Department of CSE

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Course Title
Internet of Things

Lab 04

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Executive Summary

We built a small ESP8266 mesh using the painlessMesh library and verified broadcasting with core callbacks, direct single-node messaging, and multi-hop delivery. Evidence is provided with serial logs and screenshots. The mesh adapted to topology changes while maintaining delivery across relays.

1. Introduction

Mesh networking enables devices to relay data for one another, extending range and resilience compared to a star topology. The painlessMesh library provides neighbor discovery, time synchronization, and message routing for ESP8266/ESP32 with a simple API.

2. Hardware & Methods

Hardware

- 3 × NodeMCU (ESP-12E) boards powered via USB.
- Arduino IDE with ESP8266 core; painlessMesh installed from Library Manager.
- Placement for multi-hop: nodes A and C out of direct range; B positioned as relay.
- Evidence captured from the Arduino Serial Monitor at 115200 bps.

Mesh Settings

Mesh Prefix	MeshLabDemo
Mesh Password	mesh_password123
Mesh Port	5555
Serial Speed	115200 bps

3. Results — Task 1

Task 1 — Broadcast & Callback Messages

Periodic broadcast and callback activity showing discovery, RX logs, and time sync offsets. Each node periodically broadcasts 'Hello from node <id>' and prints callback activity. Observed messages include neighbor discovery (New Connection / scanComplete), repeated RX lines, and Adjusted time offsets. New Connection indicates a direct link with a peer; Changed connections signals a topology update; Adjusted time is the mesh clock correction (µs).

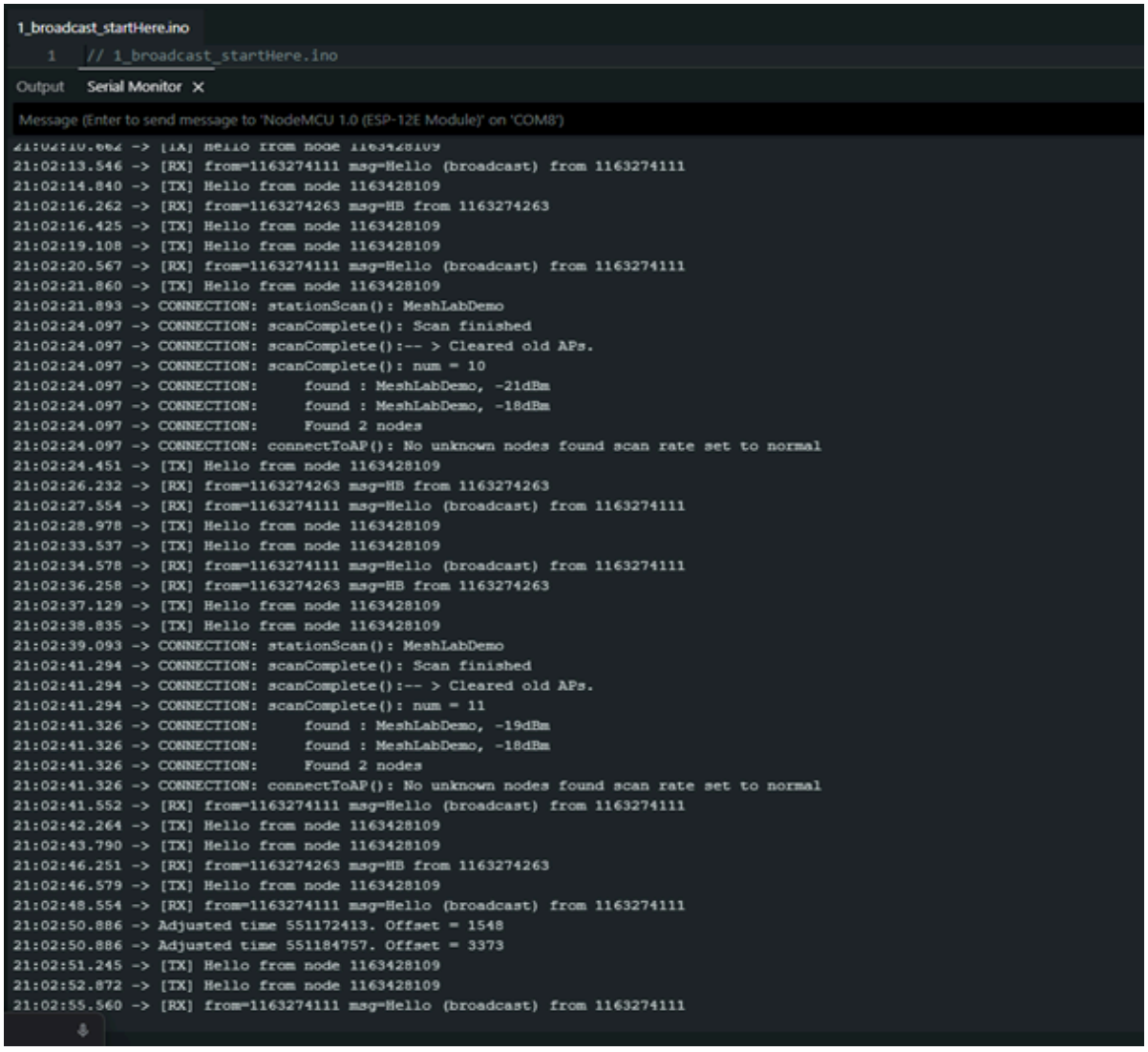

Figure 1 — Broadcast & callbacks (New Connection, Changed connections, Adjusted time, RX/TX).

New Connection

This callback indicates that the current node has established a direct link with a newly discovered peer. The event signifies mesh growth and the potential expansion of routing possibilities.

--> startHere: New Connection, nodeId = 1163274111

Connection Change

This message is produced when the network topology is altered—e.g., a node joins or leaves, or a link forms or breaks due to changing signal conditions. After this event, painlessMesh updates internal routing to reflect the new topology.

