



# VISVERSVARAYA TECHNOLOGICAL UNIVERSITY

**“JNANA SANGAMA” , Belgaum, Karnataka - 590018**

## GOVT. S.K.S.J TECHNOLOGICAL INSTITUTE BANGALORE - 1

Department Of Computer Science Engineering  
A Computer Network Project On

**“STAR, RING AND HYBRID TOPOLOGY”**  
using TCL Script, Network Simulator, Network Animator

In partial fulfilment Of CN Laboratory  
In Computer Science & Engineering for the  
Academic Year 2022-23

Submitted by:

K SRISAHITI  
1SK20CS0015

BHAVANI ONKAR  
1SK20CS008

RANJAN G  
1SK20CS039

Under The Guidance Of  
Mr. Shyleshchandra Gudihatti K N  
Ph.D  
Associate Professor  
Department Of CSE

# **STAR - RING - HYBRID TOPOLOGIES**

Using TCL Script, Network Animator  
and Network Simulator

# The Star Topology

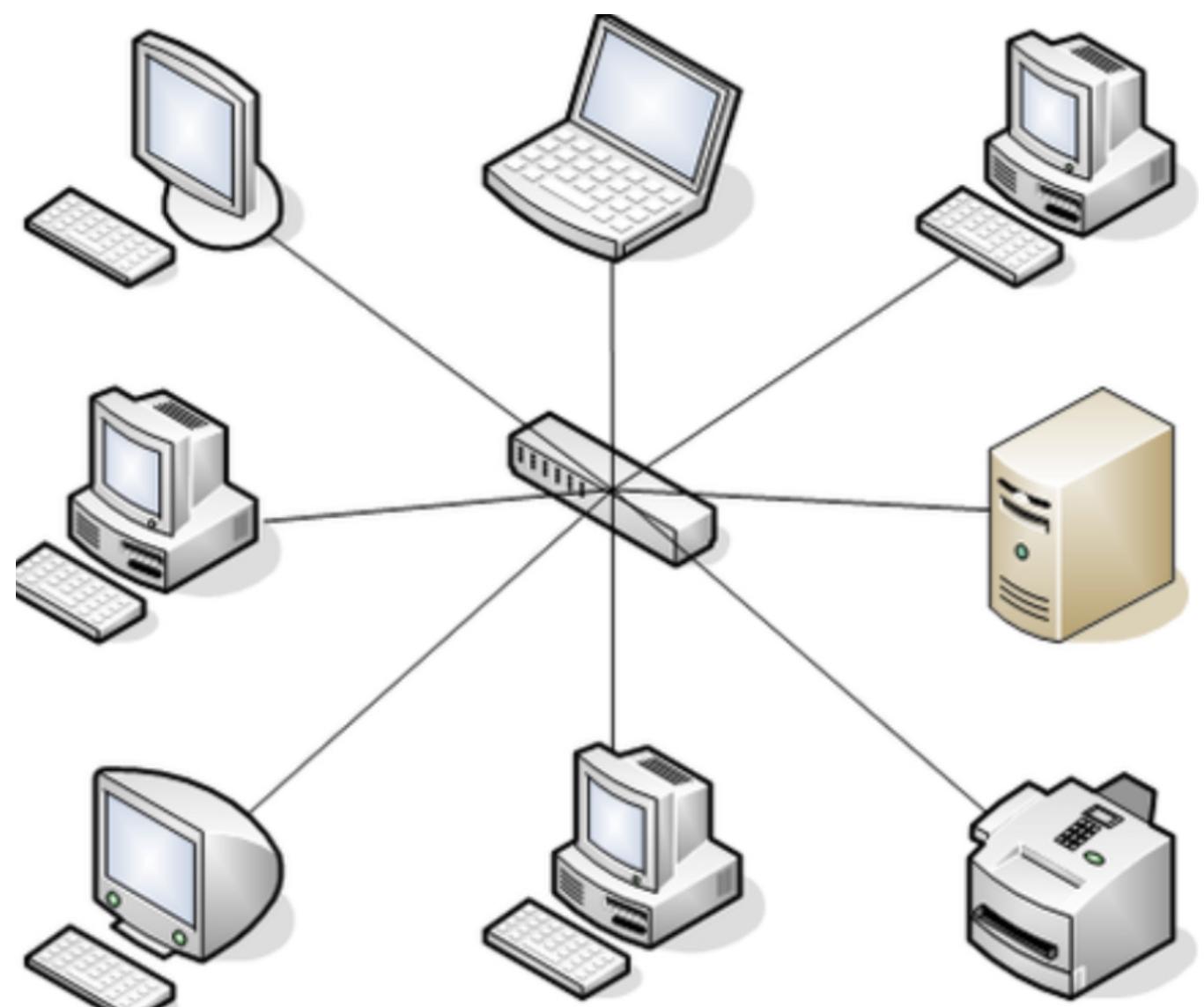
- A **star network** is an implementation of a spoke–hub distribution paradigm in computer networks.
- In a star network, every host is connected to a central hub. In its simplest form, one central hub acts as a conduit to transmit messages.
- The star network is one of the most common computer network topologies.
- The hub and hosts, and the transmission lines between them, form a graph with the topology of a star. Data on a star network passes through the hub before continuing to its destination.
- The hub manages and controls all functions of the network. It also acts as a repeater for the data flow.
- The star topology reduces the impact of a transmission line failure by independently connecting each host to the hub. Each host may thus communicate with all others by transmitting to, and receiving from, the hub.
- The failure of a transmission line linking any host to the hub will result in the isolation of that host from all others, but the rest of the network will be unaffected.
- The star configuration is commonly used with twisted pair cable and optical fiber cable. However, it can also be used with coaxial cable as in, for example, a video router.

## Advantages

- If one node or its connection breaks, it does not affect the other computers nor their connections[3]
- Devices can be added or removed without disturbing the network
- Works well under heavy load
- Appropriate for a large network

## Disadvantages

- Expensive due to the number and length of cables needed to wire each host to the central hub[3]
- The central hub is a single point of failure for the network



