

A Comparative Evaluation of Nature-Inspired Algorithms for DSP

Results of Pairwise Kolmogorov-Smirnov (KS) test for statistical significance
(Metric: Waiting time)

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Table 1: Evaluation scenarios: application types and varying number of requests generated during the simulation of each scenario.

Scenario	Application	Users	Lambda	AvgRequests
Scenario 1	Generic	50	24'	556
Scenario 1	LTS	30	24'	147
Scenario 1	MMA	10	30'	15
Scenario 1	PWD	10	24'	49
Scenario 2	Generic	100	24'	1118
Scenario 2	LTS	60	24'	288
Scenario 2	MMA	20	30'	34
Scenario 2	PWD	20	24'	97
Scenario 3	Generic	150	24'	1686
Scenario 3	LTS	90	24'	433
Scenario 3	MMA	30	30'	49
Scenario 3	PWD	30	24'	144
Scenario 4	Generic	200	24'	2246
Scenario 4	LTS	120	24'	575
Scenario 4	MMA	40	30'	67
Scenario 4	PWD	40	24'	195
Scenario 5	Generic	250	24'	2833
Scenario 5	LTS	150	24'	728
Scenario 5	MMA	50	30'	84
Scenario 5	PWD	50	24'	234

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Table 2: The network size ranges from 100 to 500 edge servers in increments of 100 for each experiment.

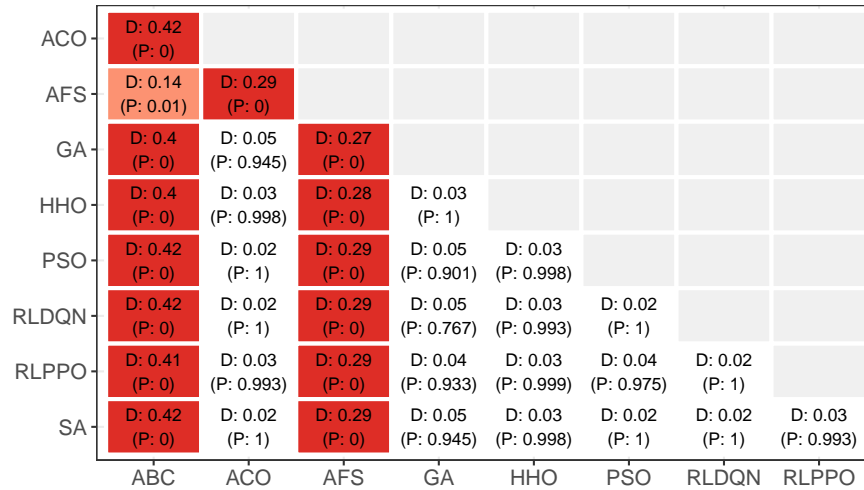
servers	100	200	300	400	500
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Table 3: The applications are composed of a varying number of services, ranging from 1 to 7.

services	1	3	5	7
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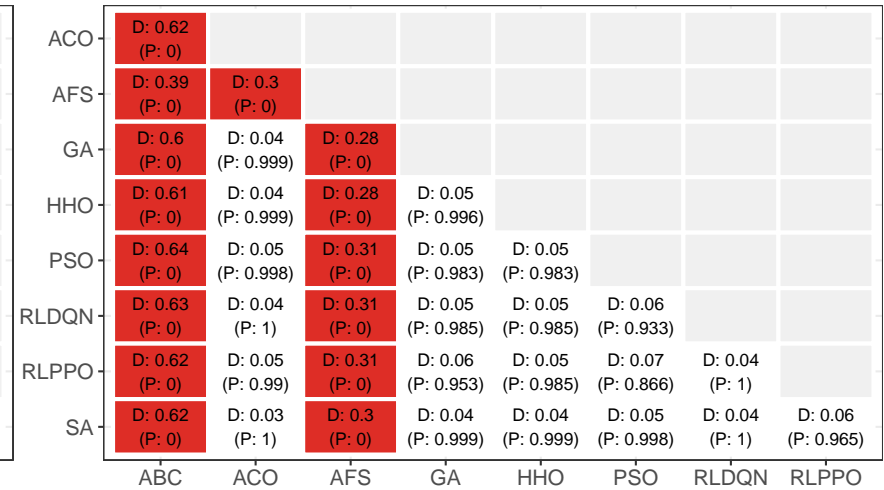
We introduce diverse system model configurations (as listed above) to facilitate evaluation of a broad range of scenarios. System users making the placement requests range from 100 to 500 users, with an increment of 100 in each experiment (see Table 1 above). The network has a cloud server and distributed edge servers deployed in a grid pattern across the city. The cloud server manages the edge servers and facilitates communication between them. The network size ranges from 100 to 500 edge servers in increments of 100 for each experiment. In each experiment, the applications are composed of a varying number of services, ranging from 1 to 7 (increased by 2) in order to evaluate the impact of applications' complexity on the placement approaches.

scenario_1_servers_100_services_1_application_GENERIC



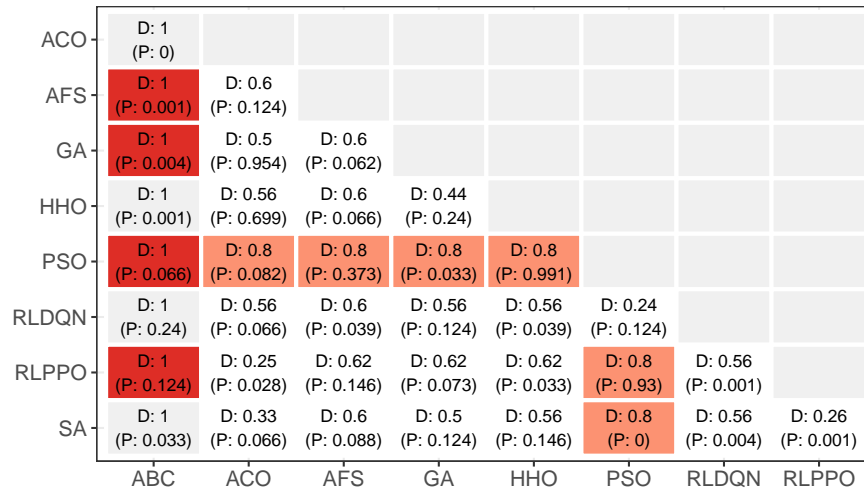
□ NS □ P < 0.05 ■ P < 0.01

scenario_1_servers_100_services_1_application_LTS



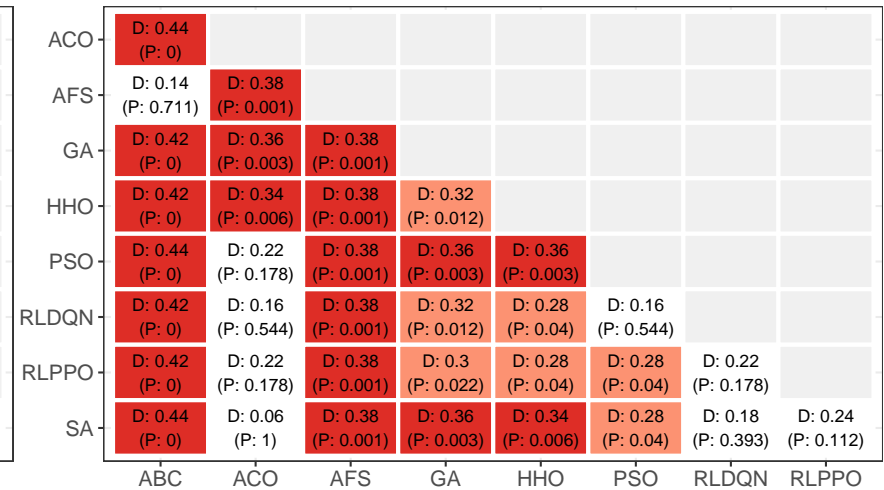
□ NS ■ P < 0.01

scenario_1_servers_100_services_1_application_MMA



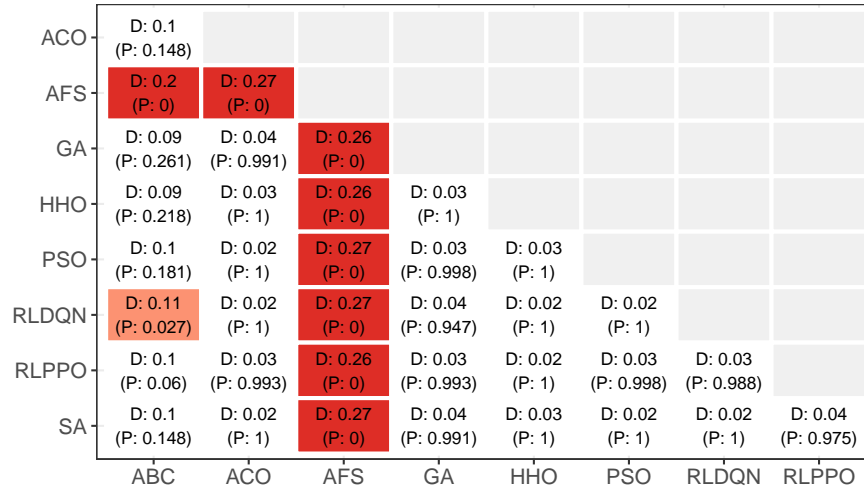
□ NS □ P < 0.05 ■ P < 0.01

scenario_1_servers_100_services_1_application_PWD



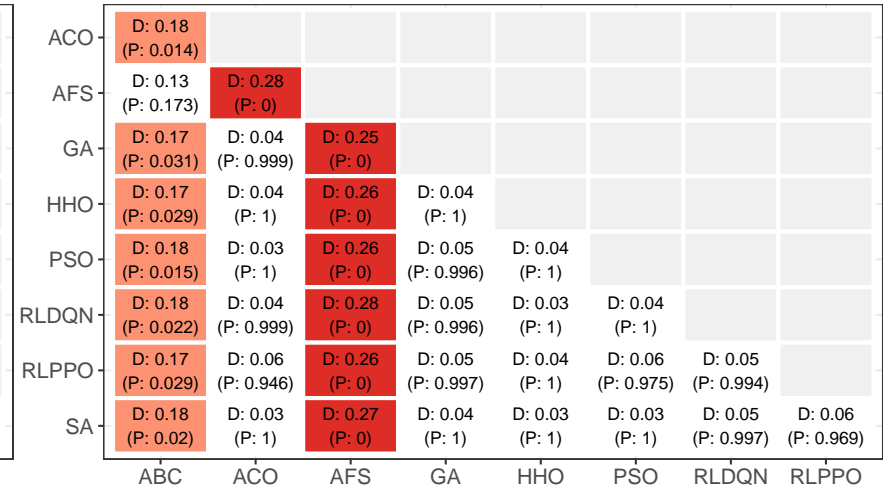
□ NS □ P < 0.05 ■ P < 0.01

scenario_1_servers_100_services_3_application_GENERIC



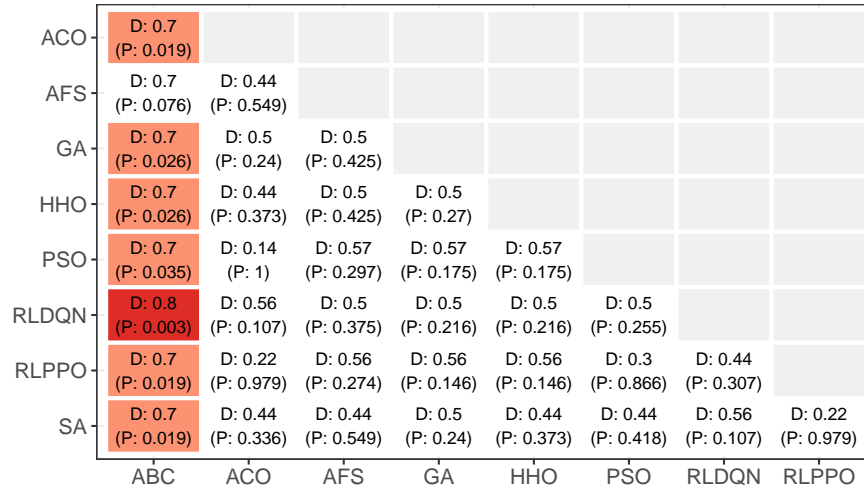
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scenario_1_servers_100_services_3_application_LTS



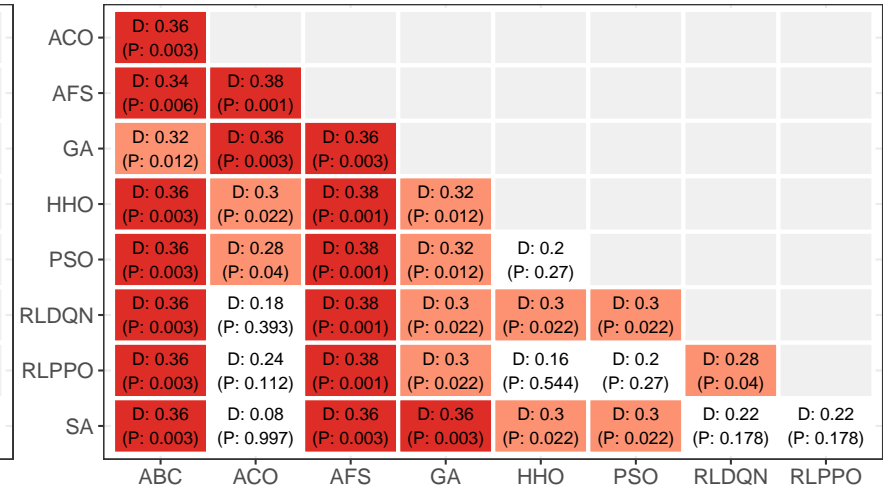
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scenario_1_servers_100_services_3_application_MMA



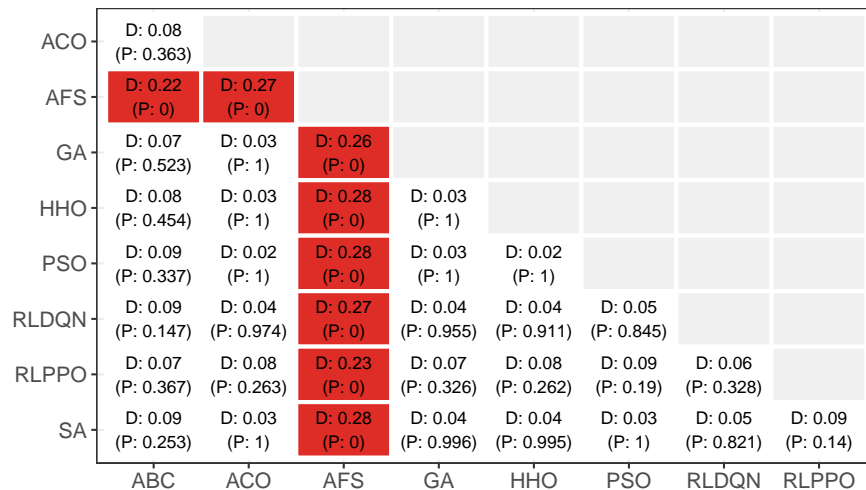
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scenario_1_servers_100_services_3_application_PWD



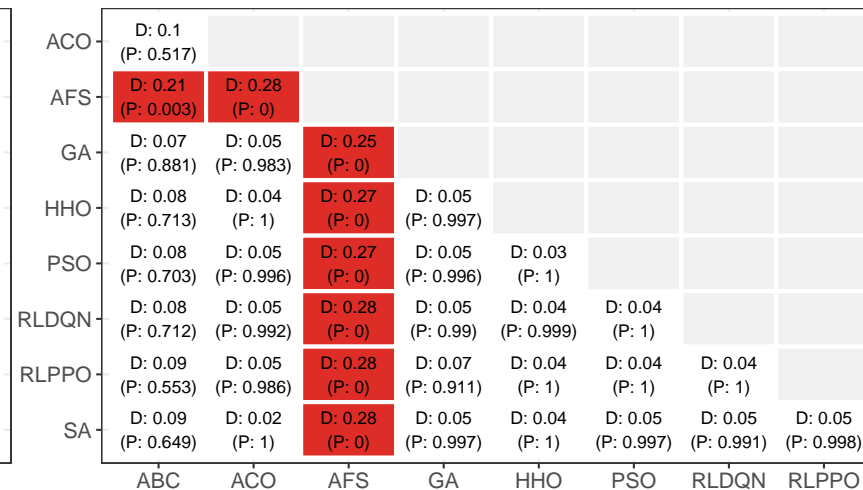
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scenario_1_servers_100_services_5_application_GENERIC



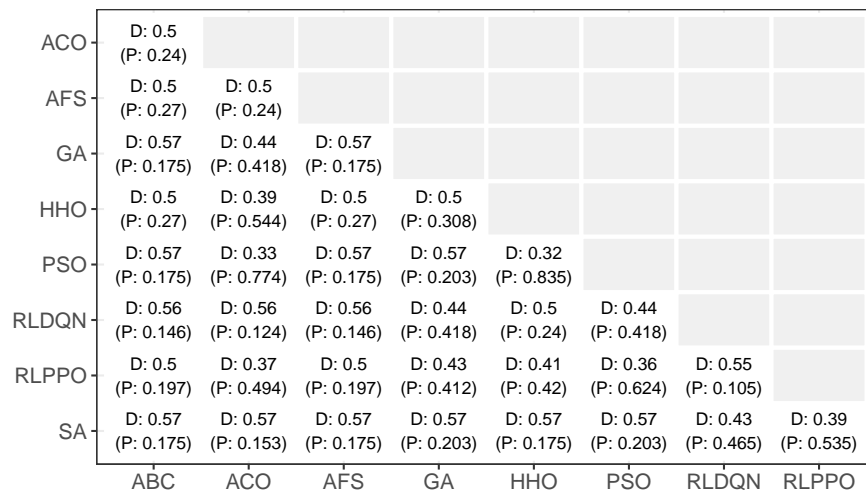
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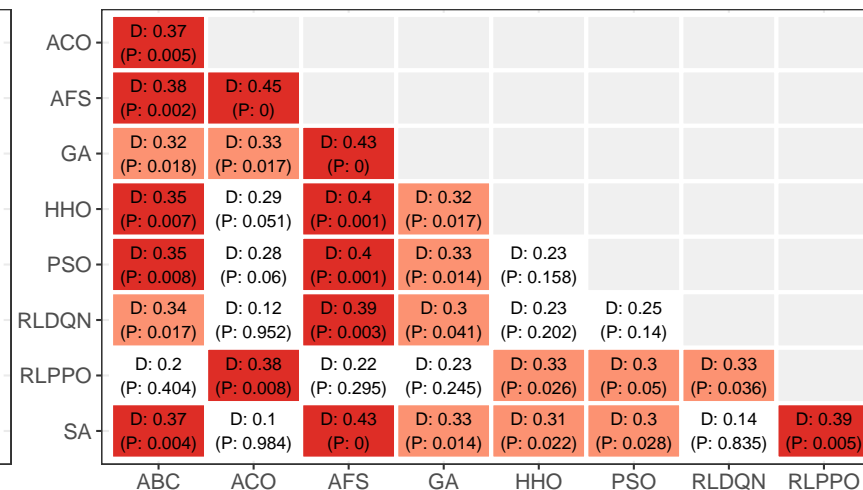
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scenario_1_servers_100_services_5_application_MMA



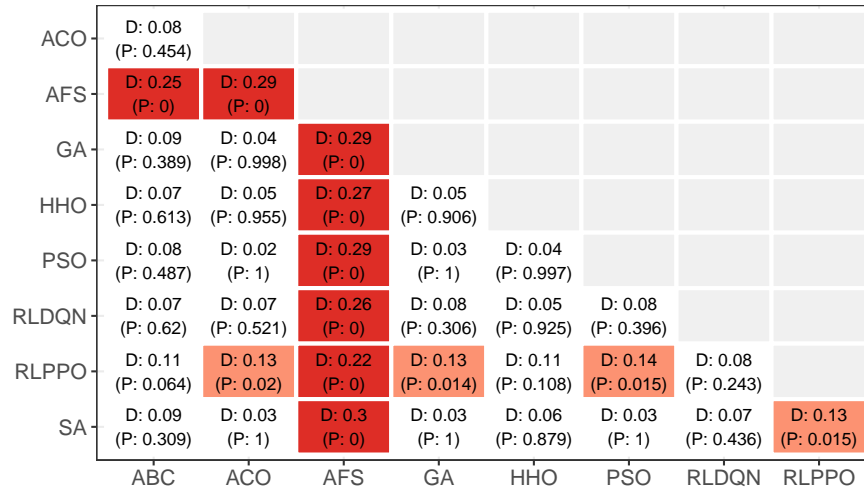
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scenario_1_servers_100_services_5_application_PWD



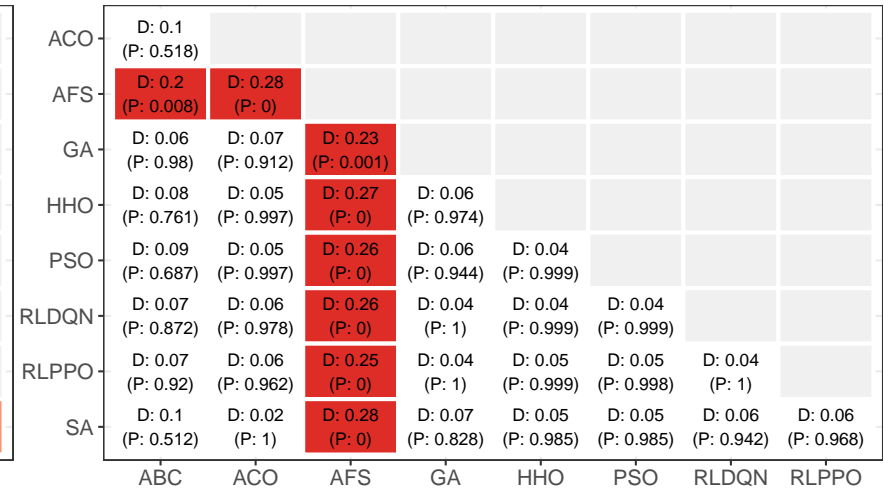
NS P < 0.05 P < 0.01

scenario_1_servers_100_services_7_application_GENERIC



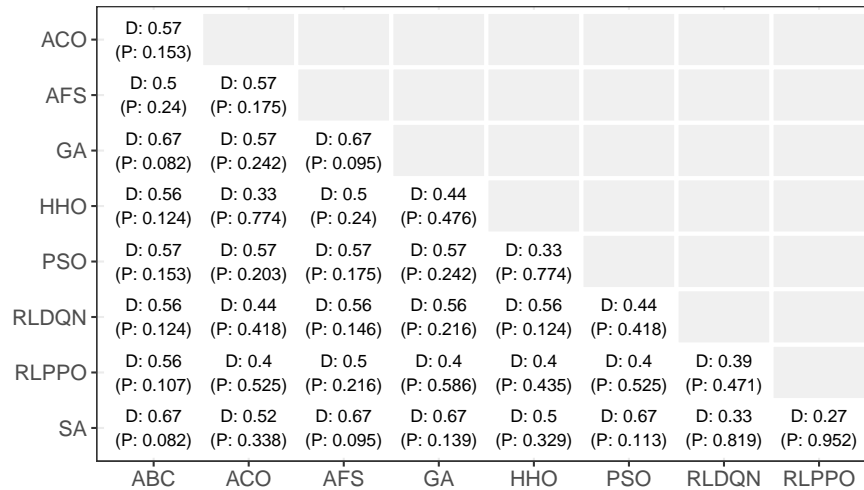
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scenario_1_servers_100_services_7_application_LTS



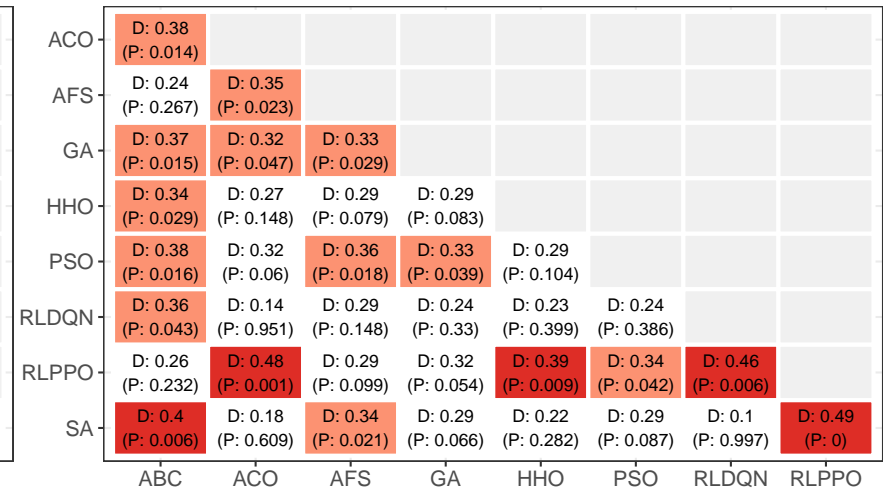
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scenario_1_servers_100_services_7_application_MMA



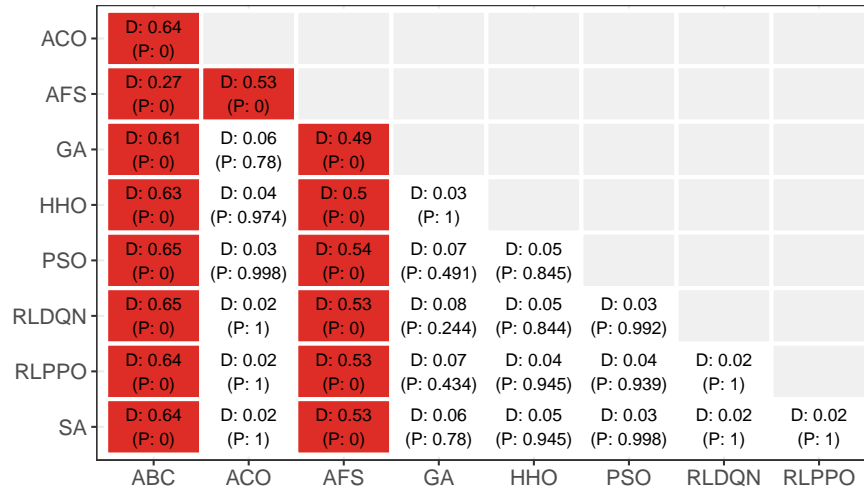
□ NS

scenario_1_servers_100_services_7_application_PWD



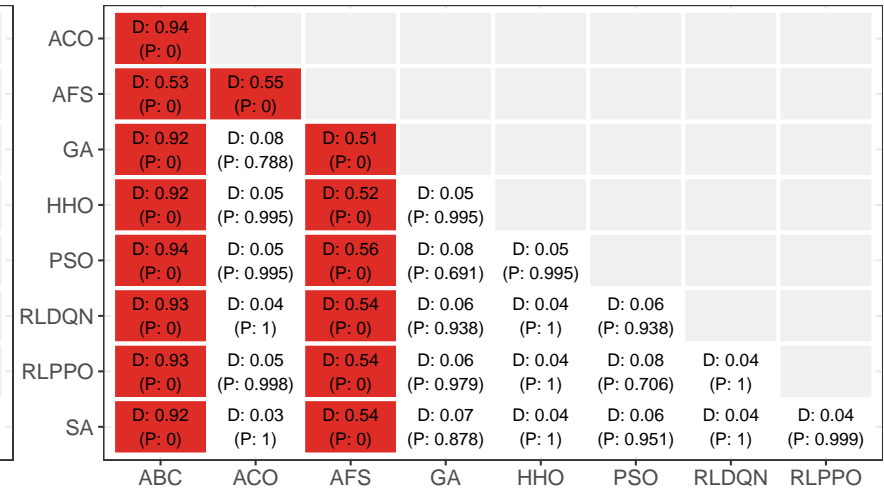
□ NS □ P < 0.05 ■ P < 0.01

scenario_1_servers_200_services_1_application_GENERIC



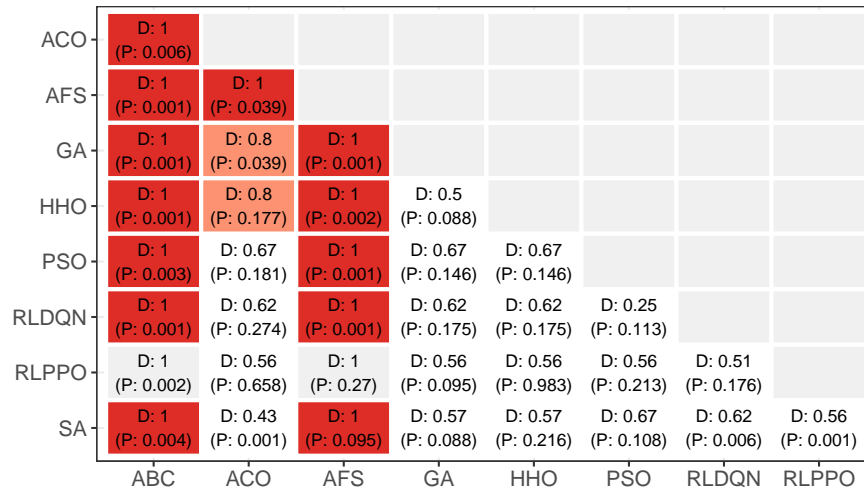
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scenario_1_servers_200_services_1_application_LTS



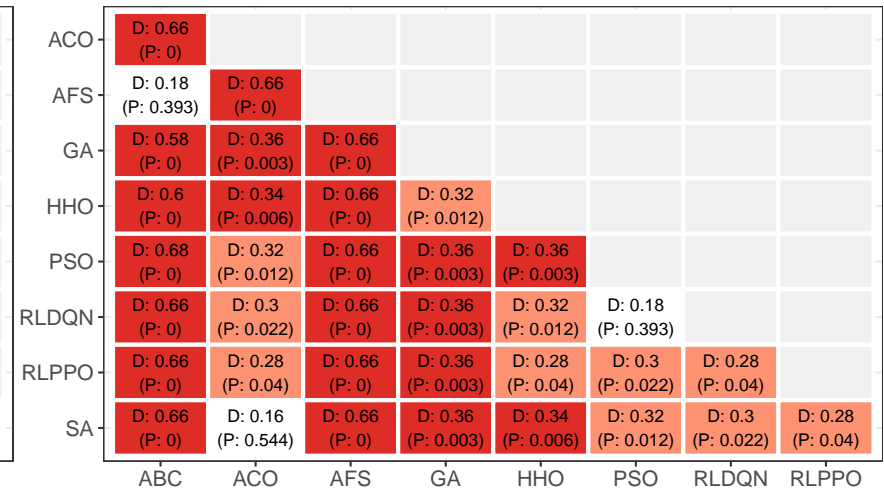
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scenario_1_servers_200_services_1_application_MMA



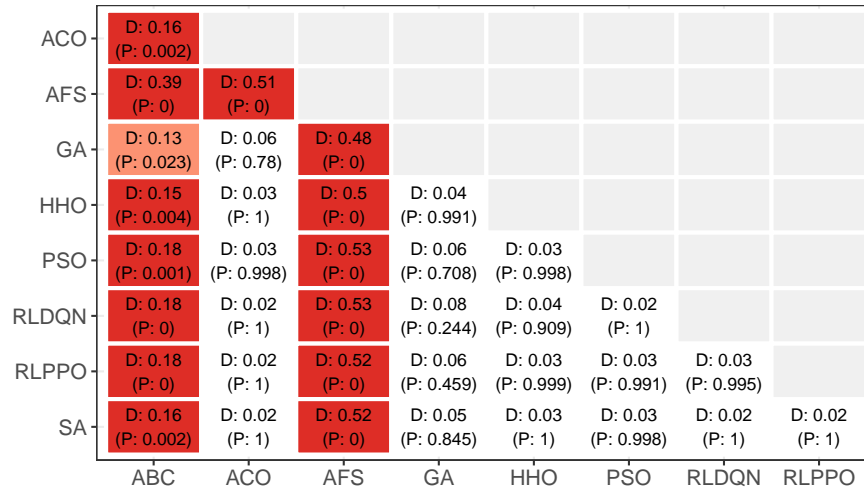
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scenario_1_servers_200_services_1_application_PWD



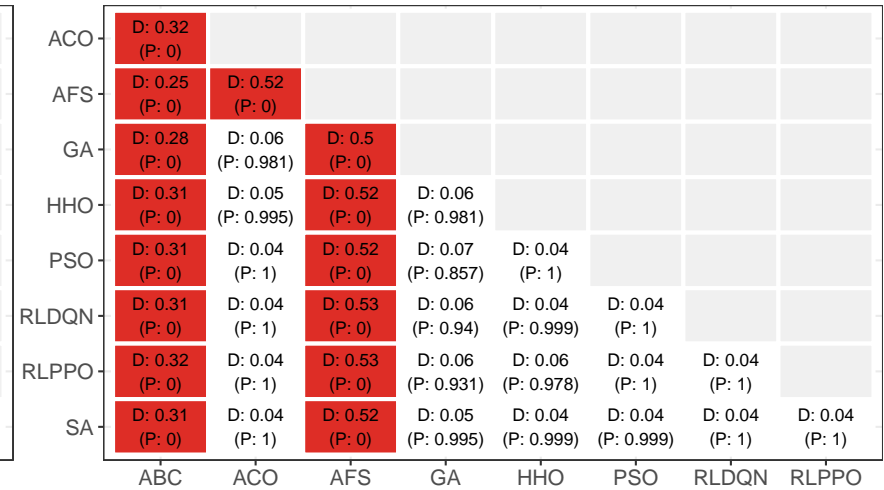
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scenario_1_servers_200_services_3_application_GENERIC



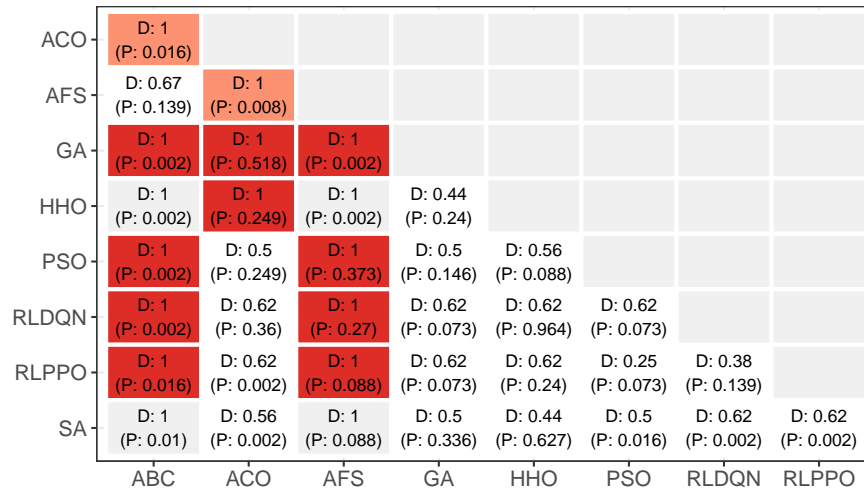
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scenario_1_servers_200_services_3_application_LTS



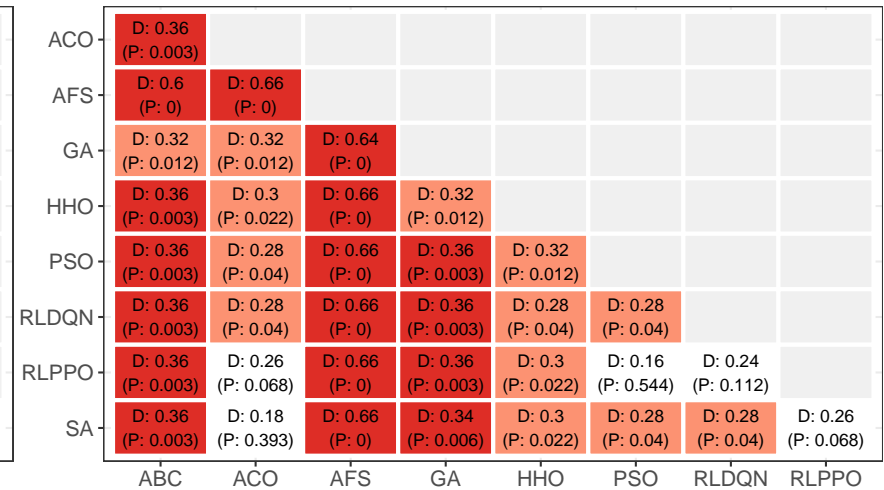
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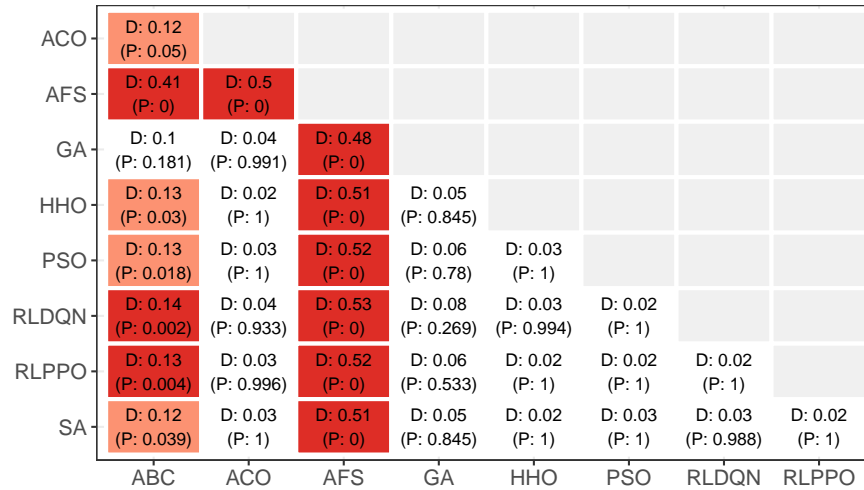
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scenario_1_servers_200_services_3_application_PWD



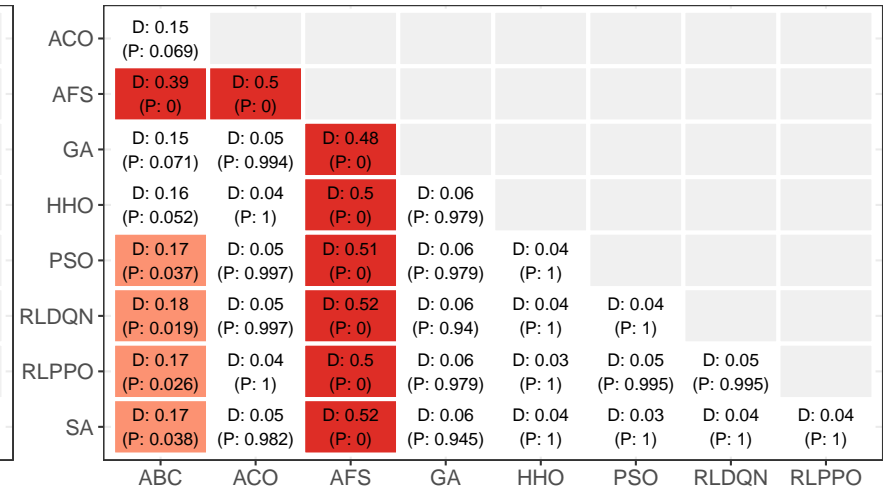
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scenario_1_servers_200_services_5_application_GENERIC



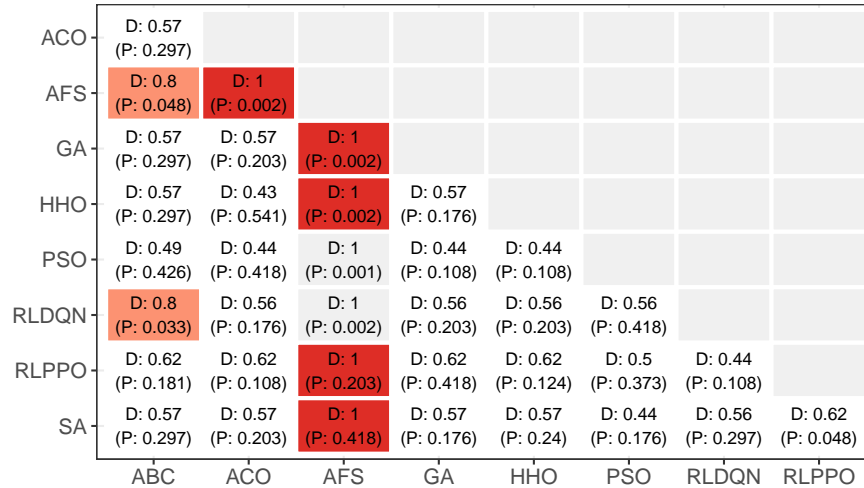
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scenario_1_servers_200_services_5_application_LTS



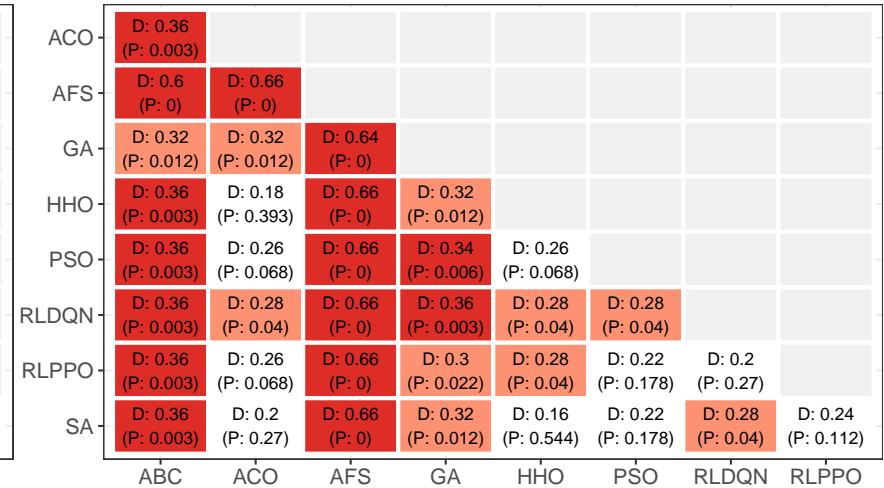
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scenario_1_servers_200_services_5_application_MMA



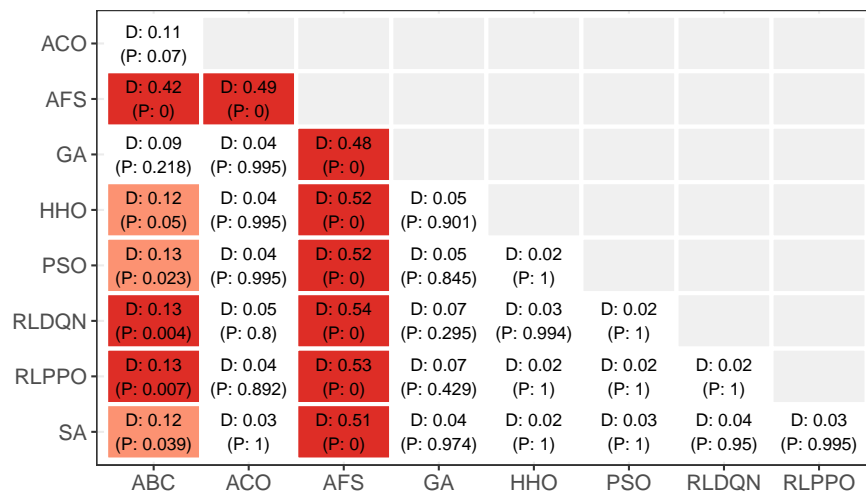
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scenario_1_servers_200_services_5_application_PWD



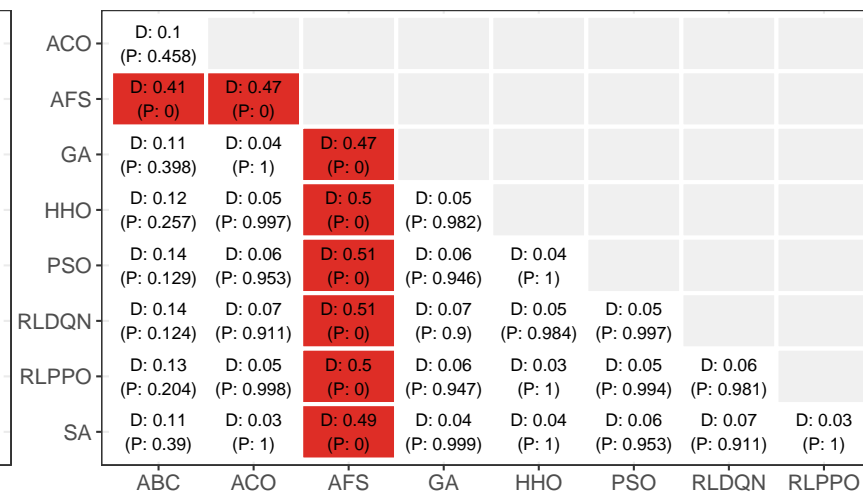
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scenario_1_servers_200_services_7_application_GENERIC



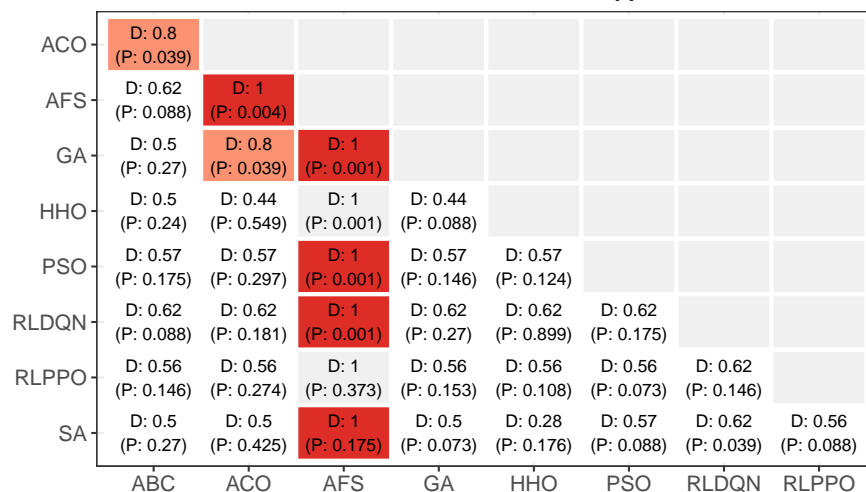
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scenario_1_servers_200_services_7_application_LTS



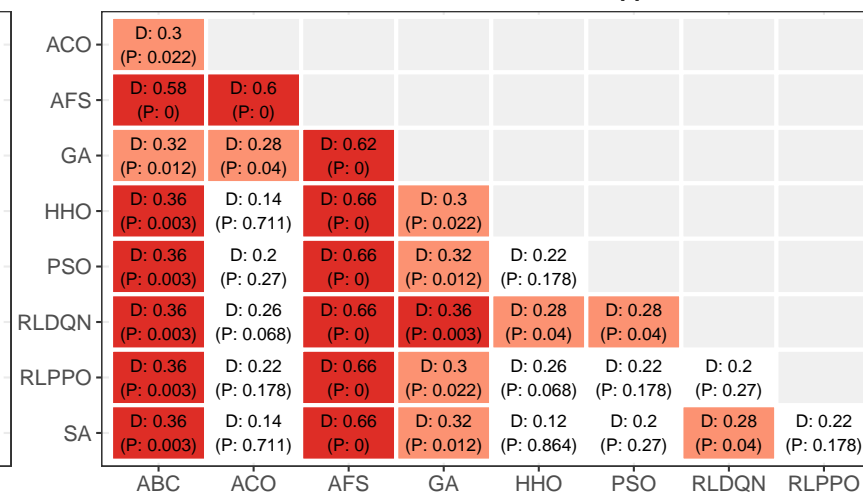
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scenario_1_servers_200_services_7_application_MMA



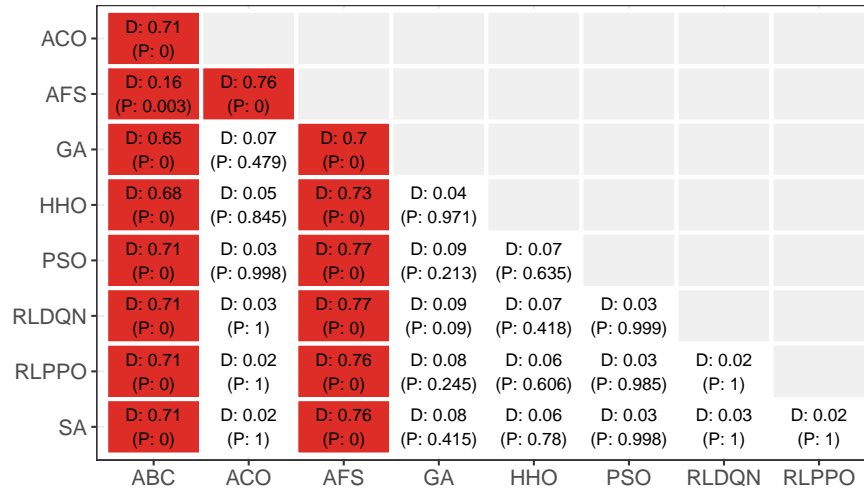
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scenario_1_servers_200_services_7_application_PWD



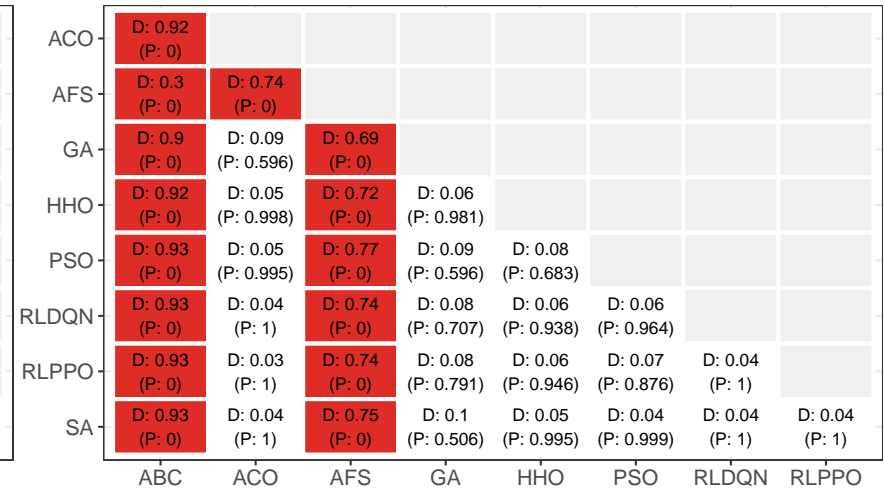
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scenario_1_servers_300_services_1_application_GENERIC



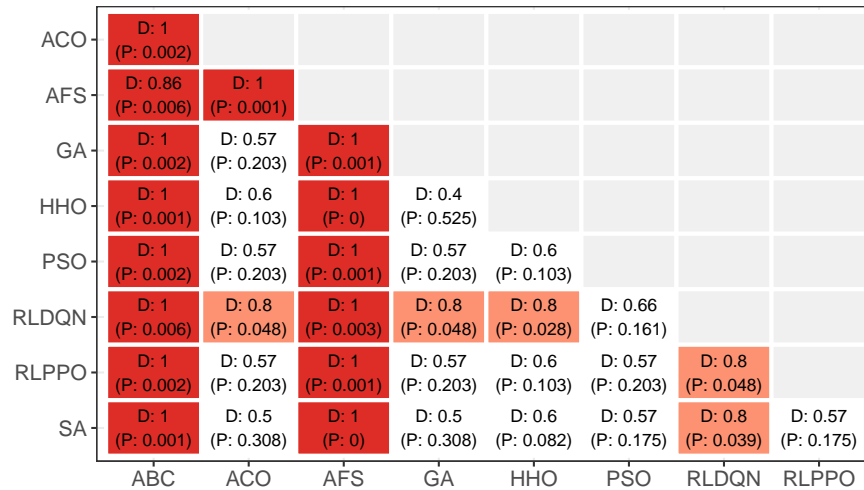
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scenario_1_servers_300_services_1_application_LTS



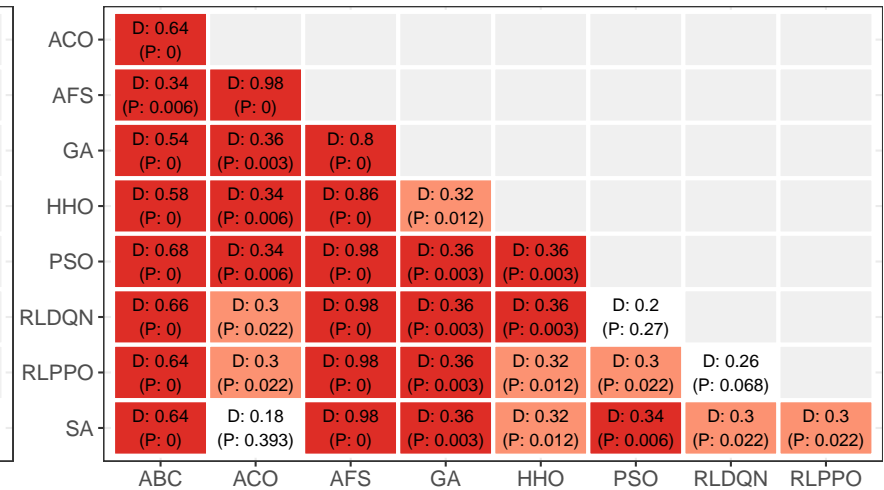
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scenario_1_servers_300_services_1_application_MMA



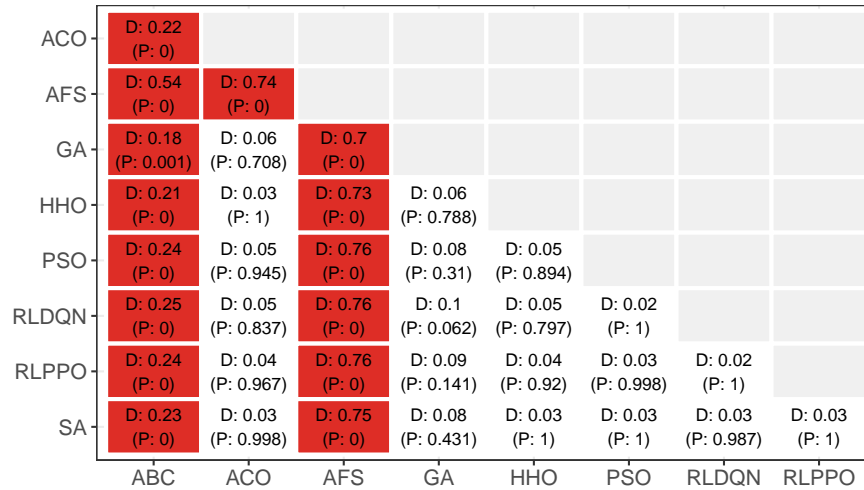
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scenario_1_servers_300_services_1_application_PWD



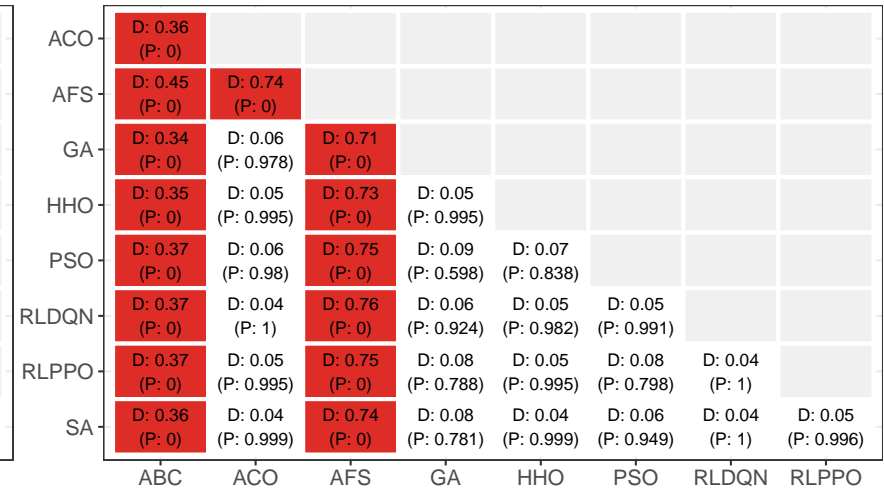
NS P < 0.05 P < 0.01

scenario_1_servers_300_services_3_application_GENERIC



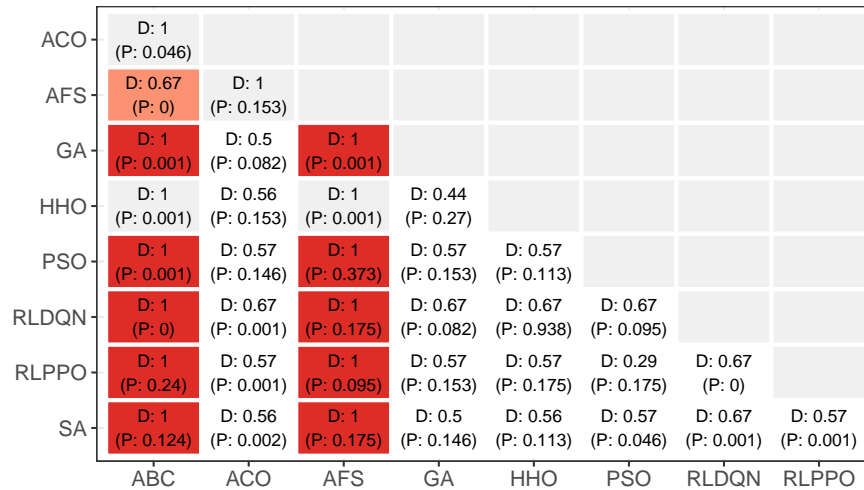
□ NS □ P < 0.01

scenario_1_servers_300_services_3_application_LTS



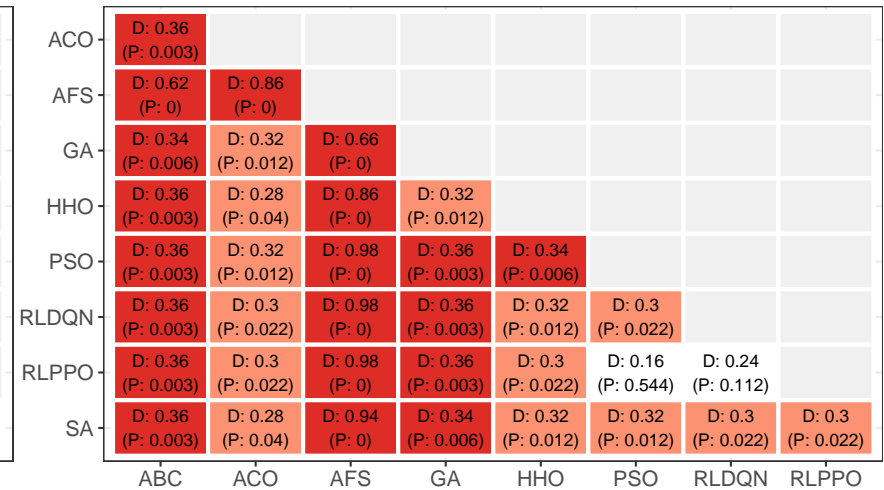
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scenario_1_servers_300_services_3_application_MMA



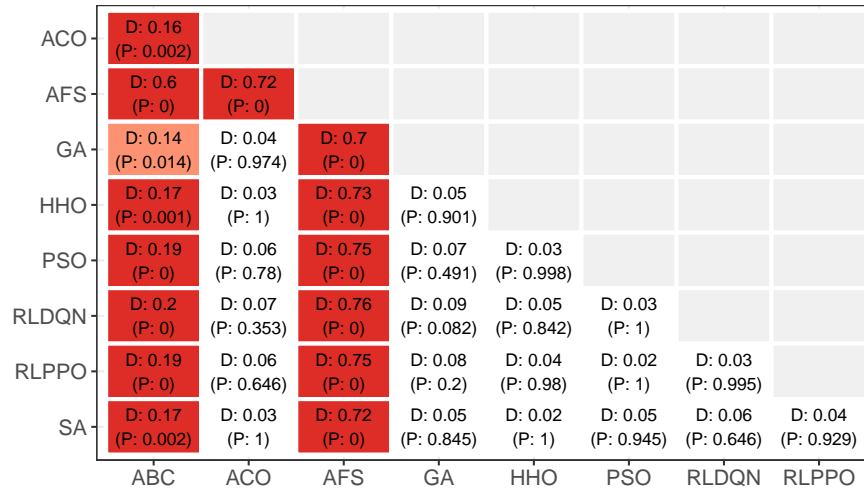
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scenario_1_servers_300_services_3_application_PWD



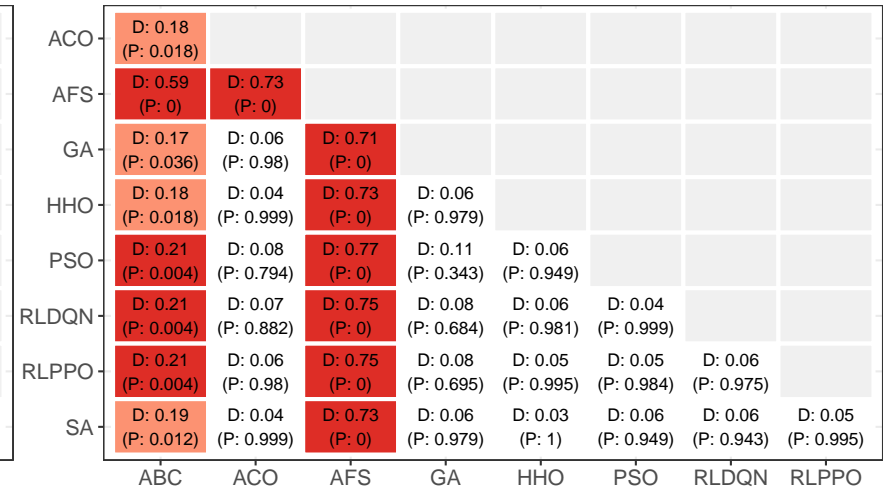
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scenario_1_servers_300_services_5_application_GENERIC



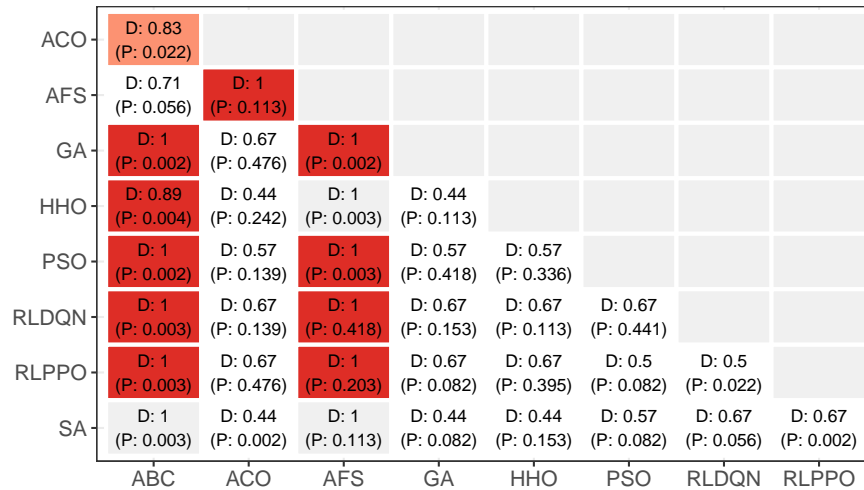
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scenario_1_servers_300_services_5_application_LTS



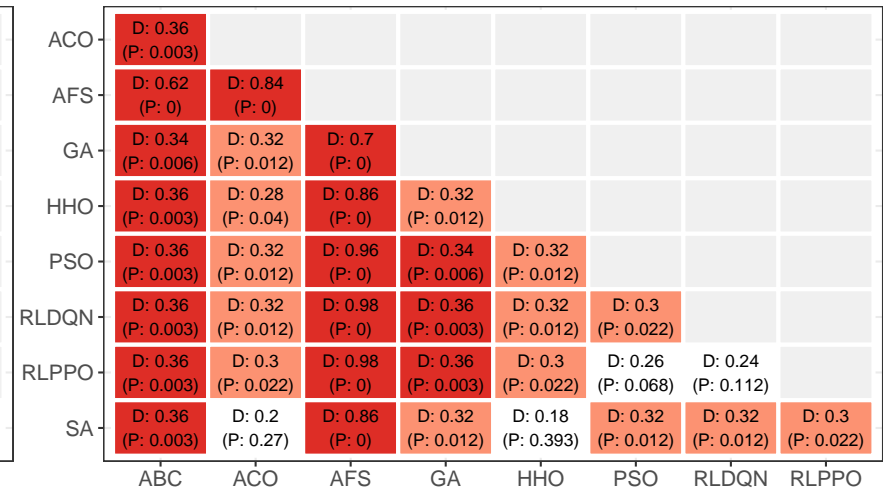
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scenario_1_servers_300_services_5_application_MMA



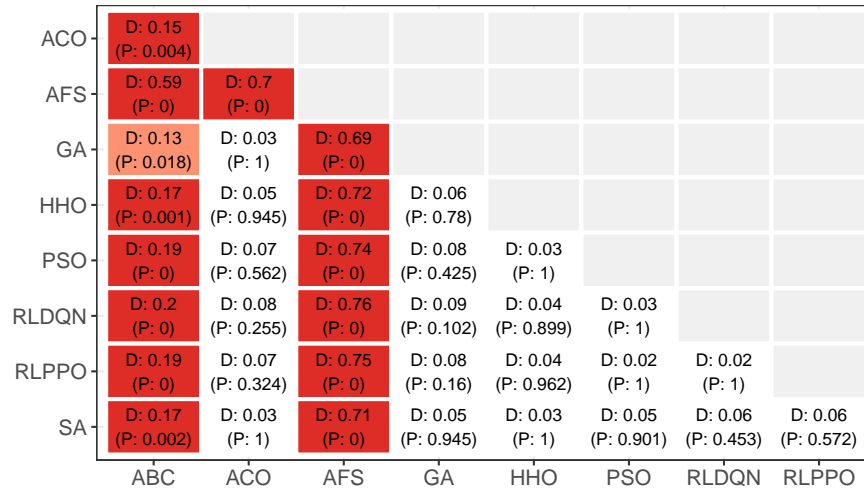
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scenario_1_servers_300_services_5_application_PWD



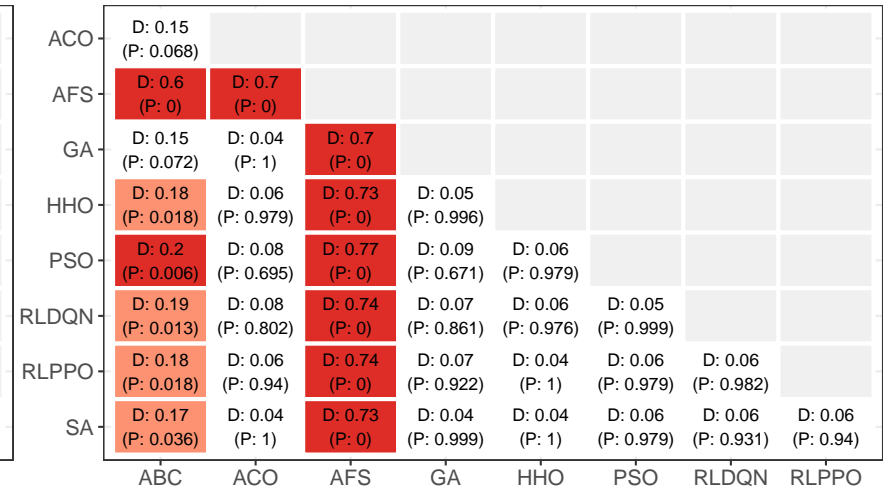
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scenario_1_servers_300_services_7_application_GENERIC



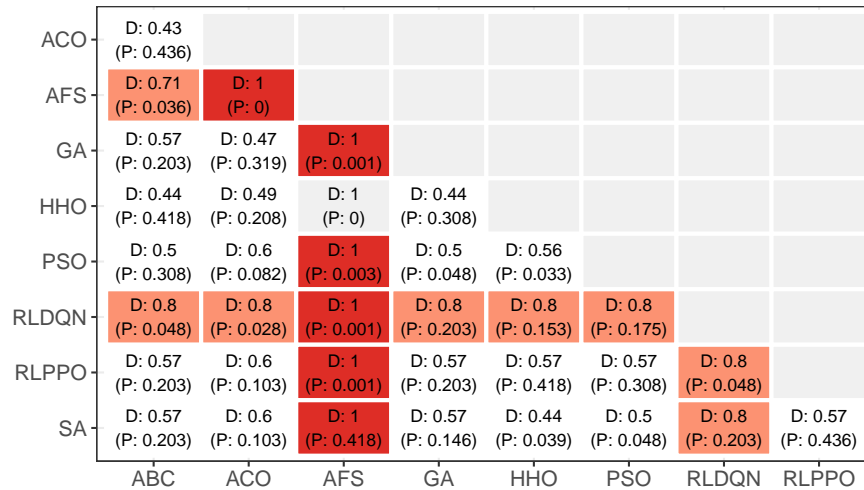
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scenario_1_servers_300_services_7_application_LTS



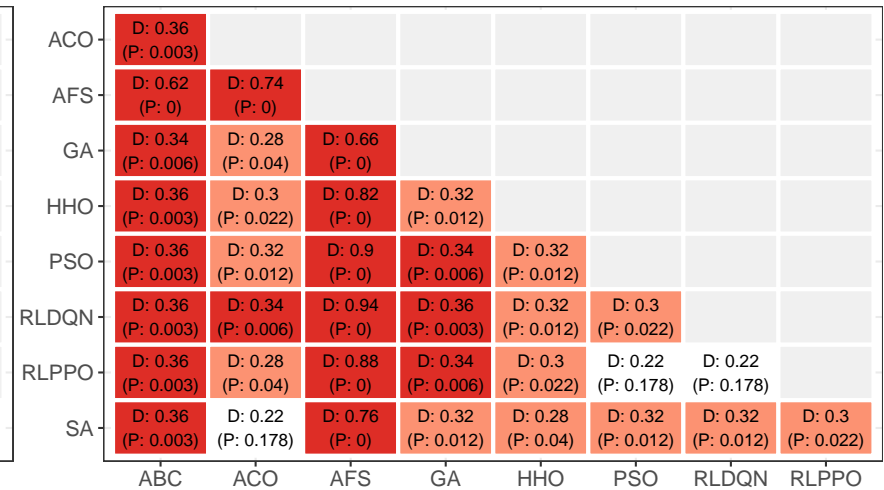
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scenario_1_servers_300_services_7_application_MMA



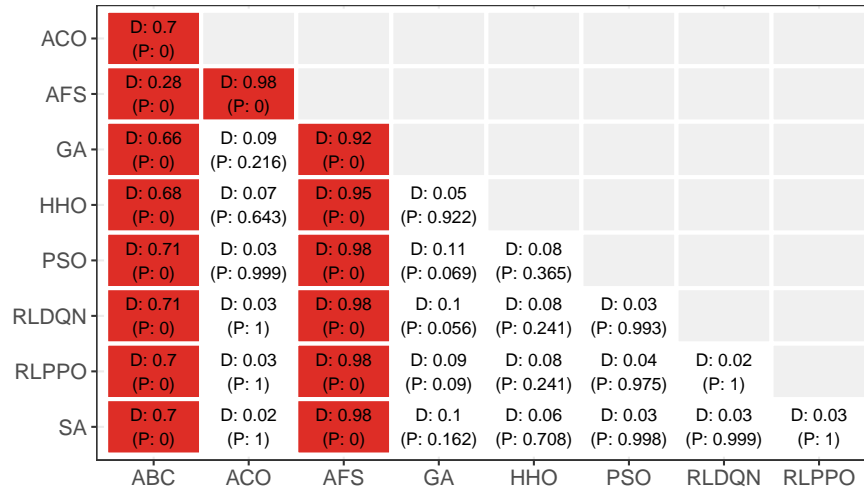
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scenario_1_servers_300_services_7_application_PWD



