Redefining the Eurovision voting process using linear ECC

Roberto Trifiletti, Aarhus University

Joint work with Bernardo David, Irene Giacomelli, Jesper Buus Nielsen Ignacio Cascudo Pueyo

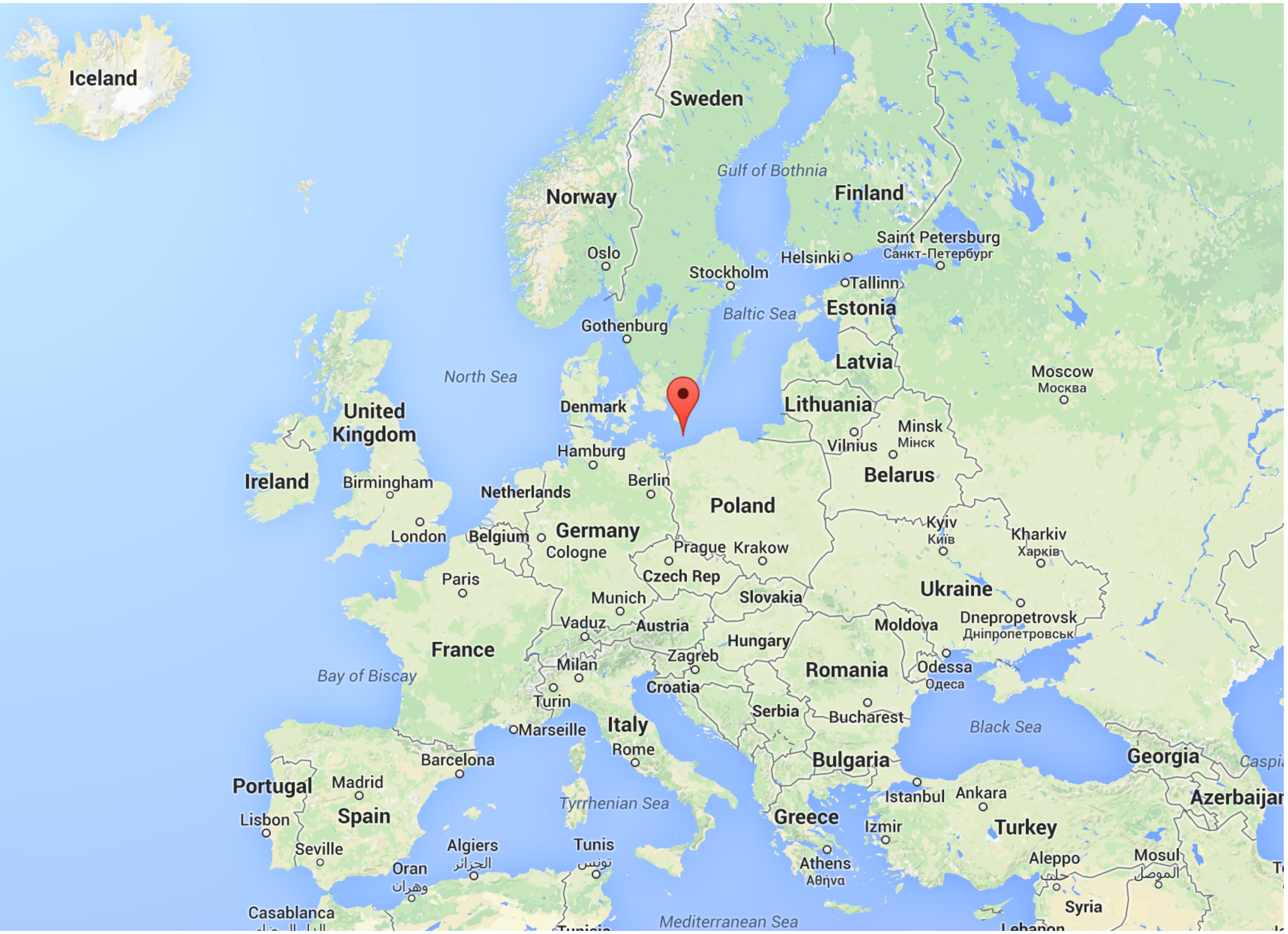
The artists perform

Each in their own way…

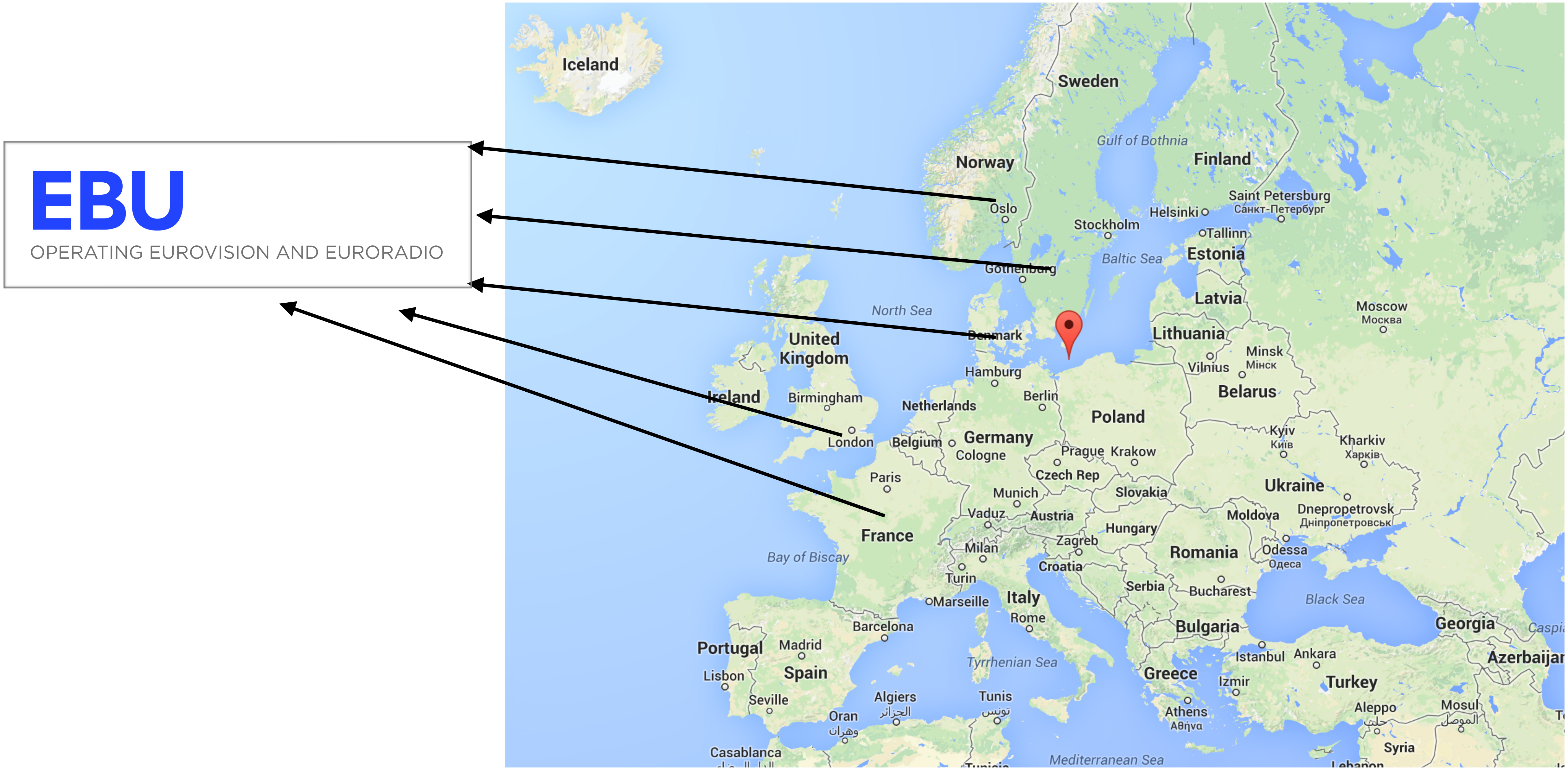
The voting process

EBU