# The Ring Topology

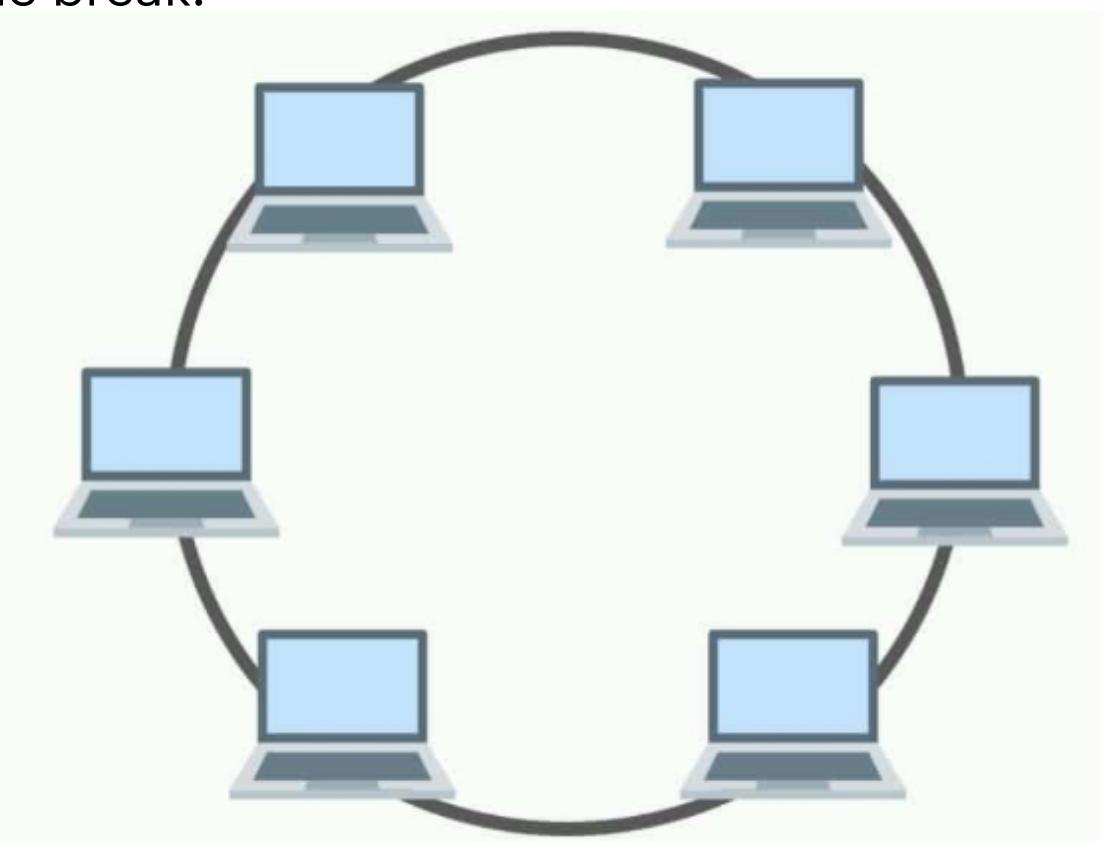
- A **ring network** is a network topology in which each node connects to exactly two other nodes, forming a single continuous pathway for signals through each node – a ring. Data travels from node to node, with each node along the way handling every packet.
- Rings can be unidirectional, with all traffic travelling either clockwise or anticlockwise around the ring, or bidirectional (as in SONET/SDH). Because a unidirectional ring topology provides only one pathway between any two nodes, unidirectional ring networks may be disrupted by the failure of a single link.
- In response, some ring networks add a "counter-rotating ring" (C-Ring) to form a redundant topology: in the event of a break, data are wrapped back onto the complementary ring before reaching the end of the cable, maintaining a path to every node along the resulting C-Ring. Such "dual ring" networks include the ITU-T's PSTN telephony systems network Signalling System No. 7 (SS7), Spatial Reuse Protocol, Fiber Distributed Data Interface (FDDI), and Resilient Packet Ring
- Rings can be used to carry circuits or packets or a combination of both. SDH rings carry circuits. Circuits are set up with out-of-band signalling protocols, whereas packets are usually carried via a Medium Access Control Protocol (MAC).

## Advantages

- Very orderly network where every device has access to the token and the opportunity to transmit
- Performs better than a bus topology under heavy network load
- Does not require a central node to manage the connectivity between the computers
- Due to the point-to-point line configuration of devices with a device on either side (each device is connected to its immediate neighbor), it is quite easy to install and reconfigure since adding or removing a device requires moving just two connections.
- Point-to-point line configuration makes it easy to identify and isolate faults.
- Ring Protection reconfiguration for line faults of bidirectional rings can be very fast, as switching happens at a high level, and thus the traffic does not require individual rerouting.

## Disadvantages

- One malfunctioning workstation can create problems for the entire network. This can be solved by using a dual ring or a switch that closes off the break.
- Moving, adding and changing the devices can affect the network
- Communication delay is directly proportional to number of nodes in the network
- Bandwidth is shared on all links between devices
- More difficult to configure than a Star: node adjunction = Ring shutdown and reconfiguration