Example

Changed connections

CONNECTION: scanComplete(): Scan finished

Adjusted Time

This callback reports synchronization of the node's local clock to the mesh's time base. The printed offset (in microseconds) is the correction applied, enabling consistent scheduling of time-dependent tasks across nodes.

Example:

Adjusted time 551712345. Offset = 1548
Adjusted time 593695067. Offset = -3281

Received Message (onMessage)

This line confirms reception of a message—either broadcast or direct—and identifies the sender ID and payload.

Example

[RX] from=1163428109 msg=Hello from node 1163428109
[RX] from=1163274263 msg=HB from 1163274263

3. Results — Task 2

Task 2 — Direct Message to a Specific Node

Set target via T:<id> and send with M:<text>; only the target prints the RX line. Using 2_sendSingle_target.ino, we set a target with T:<id> and sent a direct message via M:<text>. The sender prints '[TX] to <targetId> ok=true ...' and only the target prints '[RX] from=<senderId>.

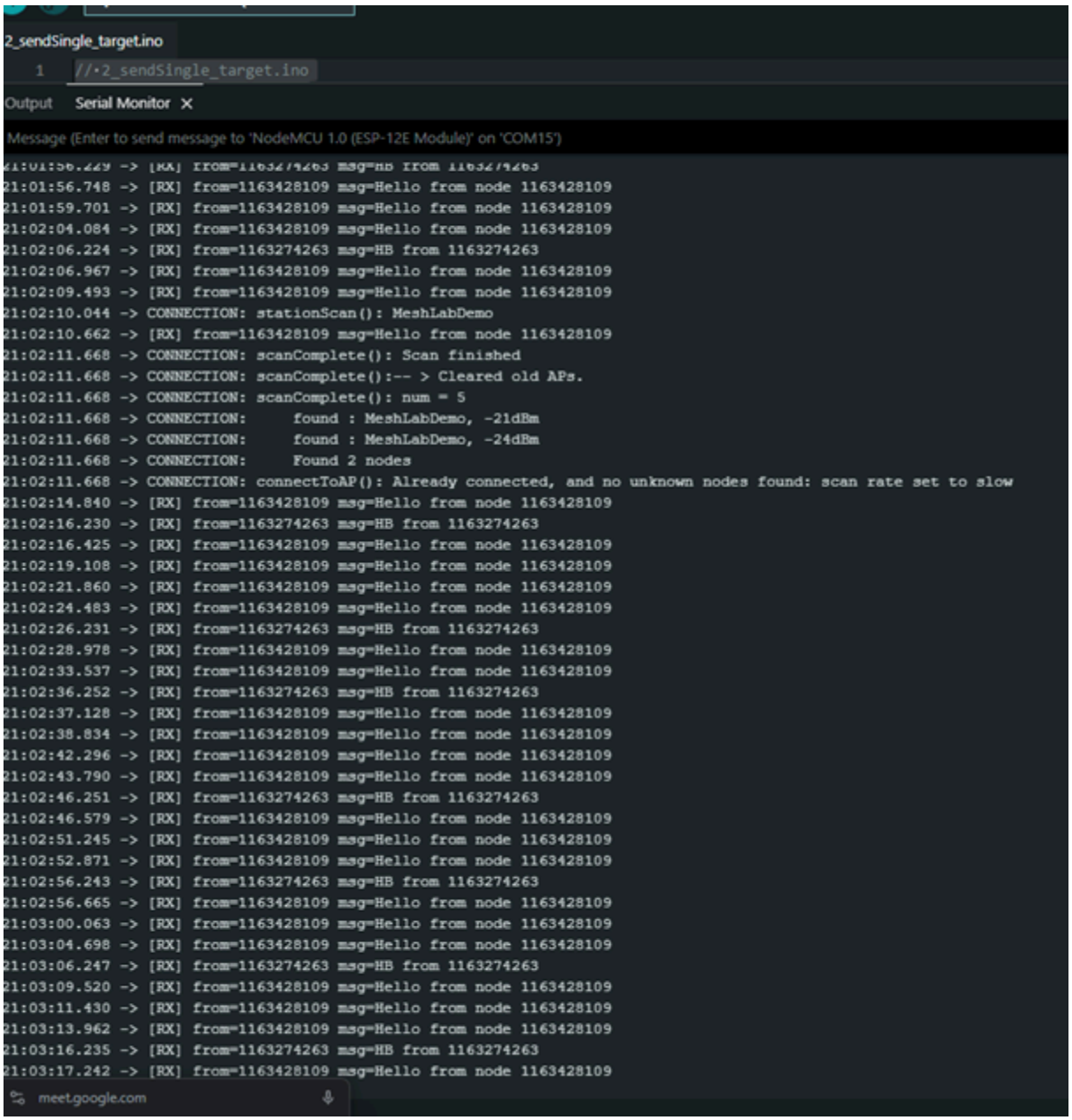

Figure 2 — Direct sendSingle() activity and neighbor discovery.

Usage during testing (concise).

1. Open Serial Monitor (115200) on at least two nodes; issue ? to print each node's ID and neighbors.
2. On the sender, set the destination with T:<targetId> and send a message via M:Direct hello from <myId>.
3. The sender should print a [TX] … ok=true line; only the destination should print the matching [RX] … line.
4. If the destination is unreachable, the sketch prints a [WARN] Target <id> not connected. message and does not attempt delivery.

3. Results — Task 3

Task 3 — Multi-hop Direct Messaging & Signal Strength

Extended debug shows routePackage() traces while relaying across the intermediate node. With 3_multihop_debug.ino and extended debug, messages traverse an intermediate node when source and destination are out of range. routePackage() traces and connection updates appear as nodes move and links change.

