

A Probabilistic Approach to Service Selection with Conditional Contracts and Usage Patterns

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Agenda

1. Introduction

2. Scenario

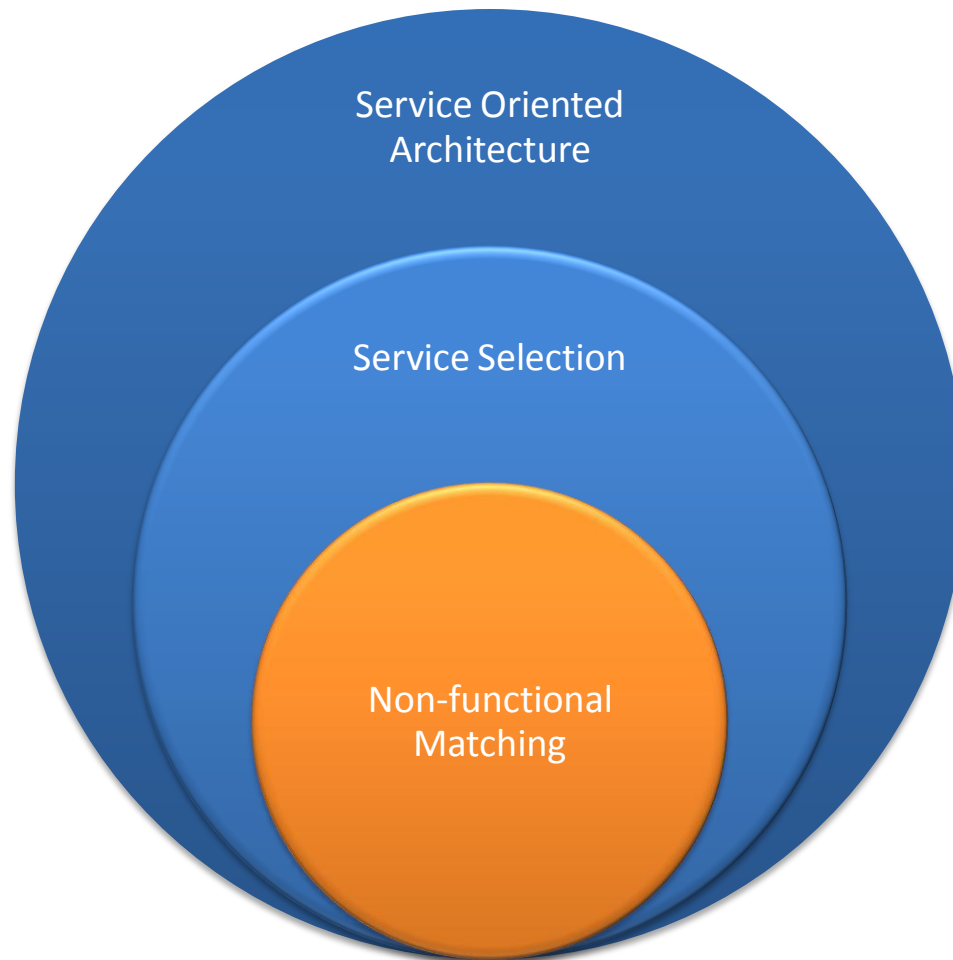
3. Approach

4. Related Work

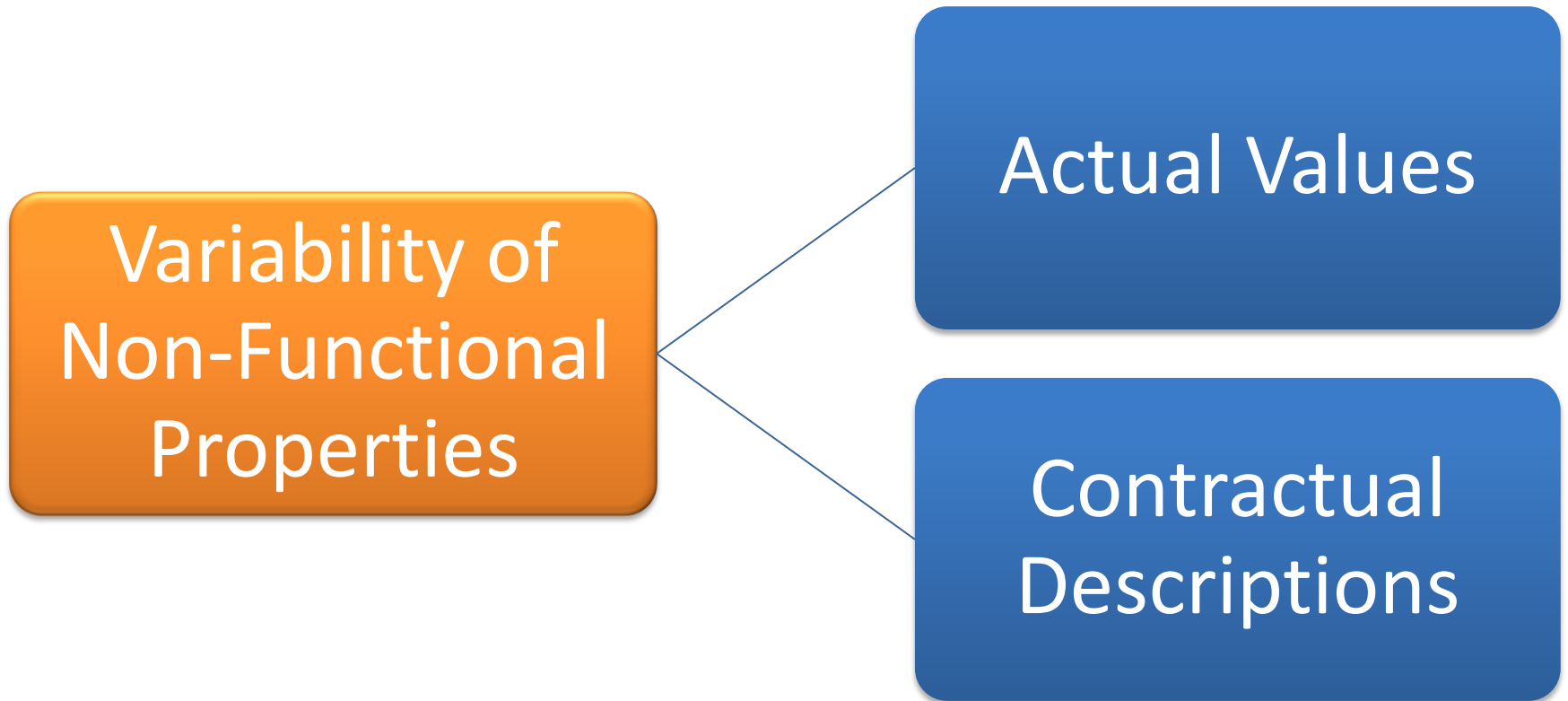
5. Evaluation

6. Conclusion

Research field