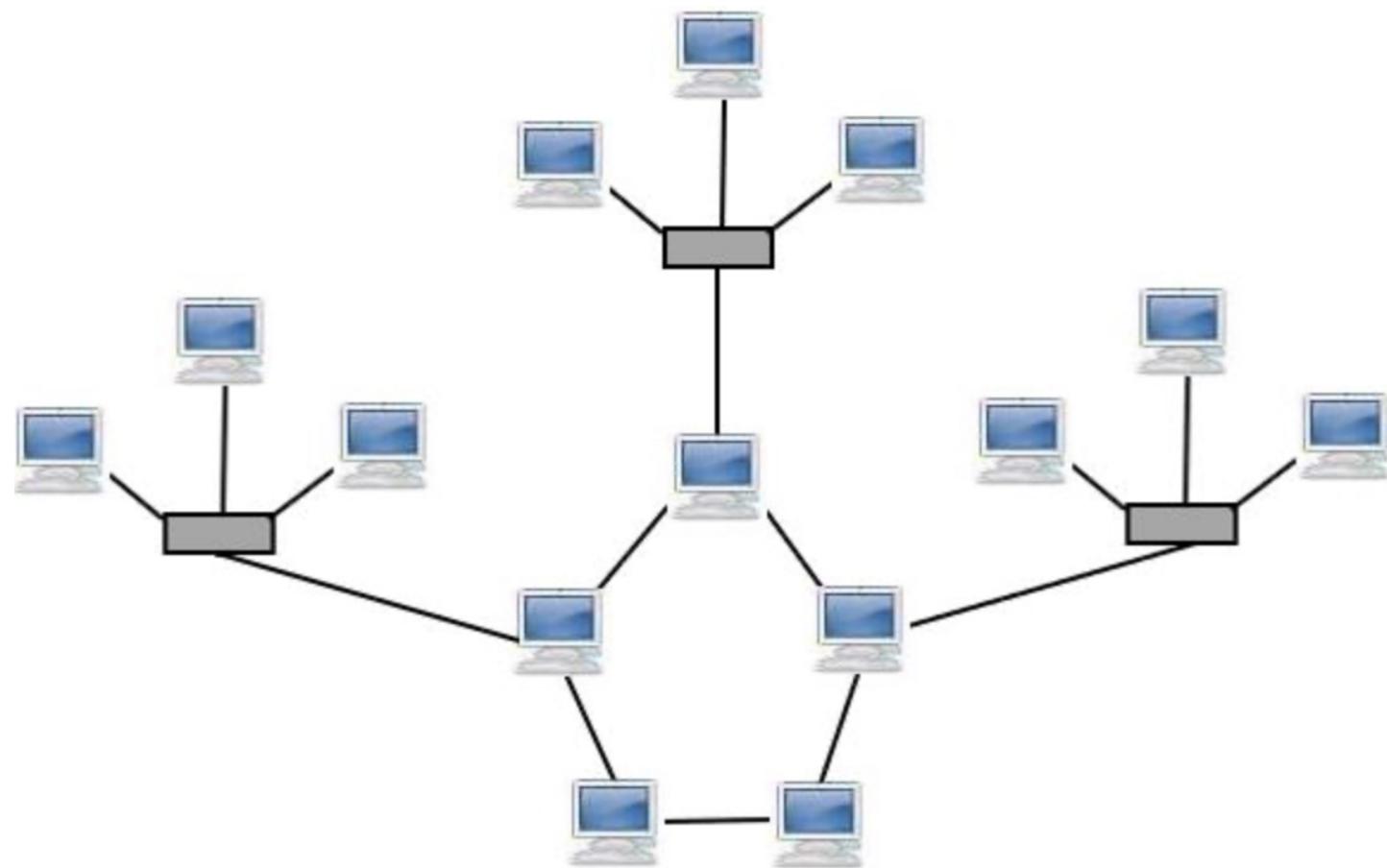
# The Hybrid Topology

- A **hybrid topology** is a type of network topology that uses two or more differing network topologies. These topologies can include a mix of bus topology, mesh topology, ring topology, star topology, and tree topology.
- The choice to use a hybrid topology over a standard topology depends on the needs of a business, school, or the users. The number of computers, their location, and desired network performance are all factors in the decision.

## TYPES OF HYBRID TOPOLOGIES

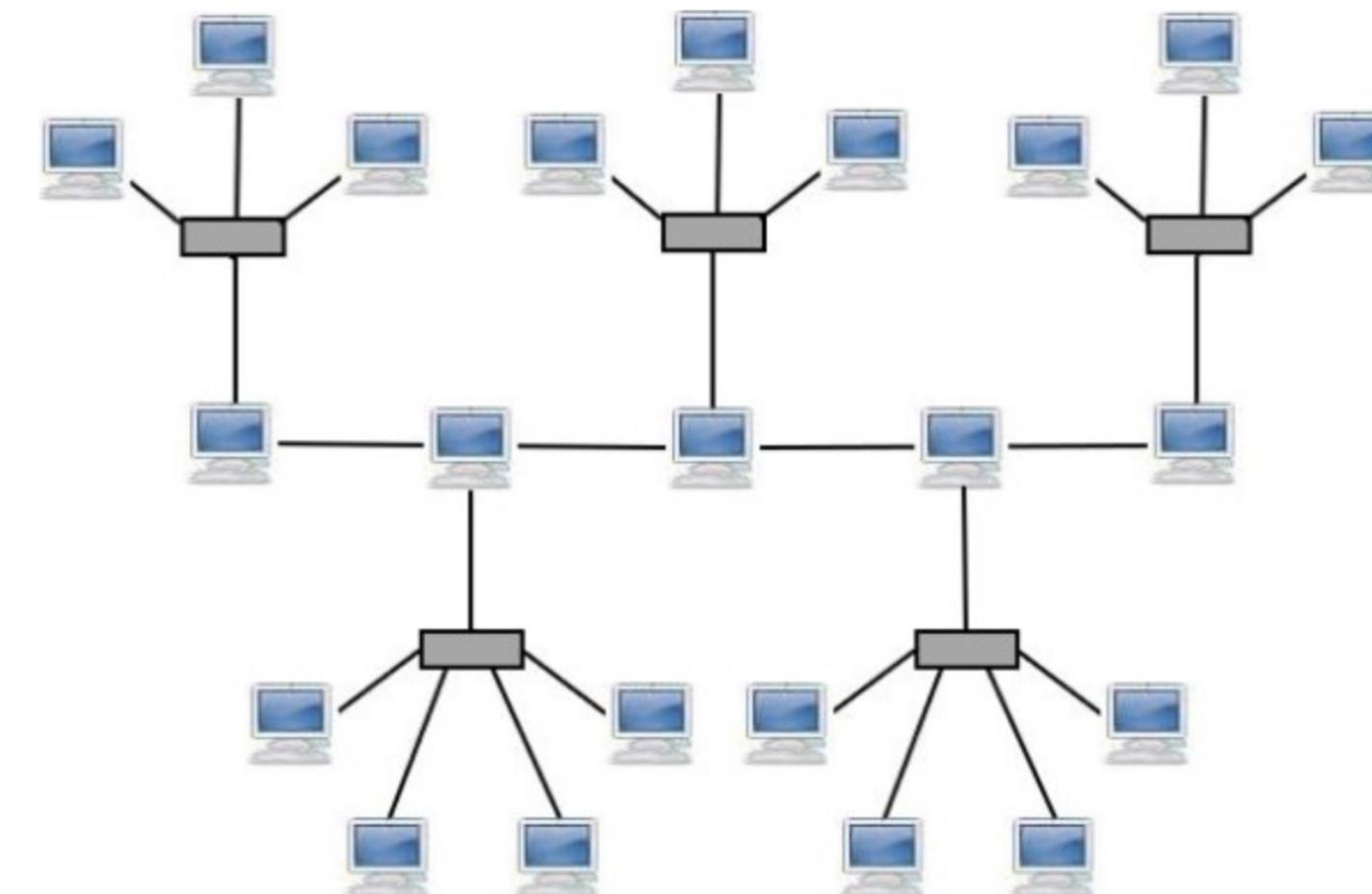
### Star-Ring hybrid topology

A star-ring hybrid topology is a combination of the star topology and ring topology.  
Two or more star topologies are connected together through a ring topology.