OPERATING EUROVISION AND EURORADIO



The voting process



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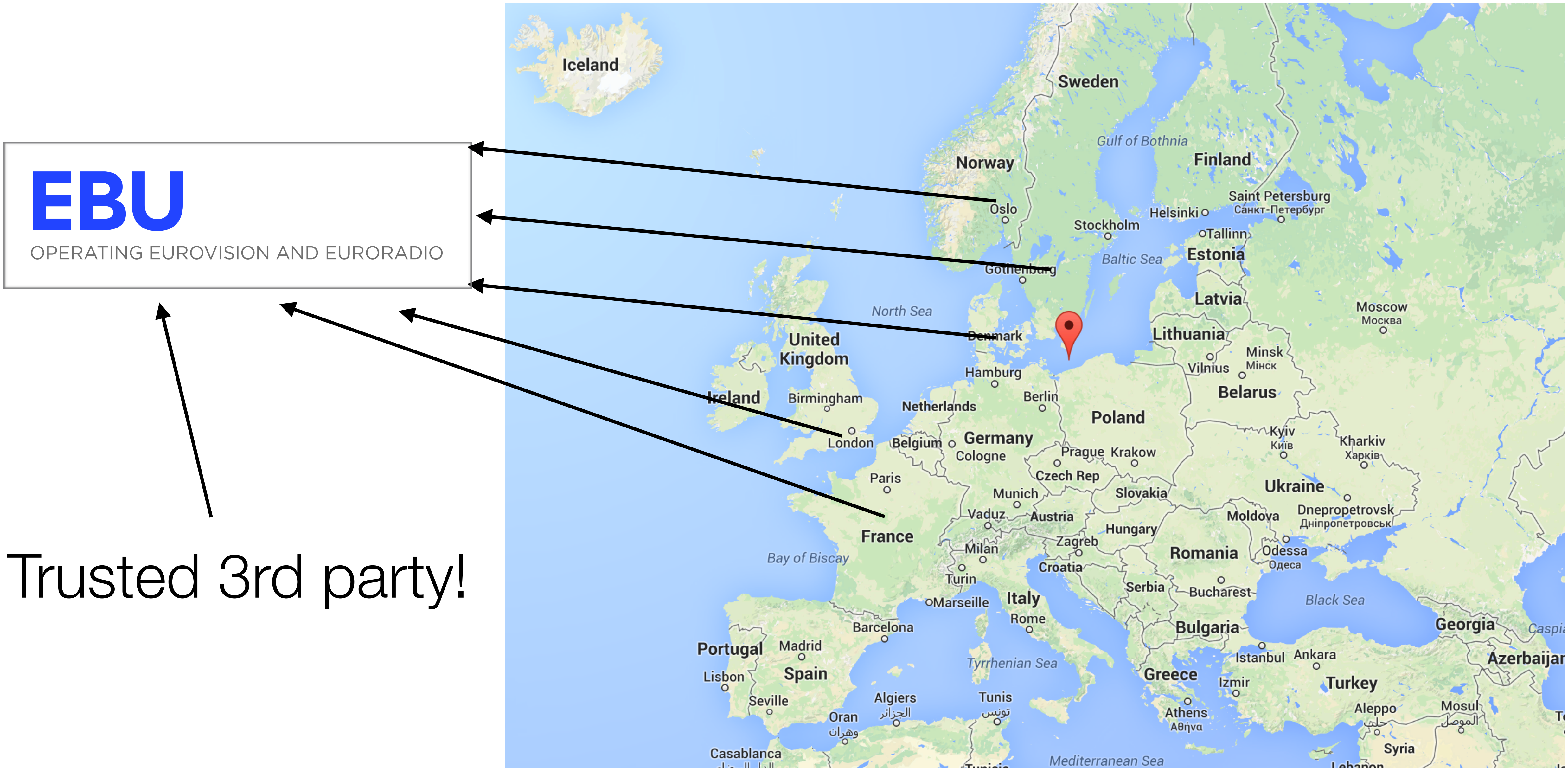

Trusted 3rd party!