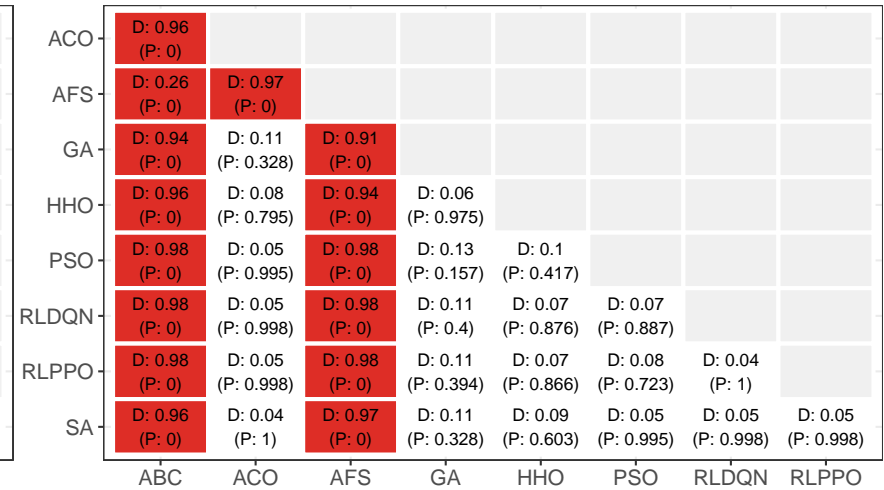
NS P < 0.05 P < 0.01

scenario_1_servers_400_services_1_application_GENERIC



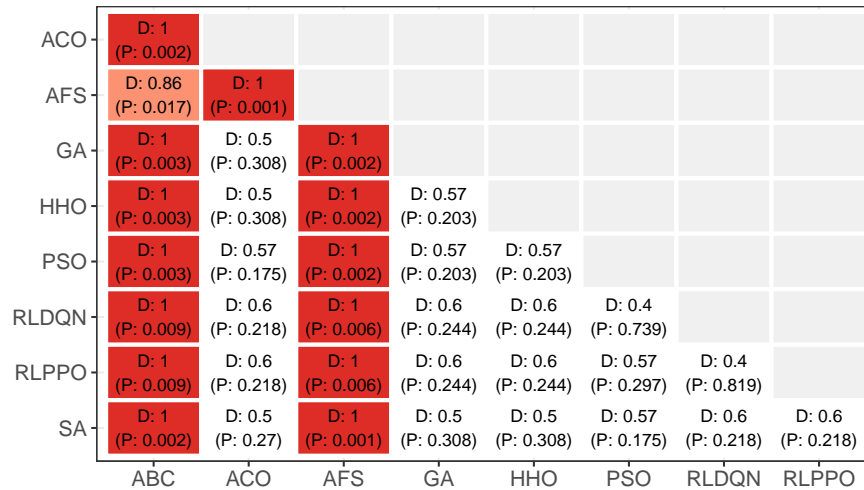
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scenario_1_servers_400_services_1_application_LTS



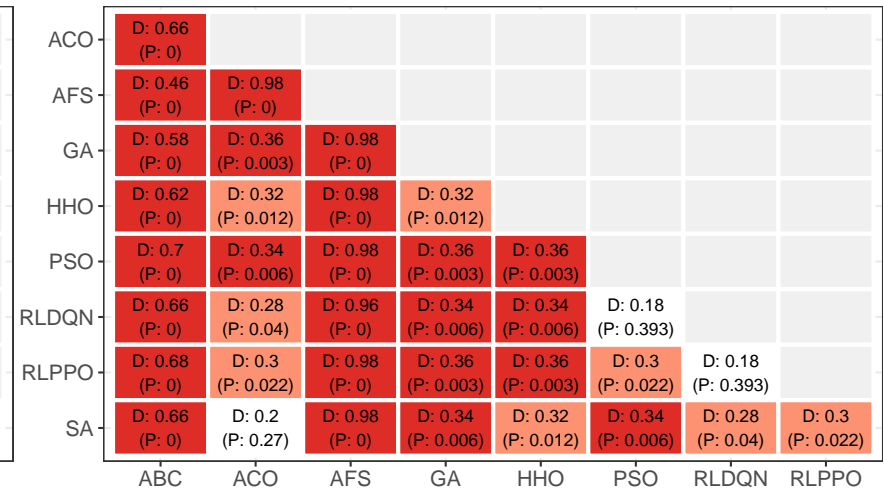
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scenario_1_servers_400_services_1_application_MMA



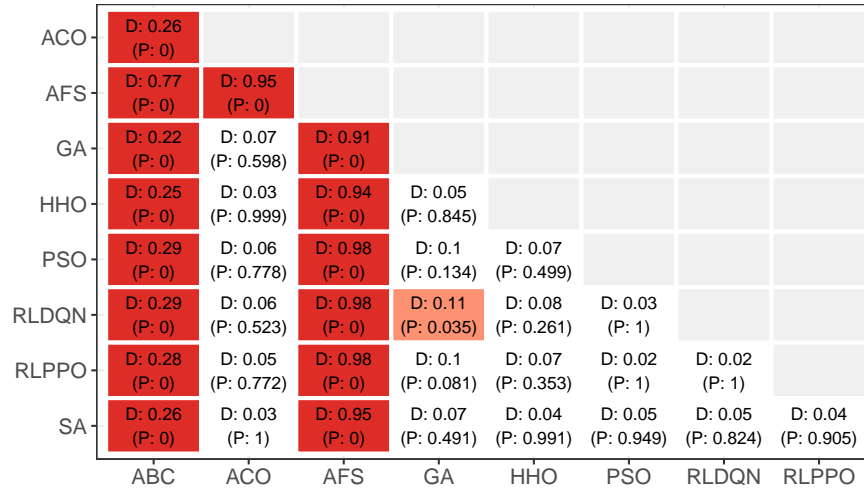
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scenario_1_servers_400_services_1_application_PWD



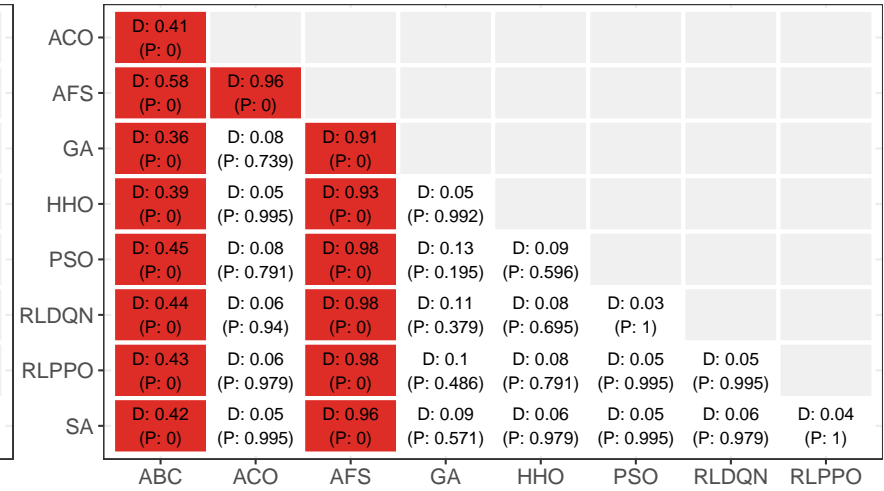
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scenario_1_servers_400_services_3_application_GENERIC



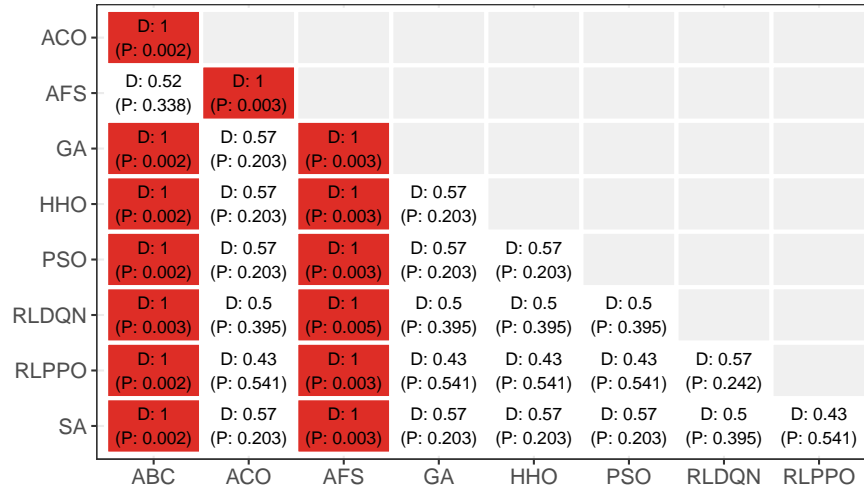
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scenario_1_servers_400_services_3_application_LTS



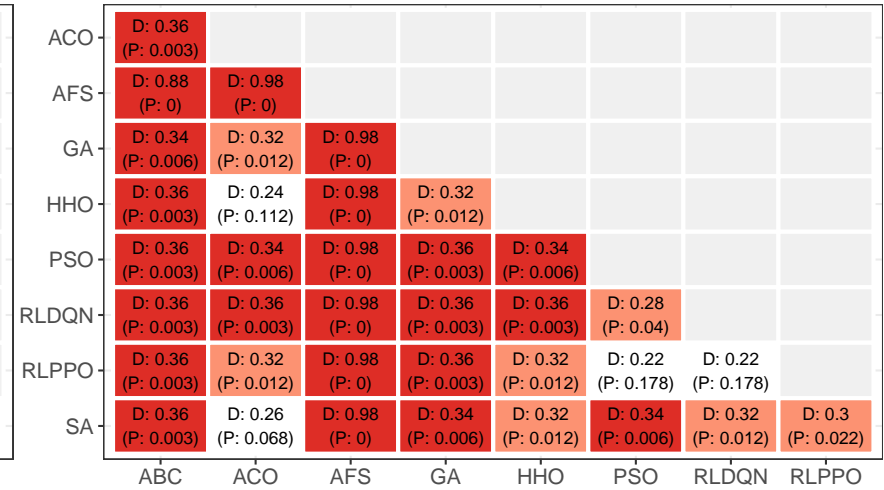
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scenario_1_servers_400_services_3_application_MMA



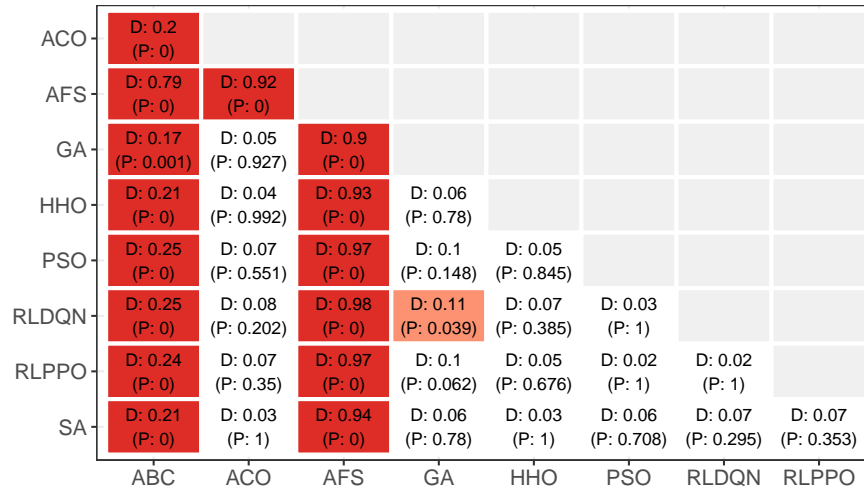
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scenario_1_servers_400_services_3_application_PWD



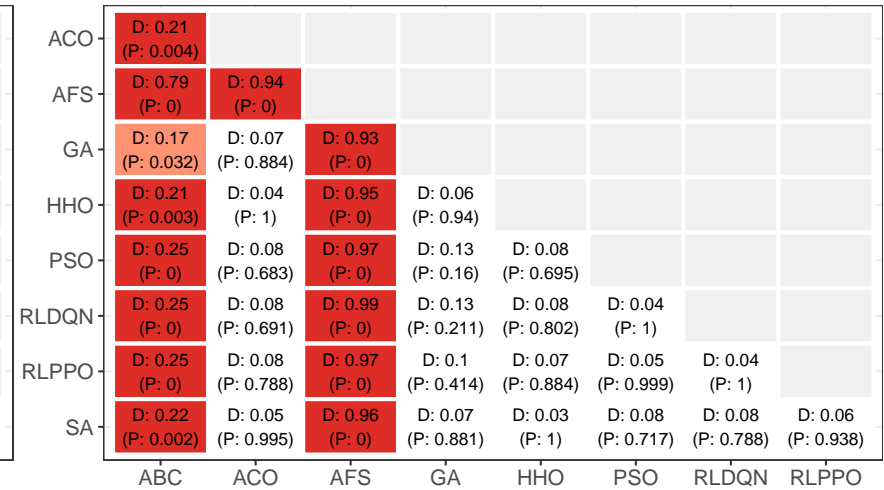
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scenario_1_servers_400_services_5_application_GENERIC



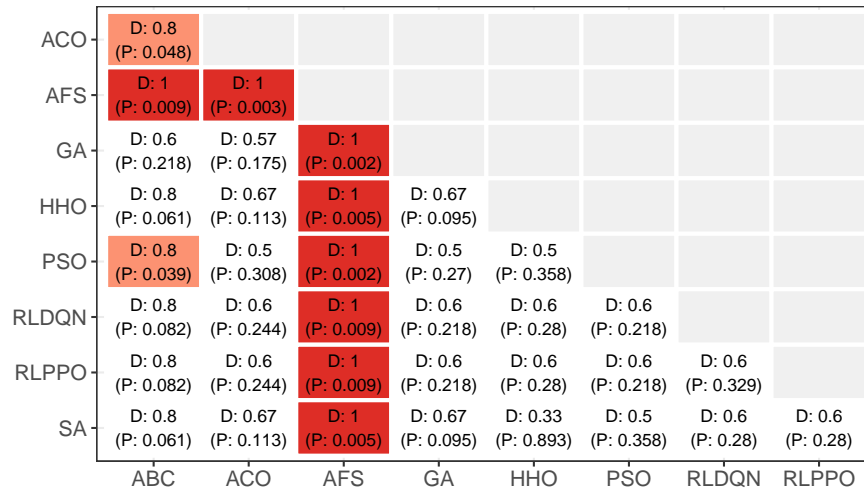
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scenario_1_servers_400_services_5_application_LTS



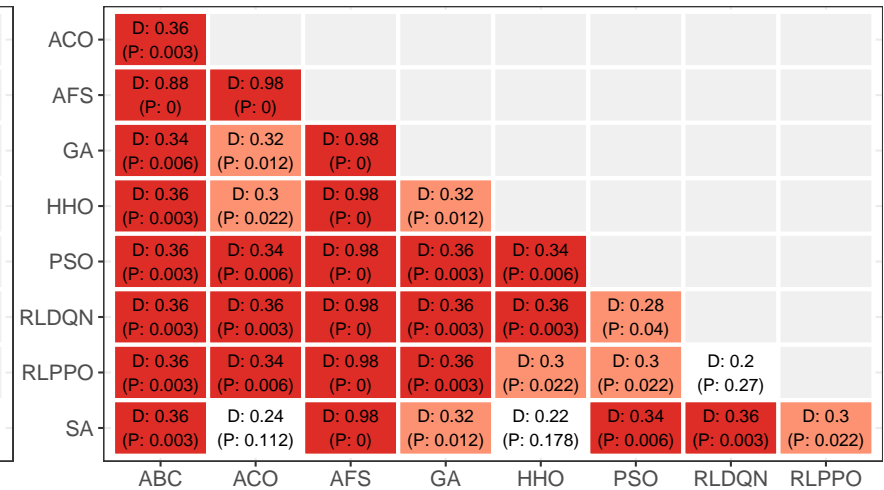
□ NS □ P < 0.05 ■ P < 0.01

scenario_1_servers_400_services_5_application_MMA



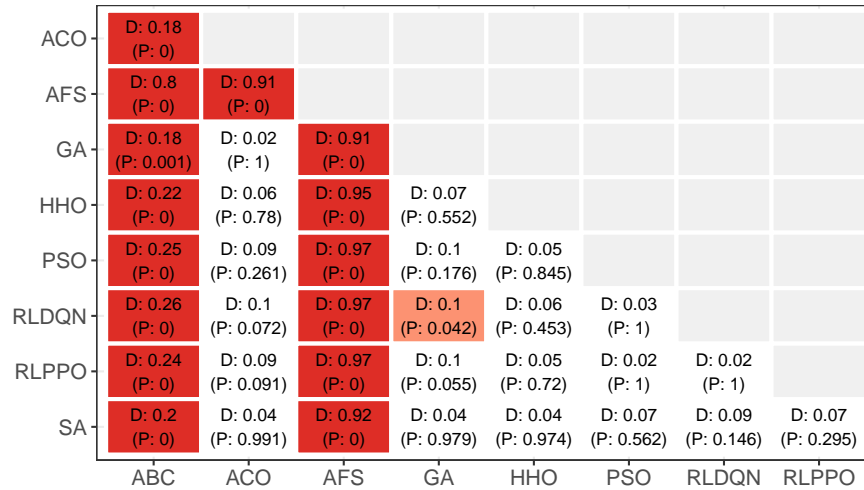
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scenario_1_servers_400_services_5_application_PWD



