After Running Multiple Times We Found In the Comparison

It shows that PSO allocated distrubutes tasks uniformy to a server such that there will be no excessive load or underloading , and all the server are utilized in a balanced way (maintaining efficient resource usage over time).  
  
Like allocating task to most of the servers simultaneously distributing the load In a efficient way

Below is the comparison between PSO without convergence criteria and best fit algorithm   
  
The comaparison between PSO with convergence criteria will be updated ..

TEST 1)

**Best Fit Resource Allocation Table:**

| **Task** | **Server Assignment** |
| --- | --- |
| 0 | Server 1 |
| 1 | Server 1 |
| 2 | Server 1 |
| 3 | Server 1 |
| 4 | Server 1 |
| 5 | Server 1 |
| 6 | Server 0 |
| 7 | Server 2 |
| 8 | Server 1 |
| 9 | Server 0 |

Server Usage Counts:

* Server 0 - Usage count 2
* Server 1 - Usage count 6
* Server 2 - Usage count 2

**Best Assignment Using PSO Table:**

| **Task** | **Server Assignment** |
| --- | --- |
| 0 | Server 2 |
| 1 | Server 1 |
| 2 | Server 2 |
| 3 | Server 0 |
| 4 | Server 0 |
| 5 | Server 0 |
| 6 | Server 0 |
| 7 | Server 2 |
| 8 | Server 0 |
| 9 | Server 2 |

Server Usage Counts:

* Server 0 - Usage count 5
* Server 1 - Usage count 1
* Server 2 - Usage count 4

TEST 2)

**Best Fit Resource Allocation:**

| **Task** | **Server Assignment** | **CPU Utilization** | **Memory Utilization** | **Energy Consumed** |
| --- | --- | --- | --- | --- |
| 0 | Server 0 | 58.64% | 36.11% | 4.00 units |
| 1 | Server 0 | 12.83% | 7.90% | 3.20 units |
| 2 | Server 0 | 2.81% | 1.73% | 1.50 units |
| 3 | Server 0 | 0.61% | 0.38% | 3.80 units |
| 4 | Server 0 | 0.13% | 0.08% | 4.30 units |
| 5 | Server 0 | 0.03% | 0.02% | 5.00 units |
| 6 | Server 0 | 0.01% | 0.00% | 3.10 units |
| 7 | Server 0 | 0.00% | 0.00% | 1.80 units |
| 8 | Server 0 | 0.00% | 0.00% | 3.10 units |
| 9 | Server 2 | 0.07% | 0.02% | 1.10 units |

Server Usage Counts:

* Server 0 - Usage count 9
* Server 2 - Usage count 1

**Best Assignment Using PSO:**

| **Task** | **Server Assignment** | **CPU Utilization** | **Memory Utilization** | **Execution Time** |
| --- | --- | --- | --- | --- |
| 0 | Server 0 | 39.72% | 35.98% | 4.00 seconds |
| 1 | Server 1 | 72.87% | 55.81% | 1.00 seconds |
| 2 | Server 1 | 72.87% | 55.81% | 9.00 seconds |
| 3 | Server 2 | 0.00% | 0.00% | 6.00 seconds |
| 4 | Server 1 | 72.87% | 55.81% | 1.00 seconds |
| 5 | Server 2 | 0.00% | 0.00% | 6.00 seconds |
| 6 | Server 0 | 39.72% | 35.98% | 6.00 seconds |
| 7 | Server 2 | 0.00% | 0.00% | 10.00 seconds |
| 8 | Server 0 | 39.72% | 35.98% | 6.00 seconds |
| 9 | Server 2 | 0.00% | 0.00% | 3.00 seconds |

Server Usage Counts:

* Server 0 - Usage count 4
* Server 1 - Usage count 2
* Server 2 - Usage count 4

TEST 3)

