Distributed Algorithms

Report

All the tests and examples were run on the following machine:

**System 1 Tests**

Test 1 Local - nr\_of\_peers = 5, max\_broadcasts = 1000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 1000, timeout: 3000

3: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

1: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

0: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

4: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

2: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

Comments: All messages are delivered, which is to be expected as the number of messages is low

Test 2 Local - nr\_of\_peers = 5, max\_broadcasts = 10\_000\_000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

4: [{126664, 107601}, {126664, 88052}, {126664, 70147}, {126664, 93093}, {126664, 126661}]

2: [{70216, 107585}, {70216, 88052}, {70216, 70146}, {70216, 93093}, {70216, 126662}]

0: [{107796, 107790}, {107796, 88053}, {107796, 70215}, {107796, 93094}, {107796, 126662}]

1: [{88065, 107557}, {88065, 88052}, {88065, 70137}, {88065, 93094}, {88065, 126662}]

3: [{93106, 107788}, {93106, 88052}, {93106, 70214}, {93106, 93093}, {93106, 126662}]

Comments: Not all messages are delivered, which is to be expected as the number of messages is really high and the timeout is short.

Test 3 Local - nr\_of\_peers = 10, max\_broadcasts = 10\_000\_000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

0: [{14685, 14674}, {14685, 13219}, {14685, 16135}, {14685, 21102}, {14685, 23976}, {14685, 13223}, {14685, 16031}, {14685, 13106}, {14685, 13231}, {14685, 11473}]

4: [{23987, 14678}, {23987, 13224}, {23987, 16140}, {23987, 21106}, {23987, 23980}, {23987, 13228}, {23987, 16062}, {23987, 13138}, {23987, 13235}, {23987, 11478}]

2: [{16147, 14673}, {16147, 13219}, {16147, 16134}, {16147, 21102}, {16147, 23976}, {16147, 13223}, {16147, 16030}, {16147, 13105}, {16147, 13230}, {16147, 11473}]

7: [{13188, 14677}, {13188, 13222}, {13188, 16139}, {13188, 21105}, {13188, 23979}, {13188, 13227}, {13188, 16054}, {13188, 13128}, {13188, 13234}, {13188, 11476}]

6: [{16114, 14684}, {16114, 13230}, {16114, 16146}, {16114, 21112}, {16114, 23986}, {16114, 13235}, {16114, 16106}, {16114, 13180}, {16114, 13242}, {16114, 11484}]

3: [{21113, 14677}, {21113, 13222}, {21113, 16138}, {21113, 21105}, {21113, 23979}, {21113, 13227}, {21113, 16053}, {21113, 13128}, {21113, 13234}, {21113, 11477}]

5: [{13236, 14674}, {13236, 13220}, {13236, 16135}, {13236, 21101}, {13236, 23976}, {13236, 13224}, {13236, 16034}, {13236, 13109}, {13236, 13231}, {13236, 11474}]

9: [{11485, 14672}, {11485, 13218}, {11485, 16134}, {11485, 21100}, {11485, 23974}, {11485, 13222}, {11485, 16029}, {11485, 13104}, {11485, 13229}, {11485, 11473}]

1: [{13231, 14679}, {13231, 13225}, {13231, 16141}, {13231, 21107}, {13231, 23981}, {13231, 13230}, {13231, 16065}, {13231, 13141}, {13231, 13236}, {13231, 11479}]

8: [{13243, 14673}, {13243, 13218}, {13243, 16134}, {13243, 21101}, {13243, 23975}, {13243, 13222}, {13243, 16030}, {13243, 13105}, {13243, 13230}, {13243, 11473}]

Comments: Same as test 2

TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO

Test 1 Docker - nr\_of\_peers = 5, max\_broadcasts = 1000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 1000, timeout: 3000

3: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

1: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

0: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

4: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

2: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

Comments:

Test 2 Docker - nr\_of\_peers = 5, max\_broadcasts = 10\_000\_000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

4: [{126664, 107601}, {126664, 88052}, {126664, 70147}, {126664, 93093}, {126664, 126661}]

2: [{70216, 107585}, {70216, 88052}, {70216, 70146}, {70216, 93093}, {70216, 126662}]

0: [{107796, 107790}, {107796, 88053}, {107796, 70215}, {107796, 93094}, {107796, 126662}]

1: [{88065, 107557}, {88065, 88052}, {88065, 70137}, {88065, 93094}, {88065, 126662}]

3: [{93106, 107788}, {93106, 88052}, {93106, 70214}, {93106, 93093}, {93106, 126662}]

Comments:

Test 3 Docker - nr\_of\_peers = 10, max\_broadcasts = 10\_000\_000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

0: [{14685, 14674}, {14685, 13219}, {14685, 16135}, {14685, 21102}, {14685, 23976}, {14685, 13223}, {14685, 16031}, {14685, 13106}, {14685, 13231}, {14685, 11473}]

4: [{23987, 14678}, {23987, 13224}, {23987, 16140}, {23987, 21106}, {23987, 23980}, {23987, 13228}, {23987, 16062}, {23987, 13138}, {23987, 13235}, {23987, 11478}]

2: [{16147, 14673}, {16147, 13219}, {16147, 16134}, {16147, 21102}, {16147, 23976}, {16147, 13223}, {16147, 16030}, {16147, 13105}, {16147, 13230}, {16147, 11473}]

7: [{13188, 14677}, {13188, 13222}, {13188, 16139}, {13188, 21105}, {13188, 23979}, {13188, 13227}, {13188, 16054}, {13188, 13128}, {13188, 13234}, {13188, 11476}]

6: [{16114, 14684}, {16114, 13230}, {16114, 16146}, {16114, 21112}, {16114, 23986}, {16114, 13235}, {16114, 16106}, {16114, 13180}, {16114, 13242}, {16114, 11484}]

3: [{21113, 14677}, {21113, 13222}, {21113, 16138}, {21113, 21105}, {21113, 23979}, {21113, 13227}, {21113, 16053}, {21113, 13128}, {21113, 13234}, {21113, 11477}]

5: [{13236, 14674}, {13236, 13220}, {13236, 16135}, {13236, 21101}, {13236, 23976}, {13236, 13224}, {13236, 16034}, {13236, 13109}, {13236, 13231}, {13236, 11474}]

9: [{11485, 14672}, {11485, 13218}, {11485, 16134}, {11485, 21100}, {11485, 23974}, {11485, 13222}, {11485, 16029}, {11485, 13104}, {11485, 13229}, {11485, 11473}]

1: [{13231, 14679}, {13231, 13225}, {13231, 16141}, {13231, 21107}, {13231, 23981}, {13231, 13230}, {13231, 16065}, {13231, 13141}, {13231, 13236}, {13231, 11479}]

8: [{13243, 14673}, {13243, 13218}, {13243, 16134}, {13243, 21101}, {13243, 23975}, {13243, 13222}, {13243, 16030}, {13243, 13105}, {13243, 13230}, {13243, 11473}]

