Layered Protocols in Click

Implementation of Layered Protocols with Click Modular Router

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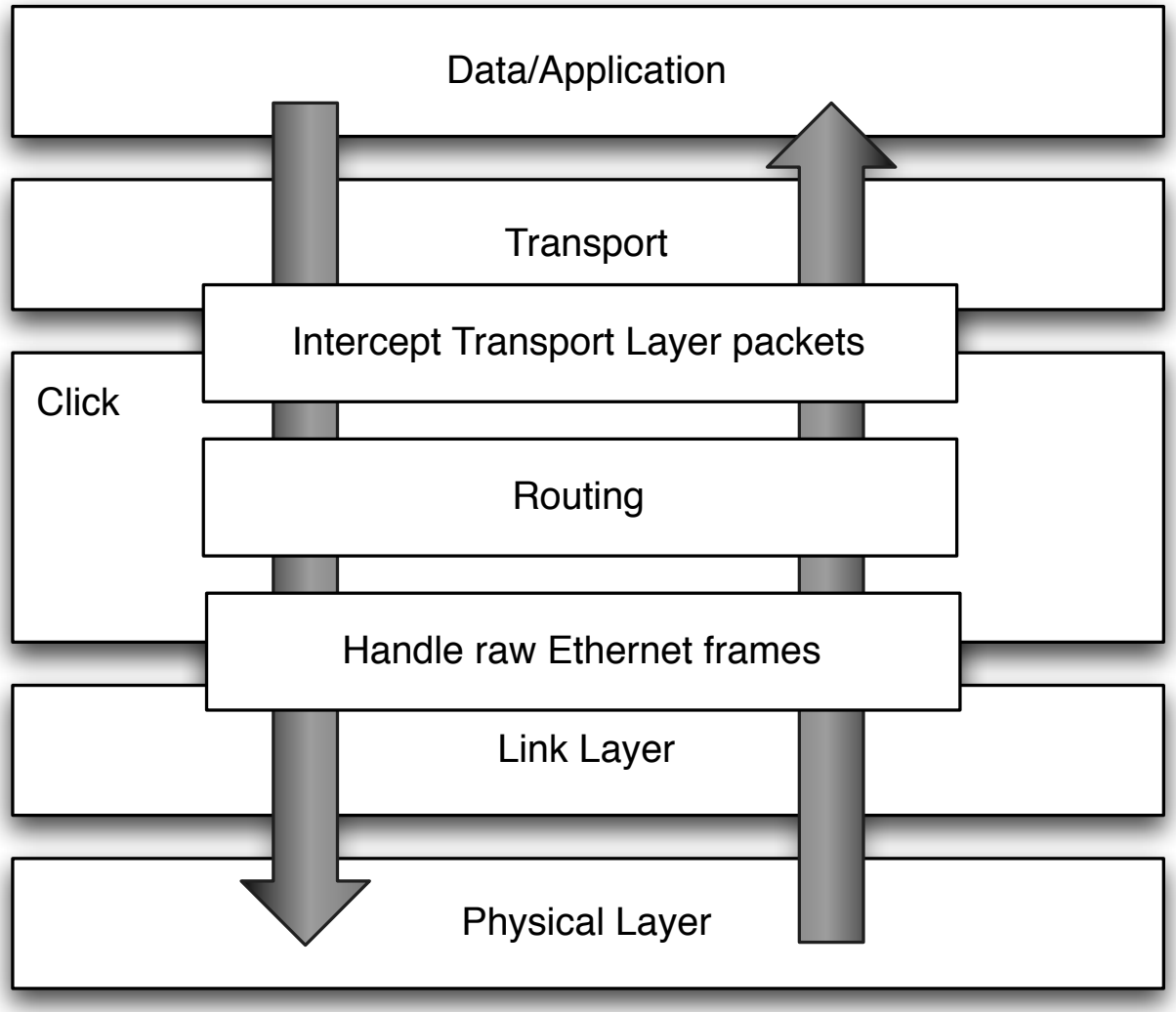
Click in ISO/OSI Reference Model



