eCOUSIN: enhanced COntent distribUtion with Social Information

At A Glance: eCOUSIN
enhanced COntent distribUtion with Social Information

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Main Objectives

Content Distribution Services are booming and they will be responsible for the majority of future Internet traffic. In parallel, Online Social Networks (OSNs) have become today’s most popular Internet applications. The widespread adoption of OSNs has drastically changed the way content is consumed in the Internet, as content consumption is nowadays highly impacted by the information shared by users through OSNs and the popularity of a given content is most often dictated by its “social” success.

With such a “social-content revolution”, operators need to evolve and optimize their network to avoid being overwhelmed by the ever growing traffic volumes resulting from this paradigm change.

To this aim, the goal of eCOUSIN is to design a novel social-aware network architecture with built-in content dissemination functionalities that exploits the social-content interdependencies to improve its efficiency.

This goal translates into four specific objectives:

- The implementation of high performance distributed tools for collecting necessary data to study and model the social-content interdependencies;
- The improvement of the scalability of network infrastructures when handling content by exploiting social information;
- The design of an on-net operational framework that tightly integrates network functionalities and content-related service functionalities;
- eCOUSIN shall provide a clear added-value in use cases involving social-content interdependencies such as personal content sharing clouds, social-assisted time-unconstrained content delivery, Content-Centric Networking for social-driven content delivery, and enhanced content placement in distribution networks using users’ social and coarse-grain location information.
• The design of algorithms that exploit social information for placing and delivering contents in an optimized manner with a special focus on mobile environments.

Technical Approach

At the core of the eCOUSIN work plan is the realisation that the functions needed to realize its objectives are decomposable into three horizontal layers, mapped to three Work packages (WPs).

• First, tools used to monitor, aggregate and collect data from OSNs and content distribution applications in a distributed manner, together with algorithms that exploit such data for modelling the social-content interdependencies make up the Social-Content Interdependencies layer (WP3).

• Second, functionalities for content placement and delivery that exploit the social-content interdependencies and the knowledge of the network infrastructure make up the On-net Content Dissemination layer (WP4).

• Third, the networking functions that need to be evolved as a consequence of the usage of social information and that support the dissemination layer and the applications, comprise the Networking for Social-enhanced Content-awareness layer (WP5).

These three “horizontal” WPs are bound together by two “vertical” WPs comprising project-wide topics. Use cases, requirements, architecture, business and economic analysis as well as privacy and regulation considerations are addressed in WP2, while WP6 encompasses integration, demonstration and testbed activities.

Key Issues

The framework for monitoring and modelling social-content interdependencies shall be capable of gathering up-to-date information of users’ real-time interactions, and of uncovering the interdependencies between user interaction in OSNs and the resulting behaviour of content in related content distribution services.

Second, eCOUSIN does not only focus on popular content, which usually dominates content management, but also on less popular content, which might be of interest for social groups. So the techniques to replicate and place the content next to the user, which are normally only based on content popularity and shortest paths, must be enhanced with additional information extracted from OSNs. And the existing techniques for content search and retrieval require to be extended with information about users’ interest and similar search results of their social contacts.

Third, naming of content is of great importance in OSNs. In the case where OSN traffic is delivered onto an Information Centric Network (ICN) the naming must be investigated as well as how OSNs can adapt them to the ICN paradigm, and how ICN routing can benefit from the social links in the OSNs to improve its routing and forwarding strategy.

Fourth, the target system must also represent an evolved management system for content placement and delivery to mobile users by exploiting statistical patterns being derived from mobility-, connectivity- and social information. Thus the project will have to study the use of open interfaces as well as the potential use of new interfaces with mobile network infrastructure components, aiming at advanced caching, management and delivery of content to mobile consumers.

**Expected Impact**

The first and foremost impact of eCOUSIN will come from the design of this novel social-aware network architecture for the future Internet that exploits the interdependencies of content distribution and social networks in order to continue scaling up traffic and content consumption to the same degree as in the past.

The second impact of eCOUSIN is to offer European citizens a vastly improved content delivery experience. By placing the right content closer to the user, media streams can be delivered at higher rates and with lower delay, without increasing the burden on the network infrastructure.

The eCOUSIN consortium comprises two leading network operators, two subsidiaries of a major manufacturer of telecommunication equipment, one research institute and four universities. All of them are strong actors in the areas of this project, and their complementary nature ensures the impact of the eCOUSIN outcomes on both the industrial and scientific domains.