EXERCISE 6: Inter-AS Routing (BGP Concepts)
Interpretation:

NS-3 has no native BGP → model logical AS separation.

Explanation

This exercise focuses on inter-domain routing, which is how traffic is routed between different networks or Autonomous Systems (AS) on the Internet. It introduces the basic concepts behind the Border Gateway Protocol (BGP).

In this exercise, multiple networks are treated as separate autonomous systems, and routing decisions are made based on policies rather than just the shortest path. Factors such as preferred routes, network ownership, and path attributes influence how traffic is forwarded between domains.

The exercise shows that inter-domain routing is more complex than internal routing and highlights the limitations of simulation tools like NS-3 for full BGP implementation, while still helping to understand the core principles of Internet-scale routing.

AS Modeling:
• AS65001 nodes
• AS65002 nodes
• Exchange points as routers

BGP Attribute Simulation:
Attributes:
• AS_PATH (vector)
• LOCAL_PREF (integer)
• PREFIX (e.g., 192.168.0.0/16)

Decision Rule
Higher LOCAL_PREF → Shorter AS_PATH → Best route installed

Route Leak Simulation:
• Advertise internal prefix to external AS

• Observe incorrect path selection

Reality vs NS-3

NS-3 limitations:

• No real BGP FSM
• No route reflectors
• No communities