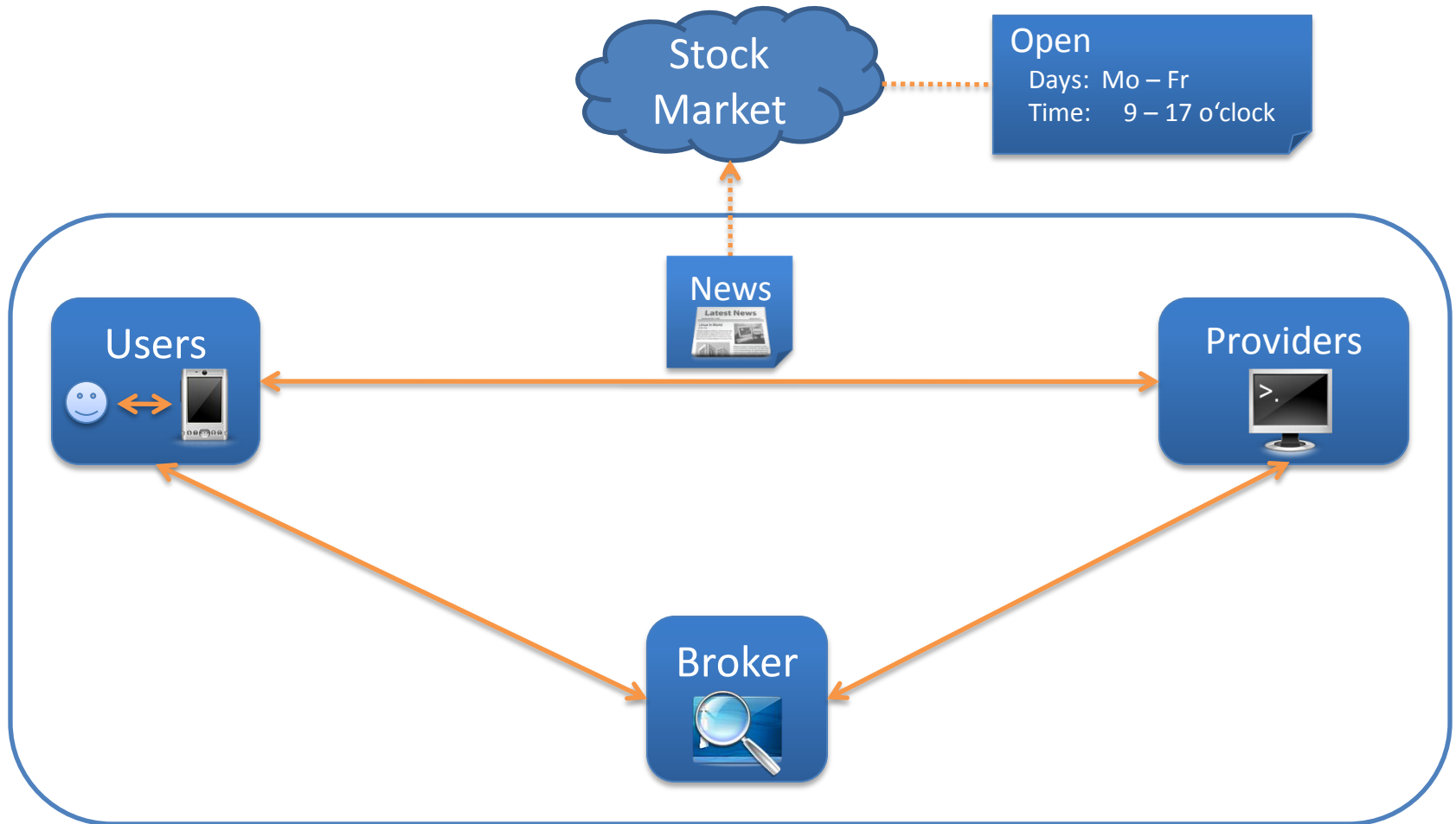
Goal



Agenda

1. Introduction
- 2. Scenario**
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Scenario



Challenges

Users

Needs	Business	Casual
Response time	high	medium
Price	low	High

+

Time of Usage	Business	Casual
Mo-Fr, 9-17	mainly	rarely
Mo-Fr, else	sometimes	sometimes
Sa-Su	rarely	mainly