A concrete cheating strategy

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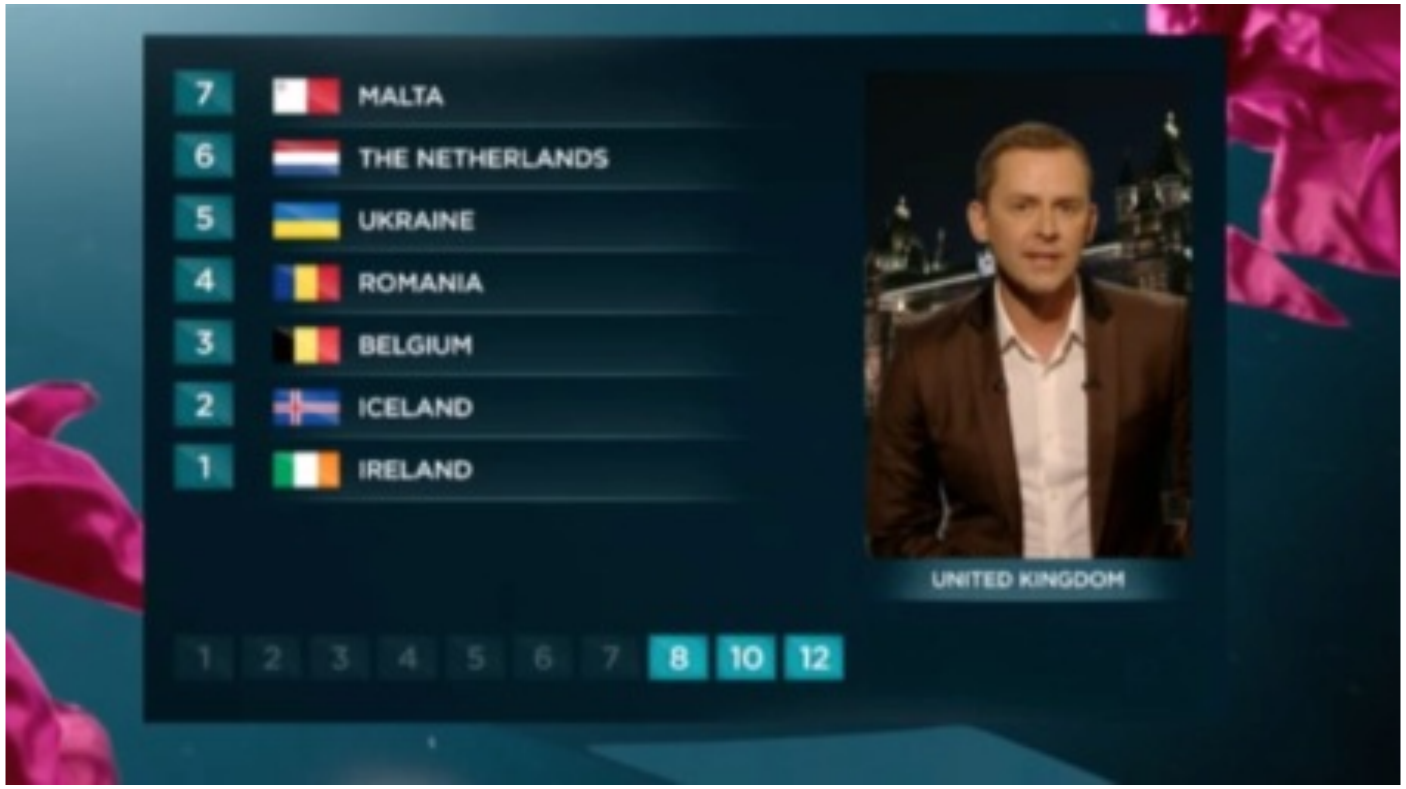
- The UK (as well as their friends) adjust their votes accordingly to maximize their winning probability



7	MALTA
6	THE NETHERLANDS
5	UKRAINE
4	ROMANIA
3	BELGIUM
2	ICELAND
1	IRELAND

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- But might ruin the dramatics of the voting count up

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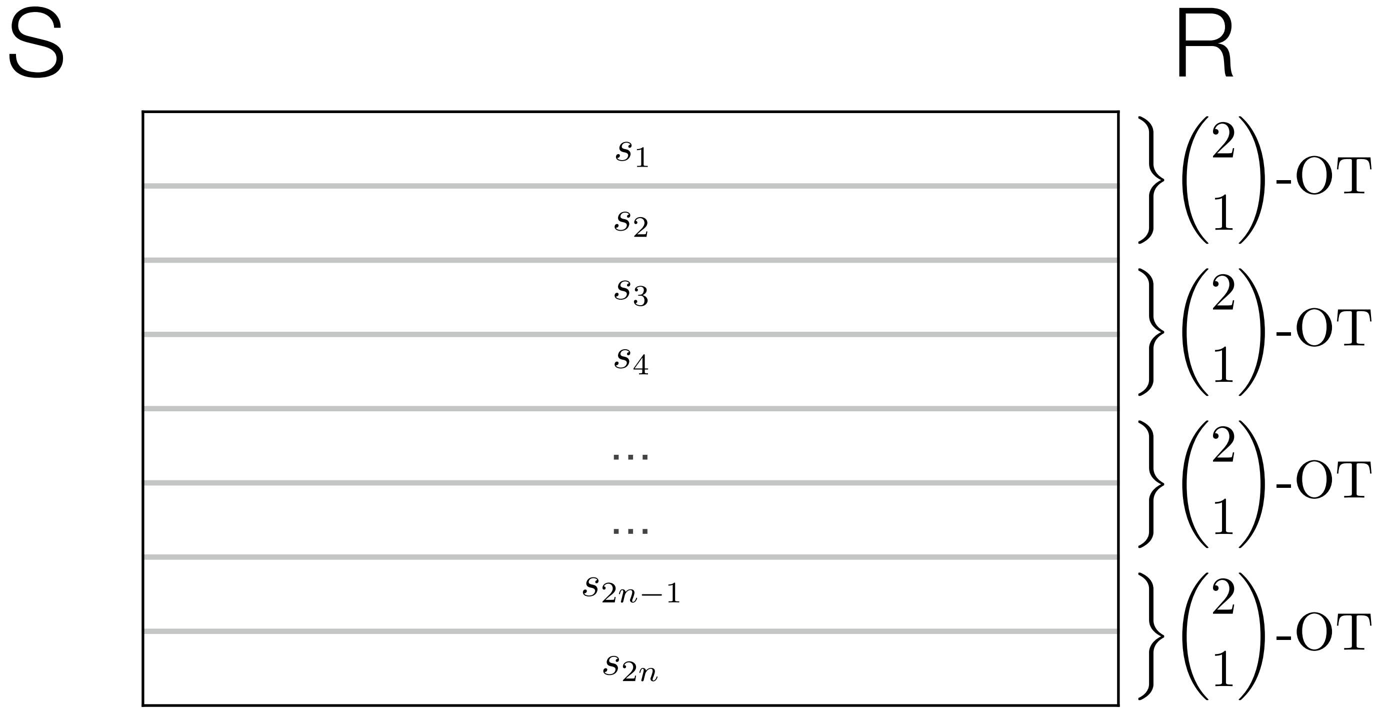
Do n 1-out-of-2 OT



