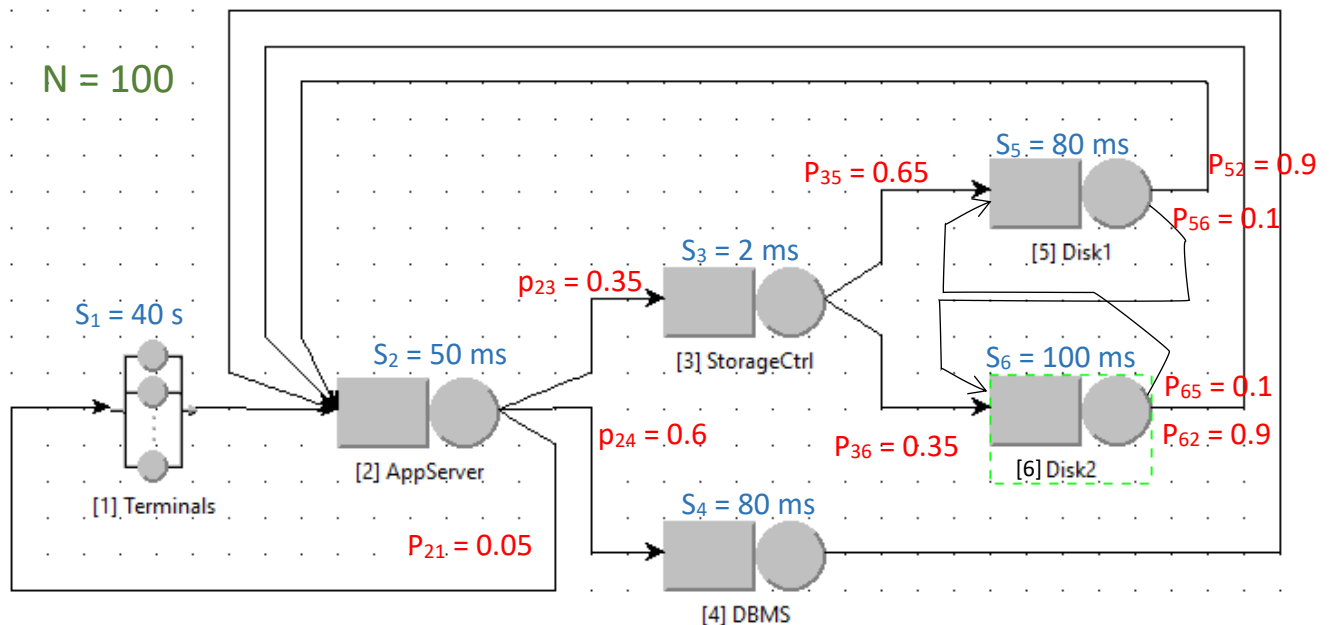


## Closed models

Let us consider an intranet of a small company, used by  $N = 100$  employees, 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 [2] Application Server, [4] DBMS, [5] Disk 1, and [6] Disk 2.
5. The throughput of the two disks