1) Selection

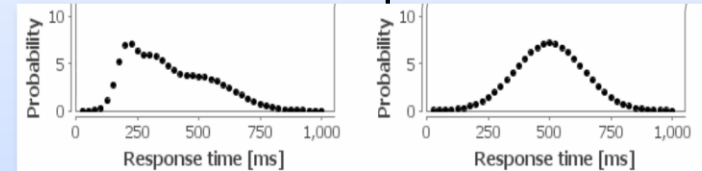


2) Tailoring



Providers

Same maximum response time



Conditional Pricing

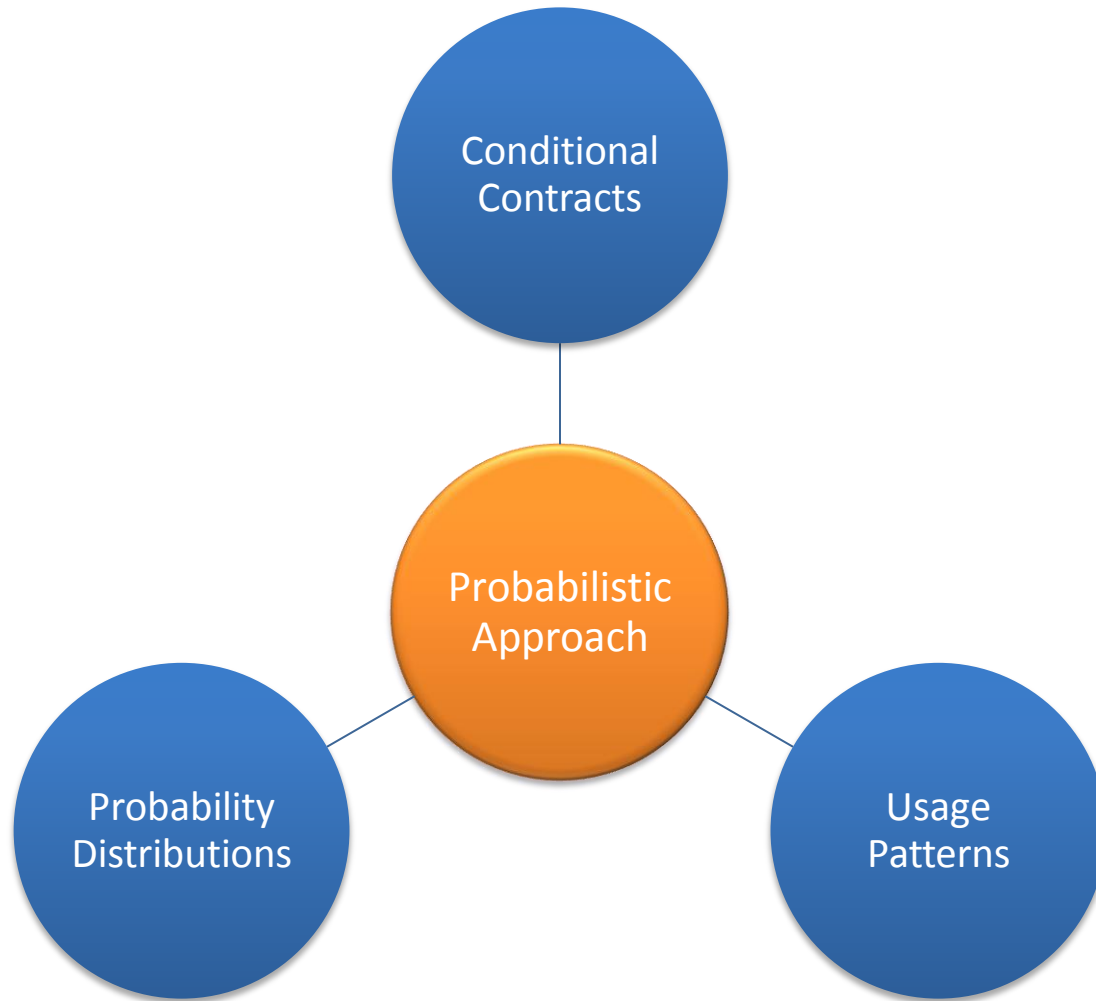
5\$ from Mo-Fr
1\$ from Sa-Su

1\$ from Mo-Fr
5\$ from Sa-Su

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Approach



Conditional Contracts

- Definition

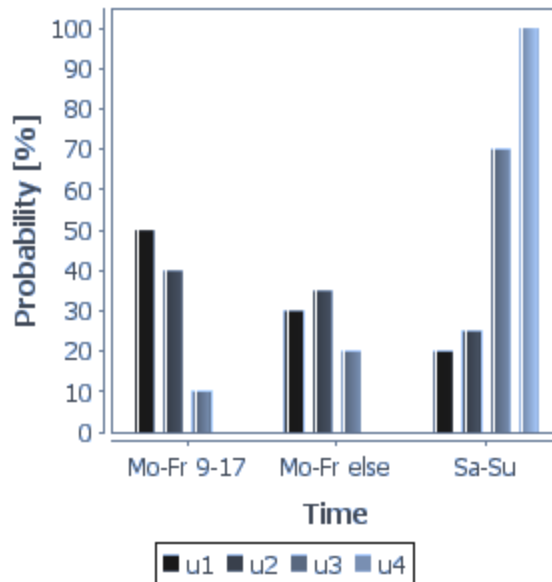
- `<contract> ::= <conditional_statement>`
- `<conditional_statement> ::= <statement> OR
(<condition>, <conditional_statement>, <conditional_statement>)`

- Syntax & Semantics

```
contract {  
  if Mo <= time.weekDay <= Fr  
    if 9 <= time.hour <= 17  
      price = 5  
    else  
      price = 2  
  else  
    price = 1  
}
```

Usage Patterns

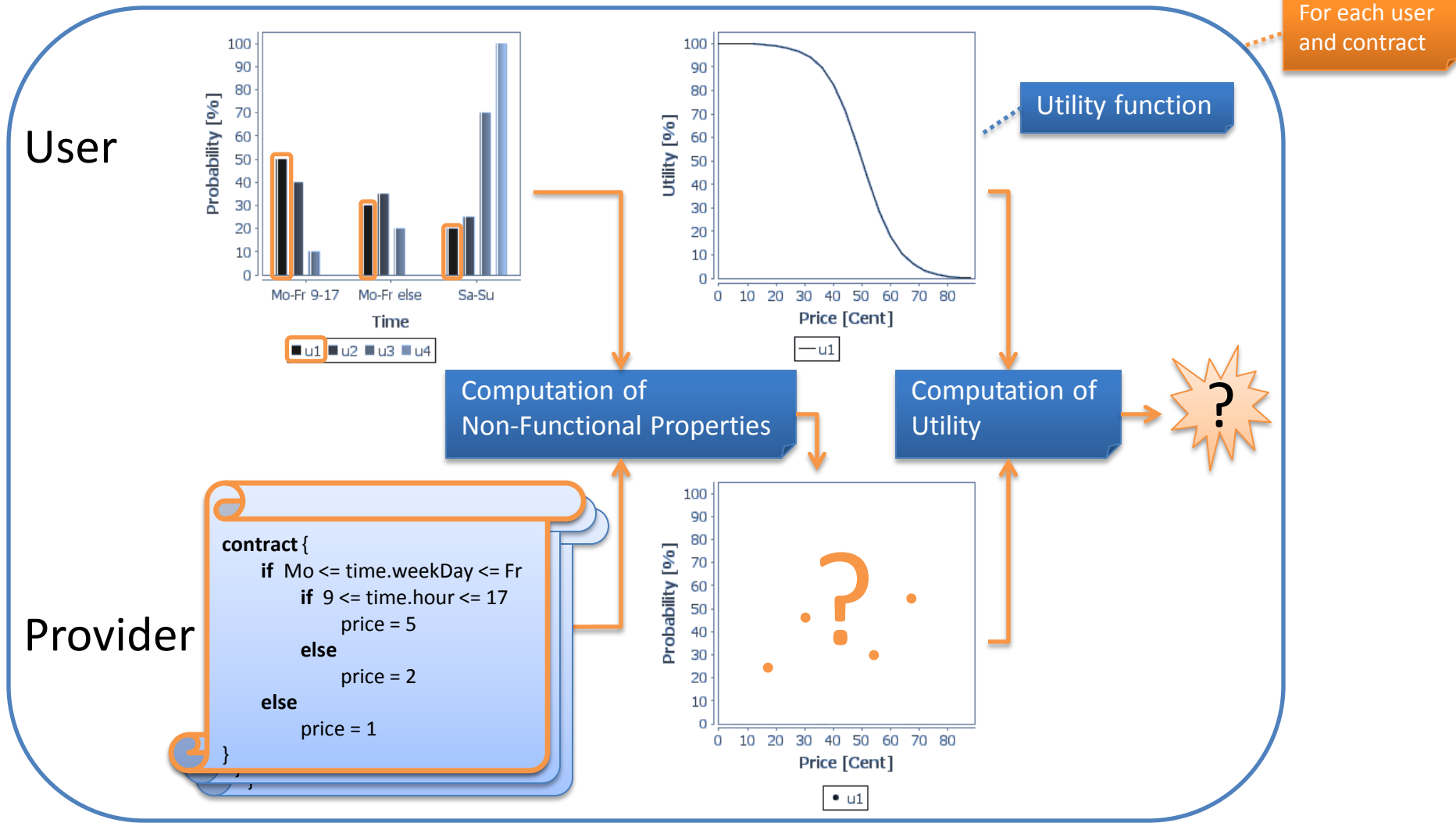
- Definition
 - *A usage pattern tells us in which way a user interacts with a service.*
- Example



Time of Usage

When do the users call the service?

Probabilistic Selection



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Related Work

1. Probability distributions (Hwang07, Rosario08)

- **for** contract descriptions and service composition
- **not for** service selection

2. Logical rules (Toma07)

- **for** service obligations (\sim contract)
- **not** used for probabilistic computations
- **not** used with usage patterns

3. Usage patterns (Balke03)

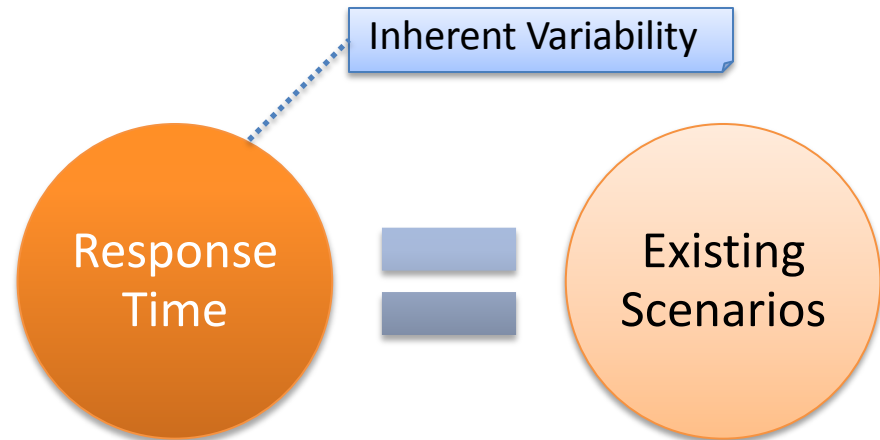
- **only** mentioned
- **not** formally defined
- **not** used for computation

