

Interoperability

Some introductory ideas

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9th Florence Intermodal Forum
2 May 2022

Interoperability

- This will be a consistent topic throughout the day
- Maybe it's useful to think what the concept means
- It's not just standards

- Let's have a look at payment cards
- A real success story for interoperability
- Turn up anywhere and they work
- Buy something online and they work
- Taken for granted
- How is it done?

Card scheme governance

- It's the card schemes – they are in charge – this is fundamental
- Banks make up most of the membership and set the rules
- There is interop domain, issuers, merchant acquirers and merchants
- Everyone has to sign up before they can participate
- They have a rule book that everyone must abide by
 - one set of rules for retail transactions
 - another set of rules for transit transactions
- The scheme rules define the liabilities of the participants
- The scheme rules ensure the probity of the participants and therefore that debts are paid
- There are (sometime significant) penalties for failing to follow the scheme rules

Card scheme standards

- The standards body EMVCo works for the card schemes
- ISO (open) standards are also used by payment card schemes
- All the participants must use the standards
- There are standard business processes:
 - eg authorisation, clearance (payment), 3D Secure
- There are standard equipment technologies:
 - eg magstripe, Chip&PIN, Contactless, mobile wallet, QR barcode
- There are standard message formats:
 - although some variation by scheme in codes used
 - this variation is accommodated by the acquirers

Card scheme certification

- Certainty of interoperability depends on testing and certification
 - Certified testing houses to certify equipment
 - Reader RF testing to ISO 14443 – also EMVCo and NCF Forum variants
 - Card testing for EMV Level 1 and 2
 - PCIDSS assessment for card data privacy and security
 - PCIDSS checked by QSAs – Qualified Security Assessors
 - Merchant acquirer testing before connecting to the network
 - Merchant acquirers use uniform test cards for testing
 - Retesting when a new acquirer is used
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- Where's the certification in transport ticketing?

What can be learned?

- Concept of a scheme with rules
 - Concept of a real scheme manager
 - Rules to define participation
 - Rules to define the legal responsibilities, liabilities and penalties
 - Rules to define change management
 - Imposition of standards
 - Requirement for testing and certification
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- All these are needed for a truly interoperable system

Think also of *post-facto* interoperability

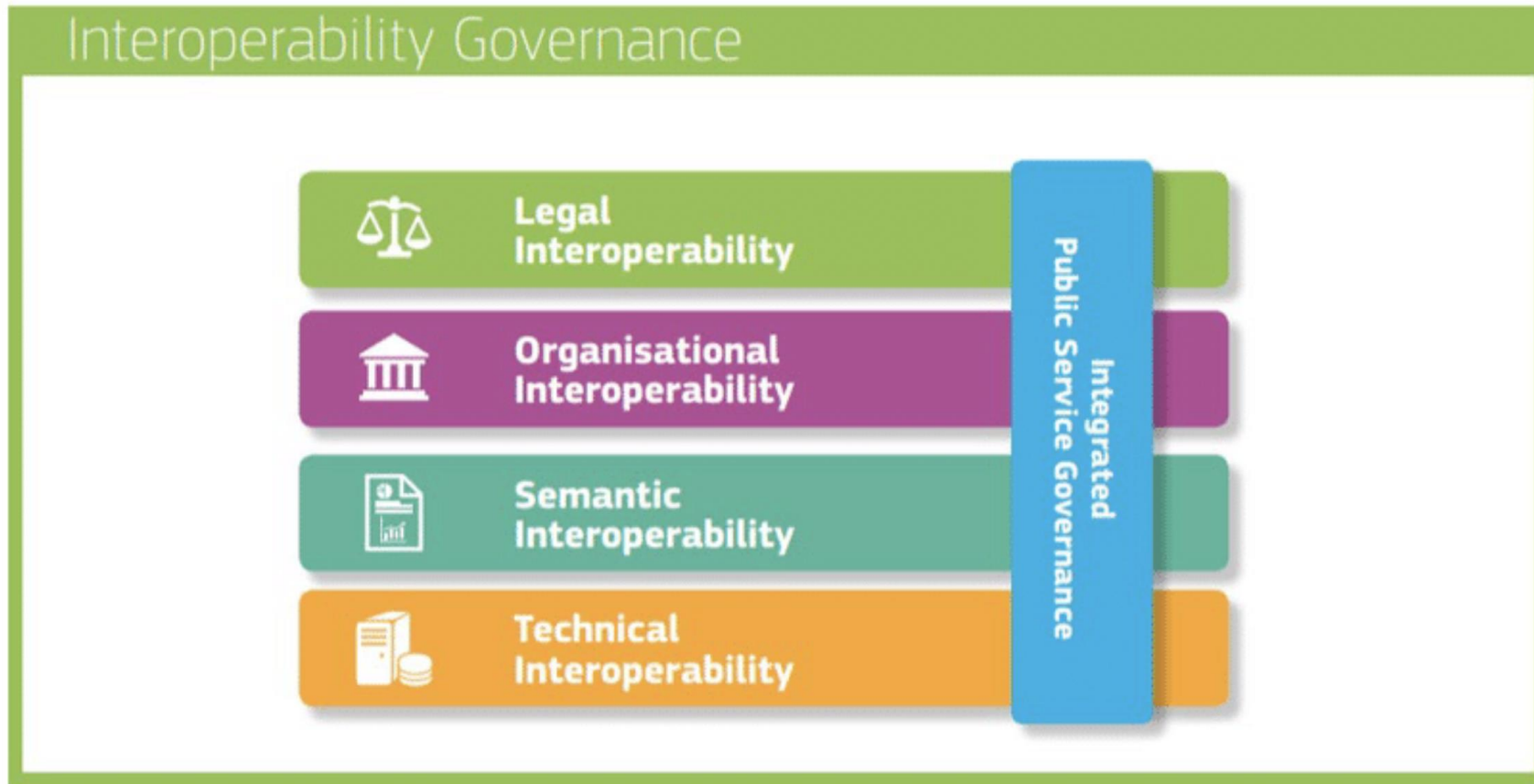
- This is where a single supplier dominates the market and creates interoperability by imposing its own rules and standards
- Subject, of course, to legal challenge
- Examples are Apple and Android wallets used to store tickets
- Developers are obliged to do it the OS supplier way
- We may not like it but it provides interoperability
- Maybe not ideal but often the good is better than the perfect
- Maybe bespoke is not a good idea for ticketing any more

Think also of interfacing

- Where software suppliers develop the skills to connect otherwise incompatible system to make them seem interoperable
- The system providers being so connected can conduct their business largely insulated from each other
- Common in the air and rail sector
- And increasingly in the urban sector as well
- Already active in MaaS app provision
- Maybe cheaper and simpler than imposing strict rules on everyone

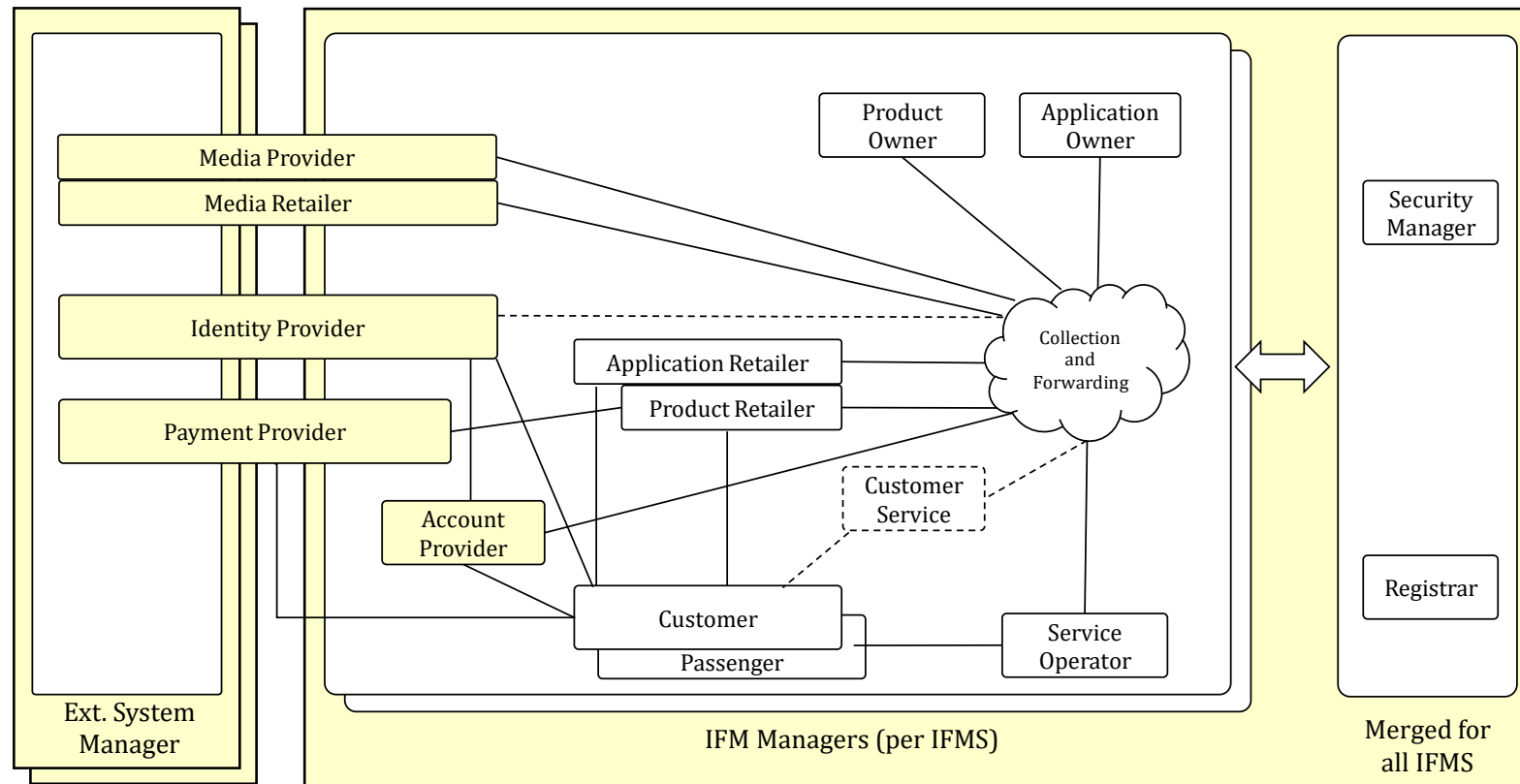
Interoperability is a general concern

- The European Interoperability Framework
- Includes Legal, Organisational, Semantic and Technical Elements



And addressed specifically for transport

- IFMS Interoperable Fare Management Systems
- Defined in ISO 24014-1
- Accommodates external media, identity and payment providers



Interconnecting IFMSs

- “interoperable” is not a sensible adjective for a single IFM as the IFM manager imposes a set of rules and specifications
- All the members of the scheme are subject to a single governance
- Interoperability is complex and involves mutual recognition of:
 - accepted media, identity methods and security methods
 - products, reference data and product acceptance rules
 - payment, apportionment, settlement and liabilities
 - change management processes, etc
- All actors in all interconnected schemes unavoidably become subject to all relevant governance arrangements
- But standards can help to minimise this complexity
- Server-based PAYG can make it manageable for urban transport

What can we learn?

- Key entity here is the scheme – like with the card schemes
- The scheme manager imposes interoperability on scheme members
- Where schemes work together then all participants of the super-scheme must follow the rules of both schemes
- Lots of compromises are needed to interoperate schemes

- Question: where are the schemes in European transport ticketing?
- Some at Member State level and some at sector level (eg rail) though often missing at any scale
- Reluctance to interoperate between schemes – not invented here
- Is the scheme/super-scheme dichotomy helpful in MDMS thinking?

Discussion