**Best Fit Resource Allocation:**

| **Task** | **Server Assignment** | **CPU Utilization** | **Memory Utilization** | **Energy Consumed** |
| --- | --- | --- | --- | --- |
| 0 | Server 3 | 30.66% | 28.45% | 1.10 units |
| 1 | Server 1 | 8.59% | 3.30% | 4.10 units |
| 2 | Server 3 | 2.34% | 2.17% | 2.40 units |
| 3 | Server 3 | 0.65% | 0.60% | 2.10 units |
| 4 | Server 2 | 0.11% | 0.08% | 2.80 units |
| 5 | Server 1 | 0.05% | 0.02% | 2.40 units |
| 6 | Server 3 | 0.01% | 0.01% | 4.00 units |
| 7 | Server 2 | 0.00% | 0.00% | 3.70 units |
| 8 | Server 1 | 0.00% | 0.00% | 1.40 units |
| 9 | Server 1 | 0.00% | 0.00% | 3.50 units |

Server Usage Counts:

* Server 1 - Usage count 5
* Server 2 - Usage count 2
* Server 3 - Usage count 3

**Best Assignment Using PSO:**

| **Task** | **Server Assignment** | **CPU Utilization** | **Memory Utilization** | **Execution Time** |
| --- | --- | --- | --- | --- |
| 0 | Server 0 | 28.83% | 13.87% | 6.00 seconds |
| 1 | Server 1 | 22.51% | 18.08% | 2.00 seconds |
| 2 | Server 0 | 28.83% | 13.87% | 1.00 seconds |
| 3 | Server 0 | 28.83% | 13.87% | 10.00 seconds |
| 4 | Server 0 | 28.83% | 13.87% | 9.00 seconds |
| 5 | Server 0 | 28.83% | 13.87% | 8.00 seconds |
| 6 | Server 0 | 28.83% | 13.87% | 9.00 seconds |
| 7 | Server 1 | 22.51% | 18.08% | 9.00 seconds |
| 8 | Server 1 | 22.51% | 18.08% | 7.00 seconds |
| 9 | Server 1 | 22.51% | 18.08% | 2.00 seconds |

Server Usage Counts:

* Server 0 - Usage count 7
* Server 1 - Usage count 4

TEST 4)

**Best Fit Resource Allocation:**

| **Task** | **Server Assignment** | **CPU Utilization** | **Memory Utilization** | **Energy Consumed** |
| --- | --- | --- | --- | --- |
| 0 | Server 0 | 68.61% | 40.13% | 2.30 units |
| 1 | Server 0 | 15.38% | 9.00% | 4.70 units |
| 2 | Server 0 | 3.45% | 2.02% | 3.30 units |
| 3 | Server 0 | 0.77% | 0.45% | 4.50 units |
| 4 | Server 0 | 0.17% | 0.10% | 1.30 units |
| 5 | Server 0 | 0.04% | 0.02% | 3.90 units |
| 6 | Server 0 | 0.01% | 0.01% | 4.90 units |
| 7 | Server 0 | 0.00% | 0.00% | 1.80 units |
| 8 | Server 1 | 0.17% | 0.06% | 4.10 units |
| 9 | Server 0 | 0.00% | 0.00% | 2.10 units |

Server Usage Counts:

* Server 0 - Usage count 9
* Server 1 - Usage count 1

**Best Assignment Using PSO:**

| **Task** | **Server Assignment** | **CPU Utilization** | **Memory Utilization** | **Execution Time** |
| --- | --- | --- | --- | --- |
| 0 | Server 0 | 59.31% | 33.33% | 6.00 seconds |
| 1 | Server 1 | 30.91% | 15.00% | 6.00 seconds |
| 2 | Server 0 | 59.31% | 33.33% | 8.00 seconds |
| 3 | Server 0 | 59.31% | 33.33% | 9.00 seconds |
| 4 | Server 0 | 59.31% | 33.33% | 10.00 seconds |
| 5 | Server 0 | 59.31% | 33.33% | 2.00 seconds |
| 6 | Server 0 | 59.31% | 33.33% | 4.00 seconds |
| 7 | Server 1 | 30.91% | 15.00% | 6.00 seconds |
| 8 | Server 0 | 59.31% | 33.33% | 9.00 seconds |
| 9 | Server 0 | 59.31% | 33.33% | 6.00 seconds |

Server Usage Counts:

* Server 0 - Usage count 8
* Server 1 - Usage count 2

TEST 5 )