Agenda

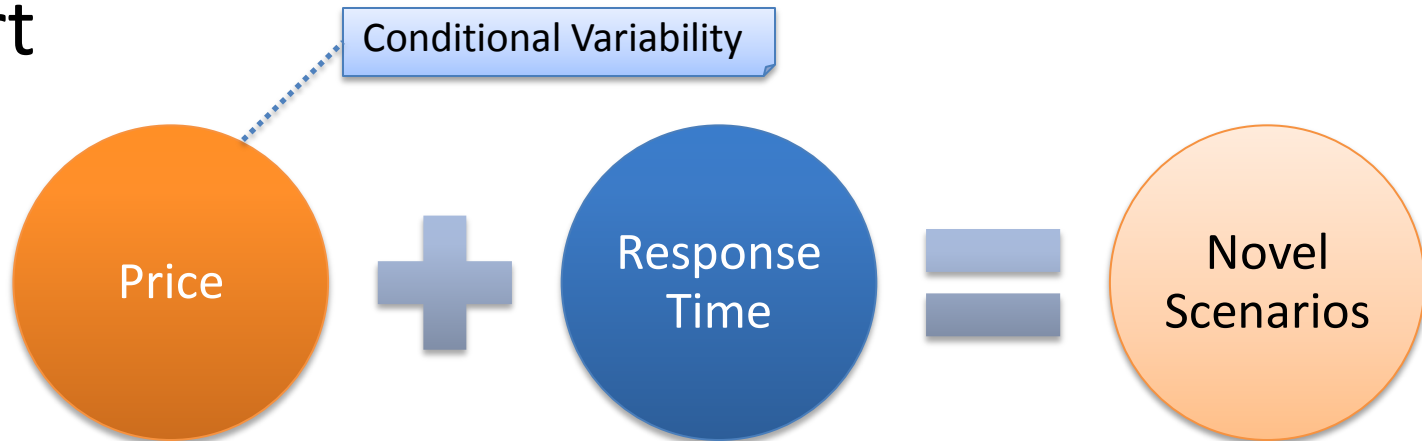
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Parts and Goals

1. Part



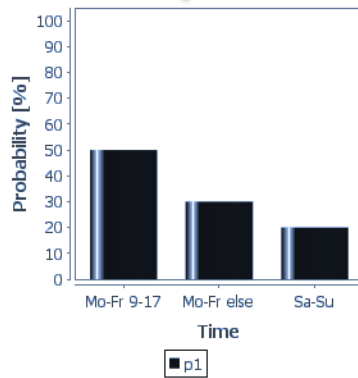
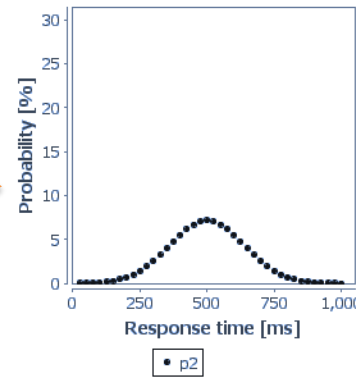
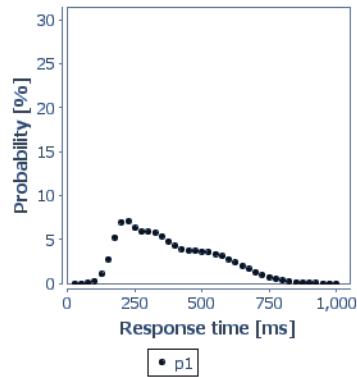
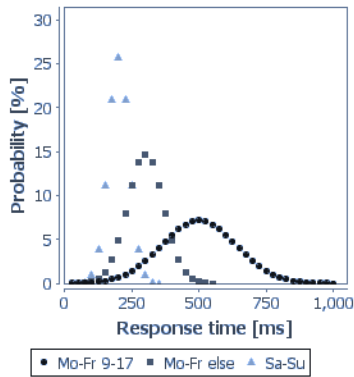
2. Part



Response Time

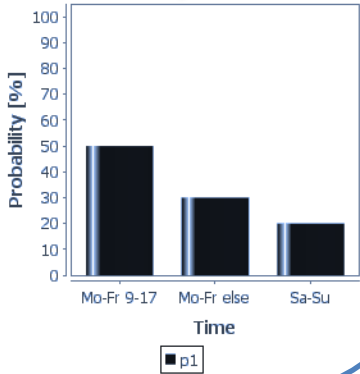
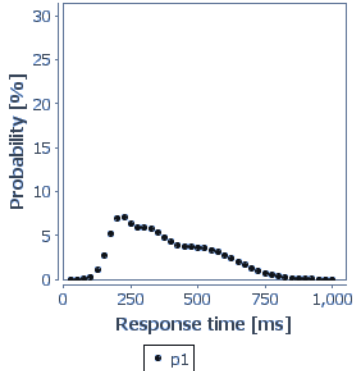
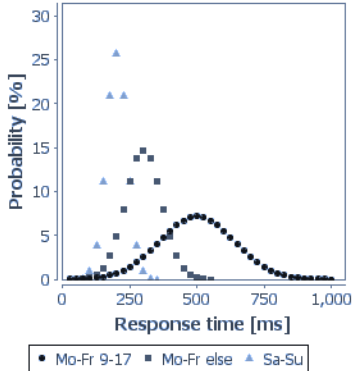
Provider 1