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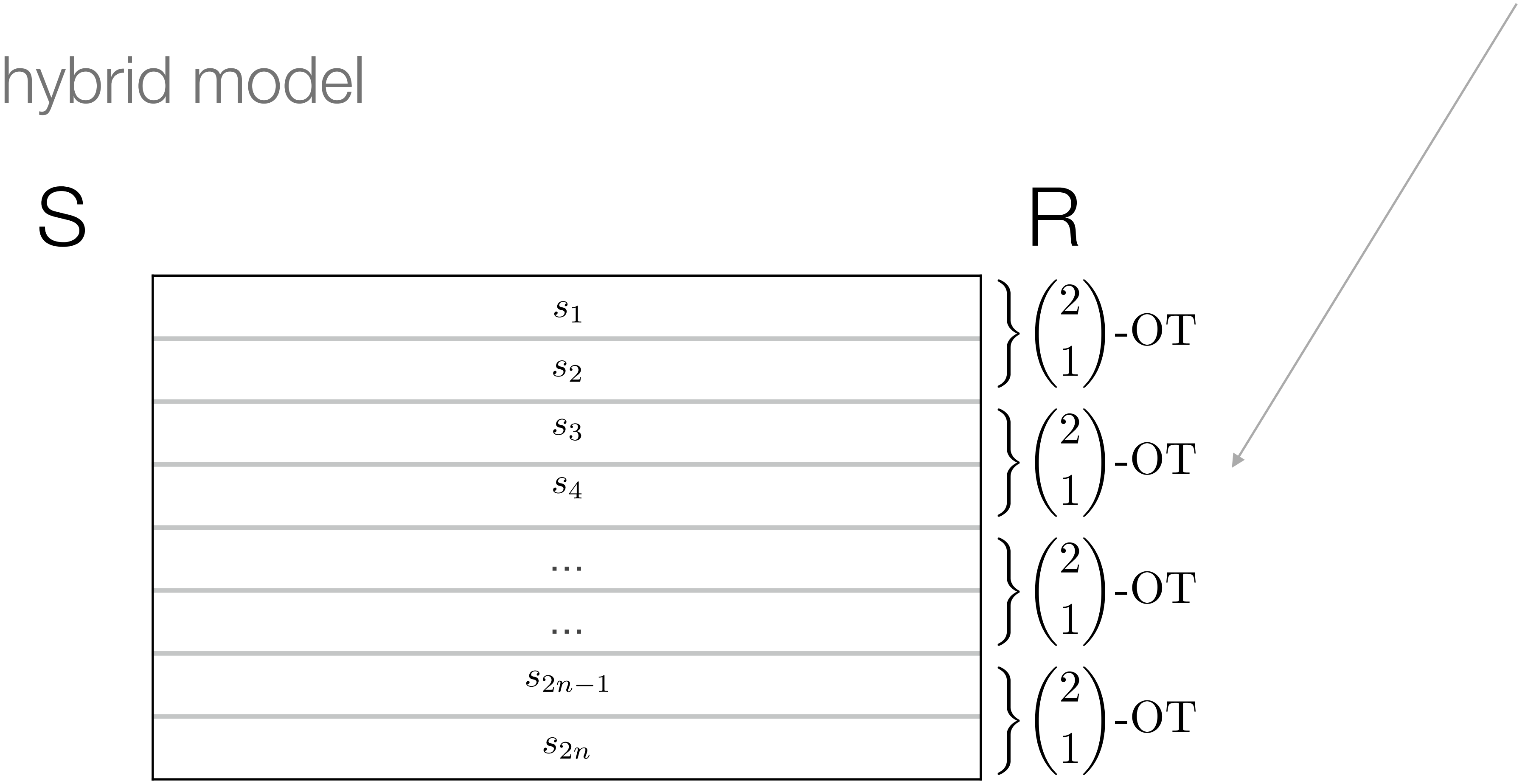