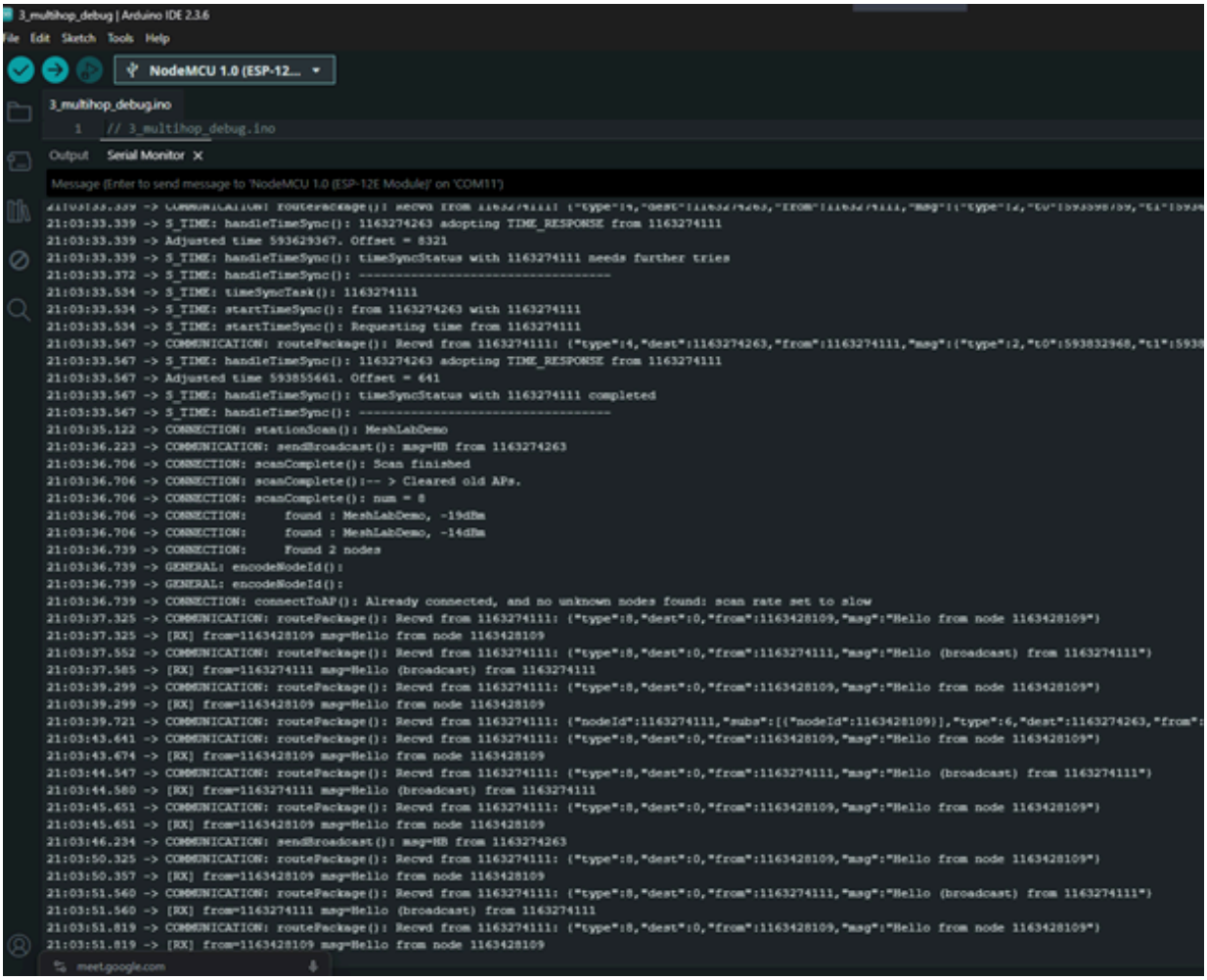

Figure 3 — Multi-hop with routePackage() traces across the relay node.

Procedure:

1.All nodes ran the Task-2 sketch; on A, the destination was set to C's node ID using T:<id>.

2.Extended debug was enabled to trace routing

3.A direct message was issued from Node A using M:<text>. Serial outputs were monitored on all nodes.

Observations:

1.The sender reported a successful transmission:

2.The relay and/or target produced COMMUNICATION traces indicating multi-hop handling,

3.When inter-node distances were adjusted to alter RSSI, additional Changed connections and Connection scanner outputs appeared, reflecting reattachment and route recalculation. Temporary delivery failures during movement were resolved once the mesh reconverged.

4. Discussion & Explanation

Mesh vs star: Mesh increases coverage and resilience (multiple paths) with some overhead and potential per-hop latency. painlessMesh handled discovery, sync, and route changes transparently. If logs are noisy, slow the broadcast rate; if nodes do not link, verify credentials and restart; multi-hop success depends on placement/RSSI.

PainlessMesh maintains a dynamically updated view of neighbor relationships and constructs a routing tree that favors stronger links (better signal quality). When a direct path from A to C is unavailable, the stack selects an appropriate multi-hop route (e.g., A→B→C). As signal strength and topology evolve, attachments and routes adapt automatically; this behavior is observable through the `Connection` and `COMMUNICATION` debug output.

5. Conclusion

We demonstrated broadcast operation with required callbacks, direct addressing with sendSingle(), and multi-hop routing with debug traces. The mesh adapted to topology changes and delivered messages across relays as expected.

