

Framework Programme 7



“Future Media Internet Coordination action”

Contract no.: 249065

1st Future Content Networks Meeting

Venue: Av Beaulieu 25, Brussels, Belgium

Date: 20 January 2010

List of Participants

No	Participant Name	Affiliation	e-mail
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1st FCN Meeting agenda

Wednesday, 20 January 2010		
Time	Topic	Presenter
09:00 – 09:10	Welcome speech	Isidro Laso-Ballesteros
09:10 – 09:20	nextMEDIA presentation	Federico Alvarez
09:20 – 09:30	Meeting objectives	Petros Daras
09:30 – 09:45	FCN results - FIA Stockholm	Theodore Zahariadis
09:45 – 11:10	Short presentations from the participants (8-10' each) - companies and research centres	Adolfo Rosas, Pierre-Yves Danet, Peter Stollenmayer, Jari Ahola, Irene Lopez, Cezary Mazurek, Paul Moore, Oscar Mayora Theodore Zahariadis
11:00 – 11:10	Coffee break	
11:10 – 12:20	Short presentations from the participants (8-10' each) - Universities	Antonio Camurri, George Pavlou, Raffaella Bolla, Xavier Sanchez, Dimitris Protopsaltou, Petros Daras, Ebroul Izquierdo, Federico Alvarez
12:20 – 13:00	Wrap-up and conclusions	Petros Daras

1. Welcome and order of the day-Short participants presentation

The EC project Officer **Mr Isidro Laso-Ballesteros** welcomed the participants of the meeting

2. nextMEDIA presentation

Dr Federico Alvarez (UPM) presented the agenda of the meeting and the objectives of the nextMEDIA project. He said the nextMEDIA's objectives are:

- To coordinate the different European efforts towards a European Future Media Internet proposal, by means of:
 - Creation and coordination of groups, task forces and think tanks for a common European FMI architecture
 - Coordination of research projects and liaison with FIA
 - Elaboration of the European FMI research roadmap comparing the situation with the rest of the world.
 - Organising top-notch events and dissemination in the best industrial and scientific publications and congresses.
 - Promote the standardisation and best practices.
- Coordinating and supporting activities towards a European Future Media Internet proposal:
 - The new “Future Media Internet Architecture” Think Tank to reinforce the leadership of the EU in this field.
 - the initiatives organised by the EC “Future Media & 3D Internet Task Force” and the “Future Content Networks” group (and bridge to other FIA groups)
- Coordinating the efforts of the projects on Future Media Internet:
 - By collecting and analysing the short term (commercial/business) and the longer term (academic) research priorities.
 - By coordinating the Future Media projects with the FIA groups and promote a coordinated approach between activities
- Structuring the Future Media Internet research evolution path:
 - Organising the existing knowledge in a unified form and
 - Compare the research situation in Europe with other areas of the world: Japan and USA mainly, Korea, China, etc
- Maximising the impact of the European positioning at scientific & industrial levels:
 - promote European research participation in top-notch events and forums.
 - Organise promotion towards excellence: leading Conferences, Panels and Journals for key EU research actors
 - Coordinate participation of relevant European actors and third Countries key players (mainly from USA and Japan) in a forum for exchange of ideas.
 - Collaboration with third countries
- Coordinating the standardisation of the EU research results in Future Media Internet:
 - Promoting the standardisation of the EU research projects results

- Launching an Industry Specification Group (ISG) on Future Media Internet (inside ETSI).
- Dissemination in exhibition events
- Talent support: creation of online course materials.

He finally emphasised that FCN group's main aspects are:

- FCN orchestrated contribution to the BO sessions in FIA
- FCN evolutionary and revolutionary approaches

3. Meeting Objectives

Dr Petros Daras (CERTH) presented the structure of the Future Internet Assembly (FIA) (Figure 1) and briefly explained the objectives of each group.

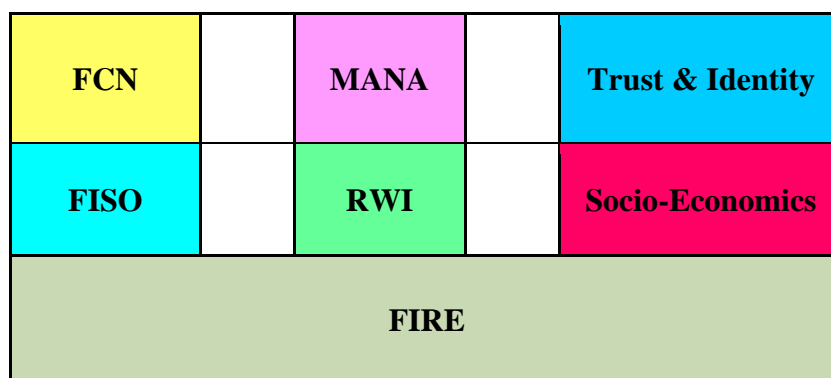


Figure 1: FIA structure

He then, presented the structure of the FCN group which is the following:

- EC leader: Isidro Laso-Ballesteros
- Caretakers:
 - Theodore Zahariadis (Synelixis)
 - Jean-Dominique Meunier (THOMSON)
 - Norbert Niebert (ERICSSON)
 - Petros Daras (CERTH)

Moreover, he debriefed the participants about the FIA events that have taken place so far (Bled, April 2008, Madrid, December 2008, Prague, May 2009, Stockholm, November 2009) and presented the achievements of the group so far, which can be summarised as follows:

- FCN Issues Paper (Bled)
- FCN Position paper (Madrid)
- Incremental and Visionary scenarios (Prague)
- Incremental and Visionary research challenges (Prague)
- Content Centric Internet Architecture (Prague, Stockholm)
- Content objects (Prague, Stockholm)
- *"Why do we need a Content-Centric Future Internet? Proposals Towards Content-Centric Internet Architectures"* European Commission, Networked Media Unit, Information Society and Media, May 2009

- "Future Internet and NGN Design requirements and principles for a Future Media and 3D Internet" European Commission, Networked Media Unit, Information Society and Media, ISBN 978-92-79-12809-7, Feb 2009
- "Research on Future Media and 3D Internet" White Paper, European Commission, Networked Media Unit, Information Society and Media, ISBN 978-92-79-12810-3, Jan 2009
- FIA Book chapters

Furthermore, he explained the structure of the Break-Out (BO) Sessions that were introduced in FIA Stockholm and can be seen in the figure below (in the underlined BO sessions FCN members were either caretakers and co-organisers or speakers).

<u>Architectures</u>		<u>Search</u>		Trust
Infrastructures		EDR		FIRE
Smart Cities		<u>Orchestration</u>		<u>FI for Enterprises</u>

Figure 2: FIA BO Sessions, Stockholm 2009

Dr Daras also presented the provisional structure of the FIA Valencia workshop which is depicted in Figure 3 (FCN members will actively contribute to the underlined BO sessions).

<u>Architectures (3 sessions)</u>		<u>Search</u>		<u>Smart Energy</u>
Trust & Provenance		FIRE		<u>Smart Health</u>
Economics		Smart Cities		FI for Enterprises

Figure 3: FIA BO Sessions, Valencia 2010

He then presented the objectives of the meeting which were the following:

- Contribution to the FCN Session & Contribution to the different BO sessions
 - to identify new goals for the upcoming FIA workshops,
 - to contribute/participate to the different FIA Break-Out sessions,
 - to identify/propose new horizontal sessions that might be of interest for the FIA attendees,
 - to prepare a position paper for next FIA (Gent, December 2010)

4. FCN results, FIA Stockholm

Dr. Theodore Zahariadis (Synelixis) presented the results of the FCN meetings in FIA Stockholm. Due to time constraints he also presented the approaches for the FCN Architecture. Based to the presentation and FCN initial results, FIA will bring:

- New Media/New Experience
- Mobility
- Federation

The he presented the FCN logo, which represents the FCN acronym surrounded by the crystal structure of the water, following two metaphors:

- Life was born in the water
- Future Media Internet may/might be based on the Content Components

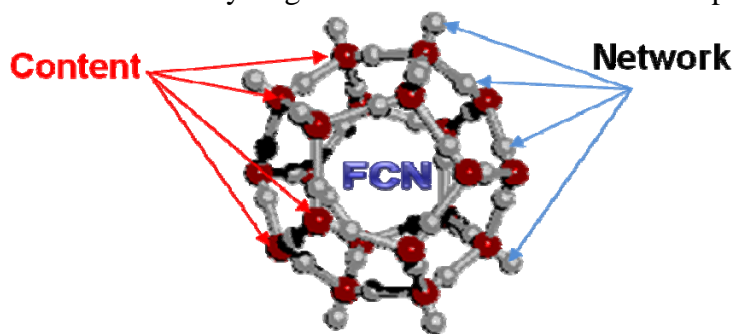


Figure 4: The FCN Logo

The red crystals represent the content and the grey the network. The comments were that the FCN logo is not so obvious, so new logo propositions should be considered. Then, he continued with the presentation of the FCN architectures. Figure 5 shows the interrelations between the different components. In more details, we may define:

- Infrastructure will consist of transport, storage and processing functions.
- Content is any type and volume of raw information.
- Information is the product of a number of functions applied to the content.
- Service is the result of a set of functions applied to the content.
- Security will be a property of content, information, services and Infrastructure.
- User/Media experience encompasses all aspects of the end-user's interaction with the services and the Media.

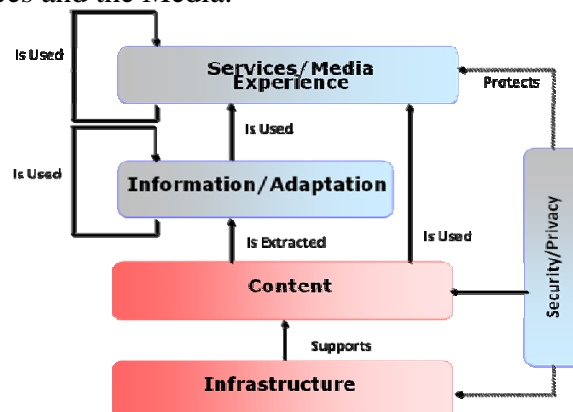


Figure 5: Future Content-Centric Internet components interrelation

Then he presented the evolutionary and the innovative architectures and concluded with the following questions towards Valencia:

- Is the approach correct or artificial ? A new MPEG-21 ?
- How to provide a powerful solution with a simple approach?
- How to define and evaluate an architecture ?
- How to fit the new services into the picture ?
- Can we use the evolutionary architecture to enhance the “Network” and the content objects to enhance the “Media”?

A discussion started between Theodore and Ebroul on the success of MPEG4, MPEG7, MPEG21 and content objects in general. Short discussion with respect to network coding also took place. Due to time constraints the discussion was postponed.

5. Short presentations – companies and research centres

Dr Adolfo Rosas (Telefonica I+D) presented the “Future of DCNs and Media Delivery”, where he explained the current state-of-the-art in Internet Media and private networks and he stressed the Telco’s point of view on these aspects. He then presented Telefonica’s work on a hybrid approach to CDNs. He also supported that the following aspects should be taken into account:

- Having two completely different environments: private & public for media delivery is really a problem for the evolution of media delivery standards and systems.
- The IPTV and the internet media should converge at the expense of IPTV.
- Media transport should be simplified: HTTP is a good candidate to be the ONLY media transport.
- Media coding has evolved beyond transport and network capabilities.
- Need to map new coding schemas to HTTP.
- Need to address QoS in global networks, QoS solutions should be scalable.
- Investment in media networks to have a certain QoS can be huge so interoperability is needed to ensure that we do not create ‘islands of service’
- Premium Content needs security models . Whats beyond DRM & CAS? : Managed Media.

Dr Rosas concluded with the following remarks:

- Future Content Networks will be most probably a single Content Network: Internet.
- Standards for content delivery and content service have to be simplified; transport needs to be interoperable and open.
- Telcos cannot be living a life apart from the concerns of transporting media: content is a first class passenger of internet.
- New business models should be created to give internet access and media access so security does not mean necessarily ‘locking’ content. Managed Media is an evolution of Managed information that can be very beneficial for the consumer : rights locker, buy once obtain new copies forever,... . Cannot repeat the failures of DRM.
- We need to ensure that the future Content Services are not tied to a few companies that create proprietary infrastructure.
- Media networking infrastructure can have a great impact in ‘digital life’; it makes sense that there is public support to creating & enhancing these networks

Mr. Pierre-Yves Danet (France Telecom/Orange) gave a presentation having NEM priorities in mind. However, he sent a list with potential application where FCNs can contribute and he listed the following ideas that can be taken into account by the group members:

- Identify weakness of the current internet regarding Content delivery services requirements (security&trust, mobility, real time, QoS, etc)
- Check if the evolutionary approach fixes all these points,
- Study how to move from the existing network to the next FCN insuring compatibility
- Identify where FCN could contribute to the Grand Societal Challenges (health, energy, cities, transport, disable people, cultural heritage, etc.)

He also presented his ideas about the Smart Energy BO session that will be held in FIA Valencia.

Mr Peter Stollenmayer (Eurescom) proposed that the following issues should get more attention:

- Multi-disciplinary, integrative approaches from other disciplines, particularly: human behaviour, societal issues, market analysis (incl. demand and acceptability), usability, digital divide.
- Visions and recommendations how the media world should/could/should not look like in future.
- Overarching architectural issues (FCN should probably not be leading on this, but be properly involved).
- Ensure that the users trust the system, including guaranteed help in case something goes wrong (FCN should probably not be leading on this, but be properly involved).

He then suggested that:

- The FCN group could concentrate on:
 - Visions how the media world should/could/should not look like in future.
 - Getting, digesting and channelling input from multi-disciplinary, integrative approaches from other disciplines, particularly: human behaviour, societal issues, market analysis (incl. demand and acceptability), usability, digital divide.
 - Organising proper continuous and structured representation in the other groups (e.g. architecture and trust group).
 - Integrating new projects and new people working in the FCN area.
- Ask the architecture group to ensure clearly structured overarching architecture work (incl. standardisation) with proper continuous representation of FCN representatives.
- Proper continuous and clearly structured representation of FCN representatives in the trust group (incl. standardisation). Maybe widen it to all issues related to trust, security, privacy, certification, user security (in-)assurance, etc.
- Widen the socio-economic break-out session to cover more societal disciplines and provide input.

Mr Jari Ahola (VTT) suggested that the FCN group can contribute to:

- Technical sessions (Architecture, Trust, Search & Discovery etc.)

- FCN should identify the top 3-5 requirements for each technical topic based on the most important FCN project portfolio crossing business requirements/usage scenarios
- Identify potential gaps in the current FCN project portfolio towards the 2015 goals
- Identify key contributions for each technical topic based on the current project portfolio on a timeline 2010-2015
- Identify active areas of relevant standardisation where FCN is active
- Societal sessions (Economics, Green ICT, Public Sector etc.)
 - FCN should identify the top 3-5 supporting contributions for each societal topic based on the most important FCN project portfolio crossing usage scenarios
 - FCN should formulate a position statement to help refine policy/usage requirements & potentially identify key obstacles in regulation/legislation

He also analysed the way that FCN can contribute to the above sessions as follows:

- Provide a practical example from FCN's point of view by summarising FCN project portfolio level top issues in a concrete manner
- Prepare coverage & gap analysis with new Call 4 projects
- Synchronize with other relevant stakeholders by the next FIA after Valencia

Mrs Irene Lopez (Tekniker IK4) identified Future Content challenges as follows:

- Content Characteristics yesterday
 - Traditional, professional, pre-recorded
- Content Characteristics today
 - New combined, user-generated, live, interactive, personalised
- Content Challenges
 - Volume, Format heterogeneity, Real-time interactivity

She also presented the trends that are currently observed and involve:

- From Open Data... To Linked Data
- Processing streaming data
- Collective intelligence
- Multitude of providers
- Quality of content
- Presentation practicalities

Dr Cezary Mazurek (PSNC) presented the activities of the Poznan Supercomputing and Networking Center which are related with the FCN activities: He identified the following key concepts:

- Own Dark Fibers – main concept for research networks
- IP Protocol – the base platform for any telecommunication and broadband new generation services
- Optical and Wireless technologies for broadband access anytime and anywhere

- Integrated service platforms – distributed network computers for very high scalability (multimillion users as well as information sources)
- Uniform and integrated network resources and grid management
- Universal virtualization of resources, organization, and users.
- Multicriteria resource allocation as a basis for realizing effective grid resource management systems
- Digital content and comprehensive network infrastructure are forming a new dimension of media in the information era.

Mr Paul Moore (ATOS Origin) presented in detail the results of the BO session: “What does the FI mean for Enterprise?” which was held in FIA Stockholm. More specifically, he explained the three Knowledge Cafes that took place:

- Visions & Policy
- Socio-economic Aspects
- Technology

He also gave more information about the organization of the group which can be summarized as follows:

- A wiki has been created
 - <http://services.future-internet.eu/index.php/Enterprises>
 - Includes: problem statement, session slides, open consultation, survey of the prioritisation of research topics
- Open consultation through the wiki
- Possibility to prepare a Position Paper on the enterprise in the FI context
- Followup session at the FIA Valencia

Dr Oscar Mayora (CRETA-NET) presented in detail the results of the BO session: “What does it mean to conduct Experimentally Driven Research?” which was held in FIA Stockholm. More specifically, he explained the objectives of the session:

- Going beyond theoretical results towards implementation and testing involving real users
- Enforce usable project results
- Grow in sustainability
- Promote global collaboration between projects through large scale federated infrastructures
- Reduce time to market

He gave some Relevant Premises for Experimental Research:

- Experimentation is a mandatory step in the validation of new ideas
- Migration strategies and coexistence testing are as much important as models validation
- International collaboration and concertation, also at the technical level is of utmost importance
- Special attention has to be given to standardization
- FIRE facilities offer the bridge between tests in a lab and in a very large scale

Finally, he listed the following challenges

- Include prototypic services in key fields of future European societal needs (Pervasiveness, Green, ehealth, wellbeing, content delivery, transport, etc)

- Active participation of users in experimentations
- Establishment of metrics at qualitative and quantitative levels to measure success of experiments (on performance, costs, etc.)
- Analysis of tradeoffs between lab-oriented simulations and field, real-life-oriented tests
- New evaluation methodologies for extrapolating results from testbed level experimentations to wider scales at technology and users levels

6. Short presentations – universities

Prof. Antonio Camurri (University of Genoa) made a presentation about “Interaction with content in FI”. His talk was about two perspectives which may have a strong impact on FCNs:

- Interaction with enriched content: toward embodied social networks?
- Overcoming the “ideology of present”: How to preserve in FI the awareness of past, of history, and therefore of future?

After a detailed analysis Prof Camurri identified the following research challenges:

- gaining a deeper understanding and exploitation of human non-verbal expressive communication channels,
- developing techniques for analysis and recognition of a broad range of spontaneous expressive gestures, nuances, etc.
- developing techniques for analysing the subtlest and more significant human emotional expressions,
- supporting social interaction: entrainment, empathy, co-creation, contagion, emotional engagement.

Prof. George Pavlou (UCL) presentation was about “Network-related Research Issues”. After analyzing Evolutionary and Revolutionary Future Content Network Approaches, he identified the following Key Network-related Challenges in Evolutionary Future Content Networks:

- Business models: currently overlay user-provided or ISP-provided FCNs. Increased flexibility to allow a number of different stakeholders to generate revenues
 - Business model innovation
- Content naming: it should be location independent and searchable / accessible in a unified manner across all intermediaries
 - Should scale to billions of content entries
- Location of content copies based on both server load and the state between server and requesting user
 - Performance management within the content network
- Overlay – ISP network cooperation through standardised interfaces via dynamic negotiation for win-win situations
 - Game theoretical approaches to manage the tussle

Furthermore, he analysed Key Challenges in Visionary CCNs, which include:

- Combined name resolution and routing: routing by name/ID directly to the content copy (or user)

- Rendezvous-based ID Routing: inherent support for multicast/anycast but not easy to engineer
- Replicating content in routers: the difference between routers and servers will tend to diminish
- Network-media self-awareness: resolving and routing content based on the current state of network & content

Finally, Prof Pavlou stressed the necessity of having Parallel Future Internet Architectures and he explained that parallel Internet architectures can conform to a meta-architecture that supports parallel instantiations, where:

- Virtualisation will have a key role to play in this context
- Virtualisation of node (storage/computation) resources and of network (bandwidth/addressing) resources required

Prof. Raffaele Bolla (University of Genoa) presented “Smart network architectures for multimedia content handling”. He explained the SoA in the multimedia content on the Internet and the current status in FCNs:

- Future Content Networks have mainly addressed
 - Content retrieval
 - Optimization of overlay topologies, overlay location
 - Content-based ID
 - Content delivery
 - Overlay streaming
 - Native routing based on IDs

He then, presented in detail his current research activities in Smart Network Architectures:

- Prerequisites:
 - Personal and content identification
 - Underlying plain network architecture (IPv6?)
 - Service-Specific Overlay Networks
- Objectives:
 - Content adaptation to users’ context
 - Device, network, impairments
 - Automatic manipulation through network routing
 - Traversal of content handling servers

Dr Xavier Sanchez (i2CAT/UPC), presented the SoA in Future Media and FCN and he identified the following FCN requirements:

- FI should provide:
 - Ubiquity
 - Device-Independence
 - Anyhow
 - Mobility
 - Wireless support
 - Simplicity to the user
 - Context-awareness
 - Anytime, anywhere → In-Network intelligence
 - Flexibility & adaptability (run-time)

- Self-X (configuration, healing, optimisation,..)
- QoS provisioning & assuring
 - Enhancing QoE
 - SLA agreements & contracts
- Seamless discovery of services and content
- Enhanced user control
- Effective Delivery
 - Multicast, Anycast, Unicast
 - Semantic cast

He also presented and analysed a Clean-slate/Disruptive network architecture which is currently under development in UPC (Tarifa project). He finally supported that FCN can contribute to:

- Architectures: proposing new architectures following data/information/content-centric approaches according to previous requirements (clean-slate proposal)
- FI service offer (provisioning): semantics are crucial for enhancing/enriching service behavior and user experience
 - Contents should be offered in an efficient and personalized way
 - Services and devices must be context-aware
- FI socio economics: new business models generation.
 - User and operators role empowerment.
 - Promote peering relations amongst operators
- Find and search in Future Internet: Transparent search and discovery of contents, services and resources
 - Semantic routing

Dr Dimitris Protosaltou (University of Geneva/Miralab) analysed the implication of FCN in medical applications. He stressed the need for synergy of telecommunication, multimedia and medicine and the requirement for solutions needed in order to achieve efficient transmission of digital medical images. He also pointed out the necessity for collaborative editing of medical images which requires:

- Real-time and interactive
- Collaborative and concurrent
- Support of many users
- Flexible (different scenarios like teaching or cooperative work)

Dr Petros Daras (CERTH) presented in detail the results of the BO session: “The Question of Discovery and Search in the Future Internet”, which was held in FIA Stockholm. More specifically, he explained that Search involves a number of different disciplines within the FI, including:

- FCNs: a) content as the main ingredient of media, and b), networks in terms of improving the user’s experience and satisfaction;
- IoTs: resource and information discovery from a sea of heterogeneous devices and sensors;
- IoSs: service discovery approaches range from keyword search over service directories to semantic approaches which delineate between a service capability (what the service does), non-functional properties, and descriptions of service behaviour.

He said that the main objective of the session was to proceed towards a common understanding between the different communities and he presented the detailed objectives of the session which were the following:

- Heterogeneity and diversity issues, concerning resources, information sources, infrastructure, user communities, etc;
- Human factors, concerning “the user in the loop”, feedback, personalisation, recommendations, interaction with the information, emotional characteristics, etc;
- Real time issues, concerning content/media indexing and retrieval, visibility, aggregation, re-composition of services, etc;
- Security and privacy issues;
- Evaluation and benchmarking issues

Finally, Dr Daras presented the preliminary plans for the follow up session which will be held in Valencia.

Prof. Ebroul Izquierdo (QMUL) introduced what he regards as important aspects of FCN. FCN is a combination of content processing and network engineering. FCN will embrace a combination of available (SotA) and new technology. In a incremental approach towards FI and more specifically FCNs research should focus on Emerging innovative ideas and approaches by integrating them with available techniques and paradigms. In this context, the following are four SotA and emerging technologies that should be considered when defining priorities in FCN.

- Network coding
- Scalable source and channel coding
- Peer to peer
- Social networks

Network coding

- Current nodes (routers) just store and forward packets
- There is almost no “processing” at intermediate nodes
- Information-theoretic limits can be overcome by allowing nodes to perform non-trivial operations on packets
- Putting more “intelligence” at the nodes
- Facilitating P2P communications
- Suitable computational power at least at some network nodes
- Storage capacity and decision making capability at network nodes
- Executing coding operations on content, in addition to routing
- Enabling new communication systems architectures

Network coding appears as a very promising approach for re-designing future networks and substantially improves their performance. It allows trade-off communication capacity against computational costs. It brings significantly benefits in terms of throughput, reliability and fault tolerance

Scalable content coding

- Source and channel coding should be scalable

- Hierarchical to allow seamless transmission over heterogeneous networks
- Scalable content coding adaptable to heterogeneous networks, dynamic traffic and end user devices

Considering social connections and implications

- Social P2P technology
- Social network analysis
- Mapping and measuring relationships and flows between people, groups, organizations, etc.
- The nodes in the network are the people or groups
- The links show relationships

In this context available P2P networking protocols as BitTorrent and Tribler can be exploited.

Considering social connections add value to future services and applications. For instance it will enable temporal tag integration and learning, temporal generalization (tag a frame given tagged neighboring frames), and temporal segmentation (into tag-based shots). These features are key for emerging multimedia search and retrieval technology.

Dr Federico Alvarez (UPM) presented in detail the results of the BO session: “Orchestration Across Networks, Services, Things and Content”, which was held in FIA Stockholm. More specifically, he mentioned that the focus of the session was on:

- Mechanisms and capabilities for controlling workflow for all systems of all FI system-of-systems
- Mechanisms and capabilities for allowing heterogeneous systems to interwork (i.e. polymorphic facets of the Internet: communication-centric systems, information-centric systems, context-centric systems)
- Transparent/federated accessing networks of things
- Controlling co-existence of multiple and parallel FI
- Governance
- QoS control

He then explained that the main outcome of the session was:

- Agreement and initial description of the:
 - Resources (networks, services, things, and content) requirements for Future Internet virtualisation, semi-dynamic annotation and composition.
 - FI Orchestration Plane (OP) capabilities and reference configuration.
 - Explicit OP interfaces.
 - Explicit Governance for the OP.
 - Business value enabled by the OP.

Finally, Dr Alvarez commented that FCN could contribute to this session:

- Proposing management structures of the network for any kind of Future Media delivery
- Federated IoX approach considering the Future Content Networks integration for a unified network architecture.

- Future Content Networks application to the “Internet of Things” (e.g. Smart Factories)
- Content components approach to be proposed as a base for the orchestration?

7. Conclusions

The main meeting objective was to orchestrate FCN group’s contribution to the different FIA BO sessions. Towards this aim it was decided that the FCN group will send representatives to the different BO sessions to ensure continuity:

- FI PPP 2015 (all – J. Ahola & nextMEDIA)
- Enterprises (D. Protopsaltou & P. Moore)
- Energy (R. Bolla & P-Y. Danet)
- Health (D. Protopsaltou, P. Moore & A. Camurri)
- Search (P. Daras & E. Izquierdo)
- Architectures (G. Pavlou, T. Zahariadis & R. Bolla)
- Economics (A. Rosas & P. Stollenmayer)
- Smart cities (E. Izquierdo, P-Y. Danet & I. Lopez)
- FIRE (F. Alvarez, O. Mayora & A. Rosas)

The main roles of these representatives are:

- overlook and contribute to the agenda of the BO sessions as appropriate
- report back to the FCN group
- if feasible propose a contribution paper to the BO session (such a contribution papers should be clear, with maximum length 1-2 pages and should be ready until 20/2/2010).

The contribution papers should be clear, with maximum length 1-2 pages and should be ready until 20/2/2010.

Moreover, it was decided that the results of the meeting will be uploaded to nextMEDIA website and will also distributed to the wide FCN list.

Specific attention was also paid to the FI architectures (both evolutionary and revolutionary ones):

- Evolutionary:
 - Hybrid CDN
 - Mediation planes
 - Intelligent nodes
 - Smart network architectures
 - Initial FCN evolutionary proposal
- Revolutionary
 - Content objects (components)
 - Content based routing
 - Other clean-slate

It was in general agreed that in order to achieve the vision of a Future Internet fully suited to future users’ needs, several aspects need to be considered. Among others,

network structure complexity vs. engineering design simplicity, scaling vs. delivering quality and response time, efficiency vs. user friendliness, services and content location, user and network mobility, societal aspects and issues of trust and security, just to name a few. Moreover, the decision on following a revolutionary or a clean-slate approach is heavily under discussion. Yet, an incremental approach starting from a Virtualised Network towards Content Object Mash-ups is a possible scenario. However, it was agreed that this discussion should take place in the Future Media Internet – Think Tank meetings.

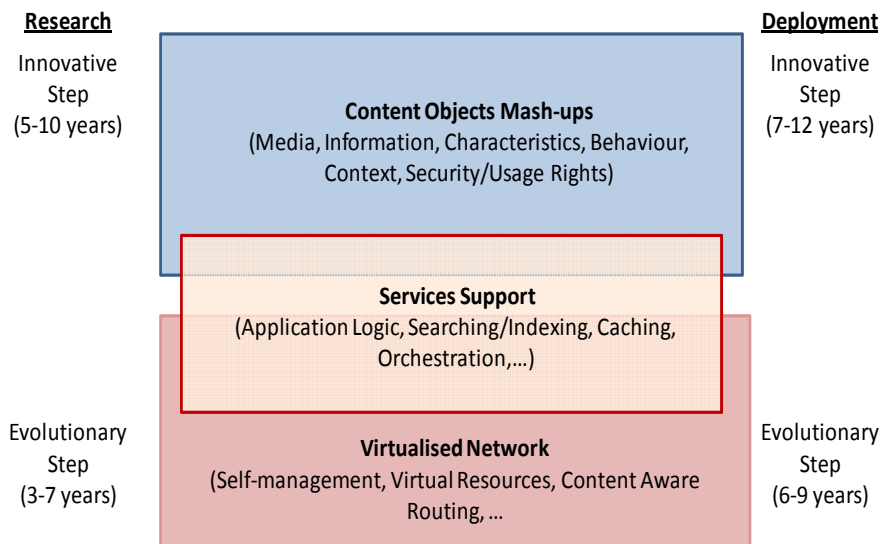


Figure 6: Research and Deployment for Future Content Centric Internet

The next meeting of the FCN group will be held in FIA Valencia.

For more details and participants' presentations please visit "www,fi-nextmedia.eu"