Comments:

**System 2 Tests**

Test 1 Local - nr\_of\_peers = 5, max\_broadcasts = 1000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 1000, timeout: 3000

4: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

2: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

1: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

3: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

0: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

Comments: The results are the same as for system1, because there is only one extra component and the redirection takes negligible time for this case

Test 2 Local - nr\_of\_peers = 5, max\_broadcasts = 10\_000\_000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

0: [{54774, 25088}, {54774, 27692}, {54774, 18143}, {54774, 14318}, {54774, 12723}]

1: [{59659, 28334}, {59659, 33794}, {59659, 21617}, {59659, 16955}, {59659, 15301}]

3: [{67670, 11333}, {67670, 12952}, {67670, 10960}, {67670, 8068}, {67670, 7391}]

2: [{74033, 9217}, {74033, 10567}, {74033, 9710}, {74033, 6869}, {74033, 6206}]

4: [{64216, 8080}, {64216, 8918}, {64216, 8447}, {64216, 6136}, {64216, 5299}]

Comments: The results are the same as for system1, but because we introduce another component and therefore it takes time to redirect the messages

Test 3 Local - nr\_of\_peers = 10, max\_broadcasts = 10\_000\_000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 10, max\_broadcasts: 10000000, timeout: 3000

0: [{11873, 3977}, {11873, 4168}, {11873, 3194}, {11873, 3707}, {11873, 3024}, {11873, 6275}, {11873, 3406}, {11873, 3094}, {11873, 4939}, {11873, 3215}]

3: [{13597, 4286}, {13597, 4531}, {13597, 3549}, {13597, 4165}, {13597, 3445}, {13597, 6671}, {13597, 3841}, {13597, 3485}, {13597, 5351}, {13597, 3554}]

8: [{11579, 5616}, {11579, 5771}, {11579, 5151}, {11579, 6465}, {11579, 5427}, {11579, 8457}, {11579, 5441}, {11579, 4698}, {11579, 6949}, {11579, 4746}]

7: [{10887, 4152}, {10887, 4355}, {10887, 3370}, {10887, 3950}, {10887, 3258}, {10887, 6475}, {10887, 3618}, {10887, 3288}, {10887, 5146}, {10887, 3385}]

9: [{13920, 3862}, {13920, 4076}, {13920, 3085}, {13920, 3576}, {13920, 2883}, {13920, 6155}, {13920, 3331}, {13920, 2998}, {13920, 4852}, {13920, 3097}]

4: [{15369, 3398}, {15369, 3578}, {15369, 2646}, {15369, 2988}, {15369, 2395}, {15369, 5672}, {15369, 2702}, {15369, 2430}, {15369, 4447}, {15369, 2647}]

5: [{15779, 4615}, {15779, 4841}, {15779, 3927}, {15779, 4779}, {15779, 3949}, {15779, 7098}, {15779, 4146}, {15779, 3721}, {15779, 5652}, {15779, 3834}]

6: [{15014, 2896}, {15014, 3085}, {15014, 2093}, {15014, 2391}, {15014, 1901}, {15014, 4926}, {15014, 2169}, {15014, 2007}, {15014, 3883}, {15014, 2162}]

1: [{14353, 3543}, {14353, 3746}, {14353, 2799}, {14353, 3197}, {14353, 2548}, {14353, 5854}, {14353, 2882}, {14353, 2606}, {14353, 4598}, {14353, 2785}]

2: [{16384, 3087}, {16384, 3252}, {16384, 2293}, {16384, 2585}, {16384, 2038}, {16384, 5204}, {16384, 2331}, {16384, 2138}, {16384, 4086}, {16384, 2344}]

Comments: Same for test2

TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO

Test 1 Docker - nr\_of\_peers = 5, max\_broadcasts = 1000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 1000, timeout: 3000

3: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

1: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

0: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

4: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

2: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

Comments:

Test 2 Docker - nr\_of\_peers = 5, max\_broadcasts = 10\_000\_000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

4: [{126664, 107601}, {126664, 88052}, {126664, 70147}, {126664, 93093}, {126664, 126661}]

2: [{70216, 107585}, {70216, 88052}, {70216, 70146}, {70216, 93093}, {70216, 126662}]

0: [{107796, 107790}, {107796, 88053}, {107796, 70215}, {107796, 93094}, {107796, 126662}]

1: [{88065, 107557}, {88065, 88052}, {88065, 70137}, {88065, 93094}, {88065, 126662}]

3: [{93106, 107788}, {93106, 88052}, {93106, 70214}, {93106, 93093}, {93106, 126662}]

Comments:

Test 3 Docker - nr\_of\_peers = 10, max\_broadcasts = 10\_000\_000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

0: [{14685, 14674}, {14685, 13219}, {14685, 16135}, {14685, 21102}, {14685, 23976}, {14685, 13223}, {14685, 16031}, {14685, 13106}, {14685, 13231}, {14685, 11473}]

4: [{23987, 14678}, {23987, 13224}, {23987, 16140}, {23987, 21106}, {23987, 23980}, {23987, 13228}, {23987, 16062}, {23987, 13138}, {23987, 13235}, {23987, 11478}]

2: [{16147, 14673}, {16147, 13219}, {16147, 16134}, {16147, 21102}, {16147, 23976}, {16147, 13223}, {16147, 16030}, {16147, 13105}, {16147, 13230}, {16147, 11473}]

7: [{13188, 14677}, {13188, 13222}, {13188, 16139}, {13188, 21105}, {13188, 23979}, {13188, 13227}, {13188, 16054}, {13188, 13128}, {13188, 13234}, {13188, 11476}]

6: [{16114, 14684}, {16114, 13230}, {16114, 16146}, {16114, 21112}, {16114, 23986}, {16114, 13235}, {16114, 16106}, {16114, 13180}, {16114, 13242}, {16114, 11484}]

3: [{21113, 14677}, {21113, 13222}, {21113, 16138}, {21113, 21105}, {21113, 23979}, {21113, 13227}, {21113, 16053}, {21113, 13128}, {21113, 13234}, {21113, 11477}]

5: [{13236, 14674}, {13236, 13220}, {13236, 16135}, {13236, 21101}, {13236, 23976}, {13236, 13224}, {13236, 16034}, {13236, 13109}, {13236, 13231}, {13236, 11474}]

9: [{11485, 14672}, {11485, 13218}, {11485, 16134}, {11485, 21100}, {11485, 23974}, {11485, 13222}, {11485, 16029}, {11485, 13104}, {11485, 13229}, {11485, 11473}]

1: [{13231, 14679}, {13231, 13225}, {13231, 16141}, {13231, 21107}, {13231, 23981}, {13231, 13230}, {13231, 16065}, {13231, 13141}, {13231, 13236}, {13231, 11479}]