6. Appendix — Serial Snippet

[SENDER] [TX] to <targetId> ok=true msg=Direct hello from <myId>
[TARGET] [RX] from=<myId> msg=Direct hello from <myId>

Outputs:

2_sendSingle_target.ino

```
1  //·2_sendSingle_target.ino
```

Output Serial Monitor ×

Message (Enter to send message to 'NodeMCU 1.0 (ESP-12E Module)' on 'COM15')

```
21:01:56.229 -> [RX] from=1163274263 msg=HB from 1163274263
21:01:56.748 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:01:59.701 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:04.084 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:06.224 -> [RX] from=1163274263 msg=HB from 1163274263
21:02:06.967 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:09.493 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:10.044 -> CONNECTION: stationScan(): MeshLabDemo
21:02:10.662 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:11.668 -> CONNECTION: scanComplete(): Scan finished
21:02:11.668 -> CONNECTION: scanComplete():-- > Cleared old APs.
21:02:11.668 -> CONNECTION: scanComplete(): num = 5
21:02:11.668 -> CONNECTION:     found : MeshLabDemo, -21dBm
21:02:11.668 -> CONNECTION:     found : MeshLabDemo, -24dBm
21:02:11.668 -> CONNECTION:     Found 2 nodes
21:02:11.668 -> CONNECTION: connectToAP(): Already connected, and no unknown nodes found: scan rate set to slow
21:02:14.840 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:16.230 -> [RX] from=1163274263 msg=HB from 1163274263
21:02:16.425 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:19.108 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:21.860 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:24.483 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:26.231 -> [RX] from=1163274263 msg=HB from 1163274263
21:02:28.978 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:33.537 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:36.252 -> [RX] from=1163274263 msg=HB from 1163274263
21:02:37.128 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:38.834 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:42.296 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:43.790 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:46.251 -> [RX] from=1163274263 msg=HB from 1163274263
21:02:46.579 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:51.245 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:52.871 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:02:56.243 -> [RX] from=1163274263 msg=HB from 1163274263
21:02:56.665 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:03:00.063 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:03:04.698 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:03:06.247 -> [RX] from=1163274263 msg=HB from 1163274263
21:03:09.520 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:03:11.430 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:03:13.962 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:03:16.235 -> [RX] from=1163274263 msg=HB from 1163274263
21:03:17.242 -> [RX] from=1163428109 msg=Hello from node 1163428109
```

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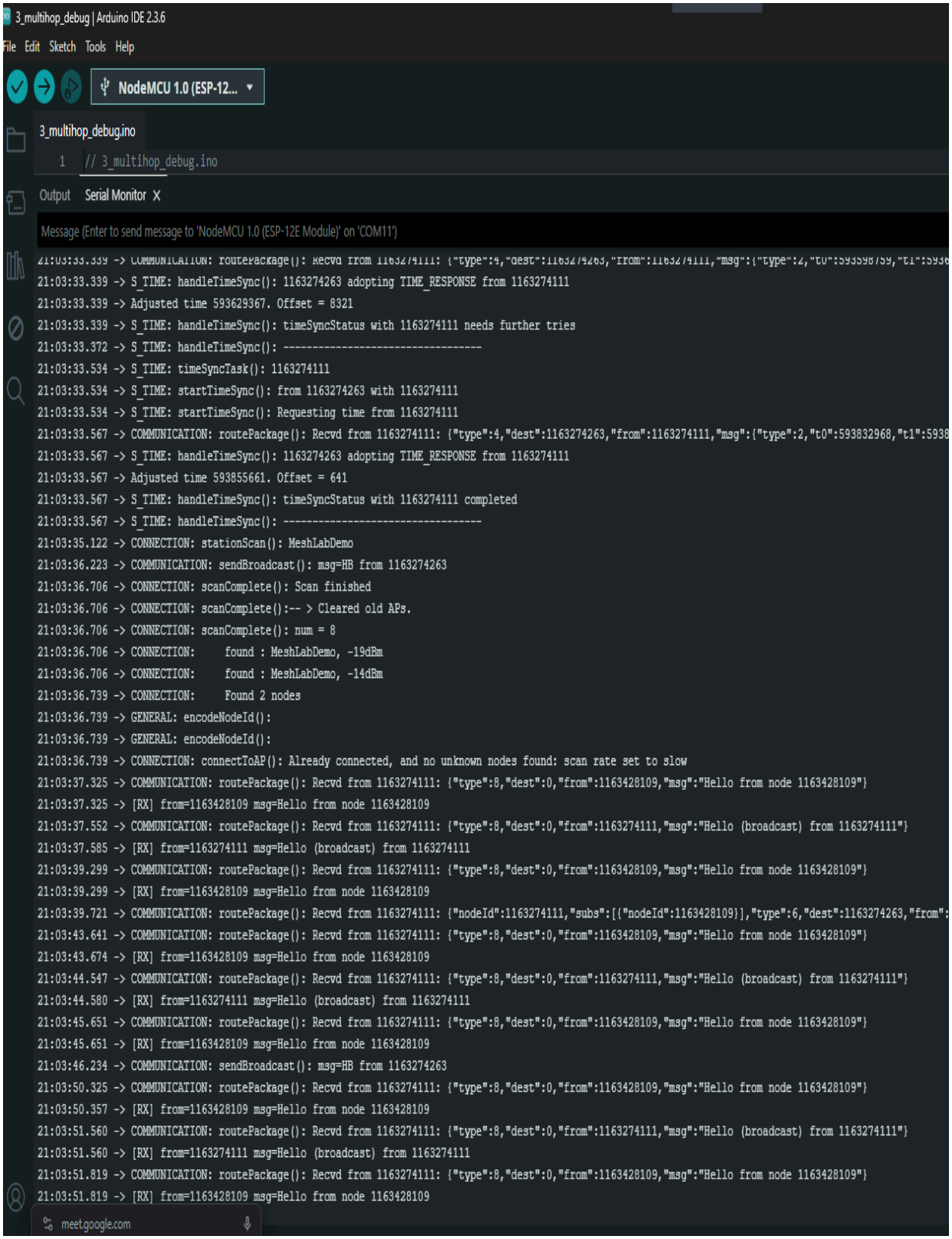
3_multihop_debug | Arduino IDE 2.3.6
File Edit Sketch Tools Help
NodeMCU 1.0 (ESP-12...
3_multihop_debug.ino
1 // 3_multihop_debug.ino
Output Serial Monitor X
Message (Enter to send message to 'NodeMCU 1.0 (ESP-12E Module)' on 'COM11')
21:03:33.339 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":4,"dest":1163274263,"from":1163274111,"msg":{"type":2,"t0":593598759,"t1":5936
