Closed models

Let us consider an intranet of a small company, used by N = 80 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. 40 % of the requests are routed to a [3] storage controller, with an average service time of S_3 = 2 ms, 50 % to the [4] DBMS, with average duration S_4 = 80 ms, while the remaining 10 % 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) 60 % of the times, or to [6] Disk 2, (average service time S_6 = 120 ms).
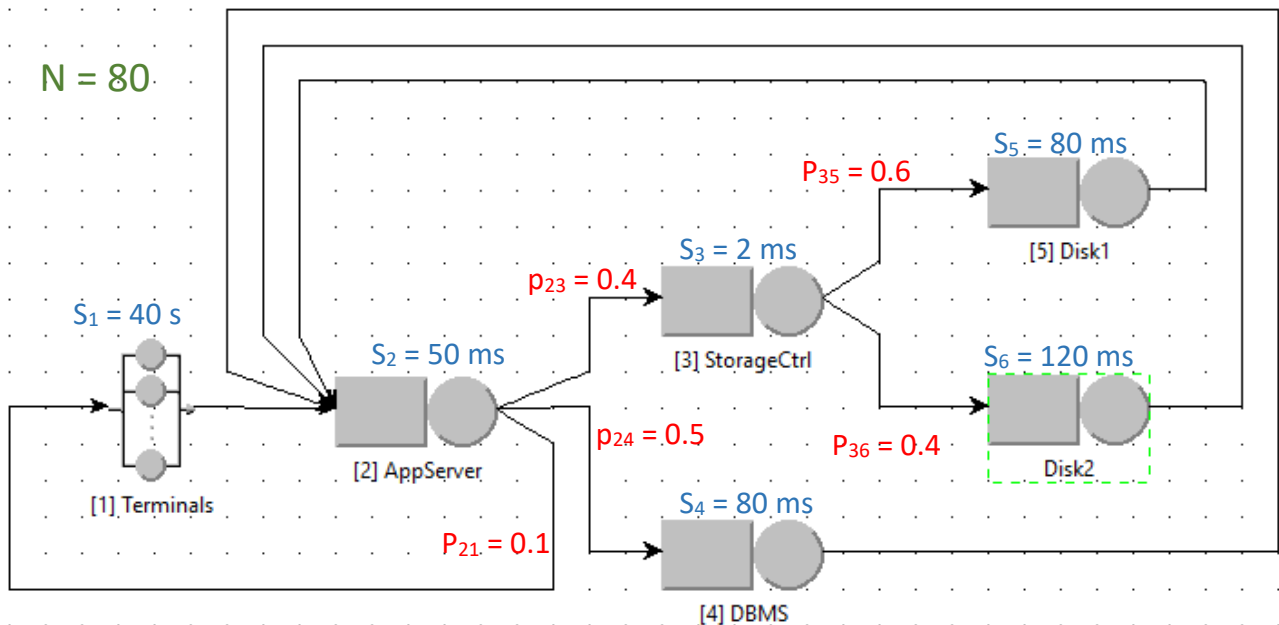
Considering the system to be separable, compute by implementing the Mean Value Analysis technique yourself:

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