B.2. Creating a network

Using the icons in the **Topology Configuration window** to create a network topology.

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Step 1) create a node

Select an icon (e.g., RFG) by clicking on it in the **Topology Configuration window**. Now move the pointer to the **Topology window**, the pointer will become the selected icon as it passes within the **Topology window**. When you have the icon located where you want to place it, click it. A pop-up window (similar to Figure 7) will appear for you to enter its configuration parameters.

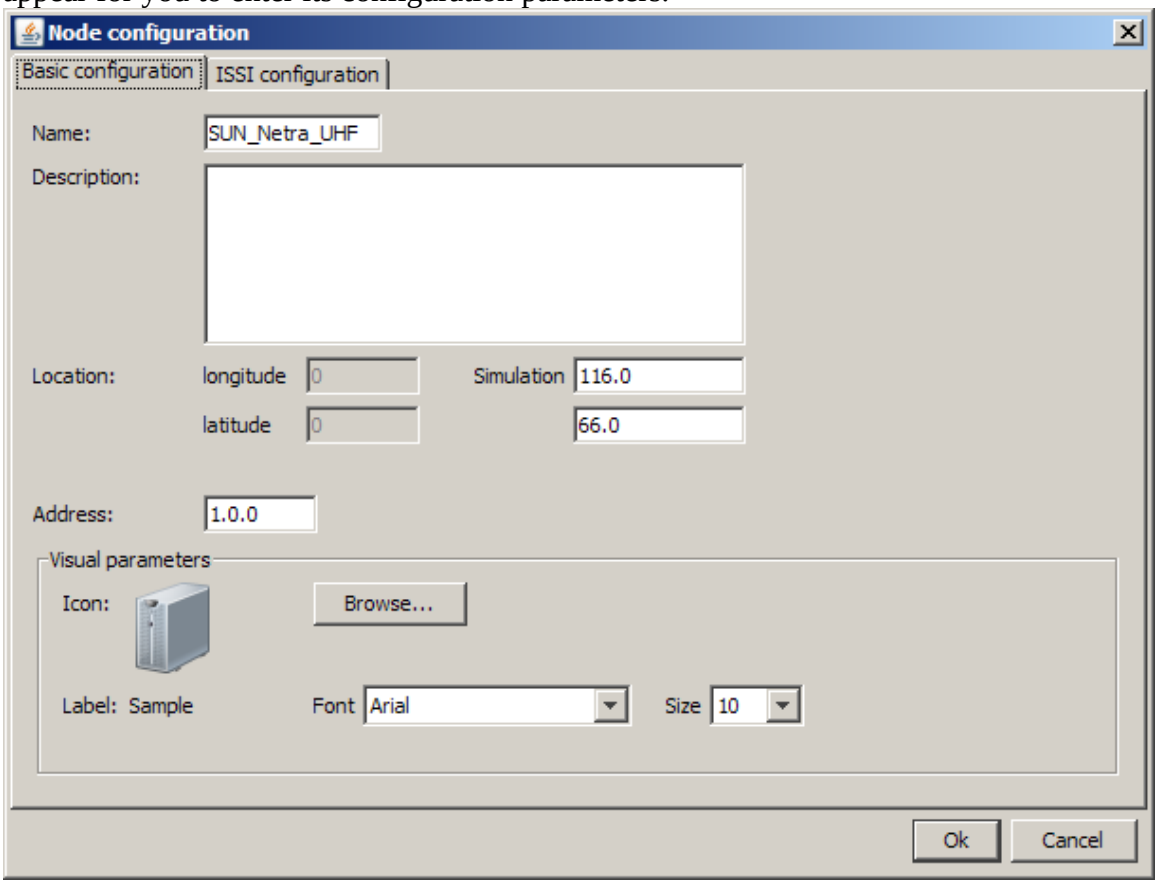


Figure 7 - Node configuration pop-up window (basic configuration tab)

ACTIONS:

- Enter a name that you like, remembering that names must be unique throughout the simulation.

  Acceptable values are alphanumeric (a .. z, A..Z, and 0..9 and "_"). The value must begin with a letter and be two characters in length.

- Enter a description that will help you to remember what this node does.
- Change the location (placement), if you desire, by entering values for the longitude or latitude fields or by selecting the edit location button. The current X,Y coordinate position is displayed in the Simulation field.

Acceptable values are zero through the maximum X coordinate and zero through the maximum Y coordinate.

- Enter an address (NS-2), if you desire.

NOTE: Addresses must be unique, so it may be better to let the program automatically generate this.

- Change the icon, font type and font size, if you desire.

Use the Browse button to locate an icon from those available.
Select the font from the list.
Select the font size from the list.

- Click on the ISSI configuration tab and configure these related parameters (see Figure 8).