21:03:33.339 -> S_TIME: handleTimeSync(): 1163274263 adopting TIME_RESPONSE from 1163274111
21:03:33.339 -> Adjusted time 593629367. Offset = 8321
21:03:33.339 -> S_TIME: handleTimeSync(): timeSyncStatus with 1163274111 needs further tries
21:03:33.372 -> S_TIME: handleTimeSync(): ----------
21:03:33.534 -> S_TIME: timeSyncTask(): 1163274111
21:03:33.534 -> S_TIME: startTimeSync(): from 1163274263 with 1163274111
21:03:33.534 -> S_TIME: startTimeSync(): Requesting time from 1163274111
21:03:33.567 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":4,"dest":1163274263,"from":1163274111,"msg":{"type":2,"t0":593832968,"t1":5938
21:03:33.567 -> S_TIME: handleTimeSync(): 1163274263 adopting TIME_RESPONSE from 1163274111
21:03:33.567 -> Adjusted time 593855661. Offset = 641
21:03:33.567 -> S_TIME: handleTimeSync(): timeSyncStatus with 1163274111 completed
21:03:33.567 -> S_TIME: handleTimeSync(): ----------
21:03:35.122 -> CONNECTION: stationScan(): MeshLabDemo
21:03:36.223 -> COMMUNICATION: sendBroadcast(): msg=HB from 1163274263
21:03:36.706 -> CONNECTION: scanComplete(): Scan finished
21:03:36.706 -> CONNECTION: scanComplete():-- > Cleared old APs.
21:03:36.706 -> CONNECTION: scanComplete(): num = 8
21:03:36.706 -> CONNECTION: found : MeshLabDemo, -19dBm
21:03:36.706 -> CONNECTION: found : MeshLabDemo, -14dBm
21:03:36.739 -> CONNECTION: Found 2 nodes
21:03:36.739 -> GENERAL: encodeNodeId():
21:03:36.739 -> GENERAL: encodeNodeId():
21:03:36.739 -> CONNECTION: connectToAP(): Already connected, and no unknown nodes found: scan rate set to slow
21:03:37.325 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163428109,"msg":"Hello from node 1163428109"}
21:03:37.325 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:03:37.552 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163274111,"msg":"Hello (broadcast) from 1163274111"}
21:03:37.585 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
21:03:39.299 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163428109,"msg":"Hello from node 1163428109"}
21:03:39.299 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:03:39.721 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"nodeId":1163274111,"subs":[{"nodeId":1163428109}],"type":6,"dest":1163274263,"from":
21:03:43.641 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163428109,"msg":"Hello from node 1163428109"}
21:03:43.674 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:03:44.547 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163274111,"msg":"Hello (broadcast) from 1163274111"}
21:03:44.580 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
21:03:45.651 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163428109,"msg":"Hello from node 1163428109"}
21:03:45.651 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:03:46.234 -> COMMUNICATION: sendBroadcast(): msg=HB from 1163274263
21:03:50.325 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163428109,"msg":"Hello from node 1163428109"}
21:03:50.357 -> [RX] from=1163428109 msg=Hello from node 1163428109
21:03:51.560 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163274111,"msg":"Hello (broadcast) from 1163274111"}
21:03:51.560 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
21:03:51.819 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163428109,"msg":"Hello from node 1163428109"}
21:03:51.819 -> [RX] from=1163428109 msg=Hello from node 1163428109
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3_multihop_debug | Arduino IDE 2.3.6

