**User Guide for Intelligent Automated Network Route Monitor (IANRM)**

**Introduction**

The **Intelligent Automated Network Route Monitor (IANRM)** is a Python-based network monitoring tool that automates the process of checking the connectivity, packet loss, and traceroute of target IP addresses. The system sends desktop and Pushbullet notifications to alert users about any issues detected during the monitoring process.

This guide will provide instructions on setting up and running the IANRM system, including how to configure the necessary input files and integrate Pushbullet for notifications.

**System Requirements**

1. **Python 3.x**: Ensure that Python is installed on your machine. You can download it from [python.org](https://www.python.org/downloads/).
2. **Pushbullet Account**: Create a Pushbullet account and obtain your API token from [Pushbullet](https://www.pushbullet.com/).
3. **External Libraries**:
   * plyer (for desktop notifications)
   * pushbullet.py (for sending Pushbullet alerts)

To install the required libraries, you can use the following commands:

pip install plyer

pip install pushbullet.py

**File Structure**

1. **targets.txt**: A text file that contains the list of target IPs to monitor and the number of packets to send during the ping test.
2. **network\_monitor.log**: A log file where the results of the network tests are recorded.
3. **ianrm\_script.py**: The Python script containing the monitoring logic.

**Step-by-Step Guide**

**1. Preparing the Input File (targets.txt)**

The targets.txt file should be structured in the following way:

<Number of Packets>

<Target IP 1>

<Target IP 2>

...

<Target IP N>

* **First Line**: The number of packets to send during the ping test (integer).
* **Subsequent Lines**: A list of target IP addresses that need to be monitored.

**Example targets.txt:**

4

192.168.1.1

8.8.8.8

10.0.0.1

In this example, 4 packets will be sent to each IP (192.168.1.1, 8.8.8.8, and 10.0.0.1) during the ping tests.

**2. Setting up Pushbullet API**

To receive notifications on your mobile device, you need to integrate Pushbullet with the script:

1. Go to [Pushbullet](https://www.pushbullet.com/) and sign in with your account.
2. Navigate to **Settings** and generate an **Access Token**.
3. Replace YOUR\_TOKEN in the script with the generated token:
4. pb = Pushbullet("YOUR\_TOKEN") # Replace with your token

This token will allow the script to send notifications via Pushbullet.

**3. Understanding the Script**

**Key Functions:**

* **log(msg)**: Logs the message to the network\_monitor.log file with a timestamp.
* **read\_targets(file\_path)**: Reads the target IPs and packet size from the targets.txt file.
* **before\_check(host)**: Checks the basic connectivity (ping) to the target IP to ensure it's reachable.
* **ping\_host(host, packets)**: Pings the target IP with the specified number of packets and returns the result.
* **trace\_route(host)**: Performs a traceroute to the target IP to identify where packet loss is occurring.
* **extract\_packet\_stats(ping\_output)**: Extracts the packet statistics (sent, received, lost) from the ping output.
* **send\_desktop\_alert(title, message)**: Sends a desktop notification using the plyer library.
* **send\_pushbullet\_alert(title, message)**: Sends a Pushbullet notification.

**Flow of Execution:**

1. The script reads the targets.txt file to get the number of packets and the list of target IPs.
2. For each target IP:
   * A basic connectivity check (ping) is performed.
   * If the target is reachable, the script sends the specified number of packets and checks for packet loss.
   * If packet loss is detected, a traceroute is executed to determine the source of the issue.
3. Alerts are sent via desktop notifications and Pushbullet notifications based on the results.

**4. Running the Script**

To run the script, simply execute it in your terminal:

python ianrm\_script.py

* The script will start processing the target IPs in targets.txt, performing the connectivity check, ping test, and traceroute as necessary.
* Alerts will be sent based on the outcomes (successful ping, packet loss, or unreachable target).

**5. Log File (network\_monitor.log)**

The script logs all results to network\_monitor.log. The log file will contain timestamps and detailed information about the results of each ping test and traceroute.

Example log entry:

[2025-04-21 14:32:56] --- Starting check for 192.168.1.1 ---

[2025-04-21 14:32:56] Initial connectivity check successful to 192.168.1.1

[2025-04-21 14:33:00] Ping successful: 192.168.1.1

[2025-04-21 14:33:00] Round Trip Results:

Packets Sent: 4, Packets Received: 4, Packets Lost: 0

[2025-04-21 14:33:05] No Data packet loss detected!!

**Troubleshooting**

* **No Pushbullet Notifications**: Ensure that you have correctly set up your Pushbullet API token and have an active Pushbullet account.
* **Ping Failures**: If a target IP is unreachable, check your network connection or verify the target's availability.

**Conclusion**

The **Intelligent Automated Network Route Monitor (IANRM)** provides an automated solution for monitoring network connectivity, packet loss, and route analysis. It sends real-time alerts to users and logs detailed information to help in troubleshooting network issues. With the integration of Pushbullet and desktop notifications, you can stay informed about the health of your network even when you're away from your terminal.

Make sure to configure the targets.txt file and Pushbullet API token correctly to start monitoring your network.