Table The statistics of operations for breaking cycles in Jmeter

| $SCC$ | $Edge'(C_i,C_j)$ | $\omega(C_i,C_j)$ | $Cycles_b$ | $Cycles_a$ | $\mathcal{R}(C_i)$ | $SCplx(C_i,C_j)$ | $\hat{W}_{ij}$ | $N_m$ | $N_a$ |
|---|---|---|---|---|---|---|---|---|---|
| $SCC_1$ = {251, 106, 99, 76, 74, 107, 71, 39, 100, 97, 70, 98, 63, 248, 52, 59} | 107→74 | 75 | 160 | 85 | 0.1701 | 0.1414 | 1.8346 | 1 | 1 |
| | 107→98 | 27 | 85 | 58 | 0.1701 | 0.1414 | 1.7285 | 1 | 1 |
| | 248→63 | 37 | 58 | 21 | 0.1843 | 0.2828 | 1.1741 | 2 | 2 |
| | 107→63 | 9 | 21 | 12 | 0.1701 | 0.2828 | 1.0469 | 2 | 2 |
| | 107→100 | 1 | 12 | 11 | 0.1701 | 0.1414 | 0.9625 | 1 | 1 |
| | 74→76 | 3 | 11 | 8 | 0.0005 | 0.1414 | 0.7101 | 1 | 1 |
| | 63→98 | 3 | 8 | 5 | 0.0031 | 0.2828 | 0.7160 | 2 | 2 |
| | 70→98 | 1 | 5 | 4 | 0.0038 | 0.1414 | 0.0271 | 1 | 1 |
| $SCC_2$ = {164, 162} | 162→164 | 1 | 4 | 3 | 0.0439 | 0.5657 | 0.0439 | 4 | 4 |
| $SCC_3$ = {160, 159, 156} | 156→159 | 1 | 3 | 2 | 0.0017 | 0.2828 | 0.0059 | 2 | 2 |
| $SCC_4$ = {179, 180} | 179→180 | 1 | 2 | 1 | 0.0001 | 0.1414 | 0.0004 | 1 | 1 |
| $SCC_5$ = {262, 259} | 259→262 | 1 | 1 | 0 | 0.0029 | 0.2828 | 0.0102 | 2 | 2 |

