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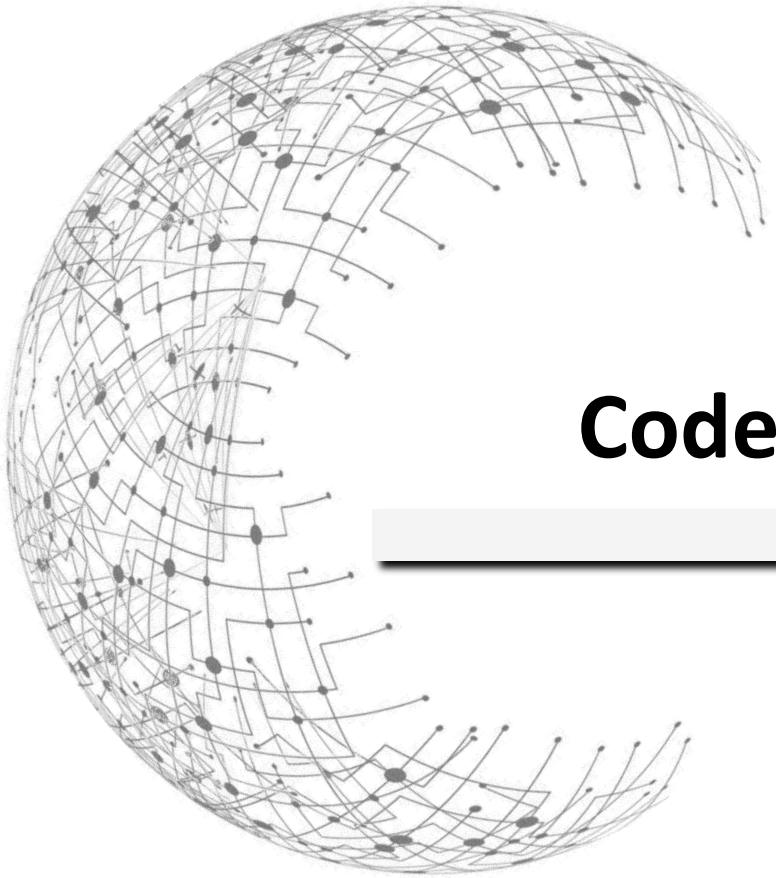
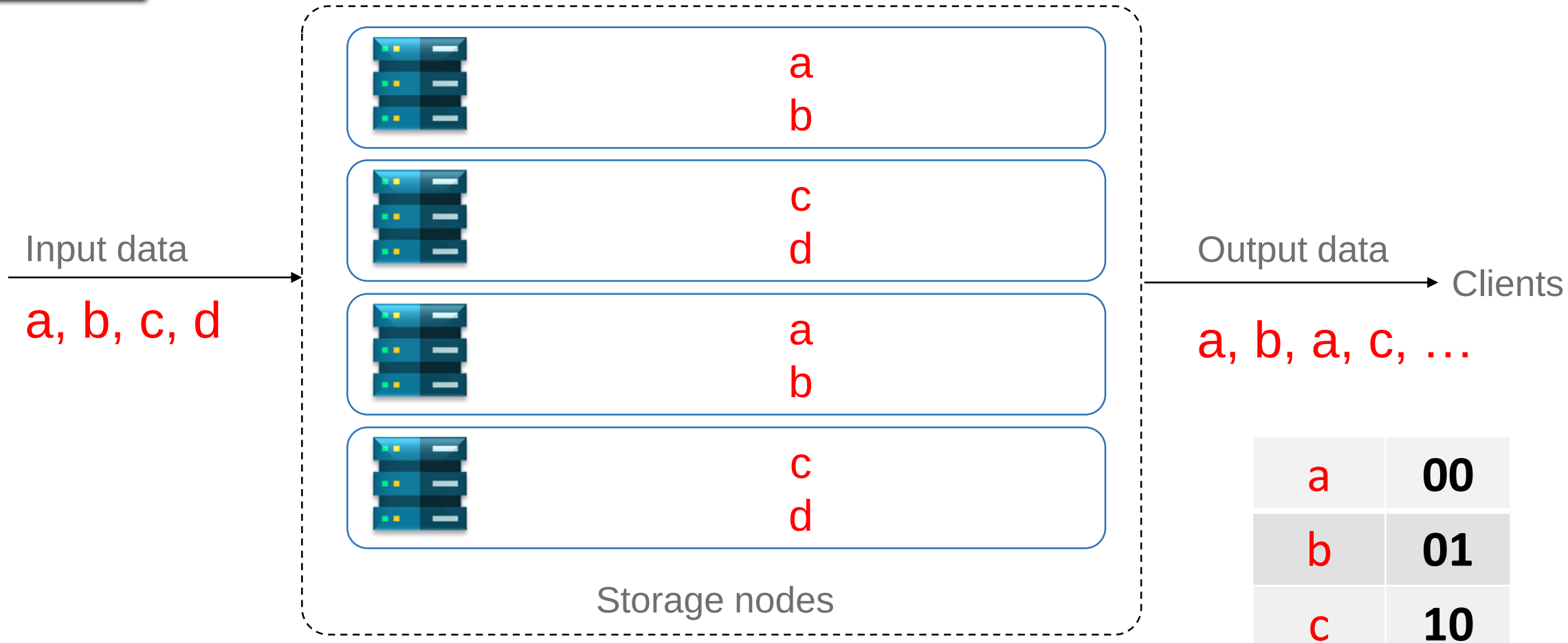


Codes for Distributed Storage Systems

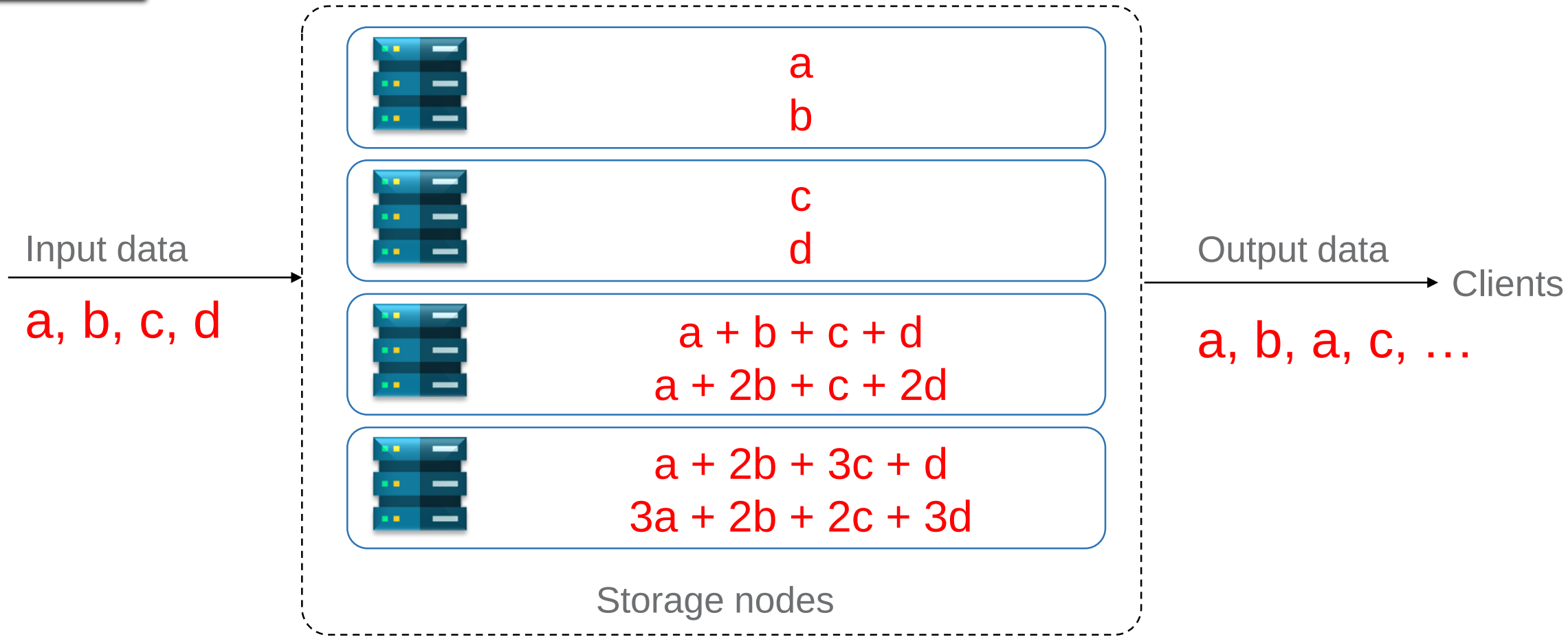
Junming Ke
University of Tartu
March, 2022

