

Pós Graduação em Informática - PUC-Rio

Sistemas Distribuídos - 2018.1

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Relatório - Trabalho 1:

O trabalho prova que o *hand-shake* envolvido no protocolo TCP, que é feito entre duas partes comunicantes de um sistema para a abertura de conexões, causa um *overhead* no sistema.

No output a seguir, podemos verificar que é evidente que a solução *KEEP-ALIVE* tem um desempenho superior à solução *NAIVE*, ainda que trocando mensagens dentro de um mesmo *host*, ou seja, sem influência nenhuma da latência de rede.

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Starting
1. Setting up LUA paths
2. Running benchmarks
2.1. NAIVE communication
2.1.1. Starting NAIVE server
2.1.2. Sending messages
2.1.2.1. Batch #1
messages: 10.0 / elapsed ms: 2.211181640625 / ratio: 4.5224688086563 (messages/ms)
messages: 100.0 / elapsed ms: 1.208984375 / ratio: 82.714054927302 (messages/ms)
messages: 1000.0 / elapsed ms: 2.71826171875 / ratio: 367.88216274475 (messages/ms)
messages: 10000.0 / elapsed ms: 1.03125 / ratio: 9696.9696969697 (messages/ms)
messages: 100000.0 / elapsed ms: 0.89501953125 / ratio: 111729.40534643 (messages/ms)
messages: 1000000.0 / elapsed ms: 0.903076171875 / ratio: 1107326.3044066 (messages/ms)
messages: 10000000.0 / elapsed ms: 1.999755859375 / ratio: 5000610.4260774 (messages/ms)
messages: 100000000.0 / elapsed ms: 1.31787109375 / ratio: 75879955.539089 (messages/ms)
messages: 1000000000.0 / elapsed ms: 1.922119140625 / ratio: 520259113.42563 (messages/ms)
messages: 10000000000.0 / elapsed ms: 0.905029296875 / ratio: 11049366064.203 (messages/ms)
TOTAL messages: 11111111110.0 / TOTAL elapsed ms: 15.112548828125 / TOTAL ratio: 735224166.11299 (messages/ms)
2.1.2.2. Batch #2
messages: 10.0 / elapsed ms: 1.947021484375 / ratio: 5.1360501567398 (messages/ms)
messages: 100.0 / elapsed ms: 1.14111328125 / ratio: 87.633718442448 (messages/ms)
messages: 1000.0 / elapsed ms: 1.138916015625 / ratio: 878.02786709539 (messages/ms)
messages: 10000.0 / elapsed ms: 1.35107421875 / ratio: 7401.5178894109 (messages/ms)
messages: 100000.0 / elapsed ms: 0.926025390625 / ratio: 107988.39968363 (messages/ms)
messages: 1000000.0 / elapsed ms: 0.932861328125 / ratio: 1071970.6883015 (messages/ms)
messages: 10000000.0 / elapsed ms: 0.951171875 / ratio: 10513347.022587 (messages/ms)
messages: 100000000.0 / elapsed ms: 0.843994140625 / ratio: 118484234.88574 (messages/ms)
messages: 1000000000.0 / elapsed ms: 0.921142578125 / ratio: 1085608269.2817 (messages/ms)
messages: 10000000000.0 / elapsed ms: 0.89697265625 / ratio: 11148611867.175 (messages/ms)
TOTAL messages: 11111111110.0 / TOTAL elapsed ms: 11.05029296875 / TOTAL ratio: 1005503758.2643 (messages/ms)
2.1.2.3. Batch #3
messages: 10.0 / elapsed ms: 1.251220703125 / ratio: 7.9921951219512 (messages/ms)
messages: 100.0 / elapsed ms: 1.2998046875 / ratio: 76.934635612322 (messages/ms)
messages: 1000.0 / elapsed ms: 0.9140625 / ratio: 1094.0170940171 (messages/ms)
messages: 10000.0 / elapsed ms: 0.964111328125 / ratio: 10372.246138263 (messages/ms)
messages: 100000.0 / elapsed ms: 0.9619140625 / ratio: 103959.39086294 (messages/ms)
messages: 1000000.0 / elapsed ms: 1.10107421875 / ratio: 908203.99113082 (messages/ms)
messages: 10000000.0 / elapsed ms: 0.9970703125 / ratio: 10029382.957884 (messages/ms)
messages: 100000000.0 / elapsed ms: 0.921875 / ratio: 108474576.27119 (messages/ms)
messages: 1000000000.0 / elapsed ms: 0.93994140625 / ratio: 1063896103.8961 (messages/ms)
messages: 10000000000.0 / elapsed ms: 0.866943359375 / ratio: 11534778935.511 (messages/ms)
TOTAL messages: 11111111110.0 / TOTAL elapsed ms: 10.218017578125 / TOTAL ratio: 1087403796.7782 (messages/ms)
2.1.2.4. Batch #4
messages: 10.0 / elapsed ms: 1.0009765625 / ratio: 9.990243902439 (messages/ms)
messages: 100.0 / elapsed ms: 2.2841796875 / ratio: 43.77939290295 (messages/ms)
messages: 1000.0 / elapsed ms: 0.9951171875 / ratio: 1004.9067713445 (messages/ms)
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messages: 10000.0 / elapsed ms: 0.927001953125 / ratio: 10787.4637872 (messages/ms)
messages: 100000.0 / elapsed ms: 0.9990234375 / ratio: 100097.75171065 (messages/ms)
messages: 1000000.0 / elapsed ms: 0.949951171875 / ratio: 1052685.6849139 (messages/ms)
messages: 10000000.0 / elapsed ms: 0.905029296875 / ratio: 11049366.064203 (messages/ms)
messages: 100000000.0 / elapsed ms: 0.89111328125 / ratio: 112219178.08219 (messages/ms)
messages: 1000000000.0 / elapsed ms: 0.9609375 / ratio: 1040650406.5041 (messages/ms)
messages: 10000000000.0 / elapsed ms: 0.93798828125 / ratio: 10661114003.123 (messages/ms)
TOTAL messages: 1111111110.0 / TOTAL elapsed ms: 10.851318359375 / TOTAL ratio: 1023941123.283 (messages/ms)

2.1.2.5. Batch #5

messages: 10.0 / elapsed ms: 1.0029296875 / ratio: 9.9707887049659 (messages/ms)
messages: 100.0 / elapsed ms: 1.495849609375 / ratio: 66.851640280725 (messages/ms)
messages: 1000.0 / elapsed ms: 1.421142578125 / ratio: 703.65916509191 (messages/ms)
messages: 10000.0 / elapsed ms: 0.902099609375 / ratio: 11085.250338295 (messages/ms)
messages: 100000.0 / elapsed ms: 0.929931640625 / ratio: 107534.78603308 (messages/ms)
messages: 1000000.0 / elapsed ms: 0.927978515625 / ratio: 1077611.1549592 (messages/ms)
messages: 10000000.0 / elapsed ms: 0.954833984375 / ratio: 10473024.801841 (messages/ms)
messages: 100000000.0 / elapsed ms: 0.925048828125 / ratio: 108102401.6891 (messages/ms)
messages: 1000000000.0 / elapsed ms: 1.125 / ratio: 888888888.88889 (messages/ms)
messages: 10000000000.0 / elapsed ms: 1.0390625 / ratio: 9624060150.3759 (messages/ms)
TOTAL messages: 1111111110.0 / TOTAL elapsed ms: 10.723876953125 / TOTAL ratio: 1036109530.0298 (messages/ms)

2.1.3. Shutting down NAIVE server

2.2. KEEP ALIVE communication

2.2.1. Starting KEEP ALIVE server

2.2.2. Sending messages

2.2.2.1. Batch #1

messages: 10.0 / elapsed ms: 2.700927734375 / ratio: 3.7024315285185 (messages/ms)
messages: 100.0 / elapsed ms: 0.580078125 / ratio: 172.39057239057 (messages/ms)
messages: 1000.0 / elapsed ms: 0.390869140625 / ratio: 2558.400993754 (messages/ms)
messages: 10000.0 / elapsed ms: 0.39501953125 / ratio: 25315.203955501 (messages/ms)
messages: 100000.0 / elapsed ms: 0.578857421875 / ratio: 172754.11218895 (messages/ms)
messages: 1000000.0 / elapsed ms: 0.749267578125 / ratio: 1334636.6894754 (messages/ms)
messages: 10000000.0 / elapsed ms: 0.580078125 / ratio: 17239057.239057 (messages/ms)
messages: 100000000.0 / elapsed ms: 0.55908203125 / ratio: 178864628.82096 (messages/ms)
messages: 1000000000.0 / elapsed ms: 0.55908203125 / ratio: 1788646288.2096 (messages/ms)
messages: 10000000000.0 / elapsed ms: 0.51904296875 / ratio: 19266227657.573 (messages/ms)
TOTAL messages: 1111111110.0 / TOTAL elapsed ms: 7.6123046875 / TOTAL ratio: 1459625115.669 (messages/ms)

2.2.2.2. Batch #2

messages: 10.0 / elapsed ms: 0.654052734375 / ratio: 15.289287047406 (messages/ms)
messages: 100.0 / elapsed ms: 0.591064453125 / ratio: 169.18628665841 (messages/ms)
messages: 1000.0 / elapsed ms: 0.660888671875 / ratio: 1513.1141485039 (messages/ms)
messages: 10000.0 / elapsed ms: 0.746826171875 / ratio: 13389.996730958 (messages/ms)
messages: 100000.0 / elapsed ms: 1.4150390625 / ratio: 70669.427191166 (messages/ms)
messages: 1000000.0 / elapsed ms: 0.59814453125 / ratio: 1671836.7346939 (messages/ms)
messages: 10000000.0 / elapsed ms: 0.56689453125 / ratio: 17639965.546942 (messages/ms)
messages: 100000000.0 / elapsed ms: 0.584228515625 / ratio: 171165900.54325 (messages/ms)
messages: 1000000000.0 / elapsed ms: 0.574951171875 / ratio: 1739278131.6348 (messages/ms)
messages: 10000000000.0 / elapsed ms: 0.63671875 / ratio: 15705521472.393 (messages/ms)
TOTAL messages: 1111111110.0 / TOTAL elapsed ms: 7.02880859375 / TOTAL ratio: 1580795800.8531 (messages/ms)

2.2.2.3. Batch #3

messages: 10.0 / elapsed ms: 0.612060546875 / ratio: 16.338252891903 (messages/ms)
messages: 100.0 / elapsed ms: 0.5947265625 / ratio: 168.14449917898 (messages/ms)
messages: 1000.0 / elapsed ms: 0.593994140625 / ratio: 1683.5182901767 (messages/ms)
messages: 10000.0 / elapsed ms: 0.58984375 / ratio: 16953.642384106 (messages/ms)
messages: 100000.0 / elapsed ms: 0.608154296875 / ratio: 164431.95503814 (messages/ms)
messages: 1000000.0 / elapsed ms: 0.55908203125 / ratio: 1788646.2882096 (messages/ms)
messages: 10000000.0 / elapsed ms: 0.633056640625 / ratio: 15796374.85538 (messages/ms)
messages: 100000000.0 / elapsed ms: 0.576171875 / ratio: 173559322.0339 (messages/ms)
messages: 1000000000.0 / elapsed ms: 0.583984375 / ratio: 1712374581.9398 (messages/ms)
messages: 10000000000.0 / elapsed ms: 0.68896484375 / ratio: 14514528703.047 (messages/ms)
TOTAL messages: 1111111110.0 / TOTAL elapsed ms: 6.0400390625 / TOTAL ratio: 1839576035.0267 (messages/ms)

2.2.2.4. Batch #4

messages: 10.0 / elapsed ms: 0.64501953125 / ratio: 15.50340651022 (messages/ms)
messages: 100.0 / elapsed ms: 0.76513671875 / ratio: 130.69559668156 (messages/ms)
messages: 1000.0 / elapsed ms: 0.590087890625 / ratio: 1694.6628051303 (messages/ms)
messages: 10000.0 / elapsed ms: 0.610107421875 / ratio: 16390.556222489 (messages/ms)
messages: 100000.0 / elapsed ms: 0.593994140625 / ratio: 168351.82901767 (messages/ms)
messages: 1000000.0 / elapsed ms: 0.59716796875 / ratio: 1674570.7277187 (messages/ms)
messages: 10000000.0 / elapsed ms: 0.568115234375 / ratio: 17602062.741728 (messages/ms)
messages: 100000000.0 / elapsed ms: 0.5869140625 / ratio: 170382695.50749 (messages/ms)
messages: 1000000000.0 / elapsed ms: 0.5810546875 / ratio: 1721008403.3613 (messages/ms)
messages: 10000000000.0 / elapsed ms: 0.623046875 / ratio: 16050156739.812 (messages/ms)

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TOTAL messages: 1111111110.0 / TOTAL elapsed ms: 6.16064453125 / TOTAL ratio: 1803563093.7053 (messasges/ms)
2.2.2.5. Batch #5
messages: 10.0 / elapsed ms: 0.69091796875 / ratio: 14.473498233216 (messages/ms)
messages: 100.0 / elapsed ms: 0.736083984375 / ratio: 135.85406301824 (messages/ms)
messages: 1000.0 / elapsed ms: 3.01806640625 / ratio: 331.33797120207 (messages/ms)
messages: 10000.0 / elapsed ms: 0.91015625 / ratio: 10987.124463519 (messages/ms)
messages: 100000.0 / elapsed ms: 0.81201171875 / ratio: 123150.93205051 (messages/ms)
messages: 1000000.0 / elapsed ms: 0.616943359375 / ratio: 1620894.3411159 (messages/ms)
messages: 10000000.0 / elapsed ms: 0.589111328125 / ratio: 16974720.26523 (messages/ms)
messages: 100000000.0 / elapsed ms: 0.591064453125 / ratio: 169186286.65841 (messages/ms)
messages: 1000000000.0 / elapsed ms: 0.605224609375 / ratio: 1652279144.8165 (messages/ms)
messages: 10000000000.0 / elapsed ms: 0.597900390625 / ratio: 16725193956.717 (messages/ms)
TOTAL messages: 1111111110.0 / TOTAL elapsed ms: 9.16748046875 / TOTAL ratio: 1212013611.3598 (messasges/ms)
2.2.3. Shutting down KEEP ALIVE server
Done

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Abaixo seguem gráficos para retratar o resultado do *output*:

