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CERTIFICATION COURSES

Cloud Computing :
Broker for Cloud Marketplace

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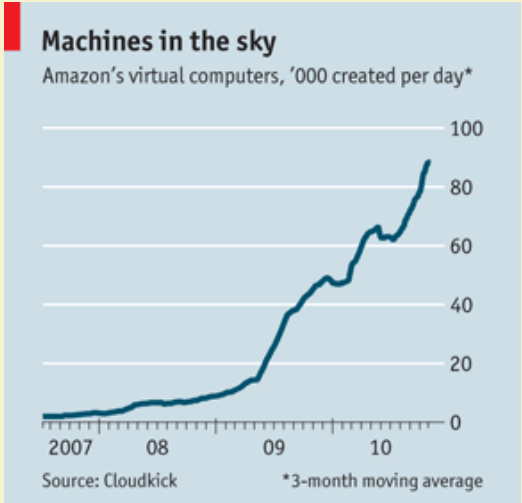
INTRODUCTION

- Rapid growth of available cloud services
- Huge number of providers with varying QoS
- Different types of customer use cases – each with different requirements



INTRODUCTION

- Rapid growth of available cloud services
- Huge number of providers with varying QoS
- Different types of customer use cases – each with different requirements

- *Need for a "middle man" (Intelligent Broker!) to*
  - Suggest the best cloud provider to the customer
  - Safeguard the interests of the customer

MOTIVATION

- Flexible selection of cloud provider
- Trustworthiness of provider
- Monitoring of services
- Avoiding vendor lock-in

OBJECTIVES

- Selection of the most suitable provider satisfying customer's QoS requirements
- Calculation of the degree of SLA satisfaction and trustworthiness of a provider
- Decision making system for dynamic service migration based on experienced QoS

Different Approaches

- CloudCmp: a tool that compares cloud providers in order to measure the QoS they offer and helps users to select a cloud.
- Fuzzy provider selection mechanism.
- Framework with a measure of satisfaction with a provider for keeping in mind the fuzzy nature of the user requirements.
- Provider selection framework which takes into account the trustworthiness and competence of a provider.

CUSTOMER QoS PARAMETERS

Infrastructure-as-a-Service

Software-as-a-Service

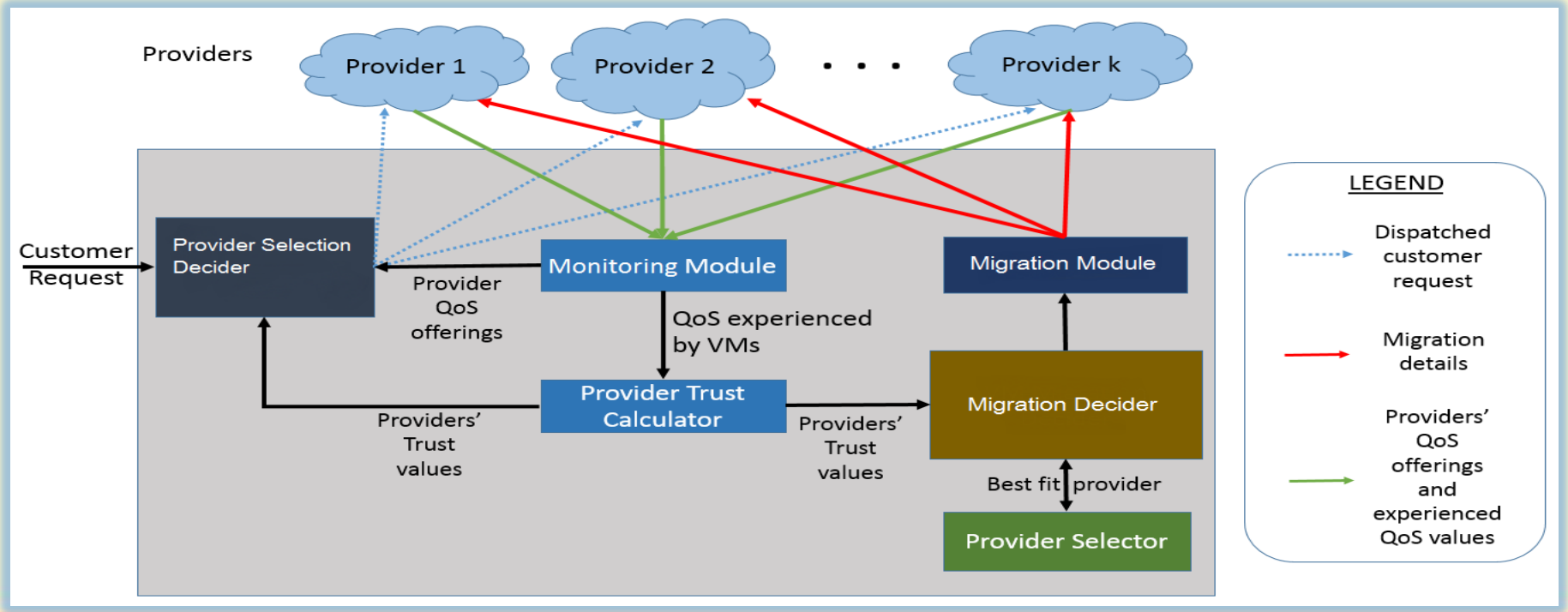
- *More QoS parameter can be added easily.*

