



Google ROADEF/EURO Challenge

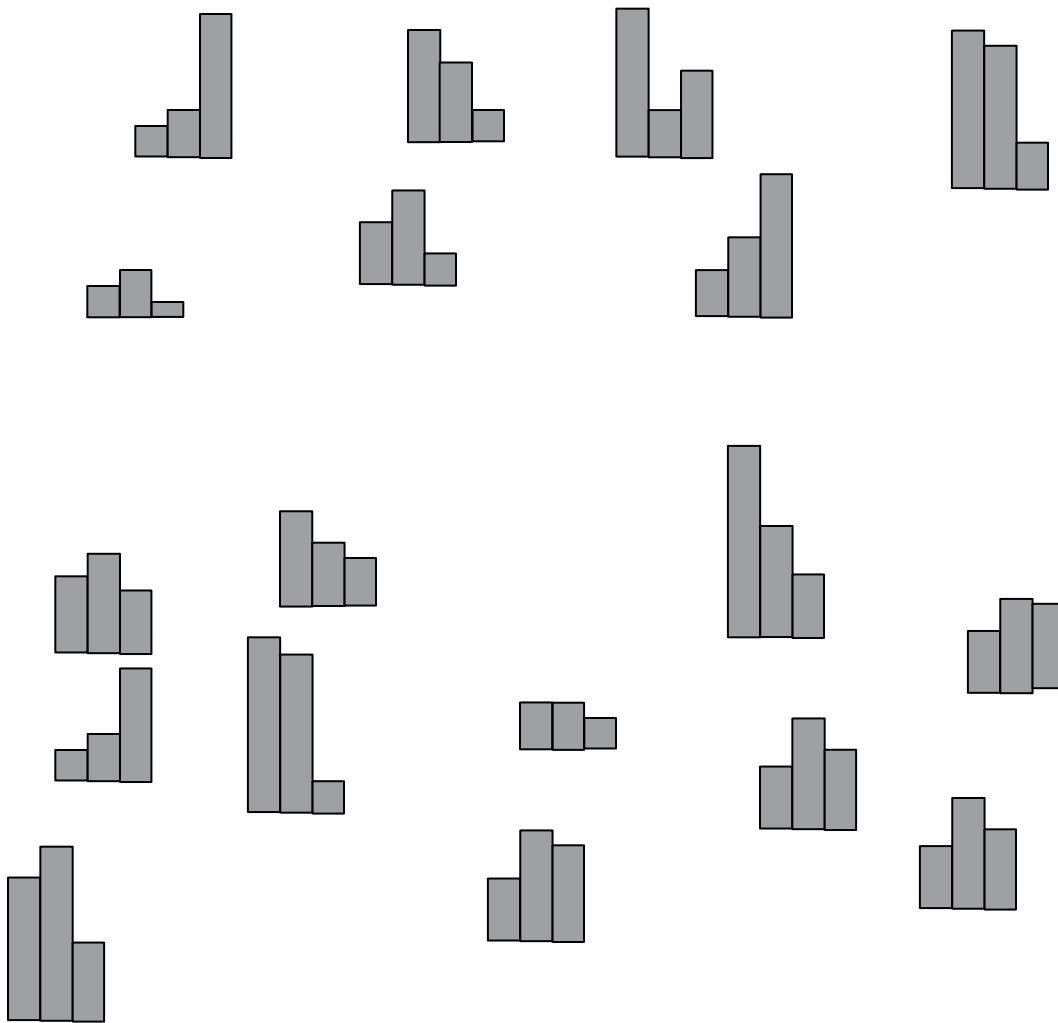
2011-2012

Qualification and final results

Emmanuel Guéré

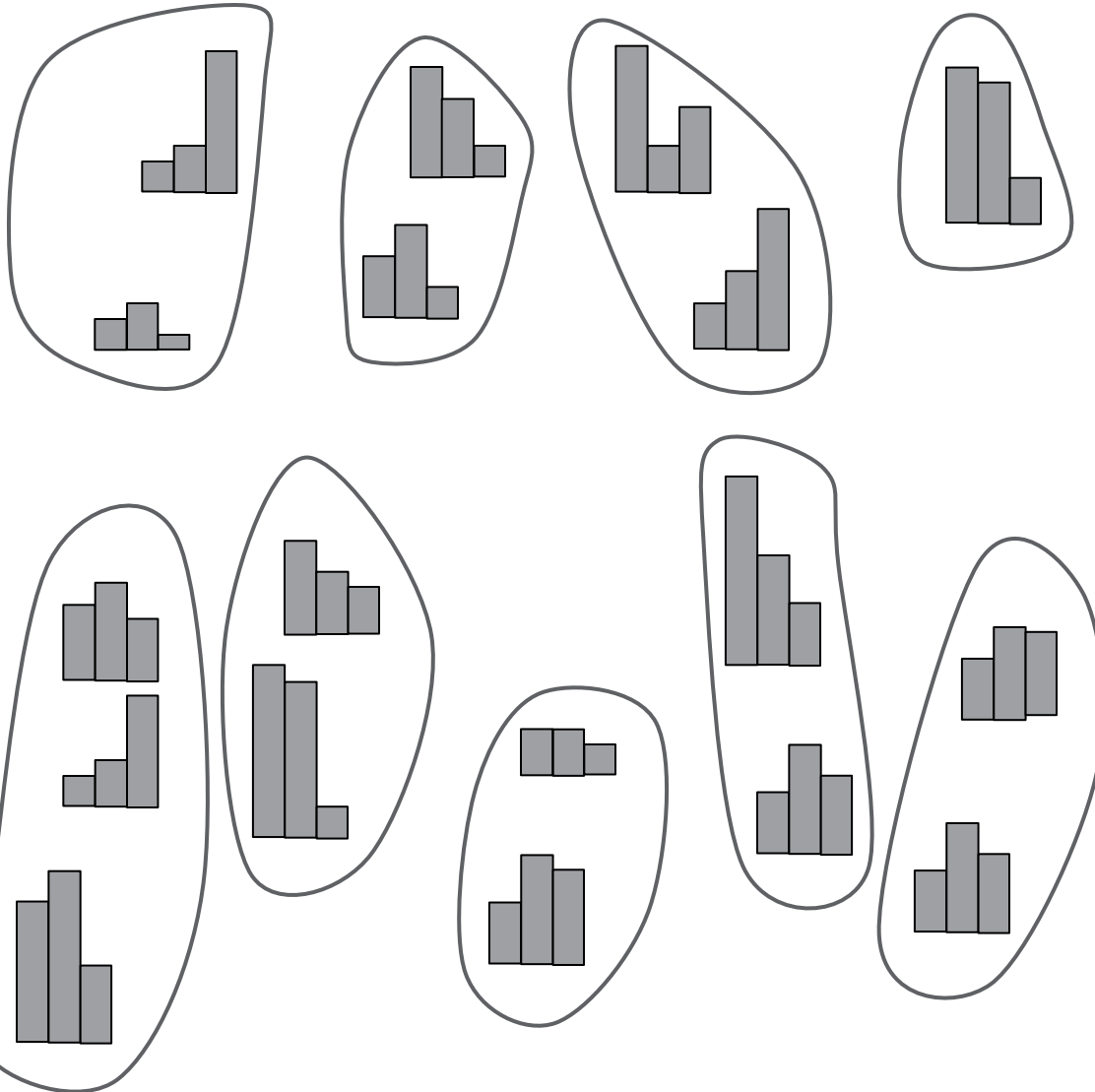
- 82 registered teams 📍 📍 📍
- 48 teams sent a program for qualification 📍 📍
- 30 qualified teams 📍
- 27 teams sent a program for final





