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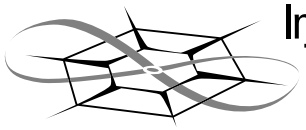

Information and Telecommunication Technology Center

A Technical Report of the
Networking and Distributed Systems Laboratory

KU-PNNI Simulator Version 2.0 Upgrades

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Contents

Chapter 1

Introduction

This report describes the status of the KU PNNI simulation tool. It briefly states the changes made to the simulator both in the user interface as well as the simulator itself. It also describes the enhancements made to the simulator to support multiple call types per host and the capability to generate different type of calls with different distributions.

Chapter2 talks about the changes made to the simulator with respect to the user interface and the and the format of how the results are printed.Chapter3 provides a brief description of the capabilities added to the simulator.

Chapter4 explains the various bugs that were encountered and fixed and other inconsistencies which were rectified.

Several example scripts and the outputs produced from them are detailed in Chapter5.

Chapter 2

Amendments

This section details the various changes made to the simulator with respect to the user-interface and the format of the results. Some of the changes made in the user-interface were driven by the need to reduce the size of the input scripts and others resulted to support the new features added to the simulator as described in Chapter3.

2.1 List of Amendments

Here we list the components changed in the simulator.

- ***Distributions:*** In version 2.0 of the simulator, the distribution for parameters such as arrival rates of calls, duration of calls could be specified as a uniform distribution or poisson distribution or a fixed distribution. In version 2.1, instead of referring a exponential distribution as poisson we refer it as exponential. Thus any parameter declared with the keyword poisson will now be replaced with the keyword exponential. An example of a declaration in the version 2.0 and a corresponding declaration in the version 2.1 is shown below:

  Exponential Distribution declaration in KU PNNI version 2.0:

  ```
  arrival_distribution = poisson
  arrival_mean = 20
  ```

  Exponential Distribution declaration in KU PNNI version 2.1:

  ```
  arrival_distribution = [exponential 20]
  ```

  The example above indicates that to declare an exponential distribution, we needed two declarations in the version 2.0. One declaration to specify the distribution(i.e. poisson) and the other to specify the parameters of that distribution(i.e. mean). In version 2.1, we can declare the distribution in a single line. This has been done for all distributions, namely, fixed, exponential and uniform. A histogram distribution which is a newly added feature and discussed in Chapter3 should be declared as a block. The examples of histograms will be given in Chapter3.

  We now show, with an example of a duration distribution, how the declarations in the version 2.0 and version 2.1 of the KU PNNI simulator vary:

  Fixed Distribution
  Version 2.0:

```
duration_distribution = fixed
duration_period = 20
```

Version 2.1:

```
duration_distribution = [fixed 20]
```

Uniform Distribution
Version 2.0:

```
duration_distribution = Uniform
duration_low = 20
duration_high = 50
```

Version 2.1:

```
duration_distribution = [Uniform 20 40]
```

- ***Call Bandwidths:*** In version 2.0 of the KU PNNI simulator the bandwidth of a call was specified by the parameter **call_bw**. A CBR call is characterised by the peak cell rate, .. etc.. Similarly a VBR call is characterised by peak cell rate, sustainable cell rate, maximum burst size, etc... Since we have added the capability to specify multiple call types in a single host (refer Chapter3) and also the capacity to specify the QoS parameters in terms of distributions, we decided that the parameters of the calls should be specified in more realistic terms. In version 2.1 of the simulator, a CBR call may be specified by a peak cell rate and QoS parameters such as cell transfer delay etc.. Thus **call_bw** cannot be used to specify the bandwidth of a call. Instead parameters such as **pcr** and **pcr2scr** must be used. For a cbr call, **pcr** is a required parameter and **pcr2scr must not** be specified. For a vbr call, both **pcr** and **pcr2scr** are required.

  We illustrate with an example how a cbr and a vbr call can be declared for a single source. Extensive examples will be given in Chapter5.

  Example for a cbr call:

  ```
  call_type = cbr,
  pcr = [uniform 10]
  ```

  Example for a vbr call:

  ```
  call_type = vbr,
  pcr = [fixed 100],
  pcr2scr = [uniform 2 10]
  ```

  Note that **pcr2scr** does not support an exponential distribution and such a distribution must not be used.

- ***Format of Results:*** The results printed in version 2.1 of simulator include the pcr, the pcr2scr ratio and other QoS parameters used for each and every call. In version 2.0 of the simulator the parameters of a call were all constants and thus there was no need to print these results. Since the QoS values can vary for each call, it is necessary to print the results of each call and hence this feature was incorporated in the simulator.

  An example output of a simulation is included in Chapter5

Chapter 3

Enhancements

In this section we describe the enhancements made to the simulator. In KUPNNI Version 1.2, a host could generate only a single type of call. Moreover the QoS parameters of the calls were fixed values that the user could specify in the input script. In Version 1.3 of the simulator a single host can generate multiple types of calls with different distributions. For example, a host can generate vbr and cbr calls with a uniform distribution and also specify the cell transfer delay to be uniformly distributed between certain values.

The user can also specify the arrival distributions, duration distributions, and other parameters of a call in terms of a histogram. Specific details are provided in the next section.

Before the user specifies various parameters for multiple sources, the **sourcetype** option and the **numsources** option in the parameter block host must be specified. This informs the simulator that multiple sources will be specified and the number of sources that will be specified. Failure to do this will generate errors.

Multiple source option could be overridden in the the individual host blocks (see Chapter5). Moreover, all the options for individual sources can also be changed. But if the number of sources are changed by using the **numsources** option in the host block, then all the parameters for each source must be specified again in that host block.For example, if two sources are specified in the parameter block and three sources are specified in the host block then all the parameters of each source in the host block must be stated again irrespective of the parameters specified in the parameter block.

3.1 Component Specific Details

Below is a list of parameters which have been added to support the enhancements.

parameter: **calltype**(followed by the source number for multiple sources)
description: This is the service type of the call to be attempted by the source identified by the source number
values: cbr for constant bit rate service, abr for available bit rate service, rtvbr for real time variable bit rate service, vbr for non real time variable bit rate service, or ubr for unspecified bit rate service
default: cbr
optional: Yes
example: For a single source:
calltype = cbr
For multiple sources:
calltype1 = cbr,
calltype2 = vbr
etc..

parameter: **arrival_distribution**
description: The distribution of call inter-arrival times in seconds
values: periodic, exponential, bursty, tear_down and histogram. The user could specify the distributions and the its parameters in a single line or in multiple lines. If the distribution is a histogram then the user will use the histogram option separately to specify its parameters [fixed <value>] or [exponential <mean>] or [uniform <low> <high>] or histogram
default: [fixed 10]
optional: Yes
example: arrival_distribution = [fixed 10]

parameter: **duration_distribution**(followed by the source number for multiple sources)
description: The distribution of call durations in seconds
values: [fixed <value>] or [exponential <mean>] or [uniform <low> <high>] or histogram
default: [fixed 1]
optional: Yes
example: For a single source :
duration_distribution = [exponential 1]
For multiple sources:
duration_distribution1 = [exponential 1],
duration_distribution2 = [fixed 5]
etc..

parameter: **pcr**(followed by the source number for multiple sources)
description: The distribution of peak cell rates of calls in kbps
values: [fixed <value>] or [exponential <mean>] or [uniform <low> <high>] or histogram
default: [fixed 64]
optional: Yes
example: For a single source :
pcr = [exponential 1]
For multiple sources:
pcr1 = [exponential 1],
pcr2 = [uniform 20 30]
etc..

parameter: **pcr2scr**(followed by the source number for multiple sources)
description: The distribution of peak cell rate to sustainable rate ratio. This has no units. All possible values must be 1 or greater
values: [fixed <value>] or [uniform <low> <high>] or histogram. This parameter does not have an exponential distribution
default: [fixed 1]
optional: Yes
example: For a single source :
pcr2scr = [uniform 5 10]
For multiple sources:
pcr2scr1 = [uniform 5 10],
pcr2scr2 = [fixed 2]
etc..

parameter: **mbs**(followed by the source number for multiple sources)
description: The distribution of maximum burst size of calls in kilo bytes
values: [fixed <value>] or [exponential <mean>] or [uniform <low> <high>] or histogram
default: None
optional: Yes
example: For a single source :
mbs = [fixed 1]
For multiple sources:
mbs1 = [fixed 1],
mbs2 = [fixed 5]
etc..

parameter: **ctd**(followed by the source number for multiple sources)
description: The distribution of cell transfer delay of calls. The values are in milliseconds
values: [fixed <value>] or [exponential <mean>] or [uniform <low> <high>] or histogram
default: None
optional: No
example: For a single source :
ctd = [fixed 1]
For multiple sources:
ctd1 = [fixed 1],
ctd2 = [uniform 1 4]
etc..

parameter: **cdv**(followed by the source number for multiple sources)
description: The distribution of cell delay variation of calls. The values are in milliseconds
values: [fixed <value>] or [exponential <mean>] or [uniform <low> <high>] or histogram. The values specified are in milliseconds.
default: None
optional: Yes
example: For a single source :
cdv = [fixed 1]
For multiple sources:
cdv1 = [fixed 1]
cdv2 = [fixed 1]
etc..

parameter: **clr**(followed by the source number for multiple sources)
description: The distribution of cell loss ratio of calls. The values specified are non-negative integers.(The cell ratio is $10^{(-sampledvaluefromthedistribtuion)}$).
values: [fixed <value>] or [exponential <mean>] or [uniform <low> <high>] or histogram
default: None
optional: Yes
example: For a single source :
clr = [fixed 1]
For multiple sources:
clr1 = [fixed 1],
clr2 = [uniform 1 5]
etc..

3.1.1 Specifying Histograms

In this section we specify how to use the histogram distribution in the simulator. The histogram distribution can be used for arrival distributions, duration distributions, peak cell rate distributions , peak cell rate to sustainable cell rate ratio distributions, maximum burst size distributions,cell transfer delay distributions, cell delay variation distributions and cell loss ratio distributions.

The histogram has to be specified as a block information and within the parameter_block host.

Histogram distribution needs the number of bins, width of each bin, the low limit of the first bin and the percentage share in each bin. The percentage shares must add up to 100 else an error message is generated.

Note: There are no default values for a histogram. All the values of a histogram i.e, bins, binwidth, lowlimit and shares must be specified. Failure to do this would cause the simulation to stop.

Parameter block for histogram

```
histogram_dist entityname {
  bins
  binwidth
  lowlimit
  shares
}
```

entityname above could be any of the following:

harrival, hduration, hpcr, hpcr2scr, hctd, hcdv, and hclr. The 'h' appended to all the attributes(i.e. the 'h' in 'harrival') signifies that it is a histogram and is necessary.

3.1.2 Component Specific details of the histogram block

parameter: **bins**
description: This is the number of bins in the histogram
values: Non-negative integer value
default: None
optional: No
example: bins = 4

parameter: **binwidth**
description: This is the width of the bins in the histogram
values: Non-negative real number
default: None
optional: No
example: binwidth = 25

parameter: **lowlimit**
description: This is the low-level of the first bin in the histogram
values: Non-negative real number
default: None
optional: No
example: lowlimit = 0

parameter: **shares**
description: This is the share of each bin in percentage
values: [Non-negative real number for each bin adding to 100]
default: None
optional: No
example: shares = [10 40 30 20]

A simple example of a histogram block for a duration distribution in case of a single source is shown below:

```
histogram_dist hduration {
  bins                    =       2,
  binwidth                =       5,
  lowlimit                =       5,
  shares                  =       [ 50 50]
}
```

For multiple sources the number of the source is appended to the histogram_dist.
For example:

```
histogram_dist1 hduration {
  bins                    =       2,
  binwidth                =       5,
  lowlimit                =       5,
  shares                  =       [ 50 50]
}
```

Chapter 4

BugFixes

This section describes the bugs that were encountered while testing the simulator with various test scripts and the files that were modified to correct them. It is advised to refer to the inline commenting provided in the source files.

4.1 List of BugFixes

Here we list a few of the errors which we debugged and rectified in the simulator. A few of the errors were very difficult to trace and consumed a unexpected amount of time.This work was done in co-operation with Pradeep Kumar Mani.*(mpradeep@ittc.ku.edu)*

- ***Timer 308:*** Under heavy loads (high call arrival rates), we found that the simulations after running for a long timer suddenly crashed. After days of debugging we found that the expiry of timer 308 was causing problems.

  Timer 308 is started by the network when a RELEASE message is sent to the other end of the connection.

  If the RELEASE COMPLETE message is not received and the timer expires for the first time then the network restarts the timer and sends the RELEASE message again. In case the timer expires the second time, the call reference is released and the call state is set to NULL. Restart procedures for the the virtual channel are called.

  For strange reasons we were intially encountering core dump problems. The timer was being referenced after after its deletion. We tried to avoid this by not deleting the timer 308 but a new set of memory problems were encountered.

  We also tried to solve the problem by setting the expiry time to high values so that the timer does not expire and even if it expires the timer is restarted by setting it state to be Unexpired. This esssentially means that we wait for the RELEASE COMPLETE message from the other end indefinitely. This scheme worked for some toplogies and the we are still working to alleviate the problem completely by debugging and also running simulations in parallel.

  File References: q93b_timers.h, q93b_timers.cc, callrecTimer.h, callrecTimer.cc

- ***Other Timers:*** Apart from the timer 308, there were problems with timer Tguard which is a timer for the call reference values. This problem was removed by setting the expiry time for this timer to a high value. Most of the timer problems were encountered because of some inconsistencies in deleting timers. Some of them were deleted and some were not. We removed these inconsistencies and used an uniform policy with respect to all the timers.

