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# P2P and IMS

## Cooperation / Integration

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Jens Fiedler - Fraunhofer FOKUS - 2008

### P2P vs. IMS

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➤ Isn't "P2P and IMS" like "Fire and Water" ?

- No, more like "Fish and Chips". They are good for themselves, but better together.

	P2P	IMS
Scalability	Very good	Difficult
Single Points of Failure	No	Yes
Users as Content Providers	Yes	No
DDoS vulnerable	No	Yes
Access	Easy	Difficult
Security / AAA	Bad	Good
Topology aware	Difficult	Yes
Standardized	No	Yes
Quality of Service	No	Yes
NAT Client Problem	Difficult	Solved
Service Deployment	Difficult	Easy

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## ***P2P Terms***

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### P2P Technologies:

DHT, Chord, CAN, Tapestry, BitTorrent, etc.

### P2P Applications:

File sharing, Storage, Processing, etc.

### P2P Software:

BitComet, eMule, Napster, etc.

## ***P2P in Centralistic Architectures***

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Three Approaches so far:

1. Core: Use P2P Technologies to scale up one or more IMS components (E.g. HSS)
2. Access: Bundle Media Servers in Access Networks to P2P Overlays
3. User: Use “traditional” P2P between user nodes, but enhance the service and communication with an NGN.  
(Focus on the VITAL++ Project)

## *P2P in the Core Network*

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Use P2P Technologies to scale up one or more IMS components

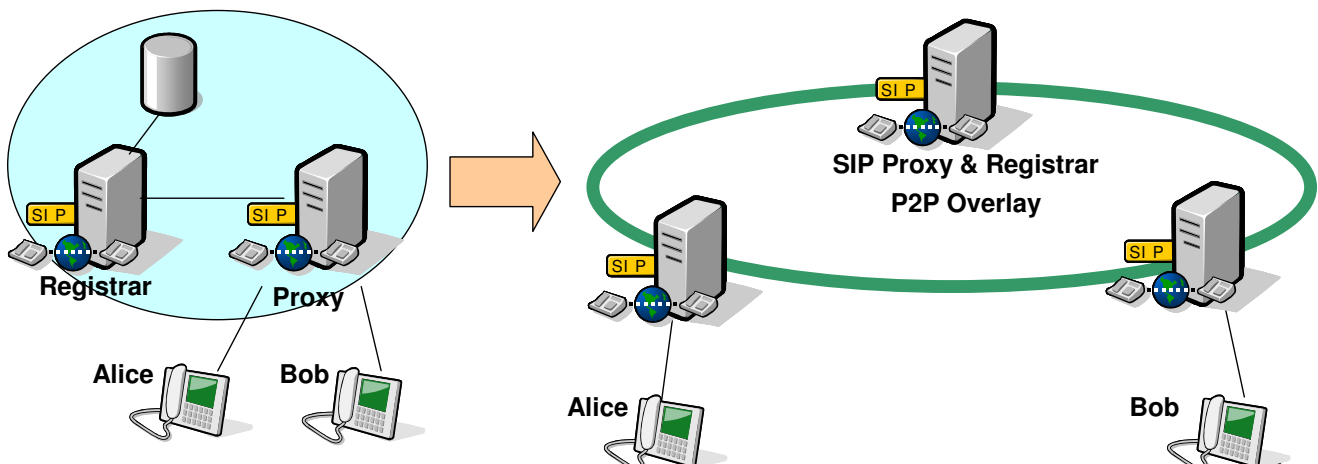
- Load Balancing
- Service Scalability

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## *P2P Server scale up*

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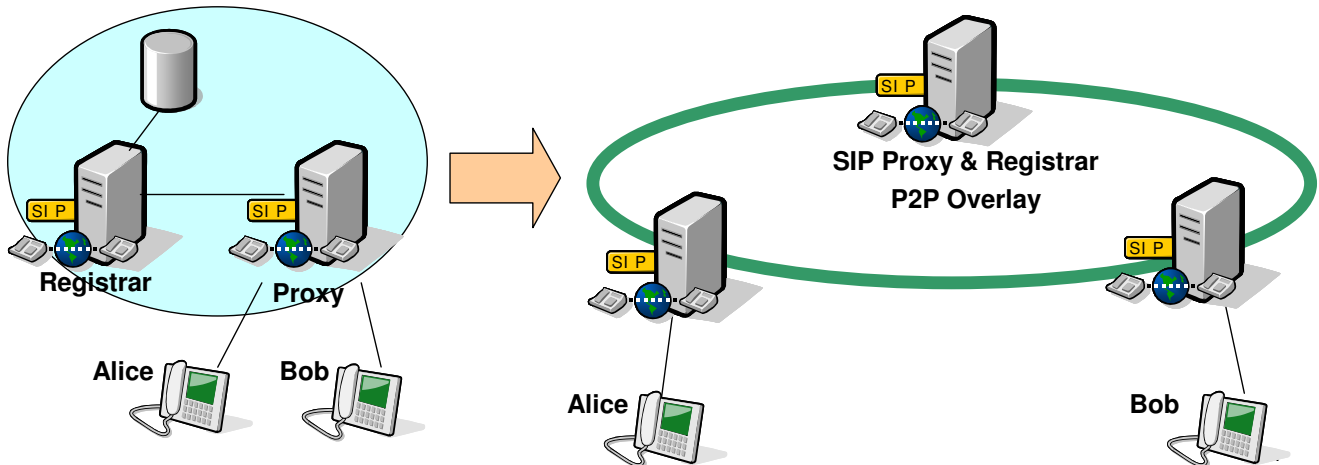
- Replace static central servers with managed P2P networks.
- Entities act as Adaptor Nodes.
  - Talk SIP to Clients
  - Talk P2PSIP among each other
- Utilize SIP 30x redirect to find locations.
- Clients stay Clients, can contact ANY of the Entities.



## ***P2P Server scale up: Optimizations***

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- Simulation of 15 nodes with unmanaged IDs -> 1:14.55
- Simulation of 15 nodes with managed IDs -> 1:1.25 (load factors)
  
- Standard Fingertable: Up to 5 intranet queries
- Adding Successortable: Up to 3 intranet queries
- Full mesh: Up to 1 intranet query



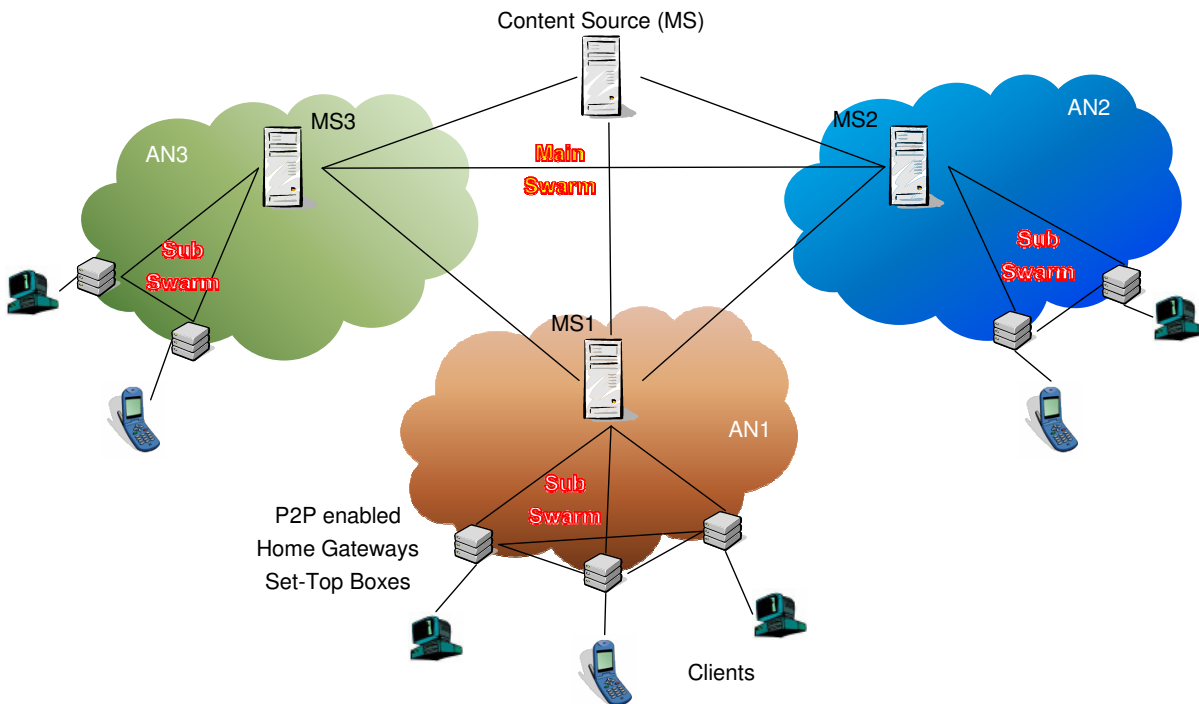
## ***P2P in Access Networks***

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Bundle Media Servers in Access Networks to P2P Overlays

- Media Caching
- Reduce Cross-Network Traffic

## P2P in Access Networks



- Pre-share contents into the relevant access networks (IMS profiles)
- Hierarchical approach for topology awareness

## P2P in Access Networks

- Minimum cross-network traffic
- IMS can help building the overlay (Topology)
- IMS services decide which content is to be distributed (Profiles)
- Media server load reduction
- Content in private boxes -> trick functions (FF, Store, Pause, etc.)
- User generated content possible

## ***P2P between Users***

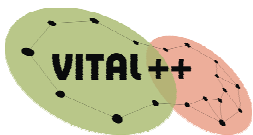
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“Traditional” P2P between user nodes, but enhance the service and communication with an NGN.

### The VITAL++ approach

- AAA/DRM Enhancement
- QoS Enhancement
- Service Availability

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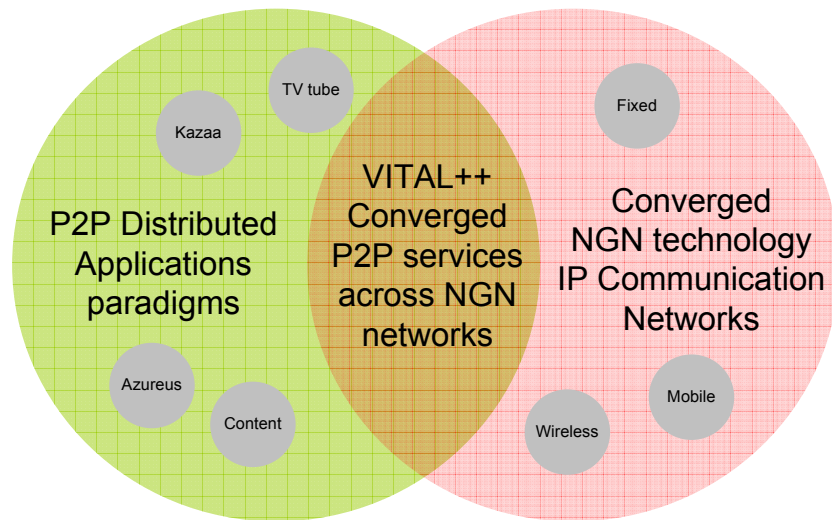
## **VITAL++**



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- FP7 EU Project (STREP)
  - Start: June 2008 (Kickoff June 5<sup>th</sup>), Duration: 30 Months
  - Partners:
    - Academic: University of Patras (Greece) (PJ Lead)
    - Centre for Technological Research of Crete (Greece)
    - Waterford Institute of Technology (Ireland)
    - Fraunhofer FOKUS (Germany)
    - Industry: Blue Chip Technologies (Greece)
    - Telefonica I+D (Spain)
    - Voiceglobe (Belgium)
    - Rundfunk Berlin-Brandenburg (Germany)
    - Telekom Austria (Austria)

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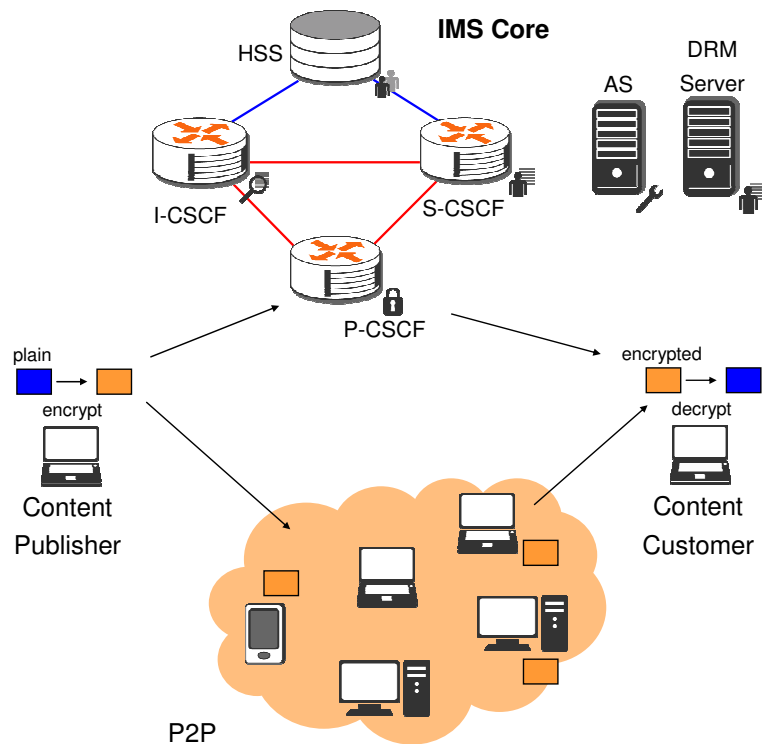
# Vital++

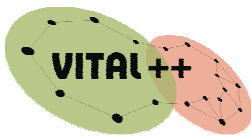


## ➤ Scenarios

- P2P Video Live Streaming
- Peer assisted Video on Demand
- Static Content Distribution (+DRM)

# IMS-secured Content Sharing





## IMS-secured Content Sharing

What do I win ?

- Scalability in Content Delivery
- User Generated Content
- Content Control (revoke Licenses)
- Content Security (DRM, Encryption)
- Provide content without hosting it
- Unburdening of Media Servers
- IMS Session Control (E.g. for Billing)

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## Peer assisted VoD

- Video-on-Demand:
  1. Select the video
  2. Prebuffer
  3. Start playout asap.
- Why IMS for that ? Simple answer: QoS
- Similar sharing and DRM concepts as for static content.
- Difference to Content sharing: This is a realtime application !

User experience without QoS:

*"... its slow, bucking and jerking."*

*"Sometimes it aborts, rarely good quality."*

- Content Receiver pays QoS measures (Bandwidth reservation)
- Good for popular, recent content.

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## P2P Live Streaming

- Problem: Only a very small number of original stream sources, but big number of stream consumers.
- QoS more important than ever. (Stronger requirements than for VoD)
  - Low latency
  - High bandwidth not only for downlink, also for uplink (stream speed)
- Similar sharing and DRM concepts as for VoD.
- Difference to VoD: This is a **hard** realtime application !
  
- Probably cannot completely unburden MS, but overall upload capacity of the system grows with every peer.

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## Any Questions?



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Hope to see you in November on ...

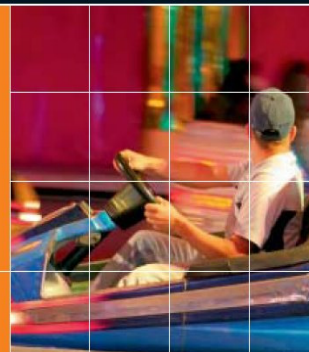
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[www.fokus.fraunhofer.de/go/ims-event](http://www.fokus.fraunhofer.de/go/ims-event)

Challenges and Opportunities  
in a Converged Services World –  
an Update on IMS, IPTV, SDPs,  
SOA and Web X.0

4th International FOKUS IMS Workshop

Berlin, November 6–7, 2008

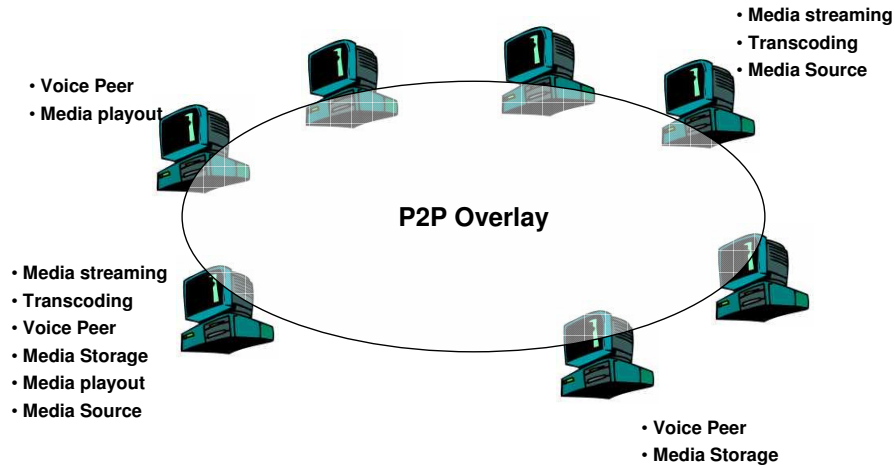


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## WP3 Work Description

### Overlay Network Design

- Components (e.g. Clients, Adapters, Proxies, Privileged Entities)
- Functional Blocks of Peers
- Identify new FBs in the NGN and Interfaces needed.

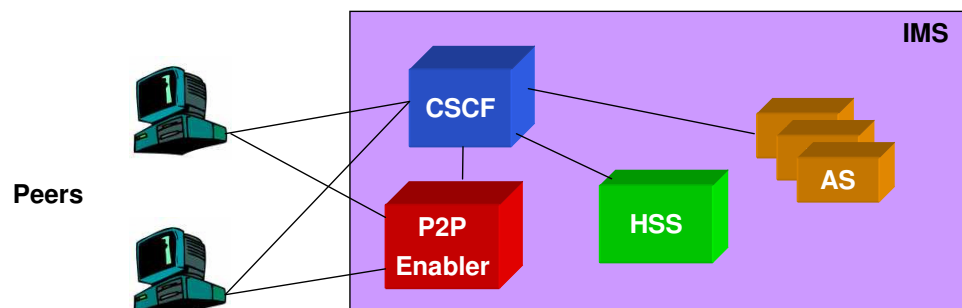


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## WP3 Work Description

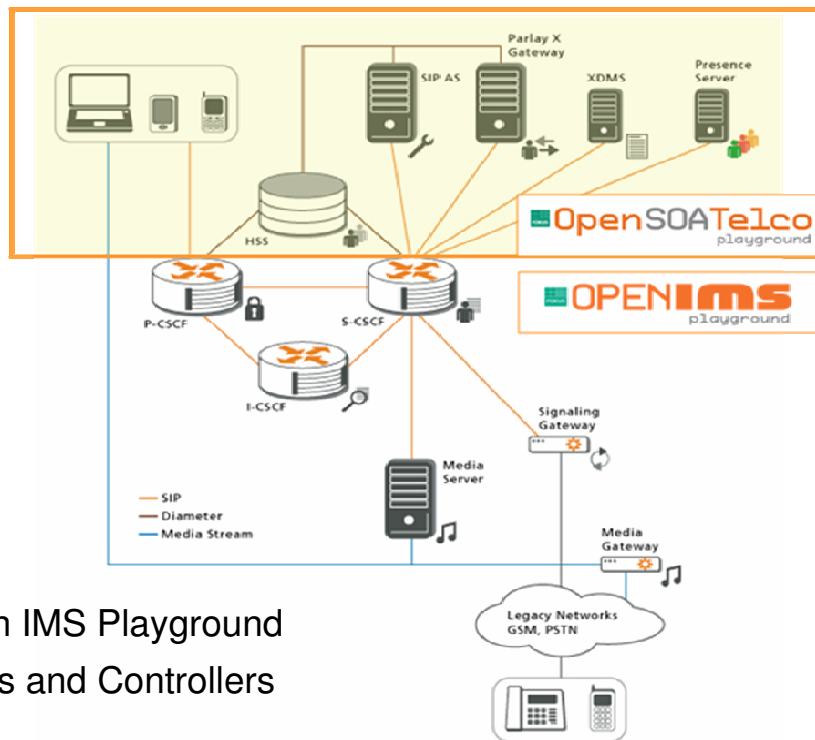
### P2P Migration for NGNs

- Specify, how to realize Services in the mixed P2P/NGN Environment (E.g. how to setup a Call / authenticate a caller ? )
- Identify FBs in NGN which can be used by P2P Services (E.g. QoS)



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# Vital++ NGNI IMS Testbed



- Extend the Open IMS Playground with P2P-Enablers and Controllers