Internet content delivery as a two-sided market

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SAIL Project

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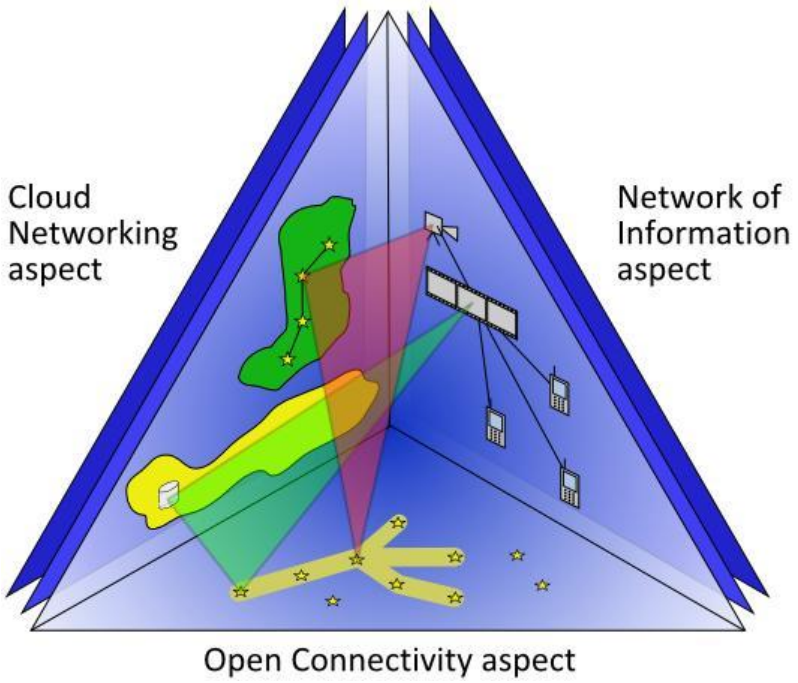
Outline

- Overview of the SAIL project
- Definition: What is quality?
- Trends: Who needs and is willing to offer quality?
- Case: Internet content delivery as a two-sided market
- Summary

SAIL project

- Continuation of 4WARD
- 24 partners
- Started on 01/08/2010
- Duration: 30 months
- 3 technical WPs →
- Socio-economic task covering business and regulative aspects



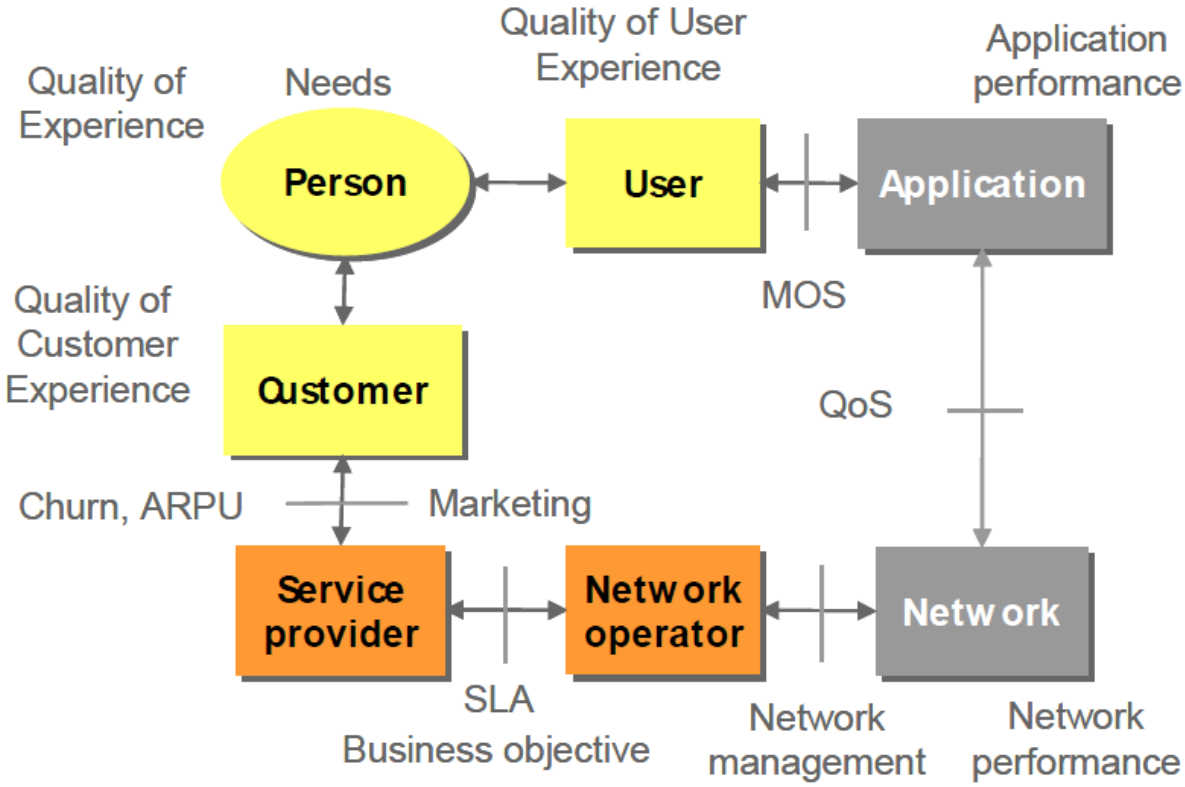
Definition: What is quality?