Table The statistics of operations for breaking cycles in Joda-time

| $SCC$ | $Edge'(C_i,C_j)$ | $\omega(C_i,C_j)$ | $Cycles_b$ | $Cycles_a$ | $\mathcal{R}(C_i)$ | $SCplx(C_i,C_j)$ | $\hat{W}_{ij}$ | $N_m$ | $N_a$ |
|---|---|---|---|---|---|---|---|---|---|
| $SCC_1$ = {134, 125} | 125→134 | 1 | 526 | 525 | 0.0002 | 0.1782 | 0.0009 | 1 | 1 |
| $SCC_2$ = {91, 88, 74, 87, 85, 116, 115, 114, 113, 112, 111, 108, 107, 103, 98, 97, 93, 83, 79, 99, 101, 151, 144, 142, 21, 146, 143, 57, 32, 62, 23, 13, 86, 84, 78, 77, 76, 71, 70, 69, 73, 89, 90} | 90→91 | 150 | 525 | 375 | 0.0002 | 0.0110 | 16.8303 | 1 | 0 |
| | 101→99 | 119 | 375 | 256 | 0.0007 | 0.0110 | 18.8166 | 1 | 0 |
| | 101→112 | 34 | 256 | 222 | 0.0007 | 0.0110 | 8.0970 | 1 | 0 |
| | 101→116 | 23 | 222 | 199 | 0.0007 | 0.0110 | 6.3795 | 1 | 0 |
| | 101→114 | 18 | 199 | 181 | 0.0007 | 0.0110 | 5.6197 | 1 | 0 |
| | 101→113 | 18 | 181 | 163 | 0.0007 | 0.0110 | 6.3048 | 1 | 0 |
| | 101→111 | 18 | 163 | 145 | 0.0007 | 0.0110 | 7.1811 | 1 | 0 |
| | 101→108 | 18 | 145 | 127 | 0.0007 | 0.0110 | 8.3416 | 1 | 0 |
| | 101→115 | 17 | 127 | 110 | 0.0007 | 0.0110 | 9.3675 | 1 | 0 |
| | 101→107 | 17 | 110 | 93 | 0.0007 | 0.0110 | 11.4573 | 1 | 0 |
| | 101→103 | 17 | 93 | 76 | 0.0007 | 0.0110 | 14.7515 | 1 | 0 |
| | 13→23 | 43 | 76 | 33 | 0.0027 | 0.1782 | 3.4002 | 1 | 1 |
| | 97→21 | 12 | 33 | 21 | 0.0423 | 0.1782 | 2.5846 | 1 | 1 |
| | 90→89 | 4 | 21 | 17 | 0.0002 | 0.1782 | 3.3946 | 1 | 1 |
| | 146→21 | 3 | 17 | 14 | 0.0055 | 0.1782 | 3.4065 | 1 | 1 |
| | 62→57 | 2 | 14 | 12 | 0.0012 | 1.2374 | 0.4853 | 7 | 7 |
| | 144→142 | 1 | 12 | 11 | 0.0019 | 0.1782 | 0.0105 | 1 | 1 |
| | 62→32 | 1 | 11 | 10 | 0.0012 | 0.1782 | 0.0017 | 1 | 1 |
| | 69→88 | 1 | 10 | 9 | 0.0001 | 0.1782 | 0.0006 | 1 | 1 |
| | 69→87 | 1 | 9 | 8 | 0.0001 | 0.1782 | 0.0006 | 1 | 1 |
| | 69→85 | 1 | 8 | 7 | 0.0001 | 0.1782 | 0.0006 | 1 | 1 |
| | 69→84 | 1 | 7 | 6 | 0.0001 | 0.1782 | 0.0006 | 1 | 1 |
| | 69→78 | 1 | 6 | 5 | 0.0001 | 0.1782 | 0.0006 | 1 | 1 |
| | 69→77 | 1 | 5 | 4 | 0.0001 | 0.1782 | 0.0006 | 1 | 1 |
| | 69→76 | 1 | 4 | 3 | 0.0001 | 0.1782 | 0.0006 | 1 | 1 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 69→71 | 1 | 3 | 2 | 0.0001 | 0.1782 | 0.0006 | 1 | 1 |
| | 69→70 | 1 | 2 | 1 | 0.0001 | 0.1782 | 0.0006 | 1 | 1 |
| $SCC_3$ = {138, 128} | 138→128 | 1 | 1 | 0 | 0.0002 | 0.1782 | 0.0009 | 1 | 1 |

Table IX The statistics of operations for breaking cycles in Xml-security

| *SCC* | $Edge'(C_i,C_j)$ | $\omega(C_i,C_j)$ | $Cycles_b$ | $Cycles_a$ | $\mathcal{R}(C_i)$ | $SCplx(C_i,C_j)$ | $\hat{W}_{ij}$ | $N_m$ | $N_a$ |
|---|---|---|---|---|---|---|---|---|---|
| $SCC_1$ = {212, 211, 172, 120, 88, 87, 85, 84, 83, 81, 80, 76, 75, 170, 166, 33, 167, 171, 74, 73, 72, 79, 77, 71, 206, 70, 67, 66, 8, 7, 2, 5, 195, 197, 194, 193, 64, 191, 159, 63, 199, 65, 36, 35, 34, 209, 3, 1} | 1→67 | 883 | 1119 | 236 | 1.6e-05 | 0.3536 | 1.3558 | 1 | 1 |
| | 199→1 | 223 | 236 | 13 | 3.1e-05 | 1.0607 | 0.5657 | 3 | 3 |
| | 197→209 | 4 | 13 | 9 | 0.0001 | 0.3536 | 1.6972 | 1 | 1 |
| | 191→209 | 4 | 9 | 5 | 9.4e-05 | 0.3536 | 1.6972 | 1 | 1 |
| | 209→195 | 1 | 5 | 4 | 0.1974 | 0.3536 | 0.2233 | 1 | 1 |
| | 209→194 | 1 | 4 | 3 | 0.1974 | 0.3536 | 0.2233 | 1 | 1 |
| | 209→193 | 1 | 3 | 2 | 0.1974 | 0.7071 | 0.2792 | 2 | 2 |
| | 209→34 | 1 | 2 | 1 | 0.1974 | 1.4142 | 0.1396 | 4 | 4 |
| $SCC_2$ = {153, 150} | 153→150 | 1 | 1 | 0 | 2.3e-04 | 0.0566 | 4.0e-08 | 1 | 0 |

Table IX The statistics of operations for breaking cycles in DNS

| *SCC* | $Edge'(C_i,C_j)$ | $\omega(C_i,C_j)$ | $Cycles_b$ | $Cycles_a$ | $\mathcal{R}(C_i)$ | $SCplx(C_i,C_j)$ | $\hat{W}_{ij}$ | $N_m$ | $N_a$ |
|---|---|---|---|---|---|---|---|---|---|
| $SCC_1$ = {8,11,21,25, 32,48,58} | 21→11 | 10 | 16 | 6 | 0.1403 | 0.0410 | 16.01 | 1 | 0 |
| | 21→8 | 1 | 6 | 5 | 0.1403 | 0.1399 | 1.12 | 3 | 1 |
| | 32→48 | 1 | 5 | 4 | 0.0875 | 0.1399 | 0.73 | 3 | 1 |
| | 32→58 | 1 | 4 | 3 | 0.0875 | 0.6077 | 0.27 | 2 | 9 |
| $SCC_2$ = {33,38,52} | 38→33 | 2 | 3 | 1 | 0.0515 | 0.2707 | 3.64 | 1 | 4 |
| | 52→33 | 1 | 1 | 0 | 0.0434 | 0.2707 | 0.25 | 1 | 4 |

Table X The statistics of operations for breaking cycles in ANT

| *SCC* | $Edge'(C_i,C_j)$ | $\omega(C_i,C_j)$ | $Cycles_b$ | $Cycles_a$ | $\mathcal{R}(C_i)$ | $SCplx(C_i,C_j)$ | $\hat{W}_{ij}$ | $N_m$ | $N_a$ |
|---|---|---|---|---|---|---|---|---|---|
| $SCC_1$ = {2,4,10,16, 17,18,19,20, 21,22,23,24} | 24→23 | 40 | 654 | 614 | 0.0587 | 0.0554 | 6.17 | 1 | 1 |
| | 24→22 | 68 | 614 | 546 | 0.0587 | 0.0554 | 5.35 | 1 | 1 |
| | 10→23 | 60 | 546 | 486 | 0.0093 | 0.0756 | 5.07 | 2 | 2 |
| | 18→23 | 25 | 486 | 461 | 0.0375 | 0.0554 | 4.54 | 1 | 1 |
| | 16→22 | 40 | 461 | 421 | 0.2467 | 0.0554 | 3.95 | 1 | 1 |
| | 18→22 | 59 | 421 | 362 | 0.0375 | 0.0554 | 3.72 | 1 | 1 |
| | 10→4 | 59 | 362 | 303 | 0.0093 | 0.1366 | 3.48 | 3 | 3 |
| | 16→4 | 92 | 303 | 211 | 0.2466 | 0.2272 | 3.79 | 7 | 7 |
| | 16→20 | 64 | 211 | 147 | 0.2466 | 0.1461 | 3.36 | 4 | 4 |
| | 16→2 | 92 | 147 | 55 | 0.2466 | 0.1902 | 3.01 | 5 | 5 |
| | 19→18 | 31 | 55 | 24 | 0.0434 | 0.1366 | 2.72 | 3 | 3 |
| | 21→20 | 19 | 24 | 5 | 0.0263 | 0.1597 | 2.56 | 0 | 7 |
| | 16→21 | 3 | 5 | 2 | 0.2466 | 0.1902 | 1.86 | 5 | 5 |
| | 16→17 | 1 | 2 | 1 | 0.2466 | 0.0554 | 0.95 | 1 | 1 |
| | 20→18 | 1 | 1 | 0 | 0.0439 | 0.0554 | 0.34 | 1 | 1 |

Table XI The statistics of operations for breaking cycles in BCEL

| *SCC* | $Edge'(C_i,C_j)$ | $\omega(C_i,C_j)$ | $Cycles_b$ | $Cycles_a$ | $\mathcal{R}(C_i)$ | $SCplx(C_i,C_j)$ | $\hat{W}_{ij}$ | $N_m$ | $N_a$ |
|---|---|---|---|---|---|---|---|---|---|
| $SCC_1$ = {2,4,5,6, 7,8,9,10, 11,12,13,14, 15,1617,18, 19,20,21,22, 25,26,27,28, 29,30,31,32, 33,34,35,36, 37,38,39,40, 41,43,44,45} | 2→21 | 133674 | 416091 | 282417 | 0.0647 | 0.0979 | 9.57 | 1 | 1 |
| | 20→45 | 40096 | 282417 | 242321 | 0.0651 | 0.0884 | 6.51 | 1 | 0 |
| | 18→10 | 17162 | 242321 | 225159 | 0.1232 | 0.0884 | 3.62 | 1 | 0 |
| | 18→15 | 17162 | 225159 | 207997 | 0.1232 | 0.0884 | 4.39 | 1 | 0 |
| | 18→13 | 17092 | 207997 | 190905 | 0.1232 | 0.0884 | 4.42 | 1 | 0 |
| | 6→15 | 15020 | 190905 | 175885 | 0.0794 | 0.0884 | 3.80 | 1 | 0 |
| | 6→13 | 14960 | 175885 | 160925 | 0.0794 | 0.0884 | 3.73 | 1 | 0 |
| | 16→45 | 16775 | 160925 | 144150 | 0.0083 | 0.0884 | 4.52 | 1 | 0 |
| | 14→45 | 16168 | 144150 | 127982 | 0.0089 | 0.0884 | 4.67 | 1 | 0 |
| | 12→45 | 16168 | 127982 | 111814 | 0.0089 | 0.0884 | 5.28 | 1 | 0 |
| | 11→45 | 16168 | 111814 | 95646 | 0.0089 | 0.0884 | 5.66 | 1 | 0 |
| | 9→45 | 16167 | 95646 | 79479 | 0.0070 | 0.0884 | 6.81 | 1 | 0 |
| | 7→45 | 15418 | 79479 | 64061 | 0.0076 | 0.0884 | 7.76 | 1 | 0 |
| | 19→45 | 15223 | 64061 | 48838 | 0.0119 | 0.0884 | 9.56 | 1 | 0 |
| | 6→45 | 11189 | 48838 | 37649 | 0.0794 | 0.0884 | 9.29 | 1 | 0 |
| | 10→45 | 11178 | 37649 | 26471 | 0.0066 | 0.0884 | 8.67 | 1 | 0 |
| | 6→36 | 11189 | 26471 | 15282 | 0.0794 | 0.0884 | 6.56 | 1 | 0 |
| | 18→45 | 6950 | 15282 | 8332 | 0.1232 | 0.0884 | 13.47 | 1 | 0 |
| | 18→36 | 6950 | 8332 | 1382 | 0.1232 | 0.0884 | 10.37 | 1 | 0 |
| | 17→18 | 70 | 1382 | 1312 | 0.0083 | 0.0839 | 6.39 | 0 | 2 |
| | 6→7 | 12 | 1312 | 1300 | 0.0794 | 0.0979 | 5.08 | 1 | 1 |
| | 6→9 | 12 | 1300 | 1288 | 0.0794 | 0.0979 | 5.73 | 1 | 1 |
| | 6→11 | 12 | 1288 | 1276 | 0.0794 | 0.0979 | 6.61 | 1 | 1 |
| | 6→12 | 12 | 1276 | 1264 | 0.0794 | 0.0979 | 7.85 | 1 | 1 |
| | 6→14 | 12 | 1264 | 1252 | 0.0794 | 0.0979 | 9.69 | 1 | 1 |
| | 6→19 | 12 | 1252 | 1240 | 0.0794 | 0.0979 | 10.53 | 1 | 1 |
| | 6→16 | 12 | 1240 | 1228 | 0.0794 | 0.1218 | 6.65 | 1 | 2 |
| | 8→18 | 12 | 1228 | 1216 | 0.0131 | 0.1957 | 5.05 | 2 | 2 |
| | 6→20 | 1 | 1216 | 1215 | 0.0794 | 0.0979 | 1.19 | 1 | 1 |
| | 6→10 | 1 | 1215 | 1214 | 0.0794 | 0.3536 | 0.40 | 4 | 0 |
| | 18→7 | 1 | 1214 | 1213 | 0.1232 | 0.1817 | 1.22 | 2 | 1 |
| | 18→9 | 1 | 1213 | 1212 | 0.1232 | 0.1817 | 1.22 | 2 | 1 |
| | 18→11 | 1 | 1212 | 1211 | 0.1232 | 0.1817 | 1.22 | 2 | 1 |
| | 18→12 | 1 | 1211 | 1210 | 0.1232 | 0.1817 | 1.22 | 2 | 1 |
| | 18→14 | 1 | 1210 | 1209 | 0.1232 | 0.1817 | 1.22 | 2 | 1 |
| | 18→19 | 1 | 1209 | 1208 | 0.1232 | 0.1817 | 1.22 | 2 | 1 |
| | 18→16 | 1 | 1208 | 1207 | 0.1232 | 0.2781 | 0.75 | 3 | 2 |
| | 33→45 | 108 | 1207 | 1099 | 0.0111 | 0.0884 | 2.42 | 1 | 0 |
| | 45→26 | 91 | 1099 | 1008 | 0.0158 | 0.0884 | 2.46 | 1 | 0 |
| | 33→36 | 99 | 1008 | 909 | 0.0111 | 0.0884 | 2.52 | 1 | 0 |
| | 31→45 | 61 | 909 | 848 | 0.0232 | 0.0884 | 2.57 | 1 | 0 |
| | 34→45 | 60 | 848 | 788 | 0.0222 | 0.0884 | 2.60 | 1 | 0 |

| *SCC* | $Edge'(C_i,C_j)$ | $\omega(C_i,C_j)$ | $Cycles_b$ | $Cycles_a$ | $\mathcal{R}(C_i)$ | $SCplx(C_i,C_j)$ | $\hat{W}_{ij}$ | $N_m$ | $N_a$ |
|---|---|---|---|---|---|---|---|---|---|
| | 32→45 | 60 | 788 | 728 | 0.0170 | 0.0884 | 2.65 | 1 | 0 |
| | 41→45 | 37 | 728 | 691 | 0.0867 | 0.0884 | 2.68 | 1 | 0 |
| | 2→29 | 106 | 691 | 585 | 0.0647 | 0.0839 | 2.77 | 0 | 2 |
| | 31→36 | 61 | 585 | 524 | 0.0232 | 0.0884 | 2.83 | 1 | 0 |
| | 43→45 | 36 | 524 | 488 | 0.0088 | 0.0884 | 2.87 | 1 | 0 |
| | 40→45 | 36 | 488 | 452 | 0.0078 | 0.0884 | 2.92 | 1 | 0 |
| | 44→45 | 36 | 452 | 416 | 0.0071 | 0.0884 | 2.96 | 1 | 0 |
| | 25→45 | 36 | 416 | 380 | 0.0052 | 0.0884 | 3.00 | 1 | 0 |
| | 22→45 | 36 | 380 | 344 | 0.0014 | 0.0884 | 3.04 | 1 | 0 |
| | 2→37 | 37 | 344 | 307 | 0.0647 | 0.0420 | 3.10 | 0 | 1 |
| | 2→38 | 37 | 307 | 270 | 0.0647 | 0.0979 | 3.16 | 1 | 1 |
| | 2→36 | 36 | 270 | 234 | 0.0647 | 0.0884 | 3.22 | 1 | 0 |
| | 2→39 | 35 | 234 | 199 | 0.0647 | 0.0420 | 3.28 | 0 | 1 |
| | 40→36 | 36 | 199 | 163 | 0.0078 | 0.0884 | 3.33 | 1 | 0 |
| | 5→36 | 31 | 163 | 132 | 0.0021 | 0.0884 | 3.39 | 1 | 0 |
| | 30→35 | 27 | 132 | 105 | 0.1497 | 0.1768 | 3.55 | 2 | 0 |
| | 2→4 | 45 | 105 | 60 | 0.0647 | 0.3469 | 3.88 | 1 | 8 |
| | 13→45 | 4 | 60 | 56 | 0.0071 | 0.0884 | 3.93 | 1 | 0 |
| | 30→45 | 1 | 56 | 55 | 0.1497 | 0.0884 | 3.97 | 1 | 0 |
| | 30→26 | 6 | 55 | 49 | 0.1497 | 0.1768 | 4.09 | 2 | 0 |
| | 30→36 | 1 | 49 | 48 | 0.1497 | 0.0884 | 4.15 | 1 | 0 |
| | 30→39 | 2 | 48 | 46 | 0.1497 | 0.0979 | 4.23 | 1 | 1 |
| | 45→29 | 4 | 46 | 42 | 0.0158 | 0.1218 | 4.33 | 1 | 2 |
| | 21→45 | 2 | 42 | 40 | 0.0227 | 0.0884 | 4.37 | 1 | 0 |
| | 45→39 | 2 | 40 | 38 | 0.0158 | 0.0979 | 4.43 | 1 | 1 |
| | 45→35 | 13 | 38 | 25 | 0.0158 | 0.0884 | 5.13 | 1 | 0 |
| | 45→4 | 5 | 25 | 20 | 0.0158 | 0.3469 | 5.46 | 1 | 8 |
| | 2→45 | 9 | 20 | 11 | 0.0647 | 0.0884 | 6.77 | 1 | 0 |
| | 2→22 | 1 | 11 | 10 | 0.0647 | 0.0979 | 6.83 | 1 | 1 |
| | 2→43 | 1 | 10 | 9 | 0.0647 | 0.0979 | 6.89 | 1 | 1 |
| | 2→25 | 1 | 9 | 8 | 0.0647 | 0.1218 | 6.98 | 1 | 2 |
| | 2→32 | 1 | 8 | 7 | 0.0647 | 0.1218 | 7.08 | 1 | 2 |
| | 2→34 | 1 | 7 | 6 | 0.0647 | 0.1218 | 7.17 | 1 | 2 |
| | 2→40 | 1 | 6 | 5 | 0.0647 | 0.1218 | 7.25 | 1 | 2 |
| | 2→44 | 1 | 5 | 4 | 0.0647 | 0.1537 | 7.38 | 1 | 3 |
| | 45→28 | 2 | 4 | 2 | 0.0158 | 0.1897 | 7.56 | 1 | 4 |
| | 45→15 | 1 | 2 | 1 | 0.0158 | 0.0884 | 7.60 | 1 | 0 |
| | 45→5 | 1 | 1 | 0 | 0.0158 | 0.1897 | 7.77 | 1 | 4 |

Here, $Edge'(C_i,C_j)$ represents the removed edge, $Cycles_b$ and $Cycles_b$ denote the number of cycles in the system before and after remove $<C_i, C_j>$.