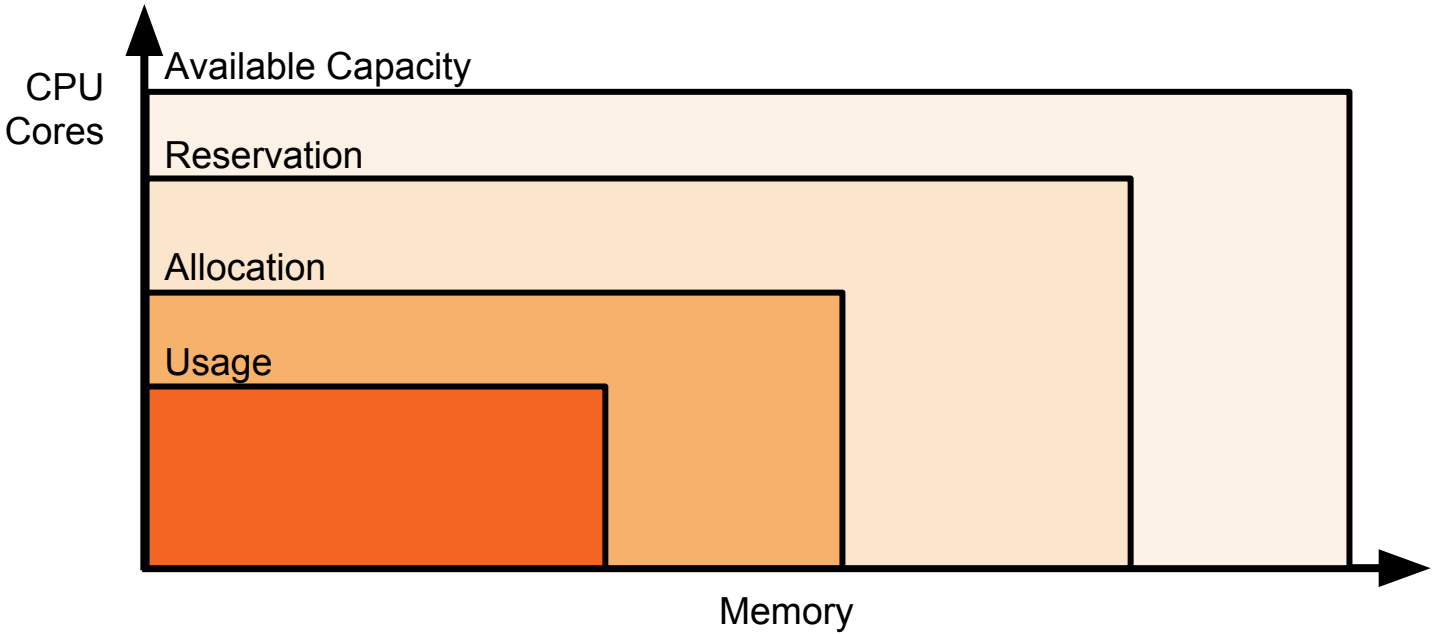
Long-term SLOs for reclaimed cloud computing resources