File Edit Sketch Tools Help

NodeMCU 1.0 (ESP-12...

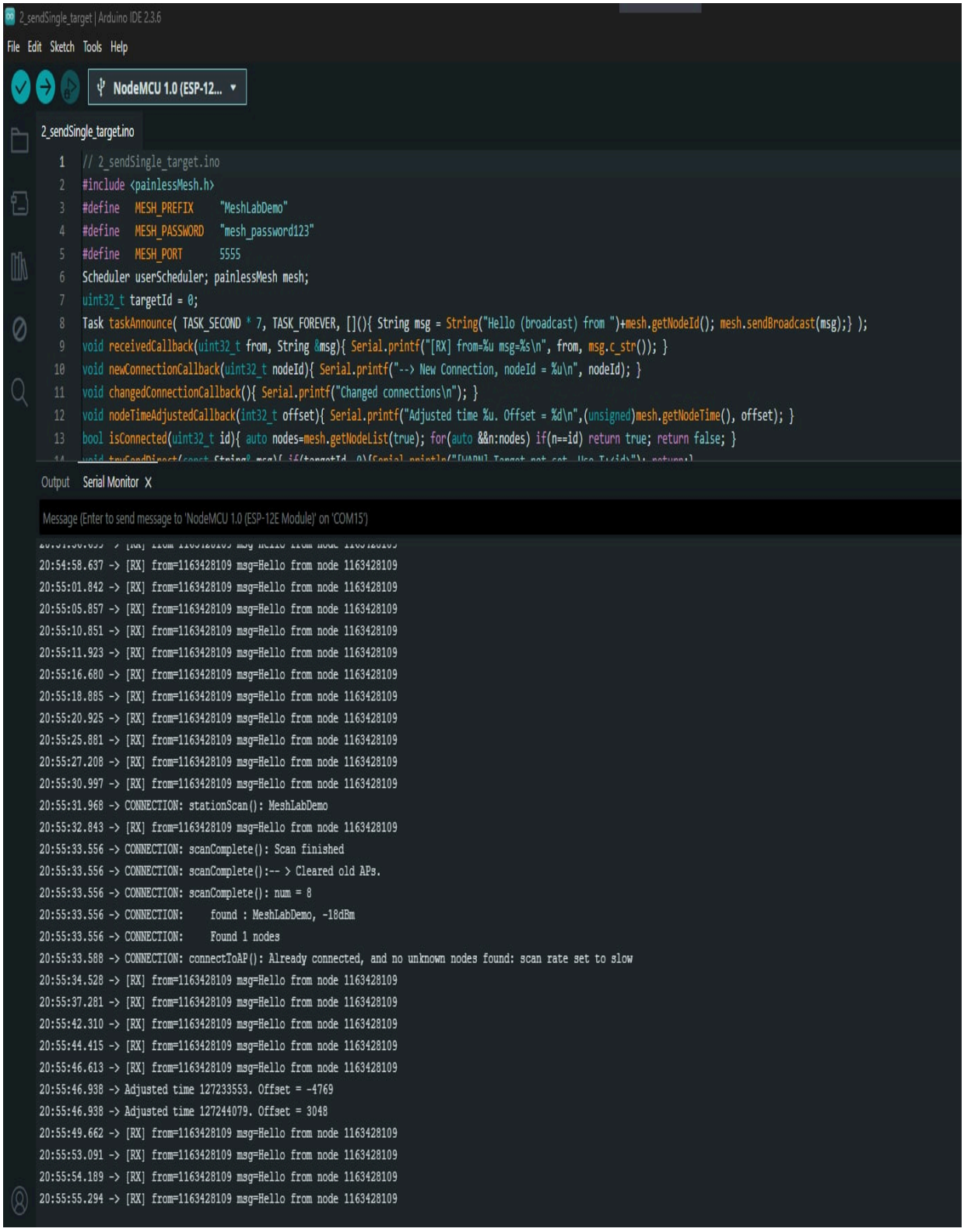
3_multihop_debug.ino

```ino
// 3_multihop_debug.ino
#include <painlessMesh.h>
#define   MESH_PREFIX     "MeshLabDemo"
#define   MESH_PASSWORD   "mesh_password123"
#define   MESH_PORT       5555
Scheduler userScheduler; painlessMesh mesh; uint32_t targetId=0;
Task taskHeartbeat( TASK_SECOND * 10, TASK_FOREVER, [](){ String hb=String("HB from ")+mesh.getNodeId(); mesh.sendBroadcast(hb);} );
void receivedCallback(uint32_t from, String &msg){ Serial.printf("[RX] from=%u msg=%s\n", from, msg.c_str()); }
void newConnectionCallback(uint32_t nodeId){ Serial.printf("--> New Connection, nodeId = %u\n", nodeId); }
void changedConnectionCallback(){ Serial.printf("Changed connections\n"); }
void nodeTimeAdjustedCallback(int32_t offset){ Serial.printf("Adjusted time %u. Offset = %d\n",(unsigned)mesh.getNodeTime(), offset); }
bool isConnected(uint32_t id){ auto nodes=mesh.getNodeList(true); for(auto &&n:nodes) if(n==id) return true; return false; }
void trySendDirect(const String& msg){ if(targetId==0){Serial.println("[WARN] Target not set. Use T:<id>"); return;}
  if(!isConnected(targetId)){ Serial.printf("[WARN] Target %u not connected.\n", targetId); return;}
  bool ok=mesh.sendSingle(targetId, msg); Serial.printf("[TX] to %u ok=%s msg=%s\n", targetId, ok?"true":"false", msg.c_str()); }
```

Output Serial Monitor X

Message (Enter to send message to 'NodeMCU 1.0 (ESP-12E Module)' on 'COM11')

```
20:57:33.472 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:57:33.569 -> ●●●●●m●●●JCOMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163274111,"msg":"Hello (broadcast) from 1163274111"}
20:57:47.609 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
20:57:50.228 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163428109,"msg":"Hello from node 1163428109"}
20:57:50.228 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:57:52.297 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163428109,"msg":"Hello from node 1163428109"}
20:57:52.297 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:57:54.564 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163274111,"msg":"Hello (broadcast) from 1163274111"}
20:57:54.564 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
20:57:54.726 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163428109,"msg":"Hello from node 1163428109"}
20:57:54.726 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:57:56.215 -> COMMUNICATION: sendBroadcast(): msg=HB from 1163274263
20:57:56.635 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163428109,"msg":"Hello from node 1163428109"}
20:57:56.635 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:58:00.522 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163428109,"msg":"Hello from node 1163428109"}
20:58:00.555 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:58:01.556 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163274111,"msg":"Hello (broadcast) from 1163274111"}
20:58:01.556 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
20:58:01.751 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163428109,"msg":"Hello from node 1163428109"}
20:58:01.784 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:58:06.222 -> COMMUNICATION: sendBroadcast(): msg=HB from 1163274263
20:58:06.383 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163428109,"msg":"Hello from node 1163428109"}
20:58:06.383 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:58:08.548 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163274111,"msg":"Hello (broadcast) from 1163274111"}
20:58:08.548 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
20:58:08.870 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163428109,"msg":"Hello from node 1163428109"}
20:58:08.870 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:58:10.622 -> COMMUNICATION: routePackage(): Recvd from 1163274111: {"type":8,"dest":0,"from":1163428109,"msg":"Hello from node 1163428109"}
20:58:10.654 -> [RX] from=1163428109 msg=Hello from node 1163428109
```