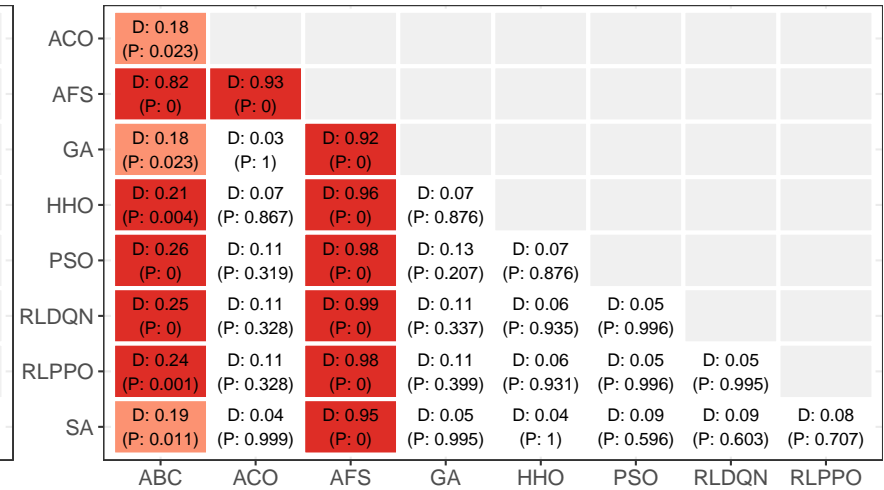
□ NS □ P < 0.05 ■ P < 0.01

scenario_1_servers_400_services_7_application_GENERIC



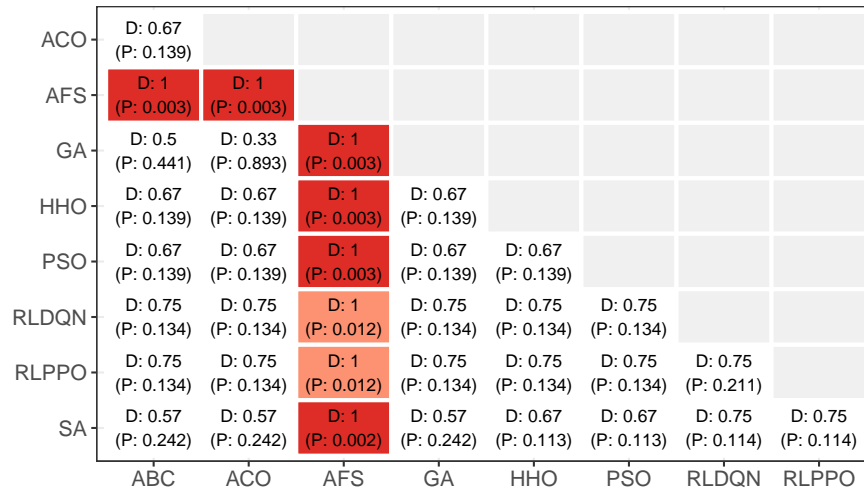
□ NS □ P < 0.05 ■ P < 0.01

scenario_1_servers_400_services_7_application_LTS



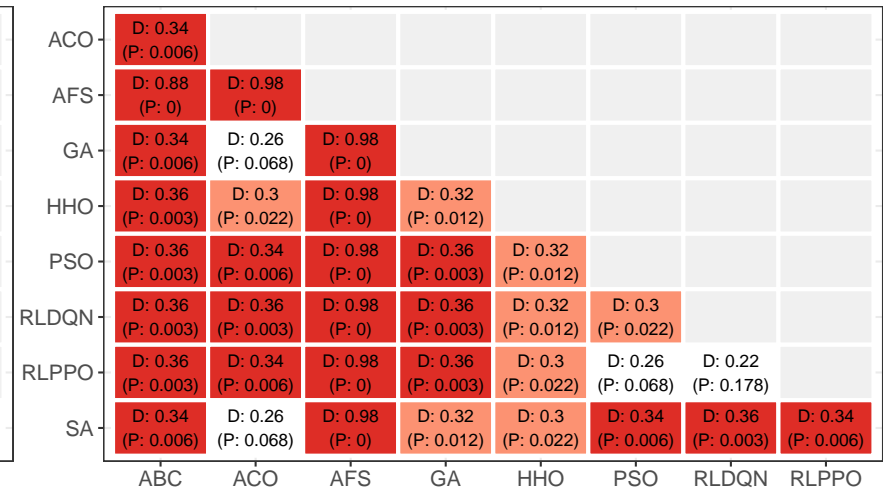
□ NS □ P < 0.05 ■ P < 0.01

scenario_1_servers_400_services_7_application_MMA



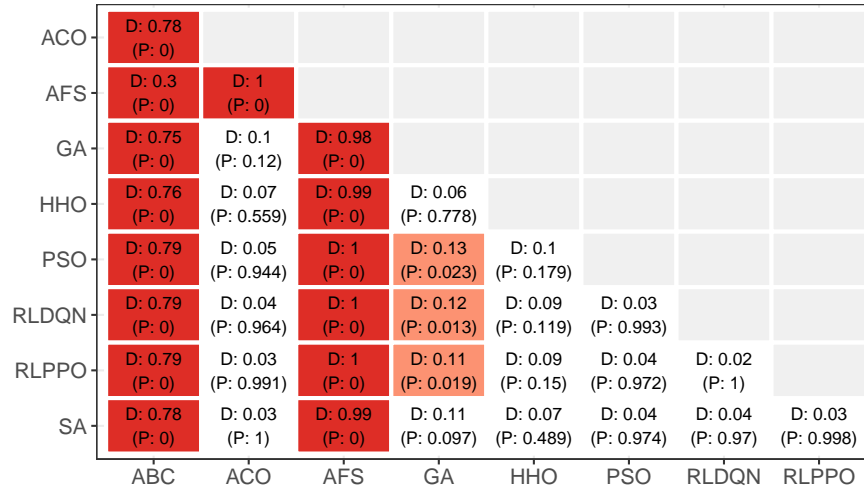
□ NS □ P < 0.05 ■ P < 0.01

scenario_1_servers_400_services_7_application_PWD



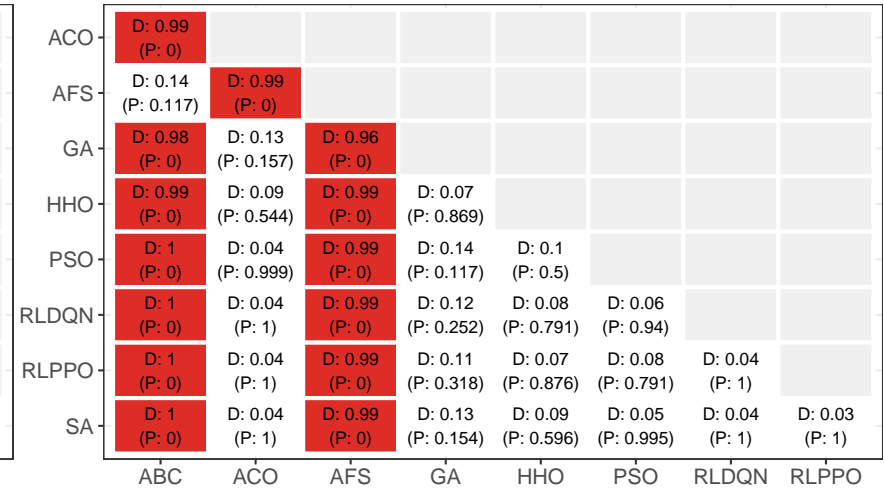
□ NS □ P < 0.05 ■ P < 0.01

scenario_1_servers_500_services_1_application_GENERIC



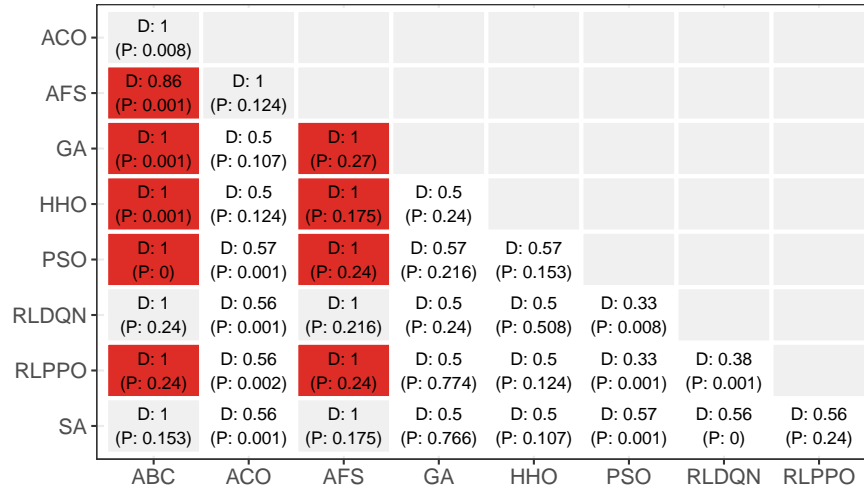
□ NS □ P < 0.05 ■ P < 0.01

scenario_1_servers_500_services_1_application_LTS



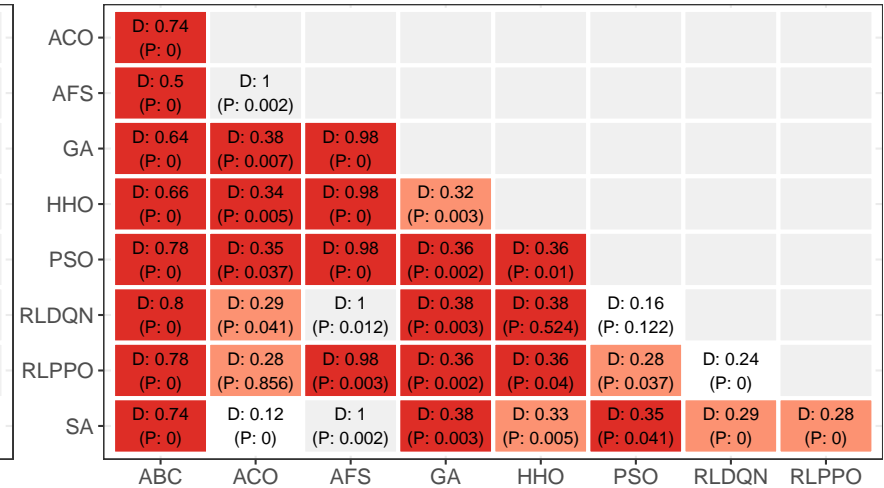
□ NS ■ P < 0.01

scenario_1_servers_500_services_1_application_MMA



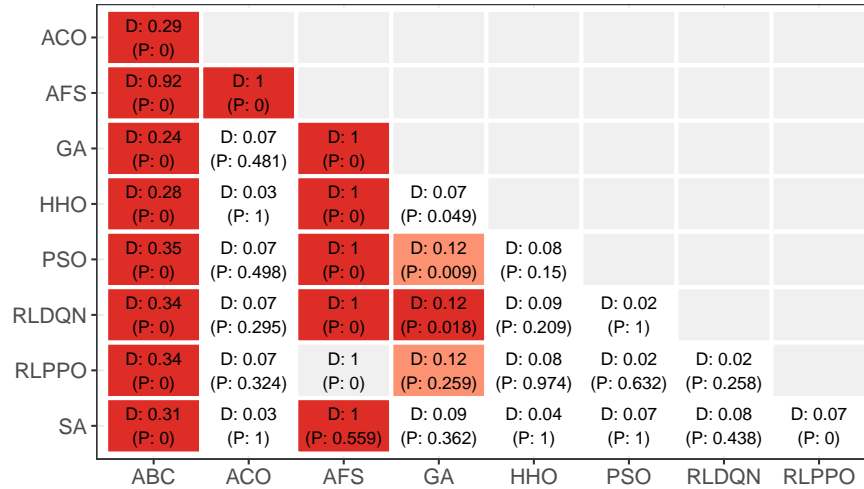
□ NS ■ P < 0.01

scenario_1_servers_500_services_1_application_PWD



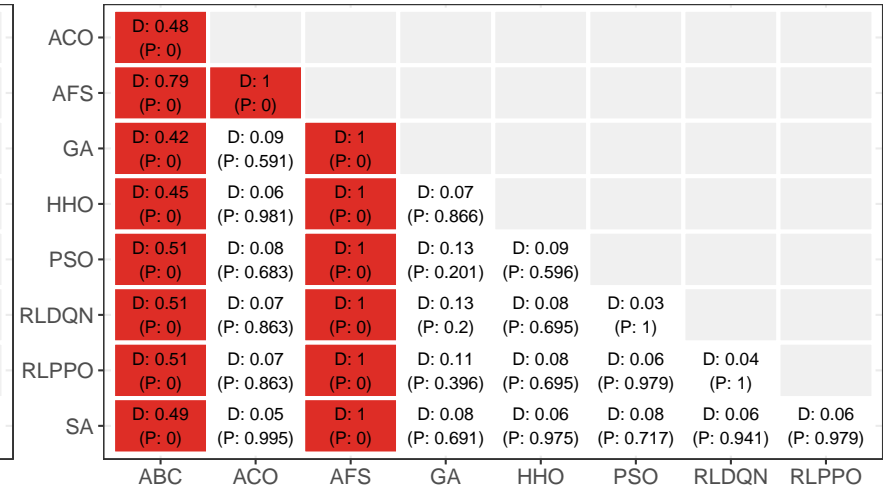
□ NS □ P < 0.05 ■ P < 0.01

scenario_1_servers_500_services_3_application_GENERIC



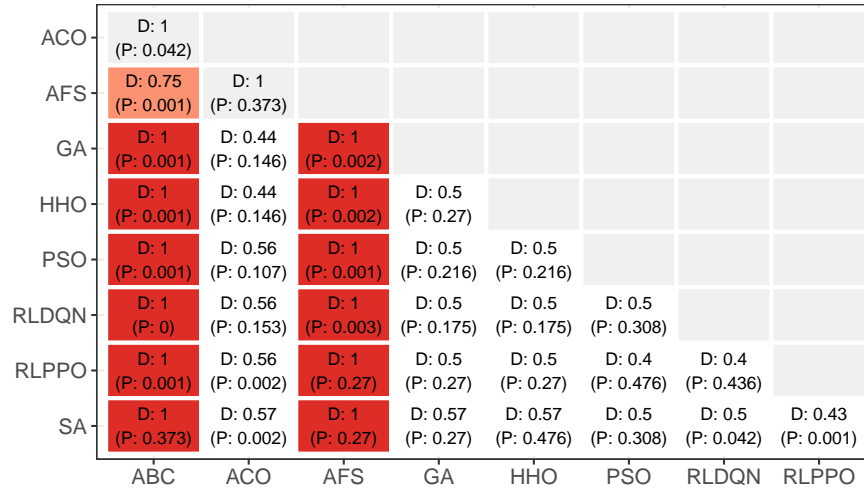
NS
 P < 0.05
 P < 0.01

scenario_1_servers_500_services_3_application_LTS



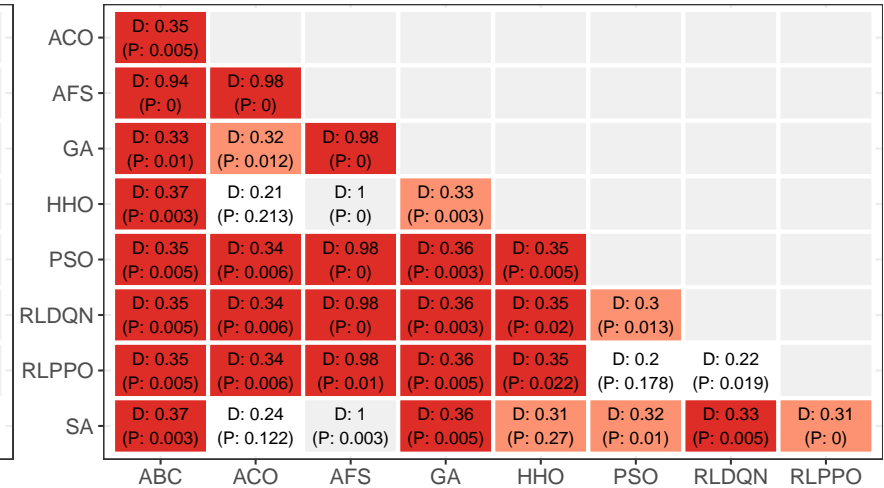
NS
 P < 0.01

scenario_1_servers_500_services_3_application_MMA



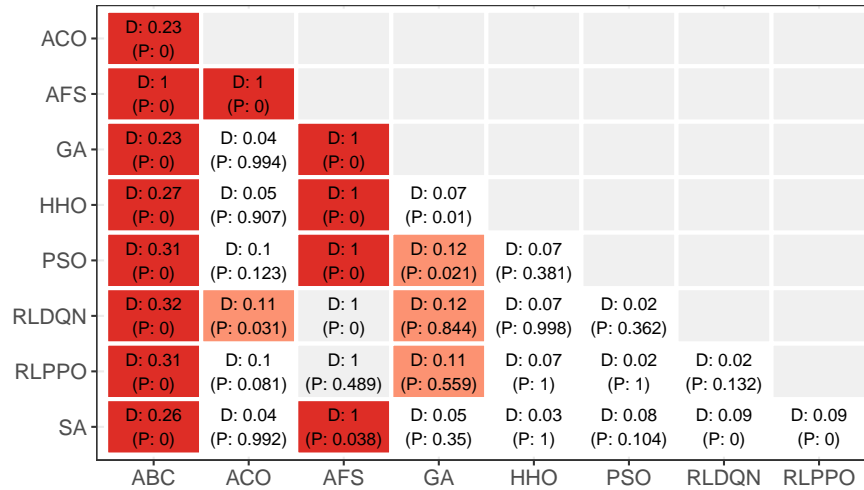
NS
 P < 0.05
 P < 0.01

scenario_1_servers_500_services_3_application_PWD



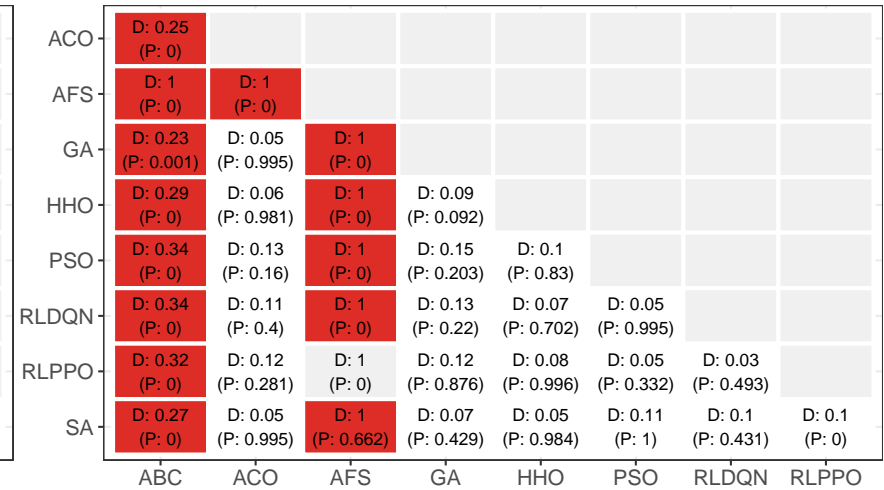
NS
 P < 0.05
 P < 0.01

scenario_1_servers_500_services_5_application_GENERIC



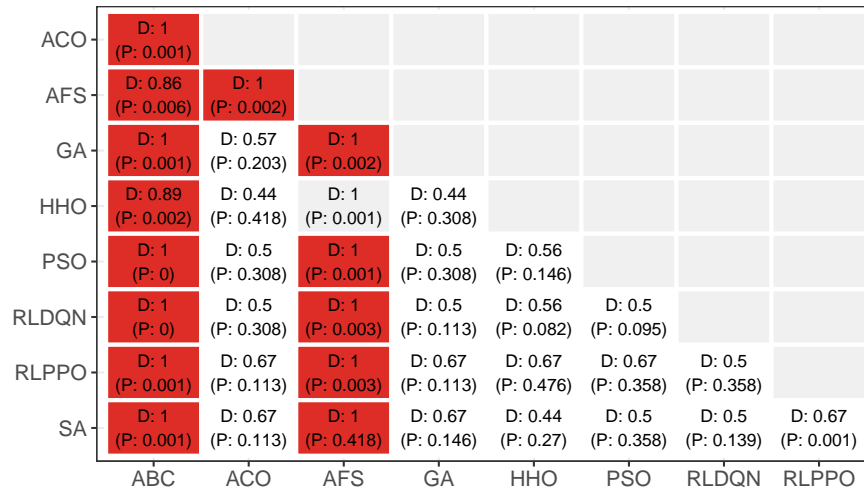
□ NS □ P < 0.05 ■ P < 0.01

scenario_1_servers_500_services_5_application_LTS



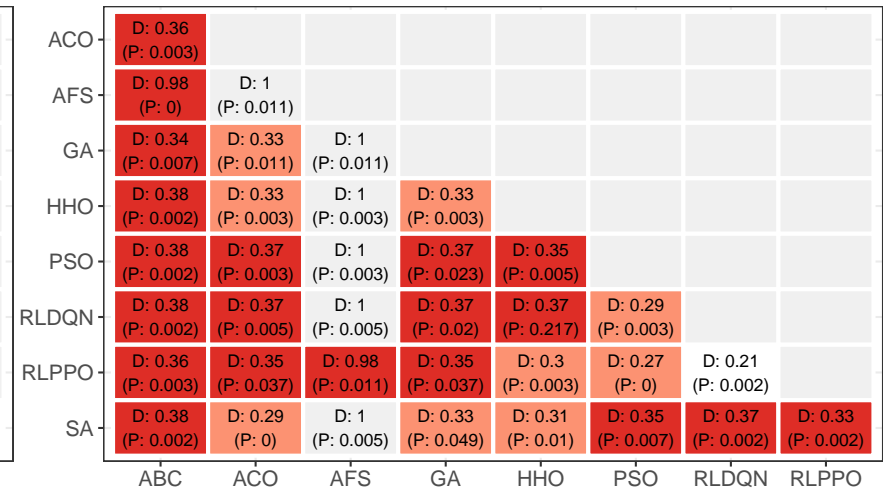
□ NS ■ P < 0.01

scenario_1_servers_500_services_5_application_MMA



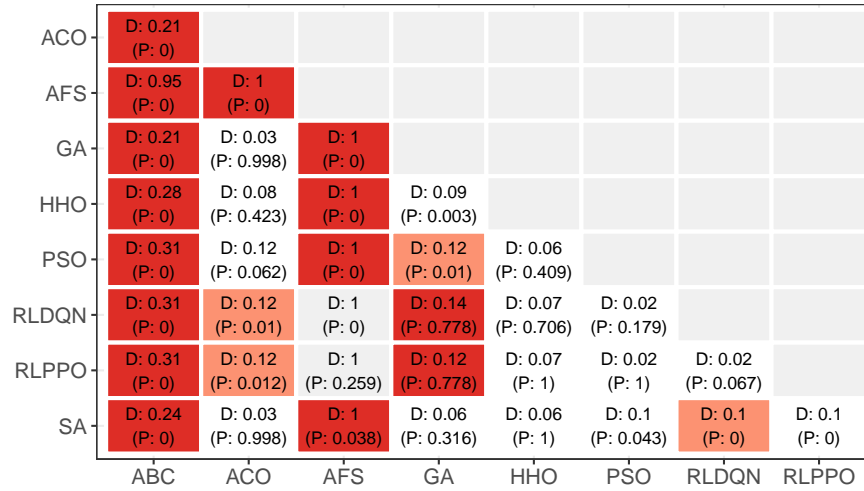
□ NS ■ P < 0.01

scenario_1_servers_500_services_5_application_PWD



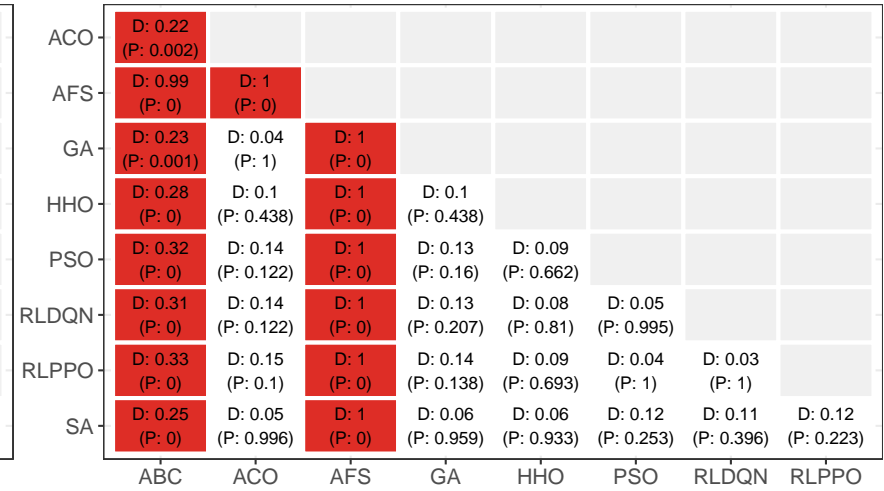
□ NS □ P < 0.05 ■ P < 0.01

scenario_1_servers_500_services_7_application_GENERIC



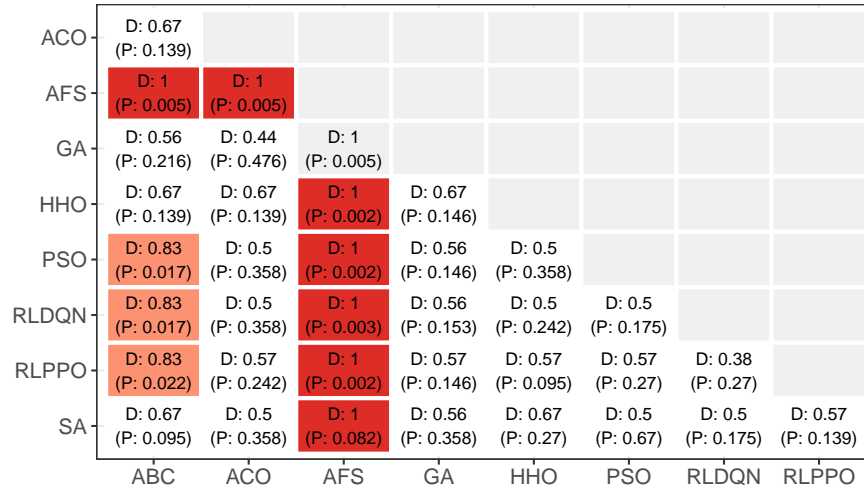
□ NS □ P < 0.05 ■ P < 0.01

scenario_1_servers_500_services_7_application_LTS



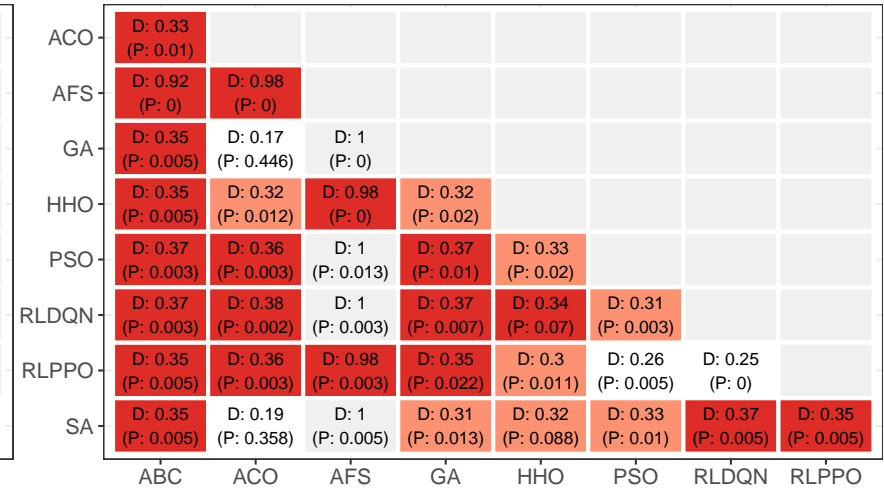
□ NS ■ P < 0.01

scenario_1_servers_500_services_7_application_MMA



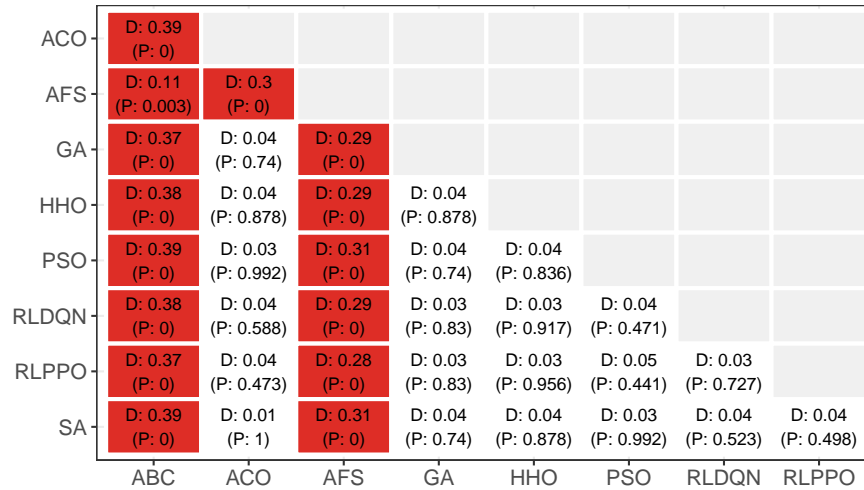
□ NS □ P < 0.05 ■ P < 0.01

scenario_1_servers_500_services_7_application_PWD



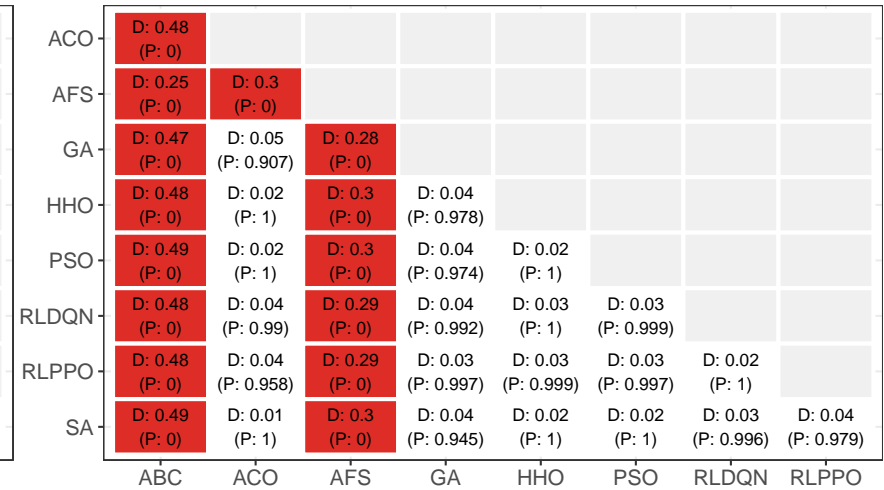
□ NS □ P < 0.05 ■ P < 0.01

scenario_2_servers_100_services_1_application_GENERIC



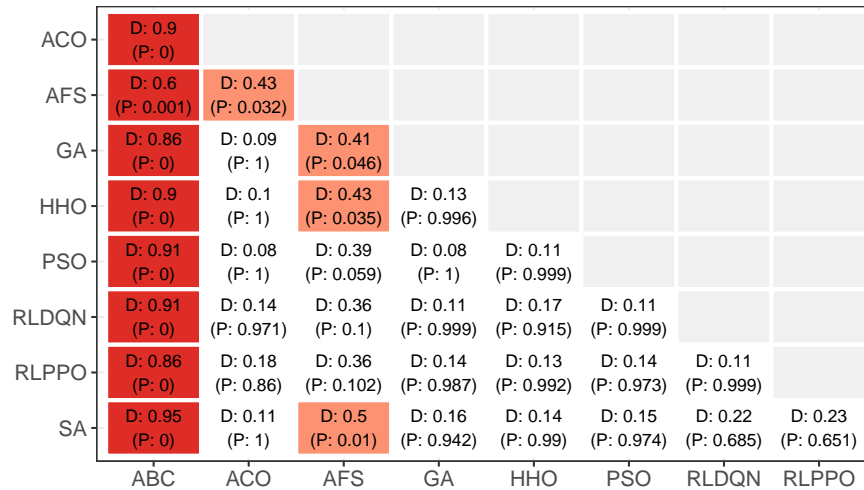
NS P < 0.01

scenario_2_servers_100_services_1_application_LTS



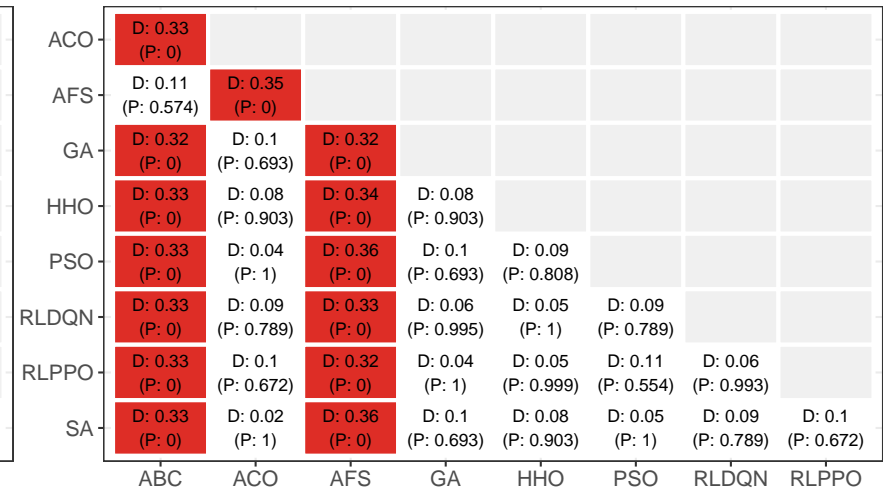
NS P < 0.01

scenario_2_servers_100_services_1_application_MMA



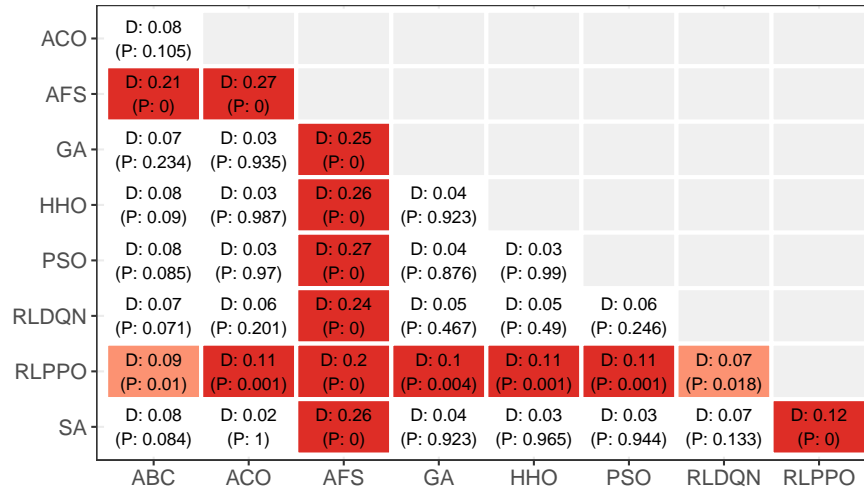
NS P < 0.05 P < 0.01

scenario_2_servers_100_services_1_application_PWD



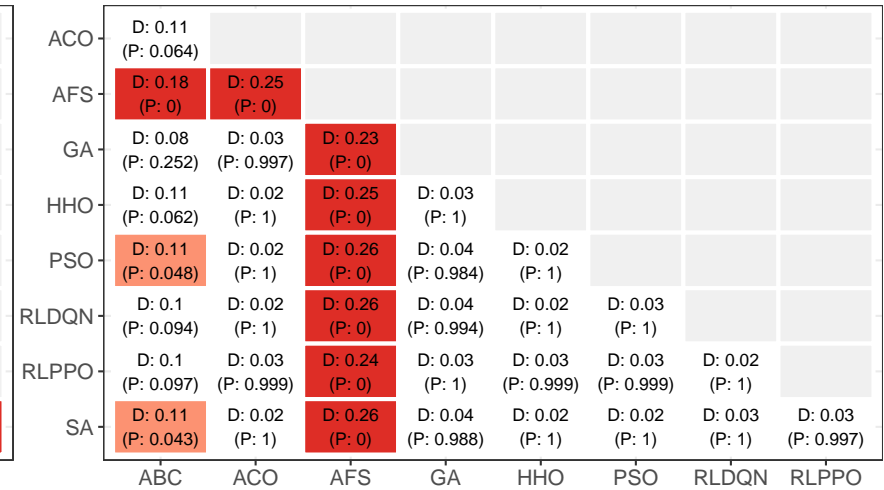
NS P < 0.01

scenario_2_servers_100_services_3_application_GENERIC



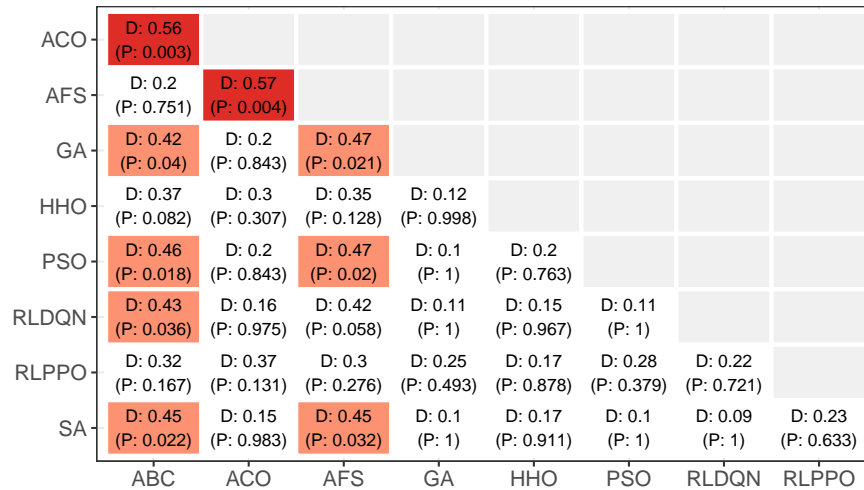
NS
 P < 0.05
 P < 0.01

scenario_2_servers_100_services_3_application_LTS



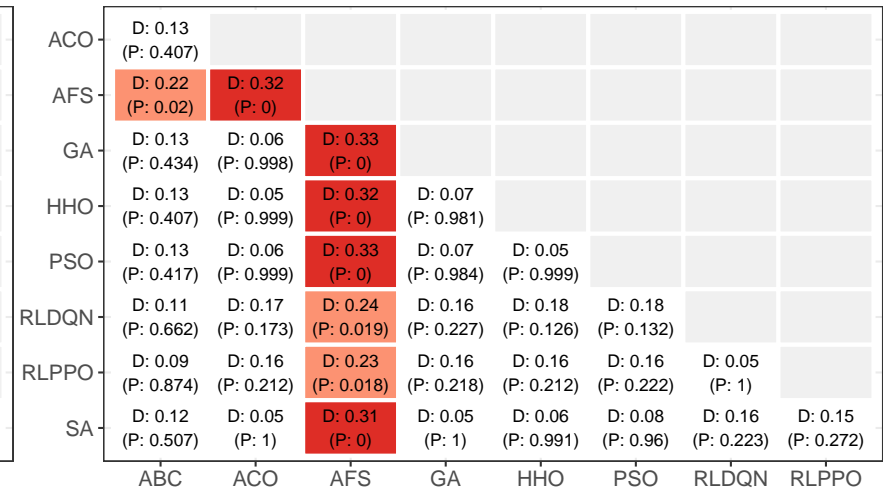
NS
 P < 0.05
 P < 0.01

scenario_2_servers_100_services_3_application_MMA



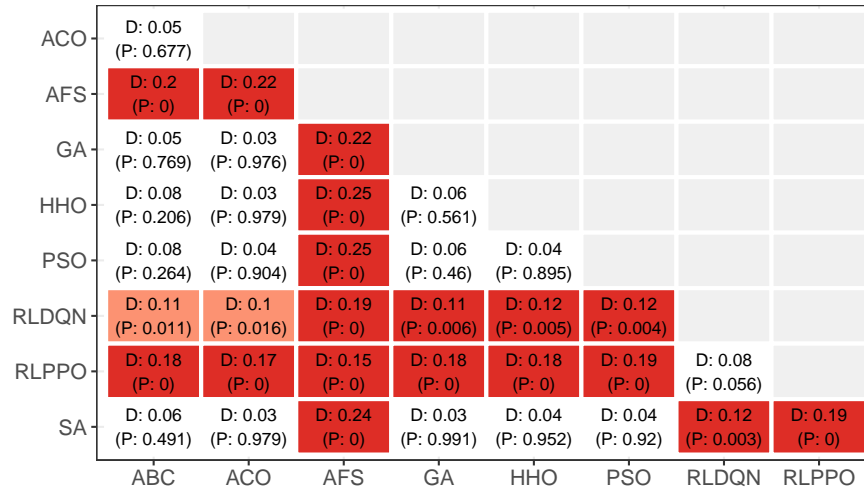
NS
 P < 0.05
 P < 0.01

scenario_2_servers_100_services_3_application_PWD



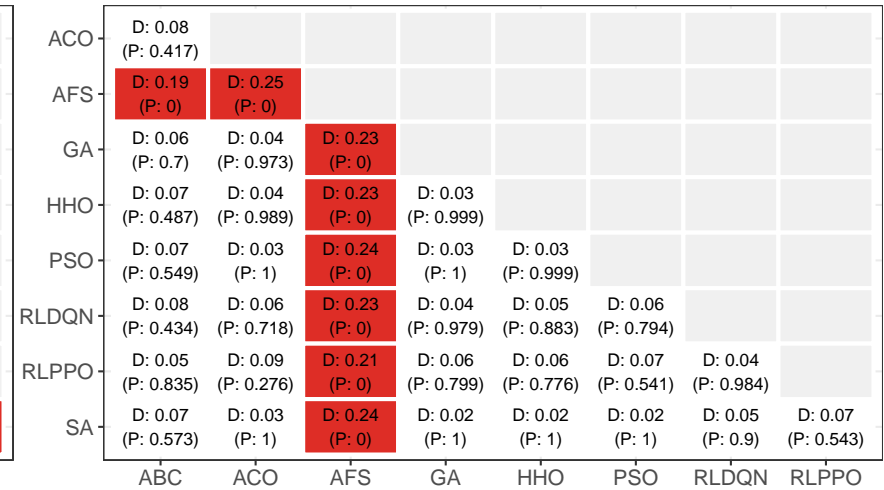
NS
 P < 0.05
 P < 0.01

scenario_2_servers_100_services_5_application_GENERIC



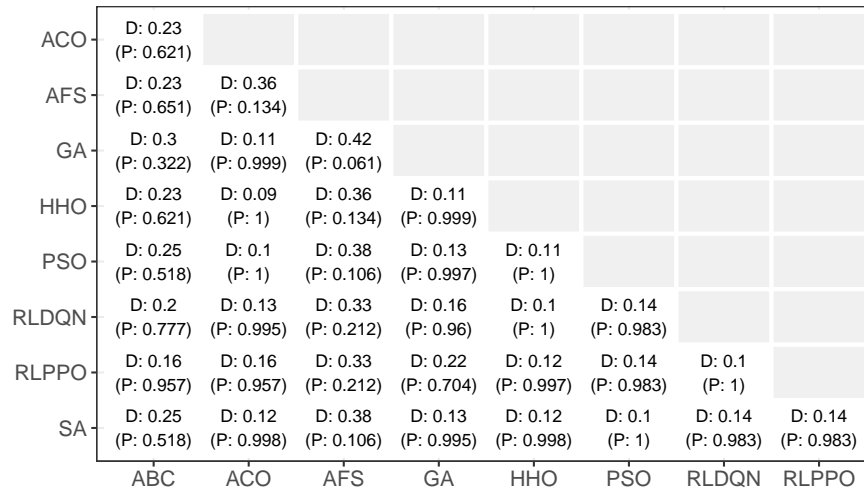
NS
 P < 0.05
 P < 0.01

scenario_2_servers_100_services_5_application_LTS



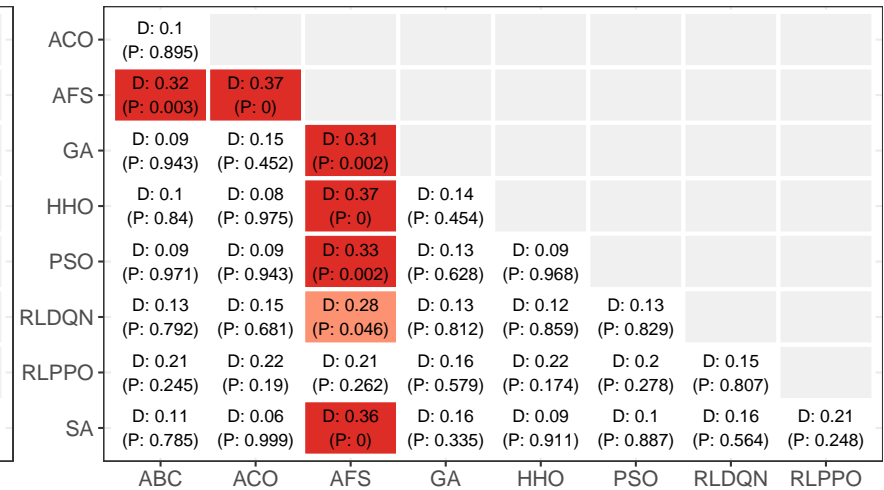
NS
 P < 0.01

scenario_2_servers_100_services_5_application_MMA



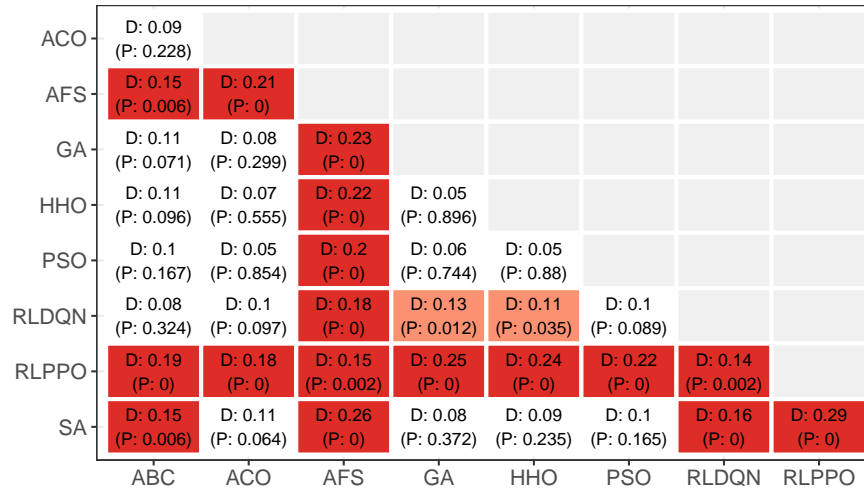
NS

scenario_2_servers_100_services_5_application_PWD



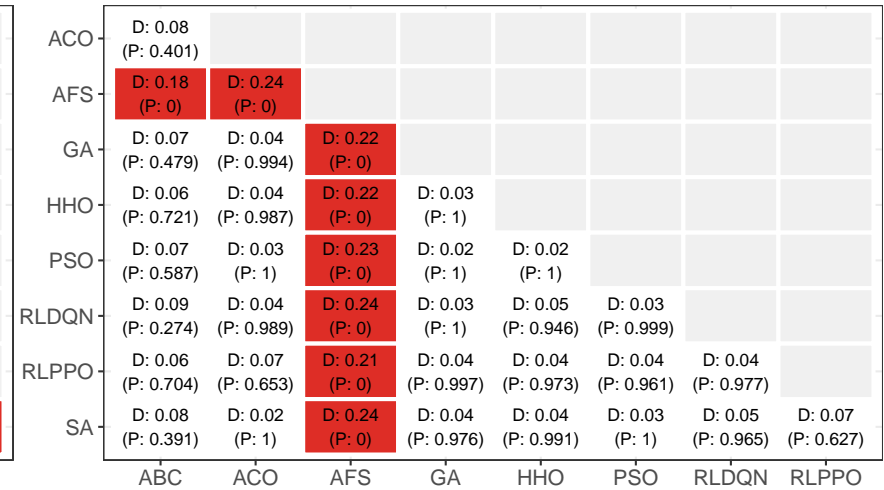
NS
 P < 0.05
 P < 0.01

scenario_2_servers_100_services_7_application_GENERIC



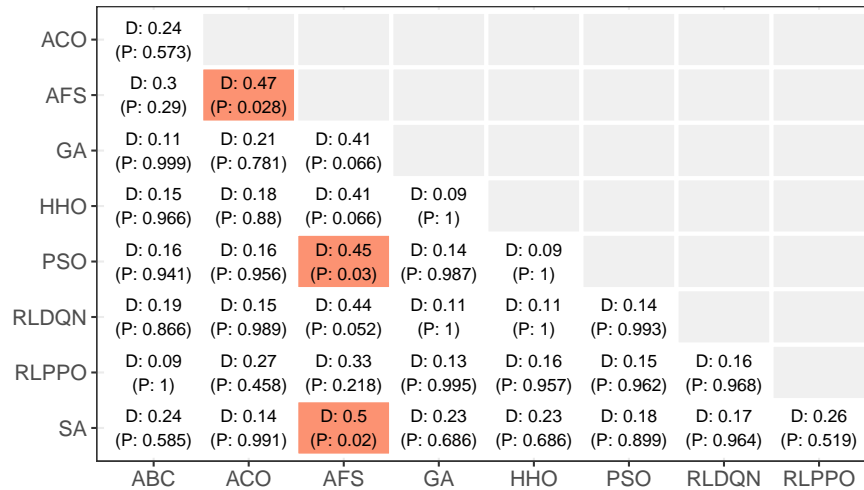
□ NS □ P < 0.05 ■ P < 0.01

scenario_2_servers_100_services_7_application_LTS



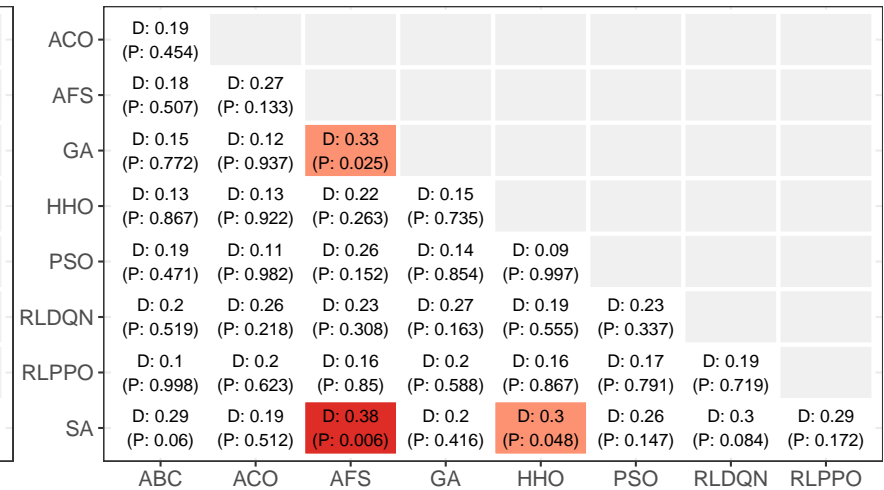
□ NS ■ P < 0.01

scenario_2_servers_100_services_7_application_MMA



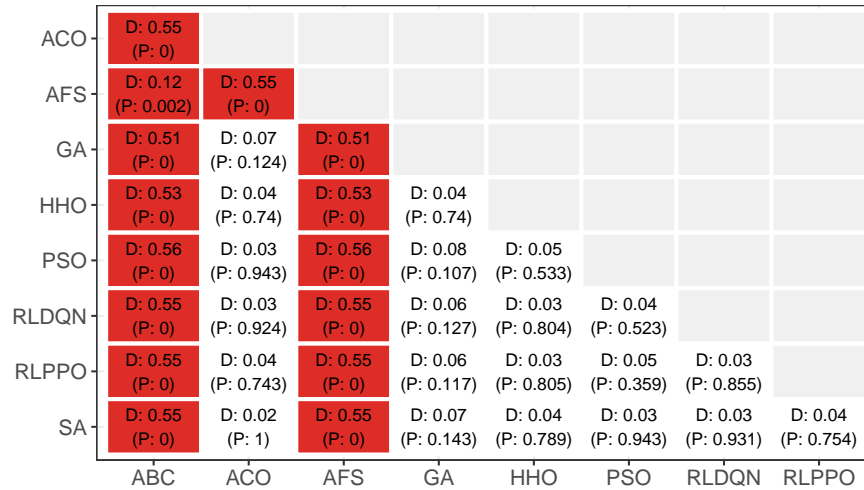
□ NS □ P < 0.05

scenario_2_servers_100_services_7_application_PWD



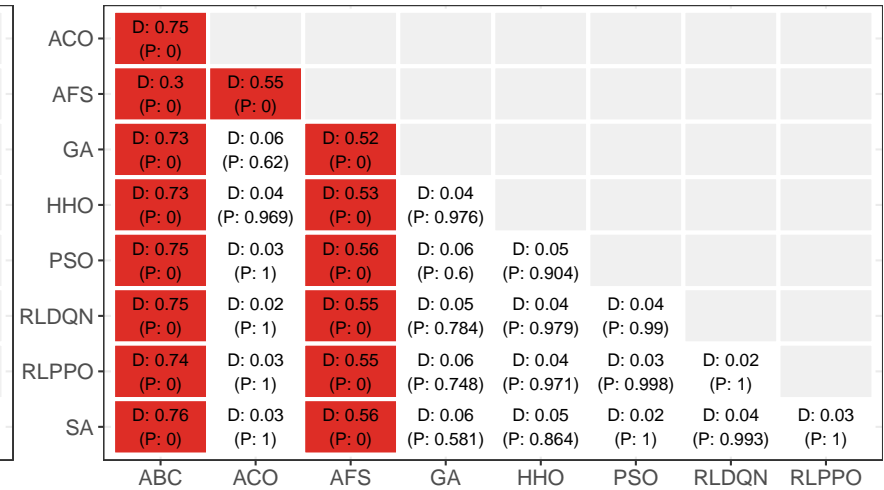
□ NS □ P < 0.05 ■ P < 0.01

scenario_2_servers_200_services_1_application_GENERIC



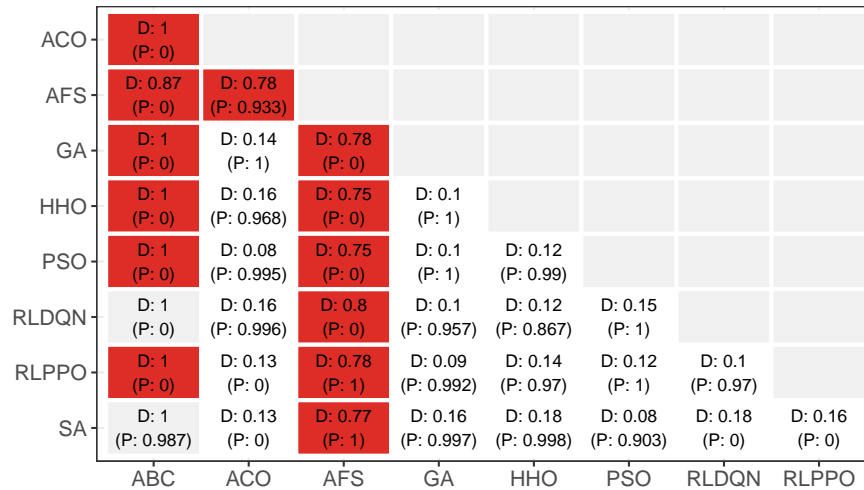
NS P < 0.01

scenario_2_servers_200_services_1_application_LTS



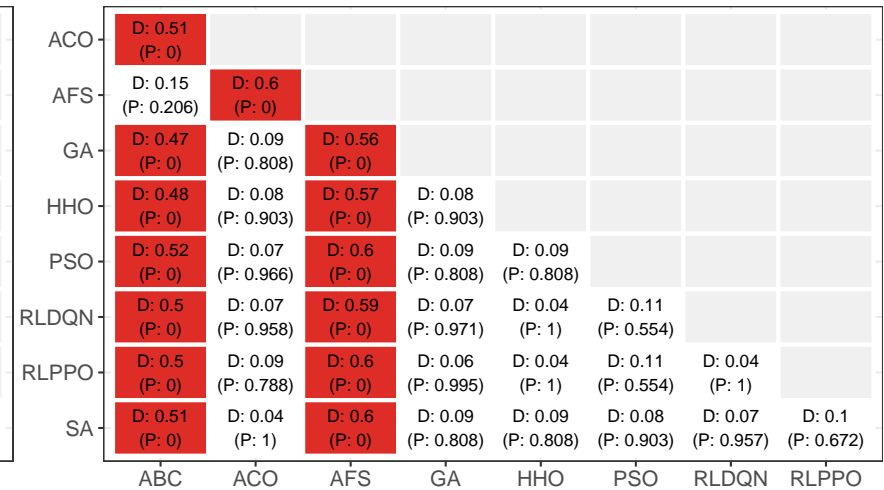
NS P < 0.01

scenario_2_servers_200_services_1_application_MMA



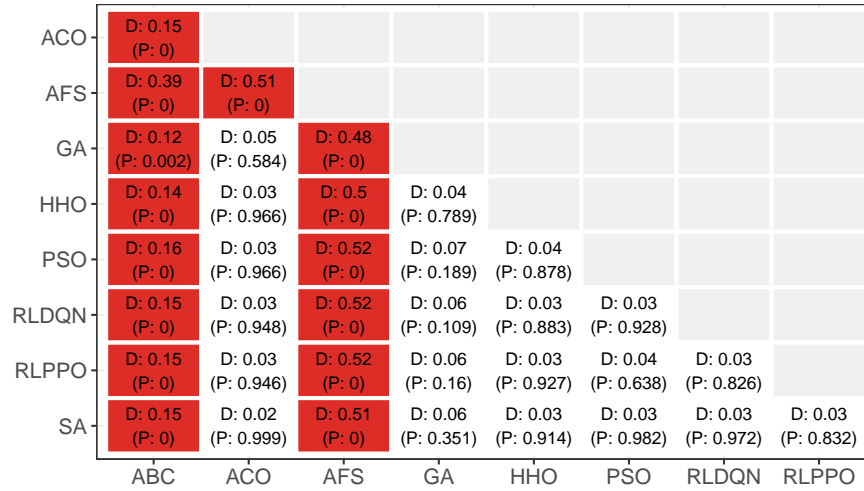
NS P < 0.01

scenario_2_servers_200_services_1_application_PWD



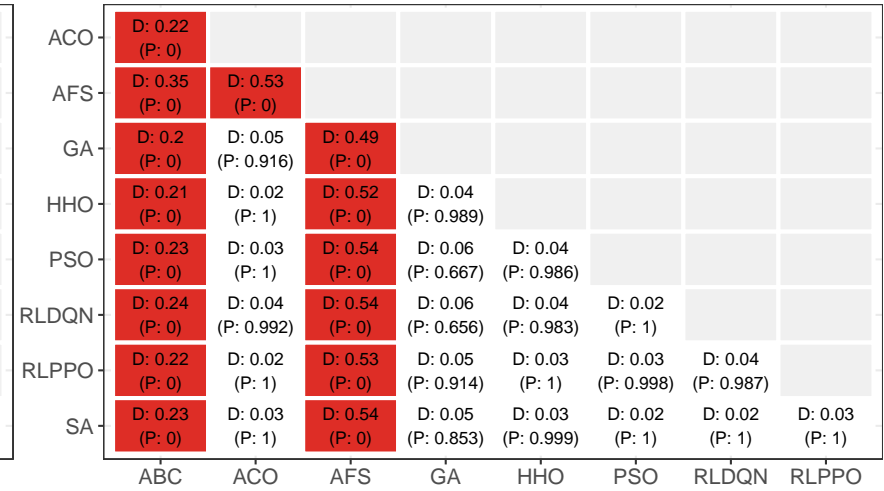
NS P < 0.01

scenario_2_servers_200_services_3_application_GENERIC



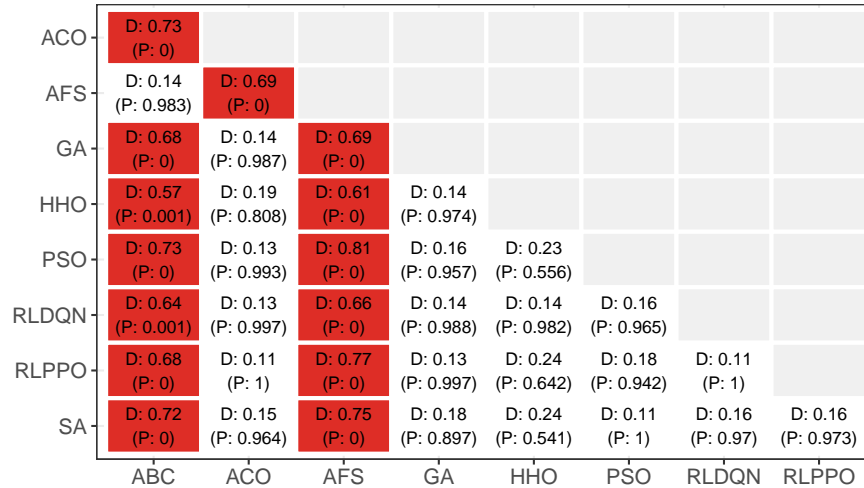
NS P < 0.01

scenario_2_servers_200_services_3_application_LTS



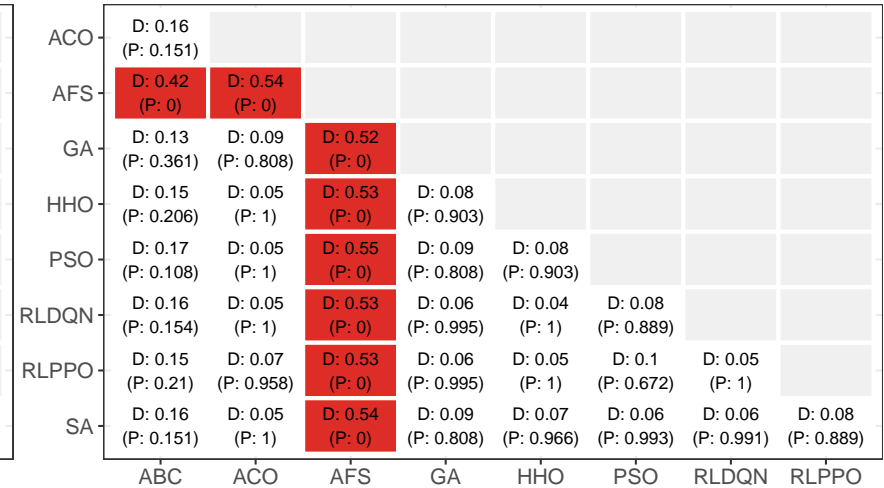
NS P < 0.01

scenario_2_servers_200_services_3_application_MMA



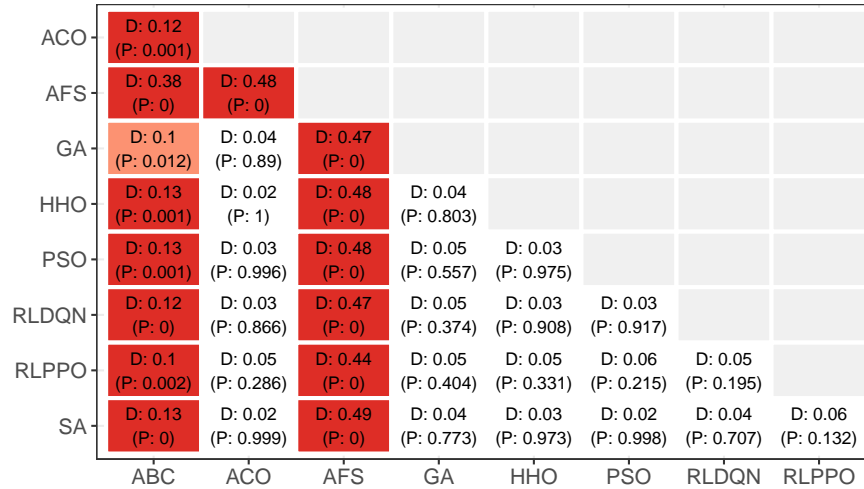
NS P < 0.01

scenario_2_servers_200_services_3_application_PWD



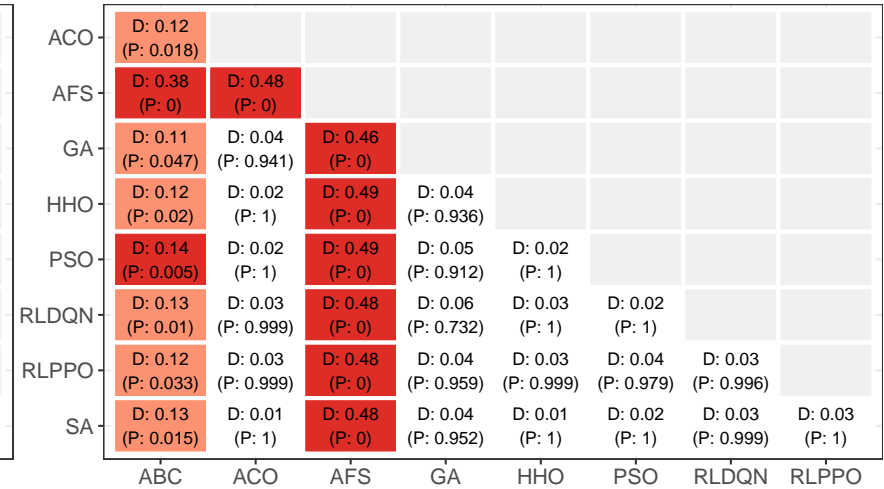
NS P < 0.01

scenario_2_servers_200_services_5_application_GENERIC



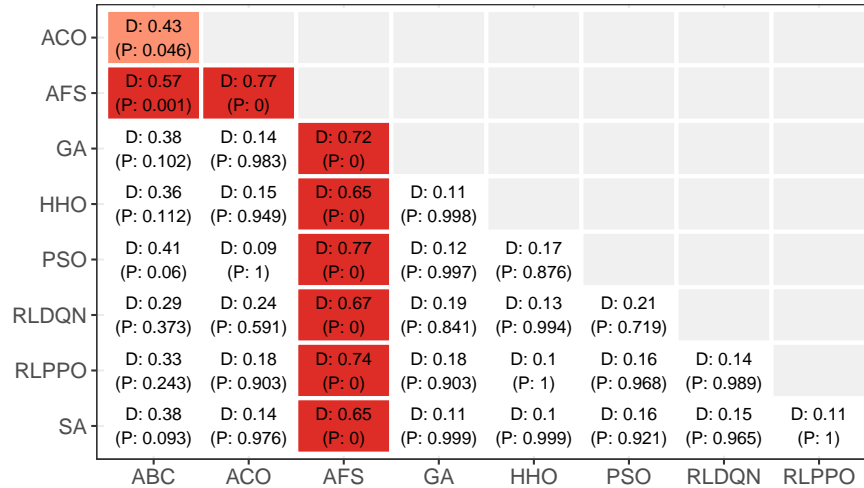
NS
 P < 0.05
 P < 0.01

scenario_2_servers_200_services_5_application_LTS



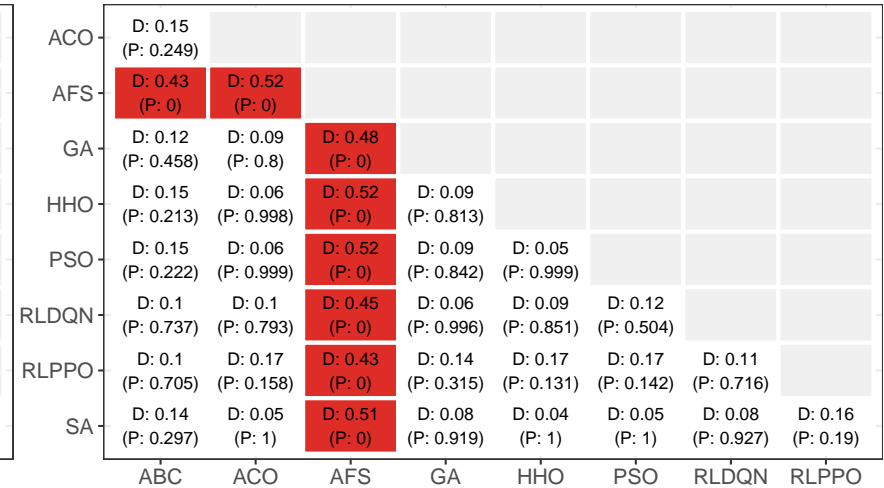
NS
 P < 0.05
 P < 0.01

scenario_2_servers_200_services_5_application_MMA



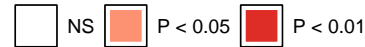
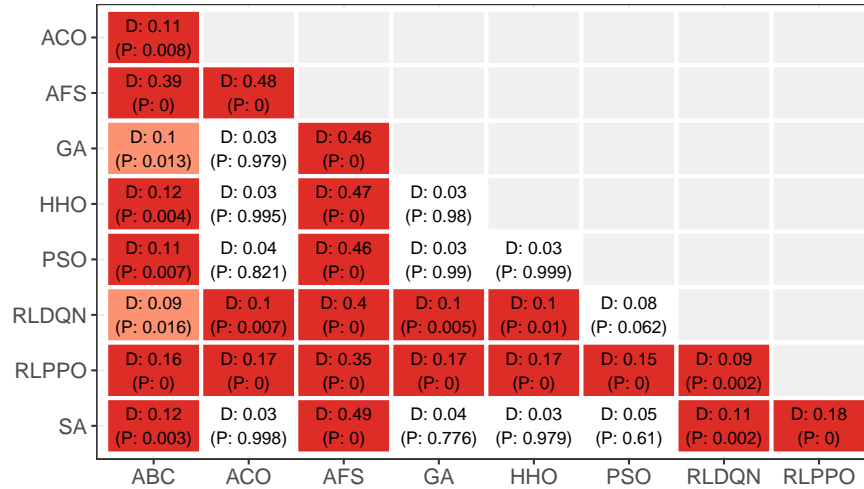
NS
 P < 0.05
 P < 0.01

scenario_2_servers_200_services_5_application_PWD

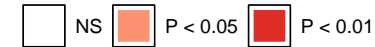
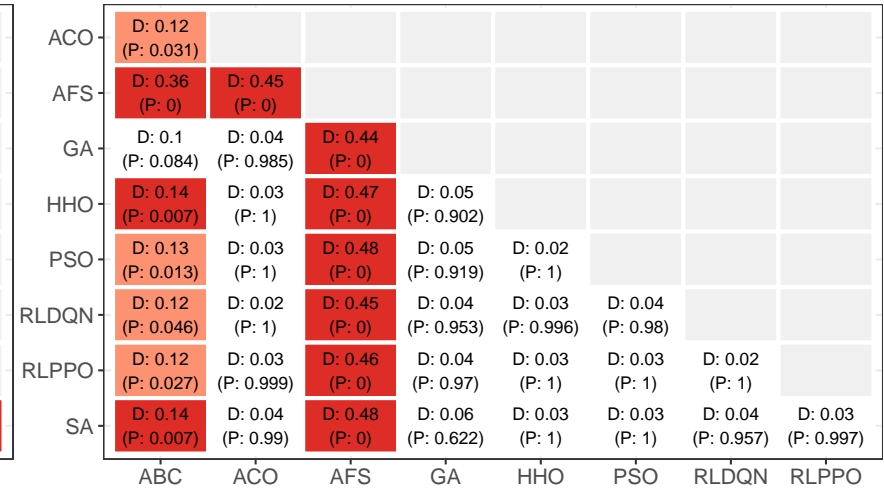


NS
 P < 0.01

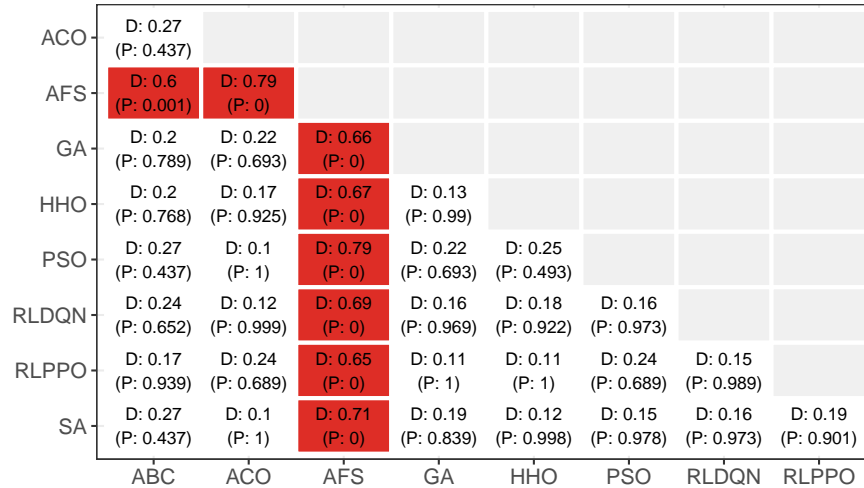
scenario_2_servers_200_services_7_application_GENERIC



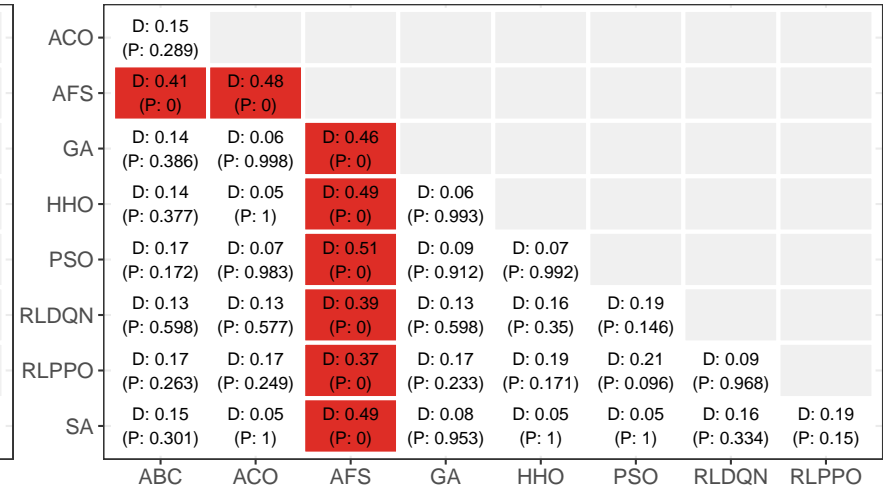
scenario_2_servers_200_services_7_application_LTS



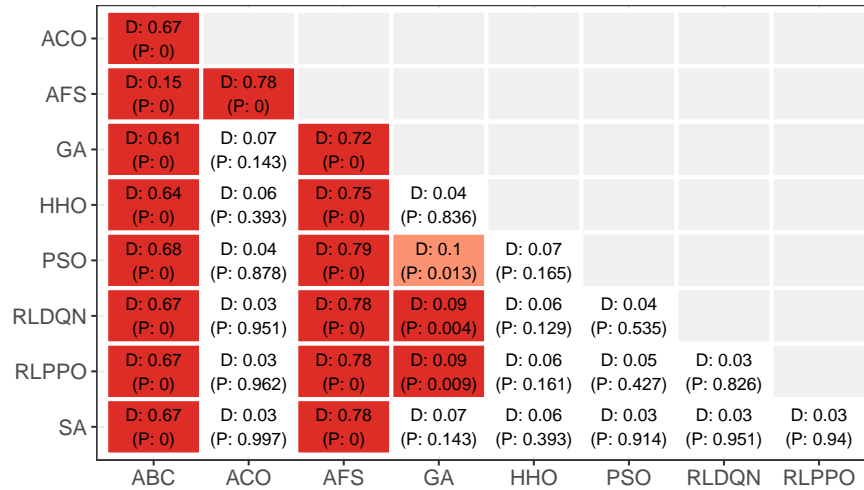
scenario_2_servers_200_services_7_application_MMA



scenario_2_servers_200_services_7_application_PWD

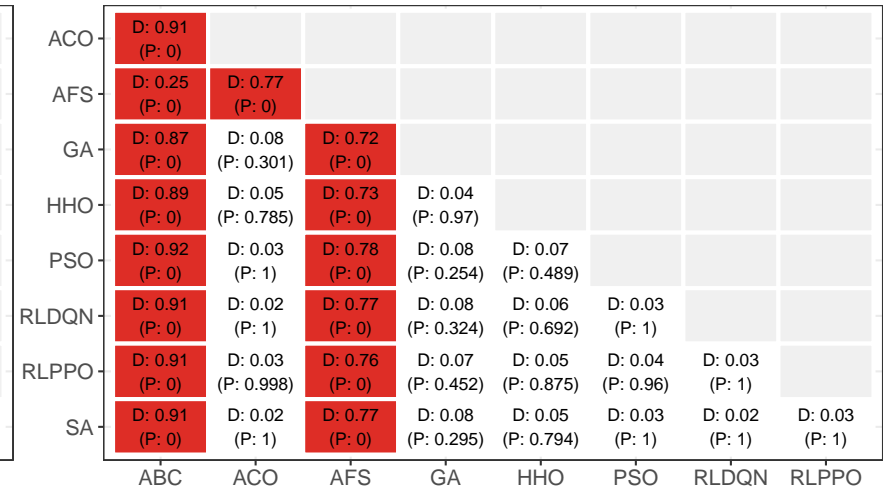


scenario_2_servers_300_services_1_application_GENERIC



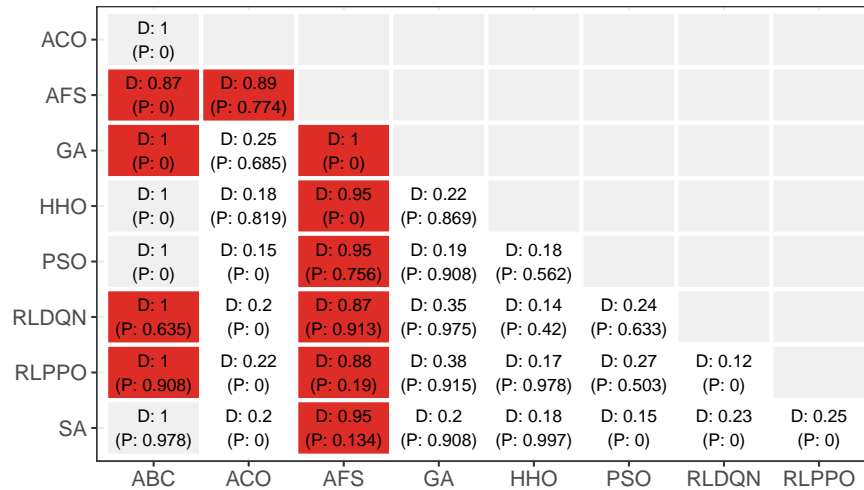
□ NS □ P < 0.05 ■ P < 0.01

scenario_2_servers_300_services_1_application_LTS



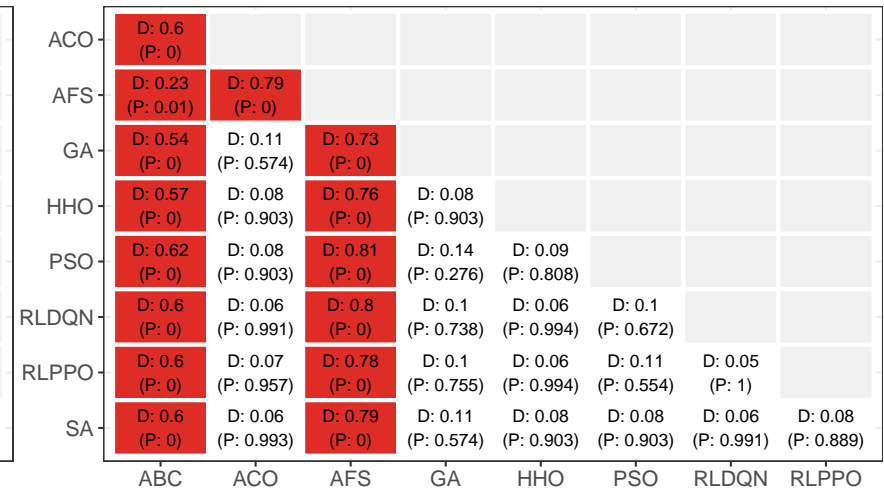
□ NS ■ P < 0.01

scenario_2_servers_300_services_1_application_MMA



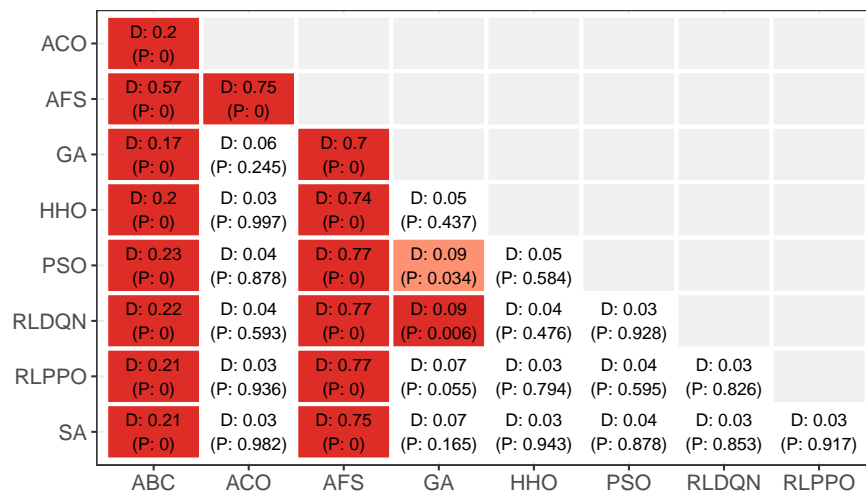
□ NS ■ P < 0.01

scenario_2_servers_300_services_1_application_PWD



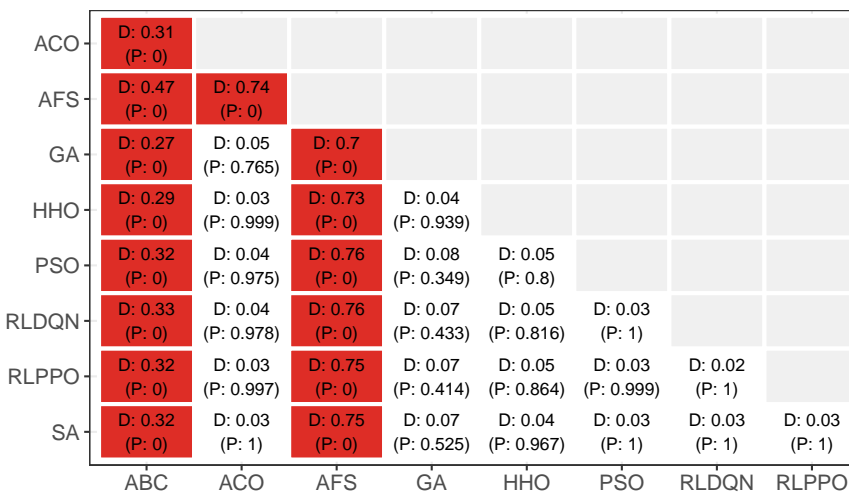
□ NS ■ P < 0.01

scenario_2_servers_300_services_3_application_GENERIC



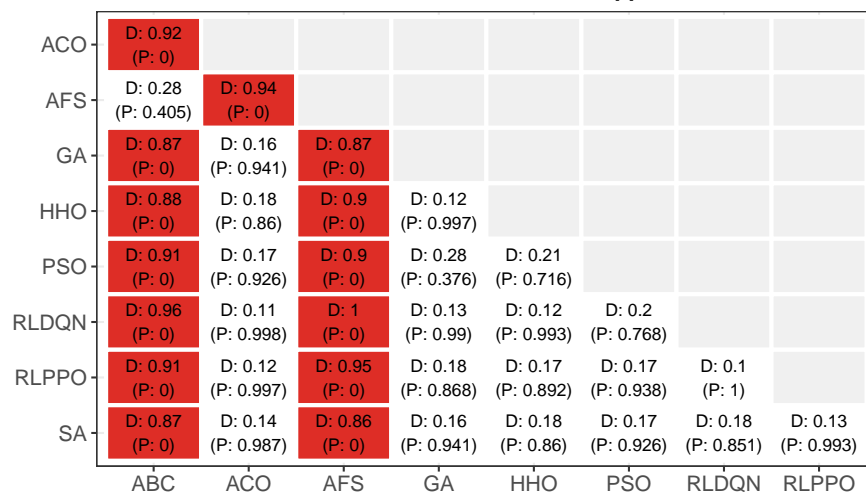
□ NS □ P < 0.05 ■ P < 0.01

scenario_2_servers_300_services_3_application_LTS



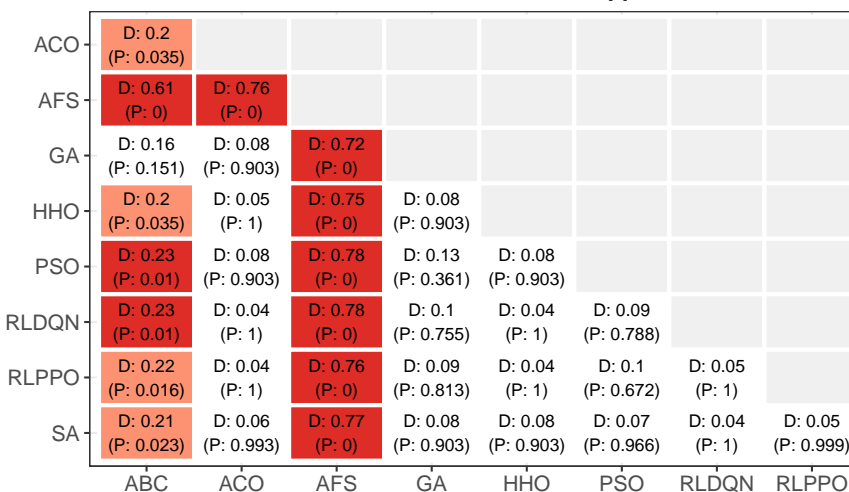
□ NS ■ P < 0.01

scenario_2_servers_300_services_3_application_MMA



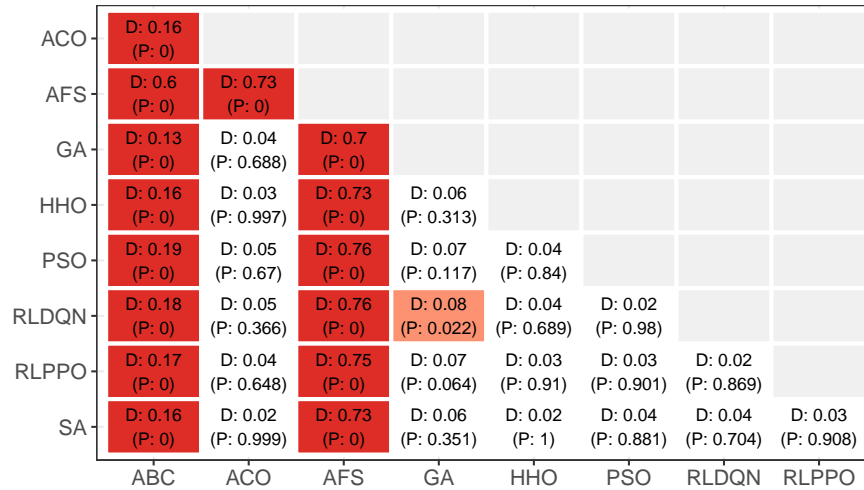
□ NS ■ P < 0.01

scenario_2_servers_300_services_3_application_PWD



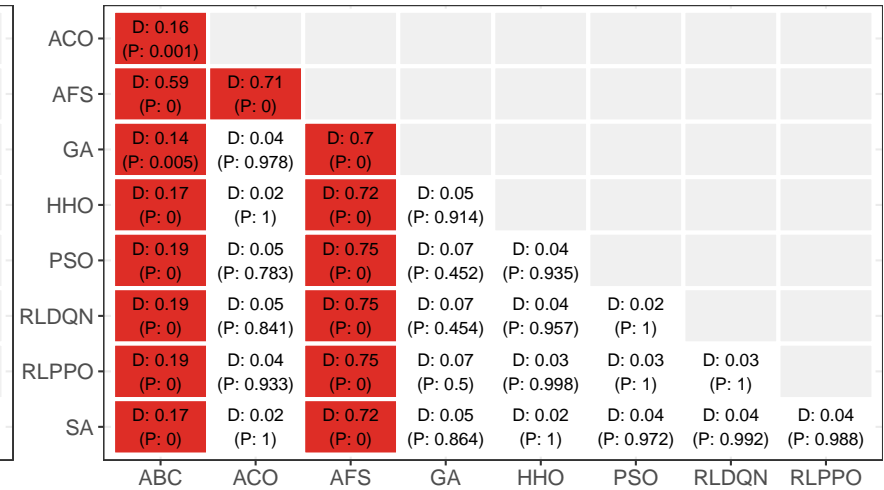
□ NS □ P < 0.05 ■ P < 0.01

scenario_2_servers_300_services_5_application_GENERIC



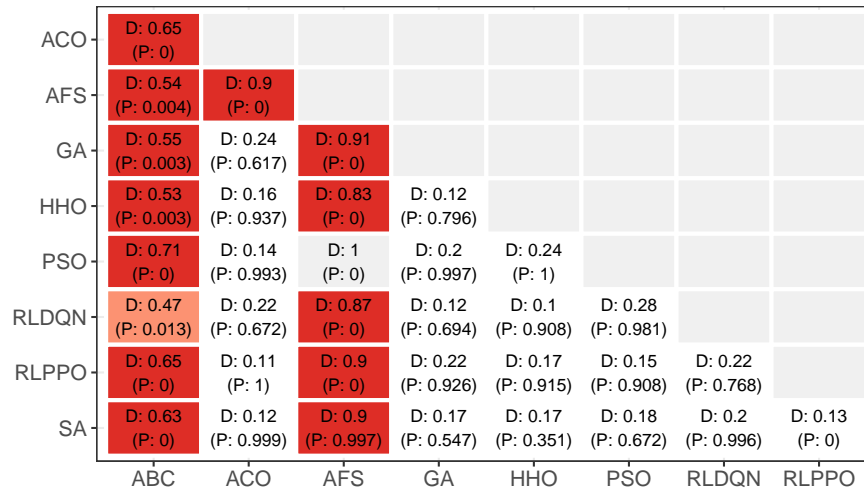
□ NS □ P < 0.05 ■ P < 0.01

scenario_2_servers_300_services_5_application_LTS



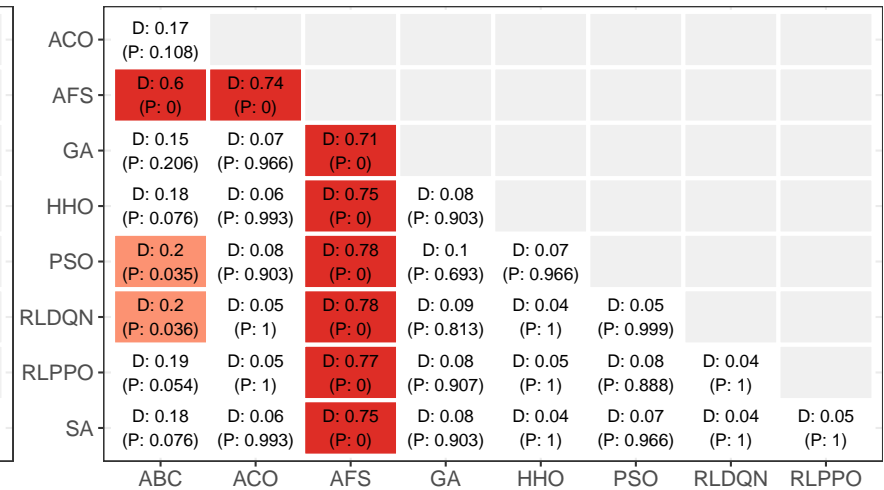
□ NS ■ P < 0.01

scenario_2_servers_300_services_5_application_MMA



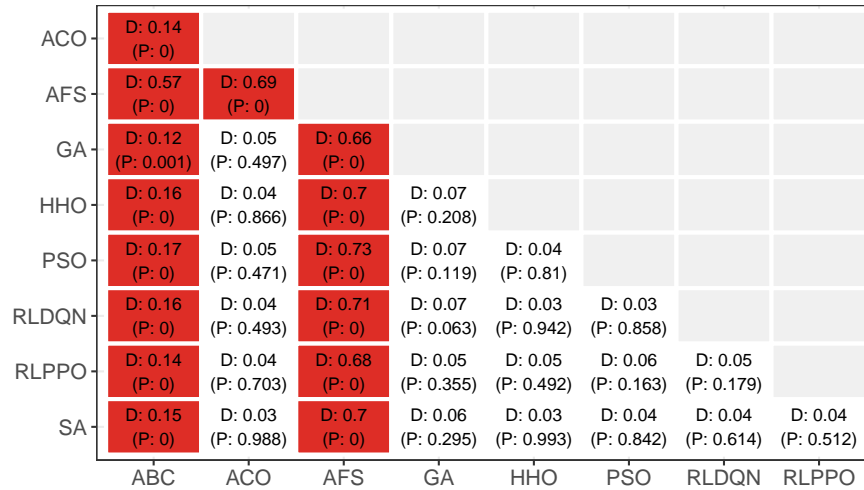
□ NS □ P < 0.05 ■ P < 0.01

scenario_2_servers_300_services_5_application_PWD



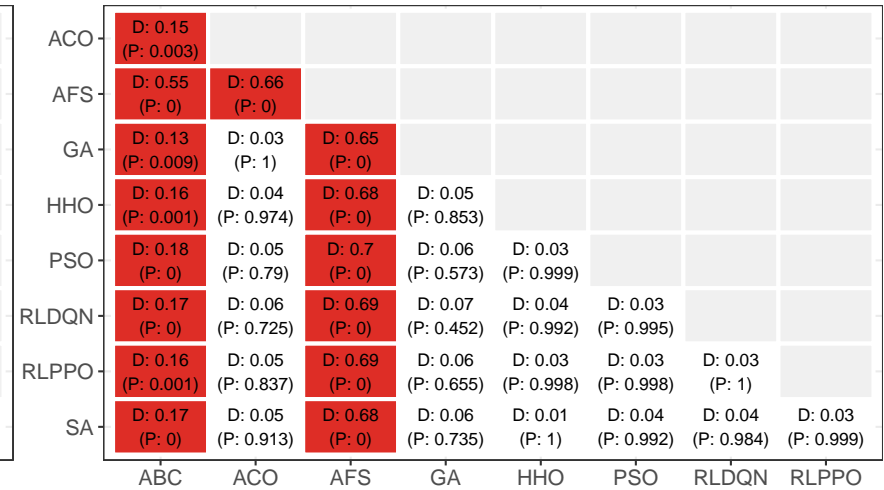
□ NS □ P < 0.05 ■ P < 0.01

scenario_2_servers_300_services_7_application_GENERIC



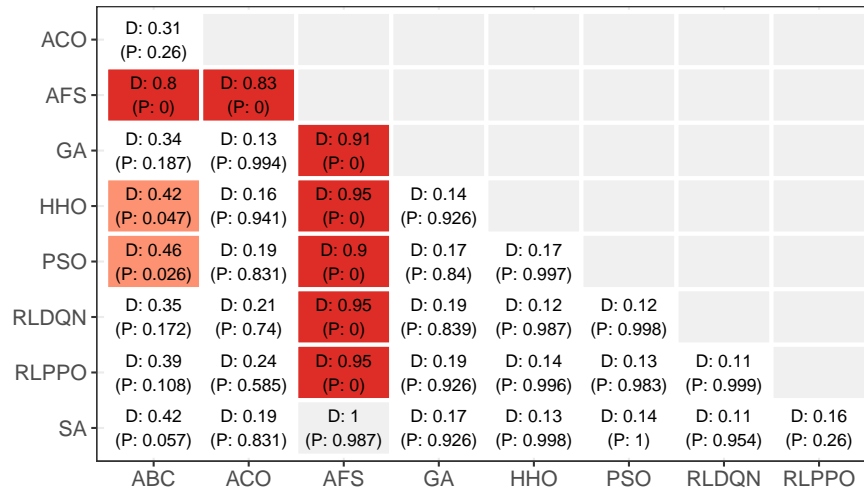
NS P < 0.01

scenario_2_servers_300_services_7_application_LTS



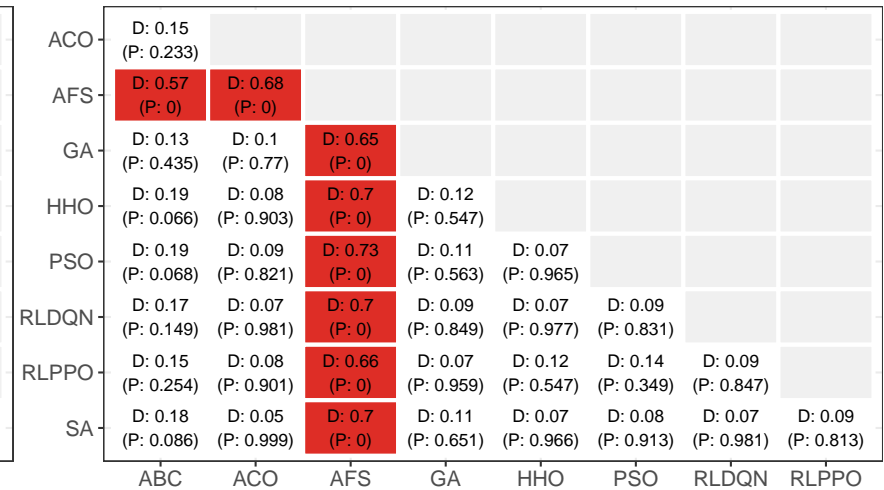
NS P < 0.01

scenario_2_servers_300_services_7_application_MMA



NS P < 0.05 P < 0.01

scenario_2_servers_300_services_7_application_PWD



NS P < 0.01

scenario_2_servers_400_services_1_application_GENERIC

ACO	D: 0.72 (P: 0)						
AFS	D: 0.26 (P: 0)	D: 0.98 (P: 0)					
GA	D: 0.68 (P: 0)	D: 0.11 (P: 0.006)	D: 0.92 (P: 0)				
HHO	D: 0.7 (P: 0)	D: 0.07 (P: 0.215)	D: 0.95 (P: 0)	D: 0.06 (P: 0.319)			
PSO	D: 0.73 (P: 0)	D: 0.04 (P: 0.878)	D: 0.99 (P: 0)	D: 0.11 (P: 0.005)	D: 0.08 (P: 0.092)		
RLDQN	D: 0.73 (P: 0)	D: 0.03 (P: 0.895)	D: 0.99 (P: 0)	D: 0.1 (P: 0.002)	D: 0.07 (P: 0.067)	D: 0.04 (P: 0.523)	
RLPPO	D: 0.73 (P: 0)	D: 0.03 (P: 0.895)	D: 0.99 (P: 0)	D: 0.1 (P: 0.001)	D: 0.07 (P: 0.056)	D: 0.05 (P: 0.404)	D: 0.02 (P: 0.907)
SA	D: 0.72 (P: 0)	D: 0.02 (P: 0.999)	D: 0.98 (P: 0)	D: 0.1 (P: 0.008)	D: 0.07 (P: 0.215)	D: 0.04 (P: 0.836)	D: 0.03 (P: 0.849)

□ NS □ P < 0.01

scenario_2_servers_400_services_1_application_LTS

ACO	D: 0.95 (P: 0)						
AFS	D: 0.2 (P: 0)	D: 0.95 (P: 0)					
GA	D: 0.93 (P: 0)	D: 0.09 (P: 0.205)	D: 0.9 (P: 0)				
HHO	D: 0.94 (P: 0)	D: 0.06 (P: 0.672)	D: 0.93 (P: 0)	D: 0.05 (P: 0.823)			
PSO	D: 0.96 (P: 0)	D: 0.04 (P: 0.942)	D: 0.96 (P: 0)	D: 0.11 (P: 0.045)	D: 0.08 (P: 0.323)		
RLDQN	D: 0.95 (P: 0)	D: 0.03 (P: 1)	D: 0.95 (P: 0)	D: 0.11 (P: 0.072)	D: 0.07 (P: 0.406)	D: 0.03 (P: 0.994)	
RLPPO	D: 0.95 (P: 0)	D: 0.03 (P: 1)	D: 0.96 (P: 0)	D: 0.09 (P: 0.146)	D: 0.07 (P: 0.521)	D: 0.05 (P: 0.876)	D: 0.02 (P: 1)
SA	D: 0.95 (P: 0)	D: 0.02 (P: 1)	D: 0.95 (P: 0)	D: 0.09 (P: 0.15)	D: 0.06 (P: 0.675)	D: 0.04 (P: 0.973)	D: 0.03 (P: 1)

□ NS □ P < 0.05 □ P < 0.01

scenario_2_servers_400_services_1_application_MMA

ACO	D: 1 (P: 0)						
AFS	D: 0.89 (P: 0)	D: 1 (P: 0.949)					
GA	D: 1 (P: 0)	D: 0.24 (P: 0.858)	D: 1 (P: 0)				
HHO	D: 1 (P: 0)	D: 0.15 (P: 0.99)	D: 1 (P: 0)	D: 0.14 (P: 0.551)			
PSO	D: 1 (P: 0)	D: 0.18 (P: 0.878)	D: 1 (P: 0.985)	D: 0.32 (P: 0.46)	D: 0.26 (P: 0.471)		
RLDQN	D: 1 (P: 0)	D: 0.13 (P: 1)	D: 1 (P: 0.256)	D: 0.15 (P: 1)	D: 0.1 (P: 0.408)	D: 0.26 (P: 0.99)	
RLPPO	D: 1 (P: 0)	D: 0.17 (P: 0)	D: 1 (P: 0.959)	D: 0.15 (P: 1)	D: 0.09 (P: 0.858)	D: 0.27 (P: 0.878)	D: 0.13 (P: 0)
SA	D: 1 (P: 0.551)	D: 0.09 (P: 0)	D: 1 (P: 0.959)	D: 0.24 (P: 0.949)	D: 0.15 (P: 0.99)	D: 0.18 (P: 0)	D: 0.13 (P: 0)

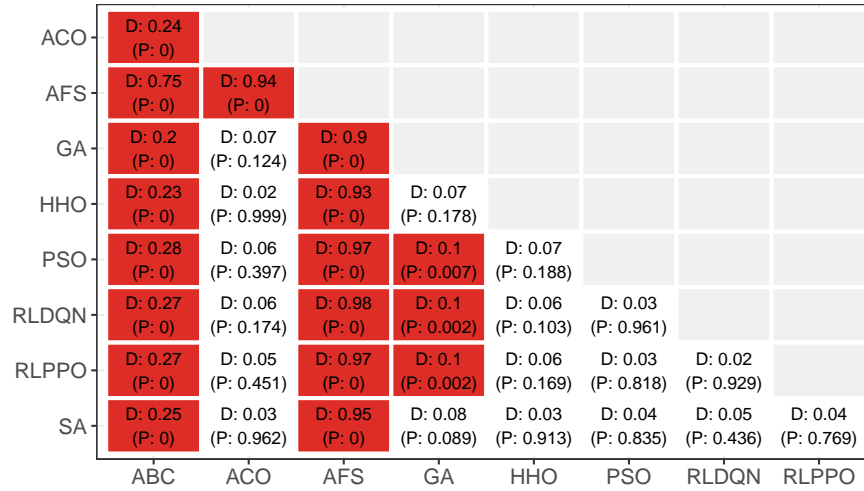
□ NS □ P < 0.01

scenario_2_servers_400_services_1_application_PWD

ACO	D: 0.65 (P: 0)						
AFS	D: 0.34 (P: 0)	D: 0.99 (P: 0)					
GA	D: 0.6 (P: 0)	D: 0.13 (P: 0.361)	D: 0.94 (P: 0)				
HHO	D: 0.63 (P: 0)	D: 0.08 (P: 0.903)	D: 0.95 (P: 0)	D: 0.08 (P: 0.471)			
PSO	D: 0.66 (P: 0)	D: 0.08 (P: 0.903)	D: 0.99 (P: 0)	D: 0.14 (P: 0.471)	D: 0.09 (P: 0.966)		
RLDQN	D: 0.66 (P: 0)	D: 0.04 (P: 1)	D: 1 (P: 0)	D: 0.12 (P: 0.361)	D: 0.07 (P: 0.903)	D: 0.1 (P: 0.903)	
RLPPO	D: 0.66 (P: 0)	D: 0.05 (P: 0.999)	D: 1 (P: 0.903)	D: 0.12 (P: 0.808)	D: 0.07 (P: 0.672)	D: 0.1 (P: 1)	D: 0.05 (P: 0.999)
SA	D: 0.65 (P: 0)	D: 0.05 (P: 1)	D: 0.99 (P: 0.276)	D: 0.13 (P: 0.966)	D: 0.08 (P: 0.672)	D: 0.08 (P: 1)	D: 0.04 (P: 0)

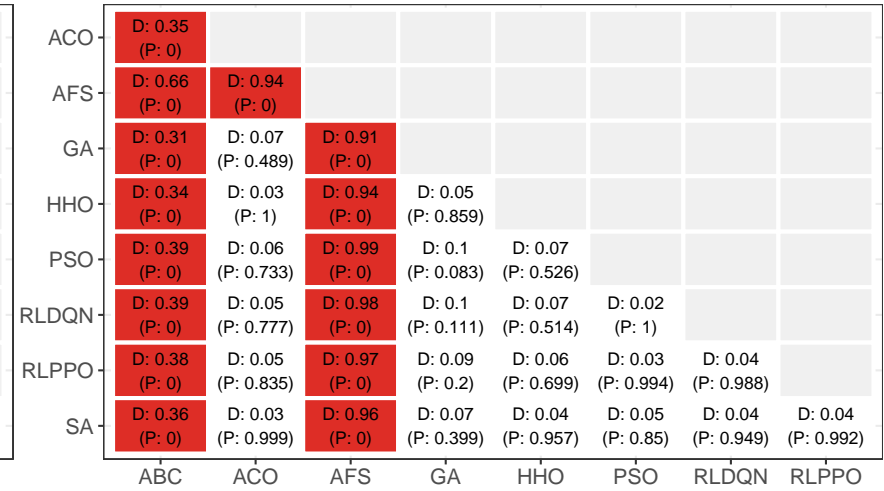
□ NS □ P < 0.01

scenario_2_servers_400_services_3_application_GENERIC



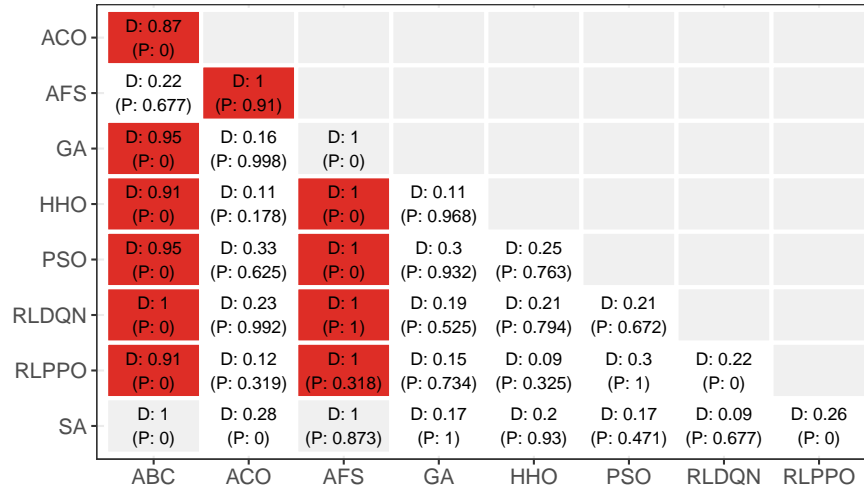
NS P < 0.01

scenario_2_servers_400_services_3_application_LTS



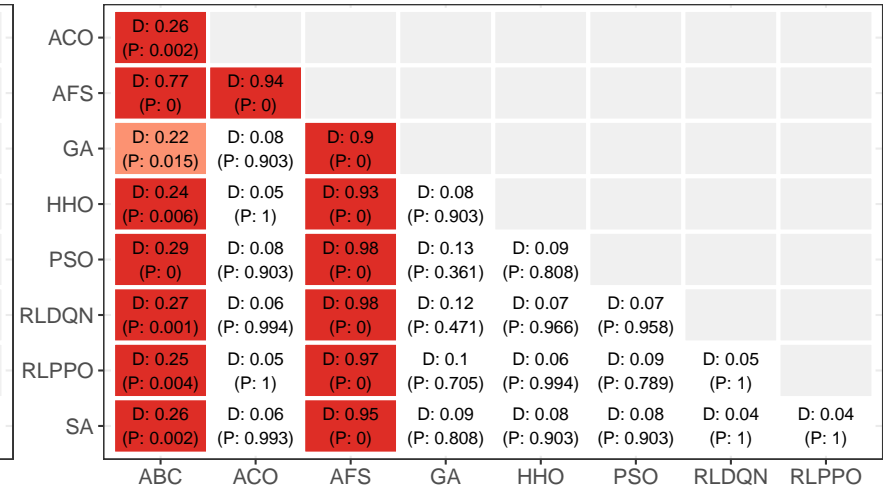
NS P < 0.01

scenario_2_servers_400_services_3_application_MMA



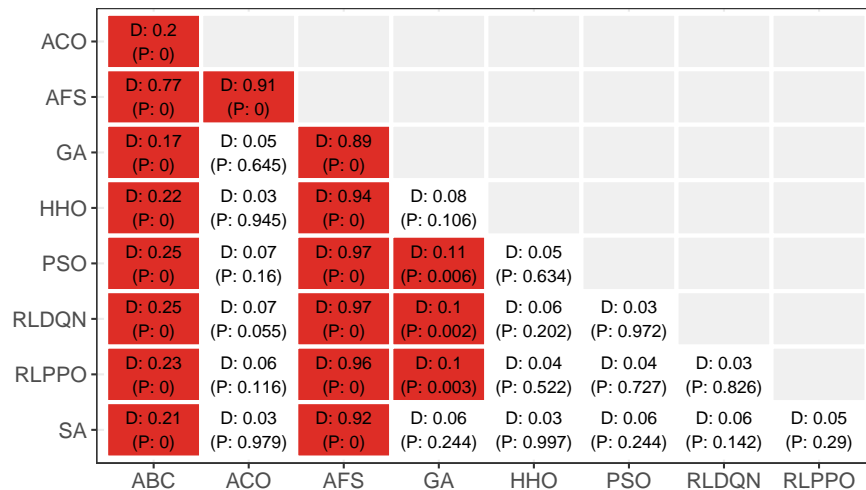
NS P < 0.01

scenario_2_servers_400_services_3_application_PWD



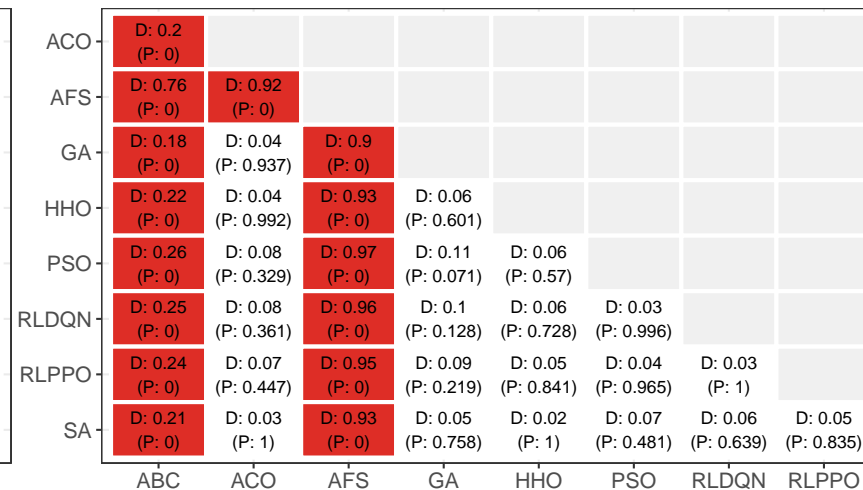
NS P < 0.05 P < 0.01

scenario_2_servers_400_services_5_application_GENERIC



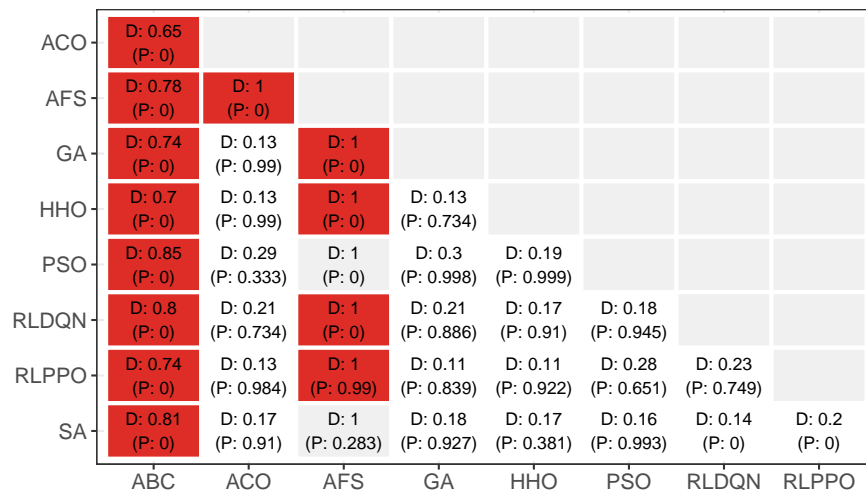
NS P < 0.01

scenario_2_servers_400_services_5_application_LTS



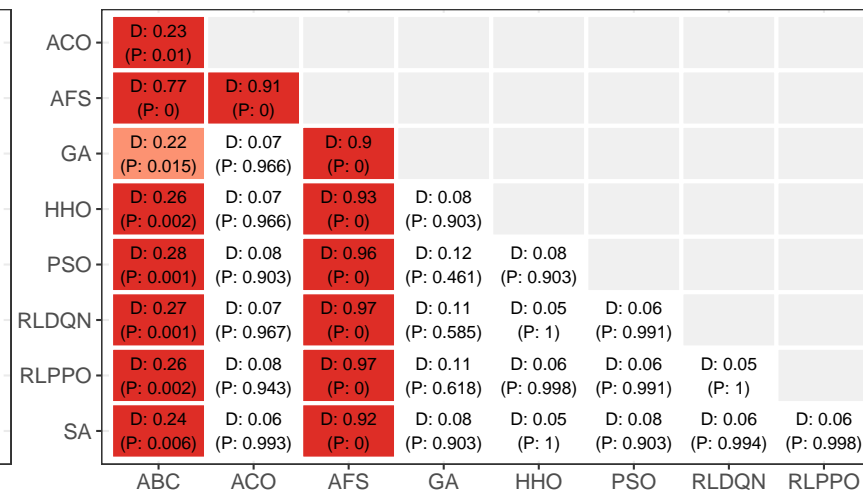
NS P < 0.01

scenario_2_servers_400_services_5_application_MMA



NS P < 0.01

scenario_2_servers_400_services_5_application_PWD



NS P < 0.05 P < 0.01

scenario_2_servers_400_services_7_application_GENERIC

ACO	D: 0.17 (P: 0)							
AFS	D: 0.77 (P: 0)	D: 0.9 (P: 0)						
GA	D: 0.16 (P: 0)	D: 0.03 (P: 0.919)	D: 0.89 (P: 0)					
HHO	D: 0.21 (P: 0)	D: 0.05 (P: 0.484)	D: 0.94 (P: 0)	D: 0.08 (P: 0.094)				
PSO	D: 0.24 (P: 0)	D: 0.08 (P: 0.107)	D: 0.96 (P: 0)	D: 0.1 (P: 0.011)	D: 0.04 (P: 0.836)			
RLDQN	D: 0.23 (P: 0)	D: 0.08 (P: 0.02)	D: 0.97 (P: 0)	D: 0.1 (P: 0.002)	D: 0.06 (P: 0.227)	D: 0.03 (P: 0.895)		
RLPPO	D: 0.22 (P: 0)	D: 0.07 (P: 0.048)	D: 0.96 (P: 0)	D: 0.09 (P: 0.003)	D: 0.04 (P: 0.577)	D: 0.03 (P: 0.812)	D: 0.03 (P: 0.761)	
SA	D: 0.19 (P: 0)	D: 0.03 (P: 0.966)	D: 0.92 (P: 0)	D: 0.05 (P: 0.593)	D: 0.03 (P: 0.943)	D: 0.06 (P: 0.245)	D: 0.07 (P: 0.071)	D: 0.06 (P: 0.157)
	ABC	ACO	AFS	GA	HHO	PSO	RLDQN	RLPPO

NS
 P < 0.05
 P < 0.01

scenario_2_servers_400_services_7_application_LTS

ACO	D: 0.17 (P: 0)							
AFS	D: 0.78 (P: 0)	D: 0.91 (P: 0)						
GA	D: 0.17 (P: 0)	D: 0.02 (P: 1)	D: 0.91 (P: 0)					
HHO	D: 0.2 (P: 0)	D: 0.05 (P: 0.762)	D: 0.94 (P: 0)	D: 0.06 (P: 0.69)				
PSO	D: 0.24 (P: 0)	D: 0.1 (P: 0.13)	D: 0.97 (P: 0)	D: 0.1 (P: 0.125)	D: 0.05 (P: 0.808)			
RLDQN	D: 0.25 (P: 0)	D: 0.09 (P: 0.156)	D: 0.97 (P: 0)	D: 0.1 (P: 0.139)	D: 0.06 (P: 0.73)	D: 0.03 (P: 0.999)		
RLPPO	D: 0.25 (P: 0)	D: 0.09 (P: 0.147)	D: 0.97 (P: 0)	D: 0.09 (P: 0.168)	D: 0.06 (P: 0.724)	D: 0.03 (P: 0.998)	D: 0.04 (P: 0.985)	
SA	D: 0.19 (P: 0)	D: 0.04 (P: 0.95)	D: 0.93 (P: 0)	D: 0.04 (P: 0.942)	D: 0.03 (P: 1)	D: 0.07 (P: 0.527)	D: 0.07 (P: 0.442)	D: 0.07 (P: 0.537)
	ABC	ACO	AFS	GA	HHO	PSO	RLDQN	RLPPO

NS
 P < 0.01

scenario_2_servers_400_services_7_application_MMA

ACO	D: 0.45 (P: 0.021)							
AFS	D: 0.9 (P: 0)	D: 1 (P: 0)						
GA	D: 0.45 (P: 0.021)	D: 0.09 (P: 1)	D: 1 (P: 0)					
HHO	D: 0.56 (P: 0.003)	D: 0.19 (P: 0.86)	D: 1 (P: 0)	D: 0.19 (P: 0.987)				
PSO	D: 0.58 (P: 0.001)	D: 0.25 (P: 0.507)	D: 1 (P: 0)	D: 0.26 (P: 0.987)	D: 0.13 (P: 0.897)			
RLDQN	D: 0.58 (P: 0.002)	D: 0.18 (P: 0.897)	D: 1 (P: 0.86)	D: 0.18 (P: 0.996)	D: 0.1 (P: 0.932)	D: 0.17 (P: 0.972)		
RLPPO	D: 0.55 (P: 0.003)	D: 0.14 (P: 0.987)	D: 1 (P: 0.485)	D: 0.14 (P: 1)	D: 0.16 (P: 0.731)	D: 0.21 (P: 0.897)	D: 0.15 (P: 0.021)	
SA	D: 0.5 (P: 0.008)	D: 0.14 (P: 0.987)	D: 1 (P: 0.897)	D: 0.14 (P: 0.942)	D: 0.18 (P: 0.731)	D: 0.21 (P: 0.987)	D: 0.18 (P: 0)	D: 0.14 (P: 0.021)
	ABC	ACO	AFS	GA	HHO	PSO	RLDQN	RLPPO

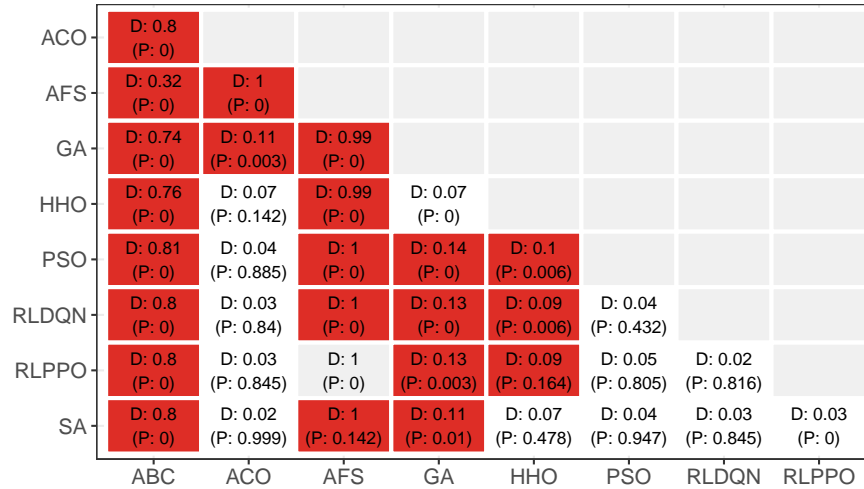
NS
 P < 0.05
 P < 0.01

scenario_2_servers_400_services_7_application_PWD

ACO	D: 0.21 (P: 0.023)							
AFS	D: 0.79 (P: 0)	D: 0.9 (P: 0)						
GA	D: 0.19 (P: 0.052)	D: 0.08 (P: 0.903)	D: 0.89 (P: 0)					
HHO	D: 0.25 (P: 0.004)	D: 0.07 (P: 0.966)	D: 0.93 (P: 0)	D: 0.09 (P: 0.808)				
PSO	D: 0.28 (P: 0.001)	D: 0.08 (P: 0.903)	D: 0.95 (P: 0)	D: 0.14 (P: 0.276)	D: 0.08 (P: 0.903)			
RLDQN	D: 0.25 (P: 0.004)	D: 0.08 (P: 0.924)	D: 0.94 (P: 0)	D: 0.12 (P: 0.504)	D: 0.05 (P: 1)	D: 0.06 (P: 0.996)		
RLPPO	D: 0.25 (P: 0.004)	D: 0.07 (P: 0.967)	D: 0.95 (P: 0)	D: 0.11 (P: 0.614)	D: 0.05 (P: 1)	D: 0.09 (P: 0.789)	D: 0.05 (P: 1)	
SA	D: 0.21 (P: 0.023)	D: 0.06 (P: 0.993)	D: 0.91 (P: 0)	D: 0.09 (P: 0.808)	D: 0.07 (P: 0.966)	D: 0.08 (P: 0.903)	D: 0.08 (P: 0.943)	D: 0.06 (P: 0.994)
	ABC	ACO	AFS	GA	HHO	PSO	RLDQN	RLPPO

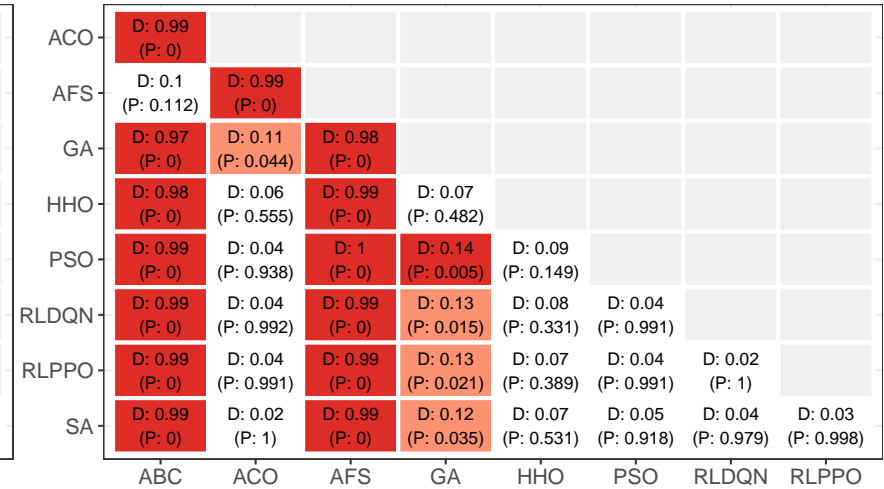
NS
 P < 0.05
 P < 0.01

scenario_2_servers_500_services_1_application_GENERIC



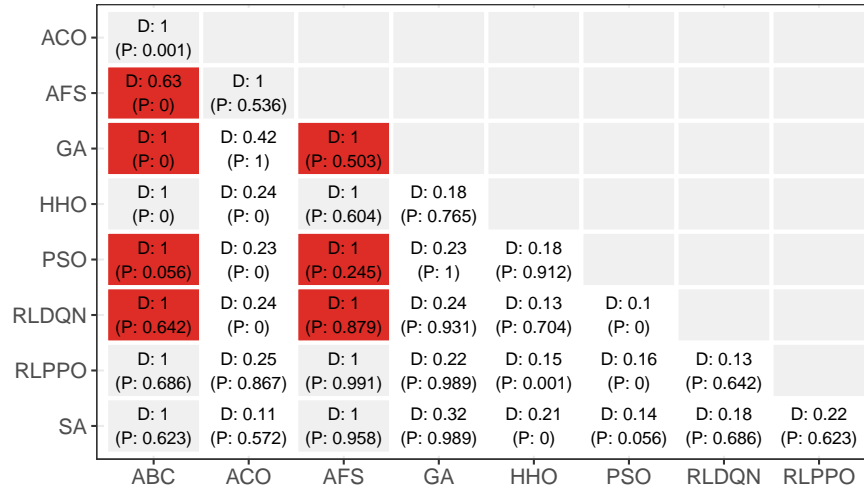
□ NS □ P < 0.01

scenario_2_servers_500_services_1_application_LTS



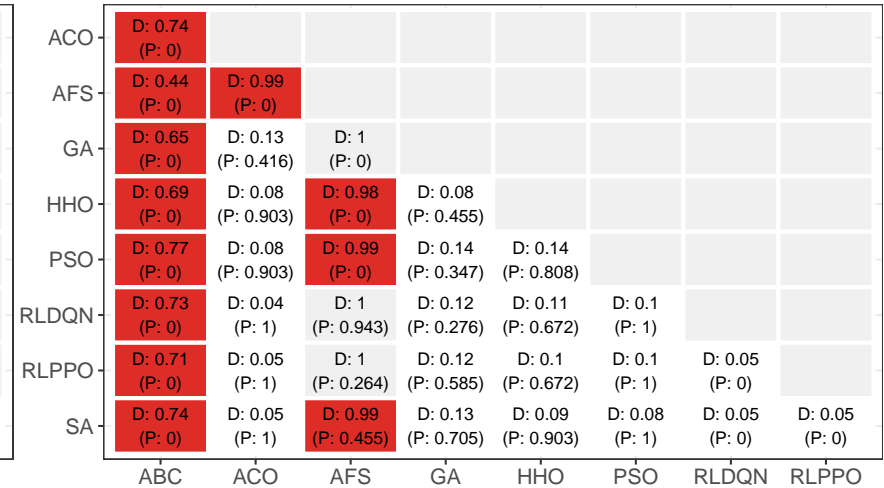
□ NS □ P < 0.05 □ P < 0.01

scenario_2_servers_500_services_1_application_MMA



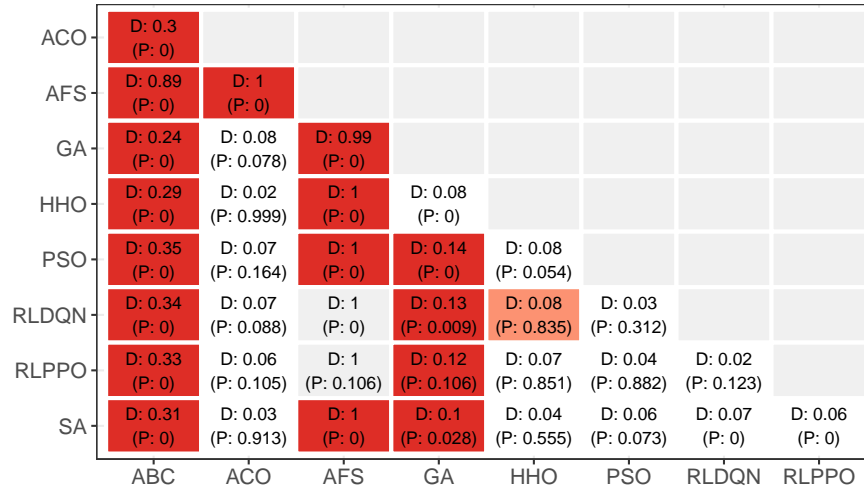
□ NS □ P < 0.01

scenario_2_servers_500_services_1_application_PWD



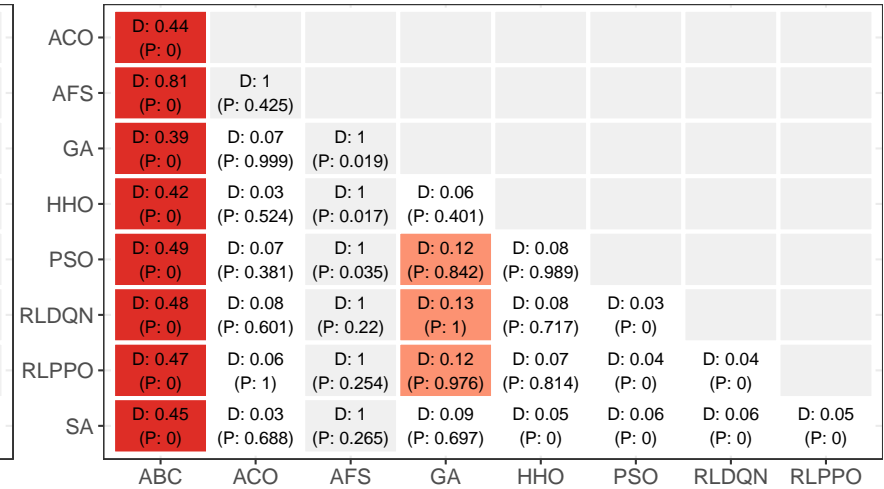
□ NS □ P < 0.01

scenario_2_servers_500_services_3_application_GENERIC



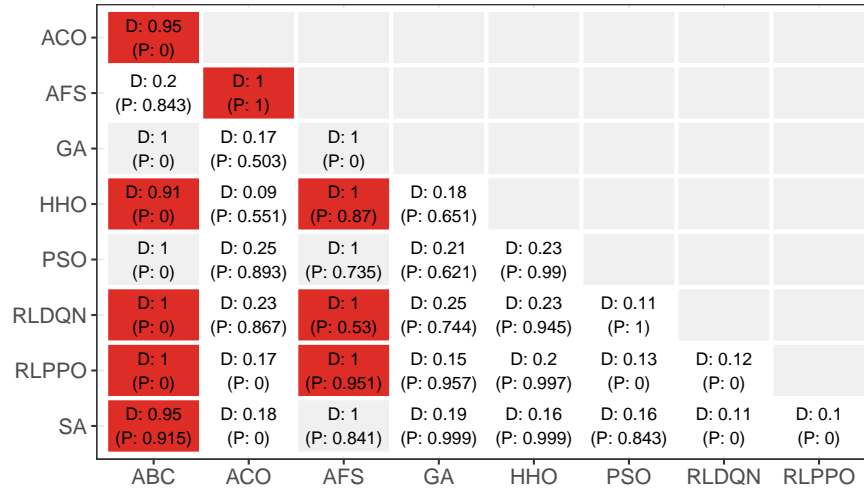
□ NS □ P < 0.05 ■ P < 0.01

scenario_2_servers_500_services_3_application_LTS



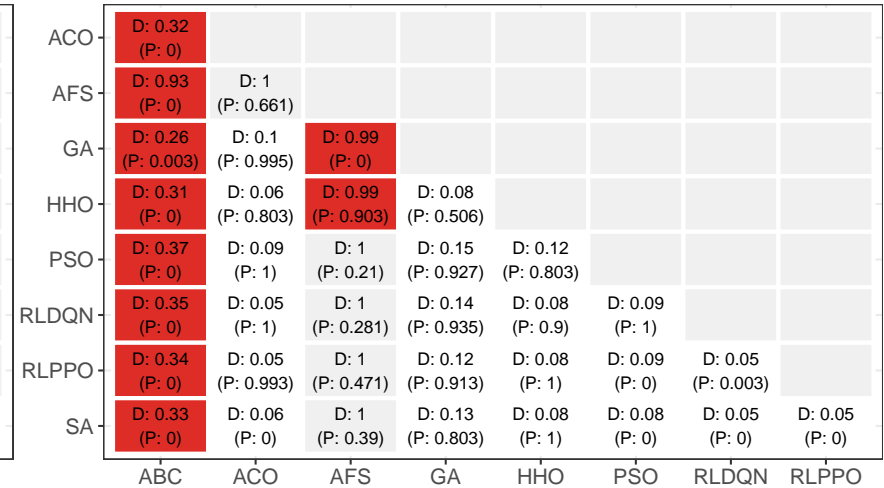
□ NS □ P < 0.05 ■ P < 0.01

scenario_2_servers_500_services_3_application_MMA



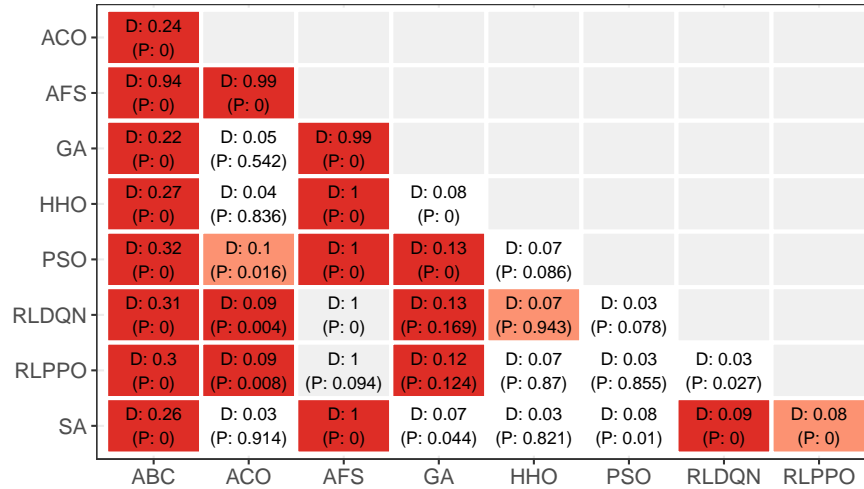
□ NS ■ P < 0.01

scenario_2_servers_500_services_3_application_PWD



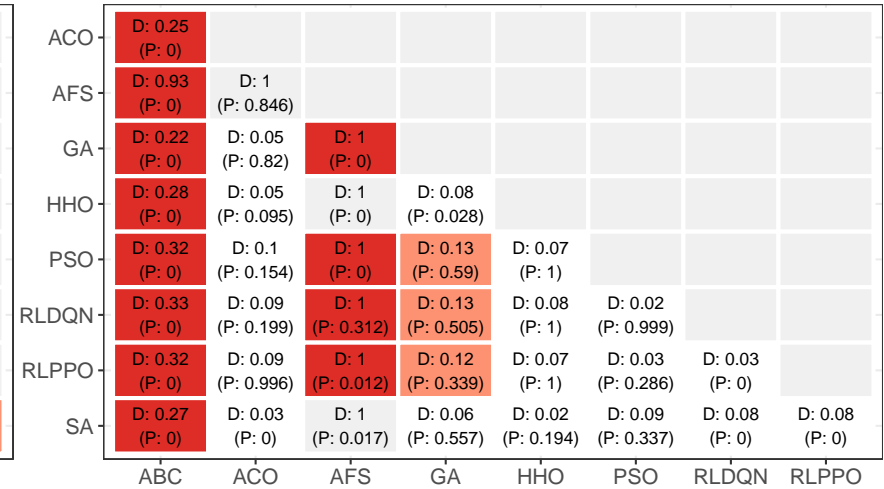
□ NS ■ P < 0.01

scenario_2_servers_500_services_5_application_GENERIC



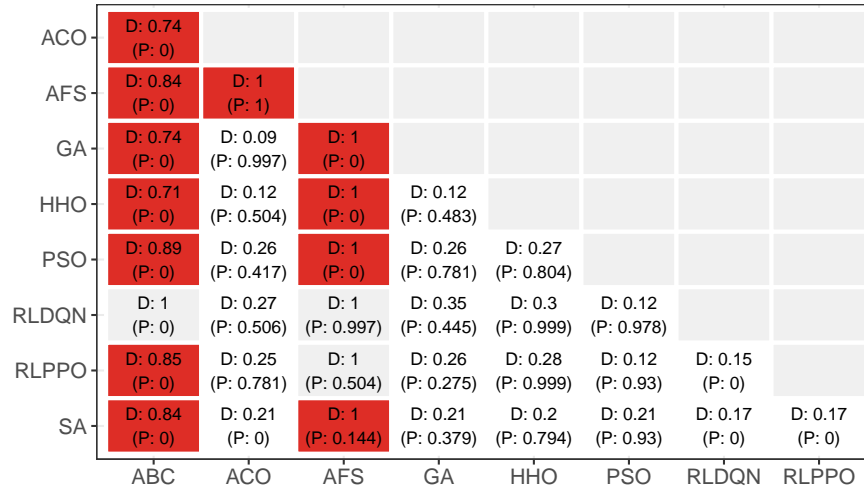
□ NS □ P < 0.05 ■ P < 0.01

scenario_2_servers_500_services_5_application_LTS



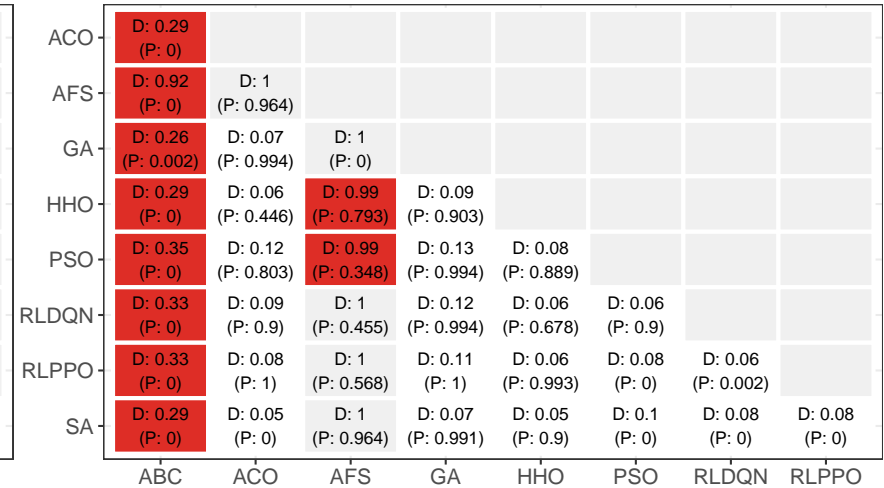
□ NS □ P < 0.05 ■ P < 0.01

scenario_2_servers_500_services_5_application_MMA



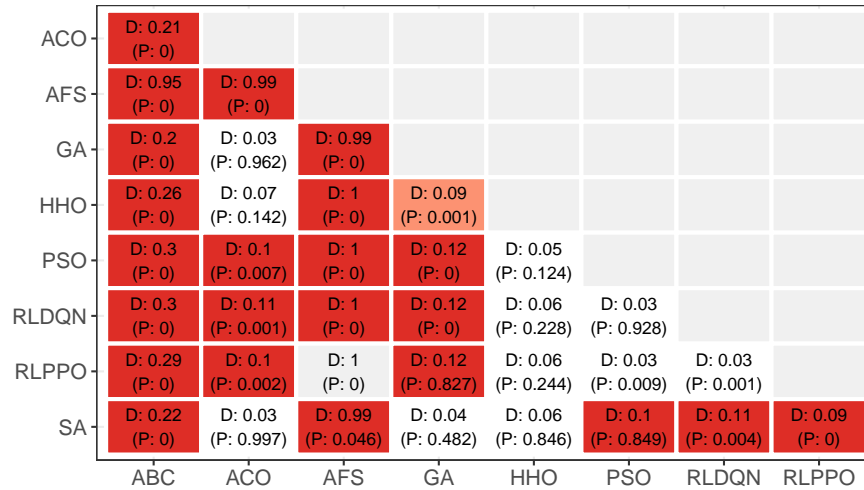
□ NS ■ P < 0.01

scenario_2_servers_500_services_5_application_PWD



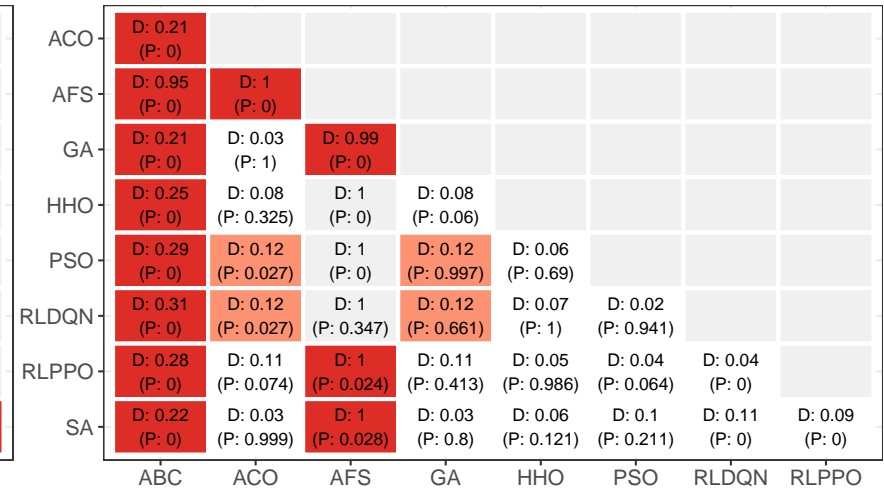
□ NS ■ P < 0.01

scenario_2_servers_500_services_7_application_GENERIC



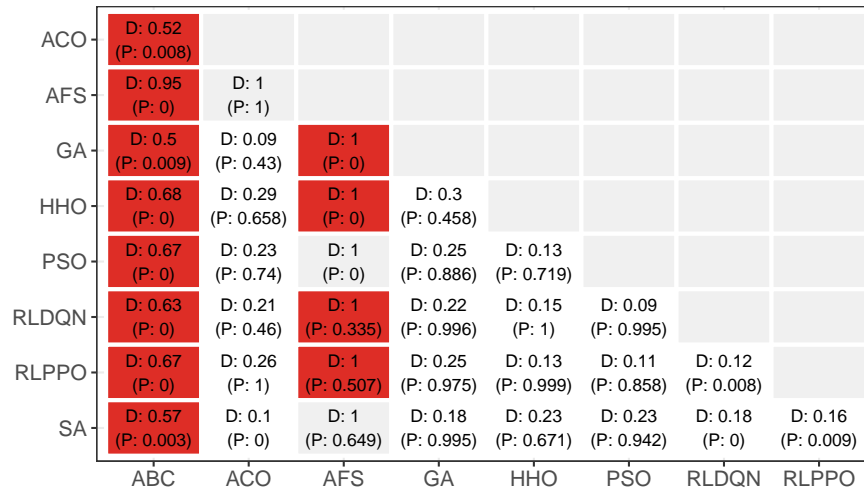
□ NS □ P < 0.05 ■ P < 0.01

scenario_2_servers_500_services_7_application_LTS



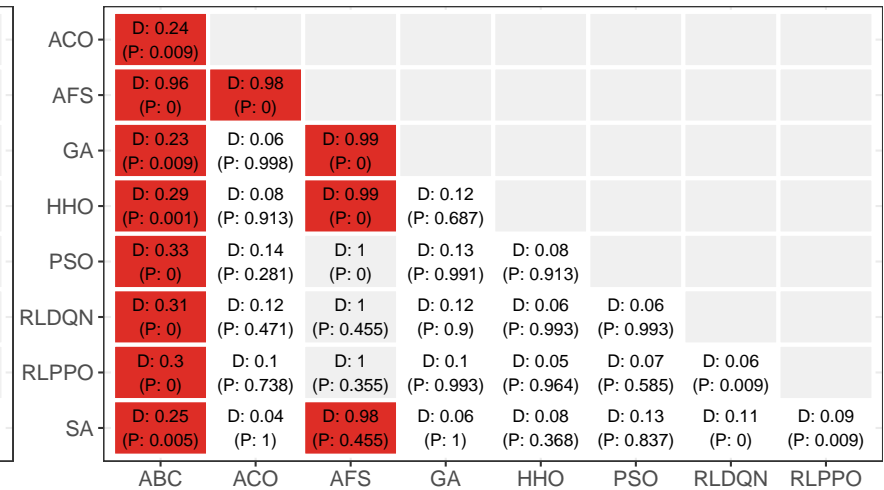
□ NS □ P < 0.05 ■ P < 0.01

scenario_2_servers_500_services_7_application_MMA



□ NS ■ P < 0.01

scenario_2_servers_500_services_7_application_PWD



□ NS ■ P < 0.01

scenario_3_servers_100_services_1_application_GENERIC

ACO	D: 0.3 (P: 0)						
AFS	D: 0.07 (P: 0.06)	D: 0.31 (P: 0)					
GA	D: 0.27 (P: 0)	D: 0.04 (P: 0.607)	D: 0.29 (P: 0)				
HHO	D: 0.29 (P: 0)	D: 0.02 (P: 0.985)	D: 0.3 (P: 0)	D: 0.02 (P: 0.985)			
PSO	D: 0.3 (P: 0)	D: 0.01 (P: 1)	D: 0.31 (P: 0)	D: 0.04 (P: 0.565)	D: 0.02 (P: 0.973)		
RLDQN	D: 0.29 (P: 0)	D: 0.02 (P: 0.982)	D: 0.31 (P: 0)	D: 0.03 (P: 0.766)	D: 0.01 (P: 1)	D: 0.02 (P: 0.98)	
RLPPO	D: 0.29 (P: 0)	D: 0.03 (P: 0.796)	D: 0.31 (P: 0)	D: 0.03 (P: 0.829)	D: 0.01 (P: 1)	D: 0.03 (P: 0.796)	D: 0.01 (P: 1)
SA	D: 0.3 (P: 0)	D: 0.01 (P: 1)	D: 0.31 (P: 0)	D: 0.04 (P: 0.607)	D: 0.02 (P: 0.985)	D: 0.01 (P: 1)	D: 0.02 (P: 0.982)
	ABC	ACO	AFS	GA	HHO	PSO	RLDQN

NS P < 0.01

scenario_3_servers_100_services_1_application_LTS

ACO	D: 0.39 (P: 0)						
AFS	D: 0.13 (P: 0.001)	D: 0.33 (P: 0)					
GA	D: 0.37 (P: 0)	D: 0.04 (P: 0.779)	D: 0.31 (P: 0)				
HHO	D: 0.39 (P: 0)	D: 0.03 (P: 0.998)	D: 0.32 (P: 0)	D: 0.03 (P: 0.998)			
PSO	D: 0.39 (P: 0)	D: 0.01 (P: 1)	D: 0.33 (P: 0)	D: 0.04 (P: 0.804)	D: 0.03 (P: 0.996)		
RLDQN	D: 0.39 (P: 0)	D: 0.03 (P: 0.999)	D: 0.32 (P: 0)	D: 0.03 (P: 0.992)	D: 0.02 (P: 1)	D: 0.02 (P: 1)	
RLPPO	D: 0.39 (P: 0)	D: 0.04 (P: 0.941)	D: 0.32 (P: 0)	D: 0.02 (P: 0.999)	D: 0.02 (P: 1)	D: 0.04 (P: 0.941)	D: 0.02 (P: 1)
SA	D: 0.4 (P: 0)	D: 0.01 (P: 1)	D: 0.33 (P: 0)	D: 0.04 (P: 0.754)	D: 0.03 (P: 0.997)	D: 0.01 (P: 1)	D: 0.03 (P: 0.997)
	ABC	ACO	AFS	GA	HHO	PSO	RLDQN

NS P < 0.01

scenario_3_servers_100_services_1_application_MMA

ACO	D: 0.88 (P: 0)						
AFS	D: 0.66 (P: 0)	D: 0.67 (P: 0)					
GA	D: 0.82 (P: 0)	D: 0.17 (P: 0.756)	D: 0.56 (P: 0)				
HHO	D: 0.88 (P: 0)	D: 0.11 (P: 0.997)	D: 0.64 (P: 0)	D: 0.16 (P: 0.835)			
PSO	D: 0.82 (P: 0)	D: 0.16 (P: 0.839)	D: 0.58 (P: 0)	D: 0.14 (P: 0.932)	D: 0.13 (P: 0.974)		
RLDQN	D: 0.85 (P: 0)	D: 0.19 (P: 0.64)	D: 0.59 (P: 0)	D: 0.14 (P: 0.932)	D: 0.16 (P: 0.857)	D: 0.1 (P: 0.999)	
RLPPO	D: 0.82 (P: 0)	D: 0.18 (P: 0.698)	D: 0.54 (P: 0)	D: 0.09 (P: 1)	D: 0.15 (P: 0.903)	D: 0.1 (P: 0.995)	D: 0.1 (P: 0.995)
SA	D: 0.88 (P: 0)	D: 0.1 (P: 0.998)	D: 0.61 (P: 0)	D: 0.16 (P: 0.828)	D: 0.07 (P: 1)	D: 0.09 (P: 1)	D: 0.11 (P: 0.992)
	ABC	ACO	AFS	GA	HHO	PSO	RLDQN

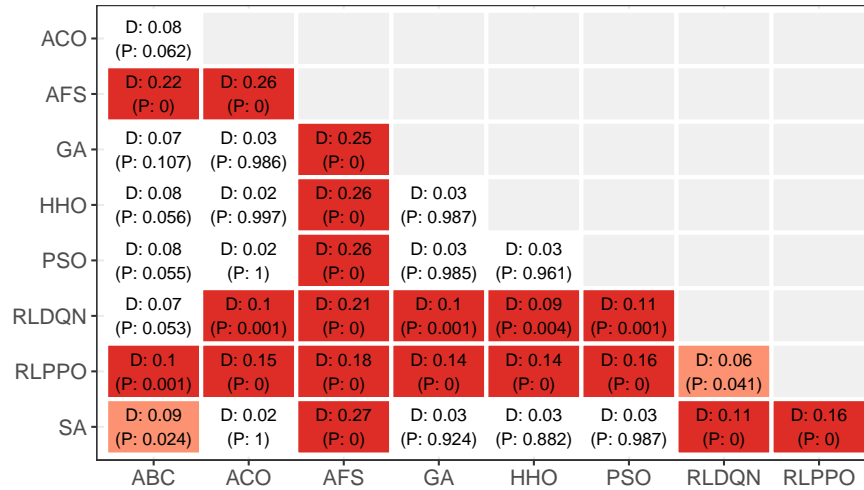
NS P < 0.01

scenario_3_servers_100_services_1_application_PWD

ACO	D: 0.24 (P: 0)						
AFS	D: 0.14 (P: 0.134)	D: 0.34 (P: 0)					
GA	D: 0.22 (P: 0.002)	D: 0.05 (P: 0.982)	D: 0.32 (P: 0)				
HHO	D: 0.22 (P: 0.001)	D: 0.05 (P: 0.982)	D: 0.33 (P: 0)	D: 0.05 (P: 0.996)			
PSO	D: 0.24 (P: 0)	D: 0.03 (P: 1)	D: 0.34 (P: 0)	D: 0.05 (P: 0.982)	D: 0.05 (P: 0.982)		
RLDQN	D: 0.24 (P: 0)	D: 0.06 (P: 0.963)	D: 0.34 (P: 0)	D: 0.05 (P: 0.988)	D: 0.05 (P: 0.997)	D: 0.07 (P: 0.913)	
RLPPO	D: 0.23 (P: 0.001)	D: 0.07 (P: 0.841)	D: 0.34 (P: 0)	D: 0.05 (P: 0.988)	D: 0.05 (P: 0.997)	D: 0.07 (P: 0.841)	D: 0.03 (P: 1)
SA	D: 0.24 (P: 0)	D: 0.02 (P: 1)	D: 0.34 (P: 0)	D: 0.05 (P: 0.982)	D: 0.05 (P: 0.982)	D: 0.04 (P: 1)	D: 0.07 (P: 0.913)
	ABC	ACO	AFS	GA	HHO	PSO	RLDQN