S

R

s_1

s_2

s_3

s_4

…

…

s_{2n-1}

s_{2n}

$\binom{2}{1}$-OT

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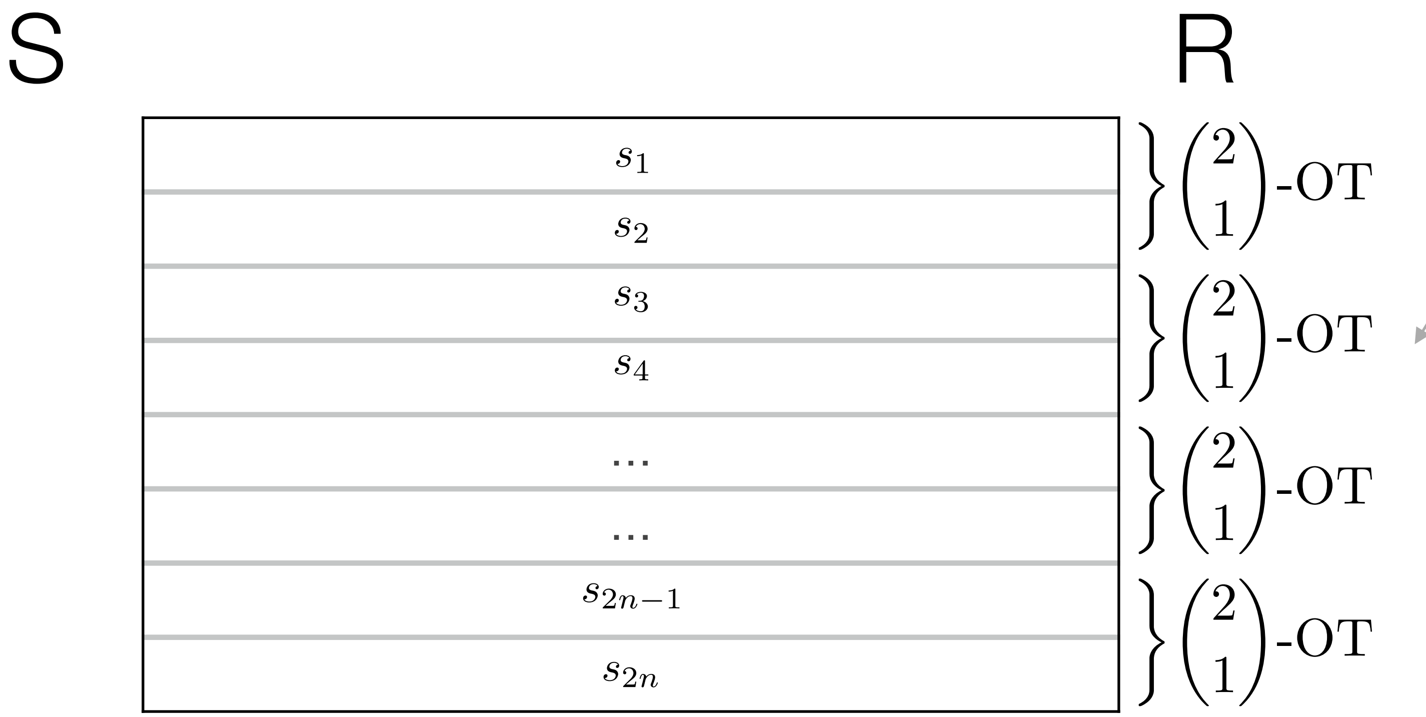

