

MPEG-7 표준과 TV-Anytime 상용화

2002. 10. 4.

강경원

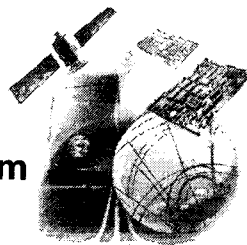
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4. 방송 응용 기술



Metadata

■ 방송 콘텐츠에 대한 메타데이터

- ◆ 콘텐츠를 기술(Description)하는 부가 데이터
- ◆ 콘텐츠 활용의 전 과정 기능 제공
 - 탐색 - 선택 - 획득 - 저장 - 활용
- ◆ 내용기반 탐색 및 획득 기능 제공
- ◆ 개인 취향(user preference)에 따른 자동 필터링
- ◆ 선택적 저장
- ◆ 시청자 취향에 특화된 광고/프로그램 제공
- ◆ **Personalized TV**
- ◆ **Advanced EPG** 기능
- ◆ **Content-Based Browsing/Non-linear Navigation**

표준화 현황

■ MPEG-7

- ◆ 멀티미디어 콘텐츠의 저장/전송/검색을 위한 기술(description) 방법에 대한 표준 제정
- ◆ DDL, Systems, MDS, Visual, Audio, etc.
- ◆ 2002년 4월 국제표준(IS) 제정

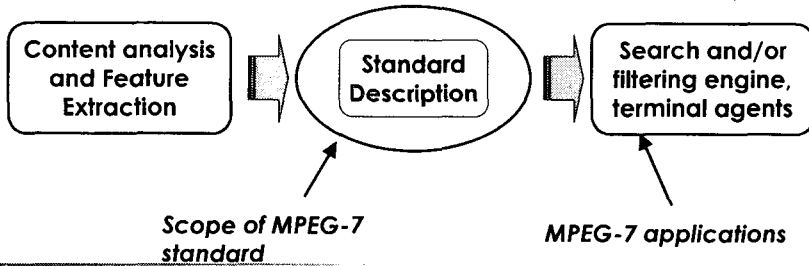
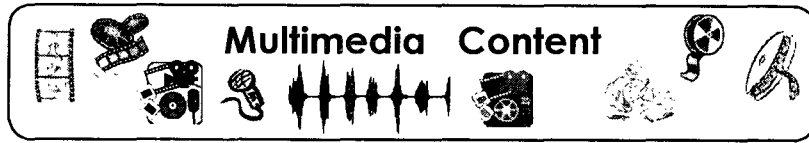
■ TV Anytime Forum

- ◆ 대용량 저장매체를 갖는 사용자 환경에서 디지털 방송 서비스 제공을 위한 표준 개발을 목표로 2002년 phase 1에 대한 최종 표준 완료 예정
- ◆ Business Model, System Description(informative)
- ◆ Metadata, Content Referencing, Rights Management(mandate)

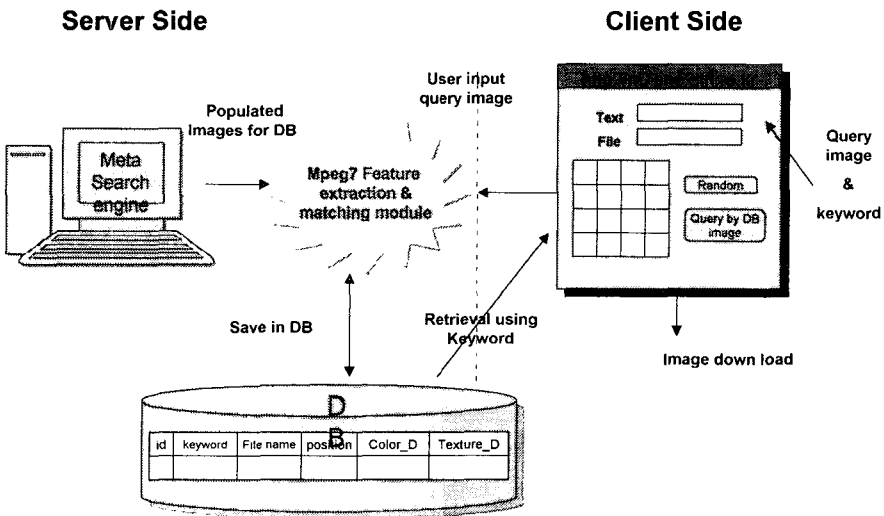
■ ATSC T3 산하의 S8(Transport) 그룹

- ◆ Advanced EPG 기능을 위한 PSIP 개정 작업
 - 멀티미디어 메타데이터, 프로그램 검색/네비게이션 등
 - 메타데이터 및 전송 관련 표준을 2002년 12월 확정 예정