### Star-Bus Hybrid Topology

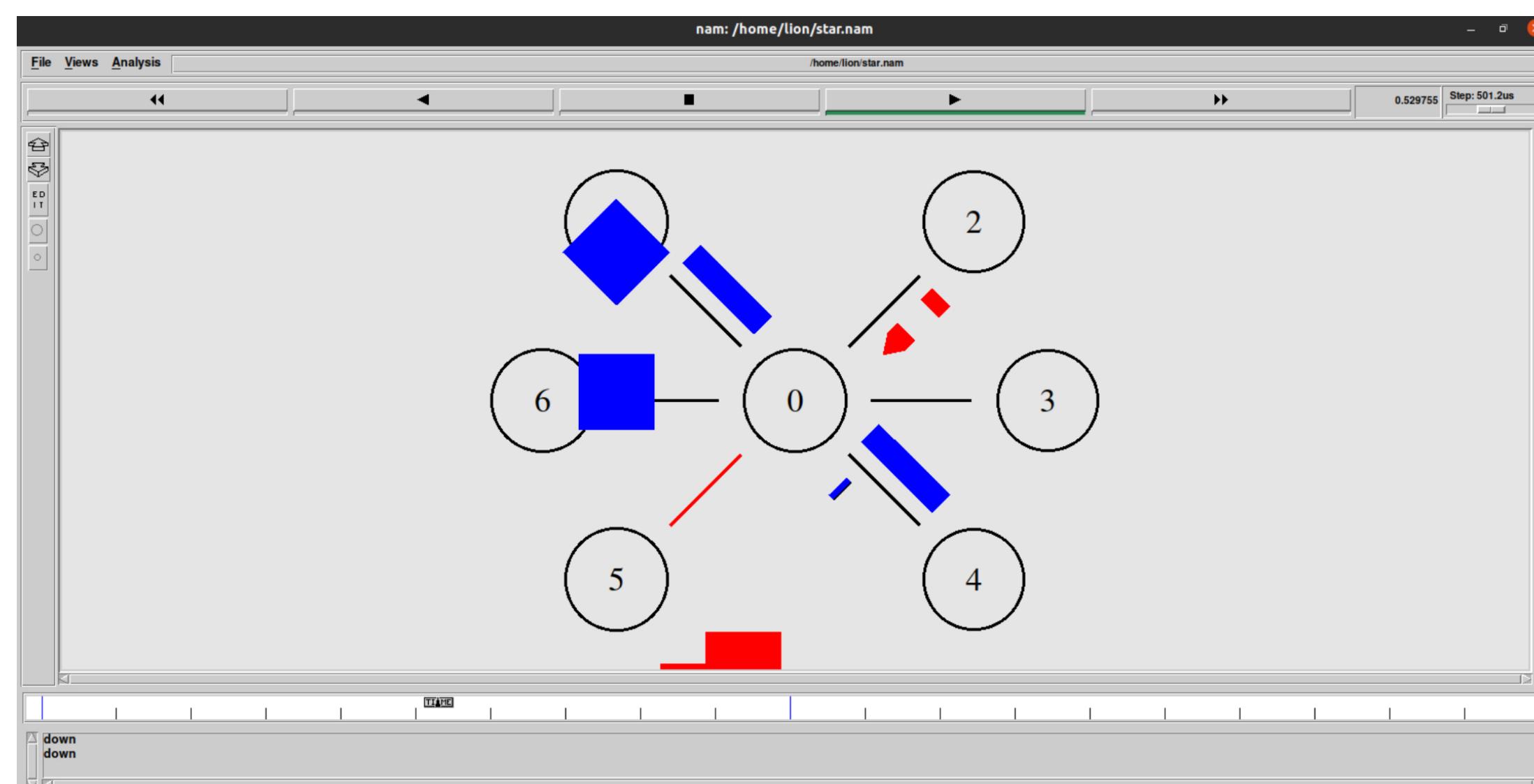
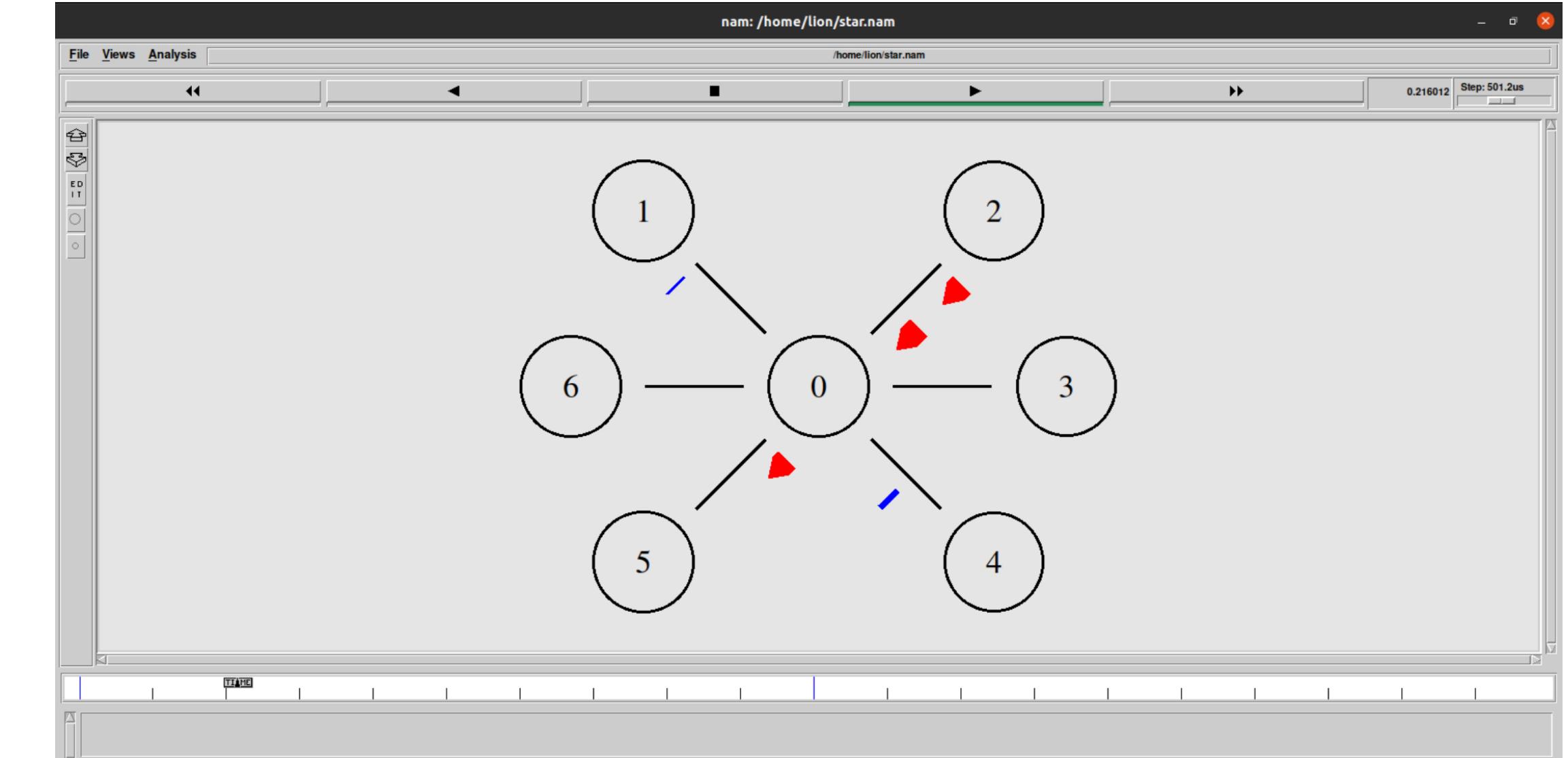
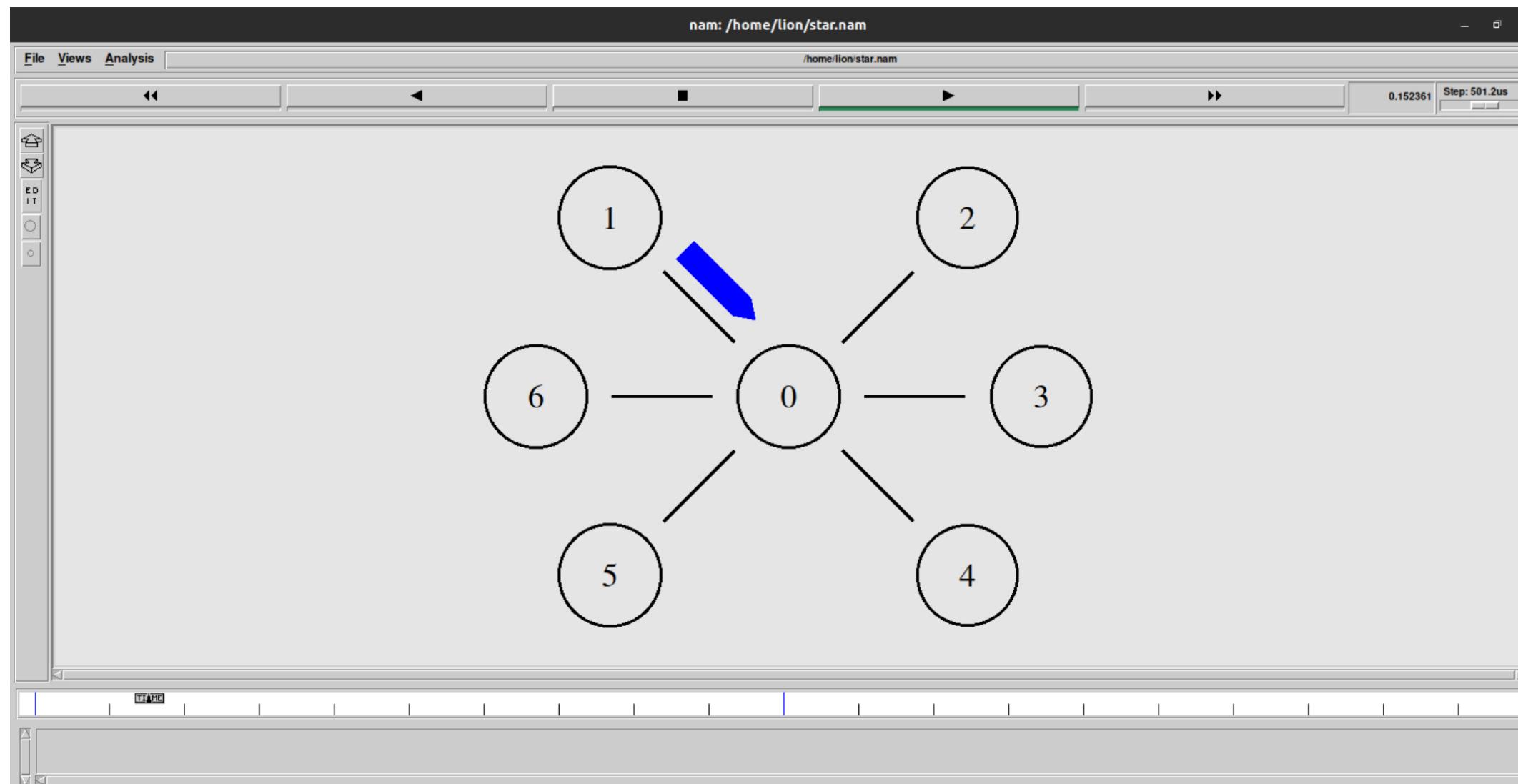
A star-bus hybrid topology is a combination of the star and bus topology.  
Two or more star topologies are connected through a bus topology.



