

Unit 7 - Week 05: Keeping <Key, Value> Pairs at Correct Root Nodes, Abrupt and Graceful Exit of Root Node, Resilience of <Key, Value> Pairs, Distributed File System, Storage Space Problem and Incentives to Share Storage

Course outline
How does an NPTEL online course work?
Week 0
Week 01: P2P Networks – Motivation, Basics – Cryptographic Hash, Public Key Cryptography Principles, Security Certificates, Structured and Unstructured P2P Networks, Inconsistent Hashing, Consistent Hashing, Rendezvous Hashing, Locality Preserving Hashing, Distributed Hash Tables
Week 02: Logarithmic Partitioning of Node ID Space and Index Entry Authenticity, Implementation of Voice Over Internet Telephony in P2P Way, Leaf node, Core node and Type of Messages in DHT Networks, Static and Dynamic Partitioning of Node ID Space: Fixed and floating partitioning
Week 03: DHT Routing Protocol : Pastry and Kademlia
Week 04: Tapestry Routing Protocol, Multi-dimensional Distributed Hash Table, and Multi-Layer DHT
Week 05: Keeping <Key, Value> Pairs at Correct Root Nodes, Abrupt and Graceful Exit of Root Node, Resilience of <Key, Value> Pairs, Distributed File System, Storage Space Problem and Incentives to Share Storage
<input type="radio"/> Lecture 15: Keeping <Key, Value> Pairs at Correct Root Nodes <input checked="" type="radio"/> Lecture 16: Abrupt and Graceful Exit of Root Node: Maintaining <Key, Value> Pairs Alive <input type="radio"/> Lecture 17: Resilience of <Key, Value> Pairs <input type="radio"/> Lecture 18: A P2P Distributed File System <input checked="" type="radio"/> Lecture 19: Storage Space Problem and incentives to Share Storage <input type="radio"/> Quiz : Assignment_5 <input type="radio"/> Feedback For Week 5 <input checked="" type="radio"/> Solution: Assignment-05
Week 06: P2P Nodes Communications Challenges in Heterogeneous Network Environments, P2P Overlay Multicast, and A Design of P2P Email System
Week 07: P2P Mailing List Services, P2P Web, P2P Search Engine, On Being Anonymous and P2P in Blockchain
Week 08: P2P Anonymous Communication, The Anonymous Communication on the Internet through TOR Network, An Introduction to TOR Browser, Hidden Services on TOR Network, and Summary of the Course
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Assignment_5

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-10-21, 23:59 IST.

- 1) Consider the following statements for a newly joined node in a DHT network. 1 point
- It randomly chooses a node ID. If the chosen node ID is not duplicate, there will be some other node which will be root for the chosen node ID.
 - It uses hash of chosen node ID, as hash ID to find the root node for duplicity check.
 - The node will become responsible for holding some <key, value> pairs which are currently with other nodes.
 - A node will be root of its own node ID irrespective which DHT algorithm is used.

Which of the above statement/s is/are true? Choose the option indicating all the correct statements.

- i, ii
 i, iii
 i, iii, iv
 iii, iv

No, the answer is incorrect.
Score: 0

Accepted Answers:
i, iii, iv

- 2) In the DHT network, when nodes abruptly enter and exit the DHT network, the following are the statements regarding the activity of such a node and system performance. 1 point
- Abruptly enter and exit of the nodes increase the churn rate in the DHT network.
 - The node can always re-enter the DHT network with the same hash id, used before exiting, without checking for duplication.
 - A newly joined nodes can have the same node ID used by another node which had exited the system.
 - When a node exits from a DHT network, <Key, Value> pairs stored with it are restored to new root nodes, using their other copies stored at other root nodes.

Which of the above statement/s is/are true? Choose the option indicating all the correct statements.

- i, ii
 i, iii
 ii, iv
 i, iii, iv

No, the answer is incorrect.
Score: 0

Accepted Answers:
i, iii, iv

- 3) Which of the following statement/s is/are **NOT** true for <key, value> pairs stored in nodes in a DHT system? 1 point
- If somebody wants to find a key, it has to compute hash (key) to get hash ID.
 <key, value> pair will be stored at a responsible node in DHT.
 The responsible node is found by searching for root of hash ID.
 At most one <key, value> pair can exist for a key.

No, the answer is incorrect.
Score: 0

Accepted Answers:
At most one <key, value> pair can exist for a key.