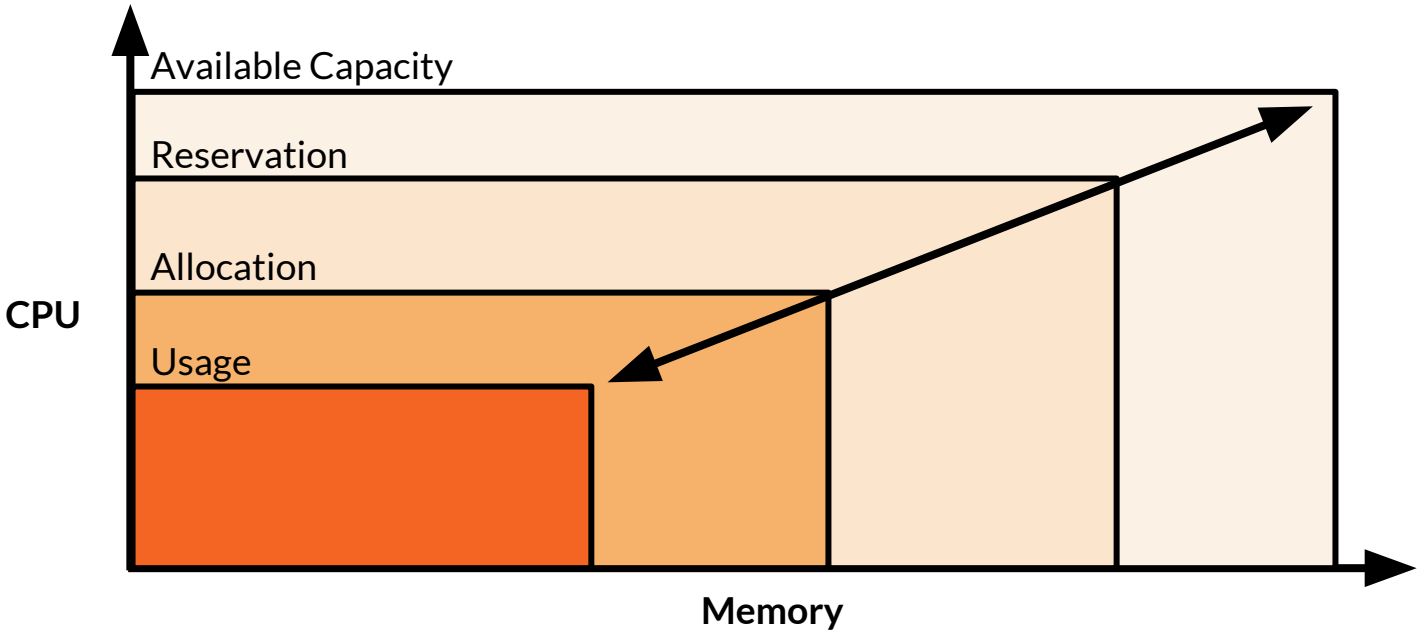
Carvalho et al. (2014)