2_sendSingle_target | Arduino IDE 2.3.6
File Edit Sketch Tools Help
NodeMCU 1.0 (ESP-12...
2_sendSingle_target.ino
// 2_sendSingle_target.ino
#include <painlessMesh.h>
#define MESH_PREFIX "MeshLabDemo"
#define MESH_PASSWORD "mesh_password123"
#define MESH_PORT 5555
Scheduler userScheduler; painlessMesh mesh;
uint32_t targetId = 0;
Task taskAnnounce(TASK_SECOND * 7, TASK_FOREVER, []{ String msg = String("Hello (broadcast) from ")+mesh.getNodeId(); mesh.sendBroadcast(msg);});
void receivedCallback(uint32_t from, String &msg){ Serial.printf("[RX] from=%u msg=%s\n", from, msg.c_str()); }
void newConnectionCallback(uint32_t nodeId){ Serial.printf("--> New Connection, nodeId = %u\n", nodeId); }
void changedConnectionCallback(){ Serial.printf("Changed connections\n"); }
void nodeTimeAdjustedCallback(int32_t offset){ Serial.printf("Adjusted time %u. Offset = %d\n",(unsigned)mesh.getNodeTime(), offset); }
bool isConnected(uint32_t id){ auto nodes=mesh.getNodeList(true); for(auto &&n:nodes) if(n==id) return true; return false; }
Output Serial Monitor X
Message (Enter to send message to 'NodeMCU 1.0 (ESP-12E Module)' on 'COM15')
20:54:58.637 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:01.842 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:05.857 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:10.851 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:11.923 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:16.680 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:18.885 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:20.925 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:25.881 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:27.208 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:30.997 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:31.968 -> CONNECTION: stationScan(): MeshLabDemo
20:55:32.843 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:33.556 -> CONNECTION: scanComplete(): Scan finished
20:55:33.556 -> CONNECTION: scanComplete():-- > Cleared old APs.
20:55:33.556 -> CONNECTION: scanComplete(): num = 8
20:55:33.556 -> CONNECTION: found : MeshLabDemo, -18dBm
20:55:33.556 -> CONNECTION: Found 1 nodes
20:55:33.588 -> CONNECTION: connectToAP(): Already connected, and no unknown nodes found: scan rate set to slow
20:55:34.528 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:37.281 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:42.310 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:44.415 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:46.613 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:46.938 -> Adjusted time 127233553. Offset = -4769
20:55:46.938 -> Adjusted time 127244079. Offset = 3048
20:55:49.662 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:53.091 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:54.189 -> [RX] from=1163428109 msg=Hello from node 1163428109
20:55:55.294 -> [RX] from=1163428109 msg=Hello from node 1163428109

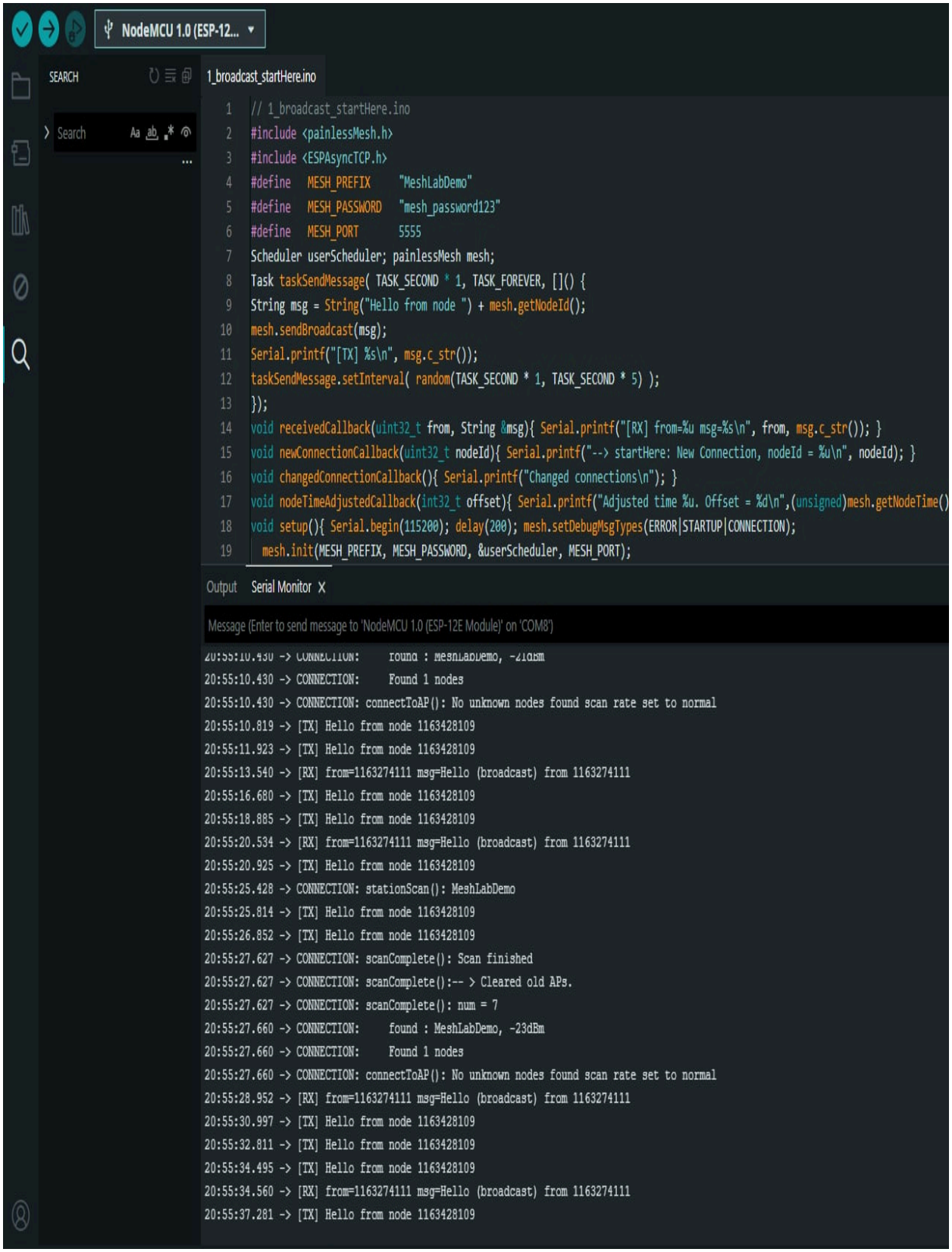
1_broadcast_startHere.ino

```
1   // 1_broadcast_startHere.ino
```