PROVIDER

- Promised QoS values : $Prom_i{}^1, Prom_i{}^2, \ldots, Prom_i{}^L$
- Trust values : $TRUST_i{}^1, TRUST_i{}^2, \ldots, TRUST_i{}^L$

Note: They have been kept independent as they pertain to different parameters

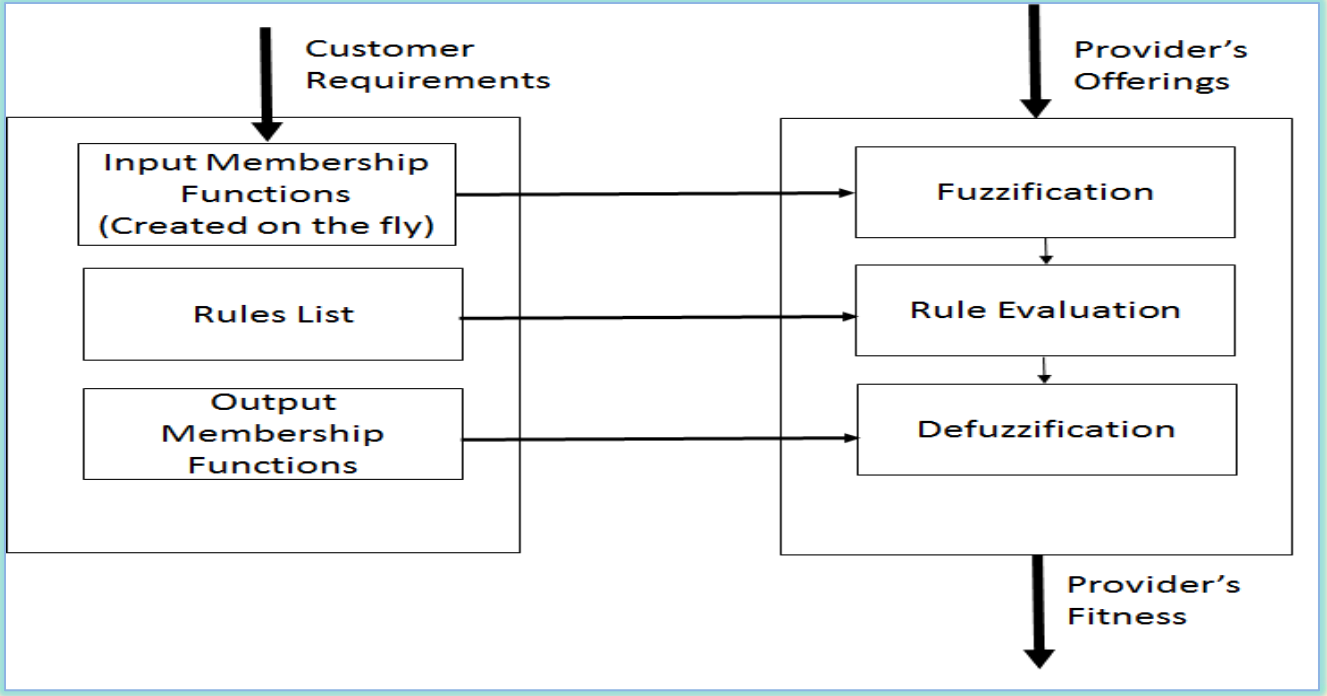
Typical MARKETPLACE Architecture



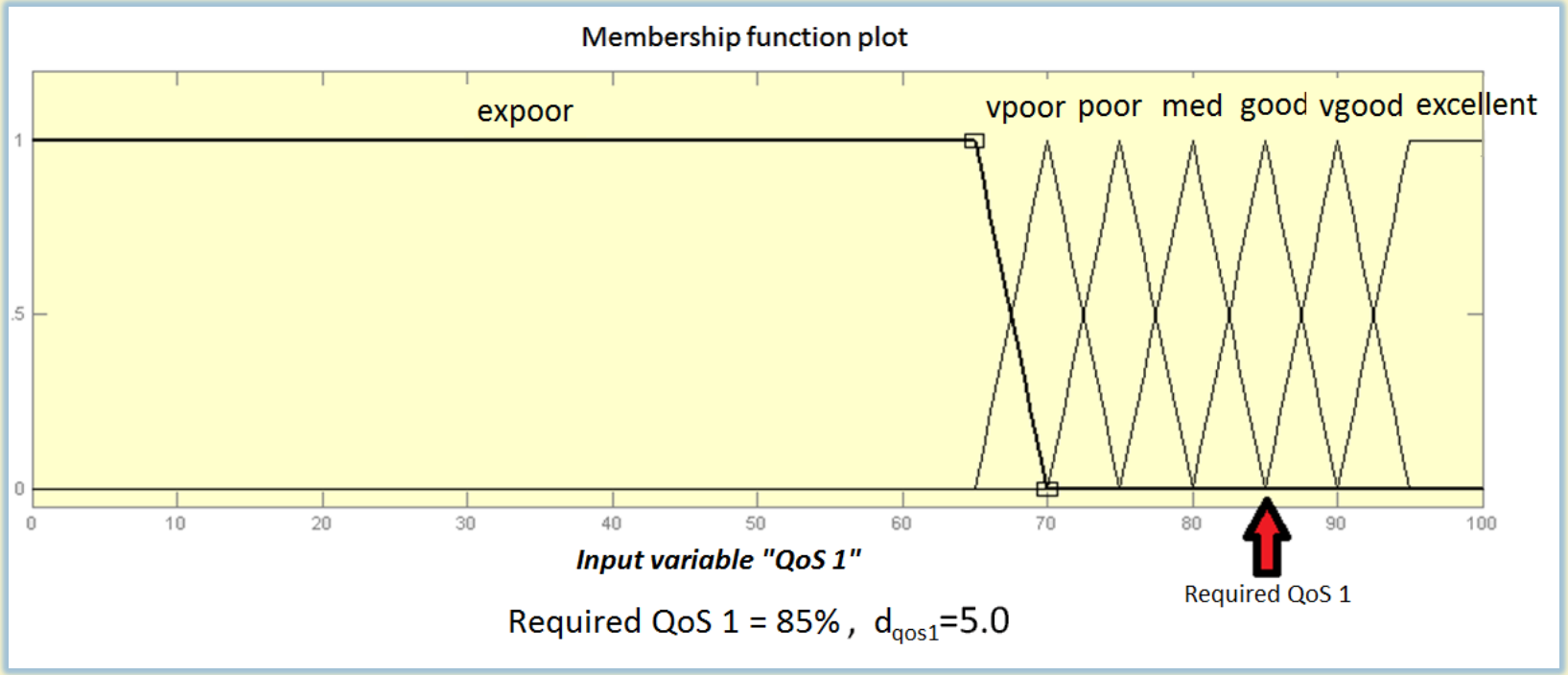
PROVIDER SELECTION

- Selection of provider is done using a fuzzy inference engine