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- Use s_i as seed for PRG and use output y_i as OTP

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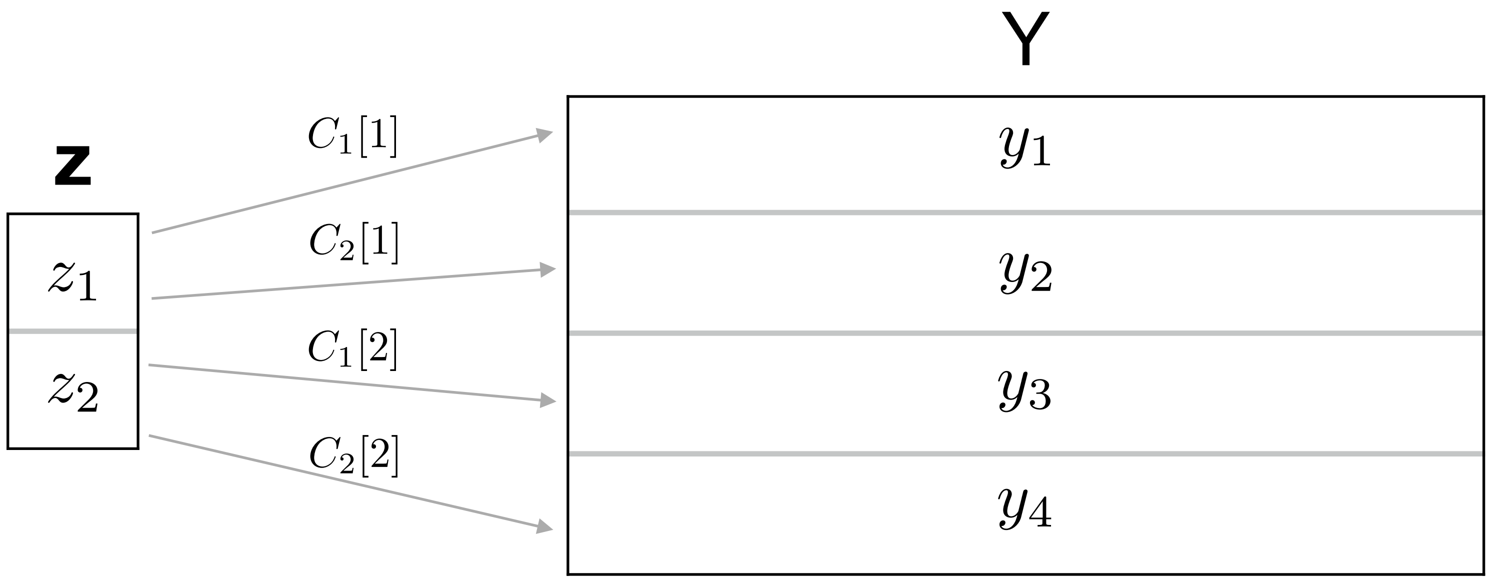
  - Entry - and pair-wise pad $\mathbf{c_1}$ and $\mathbf{c_2}$ using the y_i's. Send the padded vectors to R