**Best Fit Resource Allocation:**

| **Task** | **Server Assignment** | **CPU Utilization** | **Memory Utilization** | **Energy Consumed** |
| --- | --- | --- | --- | --- |
| 0 | Server 0 | 37.95% | 22.60% | 3.10 units |
| 1 | Server 0 | 8.09% | 4.82% | 4.50 units |
| 2 | Server 0 | 1.73% | 1.03% | 4.60 units |
| 3 | Server 0 | 0.37% | 0.22% | 4.20 units |
| 4 | Server 0 | 0.08% | 0.05% | 3.80 units |
| 5 | Server 2 | 0.14% | 0.09% | 3.30 units |
| 6 | Server 1 | 0.07% | 0.05% | 3.00 units |
| 7 | Server 0 | 0.00% | 0.00% | 4.10 units |
| 8 | Server 2 | 0.01% | 0.00% | 2.00 units |
| 9 | Server 1 | 0.00% | 0.00% | 3.50 units |

Server Usage Counts:

* Server 0 - Usage count 4
* Server 1 - Usage count 2
* Server 2 - Usage count 2

**Best Assignment Using PSO:**

| **Task** | **Server Assignment** | **CPU Utilization** | **Memory Utilization** | **Execution Time** |
| --- | --- | --- | --- | --- |
| 0 | Server 2 | 32.20% | 16.61% | 7.00 seconds |
| 1 | Server 1 | 43.68% | 31.61% | 7.00 seconds |
| 2 | Server 0 | 30.83% | 9.09% | 5.00 seconds |
| 3 | Server 2 | 32.20% | 16.61% | 5.00 seconds |
| 4 | Server 0 | 30.83% | 9.09% | 6.00 seconds |
| 5 | Server 1 | 43.68% | 31.61% | 10.00 seconds |
| 6 | Server 2 | 32.20% | 16.61% | 6.00 seconds |
| 7 | Server 2 | 32.20% | 16.61% | 4.00 seconds |
| 8 | Server 1 | 43.68% | 31.61% | 4.00 seconds |
| 9 | Server 3 | 12.12% | 15.58% | 4.00 seconds |

Server Usage Counts:

* Server 0 - Usage count 2
* Server 1 - Usage count 3
* Server 2 - Usage count 4
* Server 3 - Usage count 1

TEST 6)

**Best Fit Resource Allocation:**

| **Task** | **Server Assignment** | **CPU Utilization** | **Memory Utilization** | **Energy Consumed** |
| --- | --- | --- | --- | --- |
| 0 | Server 3 | 43.42% | 25.44% | 4.70 units |
| 1 | Server 3 | 9.52% | 5.58% | 4.40 units |
| 2 | Server 3 | 2.09% | 1.22% | 3.60 units |
| 3 | Server 3 | 0.46% | 0.27% | 5.00 units |
| 4 | Server 3 | 0.10% | 0.06% | 2.60 units |
| 5 | Server 2 | 0.10% | 0.07% | 2.40 units |
| 6 | Server 3 | 0.00% | 0.00% | 4.30 units |
| 7 | Server 2 | 0.01% | 0.01% | 4.70 units |
| 8 | Server 0 | 0.06% | 0.03% | 2.30 units |
| 9 | Server 3 | 0.00% | 0.00% | 2.00 units |

Server Usage Counts:

* Server 0 - Usage count 1
* Server 2 - Usage count 2
* Server 3 - Usage count 7

**Best Assignment Using PSO:**

| **Task** | **Server Assignment** | **CPU Utilization** | **Memory Utilization** | **Execution Time** |
| --- | --- | --- | --- | --- |
| 0 | Server 2 | 45.80% | 34.03% | 1.00 seconds |
| 1 | Server 2 | 45.80% | 34.03% | 1.00 seconds |
| 2 | Server 2 | 45.80% | 34.03% | 1.00 seconds |
| 3 | Server 2 | 45.80% | 34.03% | 5.00 seconds |
| 4 | Server 0 | 37.59% | 7.09% | 7.00 seconds |
| 5 | Server 0 | 37.59% | 7.09% | 3.00 seconds |
| 6 | Server 0 | 37.59% | 7.09% | 2.00 seconds |
| 7 | Server 2 | 45.80% | 34.03% | 8.00 seconds |
| 8 | Server 1 | 48.05% | 41.56% | 2.00 seconds |
| 9 | Server 0 | 37.59% | 7.09% | 1.00 seconds |

Server Usage Counts:

* Server 0 - Usage count 4
* Server 1 - Usage count 1
* Server 2 - Usage count 4