- Technical perspective: Quality of Service (QoS)
  - Definition by Kilkki (2008): Attributes that can be used to define the network's capability to meet the requirements of applications
  - Throughput, delay, delay variation (jitter),reliability
  - Objectively measurable

- Socio-economic perspective: Quality of Experience (QoE)
  - End-user centric → perceived quality matters
  - Subjectively measurable (*e.g.*, Mean Opinion Score)

Source: Kilkki, 2008

Quality in communications ecosystem



Source: Kilkki, 2008

Trend: Hyper-competition leads into hyper-usability

Fierce competition in the service layer

+

Minimal switching costs for end-users

→

High-quality services

Source: Finnish Future Internet Programme

Trend: Hyper-competition leads into hyper-usability

Fierce competition in the service l

Content providers are willing to offer quality

nd-users

→

High-quality services

Source: Finnish Future Internet Programme

Trend: Focus from connectivity into content and services

Fierce competition in the interconnection and abundant capacity has collapsed transit prices

+

Coordination problems in defining e2e QoS have created market for new competitors (esp. CDNs)

→

Market shifts focus to higher value services

Source: Faratin (2007), Labowitz et al. (2010)

Trend: Focus from connectivity into content and services

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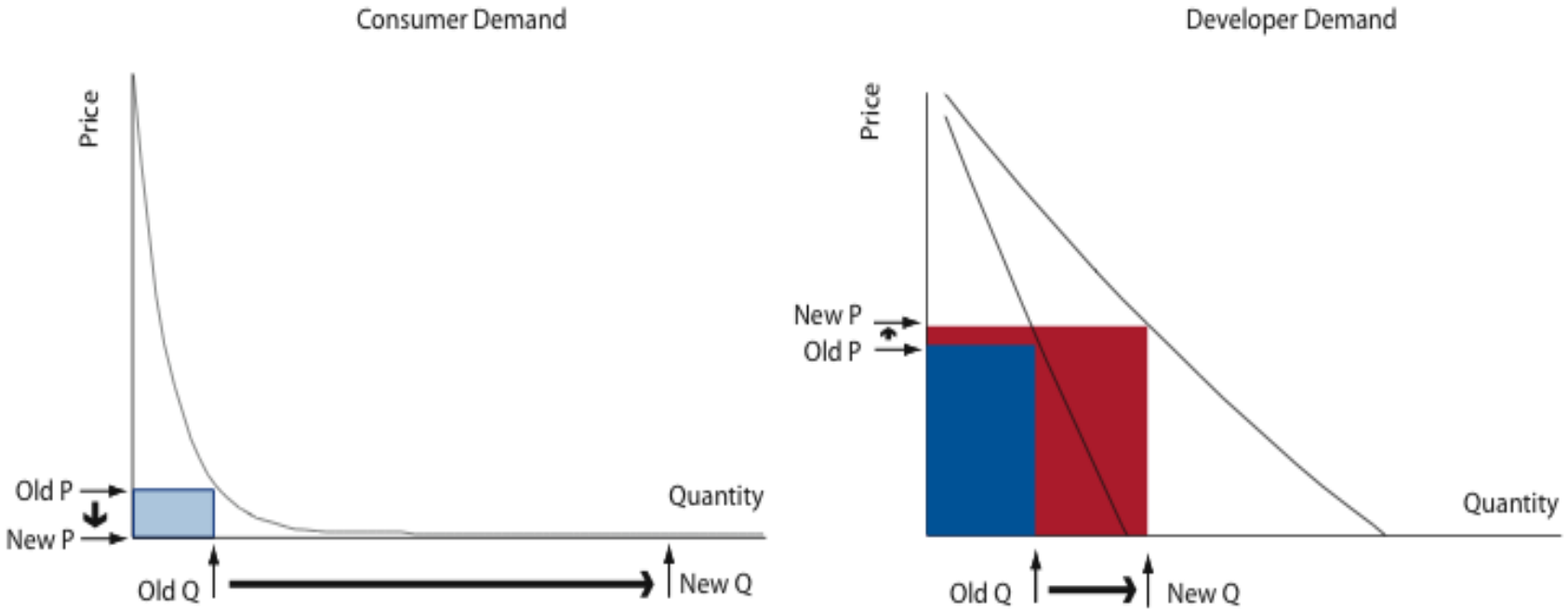
Source: Faratin (2007), Labowitz et al. (2010)

Definition of Two-sided Markets

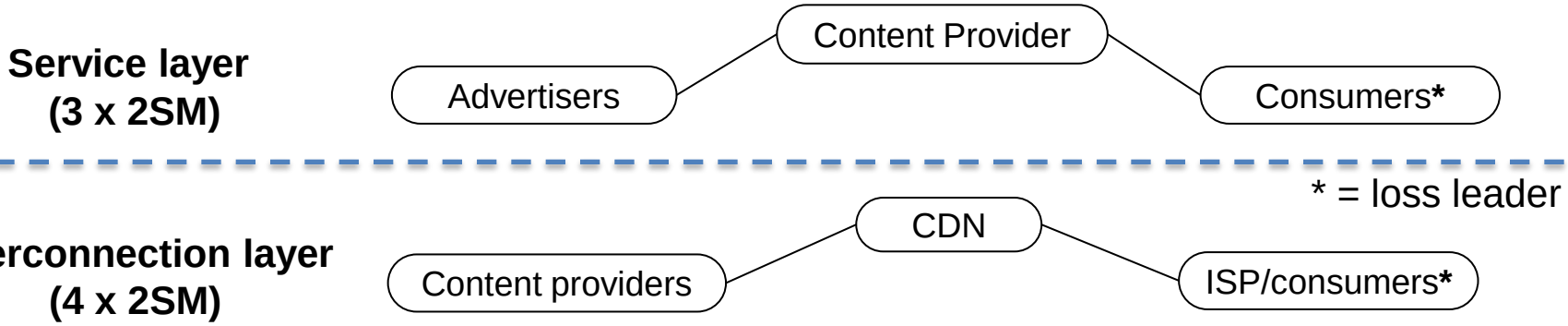
Markets with two distinct sides that are interlinked and where not only the overall price level matters but also the price structure between the two sides (Rochet & Tirole, 2006).



Source: Rochet & Tirole (2006), Wikipedia,

Internet content delivery as a two-sided market

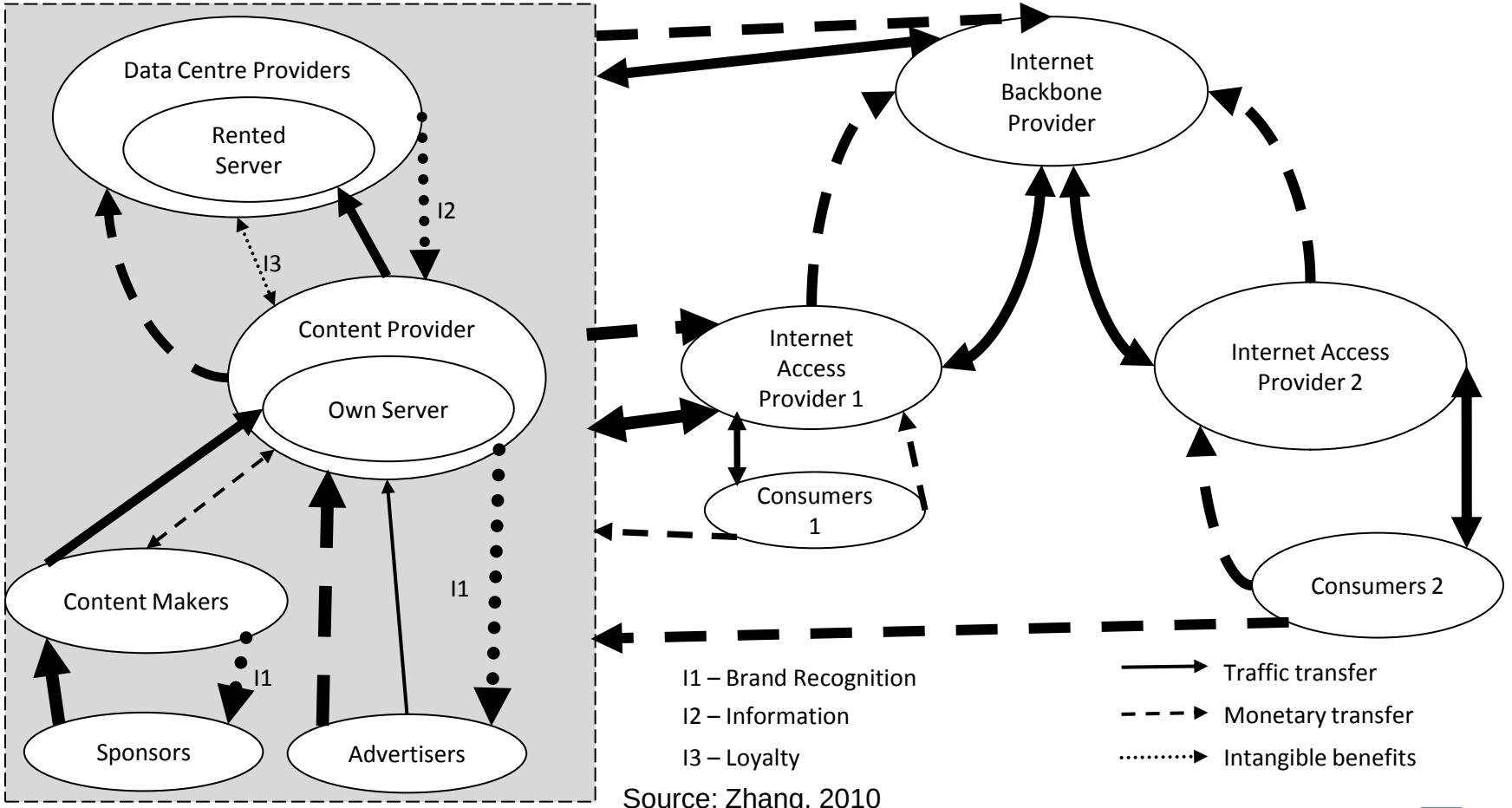
- Two-sided markets exist both in the service layer and in the interconnection layer



- What does the 2SM analysis (of CDN model) tell us about the feasibility of information networking?

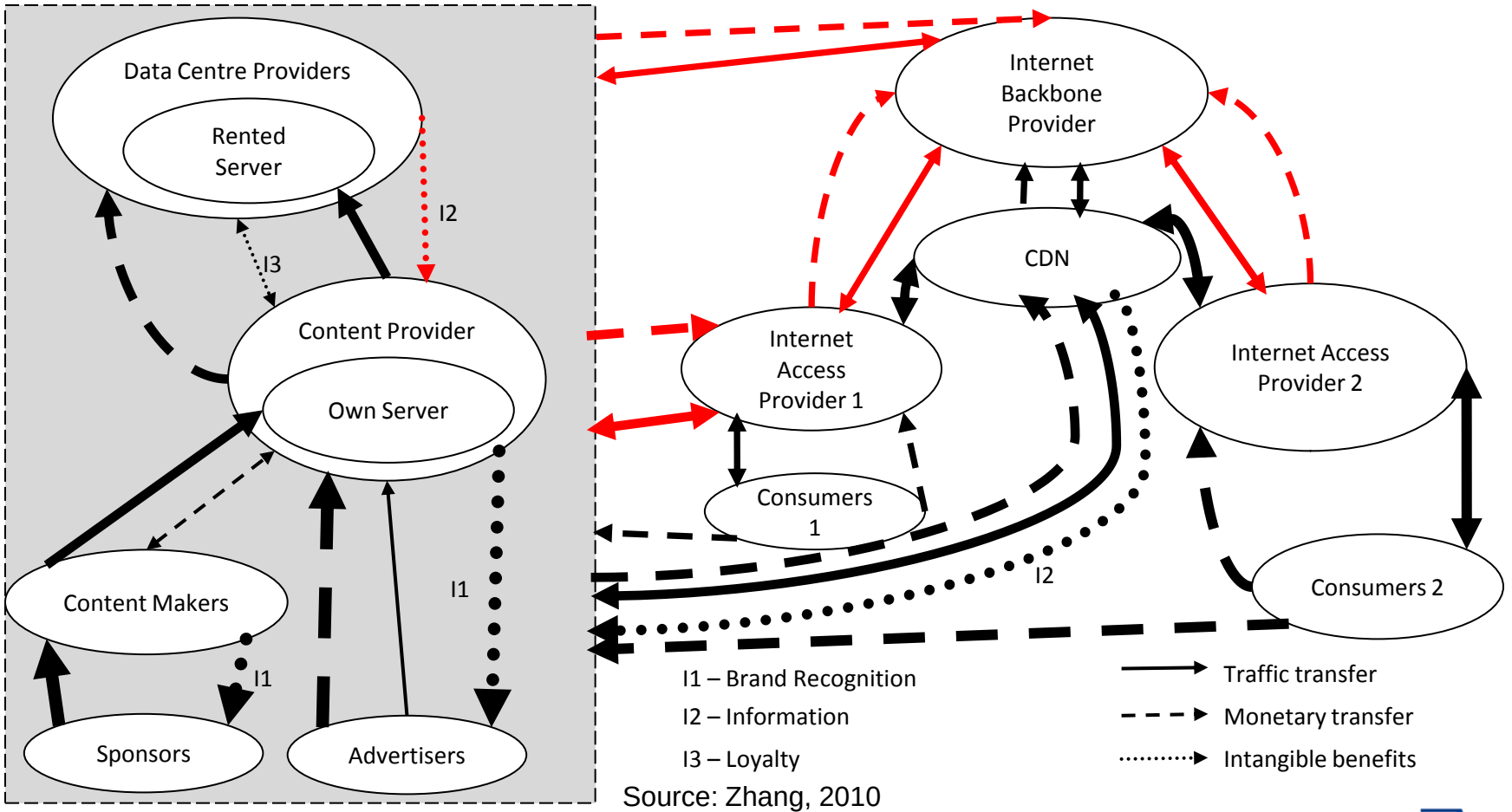
Source: Zhang, 2010

Value Network: Client - Server



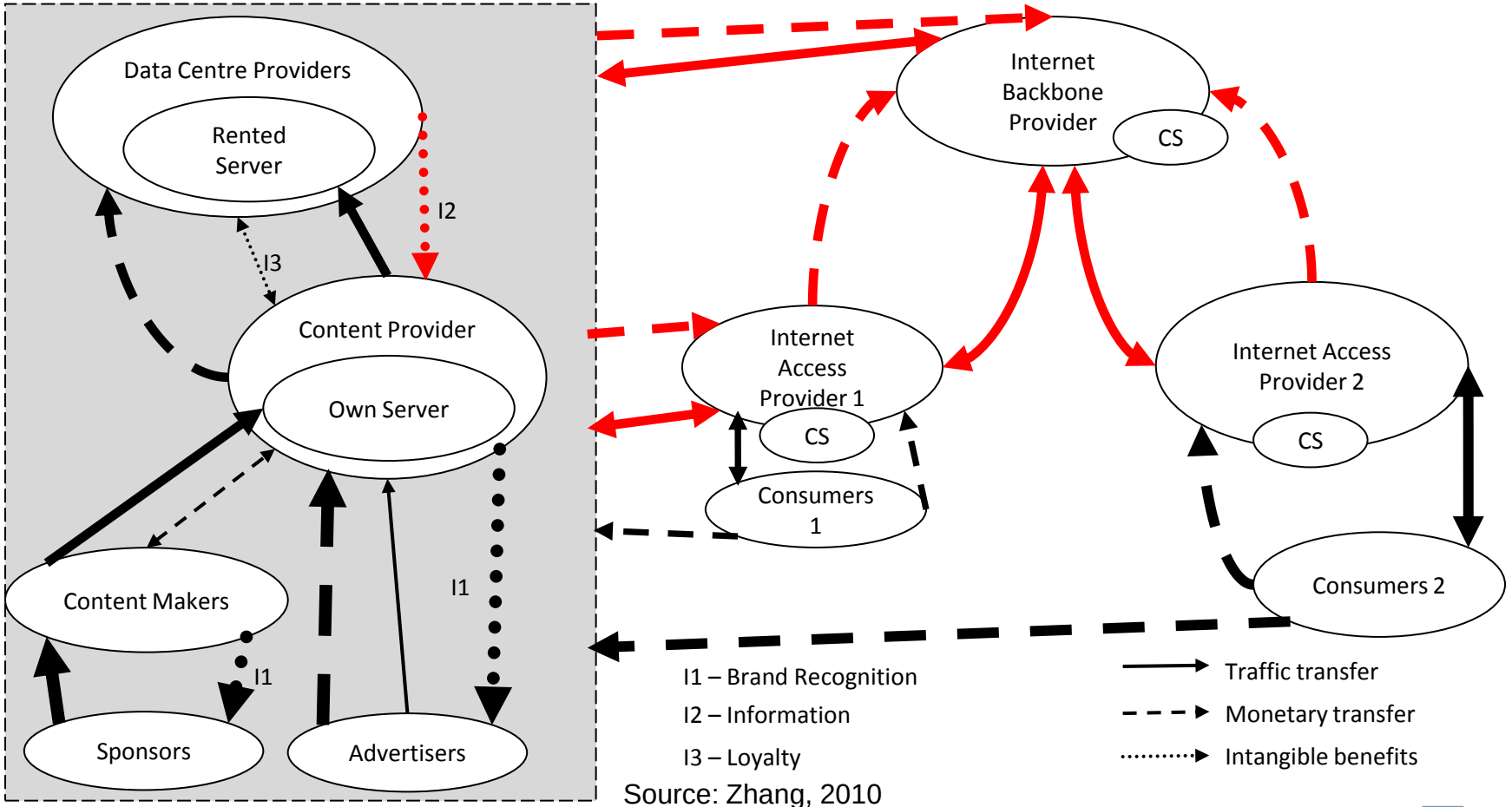
Source: Zhang, 2010

Value Network: CDN



Source: Zhang, 2010

Value Network: Inf. netw. (CCN)



Source: Zhang, 2010

Key findings from 2SM analysis

- Content providers have higher price elasticity of demand, i.e., higher willingness to pay for quality, than ISPs have
- CDNs seem to take the market pressure from content providers more efficiently than ISPs
- Two-sided pricing may cause consolidation of CDNs
- Information networking reduces off-net traffic which may encourage ISPs to deploy it
- But can inf. networking create revenue like CDN can?
  → Business case of inf. networking needs to be studied

Source: Zhang, 2010

Summary

- A holistic view to quality is necessary, *i.e.*, QoS + QoE
- End user demand for quality may not easily translate into direct revenue
- Both ISPs and CPs are willing to offer quality
- The CDN example suggests that
  - solving coordination problem is crucial for a content delivery model (*e.g.*, to guarantee quality and provide usage statistics)
  - CPs have higher willingness to pay for quality than ISPs have
  - CDNs take market pressure
- Information networking architectures can succeed only if the incentives of all stakeholders are aligned

References

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