In a picture



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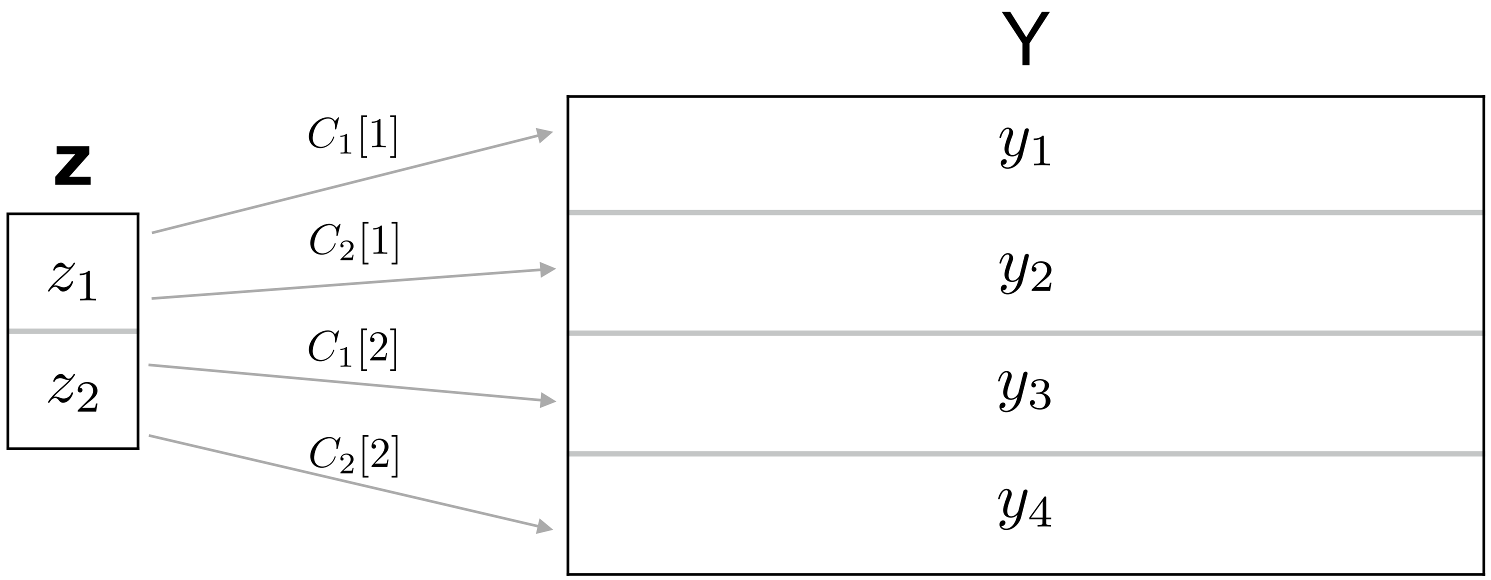

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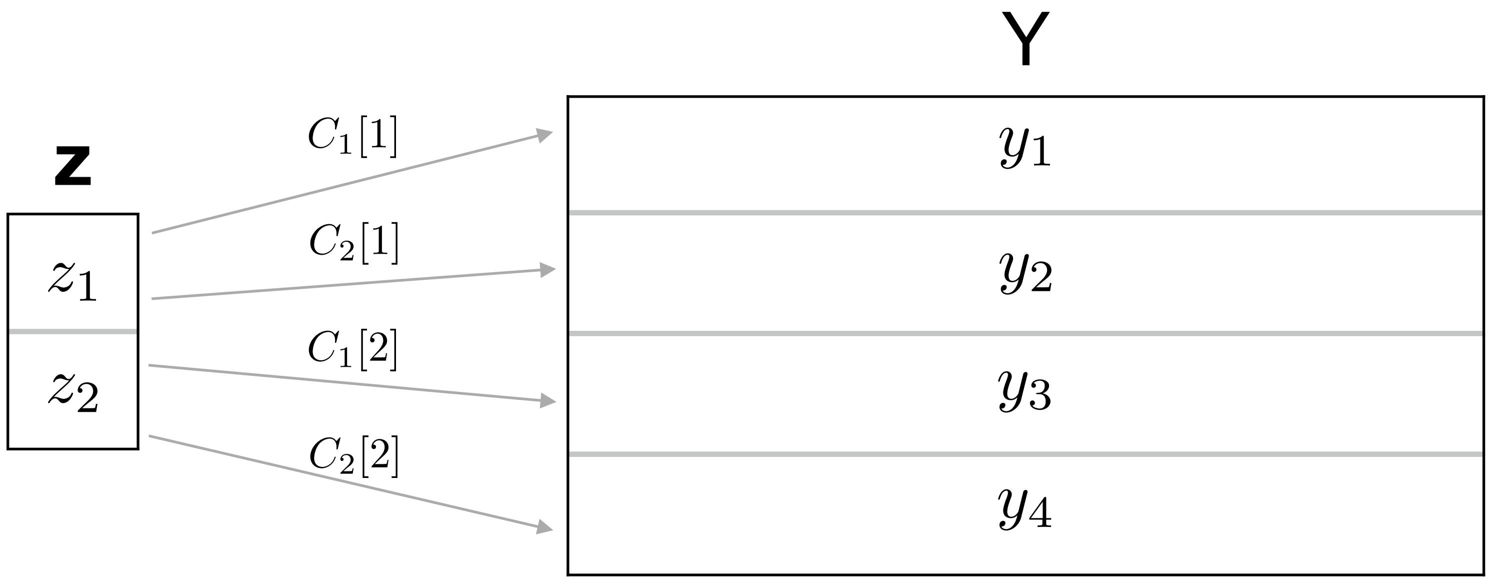

- Receiver learns half the shares, i.e. perfectly hiding
- Sender unaware which shares are “watched”. Need to change d shares in order to change code-word.
  => Probability of cheating 2^{-d} (more or less)