Provider 2



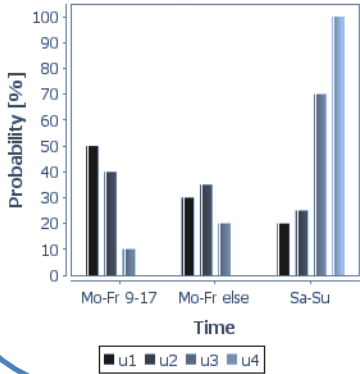
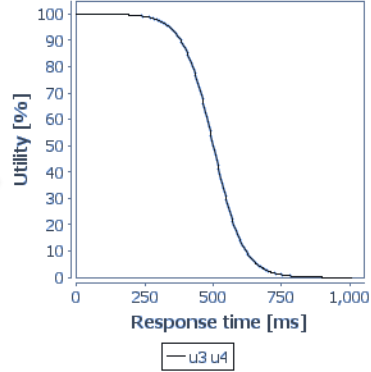
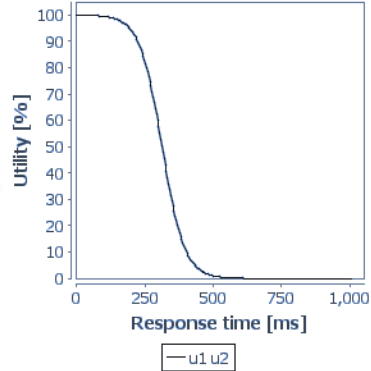
Response Time

Provider 1



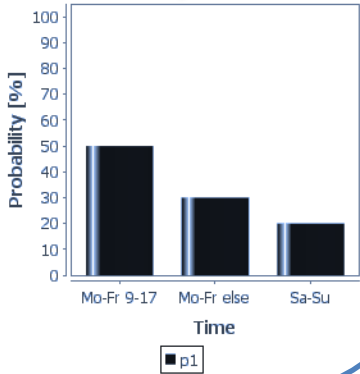
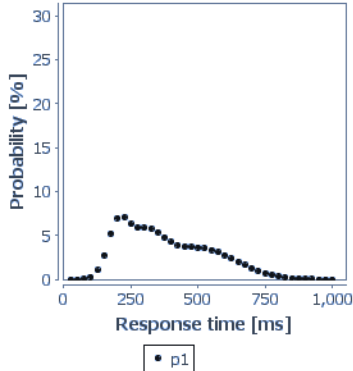
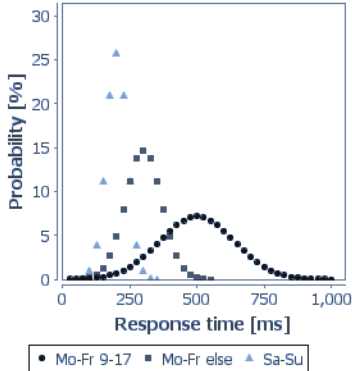
Users

Business
- u1, u2
Casual
- u3, u4

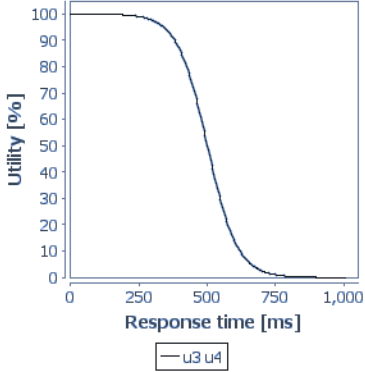
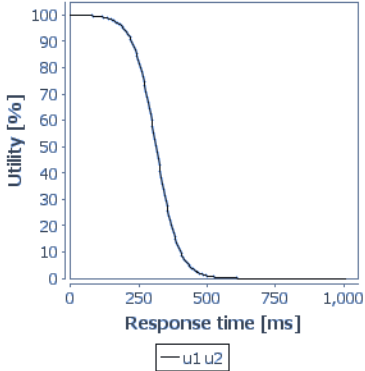
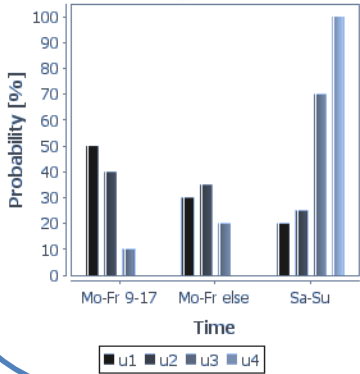
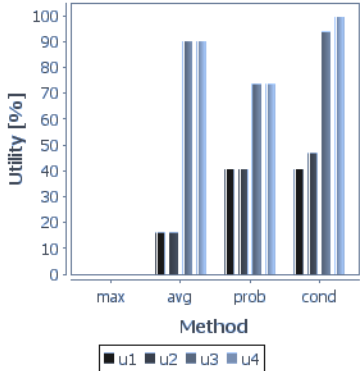


