

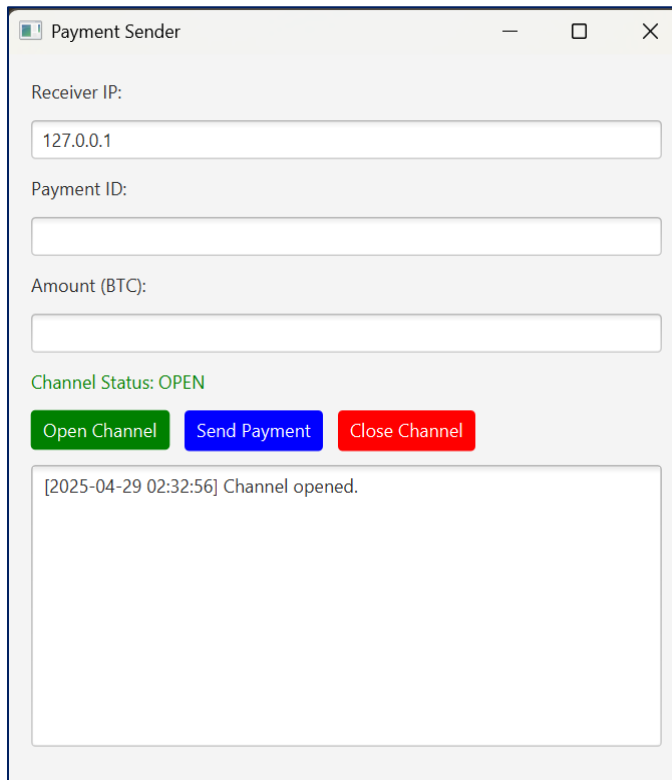
FINAL PROJECT SUBMISSION (GROUP -05)

DONE BY :- NEHA SAHA (2251181) PRIYANSHU MONDAL (2251222)
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8. Outputs and Their Real-World Meanings

A. Channel Opened:

Simulates: Opening a payment channel (similar to Lightning Network channel creation).



The screenshot shows a window titled "Payment Sender" with a standard Windows-style title bar (minimize, maximize, close buttons). The window contains the following elements:

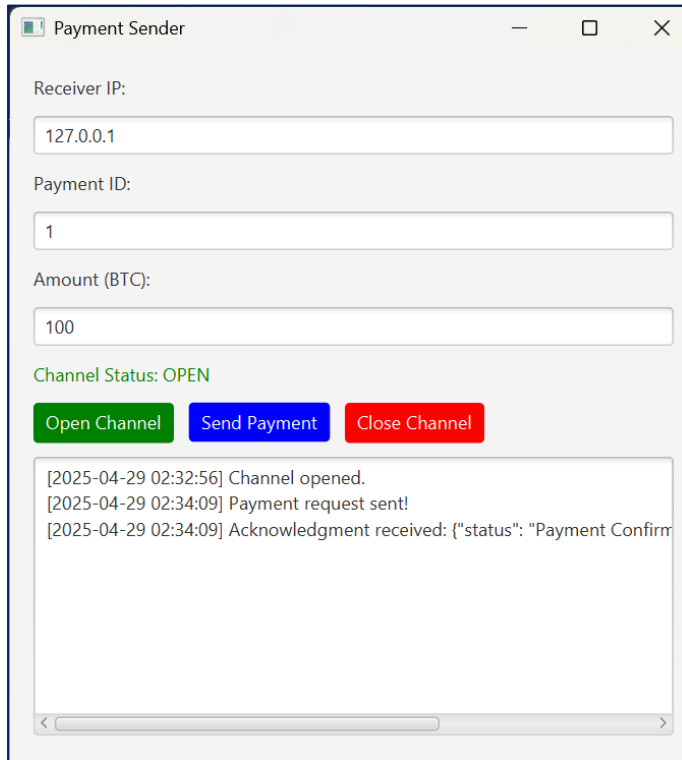
- Receiver IP:** A text input field containing "127.0.0.1".
- Payment ID:** An empty text input field.
- Amount (BTC):** An empty text input field.
- Channel Status:** The text "Channel Status: OPEN" is displayed in green.
- Action Buttons:** Three buttons are visible: "Open Channel" (green), "Send Payment" (blue), and "Close Channel" (red).
- Log Area:** A large text area at the bottom containing the message "[2025-04-29 02:32:56] Channel opened."