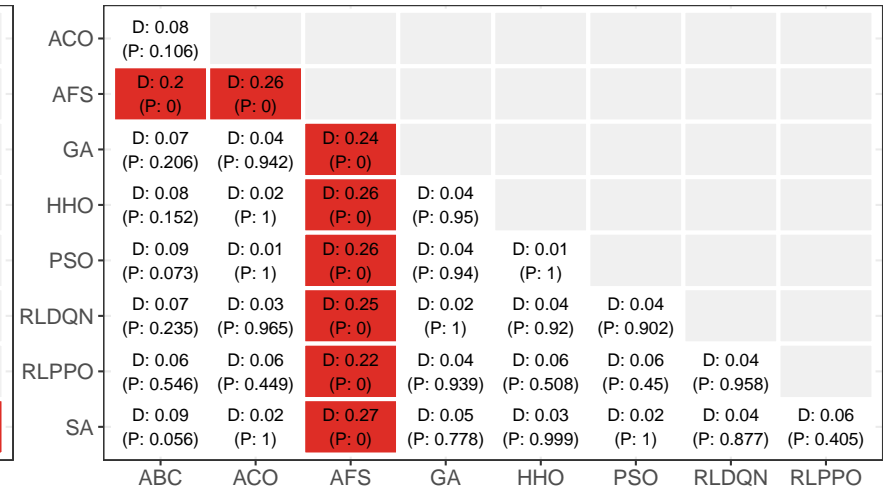
NS P < 0.01

scenario_3_servers_100_services_3_application_GENERIC



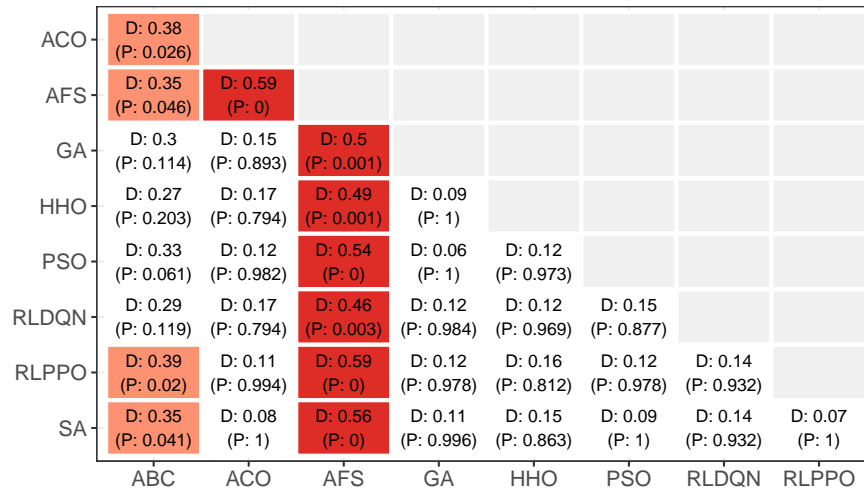
NS
 P < 0.05
 P < 0.01

scenario_3_servers_100_services_3_application_LTS



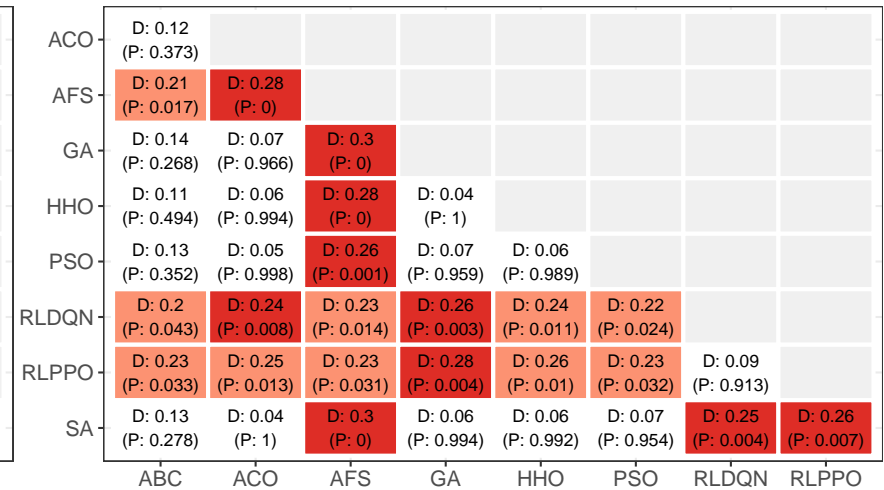
NS
 P < 0.01

scenario_3_servers_100_services_3_application_MMA



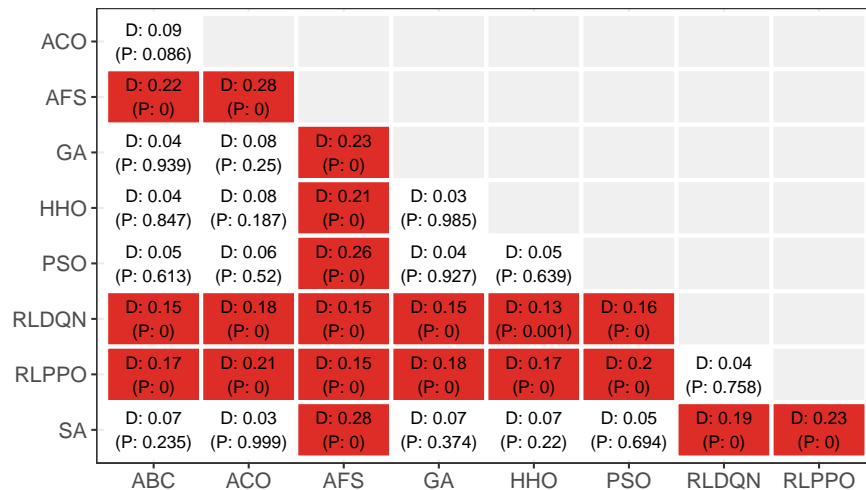
NS
 P < 0.05
 P < 0.01

scenario_3_servers_100_services_3_application_PWD



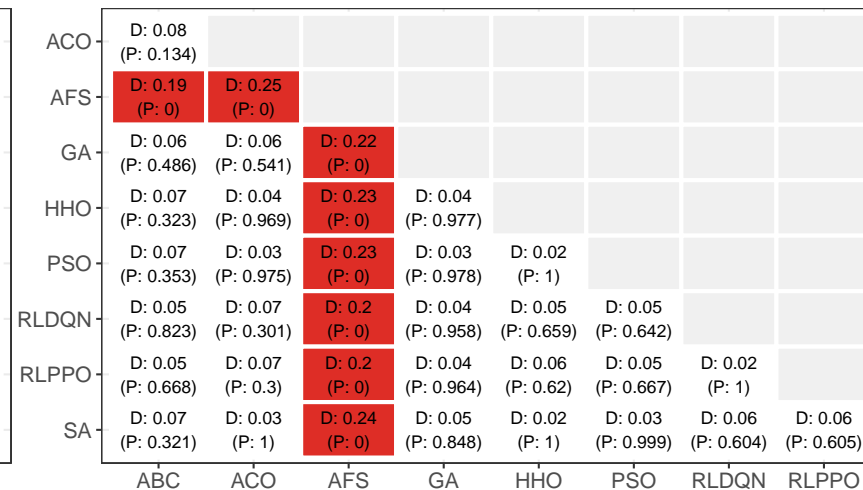
NS
 P < 0.05
 P < 0.01

scenario_3_servers_100_services_5_application_GENERIC



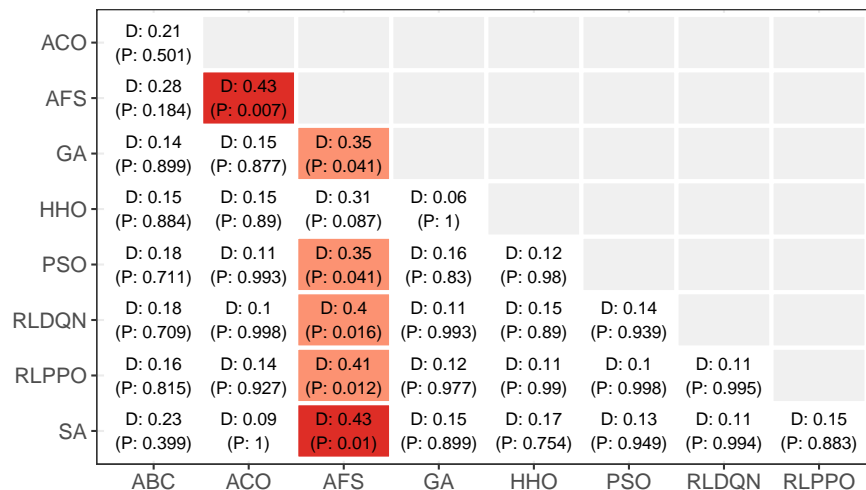
NS P < 0.01

scenario_3_servers_100_services_5_application_LTS



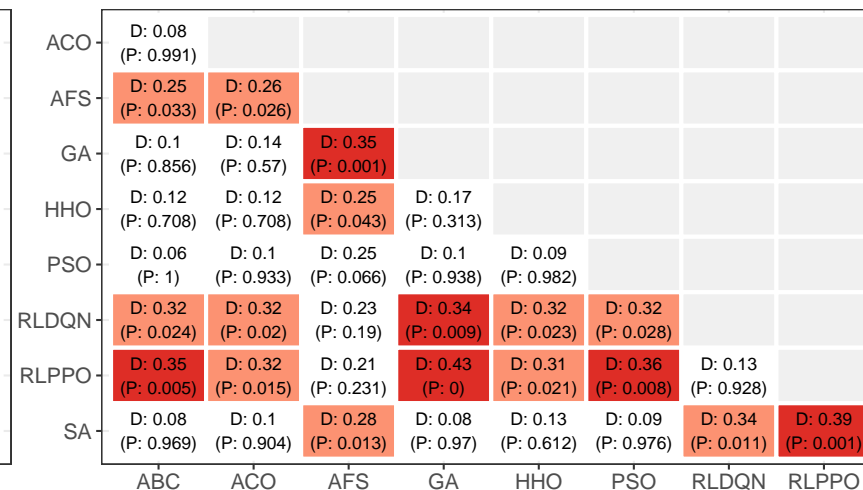
NS P < 0.01

scenario_3_servers_100_services_5_application_MMA



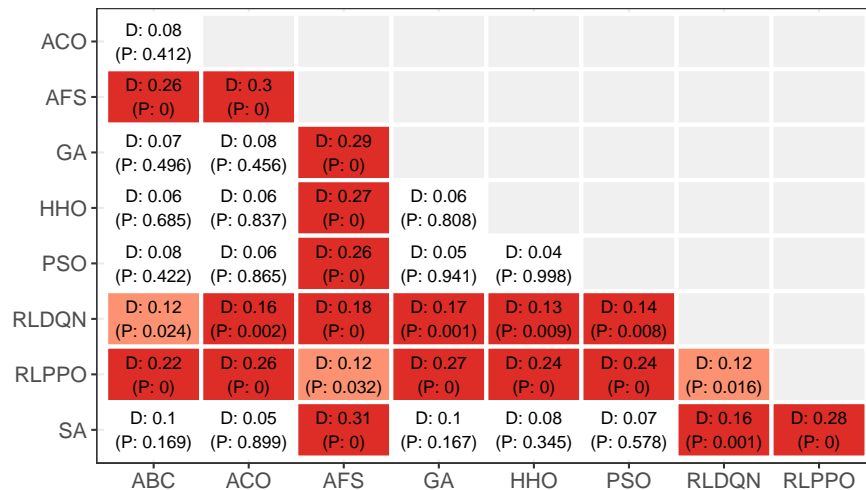
NS P < 0.05 P < 0.01

scenario_3_servers_100_services_5_application_PWD



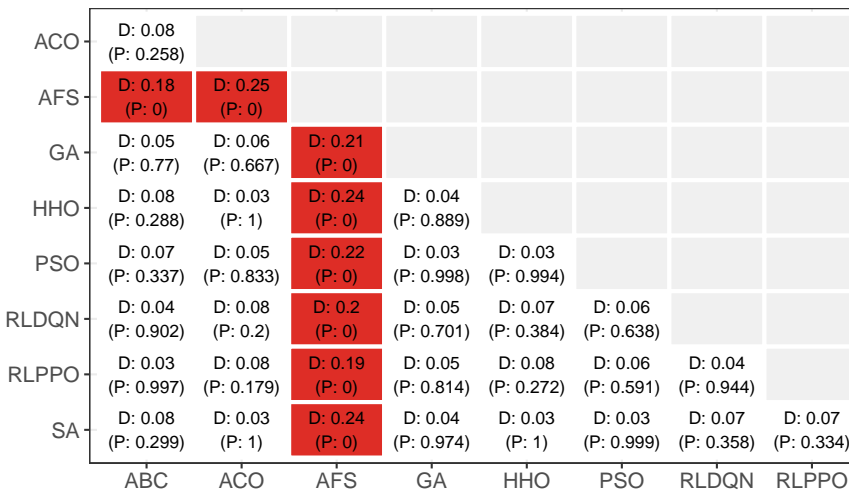
NS P < 0.05 P < 0.01

scenario_3_servers_100_services_7_application_GENERIC



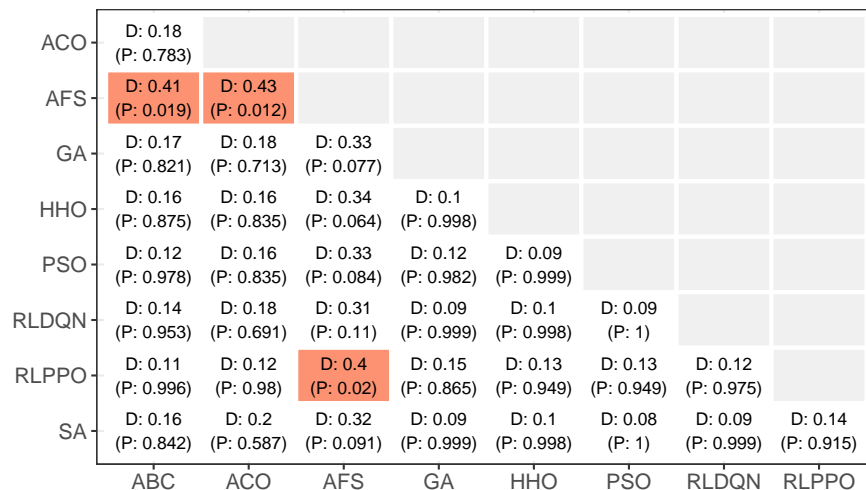
□ NS □ P < 0.05 ■ P < 0.01

scenario_3_servers_100_services_7_application_LTS



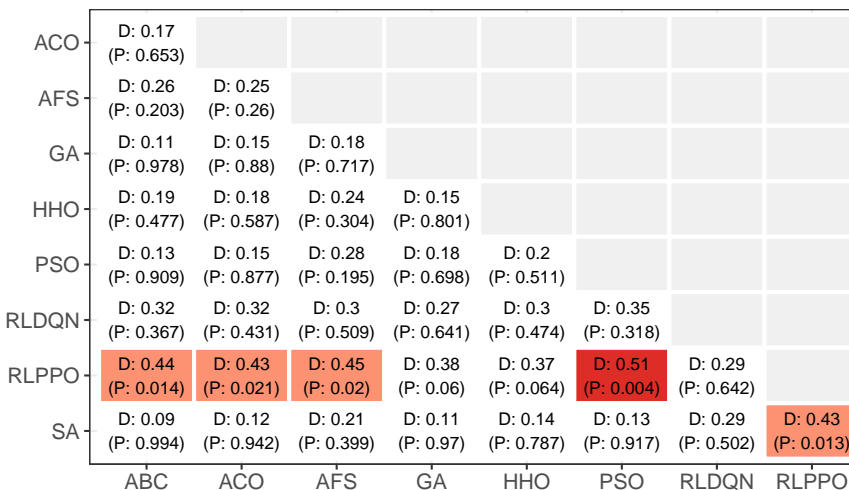
□ NS ■ P < 0.01

scenario_3_servers_100_services_7_application_MMA



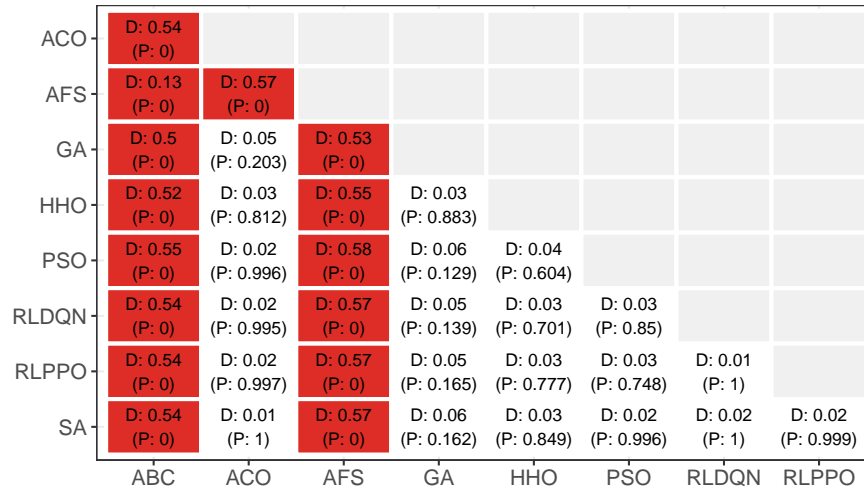
□ NS □ P < 0.05

scenario_3_servers_100_services_7_application_PWD



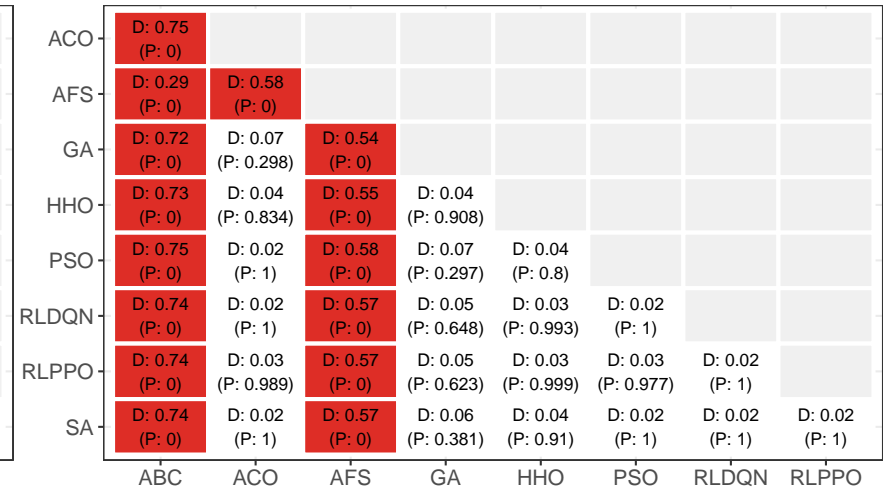
□ NS □ P < 0.05 ■ P < 0.01

scenario_3_servers_200_services_1_application_GENERIC



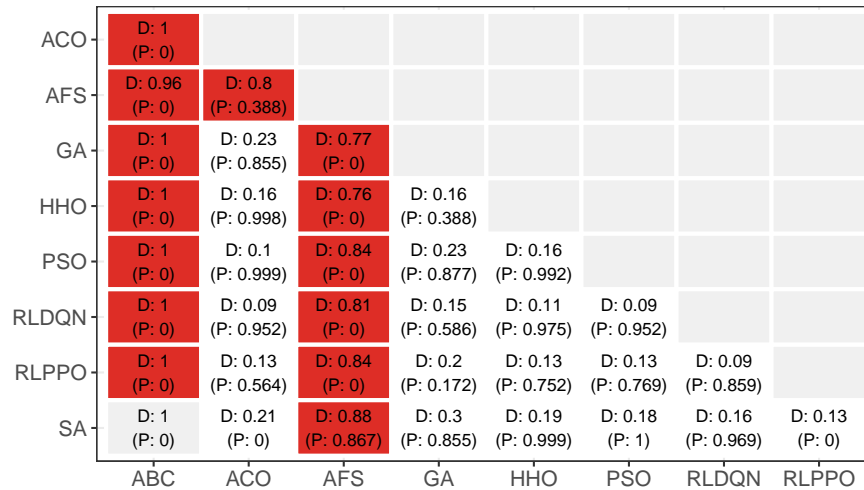
□ NS □ P < 0.01

scenario_3_servers_200_services_1_application_LTS



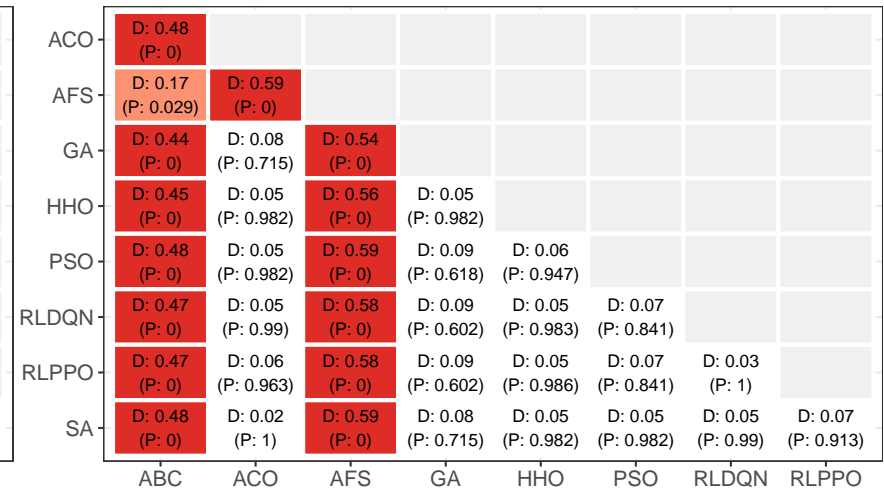
□ NS □ P < 0.01

scenario_3_servers_200_services_1_application_MMA



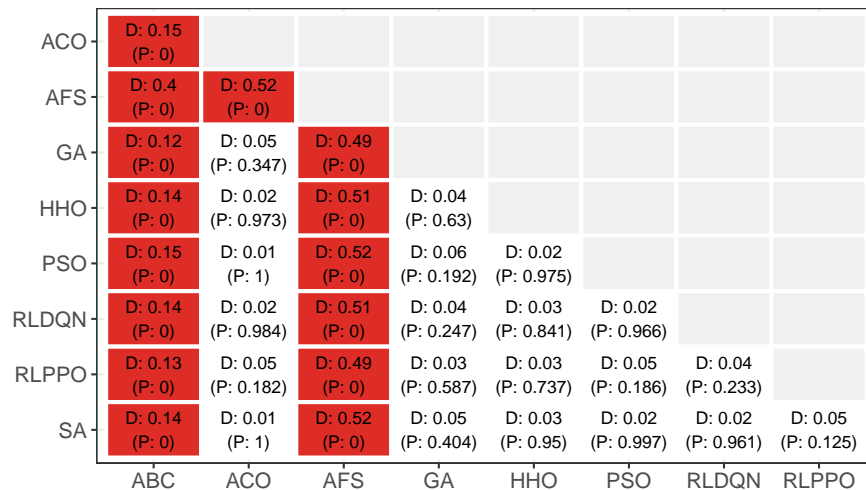
□ NS □ P < 0.01

scenario_3_servers_200_services_1_application_PWD



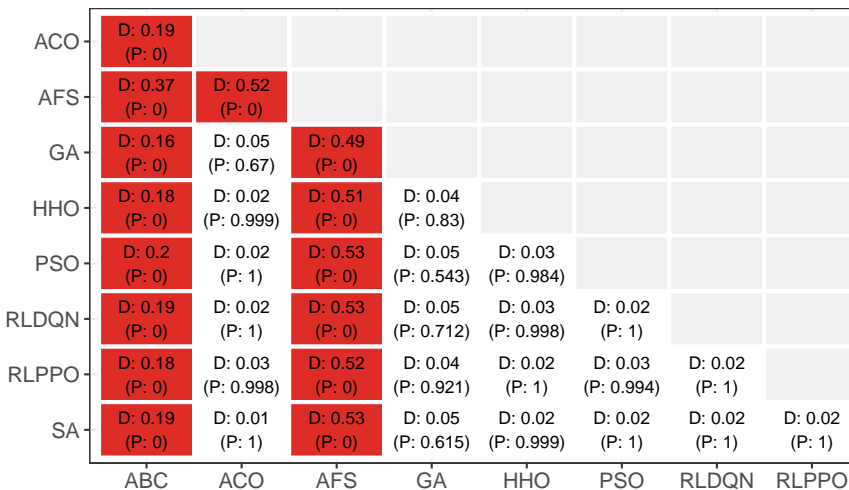
□ NS □ P < 0.05 □ P < 0.01

scenario_3_servers_200_services_3_application_GENERIC



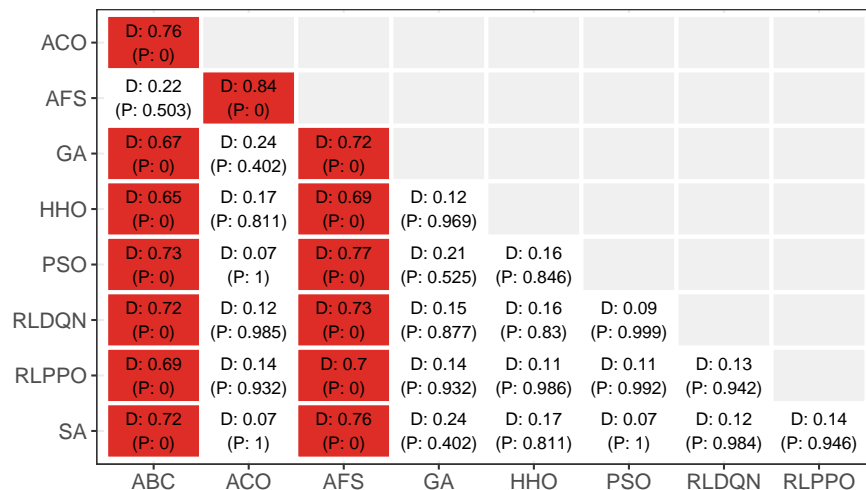
NS P < 0.01

scenario_3_servers_200_services_3_application_LTS



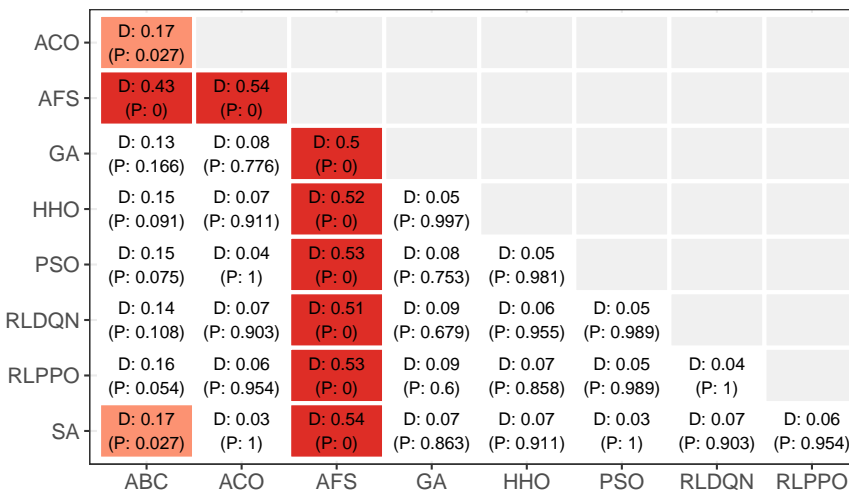
NS P < 0.01

scenario_3_servers_200_services_3_application_MMA



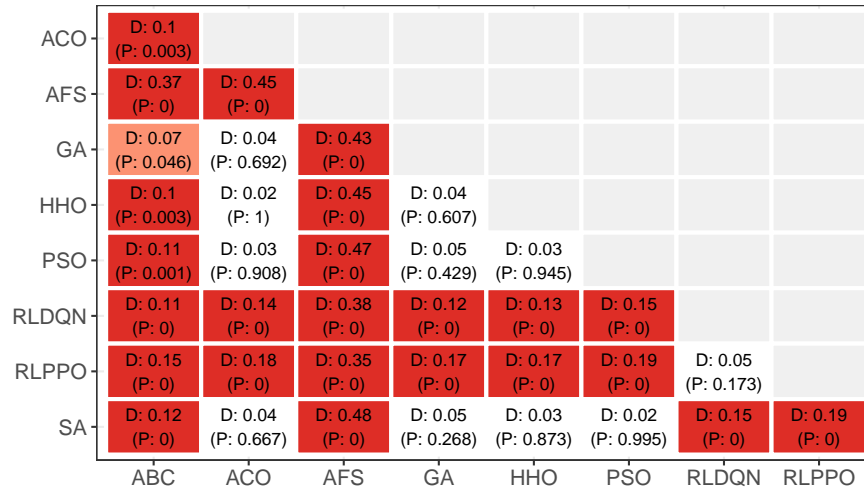
NS P < 0.01

scenario_3_servers_200_services_3_application_PWD



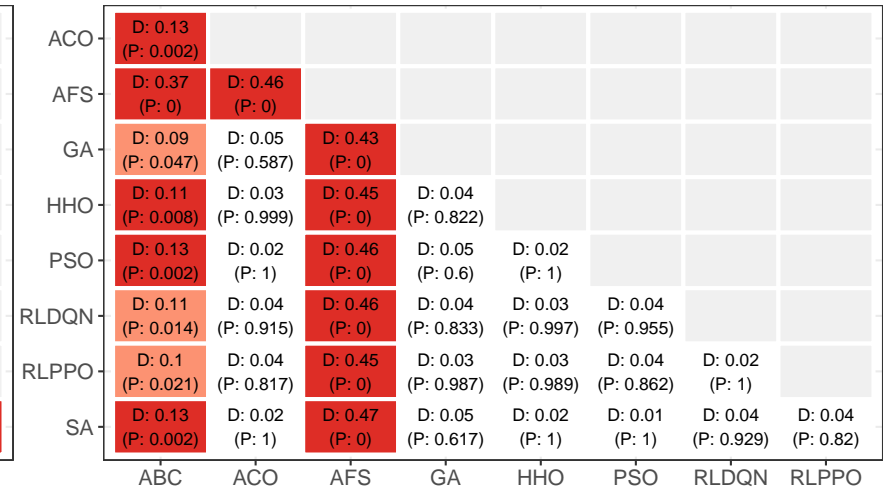
NS P < 0.05 P < 0.01

scenario_3_servers_200_services_5_application_GENERIC



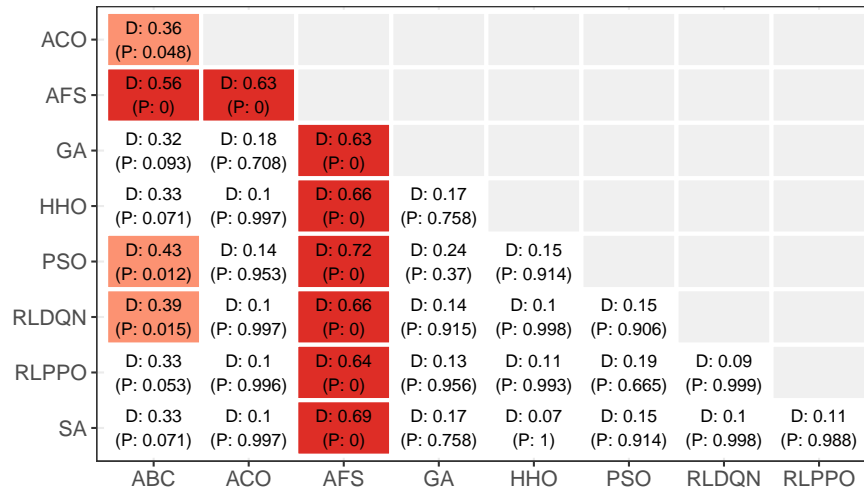
□ NS □ P < 0.05 ■ P < 0.01

scenario_3_servers_200_services_5_application_LTS



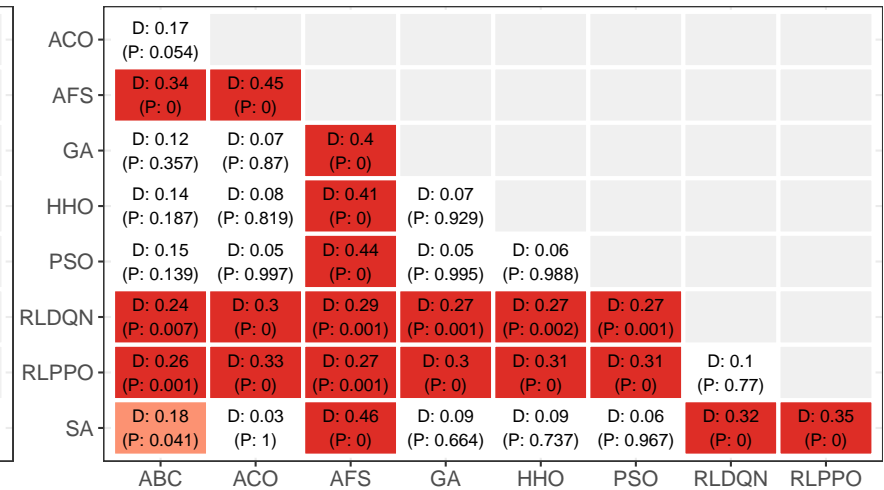
□ NS □ P < 0.05 ■ P < 0.01

scenario_3_servers_200_services_5_application_MMA



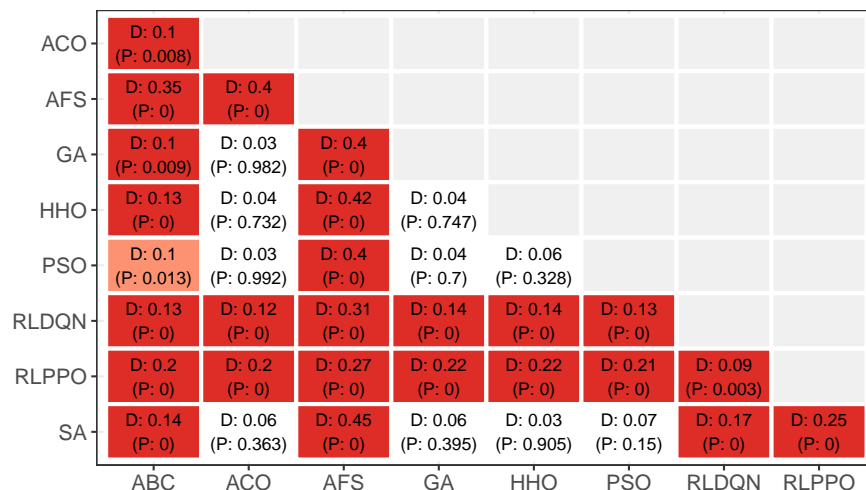
□ NS □ P < 0.05 ■ P < 0.01

scenario_3_servers_200_services_5_application_PWD



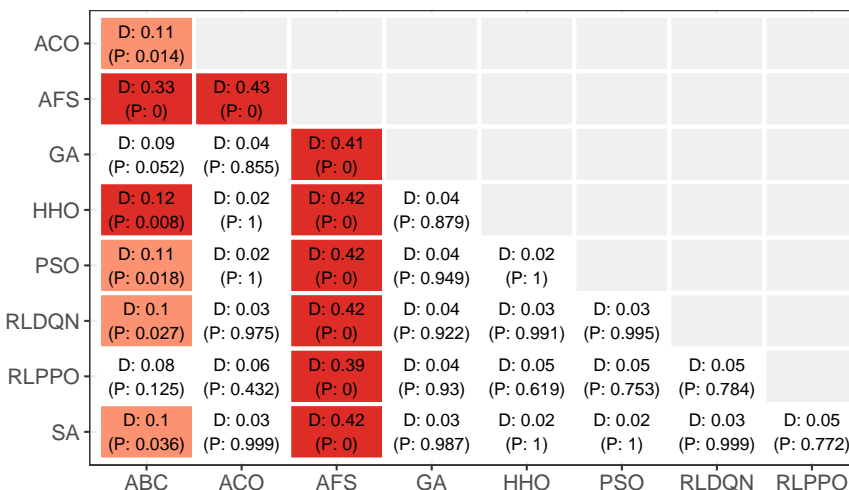
□ NS □ P < 0.05 ■ P < 0.01

scenario_3_servers_200_services_7_application_GENERIC



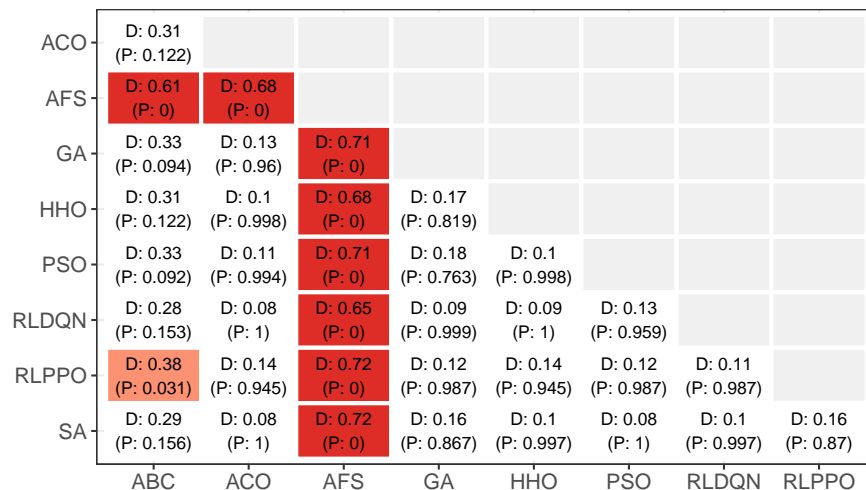
NS
 P < 0.05
 P < 0.01

scenario_3_servers_200_services_7_application_LTS



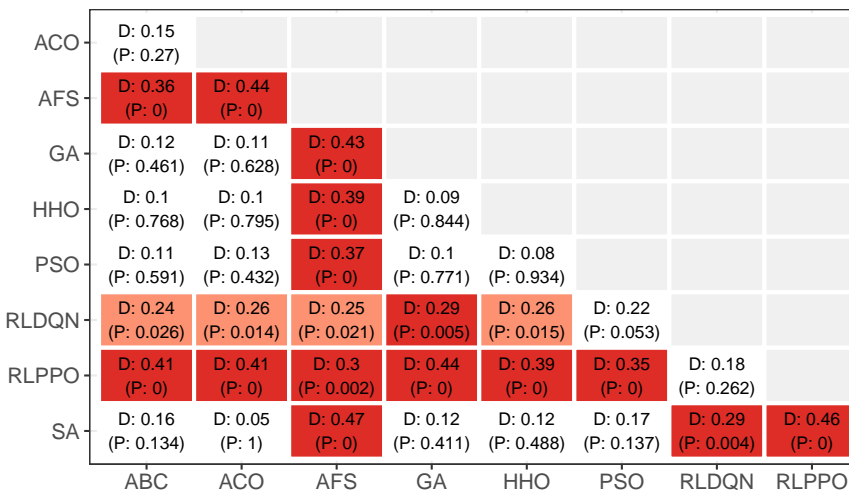
NS
 P < 0.05
 P < 0.01

scenario_3_servers_200_services_7_application_MMA



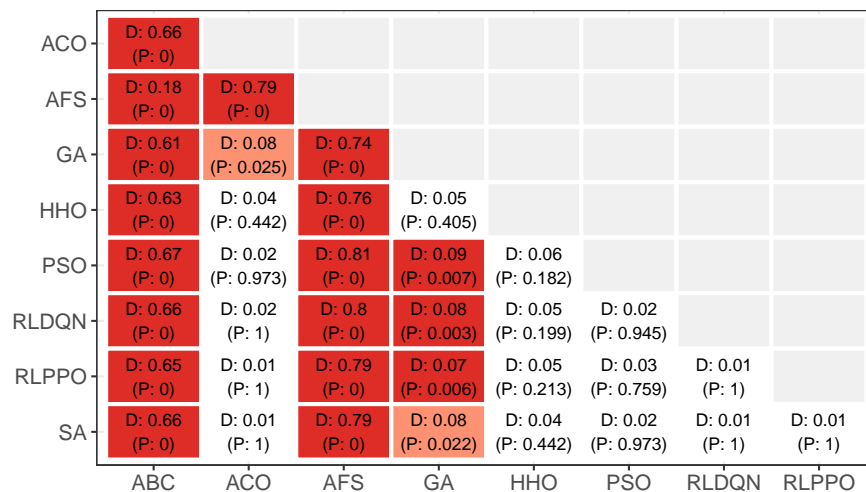
NS
 P < 0.05
 P < 0.01

scenario_3_servers_200_services_7_application_PWD



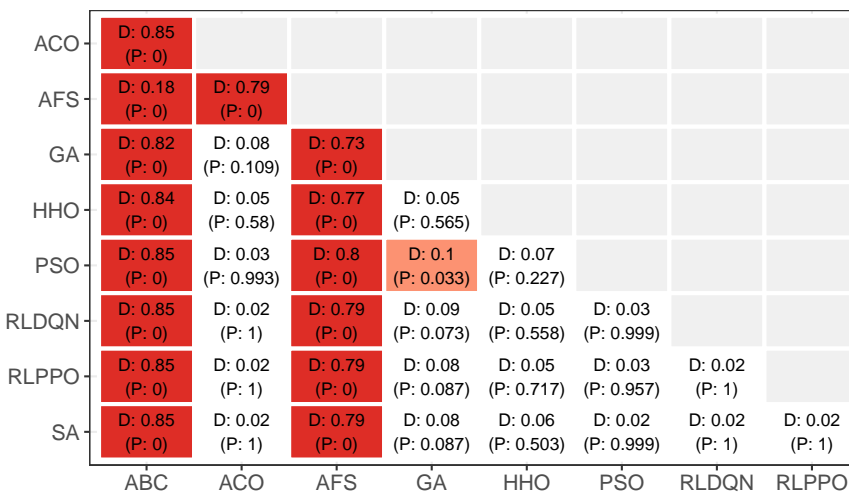
NS
 P < 0.05
 P < 0.01

scenario_3_servers_300_services_1_application_GENERIC



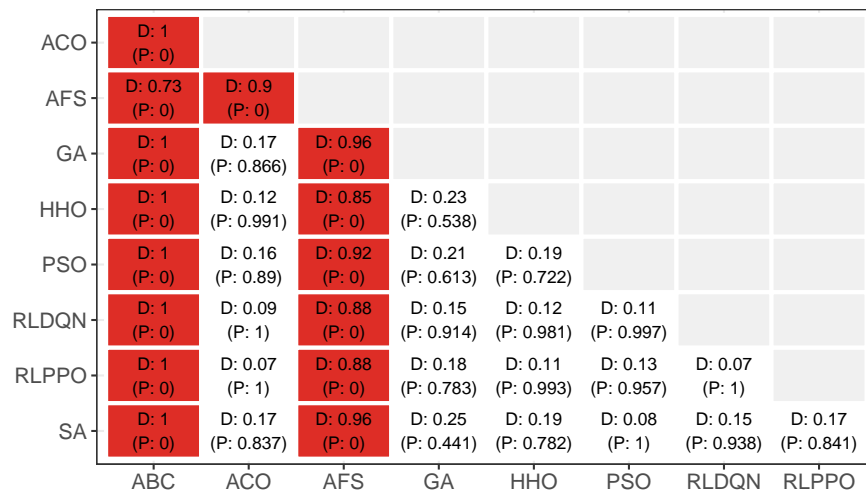
□ NS □ P < 0.05 ■ P < 0.01

scenario_3_servers_300_services_1_application_LTS



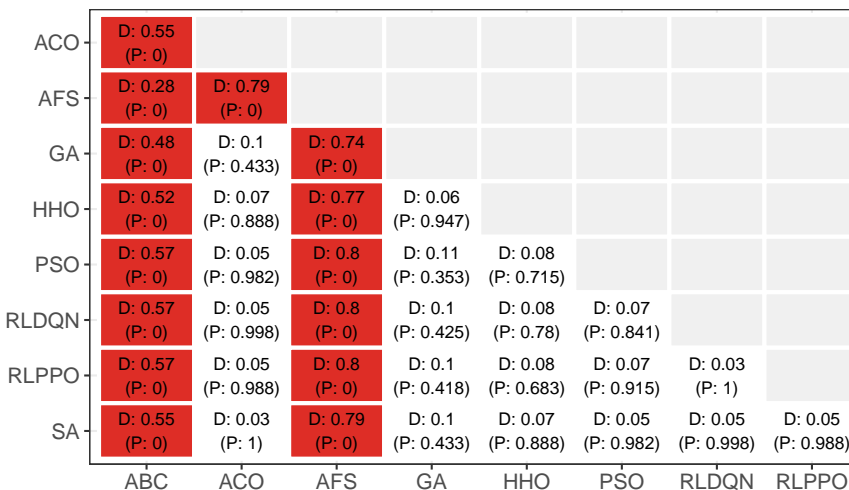
□ NS □ P < 0.05 ■ P < 0.01

scenario_3_servers_300_services_1_application_MMA



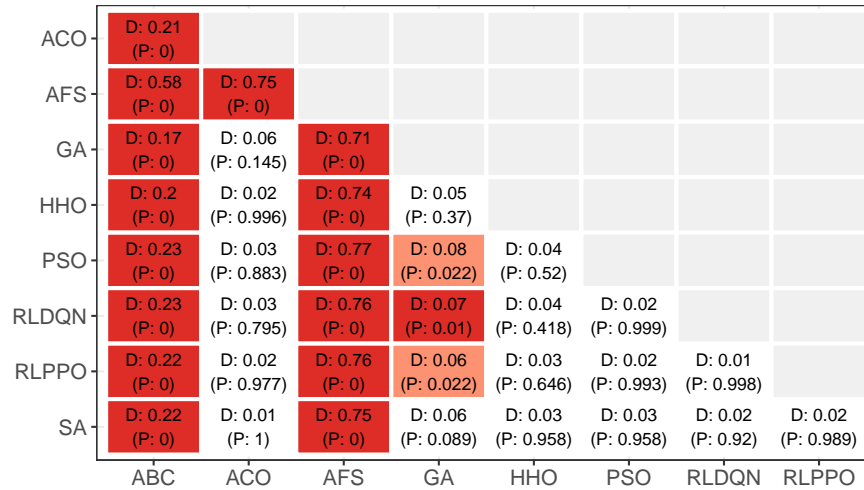
□ NS ■ P < 0.01

scenario_3_servers_300_services_1_application_PWD



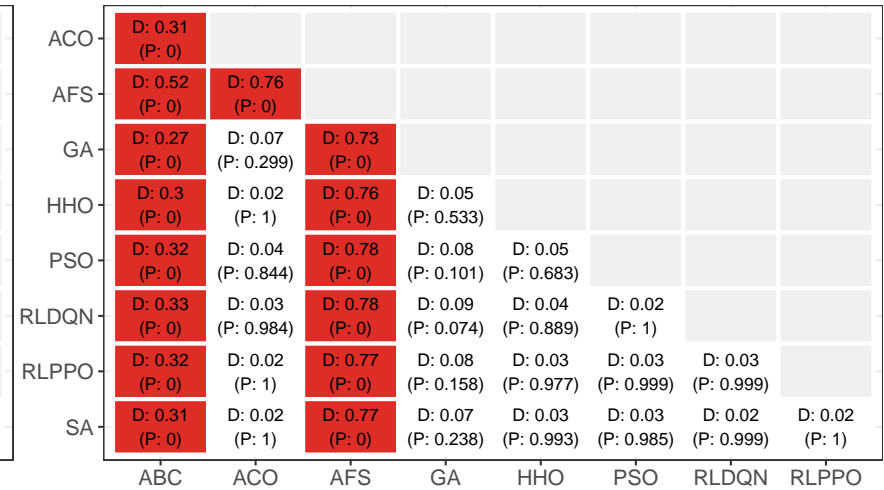
□ NS ■ P < 0.01

scenario_3_servers_300_services_3_application_GENERIC



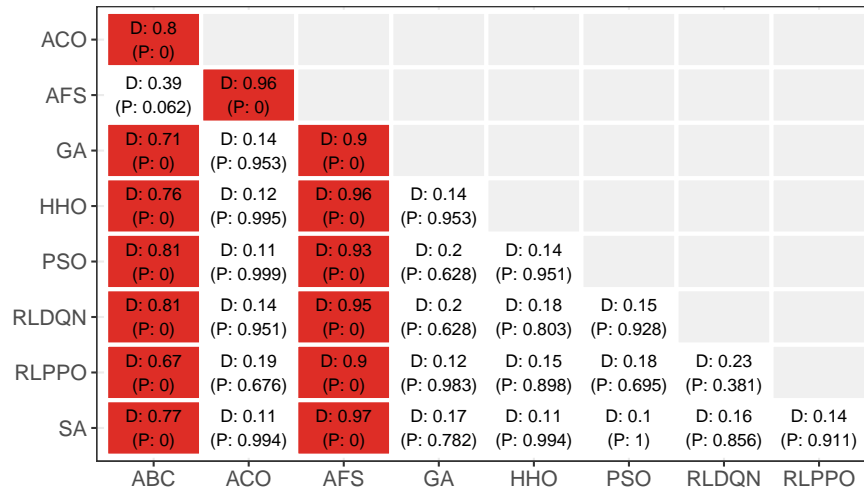
□ NS □ P < 0.05 ■ P < 0.01

scenario_3_servers_300_services_3_application_LTS



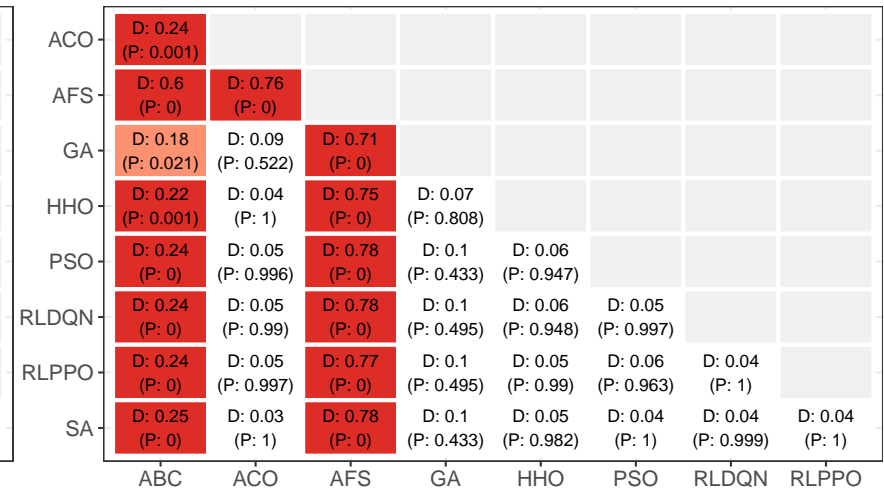
□ NS ■ P < 0.01

scenario_3_servers_300_services_3_application_MMA



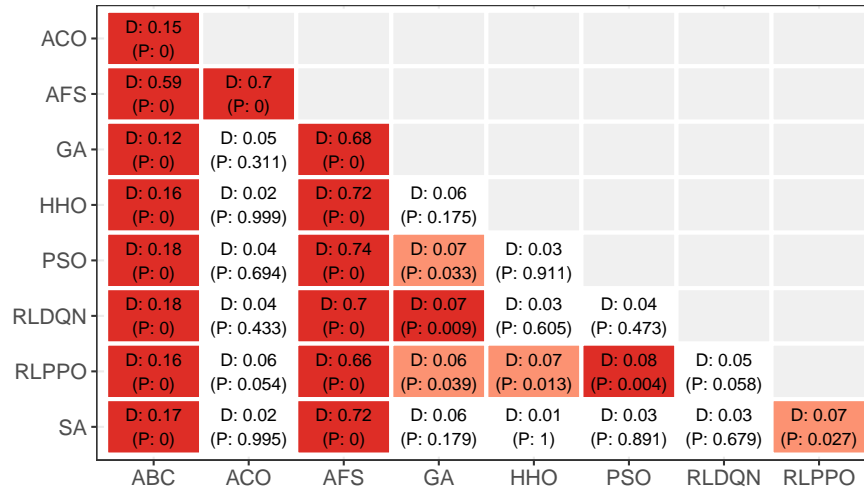
□ NS ■ P < 0.01

scenario_3_servers_300_services_3_application_PWD



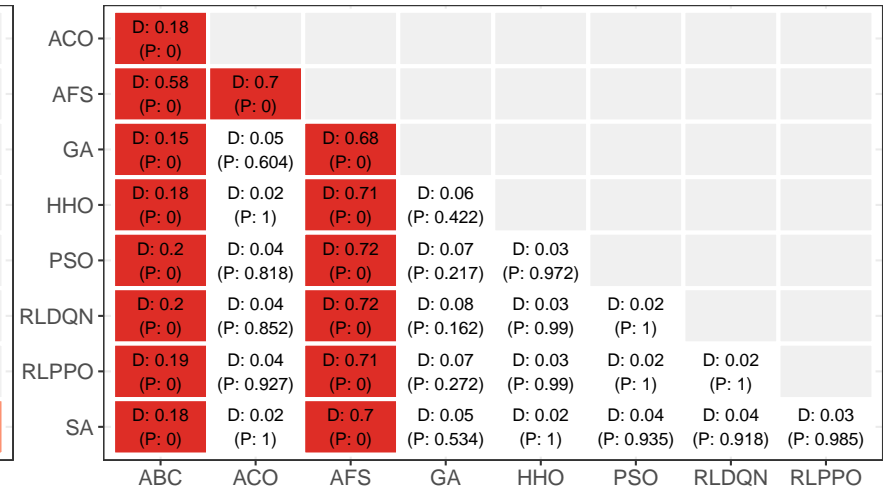
□ NS □ P < 0.05 ■ P < 0.01

scenario_3_servers_300_services_5_application_GENERIC



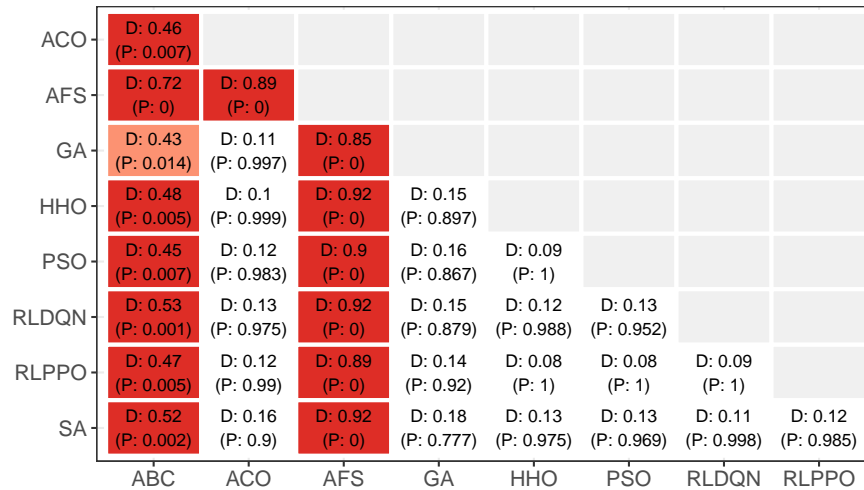
NS P < 0.05 P < 0.01

scenario_3_servers_300_services_5_application_LTS



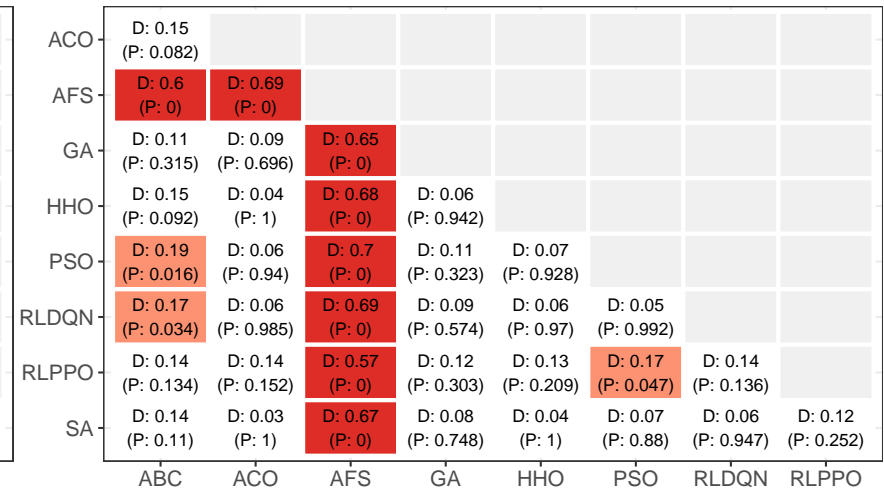
NS P < 0.01

scenario_3_servers_300_services_5_application_MMA



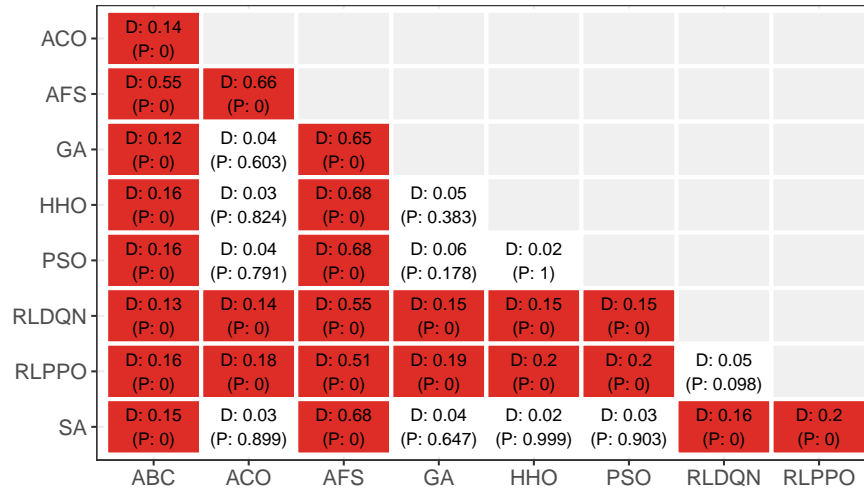
NS P < 0.05 P < 0.01

scenario_3_servers_300_services_5_application_PWD



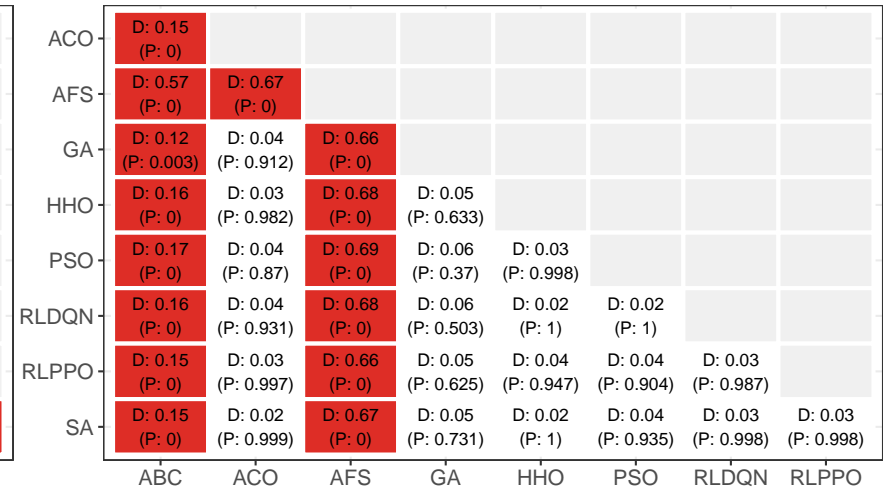
NS P < 0.05 P < 0.01

scenario_3_servers_300_services_7_application_GENERIC



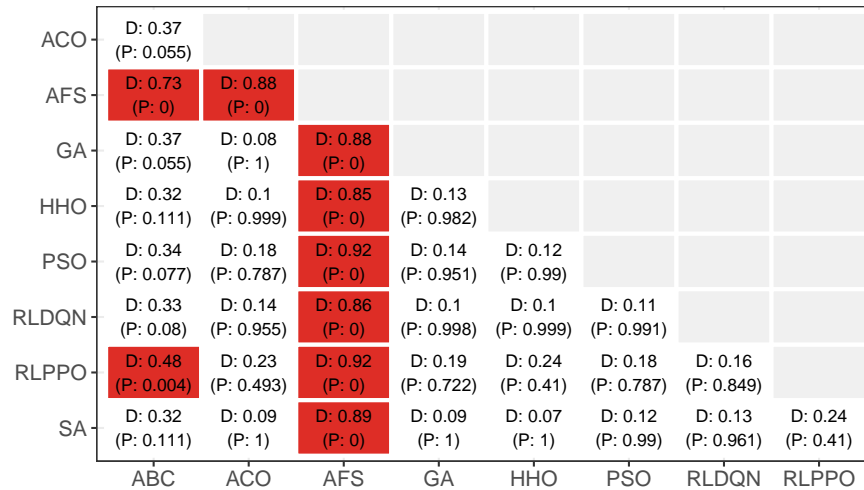
□ NS □ P < 0.01

scenario_3_servers_300_services_7_application_LTS



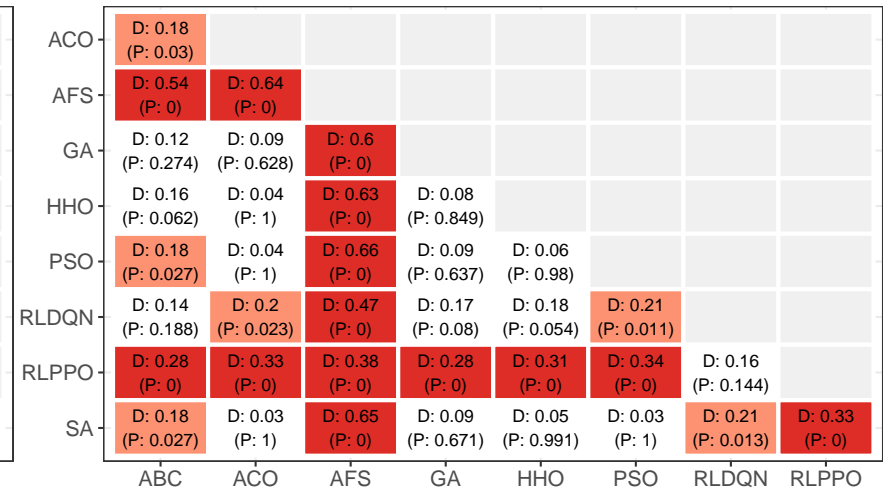
□ NS □ P < 0.01

scenario_3_servers_300_services_7_application_MMA



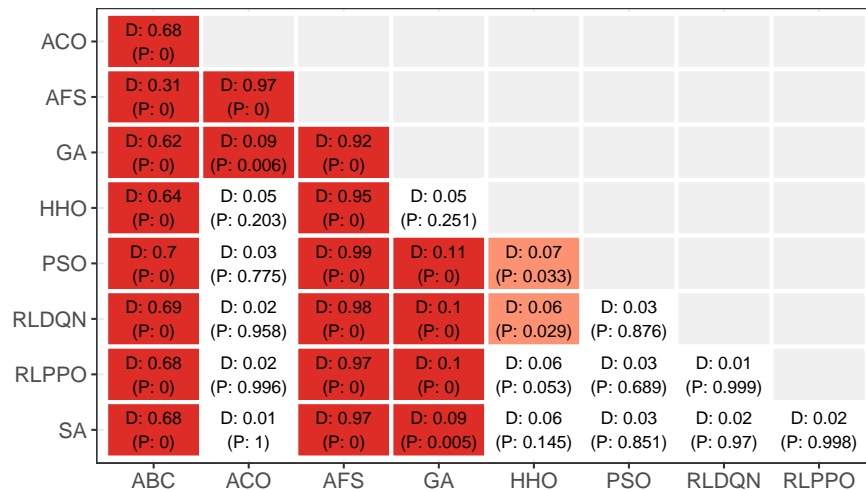
□ NS □ P < 0.01

scenario_3_servers_300_services_7_application_PWD



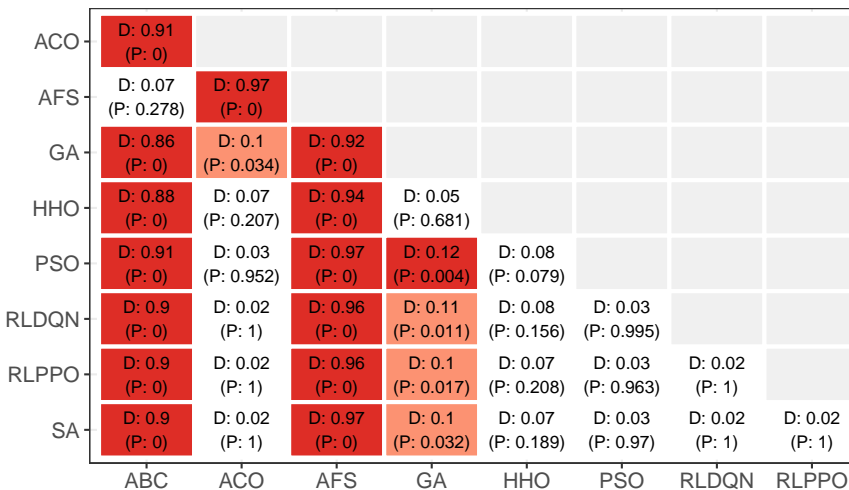
□ NS □ P < 0.05 □ P < 0.01

scenario_3_servers_400_services_1_application_GENERIC



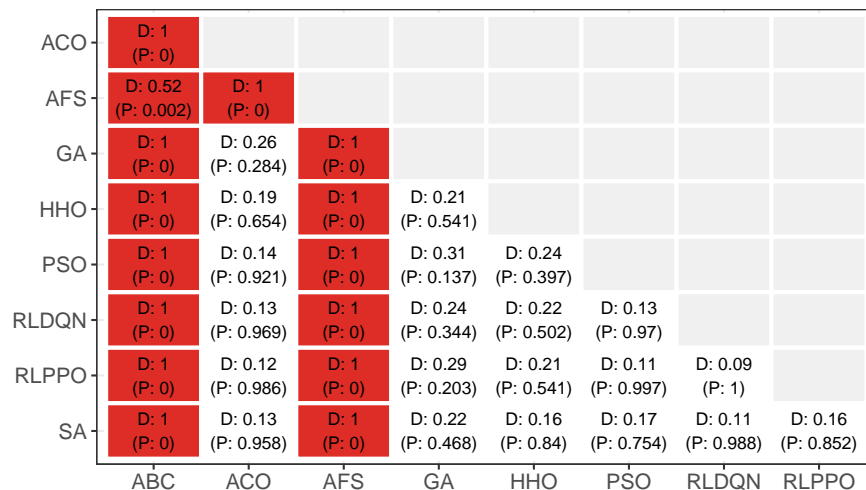
□ NS □ P < 0.05 ■ P < 0.01

scenario_3_servers_400_services_1_application_LTS



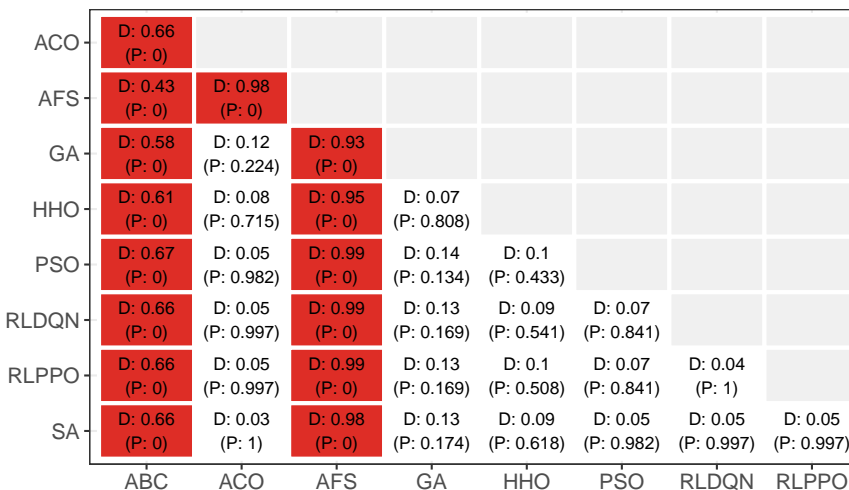
□ NS □ P < 0.05 ■ P < 0.01

scenario_3_servers_400_services_1_application_MMA



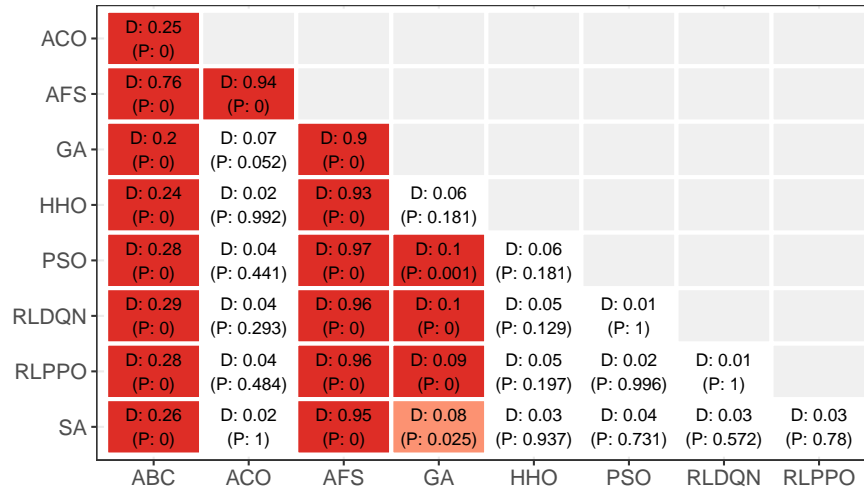
□ NS ■ P < 0.01

scenario_3_servers_400_services_1_application_PWD



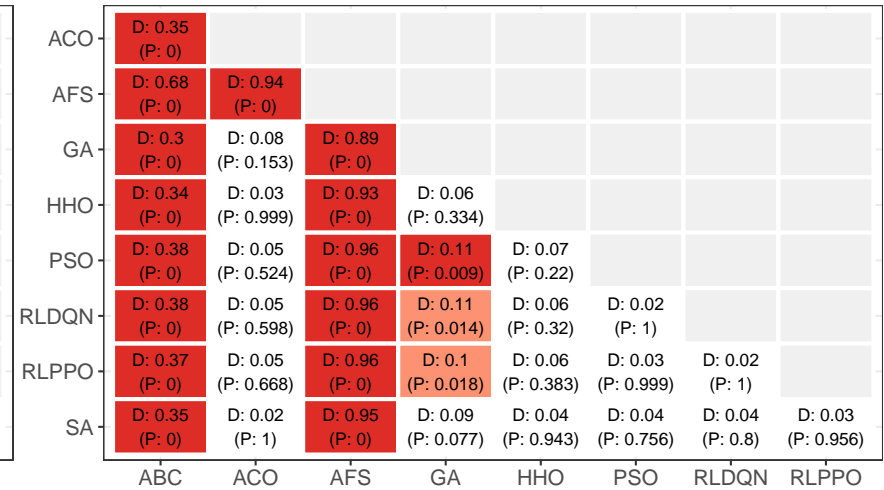
□ NS ■ P < 0.01

scenario_3_servers_400_services_3_application_GENERIC



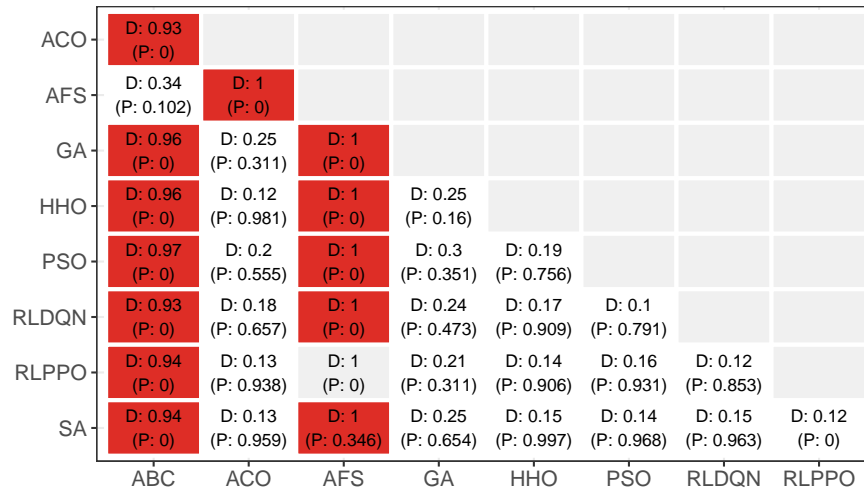
NS P < 0.05 P < 0.01

scenario_3_servers_400_services_3_application_LTS



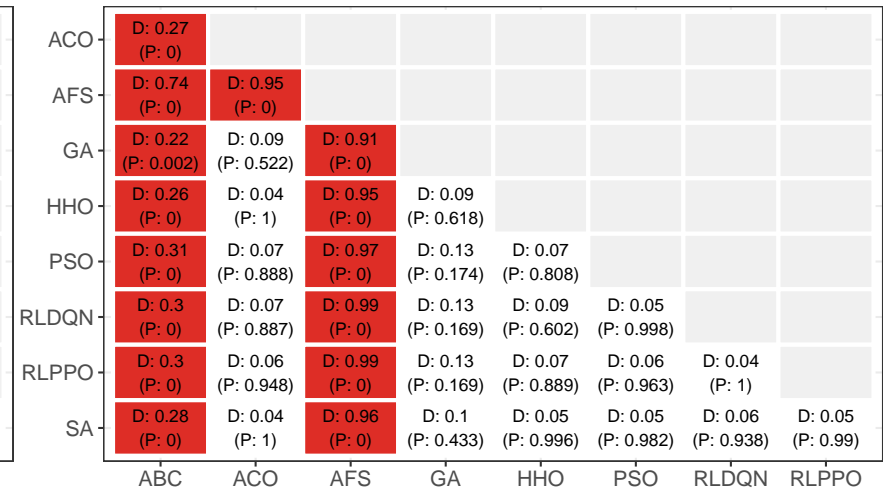
NS P < 0.05 P < 0.01

scenario_3_servers_400_services_3_application_MMA



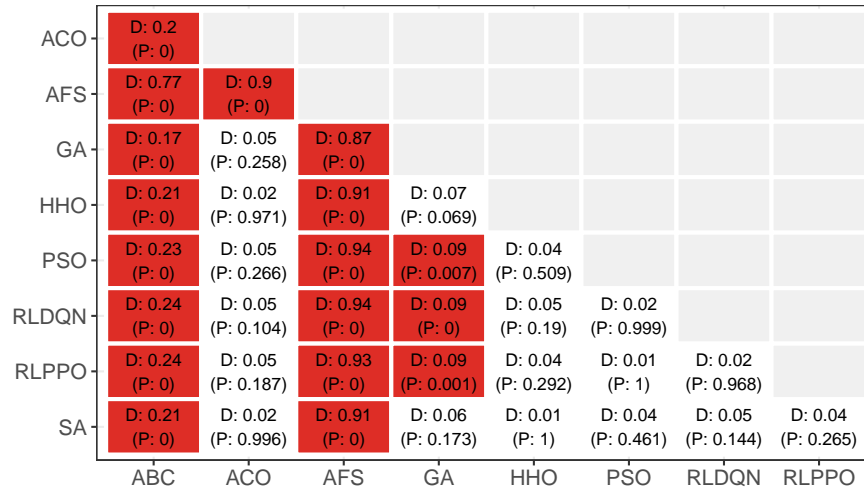
NS P < 0.01

scenario_3_servers_400_services_3_application_PWD



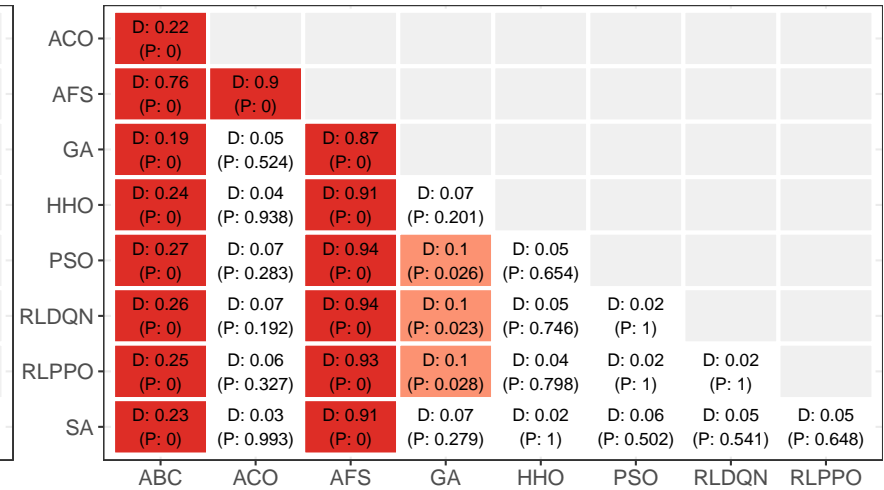
NS P < 0.01

scenario_3_servers_400_services_5_application_GENERIC



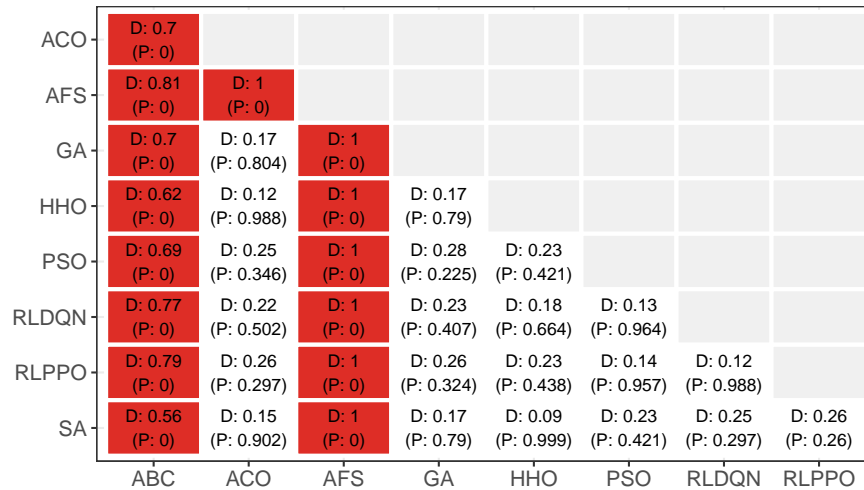
□ NS □ P < 0.01

scenario_3_servers_400_services_5_application_LTS



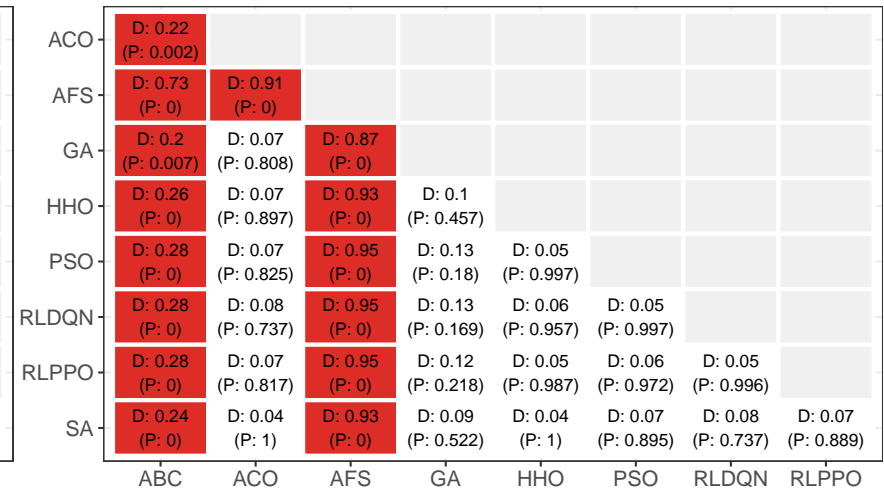
□ NS □ P < 0.05 □ P < 0.01

scenario_3_servers_400_services_5_application_MMA



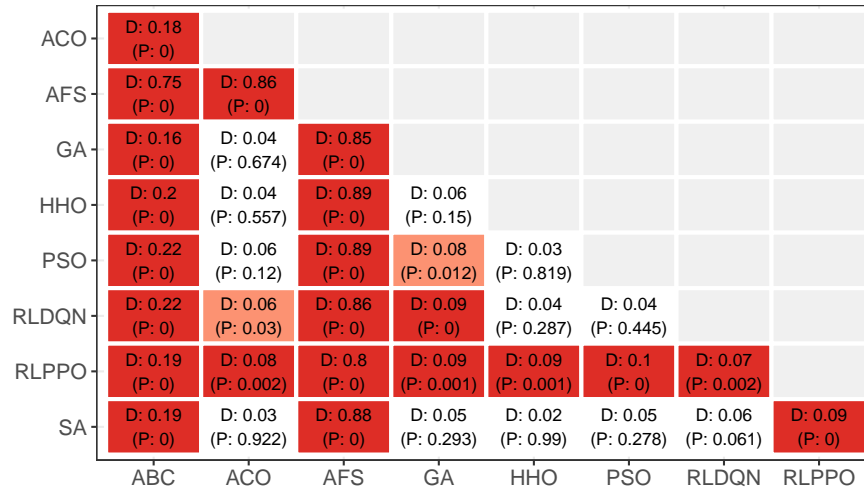
□ NS □ P < 0.01

scenario_3_servers_400_services_5_application_PWD



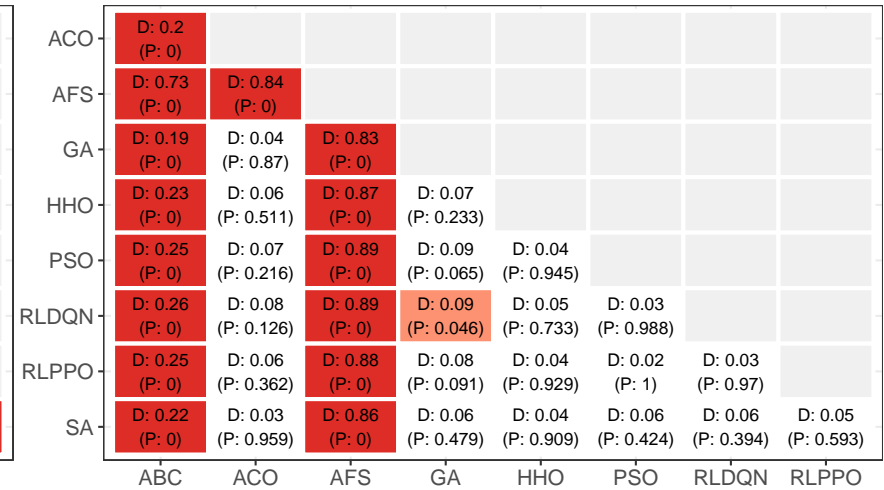
□ NS □ P < 0.01

scenario_3_servers_400_services_7_application_GENERIC



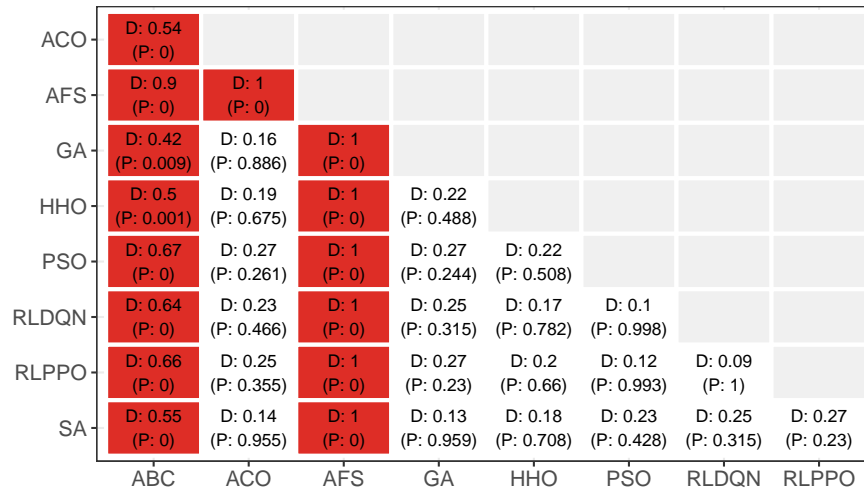
NS P < 0.05 P < 0.01

scenario_3_servers_400_services_7_application_LTS



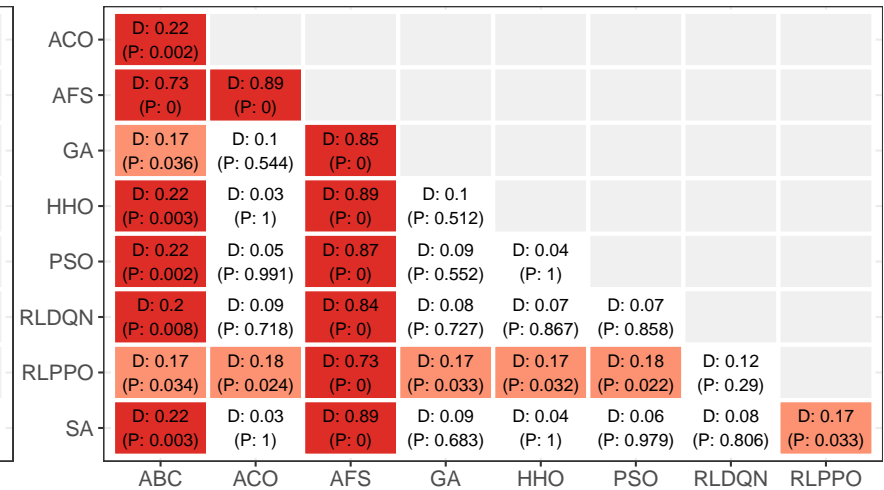
NS P < 0.05 P < 0.01

scenario_3_servers_400_services_7_application_MMA



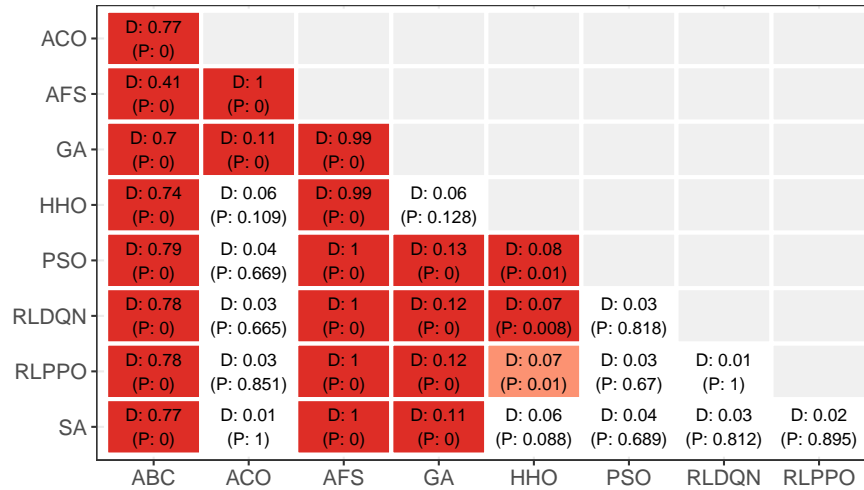
NS P < 0.01

scenario_3_servers_400_services_7_application_PWD



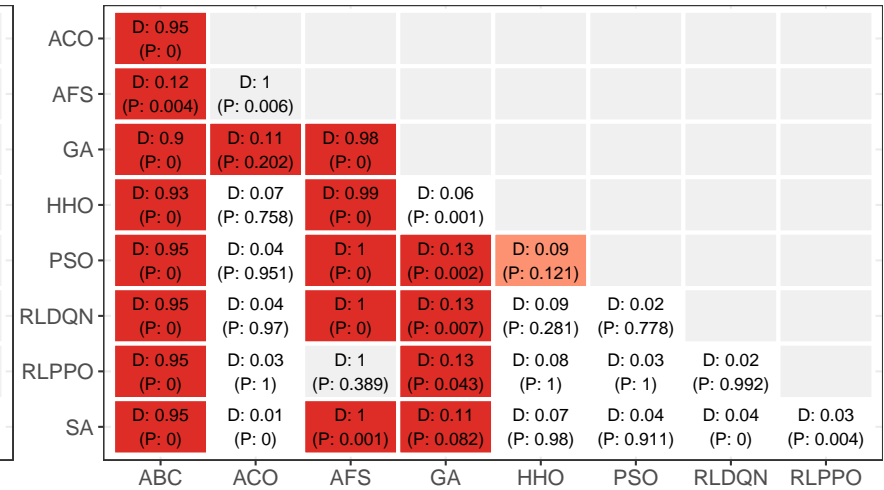
NS P < 0.05 P < 0.01

scenario_3_servers_500_services_1_application_GENERIC



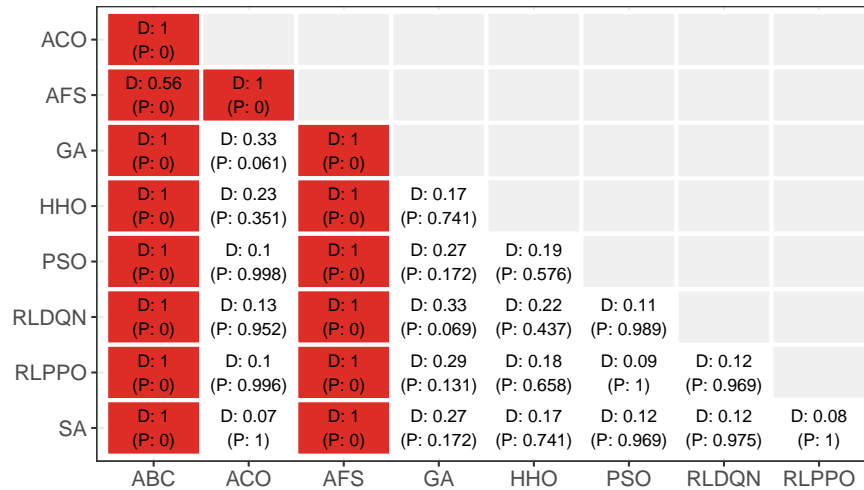
NS P < 0.05 P < 0.01

scenario_3_servers_500_services_1_application_LTS



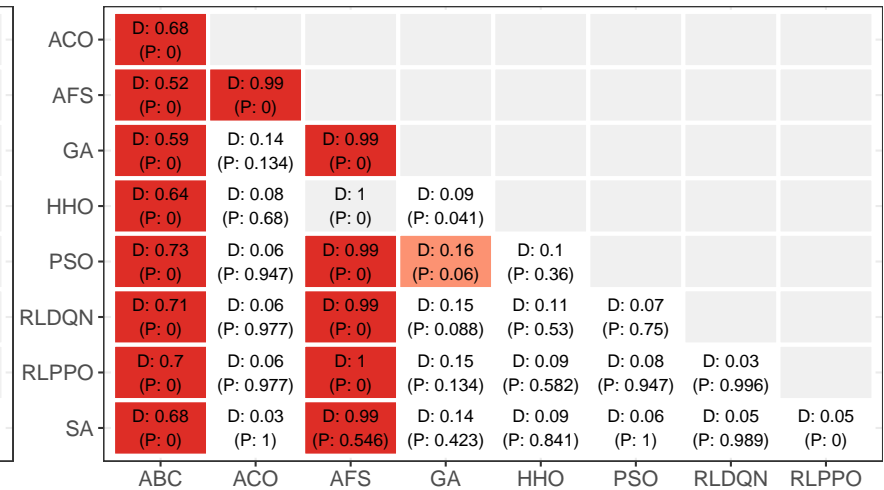
NS P < 0.05 P < 0.01

scenario_3_servers_500_services_1_application_MMA



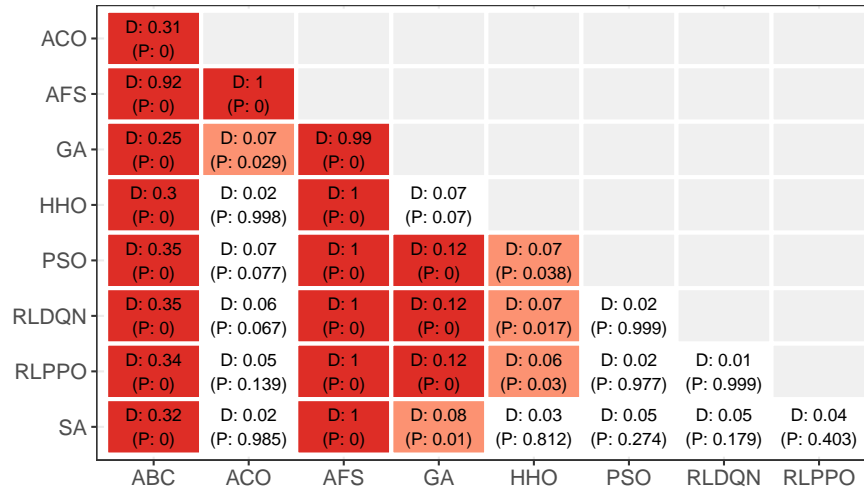
NS P < 0.01

scenario_3_servers_500_services_1_application_PWD



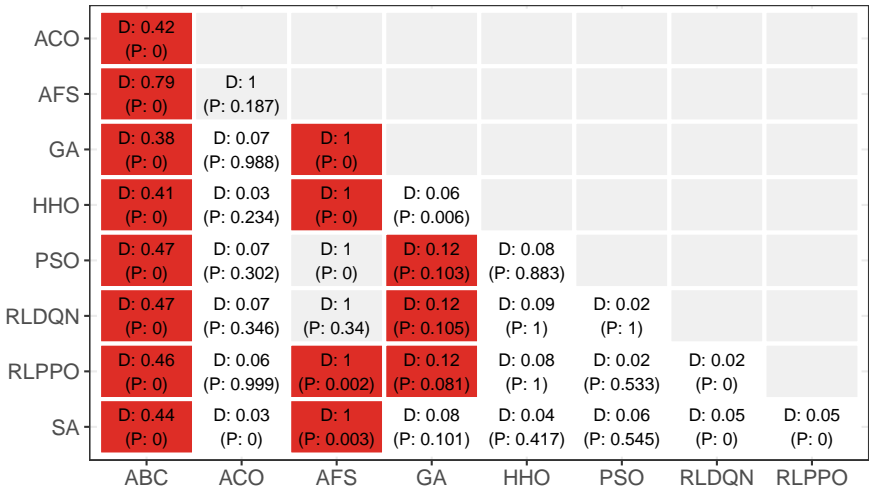
NS P < 0.05 P < 0.01

scenario_3_servers_500_services_3_application_GENERIC



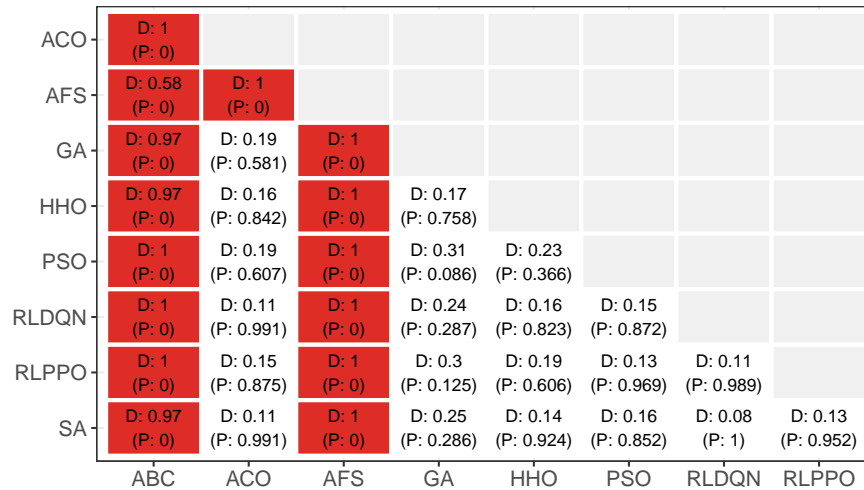
□ NS □ P < 0.05 ■ P < 0.01

scenario_3_servers_500_services_3_application_LTS



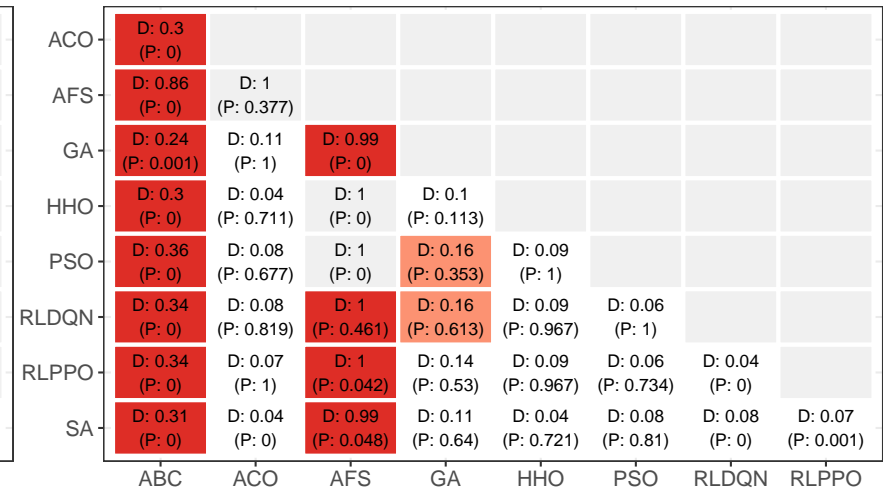
□ NS ■ P < 0.01

scenario_3_servers_500_services_3_application_MMA



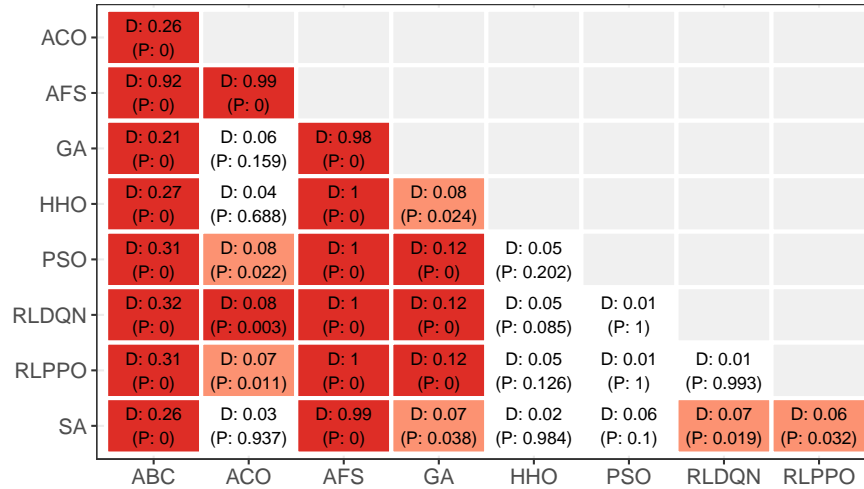
□ NS ■ P < 0.01

scenario_3_servers_500_services_3_application_PWD



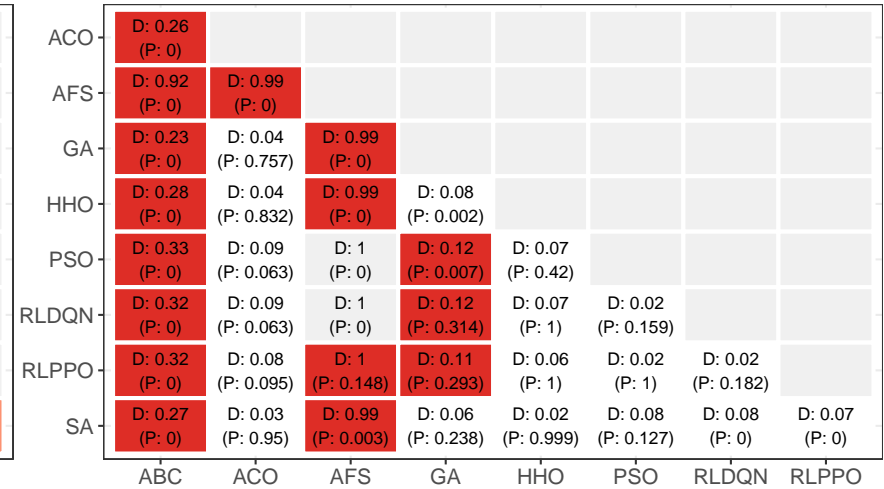
□ NS □ P < 0.05 ■ P < 0.01

scenario_3_servers_500_services_5_application_GENERIC



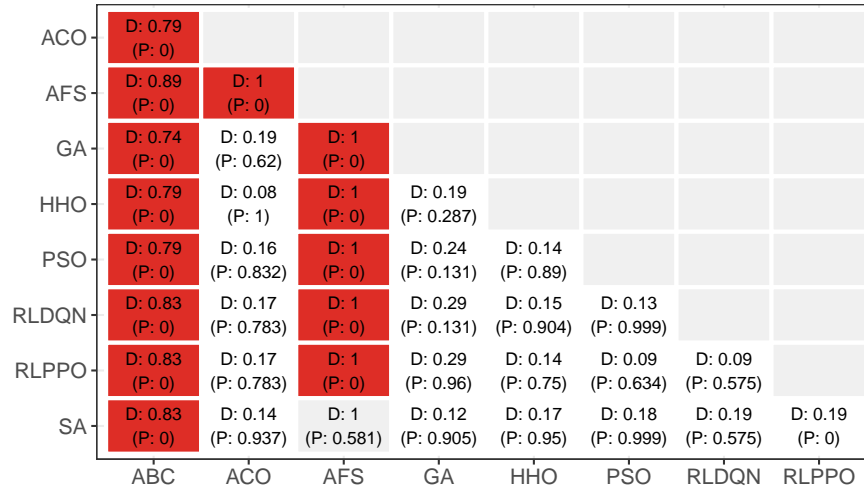
□ NS □ P < 0.05 ■ P < 0.01

scenario_3_servers_500_services_5_application_LTS



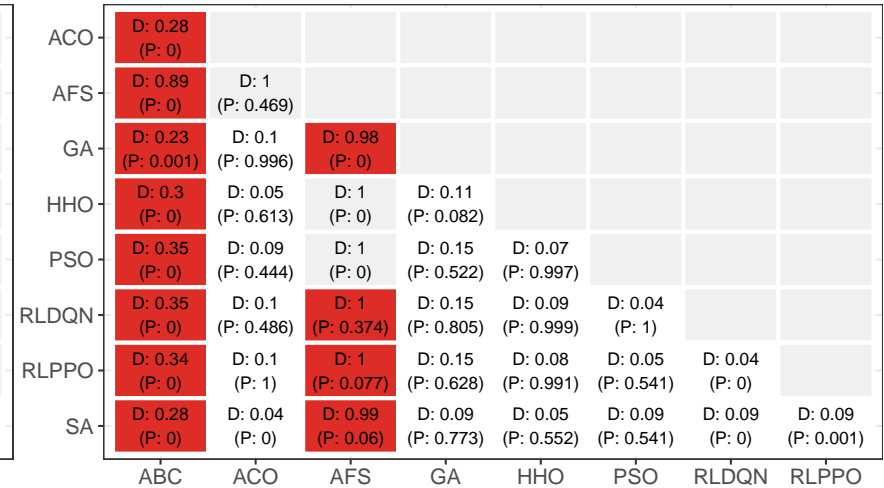
□ NS ■ P < 0.01

scenario_3_servers_500_services_5_application_MMA



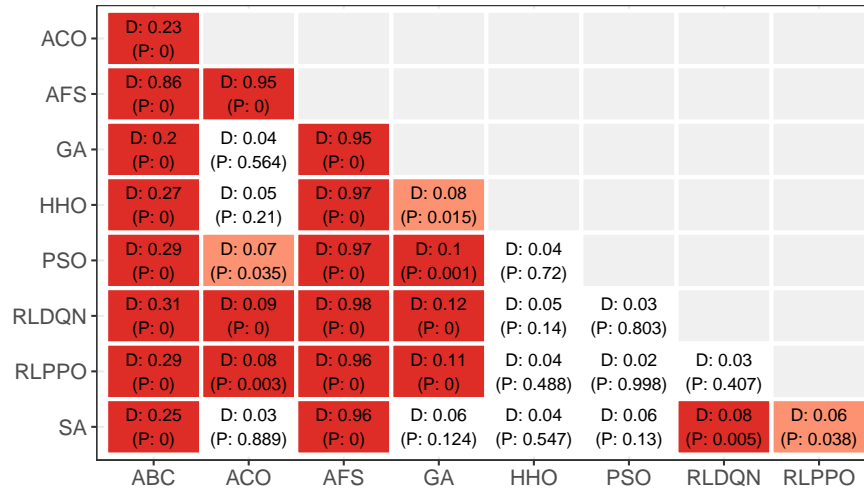
□ NS ■ P < 0.01

scenario_3_servers_500_services_5_application_PWD



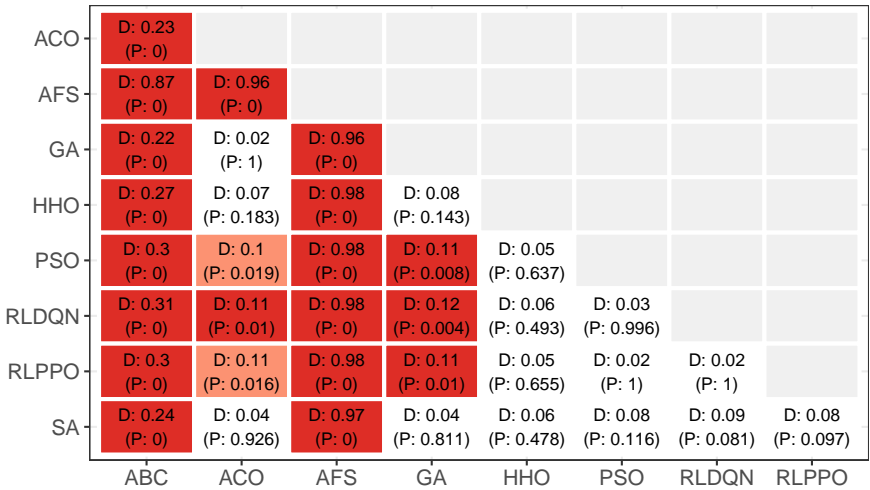
□ NS ■ P < 0.01

scenario_3_servers_500_services_7_application_GENERIC



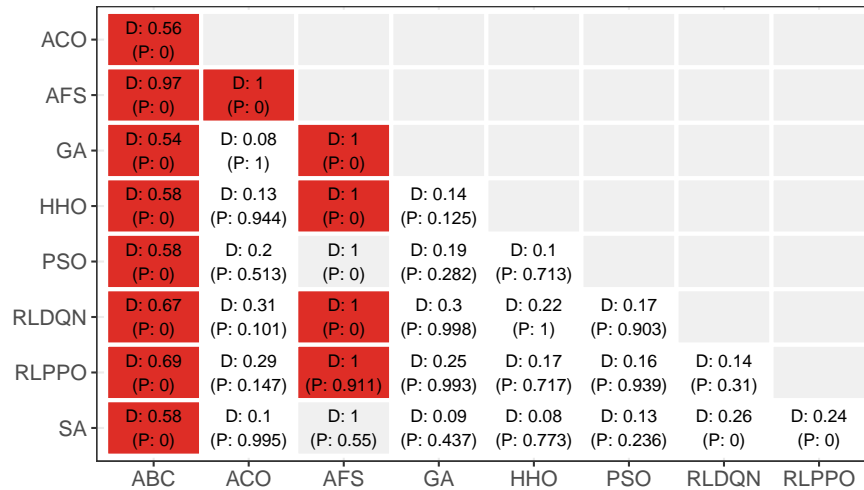
NS P < 0.05 P < 0.01

scenario_3_servers_500_services_7_application_LTS



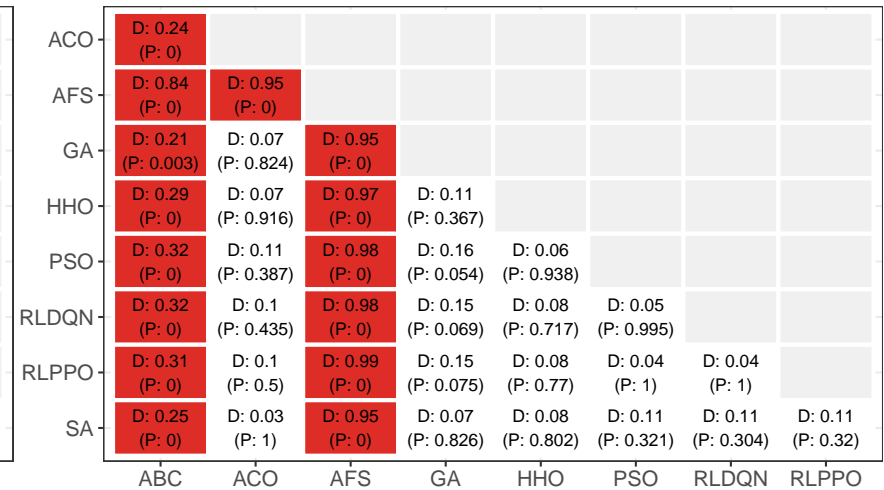
NS P < 0.05 P < 0.01

scenario_3_servers_500_services_7_application_MMA



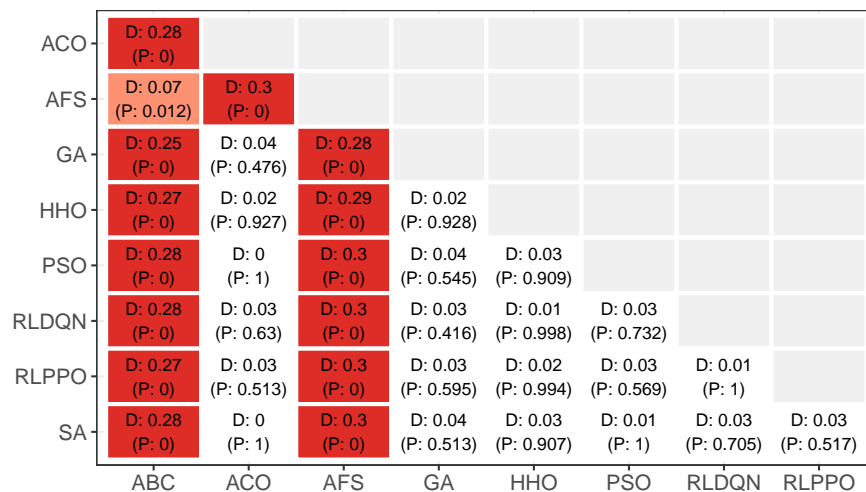
NS P < 0.01

scenario_3_servers_500_services_7_application_PWD



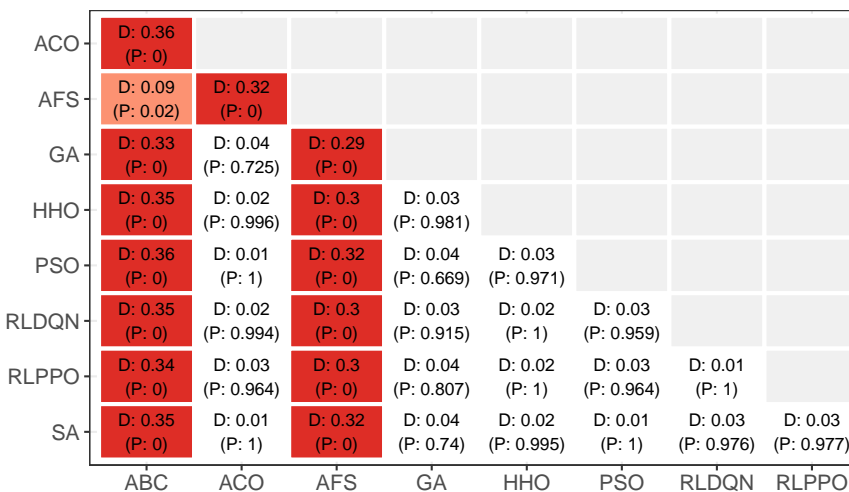
NS P < 0.01

scenario_4_servers_100_services_1_application_GENERIC



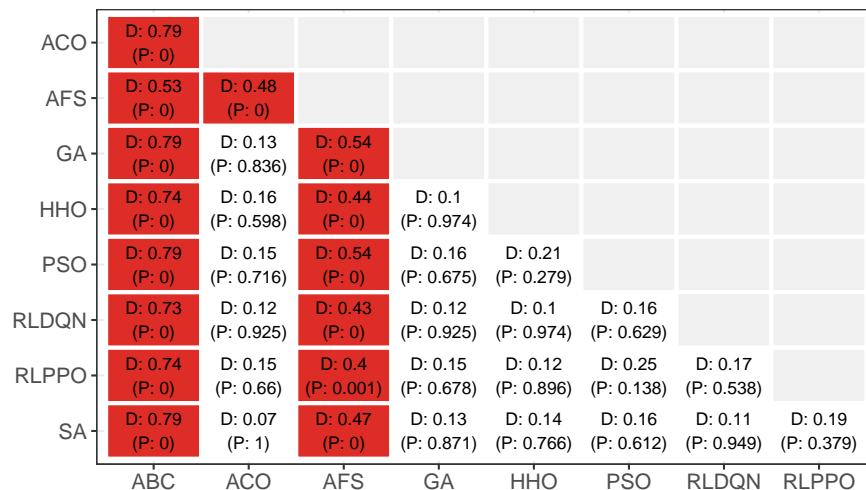
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_100_services_1_application_LTS



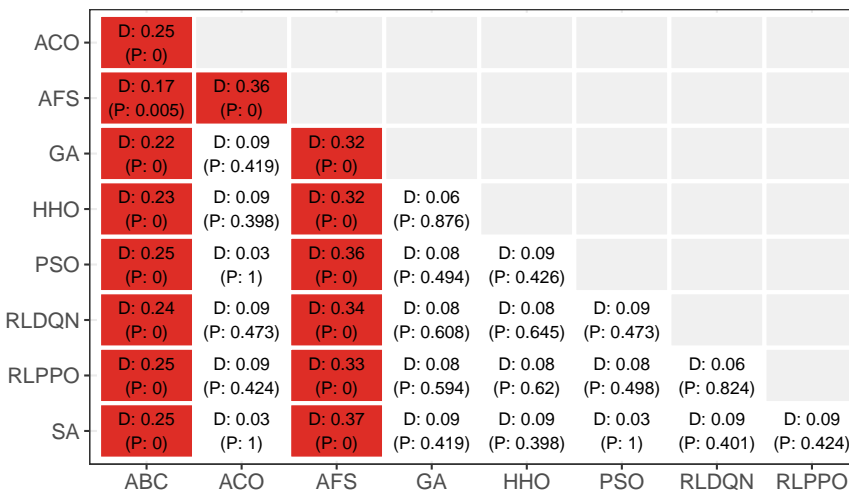
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_100_services_1_application_MMA