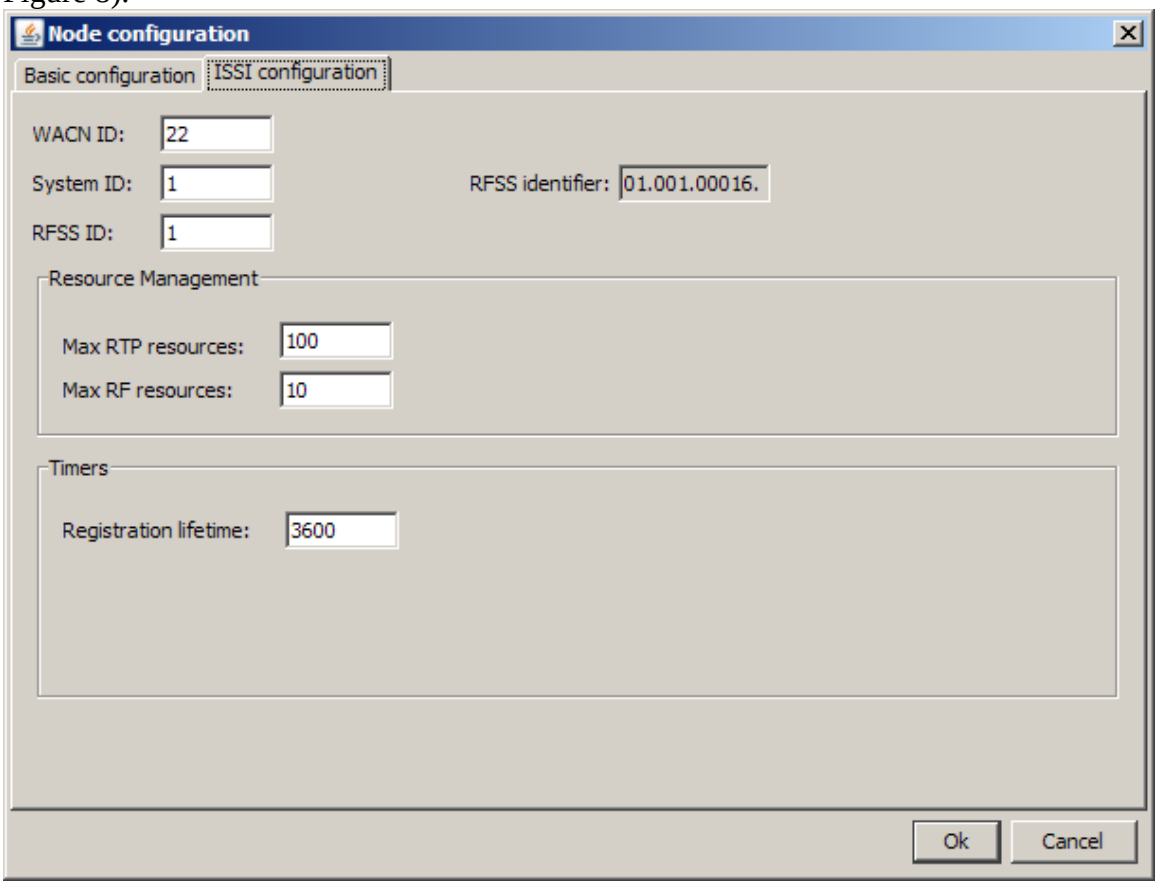


Figure 8 - Node configuration pop-up window (ISSI configuration tab)

ACTIONS:

- Enter the Wide Area Communications Network (WACN) identification (ID) for this node. This is a 5HEX-DIGIT value.

Acceptable range of integer values is 0 to 1048575 (i.e., 0x00000 to 0xFFFFF).
To enter a 5HEX-DIGIT value, precede the number by the two characters: zero and the lower case letter x (i.e., 0x). The number must contain five digits.

- Enter the System identification (ID) for this node. This is a 3HEX-DIGIT value.

Acceptable range of integer values is 0 to 4095 (i.e., 0x000 to 0xFFF).
To enter a 3HEX-DIGIT value, precede the number by the two characters: zero and the lower case letter x (i.e., 0x). The number must contain three digits.

- Enter the Radio Frequency Subsystem (RFSS) identification (ID) for this node. This is a 2HEX-DIGIT value.

Acceptable range of integer values is 0 to 255 (i.e., 0x00 to 0xFF).

To enter a 2HEX-DIGIT value, precede the number by the two characters: zero and the lower case letter x (i.e., 0x). The number must contain two digits.

NOTE: The RFSS identifier is automatically generated based on the previous three input values using the format: rfss-id"."system-id"."wacn-id as specified in TIA-102.BACA, section 3.4.1.1.

- Enter the maximum Real-time Transport Protocol (RTP) resources available.

Acceptable range of integer values is 0 to 2,147,483,647 (2^{31}-1).

- Enter the maximum Radio Frequency (RF) resources available for this Radio Frequency Gateway (RFG). Radio Frequency resources are equivalent to radio frequency channels. It requires one Radio Frequency resource to support one call.

Acceptable range of integer values is 0 to 2,147,483,647 (2^{31}-1).

- Enter the maximum Registration lifetime.

Acceptable range of integer values is 0 to 2,147,483,647 (2^{31}-1).

Step 2) Create at least one other node following step 1.

Step 3) Connect two nodes with a link

Select a link template from the topology configuration window and use it to connect two nodes together. Single click on the first node, then move to the other node and single click on it. Once this is done, a pop-up window (Figure 9) appears for you to configure the properties of this newly created link.

