

Networks Break Out Session B 1

Panel 4: Content-Delivery Networks

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Expected Evolution/Revolution

- ❖ Ability to aggregate/bundle and manage content, i.e. compose, produce content
 - from multiple sources, over multiple bearers/technologies
 - Content needs to be published, advertised, certified, authenticated, protected, versioned - mostly rich semantic framework matters
 - Multimedia content / flows only? How about other information objects.
- ❖ Need to have a close cooperation between content producers and providers and networking - the networks...
 - Clear evolutions towards Knowledge Based Networking and Semantic Networking, In-network management and autonomic communications and more...are emerging
 - Networks need to know the semantics of used content models, meta-models to design the networking paradigms and the control systems
 - Plus: The e2e paradigm will not stay exactly as it is today

Expected Evolution/Revolution

❖ **Need for flexibility, extensibility, “evolvability”**

- Puts requirements on content producers to become network (evolution) aware, e2e assumption is challenged
- More functions and services traditionally in the service architecture will be moved to the networks
- Can not happen without enterprise interoperability, and the ability to set up agreements and set up contracts (from none to elaborate)

❖ **The challenge is crossing domains**

- Content alone is not going to solve the presence of multiple administrative domains and heterogeneous technologies in the e2e path. Content, data, people networking that enables observation, inspection, auditing, accountability will come from the networks

❖ **We need coupling (loose coupling) between content (applications, services) and networks**

- Very loose coupling that allows dynamic configuration and set up to offer per application networking solutions

Expected impact/foreseen needs

❖ **It is all a matter of**

- APIs between content, applications, services levels and the networks (networking) – Upper and lower API – can we identify the best split!
- Distributed control to ensure networking while adhering to enterprise interoperability agreements

❖ **The focus should be on the definition of these APIs** in rather unbinding ways while ensuring loose coupling between levels

❖ **A possible approach:**

- Content, applications, services – bundling, aggregation, composition is described first in an abstract way – not related to any technology or supporting services
- Second the description and the workflow are mapped to a concrete description that can be executed in the networks – following trading and binding – relies on discovery and rich semantics
- Networks build from awareness of the meta models and semantically rich descriptions in content descriptors and meta data (including non functional attributes)
- Use governance to define policies & rules to enable P2P control of content based networking

Expected impact/foreseen needs

- ❖ Deal with heterogeneous multimedia content, information objects in general – extend to any type of object referred to by an identifier?
- ❖ Merging the real/physical and digital worlds will put additional stringent requirements on the networks, especially wireless
 - Augmented reality and 3D Internet
 - Real world objects and their virtual representations
- ❖ large-scale 3D networked media environments
 - require higher bandwidth for content streaming and delivery
 - need to be aware of the networks supporting services and capabilities at least at the creation/deployment phases
 - Will it require ability to rely on bearer diversity – but synchronization is a challenge?