8: [{13243, 14673}, {13243, 13218}, {13243, 16134}, {13243, 21101}, {13243, 23975}, {13243, 13222}, {13243, 16030}, {13243, 13105}, {13243, 13230}, {13243, 11473}]

Comments:

**System 3 Tests**

Test 1 Local - nr\_of\_peers = 5, max\_broadcasts = 1000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 1000, timeout: 3000

4: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

0: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

1: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

3: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

2: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

Comments: The results are the same as for system2, which is to be expected at this values

Test 2 Local - nr\_of\_peers = 5, max\_broadcasts = 10\_000\_000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

3: [{185205, 977}, {185205, 4814}, {185205, 3889}, {185205, 910}, {185205, 795}]

4: [{197493, 1081}, {197493, 5069}, {197493, 4087}, {197493, 989}, {197493, 893}]

0: [{187255, 452}, {187255, 4126}, {187255, 3302}, {187255, 536}, {187255, 454}]

1: [{216147, 1670}, {216147, 6032}, {216147, 4992}, {216147, 1615}, {216147, 1362}]

2: [{247167, 1367}, {247167, 5578}, {247167, 4588}, {247167, 1287}, {247167, 1125}]

Comments: The rate of received messages is even lower because we introduce another component to redirect more messages, therefore slowing the message rate

Test 3 Local - nr\_of\_peers = 10, max\_broadcasts = 10\_000\_000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 10, max\_broadcasts: 10000000, timeout: 3000

4: [{90676, 320}, {90676, 234}, {90676, 312}, {90676, 306}, {90676, 312}, {90676, 501}, {90676, 488}, {90676, 337}, {90676, 336}, {90676, 310}]

3: [{90883, 217}, {90883, 164}, {90883, 207}, {90883, 197}, {90883, 193}, {90883, 312}, {90883, 376}, {90883, 229}, {90883, 228}, {90883, 213}]

9: [{63852, 245}, {63852, 184}, {63852, 236}, {63852, 226}, {63852, 226}, {63852, 367}, {63852, 408}, {63852, 258}, {63852, 258}, {63852, 241}]

5: [{70531, 36}, {70531, 36}, {70531, 36}, {70531, 36}, {70531, 36}, {70531, 37}, {70531, 36}, {70531, 36}, {70531, 36}, {70531, 36}]

7: [{67811, 208}, {67811, 159}, {67811, 199}, {67811, 189}, {67811, 186}, {67811, 300}, {67811, 368}, {67811, 221}, {67811, 221}, {67811, 206}]

1: [{67127, 182}, {67127, 140}, {67127, 174}, {67127, 165}, {67127, 158}, {67127, 248}, {67127, 342}, {67127, 193}, {67127, 192}, {67127, 182}]

8: [{68283, 206}, {68283, 157}, {68283, 197}, {68283, 187}, {68283, 183}, {68283, 294}, {68283, 366}, {68283, 219}, {68283, 219}, {68283, 204}]

6: [{74405, 76}, {74405, 71}, {74405, 75}, {74405, 73}, {74405, 71}, {74405, 102}, {74405, 226}, {74405, 83}, {74405, 83}, {74405, 82}]

0: [{67409, 245}, {67409, 183}, {67409, 235}, {67409, 225}, {67409, 224}, {67409, 363}, {67409, 407}, {67409, 258}, {67409, 257}, {67409, 241}]

2: [{90252, 209}, {90252, 159}, {90252, 199}, {90252, 189}, {90252, 187}, {90252, 300}, {90252, 369}, {90252, 222}, {90252, 221}, {90252, 207}]

Comments: Same as test 2

TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO

Test 1 Docker - nr\_of\_peers = 5, max\_broadcasts = 1000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 1000, timeout: 3000

3: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

1: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

0: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

4: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

2: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

Comments:

Test 2 Docker - nr\_of\_peers = 5, max\_broadcasts = 10\_000\_000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

4: [{126664, 107601}, {126664, 88052}, {126664, 70147}, {126664, 93093}, {126664, 126661}]

2: [{70216, 107585}, {70216, 88052}, {70216, 70146}, {70216, 93093}, {70216, 126662}]

0: [{107796, 107790}, {107796, 88053}, {107796, 70215}, {107796, 93094}, {107796, 126662}]

1: [{88065, 107557}, {88065, 88052}, {88065, 70137}, {88065, 93094}, {88065, 126662}]

3: [{93106, 107788}, {93106, 88052}, {93106, 70214}, {93106, 93093}, {93106, 126662}]

Comments:

Test 3 Docker - nr\_of\_peers = 10, max\_broadcasts = 10\_000\_000, timeout = 3000

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

0: [{14685, 14674}, {14685, 13219}, {14685, 16135}, {14685, 21102}, {14685, 23976}, {14685, 13223}, {14685, 16031}, {14685, 13106}, {14685, 13231}, {14685, 11473}]

4: [{23987, 14678}, {23987, 13224}, {23987, 16140}, {23987, 21106}, {23987, 23980}, {23987, 13228}, {23987, 16062}, {23987, 13138}, {23987, 13235}, {23987, 11478}]

2: [{16147, 14673}, {16147, 13219}, {16147, 16134}, {16147, 21102}, {16147, 23976}, {16147, 13223}, {16147, 16030}, {16147, 13105}, {16147, 13230}, {16147, 11473}]

7: [{13188, 14677}, {13188, 13222}, {13188, 16139}, {13188, 21105}, {13188, 23979}, {13188, 13227}, {13188, 16054}, {13188, 13128}, {13188, 13234}, {13188, 11476}]

6: [{16114, 14684}, {16114, 13230}, {16114, 16146}, {16114, 21112}, {16114, 23986}, {16114, 13235}, {16114, 16106}, {16114, 13180}, {16114, 13242}, {16114, 11484}]

3: [{21113, 14677}, {21113, 13222}, {21113, 16138}, {21113, 21105}, {21113, 23979}, {21113, 13227}, {21113, 16053}, {21113, 13128}, {21113, 13234}, {21113, 11477}]

5: [{13236, 14674}, {13236, 13220}, {13236, 16135}, {13236, 21101}, {13236, 23976}, {13236, 13224}, {13236, 16034}, {13236, 13109}, {13236, 13231}, {13236, 11474}]

9: [{11485, 14672}, {11485, 13218}, {11485, 16134}, {11485, 21100}, {11485, 23974}, {11485, 13222}, {11485, 16029}, {11485, 13104}, {11485, 13229}, {11485, 11473}]

1: [{13231, 14679}, {13231, 13225}, {13231, 16141}, {13231, 21107}, {13231, 23981}, {13231, 13230}, {13231, 16065}, {13231, 13141}, {13231, 13236}, {13231, 11479}]

8: [{13243, 14673}, {13243, 13218}, {13243, 16134}, {13243, 21101}, {13243, 23975}, {13243, 13222}, {13243, 16030}, {13243, 13105}, {13243, 13230}, {13243, 11473}]

