

Step 1: Classes specification

Product Form Queuing Network Solver

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Classes Stations Service Demands Reference Station What-if Comment

Classes characteristics
Number, customized name, type of classes and number of customers (closed class) or arrival rate (open class). Add classes one by one or define total number at once. Number: 4

	Name	Type	No. of Customers	Arrival Rate (λ)
1	Browsing clients (B)	open		0.1667
2	Purchasing clients (P)	open		0.0500
3	Administration employees (A)	closed	10	
4	Warehouse employees (W)	closed	15	

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Step 2: Stations definition

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Classes Stations Service Demands Reference Station What-if Comment

Stations characteristics
Number, customized name and type of stations. Add stations one by one or define the total number at once. Load Dependent stations necessarily require the use of MVA. Number: 4

	Name	Type
1	Application Server (1)	Load Independent
2	Database (2)	Load Independent
3	Storage server (3)	Load Independent
4	Terminal (4)	Delay (Infinite Server)

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Click or drag to select stations; to edit data double-click and start typing. Right-click for a list of available operations

Step 3: Specify service demands

Service Demands

Input service demands of each station and class.
If the station is "Load Dependent" you can set the service demands for each number of customers by double-click on "LD Settings..." button.
Press "Service Times and Visits" button to enter service times and visits instead of service demands.

	Browsing clients (B)	Purchasing clients (P)	Administration employees (A)	Warehouse employees (W)
Application:	2.0000	5.0000	1.0000	1.5000
Database (2)	3.0000	1.0000	2.0000	2.0000
Storage se...	1.0000	1.5000	2.0000	2.5000
Terminal (4)	0.0000	0.0000	300.0000	600.0000

Service Times and Visits

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Step 4: Set reference stations

Reference Station

The station is used to compute the system throughput and the system response time for each closed class.
Performance metrics of open classes are always computed with respect to the arrival process. Visits at the Reference station can not be Zero.
WARNING: the reference station for all closed classes is forced to be the same station.

Class	Station
Browsing clients (B)	Arrival Process
Purchasing clients (P)	Arrival Process
Administration employees (A)	Terminal (4)
Warehouse employees (W)	Terminal (4)

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Results

1) The system is stable?

Utilization	
Utilization of a customer	
*	Aggregate
Applicati...	0.6521
Database ...	0.6630
Storage s...	0.3669
Terminal ...	24.2795

As we can see, the utilization of all of the stations (except the terminal station) is less than 1, so the system is stable.

2) Average system response time

System Response Time

The global aggregate is the "System Response Time" and is obtained weighting the aggregated values by the relative per-class throughput.

A: This value of System Response Time **includes** the Residence Time of the Reference Station.

B: This value of System Response Time **does NOT include** the Residence Time of the Reference Station.

Notice: For **open classes** the Reference Station always coincides with the arrival process. Thus the **B** values are not computed.

*	Aggregate	Browsing clients (B)	Purchasing clients (P)	Administration employees (A)	Warehouse employees (W)
A	--	16.1759	19.6664	311.7666	614.0439
B	--	--	--	11.7666	14.0439

3) Throughput of the closed classes

Administration employees (A)	Warehouse employees (W)
0.0321	0.0244
0.0321	0.0244
0.0321	0.0244
0.0321	0.0244
0.0321	0.0244

4) Average number of jobs of the open classes

Number of Customers			
Average number of customers for each class at each station.			
*	Aggregate	Browsing clients (B)	Purchasing clients (P)
Aggregate	28.6793	2.6960	0.9833
Applicati...	1.8695	0.9565	0.7174
Database ...	1.9533	1.4766	0.1477
Storage s...	0.5770	0.2628	0.1183
Terminal ...	24.2795	0.0000	0.0000