

Data Networks - (DCCN) -

Sessional - 1:

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Date: 22/10/20

Ques 1:

a) A (distributed hash table) (DHT) is a distributed system, 'key value' pairs are stored in a (DHT) and any active node can efficiently retrieve the value associated with that given key. nodes can also be added or removed with minimum or no work around re-distributing keys.

The properties that make it efficient are:

- Fault tolerance
- Scalability etc.

→ Peer to Peer overlay networks enable peers that are participating to find the other peers not by their IP Addresses but 'Logical identifiers' which are given to all peers for identification.

Ques 2.

In BitTorrent, a peer picks a random peer and optimistically enlog the peer for a short period of time, Therefore qatmia will eventually be optimistically unthoked by one of the neighbors peers, during which time she receives the chunks from that peer.

Ques 3. recursive DNS Query

In 'Recursive DNS Query' the DNS server will itself fetches all queries/messages and respond back to you by giving the answer.

Scenario.

For instance you open the browser & search for 'www.youtube.com', now the operating system will send query

iterative DNS Query

In an 'iterative Query' the name server will not itself fetches the complete answer, but will give a referral to other DNS servers.

Scenario.

If the DNS server is an iterative one, it will respond back to us if it has the answer

to DNS Server i.e (192.16.200 in the records
30).

The DNS Server, after
receiving the Query, will
look for it in cache
memory to find IP
address for domain.

→ In case, it does not
have the answer, it
sends query to one of
the 'Root DNS Server'
for the solution.

Advantages.

Recursive DNS queries
are faster to get
resolved than iterative
ones - This may
be due to cache
memory/storage.

otherwise give a referral
to root servers, also
it will not query to
the root servers

Itself, rather our
operating system
resolver will do
this job.

In iterative Query,
client is responsible
for sending query to
servers until the
query gets resolved.

Ques 4. d. parallel processing.

advantages:

- improved speed of processing.
- multiple connections
- it opens multiple ways for HTTP transactions.

disadvantages:

- Power consumption is huge by using multi-core architectures.
- Communication of having inappropriate results sometimes.
- better coding technologies are required in case of clusters.
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Ques 5: e

- The DHT is a single giant tracker, less fragmented than many trackers so, many peers more likely to find each other.
- classic Bit-torrent tracker is a single point of failure
→ legal attacks.

→ BT client
→ key
→ value
to

Ques 3.

F =
μs
di =
FOR. N =

FOR N

• DOS attacks

→ BT clients use DHT;

→ key = file content hash

→ value = ip address of peer willing/able to serve file

Ques 3.

$$F = 35 \text{ Gbits} = 35840 \text{ Mbits}$$

Q3

Server
For Server

$$F = 35 \text{ Gbits} = 35 \times 1024 = 35840 \text{ Mbits}$$

$$u_s = 60 \text{ Mbps}, d_i = 4 \text{ Mbps}$$

$$N = 50, 200, 2000$$

$$D_{c-s} = \max \left\{ \frac{NF}{u_s}, \frac{F}{d_{\min}} \right\}$$

For $N=50$,

$$D_{c-s} = \max \left\{ \frac{50 \times 35840}{60}, \frac{35840}{4} \right\}$$
$$= \{ 29866.66, 8960 \}$$

$$D_{c-s} = 29866.6$$

For $N=200$,

$$D_{c-s} = \max \left\{ \frac{200 \times 35840}{60}, \frac{35840}{4} \right\}$$

$$D_{c-s} = \max \{ 119466.6, 8960 \}$$

$$D_{c-s} = 119466.6$$

For $N=2000$,

$$D_{c-s} = \max \left\{ \frac{2000 \times 35840}{60}, 8960 \right\}$$

$$D_{c-s} = \max \{ 1194666.6, 8960 \}$$

Peer to Peer.

$$D_{pp} = \max \left\{ \frac{F_i}{u_i}, \frac{F_i}{u_{\min}}, \frac{NF(46 + 24)}{100} \right\}$$

$$\text{for } n = 50$$

$$= \max \left\{ \frac{35840}{60}, \frac{35840}{0.6}, \frac{50 \times 35840}{(60 + \frac{50}{2} \times 0.6)} \right\}$$

$$P_{2p} = \max \{ 59733, 59733, 3025600 \}$$

for $n = 200$,

$$D_{pp} = \max \left\{ \frac{35840}{60}, \frac{35840}{0.6}, \frac{200 \times 35840}{(60 + \frac{200}{2} \times 0.6)} \right\}$$

$$\{ 59733, 59733, 645120000 \}$$