Comments:

**System 4 Tests**

Test 1 Local - nr\_of\_peers = 5, max\_broadcasts = 1000, timeout = 3000, send\_percentage = 0

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 1000, timeout: 3000

0: [{1000, 0}, {1000, 0}, {1000, 0}, {1000, 0}, {1000, 0}]

4: [{1000, 0}, {1000, 0}, {1000, 0}, {1000, 0}, {1000, 0}]

2: [{1000, 0}, {1000, 0}, {1000, 0}, {1000, 0}, {1000, 0}]

1: [{1000, 0}, {1000, 0}, {1000, 0}, {1000, 0}, {1000, 0}]

3: [{1000, 0}, {1000, 0}, {1000, 0}, {1000, 0}, {1000, 0}]

Comments: The output is to be expected for send\_percentage = 0

Test 2 Local - nr\_of\_peers = 5, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 0

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

1: [{206829, 21}, {206829, 13}, {206829, 29}, {206829, 38}, {206829, 17}]

3: [{273739, 23}, {273739, 23}, {273739, 27}, {273739, 24}, {273739, 11}]

4: [{136996, 21}, {136996, 26}, {136996, 21}, {136996, 30}, {136996, 18}]

0: [{204566, 17}, {204566, 19}, {204566, 27}, {204566, 28}, {204566, 10}]

2: [{223344, 14}, {223344, 24}, {223344, 21}, {223344, 31}, {223344, 19}]

Comments: The output should be the same as in test 1 send\_percentage = 0, but because there is a higher amount of messages send it might be that the random function has a bug which makes it biased.

Test 3 Local - nr\_of\_peers = 10, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 0

Output:

Starting local with nr\_of\_peers: 10, max\_broadcasts: 10000000, timeout: 3000

1: [{40859, 4}, {40859, 6}, {40859, 4}, {40859, 3}, {40859, 9}, {40859, 7}, {40859, 4}, {40859, 7}, {40859, 5}, {40859, 2}]

4: [{73911, 3}, {73911, 4}, {73911, 0}, {73911, 4}, {73911, 7}, {73911, 2}, {73911, 2}, {73911, 5}, {73911, 3}, {73911, 3}]

3: [{55816, 7}, {55816, 5}, {55816, 4}, {55816, 3}, {55816, 7}, {55816, 5}, {55816, 4}, {55816, 4}, {55816, 2}, {55816, 7}]

0: [{48675, 4}, {48675, 8}, {48675, 4}, {48675, 4}, {48675, 4}, {48675, 0}, {48675, 1}, {48675, 4}, {48675, 1}, {48675, 5}]

9: [{61908, 4}, {61908, 4}, {61908, 3}, {61908, 5}, {61908, 8}, {61908, 10}, {61908, 4}, {61908, 4}, {61908, 0}, {61908, 7}]

5: [{38479, 6}, {38479, 3}, {38479, 4}, {38479, 1}, {38479, 4}, {38479, 5}, {38479, 5}, {38479, 2}, {38479, 5}, {38479, 6}]

7: [{47096, 6}, {47096, 4}, {47096, 5}, {47096, 9}, {47096, 12}, {47096, 4}, {47096, 3}, {47096, 9}, {47096, 4}, {47096, 6}]

8: [{40794, 3}, {40794, 0}, {40794, 1}, {40794, 8}, {40794, 11}, {40794, 1}, {40794, 6}, {40794, 3}, {40794, 5}, {40794, 7}]

6: [{38053, 2}, {38053, 3}, {38053, 2}, {38053, 8}, {38053, 9}, {38053, 4}, {38053, 3}, {38053, 4}, {38053, 5}, {38053, 11}]

2: [{46140, 0}, {46140, 1}, {46140, 1}, {46140, 0}, {46140, 1}, {46140, 2}, {46140, 1}, {46140, 1}, {46140, 3}, {46140, 3}]

Comments: Same as for test 2

Test 1 Local - nr\_of\_peers = 5, max\_broadcasts = 1000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 1000, timeout: 3000

0: [{1000, 499}, {1000, 489}, {1000, 506}, {1000, 479}, {1000, 525}]

1: [{1000, 521}, {1000, 525}, {1000, 535}, {1000, 508}, {1000, 518}]

2: [{1000, 481}, {1000, 476}, {1000, 492}, {1000, 527}, {1000, 481}]

4: [{1000, 532}, {1000, 516}, {1000, 489}, {1000, 486}, {1000, 500}]

3: [{1000, 489}, {1000, 500}, {1000, 487}, {1000, 497}, {1000, 502}]

Comments: To be expected, the number of received messages is 50%

Test 2 Local - nr\_of\_peers = 5, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

3: [{174709, 3070}, {174709, 2130}, {174709, 2846}, {174709, 4090}, {174709, 2315}]

4: [{153810, 2148}, {153810, 1515}, {153810, 2112}, {153810, 3284}, {153810, 1621}]

2: [{242905, 2458}, {242905, 1727}, {242905, 2479}, {242905, 3573}, {242905, 1878}]

0: [{162369, 1993}, {162369, 1339}, {162369, 1997}, {162369, 3108}, {162369, 1483}]

1: [{223713, 1366}, {223713, 992}, {223713, 1575}, {223713, 2837}, {223713, 1117}]

Comments: If we compare this result with the previous system we can see that only 50% of the messages have been received

Test 3 Local - nr\_of\_peers = 10, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 10, max\_broadcasts: 10000000, timeout: 3000

8: [{68829, 213}, {68829, 204}, {68829, 238}, {68829, 225}, {68829, 246}, {68829, 384}, {68829, 188}, {68829, 187}, {68829, 193}, {68829, 171}]

5: [{70516, 14}, {70516, 19}, {70516, 14}, {70516, 17}, {70516, 16}, {70516, 13}, {70516, 13}, {70516, 15}, {70516, 16}, {70516, 16}]

1: [{69734, 211}, {69734, 193}, {69734, 232}, {69734, 263}, {69734, 245}, {69734, 394}, {69734, 217}, {69734, 202}, {69734, 203}, {69734, 195}]

7: [{59095, 0}, {59095, 0}, {59095, 0}, {59095, 0}, {59095, 0}, {59095, 0}, {59095, 0}, {59095, 0}, {59095, 0}, {59095, 0}]

3: [{69720, 260}, {69720, 264}, {69720, 306}, {69720, 322}, {69720, 339}, {69720, 502}, {69720, 242}, {69720, 247}, {69720, 260}, {69720, 232}]

9: [{69029, 219}, {69029, 213}, {69029, 264}, {69029, 278}, {69029, 260}, {69029, 422}, {69029, 214}, {69029, 219}, {69029, 226}, {69029, 199}]

0: [{68888, 202}, {68888, 186}, {68888, 217}, {68888, 254}, {68888, 222}, {68888, 368}, {68888, 197}, {68888, 185}, {68888, 195}, {68888, 183}]