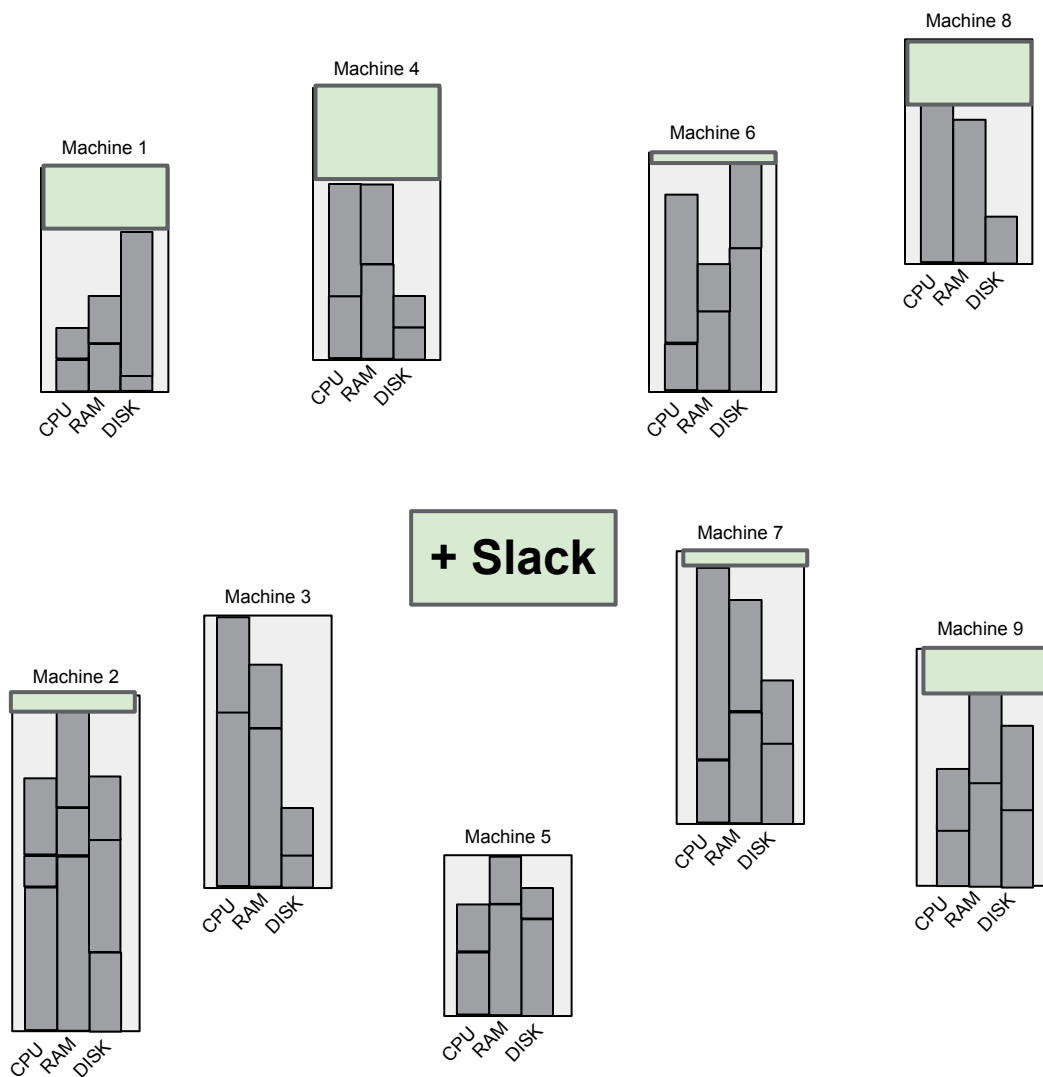
- **Generate resources**
- **Generate processes**
- Generate machines
 - Assignment
 - Add slack
 - Safety capacity (turndown?)
- Generate locations
- Generate services
 - Select processes
 - Choose SpreadMin
- Generate neighborhoods
- Generate dependencies
- Generate costs

- Obfuscate quantities, resources...



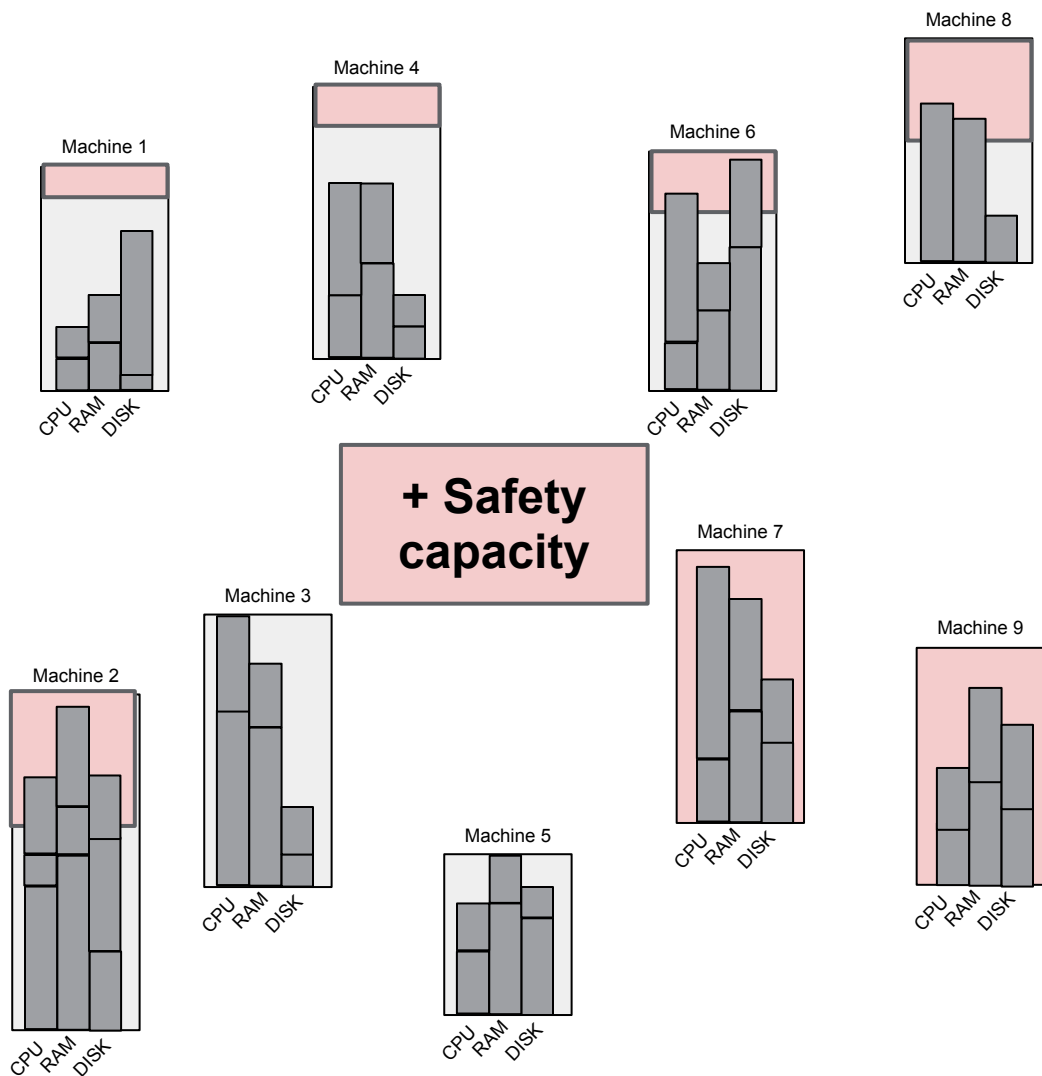
- Generate resources
- Generate processes
- **Generate machines**
 - **Assignment**
 - Add slack
 - Safety capacity (turndown?)
- Generate locations
- Generate services
 - Select processes
 - Choose SpreadMin
- Generate neighborhoods
- Generate dependencies
- Generate costs

- Obfuscate quantities, resources...



