

Routing Recitation #3

COS 461: Computer Networks
Spring 2013

1

Outline

- Fork()
- Wireshark
- Practice routing questions

2

Handle Multiple Clients using fork()

- Steps to handle multiple clients
 - Go to a loop and accept connections using `accept()`
 - After a connection is established, call `fork()` to create a new child process to handle it
 - Go back to listen for another socket in the parent process
 - `close()` when you are done

3

```
while (1) {
    fd = accept (srv_fd, (struct sockaddr *) &caddr, &scen);
    ...
    pid = fork(); children++;
    /* child process to handle request */
    if (pid == 0) {
        /* exit(0) on success, exit(1) on error */
    }
    /* parent process */
    else if (pid > 0) {
        while ((waitpid(-1, &status, WNOHANG)) > 0)
            children--;
        if (children > MAX_PROCESSES)
            ...
    }
    else {
        perror("ERROR on fork");
        exit(1);
    }
}
```

4

Wireshark

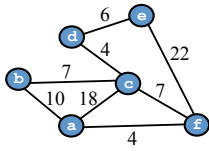
- Selecting and listening on interface
 - Root for promiscuous mode: sniff on neighbors!
- Writing filters to select packets
 - “udp.dstport == 53”, “http.request_method is present”
- Examining packet formats
 - Look at Ethernet, IP, TCP, HTTP headers
- Following TCP streams
 - Trace HTTP request(s) belonging to a TCP connection

5

Questions

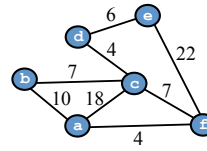
6

Link State (Dijkstra's)



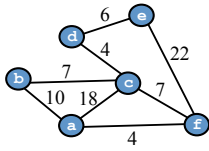
dest	link
b	(a,?)
c	(a,?)
d	(a,?)
e	(a,?)
f	(a,?)

Link State (Dijkstra's)



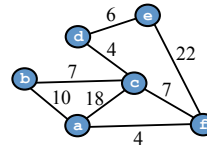
dest	link
b	(a,b)
c	(a,?)
d	(a,?)
e	(a,?)
f	(a,?)

Link State (Dijkstra's)



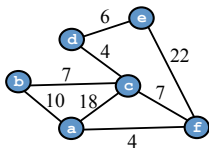
dest	link
b	(a,b)
c	(a,f)
d	(a,?)
e	(a,?)
f	(a,?)

Link State (Dijkstra's)



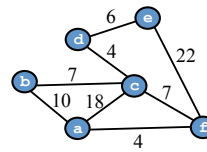
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b	(a,b)
c	(a,f)
d	(a,f)
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f	(a,?)

Link State (Dijkstra's)



dest	link
b	(a,b)
c	(a,f)
d	(a,f)
e	(a,f)
f	(a,?)

Link State (Dijkstra's)



dest	link
b	(a,b)
c	(a,f)
d	(a,f)
e	(a,f)
f	(a,f)

Which routing protocol requires the least amount of state on the router?

- a) link state
- b) distance vector
- c) path vector

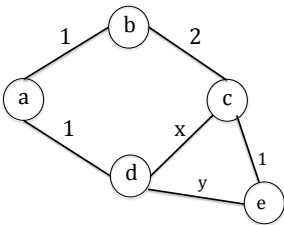
13

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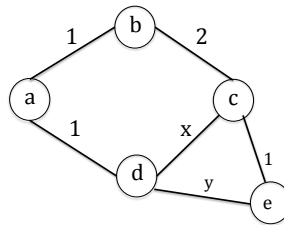
14

Which of the following, if true, ensures packets from a to e always traverse c?



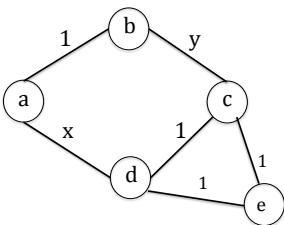
- A. $y > 3$
- B. $y > x + 1$
- C. $y > x$
- D. A or B

Which of the following, if true, ensures packets from a to e always traverse c?



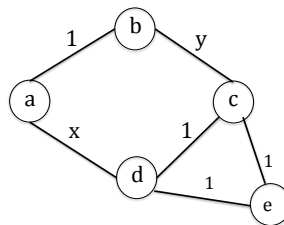
- A. $y > 3$
- B. $y > x + 1$
- C. $y > x$
- D. A or B

Which of the following, if true, ensures packets from b to e always traverse d?



- A. $y > 2$
- B. $y > x + 1$
- C. $y > x$
- D. A or B

Which of the following, if true, ensures packets from b to e always traverse d?



- A. $y > 2$
- B. $y > x + 1$
- C. $y > x$
- D. A or B

Distance Vector Routing

Initial Routing table at E

Destination	Cost	Next Hop
A		
B		
C		
D		

Distance Vector Routing

Initial Routing table at E

Destination	Cost	Next Hop
A	Inf	---
B		
C		
D		

Distance Vector Routing

Initial Routing table at E

Destination	Cost	Next Hop
A	Inf	---
B	Inf	---
C		
D		

Distance Vector Routing

Initial Routing table at E

Destination	Cost	Next Hop
A	Inf	---
B	Inf	---
C	11	C
D		

Distance Vector Routing

Initial Routing table at E

Destination	Cost	Next Hop
A	Inf	---
B	Inf	---
C	11	C
D	17	D

Distance Vector Routing

Routing table at E after one iteration

Destination	Cost	Next Hop
A	Inf	---
B	Inf	---
C	11	C
D	17	D

Distance Vector Routing

Routing table at E after one iteration

Destination	Cost	Next Hop
A	32	D
B	Inf	---
C	11	C
D	17	D

Distance Vector Routing

Routing table at E after one iteration

Destination	Cost	Next Hop
A	32	D
B	29	C
C	11	C
D	17	D

Distance Vector Routing

Routing table at E after one iteration

Destination	Cost	Next Hop
A	32	D
B	29	C
C	11	C
D	17	D

Distance Vector Routing

Routing table at E after one iteration

Destination	Cost	Next Hop
A	32	D
B	29	C
C	11	C
D	16	C

Distance Vector Routing

Routing table at E after two iterations

Destination	Cost	Next Hop
A	32	D
B	29	C
C	11	C
D	16	C

Distance Vector Routing

Routing table at E after two iterations

Destination	Cost	Next Hop
A	31	D
B	29	C
C	11	C
D	16	C

Distance Vector Routing

Routing table at E after two iterations

Destination	Cost	Next Hop
A	31	C
B	28	C
C	11	C
D	16	C

Distance Vector Routing

Routing table at E after two iterations

Destination	Cost	Next Hop
A	31	C
B	28	C
C	11	C
D	16	C

Distance Vector Routing

Routing table at E after two iterations

Destination	Cost	Next Hop
A	31	C
B	28	C
C	11	C
D	16	C

Distance Vector Routing

For what value of x does the routing table at E not change anymore after two iterations?

(a) For all $X \geq 2$
 (b) For all $X \geq 3$
 (c) For all $X \leq 4$
 (d) For all $X \leq 3$

Distance Vector Routing

For what value of x does the routing table at E not change anymore after two iterations?

(a) For all $X \geq 2$
 (b) For all $X \geq 3$
 (c) For all $X \leq 4$
 (d) For all $X \leq 3$