6: [{68897, 146}, {68897, 149}, {68897, 170}, {68897, 180}, {68897, 177}, {68897, 282}, {68897, 136}, {68897, 143}, {68897, 161}, {68897, 138}]

4: [{82367, 257}, {82367, 248}, {82367, 303}, {82367, 307}, {82367, 335}, {82367, 512}, {82367, 274}, {82367, 278}, {82367, 274}, {82367, 269}]

2: [{71405, 205}, {71405, 204}, {71405, 242}, {71405, 261}, {71405, 249}, {71405, 402}, {71405, 215}, {71405, 198}, {71405, 188}, {71405, 179}]

Comments: Same as for test 2 send\_percentage = 50

Test 1 Local - nr\_of\_peers = 5, max\_broadcasts = 1000, timeout = 3000, send\_percentage = 100

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 1000, timeout: 3000

0: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

3: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

4: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

1: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

2: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

Comments: The results are identical to the previous system

Test 2 Local - nr\_of\_peers = 5, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 100

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

4: [{191605, 1613}, {191605, 2437}, {191605, 2467}, {191605, 2876}, {191605, 2466}]

2: [{188441, 1977}, {188441, 2898}, {188441, 2962}, {188441, 3302}, {188441, 2914}]

3: [{158487, 1670}, {158487, 2484}, {158487, 2526}, {158487, 2915}, {158487, 2511}]

1: [{208811, 1120}, {208811, 1777}, {208811, 1873}, {208811, 2198}, {208811, 1876}]

0: [{175643, 103}, {175643, 90}, {175643, 90}, {175643, 302}, {175643, 102}]

Comments: There are less received messages compared to the previous system, although the send\_percentage = 100, this could be because the random time function takes more time to evaluate or because it is biased

Test 3 Local - nr\_of\_peers = 10, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 100

Output:

Starting local with nr\_of\_peers: 10, max\_broadcasts: 10000000, timeout: 3000

9: [{59273, 63}, {59273, 63}, {59273, 1247}, {59273, 62}, {59273, 51}, {59273, 67}, {59273, 56}, {59273, 61}, {59273, 62}, {59273, 52}]

8: [{62434, 99}, {62434, 99}, {62434, 1486}, {62434, 84}, {62434, 64}, {62434, 228}, {62434, 85}, {62434, 97}, {62434, 98}, {62434, 65}]

6: [{62476, 98}, {62476, 98}, {62476, 1485}, {62476, 83}, {62476, 64}, {62476, 226}, {62476, 84}, {62476, 96}, {62476, 97}, {62476, 65}]

0: [{53015, 144}, {53015, 143}, {53015, 1547}, {53015, 118}, {53015, 74}, {53015, 298}, {53015, 121}, {53015, 142}, {53015, 143}, {53015, 75}]

7: [{60344, 90}, {60344, 90}, {60344, 1448}, {60344, 78}, {60344, 62}, {60344, 195}, {60344, 77}, {60344, 87}, {60344, 89}, {60344, 63}]

3: [{64629, 99}, {64629, 99}, {64629, 1486}, {64629, 84}, {64629, 65}, {64629, 228}, {64629, 85}, {64629, 97}, {64629, 98}, {64629, 65}]

4: [{74077, 119}, {74077, 119}, {74077, 1518}, {74077, 99}, {74077, 68}, {74077, 263}, {74077, 98}, {74077, 116}, {74077, 119}, {74077, 69}]

2: [{79495, 141}, {79495, 141}, {79495, 1546}, {79495, 116}, {79495, 73}, {79495, 295}, {79495, 119}, {79495, 139}, {79495, 140}, {79495, 74}]

1: [{76740, 89}, {76740, 89}, {76740, 1443}, {76740, 78}, {76740, 63}, {76740, 193}, {76740, 77}, {76740, 86}, {76740, 88}, {76740, 63}]

5: [{78448, 12}, {78448, 12}, {78448, 12}, {78448, 12}, {78448, 12}, {78448, 11}, {78448, 11}, {78448, 11}, {78448, 11}, {78448, 12}]

Comments: Same as for test2 send\_percentage = 100

TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO

Test 1 Docker - nr\_of\_peers = 5, max\_broadcasts = 1000, timeout = 3000, send\_percentage = 0

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 1000, timeout: 3000

3: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

1: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

0: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

4: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

2: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

Comments:

Test 2 Docker - nr\_of\_peers = 5, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 0

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

4: [{126664, 107601}, {126664, 88052}, {126664, 70147}, {126664, 93093}, {126664, 126661}]

2: [{70216, 107585}, {70216, 88052}, {70216, 70146}, {70216, 93093}, {70216, 126662}]

0: [{107796, 107790}, {107796, 88053}, {107796, 70215}, {107796, 93094}, {107796, 126662}]

1: [{88065, 107557}, {88065, 88052}, {88065, 70137}, {88065, 93094}, {88065, 126662}]

3: [{93106, 107788}, {93106, 88052}, {93106, 70214}, {93106, 93093}, {93106, 126662}]

Comments:

Test 3 Docker - nr\_of\_peers = 10, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 0

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

0: [{14685, 14674}, {14685, 13219}, {14685, 16135}, {14685, 21102}, {14685, 23976}, {14685, 13223}, {14685, 16031}, {14685, 13106}, {14685, 13231}, {14685, 11473}]

4: [{23987, 14678}, {23987, 13224}, {23987, 16140}, {23987, 21106}, {23987, 23980}, {23987, 13228}, {23987, 16062}, {23987, 13138}, {23987, 13235}, {23987, 11478}]

2: [{16147, 14673}, {16147, 13219}, {16147, 16134}, {16147, 21102}, {16147, 23976}, {16147, 13223}, {16147, 16030}, {16147, 13105}, {16147, 13230}, {16147, 11473}]

7: [{13188, 14677}, {13188, 13222}, {13188, 16139}, {13188, 21105}, {13188, 23979}, {13188, 13227}, {13188, 16054}, {13188, 13128}, {13188, 13234}, {13188, 11476}]

6: [{16114, 14684}, {16114, 13230}, {16114, 16146}, {16114, 21112}, {16114, 23986}, {16114, 13235}, {16114, 16106}, {16114, 13180}, {16114, 13242}, {16114, 11484}]

3: [{21113, 14677}, {21113, 13222}, {21113, 16138}, {21113, 21105}, {21113, 23979}, {21113, 13227}, {21113, 16053}, {21113, 13128}, {21113, 13234}, {21113, 11477}]

5: [{13236, 14674}, {13236, 13220}, {13236, 16135}, {13236, 21101}, {13236, 23976}, {13236, 13224}, {13236, 16034}, {13236, 13109}, {13236, 13231}, {13236, 11474}]