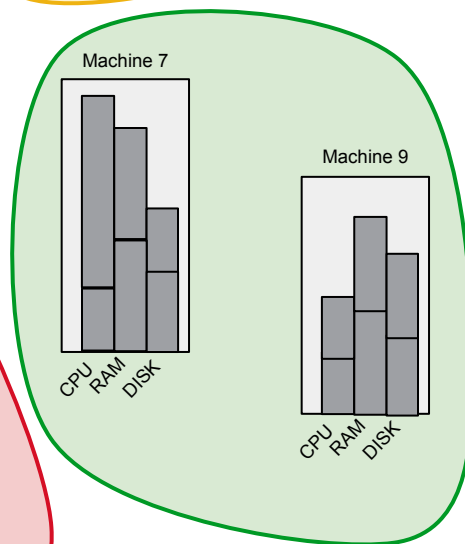
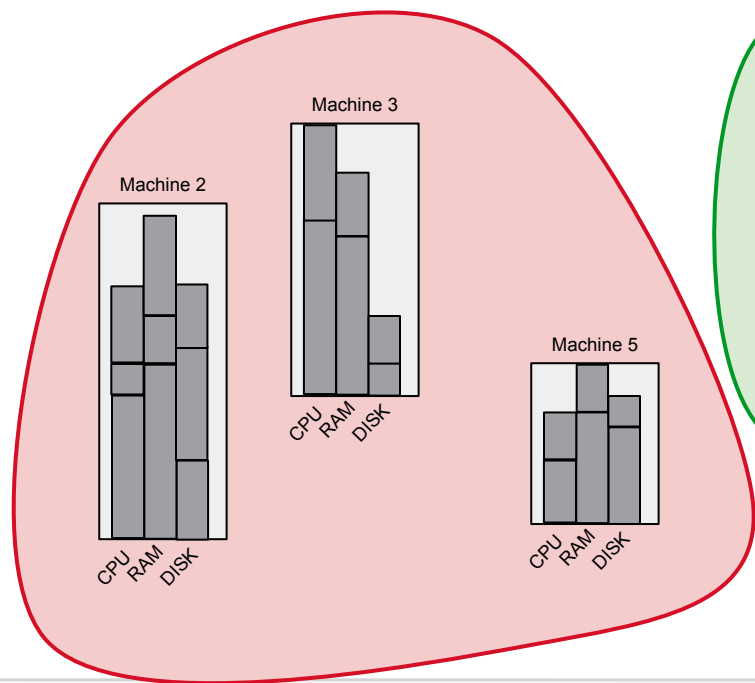
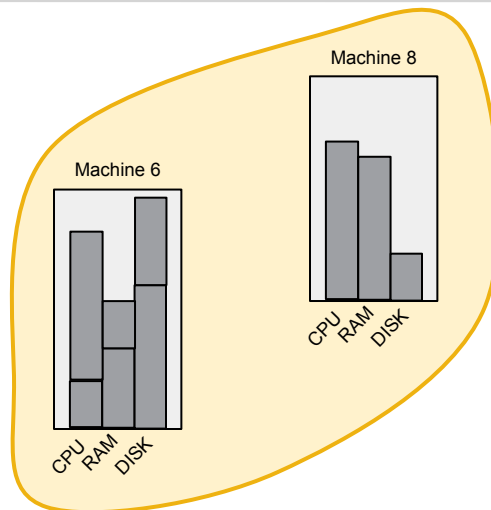
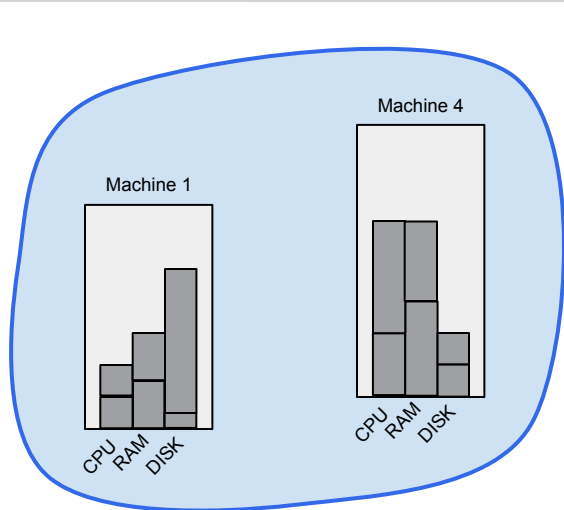
- Generate resources
- Generate processes
- Generate machines
 - Assignment
 - **Add slack**
 - Safety capacity (turndown?)
- Generate locations
- Generate services
 - Select processes
 - Choose SpreadMin
- Generate neighborhoods
- Generate dependencies
- Generate costs

- Obfuscate quantities, resources...