- ***PTSE Refresh Interval:*** As per the PNNI specifications "When a significant change occurs, if the PTSE was last originated more than MinPTSEInterval time ago it may be re-originated again immediately. If the PTSE in question was originated less than MinPTSEInterval time ago, it must not be re-originated immediately." Because of the stale PTSE's some of the calls were not setup and failed. We made modifications so that the PTSE's were re-originated after a significant change and were conformant with the PNNI specifications.

  File References: CACRoutingFSM.cc

- ***Free Bandwidth:*** Freeing the bandwidth is an essential function which is called as soon as call is completed. For a nrt-vbr calls the bandwidths were not freed and so the results we achieved were not as expected. We made modifications so that the simulator could process cbr and vbr calls as per the specifications.

  File References: CACRoutingFSM.cc, port_info.cc

- ***GCAC in the Fabric Module*** The q-port's implementation of the GCAC was found to be very preliminary without taking into account the types of the call. For example, in case of a vbr call the available link rate was checked if it could support the pcr of the call instead of checking for the a value between pcr and scr. Most of the calls failed because of this error. The GCAC of the q-port implementation was not used because the simulator performed the generic call control at a higher level.

  File References: ParsedData.cc

- ***Other Inconsistencies and Memory Leaks:*** We used Insure++ software to detect memory leaks and other inconsistencies. This software is widely used in the industry to make the software error free and free of memory leaks. Many compile timer inconsistencies were removed but the software could not be used for runtime errors. We are trying to remove use Insure++ to detect runtime errors.

  File References: Node.cc, HostInfo.cc, Callgen.cc

Chapter 5

Examples

This section lists various examples of the input scripts and the output generated by using these scripts.

5.1 Multiple Sources

5.1.1 First example for multiple sources

```
#The script consists of two classes of hosts which consist of two and three
#sources respectively.

parameter_block node spark {
        prop_constant           =       25,
        default_flooding_period =       1800,
        default_flooding_factor =       2,
        flooding_threshold      =       2,
        crankback_retries       =       2,
        routing_policy          =       min_hop,
        reaggregation_timer     =       100,
        numports                =       20,
        process_time            =       5.0,
        queuesize               =       5000
};

#Host parameter blocks

parameter_block host voiceHost {
        calls                   =       30,
        sourcetype              =       multiple,
        numsources              =       2,
        share1                  =       20,
        share2                  =       80,
        arrival_distribution    =       [exponential 10],

#First Source
        calltype1               =       cbr,
```

```
        duration_distribution1  =       [exponential 100],
        pcr1                    =       [uniform 80 100],

#Second Source
        calltype2               =       cbr,
        duration_distribution2  =       histogram,
        histogram_dist2 duration
        {
          bins                  =       2,
          binwidth              =       10,
          lowlimit              =       10,
          shares                =       [ 50 50]
        },
        pcr2                    =       [uniform 30 50],

        queuesize               =       5000,
        host_process_time       =       3.0,
        destinations            =       uniform_any
};

parameter_block host videoHost {
        calls                   =       20,
        sourcetype              =       multiple,
        numsources              =       3,
        share1                  =       20,
        share2                  =       50,
        share3                  =       30,
        arrival_distribution    =       [exponential 5],

#First Source
        calltype1               =       cbr,
        duration_distribution1  =       [exponential 50],
        pcr1                    =       [uniform 60 80],

#Second Source
        calltype2               =       cbr,
        duration_distribution2  =       histogram,
        histogram_dist2 hduration
        {
          bins                  =       4,
          binwidth              =       10,
          lowlimit              =       10,
          shares                =       [ 25 50 10 15]
        },
        pcr2                    =       [uniform 40 100],

#Third Source
        calltype3               =       vbr,
```

```
        duration_distribution3  =       [fixed 30],
        pcr3                    =       histogram,
        histogram_dist3 hpcr
        {
          bins                  =       3,
          binwidth              =       20,
          lowlimit              =       0,
          shares                =       [ 50 35 15]
        },
        pcr2scr3                =       [fixed 4.5],

        queuesize               =       5000,
        host_process_time       =       3.0,
        destinations            =       uniform_any
};


# Peer group A.1
node A.1.1{
        parameter_block spark,
        leader = true,
        address = 0x47000000000000000000a010100000000000000
        };

node A.1.2{
        parameter_block spark,
        address = 0x47000000000000000000a010200000000000000
        };

node A.1.3{
        parameter_block spark,
        bordernode = true,
        aggr_token = 3,
        address = 0x47000000000000000000a010300000000000000
        };

# Peer group A.2
node A.2.1{
        parameter_block spark,
        leader = true,
        bordernode = true,
        aggr_token = 1,
        address = 0x47000000000000000000a020100000000000000
        };

node A.2.2{
        parameter_block spark,
        address = 0x47000000000000000000a020200000000000000
```

```
        };

node A.2.3{
        parameter_block spark,
        bordernode = true,
        aggr_token = 3,
        address = 0x470000000000000000000a020300000000000000
        };


# Peer group B.1
node B.1.1{
        parameter_block spark,
        leader = true,
        bordernode = true,
        aggr_token = 1,
        address = 0x470000000000000000000b010100000000000000
        };

node B.1.2{
        parameter_block spark,
        address = 0x470000000000000000000b010200000000000000
        };

node B.1.3{
        parameter_block spark,
        bordernode = true,
        aggr_token = 3,
        address = 0x470000000000000000000b010300000000000000
        };

# Peer group B.2
node B.2.1{
        parameter_block spark,
        leader = true,
        bordernode = true,
        aggr_token = 1,
        address = 0x470000000000000000000b020100000000000000
        };

node B.2.2{
        parameter_block spark,
        address = 0x470000000000000000000b020200000000000000
        };

node B.2.3{
        parameter_block spark,
        address = 0x470000000000000000000b020300000000000000
```

```
        };


host A.1.1.1{
        parameter_block videoHost,
        address = 0x47000000000000000000a010100000000000100
        };

host A.2.3.1{
        parameter_block voiceHost,
        address = 0x47000000000000000000a020300000000000100
        };

host B.1.3.1{
        parameter_block voiceHost,
        address = 0x47000000000000000000b010300000000000100
        };

host B.2.3.1{
        parameter_block videoHost,
        address = 0x47000000000000000000b020300000000000100
       };

host B.1.2.1{
        parameter_block videoHost,
        address = 0x47000000000000000000b010200000000000100
        };


port genericport {bw=OC12, delay=10};


# connections within the peergroup A.1
connection A.1.1->A.1.2{bw=300, ad_weight = 10};
connection A.1.2->A.1.3{bw=300, ad_weight = 10};
connection A.1.3->A.1.1{bw=300, ad_weight = 10};

# connections within the peergroup A.2
connection A.2.1->A.2.2{bw=300, ad_weight = 20};
connection A.2.2->A.2.3{bw=300, ad_weight = 10};
connection A.2.3->A.2.1{bw=300, ad_weight = 10};

# connections within the peergroup B.1
connection B.1.1->B.1.2{bw=300, ad_weight = 10};
connection B.1.2->B.1.3{bw=300, ad_weight = 10};
connection B.1.3->B.1.1{bw=300, ad_weight = 10};

# connections within the peergroup B.2
```

```
connection B.2.1->B.2.2{bw=300, ad_weight = 20};
connection B.2.2->B.2.3{bw=300, ad_weight = 10};
connection B.2.3->B.2.1{bw=300, ad_weight = 10};

# physical connections across peer groups
connection A.1.3->A.2.1{bw=300, ad_weight = 30};
connection A.2.3->B.1.1{bw=300, ad_weight = 30};
connection B.1.3->B.2.1{bw=300, ad_weight = 30};

# host - node connections
connection A.1.1->A.1.1.1{bw=300, ad_weight = 60};
connection A.2.3->A.2.3.1{bw=300, ad_weight = 60};
connection B.1.3->B.1.3.1{bw=300, ad_weight = 60};
connection B.1.2->B.1.2.1{bw=300, ad_weight = 60};
connection B.2.3->B.2.3.1{bw=300, ad_weight = 60};

# logical nodes

logicalnode A.1{
                  level = 88,
                  child = A.1.1
               };

logicalnode A.2{
                  level = 88,
                  child = A.2.1,
                  aggr_token = 2
               };

logicalnode B.1{
                  level = 88,
                  child = B.1.1,
                  aggr_token = 1
               };

logicalnode B.2{
                  level = 88,
                  child = B.2.1
               };


logicalnode A{
                 level = 80,
                 child = A.1,
             };

logicalnode B{
                 level = 80,
```

```
            child = B.1
          };

# logical connections
logicalconnection A.1->A.2{ delay = 25 };
logicalconnection B.1->B.2{ delay = 25 };
logicalconnection A.2->B.1{ delay = 25 };
logicalconnection A->B{ delay = 25 };

schedule{
          duration        =   1000,
          mpg             =   true,
          nodal_represent =   complex
        };
```

5.1.1.1 Output

Output:

```
 ---- W E L C O M E   T O   K U   P N N I   S I M U L A T O R ----

     Information and Telecommunication Technology Center (ITTC)
        University of Kansas Center for Research, Inc.

For enquiries, please contact:
        KU      Dr. Douglas Niehaus     <niehaus@ittc.ku.edu>
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        SPRINT  Sohel Khan              <sohel.khan@mail.sprint.com>
                                        Ph: 913 534 2914


To see the complete copyright (C) information please type
                kupnni -c
------------------------------------------------------------------------
>Parsing scriptfile ...  report1.script
>Random seed for the experiment is 195.045
>Presimulation processing ...
>Simulation Kernel instantiated ...
In SetupConvergenceControls()
Convergence Table
 PeerGroup 88:47000000000000000000b000000 : 7
 PeerGroup 88:47000000000000000000a000000 : 7
 PeerGroup 80:47000000000000000000000000000 : 6
 PeerGroup 96:47000000000000000000b020000 : 10
 PeerGroup 96:47000000000000000000b010000 : 11
 PeerGroup 96:47000000000000000000a020000 : 11
 PeerGroup 96:47000000000000000000a010000 : 10
>Simulation started (virtual time)  0s 0ms
 ... Event Processng Loop starts ...
>Simulation stopped (virtual time)  1000s  0ms
 ... Event Processng Loop stops  ...
>Printing simulation results ...

***** CALL SETUP LOGS START ******

-- A.1.1.1 host record begins -----------------------------
```

11	B.1.3.1	nrtvbr	32.648	01 m 05 s 225 ms	00 s 273.876 ms	setup	00000030 s 000000 ms	139	4.5	0	0	0	0
12	B.1.2.1	cbr	69.112	01 m 10 s 194 ms	00 s 223.109 ms	setup	00000025 s 000000 ms	163	N/A	0	0	0	0
13	B.1.2.1	nrtvbr	18.232	01 m 15 s 064 ms	00 s 248.249 ms	setup	00000030 s 000000 ms	77	4.5	0	0	0	0
14	A.2.3.1	cbr	66.992	01 m 20 s 161 ms	00 s 155.744 ms	setup	00000051 s 000000 ms	158	N/A	0	0	0	0
15	B.1.3.1	cbr	64.024	01 m 25 s 146 ms	00 s 223.020 ms	setup	00000018 s 000000 ms	151	N/A	0	0	0	0
16	B.1.2.1	cbr	49.184	01 m 30 s 126 ms	00 s 213.093 ms	setup	00000024 s 000000 ms	116	N/A	0	0	0	0
17	B.1.2.1	cbr	72.928	01 m 35 s 106 ms	00 s 246.066 ms	setup	00000053 s 000000 ms	172	N/A	0	0	0	0
18	A.2.3.1	cbr	77.168	01 m 40 s 128 ms	00 s 390.743 ms	setup	00000010 s 000000 ms	182	N/A	0	0	0	0
19	B.1.3.1	nrtvbr	4.24	01 m 45 s 150 ms	00 s 278.459 ms	setup	00000030 s 000000 ms	22	4.5	0	0	0	0
20	B.1.2.1	cbr	92.856	01 m 50 s 012 ms	00 s 228.162 ms	setup	00000026 s 000000 ms	219	N/A	0	0	0	0

total cbr calls : 15
successfull cbr calls : 100%
total cbr bw request : 1.10876 Mbps
cbr bw rejected : 0 Mbps
total nrtvbr calls : 5
successfull nrtvbr calls : 100%
total nrtvbr bw request : 0.092008 Mbps
nrt vbr bw rejected : 0 Mbps
mean callsetup time : 00 s 242.684 ms