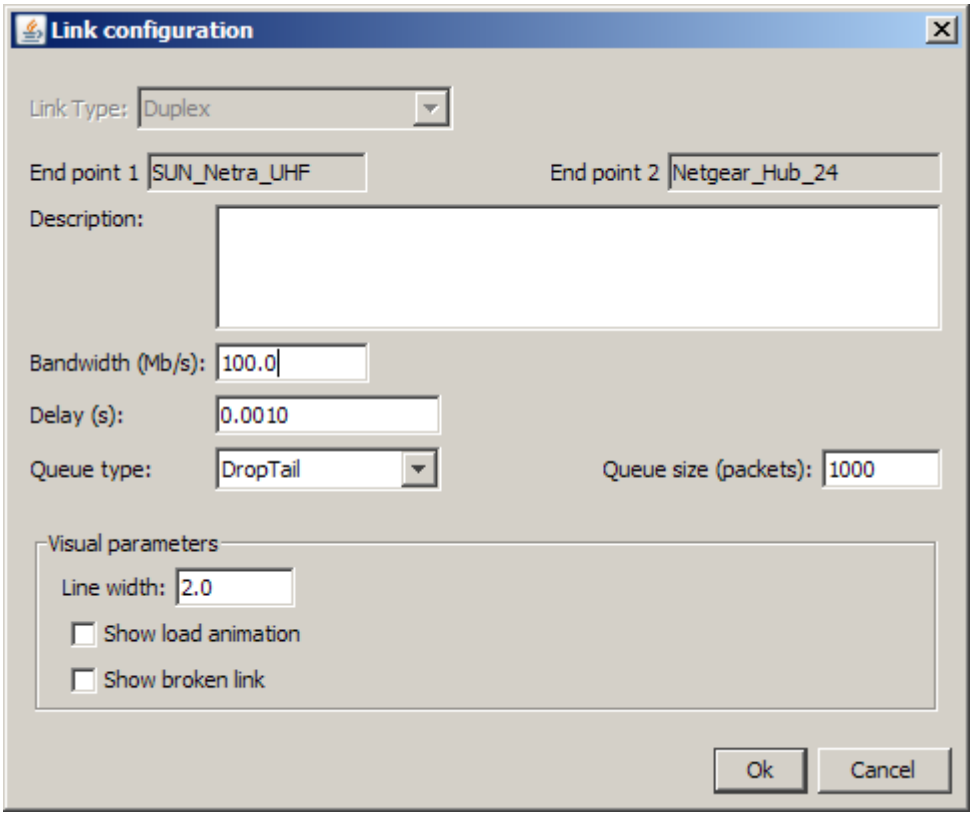


Figure 9 - Link configuration pop-up window

ACTIONS:

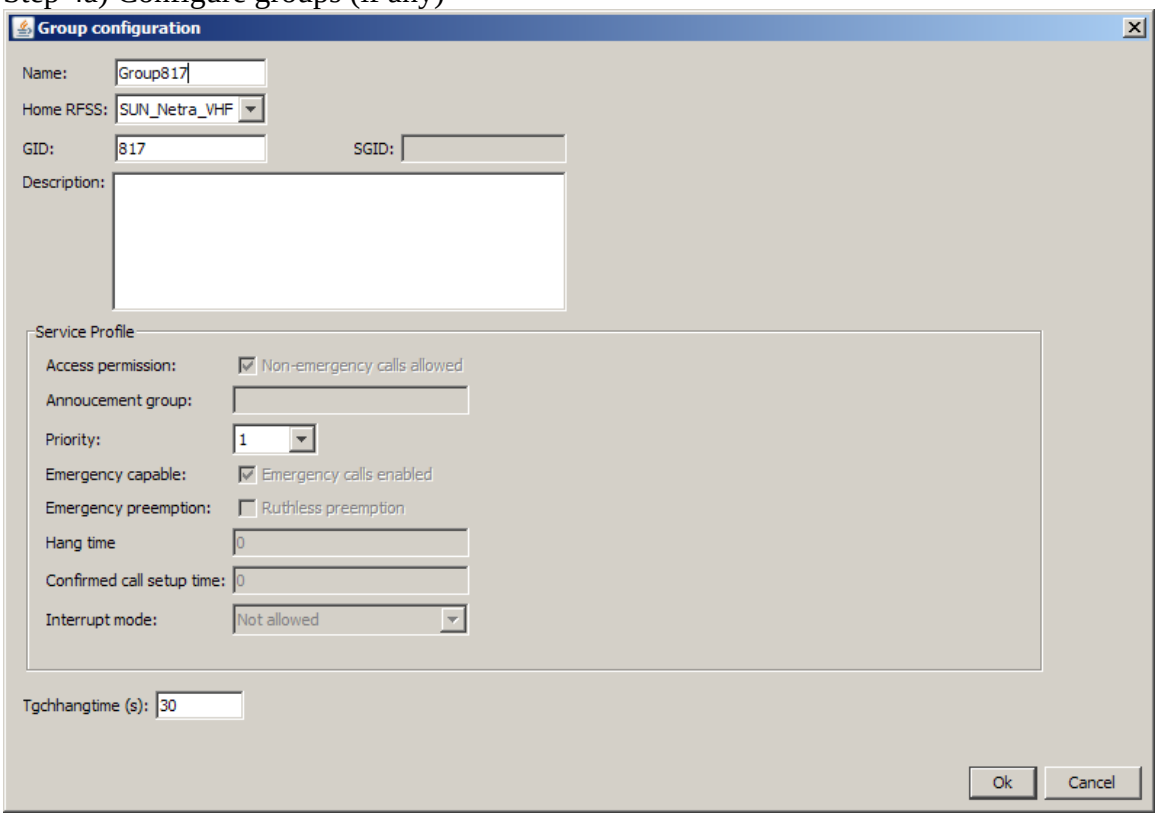
- Enter a description that will help you to remember what this link does.
- Enter a bandwidth.
  Acceptable range of values is zero (0) to 9,999,999.
- Enter a delay.
  Acceptable range of values is zero (0) to 9,999,999.
- Select a queue type or accept the default (Drop tail)
- Enter a queue size or accept the default.
  Acceptable range of integer values is 0 to 2,147,483,647 (2^{31}-1).
- Change the width of the line to be displayed, if you desire, by entering a number.
  Acceptable range of values is zero (0) to 9,999,999.
- Check/Uncheck the option to show load animation
- Check/Uncheck the option to show link as a broken line