MPEG-7 표준화

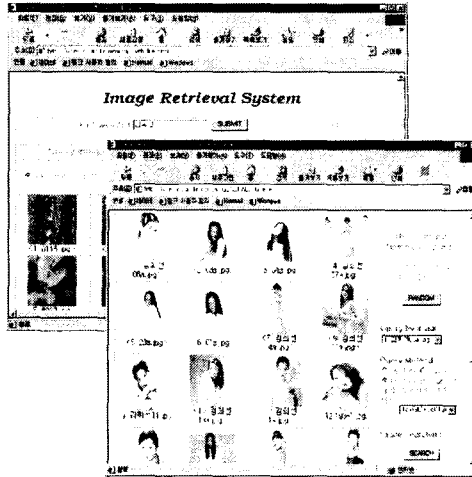


Content based Image Retrieval (1)



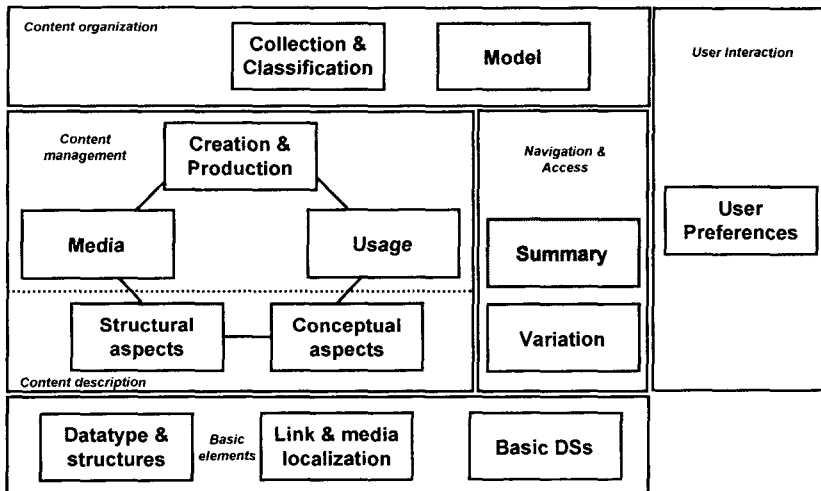
Content based Image Retrieval (2)

- Keyword
- QBI (Query By Image) using MPEG-7 visual descriptor
- User choice of weight for texture descriptor and color descriptor
- Retrieval by result image
- Random retrieval of database image



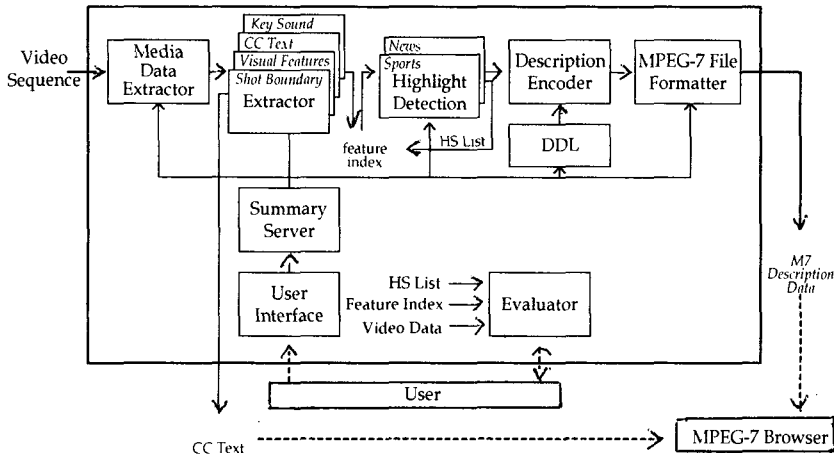
(Client User Interface Example)