-- A.1.1.1 host record ends ----------

-- A.2.3.1 host record begins ----------

No.	Destination	calltype	bw(kbps)	arrival time	setuptime	result	duration/cause	pcr(cells/sec)	pcr2scr	mbs	ctd	cdv	clr
1	B.1.2.1	cbr	83.952	00 m 23 s 000 ms	00 s 120.833 ms	setup	00000099 s 000000 ms	198	N/A	0	0	0	0
2	B.1.2.1	cbr	41.552	00 m 32 s 984 ms	00 s 120.743 ms	setup	00000010 s 000000 ms	98	N/A	0	0	0	0
3	B.1.2.1	cbr	41.976	00 m 42 s 833 ms	00 s 120.771 ms	setup	00000011 s 000000 ms	99	N/A	0	0	0	0
4	B.2.3.1	cbr	93.704	00 m 52 s 951 ms	00 s 198.148 ms	setup	00000106 s 000000 ms	221	N/A	0	0	0	0
5	B.1.2.1	cbr	38.584	01 m 03 s 115 ms	00 s 120.841 ms	setup	00000011 s 000000 ms	91	N/A	0	0	0	0
6	B.1.2.1	cbr	43.248	01 m 13 s 092 ms	00 s 136.623 ms	setup	00000020 s 000000 ms	102	N/A	0	0	0	0
7	B.1.2.1	cbr	48.76	01 m 23 s 325 ms	00 s 120.819 ms	setup	00000012 s 000000 ms	115	N/A	0	0	0	0
8	B.2.3.1	cbr	35.192	01 m 33 s 231 ms	00 s 193.146 ms	setup	00000022 s 000000 ms	83	N/A	0	0	0	0
9	B.1.2.1	cbr	46.216	01 m 43 s 240 ms	00 s 130.931 ms	setup	00000026 s 000000 ms	109	N/A	0	0	0	0
10	B.1.2.1	cbr	98.792	01 m 53 s 285 ms	00 s 125.795 ms	setup	00000087 s 000000 ms	233	N/A	0	0	0	0
11	B.1.2.1	cbr	47.488	02 m 03 s 349 ms	00 s 120.891 ms	setup	00000021 s 000000 ms	112	N/A	0	0	0	0
12	B.2.3.1	cbr	42.4	02 m 13 s 362 ms	00 s 183.260 ms	setup	00000021 s 000000 ms	100	N/A	0	0	0	0
13	B.1.2.1	cbr	79.712	02 m 23 s 291 ms	00 s 120.806 ms	setup	00000095 s 000000 ms	188	N/A	0	0	0	0
14	B.1.2.1	cbr	32.648	02 m 33 s 298 ms	00 s 125.822 ms	setup	00000012 s 000000 ms	77	N/A	0	0	0	0
15	B.1.2.1	cbr	82.256	02 m 43 s 451 ms	00 s 120.827 ms	setup	00000093 s 000000 ms	194	N/A	0	0	0	0
16	B.2.3.1	cbr	42.4	02 m 53 s 678 ms	00 s 243.417 ms	setup	00000016 s 000000 ms	100	N/A	0	0	0	0
17	B.1.2.1	cbr	31.8	03 m 03 s 457 ms	00 s 120.807 ms	setup	00000019 s 000000 ms	75	N/A	0	0	0	0

18	B.1.2.1	cbr	92.432	03 m 13 s 633 ms	00 s 120.897 ms	setup	00000091 s 000000 ms	218	N/A	0	0	0	0
19	B.1.2.1	cbr	95.824	03 m 23 s 556 ms	00 s 120.977 ms	setup	00000100 s 000000 ms	226	N/A	0	0	0	0
20	B.2.3.1	cbr	86.92	03 m 33 s 699 ms	00 s 183.186 ms	setup	00000108 s 000000 ms	205	N/A	0	0	0	0
21	B.1.2.1	cbr	37.312	03 m 43 s 765 ms	00 s 120.833 ms	setup	00000023 s 000000 ms	88	N/A	0	0	0	0
22	B.1.2.1	cbr	33.072	03 m 53 s 784 ms	00 s 120.800 ms	setup	00000018 s 000000 ms	78	N/A	0	0	0	0
23	B.1.2.1	cbr	44.52	04 m 03 s 790 ms	00 s 120.783 ms	setup	00000029 s 000000 ms	105	N/A	0	0	0	0
24	B.2.3.1	cbr	86.92	04 m 13 s 991 ms	00 s 193.167 ms	setup	00000097 s 000000 ms	205	N/A	0	0	0	0
25	B.1.2.1	cbr	94.128	04 m 23 s 945 ms	00 s 120.770 ms	setup	00000091 s 000000 ms	222	N/A	0	0	0	0
26	B.1.2.1	cbr	44.096	04 m 33 s 915 ms	00 s 120.748 ms	setup	00000022 s 000000 ms	104	N/A	0	0	0	0
27	B.1.2.1	cbr	42.4	04 m 43 s 921 ms	00 s 120.761 ms	setup	00000016 s 000000 ms	100	N/A	0	0	0	0
28	B.2.3.1	cbr	80.136	04 m 53 s 994 ms	00 s 193.128 ms	setup	00000112 s 000000 ms	189	N/A	0	0	0	0
29	B.1.2.1	cbr	47.064	05 m 03 s 961 ms	00 s 131.958 ms	setup	00000023 s 000000 ms	111	N/A	0	0	0	0
30	B.1.2.1	cbr	81.832	05 m 13 s 918 ms	00 s 120.801 ms	setup	00000096 s 000000 ms	193	N/A	0	0	0	0

total cbr calls : 30
successfull cbr calls : 100%
total cbr bw request : 1.79734 Mbps
cbr bw rejected : 0 Mbps
mean callsetup time : 00 s 140.442 ms

