Data Communication & Computer Networks

Name: AOUN-HAIDER

ID: FA21-BSE-133

Assignment: 02

(1)

$F = 20\text{Gbits} = 20 \times 1024 \text{ Mbits}$

$U_s = 30\text{Mbps}$, $d_i = 2\text{Mbps}$

(1) $N = 10$, $u = 300\text{Kbps}$

$$D_{cs} = \max\{NF/u_s , F/d_{min}\}$$

$$= \max\left\{\frac{10 \times 20 \times 1024}{30}, \frac{20 \times 1024}{2}\right\}$$

$$= \max\{6826, 10240\}$$

$$= 10240$$

$$D_{P2P} = \max\left\{F/u_s , F/d_{min} , NF/\left(u_s + \sum_{i=1}^{N} u_i\right)\right\}$$

$$= \max\left\{\frac{20 \times 1024}{30}, \frac{20 \times 1024}{2}, \frac{10 \times 20 \times 1024}{30 + \left(10 \times \frac{300}{1024}\right)}\right\}$$

$$= \max\{683, 10240, 6221\}$$

$$= 10240$$

(2) $N = 10$, $u = 700\text{Kbps}$

$$D_{cs} = \max\left\{\frac{10 \times 20 \times 1024}{30}, \frac{20 \times 1024}{2}\right\}$$

$$= 10240$$

$$D_{P2P} = max\left\{683, 10240, \frac{10\times20\times1024}{30+\left(10\times\frac{700}{1024}\right)}\right\}$$

$$= 10240$$

(3) $N=10,\ u=2Mbps$

$$D_{cs} = max\left\{\frac{10\times1024\times20}{30}, \frac{20\times1024}{2}\right\}$$

$$= 10240$$

$$D_{P2P} = max\left\{683, 10240, \frac{10\times20\times1024}{30+10\times2}\right\}$$

$$= 10240$$

(4) $N=100,\ u=300Kbps$

$$D_{cs} = max\left\{\frac{100\times20\times1024}{30}, \frac{20\times1024}{2}\right\}$$

$$= max\{68267, 10240\}$$

$$= 68267$$

$$D_{P2P} = max\left\{\frac{20\times1024}{30}, \frac{20\times1024}{2}, \frac{100\times20\times1024}{30+100\times\frac{300}{1024}}\right\}$$

$$= max\{683, 10240, 34536\}$$

$$= 34536$$

(5) $N=100,\ u=700Kbps$

$$D_{cs} = max\left\{\frac{100\times20\times1024}{30}, \frac{20\times1024}{2}\right\}$$

$$= max\{68267, 10240\}$$

$$= 68267$$

$$D_{P2P} = max\left\{683, 10240, \frac{100\times20\times1024}{30+100\times\frac{700}{1024}}\right\}$$

$$= 20826$$

(6) $N = 100, \; u = 2\text{Mbps}$

$$D_{cs} = \max\left\{ \frac{100 \times 20 \times 1024}{30}, \frac{20 \times 1024}{2} \right\}$$

$$= 68267$$

$$D_{P2P} = \max\left\{ 683, 10240, \frac{100 \times 20 \times 1024}{30 + 100 \times 2} \right\}$$

$$= 10240$$

(7) $N = 1000, \; u = 300\text{Kbps}$

$$D_{cs} = \max\left\{ \frac{1000 \times 20 \times 1024}{30}, \frac{20 \times 1024}{2} \right\}$$

$$= \max\{682667, 10240\}$$

$$= 682667$$

$$D_{P2P} = \max\left\{ \frac{\cancel{1000\times}\, 20 \times 1024}{30}, \frac{20 \times 1024}{2}, \frac{1000 \times 20 \times 1024}{30 + 1000 \times \frac{300}{1024}} \right\}$$

$$= \max\{683, 10240, 63411\}$$

$$= 63411$$

(8) $N = 1000, \; u = 700\text{ Kbps}$

$$D_{cs} = \max\{682667, 10240\} = 682667$$

$$D_{P2P} = \max\left\{ 683, 10240, \frac{1000 \times 20 \times 1024}{30 + 1000 \times \frac{700}{1024}} \right\}$$

$$= 2770$$

(9) $N = 1000, \; u = 2\text{Mbps}$

$$D_{cs} = 682667$$

$$D_{P2P} = \max\{683, 10240, 10{,}089\} = 10240$$

Client Server:

		N = 10	N = 100	N = 1000
u	300 Kbps	10240	68267	682,667
	700 Kbps	10240	68267	682,667
	2 Mbps	10240	68267	682,667

Peer to peer:

		N = 10	N = 100	N = 1000
u	300 Kbps	10240	34536	63411
	700 Kbps	10240	20826	2870
	2 Mbps	10240	10240	10240

(2)

An e-commerce site can use cookies to maintain a purchase record for each of its customers. Cookies are small pieces of data that are stored on a user's computer by a web browser and are often used to store information for various purposes including tracking activity and preferences.

1) Creating a Cookie:

When a user makes a purchase on the e-commerce site, the server can create a cookie to store relevant information about the purchase. This information might include the order number, product details, purchase date and any other relevant information that e-commerce site wishes to track.

2) Setting the cookie:

The server then sends this cookie to the user's browser. The cookie is typically set with an expiration date to determine how long the information should be stored on the user's device. For example, the cookie may expire in a few days, weeks or even months depending on the e-commerce site's need.

3) Storing purchase records:

As the user continues to make purchases on the e-commerce site, additional cookie can be created and set, each containing information about a specific purchase. These cookies accumulate in the user's browser, effectively creating a purchase history for that particular customer.

4) Accessing purchase records:

when the customer returns to the e-commerce site, the website can access the cookies stored on the user's device to retrieve their purchase history. This allows the e-commerce site to provide personalized recommendations, order tracking and other services based on the user's previous purchase

(3)

a) $T_{ip} = RTT\_1 + RTT\_2$

$= 2 + 14$

$= 16 msec$

$T_{conn} = 2 \times RTT\_HTTP$

$= 2 \times 26$

$= 52 msec$

$T_o = Num\_of.object \times T_{conn}$

$= 9 \times 52 = 468 msec$

$T = T_{ip} + T_{conn} + T_o$

$= 16 msec + 52 msec + 468 msec$

$T = 536 msec$

b)

$T_o = 2 \times RTT\_HTTP$

$= 52 msec$

$T_{conn} = 52 msec$

$T_{ip} = 16 msec$

$T = T_{ip} + T_{conn} + T_o$

$= 16 msec + 52 msec + 52 msec$

$T = 120 msec$

(1)

b)