MPEG-7 MDS Overview



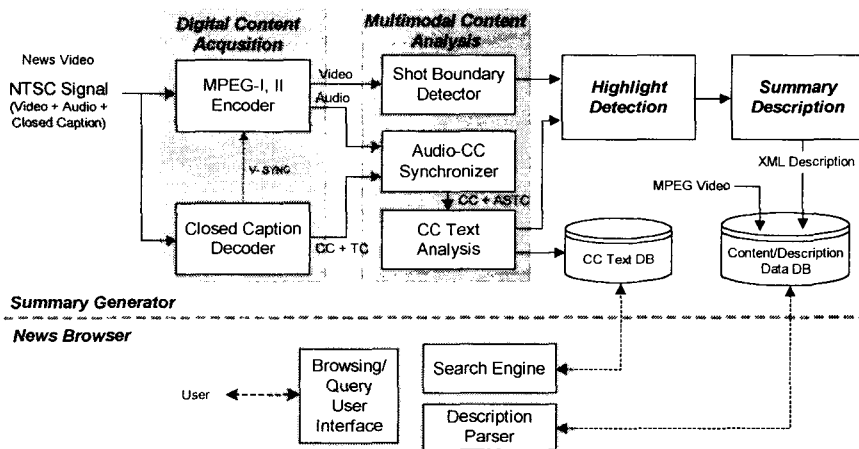
Summary Generator

General scheme



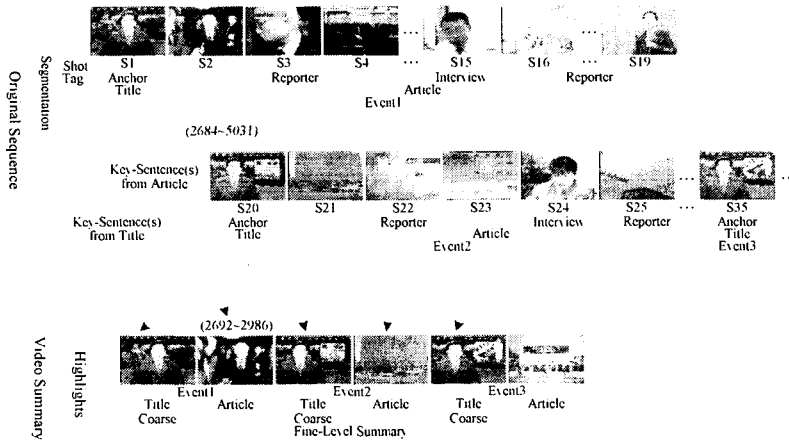
News Video Summarization (1)

System Architecture



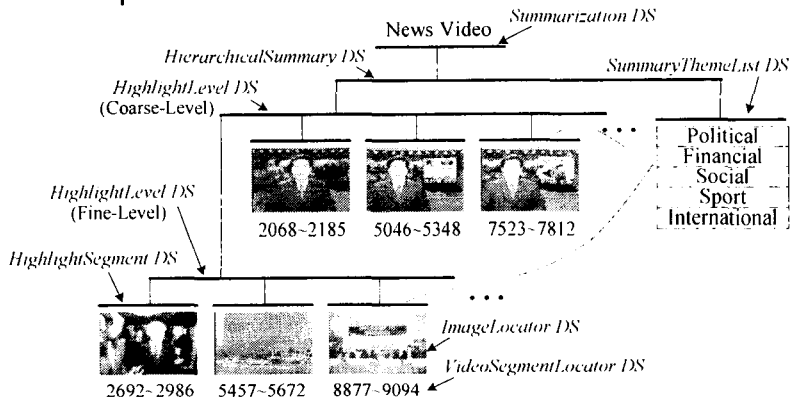
News Video Summarization (2)

News Video Summarization



News Video Summarization (3)