-- A.2.3.1 host record ends ----------

-- B.1.2.1 host record begins ----------

No.	Destination	calltype	bw(kbps)	arrival time	setuptime	result	duration/cause	pcr(cells/sec)	pcr2scr	mbs	ctd	cdv	clr
1	B.2.3.1	cbr	60.632	00 m 16 s 000 ms	00 s 329.081 ms	setup	00000013 s 000000 ms	143	N/A	0	0	0	0
2	B.2.3.1	cbr	56.392	00 m 21 s 078 ms	00 s 150.834 ms	setup	00000020 s 000000 ms	133	N/A	0	0	0	0
3	B.2.3.1	cbr	82.256	00 m 26 s 023 ms	00 s 150.781 ms	setup	00000021 s 000000 ms	194	N/A	0	0	0	0
4	B.1.3.1	cbr	68.264	00 m 31 s 096 ms	00 s 93.3380 ms	setup	00000012 s 000000 ms	161	N/A	0	0	0	0
5	B.2.3.1	cbr	65.72	00 m 36 s 022 ms	00 s 150.754 ms	setup	00000029 s 000000 ms	155	N/A	0	0	0	0
6	B.2.3.1	cbr	78.44	00 m 41 s 031 ms	00 s 150.751 ms	setup	00000021 s 000000 ms	185	N/A	0	0	0	0
7	B.2.3.1	cbr	50.456	00 m 46 s 109 ms	00 s 155.733 ms	setup	00000021 s 000000 ms	119	N/A	0	0	0	0
8	B.1.3.1	nrtvbr	7.632	00 m 51 s 019 ms	00 s 103.372 ms	setup	00000030 s 000000 ms	33	4.5	0	0	0	0
9	B.2.3.1	nrtvbr	18.232	00 m 56 s 020 ms	00 s 150.713 ms	setup	00000030 s 000000 ms	77	4.5	0	0	0	0
10	B.2.3.1	cbr	60.632	01 m 00 s 986 ms	00 s 150.769 ms	setup	00000014 s 000000 ms	143	N/A	0	0	0	0
11	B.2.3.1	cbr	85.224	01 m 06 s 000 ms	00 s 171.630 ms	setup	00000012 s 000000 ms	201	N/A	0	0	0	0
12	B.1.3.1	cbr	68.264	01 m 11 s 104 ms	00 s 93.3790 ms	setup	00000024 s 000000 ms	161	N/A	0	0	0	0
13	B.2.3.1	nrtvbr	6.36	01 m 16 s 142 ms	00 s 160.745 ms	setup	00000030 s 000000 ms	30	4.5	0	0	0	0
14	B.2.3.1	cbr	69.112	01 m 21 s 196 ms	00 s 177.329 ms	setup	00000040 s 000000 ms	163	N/A	0	0	0	0
15	B.2.3.1	cbr	91.584	01 m 26 s 144 ms	00 s 165.707 ms	setup	00000038 s 000000 ms	216	N/A	0	0	0	0
16	B.1.3.1	cbr	63.176	01 m 31 s 078 ms	00 s 93.3720 ms	setup	00000051 s 000000 ms	149	N/A	0	0	0	0
17	B.2.3.1	cbr	51.728	01 m 36 s 071 ms	00 s 166.595 ms	setup	00000042 s 000000 ms	122	N/A	0	0	0	0
18	B.2.3.1	cbr	97.944	01 m 41 s 042 ms	00 s 150.926 ms	setup	00000025 s 000000 ms	231	N/A	0	0	0	0

```
 19 B.2.3.1     cbr      61.056   01 m 45 s 989 ms 00 s 211.474 ms  setup    00000022 s 000000 ms              144   N/A      0     0     0     0
 20 B.1.3.1     nrtvbr   2.12     01 m 50 s 981 ms 00 s 88.3960 ms  setup    00000030 s 000000 ms                9  4.5      0     0     0     0

total cbr calls             : 16
successfull cbr calls       : 100%
total cbr bw request        : 1.11088 Mbps
cbr bw rejected             : 0 Mbps
total nrtvbr calls           : 4
successfull nrtvbr calls     : 100%
total nrtvbr bw request      : 0.034344 Mbps
nrt vbr bw rejected          : 0 Mbps
mean callsetup time         : 00 s 153.283 ms

-- B.1.2.1 host record ends ---------------------------

-- B.1.3.1 host record begins -----------------------------

No. Destination calltype bw(kbps)   arrival time      setuptime     result    duration/cause         pcr(cells/sec) pcr2scr  mbs   ctd   cdv   clr
  1 B.1.2.1     cbr      44.944   00 m 17 s 000 ms 00 s 121.368 ms  setup    00000015 s 000000 ms              106   N/A      0     0     0     0
  2 A.1.1.1     cbr      44.52    00 m 26 s 923 ms 00 s 231.290 ms  setup    00000013 s 000000 ms              105   N/A      0     0     0     0
  3 A.1.1.1     cbr      48.336   00 m 36 s 903 ms 00 s 213.167 ms  setup    00000024 s 000000 ms              114   N/A      0     0     0     0
  4 B.2.3.1     cbr      94.976   00 m 46 s 860 ms 00 s 130.736 ms  setup    00000102 s 000000 ms              224   N/A      0     0     0     0
  5 B.1.2.1     cbr      32.648   00 m 56 s 914 ms 00 s 93.3600 ms  setup    00000010 s 000000 ms               77   N/A      0     0     0     0
  6 A.1.1.1     cbr      41.128   01 m 06 s 943 ms 00 s 259.117 ms  setup    00000019 s 000000 ms               97   N/A      0     0     0     0
  7 A.1.1.1     cbr      39.008   01 m 16 s 932 ms 00 s 228.172 ms  setup    00000028 s 000000 ms               92   N/A      0     0     0     0
  8 B.2.3.1     cbr      41.128   01 m 26 s 829 ms 00 s 191.395 ms  setup    00000022 s 000000 ms               97   N/A      0     0     0     0
  9 B.1.2.1     cbr      39.432   01 m 36 s 732 ms 00 s 88.3850 ms  setup    00000024 s 000000 ms               93   N/A      0     0     0     0
 10 A.1.1.1     cbr      36.04    01 m 46 s 578 ms 00 s 223.838 ms  setup    00000010 s 000000 ms               85   N/A      0     0     0     0
 11 A.1.1.1     cbr      35.192   01 m 56 s 539 ms 00 s 223.905 ms  setup    00000016 s 000000 ms               83   N/A      0     0     0     0
 12 B.2.3.1     cbr      38.16    02 m 06 s 702 ms 00 s 120.861 ms  setup    00000015 s 000000 ms               90   N/A      0     0     0     0
 13 B.1.2.1     cbr      47.912   02 m 16 s 622 ms 00 s 88.4080 ms  setup    00000011 s 000000 ms              113   N/A      0     0     0     0
 14 A.1.1.1     cbr      30.104   02 m 26 s 695 ms 00 s 213.259 ms  setup    00000029 s 000000 ms               71   N/A      0     0     0     0
 15 A.1.1.1     cbr      35.192   02 m 36 s 687 ms 00 s 213.232 ms  setup    00000029 s 000000 ms               83   N/A      0     0     0     0
 16 B.2.3.1     cbr      32.648   02 m 46 s 619 ms 00 s 120.738 ms  setup    00000012 s 000000 ms               77   N/A      0     0     0     0
 17 B.1.2.1     cbr      46.64    02 m 56 s 478 ms 00 s 88.3870 ms  setup    00000023 s 000000 ms              110   N/A      0     0     0     0
 18 A.1.1.1     cbr      36.888   03 m 06 s 206 ms 00 s 213.228 ms  setup    00000016 s 000000 ms               87   N/A      0     0     0     0
 19 A.1.1.1     cbr      80.136   03 m 16 s 151 ms 00 s 218.220 ms  setup    00000092 s 000000 ms              189   N/A      0     0     0     0
 20 B.2.3.1     cbr      36.888   03 m 26 s 122 ms 00 s 130.930 ms  setup    00000011 s 000000 ms               87   N/A      0     0     0     0
 21 B.1.2.1     cbr      35.616   03 m 36 s 077 ms 00 s 98.3670 ms  setup    00000015 s 000000 ms               84   N/A      0     0     0     0
 22 A.1.1.1     cbr      45.368   03 m 46 s 096 ms 00 s 213.176 ms  setup    00000013 s 000000 ms              107   N/A      0     0     0     0
 23 A.1.1.1     cbr      46.216   03 m 56 s 032 ms 00 s 273.960 ms  setup    00000012 s 000000 ms              109   N/A      0     0     0     0
 24 B.2.3.1     cbr      85.648   04 m 06 s 032 ms 00 s 125.703 ms  setup    00000118 s 000000 ms              202   N/A      0     0     0     0
 25 B.1.2.1     cbr      43.672   04 m 16 s 211 ms 00 s 88.4140 ms  setup    00000011 s 000000 ms              103   N/A      0     0     0     0
```

```
 26 A.1.1.1     cbr      30.528   04 m 26 s 423 ms 00 s 273.389 ms  setup    00000010 s 000000 ms              72   N/A      0     0     0     0
 27 A.1.1.1     cbr      29.68    04 m 36 s 153 ms 00 s 213.082 ms  setup    00000013 s 000000 ms              70   N/A      0     0     0     0
 28 B.2.3.1     cbr      47.064   04 m 46 s 105 ms 00 s 120.705 ms  setup    00000017 s 000000 ms             111   N/A      0     0     0     0
 29 B.1.2.1     cbr      99.216   04 m 56 s 044 ms 00 s 88.3600 ms  setup    00000094 s 000000 ms             234   N/A      0     0     0     0
 30 A.1.1.1     cbr      42.4     05 m 06 s 245 ms 00 s 273.429 ms  setup    00000023 s 000000 ms             100   N/A      0     0     0     0

total cbr calls             : 30
successfull cbr calls       : 100%
total cbr bw request        : 1.38733 Mbps
cbr bw rejected             : 0 Mbps
mean callsetup time         : 00 s 172.686 ms

-- B.1.3.1 host record ends ---------------------------

-- B.2.3.1 host record begins -----------------------------

No. Destination calltype bw(kbps)   arrival time      setuptime     result    duration/cause         pcr(cells/sec) pcr2scr  mbs   ctd   cdv   clr
  1 A.1.1.1     cbr      51.304   00 m 17 s 000 ms 00 s 320.701 ms  setup    00000015 s 000000 ms             121   N/A      0     0     0     0
  2 B.1.2.1     cbr      90.736   00 m 21 s 916 ms 00 s 150.706 ms  setup    00000026 s 000000 ms             214   N/A      0     0     0     0
  3 B.1.2.1     cbr      97.944   00 m 26 s 821 ms 00 s 150.690 ms  setup    00000035 s 000000 ms             231   N/A      0     0     0     0
  4 A.1.1.1     cbr      40.28    00 m 31 s 739 ms 00 s 275.585 ms  setup    00000048 s 000000 ms              95   N/A      0     0     0     0
  5 A.1.1.1     nrtvbr   12.72    00 m 36 s 785 ms 00 s 285.364 ms  setup    00000030 s 000000 ms              54  4.5       0     0     0     0
  6 B.1.2.1     cbr      98.368   00 m 41 s 751 ms 00 s 170.920 ms  setup    00000022 s 000000 ms             232   N/A      0     0     0     0
  7 B.1.2.1     cbr      47.488   00 m 46 s 731 ms 00 s 150.680 ms  setup    00000016 s 000000 ms             112   N/A      0     0     0     0
  8 A.1.1.1     cbr      69.112   00 m 51 s 787 ms 00 s 335.581 ms  setup    00000046 s 000000 ms             163   N/A      0     0     0     0
  9 A.1.1.1     cbr      88.616   00 m 56 s 716 ms 00 s 286.206 ms  setup    00000015 s 000000 ms             209   N/A      0     0     0     0
 10 B.1.2.1     cbr      59.36    01 m 01 s 748 ms 00 s 150.672 ms  setup    00000026 s 000000 ms             140   N/A      0     0     0     0
 11 B.1.2.1     cbr      70.384   01 m 06 s 722 ms 00 s 161.431 ms  setup    00000010 s 000000 ms             166   N/A      0     0     0     0
 12 A.1.1.1     cbr      61.904   01 m 11 s 702 ms 00 s 275.374 ms  setup    00000017 s 000000 ms             146   N/A      0     0     0     0
 13 A.1.1.1     cbr      92.008   01 m 16 s 801 ms 00 s 275.397 ms  setup    00000038 s 000000 ms             217   N/A      0     0     0     0
 14 B.1.2.1     nrtvbr   8.48     01 m 21 s 754 ms 00 s 161.467 ms  setup    00000030 s 000000 ms              39  4.5       0     0     0     0
 15 B.1.2.1     nrtvbr   2.12     01 m 26 s 760 ms 00 s 150.651 ms  setup    00000030 s 000000 ms              11  4.5       0     0     0     0
 16 A.1.1.1     cbr      62.328   01 m 31 s 691 ms 00 s 335.499 ms  setup    00000033 s 000000 ms             147   N/A      0     0     0     0
 17 A.1.1.1     nrtvbr   9.752    01 m 36 s 580 ms 00 s 286.125 ms  setup    00000030 s 000000 ms              43  4.5       0     0     0     0
 18 B.1.2.1     cbr      61.904   01 m 41 s 650 ms 00 s 165.889 ms  setup    00000053 s 000000 ms             146   N/A      0     0     0     0
 19 B.1.2.1     cbr      77.168   01 m 46 s 600 ms 00 s 150.693 ms  setup    00000045 s 000000 ms             182   N/A      0     0     0     0
 20 A.1.1.1     cbr      48.336   01 m 51 s 625 ms 00 s 335.663 ms  setup    00000025 s 000000 ms             114   N/A      0     0     0     0

total cbr calls             : 16
successfull cbr calls       : 100%
total cbr bw request        : 1.11724 Mbps
cbr bw rejected             : 0 Mbps
total nrtvbr calls           : 4
```

```
successfull nrtvbr calls     : 100%
total nrtvbr bw request      : 0.033072 Mbps
nrt vbr bw rejected          : 0 Mbps
mean callsetup time          : 00 s 228.764 ms

-- B.2.3.1 host record ends ----------------------------

AVG RESULTS OF ALL CALLS

total cbr calls              : 107
successfull cbr calls        : 100%
total cbr bw request         : 6.52154 Mbps
cbr bw rejected              : 0 Mbps
total nrtvbr calls           : 13
successfull rtvbr calls      : 100%
total nrtvbrbw request       : 0.159424 Mbps
nrtvbr bw rejected           : 0 Mbps
mean callsetup time          : 00 s 182.404 ms

***** CALL SETUP LOGS END **********

##### NODE INSTRUMENTATION LOGS START #######

-- A.1.1 node record begins -----------------------------

convergence time for level 96 : 00 s 200 ms
convergence time for level 88 : 00 s 231.963 ms
convergence time for level 80 : 00 s 266.158 ms
avg hops                      : 2.75
calls routed successfully     : 45
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 5.343 ms
avg aggregation time          : 00 s 4.361 ms
total floods                  : 1353
total wasted floods           : 320
pnni data sent                : 178.236 kbps
```

```
Database size                 : 3.552 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      1
                                  88     2       2     2      1
                                  80     2       2     2      0


-- A.1.1 node record ends ------------------------------

-- A.1.2 node record begins ------------------------------

convergence time for level 96 : 00 s 195 ms
convergence time for level 88 : 00 s 281.963 ms
convergence time for level 80 : 00 s 341.158 ms
avg hops                      : 0
calls routed successfully     : 0
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 000 ms
avg aggregation time          : 00 s 000 ms
total floods                  : 647
total wasted floods           : 190
pnni data sent                : 83.744 kbps
Database size                 : 3.552 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      1
                                  88     2       2     2      1
                                  80     2       2     2      0


-- A.1.2 node record ends ------------------------------

-- A.1.3 node record begins ------------------------------

convergence time for level 96 : 00 s 185 ms
convergence time for level 88 : 00 s 271.963 ms
convergence time for level 80 : 00 s 341.158 ms
```

```
avg hops                      : 1
calls routed successfully     : 45
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 5.387 ms
avg aggregation time          : 00 s 000 ms
total floods                  : 649
total wasted floods           : 154
pnni data sent                : 87.188 kbps
Database size                 : 3.552 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      1
                                  88     2       2     2      1
                                  80     2       2     2      0


-- A.1.3 node record ends ------------------------------

-- A.2.1 node record begins ------------------------------

convergence time for level 96 : 00 s 200 ms
convergence time for level 88 : 00 s 227.449 ms
convergence time for level 80 : 00 s 321.183 ms
avg hops                      : 1.75
calls routed successfully     : 45
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 5.931 ms
avg aggregation time          : 00 s 2.04 ms
total floods                  : 909
total wasted floods           : 293
```

```
pnni data sent                : 122.424 kbps
Database size                 : 3.784 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      2
                                  88     2       2     2      1
                                  80     2       2     2      0


-- A.2.1 node record ends ------------------------------

-- A.2.2 node record begins ------------------------------

convergence time for level 96 : 00 s 195 ms
convergence time for level 88 : 00 s 277.449 ms
convergence time for level 80 : 00 s 396.183 ms
avg hops                      : 0
calls routed successfully     : 0
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 000 ms
avg aggregation time          : 00 s 000 ms
total floods                  : 525
total wasted floods           : 156
pnni data sent                : 71.06 kbps
Database size                 : 3.784 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      2
                                  88     2       2     2      1
                                  80     2       2     2      0


-- A.2.2 node record ends ------------------------------

-- A.2.3 node record begins ------------------------------

convergence time for level 96 : 00 s 185 ms
convergence time for level 88 : 00 s 267.449 ms
```

```
convergence time for level 80 : 00 s 401.183 ms
avg hops                      : 1.45455
calls routed successfully     : 75
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 4.883 ms
avg aggregation time          : 00 s 000 ms
total floods                  : 549
total wasted floods           : 130
pnni data sent                : 79.656 kbps
Database size                 : 3.784 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      2
                                  88     2       2     2      1
                                  80     2       2     2      0


-- A.2.3 node record ends ------------------------------

-- B.1.1 node record begins ----------------------------

convergence time for level 96 : 00 s 200 ms
convergence time for level 88 : 00 s 235.524 ms
convergence time for level 80 : 00 s 268.05 ms
avg hops                      : 1.15556
calls routed successfully     : 70
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 7.657 ms
avg aggregation time          : 00 s 7.042 ms
total floods                  : 1349
```

```
total wasted floods           : 270
pnni data sent                : 183.36 kbps
Database size                 : 3.784 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      2
                                  88     2       2     2      1
                                  80     2       2     2      0


-- B.1.1 node record ends ------------------------------

-- B.1.2 node record begins ------------------------------

convergence time for level 96 : 00 s 195 ms
convergence time for level 88 : 00 s 285.524 ms
convergence time for level 80 : 00 s 353.05 ms
avg hops                      : 1.75
calls routed successfully     : 71
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 5.809 ms
avg aggregation time          : 00 s 000 ms
total floods                  : 586
total wasted floods           : 177
pnni data sent                : 74.572 kbps
Database size                 : 3.784 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      2
                                  88     2       2     2      1
                                  80     2       2     2      0


-- B.1.2 node record ends ------------------------------

-- B.1.3 node record begins ------------------------------

convergence time for level 96 : 00 s 185 ms
```

```
convergence time for level 88 : 00 s 275.524 ms
convergence time for level 80 : 00 s 353.05 ms
avg hops                      : 1.5
calls routed successfully     : 82
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 5.698 ms
avg aggregation time          : 00 s 000 ms
total floods                  : 586
total wasted floods           : 145
pnni data sent                : 80.304 kbps
Database size                 : 3.784 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      2
                                  88     2       2     2      1
                                  80     2       2     2      0


-- B.1.3 node record ends ------------------------------

-- B.2.1 node record begins ------------------------------

convergence time for level 96 : 00 s 215 ms
convergence time for level 88 : 00 s 240.753 ms
convergence time for level 80 : 00 s 333.075 ms
avg hops                      : 1
calls routed successfully     : 49
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 5.762 ms
avg aggregation time          : 00 s 1.956 ms
```

```
total floods                  : 972
total wasted floods           : 263
pnni data sent                : 136.528 kbps
Database size                 : 3.552 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      1
                                  88     2       2     2      1
                                  80     2       2     2      0


-- B.2.1 node record ends ------------------------------

-- B.2.2 node record begins ------------------------------

convergence time for level 96 : 00 s 200 ms
convergence time for level 88 : 00 s 285.753 ms
convergence time for level 80 : 00 s 408.075 ms
avg hops                      : 0
calls routed successfully     : 0
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 000 ms
avg aggregation time          : 00 s 000 ms
total floods                  : 507
total wasted floods           : 175
pnni data sent                : 67.548 kbps
Database size                 : 3.552 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      1
                                  88     2       2     2      1
                                  80     2       2     2      0


-- B.2.2 node record ends ------------------------------

-- B.2.3 node record begins ------------------------------
```

```
convergence time for level 96 : 00 s 190 ms
convergence time for level 88 : 00 s 285.753 ms
convergence time for level 80 : 00 s 413.075 ms
avg hops                      : 2.5
calls routed successfully     : 49
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 9.745 ms
avg aggregation time          : 00 s 000 ms
total floods                  : 552
total wasted floods           : 134
pnni data sent                : 80.052 kbps
Database size                 : 3.552 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      1
                                  88     2       2     2      1
                                  80     2       2     2      0


-- B.2.3 node record ends -------------------------------


AVG NODE RECORDS

convergence time  low         : 00 s 266.158 ms
convergence time high         : 00 s 413.075 ms
avg hops                      : 1.65112
average database size         : 3.668 KB
total floods                  : 9184
total wastedfloods            : 2407
pnni bw low                   : 67.548
pnni bw high                  : 183.36
total pnni data               : 1244.67 kbps

### NODE INSTRUMENTATION LOGS END ######

Note: Font size reduced to fit in a page
```

