

# Optimal pricing in Cloud Computing

PCOG Yearly Meeting

30th Nov. 2018

Chao LIU

# PCOG Meeting

## Background

**15<sup>th</sup> October 2017** – PhD Candidate

### **Academic Background**

- ❖ B.Sc. in Optoelectronic Information Engineering – Huazhong University of Sci &Tech in Wuhan, China
- ❖ M.Sc.(Diplôme D'Ingénieur) in Wireless Communications – Institut Supérieur d'Électronique de Paris, France

### **Relevant Work Experience**

- ❖ Service engineer-Ericsson-Global Service Center – Radio Access Network(RAN) in LTE
  - ❖ Research engineer in Nanyang Technological University (Singapore), and Chinese University of HongKong, Shenzhen (Wireless Communication, image processing, Green RAN)
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# Technical Standardisation Activities

## Activities

- ❖ Delegate at ISO JTC 1/SC 38 – Cloud computing
- ❖ Delegate at ISO JTC1/SC 27 – IT Security Techniques

## Participation:

- ❖ Debriefing meeting ISO JTC 1/SC 38 – November 2017
- ❖ Delegates meeting ISO JTC 1/SC 38 – December 2017
- ❖ Smart Cities Standardization – December 2017
- ❖ Delegates meeting ISO JTC 1/SC 38 – January 2018
- ❖ Delegates meeting ISO JTC 1/SC 38 – March 2018
- ❖ Delegates meeting ISO JTC 1/SC 38 – June 2018
- ❖ World Standards Day – October 2018
- ❖ Delegates meeting ISO JTC 1/SC 41 – November 2018
- ❖ Cloud Computing and digital trust training – November 2018
- ❖ Plenary meeting – November 2018

## Standards Review:

- ❖ ISO/IEC DIS19086-4 Information technology – Cloud Computing – Service level agreement (SLA) framework – Part 4: components of security and protection of PII
- ❖ ISO/IEC 17963:2013 Web Services for Management (WS-Management) Specification

## Potential contribution:

[ISO/IEC NP TR 23613](#) -- Information technology -- Cloud service metering and billing elements

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# White Paper – Data Protection and Privacy

## Key Objectives:

- ❖ Adopt technical standards in research.
- ❖ Align research goals in DPP with market needs
- ❖ Gaps analysis between research and standardization

## Activities:

- ❖ Co-author: Cloud computing sections in chapters 1,3,5 & 6
- ❖ Brainstorming Sessions
- ❖ Working Group meetings
- ❖ Reports (biweekly & monthly)



## White Paper DATA PROTECTION AND PRIVACY FOR SMART ICT



17th Annual STS Conference Graz 2018  
Critical Issues in Science,  
Technology and Society Studies

Abstract ID : 58

## A Standardized Broker Model in Smart Cities

### Session Number

S33: Technical Standardisation and STS

### Content

As urban residents are expected to represent more than 60 per cent of the world's population by 2050, the current developments and interests in the "Smart City" concept are essential to enable the successful transition to this new era. This paradigm relies on the integration of emerging Information and Communication Technologies (ICT), such as the Internet of Things (IoT), Cloud Computing, Big Data to manage assets and resources efficiently while facilitating the planning, construction, management and smart services within cities.

While smart cities aim to enhance the quality, performance and interactivity of urban services at reduced cost, their realization is faced by many regulatory and technical challenges. Among these challenges, is the integration of renewable energy resources to the utility system of smart cities motivated by the increasing climate change concerns. Adding further to its complexity, is the challenge of incorporating multiple renewable energy retailers in the same region each with their own pricing strategies due to the lack of a standardized metering indicator and billing system. These challenges create a need for an intelligent and standardized cloud-based energy broker to satisfying the end-user requests, and minimize expenses by efficiently selecting the most suitable energy retailer.

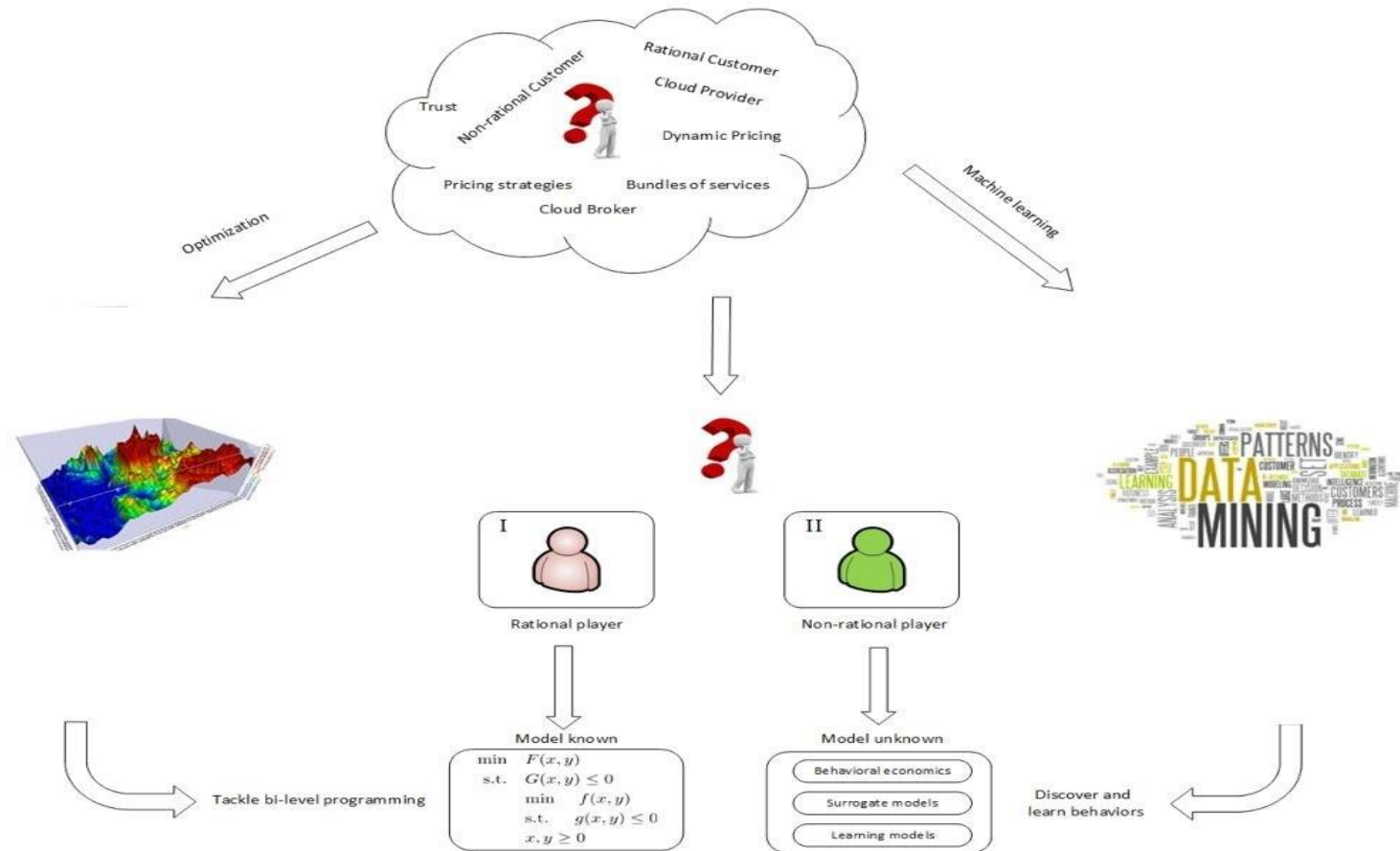
In our work, a particular focus is raised towards the optimization of such energy brokering service which is motivated by the orchestration of a brokering role aiming to improve user experience and interaction with smart city services. Hence our main contribution is proposing a standardized intelligent broker model with smart trading strategies to cope with the dynamics and complexity of the energy retail market, while allocating energy resources based on end-users' demands. This is achieved through the following steps: 1) studying a complete model of the broker service and involved parties within the exposed framework. 2) proposing a multi-objective heuristic to provide a dynamic optimization of the grid operations and resources, with full cyber-security, within the boundaries of the city. 3) analyzing the gaps among industry practices, market requirements and current technical standardization efforts at ISO/IEC JTC 1/SC 38 (Cloud Computing and distributed platform) in order to pave the way to establishing standards in metering indicators and billing principles for cloud services this while keeping in mind privacy and data protection risks and regulations enforced by ISO JT1/SC 27 and EU General Data Protection Regulation effective May 2018.

*This research was conducted in collaboration with ILNAS - the Institut Luxembourgeois de la Normalisation, de l'Accréditation, de la Sécurité et qualité des produits et services (ILNAS) under the authority of the Minister of Economy, Luxembourg.*

- ❖ Extended Abstract – 17<sup>th</sup> Annual STS Conference Graz 2018 - [A Standardized Broker Model in Smart Cities](#)
- ❖ Poster Presentation – Partnership Day 2018

# AFR application-Project PISACLUB

## Pricing Strategies for Cloud Brokers at the Software-as-a-Service (Saas) Level



## Optimal Pricing for Socially-aware Usage of Cloud Services

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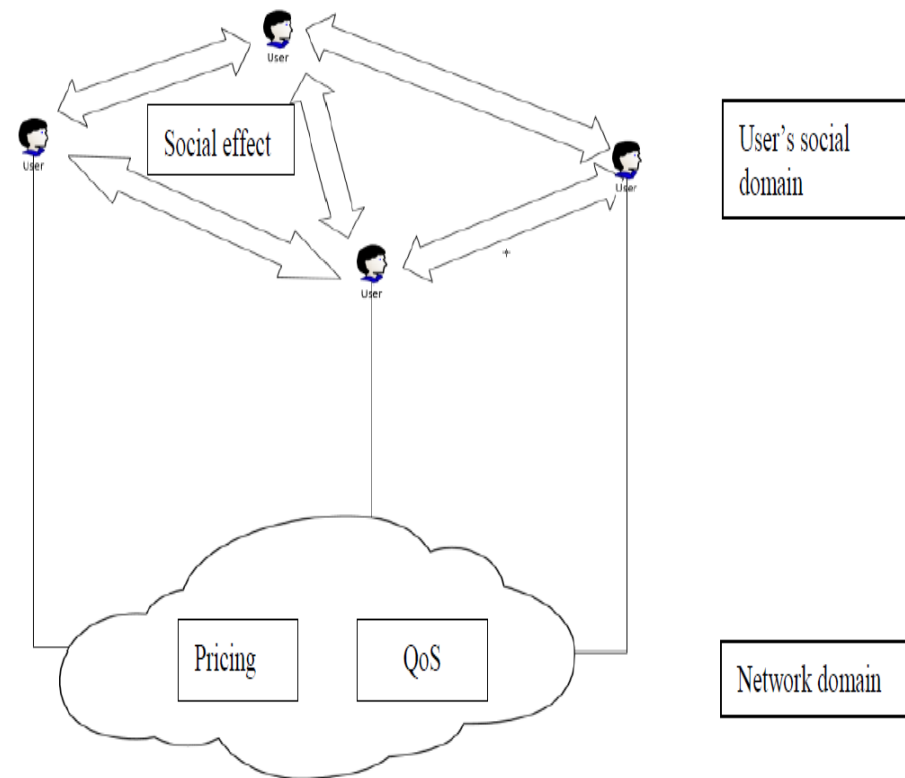
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**Keywords :** cloud computing, pricing, bi-level optimization, game theory.

### 1 Introduction

Cloud computing enables end-users to access unlimited amounts of resources and services using a pay-per-use paradigm. In practice, the business models are so complex that it leaves the end-users perplex and uncertain to reach advantageous solutions in terms of cloud service choice.

For a cloud service provider, defining what would be a fair and competitive pricing of dematerialized services is a key issue and requires complex prospective considerations, including constant attention and adaptation to the market. Our efforts aim at providing new models for the above-mentioned problems, the corresponding algorithms, implementations and validations.





## Other Activities

- ❖ Certificate of Smart ICT for Business Innovation
- ❖ Metaheuristics Summer School – July 2018
- ❖ GAMENET Training School and action conference– September 2018





# THANK YOU