Uncoded Storage (replicated storage)



a	00
b	01
c	10
d	11

Coded Storage



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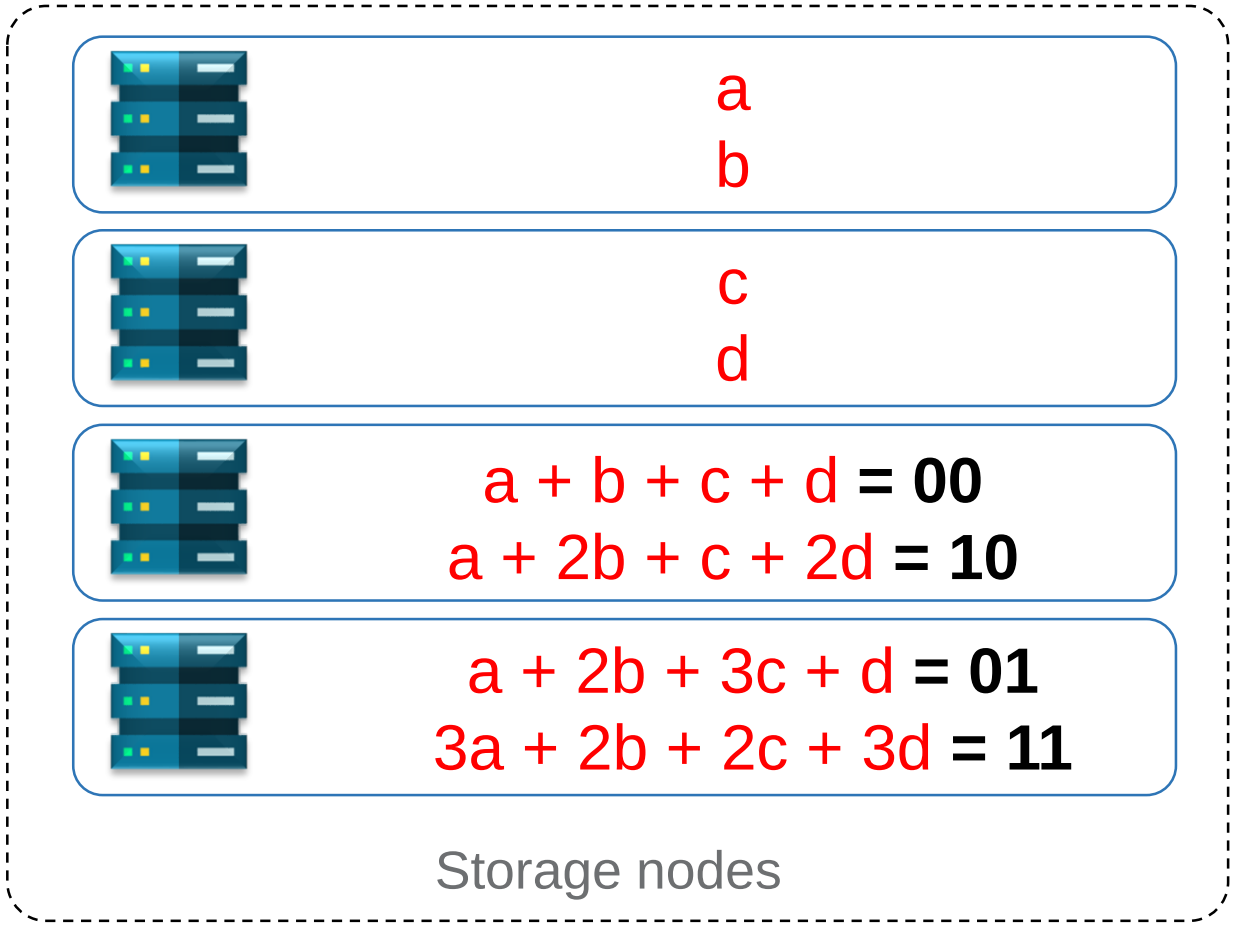
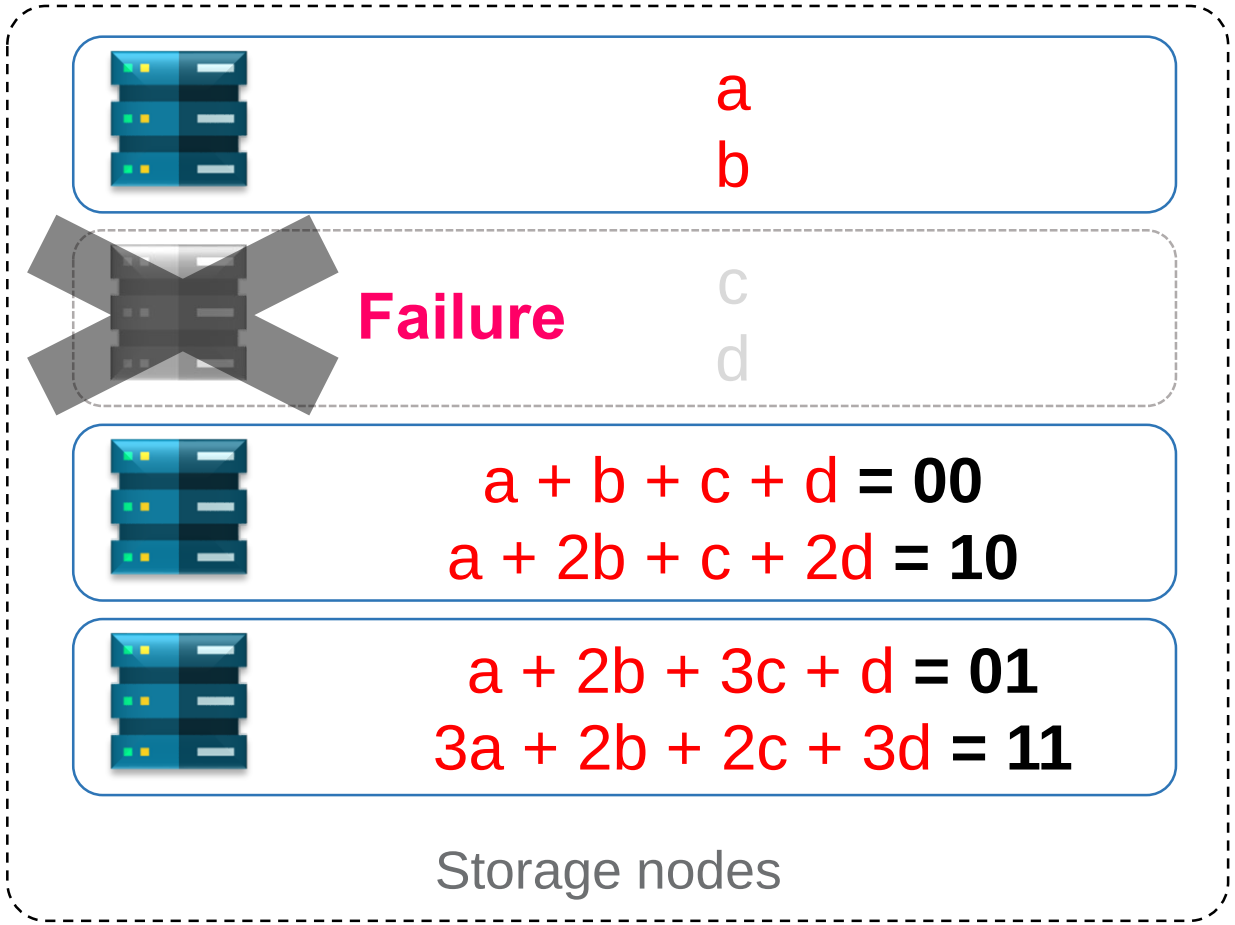
Coded Storage