5.1.2 Example script showing how to override parameters:

```
#This script consists of two classes of hosts which consist of two and three
#sources respectively. Some of the parameters declared in the parameter_block
#voiceHost will be overidden in the individual host blocks

parameter_block node spark {
        prop_constant           =       25,
        default_flooding_period =       1800,
        default_flooding_factor =       2,
        flooding_threshold      =       2,
        crankback_retries       =       2,
        routing_policy          =       min_hop,
        reaggregation_timer     =       100,
        numports                =       20,
        process_time            =       5.0,
        queuesize               =       5000
};

#Host parameter blocks

parameter_block host voiceHost {
        calls                   =       30,
        sourcetype              =       multiple,
        numsources              =       2,
        share1                  =       20,
        share2                  =       80,
        arrival_distribution    =       [exponential 10],

#First Source
        calltype1               =       cbr,
        duration_distribution1  =       [exponential 5],
        pcr1                    =       [uniform 10 20],

#Second Source
        calltype2               =       cbr,
        duration_distribution2  =       histogram,
        histogram_dist2 hduration
        {
          bins                  =       2,
          binwidth              =       10,
          lowlimit              =       10,
          shares                =       [ 50 50]
        },
        pcr2                    =       [uniform 30 50],

        queuesize               =       5000,
        host_process_time       =       3.0,
```

```
        destinations            =       uniform_any
};

parameter_block host videoHost {
        calls                   =       200,
        sourcetype              =       multiple,
        numsources              =       3,
        share1                  =       20,
        share2                  =       50,
        share3                  =       30,
        arrival_distribution    =       [exponential 20],

#First Source
        calltype1               =       cbr,
        duration_distribution1  =       [exponential 5],
        pcr1                    =       [uniform 60 80],

#Second Source
        calltype2               =       cbr,
        duration_distribution2  =       histogram,
        histogram_dist2 hduration
        {
          bins                  =       4,
          binwidth              =       10,
          lowlimit              =       10,
          shares                =       [ 25 50 10 15]
        },
        pcr2                    =       [uniform 20 30],

#Third Source
        calltype3               =       vbr,
        duration_distribution3  =       [fixed 10],
        pcr3                    =       histogram,
        histogram_dist3 hpcr
        {
          bins                  =       3,
          binwidth              =       20,
          lowlimit              =       0,
          shares                =       [ 50 35 15]
        },
        pcr2scr3                =       [fixed 5.5],

        queuesize               =       5000,
        host_process_time       =       3.0,
        destinations            =       uniform_any
};
```

```
# Peer group A.1
node A.1.1{
        parameter_block spark,
        leader = true,
        address = 0x47000000000000000000a010100000000000000
        };

node A.1.2{
        parameter_block spark,
        address = 0x47000000000000000000a010200000000000000
        };

node A.1.3{
        parameter_block spark,
        bordernode = true,
        aggr_token = 3,
        address = 0x47000000000000000000a010300000000000000
        };

# Peer group A.2
node A.2.1{
        parameter_block spark,
        leader = true,
        bordernode = true,
        aggr_token = 1,
        address = 0x47000000000000000000a020100000000000000
        };

node A.2.2{
        parameter_block spark,
        address = 0x47000000000000000000a020200000000000000
        };

node A.2.3{
        parameter_block spark,
        bordernode = true,
        aggr_token = 3,
        address = 0x47000000000000000000a020300000000000000
        };


# Peer group B.1
node B.1.1{
        parameter_block spark,
        leader = true,
        bordernode = true,
        aggr_token = 1,
        address = 0x47000000000000000000b010100000000000000
```

```
        };

node B.1.2{
        parameter_block spark,
        address = 0x47000000000000000000b010200000000000000
        };

node B.1.3{
        parameter_block spark,
        bordernode = true,
        aggr_token = 3,
        address = 0x47000000000000000000b010300000000000000
        };

# Peer group B.2
node B.2.1{
        parameter_block spark,
        leader = true,
        bordernode = true,
        aggr_token = 1,
        address = 0x47000000000000000000b020100000000000000
        };

node B.2.2{
        parameter_block spark,
        address = 0x47000000000000000000b020200000000000000
        };

node B.2.3{
        parameter_block spark,
        address = 0x47000000000000000000b020300000000000000
        };


host A.1.1.1{
        parameter_block videoHost,
        address = 0x47000000000000000000a010100000000000100
        };

host A.2.3.1{
        parameter_block voiceHost,
        address = 0x47000000000000000000a020300000000000100
#Overiding the parameters of generic block
        calltype1 = vbr,
        pcr2scr1  = [fixed 2]
        };

host B.1.3.1{
```

```
        parameter_block voiceHost,
        address = 0x47000000000000000000b010300000000000100
        };

host B.2.3.1{
        parameter_block videoHost,
        address = 0x47000000000000000000b020300000000000100

#Overiding the parameters of generic block videoHost
#and creating four sources for this host only.
#Note that we need to sepcify the parameters of all
#the fours sources again.

        numsources              =       4,
#Source1
        calltype1               =       cbr,
        share1                  =       20,
        pcr1                    =       histogram,
        histogram_dist1  hpcr
        {
         bins                   =       2,
         binwidth               =       5,
         lowlimit               =       5,
         shares                 =       [ 50 50]
        },
        pcr2scr1                =       [uniform  2 6],
        duration_distribution1  =       [uniform 15 23],
        mbs1                    =       [uniform 4 8],
        ctd1                    =       [uniform 5 10],
        cdv1                    =       [fixed 2],
        clr1                    =       [uniform  1 4],

#Source2
        calltype2               =       vbr,
        share2                  =       30,
        pcr2                    =       [fixed 100],
        pcr2scr2                =       [fixed 1.5],
        duration_distribution2  =       [uniform 24 36 ],

#Source3
        calltype3               =       vbr,
        share3                  =       10,
        pcr2                    =       [fixed 30],
        pcr2scr2                =       [fixed 2.5],
        duration_distribution2  =       [uniform 54 68 ],

#Source4
        calltype4               =       cbr,
```

```
        share2                  =       40,
        pcr2                    =       [exponential 50],
        duration_distribution2  =       [fixed 40 ]
};

host B.1.2.1{
        parameter_block videoHost,
        address = 0x47000000000000000000b010200000000000100
        };


port genericport {bw=OC12, delay=10};


# connections within the peergroup A.1
connection A.1.1->A.1.2{bw=300, ad_weight = 10};
connection A.1.2->A.1.3{bw=300, ad_weight = 10};
connection A.1.3->A.1.1{bw=300, ad_weight = 10};

# connections within the peergroup A.2
connection A.2.1->A.2.2{bw=300, ad_weight = 20};
connection A.2.2->A.2.3{bw=300, ad_weight = 10};
connection A.2.3->A.2.1{bw=300, ad_weight = 10};

# connections within the peergroup B.1
connection B.1.1->B.1.2{bw=300, ad_weight = 10};
connection B.1.2->B.1.3{bw=300, ad_weight = 10};
connection B.1.3->B.1.1{bw=300, ad_weight = 10};

# connections within the peergroup B.2
connection B.2.1->B.2.2{bw=300, ad_weight = 20};
connection B.2.2->B.2.3{bw=300, ad_weight = 10};
connection B.2.3->B.2.1{bw=300, ad_weight = 10};

# physical connections across peer groups
connection A.1.3->A.2.1{bw=300, ad_weight = 30};
connection A.2.3->B.1.1{bw=300, ad_weight = 30};
connection B.1.3->B.2.1{bw=300, ad_weight = 30};

# host - node connections
connection A.1.1->A.1.1.1{bw=300, ad_weight = 60};
connection A.2.3->A.2.3.1{bw=300, ad_weight = 60};
connection B.1.3->B.1.3.1{bw=300, ad_weight = 60};
connection B.1.2->B.1.2.1{bw=300, ad_weight = 60};
connection B.2.3->B.2.3.1{bw=300, ad_weight = 60};

# logical nodes
```

```
logicalnode A.1{
                  level = 88,
                  child = A.1.1
               };

logicalnode A.2{
                 level = 88,
                 child = A.2.1,
                 aggr_token = 2
               };

logicalnode B.1{
                 level = 88,
                 child = B.1.1,
                 aggr_token = 1
               };

logicalnode B.2{
                 level = 88,
                 child = B.2.1
               };


logicalnode A{
                level = 80,
                child = A.1,
             };

logicalnode B{
                level = 80,
                child = B.1
             };

# logical connections
logicalconnection A.1->A.2{ delay = 25 };
logicalconnection B.1->B.2{ delay = 25 };
logicalconnection A.2->B.1{ delay = 25 };
logicalconnection A->B{ delay = 25 };

schedule{
          duration        =   1000,
          mpg             =   true,
          nodal_represent =   complex
        };
```

5.1.2.1 Output

Output:

```
 ---- W E L C O M E   T O   K U   P N N I   S I M U L A T O R ----

     Information and Telecommunication Technology Center (ITTC)
        University of Kansas Center for Research, Inc.

For enquiries, please contact:
        KU      Dr. Douglas Niehaus     <niehaus@ittc.ku.edu>
                KU-PNNI Group           <pnni@ittc.ku.edu>

        SPRINT  Sohel Khan              <sohel.khan@mail.sprint.com>
                                        Ph: 913 534 2914


To see the complete copyright (C) information please type
                kupnni -c
--------------------------------------------------------------------------
>Parsing scriptfile ...  report2.script
>Random seed for the experiment is 195.045
>Presimulation processing ...
>Simulation Kernel instantiated ...
In SetupConvergenceControls()
Convergence Table
 PeerGroup 88:47000000000000000000b000000 : 7
 PeerGroup 88:47000000000000000000a000000 : 7
 PeerGroup 80:47000000000000000000000000000 : 6
 PeerGroup 96:47000000000000000000b020000 : 10
 PeerGroup 96:47000000000000000000b010000 : 11
 PeerGroup 96:47000000000000000000a020000 : 11
 PeerGroup 96:47000000000000000000a010000 : 10
>Simulation started (virtual time)  0s 0ms
 ... Event Processng Loop starts ...
>Simulation stopped (virtual time)  1000s  0ms
 ... Event Processng Loop stops  ...
>Printing simulation results ...

***** CALL SETUP LOGS START ******

-- A.1.1.1 host record begins -----------------------------

No. Destination calltype bw(kbps)   arrival time      setuptime     result    duration/cause        pcr(cells/sec) pcr2scr  mbs   ctd   cdv   clr
```

12	B.1.2.1	nrtvbr	7.632	04 m 04 s 060 ms	00 s 223.916 ms	setup	00000010 s 000000 ms	39	5.5	0	0	0	0
13	B.1.2.1	cbr	26.712	04 m 24 s 052 ms	00 s 213.112 ms	setup	00000028 s 000000 ms	63	N/A	0	0	0	0
14	A.2.3.1	cbr	25.44	04 m 44 s 108 ms	00 s 150.748 ms	setup	00000013 s 000000 ms	60	N/A	0	0	0	0
15	B.1.3.1	nrtvbr	16.96	05 m 04 s 001 ms	00 s 273.704 ms	setup	00000010 s 000000 ms	87	5.5	0	0	0	0
16	B.1.2.1	cbr	69.112	05 m 23 s 981 ms	00 s 223.881 ms	setup	00000001 s 000000 ms	163	N/A	0	0	0	0
17	B.1.2.1	cbr	60.208	05 m 44 s 089 ms	00 s 213.107 ms	setup	00000005 s 000000 ms	142	N/A	0	0	0	0
18	A.2.3.1	cbr	20.352	06 m 04 s 052 ms	00 s 211.640 ms	setup	00000023 s 000000 ms	48	N/A	0	0	0	0
19	B.1.3.1	cbr	25.864	06 m 24 s 097 ms	00 s 213.060 ms	setup	00000019 s 000000 ms	61	N/A	0	0	0	0
20	B.1.2.1	nrtvbr	8.056	06 m 44 s 383 ms	00 s 213.512 ms	setup	00000010 s 000000 ms	43	5.5	0	0	0	0
21	B.1.2.1	cbr	22.472	07 m 04 s 283 ms	00 s 213.132 ms	setup	00000029 s 000000 ms	53	N/A	0	0	0	0
22	A.2.3.1	nrtvbr	14.84	07 m 24 s 290 ms	00 s 150.772 ms	setup	00000010 s 000000 ms	76	5.5	0	0	0	0
23	B.1.3.1	cbr	65.296	07 m 44 s 175 ms	00 s 273.316 ms	setup	00000002 s 000000 ms	154	N/A	0	0	0	0
24	B.1.2.1	cbr	25.44	08 m 04 s 295 ms	00 s 213.149 ms	setup	00000048 s 000000 ms	60	N/A	0	0	0	0
25	B.1.2.1	cbr	75.472	08 m 24 s 221 ms	00 s 213.547 ms	setup	00000003 s 000000 ms	178	N/A	0	0	0	0
26	A.2.3.1	nrtvbr	6.784	08 m 44 s 182 ms	00 s 150.804 ms	setup	00000010 s 000000 ms	33	5.5	0	0	0	0
27	B.1.3.1	cbr	71.232	09 m 04 s 160 ms	00 s 273.346 ms	setup	00000007 s 000000 ms	168	N/A	0	0	0	0
28	B.1.2.1	cbr	22.472	09 m 23 s 917 ms	00 s 213.215 ms	setup	00000026 s 000000 ms	53	N/A	0	0	0	0
29	B.1.2.1	cbr	61.056	09 m 43 s 723 ms	00 s 223.885 ms	setup	00000006 s 000000 ms	144	N/A	0	0	0	0
30	A.2.3.1	cbr	24.592	10 m 03 s 736 ms	00 s 151.020 ms	setup	00000012 s 000000 ms	58	N/A	0	0	0	0
31	B.1.3.1	cbr	26.288	10 m 23 s 603 ms	00 s 213.278 ms	setup	00000020 s 000000 ms	62	N/A	0	0	0	0
32	B.1.2.1	nrtvbr	16.96	10 m 43 s 572 ms	00 s 213.130 ms	setup	00000010 s 000000 ms	84	5.5	0	0	0	0
33	B.1.2.1	nrtvbr	6.784	11 m 03 s 479 ms	00 s 213.136 ms	setup	00000010 s 000000 ms	35	5.5	0	0	0	0
34	A.2.3.1	nrtvbr	11.448	11 m 23 s 364 ms	00 s 150.778 ms	setup	00000010 s 000000 ms	56	5.5	0	0	0	0
35	B.1.3.1	cbr	22.048	11 m 43 s 156 ms	00 s 218.596 ms	setup	00000022 s 000000 ms	52	N/A	0	0	0	0
36	B.1.2.1	nrtvbr	12.296	12 m 03 s 198 ms	00 s 224.018 ms	setup	00000010 s 000000 ms	63	5.5	0	0	0	0
37	B.1.2.1	cbr	66.992	12 m 23 s 280 ms	00 s 213.135 ms	setup	00000004 s 000000 ms	158	N/A	0	0	0	0
38	A.2.3.1	cbr	19.928	12 m 43 s 417 ms	00 s 210.959 ms	setup	00000013 s 000000 ms	47	N/A	0	0	0	0
39	B.1.3.1	cbr	25.44	13 m 03 s 351 ms	00 s 213.122 ms	setup	00000021 s 000000 ms	60	N/A	0	0	0	0
40	B.1.2.1	cbr	29.256	13 m 23 s 282 ms	00 s 213.608 ms	setup	00000019 s 000000 ms	69	N/A	0	0	0	0
41	B.1.2.1	nrtvbr	28.408	13 m 43 s 420 ms	00 s 213.172 ms	setup	00000010 s 000000 ms	141	5.5	0	0	0	0
42	A.2.3.1	cbr	21.624	14 m 03 s 474 ms	00 s 150.742 ms	setup	00000029 s 000000 ms	51	N/A	0	0	0	0
43	B.1.3.1	cbr	28.408	14 m 23 s 431 ms	00 s 213.114 ms	setup	00000022 s 000000 ms	67	N/A	0	0	0	0
44	B.1.2.1	cbr	75.472	14 m 43 s 328 ms	00 s 223.860 ms	setup	00000002 s 000000 ms	178	N/A	0	0	0	0
45	B.1.2.1	nrtvbr	15.688	15 m 03 s 245 ms	00 s 224.347 ms	setup	00000010 s 000000 ms	78	5.5	0	0	0	0
46	A.2.3.1	cbr	22.896	15 m 23 s 432 ms	00 s 150.775 ms	setup	00000023 s 000000 ms	54	N/A	0	0	0	0
47	B.1.3.1	cbr	20.776	15 m 43 s 442 ms	00 s 213.141 ms	setup	00000022 s 000000 ms	49	N/A	0	0	0	0
48	B.1.2.1	cbr	25.016	16 m 03 s 426 ms	00 s 213.070 ms	setup	00000014 s 000000 ms	59	N/A	0	0	0	0
49	B.1.2.1	cbr	70.808	16 m 23 s 538 ms	00 s 213.150 ms	setup	00000005 s 000000 ms	167	N/A	0	0	0	0

