



DIVAN

DISTRIBUTED AUDIO-VISUAL ARCHIVES NETWORK



The DiVAN Project

The ESPRIT project DiVAN (EP 24956) aims at the building of a distributed audio-visual library system for TV broadcasters and video archives owners. The DiVAN system provides facilities to effectively digitize, annotate, organize, store and access raw material, in a coherent content-based manner, on top of high-speed wide area communication networks.

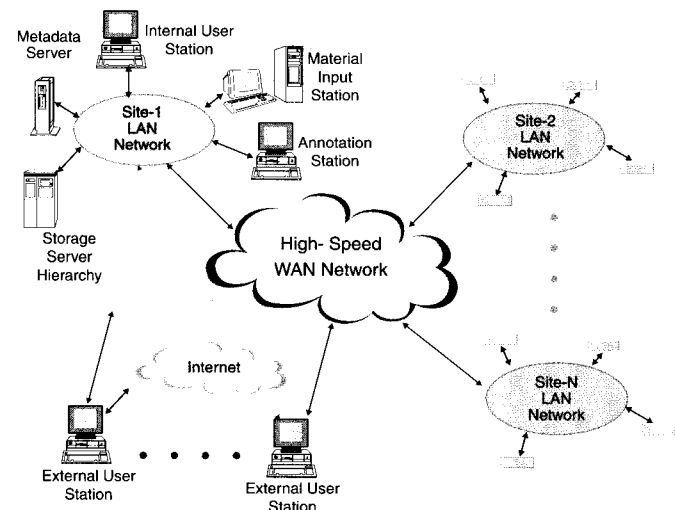
Also, the project aims at demonstrating and assessing the applicability and acceptability of the proposed system, through field trials on a DiVAN-based infrastructure interconnecting the archives of the users of the partnership, i.e. INA, RAI, and ERT.

The approach followed in the project includes:

- Development, integration, and demonstration of advanced multimedia technology. The DiVAN project focuses on emerging standards like MPEG-7 for its content-based functionalities and OMG-CORBA for the interoperability issues.
- Selection of a considerable amount of representative audio-visual material from the archives of the users in the consortium, that will be used as the basis for the experimentation. Special attention will be given to the selection of a representative subset of this material with respect to its importance to European cultural heritage.
- Definition of realistic application scenarios that will fully exploit the opportunities offered by the materials that are in digital format.

The DiVAN System

DiVAN is a suite of software modules providing a complete distributed archiving solution for TV broadcasters and archive owners. Such organisations may exploit the DiVAN system in a twofold way: a) for in-house purposes, where they can organize their vast audio-visual archives with advanced video annotation and retrieval mechanisms improving their operations, and b) by selling their content via a DiVAN based online service to external customers. The in-house or external end-users of DiVAN may comprise journalists, audio-visual and multimedia producers, researchers, programmers, cultural and educational organisations, and individuals.



The general (logical) components of the system are: a) Material Feeding Station, b) Documentation Station, c) Storage Server, d) Metadata Server, e) Internal User Station, and f) External User Station.

In general, the DiVAN system consists of one or more instances of each one of the above components, deployed in one or more sites. In such a case, where the DiVAN system comprises various servers and other components dispersed at various sites, these sites are interconnected through high-speed networks.

In the case that such a distributed DiVAN system is owned by one organization (e.g. archive owner, TV broadcaster, etc.), it will be called a logical archive. Then, various logical archives (i.e., DiVAN systems owned by various organizations) may be interconnected, forming the complete DiVAN system or DiVAN digital library.