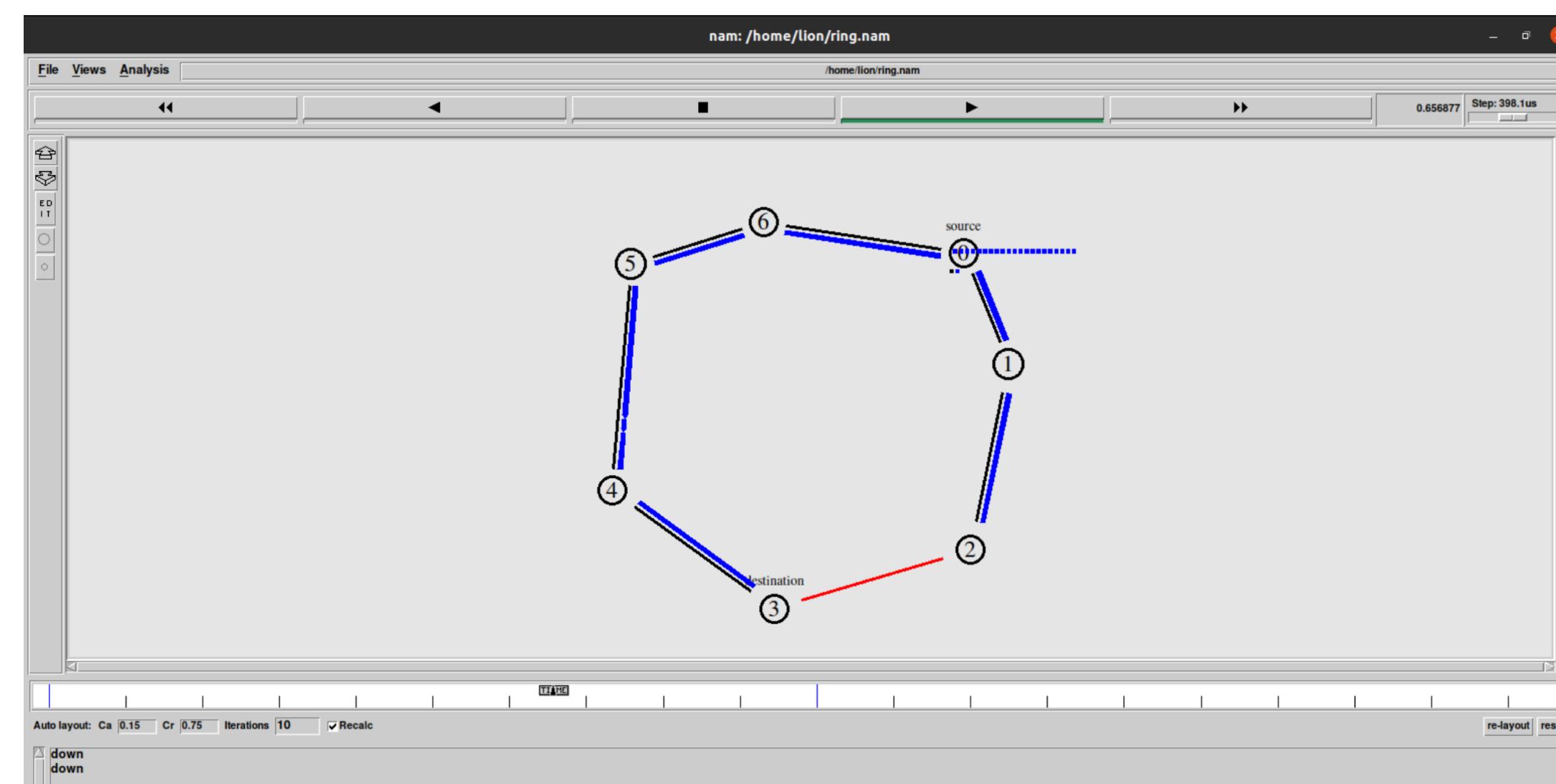
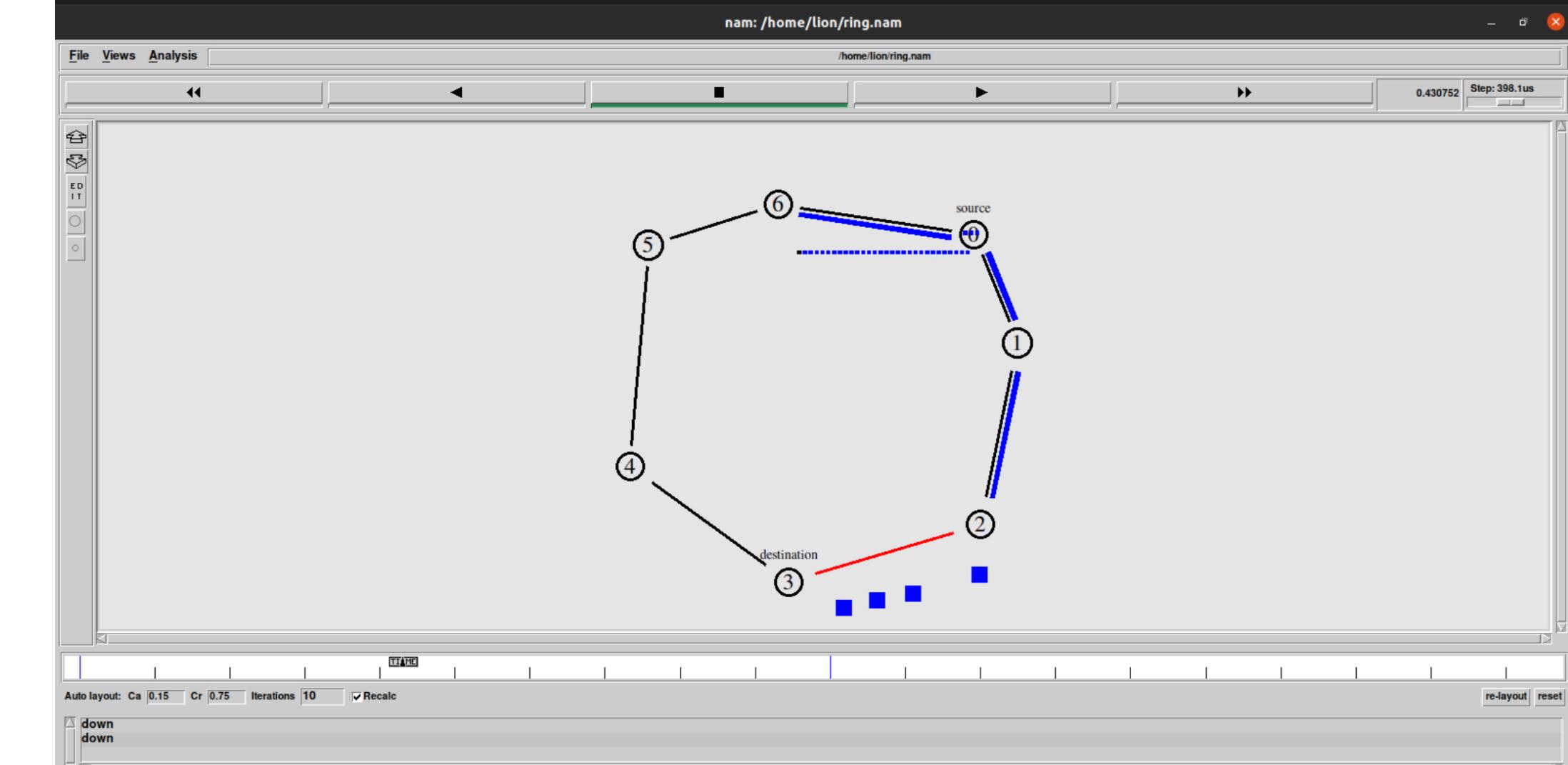
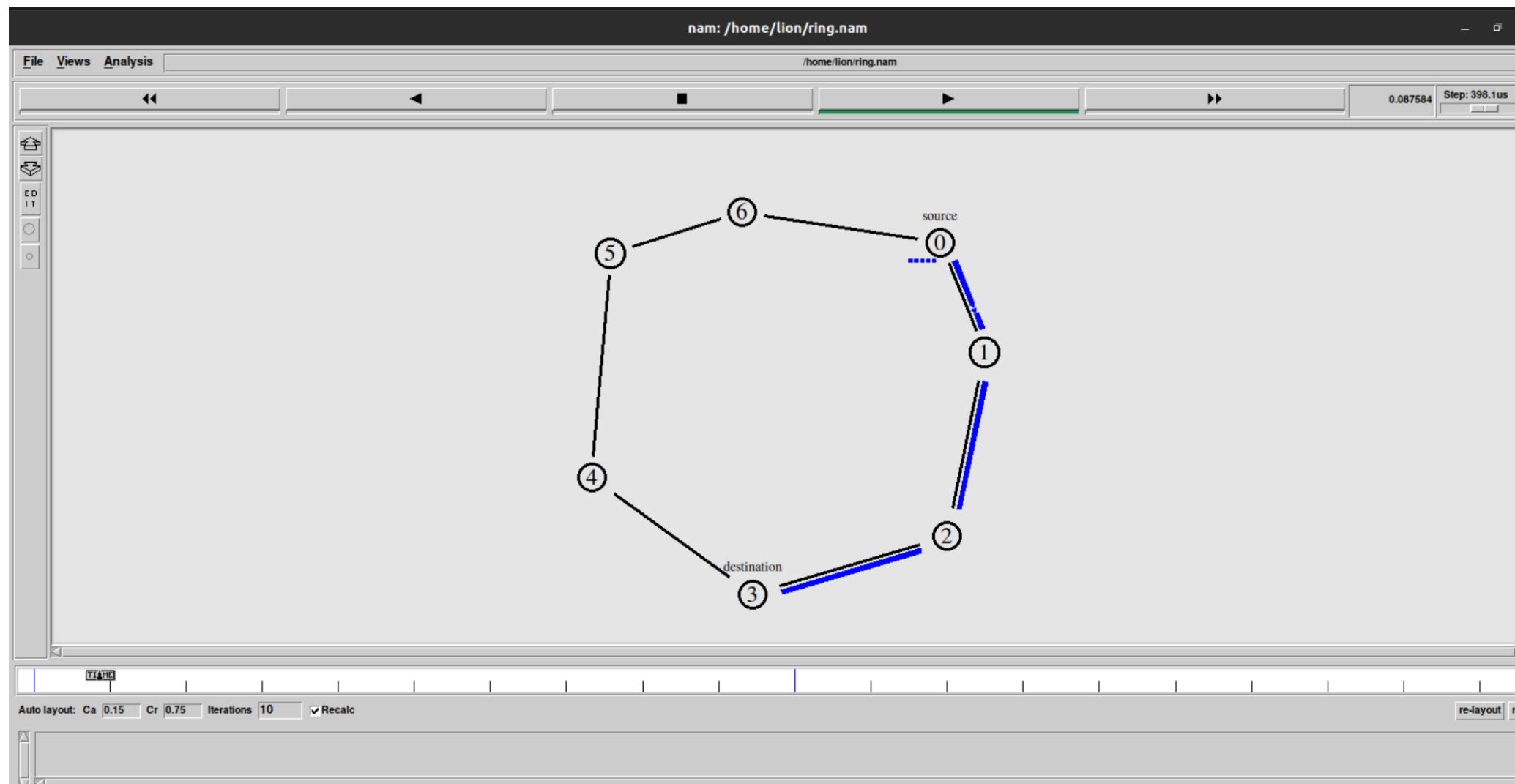
# **DEMONSTRATION OF TOPOLOGIES**

