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Aim

Using Free Open Source Software tools ns3, design and Implement star topology using StarHelperClass.

Experiment - 7

Computer Networks Lab

# **EXPERIMENT – 7**

## **Aim:**

Using Free Open Source Software tools ns3, design and Implement star topology using StarHelperClass.

## **Source Code:**

#include "ns3/core-module.h"

#include "ns3/network-module.h"

#include "ns3/netanim-module.h"

#include "ns3/internet-module.h"

#include "ns3/point-to-point-module.h"

#include "ns3/applications-module.h"

#include "ns3/point-to-point-layout-module.h"

// Network topology (default)

//

// n2 n3 n4 .

// \ | / .

// \|/ .

// n1--- n0---n5 .

// /|\ .

// / | \ .

// n8 n7 n6 .

//

using namespace ns3;

NS\_LOG\_COMPONENT\_DEFINE ("Star");

int

main (int argc, char \*argv[])

{

//

// Set up some default values for the simulation.

//

Config::SetDefault ("ns3::OnOffApplication::PacketSize", UintegerValue (137));

// ??? try and stick 15kb/s into the data rate

Config::SetDefault ("ns3::OnOffApplication::DataRate", StringValue ("14kb/s"));

//

// Default number of nodes in the star. Overridable by command line argument.

//

uint32\_t nSpokes = 8;

CommandLine cmd (\_\_FILE\_\_);

cmd.AddValue ("nSpokes", "Number of nodes to place in the star", nSpokes);

cmd.Parse (argc, argv);

NS\_LOG\_INFO ("Build star topology.");

PointToPointHelper pointToPoint;

pointToPoint.SetDeviceAttribute ("DataRate", StringValue ("5Mbps"));

pointToPoint.SetChannelAttribute ("Delay", StringValue ("2ms"));

PointToPointStarHelper star (nSpokes, pointToPoint);

NS\_LOG\_INFO ("Install internet stack on all nodes.");

InternetStackHelper internet;

star.InstallStack (internet);

NS\_LOG\_INFO ("Assign IP Addresses.");

star.AssignIpv4Addresses (Ipv4AddressHelper ("10.1.1.0", "255.255.255.0"));

NS\_LOG\_INFO ("Create applications.");

//

// Create a packet sink on the star "hub" to receive packets.

//

uint16\_t port = 50000;

Address hubLocalAddress (InetSocketAddress (Ipv4Address::GetAny (), port));

PacketSinkHelper packetSinkHelper ("ns3::TcpSocketFactory", hubLocalAddress);

ApplicationContainer hubApp = packetSinkHelper.Install (star.GetHub ());

hubApp.Start (Seconds (1.0));

hubApp.Stop (Seconds (10.0));

//

// Create OnOff applications to send TCP to the hub, one on each spoke node.

//

OnOffHelper onOffHelper ("ns3::TcpSocketFactory", Address ());

onOffHelper.SetAttribute ("OnTime", StringValue ("ns3::ConstantRandomVariable[Constant=1]"));

onOffHelper.SetAttribute ("OffTime", StringValue ("ns3::ConstantRandomVariable[Constant=0]"));

ApplicationContainer spokeApps;

for (uint32\_t i = 0; i < star.SpokeCount (); ++i)

{

AddressValue remoteAddress (InetSocketAddress (star.GetHubIpv4Address (i), port));

onOffHelper.SetAttribute ("Remote", remoteAddress);

spokeApps.Add (onOffHelper.Install (star.GetSpokeNode (i)));

}

spokeApps.Start (Seconds (1.0));

spokeApps.Stop (Seconds (10.0));

NS\_LOG\_INFO ("Enable static global routing.");

//

// Turn on global static routing so we can actually be routed across the star.

//

Ipv4GlobalRoutingHelper::PopulateRoutingTables ();

NS\_LOG\_INFO ("Enable pcap tracing.");

//

// Do pcap tracing on all point-to-point devices on all nodes.

//

pointToPoint.EnablePcapAll ("star");

NS\_LOG\_INFO ("Run Simulation.");

Simulator::Run ();

Simulator::Destroy ();

NS\_LOG\_INFO ("Done.");

return 0;

}

## **Output:**