Step 4) Configure groups or subscriber units or both

In order to use the network that you just defined using nodes and links, you now need to program either groups or subscriber units to use this network.

NOTE: If your network will have any groups defined, it is easier if you configure the groups first and then the subscriber units. If you define groups first, then when you define an SU, an option for the group will be available to select. You can define the subscriber unit first, but then you will have to revisit the SU's property to enter the group information.

Step 4a) Configure groups (if any)



ACTIONS:

- Enter a name for human recognition.
  Acceptable values are alphanumeric (a .. z, A..Z, and 0..9 and "_"). The value must begin with a letter and be two characters in length.
- Select an RFSS from the available list where this group will be homed.
- Enter a Group ID. This is a 4HEX-DIGIT value.
  Acceptable range of integer values is 0 to 65535 (i.e., 0x0000 to 0xFFFF).
  To enter a 4HEX-DIGIT value, precede the number by the two characters: zero and the lower case letter x (i.e., 0x). The number must contain four digits.
  NOTE: The subscriber group identification (SGID) is automatically calculated using the WACN and system ID of the RFSS selected as home RFSS for this group and the group ID just entered.
- Enter a description for this group, if you desire.
- Select a priority from the list for the group, when competing with other group calls.
- Enter a Tgchhangtime or accept the default. (See TIA-102.BACA, Annex A, Table 36, page 286: "Maximum time interval (i.e., ISSI hang time) during which there is no voice activity over the ISSI among the RFSSs participating in a group call, which when exceeded will entail group call release.")
  Acceptable range of integer values is 1 to 2,147,483,647 (2^{31}-1).

NOTE: Other items shown are currently not implemented.

