# NS2 Programming

## Installation:

For installing NS2 in Linux(sudo), copy the following commands in the terminal:

*sudo apt-get install ns2*
*sudo apt-get install nam*
*sudo apt-get install tcl*

This will install the required softwares for NS2.

## Programming:

### Step-1:

In order to execute any NS2 program, we need a new simulator.
The following command will create a simulator.

*set ns [new Simulator]*

### Step-2:

The next step is to create two files (.nam & .tr)
#Note: r indicates read mode
.nam - network animation file (for the animation)
.tr  - trace file (for log)
Follow the commands:

*set nf [open anim_file.nam r]*
*set tf [open trace_file.tr r]*
*$ns namtrace-all $nf*
*$ns trace-all $tf*

### Step-3:

Now we have to establish the network environment.

**Step-3.1:(Establish Network Layer)**
Creating the nodes and links.

To create nodes, follow the command:

*set node_name [$ns node]*

To create links between the nodes, follow the command:

$ns duplex-link $node_1 $node_2 bandwidth_in_Mb latency_in_ms DropTail

EX: *$ns duplex-link $n0 $n1 10Mb 300ms DropTail*

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**Step-3.2:(Establish Transport Layer)**
Now create the transport layer protocols associated with the nodes.
Transport Layer protocols can be:
1. TCP
2. UDP
At receiver's end,
1. NULL (used with UDP)
2. TCPS - TCP Sink (used with TCP)

General syntax for creating transport layer:

*set tlayer_name [new Agent/Protocol_Name]*

For TCP:

*set tcp [new Agent/TCP]*

For UDP:

*set udp [new Agent/UDP]*

For TCPS:

*set tcps [new Agent/TCPSink]*

For NULL:

*set null [new Agent/Null]*

Now attach the transport layers to the network layers i.e., the nodes created.

*$ns attach-agent $node_name $tlayer_name*

**Step-3.3:(Establish Application Layer)**
Create the application layer traffic for the nodes and attach them to transport layers
There are several application layer protocols like
1. CBR - Constant Bit Rate (used with UDP)
2. FTP - File Transfer Protocol (used with TCP)
3. TELNET - Telephone Network (used with TCP)

General Syntax for creating application layer traffic

*set alayer_name [new Application/Path_Of_Protocol]*

For CBR:

*set cbr [new Application/Traffic/CBR]*

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For FTP:

*set cbr [new Application/FTP]*

For TELNET:

*set telnet [new Application/Telnet]*

Now attach the application layers to the transport layers

*$alayer_name attach-agent $tlayer_name*

Step-4:
Connect nodes

*$ns connect $tlayer_name_1 $tlayer_name_2*

where
$tlayer_name_1 - sender's transport layer
$tlayer_name_2 - receiver's transport layer

Now the network is established and we have to start sending packets. This will be updated shortly.

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