9: [{11485, 14672}, {11485, 13218}, {11485, 16134}, {11485, 21100}, {11485, 23974}, {11485, 13222}, {11485, 16029}, {11485, 13104}, {11485, 13229}, {11485, 11473}]

1: [{13231, 14679}, {13231, 13225}, {13231, 16141}, {13231, 21107}, {13231, 23981}, {13231, 13230}, {13231, 16065}, {13231, 13141}, {13231, 13236}, {13231, 11479}]

8: [{13243, 14673}, {13243, 13218}, {13243, 16134}, {13243, 21101}, {13243, 23975}, {13243, 13222}, {13243, 16030}, {13243, 13105}, {13243, 13230}, {13243, 11473}]

Comments:

Test 1 Docker - nr\_of\_peers = 5, max\_broadcasts = 1000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 1000, timeout: 3000

3: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

1: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

0: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

4: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

2: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

Comments:

Test 2 Docker - nr\_of\_peers = 5, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

4: [{126664, 107601}, {126664, 88052}, {126664, 70147}, {126664, 93093}, {126664, 126661}]

2: [{70216, 107585}, {70216, 88052}, {70216, 70146}, {70216, 93093}, {70216, 126662}]

0: [{107796, 107790}, {107796, 88053}, {107796, 70215}, {107796, 93094}, {107796, 126662}]

1: [{88065, 107557}, {88065, 88052}, {88065, 70137}, {88065, 93094}, {88065, 126662}]

3: [{93106, 107788}, {93106, 88052}, {93106, 70214}, {93106, 93093}, {93106, 126662}]

Comments:

Test 3 Docker - nr\_of\_peers = 10, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

0: [{14685, 14674}, {14685, 13219}, {14685, 16135}, {14685, 21102}, {14685, 23976}, {14685, 13223}, {14685, 16031}, {14685, 13106}, {14685, 13231}, {14685, 11473}]

4: [{23987, 14678}, {23987, 13224}, {23987, 16140}, {23987, 21106}, {23987, 23980}, {23987, 13228}, {23987, 16062}, {23987, 13138}, {23987, 13235}, {23987, 11478}]

2: [{16147, 14673}, {16147, 13219}, {16147, 16134}, {16147, 21102}, {16147, 23976}, {16147, 13223}, {16147, 16030}, {16147, 13105}, {16147, 13230}, {16147, 11473}]

7: [{13188, 14677}, {13188, 13222}, {13188, 16139}, {13188, 21105}, {13188, 23979}, {13188, 13227}, {13188, 16054}, {13188, 13128}, {13188, 13234}, {13188, 11476}]

6: [{16114, 14684}, {16114, 13230}, {16114, 16146}, {16114, 21112}, {16114, 23986}, {16114, 13235}, {16114, 16106}, {16114, 13180}, {16114, 13242}, {16114, 11484}]

3: [{21113, 14677}, {21113, 13222}, {21113, 16138}, {21113, 21105}, {21113, 23979}, {21113, 13227}, {21113, 16053}, {21113, 13128}, {21113, 13234}, {21113, 11477}]

5: [{13236, 14674}, {13236, 13220}, {13236, 16135}, {13236, 21101}, {13236, 23976}, {13236, 13224}, {13236, 16034}, {13236, 13109}, {13236, 13231}, {13236, 11474}]

9: [{11485, 14672}, {11485, 13218}, {11485, 16134}, {11485, 21100}, {11485, 23974}, {11485, 13222}, {11485, 16029}, {11485, 13104}, {11485, 13229}, {11485, 11473}]

1: [{13231, 14679}, {13231, 13225}, {13231, 16141}, {13231, 21107}, {13231, 23981}, {13231, 13230}, {13231, 16065}, {13231, 13141}, {13231, 13236}, {13231, 11479}]

8: [{13243, 14673}, {13243, 13218}, {13243, 16134}, {13243, 21101}, {13243, 23975}, {13243, 13222}, {13243, 16030}, {13243, 13105}, {13243, 13230}, {13243, 11473}]

Comments:

Test 1 Docker - nr\_of\_peers = 5, max\_broadcasts = 1000, timeout = 3000, send\_percentage = 100

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 1000, timeout: 3000

3: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

1: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

0: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

4: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

2: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

Comments:

Test 2 Docker - nr\_of\_peers = 5, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 100

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

4: [{126664, 107601}, {126664, 88052}, {126664, 70147}, {126664, 93093}, {126664, 126661}]

2: [{70216, 107585}, {70216, 88052}, {70216, 70146}, {70216, 93093}, {70216, 126662}]

0: [{107796, 107790}, {107796, 88053}, {107796, 70215}, {107796, 93094}, {107796, 126662}]

1: [{88065, 107557}, {88065, 88052}, {88065, 70137}, {88065, 93094}, {88065, 126662}]

3: [{93106, 107788}, {93106, 88052}, {93106, 70214}, {93106, 93093}, {93106, 126662}]

Comments:

Test 3 Docker - nr\_of\_peers = 10, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 100

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

0: [{14685, 14674}, {14685, 13219}, {14685, 16135}, {14685, 21102}, {14685, 23976}, {14685, 13223}, {14685, 16031}, {14685, 13106}, {14685, 13231}, {14685, 11473}]

4: [{23987, 14678}, {23987, 13224}, {23987, 16140}, {23987, 21106}, {23987, 23980}, {23987, 13228}, {23987, 16062}, {23987, 13138}, {23987, 13235}, {23987, 11478}]

2: [{16147, 14673}, {16147, 13219}, {16147, 16134}, {16147, 21102}, {16147, 23976}, {16147, 13223}, {16147, 16030}, {16147, 13105}, {16147, 13230}, {16147, 11473}]

7: [{13188, 14677}, {13188, 13222}, {13188, 16139}, {13188, 21105}, {13188, 23979}, {13188, 13227}, {13188, 16054}, {13188, 13128}, {13188, 13234}, {13188, 11476}]

6: [{16114, 14684}, {16114, 13230}, {16114, 16146}, {16114, 21112}, {16114, 23986}, {16114, 13235}, {16114, 16106}, {16114, 13180}, {16114, 13242}, {16114, 11484}]

3: [{21113, 14677}, {21113, 13222}, {21113, 16138}, {21113, 21105}, {21113, 23979}, {21113, 13227}, {21113, 16053}, {21113, 13128}, {21113, 13234}, {21113, 11477}]

5: [{13236, 14674}, {13236, 13220}, {13236, 16135}, {13236, 21101}, {13236, 23976}, {13236, 13224}, {13236, 16034}, {13236, 13109}, {13236, 13231}, {13236, 11474}]

9: [{11485, 14672}, {11485, 13218}, {11485, 16134}, {11485, 21100}, {11485, 23974}, {11485, 13222}, {11485, 16029}, {11485, 13104}, {11485, 13229}, {11485, 11473}]

1: [{13231, 14679}, {13231, 13225}, {13231, 16141}, {13231, 21107}, {13231, 23981}, {13231, 13230}, {13231, 16065}, {13231, 13141}, {13231, 13236}, {13231, 11479}]

