

Bus Topology

```
#include "ns3/core-module.h"
#include "ns3/network-module.h"
#include "ns3/csma-module.h"
#include "ns3/internet-module.h"
#include "ns3/point-to-point-module.h"
#include "ns3/applications-module.h"
#include "ns3/ipv4-global-routing-helper.h"
#include "ns3/netanim-module.h"
#include "ns3/mobility-module.h"

using namespace ns3;

NS_LOG_COMPONENT_DEFINE ("SecondScriptExample");

int
main (int argc, char *argv[])
{
    bool verbose = true;
    uint32_t nCsma = 3;

    CommandLine cmd;
    cmd.AddValue ("nCsma", "Number of \"extra\" CSMA nodes/devices", nCsma);
    cmd.AddValue ("verbose", "Tell echo applications to log if true", verbose);

    cmd.Parse (argc,argv);

    if (verbose)
    {
        LogComponentEnable ("UdpEchoClientApplication", LOG_LEVEL_INFO);
        LogComponentEnable ("UdpEchoServerApplication", LOG_LEVEL_INFO);
    }

    nCsma = nCsma == 0 ? 1 : nCsma;

    NodeContainer p2pNodes;
    p2pNodes.Create (2);

    NodeContainer csmaNodes;
    csmaNodes.Add (p2pNodes.Get (1));
    csmaNodes.Create (nCsma);

    PointToPointHelper pointToPoint;
    pointToPoint.SetDeviceAttribute ("DataRate", StringValue ("5Mbps"));
    pointToPoint.SetChannelAttribute ("Delay", StringValue ("2ms"));

    NetDeviceContainer p2pDevices;
    p2pDevices = pointToPoint.Install (p2pNodes);
```

```

CsmHelper csma;
csma.SetChannelAttribute ("DataRate", StringValue ("100Mbps"));
csma.SetChannelAttribute ("Delay", TimeValue (NanoSeconds (6560)));

NetDeviceContainer csmaDevices;
csmaDevices = csma.Install (csmaNodes);

InternetStackHelper stack;
stack.Install (p2pNodes.Get (0));
stack.Install (csmaNodes);

Ipv4AddressHelper address;
address.SetBase ("10.1.1.0", "255.255.255.0");
Ipv4InterfaceContainer p2pInterfaces;
p2pInterfaces = address.Assign (p2pDevices);

address.SetBase ("10.1.2.0", "255.255.255.0");
Ipv4InterfaceContainer csmaInterfaces;
csmaInterfaces = address.Assign (csmaDevices);

UdpEchoServerHelper echoServer (9);

ApplicationContainer serverApps = echoServer.Install (csmaNodes.Get (nCsma));
serverApps.Start (Seconds (1.0));
serverApps.Stop (Seconds (10.0));

UdpEchoClientHelper echoClient (csmaInterfaces.GetAddress (nCsma), 9);
echoClient.SetAttribute ("MaxPackets", UIntegerValue (1));
echoClient.SetAttribute ("Interval", TimeValue (Seconds (1.0)));
echoClient.SetAttribute ("PacketSize", UIntegerValue (1024));

ApplicationContainer clientApps = echoClient.Install (p2pNodes.Get (0));
clientApps.Start (Seconds (2.0));
clientApps.Stop (Seconds (10.0));

Ipv4GlobalRoutingHelper::PopulateRoutingTables ();

pointToPoint.EnablePcapAll ("second");
csma.EnablePcap ("second", csmaDevices.Get (1), true);

    AnimationInterface anim("bus_130.xml");
        anim.SetConstantPosition(p2pNodes.Get(0),0,5);
        anim.SetConstantPosition(p2pNodes.Get(1),10,5);

Simulator::Run ();
Simulator::Destroy ();
return 0;
}

```

wscript

```
## -*- Mode: python; py-indent-offset: 4; indent-tabs-mode: nil; coding: utf-8; -*-
```

```
def build(bld):
```

```
    obj = bld.create_ns3_program('bus_130', ['core', 'point-to-point', 'csma', 'internet',
'applications', 'network', 'netanim'])
    obj.source = 'bus_130.cc'
```

```
    bld.register_ns3_script('bus_130.py', ['core', 'point-to-point', 'csma', 'internet',
'applications', 'network', 'netanim'])
```

Output:

```
student@cse3lab3-17:~/Downloads/ns-allinone-3.28.1/ns-3.28.1$ sudo ./waf --run bus_130
waf: Entering directory `~/home/student/Downloads/ns-allinone-3.28.1/ns-3.28.1/build'
[ 939/2702] Compiling examples/cse3_130/bus_130.cc
[2441/2702] Linking build/examples/cse3_130/ns3.28.1-bus_130-debug
waf: Leaving directory `~/home/student/Downloads/ns-allinone-3.28.1/ns-3.28.1/build'
Build commands will be stored in build/compile_commands.json
'build' finished successfully (2.427s)
At time 2s client sent 1024 bytes to 10.1.2.4 port 9
At time 2.0078s server received 1024 bytes from 10.1.1.1 port 49153
At time 2.0078s server sent 1024 bytes to 10.1.1.1 port 49153
At time 2.01761s client received 1024 bytes from 10.1.2.4 port 9
student@cse3lab3-17:~/Downloads/ns-allinone-3.28.1/ns-3.28.1$ cd ..
student@cse3lab3-17:~/Downloads/ns-allinone-3.28.1$ cd netanim-3.108/
student@cse3lab3-17:~/Downloads/ns-allinone-3.28.1/netanim-3.108$ ./NetAnim
Gtk-Message: GtkDialog mapped without a transient parent. This is discouraged.
```

Animation Output:

