Assignment 1 Report

Exercise 1

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| Perfect Failure Detector Case: γ = 1000, δ = 1000 | |
| Topology:  node(1, "127.0.0.1", 22031);  node(2, "127.0.0.1", 22032);  node(3, "127.0.0.1", 22033);  node(4, "127.0.0.1", 22034);  defaultLinks(500, 0); | Scenario:  command(1, "S1000:X");  command(2, "S6000:X");  command(3, "S10000:X");  command(4, "S500"); |
| Node 1:  1693@SCENARIO {Assignment1aMain} Process 1 has started commands [S1000:X].  0 INFO {Application1a} Sleeping 1000 milliseconds...  11200@SCENARIO {Assignment1aMain} Process 1 has terminated. | |
| Node 2:  1685@SCENARIO {Assignment1aMain} Process 2 has started commands [S6000:X].  0 INFO {Application1a} Sleeping 6000 milliseconds...  4001 INFO {Application1a} 1 was crashed!  10830@SCENARIO {Assignment1aMain} Process 2 has terminated. | |
| Node 3:  2230@SCENARIO {Assignment1aMain} Process 3 has started commands [S10000:X].  0 INFO {Application1a} Sleeping 10000 milliseconds...  4009 INFO {Application1a} 1 was crashed!  8011 INFO {Application1a} 2 was crashed! | |
| Node 4:  2230@SCENARIO {Assignment1aMain} Process 4 has started commands [S500].  0 INFO {Application1a} Sleeping 500 milliseconds...  500 INFO {Application1a} DONE ALL OPERATIONS  4006 INFO {Application1a} 1 was crashed!  8019 INFO {Application1a} 2 was crashed!  12022 INFO {Application1a} 3 was crashed! | |
| Observation:  The nodes failure is detected as expected. | |

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| Eventually Perfect Failure Detector Case: Time Delay = 1000, Δ= 500 | |
| Topology:  node(1, "127.0.0.1", 22031);  node(2, "127.0.0.1", 22032);  node(3, "127.0.0.1", 22033);  node(4, "127.0.0.1", 22034);  defaultLinks(500, 0); | Scenario:  command(1, "S1000:X");  command(2, "S6000:X");  command(3, "S10000:X");  command(4, "S500"); |
| Node 1:  1601@SCENARIO {Assignment1bMain} Process 1 has started commands [S1000:X].  0 INFO {Epfd} Timedelay=1000, Delta=500  500 INFO {Application1b} Sleeping 1000 milliseconds...  5335@SCENARIO {Assignment1bMain} Process 1 has terminated. | |
| Node 2:  1674@SCENARIO {Assignment1bMain} Process 2 has started commands [S6000:X].  0 INFO {Epfd} Timedelay=1000, Delta=500  158 INFO {Application1b} Sleeping 6000 milliseconds...  2168 INFO {Application1b} Node 1 was suspected! Period=1000  10418@SCENARIO {Assignment1bMain} Process 2 has terminated. | |
| Node 3:  1543@SCENARIO {Assignment1bMain} Process 3 has started commands [S10000:X].  0 INFO {Epfd} Timedelay=1000, Delta=500  80 INFO {Application1b} Sleeping 10000 milliseconds...  2087 INFO {Application1b} Node 1 was suspected! Period=1000  7117 INFO {Application1b} Node 3 was suspected! Period=1000  7117 INFO {Application1b} Node 2 was suspected! Period=1000  8126 INFO {Epfd} Increase period by 500 and current period is 1500  8131 INFO {Application1b} Node 3 was restored! Period=1500  14441@SCENARIO {Assignment1bMain} Process 3 has terminated. | |
| Node 4:  1296@SCENARIO {Assignment1bMain} Process 4 has started commands [S500].  0 INFO {Epfd} Timedelay=1000, Delta=500  376 INFO {Application1b} Sleeping 500 milliseconds...  907 INFO {Application1b} DONE ALL OPERATIONS  2385 INFO {Application1b} Node 3 was suspected! Period=1000  2387 INFO {Application1b} Node 1 was suspected! Period=1000  2387 INFO {Application1b} Node 2 was suspected! Period=1000  3388 INFO {Epfd} Increase period by 500 and current period is 1500  3393 INFO {Application1b} Node 3 was restored! Period=1500  3396 INFO {Application1b} Node 2 was restored! Period=1500  9407 INFO {Application1b} Node 2 was suspected! Period=1500  13909 INFO {Application1b} Node 3 was suspected! Period=1500 | |
| Observation:  From the log above, we can see some nodes are suspected and restored after sometime because at the beginning the time delay is same as period but heartbeat message has transition time. Then after the period is increased by 500, there’s no problem. The suspects were detected as expected. | |

Exercise 2:

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| Eventually Perfect Failure Detector Case: Time Delay = 1000, Δ= 500 | |
| Topology:  node(1, "127.0.0.1", 22031);  node(2, "127.0.0.1", 22032);  node(3, "127.0.0.1", 22033);  node(4, "127.0.0.1", 22034);  defaultLinks(3000, 0); | Scenario:  command(1, "S500");  command(2, "S500");  command(3, "S500");  command(4, "S500"); |
| Node 1:  1577@SCENARIO {Assignment1bMain} Process 1 has started commands [S500].  0 INFO {Epfd} Timedelay=1000, Delta=500  349 INFO {Application1b} Sleeping 500 milliseconds...  849 INFO {Application1b} DONE ALL OPERATIONS  2352 INFO {Application1b} Node 4 was suspected! Period=1000  2352 INFO {Application1b} Node 3 was suspected! Period=1000  2352 INFO {Application1b} Node 2 was suspected! Period=1000  3352 INFO {Application1b} Node 1 was suspected! Period=1000  4423 INFO {Epfd} Increase period by 500 and current period is 1500  4425 INFO {Application1b} Node 1 was restored! Period=1500  5925 INFO {Epfd} Increase period by 500 and current period is 2000  5926 INFO {Application1b} Node 4 was restored! Period=2000  5926 INFO {Application1b} Node 3 was restored! Period=2000  5926 INFO {Application1b} Node 2 was restored! Period=2000 | |
| Node 2:  1486@SCENARIO {Assignment1bMain} Process 2 has started commands [S500].  0 INFO {Epfd} Timedelay=1000, Delta=500  145 INFO {Application1b} Sleeping 500 milliseconds...  646 INFO {Application1b} DONE ALL OPERATIONS  2146 INFO {Application1b} Node 4 was suspected! Period=1000  2147 INFO {Application1b} Node 3 was suspected! Period=1000  2148 INFO {Application1b} Node 1 was suspected! Period=1000  4196 INFO {Application1b} Node 2 was suspected! Period=1000  5196 INFO {Epfd} Increase period by 500 and current period is 1500  5196 INFO {Application1b} Node 4 was restored! Period=1500  5196 INFO {Application1b} Node 3 was restored! Period=1500  5196 INFO {Application1b} Node 1 was restored! Period=1500  5197 INFO {Application1b} Node 2 was restored! Period=1500 | |
| Node 3:  1573@SCENARIO {Assignment1bMain} Process 3 has started commands [S500].  0 INFO {Epfd} Timedelay=1000, Delta=500  640 INFO {Application1b} Sleeping 500 milliseconds...  1142 INFO {Application1b} DONE ALL OPERATIONS  2646 INFO {Application1b} Node 4 was suspected! Period=1000  2648 INFO {Application1b} Node 1 was suspected! Period=1000  2648 INFO {Application1b} Node 2 was suspected! Period=1000  4697 INFO {Application1b} Node 3 was suspected! Period=1000  5697 INFO {Epfd} Increase period by 500 and current period is 1500  5697 INFO {Application1b} Node 4 was restored! Period=1500  5698 INFO {Application1b} Node 3 was restored! Period=1500  5698 INFO {Application1b} Node 1 was restored! Period=1500  5698 INFO {Application1b} Node 2 was restored! Period=1500 | |
| Node 4:  1555@SCENARIO {Assignment1bMain} Process 4 has started commands [S500].  0 INFO {Epfd} Timedelay=1000, Delta=500  196 INFO {Application1b} Sleeping 500 milliseconds...  696 INFO {Application1b} DONE ALL OPERATIONS  2200 INFO {Application1b} Node 3 was suspected! Period=1000  2200 INFO {Application1b} Node 1 was suspected! Period=1000  2200 INFO {Application1b} Node 2 was suspected! Period=1000  5241 INFO {Epfd} Increase period by 500 and current period is 1500  5241 INFO {Application1b} Node 3 was restored! Period=1500  5241 INFO {Application1b} Node 1 was restored! Period=1500  5241 INFO {Application1b} Node 2 was restored! Period=1500 | |
| Observation:  From the log above, we can see some nodes are suspected and restored. And the period was increased as expected. But the increased period is not as much as the 3000ms link delay we defined. The time delay is 1000ms so it will send heartbeat per second. Even the link delay is 3000ms, after 4000ms, the detector can receive heartbeat message every second. So the increased period doesn’t need to be as much as or higher than 3000ms. | |

Exercise 3

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| Eventually Perfect Failure Detector Case: Time Delay = 1000, Δ= 500 (Using Fair loss link) | |
| Topology:  node(1, "127.0.0.1", 22031);  node(2, "127.0.0.1", 22032);  node(3, "127.0.0.1", 22033);  node(4, "127.0.0.1", 22034);  defaultLinks(500, 0.5); | Scenario:  command(1, "S500");  command(2, "S500");  command(3, "S500");  command(4, "S500"); |
| Node 1:  ……  308683 INFO {Epfd} Increase period by 500 and current period is 6500  308683 INFO {Application1b} Node 4 was restored! Period=6500  308683 INFO {Application1b} Node 3 was restored! Period=6500  341188 INFO {Application1b} Node 4 was suspected! Period=6500  341188 INFO {Application1b} Node 3 was suspected! Period=6500  347688 INFO {Epfd} Increase period by 500 and current period is 7000  347689 INFO {Application1b} Node 4 was restored! Period=7000  347689 INFO {Application1b} Node 3 was restored! Period=7000 | |
| Node 2:  ……  208409 INFO {Application1b} Node 4 was suspected! Period=5000  208409 INFO {Application1b} Node 3 was suspected! Period=5000  208411 INFO {Application1b} Node 1 was suspected! Period=5000  213409 INFO {Epfd} Increase period by 500 and current period is 5500  213409 INFO {Application1b} Node 4 was restored! Period=5500  213409 INFO {Application1b} Node 3 was restored! Period=5500  213409 INFO {Application1b} Node 1 was restored! Period=5500 | |
| Node 3:  ……  120516 INFO {Application1b} Node 1 was restored! Period=5500  120516 INFO {Application1b} Node 2 was restored! Period=5500  302026 INFO {Application1b} Node 1 was suspected! Period=5500  302031 INFO {Application1b} Node 2 was suspected! Period=5500  307527 INFO {Epfd} Increase period by 500 and current period is 6000  307530 INFO {Application1b} Node 1 was restored! Period=6000  307530 INFO {Application1b} Node 2 was restored! Period=6000 | |
| Node 4:  ……  424764 INFO {Application1b} Node 3 was suspected! Period=6000  424765 INFO {Application1b} Node 2 was suspected! Period=6000  430765 INFO {Epfd} Increase period by 500 and current period is 6500  430765 INFO {Application1b} Node 3 was restored! Period=6500  430765 INFO {Application1b} Node 2 was restored! Period=6500 | |
| Observation:  From the log above, we can see all nodes are suspected and restored. And the period was increased as expected. At the beginning the increase is frequent. | |