

Waiting lines, queues and ciw.

@drvinceknight

github.com/CiwPython/Ciw





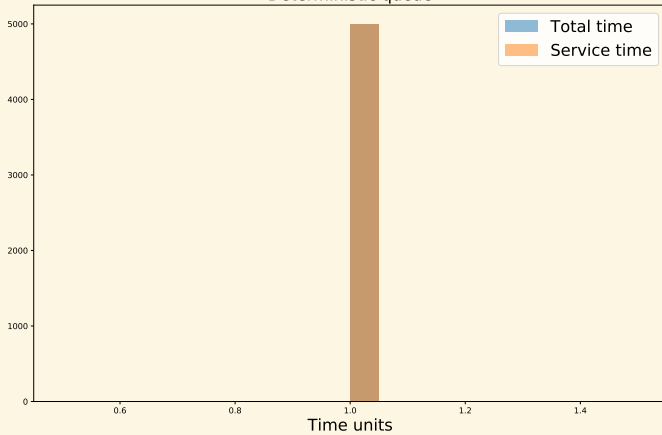
```
>>> import ciw
>>> dist = ['Deterministic', 1]
>>> N = ciw.create_network(Arrival_distributions=[dist],
...                         Service_distributions=[dist],
...                         Number_of_servers=[1])
>>> seed = 0
>>> max_customers = 5000
>>> ciw.seed(seed)
>>> Q = ciw.Simulation(N)
>>> Q.simulate_until_max_customers(max_customers)
```

```
>>> Q.nodes
[Arrival Node, Node 1, Exit Node]
>>> Q.nodes[-1].all_individuals[6].data_records
[Record(...arrival_date=7, ...service_start_date=7...)]
```

```
>>> def get_times(Q):
...     """
...     Obtain total time and service time of every individual
...     """
...
...     total_times = [ind.data_records[0].exit_date -
...                     ind.data_records[0].arrival_date
...                     for ind in Q.nodes[-1].all_individuals[:-1]]
...     service_times = [ind.data_records[0].service_time
...                       for ind in Q.nodes[-1].all_individuals[:-1]]
...     return total_times, service_times

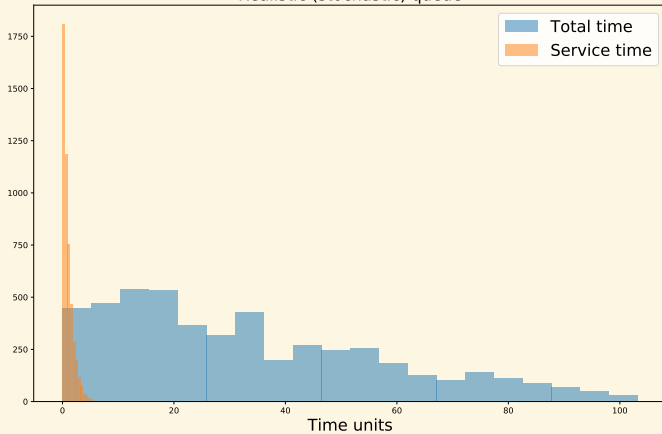
>>> total_times, service_times = get_times(Q)
```

Deterministic queue

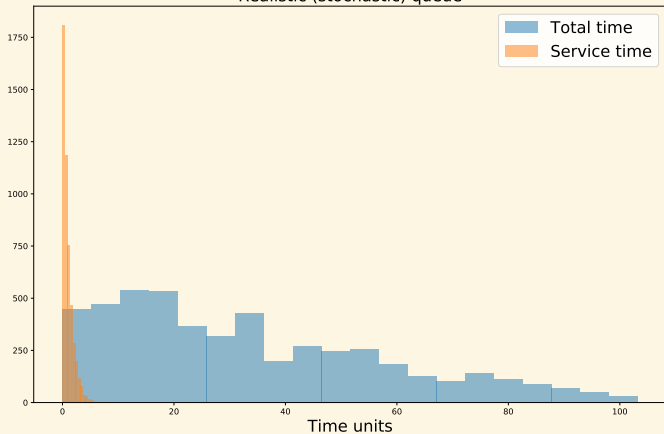


```
>>> dist = ['Exponential', 1]
>>> N = ciw.create_network(Arrival_distributions=[dist],
...                         Service_distributions=[dist],
...                         Number_of_servers=[1])
>>> seed = 0
>>> max_customers = 5000
>>> ciw.seed(seed)
>>> Q = ciw.Simulation(N)
>>> Q.simulate_until_max_customers(max_customers)
>>> total_times, service_times = get_times(Q)
```

Realistic (stochastic) queue



Realistic (stochastic) queue



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