

Administrativia

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Docket

	This Week	Next Week
Mon	Fall Break; No Class No Office Hours Midterm Grades Posted	Lecture: Network Layer Project #3 Returned
Tue		
Wed	Lecture: Network Layer	Lecture: Network Layer
Thu		
Fri		

Completed Work

• I still have grade reports and tests

- Will return on Monday
- If you haven't finished it, switch to project 4

- -s: summary mode
- -l: length mode
- -p: packet printing mode
- -m: trafficmatrix mode

- 6 traces available
 - ranging from I packet (low) ...
 - ... to 8000+ packets (kashmir)

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- Start with small traces and easier modes (e.g., summary mode)
 - move on as your program becomes more capable

- 6 traces available
 - ranging from I packet (low) ...
 - ... to 8000+ packets (kashmir)
- Start with small traces and easier modes (e.g., summary mode)
 - move on as your program becomes more capable
- You'll need to rely on diff

```
od -A d -t u1 low.trace
000000
                54
                             65 192
                                      41 161
                                                              6 128
                                                                      11 152
             0
                      0
                          0
                                                0
                                                                               59
                              74 226 119 215
0000016
                                                        69
                                                                    220
           185
               236 132
                         10
                                                     0
                                                                          42 231
0000032
                                  35
            64
                 0 255
                          6 201
                                      10
                                            1 124
                                                    10 192 168
                                                                      16
                                                                              63
0000048
                99 224 196 173 145 228
                                           43
                                                 2 224
                                                        80
            19
                                                             16 128
                                                                          29
                                                                               11
0000064
             0
                 0
0000066
```

```
od -A d -t u1 low.trace
000000
                              65 192
                                       41 161
                                                              6 128
                54
                                                     2
                                                                      11 152
                          0
                                                 0
                                                                               59
           185
                              74 226 119 215
0000016
               236 132
                                                     0
                                                         69
                                                                     220
                         10
                                                                           42 231
0000032
                                  35
                                                       192 168
                 0 255
                          6
                             201
                                       10
                                            1 124
                                                    10
                                                                               63
            64
                                                                      16
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                99 224 196 173 145 228
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                                                         80
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                                                                           29
                                                                               11
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                              65 192
                                                              6 128
                                                                      11 152
                54
                                       41 161
                                                                               59
                          0
                                                 0
0000016
                              74 226 119 215
                                                        69
                                                                     220
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                                                     0
                                                              0
                                                                          42
                                                                             231
0000032
                          6 201
                                  35
                 0 255
                                       10
                                              124
                                                    10 192 168
                                                                      16
                                                                               63
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0000048
                99 224 196 173 145 228
                                           43
                                                 2 224
                                                         80
                                                             16 128
            19
                                                                           29
                                                                               11
0000064
             0
                 0
0000066
```

od -A d -t	: u1	low	.tra	ce												
0000000	0	54	0	0	65	192	41	161	0	2	7	6	128	11	152	59
0000016	185	236	132	10	74	226	119	215	8	0	69	0	5	220	42	231
0000032	64	0	255	6	201	35	10	1	124	10	192	168	2	16	2	63
0000048	19	99	224	196	173	145	228	43	2	224	80	16	128	0	29	11
0000064	0	0														
0000066																

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0000032	64	0	255	6	201	35	10	1	124	10	192	168	2	16	2	63
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0000064	0	0														
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                                                                     220
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                         10
                                     119 215
                                                         69
                                                                              231
                                   35
0000032
            64
                  0_255
                          6 201
                                       10
                                              124
                                                                       16
                                                                                63
                                                     10 192
                                                            168
                   224 196 173 145 228
0000048
                                           43
            19
                                                 2 224
                                                         80
                                                             16 128
                                                                           29
                                                                                11
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```

9th byte of IP header is TTL TTL = 255

```
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000000
                                                               6 128
                54
                          0
                              65 192
                                       41 161
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               236 132
                              74 226
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                                                         69
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                                                                              231
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                                                     10/192 168
                                              124
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                                                                       16
                                                                                63
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9th byte of IP header is TTL TTL = 255

1st byte of IP header is 4 bits of version and 4 bytes of header len

```
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                                                              6 128
                54
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                                            1 124
0000032
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                                  35
                                                                      16
            64
                                       10
                                                                               63
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0000048
            19
                                           43
                                                             16 128
                                                                           29
                                                                               11
0000064
0000066
```

9th byte of IP header is TTL = 255

1st byte of IP header is 4 bits of version and 4 bytes of header len 69 = 01000101

```
od -A d -t u1 low.trace
000000
                              65 192
                                       41 161
                                                              6 128
                                                                      11 152
                                                                               59
0000016
           185
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                              74 226
                                     119 215
                                                        69
                                                                     220
                                                                              231
                         10
                                                    10/192 168
                                            1 124
                 0_255
                                  35
0000032
                          6 201
                                       10
                                                                      16
                                                                               63
            64
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                                                                           29
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                                       41 161
                                                              6 128
                                                                      11 152
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                                                                              231
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                                            1 124
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                                       10
                                                                      16
                                                                               63
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            19
                                           43
                                                             16 128
                                                                           29
                                                                               11
0000064
0000066
```

9th byte of IP header is TTL = 255

1st byte of IP header is 4 bits of version and 4 bytes of header len 69 = 01000101 version = 0100 = 4 HL = 0101 = 5

od -A d -	-t u2 low.t	trace						
000000	13824	0	49217	41257	512	1543	2944	15256
0000016	60601	2692	57930	55159	8	69	56325	59178
0000032	64	1791	9161	266	2684	43200	4098	16130
0000048	25363	50400	37293	11236	57346	4176	128	2845
0000064	0							
0000066								

od -A d -	t u2 low.t	crace						
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0000064	0											
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000000
             13824
                               49217
                                        41257
                                                   512
                                                           1543
                                                                    2944
                                                                            15256
             60601
0000016
                       2692
                                        55159
                                                              69
                                                                   56325
                                                                            59178
                               57930
0000032
                 64
                       1791
                                9161
                                          266
                                                          43200
                                                                    4098
                                                  2684
                                                                            16130
0000048
             25363
                      50400
                               37293
                                        11236
                                                           4176
                                                                             2845
                                                 57346
0000064
                  0
0000066
```

1st and 2nd bytes of TCP header represents the source port 16130 is in network byte order actual value is 575

```
% python
Python 2.7.10 (default, Oct 23 2015, 19:19:21)
[GCC 4.2.1 Compatible Apple LLVM 7.0.0 (clang-700.0.59.5)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> import socket
>>> socket.ntohs (16130)
575
```

- thunder.trace
 - make sure you can deal with this one
 - all sorts of oddities and crazy situations

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 - all sorts of oddities and crazy situations

- kashmir.trace
 - sort -m output ...
 - ./proj4 -m -t kashmir.trace |sort > my.m.out
 - diff kashmir-m.out my.m.out

Questions??