Response Time

Provider 1

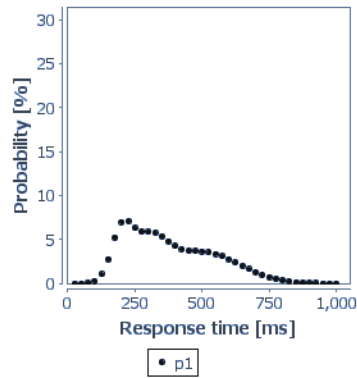


Result

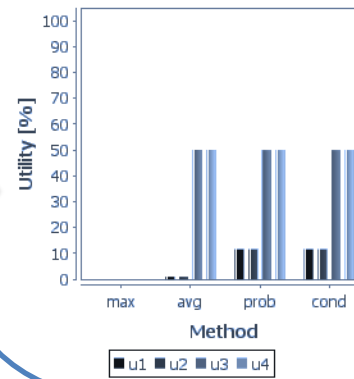
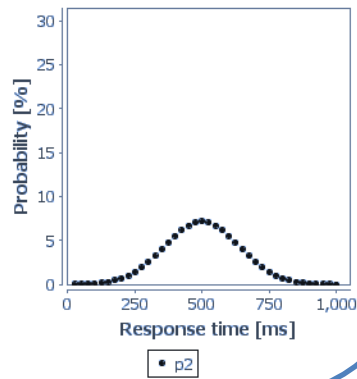
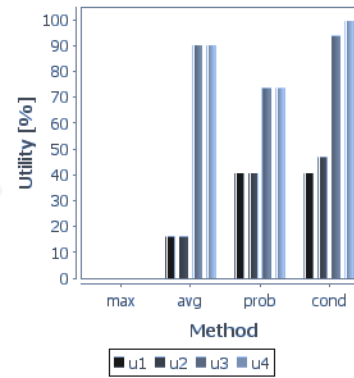


Response Time

Providers

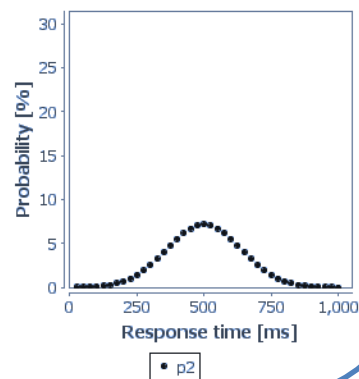
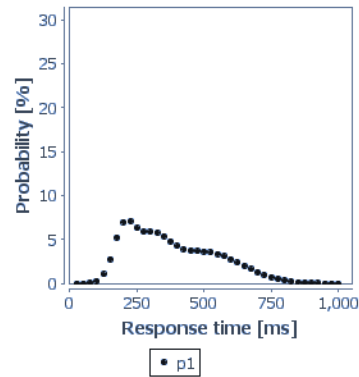
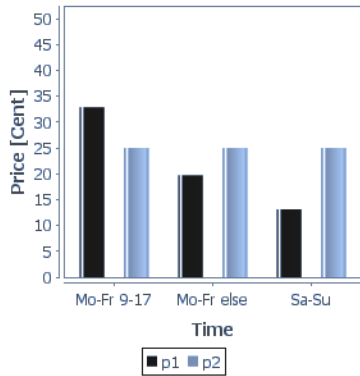


Results

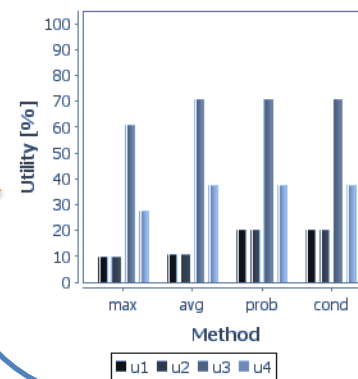
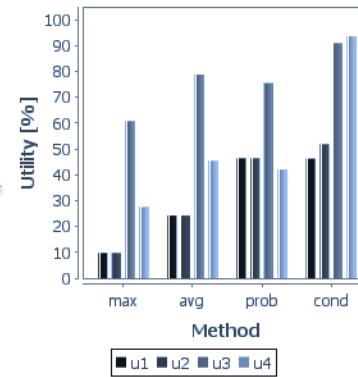


Response Time + Price

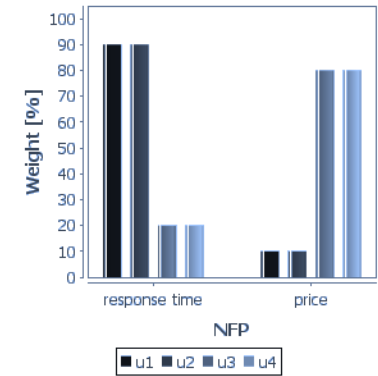
Providers



Results



Utility Functions for Price



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Conclusion

1. Results

- Improvement of selection in existing scenarios
- Possibility of selection in novel scenarios

2. Future Work

- Realize conditional contracts with SLA standards
- Apply approach to adaptation

Thank you for your attention!

References

- Icons
 - <http://www.veraldo.com/crystal/>