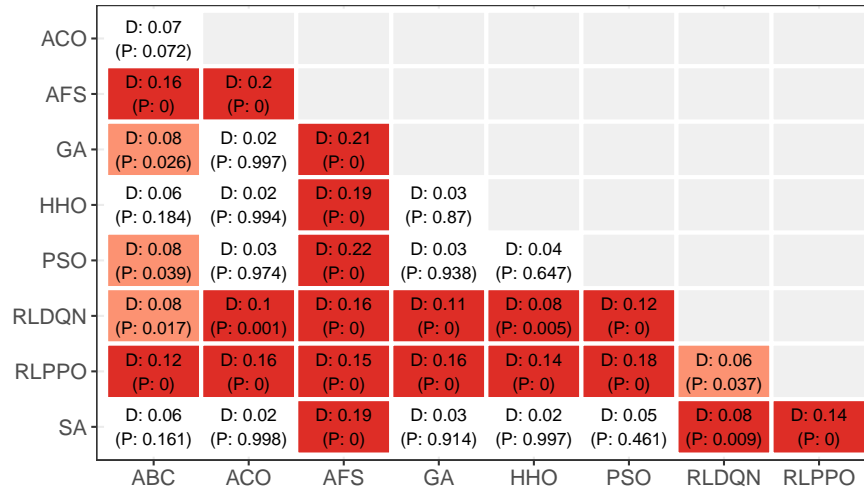
□ NS ■ P < 0.01

scenario_4_servers_100_services_1_application_PWD



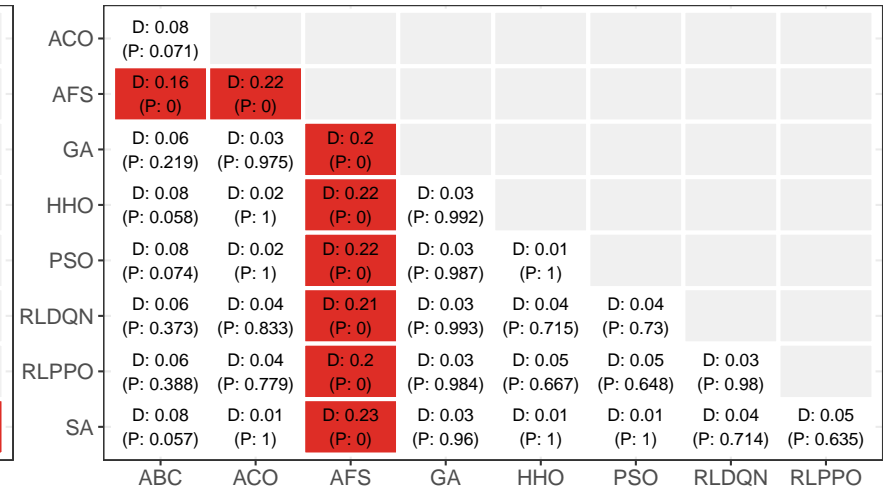
□ NS ■ P < 0.01

scenario_4_servers_100_services_3_application_GENERIC



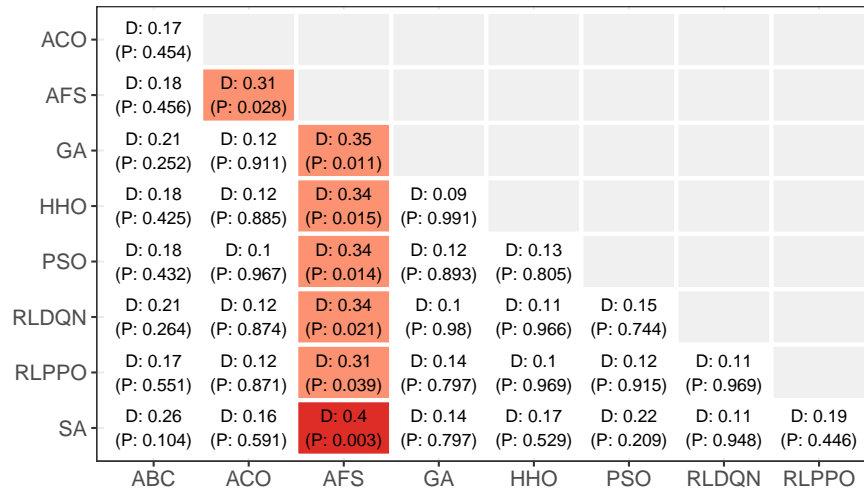
NS
 P < 0.05
 P < 0.01

scenario_4_servers_100_services_3_application_LTS



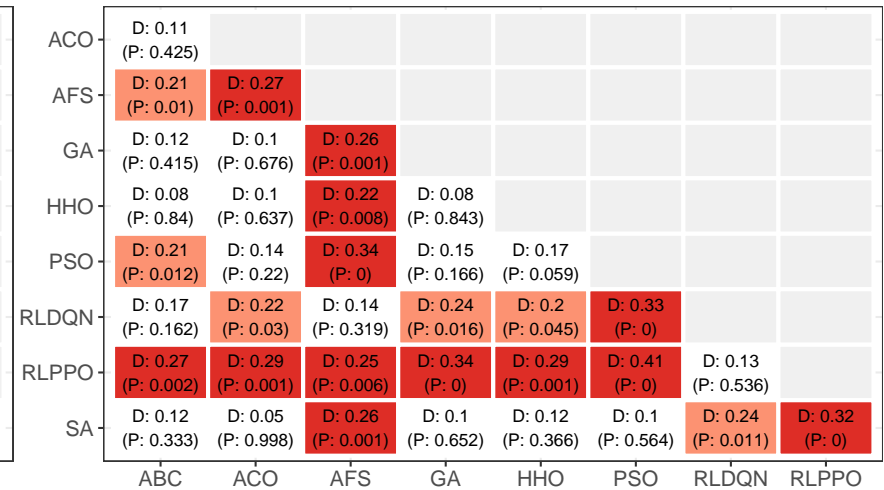
NS
 P < 0.01

scenario_4_servers_100_services_3_application_MMA



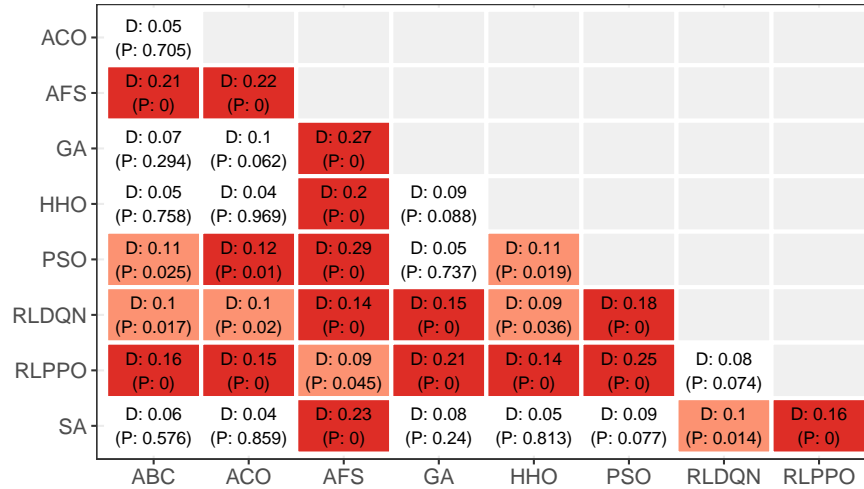
NS
 P < 0.05
 P < 0.01

scenario_4_servers_100_services_3_application_PWD



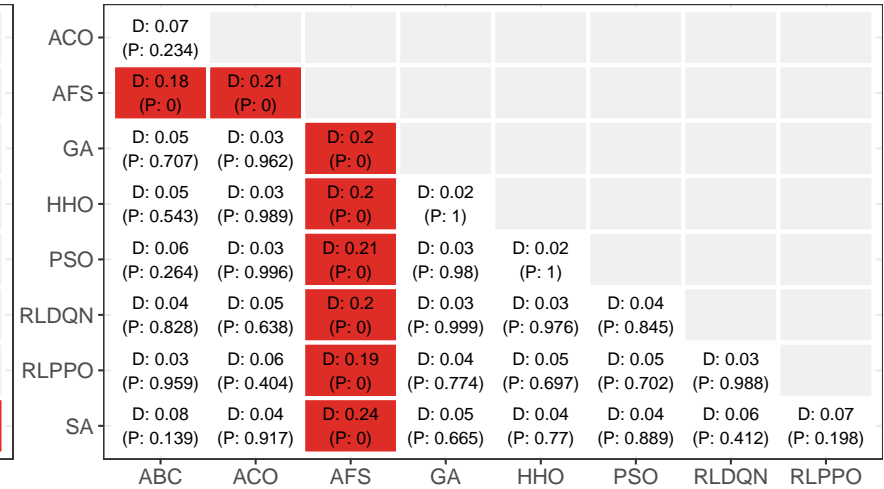
NS
 P < 0.05
 P < 0.01

scenario_4_servers_100_services_5_application_GENERIC



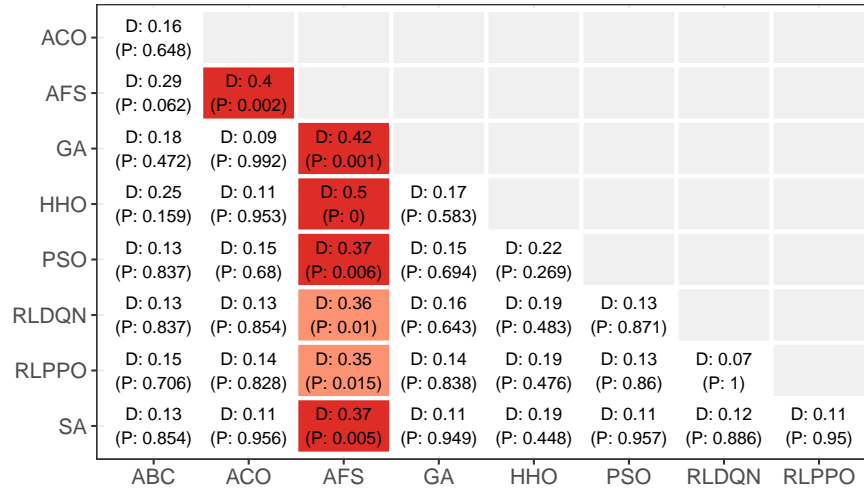
NS
 P < 0.05
 P < 0.01

scenario_4_servers_100_services_5_application_LTS



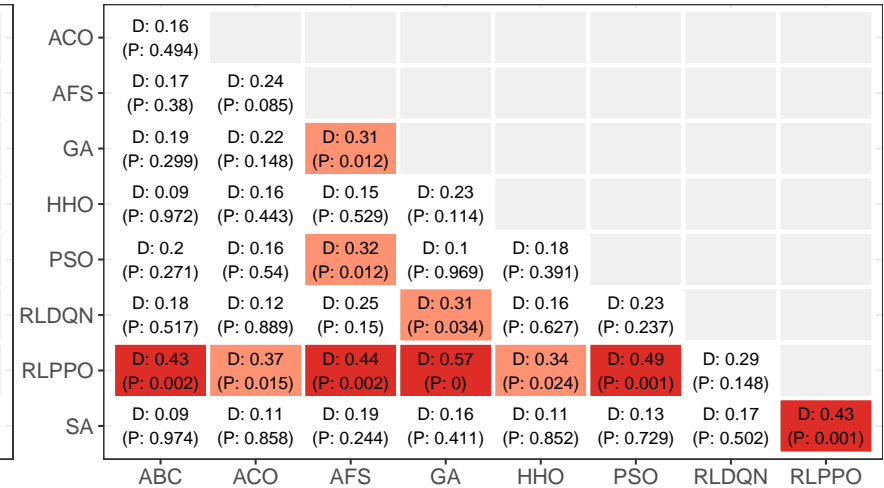
NS
 P < 0.01

scenario_4_servers_100_services_5_application_MMA



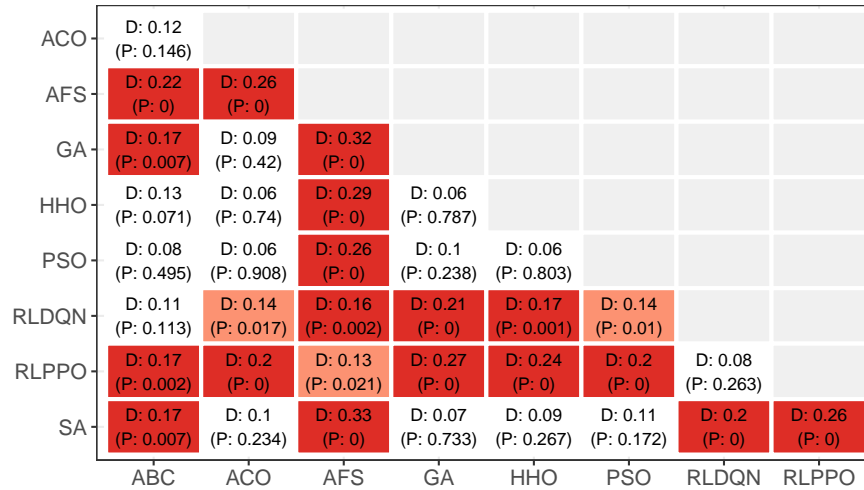
NS
 P < 0.05
 P < 0.01

scenario_4_servers_100_services_5_application_PWD



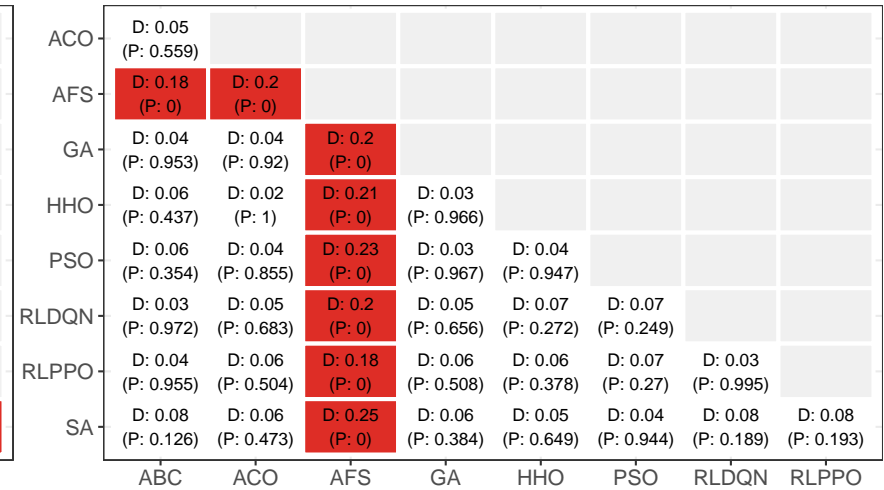
NS
 P < 0.05
 P < 0.01

scenario_4_servers_100_services_7_application_GENERIC



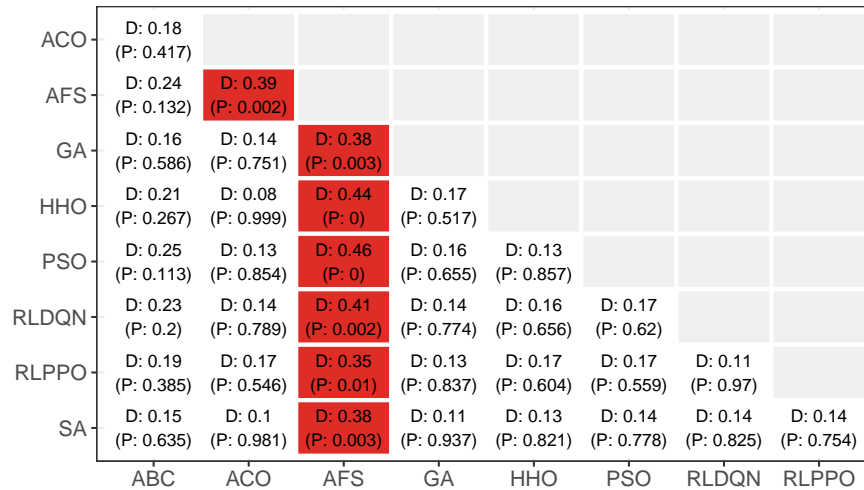
NS
 P < 0.05
 P < 0.01

scenario_4_servers_100_services_7_application_LTS



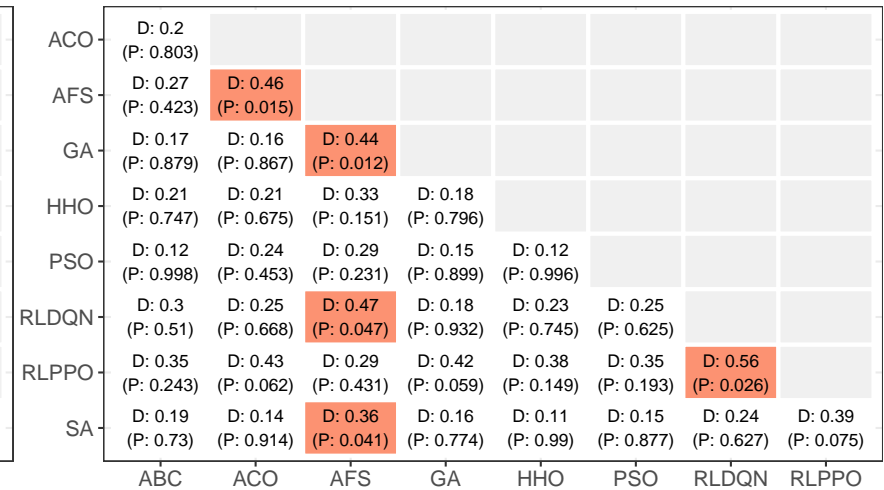
NS
 P < 0.01

scenario_4_servers_100_services_7_application_MMA



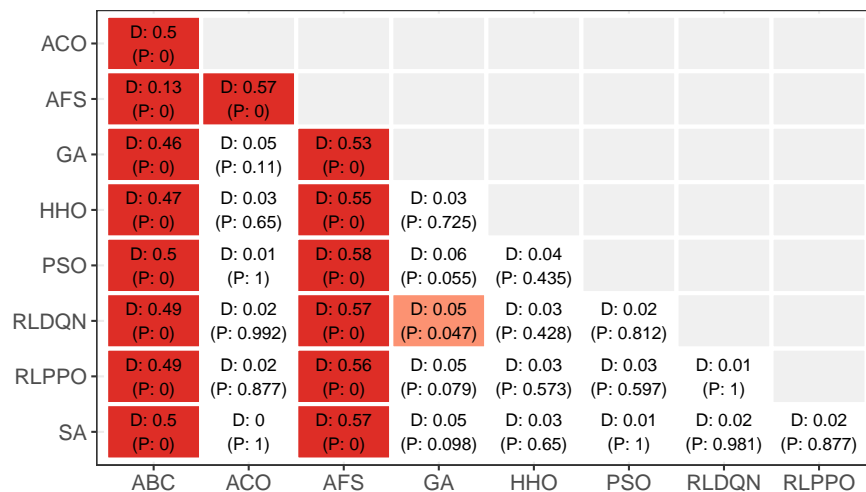
NS
 P < 0.01

scenario_4_servers_100_services_7_application_PWD



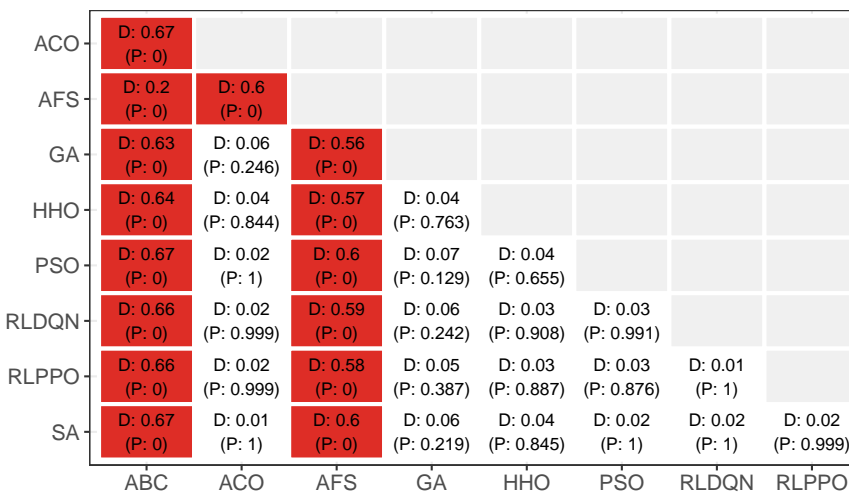
NS
 P < 0.05

scenario_4_servers_200_services_1_application_GENERIC



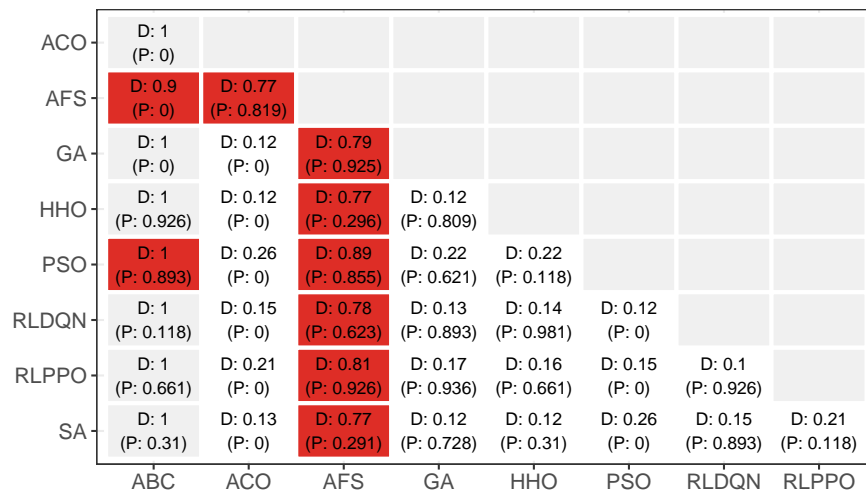
NS
 P < 0.05
 P < 0.01

scenario_4_servers_200_services_1_application_LTS



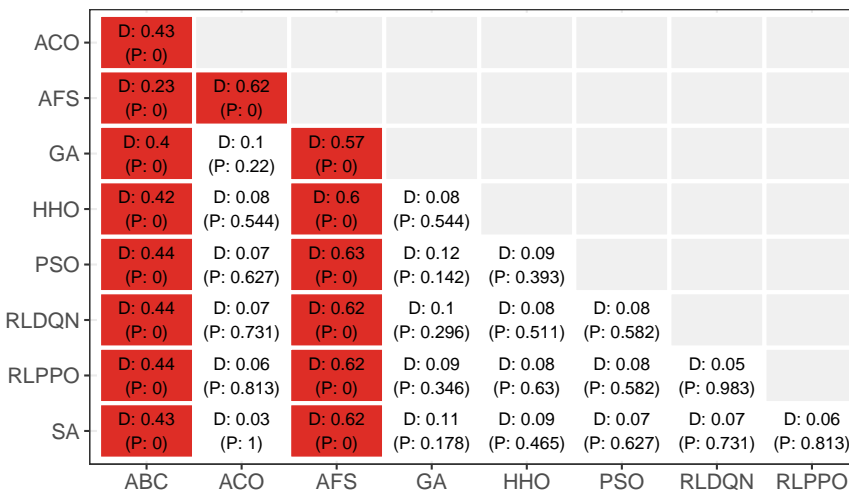
NS
 P < 0.01

scenario_4_servers_200_services_1_application_MMA



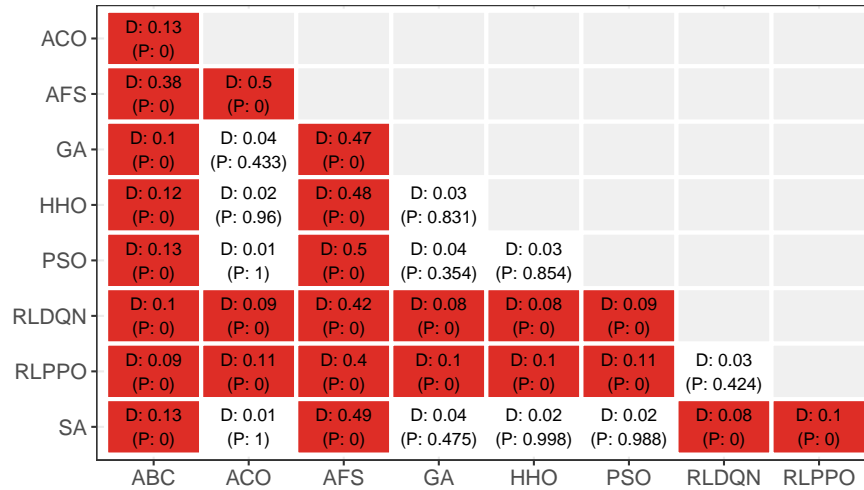
NS
 P < 0.01

scenario_4_servers_200_services_1_application_PWD



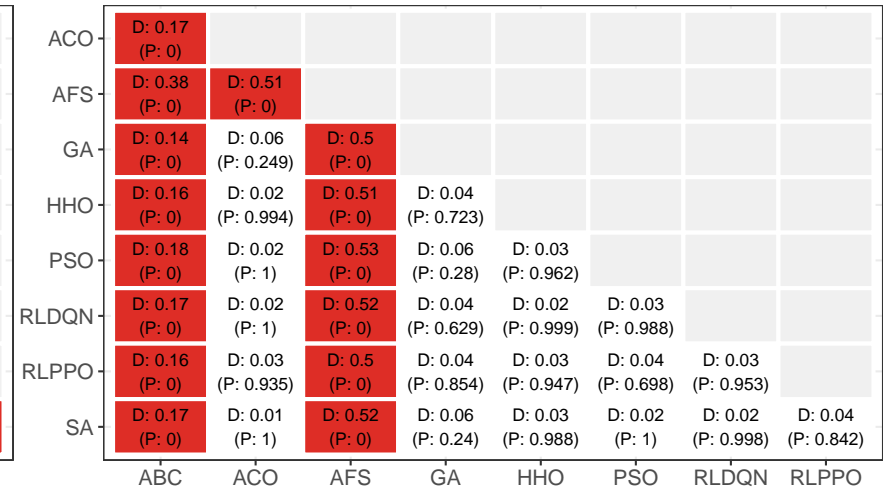
NS
 P < 0.01

scenario_4_servers_200_services_3_application_GENERIC



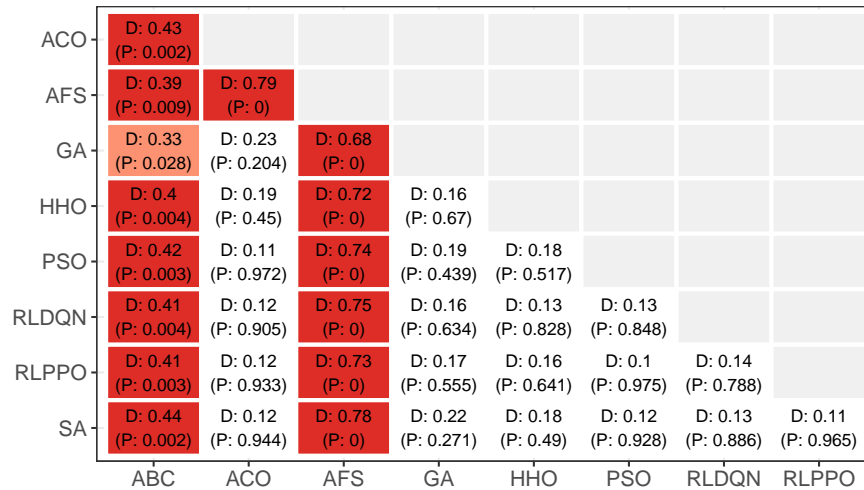
NS P < 0.01

scenario_4_servers_200_services_3_application_LTS



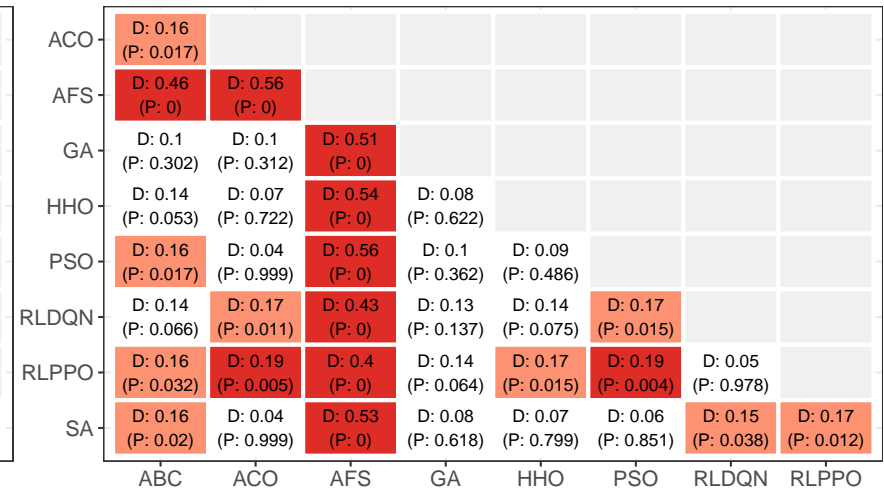
NS P < 0.01

scenario_4_servers_200_services_3_application_MMA



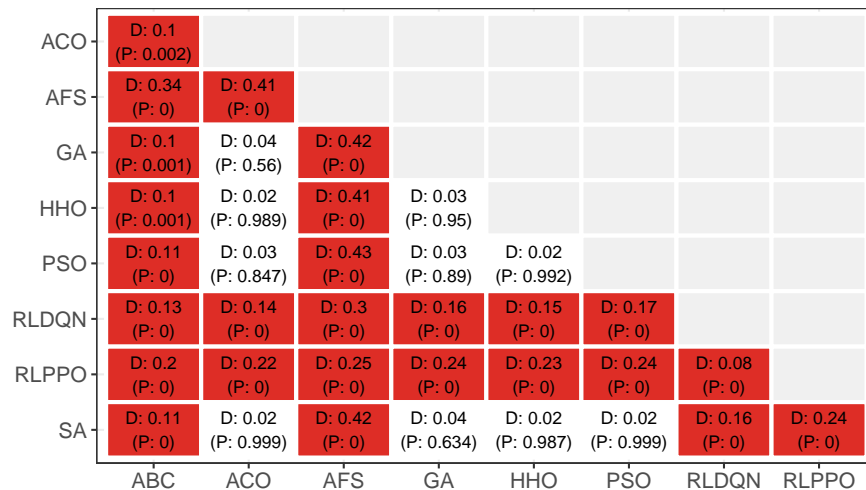
NS P < 0.05 P < 0.01

scenario_4_servers_200_services_3_application_PWD



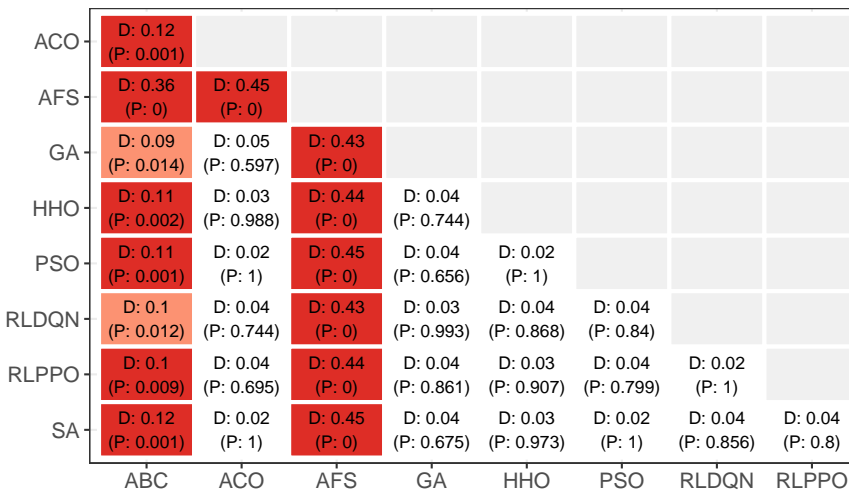
NS P < 0.05 P < 0.01

scenario_4_servers_200_services_5_application_GENERIC



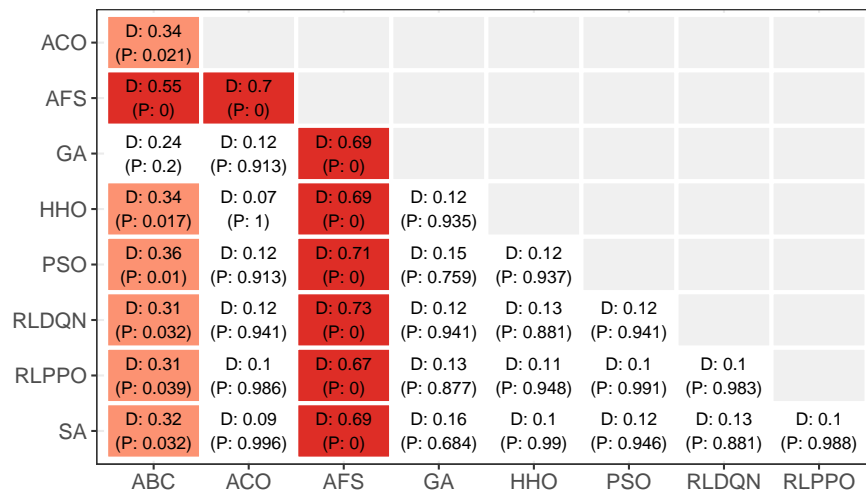
□ NS □ P < 0.01

scenario_4_servers_200_services_5_application_LTS



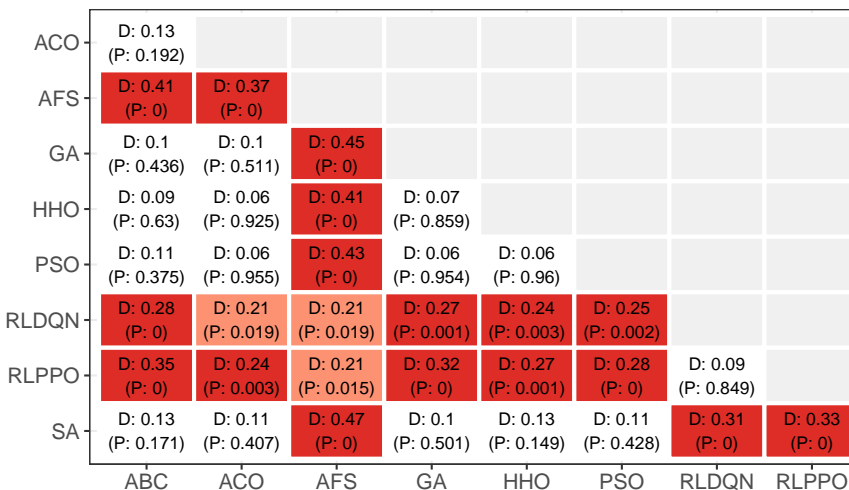
□ NS □ P < 0.05 □ P < 0.01

scenario_4_servers_200_services_5_application_MMA



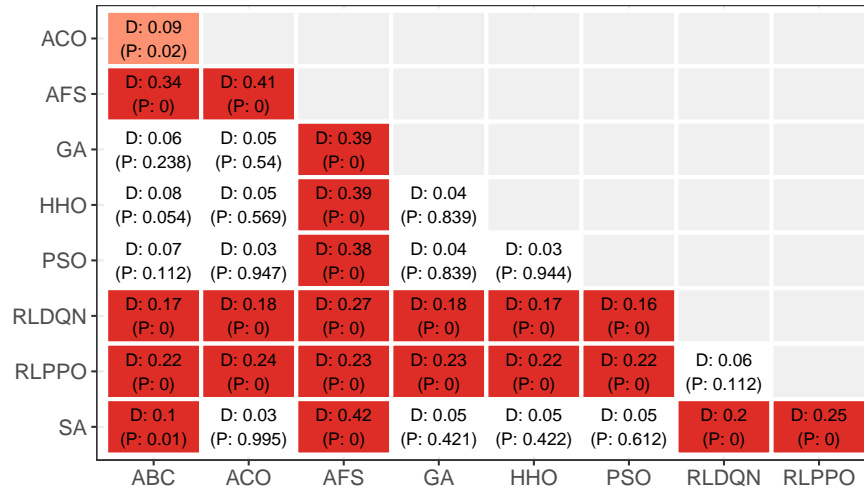
□ NS □ P < 0.05 □ P < 0.01

scenario_4_servers_200_services_5_application_PWD



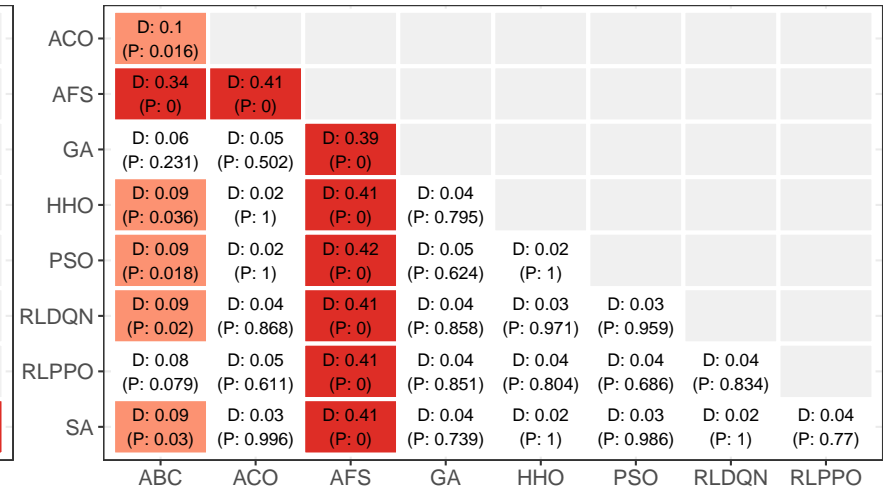
□ NS □ P < 0.05 □ P < 0.01

scenario_4_servers_200_services_7_application_GENERIC



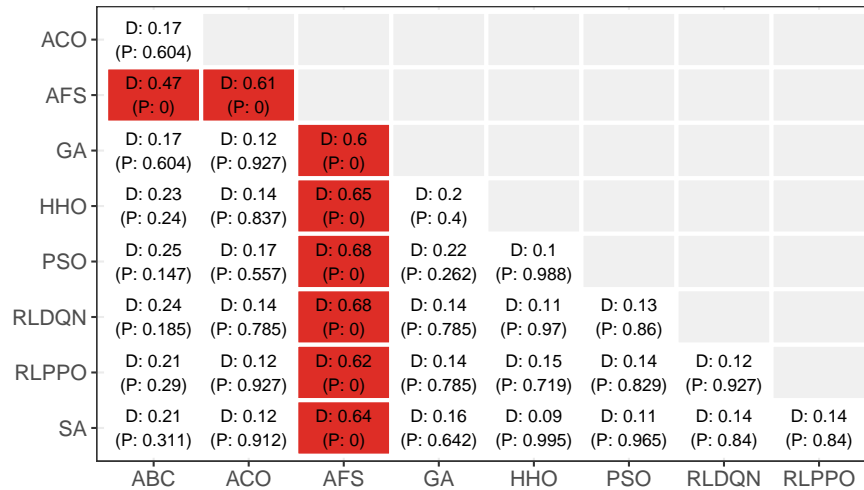
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_200_services_7_application_LTS



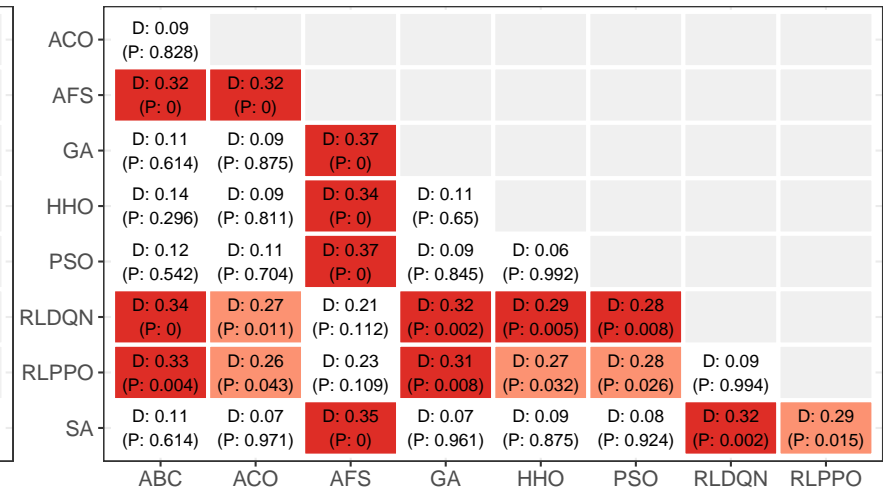
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_200_services_7_application_MMA



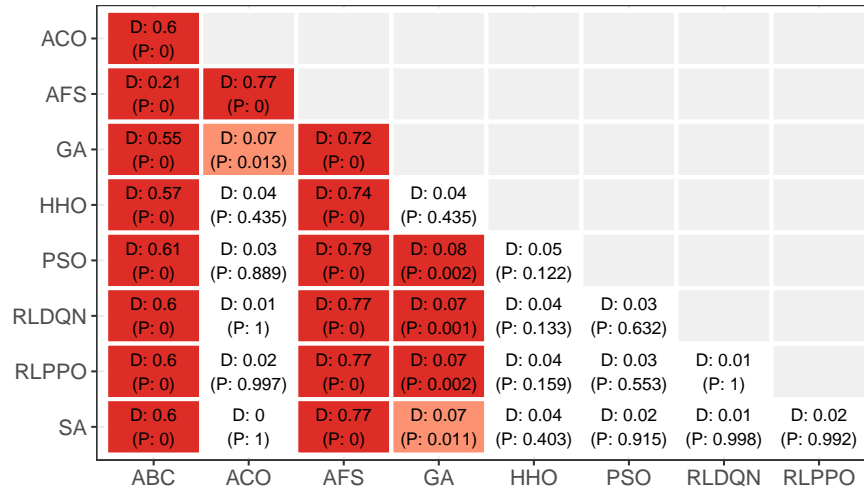
□ NS ■ P < 0.01

scenario_4_servers_200_services_7_application_PWD



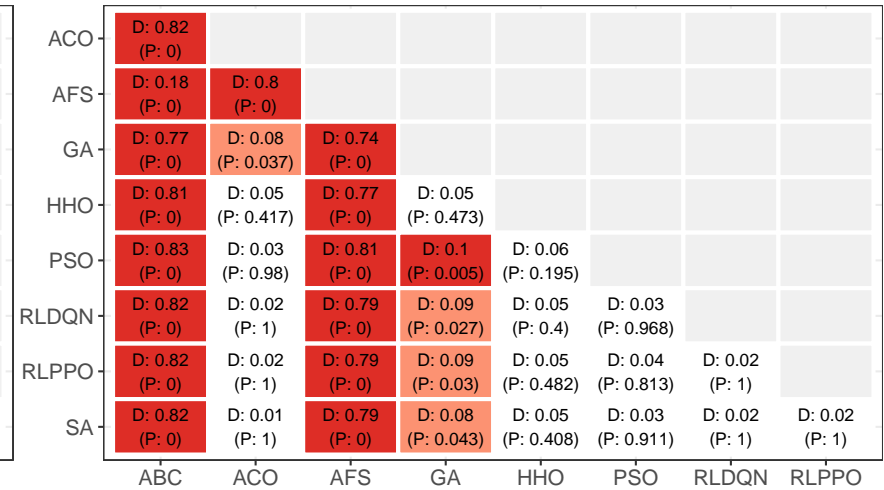
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_300_services_1_application_GENERIC



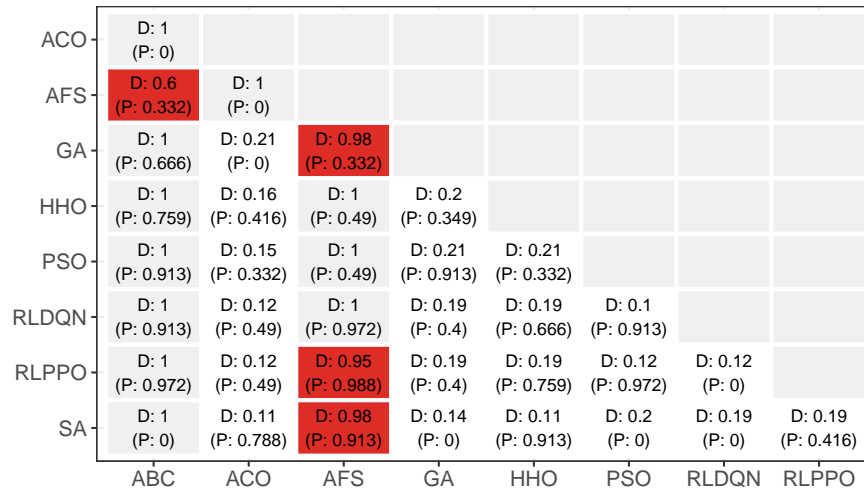
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_300_services_1_application_LTS



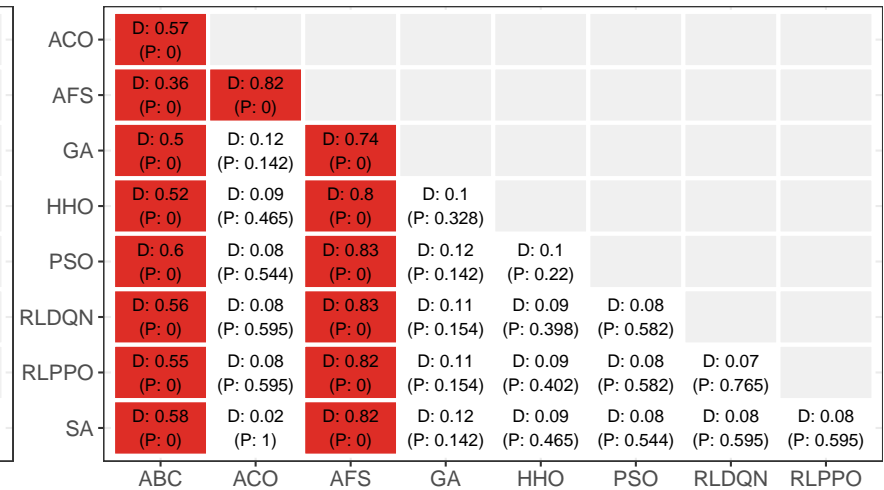
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_300_services_1_application_MMA



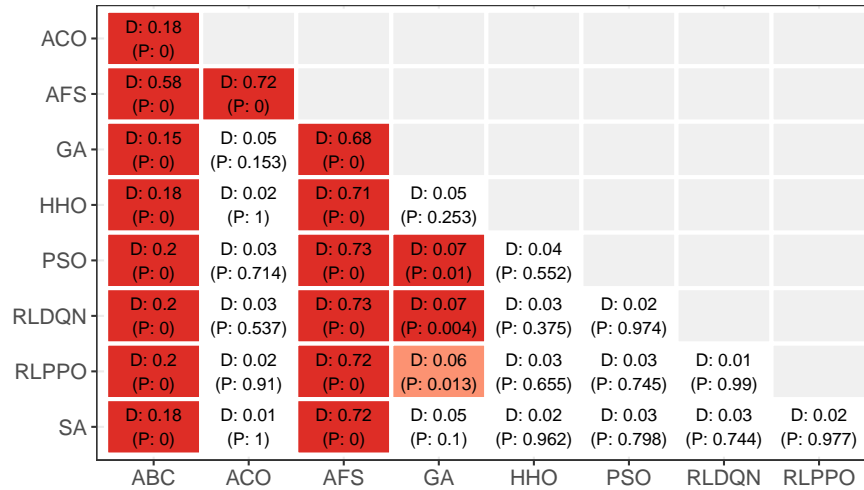
□ NS ■ P < 0.01

scenario_4_servers_300_services_1_application_PWD



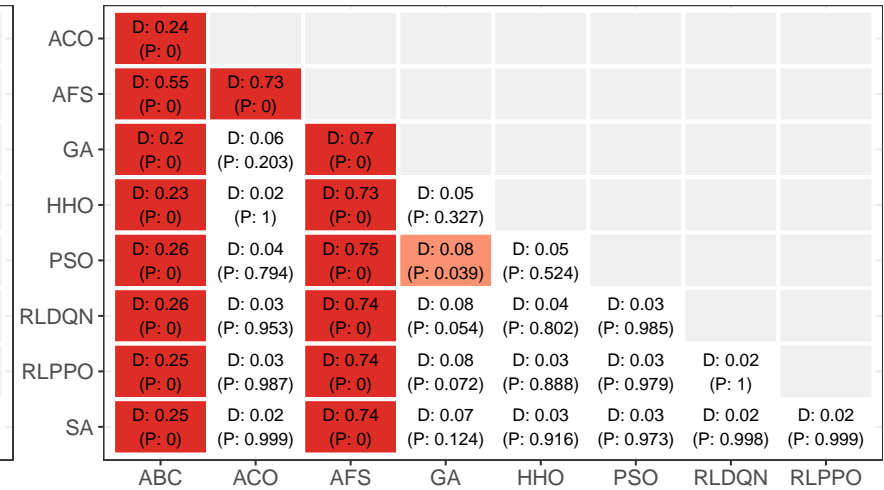
□ NS ■ P < 0.01

scenario_4_servers_300_services_3_application_GENERIC



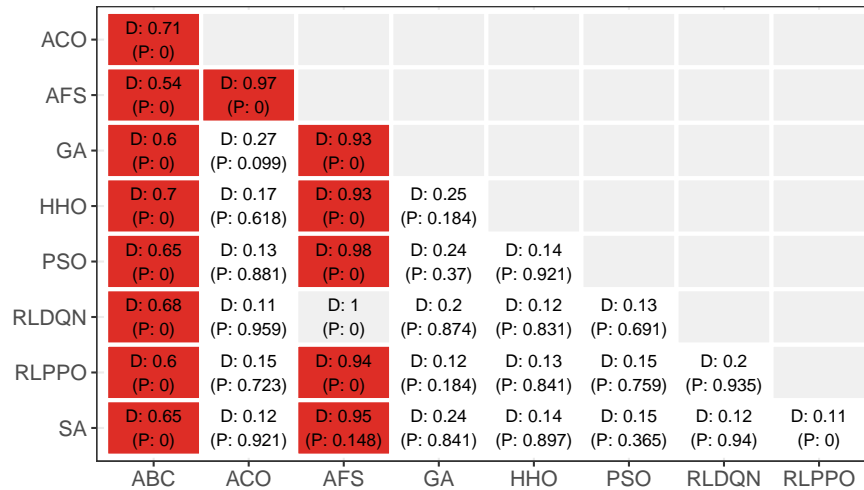
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_300_services_3_application_LTS



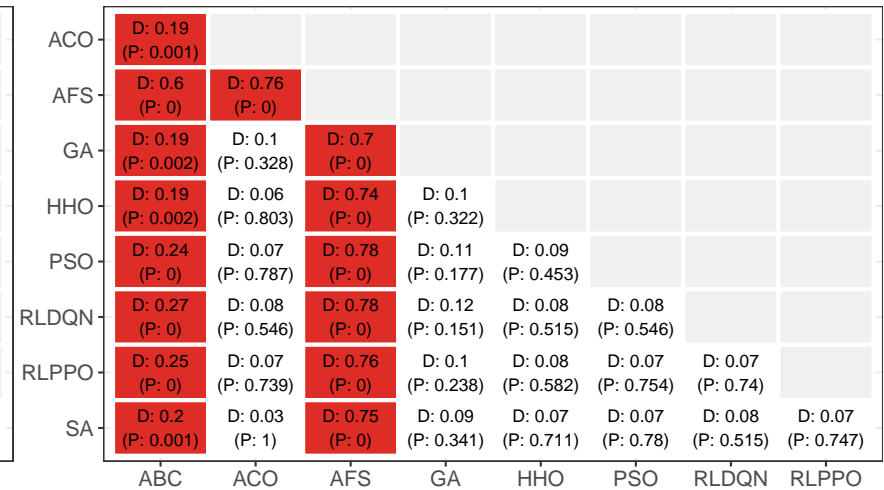
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_300_services_3_application_MMA



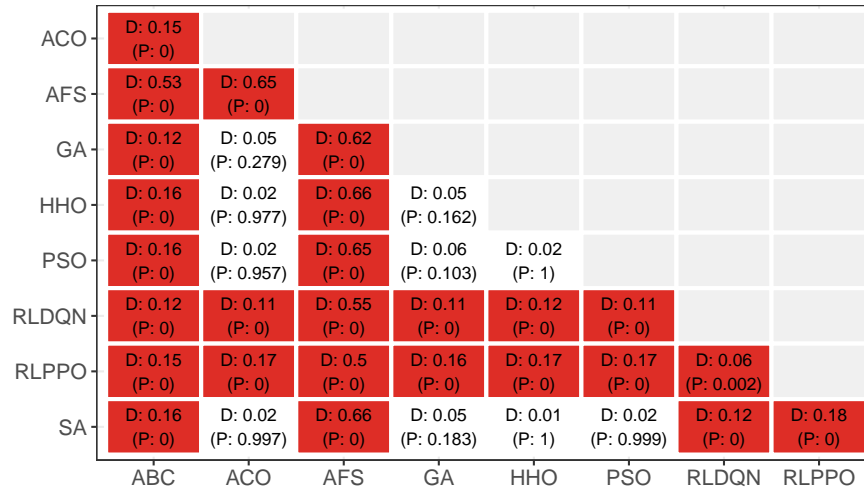
□ NS ■ P < 0.01

scenario_4_servers_300_services_3_application_PWD



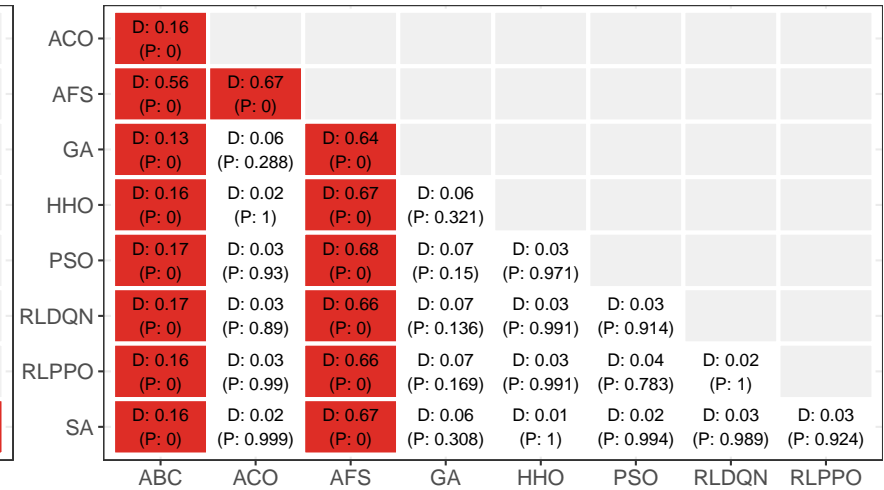
□ NS ■ P < 0.01

scenario_4_servers_300_services_5_application_GENERIC



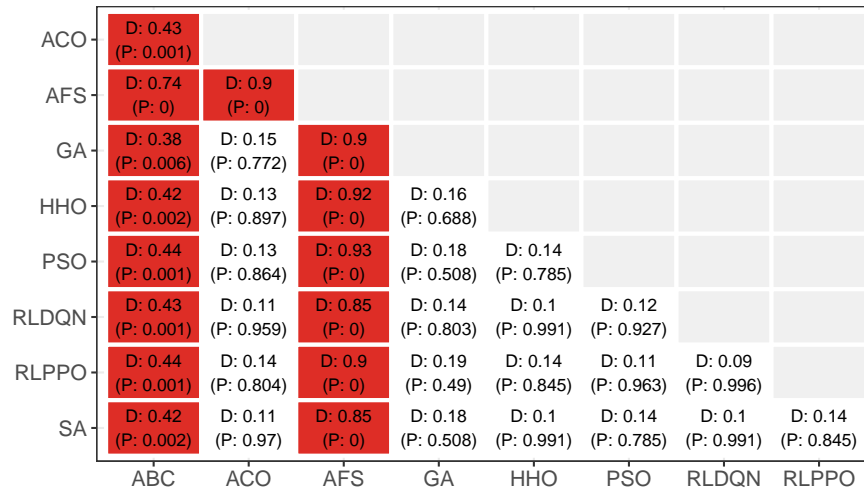
□ NS □ P < 0.01

scenario_4_servers_300_services_5_application_LTS



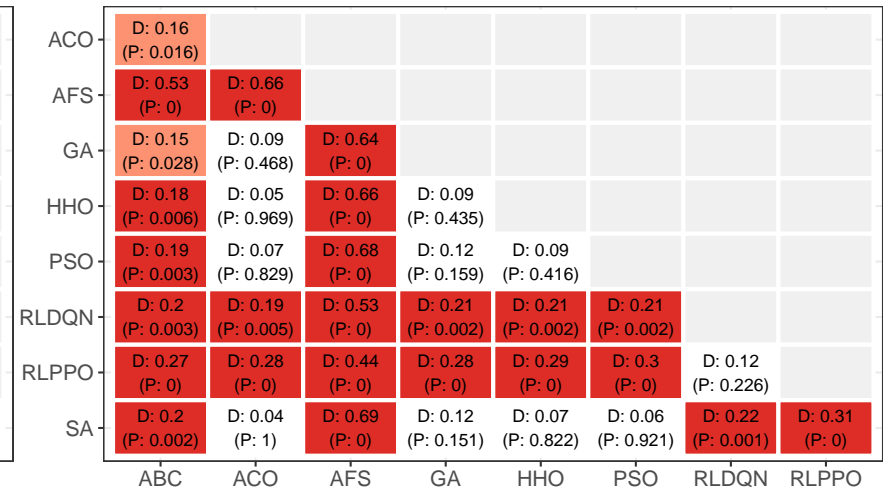
□ NS □ P < 0.01

scenario_4_servers_300_services_5_application_MMA



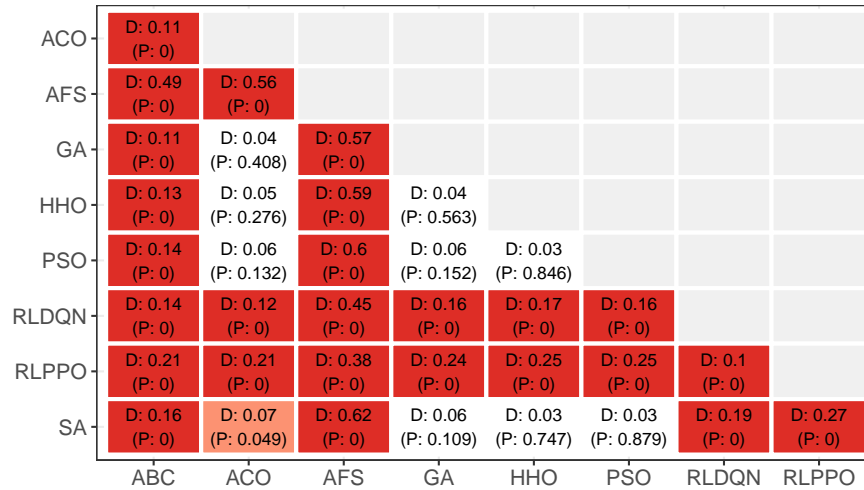
□ NS □ P < 0.01

scenario_4_servers_300_services_5_application_PWD



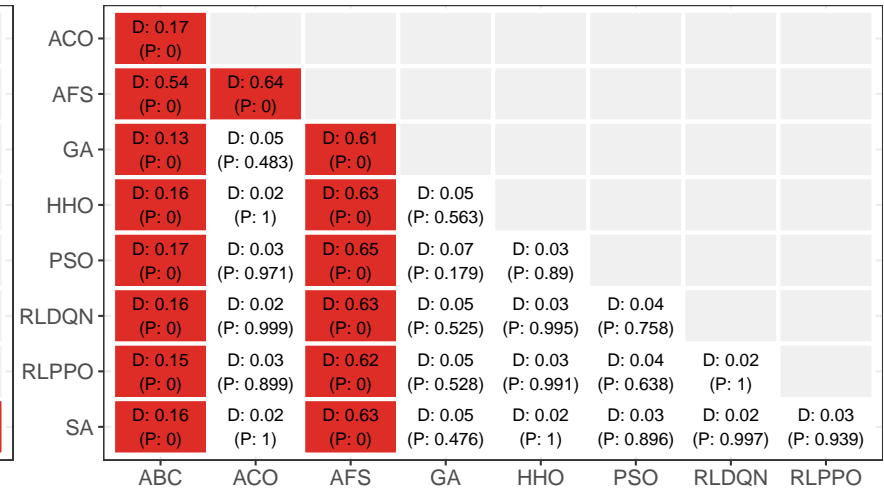
□ NS □ P < 0.05 □ P < 0.01

scenario_4_servers_300_services_7_application_GENERIC



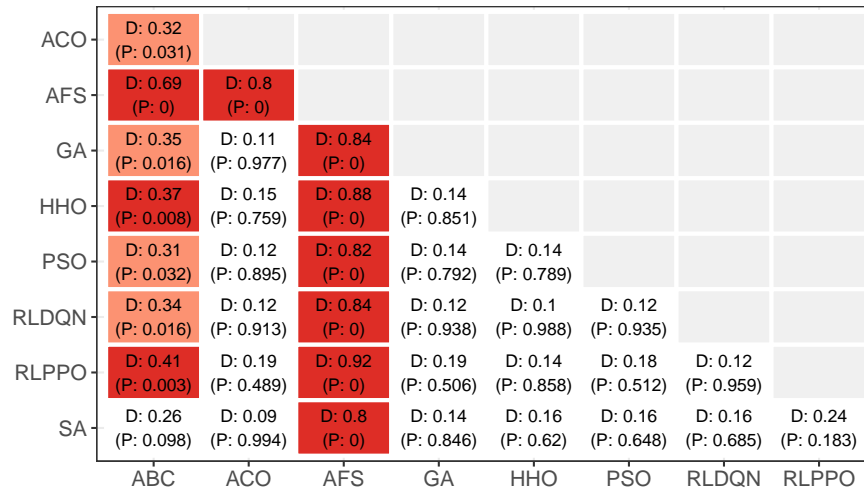
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_300_services_7_application_LTS



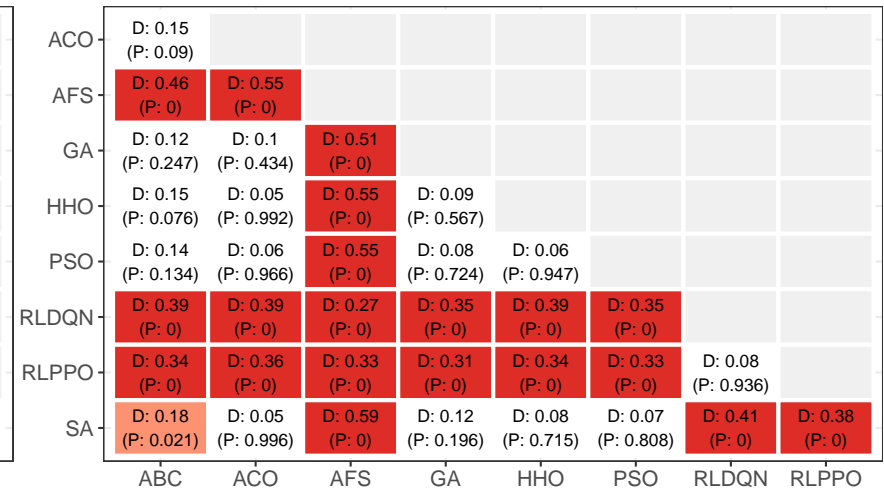
□ NS ■ P < 0.01

scenario_4_servers_300_services_7_application_MMA



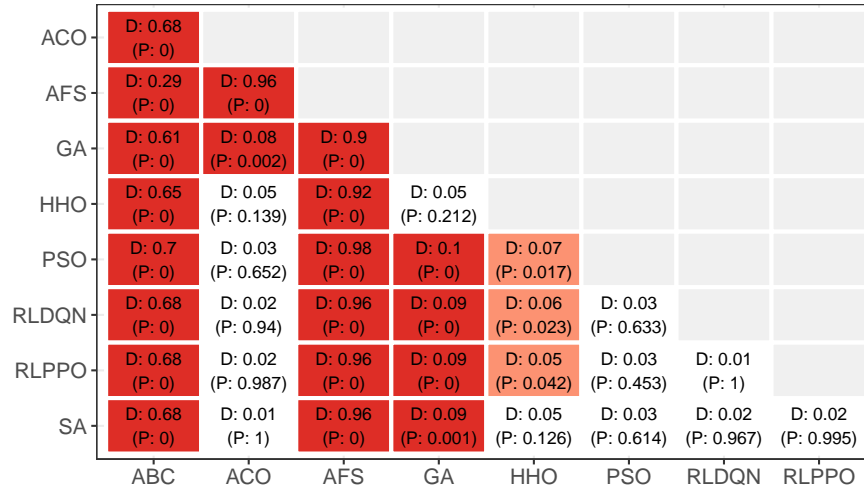
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_300_services_7_application_PWD



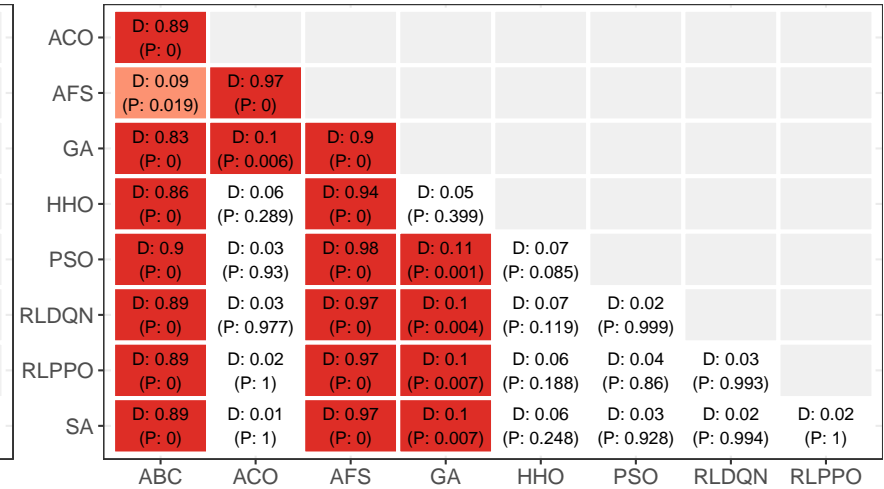
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_400_services_1_application_GENERIC



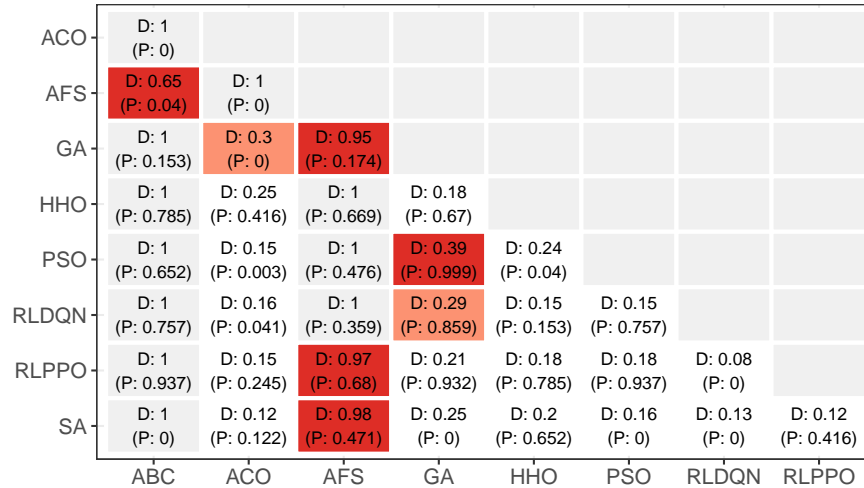
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_400_services_1_application_LTS



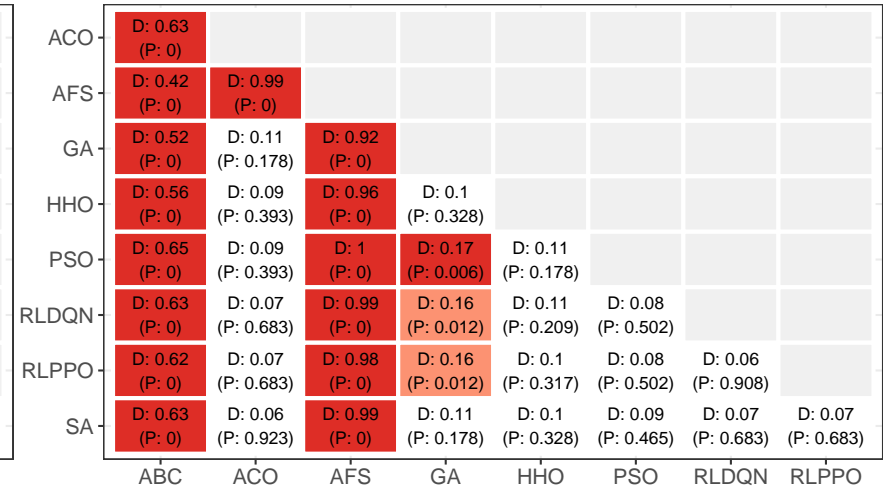
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_400_services_1_application_MMA



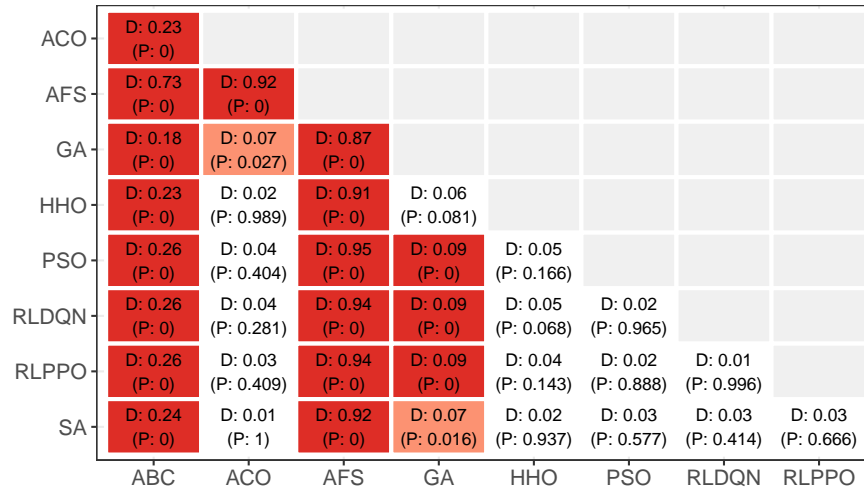
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_400_services_1_application_PWD



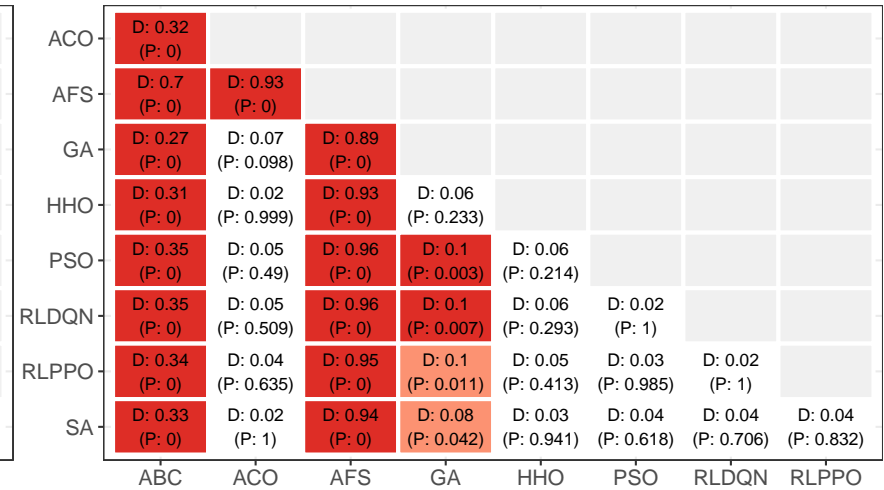
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_400_services_3_application_GENERIC



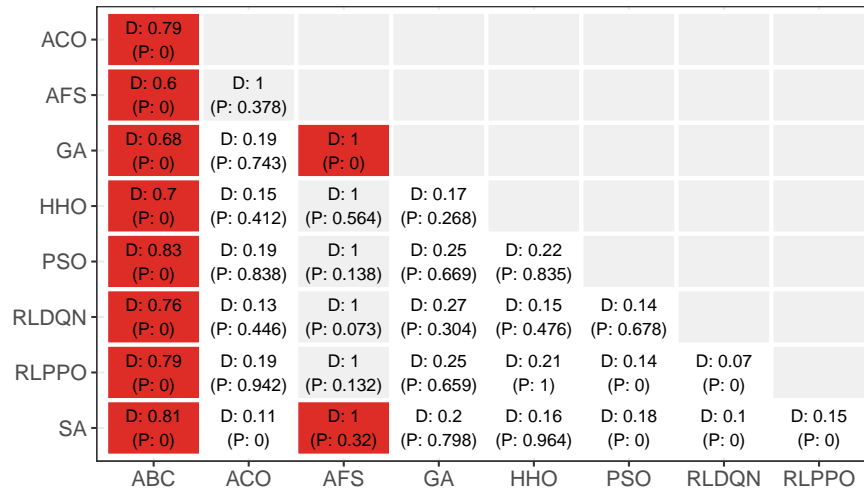
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_400_services_3_application_LTS



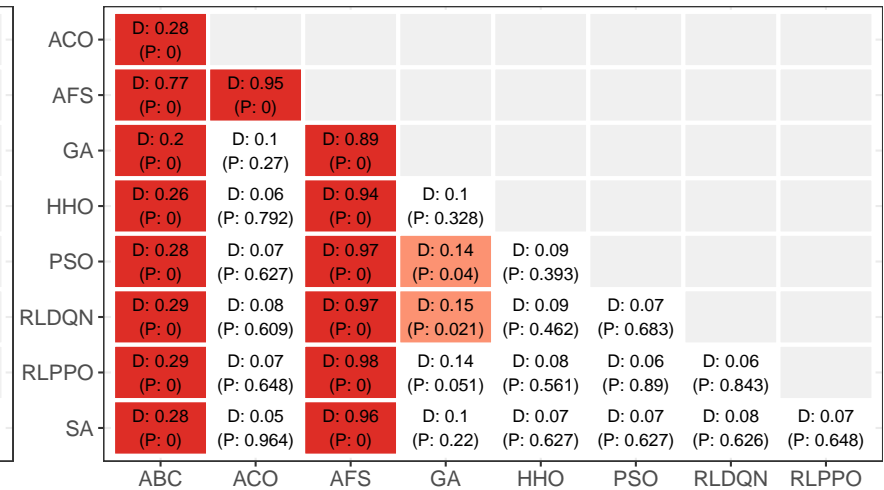
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_400_services_3_application_MMA



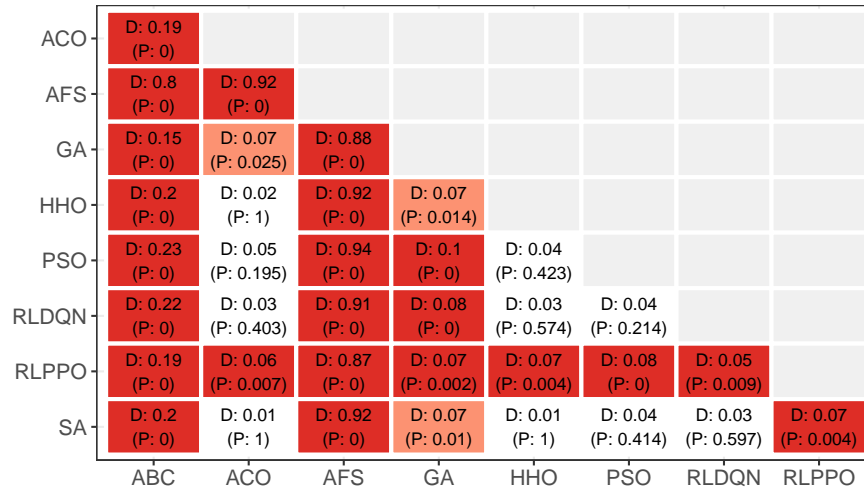
□ NS ■ P < 0.01

scenario_4_servers_400_services_3_application_PWD



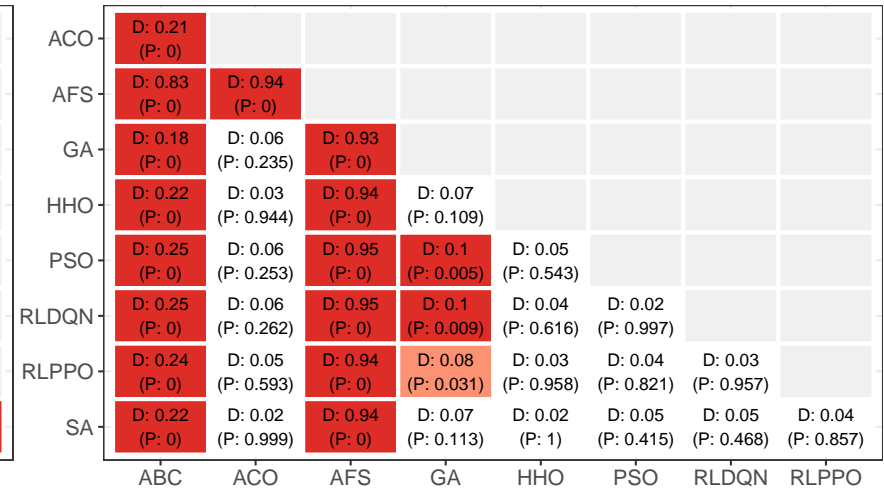
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_400_services_5_application_GENERIC



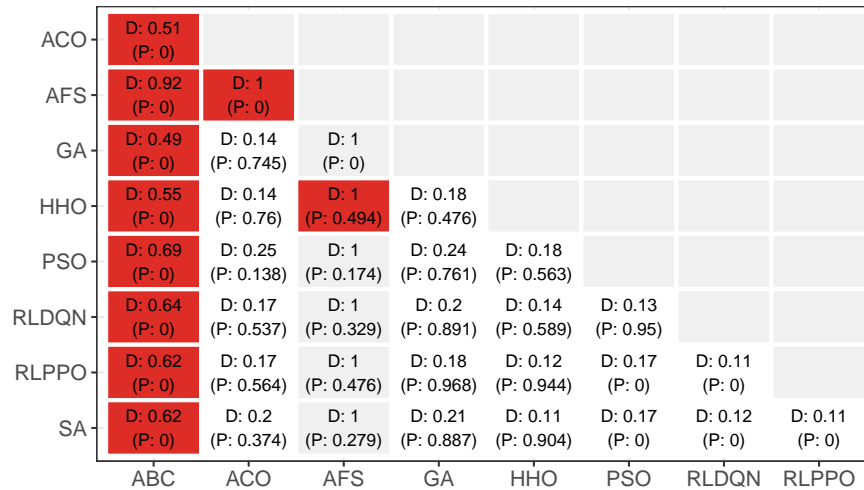
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_400_services_5_application_LTS



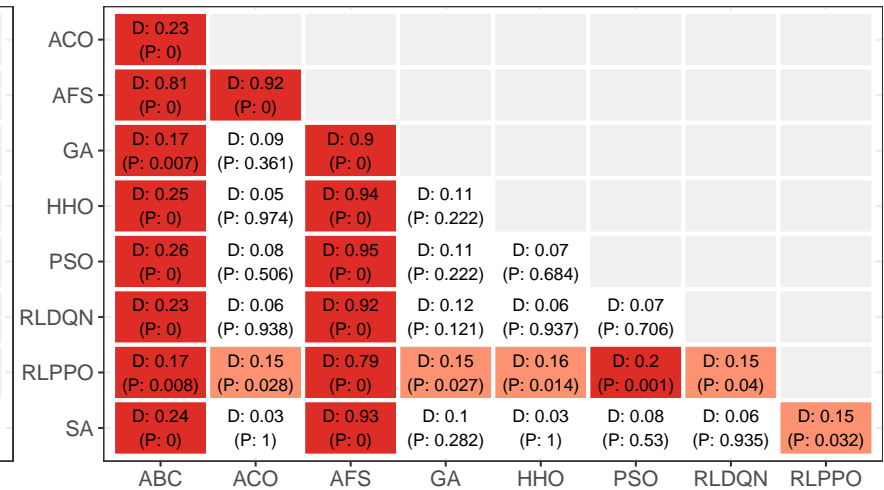
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_400_services_5_application_MMA