total cbr calls : 37
successfull cbr calls : 100%
total cbr bw request : 1.47552 Mbps
cbr bw rejected : 0 Mbps

```
total nrtvbr calls           : 12
successfull nrtvbr calls     : 100%
total nrtvbr bw request      : 0.166208 Mbps
nrt vbr bw rejected          : 0 Mbps
mean callsetup time         : 00 s 208.127 ms

-- A.1.1.1 host record ends ---------------------------

-- A.2.3.1 host record begins -----------------------------
```

No.	Destination	calltype	bw(kbps)	arrival time	setuptime	result	duration/cause	pcr(cells/sec)	pcr2scr	mbs	ctd	cdv	clr
1	B.1.2.1	cbr	42.4	00 m 21 s 000 ms	00 s 246.990 ms	setup	00000012 s 000000 ms	100	N/A	0	0	0	0
2	B.1.2.1	cbr	48.336	00 m 31 s 083 ms	00 s 161.202 ms	setup	00000013 s 000000 ms	114	N/A	0	0	0	0
3	B.1.2.1	cbr	34.344	00 m 41 s 054 ms	00 s 160.825 ms	setup	00000023 s 000000 ms	81	N/A	0	0	0	0
4	B.2.3.1	nrtvbr	11.024	00 m 51 s 105 ms	00 s 248.367 ms	setup	00000003 s 000000 ms	35	2	0	0	0	0
5	B.1.2.1	cbr	39.432	01 m 01 s 082 ms	00 s 156.645 ms	setup	00000025 s 000000 ms	93	N/A	0	0	0	0
6	B.1.2.1	cbr	32.648	01 m 11 s 068 ms	00 s 160.766 ms	setup	00000019 s 000000 ms	77	N/A	0	0	0	0
7	B.1.2.1	cbr	40.704	01 m 20 s 982 ms	00 s 181.592 ms	setup	00000017 s 000000 ms	96	N/A	0	0	0	0
8	B.2.3.1	nrtvbr	9.752	01 m 30 s 963 ms	00 s 245.766 ms	setup	00000002 s 000000 ms	31	2	0	0	0	0
9	B.1.2.1	cbr	41.976	01 m 40 s 876 ms	00 s 120.910 ms	setup	00000012 s 000000 ms	99	N/A	0	0	0	0
10	B.1.2.1	cbr	35.616	01 m 50 s 699 ms	00 s 120.776 ms	setup	00000019 s 000000 ms	84	N/A	0	0	0	0
11	B.1.2.1	cbr	35.616	02 m 00 s 721 ms	00 s 120.898 ms	setup	00000011 s 000000 ms	84	N/A	0	0	0	0
12	B.2.3.1	cbr	47.912	02 m 10 s 628 ms	00 s 183.193 ms	setup	00000012 s 000000 ms	113	N/A	0	0	0	0
13	B.1.2.1	cbr	42.4	02 m 20 s 676 ms	00 s 120.836 ms	setup	00000024 s 000000 ms	100	N/A	0	0	0	0
14	B.1.2.1	cbr	36.888	02 m 30 s 733 ms	00 s 125.751 ms	setup	00000010 s 000000 ms	87	N/A	0	0	0	0
15	B.1.2.1	cbr	48.336	02 m 40 s 679 ms	00 s 130.799 ms	setup	00000023 s 000000 ms	114	N/A	0	0	0	0
16	B.2.3.1	cbr	46.216	02 m 50 s 582 ms	00 s 183.172 ms	setup	00000021 s 000000 ms	109	N/A	0	0	0	0
17	B.1.2.1	cbr	43.672	03 m 00 s 582 ms	00 s 135.809 ms	setup	00000011 s 000000 ms	103	N/A	0	0	0	0
18	B.1.2.1	nrtvbr	13.144	03 m 10 s 584 ms	00 s 125.766 ms	setup	00000008 s 000000 ms	42	2	0	0	0	0
19	B.1.2.1	nrtvbr	8.48	03 m 20 s 651 ms	00 s 130.919 ms	setup	00000007 s 000000 ms	27	2	0	0	0	0
20	B.2.3.1	cbr	48.76	03 m 30 s 631 ms	00 s 183.140 ms	setup	00000022 s 000000 ms	115	N/A	0	0	0	0
21	B.1.2.1	cbr	39.856	03 m 40 s 723 ms	00 s 125.861 ms	setup	00000028 s 000000 ms	94	N/A	0	0	0	0
22	B.1.2.1	cbr	29.68	03 m 50 s 810 ms	00 s 125.778 ms	setup	00000013 s 000000 ms	70	N/A	0	0	0	0
23	B.1.2.1	cbr	44.944	04 m 00 s 887 ms	00 s 120.780 ms	setup	00000028 s 000000 ms	106	N/A	0	0	0	0
24	B.2.3.1	cbr	46.216	04 m 10 s 825 ms	00 s 183.124 ms	setup	00000020 s 000000 ms	109	N/A	0	0	0	0
25	B.1.2.1	cbr	47.064	04 m 20 s 680 ms	00 s 120.792 ms	setup	00000014 s 000000 ms	111	N/A	0	0	0	0
26	B.1.2.1	cbr	46.216	04 m 30 s 642 ms	00 s 120.774 ms	setup	00000019 s 000000 ms	109	N/A	0	0	0	0
27	B.1.2.1	cbr	44.096	04 m 40 s 465 ms	00 s 130.789 ms	setup	00000024 s 000000 ms	104	N/A	0	0	0	0
28	B.2.3.1	cbr	43.672	04 m 50 s 478 ms	00 s 183.089 ms	setup	00000027 s 000000 ms	103	N/A	0	0	0	0
29	B.1.2.1	nrtvbr	8.48	05 m 00 s 458 ms	00 s 176.721 ms	setup	00000004 s 000000 ms	27	2	0	0	0	0
30	B.1.2.1	cbr	30.104	05 m 10 s 457 ms	00 s 120.742 ms	setup	00000017 s 000000 ms	71	N/A	0	0	0	0

```
total cbr calls              : 25
```

```
successfull cbr calls       : 100%
total cbr bw request        : 1.0371 Mbps
cbr bw rejected             : 0 Mbps
total nrtvbr calls           : 5
successfull nrtvbr calls     : 100%
total nrtvbr bw request      : 0.05088 Mbps
nrt vbr bw rejected          : 0 Mbps
mean callsetup time         : 00 s 155.085 ms

-- A.2.3.1 host record ends ---------------------------

-- B.1.2.1 host record begins -----------------------------
```

No.	Destination	calltype	bw(kbps)	arrival time	setuptime	result	duration/cause	pcr(cells/sec)	pcr2scr	mbs	ctd	cdv	clr
1	B.2.3.1	cbr	29.256	00 m 29 s 000 ms	00 s 211.623 ms	setup	00000033 s 000000 ms	69	N/A	0	0	0	0
2	B.2.3.1	cbr	28.832	00 m 48 s 891 ms	00 s 155.817 ms	setup	00000025 s 000000 ms	68	N/A	0	0	0	0
3	B.2.3.1	cbr	29.256	01 m 08 s 601 ms	00 s 150.737 ms	setup	00000020 s 000000 ms	69	N/A	0	0	0	0
4	B.1.3.1	cbr	23.32	01 m 28 s 538 ms	00 s 88.3870 ms	setup	00000025 s 000000 ms	55	N/A	0	0	0	0
5	B.2.3.1	cbr	22.896	01 m 48 s 509 ms	00 s 150.913 ms	setup	00000023 s 000000 ms	54	N/A	0	0	0	0
6	B.2.3.1	nrtvbr	3.392	02 m 08 s 446 ms	00 s 150.816 ms	setup	00000010 s 000000 ms	17	5.5	0	0	0	0
7	B.2.3.1	nrtvbr	12.72	02 m 28 s 531 ms	00 s 150.777 ms	setup	00000010 s 000000 ms	65	5.5	0	0	0	0
8	B.1.3.1	cbr	20.352	02 m 48 s 584 ms	00 s 88.3910 ms	setup	00000018 s 000000 ms	48	N/A	0	0	0	0
9	B.2.3.1	nrtvbr	14.84	03 m 08 s 689 ms	00 s 150.747 ms	setup	00000010 s 000000 ms	74	5.5	0	0	0	0
10	B.2.3.1	nrtvbr	8.056	03 m 28 s 571 ms	00 s 150.967 ms	setup	00000010 s 000000 ms	43	5.5	0	0	0	0
11	B.2.3.1	cbr	21.2	03 m 48 s 490 ms	00 s 150.778 ms	setup	00000020 s 000000 ms	50	N/A	0	0	0	0
12	B.1.3.1	cbr	26.288	04 m 08 s 380 ms	00 s 98.3360 ms	setup	00000021 s 000000 ms	62	N/A	0	0	0	0
13	B.2.3.1	nrtvbr	8.056	04 m 28 s 360 ms	00 s 150.759 ms	setup	00000010 s 000000 ms	42	5.5	0	0	0	0
14	B.2.3.1	nrtvbr	18.232	04 m 48 s 244 ms	00 s 150.823 ms	setup	00000010 s 000000 ms	93	5.5	0	0	0	0
15	B.2.3.1	nrtvbr	19.504	05 m 08 s 001 ms	00 s 150.965 ms	setup	00000010 s 000000 ms	96	5.5	0	0	0	0
16	B.1.3.1	cbr	22.048	05 m 27 s 648 ms	00 s 104.212 ms	setup	00000040 s 000000 ms	52	N/A	0	0	0	0
17	B.2.3.1	nrtvbr	11.448	05 m 47 s 693 ms	00 s 150.767 ms	setup	00000010 s 000000 ms	57	5.5	0	0	0	0
18	B.2.3.1	cbr	27.56	06 m 07 s 874 ms	00 s 151.428 ms	setup	00000017 s 000000 ms	65	N/A	0	0	0	0
19	B.2.3.1	cbr	28.408	06 m 28 s 038 ms	00 s 155.755 ms	setup	00000028 s 000000 ms	67	N/A	0	0	0	0
20	B.1.3.1	cbr	19.928	06 m 48 s 216 ms	00 s 98.3990 ms	setup	00000021 s 000000 ms	47	N/A	0	0	0	0
21	B.2.3.1	nrtvbr	24.168	07 m 08 s 173 ms	00 s 161.705 ms	setup	00000010 s 000000 ms	120	5.5	0	0	0	0
22	B.2.3.1	cbr	25.44	07 m 28 s 179 ms	00 s 150.719 ms	setup	00000025 s 000000 ms	60	N/A	0	0	0	0
23	B.2.3.1	cbr	20.352	07 m 48 s 438 ms	00 s 161.627 ms	setup	00000020 s 000000 ms	48	N/A	0	0	0	0
24	B.1.3.1	cbr	26.712	08 m 08 s 602 ms	00 s 103.384 ms	setup	00000042 s 000000 ms	63	N/A	0	0	0	0
25	B.2.3.1	nrtvbr	0	08 m 28 s 195 ms	00 s 150.942 ms	setup	00000010 s 000000 ms	2	5.5	0	0	0	0
26	B.2.3.1	cbr	23.32	08 m 48 s 060 ms	00 s 150.807 ms	setup	00000029 s 000000 ms	55	N/A	0	0	0	0
27	B.2.3.1	nrtvbr	15.688	09 m 07 s 959 ms	00 s 150.782 ms	setup	00000010 s 000000 ms	77	5.5	0	0	0	0
28	B.1.3.1	cbr	21.624	09 m 27 s 974 ms	00 s 88.3900 ms	setup	00000015 s 000000 ms	51	N/A	0	0	0	0
29	B.2.3.1	cbr	60.632	09 m 48 s 094 ms	00 s 150.829 ms	setup	00000003 s 000000 ms	143	N/A	0	0	0	0