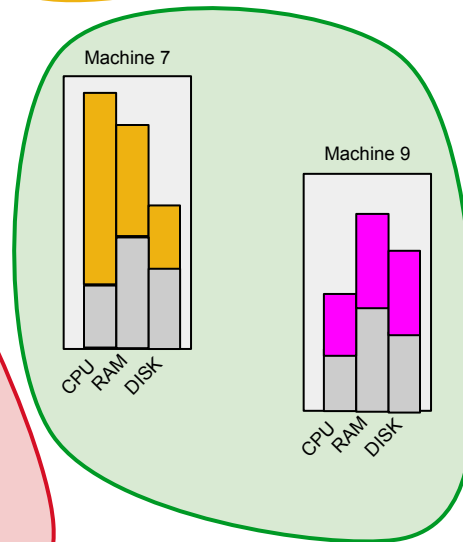
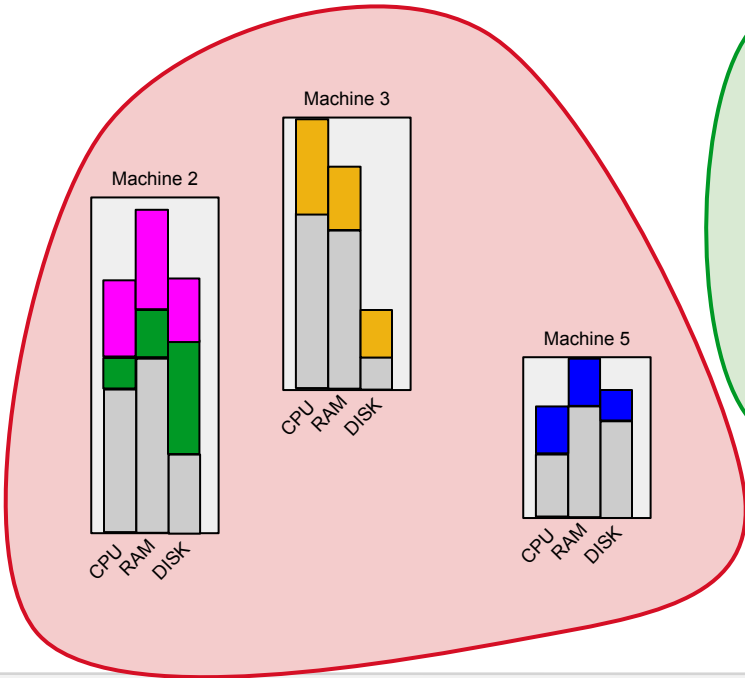
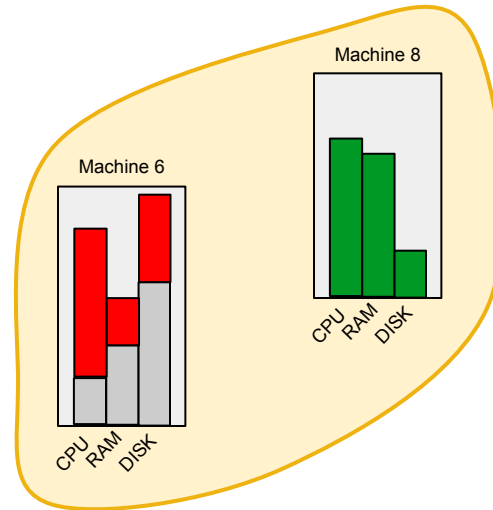
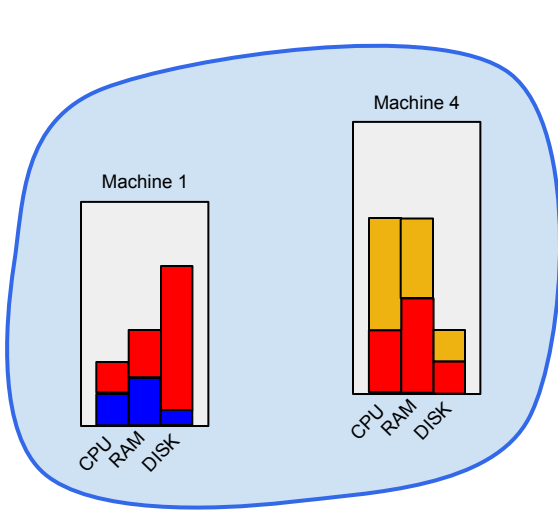
- Generate resources
- Generate processes
- Generate machines
 - Assignment
 - Add slack
 - **Safety capacity (turndown?)**
- Generate locations
- Generate services
 - Select processes
 - Choose SpreadMin
- Generate neighborhoods
- Generate dependencies
- Generate costs

- Obfuscate quantities, resources...



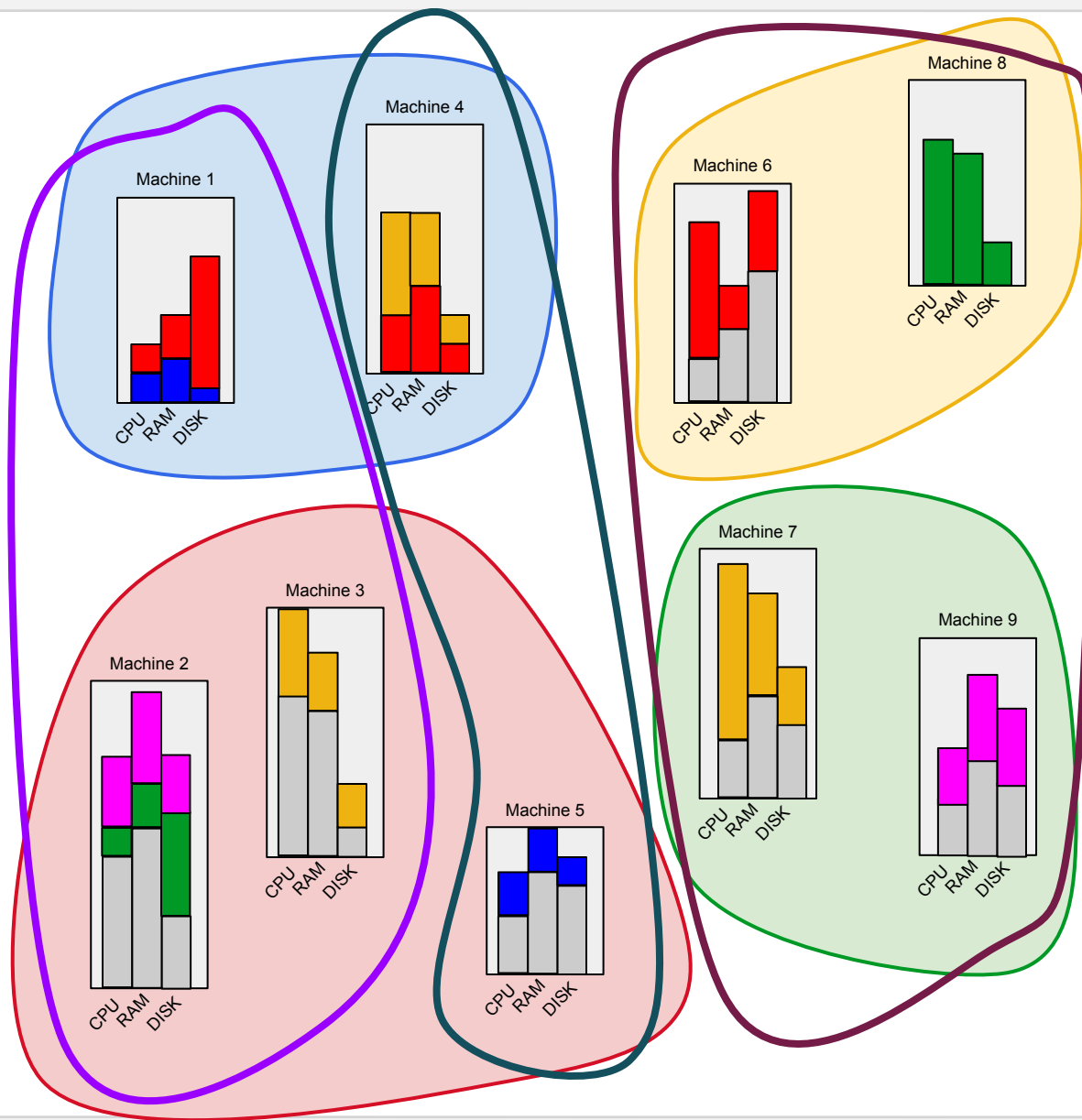
- Generate resources
- Generate processes
- Generate machines
 - Assignment
 - Add slack
 - Safety capacity (turndown?)
- **Generate locations**
- Generate services
 - Select processes
 - Choose SpreadMin
- Generate neighborhoods
- Generate dependencies
- Generate costs

- Obfuscate quantities, resources...



