Peer to Peer Systems and Blockchains
Academic Year 2020/2021

Mid Term
Sharing content in IPFS: monitoring the bitswap protocol
Deadline 18-04-2021

The assignment requires building a small application to monitor and anayse which peers contribute, and how much, to the download of a content, preferably large, from the IPFS network. In particular, the goals of the assignment are:

- download large files, or folders, from IPFS;
- query the bitswap agent to get the CID of the partners, and query the ledger to know which partners contributed to the download of a file, and how much they contributes;
- *Optional:* detect the location of these peers around the globe.

The application can be developed in any language supporting the IPFS API, such as js-ipfs and go-ipfs, or invoking the IPFS Command Line Interface commands with a script in bash. It is required to submit:

- the code of the application, with the instructions to execute it. If the application has dependencies (e.g. packages, environments etc), provide the required commands to download and configure them (e.g. the package.json file in nodeJs);
- a report describing the experiment, with plots showing the analysis performed, for example the amount of bytes/blocks a peer sent to your IPFS client, for each file you downloaded, a classification of some properties of these peers, etc. Feel free to provide any observations you think is best, and to ignore the peers who did not contribute from the plots, unless you want them for a specific reason.

We report, in the following, a list of high-size content that you can download from IPFS, to perform the experiment:

- Project Apollo Archives (from the web ui in the "Explore" tab)
  CID: QmSnuWmxptJZdLJpKRarxBMS2Ju2oANVrgbr2xWbie9b2D Size: 57GB
- XKCD Comics (from the web ui in the "Explore" tab)
  CID: QmdmQXB2mzChmMeKY47C43LxUdg1NDJ5MWcKMKxDu7RgQm Size: 107MB
- Old Internet files
  CID: QmbsZEvJE8EU51HCUHQg2aem9JNFmFHdva3tGVYutdCXHp SIZE: 210MB
- More datasets here: https://awesome.ipfs.io/datasets/

The second part of the mid term requires to answer the following questions:

- describe at least two differences existing between the classical Kademlia protocol and the version of the protocol used by IPFS.
- describe the main advantages of the distance metric used by Kademlia with respect to other distances, like the ring distance of Chord.

The assignment must be done individually and its deadline is 18 April 2021. If the evaluation of both the mid and of the final term will be positive, the student will be relieved from the oral exam. Submit the assignment through Moodle. Its evaluation will be notified through the Moodle as well.

The assignment is not mandatory, if it is not presented, the student will be required to pass the oral exam.