Internet Media Guides

Enhanced Electronic Program Guides for Mobile TV

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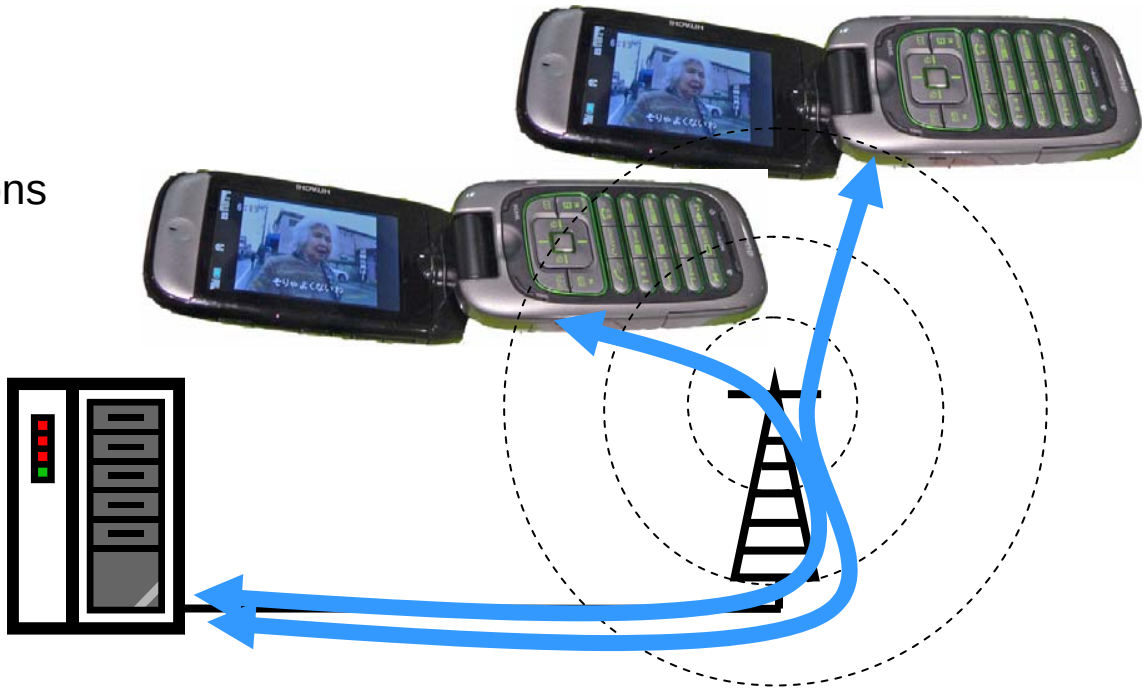
Overview

- Motivation
  - Mobile TV: multiple technologies for a specific set of services
  - Platform/network independent content provision
  - Distributing content description information in converging Mobile TV networks
- Introduction to Internet Media Guides
  - Concepts
  - Implementations
- Applications
  - Mobile TV, networked multimedia
  - New ideas
- Conclusions

Mobile TV
Multiple Technologies for a Specific Set of Services

Multiple Technologies for a Specific Set of Services: Streaming over 3G

- Using existing infrastructure, implemented today
- Personalized content, leveraging existing authorization and accounting infrastructure
- Very limited number of simultaneous sessions
- Content:
  - Canned Content
  - Personalized Programs
  - Live-TV
- Technologies
  - 3G-based IP
  - RTSP-streaming, HTTP-download



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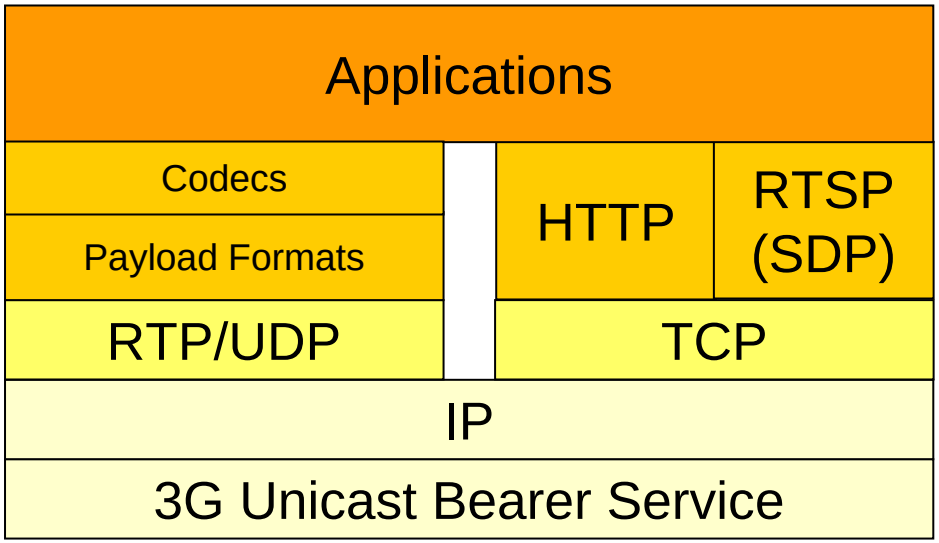
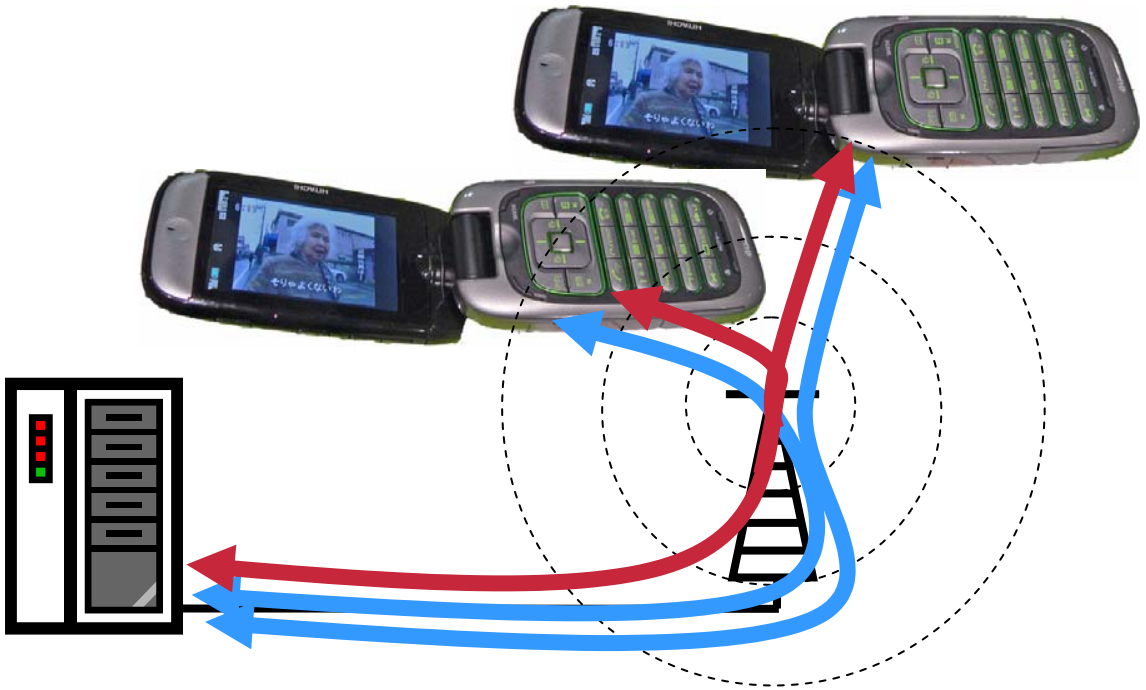


Multiple Technologies for a Specific Set of Services: Multicast/Broadcast over 3G

- Network-efficient point-to-multipoint distribution
- Using existing infrastructure, implemented soon
- Localized/Regionalized content
  - Canned Content
  - Live-TV
- Limited number of different parallel sessions
- Technologies
  - 3GPP MBMS
  - IP-Multicast, RTP, SDP
  - FLUTE for reliable multicast transport



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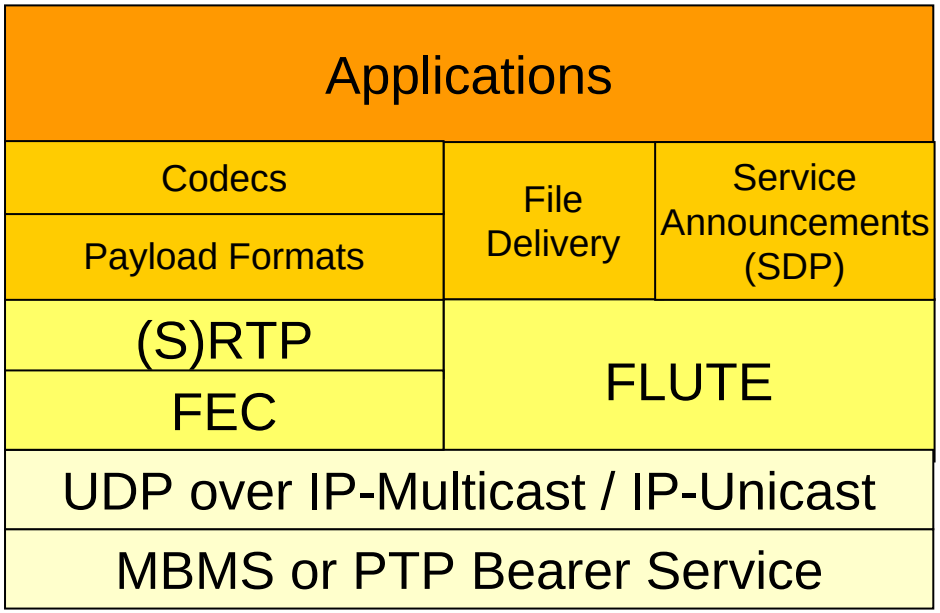
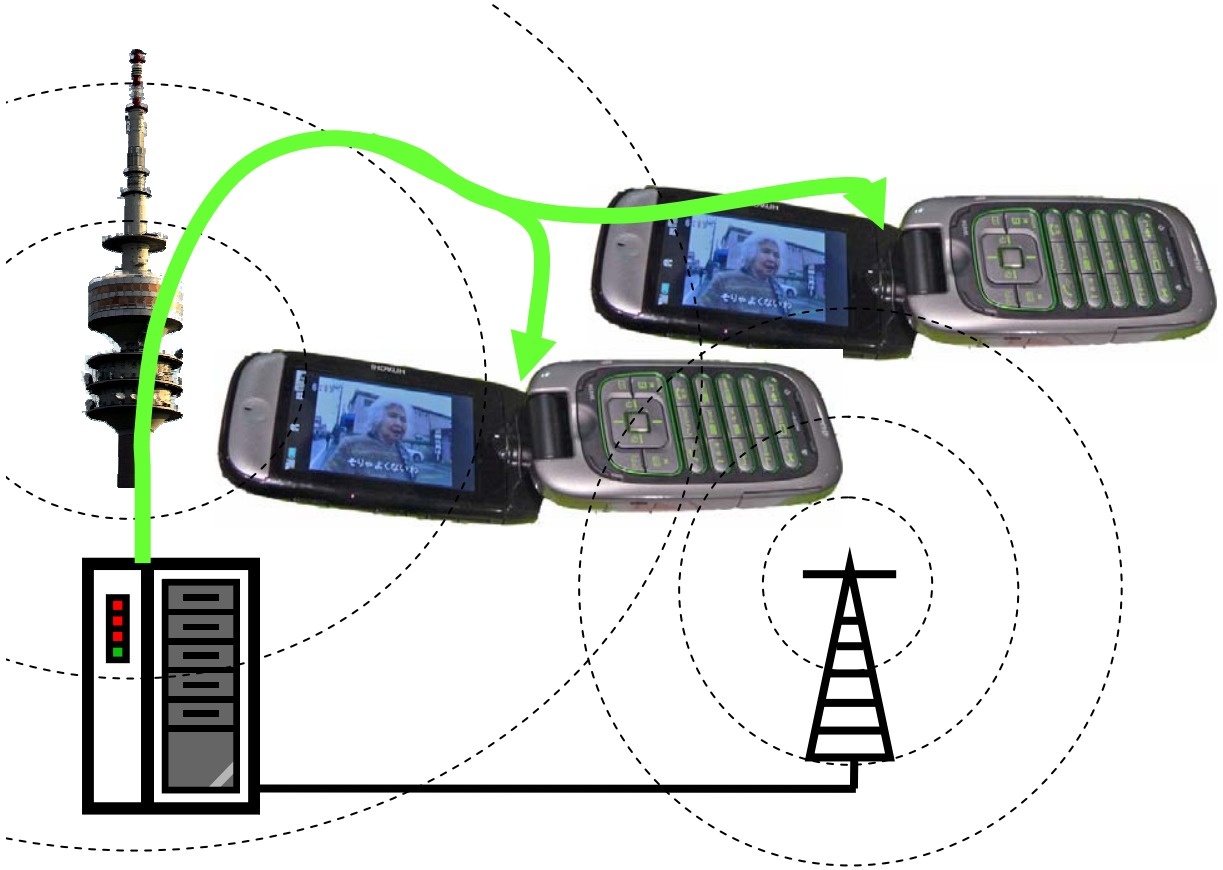


Multiple Technologies for a Specific Set of Services: Digital Terrestrial Broadcast

- Efficient mass-broadcast
  - Optimized for mobile devices (battery efficiency, resolution)
- TV-like user experience
  - Content: Live-TV
  - Regionalized content
- Implemented today (in some countries)
- Technologies
  - Broadcast bearer technologies
  - MPEG-based transport and codecs



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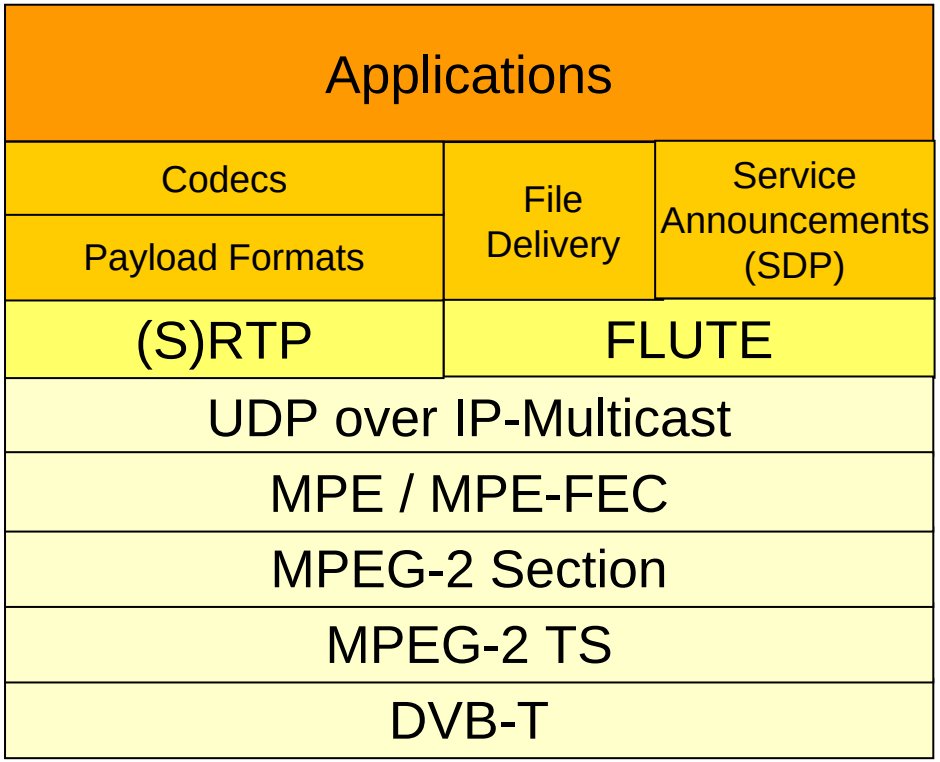
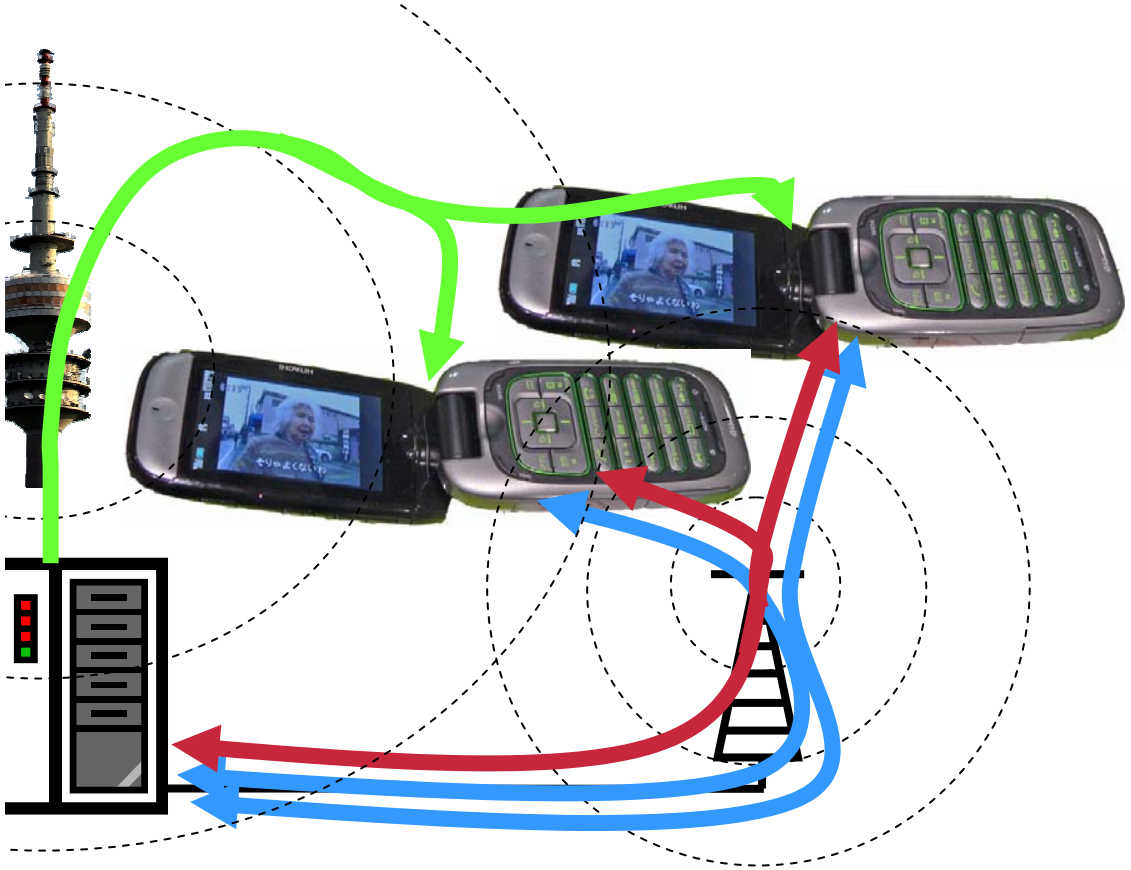


Multiple Technologies for a Specific Set of Services: Convergence?

- Multiple technologies used together
  - Localized content
  - Digital broadcast and 3G service for interactive TV, error concealment, feedback
  - Premium content, pay-per-view over MBMS
- But: largely same content, similar services
- Convergence
  - Towards common media formats, IP-based distribution, common transport mechanisms
- Heterogeneity
  - Different networks
  - Different access mechanisms, access parameters



Enabling Convergence in Heterogenous Environments

- Converging distribution platforms
- Making the same content available over different networks
- Content in a broad sense: live-TV, recorded content, regionalized broadcast
- Content should be identifiable in a region (globally, regionally)
- Content has additional information
  - Program guide information
  - Access information (e.g., access parameters for MBMS multicast group)
  - Scheduling information
  - Can be linked to additional (optional) content, e.g., for interactive TV
  - Required to make content accessible for users and mobile devices
- Must be able to describe network-specific access parameters

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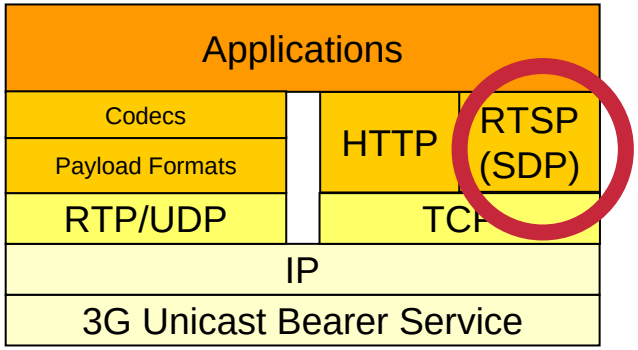
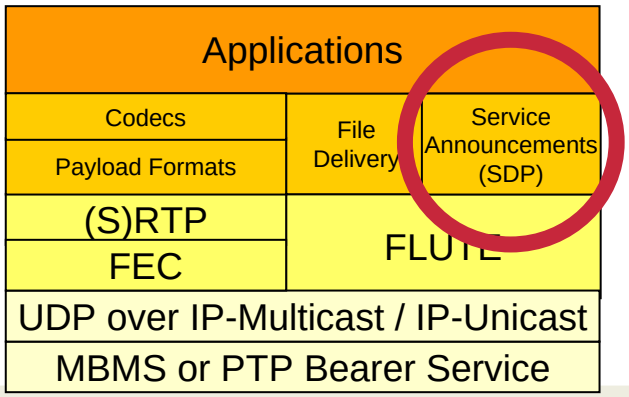
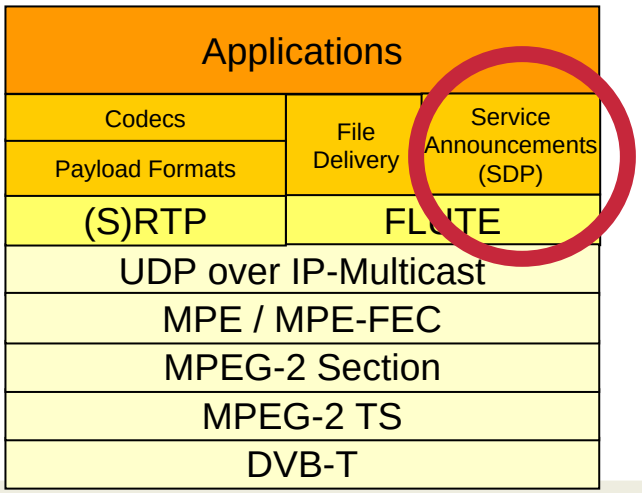
- Distributing content description and access information in network-independent ways
- Leveraging IP-based distribution technologies without precluding legacy networks

Describing and Identifying Content Across Heterogeneous Distribution Systems





- Describing content
  - Meta-Information
  - Access parameters
- Distributing content descriptions
  - Heterogeneous transport mechanisms
  - Not necessarily IP-based



Internet Media Guides (IMG)

Definition of an IMG (from IETF MMUSIC Charter)

Content:

- A **collection of multimedia session descriptions**
- Expressed using SDP, SDPng or other metadata formats
- It is used to describe a collection of multimedia sessions (e.g. television programme schedules).

Distribution:

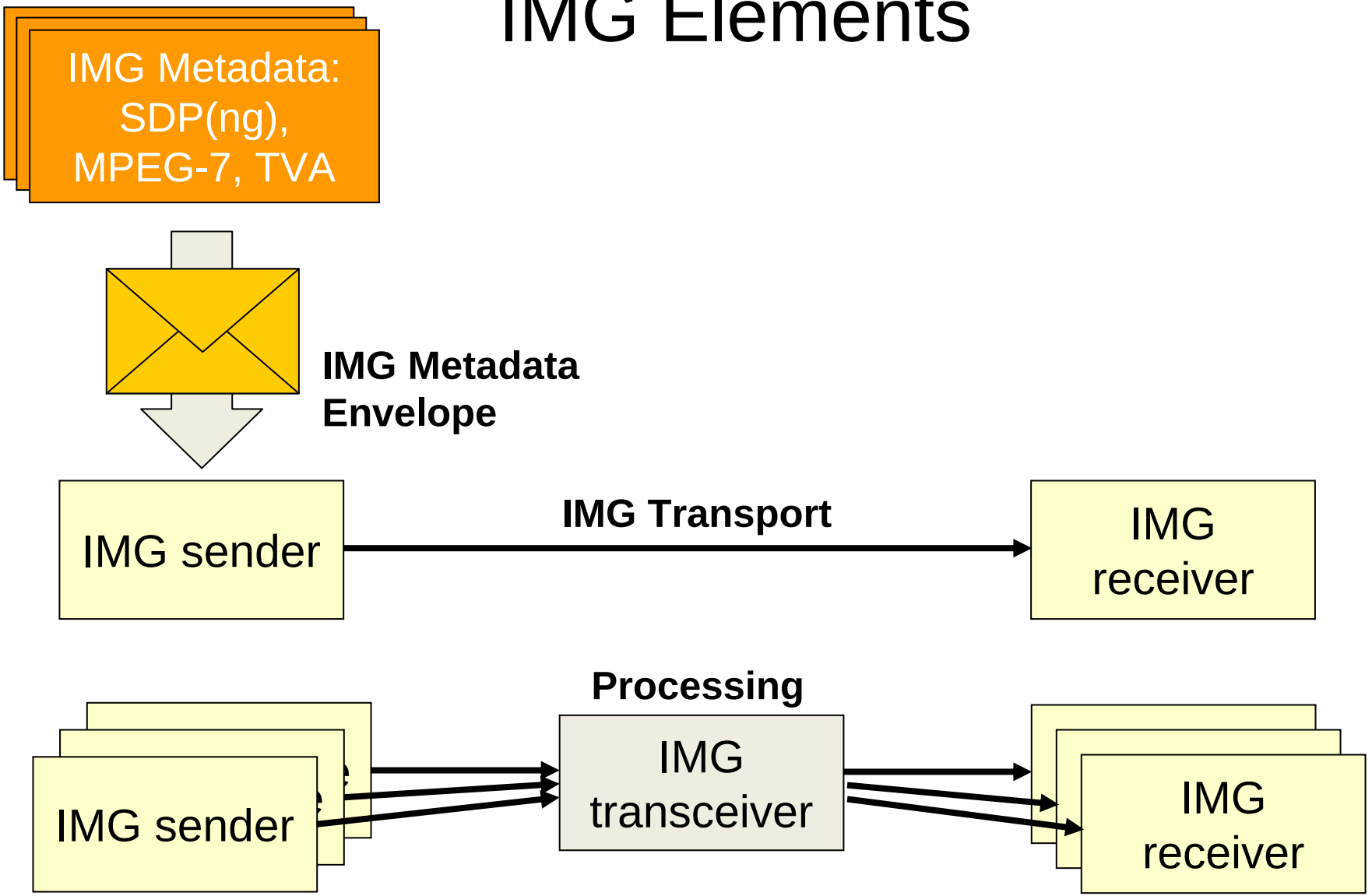
- The IMG must be **delivered to a potentially large audience (push or pull)**, who use it to join a subset of the sessions described, and who may need to be **notified of changes** to the IMG.

IMG ≈ EPG

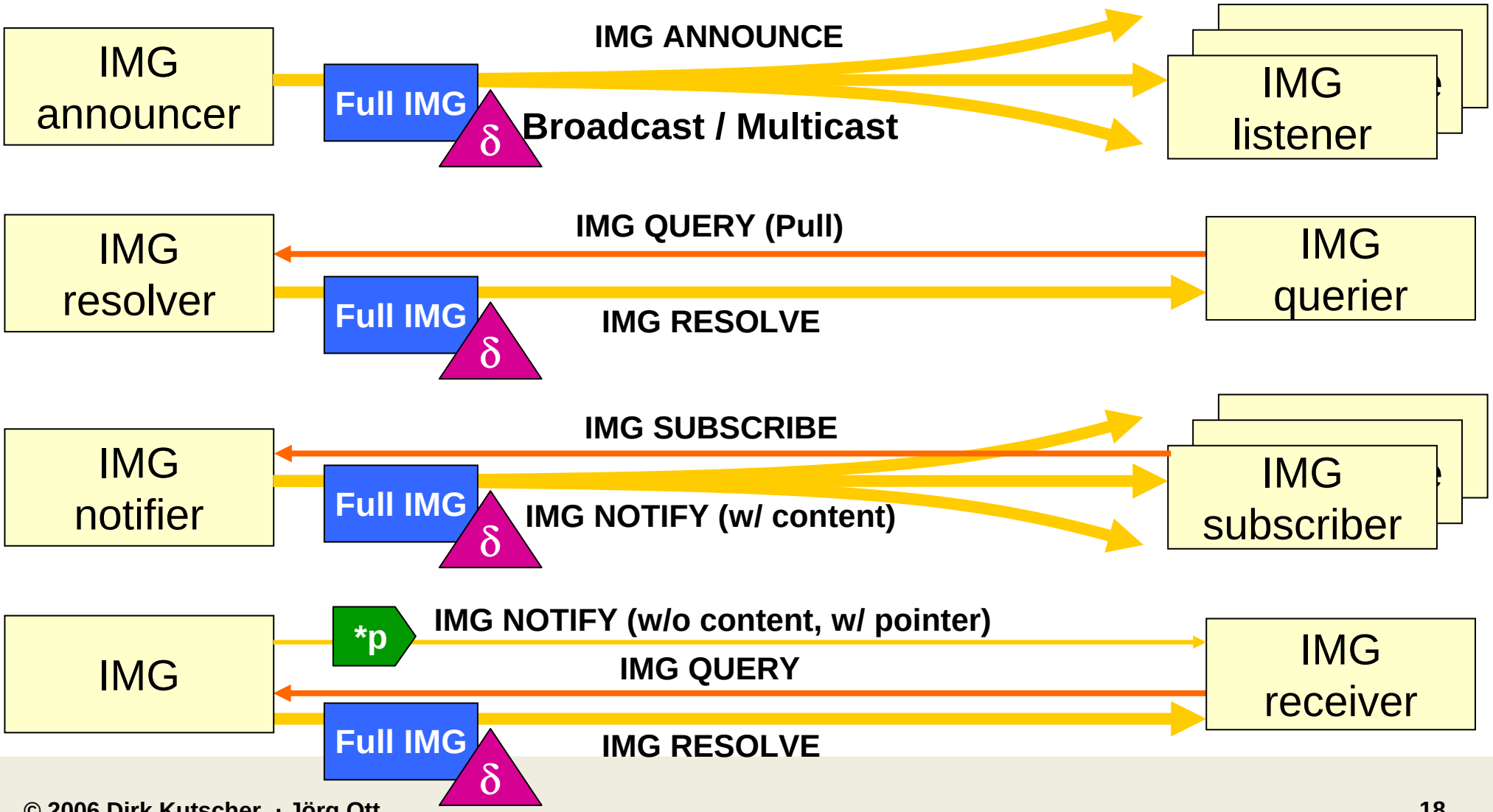
- Generalized for arbitrary...
  - Types of media
  - Types of sessions and interactions: services!
  - Classes of devices
- Plurality of access methods
  - Physical delivery
  - (Reliable) Broadcast / multicast (push)
  - Interactive retrieval (pull)
  - Provision of full IMGs and of deltas
  - Notification about changes
- Network-independent
  - For the delivery of IMGs
  - For the (request and) transmission of actual media in sessions

The same IMGs should be usable everywhere.

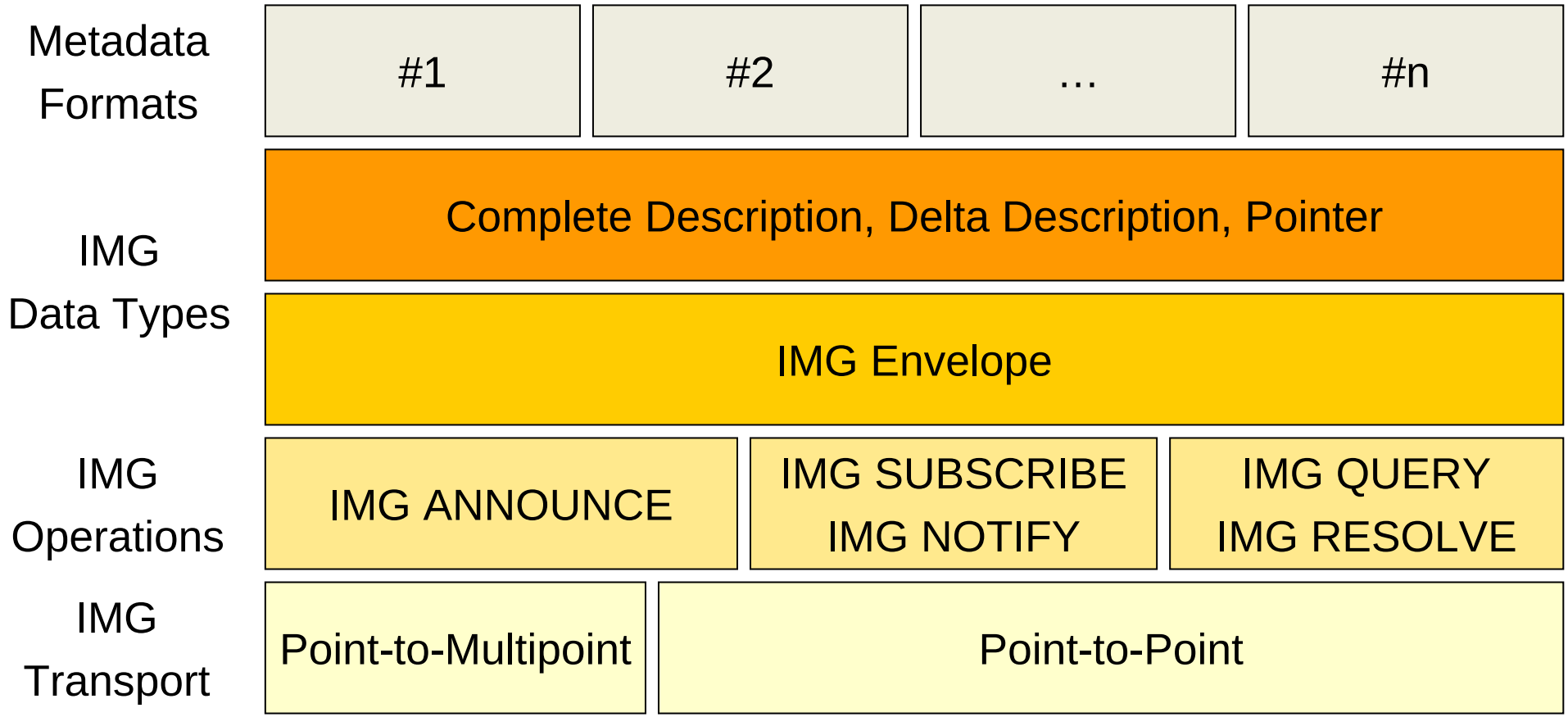
IMG Elements



IMG Delivery Models / Operations



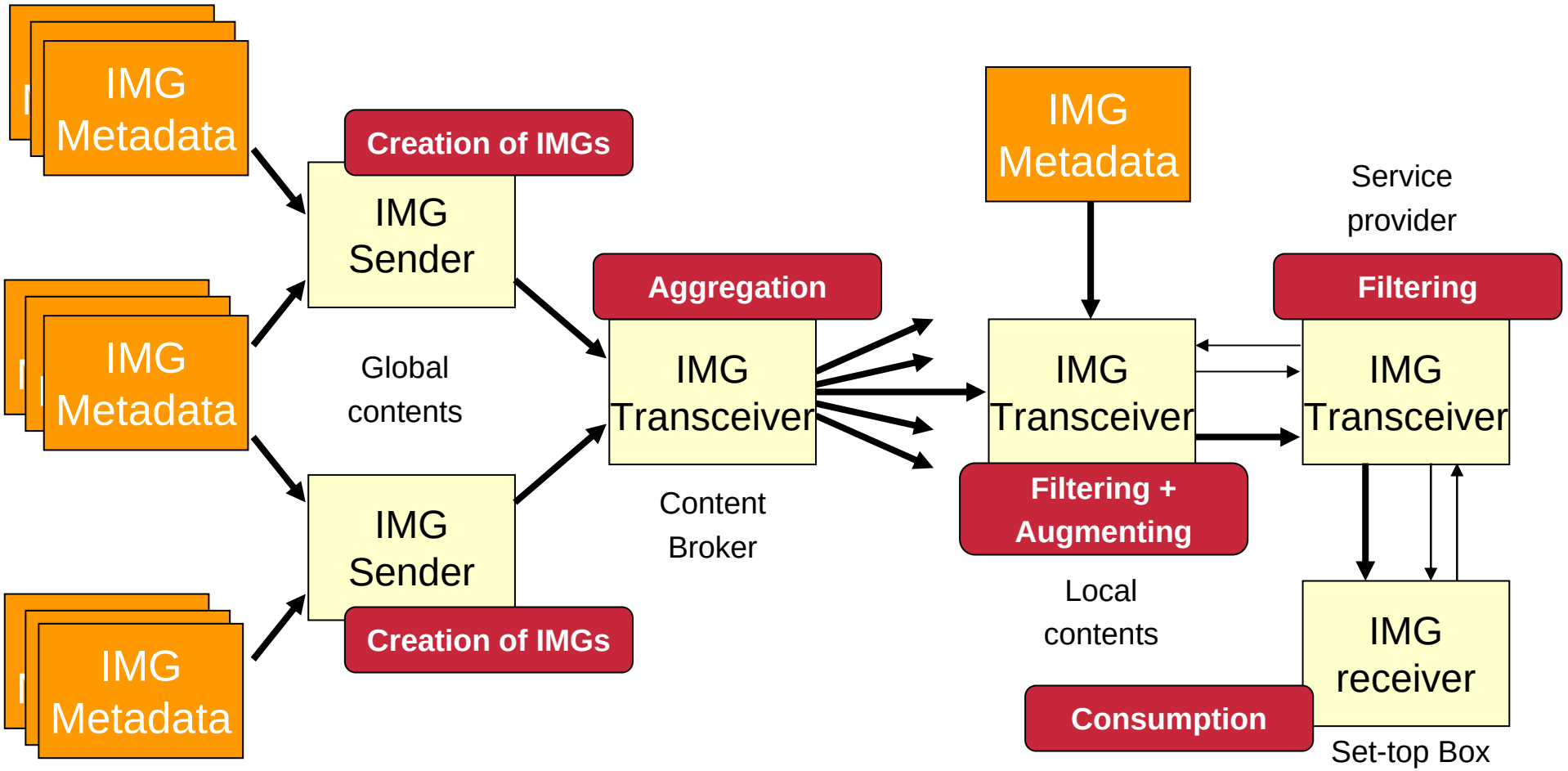
IMG Architecture



IMG Transports

- Need to provide mechanisms for IMG Operations
- ANNOUNCE
  - Reliable multicast transport protocol: FLUTE + MUPPET
- SUBSCRIBE / NOTIFY
  - Session Initiation Protocol (SIP): Extensions for Subscription/Notification
- QUERY / RESOLVE
  - HTTP
- Identify IMGs properly across protocols: IMG URI
  - Mappings to individual protocols for actual processing

Regionalization & Personalization with IMGs



TZI IMG Implementations

- Papageno: Multi-channel distribution platform
  - Application-independent object distribution system
  - FLUTE, HTTP, (SIP work in progress)
  - Open Source: http://prj.tzi.org/papageno
- IMG implementation
  - Leverages Papageno distribution platform
  - IMG sender/receiver/proxy
  - Full IMG and delta distribution
  - Extending the IMG-Envelope specification
    - Maintain authenticity of IMGs processed by transceivers
  - Clear separation of of distribution platform from IMG semantics
    - Flexible support for different meta data formats
  - http://prj.tzi.org/img

New Applications for IMG

- Past focus on traditional contents
  - Conveying plain TV-schedules
  - Streaming in 3GPP Release 6
- Broadening the scope
  - Cover services in a more general fashion
  - Provide region/location information
  - Support personalized inquiries
  - Address issues of cost
    - Make offers automatically comparable
- Technical level: enable service discovery (and location)
- Business level: support adequate service selection

Video Podcasting

- First HD phones on the market (4GB+)
- Operators already offering media distribution over 3G – *for music*
  - KDDI au LISMO in Japan
  - iTunes on mobile phones
  - Currently media-on-demand over 3G only

- Japanese 1SEG Mobile TV handsets with record function
  - Record TV content to memory card
- Automated 3G-based multimedia content distribution: KDDI EZ Channels

- Approach: Leverage broadcast data channels for scalable distribution of multimedia content for offline viewing
  - Employ IMG distribution concepts
  - Allow for alternative access methods

IMG and Mobile TV Data Broadcast Services

- Most Mobile TV broadcast technologies provide data channels for arbitrary applications
  - Augmenting TV content (supplementary information)
  - General public information
- Example: 1SEG service in Japan
  - Additional informational and commercial content for augmenting TV content
  - Distributing earthquake warnings to mobile devices over broadcast medium
- Generalized approach feasible
  - Bearer technology-independent distribution for data services
  - Identify and manage additional information across different distribution networks
  - Enable new applications and new business models by leveraging application-independent distribution infrastructure

Conclusions

- Mobile TV a heterogeneous environment
  - Converging on content representation, transport protocols, distribution architectures
  - Legacy infrastructure being converted
  - Similar requirements for content description
  - Need for integrating approach for content description
- IMG framework addresses diversity in current and future Mobile TV networks
  - A useful tool for promoting new networked multimedia applications
  - Can leverage multicast infrastructure, but workable without
  - General approach for arbitrary applications, access methods and networks
- Concept for delta distribution and aggregation/filtering through content brokers
- Generalized IP-based data distribution infrastructure can be leveraged for new applications
  - Mass data distribution, service announcements
  - Video Podcasting

Thank you!

http://prj.tzi.org/img

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