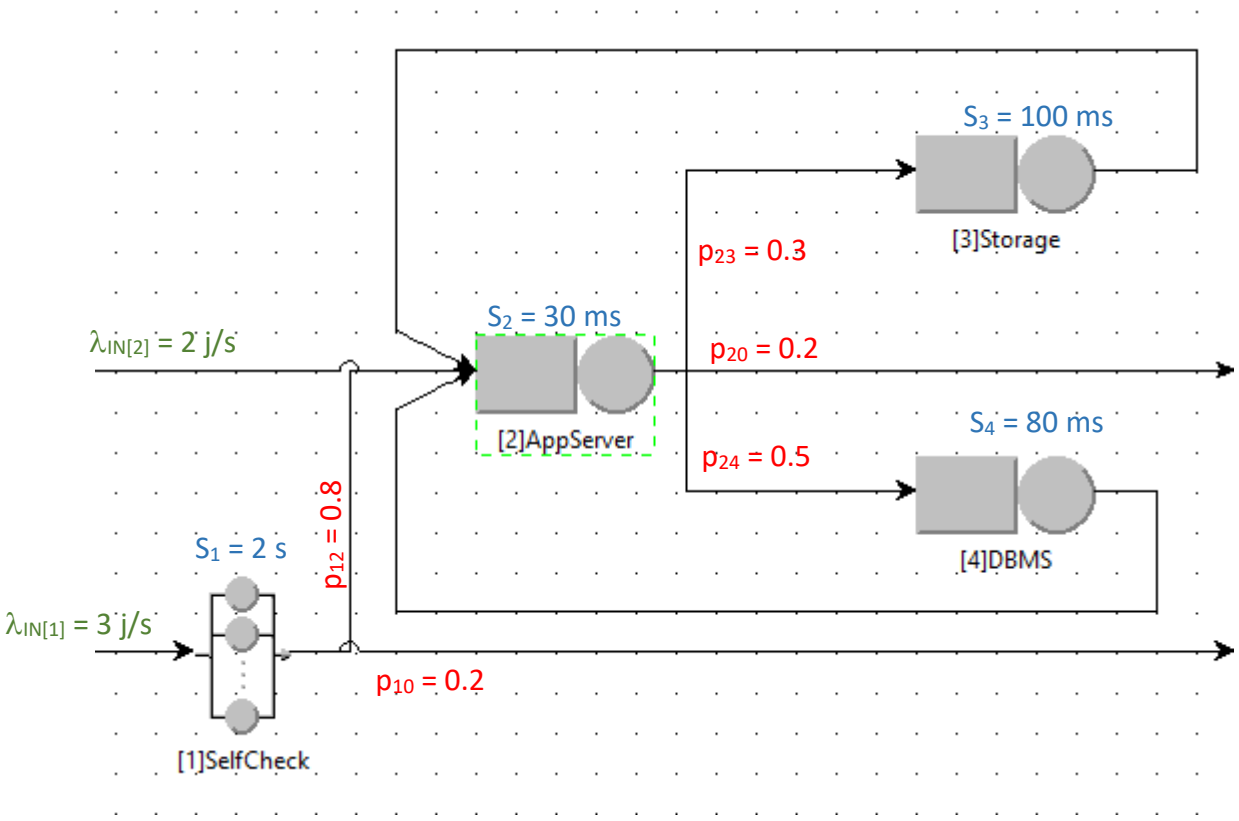
Visits, throughput and Demands

Let us consider a web application, composed by [2] an application server, [3] a web server and [4] a DBMS, each one characterized by the following average service time: S_2 = 30 ms, S_2 = 100 ms, S_3 = 80 ms. Some requests arrive directly to the application server, at the rate $\lambda_{IN[2]}$ = 2 j/s, while another $\lambda_{IN[1]}$ = 3 j/s pass through a [1] self-check performed on the client before deciding whether to request the service to the system, or to leave immediately. This check can be considered to be done in parallel by each user (infinite server), and it takes an average of S_1 = 2 s. The self-check routes the requests p_{12} = 80% of the times to the application system, while the other p_{10} = 20% out of the system. When a a job ends its service at the application server, it leaves the system p_{20} = 20% of the times, while it joins the storage or the DBMS respectively p_{23} = 30% and p_{24} = 50% of the times. Once a request is completed either at the storage or at the DBMS, it returns to the application server for further processing.



Considering the system to be separable, compute:

1. The throughput of the system (X)
2. The average number of jobs in the system (N)
3. The average system response time (R)

Ordine di come fare le cose:
Visits
demand (visits e demand come nell'A13)
system throughput
N
R