8: [{13243, 14673}, {13243, 13218}, {13243, 16134}, {13243, 21101}, {13243, 23975}, {13243, 13222}, {13243, 16030}, {13243, 13105}, {13243, 13230}, {13243, 11473}]

Comments:

**System 5 Tests**

Test 1 Local - nr\_of\_peers = 5, max\_broadcasts = 1000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 1000, timeout: 3000

1: [{1000, 519}, {1000, 524}, {1000, 469}, {1000, 0}, {1000, 482}]

2: [{1000, 525}, {1000, 510}, {1000, 524}, {1000, 0}, {1000, 501}]

0: [{1000, 490}, {1000, 478}, {1000, 500}, {1000, 0}, {1000, 533}]

4: [{1000, 512}, {1000, 506}, {1000, 510}, {1000, 0}, {1000, 479}]

Comments: We can see that peer3 crashed and can’t display it’s state and also that the nr of received message for peer3 is 0 because no message has been sent in 5 miliseconds.

Test 2 Local - nr\_of\_peers = 5, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

1: [{161506, 3945}, {161506, 4202}, {161506, 3265}, {161506, 0}, {161506, 6976}]

4: [{166389, 7331}, {166389, 6101}, {166389, 5339}, {166389, 0}, {166389, 9560}]

2: [{249511, 5280}, {249511, 5179}, {249511, 4345}, {249511, 0}, {249511, 8403}]

0: [{170958, 3605}, {170958, 4093}, {170958, 3163}, {170958, 0}, {170958, 6785}]

Comments: Same as test 1

Test 3 Local - nr\_of\_peers = 10, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 10, max\_broadcasts: 10000000, timeout: 3000

8: [{91740, 425}, {91740, 416}, {91740, 747}, {91740, 0}, {91740, 465}, {91740, 444}, {91740, 322}, {91740, 696}, {91740, 315}, {91740, 459}]

0: [{64977, 382}, {64977, 375}, {64977, 631}, {64977, 0}, {64977, 400}, {64977, 345}, {64977, 261}, {64977, 577}, {64977, 228}, {64977, 298}]

1: [{68179, 344}, {68179, 363}, {68179, 624}, {68179, 0}, {68179, 347}, {68179, 363}, {68179, 234}, {68179, 554}, {68179, 219}, {68179, 298}]

4: [{76163, 326}, {76163, 298}, {76163, 511}, {76163, 0}, {76163, 319}, {76163, 311}, {76163, 206}, {76163, 461}, {76163, 221}, {76163, 253}]

7: [{68622, 17}, {68622, 21}, {68622, 23}, {68622, 0}, {68622, 23}, {68622, 23}, {68622, 22}, {68622, 27}, {68622, 22}, {68622, 18}]

9: [{67491, 204}, {67491, 202}, {67491, 318}, {67491, 0}, {67491, 207}, {67491, 197}, {67491, 137}, {67491, 307}, {67491, 133}, {67491, 160}]

6: [{89297, 278}, {89297, 308}, {89297, 452}, {89297, 0}, {89297, 284}, {89297, 279}, {89297, 183}, {89297, 456}, {89297, 195}, {89297, 195}]

2: [{98540, 342}, {98540, 316}, {98540, 500}, {98540, 0}, {98540, 333}, {98540, 314}, {98540, 236}, {98540, 477}, {98540, 207}, {98540, 247}]

5: [{95736, 170}, {95736, 171}, {95736, 248}, {95736, 0}, {95736, 179}, {95736, 168}, {95736, 133}, {95736, 281}, {95736, 114}, {95736, 142}]

Comments: Same as test 1

TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO

Test 1 Docker - nr\_of\_peers = 5, max\_broadcasts = 1000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 1000, timeout: 3000

3: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

1: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

0: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

4: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

2: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

Comments:

Test 2 Docker - nr\_of\_peers = 5, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

4: [{126664, 107601}, {126664, 88052}, {126664, 70147}, {126664, 93093}, {126664, 126661}]

2: [{70216, 107585}, {70216, 88052}, {70216, 70146}, {70216, 93093}, {70216, 126662}]

0: [{107796, 107790}, {107796, 88053}, {107796, 70215}, {107796, 93094}, {107796, 126662}]

1: [{88065, 107557}, {88065, 88052}, {88065, 70137}, {88065, 93094}, {88065, 126662}]

3: [{93106, 107788}, {93106, 88052}, {93106, 70214}, {93106, 93093}, {93106, 126662}]

Comments:

Test 3 Docker - nr\_of\_peers = 10, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

0: [{14685, 14674}, {14685, 13219}, {14685, 16135}, {14685, 21102}, {14685, 23976}, {14685, 13223}, {14685, 16031}, {14685, 13106}, {14685, 13231}, {14685, 11473}]

4: [{23987, 14678}, {23987, 13224}, {23987, 16140}, {23987, 21106}, {23987, 23980}, {23987, 13228}, {23987, 16062}, {23987, 13138}, {23987, 13235}, {23987, 11478}]

2: [{16147, 14673}, {16147, 13219}, {16147, 16134}, {16147, 21102}, {16147, 23976}, {16147, 13223}, {16147, 16030}, {16147, 13105}, {16147, 13230}, {16147, 11473}]

7: [{13188, 14677}, {13188, 13222}, {13188, 16139}, {13188, 21105}, {13188, 23979}, {13188, 13227}, {13188, 16054}, {13188, 13128}, {13188, 13234}, {13188, 11476}]

6: [{16114, 14684}, {16114, 13230}, {16114, 16146}, {16114, 21112}, {16114, 23986}, {16114, 13235}, {16114, 16106}, {16114, 13180}, {16114, 13242}, {16114, 11484}]

3: [{21113, 14677}, {21113, 13222}, {21113, 16138}, {21113, 21105}, {21113, 23979}, {21113, 13227}, {21113, 16053}, {21113, 13128}, {21113, 13234}, {21113, 11477}]

5: [{13236, 14674}, {13236, 13220}, {13236, 16135}, {13236, 21101}, {13236, 23976}, {13236, 13224}, {13236, 16034}, {13236, 13109}, {13236, 13231}, {13236, 11474}]

9: [{11485, 14672}, {11485, 13218}, {11485, 16134}, {11485, 21100}, {11485, 23974}, {11485, 13222}, {11485, 16029}, {11485, 13104}, {11485, 13229}, {11485, 11473}]

1: [{13231, 14679}, {13231, 13225}, {13231, 16141}, {13231, 21107}, {13231, 23981}, {13231, 13230}, {13231, 16065}, {13231, 13141}, {13231, 13236}, {13231, 11479}]

8: [{13243, 14673}, {13243, 13218}, {13243, 16134}, {13243, 21101}, {13243, 23975}, {13243, 13222}, {13243, 16030}, {13243, 13105}, {13243, 13230}, {13243, 11473}]

Comments:

**System 6 Tests**

Test 1 Local - nr\_of\_peers = 5, max\_broadcasts = 1000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 1000, timeout: 3000

0: [{1000, 860}, {1000, 848}, {1000, 856}, {1000, 0}, {1000, 851}]

2: [{1000, 868}, {1000, 854}, {1000, 841}, {1000, 0}, {1000, 869}]

1: [{1000, 868}, {1000, 850}, {1000, 851}, {1000, 0}, {1000, 865}]

4: [{1000, 868}, {1000, 865}, {1000, 839}, {1000, 0}, {1000, 864}]

Comments: We can see that by having a send\_percentage = 50 we have improved our send rate to 85% by creating the new erb component.