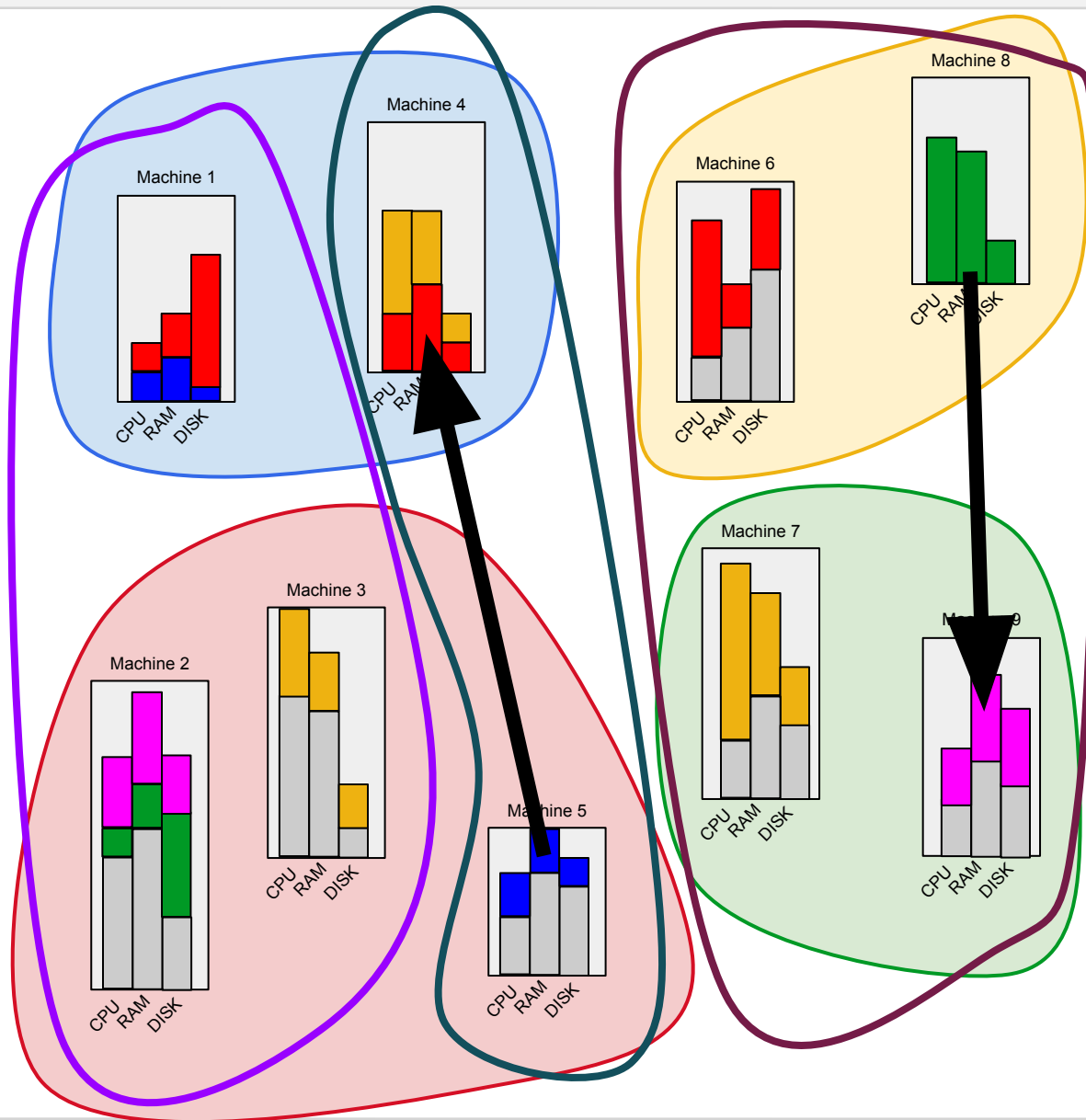
- Generate resources
- Generate processes
- Generate machines
 - Assignment
 - Add slack
 - Safety capacity (turndown?)
- Generate locations
- **Generate services**
 - **Select processes**
 - **Choose SpreadMin**
- Generate neighborhoods
- Generate dependencies
- Generate costs

- Obfuscate quantities, resources...



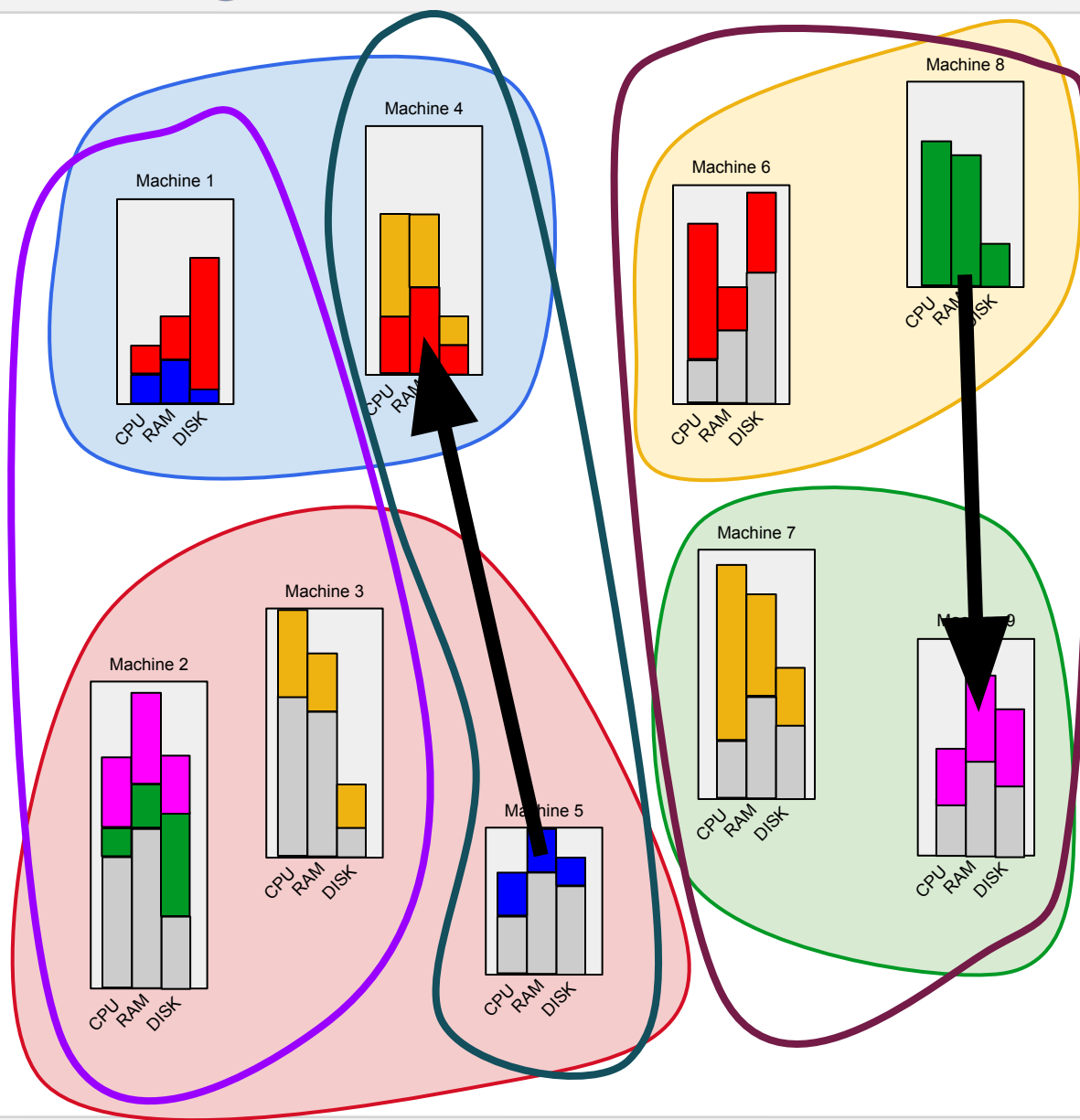
- Generate resources
- Generate processes
- Generate machines
 - Assignment
 - Add slack
 - Safety capacity (turndown?)
- Generate locations
- Generate services
 - Select processes
 - Choose SpreadMin
- **Generate neighborhoods**
- Generate dependencies
- Generate costs

- Obfuscate quantities, resources...