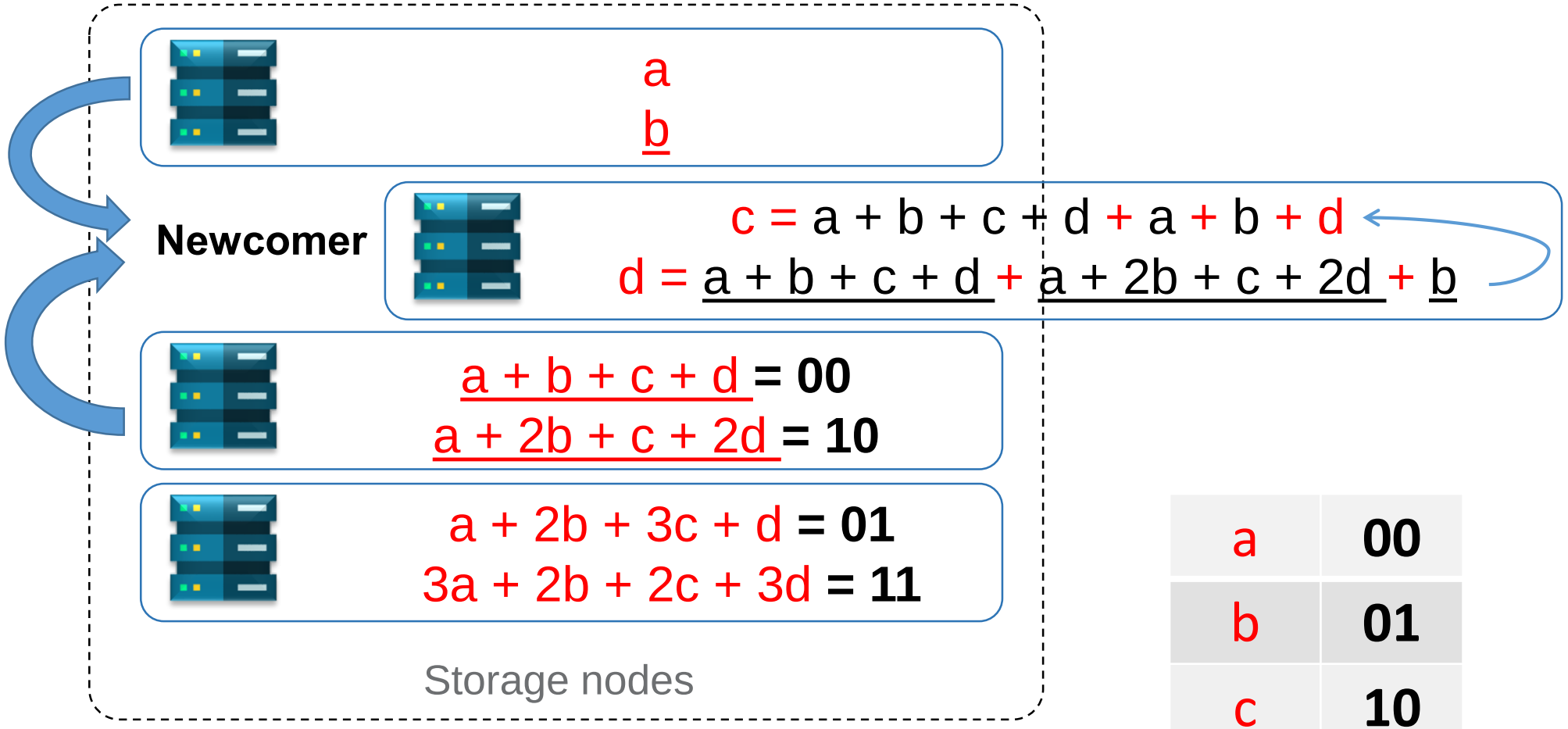
a	00
b	01
c	10
d	11

Repair



a	00
b	01
c	10
d	11

Exact Repair



a	00
b	01
c	10
d	11

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

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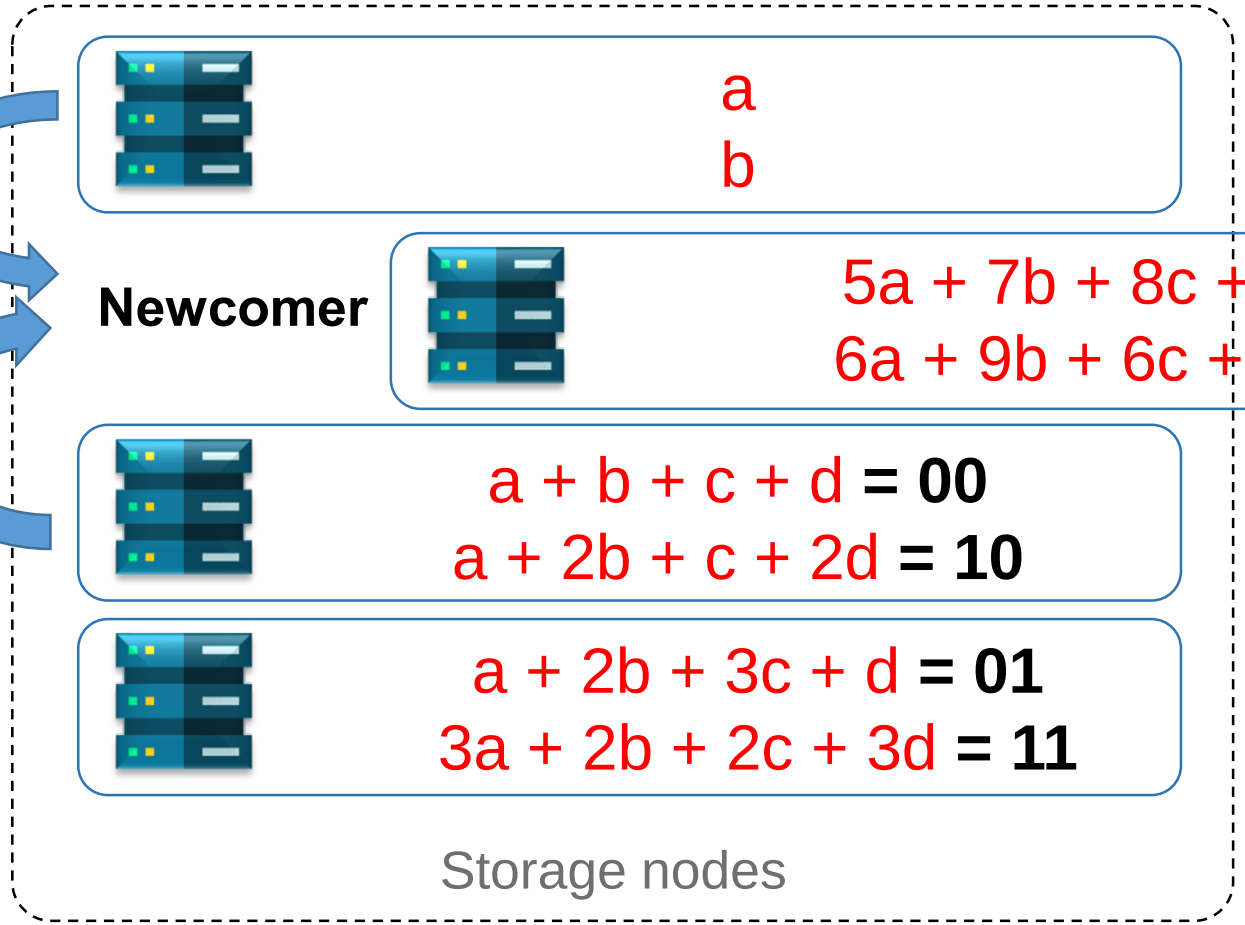
Functional Repair