Christopher Little

Motivation


CPU
Cores
Available Capacity
Reservation
Allocation
Usage
Memory

Motivation


Available Capacity
Reservation
Allocation
Usage
CPU
Memory

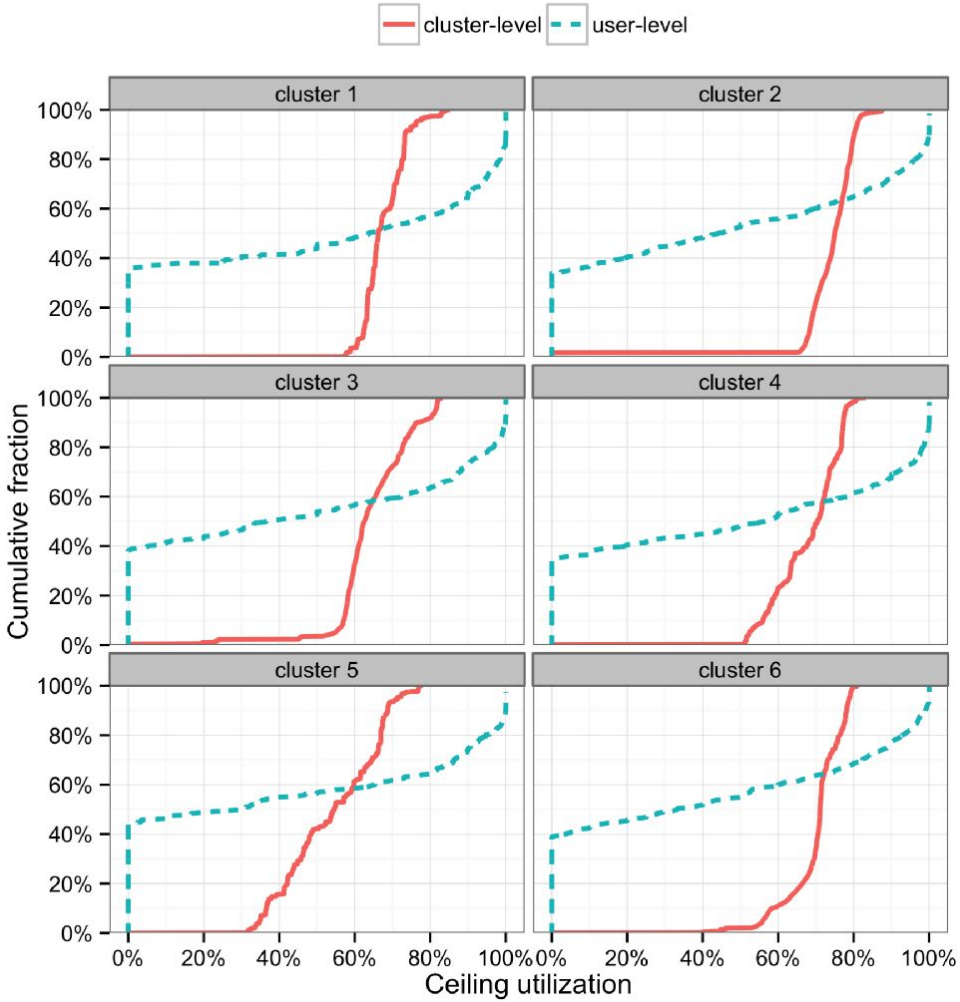
Current Approaches

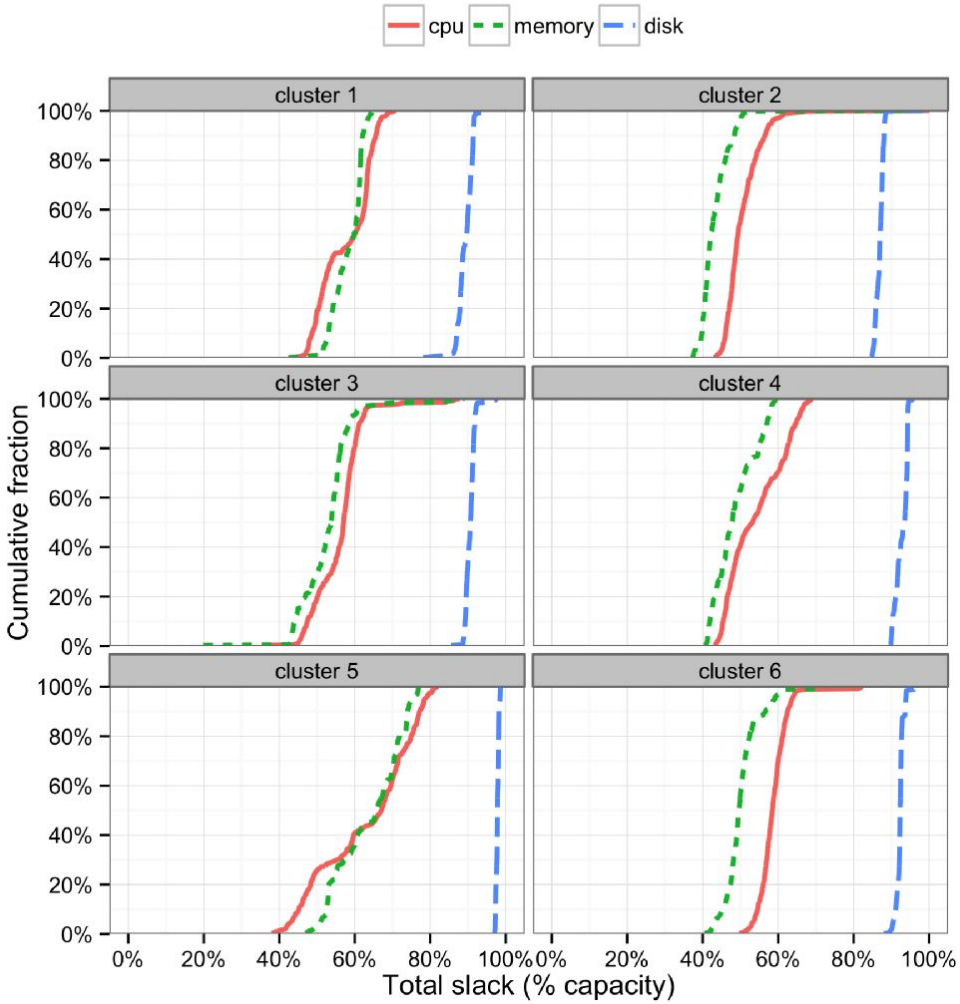
	Reserved	On-Demand	Opportunistic
Service Level Objectives (**SLO**)	**100%** Obtainability **99%** Availability	**99%** Obtainability **99%** Availability	**0%** Obtainability **0%** Availability

