

COAST

Content Aware Searching, retrieval and sTreaming

COAST aims to build a Future Content-Centric Network (FCN) overlay architecture able to efficiently link billions of content sources to billions of content consumers, and offer fast content-aware retrieval and delivery, while meeting network-wide Service Level Agreements (SLAs) in content and services consumption.

Main Objectives

COAST is expected to deliver an FCN overlay network, where the users will just specify which content or service they need, and the COAST framework will find the desired or the most relevant data, and forward it to the user in an efficient, timely and network-friendly way.

To realise the above vision, COAST will focus on three key innovation pillars:

- **“On the fly” identification and distributed “on-line” discovery.**

COAST will create a content-aware network of intelligent nodes (edge routers, home gateways, terminal devices), which will a) “on the fly” identify/classify content and identify Web services via inspection of the traffic that flows through them and b) discover “on line”, where services are located and content is located/cached, in order to optimal match users’ requests with availability, while meeting specific Service Level Agreements (SLAs) in content consumption.

- **Content-Aware Delivery Network Architecture.** COAST will efficiently and dynamically discover the underlying network infrastructure as well as user terminal devices and user needs considering the (possibly variable) capacity and quality (especially variable with mobility), the actual foreground (multimedia distribution) and background (other traffic) load, and construct content-aware overlays to offer distributed, robust and network-/service-provider friendly content delivery with optimal utilisation of the networking topology and resources.

- **Future media content adaptation and enrichment.** COAST will provide for scalable, high-definition 3D/free-viewpoint video with interactive virtual panning/zooming, which will be on-the-fly adapted, enriched and optimized to the user preferences, network and terminal characteristics and conditions and optimal streamed over dynamic constructed overlays.

COAST will test/validate the developed technologies over: a) a large scale testbed and b) a user experience FTTH services testbed.

COAST will find and deliver content and services in an efficient, timely and networked-friendly way.

At A Glance: COAST

Content Aware Searching, retrieval & sTreaming

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Technical Approach

COAST aims to progressively move intelligence in the network by implementing new networking nodes (edge routers, home gateways, terminal devices), with visibility into the type of data that they are carrying or caching. This content-level information can then be used by the routers to make more intelligent retrieval, routing and data handling decisions. Unlike other approaches, COAST relies on distributed “on-line” searching of published content (digital objects, streams and services) and “on-the fly” extracting information of the flowing streams, leaving the actual decision making to the routers. In a second step, COAST provides for content adaptation and optimal distribution over the Future Media Internet.

Within COAST, a FCN is defined as a network, based on the content-oriented paradigm. In conjunction to the client-server paradigm, the content-oriented paradigm focuses not only on the communication party, but also on the delivered data themselves. In short, COAST is expected to deliver a FCN overlay architecture, where the users will just specify which data they need, and the COAST framework will find the desired data and forward it to the users efficiently, achieving network-wide SLAs in content consumption.

Key Innovation

To achieve this goal, COAST will focus on the following key innovation technologies:

- **Distributed Content-aware Network Architecture.** The COAST network architecture will consist of intelligent, content-aware nodes able to dynamically construct overlays, based on content searching and distribution needs
- **Distributed “on-line” discovery/ caching.** Based on distributed searching, COAST nodes will be able to offer efficient content and web-services discovery at network level.
- **“On-the-fly” identification/ classification.** Based on deep packet inspection and signalling

analysis, COAST nodes will be able to offer zero-delay identification/classification of open-access content and identification of web-services

- **Advanced content coding, adaptation and enrichment.** Provide for scalable, 3D/ free-viewpoint video, on-the-fly adapted, enriched and optimized to user’s preferences, network & terminal characteristics.
- **Content-aware delivery.** Discover the underlying network infrastructure/ terminal and construct content-aware mesh-overlays to offer distributed, robust and network-/service-provider friendly content delivery with optimal utilisation of the networking topology and resources and enriched PQoS.
- **Extensive testing and Validation.** COAST will be validated over two interconnected testbeds: the Pan-European FIRE facilities and the PlanetLab/GENI and b) the TIDs’ FTTH User Experience and Digital Home Laboratories

Impact

COAST aims to provide European leadership in the following areas:

- **Content and Services location and indexing.** Our goal is to improve the overall search experience of users when seeking content. We leverage the computer power of data centres and intelligent nodes to deliver highly relevant sets of results to user queries and to efficiently use systems resources by, for example, directing the user to the closest cached copy.
- **Content Coding & Adaptation.** Provide new methods and technologies for coding HD 3D video streams with increased fidelity, features including free-view point and zoom/ pan panoramic views, creating interactive HD personalized experiences.
- **Content Streaming & Services Delivery.** Find and retrieve the content from the “best” location (based on network, terminal and traffic conditions) and Web-services, and create on-the fly overlays able to provide optimal delivery and new business models SLA in content consumption.