30	B.2.3.1	cbr	25.016	10 m 07 s 828 ms	00 s 161.769 ms	setup	00000034 s 000000 ms	59	N/A	0	0	0	0
31	B.2.3.1	cbr	22.048	10 m 27 s 957 ms	00 s 150.777 ms	setup	00000010 s 000000 ms	52	N/A	0	0	0	0
32	B.1.3.1	nrtvbr	11.448	10 m 47 s 836 ms	00 s 99.1800 ms	setup	00000010 s 000000 ms	58	5.5	0	0	0	0
33	B.2.3.1	cbr	27.56	11 m 07 s 813 ms	00 s 150.713 ms	setup	00000040 s 000000 ms	65	N/A	0	0	0	0
34	B.2.3.1	cbr	64.872	11 m 27 s 750 ms	00 s 150.775 ms	setup	00000005 s 000000 ms	153	N/A	0	0	0	0
35	B.2.3.1	cbr	24.168	11 m 47 s 739 ms	00 s 150.989 ms	setup	00000022 s 000000 ms	57	N/A	0	0	0	0
36	B.1.3.1	cbr	62.328	12 m 07 s 874 ms	00 s 88.4110 ms	setup	00000004 s 000000 ms	147	N/A	0	0	0	0
37	B.2.3.1	cbr	29.256	12 m 27 s 803 ms	00 s 150.810 ms	setup	00000025 s 000000 ms	69	N/A	0	0	0	0
38	B.2.3.1	nrtvbr	4.664	12 m 47 s 769 ms	00 s 150.781 ms	setup	00000010 s 000000 ms	26	5.5	0	0	0	0
39	B.2.3.1	cbr	70.808	13 m 07 s 889 ms	00 s 151.243 ms	setup	00000003 s 000000 ms	167	N/A	0	0	0	0
40	B.1.3.1	cbr	70.808	13 m 27 s 841 ms	00 s 88.4310 ms	setup	00000007 s 000000 ms	167	N/A	0	0	0	0
41	B.2.3.1	nrtvbr	0	13 m 48 s 072 ms	00 s 150.953 ms	setup	00000010 s 000000 ms	3	5.5	0	0	0	0
42	B.2.3.1	nrtvbr	10.176	14 m 07 s 828 ms	00 s 160.770 ms	setup	00000010 s 000000 ms	52	5.5	0	0	0	0
43	B.2.3.1	cbr	25.016	14 m 27 s 651 ms	00 s 150.758 ms	setup	00000029 s 000000 ms	59	N/A	0	0	0	0
44	B.1.3.1	cbr	23.32	14 m 47 s 544 ms	00 s 88.4020 ms	setup	00000015 s 000000 ms	55	N/A	0	0	0	0
45	B.2.3.1	cbr	67.84	15 m 07 s 554 ms	00 s 155.929 ms	setup	00000007 s 000000 ms	160	N/A	0	0	0	0
46	B.2.3.1	nrtvbr	6.784	15 m 27 s 544 ms	00 s 150.814 ms	setup	00000010 s 000000 ms	37	5.5	0	0	0	0
47	B.2.3.1	cbr	26.288	15 m 47 s 355 ms	00 s 150.773 ms	setup	00000027 s 000000 ms	62	N/A	0	0	0	0
48	B.1.3.1	nrtvbr	10.176	16 m 07 s 440 ms	00 s 88.3660 ms	setup	00000010 s 000000 ms	52	5.5	0	0	0	0
49	B.2.3.1	cbr	27.984	16 m 27 s 603 ms	00 s 150.753 ms	setup	00000024 s 000000 ms	66	N/A	0	0	0	0


```
total cbr calls             : 32
successfull cbr calls       : 100%
total cbr bw request        : 1.04474 Mbps
cbr bw rejected             : 0 Mbps
total nrtvbr calls           : 17
successfull nrtvbr calls     : 100%
total nrtvbr bw request      : 0.179352 Mbps
nrt vbr bw rejected          : 0 Mbps
mean callsetup time         : 00 s 139.224 ms

-- B.1.2.1 host record ends ----------------------------

-- B.1.3.1 host record begins ------------------------------
```

No.	Destination	calltype	bw(kbps)	arrival time	setuptime	result	duration/cause	pcr(cells/sec)	pcr2scr	mbs	ctd	cdv	clr
1	B.1.2.1	cbr	38.16	00 m 21 s 000 ms	00 s 239.990 ms	setup	00000021 s 000000 ms	90	N/A	0	0	0	0
2	A.1.1.1	cbr	47.064	00 m 30 s 871 ms	00 s 218.274 ms	setup	00000013 s 000000 ms	111	N/A	0	0	0	0
3	A.1.1.1	cbr	43.672	00 m 40 s 791 ms	00 s 284.052 ms	setup	00000010 s 000000 ms	103	N/A	0	0	0	0
4	B.2.3.1	cbr	45.368	00 m 50 s 897 ms	00 s 120.732 ms	setup	00000014 s 000000 ms	107	N/A	0	0	0	0
5	B.1.2.1	cbr	39.856	01 m 00 s 816 ms	00 s 99.0870 ms	setup	00000025 s 000000 ms	94	N/A	0	0	0	0
6	A.1.1.1	cbr	30.528	01 m 10 s 972 ms	00 s 228.224 ms	setup	00000027 s 000000 ms	72	N/A	0	0	0	0
7	A.1.1.1	cbr	32.224	01 m 21 s 041 ms	00 s 263.889 ms	setup	00000012 s 000000 ms	76	N/A	0	0	0	0

```
  8 B.2.3.1     cbr      40.704   01 m 30 s 954 ms 00 s 135.795 ms  setup    00000016 s 000000 ms              96   N/A      0     0     0     0
  9 B.1.2.1     cbr      35.616   01 m 40 s 794 ms 00 s 88.3880 ms  setup    00000013 s 000000 ms              84   N/A      0     0     0     0
 10 A.1.1.1     cbr      33.92    01 m 50 s 889 ms 00 s 218.165 ms  setup    00000021 s 000000 ms              80   N/A      0     0     0     0
 11 A.1.1.1     cbr      42.824   02 m 00 s 894 ms 00 s 224.105 ms  setup    00000012 s 000000 ms             101   N/A      0     0     0     0
 12 B.2.3.1     cbr      37.736   02 m 10 s 814 ms 00 s 120.722 ms  setup    00000010 s 000000 ms              89   N/A      0     0     0     0
 13 B.1.2.1     cbr      39.432   02 m 20 s 784 ms 00 s 88.3760 ms  setup    00000015 s 000000 ms              93   N/A      0     0     0     0
 14 A.1.1.1     cbr      46.64    02 m 30 s 735 ms 00 s 223.196 ms  setup    00000028 s 000000 ms             110   N/A      0     0     0     0
 15 A.1.1.1     cbr      30.952   02 m 40 s 699 ms 00 s 213.212 ms  setup    00000014 s 000000 ms              73   N/A      0     0     0     0
 16 B.2.3.1     cbr      46.64    02 m 50 s 785 ms 00 s 120.711 ms  setup    00000012 s 000000 ms             110   N/A      0     0     0     0
 17 B.1.2.1     cbr      47.064   03 m 00 s 734 ms 00 s 88.3680 ms  setup    00000027 s 000000 ms             111   N/A      0     0     0     0
 18 A.1.1.1     cbr      34.768   03 m 10 s 589 ms 00 s 223.199 ms  setup    00000022 s 000000 ms              82   N/A      0     0     0     0
 19 A.1.1.1     cbr      39.432   03 m 20 s 566 ms 00 s 283.221 ms  setup    00000021 s 000000 ms              93   N/A      0     0     0     0
 20 B.2.3.1     cbr      34.768   03 m 30 s 738 ms 00 s 136.538 ms  setup    00000016 s 000000 ms              82   N/A      0     0     0     0
 21 B.1.2.1     cbr      45.792   03 m 40 s 692 ms 00 s 88.4090 ms  setup    00000024 s 000000 ms             108   N/A      0     0     0     0
 22 A.1.1.1     cbr      32.224   03 m 50 s 625 ms 00 s 213.246 ms  setup    00000027 s 000000 ms              76   N/A      0     0     0     0
 23 A.1.1.1     cbr      39.008   04 m 00 s 551 ms 00 s 213.239 ms  setup    00000020 s 000000 ms              92   N/A      0     0     0     0
 24 B.2.3.1     cbr      10.176   04 m 10 s 468 ms 00 s 120.806 ms  setup    00000006 s 000000 ms              24   N/A      0     0     0     0
 25 B.1.2.1     cbr      12.296   04 m 20 s 382 ms 00 s 93.3850 ms  setup    00000002 s 000000 ms              29   N/A      0     0     0     0
 26 A.1.1.1     cbr      30.952   04 m 30 s 279 ms 00 s 213.171 ms  setup    00000017 s 000000 ms              73   N/A      0     0     0     0
 27 A.1.1.1     cbr      47.064   04 m 40 s 304 ms 00 s 213.247 ms  setup    00000021 s 000000 ms             111   N/A      0     0     0     0
 28 B.2.3.1     cbr      36.888   04 m 50 s 218 ms 00 s 120.759 ms  setup    00000011 s 000000 ms              87   N/A      0     0     0     0
 29 B.1.2.1     cbr      33.496   05 m 00 s 092 ms 00 s 169.280 ms  setup    00000015 s 000000 ms              79   N/A      0     0     0     0
 30 A.1.1.1     cbr      42.824   05 m 10 s 086 ms 00 s 213.243 ms  setup    00000028 s 000000 ms             101   N/A      0     0     0     0

total cbr calls             : 30
successfull cbr calls       : 100%
total cbr bw request        : 1.11809 Mbps
cbr bw rejected             : 0 Mbps
mean callsetup time         : 00 s 175.9 ms

-- B.1.3.1 host record ends ---------------------------

-- B.2.3.1 host record begins -----------------------------

No. Destination calltype bw(kbps)   arrival time      setuptime     result    duration/cause         pcr(cells/sec) pcr2scr  mbs   ctd   cdv   clr
  1 A.1.1.1     cbr      12.296   00 m 29 s 000 ms 00 s 458.907 ms  setup    00000022 s 000000 ms              29   N/A      12    5     0     0
  2 B.1.2.1     nrtvbr   32.648   00 m 48 s 888 ms 00 s 155.649 ms  setup    00000040 s 000000 ms             110  2.5        0    0     0     0
  3 B.1.2.1     cbr      12.72    01 m 08 s 724 ms 00 s 150.736 ms  setup    00000017 s 000000 ms              30   N/A      15    7     0     0
  4 A.1.1.1     cbr      63.6     01 m 28 s 835 ms 00 s 316.802 ms  setup    00000001 s 000000 ms             150   N/A      0     0     0     0
  5 A.1.1.1     cbr      63.6     01 m 48 s 946 ms 00 s 310.492 ms  setup    00000001 s 000000 ms             150   N/A      0     0     0     0
  6 B.1.2.1     cbr      63.6     02 m 08 s 860 ms 00 s 150.726 ms  setup    00000001 s 000000 ms             150   N/A      0     0     0     0
  7 B.1.2.1     cbr      13.144   02 m 28 s 815 ms 00 s 150.729 ms  setup    00000015 s 000000 ms              31   N/A      13    9     0     0
  8 A.1.1.1     cbr      63.6     02 m 48 s 930 ms 00 s 295.360 ms  setup    00000001 s 000000 ms             150   N/A      0     0     0     0
```