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B. Payment Request Sent:

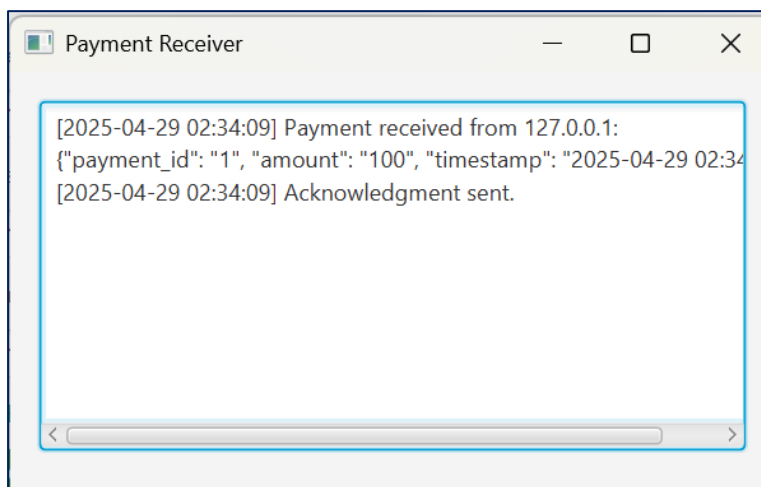
Simulates: Sending a micro-payment inside the open channel (off-chain transaction).



The screenshot shows a window titled "Payment Sender" with a light gray background. It contains three input fields: "Receiver IP:" with the value "127.0.0.1", "Payment ID:" with the value "1", and "Amount (BTC):" with the value "100". Below these fields, the text "Channel Status: OPEN" is displayed in green. There are three buttons: "Open Channel" (green), "Send Payment" (blue), and "Close Channel" (red). At the bottom, a text area shows a log of events: "[2025-04-29 02:32:56] Channel opened.", "[2025-04-29 02:34:09] Payment request sent!", and "[2025-04-29 02:34:09] Acknowledgment received: {'status': 'Payment Confirm'".

C. Acknowledgment Received:

Simulates: Receiver node confirming receipt of payment within the channel.



The screenshot shows a window titled "Payment Receiver" with a light gray background. It contains a text area with a log of events: "[2025-04-29 02:34:09] Payment received from 127.0.0.1: {'payment_id': '1', 'amount': '100', 'timestamp': '2025-04-29 02:34:09'}" and "[2025-04-29 02:34:09] Acknowledgment sent.". The text area has a blue border and a scrollbar at the bottom.

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D. Packet Loss Simulated:

Simulates: Network instability where a payment could fail due to congestion.

The screenshot displays the 'Payment Sender' application window. It features three input fields: 'Receiver IP' with the value '127.0.0.1', 'Payment ID' with the value '5', and 'Amount (BTC)' with the value '100'. Below these fields, the 'Channel Status' is indicated as 'OPEN'. Three buttons are visible: 'Open Channel' (green), 'Send Payment' (blue), and 'Close Channel' (red). A log window at the bottom shows a sequence of events: 'Payment request sent!', 'Acknowledgment received: {"status": "Payment Confirmed"}', and 'Simulated packet loss. Payment not sent.' The log entries are timestamped with the date and time '2025-04-29 02:34:09' through '2025-04-29 02:35:29'.