Output Serial Monitor X

Message (Enter to send message to 'NodeMCU 1.0 (ESP-12E Module)' on 'COM8')

```
21:02:10.662 -> [TX] Hello from node 1163428109
21:02:13.546 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
21:02:14.840 -> [TX] Hello from node 1163428109
21:02:16.262 -> [RX] from=1163274263 msg=HB from 1163274263
21:02:16.425 -> [TX] Hello from node 1163428109
21:02:19.108 -> [TX] Hello from node 1163428109
21:02:20.567 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
21:02:21.860 -> [TX] Hello from node 1163428109
21:02:21.893 -> CONNECTION: stationScan(): MeshLabDemo
21:02:24.097 -> CONNECTION: scanComplete(): Scan finished
21:02:24.097 -> CONNECTION: scanComplete():-- > Cleared old APs.
21:02:24.097 -> CONNECTION: scanComplete(): num = 10
21:02:24.097 -> CONNECTION:     found : MeshLabDemo, -21dBm
21:02:24.097 -> CONNECTION:     found : MeshLabDemo, -18dBm
21:02:24.097 -> CONNECTION:     Found 2 nodes
21:02:24.097 -> CONNECTION: connectToAP(): No unknown nodes found scan rate set to normal
21:02:24.451 -> [TX] Hello from node 1163428109
21:02:26.232 -> [RX] from=1163274263 msg=HB from 1163274263
21:02:27.554 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
21:02:28.978 -> [TX] Hello from node 1163428109
21:02:33.537 -> [TX] Hello from node 1163428109
21:02:34.578 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
21:02:36.258 -> [RX] from=1163274263 msg=HB from 1163274263
21:02:37.129 -> [TX] Hello from node 1163428109
21:02:38.835 -> [TX] Hello from node 1163428109
21:02:39.093 -> CONNECTION: stationScan(): MeshLabDemo
21:02:41.294 -> CONNECTION: scanComplete(): Scan finished
21:02:41.294 -> CONNECTION: scanComplete():-- > Cleared old APs.
21:02:41.294 -> CONNECTION: scanComplete(): num = 11
21:02:41.326 -> CONNECTION:     found : MeshLabDemo, -19dBm
21:02:41.326 -> CONNECTION:     found : MeshLabDemo, -18dBm
21:02:41.326 -> CONNECTION:     Found 2 nodes
21:02:41.326 -> CONNECTION: connectToAP(): No unknown nodes found scan rate set to normal
21:02:41.552 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
21:02:42.264 -> [TX] Hello from node 1163428109
21:02:43.790 -> [TX] Hello from node 1163428109
21:02:46.251 -> [RX] from=1163274263 msg=HB from 1163274263
21:02:46.579 -> [TX] Hello from node 1163428109
21:02:48.554 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
21:02:50.886 -> Adjusted time 551172413. Offset = 1548
21:02:50.886 -> Adjusted time 551184757. Offset = 3373
21:02:51.245 -> [TX] Hello from node 1163428109
21:02:52.872 -> [TX] Hello from node 1163428109
21:02:55.560 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
```


NodeMCU 1.0 (ESP-12...
SEARCH
Search
1_broadcast_startHere.ino
// 1_broadcast_startHere.ino
#include <painlessMesh.h>
#include <ESPAsyncTCP.h>
#define MESH_PREFIX "MeshLabDemo"
#define MESH_PASSWORD "mesh_password123"
#define MESH_PORT 5555
Scheduler userScheduler; painlessMesh mesh;
Task taskSendMessage(TASK_SECOND * 1, TASK_FOREVER, []() {
String msg = String("Hello from node ") + mesh.getNodeId();
mesh.sendBroadcast(msg);
Serial.printf("[TX] %s\n", msg.c_str());
taskSendMessage.setInterval(random(TASK_SECOND * 1, TASK_SECOND * 5));
});
void receivedCallback(uint32_t from, String &msg){ Serial.printf("[RX] from=%u msg=%s\n", from, msg.c_str()); }
void newConnectionCallback(uint32_t nodeId){ Serial.printf("--> startHere: New Connection, nodeId = %u\n", nodeId); }
void changedConnectionCallback(){ Serial.printf("Changed connections\n"); }
void nodeTimeAdjustedCallback(int32_t offset){ Serial.printf("Adjusted time %u. Offset = %d\n",(unsigned)mesh.getNodeTime()
void setup(){ Serial.begin(115200); delay(200); mesh.setDebugMsgTypes(ERROR|STARTUP|CONNECTION);
mesh.init(MESH_PREFIX, MESH_PASSWORD, &userScheduler, MESH_PORT);
Output
Serial Monitor
Message (Enter to send message to 'NodeMCU 1.0 (ESP-12E Module)' on 'COM8')
20:55:10.430 -> CONNECTION: Found : MeshLabDemo, -21dBm
20:55:10.430 -> CONNECTION: Found 1 nodes
20:55:10.430 -> CONNECTION: connectToAP(): No unknown nodes found scan rate set to normal
20:55:10.819 -> [TX] Hello from node 1163428109
20:55:11.923 -> [TX] Hello from node 1163428109
20:55:13.540 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
20:55:16.680 -> [TX] Hello from node 1163428109
20:55:18.885 -> [TX] Hello from node 1163428109
20:55:20.534 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
20:55:20.925 -> [TX] Hello from node 1163428109
20:55:25.428 -> CONNECTION: stationScan(): MeshLabDemo
20:55:25.814 -> [TX] Hello from node 1163428109
20:55:26.852 -> [TX] Hello from node 1163428109
20:55:27.627 -> CONNECTION: scanComplete(): Scan finished
20:55:27.627 -> CONNECTION: scanComplete():-- > Cleared old APs.
20:55:27.627 -> CONNECTION: scanComplete(): num = 7
20:55:27.660 -> CONNECTION: found : MeshLabDemo, -23dBm
20:55:27.660 -> CONNECTION: Found 1 nodes
20:55:27.660 -> CONNECTION: connectToAP(): No unknown nodes found scan rate set to normal
20:55:28.952 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
20:55:30.997 -> [TX] Hello from node 1163428109
20:55:32.811 -> [TX] Hello from node 1163428109
20:55:34.495 -> [TX] Hello from node 1163428109
20:55:34.560 -> [RX] from=1163274111 msg=Hello (broadcast) from 1163274111
20:55:37.281 -> [TX] Hello from node 1163428109