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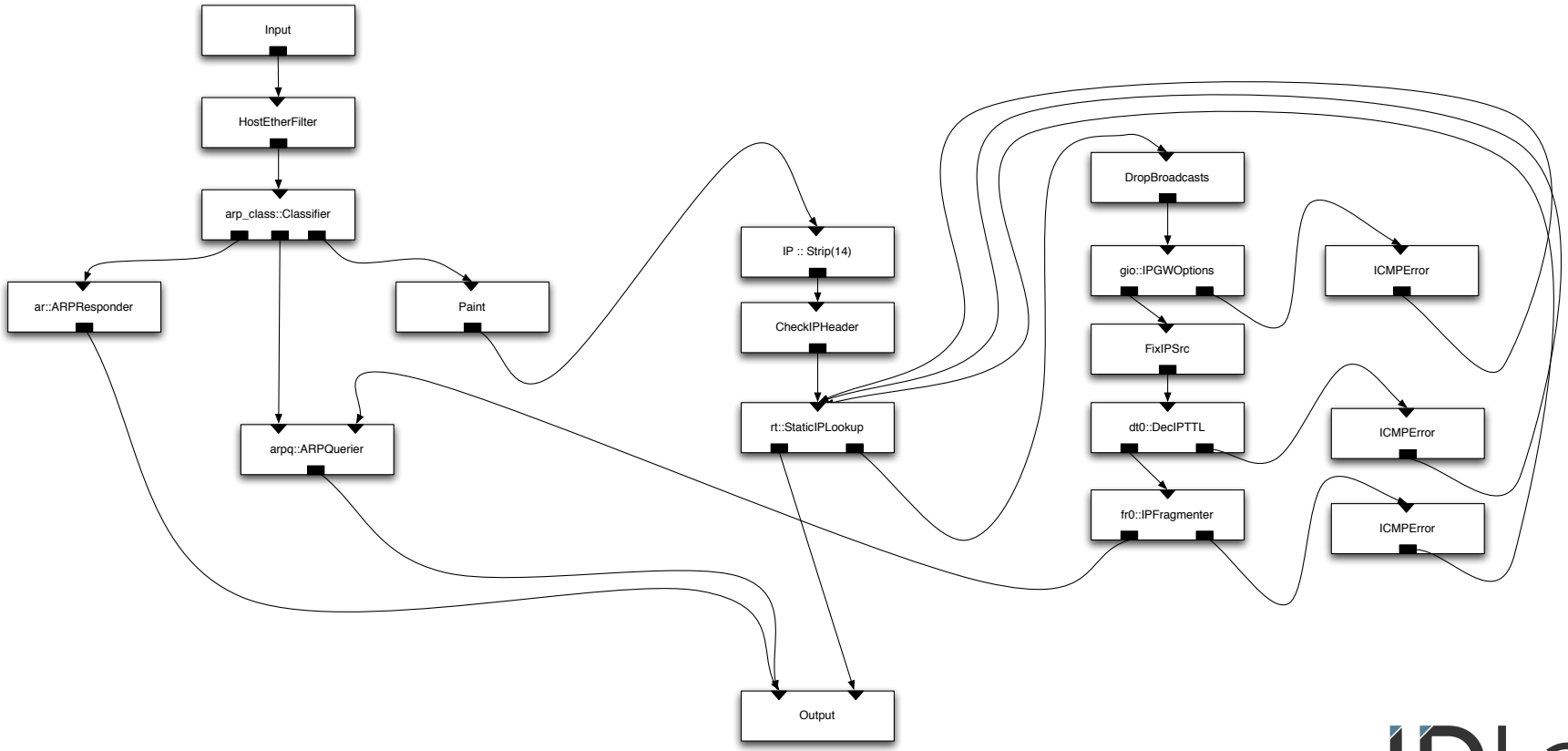
IP Router