It is possible because we can have a, b, c, d.

Information equivalent

a	**00**
b	**01**
c	**10**
d	**11**

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

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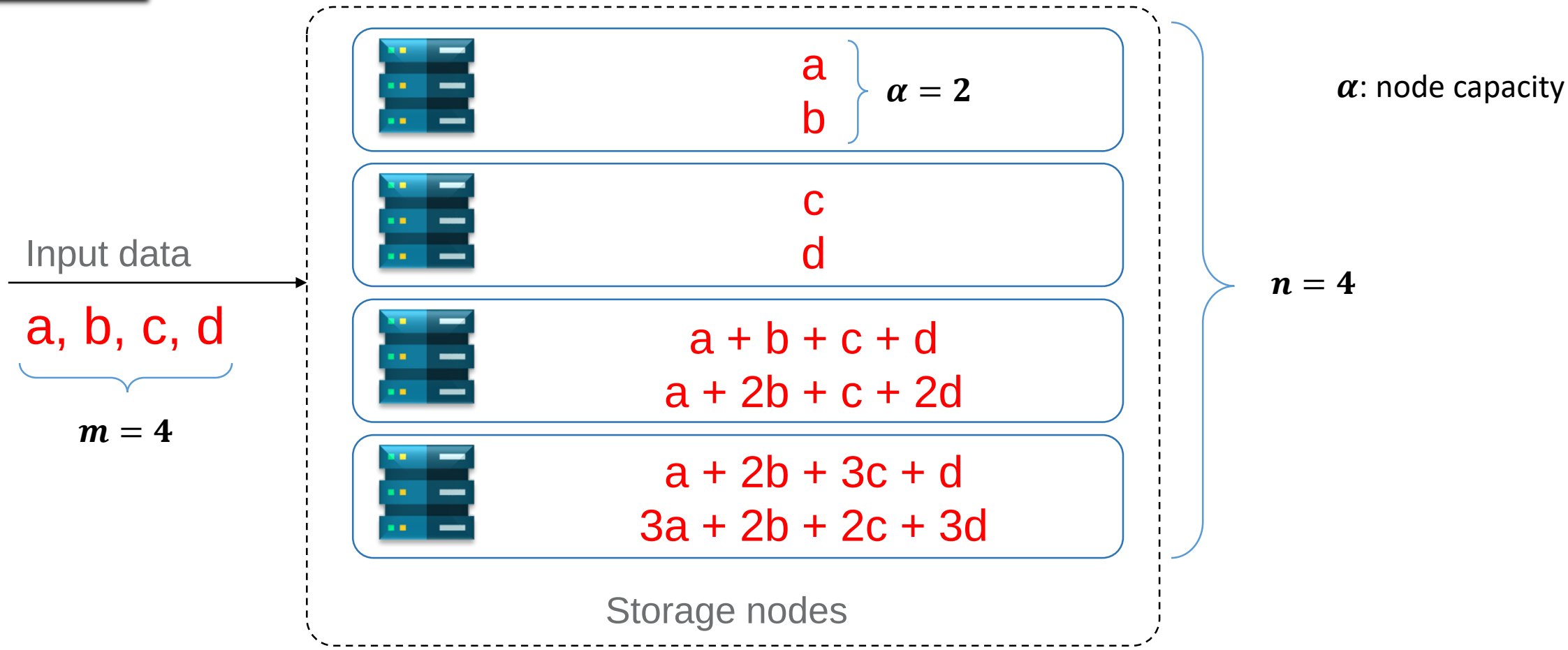
$(m, n, k, r, \alpha, \beta)$ code