Step 4b) Configure SUs

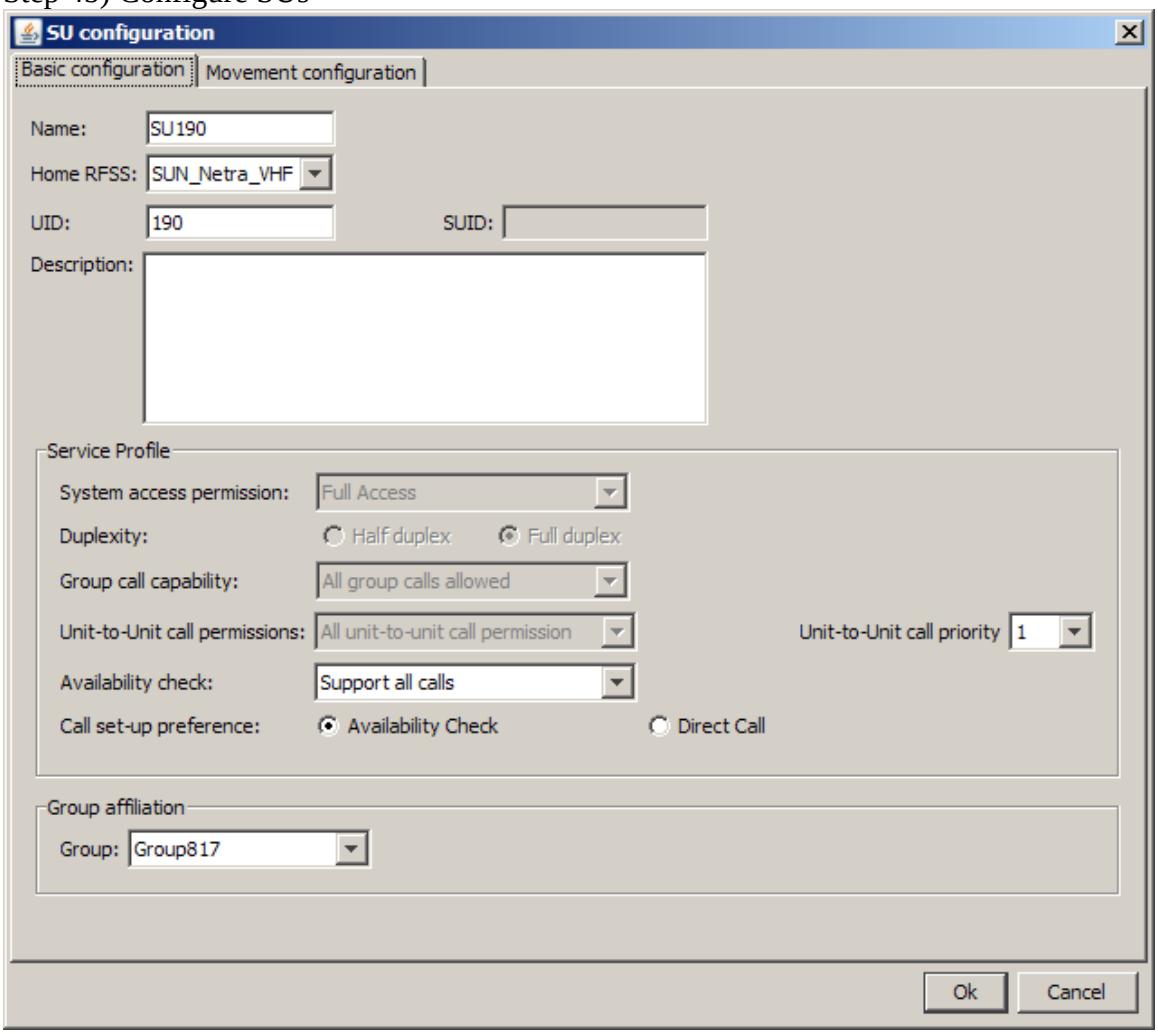


Figure 10 - SU configuration (basic configuration tab)

ACTIONS:

- Enter a name to identify the subscriber unit. Each name must be unique.
  Acceptable values are alphanumeric (a .. z, A..Z, and 0..9 and "_"). The value must begin with a letter and be two characters in length.
- Select a Home RFSS from the list of available RFSSs to be this SU's home RFSS.
- Enter a user identifier (UID), to uniquely indentify this SU.
  Acceptable values are 0 to 16777215 (2^{24}-1) (i.e., 0x000000 to 0xFFFFFF).
  To enter a 6HEX-DIGIT value, precede the number by the two characters: zero and the lower case letter x (i.e., 0x). The number must contain six digits.
- Enter a description, if you desire.
- Select a unit-to-unit call priority or accept the default.
- Select which type of calls will use availability check.
- Chose a call set-up preference of either availability check or direct call.
- Select a group affiliation, if you desire and at least one has been defined previously.

NOTE: If the SU is defined before a group is defined to which this SU is to belong, then you will be unable to select it or enter it. Instead you must save the current SU and then define the group (following step 4a) and then return to this node and select the group.

Click the next tab: Movement configuration in order to continue the SU configuration. Here is where you configure the SU to register with an RFSS or when it deregisters. By registering and deregistering the SU to different RFSSs you are able to create SU attachment to an RFSS and movement to another RFSS.

NOTE: An SU can only be registered with one and only one RFSS at a time.