- Generate resources
- Generate processes
- Generate machines
 - Assignment
 - Add slack
 - Safety capacity (turndown?)
- Generate locations
- Generate services
 - Select processes
 - Choose SpreadMin
- Generate neighborhoods
- **Generate dependencies**
- Generate costs

- Obfuscate quantities, resources...



- Generate resources
- Generate processes
- Generate machines
 - Assignment
 - Add slack
 - Safety capacity (turndown?)
- Generate locations
- Generate services
 - Select processes
 - Choose SpreadMin
- Generate neighborhoods
- Generate dependencies
- Generate costs

- **Obfuscate quantities, resources...**

Datasets A1 & A2

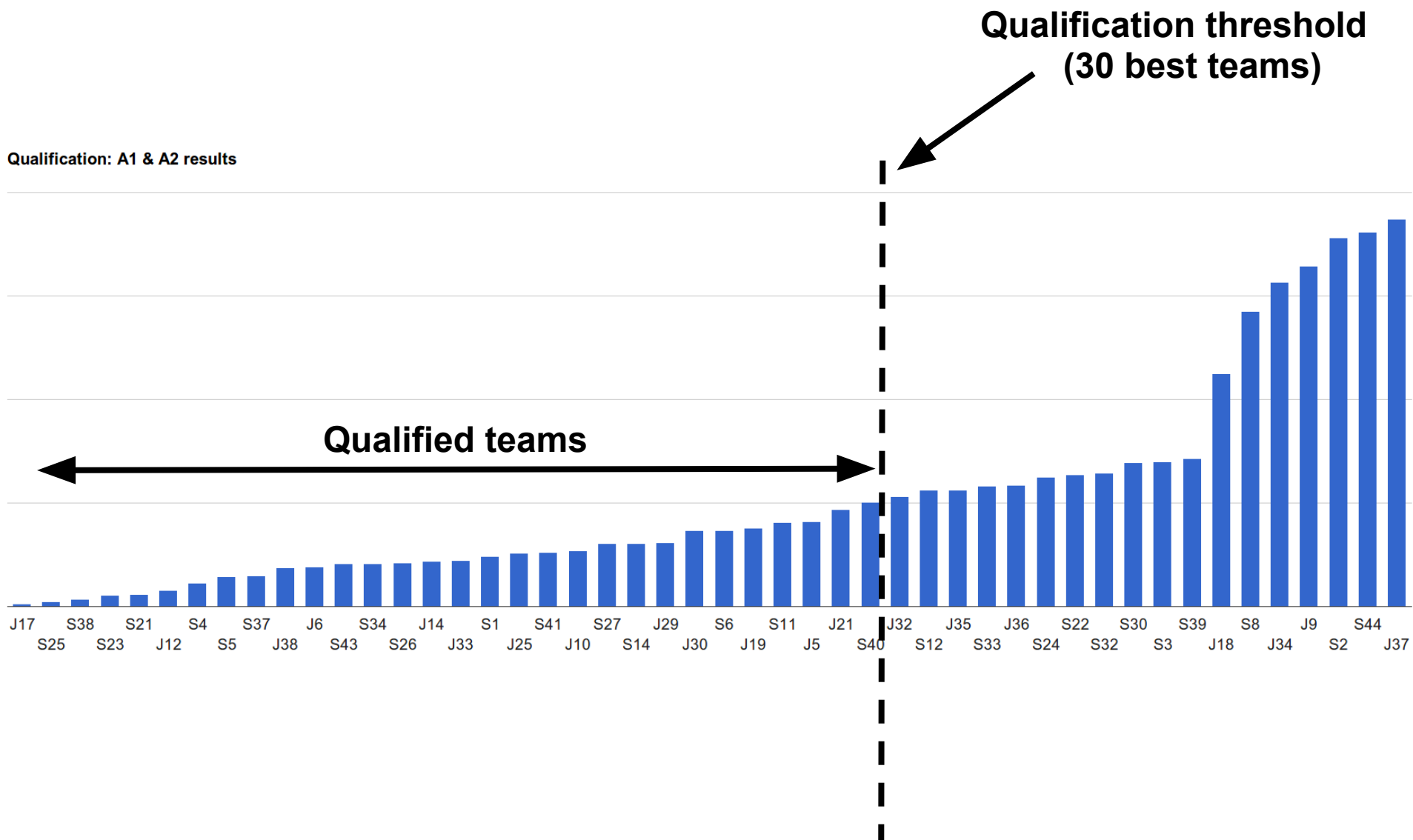
	a1_1	a1_2	a1_3	a1_4	a1_5	a2_1	a2_2	a2_3	a2_4	a2_5
#Machines	4	100	100	50	12	100	100	100	50	50
#Resources	2	4	3	3	4	3	12	12	12	12
#Transient	0	1	1	1	1	0	4	4	0	0
#Processes	100	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
#Services (non unit)	10	10	100	100	10	0	100	125	125	125
#Neighborhoods	1	2	5	50	2	1	5	5	5	5
#Locations	4	4	25	50	4	1	25	25	25	25
#Dependences (max per service)	10	10	10	10	10	0	0	10	10	10
#Balance	1	0	0	1	1	0	0	0	1	0

Evaluation:

- On LIP6 machines (Laboratoire d'Informatique de Paris)
64bits Core2duo E8500 3.16GHz, 4Go,
Debian or windows
- 5 minutes per instance
 - only one run
 - seed for A1 & A2 evaluation: 795
 - seed for B & X evaluation: 186
- Score
 - $\text{Score}(\text{instance}) = (\text{cost}(\text{instance}) - \text{cost}(\text{best})) / \text{cost}(\text{reference})$
 - $\text{Score}(\text{team}) = \text{sum}(\text{instance})$