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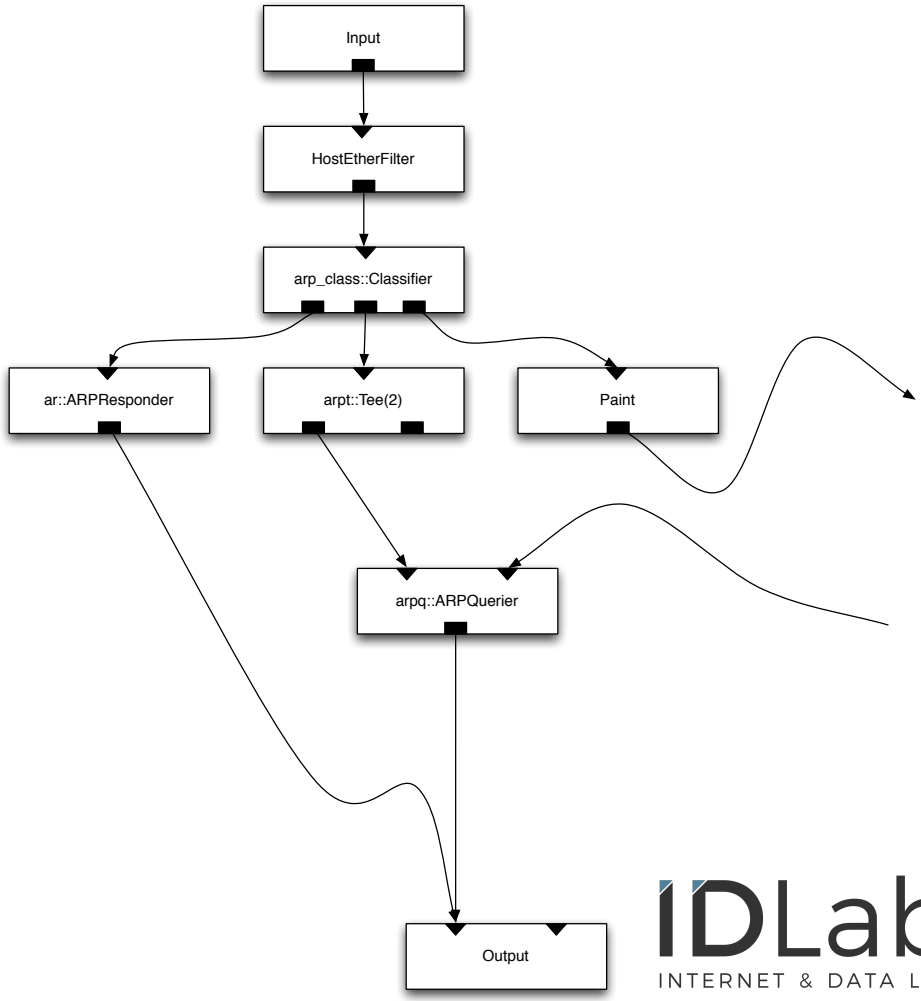
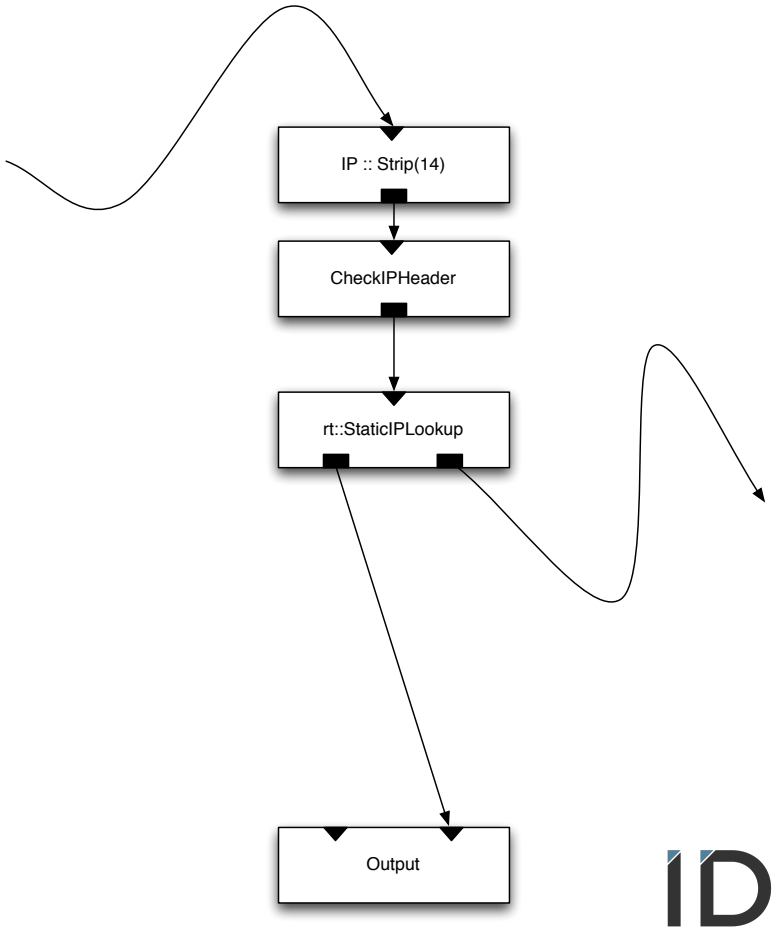
Input Path