- Input : QoS offered by a provider and its trustworthiness
- Output : Suitability of the provider for the customer
- Customer request is dispatched to provider with maximum suitability
- Membership functions are built using the user requirements

PROVIDER SELECTION



PROVIDER SELECTION – INPUT MEMBERSHIP FUNCTION



Required QoS 1 = 85% , d_{qos1}=5.0

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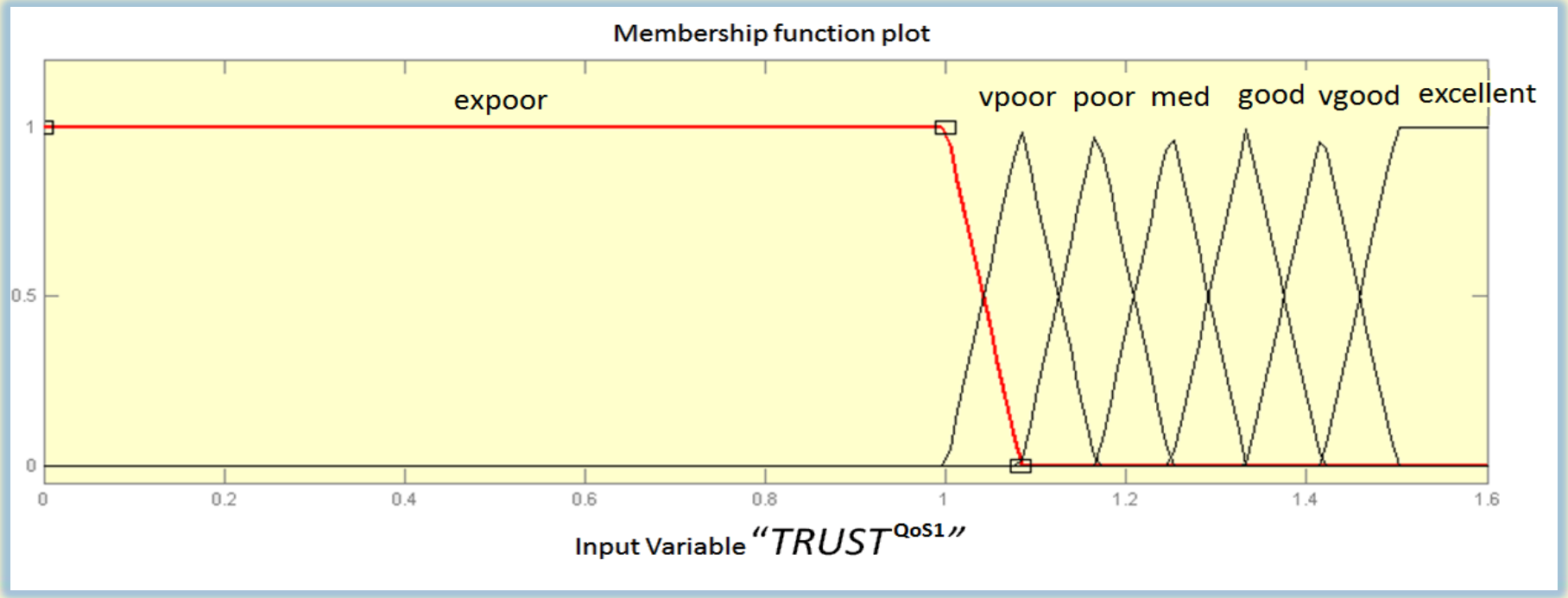

