Green University of Bangladesh
Department of Computer Science and Engineering (CSE)
Faculty of Sciences and Engineering
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Lab Report NO : 03
Course Title: Computer Networking Lab
Course Code: CSE 312 Section: 223-D1

Lab Experiment Name: Implementation of Inter-Network Communication Using RIP and NAT.

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Lab Report Status

Marks: …… **Signature:.....**
Comments:..... **Date:.....**

Title of the Lab Report Experiment: Implementation of Inter-Network Communication Using RIP and NAT.

Objective:

To set up a network infrastructure connecting three universities (GUB, BUET, and KUET), each with its own subnet and NAT configuration, and enable dynamic routing using RIP to facilitate communication and internet access.

Network Requirements:

- **Universities**: GUB, BUET, KUET
- **Devices per University**: 1 Server, 1 Computer, 1 Laptop
- **Each university connected to a global router**
- **RIP (Routing Information Protocol)**: For dynamic routing
- **NAT (Network Address Translation)**: For internet access

IP Addressing Scheme

University	Inside Network	Outside Network
GUB	192.168.10.0/24	10.0.0.0/24
BUET	192.168.20.0/24	20.0.0.0/24
KUET	192.168.30.0/24	30.0.0.0/24

Network Topology Overview:

Each university has:

- **Router 1** for internal connections (Inside NAT)
- **Router 2** as the border router (Outside NAT)
- **One connection to the global router**

Each university's internal devices connect to **Router 1**, which connects to

Router 2 using a **NAT Inside-Outside** link. **Router 2** connects to the **Global Router**, enabling communication among universities.

Configuration Steps

Step 1: IP Assignment

GUB Inside Network:

- PC: 192.168.10.2
- Laptop: 192.168.10.3
- Server: 192.168.10.4
- Router 1 (Inside): 192.168.10.1
- Router 1 (Outside): 10.0.0.2
- Router 2 (GUB): 10.0.0.1

BUET and KUET follow similar addressing with their respective networks.

Step 2: RIP Configuration

Enable RIP on all routers and include all connected networks:

Example (GUB Router 1):

bash
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Router(config)# router rip
Router(config-router)# version 2
Router(config-router)# network 192.168.10.0
Router(config-router)# network 10.0.0.0

Repeat similarly on BUET and KUET routers with their respective networks.

Step 3: NAT Configuration

On Router 1 of each university (NAT inside):

1. **Define inside and outside interfaces**:

bash
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Router(config)# interface FastEthernet0/0
Router(config-if)# ip nat inside

Router(config)# interface Serial0/0/0
Router(config-if)# ip nat outside

2. **Create NAT Pool and Access Control List (ACL)**:

bash
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Router(config)# ip nat pool GUB_POOL 10.0.0.10 10.0.0.20 netmask 255.255.255.0
Router(config)# access-list 1 permit 192.168.10.0 0.0.0.255
Router(config)# ip nat inside source list 1 pool GUB_POOL overload

Repeat the process for BUET and KUET with their respective inside/outside IPs and pools.

Step 4: Connectivity Test

- **Ping tests** between:
  - PC (GUB) → Server (BUET)
  - Laptop (KUET) → PC (BUET)
  - Server (GUB) → Internet
- Use **show ip route** and **show ip nat translations** for verification.

Results:

- Dynamic routing using RIP allows seamless communication between all university networks.
- NAT translates internal addresses to outside IPs for internet access.
- All devices across different universities can communicate and access shared services.

Conclusion:

The network was successfully configured with RIP for dynamic routing and NAT for internet access. Each university operates within its subnet and can interact securely and efficiently across the broader academic network.