- Handles ARP
- Classifies
  - ARP Requests
  - ARP Replies
  - Data



Routing Path

- Remove Ethernet Header
- Check if the IP header is correct
- Routes the packet
  - local
  - forwarding path



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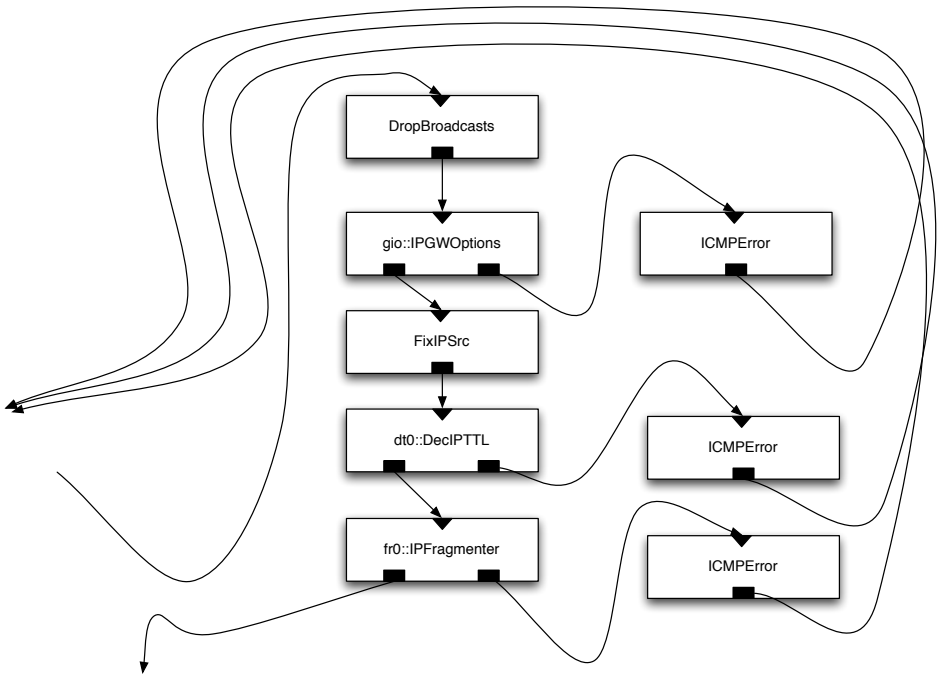
Output Path

- Check if the packet should be forwarded
- If not send an ICMP error
- Routes the packet
  - GW
  - TTL exceeded
  - Fragmentation
- else forward the packet
- via ARPQuerier



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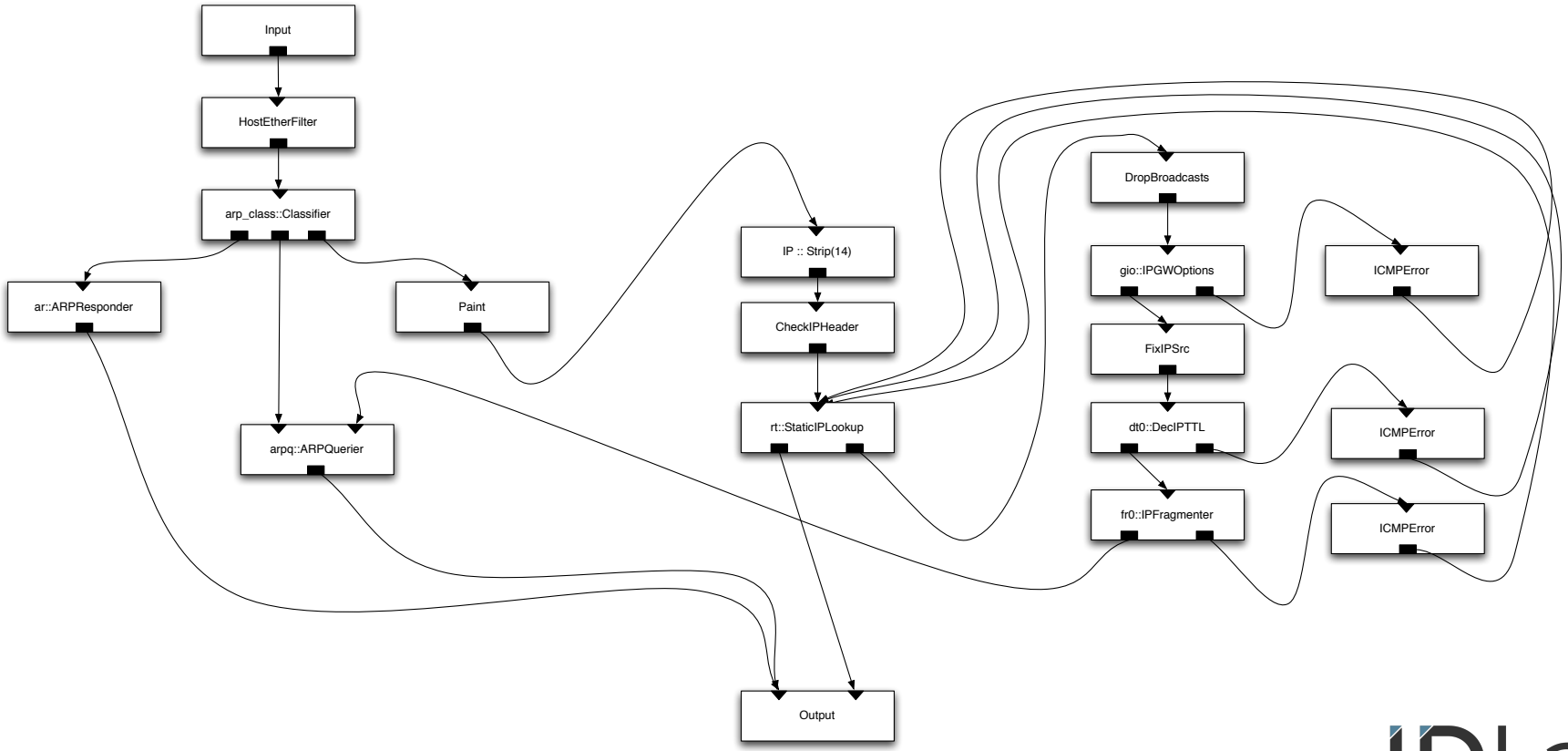
IP Router



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Layered Moded in Click

"With great power comes great responsibility."

- Click receives raw ethernet frames from Layer 2 and handles all the processing up until it is handed to the higher layers.
- Click can also handle Transport layer headers such as intercepting UDP and TCP packets making it possible to implement daemons inside Click.
- The user is in charge of respecting the layered model, not Click.

Try to adhere to the ISO/OSI reference layer as much as possible. This makes sure that the packets you handle are what you expect.

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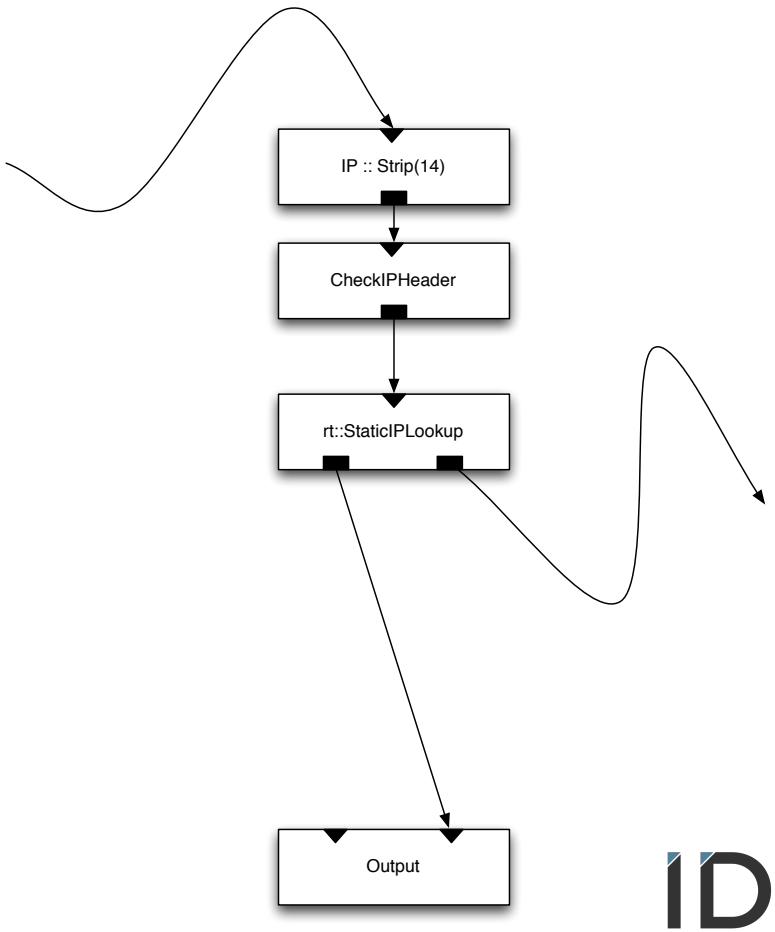
Following the Layered Model

e.g. What if you need to capture UDP packets on port 7.

- Capturing them after the Routing Path decides the packet has reached its destination.
- This ensures that you capture valid IP packets with the correct destination.



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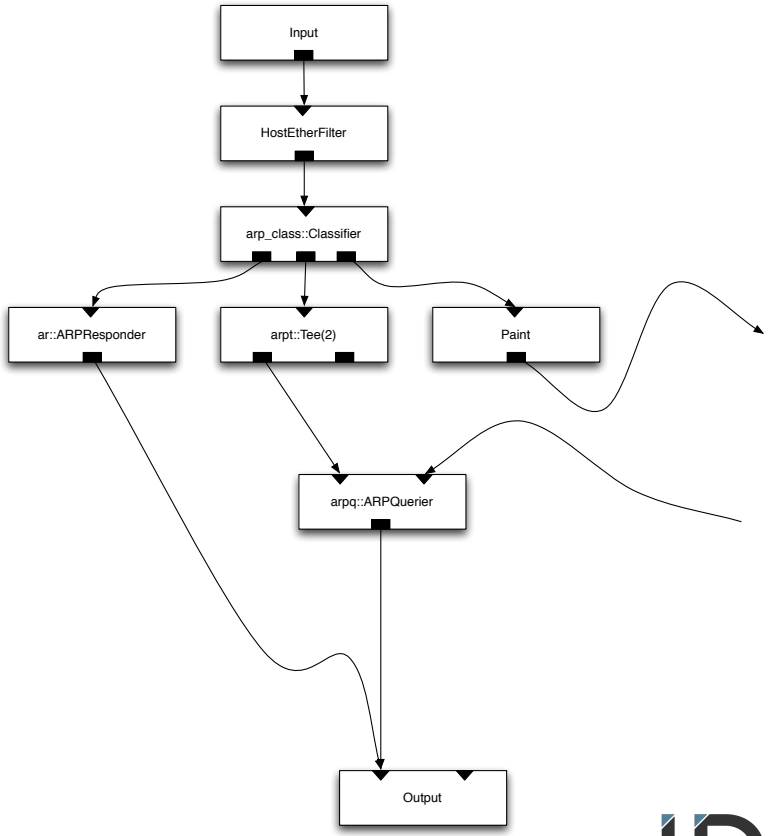
Breaking the Layered Model

If you would capture the packet directly from the input (interface):

- You could be processing the wrong packet the wrong way (e.g. treat an ARP message as UDP).
- You would have to add all these checks yourself in Click or even worse inside your own element.



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