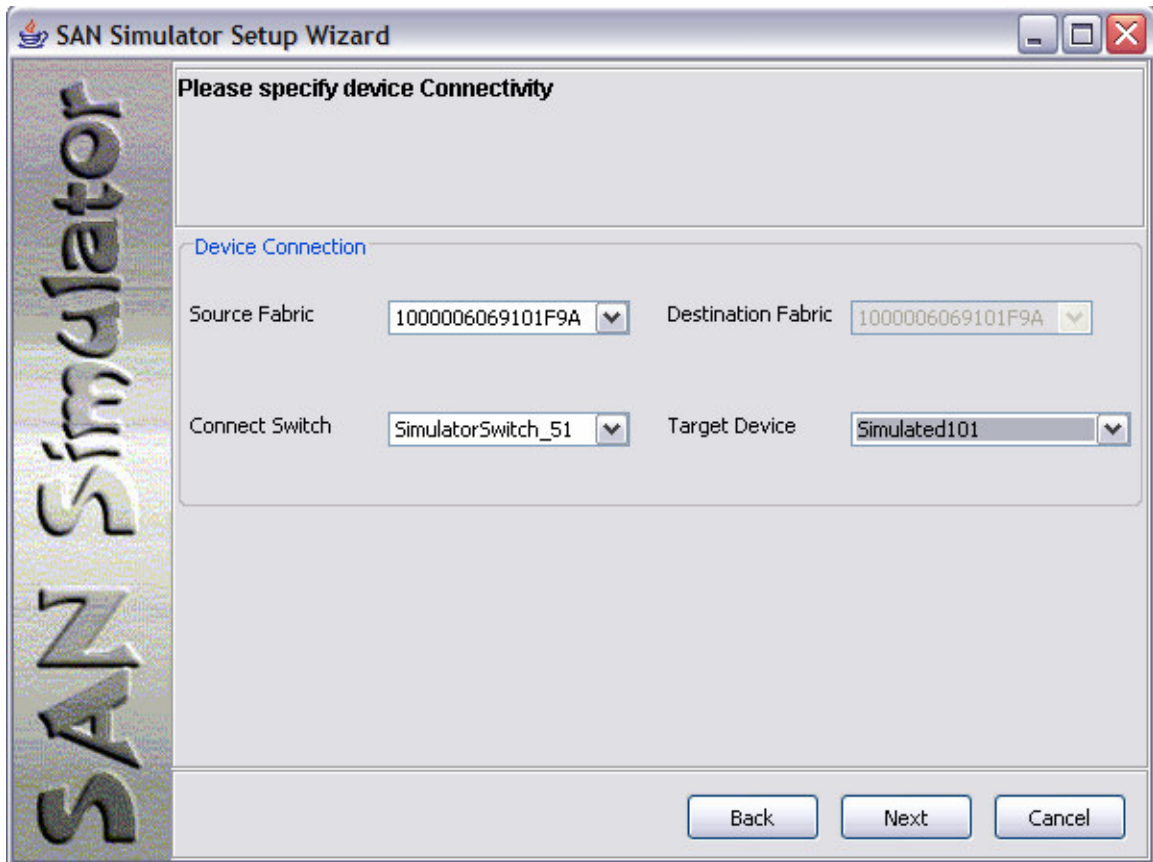
4. Here either a.) or b.) screens will be seen based on the input in step 2.
 - a.) Enter DB details for simulated storage box



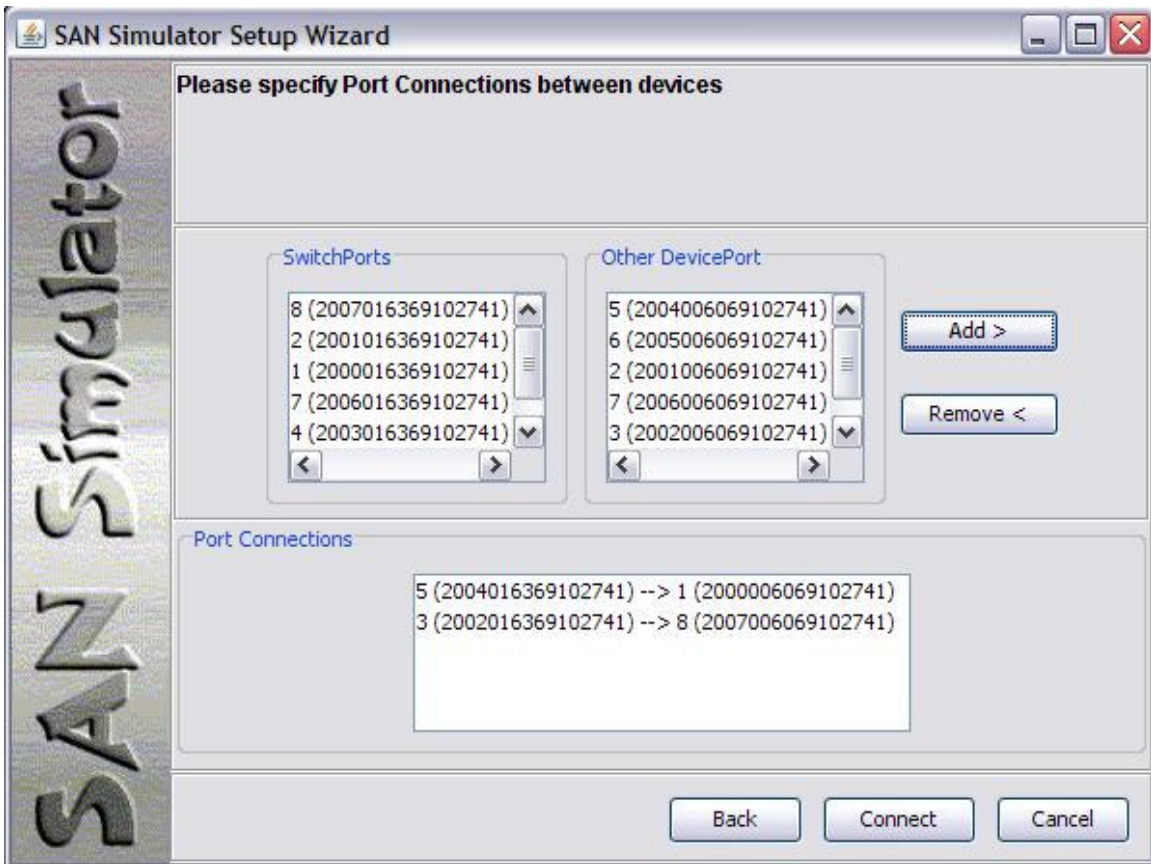
b.) Enter CIMOM details for simulated storage box



5. Select the Switch and the storage device you want to connect.



6. Select the ports you want to connect and press 'Connect'



5. Discover devices and correlation

For discovery of devices, you can use any CIM Client or CIM Explorer/Browser (e.g. SBLIM ECUTE) or CIM compliant Storage Resource Manager Suites (e.g. Eclipse Aperi SRM).

Following are the interop namespaces of the supported devices that simulated CIMOMs use. All simulated CIMOMs run using http protocol and port 5988.

DS6000 : /root/ibm

DS8000: /root/ibm

DS4000: /interop

Brocade: /interop

Tape: /root/ibm