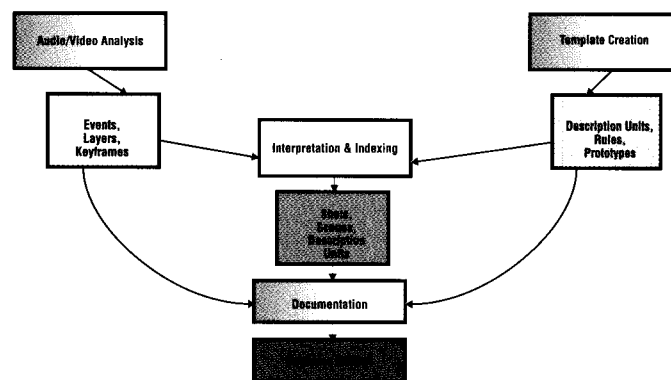
Layered Architecture

DiVAN consists of several building blocks in a layered architecture. The Foundation Layer includes existing systems and databases allowing for physical storage of content and descriptors (metadata). Various commercial systems can be integrated in this layer. All the building blocks in the horizontal and vertical layers provide well-defined CORBA Interfaces for interoperability.

Advanced Automatic Material Analysis

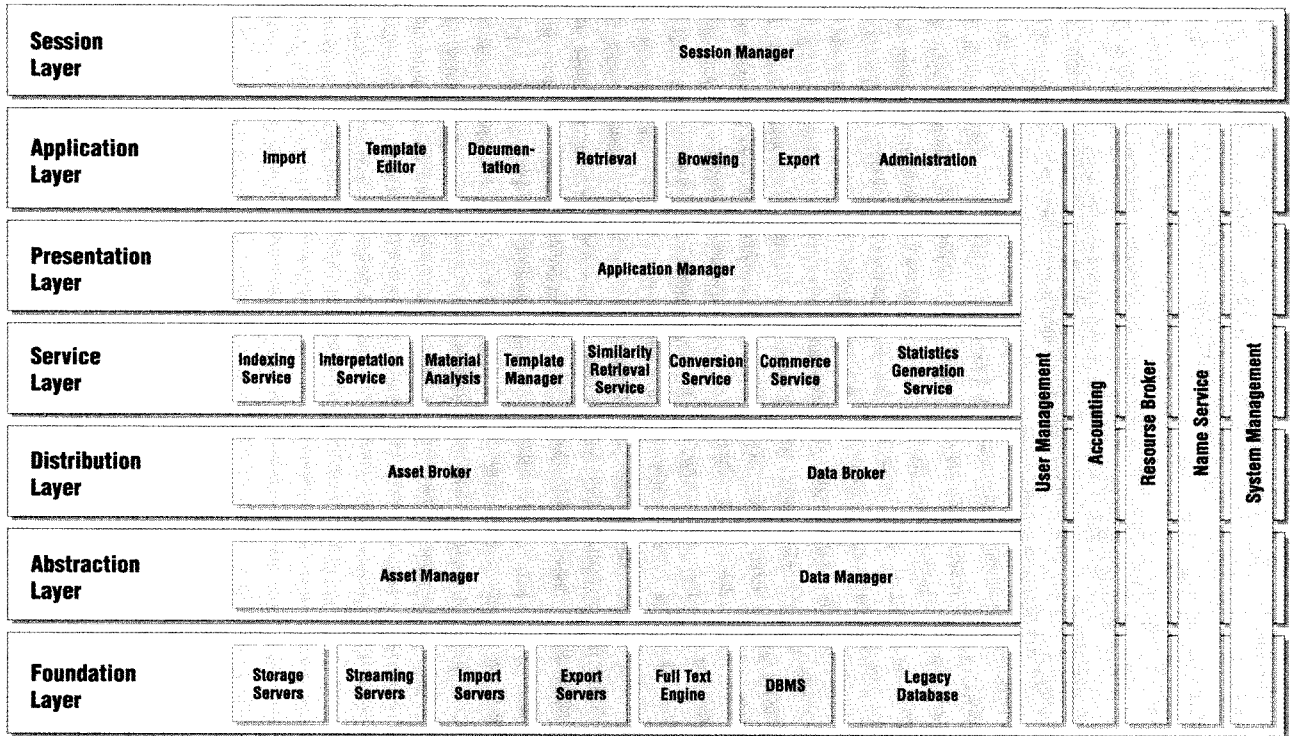
DiVAN incorporates a suite of segmentation and feature detection/extraction tools used to automatically extract useful information of the audio and video parts of the material. DiVAN combines the following three types of segmentation tools:

- Temporal Segmentation Tools (e.g. shot detection)
- Spatial Segmentation Tools (e.g. detection of faces)
- Spatio-Temporal Segmentation Tools (e.g. detection of mobile object)

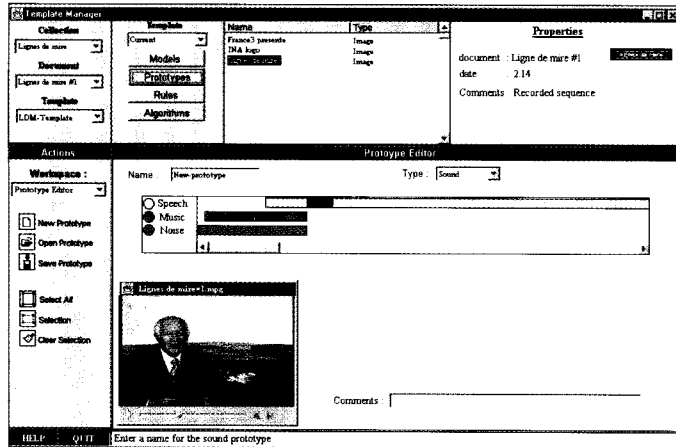


Template-based interpretation and indexing

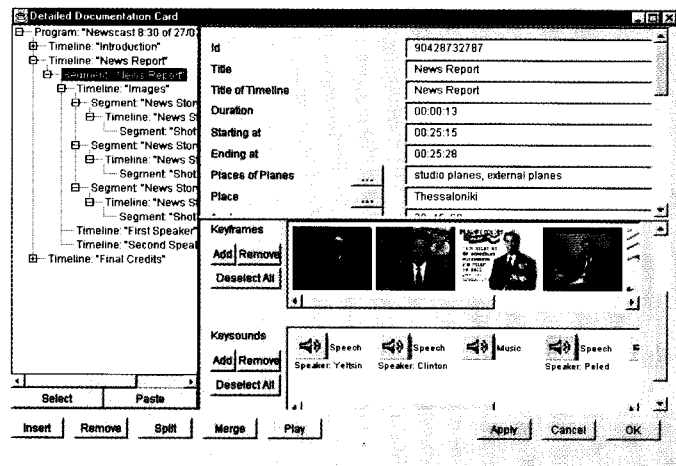
Material indexing in DiVAN goes a step ahead. The initial results of the low-level automatic material analysis step feed the interpretation and indexing component. The latter produces higher-level elements of the material such as segments or sequences of segments that consist worthwhile documentation units. With this approach, a structural description (or hierarchical representation) of an audio-visual program is built. The building of this hierarchy is controlled by program templates which are created and modified through the use of the DiVAN's Template Editor.



A program template applies to a series (a newscast edition, a cinema magazine, a fictional series, etc.) and to all the programs



or episodes of the series, and contains several documentation models and grouping rules that control the automatic interpretation process.



Efficient documentation

All the results of the automatic material analysis and interpretation are presented to documentalists through advanced graphical user interfaces, permitting them to produce the final documentation of the material.

Access By Content

The DiVAN user searches for material stored in the DiVAN system through the Retrieval Client Application, by issuing complex queries. Types of supported queries include standard keyword queries, free-text search and queries by example/search by similarity. The latter queries are based on image, audio or video features.

Extensible Data Model

The DiVAN system is based on an extensible data model, which means that by using the Template Editor new documentation strategies can be incorporated by the addition of new material descriptors. This feature enables the adoption of the proposed documentation approaches that will result from the on-going standardisation efforts, and also makes the DiVAN system adaptable to the specific documentation needs of individual organisations.

Full System and Service Management

DiVAN provides effective System and Service Management facilities for building and maintaining on-line services for the provision of digital content. The modules that constitute the DiVAN's System and Service Management are: a) User Management, b) Access Control, c) Accounting, d) Billing, e) Statistics Generation, f) QoS Manager, g) Resource Management, and h) Trace/Error Reporting.



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