Payment Sender

Receiver IP:
127.0.0.1

Payment ID:
5

Amount (BTC):
100

Channel Status: OPEN

Open Channel Send Payment Close Channel

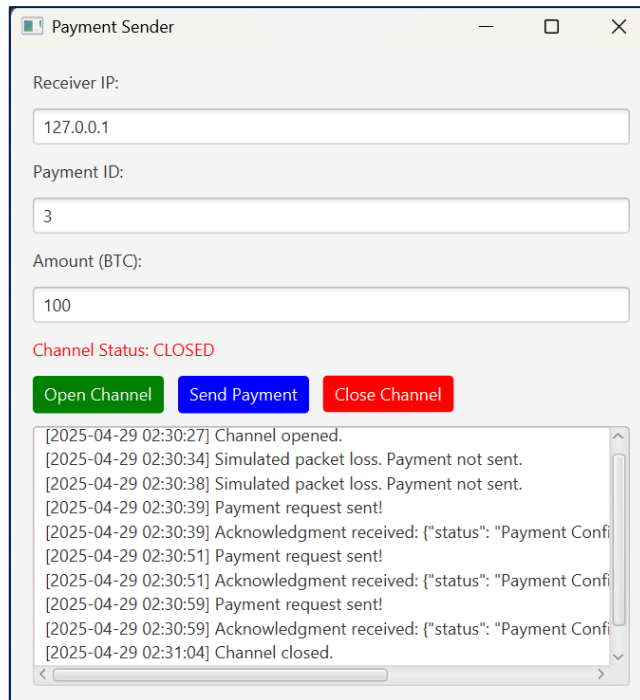
[2025-04-29 02:34:09] Payment request sent!
[2025-04-29 02:34:09] Acknowledgment received: {"status": "Payment Confirmed"}
[2025-04-29 02:35:15] Payment request sent!
[2025-04-29 02:35:15] Acknowledgment received: {"status": "Payment Confirmed"}
[2025-04-29 02:35:20] Payment request sent!
[2025-04-29 02:35:20] Acknowledgment received: {"status": "Payment Confirmed"}
[2025-04-29 02:35:25] Payment request sent!
[2025-04-29 02:35:25] Acknowledgment received: {"status": "Payment Confirmed"}
[2025-04-29 02:35:29] Simulated packet loss. Payment not sent.

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E. Channel Closed:

Simulates: Closing the channel and settling the final state (as in Lightning Network channel closing).



The screenshot shows a window titled "Payment Sender" with the following fields and controls:

- Receiver IP: 127.0.0.1
- Payment ID: 3
- Amount (BTC): 100
- Channel Status: CLOSED (displayed in red text)
- Buttons: Open Channel (green), Send Payment (blue), Close Channel (red)
- Log window (bottom):
 - [2025-04-29 02:30:27] Channel opened.
 - [2025-04-29 02:30:34] Simulated packet loss. Payment not sent.
 - [2025-04-29 02:30:38] Simulated packet loss. Payment not sent.
 - [2025-04-29 02:30:39] Payment request sent!
 - [2025-04-29 02:30:39] Acknowledgment received: {"status": "Payment Confirmed"}
 - [2025-04-29 02:30:51] Payment request sent!
 - [2025-04-29 02:30:51] Acknowledgment received: {"status": "Payment Confirmed"}
 - [2025-04-29 02:30:59] Payment request sent!
 - [2025-04-29 02:30:59] Acknowledgment received: {"status": "Payment Confirmed"}
 - [2025-04-29 02:31:04] Channel closed.

