EECS 489 PA1 cont.

Zhiyun Qian
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)
  
  ```c
  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.