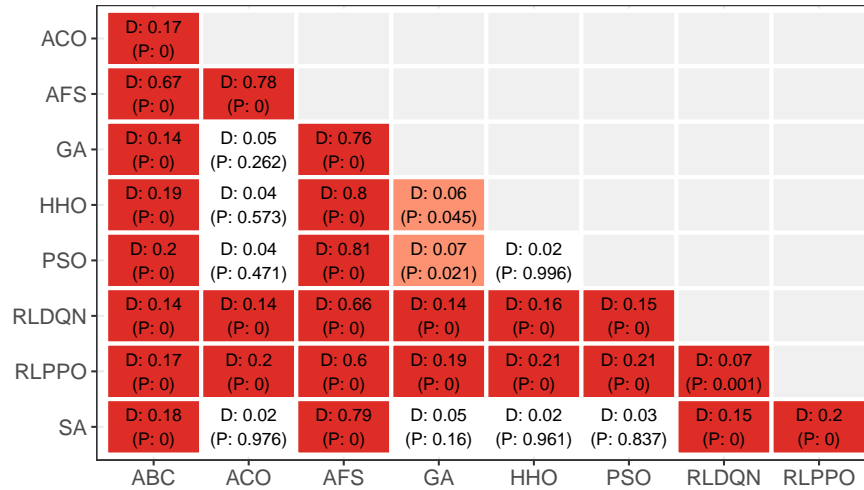
□ NS ■ P < 0.01

scenario_4_servers_400_services_5_application_PWD



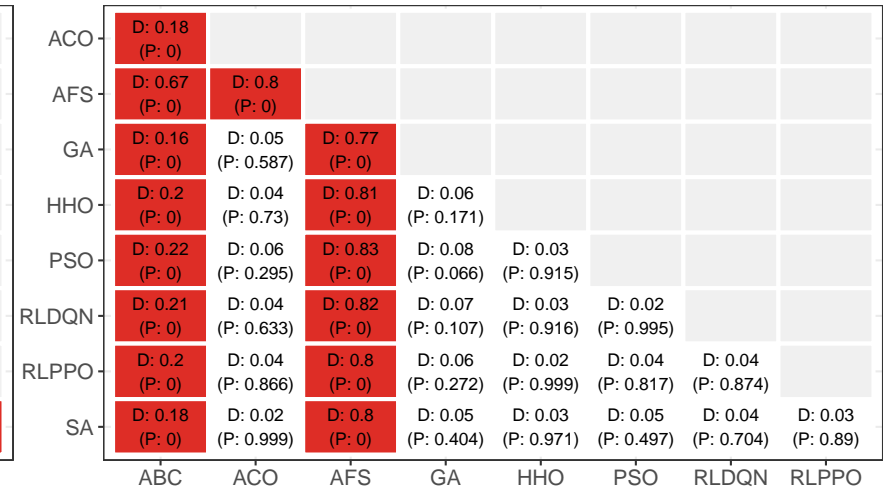
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_400_services_7_application_GENERIC



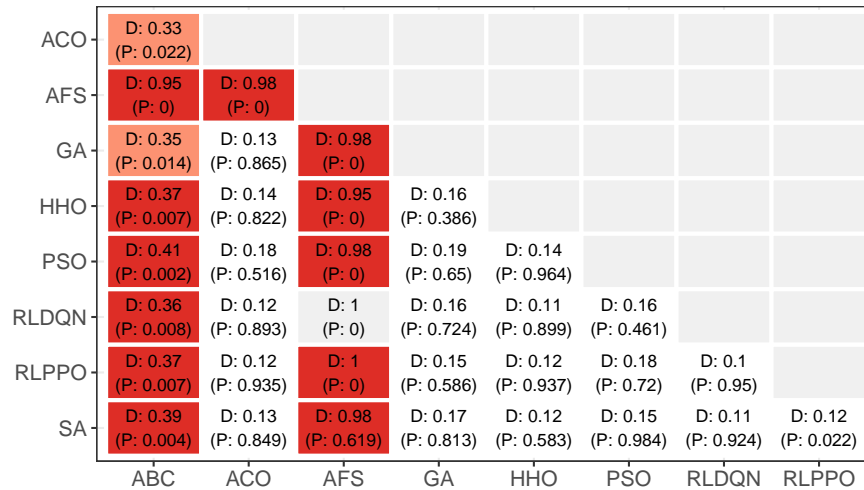
NS
 P < 0.05
 P < 0.01

scenario_4_servers_400_services_7_application_LTS



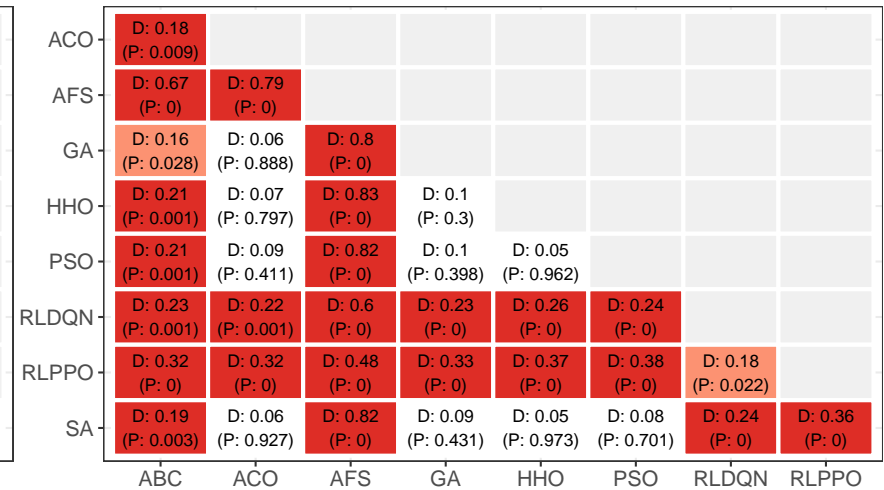
NS
 P < 0.01

scenario_4_servers_400_services_7_application_MMA



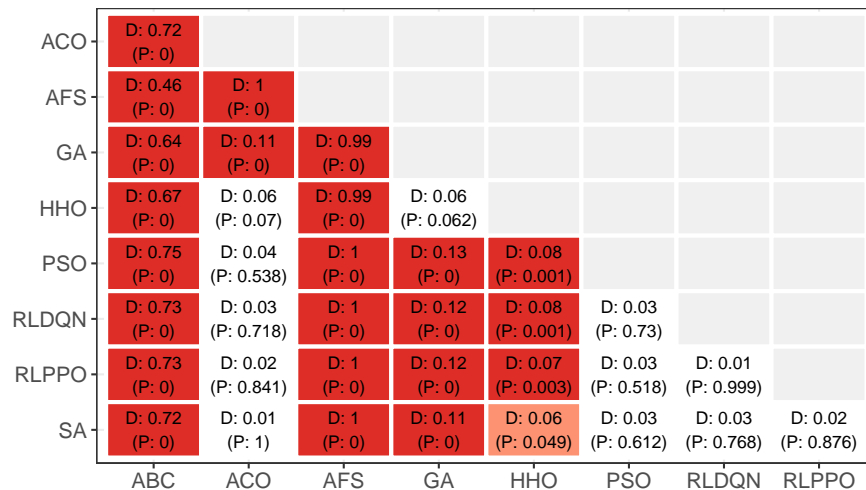
NS
 P < 0.05
 P < 0.01

scenario_4_servers_400_services_7_application_PWD



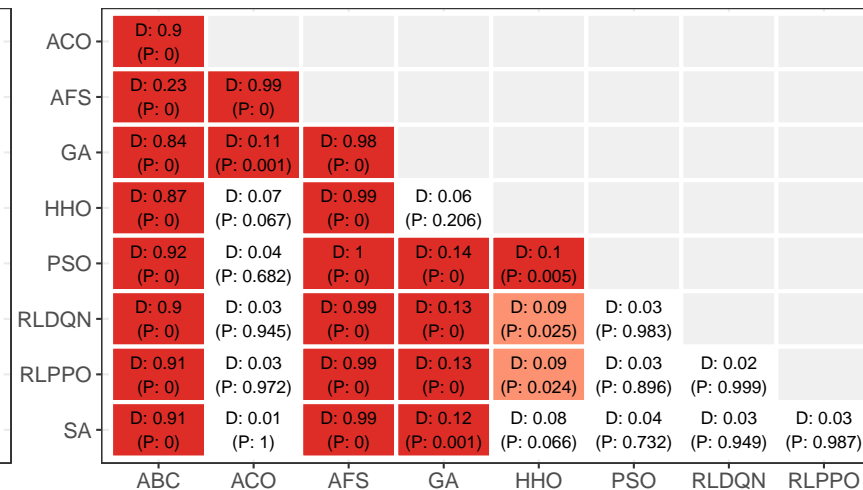
NS
 P < 0.05
 P < 0.01

scenario_4_servers_500_services_1_application_GENERIC



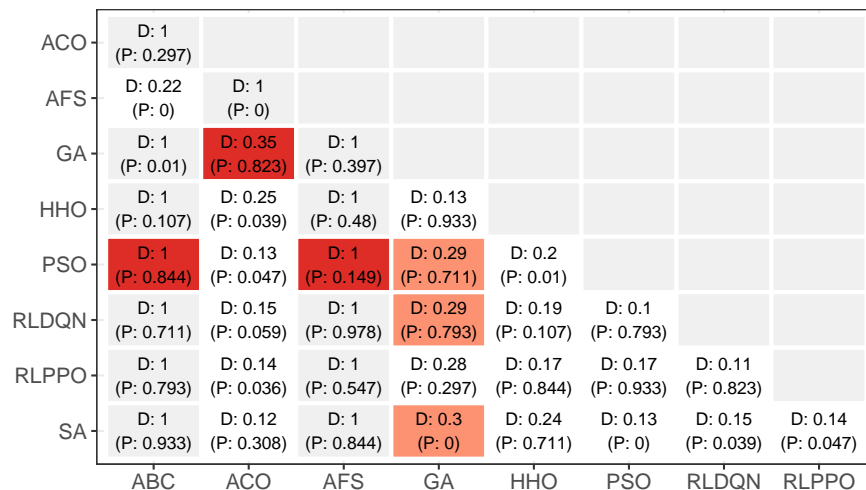
□ NS □ P < 0.05 □ P < 0.01

scenario_4_servers_500_services_1_application_LTS



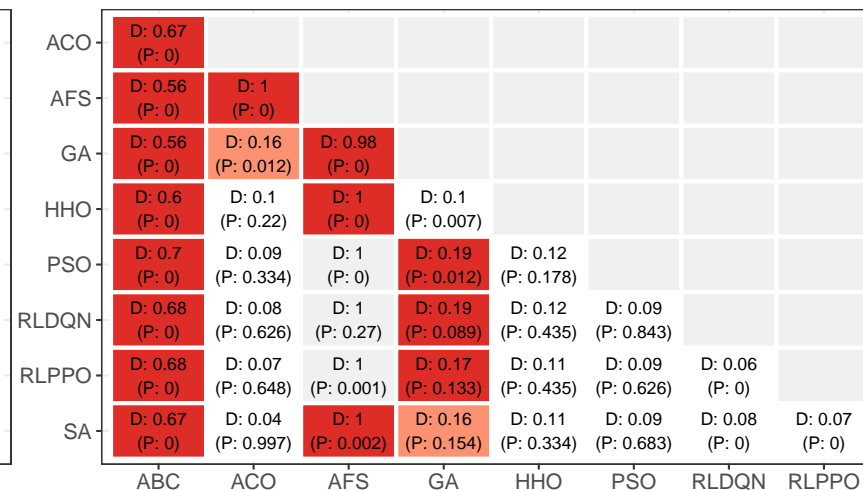
□ NS □ P < 0.05 □ P < 0.01

scenario_4_servers_500_services_1_application_MMA



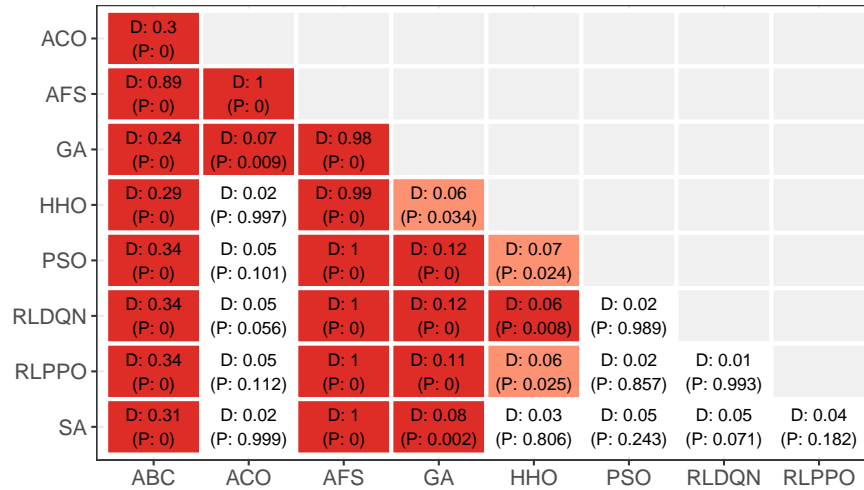
□ NS □ P < 0.05 □ P < 0.01

scenario_4_servers_500_services_1_application_PWD



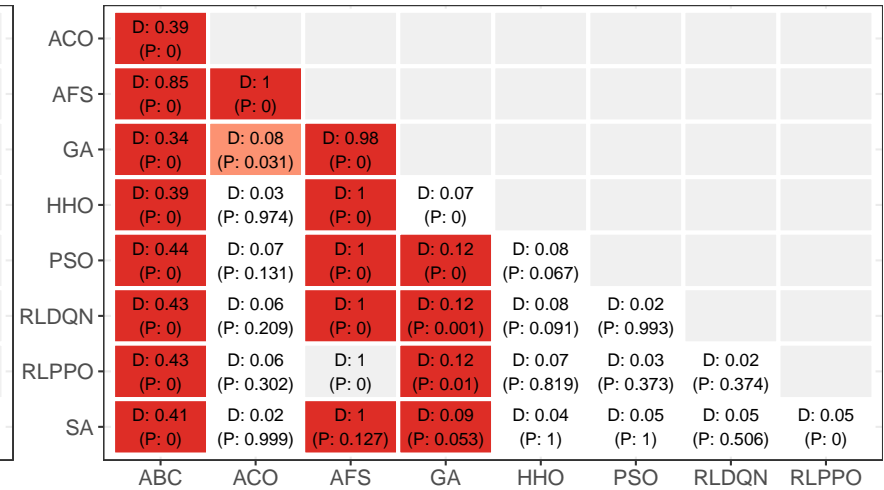
□ NS □ P < 0.05 □ P < 0.01

scenario_4_servers_500_services_3_application_GENERIC



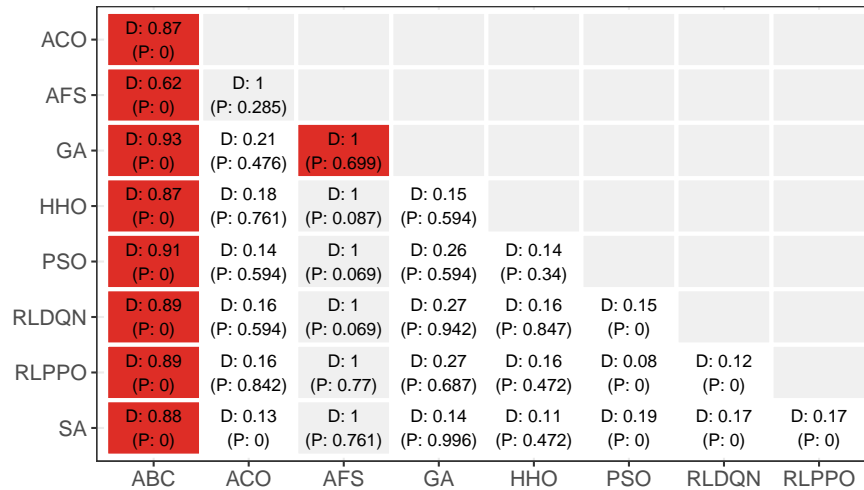
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_500_services_3_application_LTS



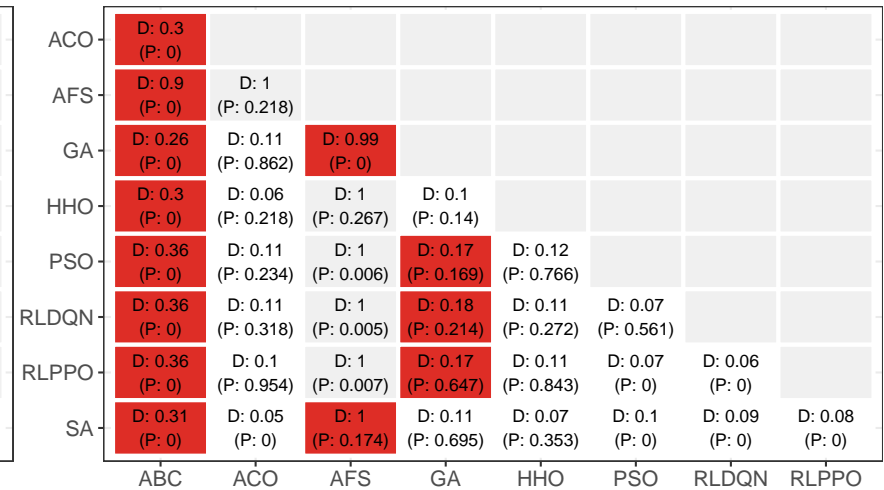
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_500_services_3_application_MMA



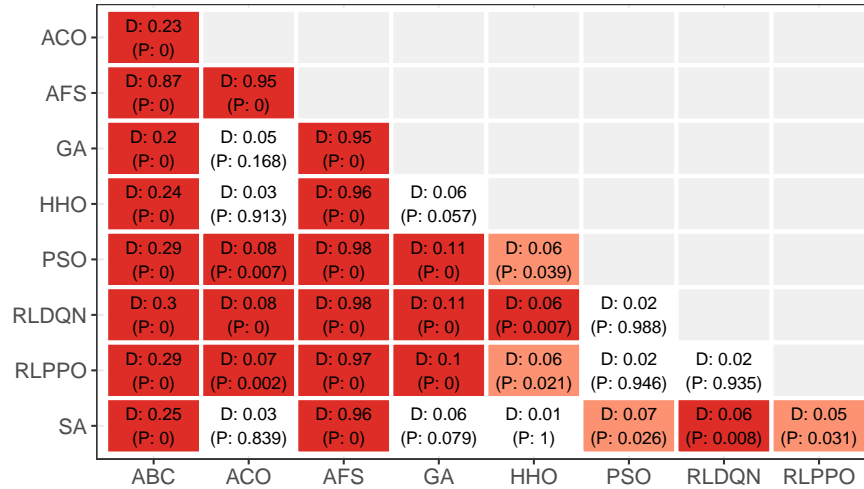
□ NS ■ P < 0.01

scenario_4_servers_500_services_3_application_PWD



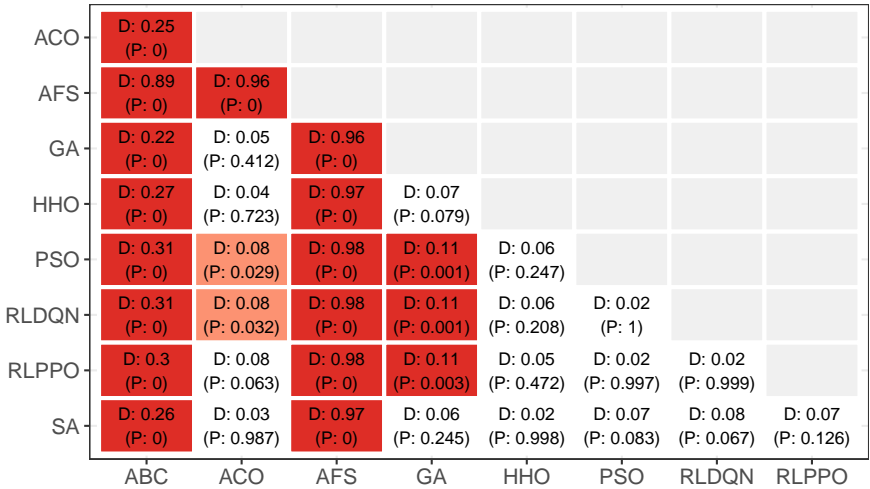
□ NS ■ P < 0.01

scenario_4_servers_500_services_5_application_GENERIC



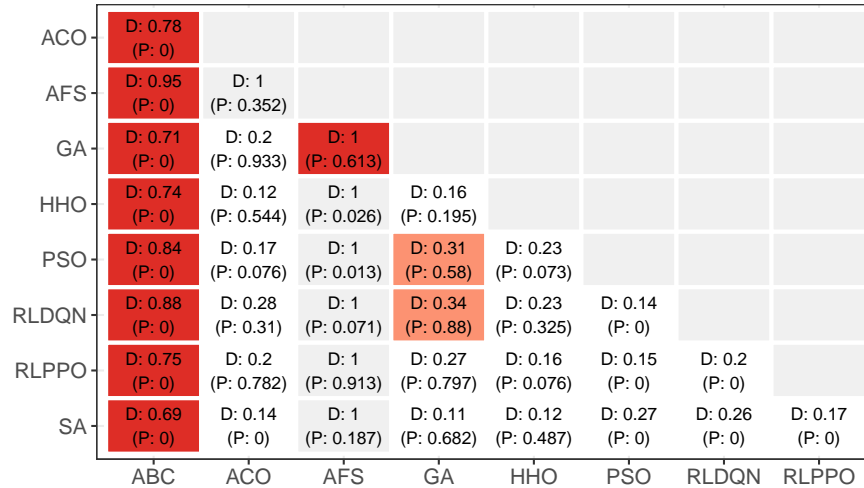
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_500_services_5_application_LTS



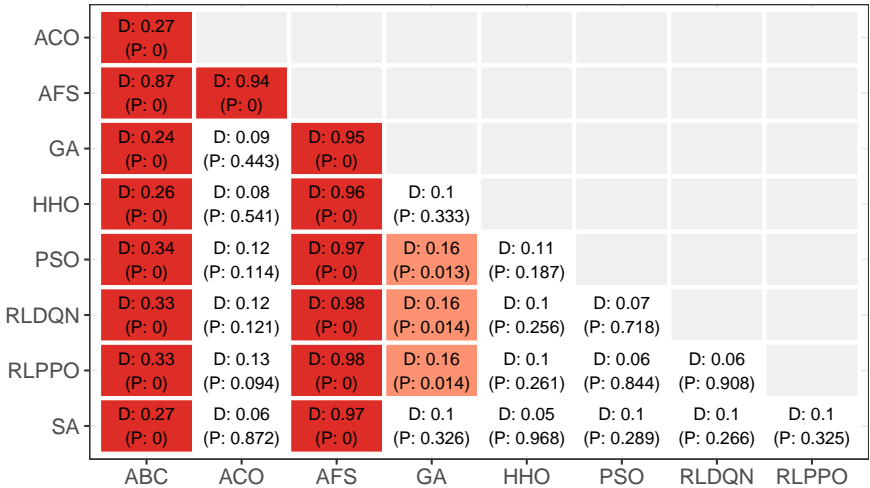
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_500_services_5_application_MMA



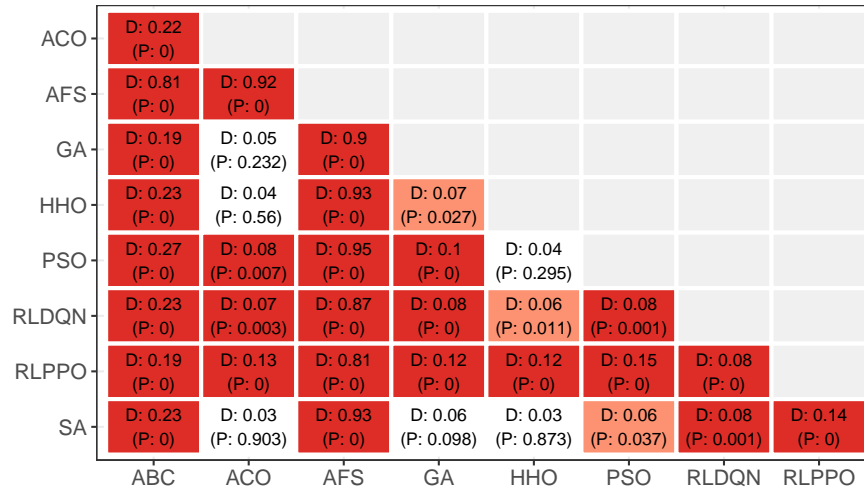
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_500_services_5_application_PWD



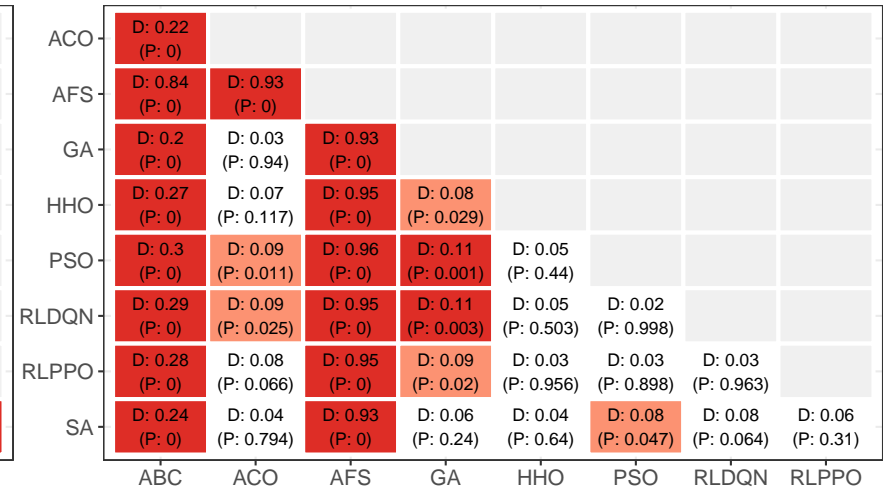
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_500_services_7_application_GENERIC



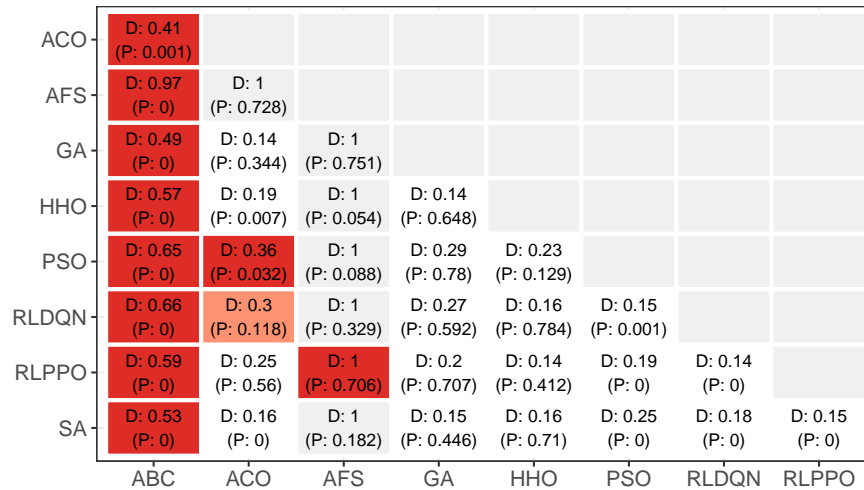
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_500_services_7_application_LTS



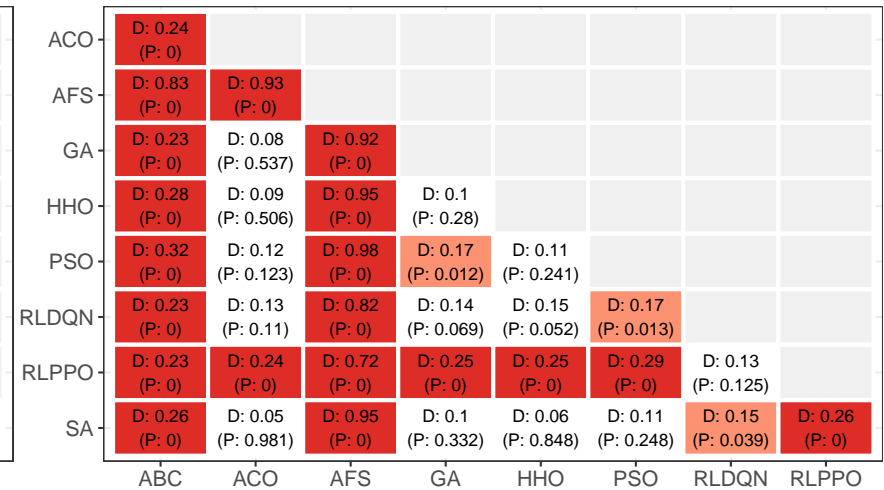
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_500_services_7_application_MMA



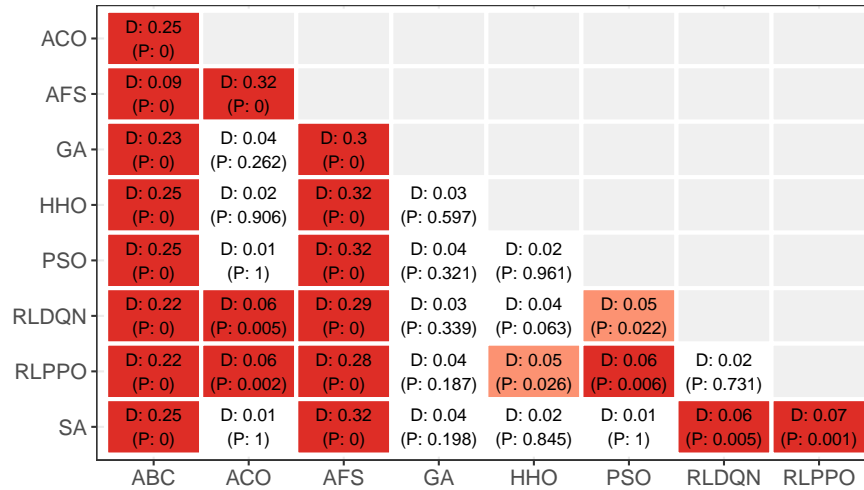
□ NS □ P < 0.05 ■ P < 0.01

scenario_4_servers_500_services_7_application_PWD



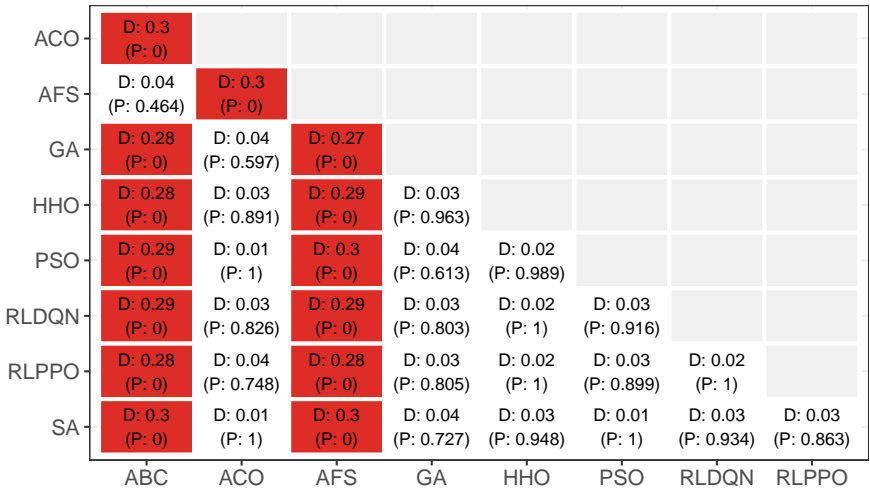
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_100_services_1_application_GENERIC



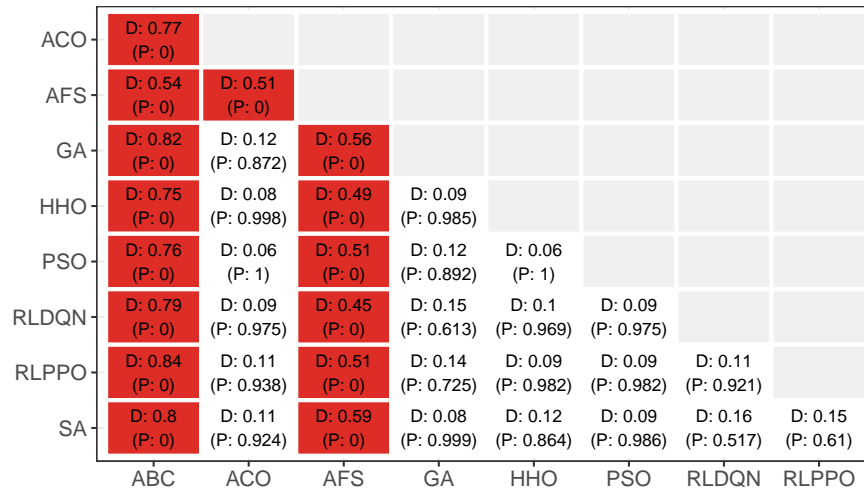
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_100_services_1_application_LTS



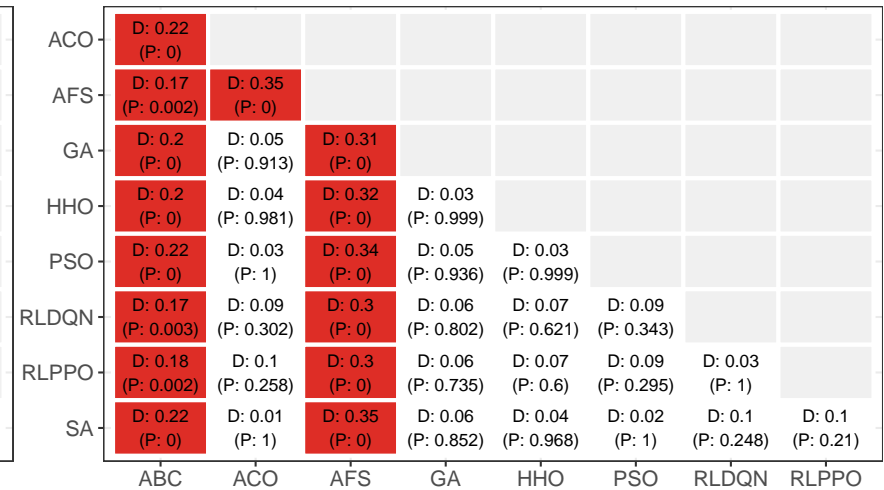
□ NS ■ P < 0.01

scenario_5_servers_100_services_1_application_MMA



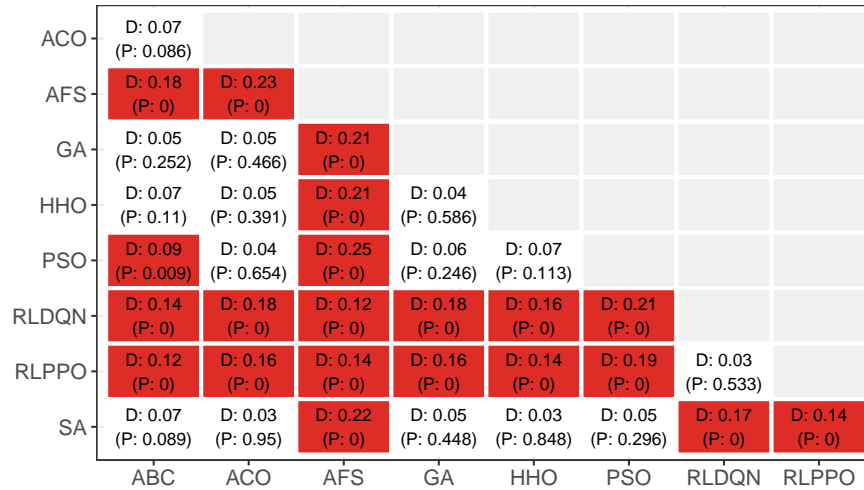
□ NS ■ P < 0.01

scenario_5_servers_100_services_1_application_PWD



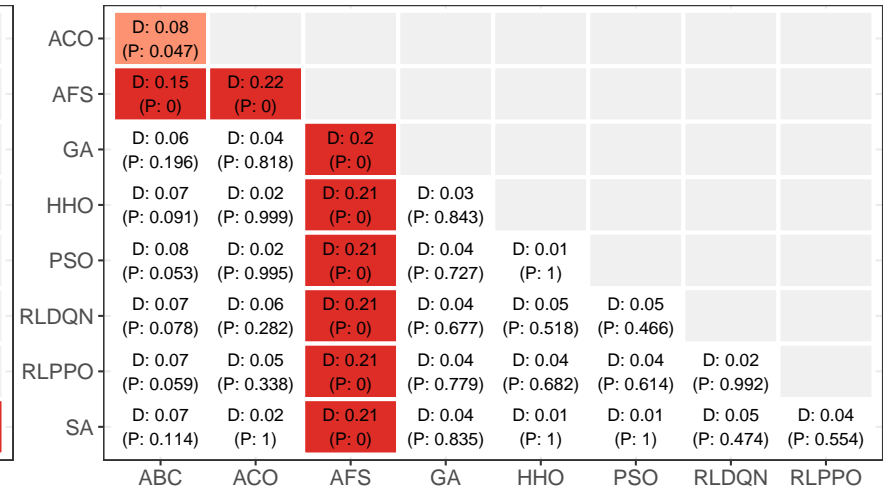
□ NS ■ P < 0.01

scenario_5_servers_100_services_3_application_GENERIC



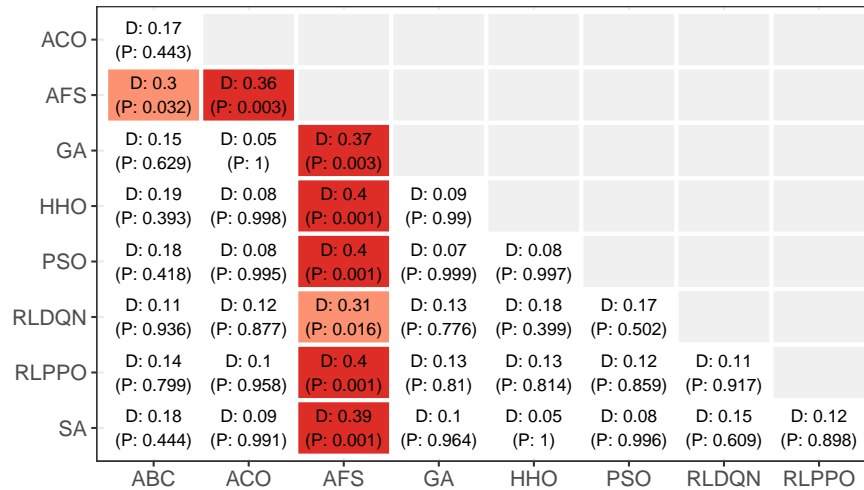
□ NS □ P < 0.01

scenario_5_servers_100_services_3_application_LTS



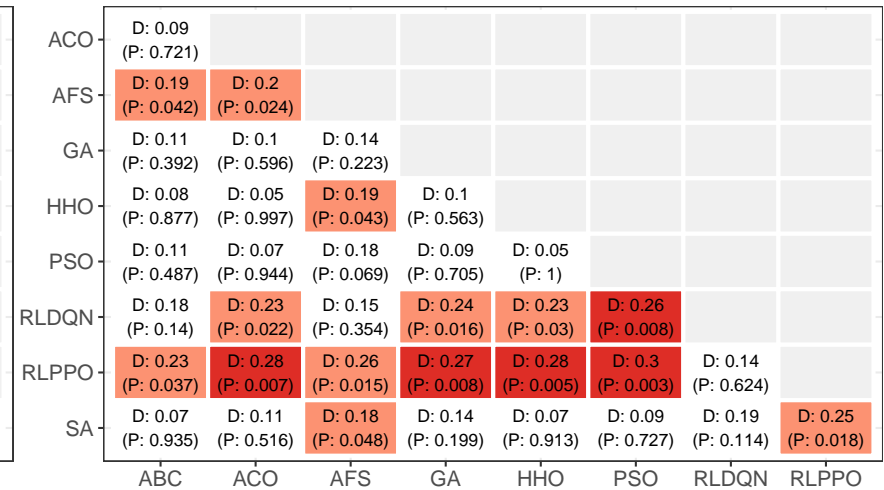
□ NS □ P < 0.05 □ P < 0.01

scenario_5_servers_100_services_3_application_MMA



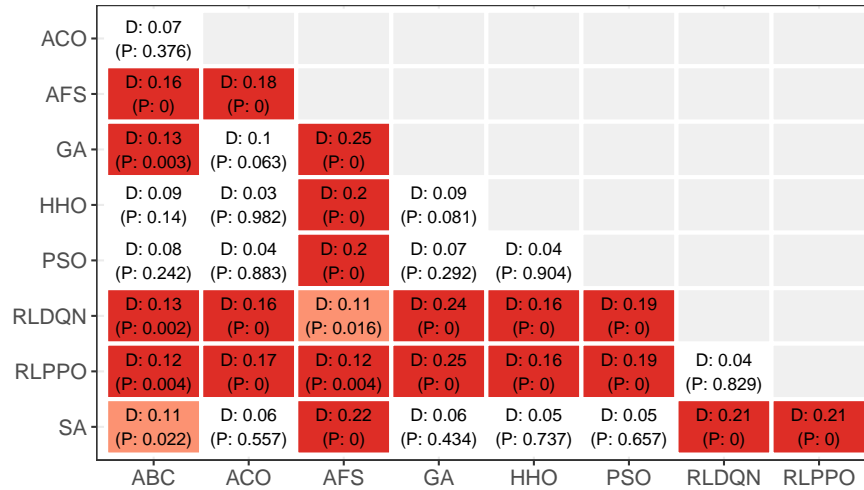
□ NS □ P < 0.05 □ P < 0.01

scenario_5_servers_100_services_3_application_PWD



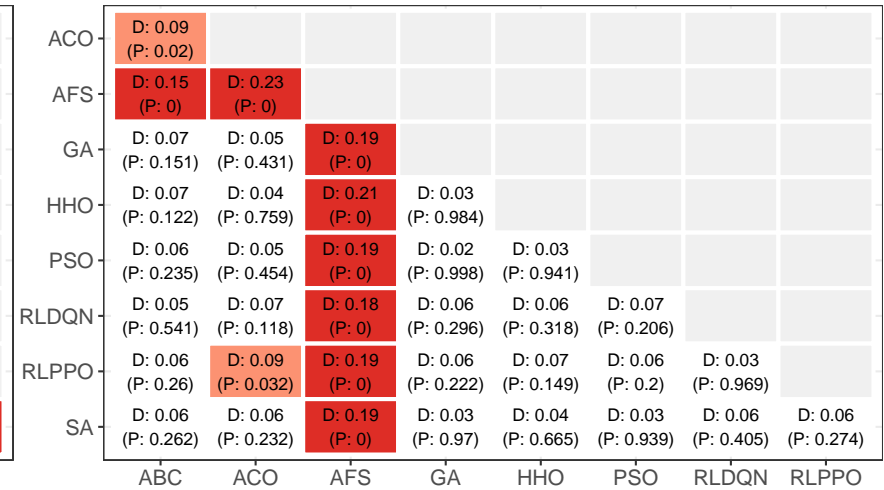
□ NS □ P < 0.05 □ P < 0.01

scenario_5_servers_100_services_5_application_GENERIC



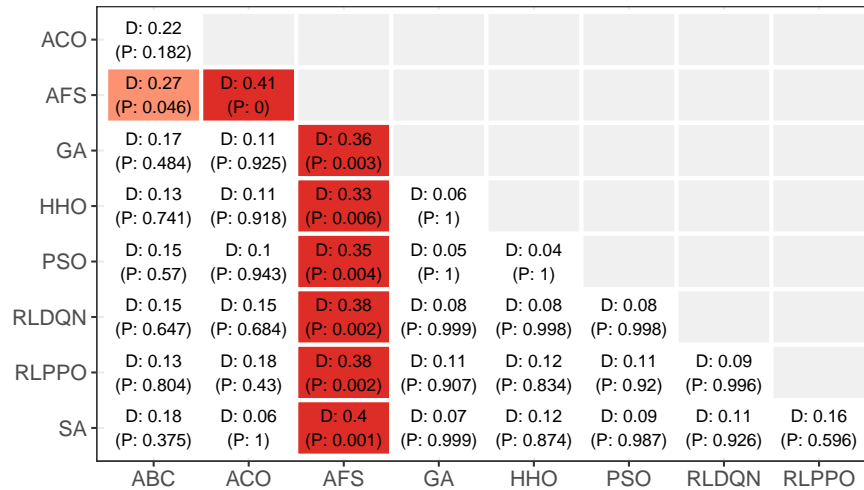
NS
 P < 0.05
 P < 0.01

scenario_5_servers_100_services_5_application_LTS



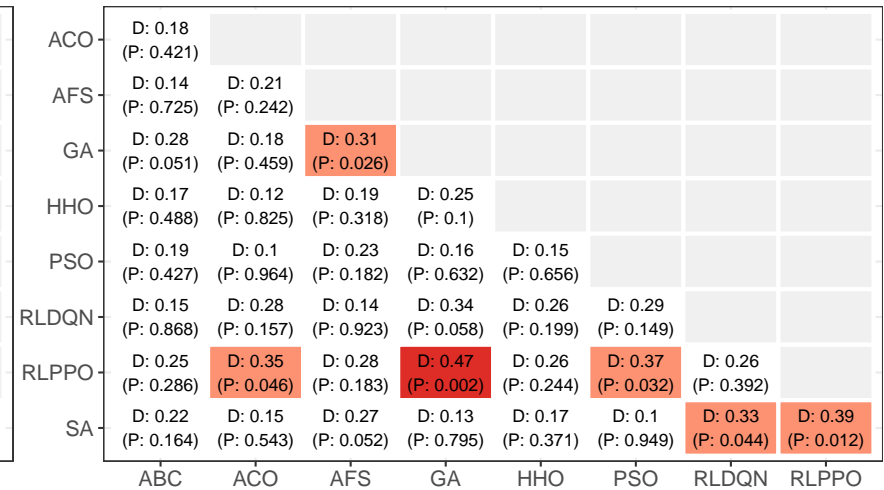
NS
 P < 0.05
 P < 0.01

scenario_5_servers_100_services_5_application_MMA



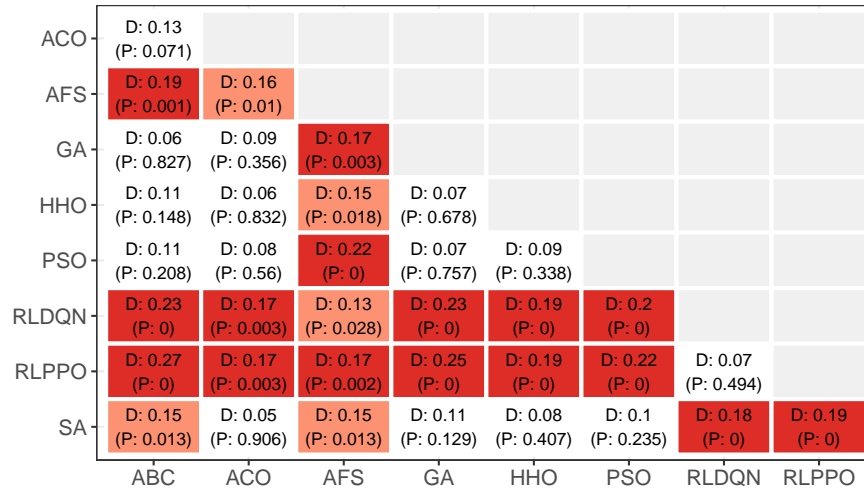
NS
 P < 0.05
 P < 0.01

scenario_5_servers_100_services_5_application_PWD



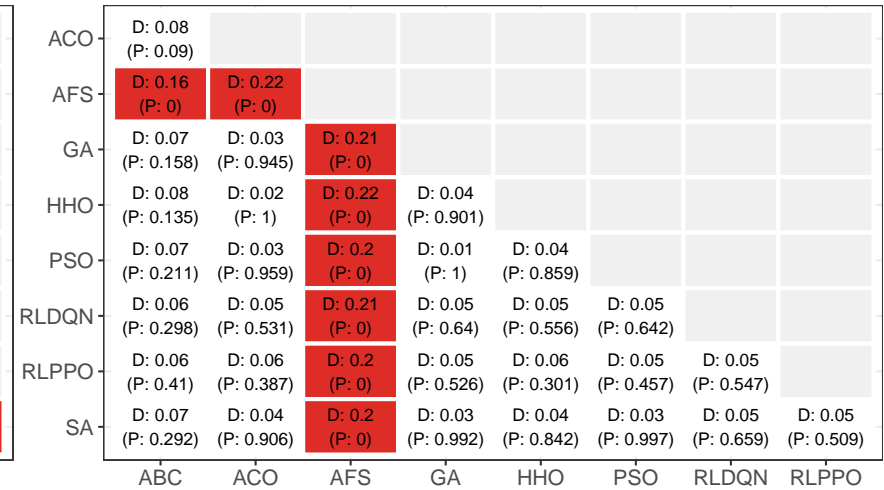
NS
 P < 0.05
 P < 0.01

scenario_5_servers_100_services_7_application_GENERIC



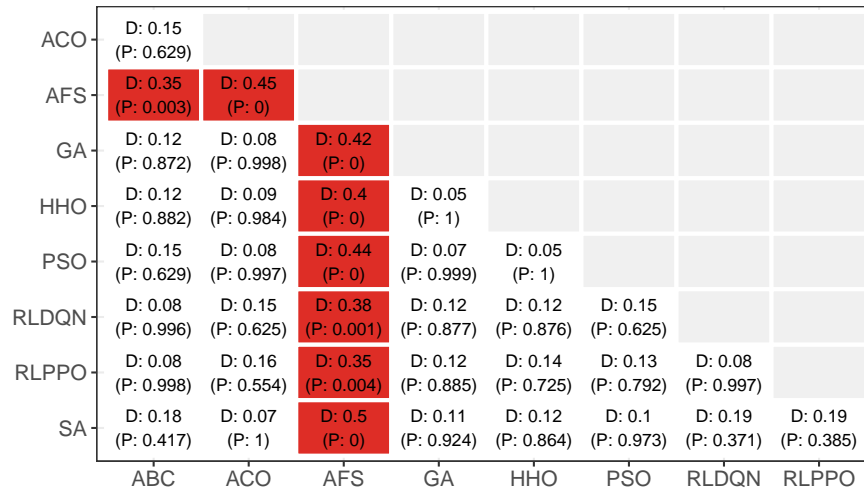
NS
 P < 0.05
 P < 0.01

scenario_5_servers_100_services_7_application_LTS



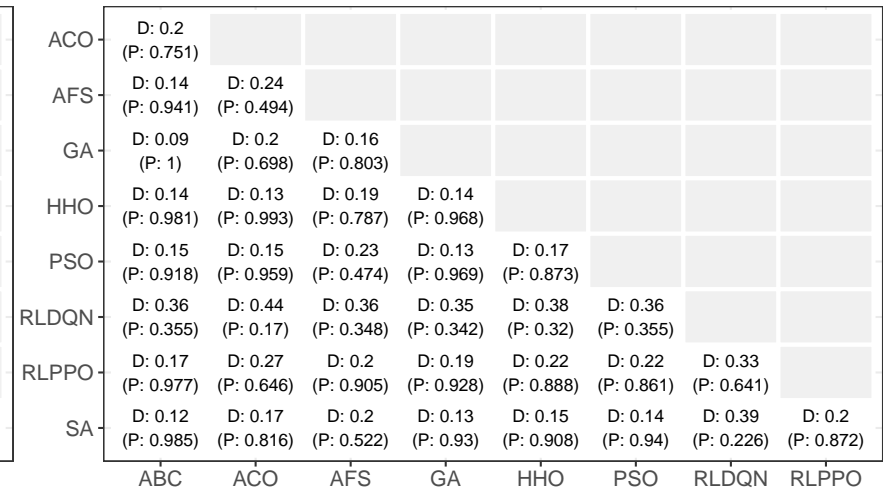
NS
 P < 0.01

scenario_5_servers_100_services_7_application_MMA



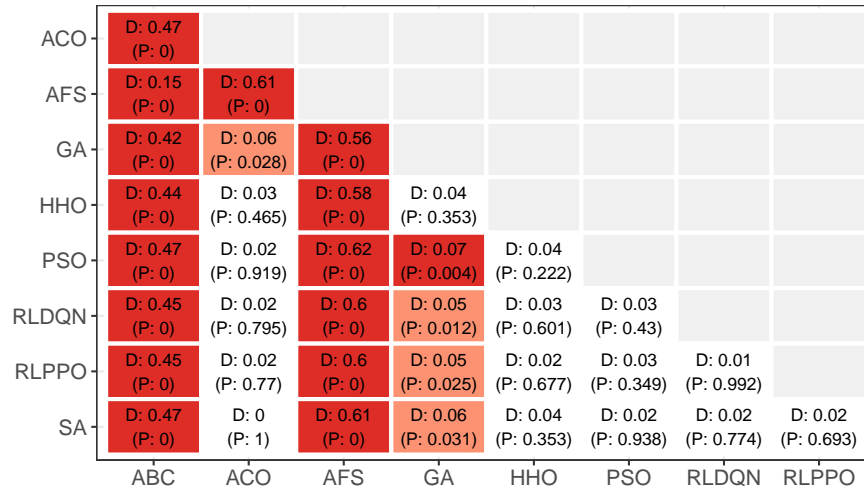
NS
 P < 0.01

scenario_5_servers_100_services_7_application_PWD



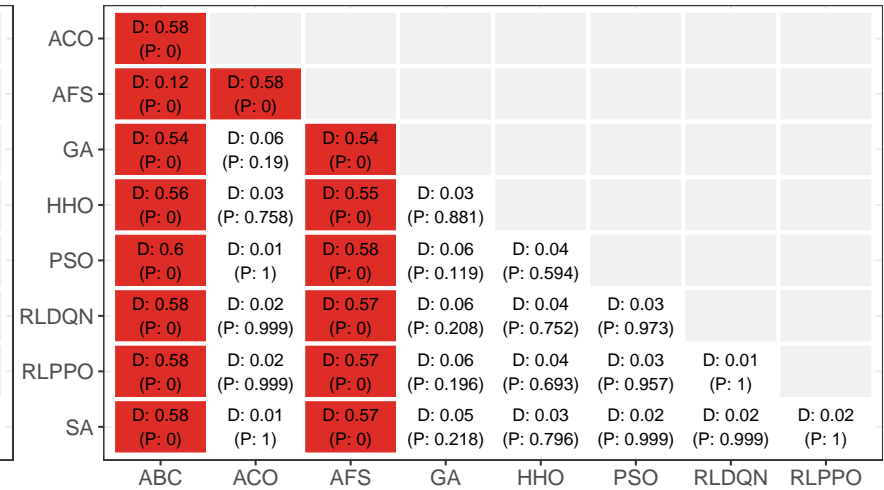
NS

scenario_5_servers_200_services_1_application_GENERIC



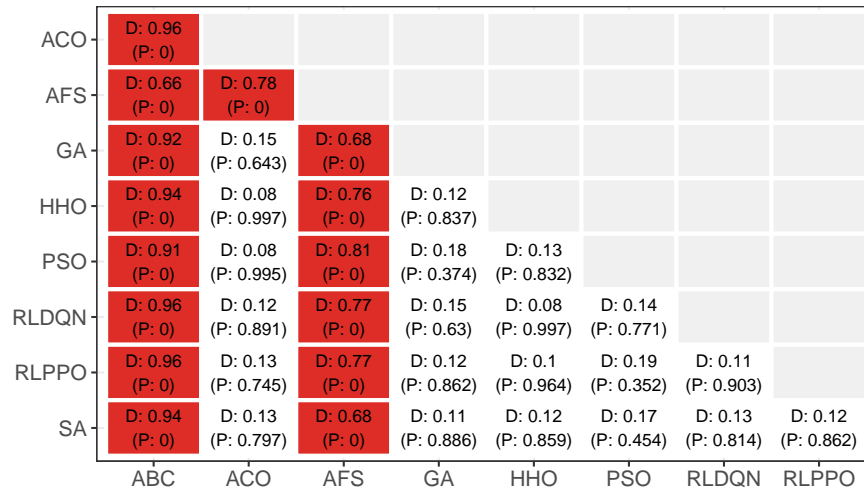
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_200_services_1_application_LTS



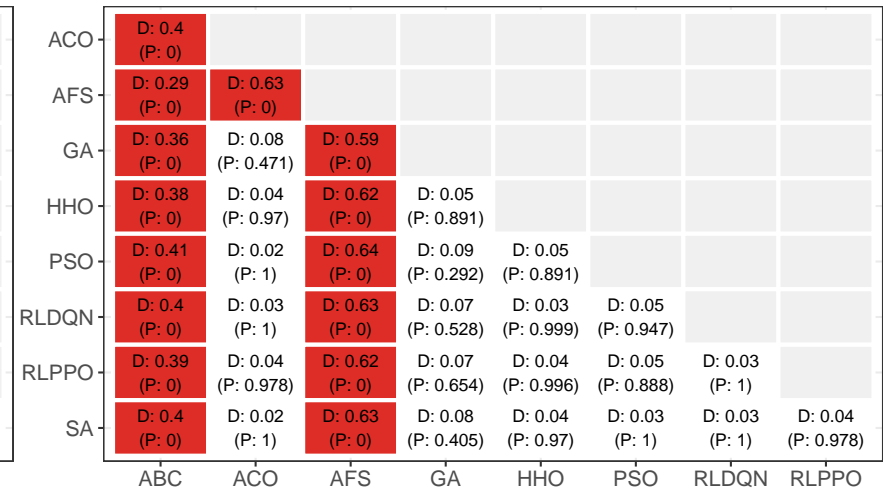
□ NS ■ P < 0.01

scenario_5_servers_200_services_1_application_MMA



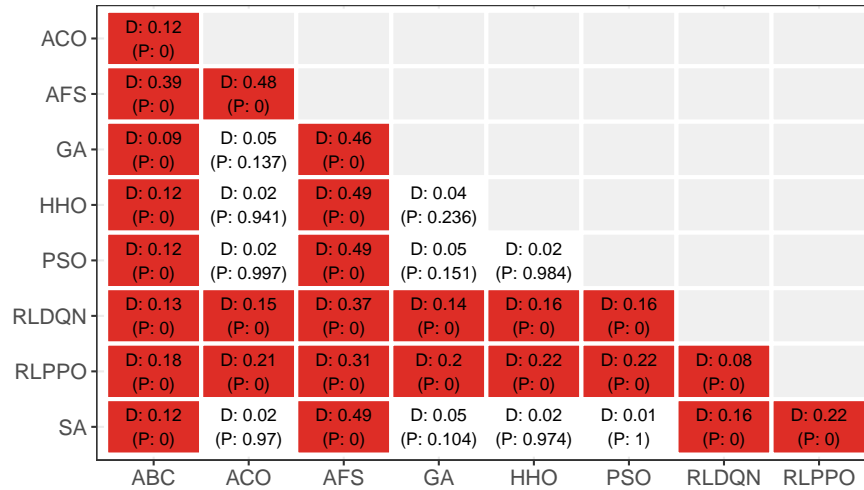
□ NS ■ P < 0.01

scenario_5_servers_200_services_1_application_PWD



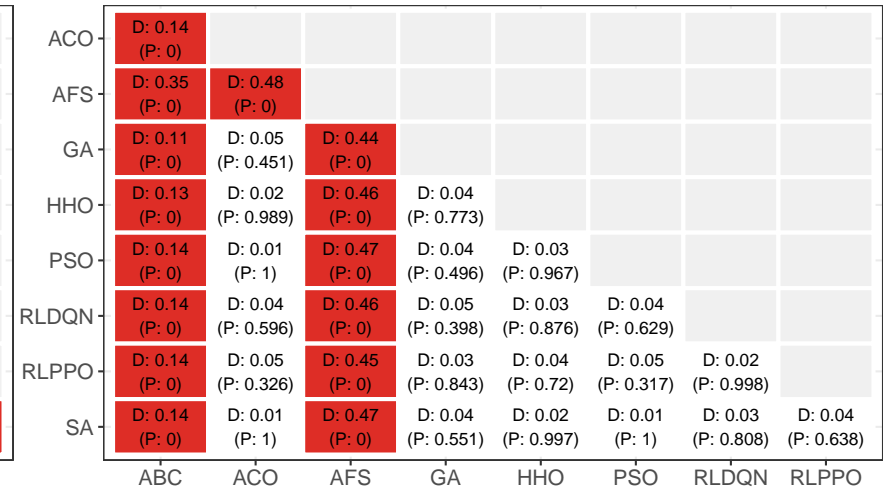
□ NS ■ P < 0.01

scenario_5_servers_200_services_3_application_GENERIC



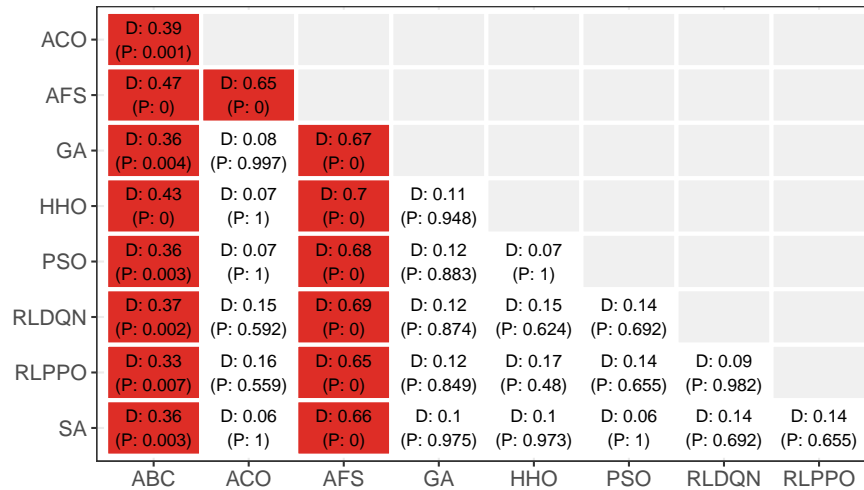
NS P < 0.01

scenario_5_servers_200_services_3_application_LTS



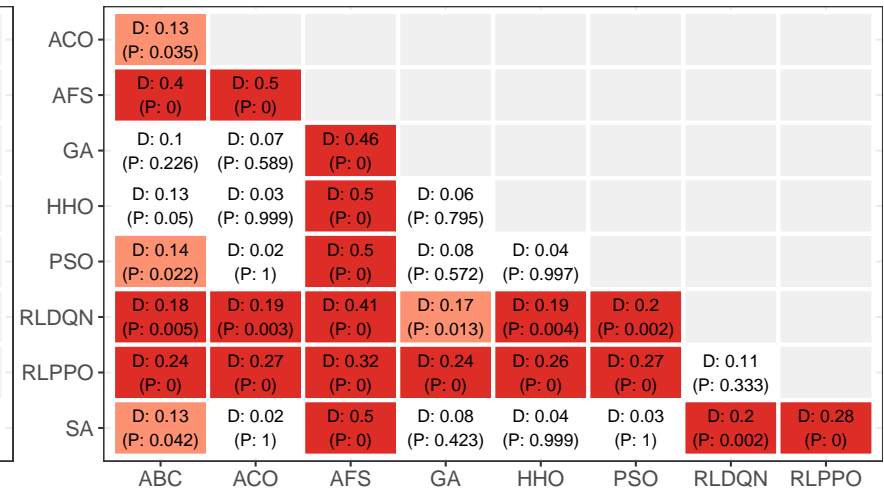
NS P < 0.01

scenario_5_servers_200_services_3_application_MMA



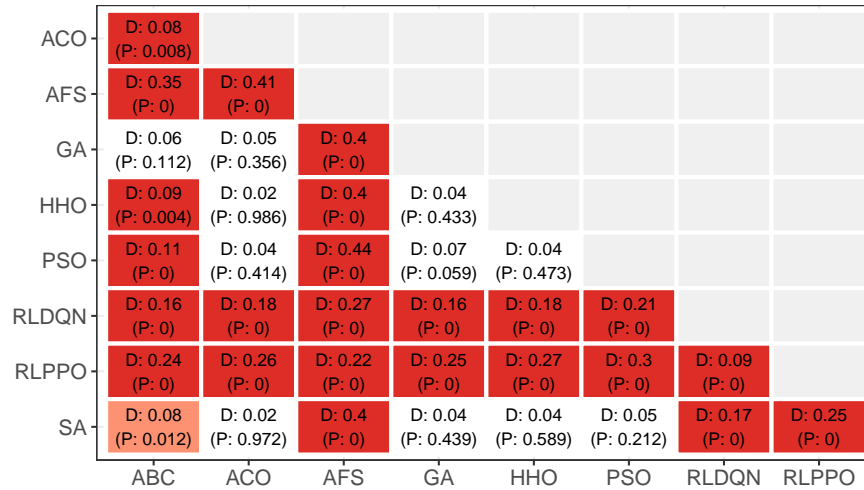
NS P < 0.01

scenario_5_servers_200_services_3_application_PWD



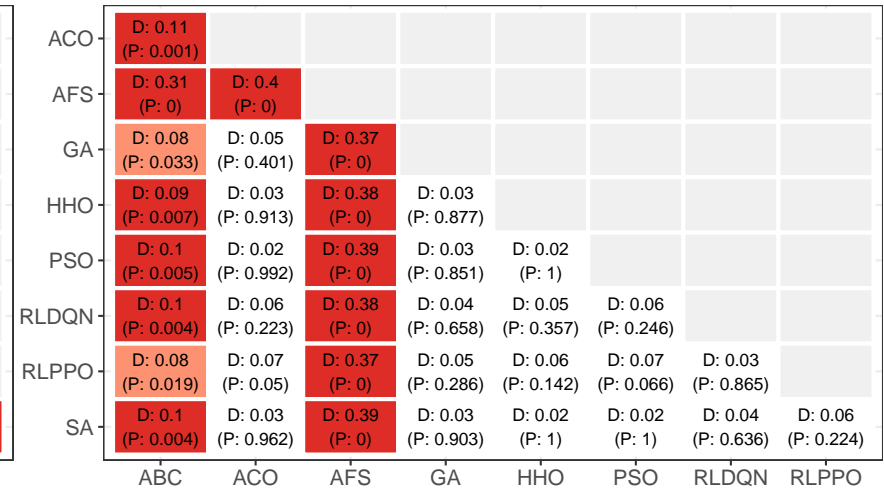
NS P < 0.05 P < 0.01

scenario_5_servers_200_services_5_application_GENERIC



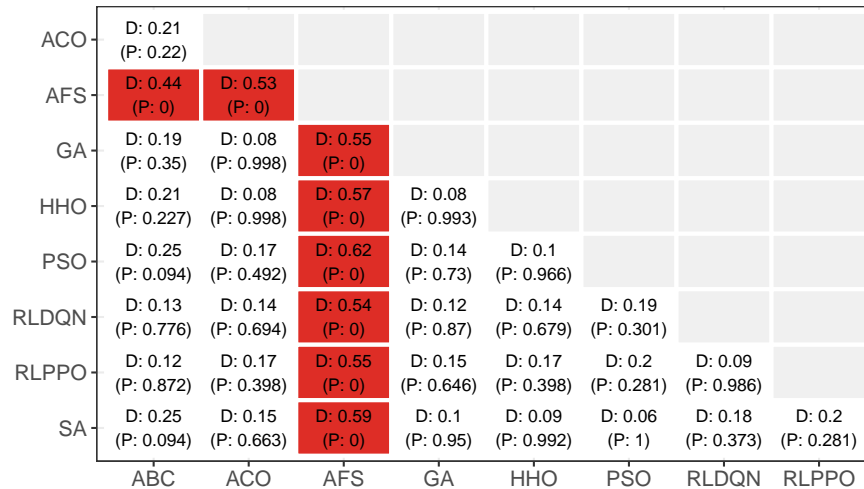
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_200_services_5_application_LTS



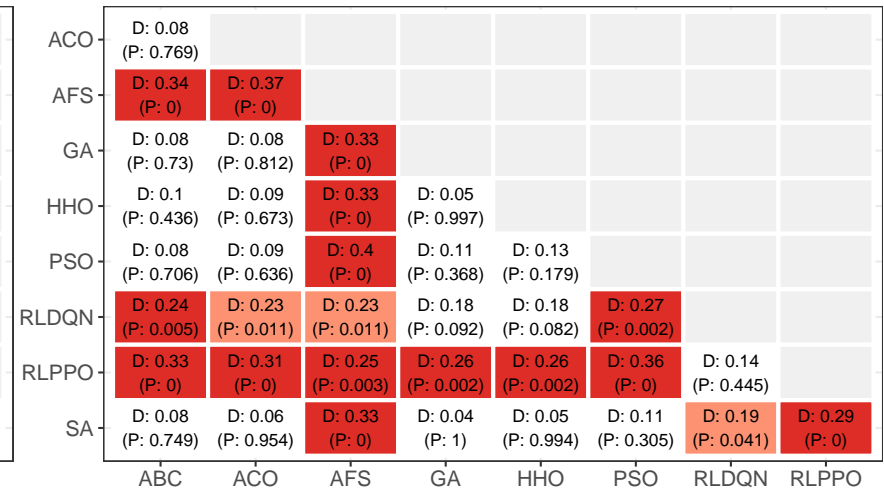
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_200_services_5_application_MMA



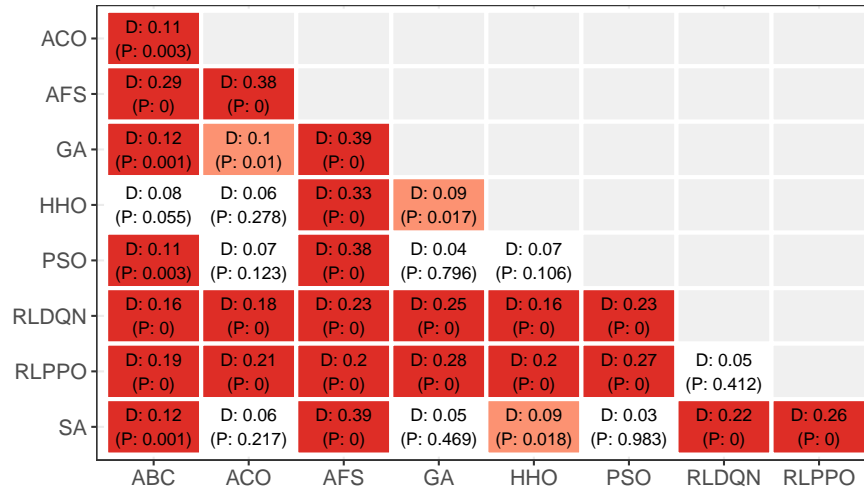
□ NS ■ P < 0.01

scenario_5_servers_200_services_5_application_PWD



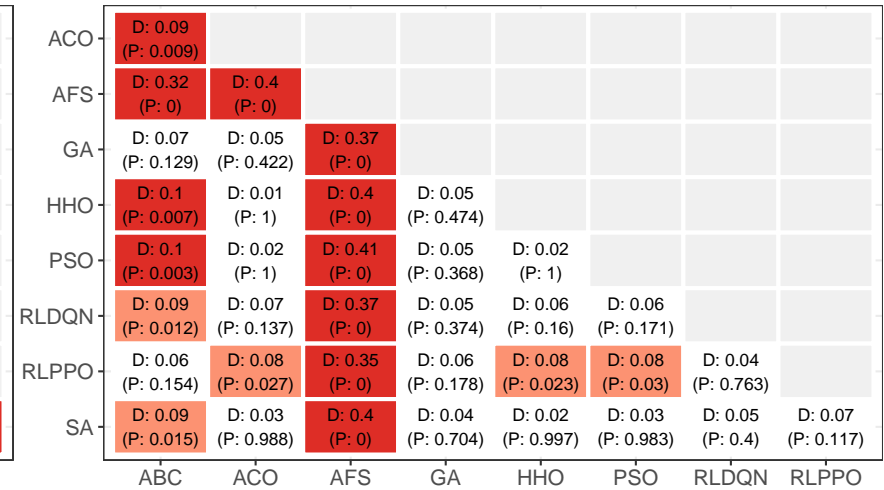
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_200_services_7_application_GENERIC



