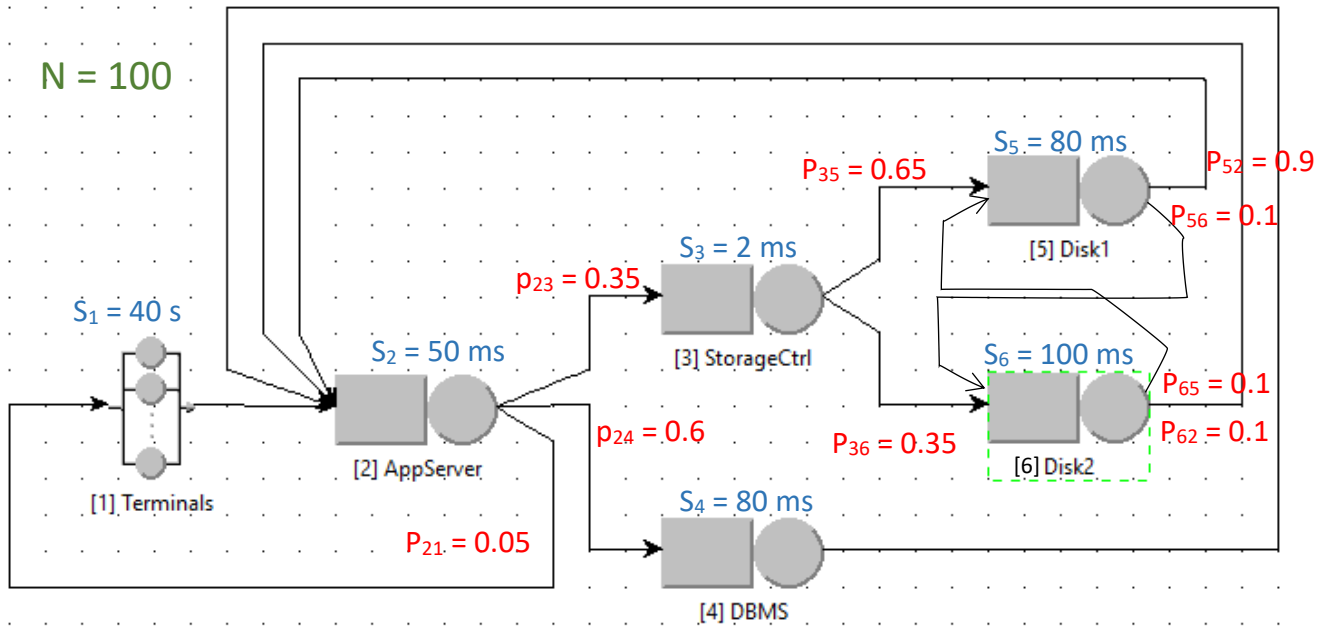
Closed models

Let us consider an intranet of a small company, used by N = 100 employers, each with a [1] think time of $S_1 = 40\ s$. Requests are sent to the [2] Application server, characterized by an average service time of $S_2 = 50\ ms$. 35 % of the requests are routed to a [3] storage controller, with an average service time of $S_3 = 2\ ms$, 60 % to the [4] DBMS, with average duration $S_4 = 80\ ms$, while the remaining 5 % complete the job and return a response to the users. The storage controller forwards the request to either [5] Disk 1, (average service time $S_5 = 80\ ms$) 65 % of the times, or to [6] Disk 2, (average service time $S_6 = 100\ ms$). Each disk, however, might offload the request to the other with a probability of 10%.



Considering the system to be separable, compute by implementing the Mean Value Analysis technique yourself:

1. The demand of the two disks
2. The throughput of the system (X)
3. The average system response time (R)
4. The utilization of the [3] Application Server, [4] DBMS, [5] Disk 1, and [6] Disk 2.
5. The throughput of the two disks