# Mesh Protocol

## Server

* At start-up the server sends a general broadcast to discover nodes.
* When it receives replies, the server assigns an ID to each node and sends it to them.
* When it needs to send a message to a node it uses flooding to propagate the packet through the network.
* Each packet has:
  + Target address – node that the message should be sent to
  + Time to live – how many hops before the packet expires
  + Packet ID – to avoid the end receiver processing the packet twice
  + Content – whatever you want to send (0’s or 1’s for turning LEDs on and off)
* The server is also constantly checking for new nodes and that all of the known ones are still in range (using the same previous broadcast).

## Nodes

* When it receives the general broadcast from the server it replies with an acknowledgement, if it has not been registered before it will receive another packet with its node ID in the network.
* Flooding is used to send the packet throughout the network:
  + When it receives a packet, it checks the target ID against its own node ID.
  + If there is a match the packet is processed and an acknowledge reply is sent with a target of the server ID.
  + If the target ID does not match it next checks the time-to-live field. If this is not zero it decrements it by one and rebroadcasts the packet. If it is zero it does nothing.
* Server broadcasts and acknowledge replies also use this flooding technique.