Current Approaches

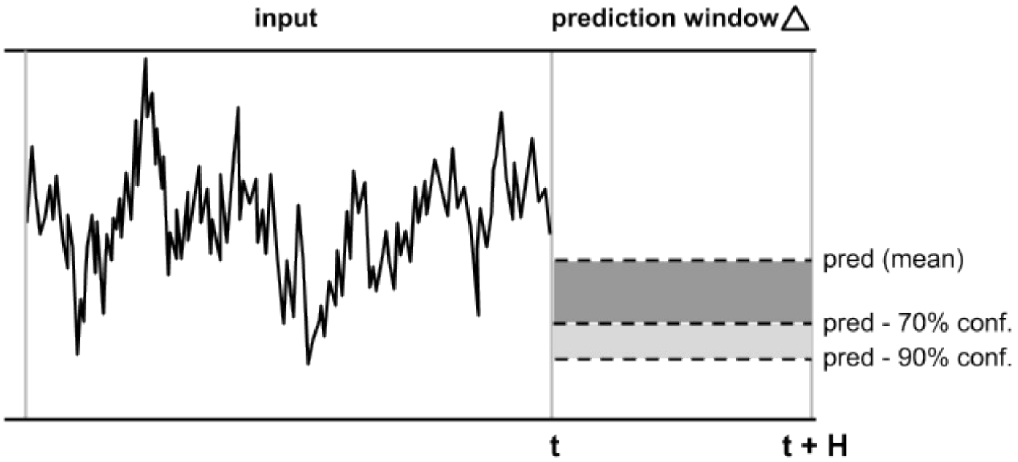
	Reserved	On-Demand	Opportunistic
Service Level Objectives (**SLO**)	**100%** Obtainability **99.9%** Availability	**99%** Obtainability **99.9%** Availability	**0%** Obtainability **0%** Availability

Economy @ 28-40%	…	Economy @ 6-17%
99% Obtainability **88.7%** Availability	…	**99%** Obtainability **98.9%** Availability


cluster-level
user-level
cluster 1
cluster 2
cluster 3
cluster 4
cluster 5
cluster 6
Cumulative fraction
Ceiling utilization
0%
20%
40%
60%
80%
100%


cpu
memory
disk
cluster 1
cluster 2
cluster 3
cluster 4
cluster 5
cluster 6
Cumulative fraction
0%
20%
40%
60%
80%
100%
Total slack (% capacity)

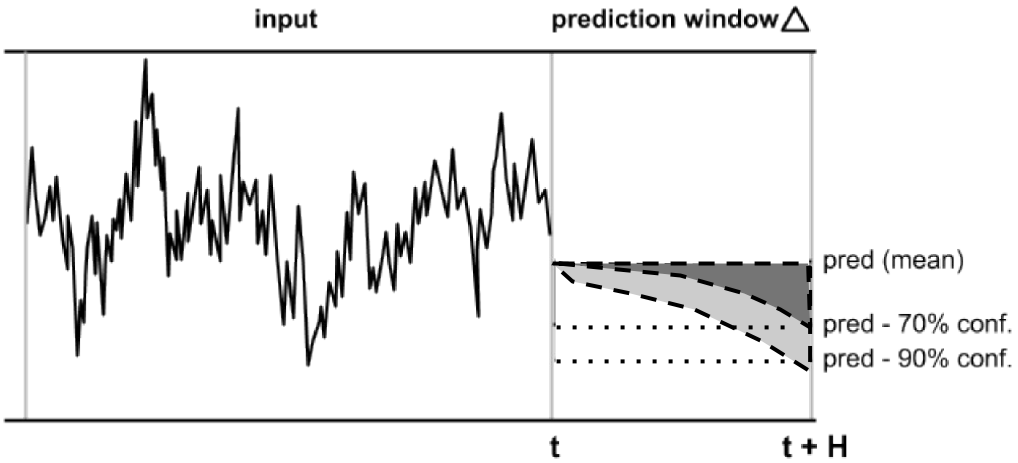
Making Predictions



Methods:

- Mean Slack
- Minimum Slack
- *ARIMA*
- *ETS*

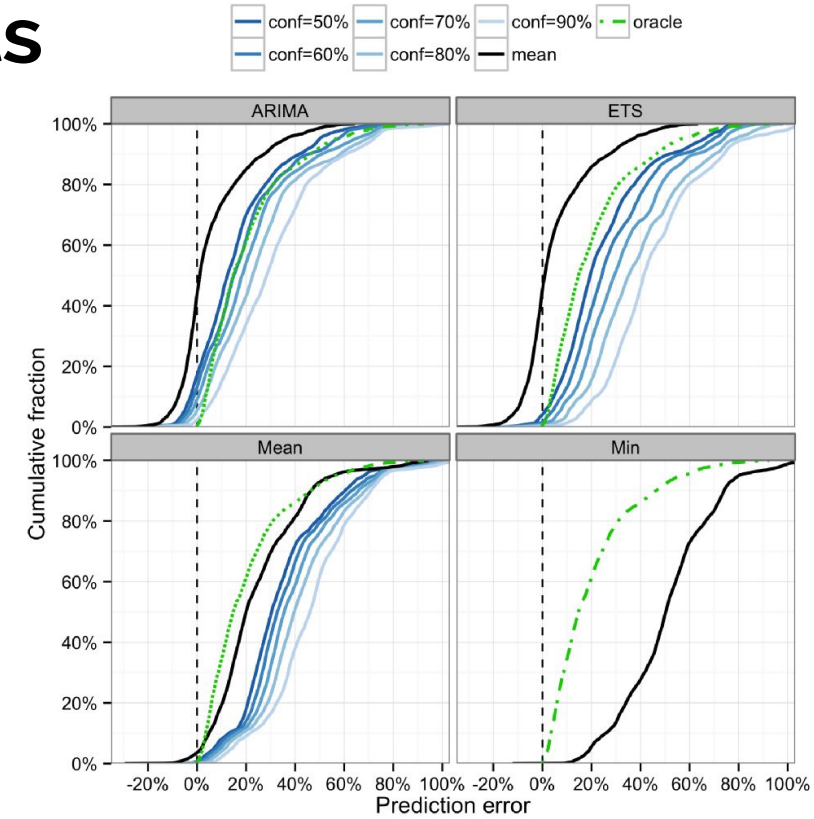
Making Predictions



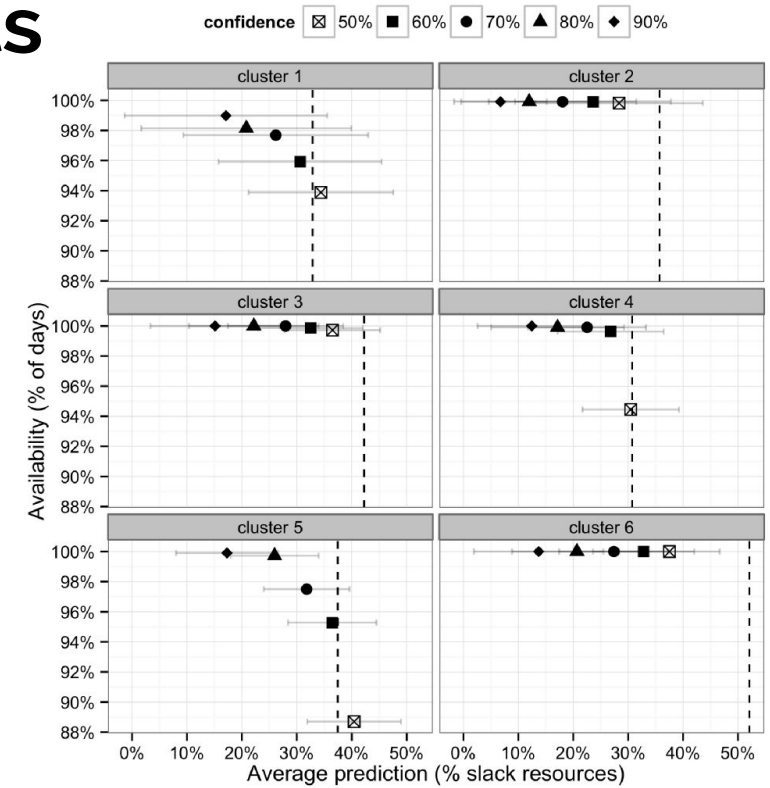
Methods:

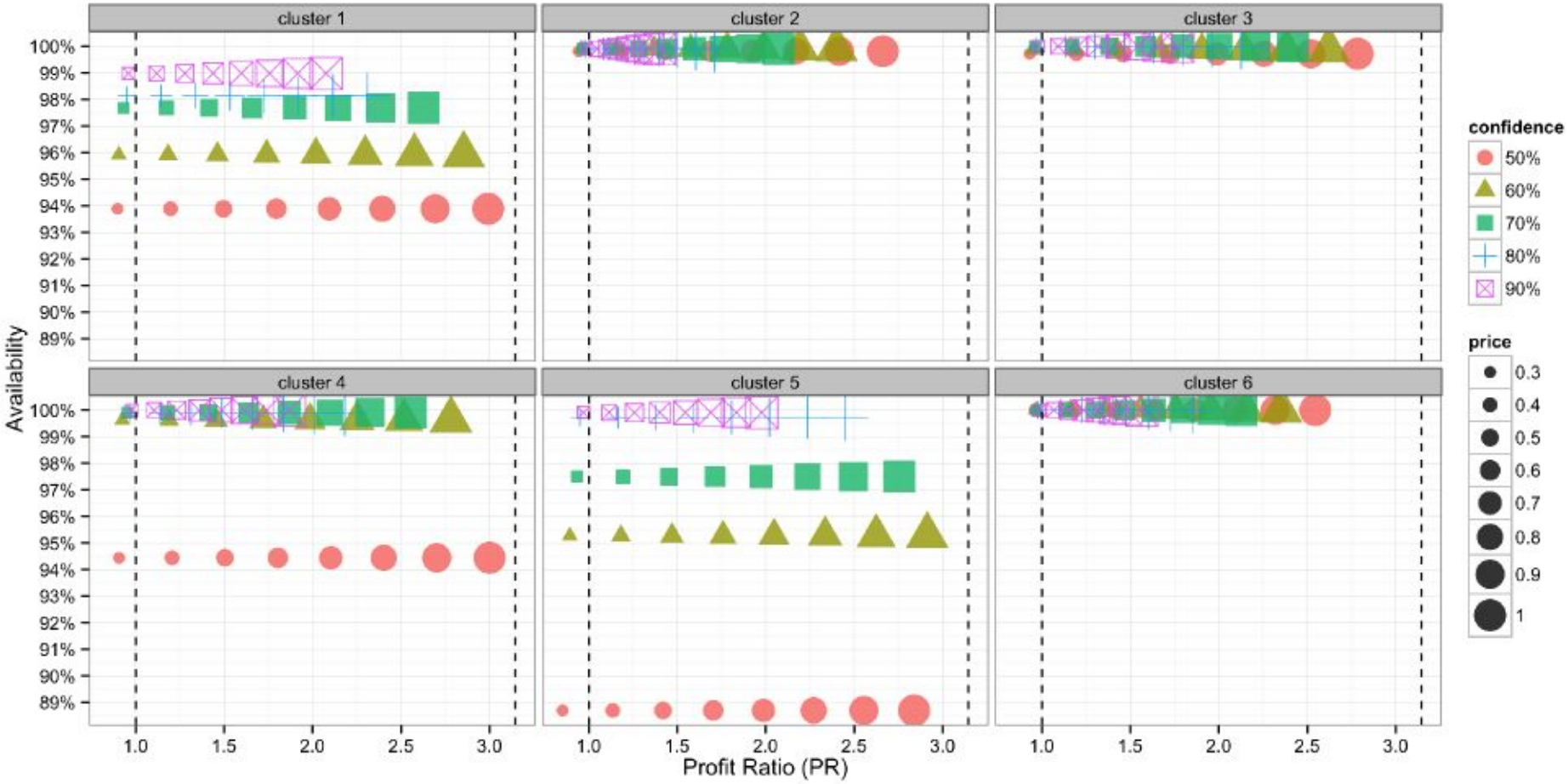
- Mean Slack
- Minimum Slack
- *ARIMA*
- *ETS*

Results


conf=50%
conf=60%
conf=70%
conf=80%
conf=90%
mean
oracle
ARIMA
ETS
Mean
Min
Cumulative fraction
100%
80%
60%
40%
20%
0%
-20%
0%
20%
40%
60%
80%
100%
Prediction error

Results


confidence
50%
60%
70%
80%
90%
cluster 1
cluster 2
cluster 3
cluster 4
cluster 5
cluster 6
Availability (% of days)
100%
98%
96%
94%
92%
90%
88%
0%
10%
20%
30%
40%
50%
Average prediction (% slack resources)


cluster 1
cluster 2
cluster 3
cluster 4
cluster 5
cluster 6
Availability
100%
99%
98%
97%
96%
95%
94%
93%
92%
91%
90%
89%
1.0
1.5
2.0
2.5
3.0
Profit Ratio (PR)
confidence
50%
60%
70%
80%
90%
price
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

Conclusion

There is potential to increase profit by using weak promises.

Evaluation

- Not particularly novel contribution
- Data analysis and graphs mostly well reported
  - Though many assumptions in profitability analysis
- Some ideas are introduced and then never revisited…
- Why 6 months?

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