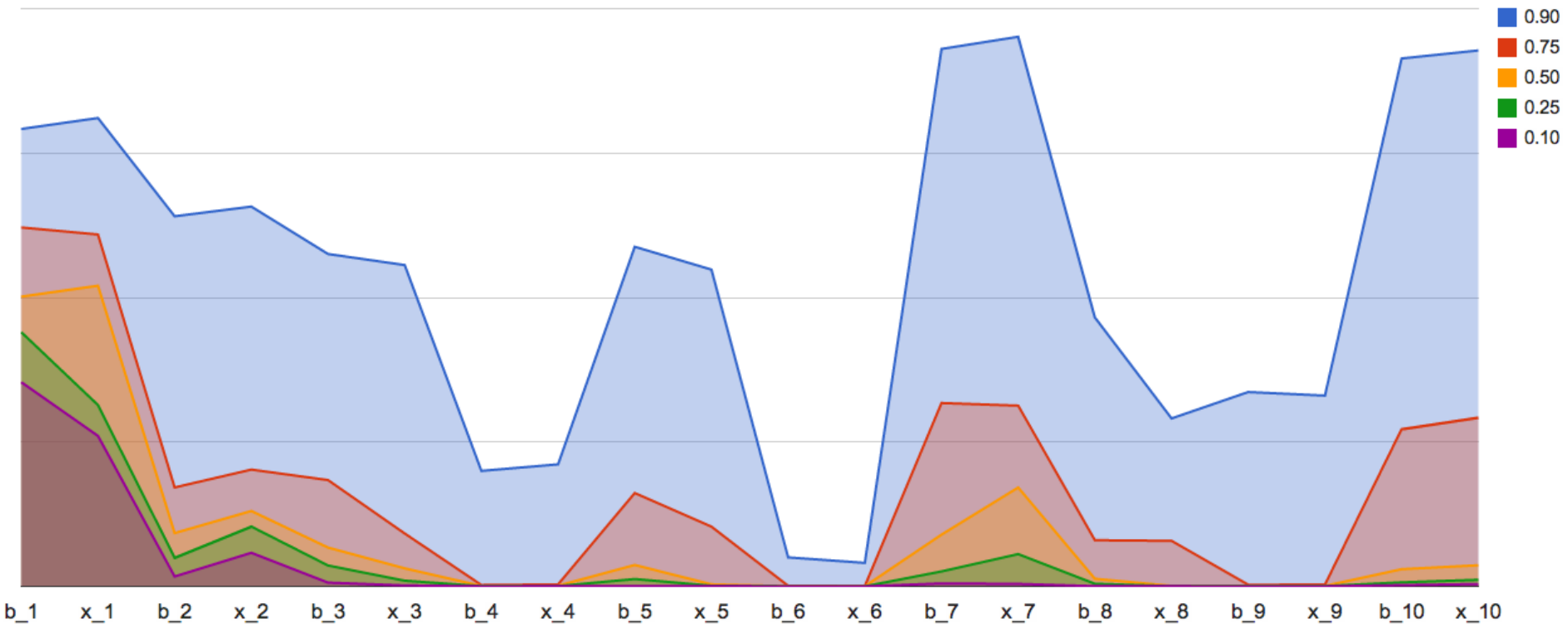
And the qualified were:



Datasets B & X

	b/x_1	b/x_2	b/x_3	b/x_4	b/x_5	b/x_6	b/x_7	b/x_8	b/x_9	b/x_10
#Machines	100	100	100	500	100	200	4K	100	1K	5K
#Resources	12	12	6	6	6	6	6	3	3	3
#Transient	4	0	2	0	2	0	0	1	0	0
#Processes	5K	5K	20K	20K	40K	40K	40K	50K	50K	50K
#Services (non unit)	500	500	1K	1K	1K	1K	1K	1K	1K	1K
#Neighborhoods	5	5	5	5	5	5	5	5	5	5
#Locations	10	10	10	50	10	50	50	10	100	100
#Dependences (max per service)	30	30	50	60	60	60	60	50	60	70
#Balance	0	1	0	1	0	1	1	0	1	1
Average slack	15%	15%	20%	20%	20%	20%	30%	20%	10%	30%
#Turn down	4%	0	4%	0	4%	0	0.5%	4%	0	0.4%

All: Percentiles for B & X



Datasets B & X

	b/x_1	b/x_2	b/x_3	b/x_4	b/x_5	b/x_6	b/x_7	b/x_8	b/x_9	b/x_10
#Machines	100	100	100	500	100	200	4K	100	1K	5K
#Resources	12	12	6	6	6	6	6	3	3	3
#Transient	4	0	2	0	2	0	0	1	0	0
#Processes	5K	5K	20K	20K	40K	40K	40K	50K	50K	50K
#Services (non unit)	500	500	1K	1K	1K	1K	1K	1K	1K	1K
#Neighborhoods	5	5	5	5	5	5	5	5	5	5
#Locations	10	10	10	50	10	50	50	10	100	100
#Dependences (max per service)	30	30	50	60	60	60	60	50	60	70
#Balance	0	1	0	1	0	1	1	0	1	1
Average slack	15%	15%	20%	20%	20%	20%	30%	20%	10%	30%
#Turn down	4%	0	4%	0	4%	0	0.5%	4%	0	0.4%

Datasets B & X

	b/x_1	b/x_2	b/x_3	b/x_4	b/x_5	b/x_6	b/x_7	b/x_8	b/x_9	b/x_10
#Machines	100	100	100	500	100	200	4K	100	1K	5K
#Resources	12	12	6	6	6	6	6	3	3	3
#Transient	4	0	2	0	2	0	0	1	0	0
#Processes	5K	5K	20K	20K	40K	40K	40K	50K	50K	50K
#Services (non unit)	500	500	1K	1K	1K	1K	1K	1K	1K	1K
#Neighborhoods	5	5	5	5	5	5	5	5	5	5
#Locations	10	10	10	50	10	50	50	10	100	100
#Dependences (max per service)	30	30	50	60	60	60	60	50	60	70
#Balance	0	1	0	1	0	1	1	0	1	1
Average slack	15%	15%	20%	20%	20%	20%	30%	20%	10%	30%
#Turn down	4%	0	4%	0	4%	0	0.5%	4%	0	0.4%

J12 Jaskowski et al.

Poznan University of Technology, Poland

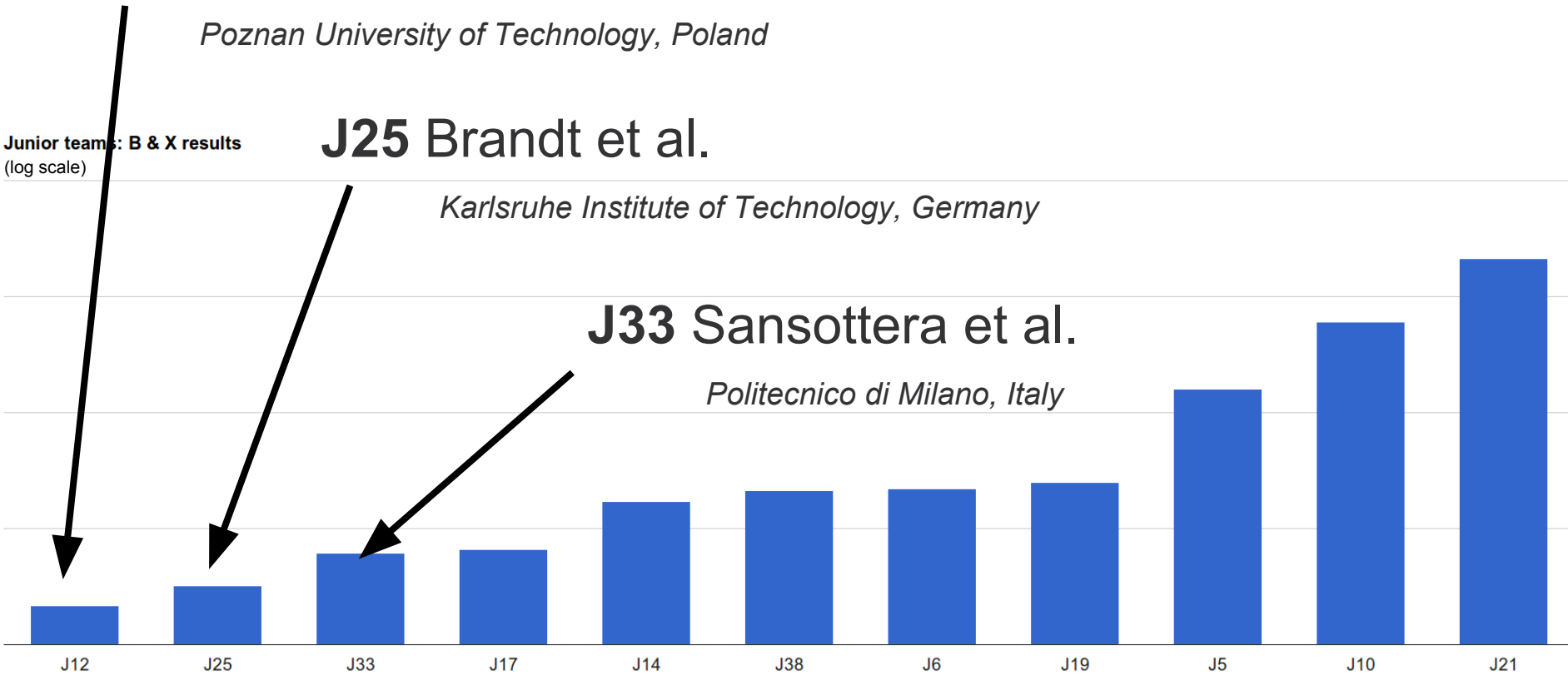
J25 Brandt et al.

