Interoperability Challenges for DRM Systems

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Interoperability Challenges for DRM Systems

Virtual Goods 2004
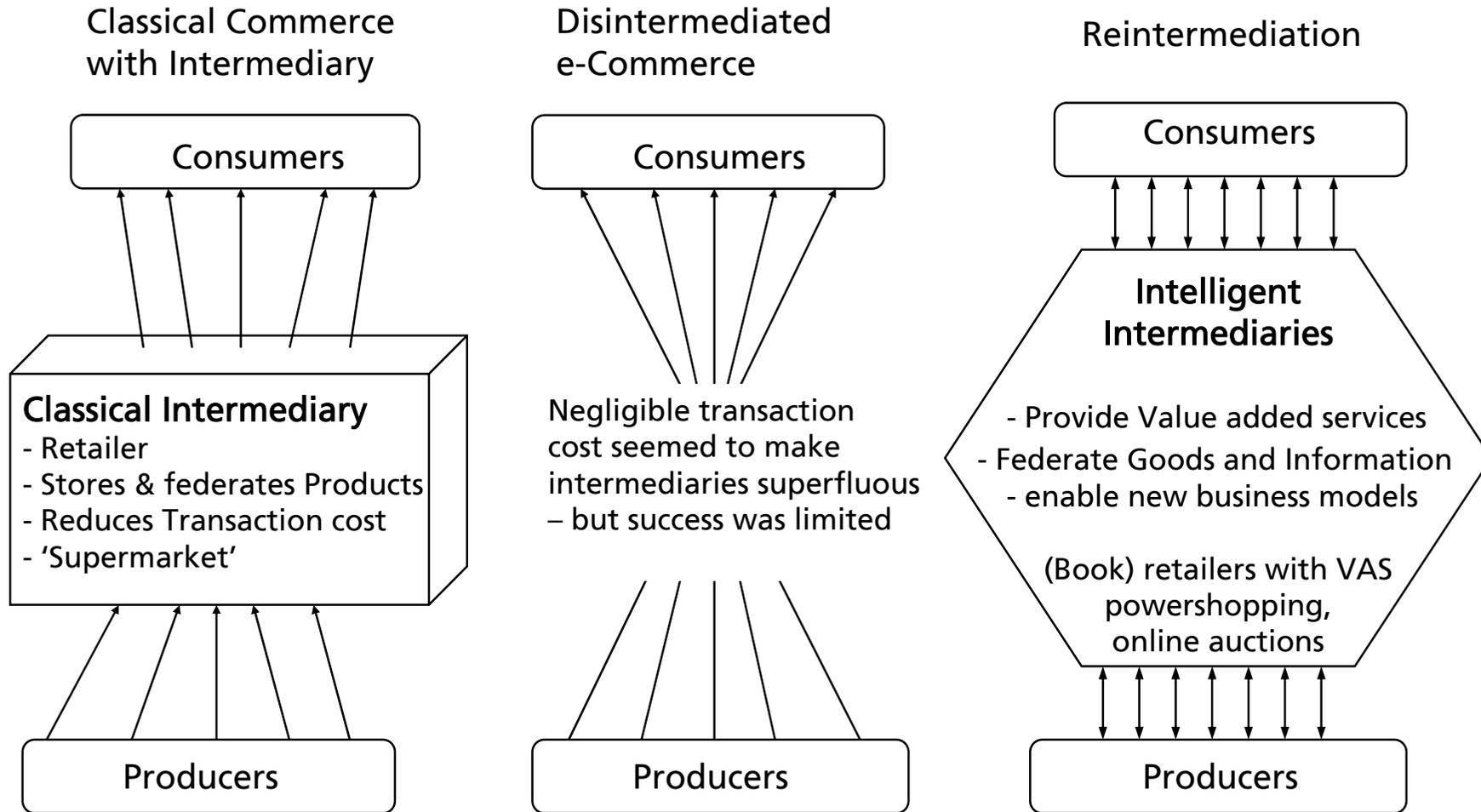
Ilmenau, 29. May 2004

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From Commerce to e-Commerce –
From Intermediaries to Intermediaries

Classical Commerce with Intermediary

Consumers

Classical Intermediary
- Retailer
- Stores & federates Products
- Reduces Transaction cost
- 'Supermarket'

Producers

Disintermediated e-Commerce

Consumers

Negligible transaction cost seemed to make intermediaries superfluous – but success was limited

Producers

Reintermediation

Consumers

Intelligent Intermediaries

- Provide Value added services
- Federate Goods and Information
- enable new business models

(Book) retailers with VAS powershopping, online auctions

Producers

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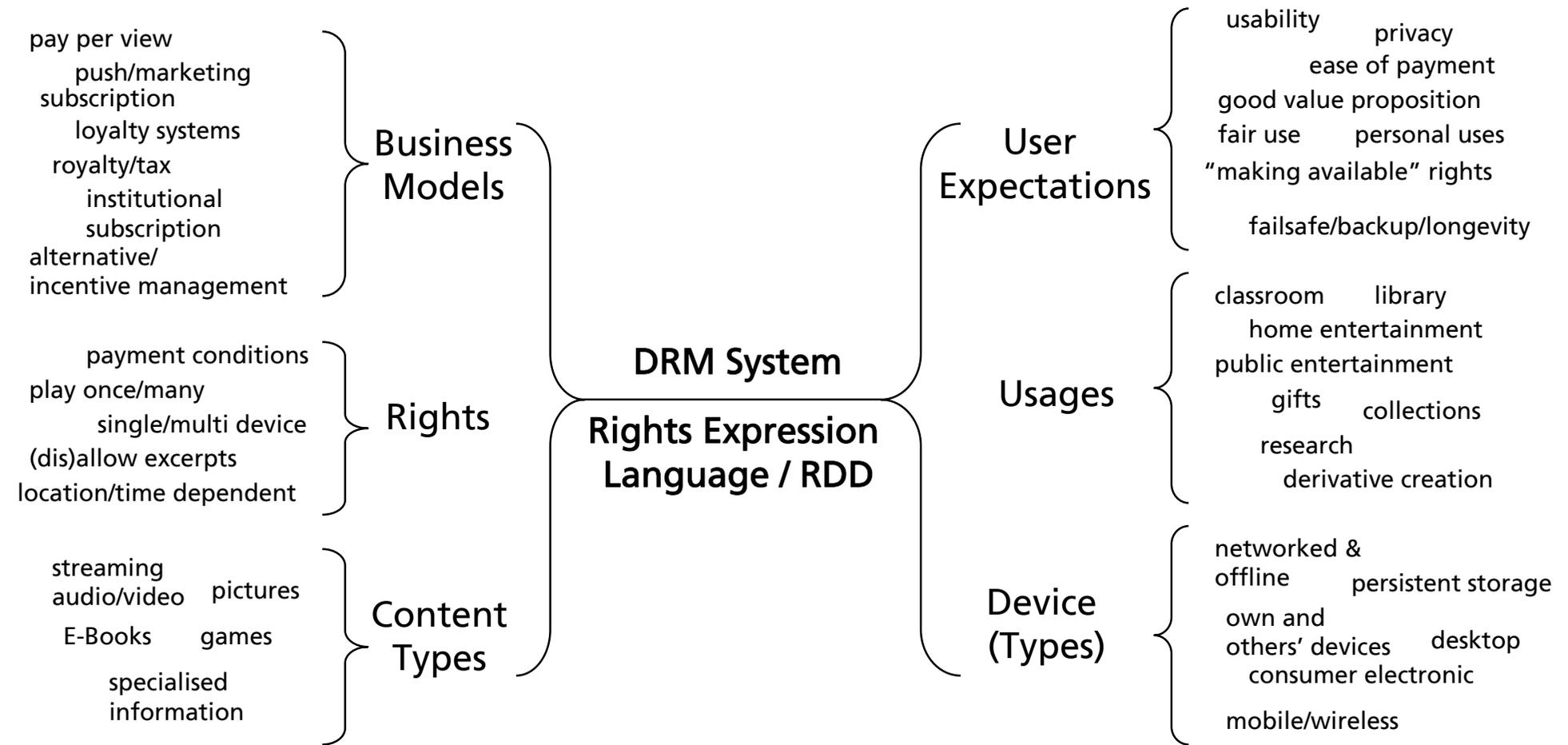Sichere Telekooperation

Claim:

This story is bound to repeat with DRM protected virtual goods!

- DRM works in a tension field of diverging requirements from

  - **Content Owners**: protection, enforcement, business models
  - **Final Consumers**: fair use, personal use, privacy, usability
  - the **legal background**: privacy, copyright, fair use & 'making available' rights
  - **potential intermediaries**, e.g. mobile network operators have own interests, resources, and business models

- This interests can only be reconciled by **intelligent intermediaries**

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The Tension Field of DRM

Content owners meet – and miss – final consumers

pay per view
push/marketing
subscription
loyalty systems
royalty/tax
institutional
subscription
alternative/
incentive management

Business Models

payment conditions
play once/many
single/multi device
(dis)allow excerpts
location/time dependent

Rights

streaming
audio/video   pictures
E-Books   games
specialised
information

Content Types

DRM System

Rights Expression Language / RDD

User Expectations

usability   privacy
ease of payment
good value proposition
fair use   personal uses
"making available" rights
failsafe/backup/longevity

Usages

classroom   library
home entertainment
public entertainment
gifts   collections
research
derivative creation

Device (Types)

networked &
offline   persistent storage
own and
others' devices   desktop
consumer electronic
mobile/wireless

The Tendency to Frustrate Users

Given the nature of DRM (enforcement) systems, which are based on classical (role based) access control mechanisms, the users' view of DRM systems will be this:


Caveat: Help may come from
- standardisation
- sophisticated rights management systems
- liberal, pre-negotiated licence terms (i-Tunes success factor)
- alternative methods, like watermarking, incentive management

But: none of these comes without an additional effort, resp. an intelligent intermediary

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The Easy Way Out – A Dead End for Digital Content

– The **Siemens Digital Music Player** is a means to give back to virtual goods the traits of **physical goods**
– It enables very basic content portability, but not much more

Custom DRM system (SDC/DWS)

2G / GPRS / 3G

Infrared / wired

MNO's Network
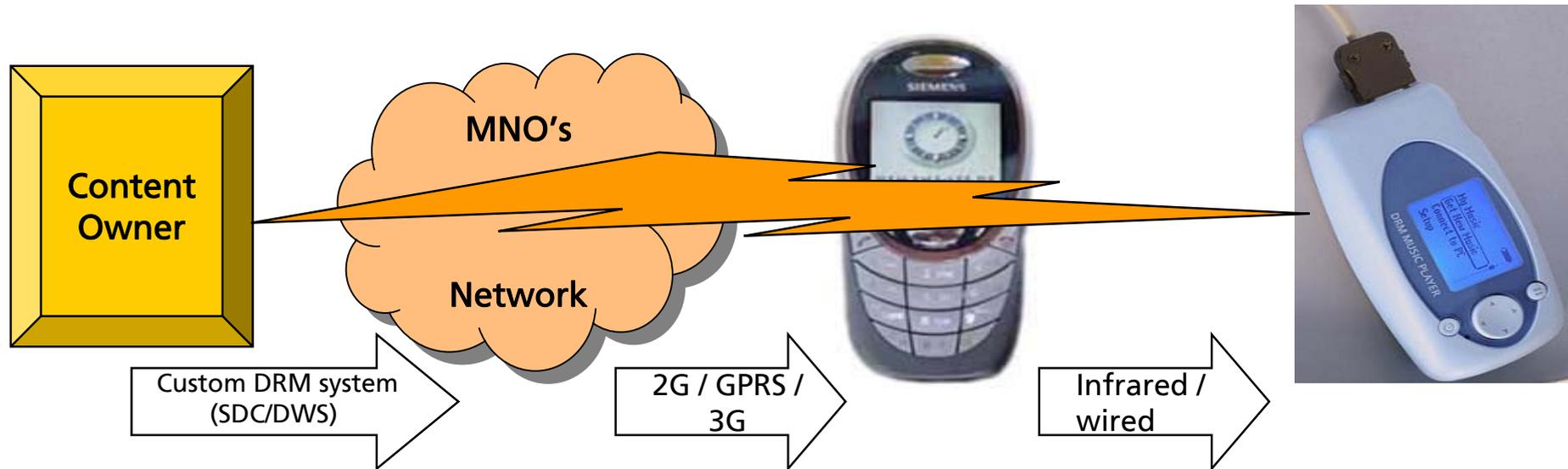
– Everything between content owner and DMP can in principle be used as a mere **bit-pipe** – an example of complete disintermediation

– interestingly, the first licensors of the DMP are MNOs (O2 UK &DE) and use it to further their own music portals

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Diversification of Rights Expression Languages
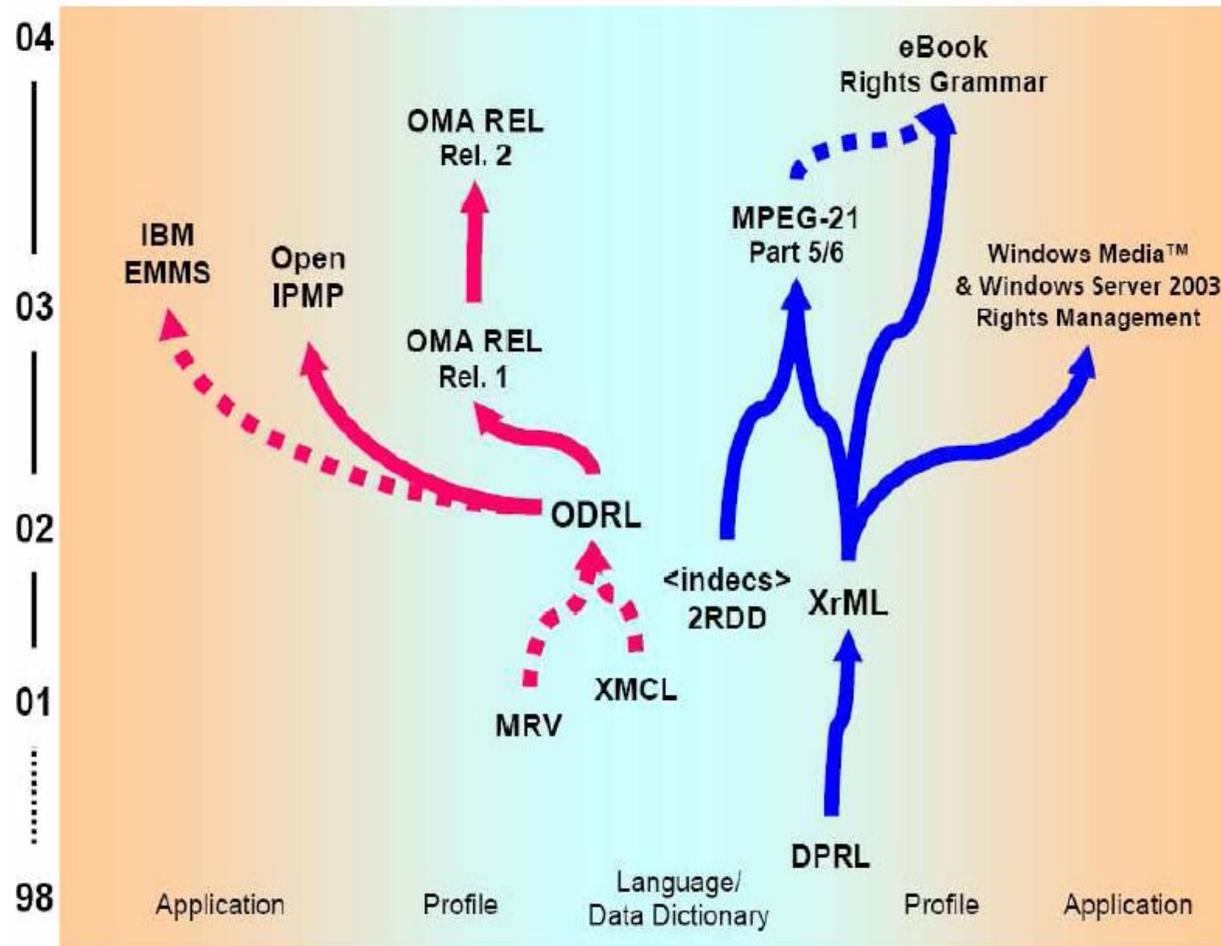
- The genealogy of RELs shows two REL families: directed at content owners, resp. content distributors, in particular for the mobile domain.

- Standardisation bodies try to harmonise, but not much between domains.

- The REL on the distribution side is often significantly *less capable* than on the content owners' side

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REL 'Transformation' Tasks – Some Examples

The content owner stipulates arbitrary rights – the DRM system operator is to enforce them

- **Repackaging and Conversion**: E.g. from a secure container to rights/content pair needs
  - **unbundling** the package (decryption) and
  - **reissue rights** to the final addressee (cf. the **Issue** concept of XrML)

- **Location Based Rights**: E.g. for educational (classroom) or entertainment (theatre) scenarios necessitates
  - a **geographical information provider** to obtain the location of the target devices
  - an agreement between DRM system operator and content owner on the **precision of locations** and **latency** of checking
  - an agreement on how to translate remaining rights, e.g. to **time limited rights**, in order to cater for latency in location checking

- **Pay Per Use Rights**: The target DRM system issues a **single usage right** for every payment received through a **payment service provider**

- **Revocation of Rights:** DRM system periodically (with pre-negotiated latency) checks the validity of licences (**revocation pull**)

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Generic REL Interoperability Tasks for an Intermediary

- Content and Rights Reformatting

  · Transform content and perform a deterministic transformation of the rights

- Data Management

  · Transient or persistent storage of rights, e.g. for sending back reports on rights exertion to the content owner

- Condition Evaluation

  · Check validity of licence conditions based on additional information (from SPs)

  · Issue (transformed) rights in to the target (REL) in case of access

- Dynamical State Evaluation

  · Continually track states

  · Issue and revoke rights accordingly

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Generic Roles for DRM Intermediaries

The federation tasks involve ultimately *rights federation* as a primordial form of *rights negotiation*:

- **Demand federation** allows content owners to view consumers as a homogeneous set, to which bulk rights can be offered
- **Content federation** allows users either to *choose* from the set of possible rights accumulated by the intermediary, or to use rights which have been *pre-negotiated* by the IM with a set of COs
- **Device federation** views groups of user's devices as a homogeneous set over which rights are extended (domain concepts, e.g., envisaged by OMA)
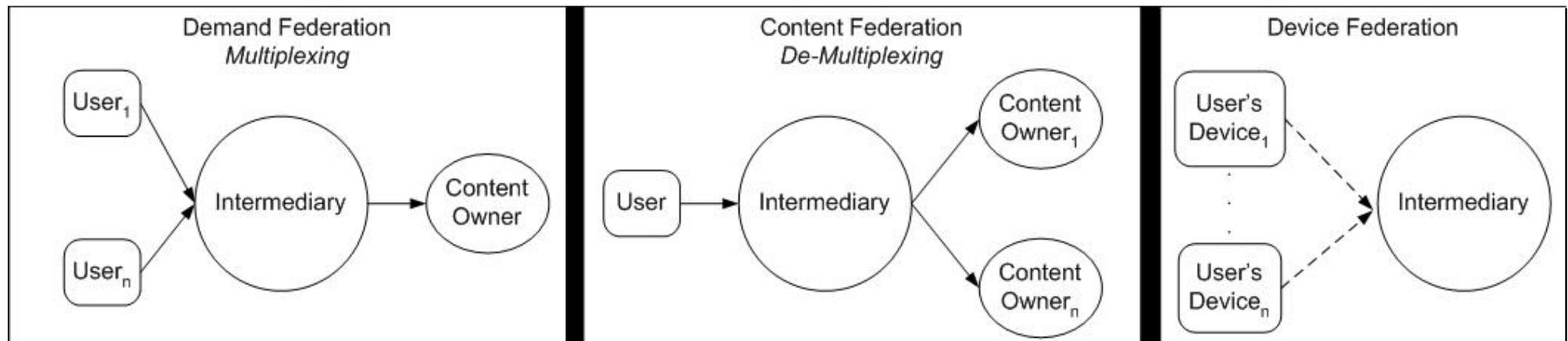
Benefits Delivered by Intermediaries – General

Intermediaries can

- weaken the DRM tension field by shielding content owners from final consumers

- foster fair and personal uses, e.g. by negotiating more liberal licence terms, and thus **vouch for consumers** (much like collecting societies)

- assure customer's privacy by withholding personalised data from CO

- still provide COs with profiling and tracking data on content usage, e.g. by pseudonymisation and statistical compilation

- provide infrastructure

- provide further value added services

- **enable new business models**

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Benefits Delivered by Intermediaries – The Mobile Domain

Mobile Network Operators are bound to become such intermediaries, because

- they can offer to COs a huge pre-existing customer base

- they want serious return on investment for UMTS licences and therefore

- need to attract (high quality) content owners to 3G networks –
  thus DRM becomes an enabling factor

- MNOs can reuse their existing infrastructure, in particular

- unique possibilities for location based rights, and

- their connection to payment services, e.g.

- they can provide cost and spending control for end users
  (an issue of increasing importance to the public)

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