- 4) Which of the following statement/s is/are true when a node exits the DHT network? 1 point
- For graceful exit, there is no churning in the system.
 For abrupt exit, all the other nodes apart from the node which leaves the system, keep retain the same <key, value> pairs as before the exit.
 Entries are never lost; there will always be a backup root node, assuming that probability of back root nodes leaving the network simultaneously is negligible.
 All of the above.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Entries are never lost; there will always be a backup root node, assuming that probability of back root nodes leaving the network simultaneously is negligible.

- 5) Which of the following sentence/s is/are true for the root node selection in DHT routing protocols? 1 point
- For Chord, Tapestry, and Pastry, if the root node for a hash ID fails, then the next root node for that hash ID will be the node that is numerically closer to the hash ID.
 For Tapestry and Pastry, if the root node for a hash ID fails, then the next root node for that hash ID will be the node that is nearer to the failed root node.
 For Chord, if the root node for a hash ID fails, then the next root node for that hash ID will be the node that is nearer from the failed root node as per the chord distance metric.
 For Tapestry and Pastry, if the root node for a hash ID fails, then the next root for that hash ID node will be the node that is nearer from the hash ID as per the corresponding distance metrics.

No, the answer is incorrect.
Score: 0

Accepted Answers:
For Chord, if the root node for a hash ID fails, then the next root node for that hash ID will be the node that is nearer from the failed root node as per the chord distance metric.

For Tapestry and Pastry, if the root node for a hash ID fails, then the next root for that hash ID node will be the node that is nearer from the hash ID as per the corresponding distance metrics.

- 6) Distributed File System (DFS) is one of the applications of P2P networks. Which of the following statement/s is/are true for DFS? 1 point
- DFS allows physically distributed computers to share storage to host each users' independent file system with own name space.
 In DFS, a file name has to be changed when a file's physical storage location varies.
 In DFS, file duplication is not possible.
 The file name in the DFS does not disclose the physical storage location of the file.

No, the answer is incorrect.
Score: 0

Accepted Answers:
DFS allows physically distributed computers to share storage to host each users' independent file system with own name space.

The file name in the DFS does not disclose the physical storage location of the file.

- 7) Consider the following statement about node exit phenomena in P2P networks? 1 point
- Nodes can leave the network either gracefully or ungracefully.
 - When leaving gracefully, a node informs its neighbours about its intention to leave the network before leaving. The node does this by sending a Leave message (understood at the application layer) and all the <key, value> pairs to neighbours for republishing. This allows the neighbours to remove the leaving node from their routing tables immediately.
 - When a node leaves the network ungracefully, it exits the network without informing its neighbours. Therefore, the neighbours must detect for themselves that the node has left.
 - Reasons for ungraceful leaving include the following:
 - The node has crashed,
 - The P2P application has crashed or has been closed down unexpectedly, and
 - Node selfish behaviour.
 - In both graceful and ungraceful departure, the result is that each of the leaving node's direct neighbours has one pointer less in their routing tables.

Which of the above statement/s is/are **NOT** true? Select the correct code.

- i only
 ii, iv
 iii, v
 None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
None of the above

- 8) In peer to peer networks, when a peer no longer wants to be part of a P2P network. It will send a "leave" request to all peers in its routing table. Each of these peers can remove the leaving peer from their routing table. Now, consider the following statements. 1 point
- As routing tables are updated due to leave request message, the routing table exchange is done immediately instead of at the expiry of timer, resulting faster update in the whole network.
 - There will be some nodes who will still learn about the exit at next heartbeat or RT exchange on timer expiry.
 - The entries handed over by the exiting node, should be republished immediately after the exit and <key, value> pairs will still reach to correct root nodes.
 - Once a "leave" message has been sent to all peers in the leaving peer routing table, the peer can safely close down all network connections and shut down.

Which of the above statement/s is/are **NOT** true? Select the correct code.

- i only
 ii, iii
 iv only
 None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
None of the above

- 9) Which of the following statement/s is/are true for proxy root? 1 point
- The proxy root is the node in the DHT that contributes its space to the node that does not have enough space.
 The entries are distributed among the root node and the proxy root node.
 The spill-over table is used to locate the root node.
 All of the above.

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of the above.

- 10) Reputation layer is one of the layers in the DHT. Which of the following statement/s is/are **NOT** true for reputation management in the DHT? 1 point
- Reputation management is done to find out nodes that are not contributing any storage in the DHT.
 If a node is down for a long period, its reputation remains constant with time.
 The nodes who are contributing to the DHT network, have a higher reputation value.
 Incentive mechanisms are used to mitigate the impact of free-riders in the DHT systems.

No, the answer is incorrect.
Score: 0

Accepted Answers:
If a node is down for a long period, its reputation remains constant with time.