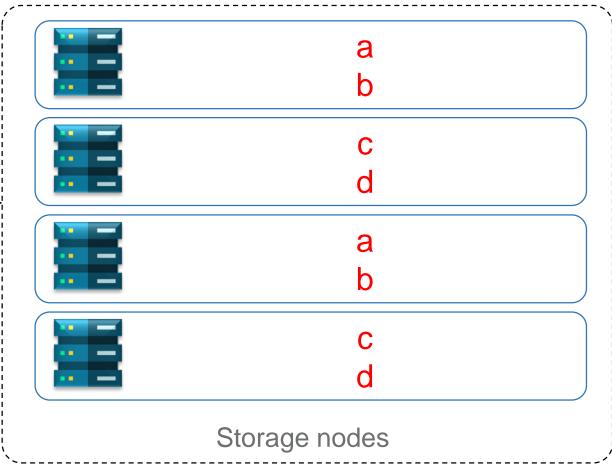


Uncoded Storage (replicated storage)

Input data

a, b, c, d



Output data

→ Clients

a, b, a, c, ...

a	00
b	01
С	10
d	11

Coded Storage

--

a

b



C

d

Input data

a, b, c, d

a + b + c + d

a + 2b + c + 2d

a + 2b + 3c + d

3a + 2b + 2c + 3d

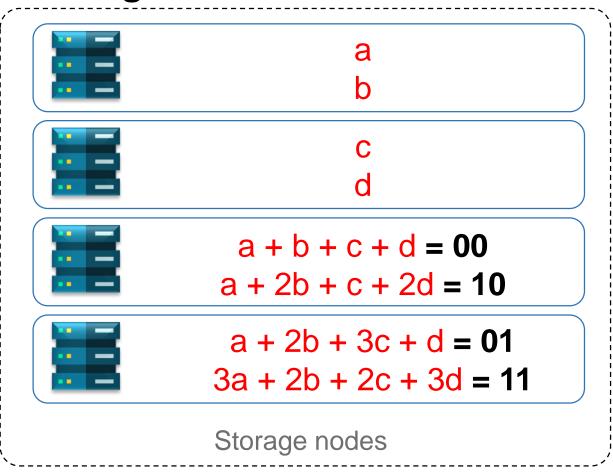
Storage nodes

Output data

→ Clients

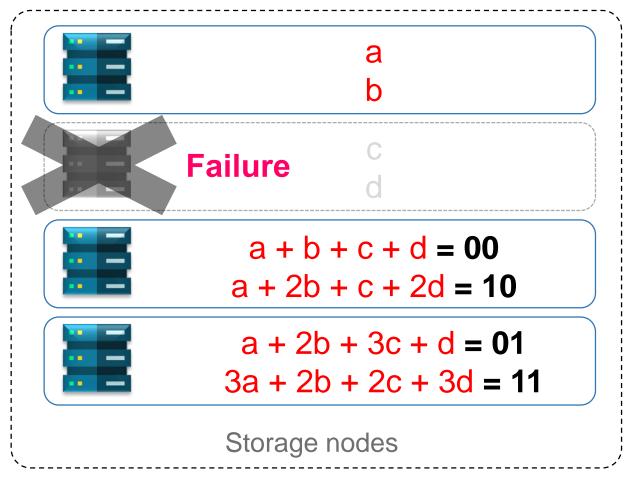
a, b, a, c, ...

Coded Storage



а	00
b	01
С	10
d	11

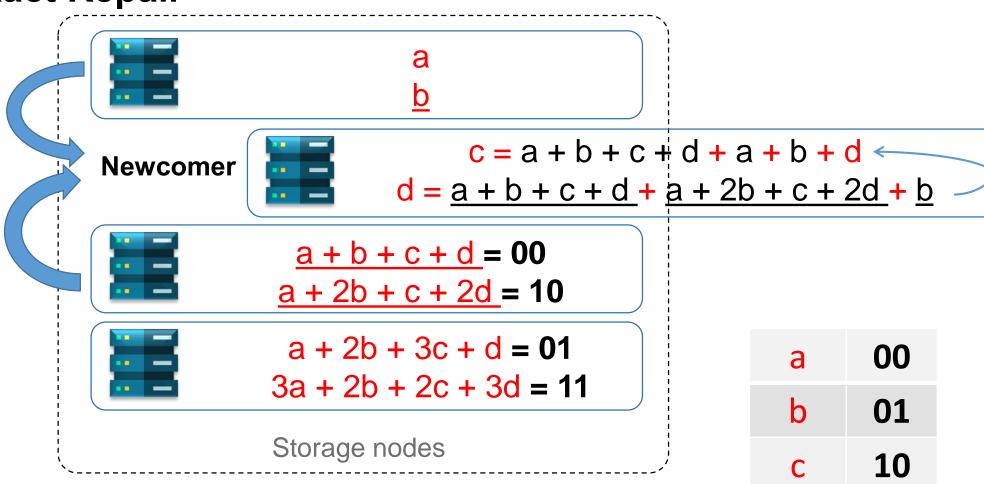
Repair



a	00
b	01
С	10
d	11



Exact Repair

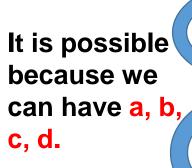


Note that any failure server can be reconstructed by any two of them.

a	00
b	01
С	10
d	11



Functional Repair





a

b

Information equivalent

Newcomer



$$5a + 7b + 8c + 7d$$

 $6a + 9b + 6c + 6d$

$$a + b + c + d = 00$$

 $a + 2b + c + 2d = 10$



$$a + 2b + 3c + d = 01$$

$$3a + 2b + 2c + 3d = 11$$

Storage nodes

a	00
b	01
С	10
d	11

After repair, any failure server still can be reconstructed by any two of them.

$(m, n, k, r, \alpha, \beta)$ code

· –

a

 $\alpha = 2$

C

d

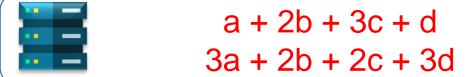
a, b, c, d

Input data

m = 4



$$a + 2b + c + 2d$$



Storage nodes

lpha: node capacity

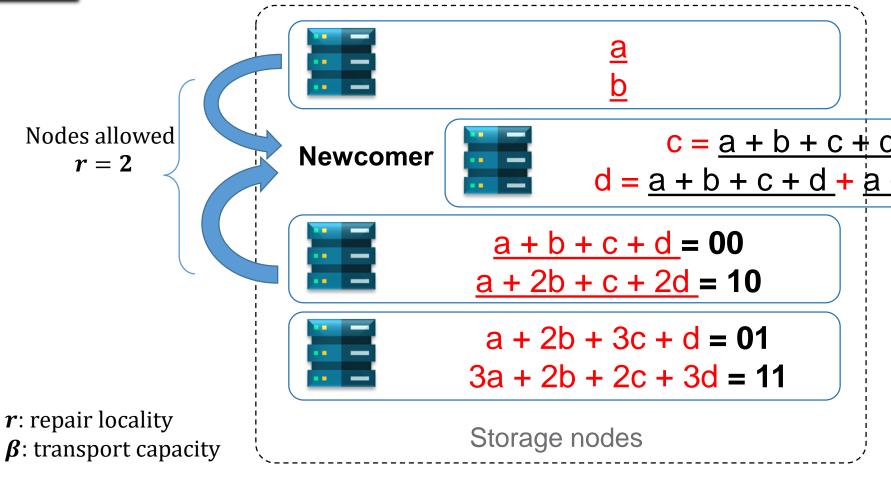
n = 4

Note that any failure server can be reconstructed by any two of them.

$$k = 2$$



$(4, 4, 2, r, 2, \beta)$ code



Communicated bits $\beta = 2$

 $c = a + b + c + d + a + b + d \leftarrow$

$$d = a + b + c + d + a + 2b + c + 2d + b$$

Communicated bits

$$\beta = 2$$