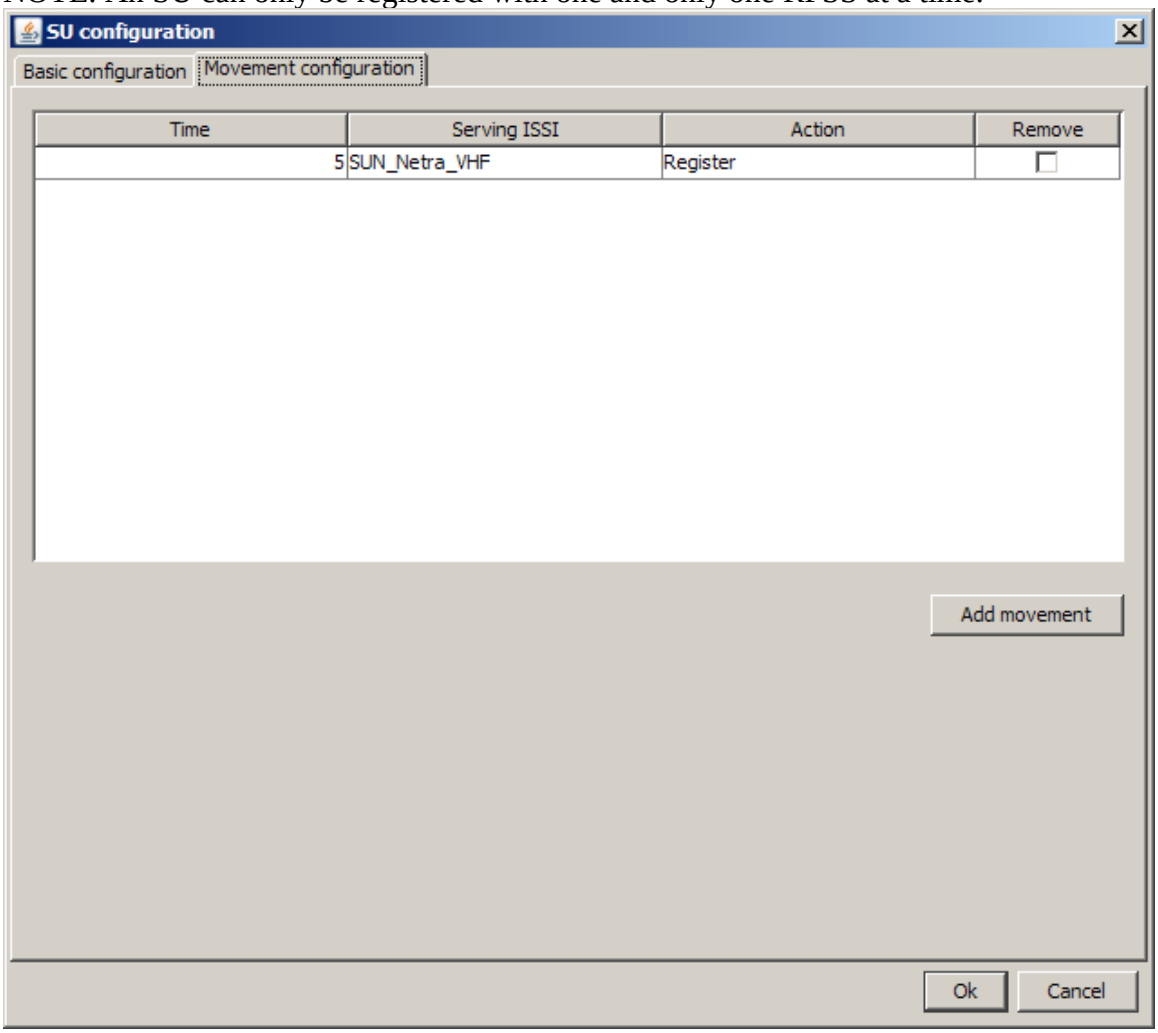


Figure 11 - SU configuration (movement configuration tab)

ACTIONS:

- Click on Add movement, then
  - Enter a time greater than zero when you want the SU to do an action,
    - Acceptable values greater than zero and less than 2,147,483,648.
  - Select a serving RFSS for those available in the pull down menu, and
  - Select an action (e.g., Register) from the pull down menu.

NOTE: An SU must be registered with a serving RFSS if it is to make or receive calls.

To simulate movement you will need to create another entry registering the SU to a different RFSS.

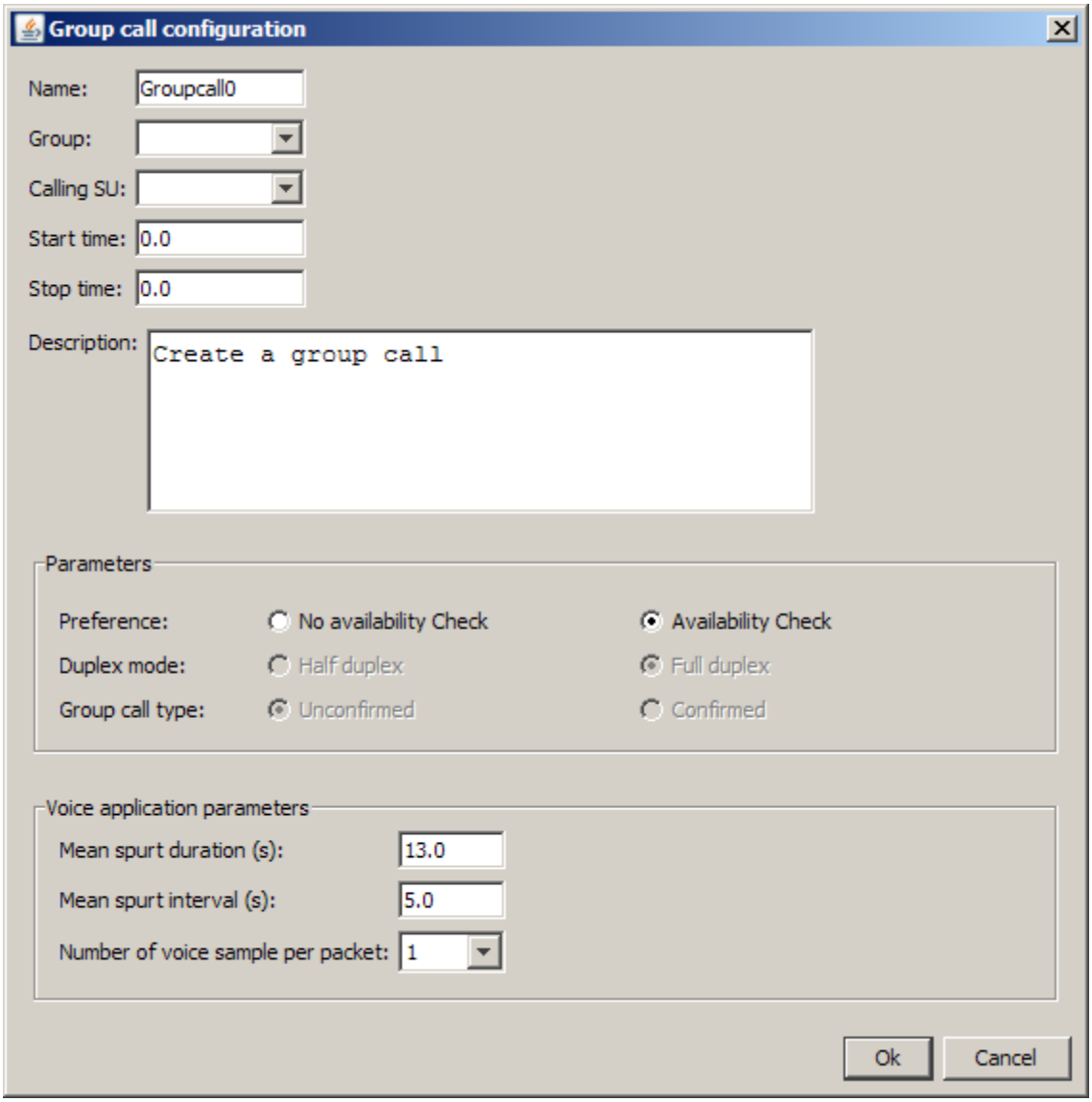
Click the “Add movement” button and in the new entry line enter a time greater than the time in the previous entry line, select a different serving RFSS (from the pull down menu of available RFSS), and select the action-Register (from the pull down menu).

NOTE: Since the SU cannot be registered with more than one RFSS, the program will automatically deregister the SU from its previous RFSS, when it Registers to a new RFSS.

Step 5) Configuring calls

Once you have defined at least two SUs, you will be able to configure group calls, unit-to-unit calls (SU-to-SU), or both.

Step 5a) Configuring group calls



ACTIONS:

- Enter a group name for human identification.
  Acceptable values are alphanumeric (a .. z, A..Z, and 0..9 and "_"). The value must begin with a letter and be two characters in length.
- Select the group name from those previously defined.
- Select the name of the SU that will initiate this call.
- Enter a start time.
  Acceptable values are zero to the stop time value or the maximum possible value (i.e., 9,999,999), which ever comes first.
- Enter a stop time, which is greater than the start time.
  Acceptable values are a number greater than the start time value to 9,999,999.
- Enter a description, if you desire.
- Chose a preference of either No availability check or Availability check.
- Optionally enter detailed Voice application parameters.
  Enter Mean spurt duration.

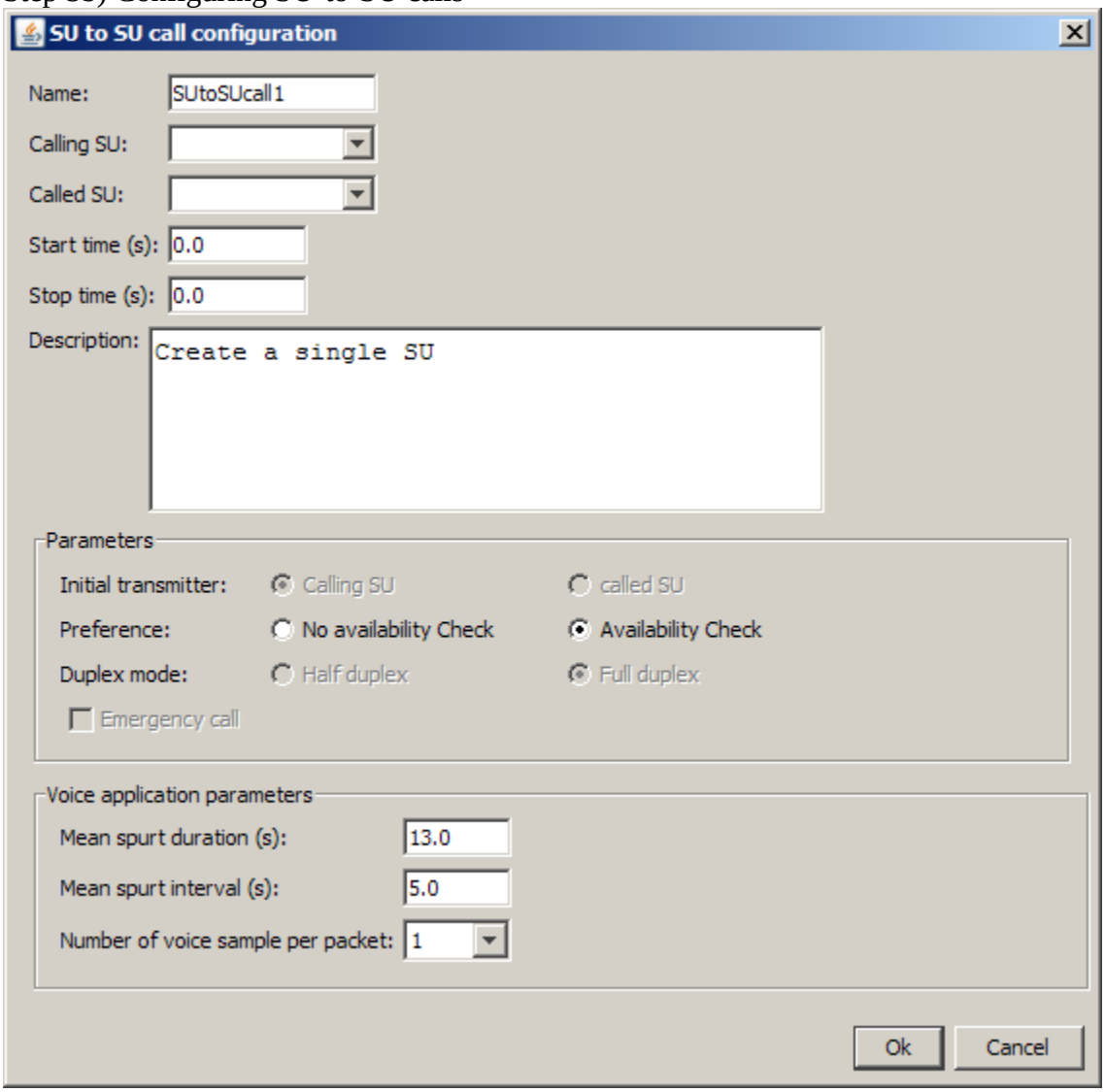
Acceptable values are zero to 9,999,999.

