

Project Profile

Indexing large scale distributed multimedia

Generic local storage and search for minimised content transfer



Video surveillance results in huge volumes of data that cannot be reduced by usual compression techniques

LINDO is leveraging existing technologies to develop a generic user-transparent architecture where indexation is distributed over multiple devices on which content is stored and archived. This will make it possible to index and retrieve specific objects reliably from very large amounts of acquired multimedia information without having to centralise content. Video surveillance – both fixed and mobile – and multimedia archives will be the first markets addressed with dedicated demonstrators.

Users in sectors as diverse as scientific research, broadcast/multimedia archives, video surveillance and security, medical and consumer multimedia often need to retrieve rapidly critical clips or records of only a few seconds out of thousand of hours of material, based on criteria that might not have been known at time of recording or storage.

Manipulating multi-source high resolution motion imagery results in huge volumes of data that cannot be reduced by the usual compression techniques as automatic content-processing algorithms usually require the best possible imagery quality to achieve full performance. If the data sources are dispersed and only a small part of the content is expected to be of interest, current architectures that involve movement of content to central locations for interpretation or indexing constitute an obvious mismatch in resource allocation.

With network bandwidth becoming the most demanded resource, LINDO is setting out to establish an innovative solution to such problems suitable for various domains that include news gathering, banks of resources for commercial or consumer applications, collaborative work, video surveillance and medical applications.

DEVELOPING GENERIC APPROACH

The main goal of LINDO is to produce a viable and scalable generic architecture offering distributed indexation, storage and retrieval with well-defined interfaces applicable to multiple types of multimedia applications. Results will be made available to other applications through standardisation of formats and interfaces. Initial industrial implementations will be figured out in two demonstrators – one in the video-surveillance domain and another combining knowledge management and TV chain automation.

LINDO's core objective is to develop a transparent storage architecture in which indexing tools are distributed to the storage locations, rather than transferring the contents to a central indexing facility. The innovation resides in the architecture itself and in the fact that a generic approach has been chosen.

The proposed architecture implies a number of critical technical achievements, especially the development of standard formats and interfaces, covering:

- Data/metadata-rich generic format;
- Standard query language;
- Standard data interface for the indexing software; and
- Indexing language.

A major challenge is to manage the knowledge for the different types of video contents: there is a major difference between multimedia/entertainment material, which is defined in a file, often edited, that contains clips with delineated scenes, and a video-

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■ Partners

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Denodo
Hi-Stor Technologies
InfoGLOBAL
IRIT
Katholieke Universiteit Leuven
SGT
Space Applications Services
Supélec
Telefónica I&D
Thales Security Systems

■ Countries involved

Belgium
France
Spain

■ Project start

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■ Project end

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surveillance file, which virtually never stops; in the latter, the indexing will be based on low level features present for a short period of time.

In the multimedia case, the metadata can be associated with the elementary scenes; in the case of video surveillance, the indexing will be based on dynamic metadata that needs to be preserved in the cut-and-edit process of transferring content to the user.



Multimedia users often need to retrieve rapidly critical clips of only a few seconds out of thousand of hours of material

TECHNOLOGY AND DEMONSTRATORS

LINDO intends to address the challenge in a generic manner through:

- Distributed storage and embedded intelligence to host the indexing tools on local affordable platforms;
- Dynamic indexing and retrieving functions: iterative indexing as criteria and indexing tools change over the time, extensive use of dynamic metadata, synchronisation and/or correlation between sources;
- Powerful and intelligent standards-based access and search techniques for dynamic multi-domain and multimedia content, enabling a single natural language type query; and

- Indexing agents with different levels of complexity from manual and deterministic indexing based on metadata, to automatic indexing based on queries and content or user criteria that may not have been known at the time of storage.

After a market-and-needs-understanding phase, a feasibility study will generate the specifications and detailed state of the art. Based on this work, partners will then develop the core technologies – intelligent storage nodes and distributed indexation – common to the selected applications, as well as the applications-specific software.

Demonstrations will be integrated in 2 steps:

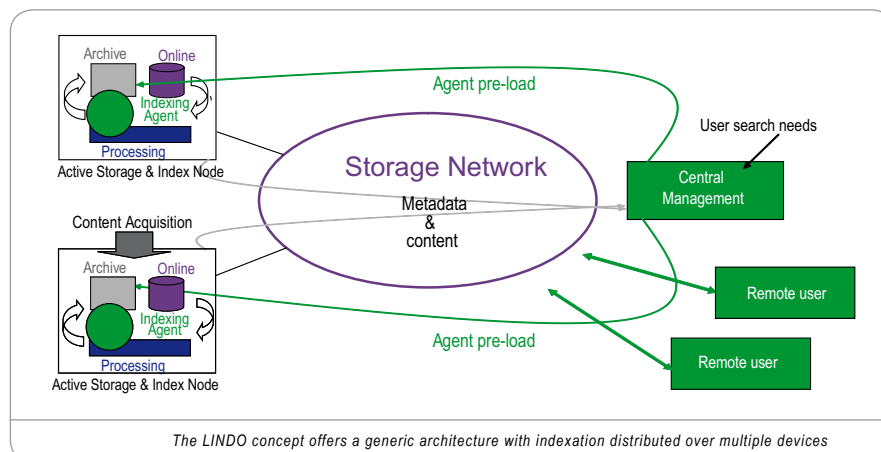
1. Assembly of the core technologies; and
2. Building of two demonstrators by assembling the application software with the core technologies.

BASIS OF BROADER SYSTEMS

The overall goal of LINDO is to create new software technologies that will address large number of high growth markets. The consortium will concentrate on only some of these applications, while the development of a generic architecture with standardised interfaces will open opportunities for other segments of the industry.

Needs have been identified, but these emerging markets have not yet been captured by well established large companies or by some specific country industry.

For a full modularity, the resulting functional workflow needs four different standard interfaces that will be formalised and eventually submitted to the international bodies. In most cases, LINDO will be the smart distributed storage and indexing tool for a broader system.



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