Project – 1

Distributed Bitcoin Mining

Description: This is a distributed Bitcoin mining system based on Actor Model in Erlang.

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Implementation Details:

For Local Implementation-

- Open erl in terminal.
- Compile master.erl .
  >c(master).
- Execute start_mining function in the master module.
  >master:start_mining().
- Enter Input i.e. the required number of zeros.
  >(any positive integer greater than 0).

Note : This generates miners based on cores of the local machine. Multiple miners are spawned which implements distributed-parallel processing on multiple cores.

For Multiple Systems Implementation-

- Start a node on server system.
  >erl -name server_name@ip_address -setcookie key

Note: key is the common cookie and should set as same for all the nodes. Node name is server_name@ip_address.

- Start client node with different machine on same network.
  >erl -name client_name@ip_address -setcookie key
- To connect the nodes with each other.
  >net_adm:ping('Node name').
  Note: This can done on any node, the Node name given should be the other node which needs to be connected.
- Multiple client nodes can be created and connected using the above steps which should share the same cookie given as key.
- The client nodes should have the compiled code of worker.erl i.e. .beam file of worker.erl.
- Connections can be checked using nodes().
- In the server node, compile master.erl.
  >c(master).
- Execute start_mining function in the master module.
  >master:start_mining().
- Enter Input i.e. the required number of zeros.
  >(any positive integer greater than 0).

Implementation Results:

1. Size of the work unit that you determined results in the best performance for your implementation:
   - Miners are 2*(No. of Available Cores)
   - Random Strings checked by each miner is 1 million.

2. The result of running program for input 4.

5> adloorihJXHITnL5azernSA+F2nbcZg4Y3naWM4x
000055c0ca7bf923d1fc12f31109b07a03603dde1712296827cbdebfeb559e69

5> adloorih943vxsfCW/yrBxeDRQuu49CGLtj+sn8R
00003edac91ade856c9f4bca26b062e5bbfe29550abfdf40150d3731d194845d

5> adloorih44HOVz1F9iI1JOX2jIQUc24cBATGC2Mk
000010c00917b123a5c2e71c805a687931255155586aff9052434761765725cb

5> adloorihpCAUEZyM1RNmPJ7nPlBFSModSosTaays
0000f11ae6eb8893c877c8fc77806d45398da865a489401e5edca7344b7c9fe7

5> adloorih5cKs4jz5Tz+zfI2onI6aHlvxMcOGJEzy
0000d7c084abf8567992ac45940be07263dc0a26ab41028359d531d999211dcd

5> adloorih/O5GdpaNjr14VRGHxqAl3Cvtq8SLoefV
0000c2e086d18c90accd6f0c11f0b1694fdcdd830a0a47eced983f80d2102f86

5> adloorih9adecvA8OlJuuTnoWWdQMzMJ3lzEpL8C
00002c4b17b6202621db6cba24528828a186d1e9b39e99074053ae6d35aa2c48

5> adloorihD1BmGvctVoSvFj7uEUCwNN3gZtJrsyOo
0000b72289dae60545392c226fa6d448712e20ed96628d7d87f74c9748bcc558

5> adloorihr5xbt/prXr7zLcv4zqKm3B4UgRzWbxpl
0000bd2594969a9ea48638264208971999d69432b75312cc1029c88d70ac1623

5> adloorihOtj4U4CT+vRqE/VQ4SQtlnI9+/AlRsaw
0000b35269b1392d0dda9fefb34b7e5f8f9b316267f502d9df17a5abd5dad889

5> adloorihlQWK1s1tOz74gXjwRBwiKoFKWaglI1x5
0000b1f9247456ab7395a1d77b4a67830e77801d6dfcd432c756a70f812eab96

5> adloorih85clW5BfX+50k/+ZgIoO3Y7nz+Hc7LI2
000004555aab06ba52e3154166fc75baa04a10efdf4dcb9d462df55d2fdde44c

5> adloorihg1myDwp2qynyYPihX2/7tie9Tkv68X/8
0000280a682ee7031ce5e0a312117e2ba5dd312c7cb5a13a761468095688c5fa

5> adloorihhAKJpWGA2a/eI5CnWDI451abJJXIbpBB
0000a4825a30341cfee85552d116306adb999706a01c2beae96bd9f11d97cedb

5> adloorihR7lUOSpKecqnf9FBztqK0a/9z4nr45wP
0000aa1d8fc9e3030fffeb326971ccf05c014bbe4bc8a8dcdd5f0c61e81b6ec0

5> adloorihPTRnu8CpJFoYBNSfPwQg4pCqSegDHVcC
0000099436bf00de66b04616f86c41deb6d4c8b1447f357aca7b1b161b01eb3a

3. The ratio of CPU Time and Real Time

   Local System Implementation-

   CPU time: 1053.594 seconds
   Real time: 101.264 seconds
   Ratio is **10.404428029704535 (Run on 12 cores Machine)**

   Multiple System Implementation-

   (hru@192.168.0.181)7> CPU time: 1067.687 seconds

   (hru@192.168.0.181)7> Real time: 109.287 seconds

   (hru@192.168.0.181)7> **Ratio is 9.769570031202246**

   (hru@192.168.0.181)7> CPU time: 66.25 seconds

   (hru@192.168.0.181)7> Real time: 6.487 seconds

   (hru@192.168.0.181)7> Ratio of the Node **'gou@192.168.0.242**' is **10.212733158624943**

4. The coin with most zeros found is **8.**

   String:

   adloorihzCINzO/P+QsaZaSvl4lqrimrlmTdvjeR

   Hashed String:

   00000000b08b251f809e04c552bd0b08b80b0eb15d4801fa570b325588b64bf1

5. The largest number of working machines are **3**.