Enter Mean spurt interval.

Acceptable values are zero to 9,999,999.

Select the number (1, 2, or 3) of IMBE packets per packet.

Step 5b) Configuring SU-to-SU calls



ACTIONS:

- Enter a name for human identification of this call.

  Acceptable values are alphanumeric (a .. z, A..Z, and 0..9 and "_"). The value must begin with a letter and be two characters in length.

- Select the name of the SU that will initiate this call.
- Select the name of the SU that will receive this call.
- Enter a start time.

  Acceptable values are zero to the stop time value or the maximum possible value (i.e., 9,999,999), which ever comes first.

- Enter a stop time.
    Acceptable values are a number greater than the start time value to 9,999,999.
- Enter a description, if you desire.
- Chose a preference of either No availability check or Availability check.
- Optionally enter detailed Voice application parameters.
    Enter Mean spurt duration.
        Acceptable values are zero to 9,999,999.
    Enter Mean spurt interval.
        Acceptable values are zero to 9,999,999.
    Select the number (1, 2, or 3) of IMBE packets per packet.

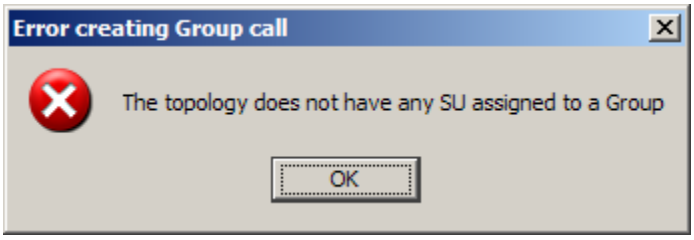
Step 6) Save the newly defined network.
From the main menu bar select Save (Ctrl+S) under the file menu.

Step 7) Run the simulation
From the main menu bar select set simulation time from the project menu.

Then click on the launch simulation in the server icon  .

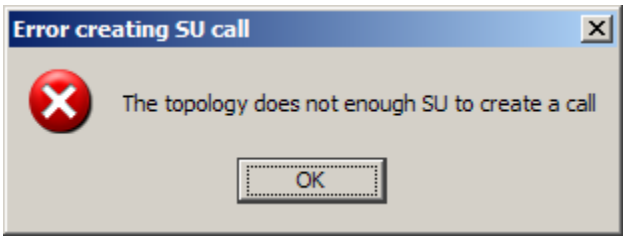
Step 8) If the simulation successfully runs, you can then view the resulting statistics.
Step 8a) If the simulation did not complete successfully, then opening the Fileviewer window and selecting the Log File (log.t) tab will display information about the failed simulation. This information may help you in diagnosing the problem of the failure.

Error messages:

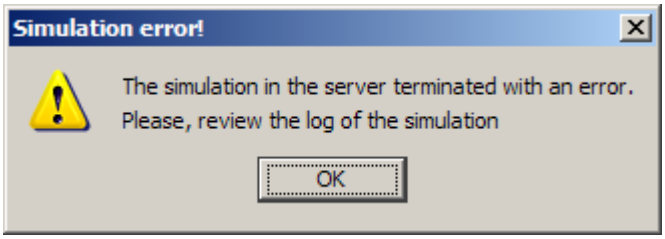


Error creating Group Call : The topology does not have any SU assigned to a Group

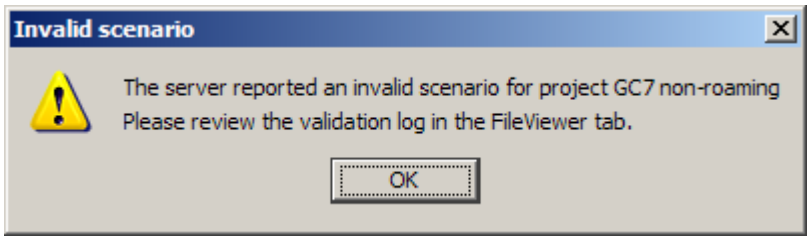
Cause(s): There are no SUs that have been configured to use a talk group or there are no SUs created.



Error creating SU call : The topology does not "have" enough SU"s" to create a call
Cause(s): The are no SUs defined or there is only one SU defined.



Simulation Error: The simulation in the server terminated with an error. Please, review the log of the simulation



Invalid scenario: The server reported an invalid scenario for project "xxx" Please review the validation log in the FileViewer tab.

Problem solving

If a simulation run completes successfully, but there is no call (group or unit-to-unit) information in the statistics, then check the simulation time to see if it is set to a time greater than the event(s).