Karlsruhe Institute of Technology, Germany

J33 Sansottera et al.

Politecnico di Milano, Italy

Junior teams: B & X results
(log scale)

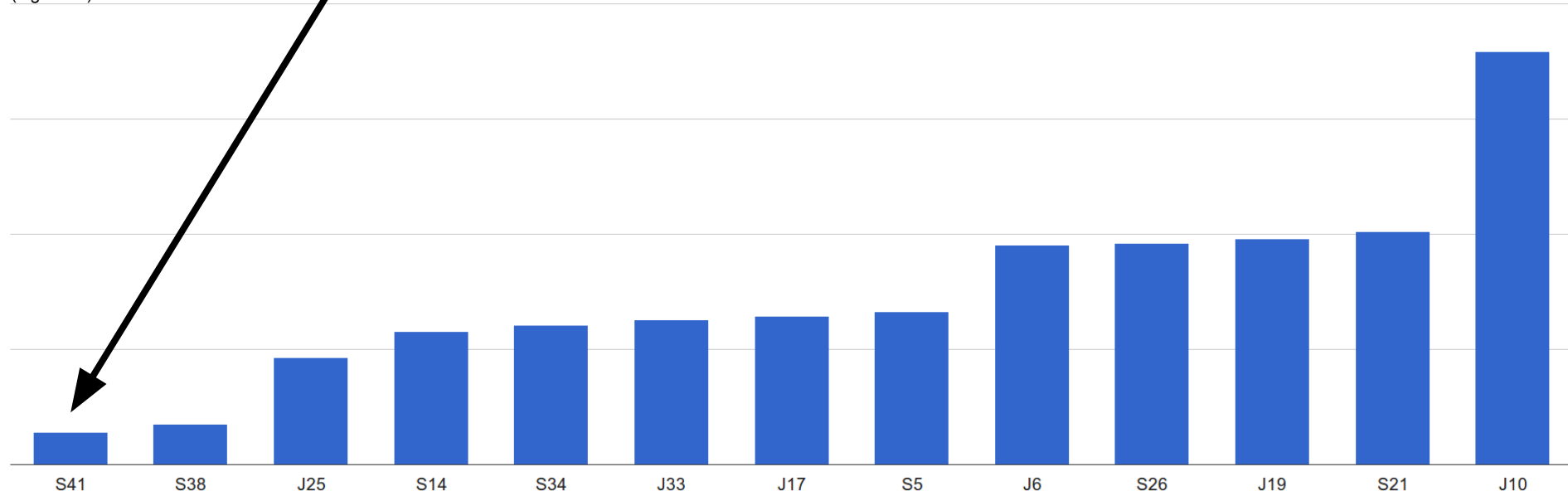


And the winners are:

S41 Buljabasic et al.

University of Sarajevo, Bosnia

Open-source teams: B & X results
(log scale)

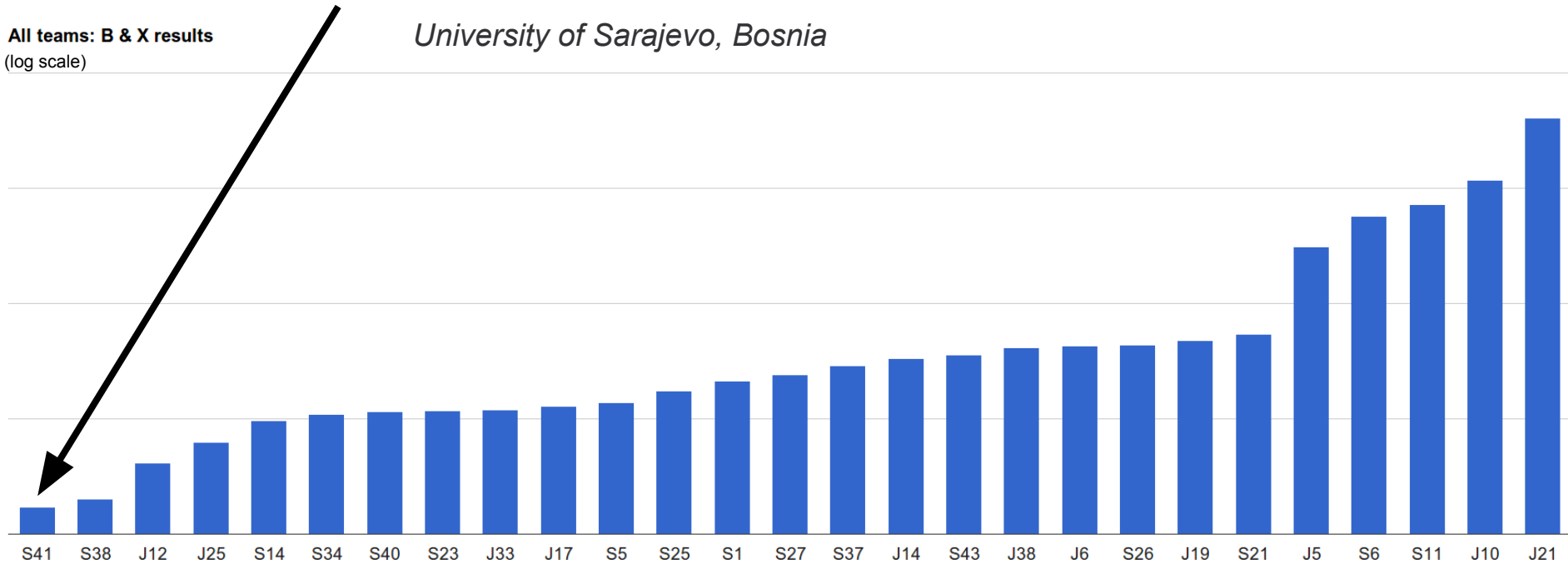


And the winners are:

S41 Buljabasic et al.

University of Sarajevo, Bosnia

All teams: B & X results
(log scale)



And the winners are:

- Juniors:

- 1st: **J12** Jaskowski et al.

Poznan University of Technology, Poland

- 2nd: **J25** Brandt et al.

Karlsruhe Institute of Technology, Germany

- 3rd: **J33** Sansottera et al.

Politecnico di Milano, Italy

3,000 Euros

1,500 Euros

500 Euros

- Senior:

- 1st: **S41** Buljbasic et al.

University of Sarajevo, Bosnia

5,000 Euros

- Open-source:

- 1st: **S41** Buljbasic et al.

University of Sarajevo, Bosnia

10,000 Euros