Using TCL Script, Network Animator  
and Network Simulator

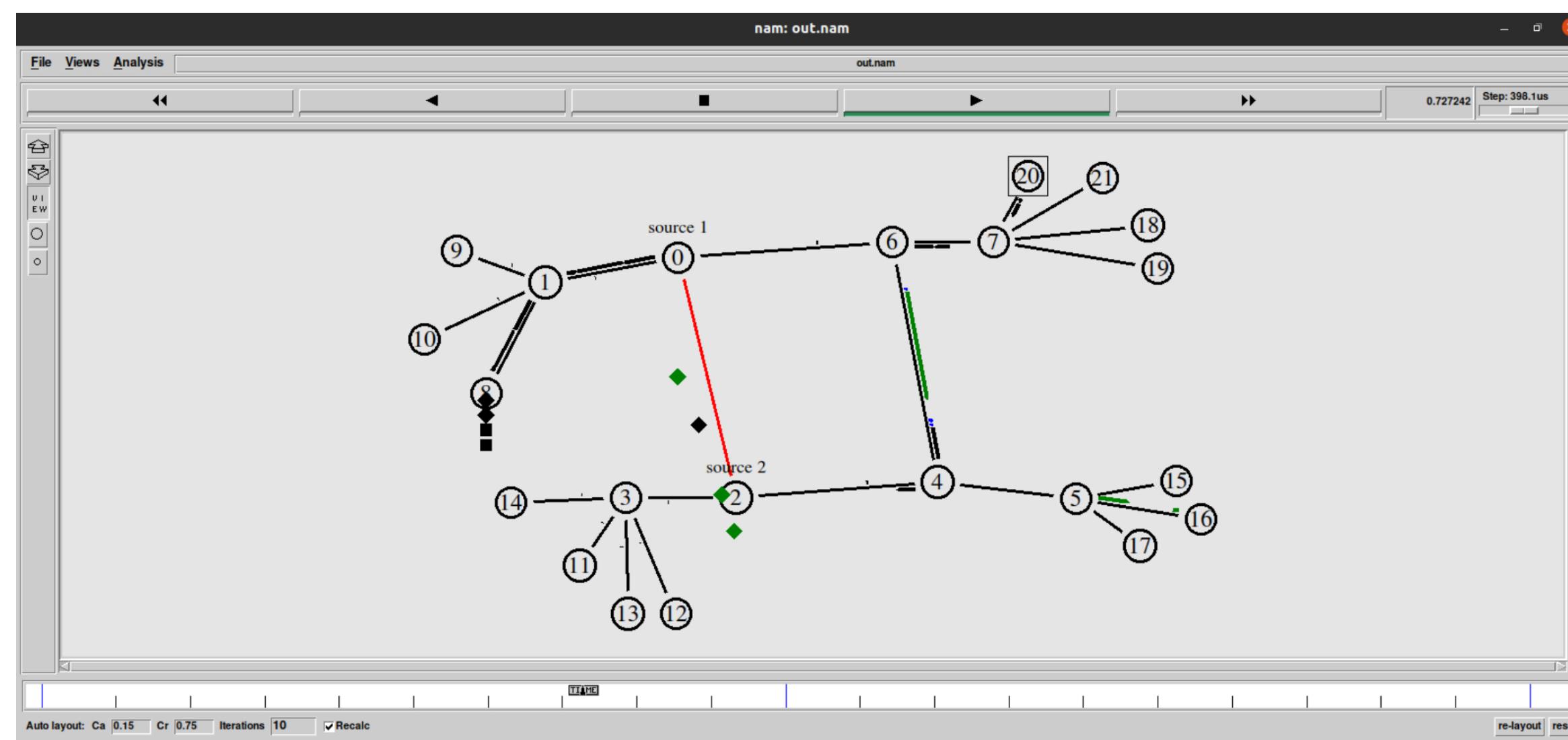
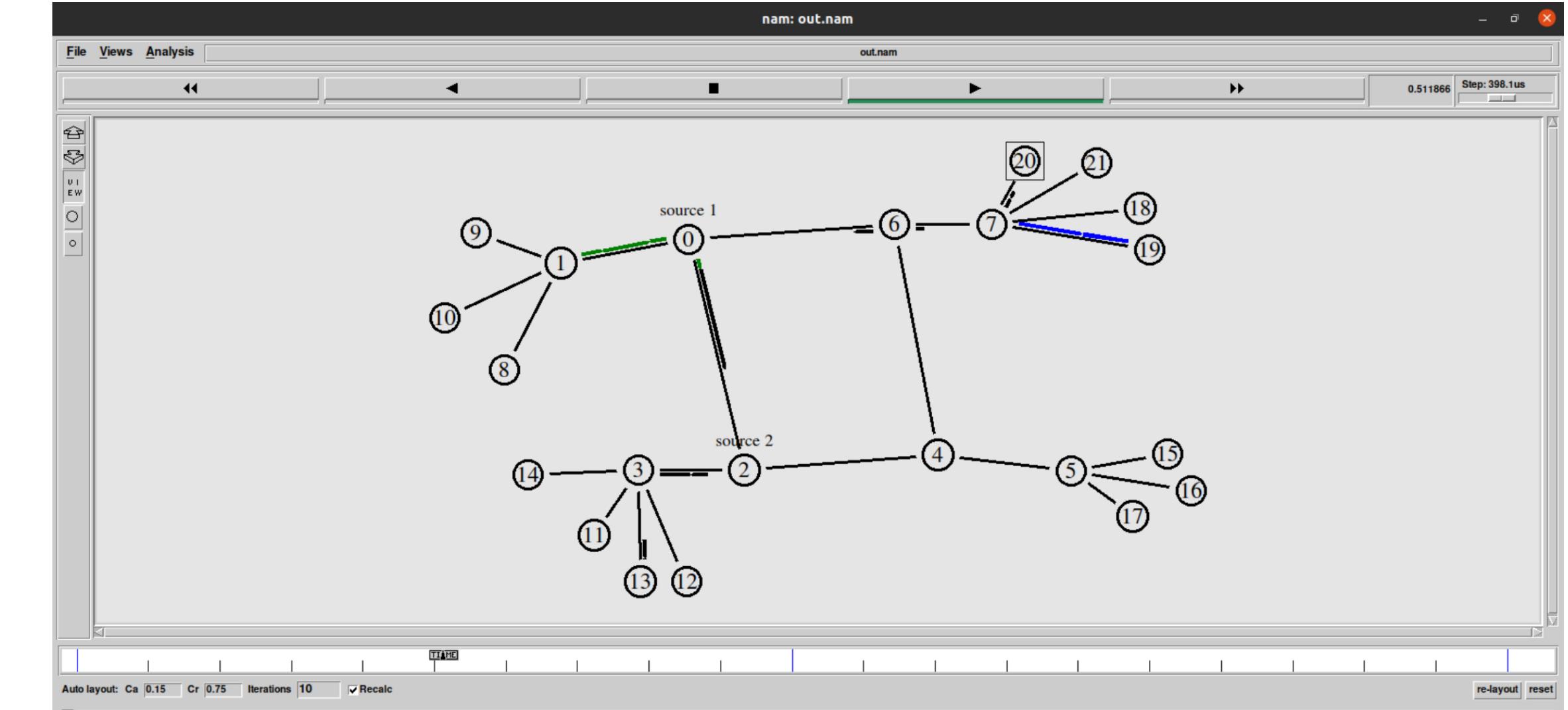
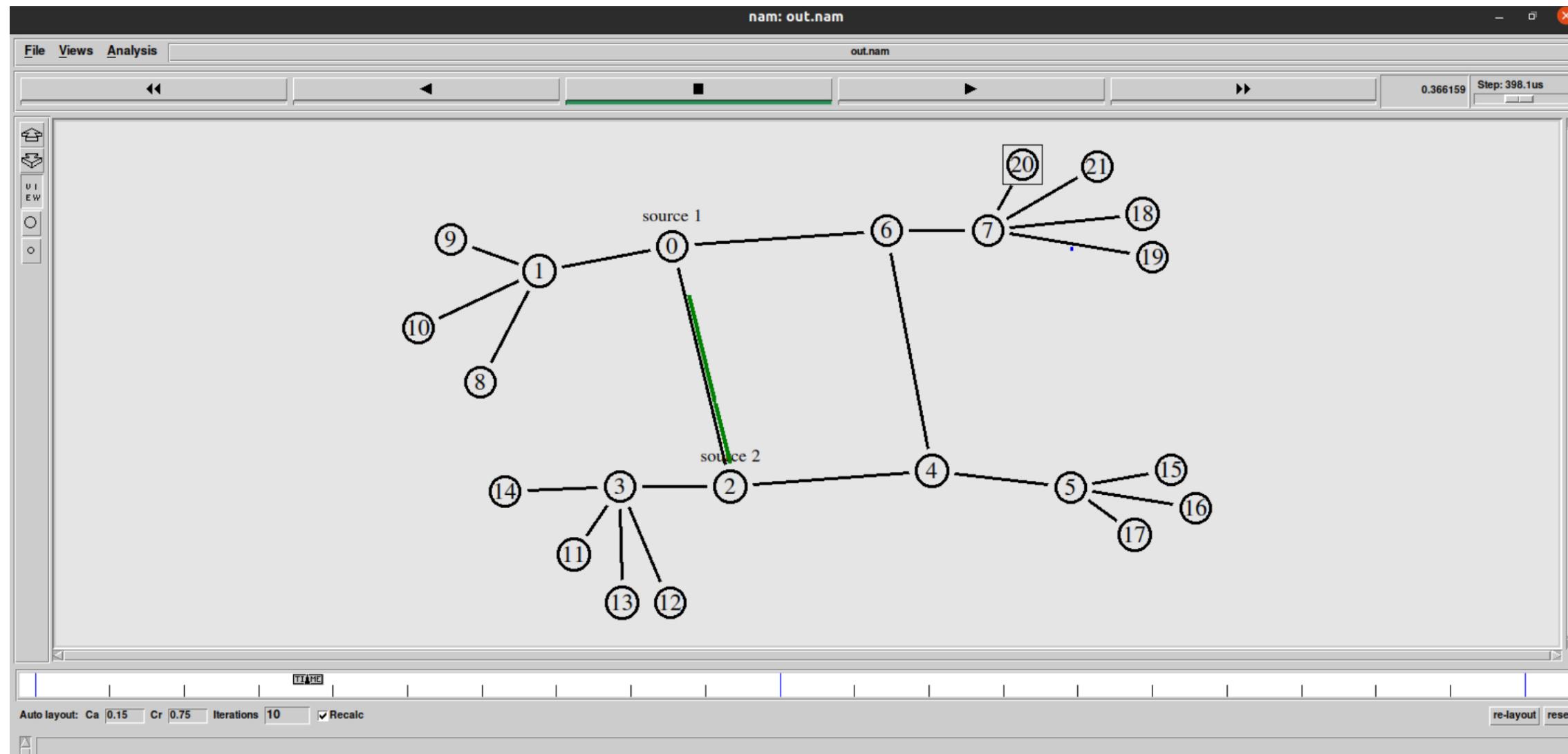
# Star Topology



# Ring Topology



# Hybrid Topology



# Thank You