9	A.1.1.1	cbr	63.6	03 m 08 s 768 ms	00 s 341.238 ms	setup	00000001 s 000000 ms	150	N/A	0	0	0	0
10	B.1.2.1	nrtvbr	63.6	03 m 28 s 720 ms	00 s 210.820 ms	setup	00000001 s 000000 ms	150	1	0	0	0	0
11	B.1.2.1	cbr	63.6	03 m 48 s 477 ms	00 s 165.744 ms	setup	00000001 s 000000 ms	150	N/A	0	0	0	0
12	A.1.1.1	nrtvbr	36.888	04 m 08 s 355 ms	00 s 275.403 ms	setup	00000040 s 000000 ms	125	2.5	0	0	0	0
13	A.1.1.1	cbr	63.6	04 m 28 s 498 ms	00 s 275.411 ms	setup	00000001 s 000000 ms	150	N/A	0	0	0	0
14	B.1.2.1	cbr	10.176	04 m 48 s 470 ms	00 s 150.716 ms	setup	00000020 s 000000 ms	24	N/A	9	6	0	0
15	B.1.2.1	cbr	63.6	05 m 08 s 325 ms	00 s 150.749 ms	setup	00000001 s 000000 ms	150	N/A	0	0	0	0
16	A.1.1.1	nrtvbr	35.192	05 m 28 s 317 ms	00 s 286.315 ms	setup	00000040 s 000000 ms	119	2.5	0	0	0	0
17	A.1.1.1	nrtvbr	34.344	05 m 48 s 152 ms	00 s 286.197 ms	setup	00000040 s 000000 ms	117	2.5	0	0	0	0
18	B.1.2.1	nrtvbr	63.6	06 m 08 s 088 ms	00 s 151.417 ms	setup	00000001 s 000000 ms	150	1	0	0	0	0
19	B.1.2.1	cbr	63.6	06 m 28 s 056 ms	00 s 170.708 ms	setup	00000001 s 000000 ms	150	N/A	0	0	0	0
20	A.1.1.1	cbr	63.6	06 m 48 s 197 ms	00 s 275.556 ms	setup	00000001 s 000000 ms	150	N/A	0	0	0	0
21	A.1.1.1	nrtvbr	38.584	07 m 08 s 053 ms	00 s 285.471 ms	setup	00000040 s 000000 ms	130	2.5	0	0	0	0
22	B.1.2.1	cbr	63.6	07 m 28 s 010 ms	00 s 150.654 ms	setup	00000001 s 000000 ms	150	N/A	0	0	0	0
23	B.1.2.1	nrtvbr	32.224	07 m 48 s 293 ms	00 s 155.693 ms	setup	00000040 s 000000 ms	109	2.5	0	0	0	0
24	A.1.1.1	cbr	12.72	08 m 08 s 178 ms	00 s 275.486 ms	setup	00000019 s 000000 ms	30	N/A	14	6	0	0
25	A.1.1.1	nrtvbr	34.344	08 m 28 s 362 ms	00 s 297.146 ms	setup	00000040 s 000000 ms	116	2.5	0	0	0	0
26	B.1.2.1	cbr	11.024	08 m 48 s 293 ms	00 s 150.740 ms	setup	00000021 s 000000 ms	26	N/A	10	8	0	0
27	B.1.2.1	cbr	63.6	09 m 08 s 303 ms	00 s 150.679 ms	setup	00000001 s 000000 ms	150	N/A	0	0	0	0
28	A.1.1.1	nrtvbr	63.6	09 m 28 s 371 ms	00 s 335.579 ms	setup	00000001 s 000000 ms	150	1	0	0	0	0
29	A.1.1.1	cbr	8.904	09 m 48 s 526 ms	00 s 336.089 ms	setup	00000018 s 000000 ms	21	N/A	11	5	0	0
30	B.1.2.1	nrtvbr	33.92	10 m 08 s 378 ms	00 s 161.492 ms	setup	00000040 s 000000 ms	115	2.5	0	0	0	0
31	B.1.2.1	nrtvbr	30.528	10 m 28 s 434 ms	00 s 201.493 ms	setup	00000040 s 000000 ms	104	2.5	0	0	0	0
32	A.1.1.1	cbr	5.512	10 m 48 s 229 ms	00 s 296.920 ms	setup	00000021 s 000000 ms	13	N/A	15	9	0	0
33	A.1.1.1	nrtvbr	63.6	11 m 08 s 293 ms	00 s 286.279 ms	setup	00000001 s 000000 ms	150	1	0	0	0	0
34	B.1.2.1	cbr	63.6	11 m 28 s 332 ms	00 s 150.673 ms	setup	00000001 s 000000 ms	150	N/A	0	0	0	0
35	B.1.2.1	nrtvbr	63.6	11 m 48 s 309 ms	00 s 150.742 ms	setup	00000001 s 000000 ms	150	1	0	0	0	0
36	A.1.1.1	nrtvbr	40.28	12 m 08 s 403 ms	00 s 275.512 ms	setup	00000040 s 000000 ms	136	2.5	0	0	0	0
37	A.1.1.1	nrtvbr	36.464	12 m 28 s 313 ms	00 s 286.088 ms	setup	00000040 s 000000 ms	124	2.5	0	0	0	0
38	B.1.2.1	nrtvbr	29.68	12 m 48 s 250 ms	00 s 150.726 ms	setup	00000040 s 000000 ms	101	2.5	0	0	0	0
39	B.1.2.1	nrtvbr	30.528	13 m 08 s 352 ms	00 s 150.668 ms	setup	00000040 s 000000 ms	104	2.5	0	0	0	0
40	A.1.1.1	cbr	63.6	13 m 28 s 336 ms	00 s 275.444 ms	setup	00000001 s 000000 ms	150	N/A	0	0	0	0
41	A.1.1.1	nrtvbr	63.6	13 m 48 s 209 ms	00 s 286.203 ms	setup	00000001 s 000000 ms	150	1	0	0	0	0
42	B.1.2.1	cbr	63.6	14 m 07 s 760 ms	00 s 165.741 ms	setup	00000001 s 000000 ms	150	N/A	0	0	0	0
43	B.1.2.1	cbr	63.6	14 m 27 s 938 ms	00 s 150.705 ms	setup	00000001 s 000000 ms	150	N/A	0	0	0	0
44	A.1.1.1	nrtvbr	34.768	14 m 47 s 627 ms	00 s 325.783 ms	setup	00000040 s 000000 ms	118	2.5	0	0	0	0
45	A.1.1.1	cbr	8.056	15 m 07 s 573 ms	00 s 285.483 ms	setup	00000018 s 000000 ms	19	N/A	17	6	0	0
46	B.1.2.1	nrtvbr	39.008	15 m 27 s 710 ms	00 s 150.761 ms	setup	00000040 s 000000 ms	132	2.5	0	0	0	0
47	B.1.2.1	cbr	63.6	15 m 47 s 827 ms	00 s 150.677 ms	setup	00000001 s 000000 ms	150	N/A	0	0	0	0
48	A.1.1.1	cbr	8.904	16 m 08 s 005 ms	00 s 275.470 ms	setup	00000016 s 000000 ms	21	N/A	15	8	0	0
49	A.1.1.1	cbr	63.6	16 m 28 s 052 ms	00 s 275.436 ms	setup	00000001 s 000000 ms	150	N/A	0	0	0	0

total cbr calls : 28

```
successfull cbr calls       : 100%
total cbr bw request        : 1.24826 Mbps
cbr bw rejected             : 0 Mbps
total nrtvbr calls           : 21
successfull nrtvbr calls     : 100%
total nrtvbr bw request      : 0.901 Mbps
nrt vbr bw rejected          : 0 Mbps
mean callsetup time         : 00 s 231.01 ms

-- B.2.3.1 host record ends ----------------------------

AVG RESULTS OF ALL CALLS

total cbr calls             : 152
successfull cbr calls       : 100%
total cbr bw request        : 5.9237 Mbps
cbr bw rejected             : 0 Mbps
total nrtvbr calls          : 55
successfull rtvbr calls     : 100%
total nrtvbrbw request      : 1.29744 Mbps
nrtvbr bw rejected          : 0 Mbps
mean callsetup time         : 00 s 184.875 ms

***** CALL SETUP LOGS END **********

##### NODE INSTRUMENTATION LOGS START #######

-- A.1.1 node record begins -----------------------------

convergence time for level 96 : 00 s 200 ms
convergence time for level 88 : 00 s 232.481 ms
convergence time for level 80 : 00 s 266.168 ms
avg hops                      : 2.7551
calls routed successfully     : 89
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 4.148 ms
```

```
avg aggregation time          : 00 s 6.223 ms
total floods                  : 1272
total wasted floods           : 285
pnni data sent                : 174.048 kbps
Database size                 : 3.552 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      1
                                  88     2       2     2      1
                                  80     2       2     2      0


-- A.1.1 node record ends ------------------------------

-- A.1.2 node record begins ------------------------------

convergence time for level 96 : 00 s 195 ms
convergence time for level 88 : 00 s 282.481 ms
convergence time for level 80 : 00 s 346.168 ms
avg hops                      : 0
calls routed successfully     : 0
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 000 ms
avg aggregation time          : 00 s 000 ms
total floods                  : 573
total wasted floods           : 162
pnni data sent                : 75.944 kbps
Database size                 : 3.552 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      1
                                  88     2       2     2      1
                                  80     2       2     2      0


-- A.1.2 node record ends ------------------------------

-- A.1.3 node record begins ------------------------------
```

```
convergence time for level 96 : 00 s 185 ms
convergence time for level 88 : 00 s 272.481 ms
convergence time for level 80 : 00 s 346.168 ms
avg hops                      : 1
calls routed successfully     : 89
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 3.087 ms
avg aggregation time          : 00 s 000 ms
total floods                  : 538
total wasted floods           : 172
pnni data sent                : 74.216 kbps
Database size                 : 3.552 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      1
                                  88     2       2     2      1
                                  80     2       2     2      0


-- A.1.3 node record ends ------------------------------

-- A.2.1 node record begins ----------------------------

convergence time for level 96 : 00 s 200 ms
convergence time for level 88 : 00 s 227.452 ms
convergence time for level 80 : 00 s 326.193 ms
avg hops                      : 1.7551
calls routed successfully     : 89
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
```

```
avg routing time              : 00 s 6.533 ms
avg aggregation time          : 00 s 8.189 ms
total floods                  : 910
total wasted floods           : 245
pnni data sent                : 130.548 kbps
Database size                 : 3.784 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      2
                                  88     2       2     2      1
                                  80     2       2     2      0


-- A.2.1 node record ends ------------------------------

-- A.2.2 node record begins ------------------------------

convergence time for level 96 : 00 s 195 ms
convergence time for level 88 : 00 s 277.452 ms
convergence time for level 80 : 00 s 406.193 ms
avg hops                      : 0
calls routed successfully     : 0
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 000 ms
avg aggregation time          : 00 s 000 ms
total floods                  : 489
total wasted floods           : 167
pnni data sent                : 68.172 kbps
Database size                 : 3.784 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      2
                                  88     2       2     2      1
                                  80     2       2     2      0


-- A.2.2 node record ends ------------------------------
```

```
-- A.2.3 node record begins ------------------------------

convergence time for level 96 : 00 s 185 ms
convergence time for level 88 : 00 s 267.452 ms
convergence time for level 80 : 00 s 396.193 ms
avg hops                      : 1.57143
calls routed successfully     : 119
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 6.57 ms
avg aggregation time          : 00 s 000 ms
total floods                  : 505
total wasted floods           : 170
pnni data sent                : 71.396 kbps
Database size                 : 3.784 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      2
                                  88     2       2     2      1
                                  80     2       2     2      0


-- A.2.3 node record ends --------------------------------

-- B.1.1 node record begins ------------------------------

convergence time for level 96 : 00 s 200 ms
convergence time for level 88 : 00 s 235.525 ms
convergence time for level 80 : 00 s 268.532 ms
avg hops                      : 1.10448
calls routed successfully     : 107
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
```

```
alternate routes succeded     : 0
avg routing time              : 00 s 3.986 ms
avg aggregation time          : 00 s 5.632 ms
total floods                  : 1476
total wasted floods           : 303
pnni data sent                : 204.204 kbps
Database size                 : 3.784 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      2
                                  88     2       2     2      1
                                  80     2       2     2      0


-- B.1.1 node record ends ------------------------------

-- B.1.2 node record begins ----------------------------

convergence time for level 96 : 00 s 195 ms
convergence time for level 88 : 00 s 285.525 ms
convergence time for level 80 : 00 s 353.532 ms
avg hops                      : 1.7551
calls routed successfully     : 129
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 2.725 ms
avg aggregation time          : 00 s 000 ms
total floods                  : 683
total wasted floods           : 212
pnni data sent                : 89.56 kbps
Database size                 : 3.784 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      2
                                  88     2       2     2      1
                                  80     2       2     2      0


-- B.1.2 node record ends ------------------------------
```

```
-- B.1.3 node record begins ------------------------------

convergence time for level 96 : 00 s 185 ms
convergence time for level 88 : 00 s 275.525 ms
convergence time for level 80 : 00 s 353.532 ms
avg hops                      : 1.50633
calls routed successfully     : 147
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 7.166 ms
avg aggregation time          : 00 s 000 ms
total floods                  : 666
total wasted floods           : 167
pnni data sent                : 94.04 kbps
Database size                 : 3.784 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      2
                                  88     2       2     2      1
                                  80     2       2     2      0


-- B.1.3 node record ends --------------------------------

-- B.2.1 node record begins ------------------------------

convergence time for level 96 : 00 s 215 ms
convergence time for level 88 : 00 s 246.485 ms
convergence time for level 80 : 00 s 333.557 ms
avg hops                      : 1
calls routed successfully     : 100
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
```

```
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 3.643 ms
avg aggregation time          : 00 s 1.823 ms
total floods                  : 949
total wasted floods           : 301
pnni data sent                : 129.152 kbps
Database size                 : 3.552 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      1
                                  88     2       2     2      1
                                  80     2       2     2      0


-- B.2.1 node record ends ------------------------------

-- B.2.2 node record begins ----------------------------

convergence time for level 96 : 00 s 200 ms
convergence time for level 88 : 00 s 291.485 ms
convergence time for level 80 : 00 s 423.557 ms
avg hops                      : 0
calls routed successfully     : 0
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 000 ms
avg aggregation time          : 00 s 000 ms
total floods                  : 554
total wasted floods           : 143
pnni data sent                : 77.496 kbps
Database size                 : 3.552 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      1
                                  88     2       2     2      1
                                  80     2       2     2      0
```

```
-- B.2.2 node record ends -------------------------------

-- B.2.3 node record begins -------------------------------

convergence time for level 96 : 00 s 190 ms
convergence time for level 88 : 00 s 291.485 ms
convergence time for level 80 : 00 s 408.557 ms
avg hops                      : 2.5102
calls routed successfully     : 100
calls confirmed from dest     : 0
source failed calls           : 0
source PeerGroup failed calls : 0
foreign PeerGroup failed calls: 0
dbIinfo failed calls          : 0
lookup fail calls             : 0
crankback count               : 0
alternate routes succeded     : 0
avg routing time              : 00 s 5.342 ms
avg aggregation time          : 00 s 000 ms
total floods                  : 509
total wasted floods           : 141
pnni data sent                : 73.38 kbps
Database size                 : 3.552 KB
No. of PTSEs                  : Level Nodal Complex HLink Uplink
                                  96     3       0     6      1
                                  88     2       2     2      1
                                  80     2       2     2      0


-- B.2.3 node record ends -------------------------------


AVG NODE RECORDS

convergence time  low         : 00 s 266.168 ms
convergence time high         : 00 s 423.557 ms
avg hops                      : 1.66197
average database size         : 3.668 KB
total floods                  : 9124
total wastedfloods            : 2468
pnni bw low                   : 68.172
pnni bw high                  : 204.204
total pnni data               : 1262.16 kbps
```

NODE INSTRUMENTATION LOGS END

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