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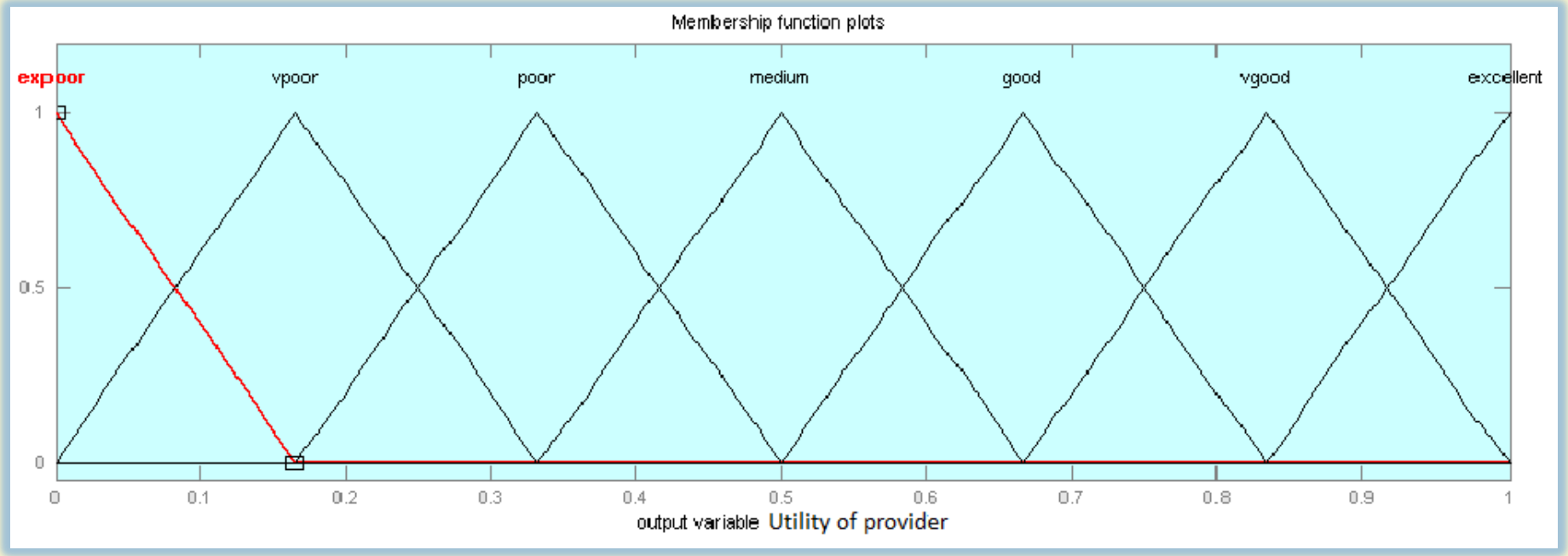
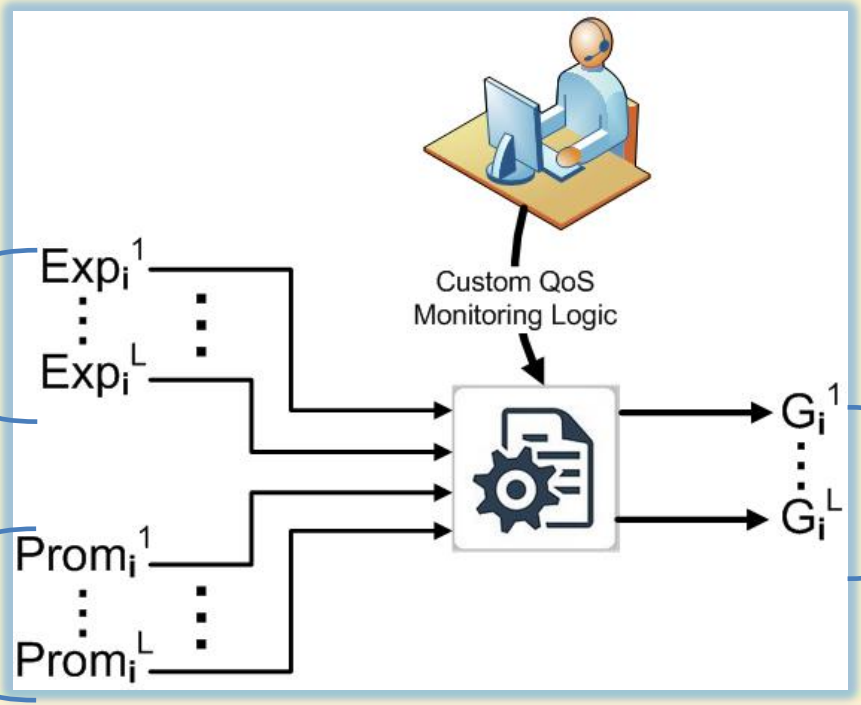


MONITORING MODULE

From provider/3rd party monitoring tool

From Repository



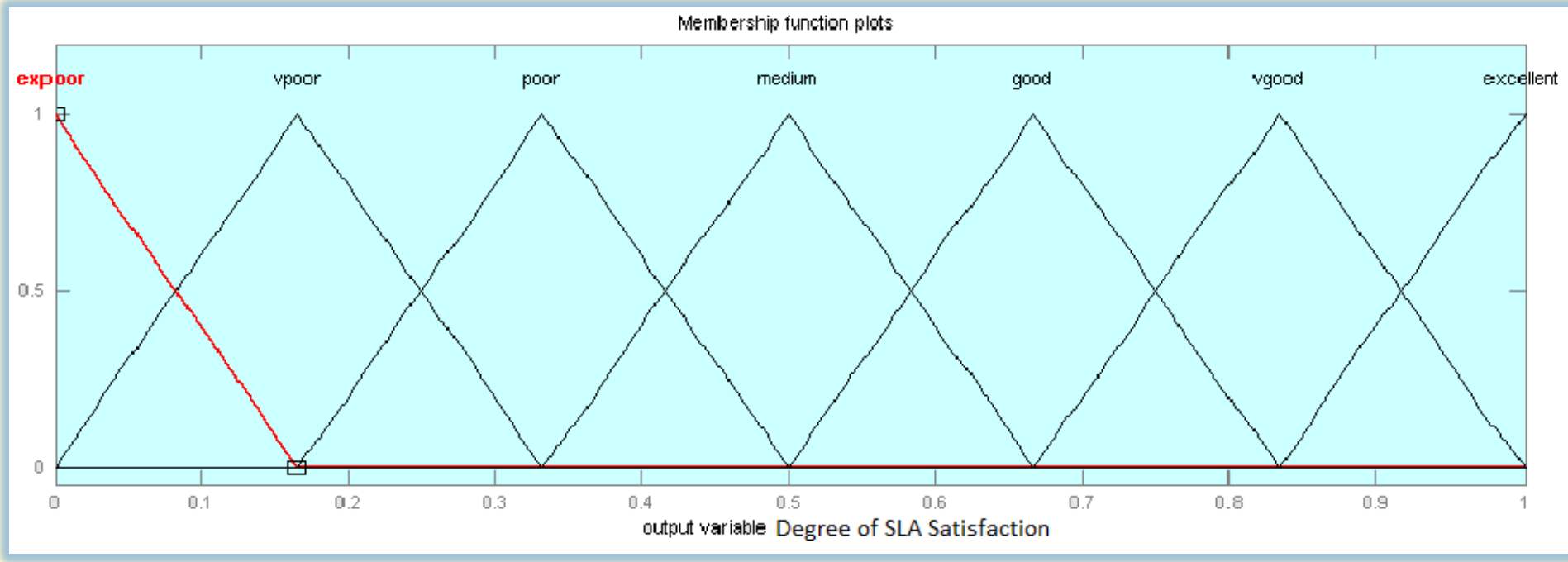
Performance for SI_i in current monitoring period

Symbol	Interpretation
$Prom_i^{avail}$	Promised availability for VM_i
$Prom_i^{bw}$	Promised bandwidth for VM_i
$Exp_i^{avail}(t)$	Availability experienced by VM_i at time t
$Exp_i^{bw}(t)$	Bandwidth experienced by VM_i at time t
$F_i^{avail}(t)$	Performance History in availability for VM_i at time t
$F_i^{bw}(t)$	Performance History in bandwidth for VM_i at time t
$G_i^{avail}(t)$	SLA satisfaction for VM_i in availability
$G_i^{bw}(t)$	SLA satisfaction for VM_i in bandwidth

MIGRATION DECIDER

- Makes use of a fuzzy inference engine
- Input : $F_i^1, F_i^2, \ldots, F_i^L$
- Output : *Degree of SLA Satisfaction* for SI_i
- If *Degree of SLA Satisfaction* < *threshold*, migrate

MIGRATION DECIDER – OUTPUT MEMBERSHIP FUNCTION



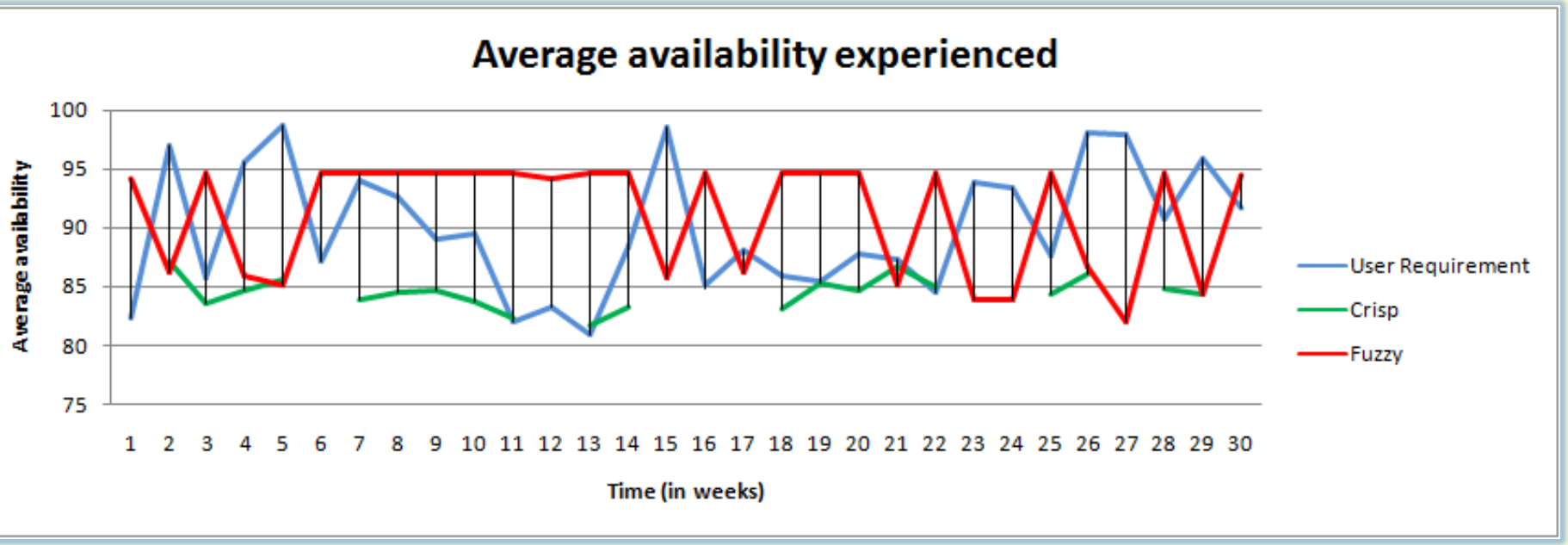
MIGRATION MODULE - SELECTION OF TARGET PROVIDER

- Similar to provider selection
- Selection done using a fuzzy inference engine

Case study on IaaS Marketplace

- 10 providers with varying offered QoS
- 500 requests for VMs
- Year long simulation
- Few providers exhibit performance degradation. Degraded QoS parameters follow a Gaussian distribution
- Comparison made with conventional (minimum cost) crisp broker

EXPERIMENTS AND RESULTS



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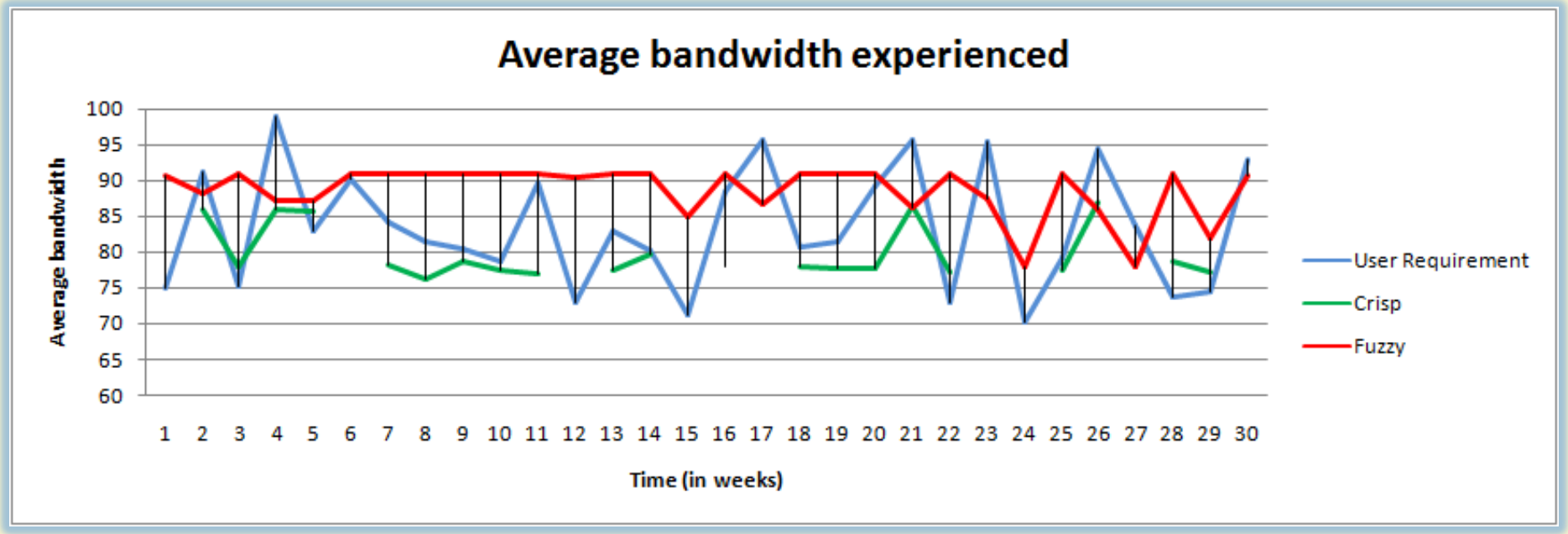

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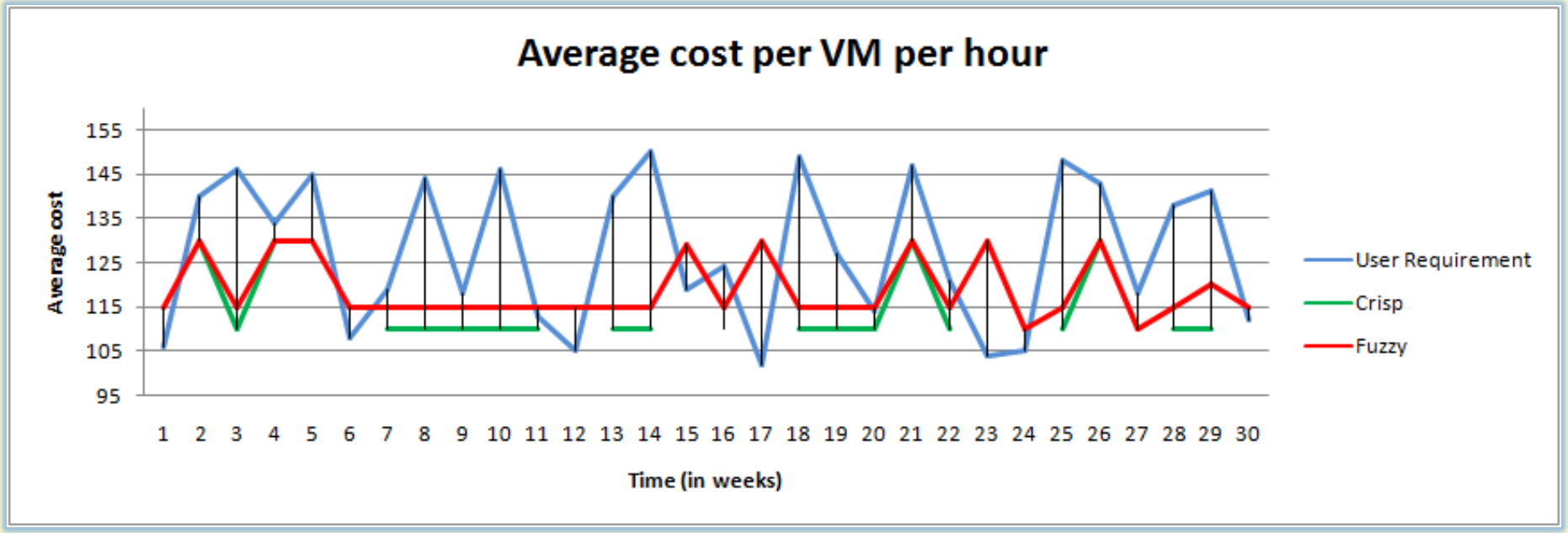
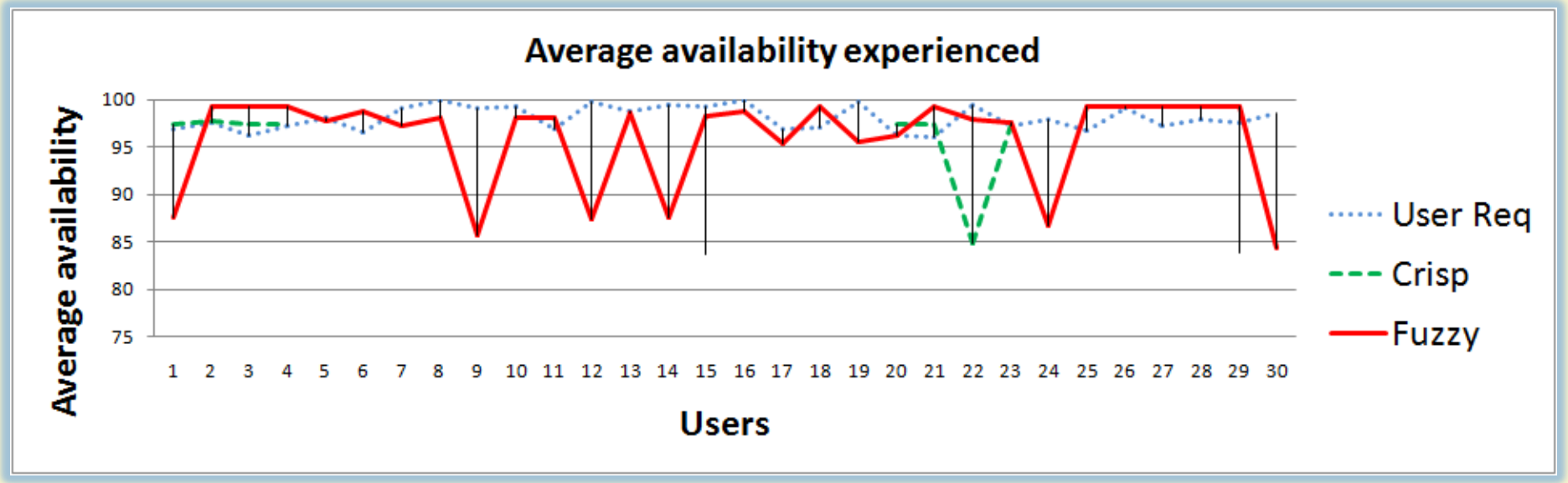


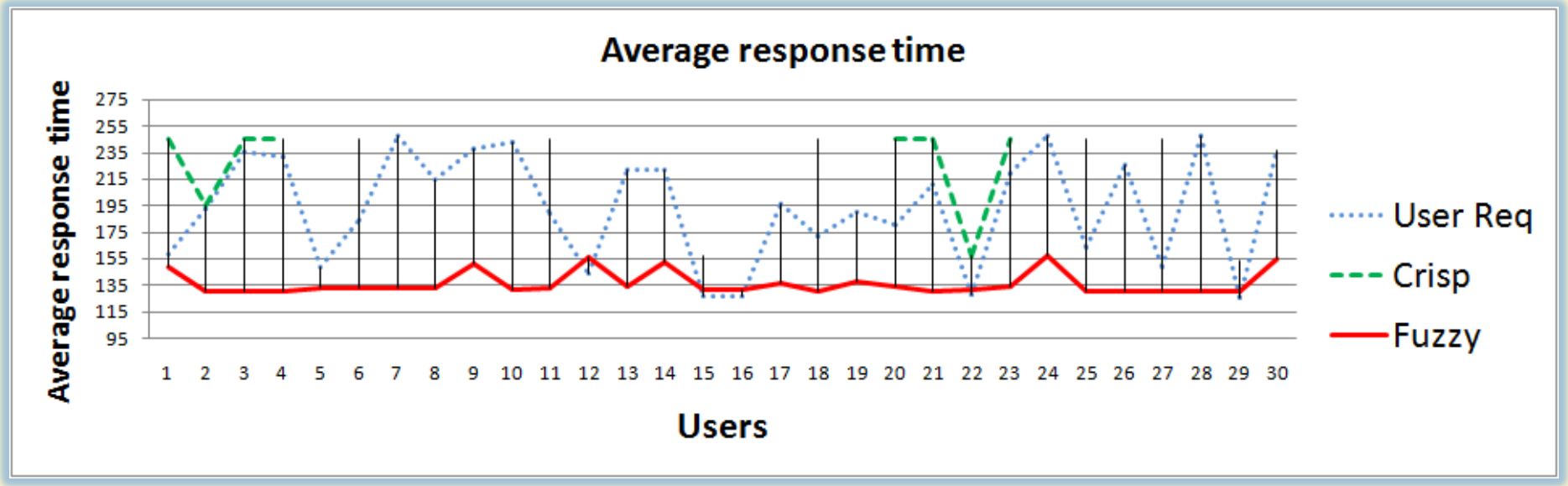
Case study on SaaS Marketplace

- 10 providers with varying offered QoS
- 500 service requests
- Year long simulation
- Few providers exhibit performance degradation. Degraded QoS parameters follow a Gaussian distribution
- Comparison made with conventional (minimum cost) crisp broker

EXPERIMENTS AND RESULTS



Experiments and Results



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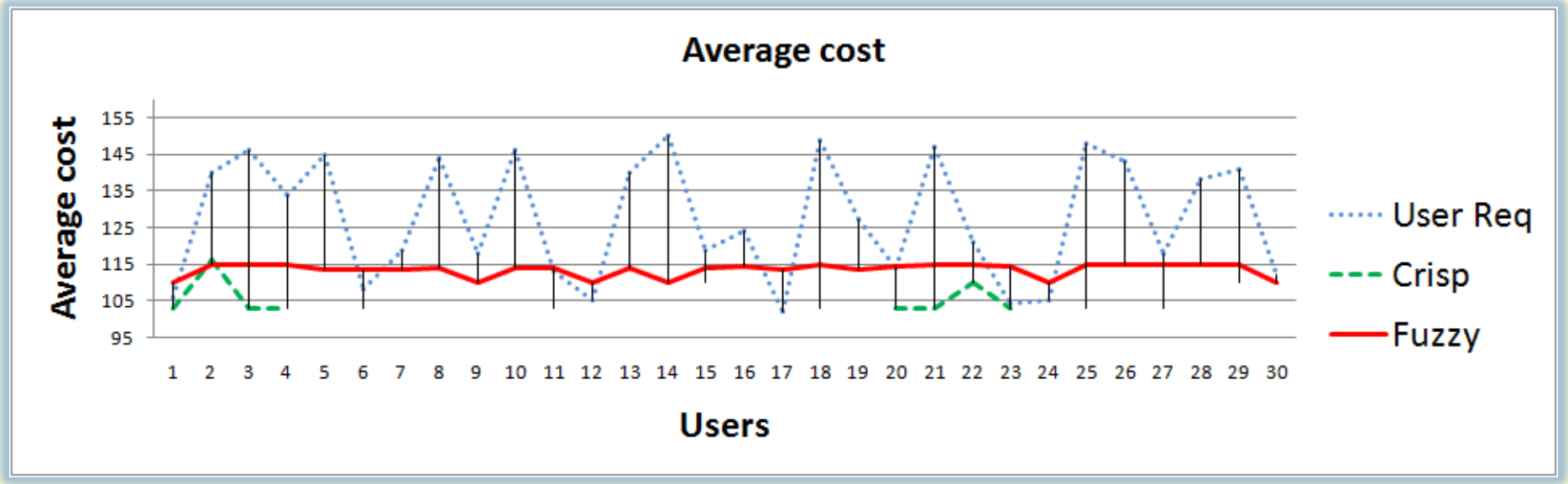

Future Scope

- Specification of flexibility in QoS requirements
- Comparison against existing approaches on production workload
- Service classes for customers

Thank You!!