Test 2 Local - nr\_of\_peers = 5, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

4: [{140402, 3837}, {140402, 4323}, {140402, 4413}, {140402, 0}, {140402, 6628}]

1: [{174690, 1751}, {174690, 901}, {174690, 2526}, {174690, 0}, {174690, 2498}]

0: [{148727, 1962}, {148727, 1008}, {148727, 2829}, {148727, 0}, {148727, 2919}]

2: [{184709, 1902}, {184709, 990}, {184709, 2808}, {184709, 0}, {184709, 2880}]

Comments: Same as test1

Test 3 Local - nr\_of\_peers = 10, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 10, max\_broadcasts: 10000000, timeout: 3000

1: [{68215, 233}, {68215, 553}, {68215, 550}, {68215, 9}, {68215, 563}, {68215, 263}, {68215, 268}, {68215, 395}, {68215, 520}, {68215, 666}]

7: [{64553, 182}, {64553, 485}, {64553, 477}, {64553, 10}, {64553, 477}, {64553, 240}, {64553, 212}, {64553, 289}, {64553, 465}, {64553, 620}]

8: [{66232, 88}, {66232, 298}, {66232, 311}, {66232, 7}, {66232, 290}, {66232, 83}, {66232, 102}, {66232, 147}, {66232, 325}, {66232, 323}]

4: [{72869, 204}, {72869, 484}, {72869, 511}, {72869, 11}, {72869, 460}, {72869, 256}, {72869, 238}, {72869, 311}, {72869, 480}, {72869, 619}]

6: [{65513, 129}, {65513, 425}, {65513, 447}, {65513, 10}, {65513, 396}, {65513, 201}, {65513, 197}, {65513, 235}, {65513, 410}, {65513, 533}]

2: [{68243, 107}, {68243, 351}, {68243, 348}, {68243, 9}, {68243, 351}, {68243, 142}, {68243, 141}, {68243, 183}, {68243, 402}, {68243, 441}]

0: [{64860, 117}, {64860, 350}, {64860, 365}, {64860, 7}, {64860, 363}, {64860, 136}, {64860, 144}, {64860, 155}, {64860, 393}, {64860, 431}]

9: [{68102, 19}, {68102, 25}, {68102, 19}, {68102, 5}, {68102, 20}, {68102, 20}, {68102, 21}, {68102, 20}, {68102, 228}, {68102, 39}]

5: [{82767, 62}, {82767, 162}, {82767, 141}, {82767, 9}, {82767, 140}, {82767, 64}, {82767, 65}, {82767, 68}, {82767, 310}, {82767, 164}]

Comments: Same as test1

TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO TODO

Test 1 Docker - nr\_of\_peers = 5, max\_broadcasts = 1000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 1000, timeout: 3000

3: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

1: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

0: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

4: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

2: [{1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}, {1000, 1000}]

Comments:

Test 2 Docker - nr\_of\_peers = 5, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

4: [{126664, 107601}, {126664, 88052}, {126664, 70147}, {126664, 93093}, {126664, 126661}]

2: [{70216, 107585}, {70216, 88052}, {70216, 70146}, {70216, 93093}, {70216, 126662}]

0: [{107796, 107790}, {107796, 88053}, {107796, 70215}, {107796, 93094}, {107796, 126662}]

1: [{88065, 107557}, {88065, 88052}, {88065, 70137}, {88065, 93094}, {88065, 126662}]

3: [{93106, 107788}, {93106, 88052}, {93106, 70214}, {93106, 93093}, {93106, 126662}]

Comments:

Test 3 Docker - nr\_of\_peers = 10, max\_broadcasts = 10\_000\_000, timeout = 3000, send\_percentage = 50

Output:

Starting local with nr\_of\_peers: 5, max\_broadcasts: 10000000, timeout: 3000

0: [{14685, 14674}, {14685, 13219}, {14685, 16135}, {14685, 21102}, {14685, 23976}, {14685, 13223}, {14685, 16031}, {14685, 13106}, {14685, 13231}, {14685, 11473}]

4: [{23987, 14678}, {23987, 13224}, {23987, 16140}, {23987, 21106}, {23987, 23980}, {23987, 13228}, {23987, 16062}, {23987, 13138}, {23987, 13235}, {23987, 11478}]

2: [{16147, 14673}, {16147, 13219}, {16147, 16134}, {16147, 21102}, {16147, 23976}, {16147, 13223}, {16147, 16030}, {16147, 13105}, {16147, 13230}, {16147, 11473}]

7: [{13188, 14677}, {13188, 13222}, {13188, 16139}, {13188, 21105}, {13188, 23979}, {13188, 13227}, {13188, 16054}, {13188, 13128}, {13188, 13234}, {13188, 11476}]

6: [{16114, 14684}, {16114, 13230}, {16114, 16146}, {16114, 21112}, {16114, 23986}, {16114, 13235}, {16114, 16106}, {16114, 13180}, {16114, 13242}, {16114, 11484}]

3: [{21113, 14677}, {21113, 13222}, {21113, 16138}, {21113, 21105}, {21113, 23979}, {21113, 13227}, {21113, 16053}, {21113, 13128}, {21113, 13234}, {21113, 11477}]

5: [{13236, 14674}, {13236, 13220}, {13236, 16135}, {13236, 21101}, {13236, 23976}, {13236, 13224}, {13236, 16034}, {13236, 13109}, {13236, 13231}, {13236, 11474}]

9: [{11485, 14672}, {11485, 13218}, {11485, 16134}, {11485, 21100}, {11485, 23974}, {11485, 13222}, {11485, 16029}, {11485, 13104}, {11485, 13229}, {11485, 11473}]

1: [{13231, 14679}, {13231, 13225}, {13231, 16141}, {13231, 21107}, {13231, 23981}, {13231, 13230}, {13231, 16065}, {13231, 13141}, {13231, 13236}, {13231, 11479}]

8: [{13243, 14673}, {13243, 13218}, {13243, 16134}, {13243, 21101}, {13243, 23975}, {13243, 13222}, {13243, 16030}, {13243, 13105}, {13243, 13230}, {13243, 11473}]

Comments: