EECS 489 PA1 cont.

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Common questions

- Memory – malloc() or local variable
- How to use vmbuf?
- When to convert byte order?
- How to test your code (especially for task 3)
- Timestamp
- Retransmission corner cases

Memory – malloc() or local variable

- Local variables can be used for most of the cases (use them right away)

  ```
  vip_t vip;
  vif_pullupn(vif, &vip, sizeof(vip_t));
  …
  vtp_input(vrt, &vip.vip_src, buf, len);
  ```

Similar when sending out packet in vip_output()

How to use vmbuf?

- vip_input() -> vip_forw(… , vmbuf);
  - Pack data into vmbuf, pass it along to other functions
- vip_forw(vmbuf) -> vip_drop(… , vmbuf->data);
  - Unpack the data and pass it along to other functions
- vip_output(vmbuf_inner) -> vif_output (vmbuf_outer)
  - vmbuf vmbuf_outer = ip header;
  - vmbuf_outer.vmbuf_next = vmbuf_inner;

When to convert byte order?

- Two invariants:
  - When bytes are going out on wire, it has to be in network byte order.
  - When data are being processed locally, say compare the version field in header, you need host byte order.
- Only needed for short, integer, long, etc.

How to test your code (especially for task 3)

- Send test packets

  ./vrouter –S caen-vnc01 –t 5

To specific destination

  ./vrouter –S caen-vnc01 –t 5–d caen-vnc01

Vary TTL to cause packet drops

  TTL already randomized in test packet, but you can still manually modify it in vtp_test() if you want.

Packet buf & timestamp

```
typedef struct _packet_buf {
        int active;
        vin_addr_t dst;
        int seq;
        char buf[65536];
        int len;
        int timestamp;
        int retry;
} packet_buf_t;
```

Retransmission corner cases

- ACK dropped
- ACK transmitted early enough by receiver, but sender didn't think it is early enough.
  - Duplicate data packets, it's fine to ACK them again.