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

$k = 2$

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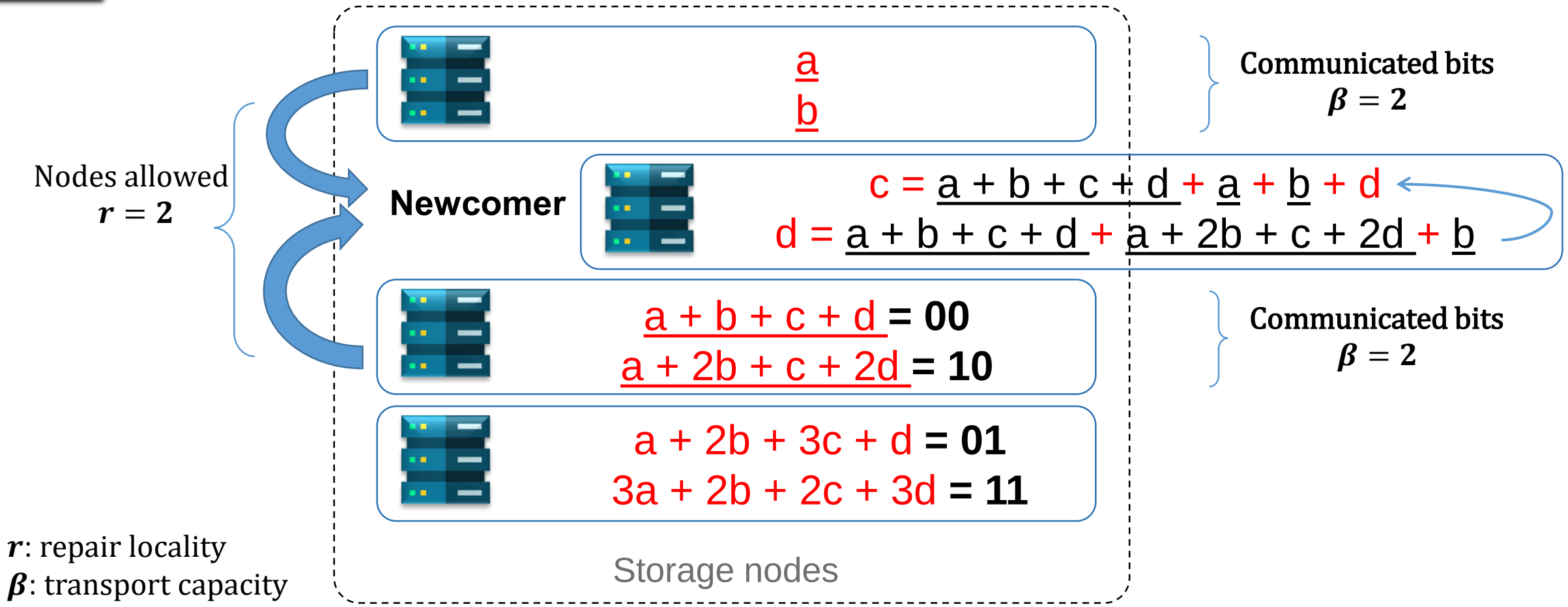
$(4, 4, 2, r, 2, \beta)$ code



r: repair locality
β: transport capacity