Performance Evaluation and Applications Projects

2021 / 2022

Project Type B

For students with ID (Codice Persona) ending with :
01, 06, 11, 16, 21, 26, 31, 36, 41, 46, 51, 56, 61, 66, 71, 76, 81, 86, 91, 96
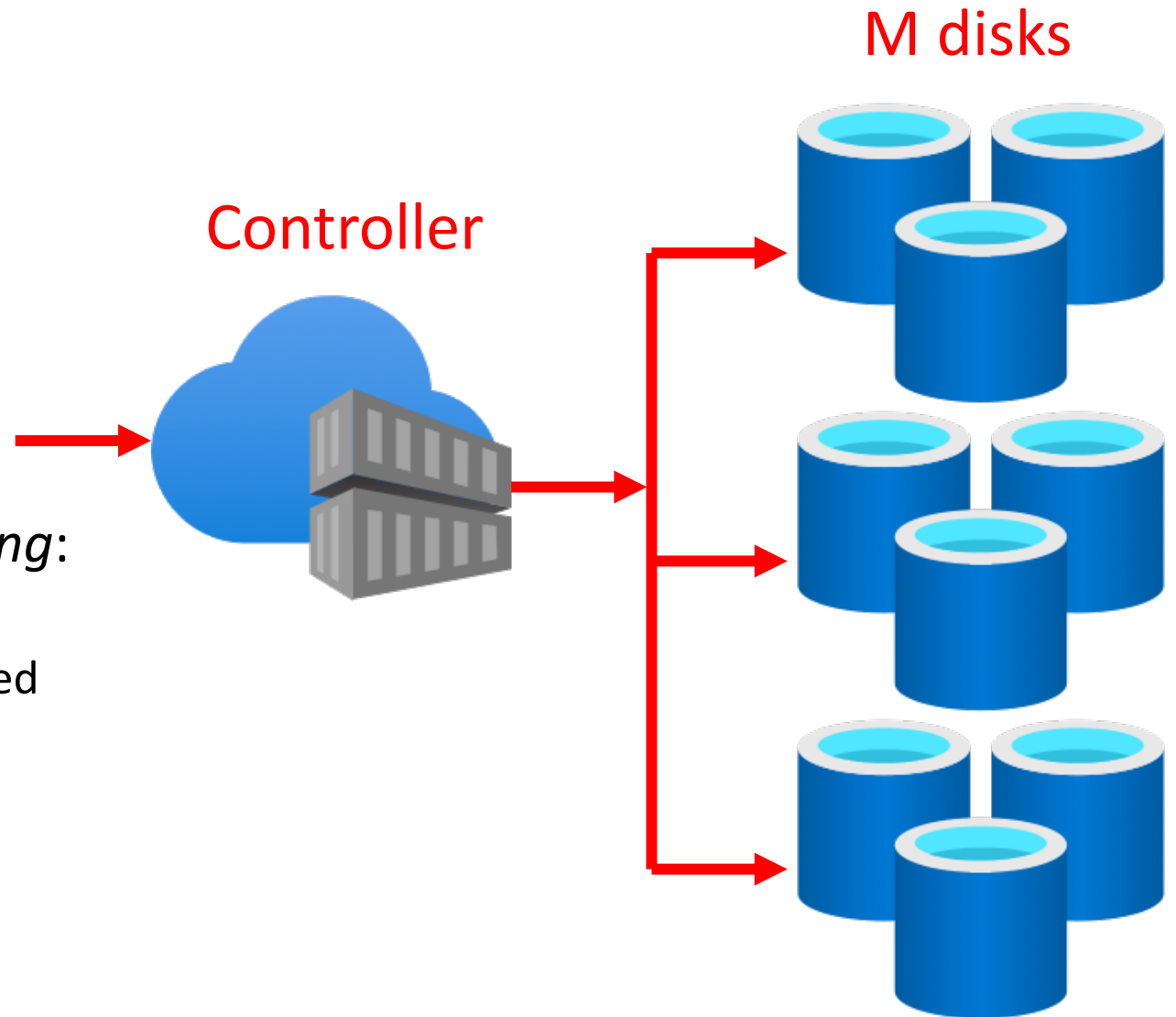
A cloud storage

It is composed by:

- A controller
- *M* disks

Each file is stored with *erasure coding*:

- It is split into *K* data chunks
- Another *N-K* coding chunks are added to improve reliability
- The file can be reconstructed when *K* out of *N* chunks are available
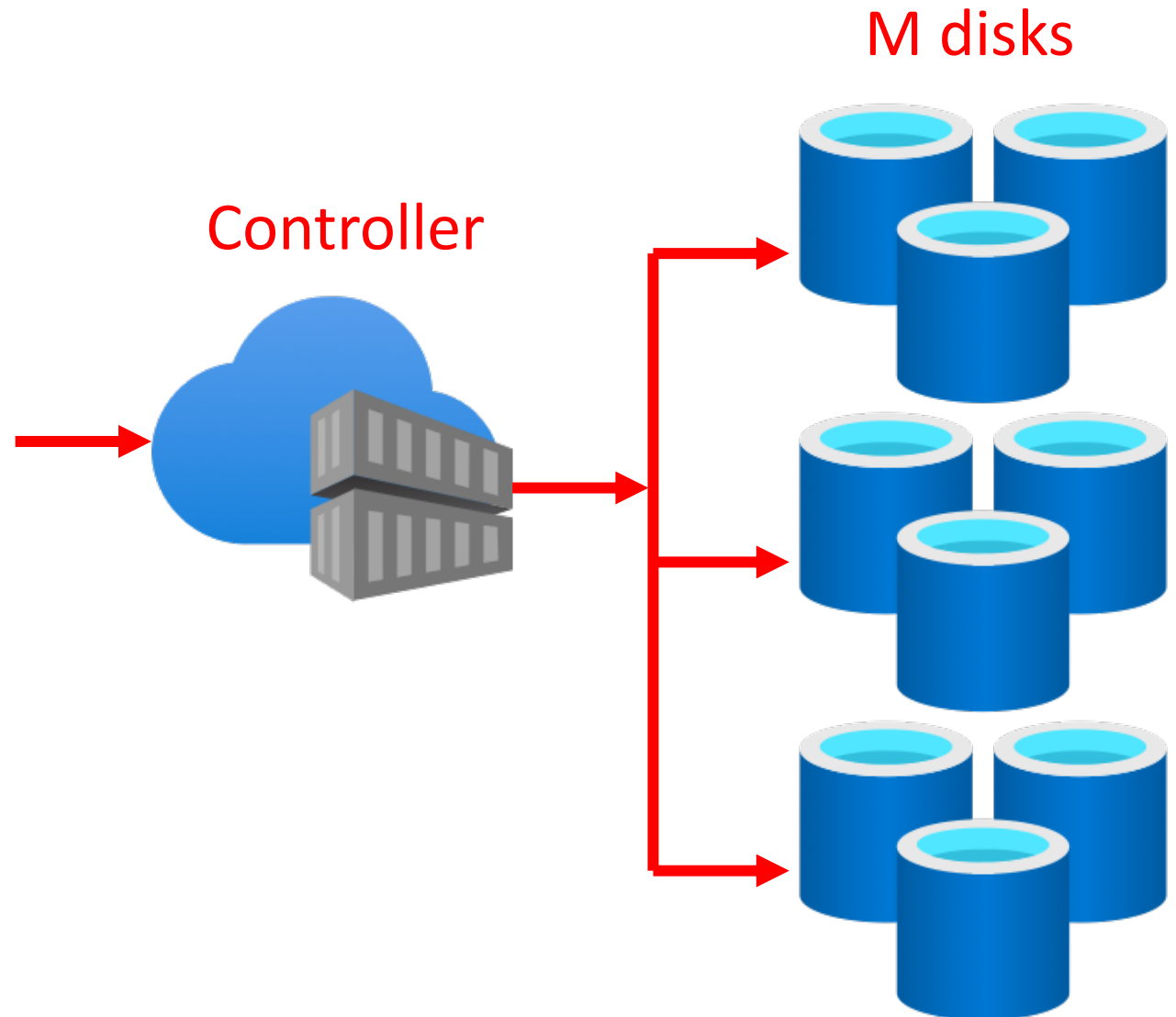- We always have *K < N < M*

Controller

M disks

A cloud storage

Two types of requests are considered:

- *Write (rate λ_W)* requests write *N* chunks on *N* randomly chosen disks among the *M* available. They terminate only when all chunks have been written.

- *Read (rate λ_R)* requests access only *K* randomly chosen disks out of the *M* available.

We are interested in modelling only perfectly functioning disks and do not consider failure.

We also suppose that read and write operations takes the same time on both the controller and the disks.

Controller

Version B1

Considering the following parameters, compute the average utilization of the disks, and the system response time.

The service times for the disks should be determined studying the corresponding trace (measured in milli-seconds): `Trace15.txt`

All other timings can be considered exponentially distributed.

λ_R	λ_W
300 req./sec.	80 req./sec.

$\mu_{Controller}$	K	N	M
1000 req./sec.	5	8	10