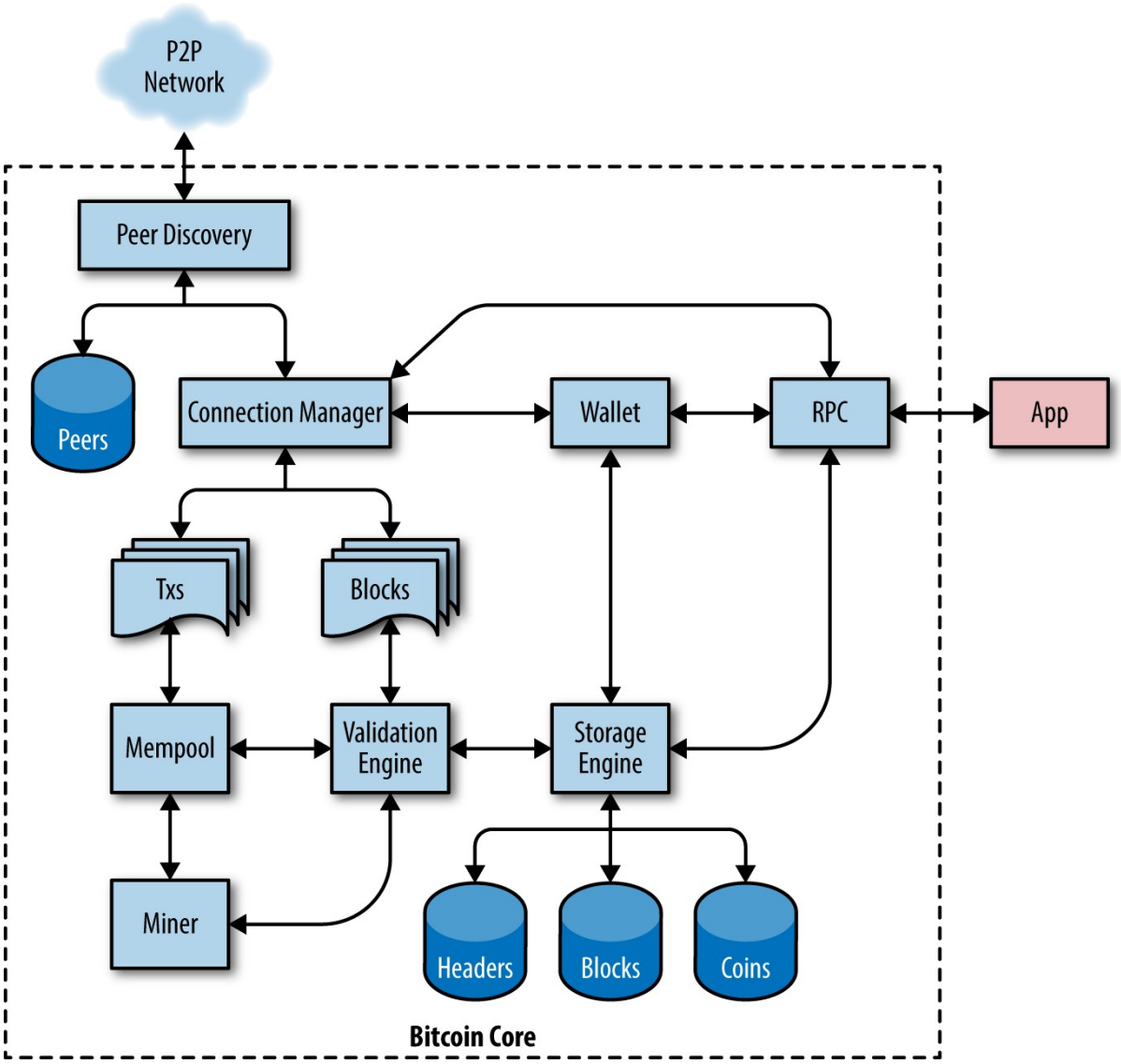
**DLC Lab Session 1: Introduction to Bitcoin Core**

Overview and Resources

Bitcoin Core is the open-source reference implementation of the bitcoin protocol which can be found at https://github.com/bitcoin/bitcoin. It consists of many interconnecting parts. Here is a diagram of the architecture of the system.




In these sessions we will learn about Bitcoin Core and other related tools to become skilled cryptocurrency practitioners. A great place to start for any questions you have about the system is a book called 'Mastering Bitcoin' https://github.com/bitcoinbook/bitcoinbook. To get a developer's introduction to Bitcoin check out this tutorial https://github.com/ChristopherA/Learning-Bitcoin-from-the-Command-Line. A broad list of resources for bitcoin (economics, legal stuff, news sites, and much more) can be found at https://www.lopp.net/bitcoin-information.html.

Tasks

Warning: Don't run Bitcoin without correctly configuring it! The Bitcoin blockchain is 260 GB so before you accidentally overwhelm your computer we will configure how Bitcoin Core runs.

These instructions are written for linux. You can use the lab's machines, or run a virtual linux machine on Windows or MacOS to follow along.

- Download Bitcoin Core from https://bitcoin.org/en/download and extract the files to desktop.
- Use Terminal and navigate to the extracted folder, and into the 'bin' folder which contains the following programs: bitcoin-qt, bitcoind, bitcoin-cli .
    - bitcoin-qt is the graphical user interface which controls your node and wallet.
    - bitcoind is the daemon and will run a bitcoin node as a background process.
    - bitcoin-cli is the command line interface to control bitcoind, the wallet, and similar processes.
- Run the Bitcoin user interface in testnet mode with ./bitcoin-qt -testnet . Bitcoin has three networks; mainnet, testnet, and regtest. Mainnet is peer-to-peer network of users where coins have real market value. Testnet is used for development and has an alternative peer-to-peer network where coins have no market value. Regtest is also for development but with no other peers, it is a local version of bitcoin.
- Open Settings > Options > Main and check 'Prune Block Storage to 1GB'. Now instead of saving the whole blockchain to disk, the software will store a maximum of 1GB and will delete historical blocks, only keeping the most current blocks that it is aware of.
- Go to the Network tab and check 'Connect through SOCKS5 proxy' (this should allow incoming connections through eduroam wifi).
- Go back to the Main tab and click Open Configuration File. When you run bitcoin-qt or bitcoind the software will first read this configuration file and depending on what variables you have it will be run differently. Write testnet=1 and save. Now you don't have to write -testnet every time you run the software.
- Close Bitcoin Core and open again for the changes to take place. It should automatically connect to the test network.
- Explore the user interface and discuss with friends how you might transact with them. Find parts that don't make sense and try to figure out what they are. KCL's firewall may be stopping incoming data from the peer-to-peer network. Did you connect to any peers? Did you send or receive any data?
- Go to Window > Console and type help. You will see all the commands (many that aren't available as buttons on the user interface) that can be used. These are the same commands that are used with bitcoin-cli. The documentation for these commands is at https://bitcoin.org/en/developer-reference.
- If you can't connect to peers in the test network (because KCL restricts the connection) then change the configuration file to run Bitcoin in regtest

mode. Now you can generate blocks locally, mint new Bitcoin, create transactions between addresses in your wallet and inspect the details of blocks and transactions. Go to the console again and type `help generatetoaddress` to get started.