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F. Latency Measurements:

Simulates: Measuring how fast transactions happen — critical for microtransaction networks

| 1 | Payment ID,Amount (BTC),Sent Time,Acknowledgment Time,Latency (ms),Status |
|----|---------------------------------------------------------------------------|
| 2 | CHANNEL OPEN,-,-,-,Open |
| 3 | 1,100,2025-04-29 02:17:19,2025-04-29 02:17:19,30,Success |
| 4 | 5,100,2025-04-29 02:17:27,2025-04-29 02:17:27,2,Success |
| 5 | 3,100,2025-04-29 02:17:37,-,-,Packet Loss (Not Sent) |
| 6 | 8,100,2025-04-29 02:17:46,-,-,Packet Loss (Not Sent) |
| 7 | 89,100,2025-04-29 02:17:57,-,-,Packet Loss (Not Sent) |
| 8 | 89,100,2025-04-29 02:17:59,2025-04-29 02:17:59,2,Success |
| 9 | CHANNEL OPEN,-,-,-,Open |
| 10 | 1,100,2025-04-29 02:30:34,-,-,Packet Loss (Not Sent) |
| 11 | 1,100,2025-04-29 02:30:38,-,-,Packet Loss (Not Sent) |
| 12 | 1,100,2025-04-29 02:30:39,2025-04-29 02:30:39,20,Success |
| 13 | 2,100,2025-04-29 02:30:51,2025-04-29 02:30:51,1,Success |
| 14 | 3,100,2025-04-29 02:30:59,2025-04-29 02:30:59,2,Success |
| 15 | CHANNEL CLOSE,-,-,-,Closed |
| 16 | CHANNEL OPEN,-,-,-,Open |
| 17 | 1,100,2025-04-29 02:34:09,2025-04-29 02:34:09,49,Success |
| 18 | 2,100,2025-04-29 02:35:15,2025-04-29 02:35:15,3,Success |
| 19 | 3,100,2025-04-29 02:35:20,2025-04-29 02:35:20,2,Success |
| 20 | 4,100,2025-04-29 02:35:25,2025-04-29 02:35:25,2,Success |
| 21 | 5,100,2025-04-29 02:35:29,-,-,Packet Loss (Not Sent) |

G. history.csv Logging:

Simulates: Internal node bookkeeping of all payment attempts and their results

| 1 | Payment ID,Amount (BTC),Sent Time,Acknowledgment Time,Latency (ms),Status |
|----|---------------------------------------------------------------------------|
| 2 | CHANNEL OPEN,-,-,-,Open |
| 3 | 1,100,2025-04-29 02:17:19,2025-04-29 02:17:19,30,Success |
| 4 | 5,100,2025-04-29 02:17:27,2025-04-29 02:17:27,2,Success |
| 5 | 3,100,2025-04-29 02:17:37,-,-,Packet Loss (Not Sent) |
| 6 | 8,100,2025-04-29 02:17:46,-,-,Packet Loss (Not Sent) |
| 7 | 89,100,2025-04-29 02:17:57,-,-,Packet Loss (Not Sent) |
| 8 | 89,100,2025-04-29 02:17:59,2025-04-29 02:17:59,2,Success |
| 9 | CHANNEL OPEN,-,-,-,Open |
| 10 | 1,100,2025-04-29 02:30:34,-,-,Packet Loss (Not Sent) |
| 11 | 1,100,2025-04-29 02:30:38,-,-,Packet Loss (Not Sent) |
| 12 | 1,100,2025-04-29 02:30:39,2025-04-29 02:30:39,20,Success |
| 13 | 2,100,2025-04-29 02:30:51,2025-04-29 02:30:51,1,Success |
| 14 | 3,100,2025-04-29 02:30:59,2025-04-29 02:30:59,2,Success |
| 15 | CHANNEL CLOSE,-,-,-,Closed |
| 16 | CHANNEL OPEN,-,-,-,Open |
| 17 | 1,100,2025-04-29 02:34:09,2025-04-29 02:34:09,49,Success |
| 18 | 2,100,2025-04-29 02:35:15,2025-04-29 02:35:15,3,Success |
| 19 | 3,100,2025-04-29 02:35:20,2025-04-29 02:35:20,2,Success |
| 20 | 4,100,2025-04-29 02:35:25,2025-04-29 02:35:25,2,Success |
| 21 | 5,100,2025-04-29 02:35:29,-,-,Packet Loss (Not Sent) |