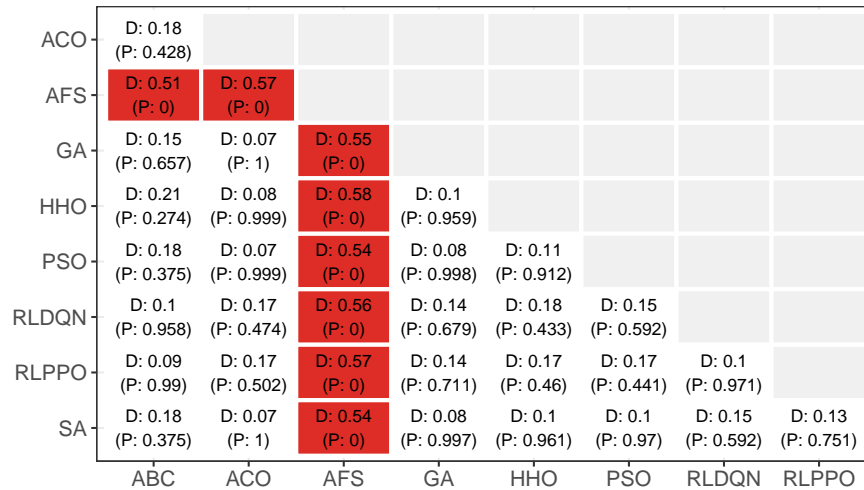
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_200_services_7_application_LTS



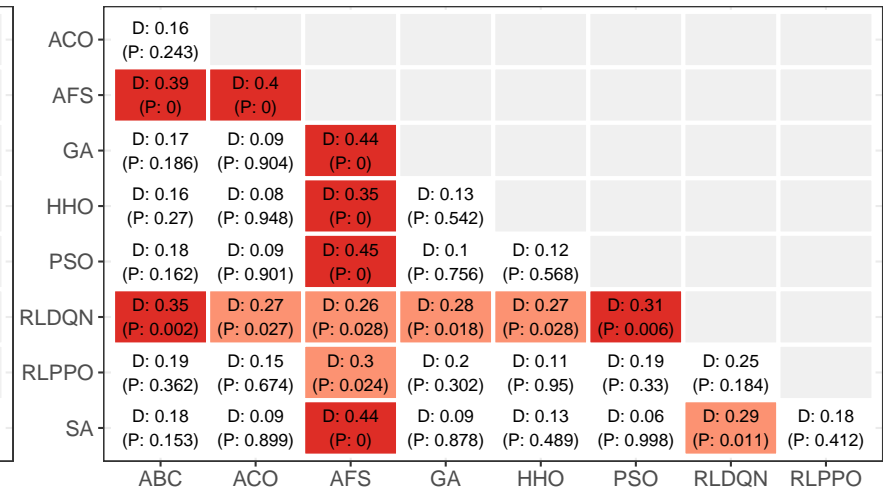
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_200_services_7_application_MMA



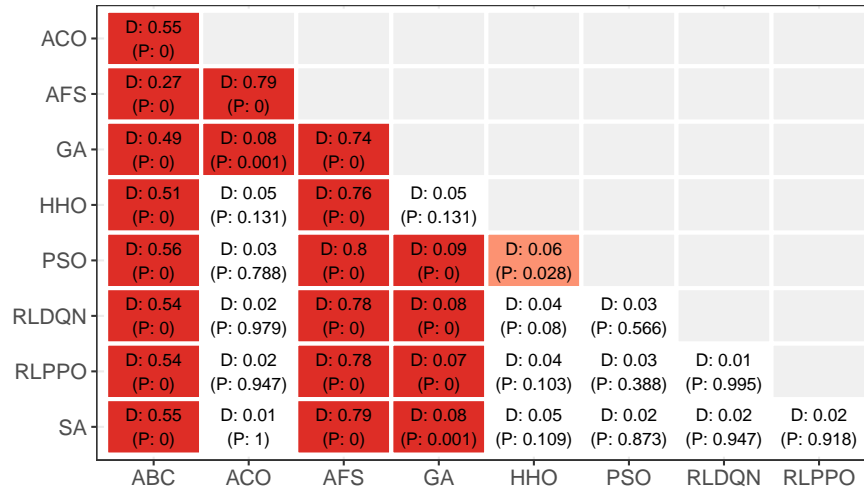
□ NS ■ P < 0.01

scenario_5_servers_200_services_7_application_PWD



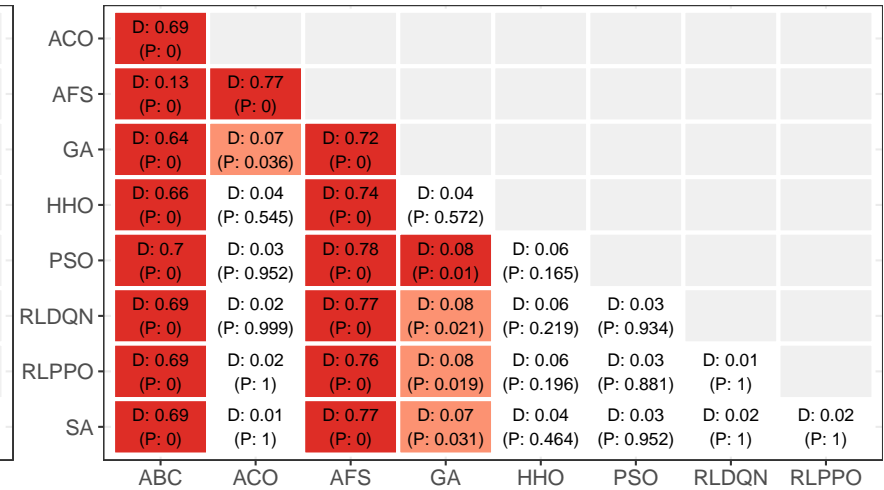
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_300_services_1_application_GENERIC



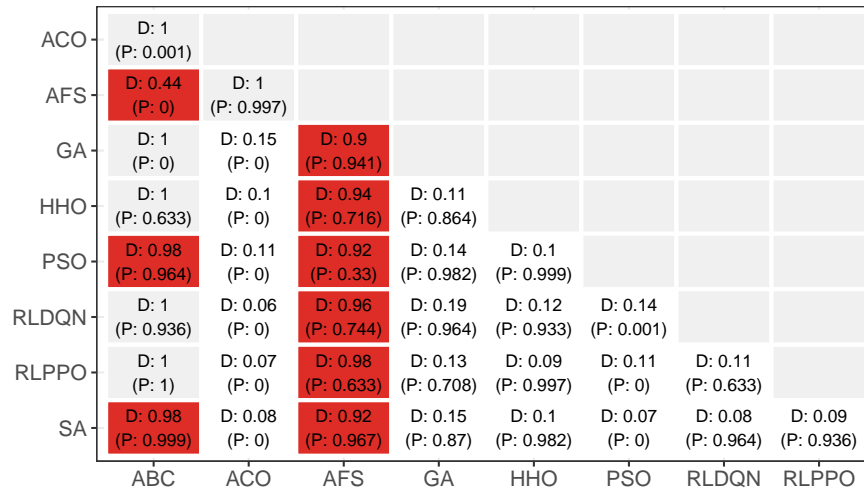
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_300_services_1_application_LTS



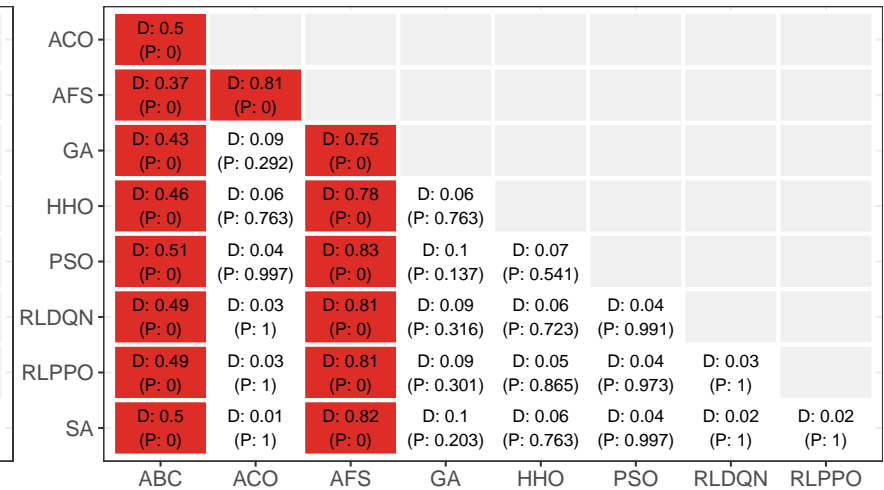
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_300_services_1_application_MMA



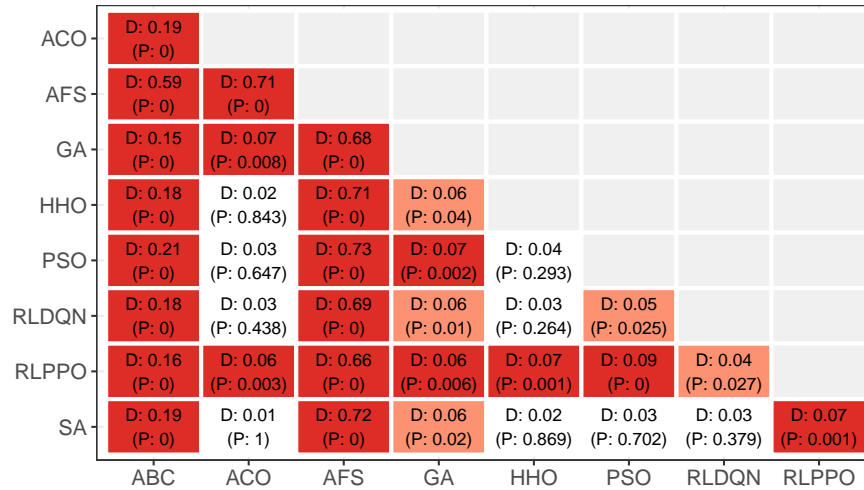
□ NS ■ P < 0.01

scenario_5_servers_300_services_1_application_PWD



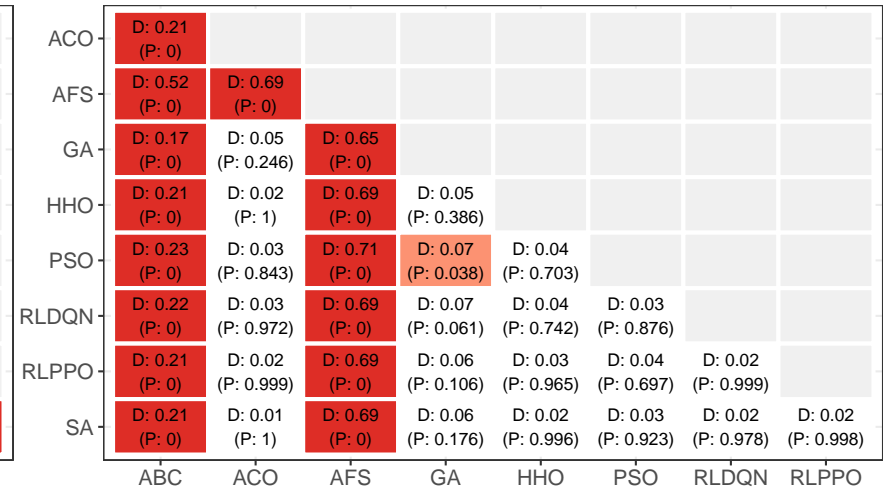
□ NS ■ P < 0.01

scenario_5_servers_300_services_3_application_GENERIC



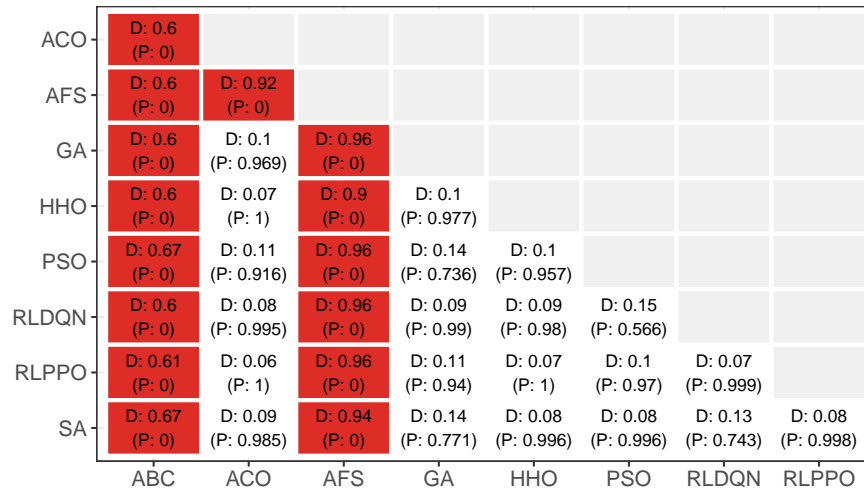
NS P < 0.05 P < 0.01

scenario_5_servers_300_services_3_application_LTS



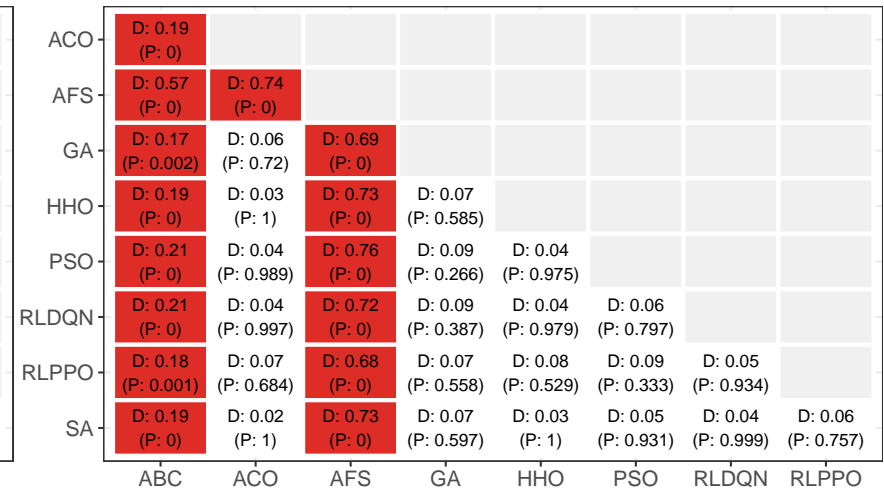
NS P < 0.05 P < 0.01

scenario_5_servers_300_services_3_application_MMA



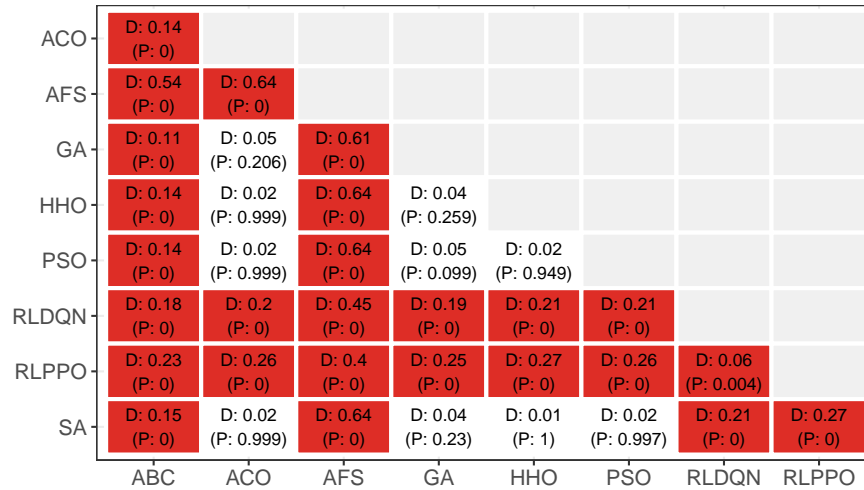
NS P < 0.01

scenario_5_servers_300_services_3_application_PWD



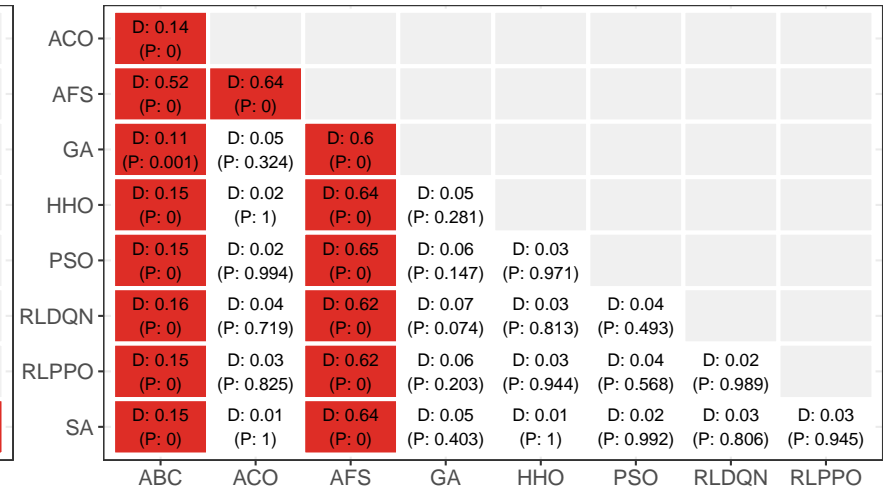
NS P < 0.01

scenario_5_servers_300_services_5_application_GENERIC



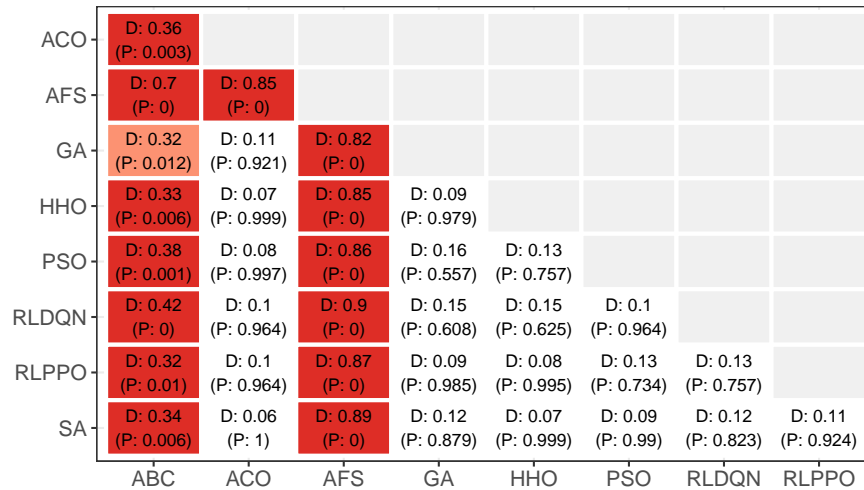
NS P < 0.01

scenario_5_servers_300_services_5_application_LTS



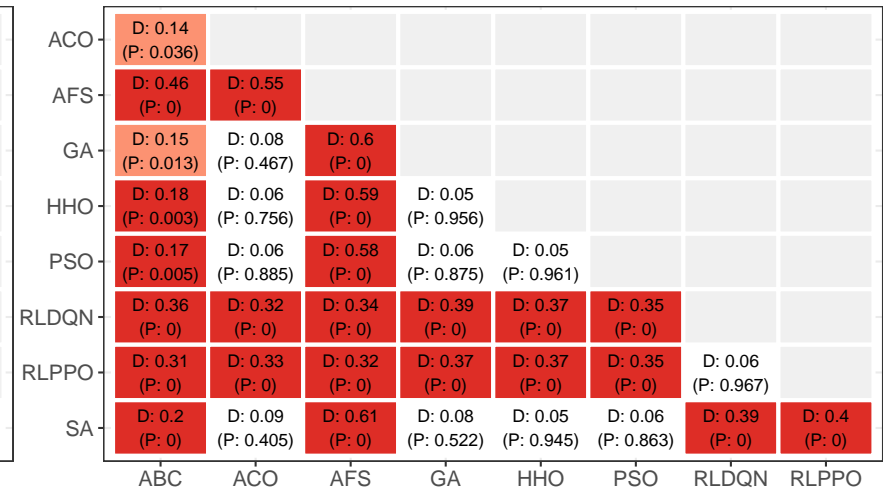
NS P < 0.01

scenario_5_servers_300_services_5_application_MMA



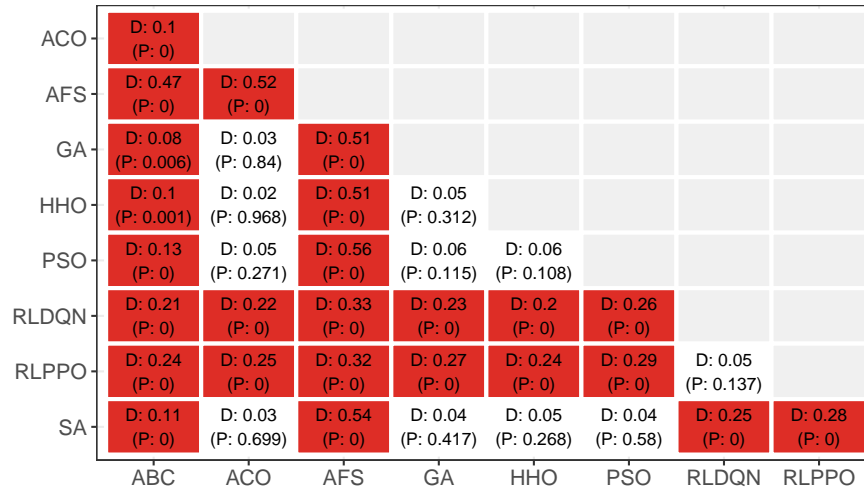
NS P < 0.05 P < 0.01

scenario_5_servers_300_services_5_application_PWD



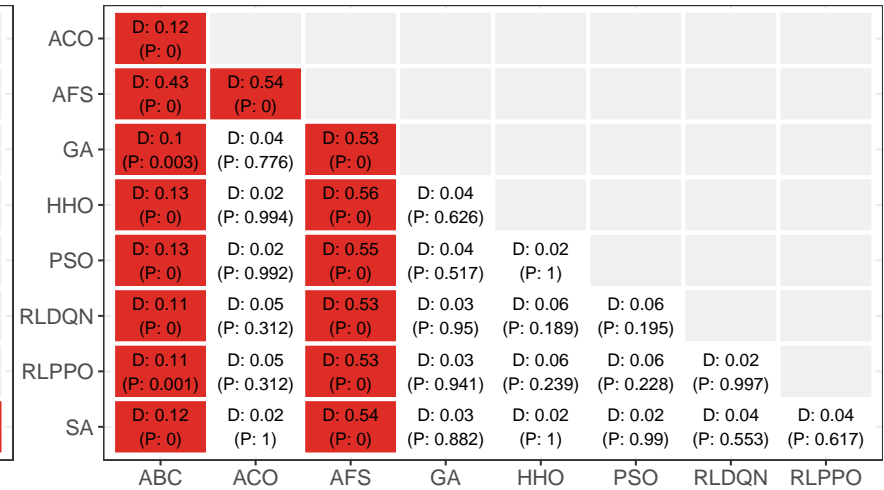
NS P < 0.05 P < 0.01

scenario_5_servers_300_services_7_application_GENERIC



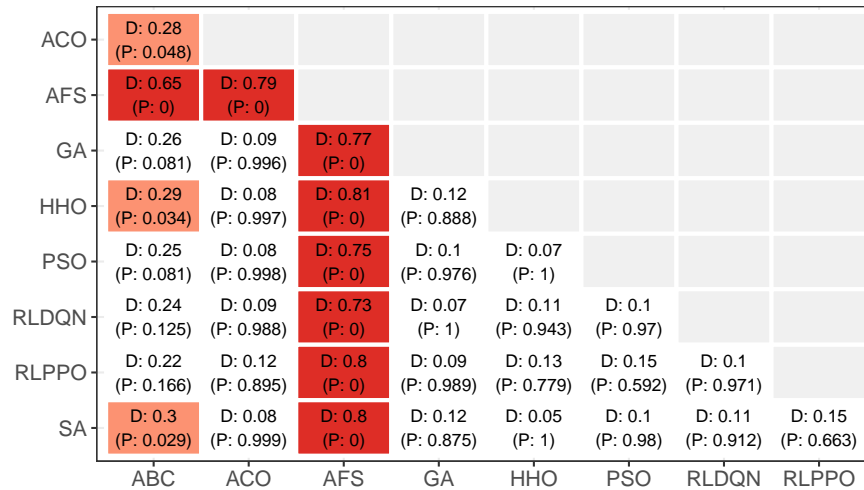
NS P < 0.01

scenario_5_servers_300_services_7_application_LTS



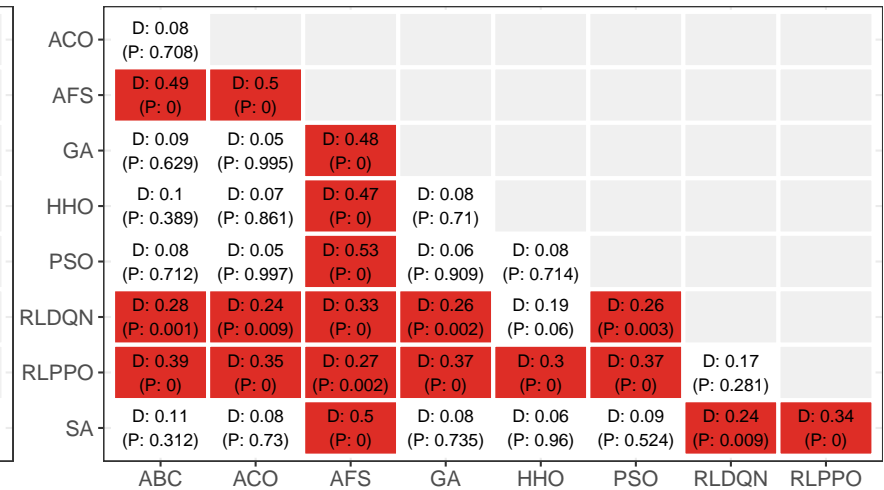
NS P < 0.01

scenario_5_servers_300_services_7_application_MMA



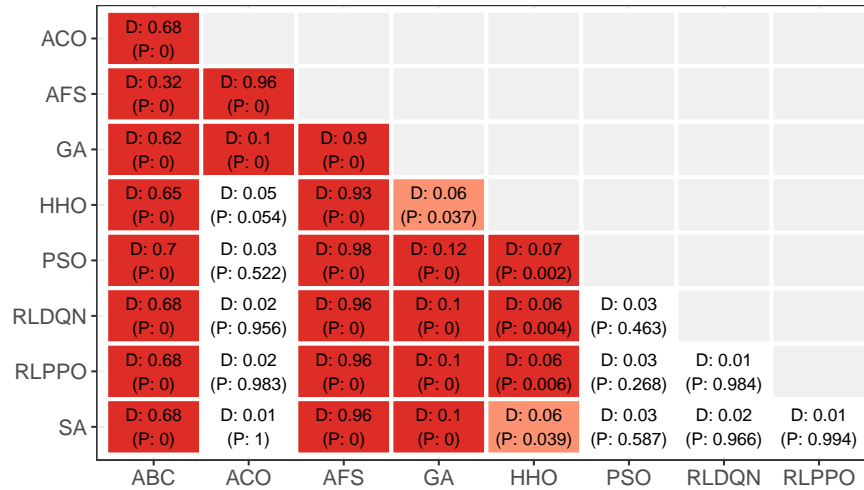
NS P < 0.05 P < 0.01

scenario_5_servers_300_services_7_application_PWD



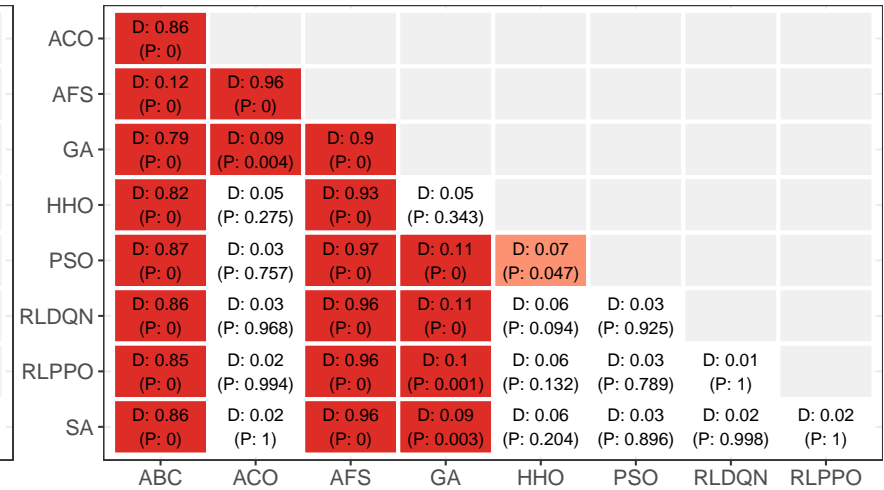
NS P < 0.01

scenario_5_servers_400_services_1_application_GENERIC



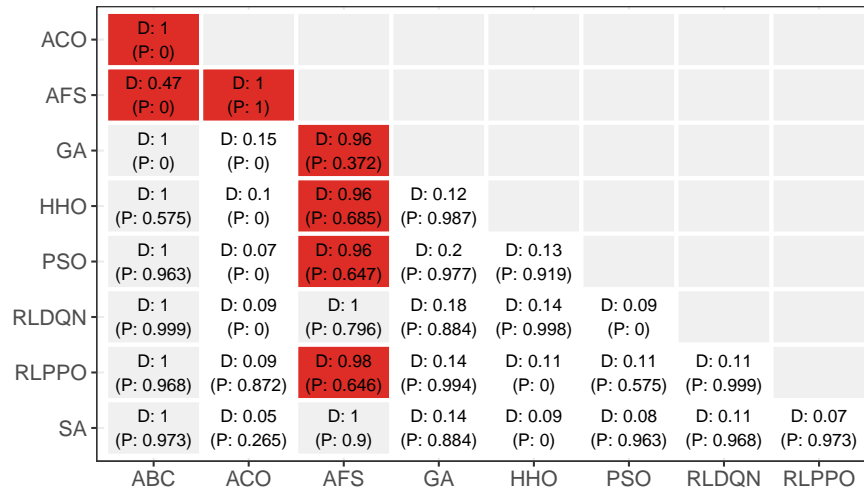
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_400_services_1_application_LTS



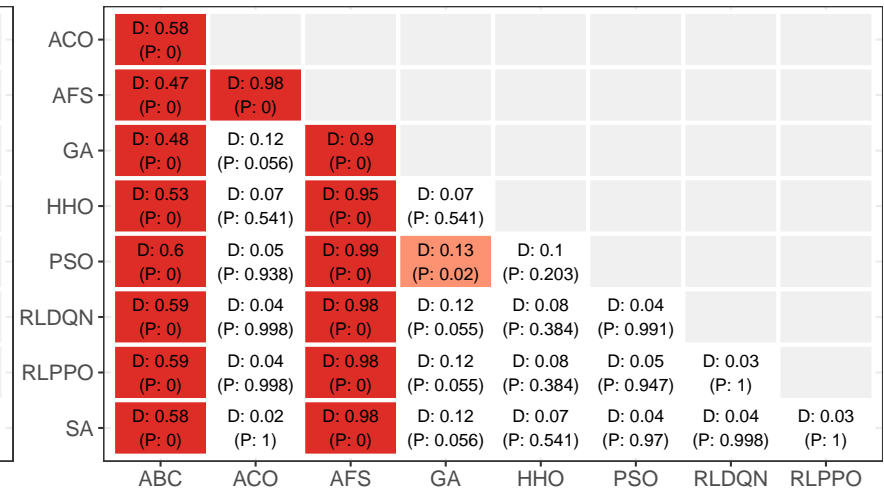
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_400_services_1_application_MMA



□ NS ■ P < 0.01

scenario_5_servers_400_services_1_application_PWD



□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_400_services_3_application_GENERIC

ACO	D: 0.26 (P: 0)							
AFS	D: 0.72 (P: 0)	D: 0.91 (P: 0)						
GA	D: 0.21 (P: 0)	D: 0.07 (P: 0.003)	D: 0.86 (P: 0)					
HHO	D: 0.25 (P: 0)	D: 0.02 (P: 0.961)	D: 0.9 (P: 0)	D: 0.06 (P: 0.014)				
PSO	D: 0.28 (P: 0)	D: 0.04 (P: 0.304)	D: 0.93 (P: 0)	D: 0.1 (P: 0)	D: 0.05 (P: 0.085)			
RLDQN	D: 0.28 (P: 0)	D: 0.03 (P: 0.354)	D: 0.92 (P: 0)	D: 0.09 (P: 0)	D: 0.04 (P: 0.091)	D: 0.02 (P: 0.954)		
RLPPO	D: 0.27 (P: 0)	D: 0.03 (P: 0.614)	D: 0.92 (P: 0)	D: 0.09 (P: 0)	D: 0.04 (P: 0.177)	D: 0.02 (P: 0.707)	D: 0.01 (P: 0.972)	
SA	D: 0.26 (P: 0)	D: 0.01 (P: 1)	D: 0.91 (P: 0)	D: 0.08 (P: 0.001)	D: 0.02 (P: 0.824)	D: 0.04 (P: 0.368)	D: 0.03 (P: 0.5)	D: 0.02 (P: 0.652)
	ABC	ACO	AFS	GA	HHO	PSO	RLDQN	RLPPO

□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_400_services_3_application_LTS

ACO	D: 0.28 (P: 0)							
AFS	D: 0.68 (P: 0)	D: 0.91 (P: 0)						
GA	D: 0.23 (P: 0)	D: 0.06 (P: 0.093)	D: 0.86 (P: 0)					
HHO	D: 0.27 (P: 0)	D: 0.02 (P: 0.998)	D: 0.9 (P: 0)	D: 0.06 (P: 0.209)				
PSO	D: 0.31 (P: 0)	D: 0.04 (P: 0.495)	D: 0.94 (P: 0)	D: 0.1 (P: 0.002)	D: 0.05 (P: 0.251)			
RLDQN	D: 0.3 (P: 0)	D: 0.05 (P: 0.414)	D: 0.93 (P: 0)	D: 0.1 (P: 0.002)	D: 0.06 (P: 0.189)	D: 0.02 (P: 0.98)		
RLPPO	D: 0.3 (P: 0)	D: 0.04 (P: 0.619)	D: 0.92 (P: 0)	D: 0.09 (P: 0.006)	D: 0.05 (P: 0.287)	D: 0.03 (P: 0.956)	D: 0.02 (P: 1)	
SA	D: 0.28 (P: 0)	D: 0.02 (P: 1)	D: 0.91 (P: 0)	D: 0.07 (P: 0.082)	D: 0.03 (P: 0.927)	D: 0.04 (P: 0.656)	D: 0.04 (P: 0.62)	D: 0.03 (P: 0.81)
	ABC	ACO	AFS	GA	HHO	PSO	RLDQN	RLPPO

□ NS ■ P < 0.01

scenario_5_servers_400_services_3_application_MMA

ACO	D: 0.72 (P: 0)							
AFS	D: 0.63 (P: 0)	D: 1 (P: 0)						
GA	D: 0.63 (P: 0)	D: 0.13 (P: 0.706)	D: 1 (P: 0.537)					
HHO	D: 0.74 (P: 0)	D: 0.07 (P: 1)	D: 1 (P: 0.687)	D: 0.16 (P: 0.708)				
PSO	D: 0.64 (P: 0)	D: 0.1 (P: 0.947)	D: 1 (P: 0.198)	D: 0.13 (P: 0.692)	D: 0.12 (P: 0.874)			
RLDQN	D: 0.77 (P: 0)	D: 0.16 (P: 0.487)	D: 1 (P: 0.761)	D: 0.21 (P: 0.995)	D: 0.14 (P: 0.308)	D: 0.16 (P: 0)		
RLPPO	D: 0.64 (P: 0)	D: 0.12 (P: 0.773)	D: 1 (P: 0.606)	D: 0.12 (P: 0.482)	D: 0.13 (P: 0.6)	D: 0.07 (P: 0)	D: 0.18 (P: 0)	
SA	D: 0.7 (P: 0)	D: 0.06 (P: 1)	D: 1 (P: 0.844)	D: 0.15 (P: 0.998)	D: 0.08 (P: 0.761)	D: 0.11 (P: 0)	D: 0.15 (P: 0)	D: 0.12 (P: 0)
	ABC	ACO	AFS	GA	HHO	PSO	RLDQN	RLPPO

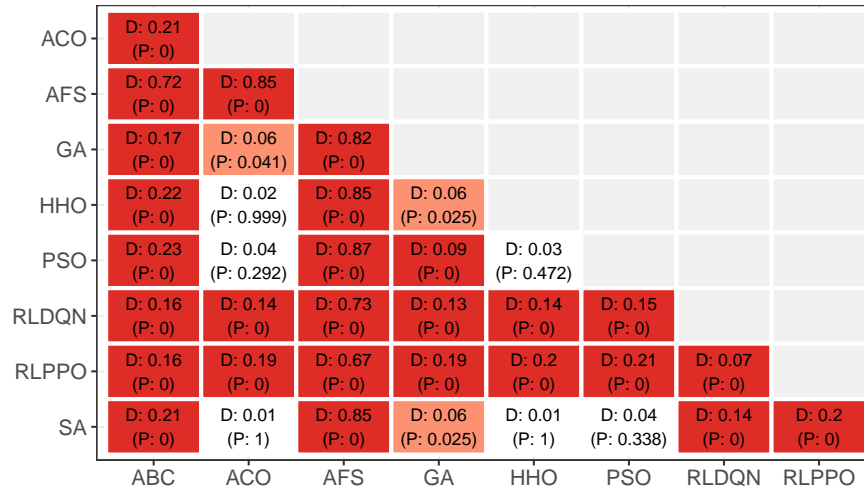
□ NS ■ P < 0.01

scenario_5_servers_400_services_3_application_PWD

ACO	D: 0.25 (P: 0)							
AFS	D: 0.7 (P: 0)	D: 0.9 (P: 0)						
GA	D: 0.2 (P: 0)	D: 0.09 (P: 0.292)	D: 0.85 (P: 0)					
HHO	D: 0.25 (P: 0)	D: 0.03 (P: 1)	D: 0.9 (P: 0)	D: 0.09 (P: 0.292)				
PSO	D: 0.27 (P: 0)	D: 0.06 (P: 0.832)	D: 0.93 (P: 0)	D: 0.11 (P: 0.089)	D: 0.06 (P: 0.69)			
RLDQN	D: 0.27 (P: 0)	D: 0.06 (P: 0.744)	D: 0.94 (P: 0)	D: 0.11 (P: 0.105)	D: 0.07 (P: 0.583)	D: 0.03 (P: 1)		
RLPPO	D: 0.27 (P: 0)	D: 0.05 (P: 0.918)	D: 0.94 (P: 0)	D: 0.1 (P: 0.158)	D: 0.06 (P: 0.744)	D: 0.02 (P: 1)	D: 0.03 (P: 1)	
SA	D: 0.27 (P: 0)	D: 0.03 (P: 1)	D: 0.91 (P: 0)	D: 0.1 (P: 0.184)	D: 0.04 (P: 0.99)	D: 0.04 (P: 0.997)	D: 0.04 (P: 0.981)	D: 0.04 (P: 0.989)
	ABC	ACO	AFS	GA	HHO	PSO	RLDQN	RLPPO

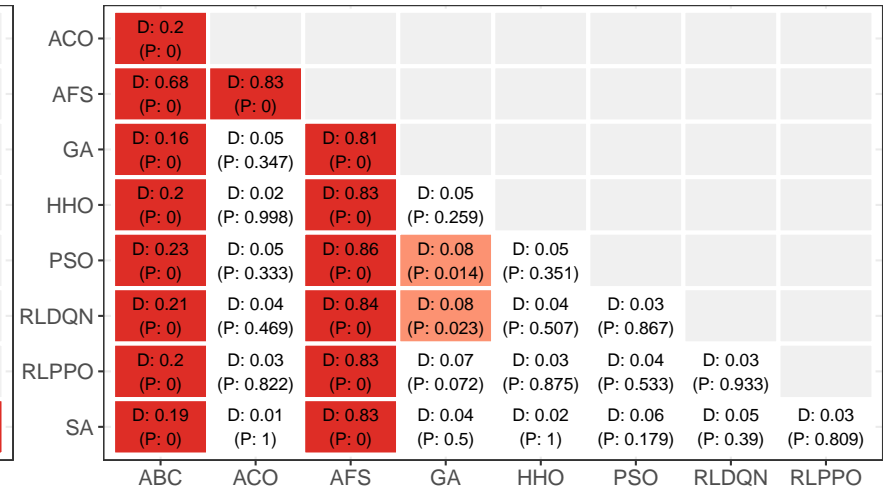
□ NS ■ P < 0.01

scenario_5_servers_400_services_5_application_GENERIC



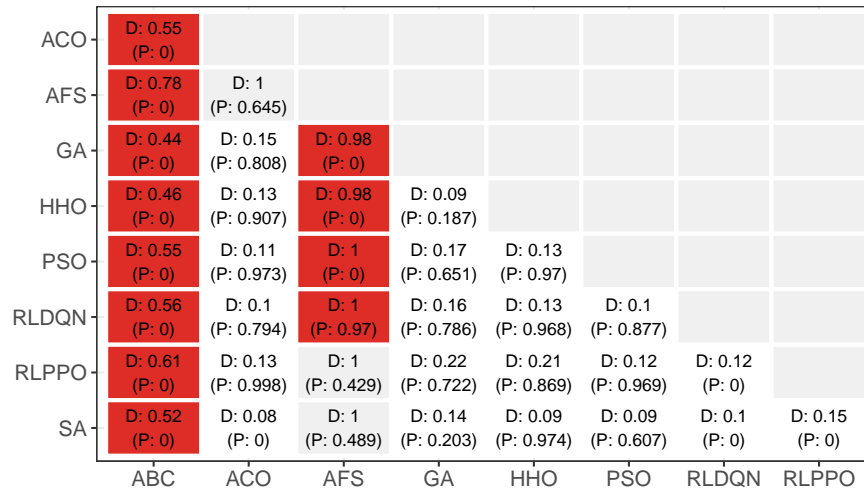
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_400_services_5_application_LTS



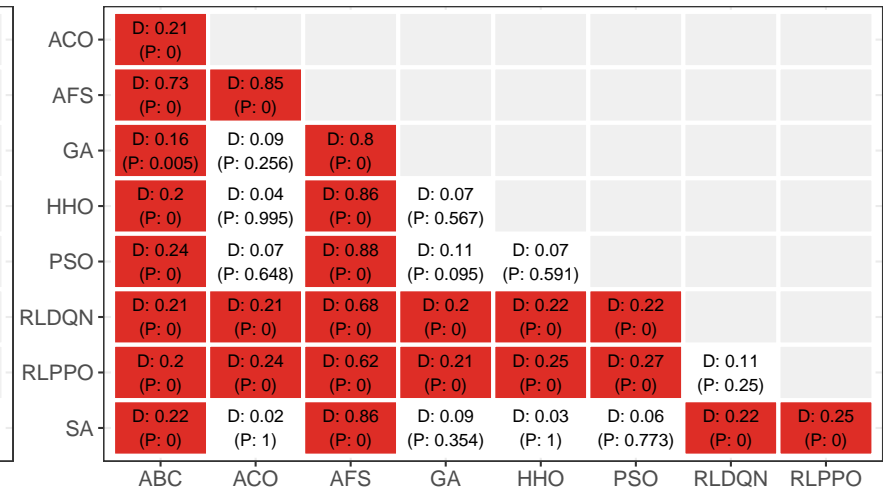
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_400_services_5_application_MMA



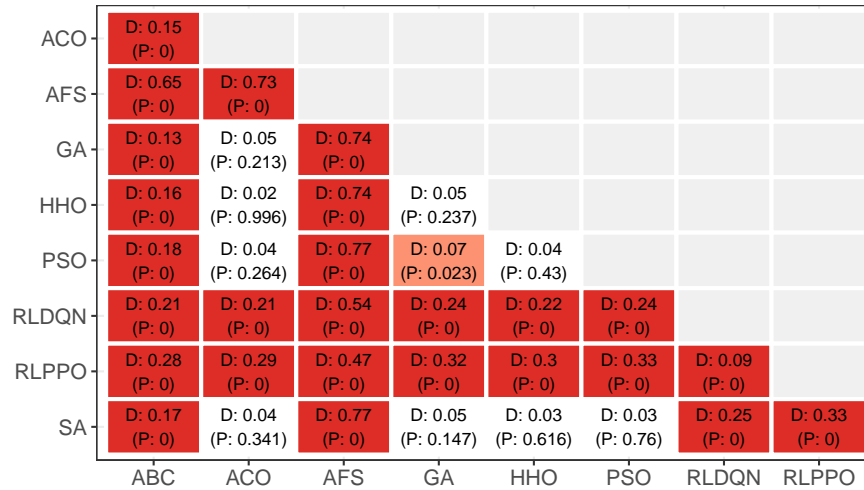
□ NS ■ P < 0.01

scenario_5_servers_400_services_5_application_PWD



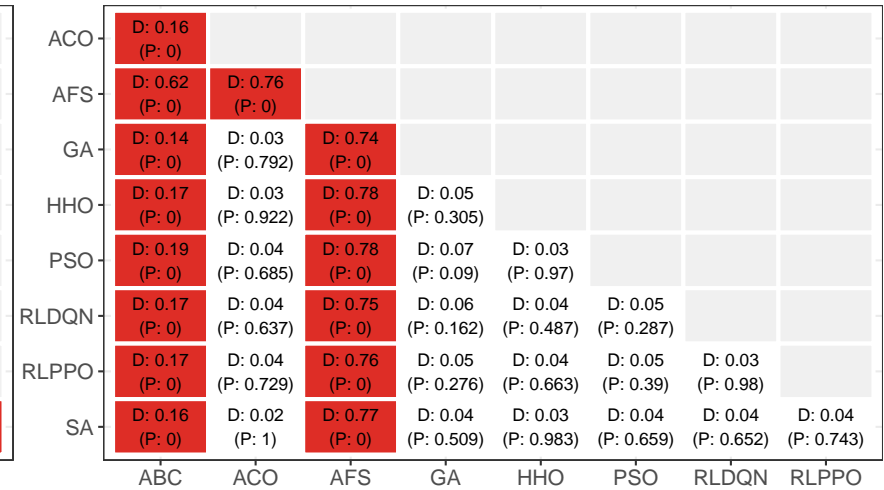
□ NS ■ P < 0.01

scenario_5_servers_400_services_7_application_GENERIC



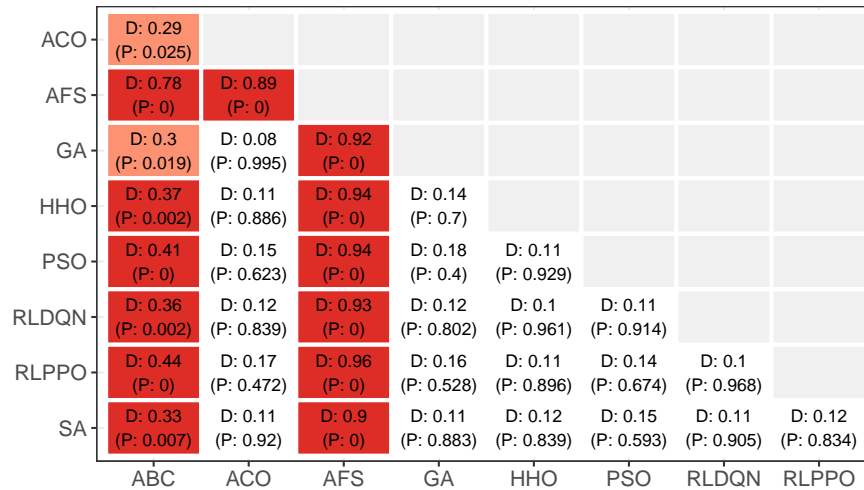
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_400_services_7_application_LTS



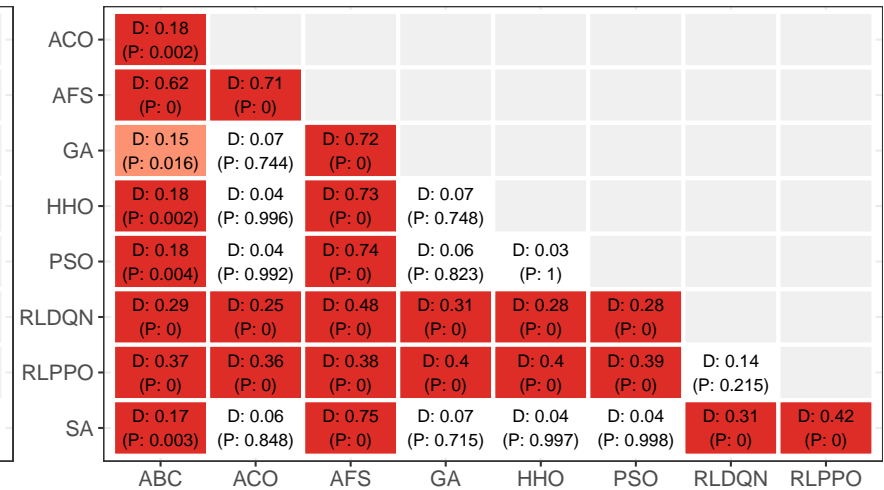
□ NS ■ P < 0.01

scenario_5_servers_400_services_7_application_MMA



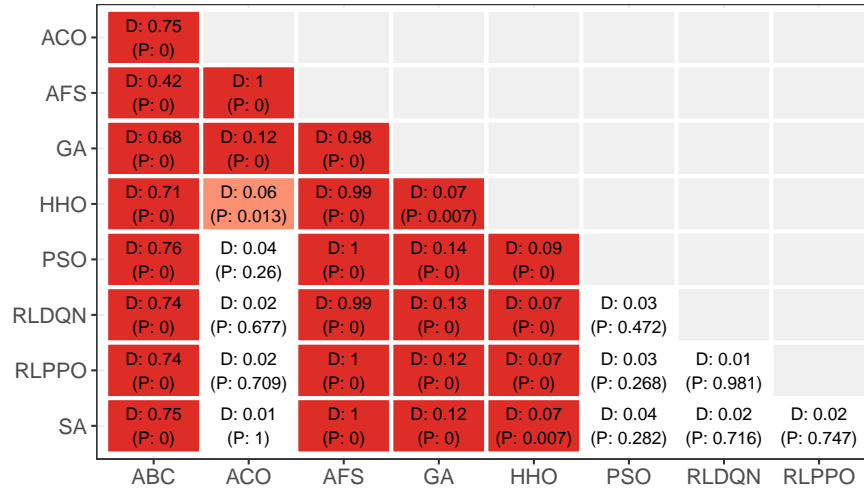
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_400_services_7_application_PWD



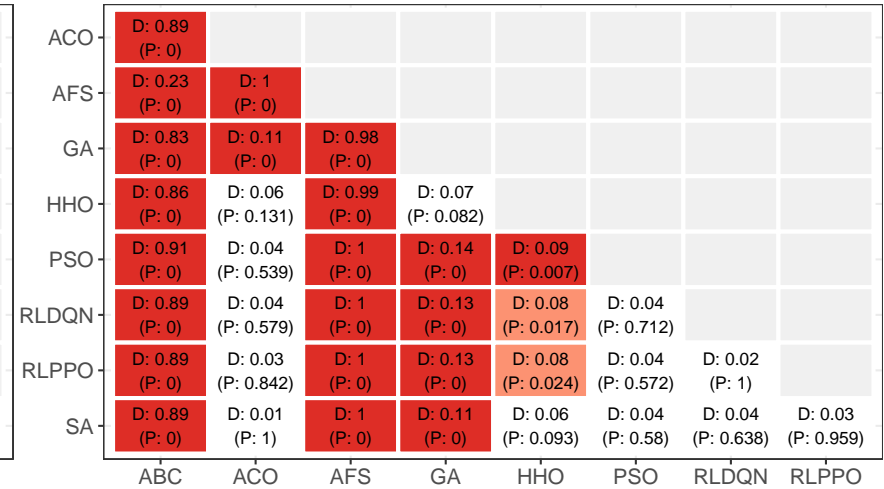
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_500_services_1_application_GENERIC



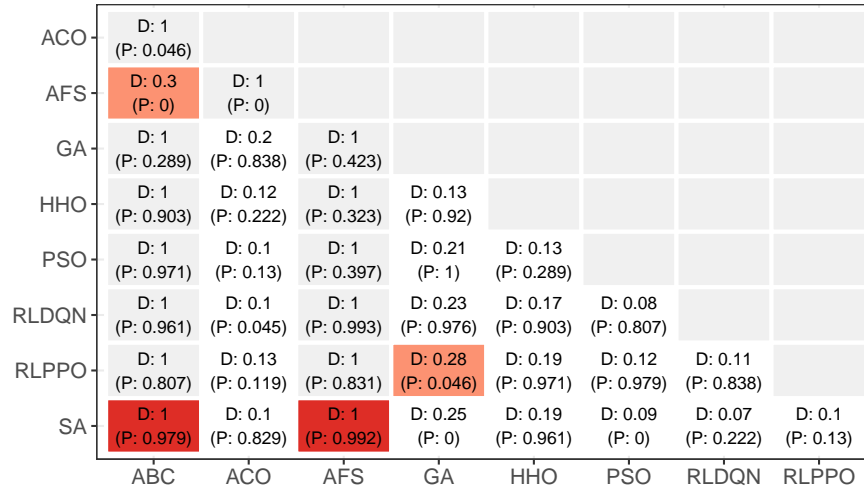
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_500_services_1_application_LTS



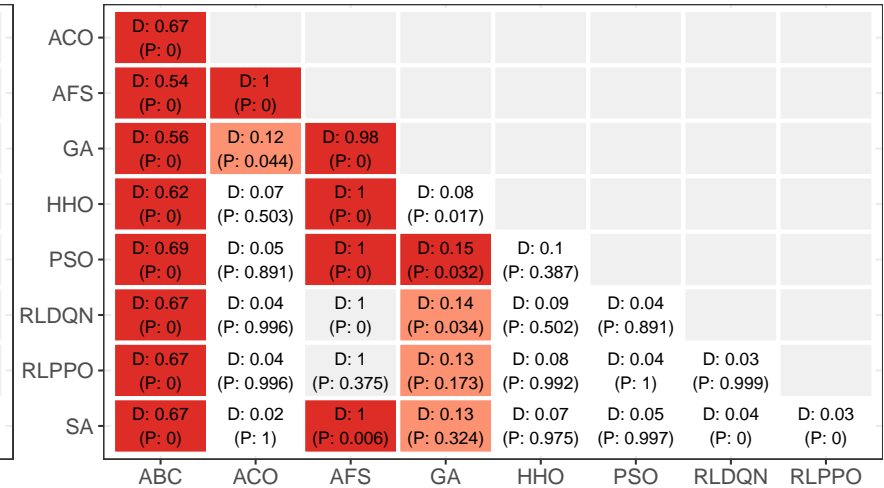
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_500_services_1_application_MMA



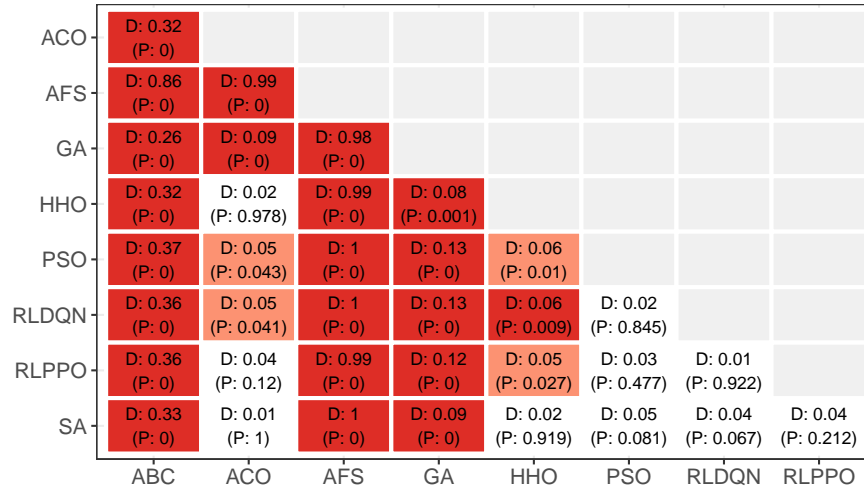
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_500_services_1_application_PWD



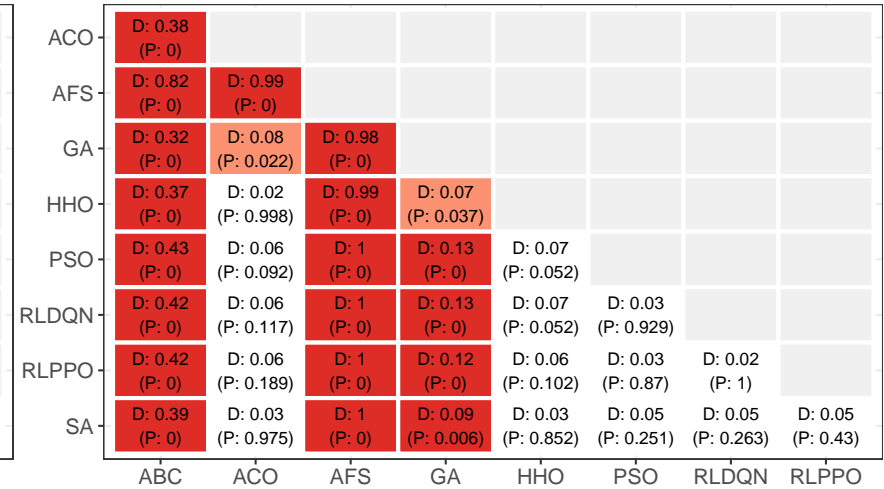
□ NS □ P < 0.05 ■ P < 0.01

scenario_5_servers_500_services_3_application_GENERIC



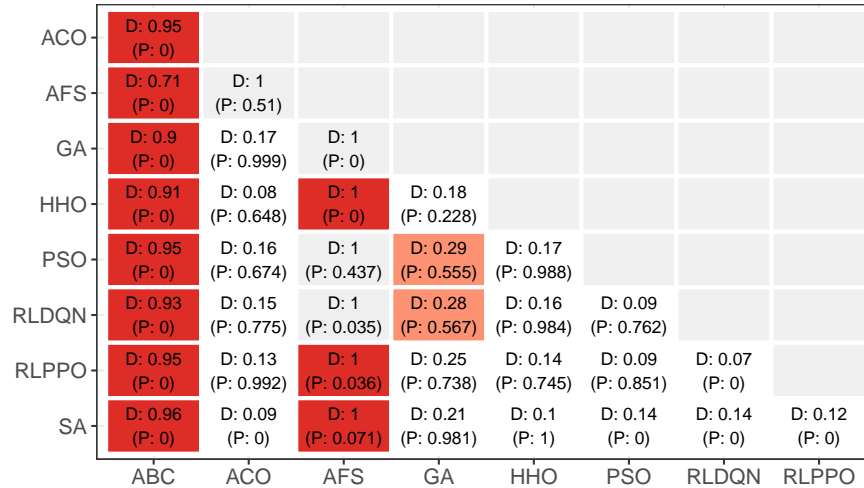
NS P < 0.05 P < 0.01

scenario_5_servers_500_services_3_application_LTS



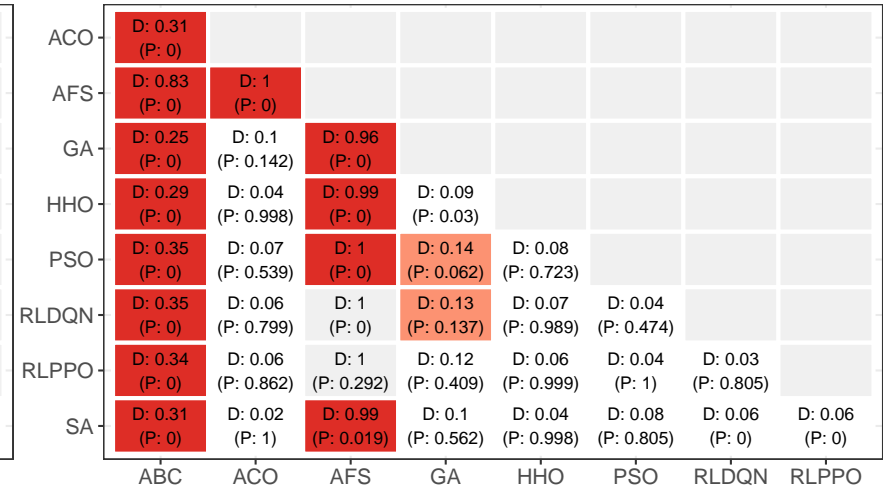
NS P < 0.05 P < 0.01

scenario_5_servers_500_services_3_application_MMA



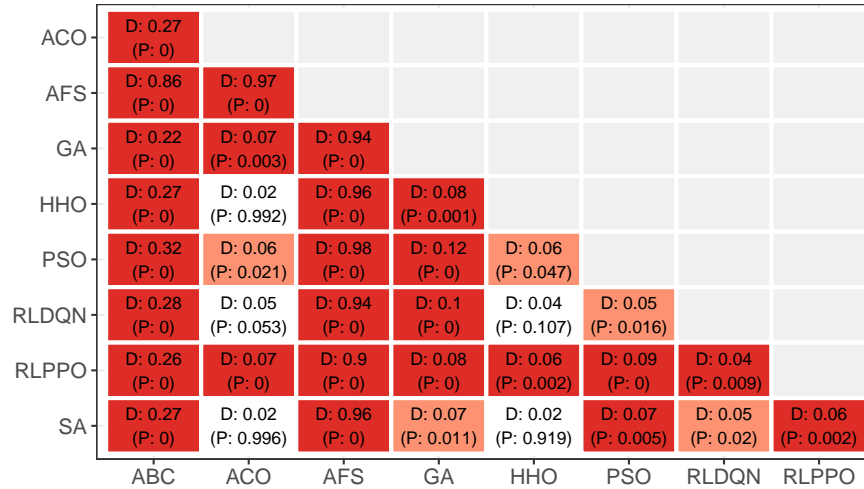
NS P < 0.05 P < 0.01

scenario_5_servers_500_services_3_application_PWD



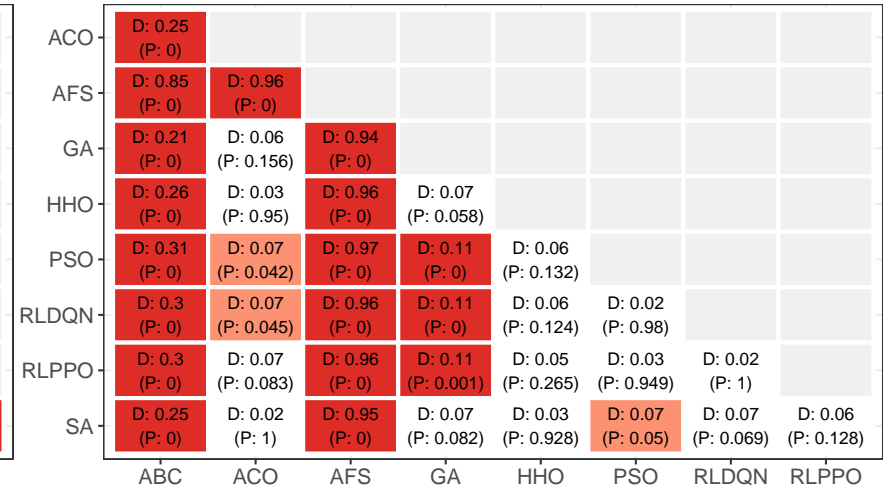
NS P < 0.05 P < 0.01

scenario_5_servers_500_services_5_application_GENERIC



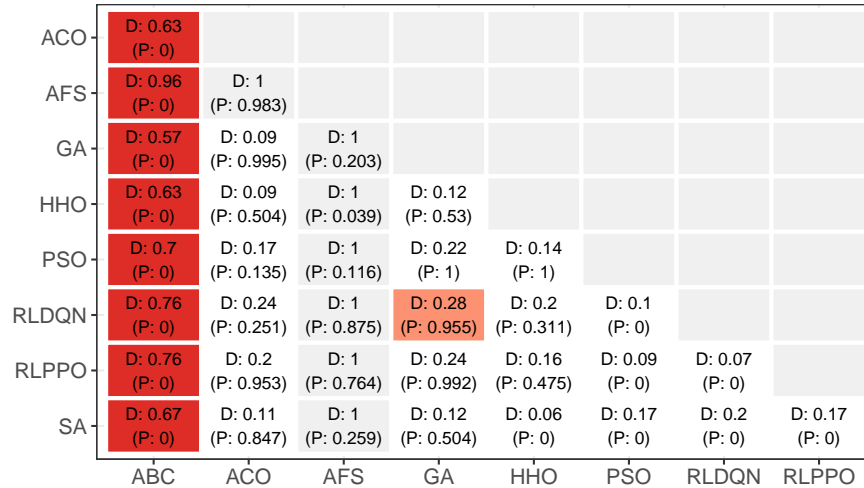
NS P < 0.05 P < 0.01

scenario_5_servers_500_services_5_application_LTS



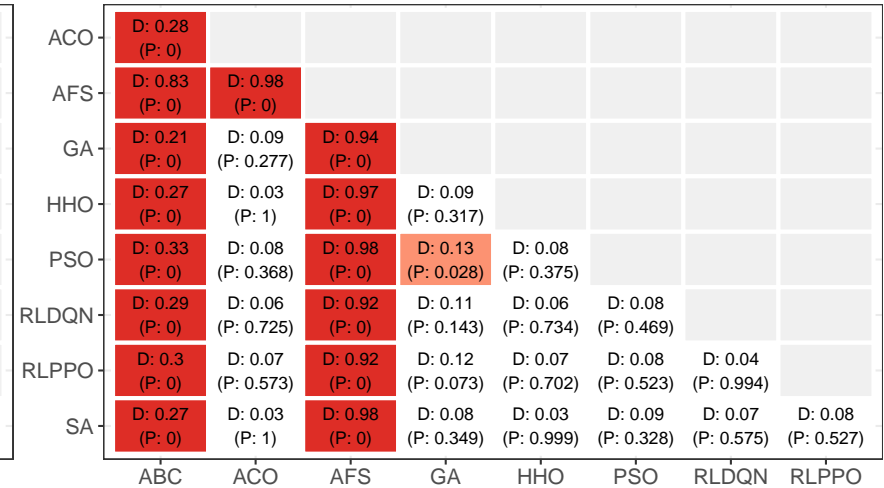
NS P < 0.05 P < 0.01

scenario_5_servers_500_services_5_application_MMA



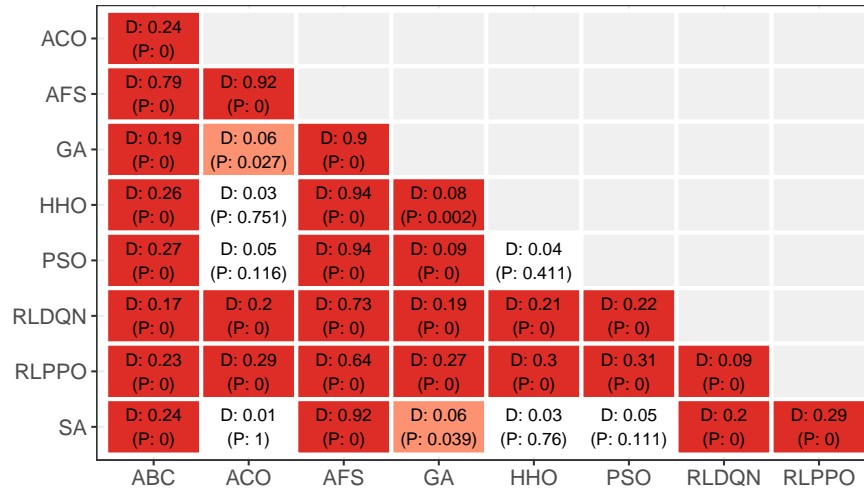
NS P < 0.05 P < 0.01

scenario_5_servers_500_services_5_application_PWD



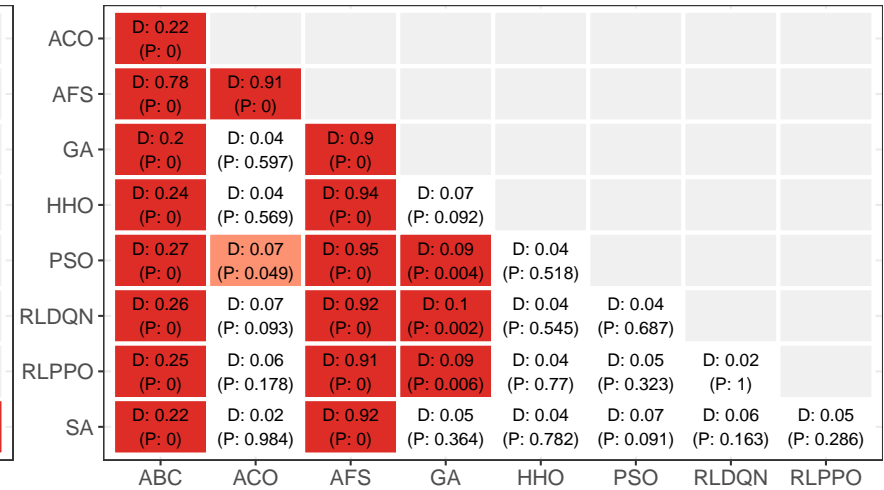
NS P < 0.05 P < 0.01

scenario_5_servers_500_services_7_application_GENERIC



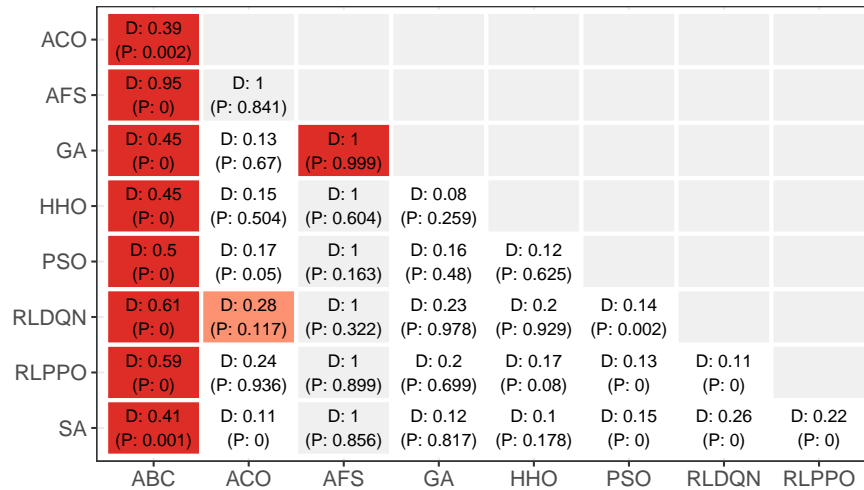
NS P < 0.05 P < 0.01

scenario_5_servers_500_services_7_application_LTS



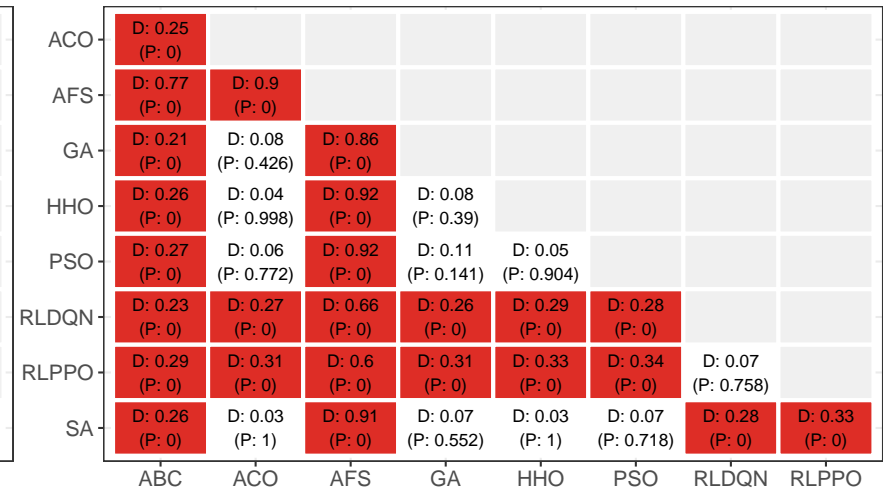
NS P < 0.05 P < 0.01

scenario_5_servers_500_services_7_application_MMA



NS P < 0.05 P < 0.01

scenario_5_servers_500_services_7_application_PWD



NS P < 0.01