Pictorial representation for news video summary description



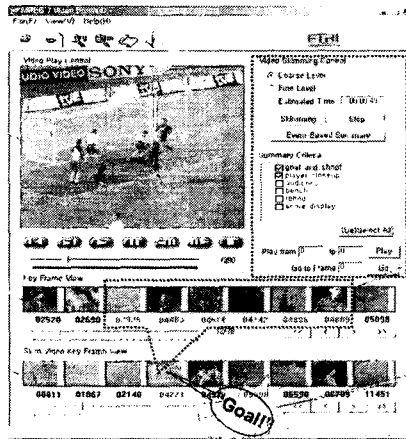
MPEG-7 Browser

- An example of stand-alone MPEG-7 Browser

Main window

Key frames of the original video

Key frames of the video summary



Control panel for browsing customized video

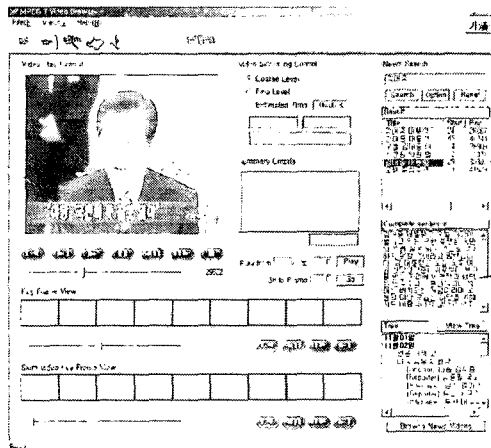
Coarse-to-fine navigation

Key sound

CC-Text 기반 뉴스 비디오 검색

- CC-text based news video retrieval

Event-related video window



Keyword-based query

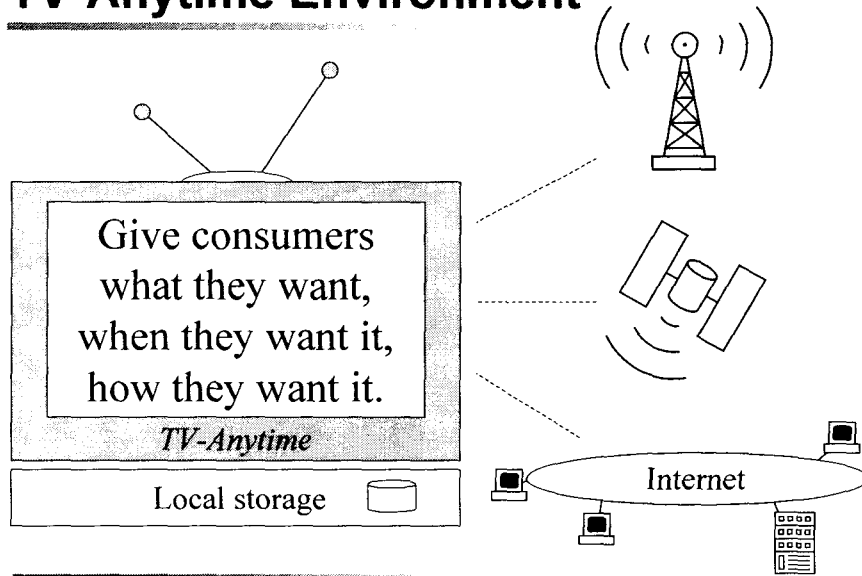
Retrieval Results: event lists

Event-related complete sentence

ToC-like news lists

TV-Anytime Environment

ETRI



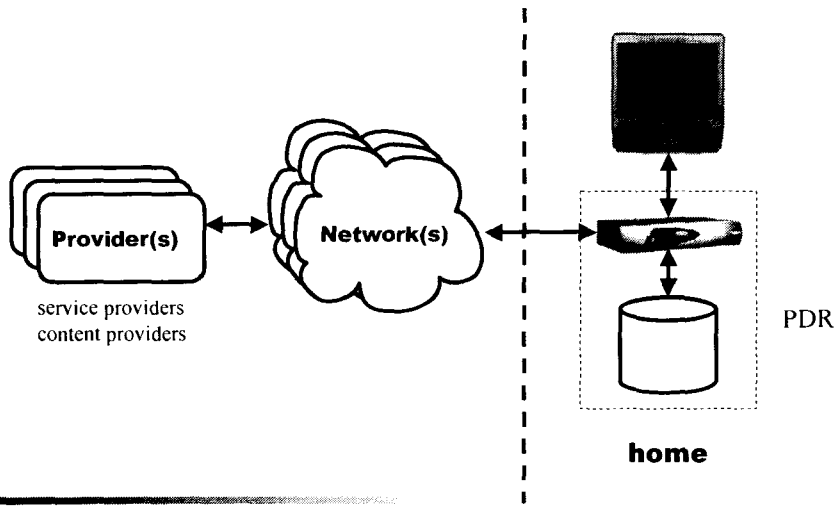
ETRI Proprietary

Radio & Broadcasting Research Laboratory

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Phase I: Simple System

ETRI

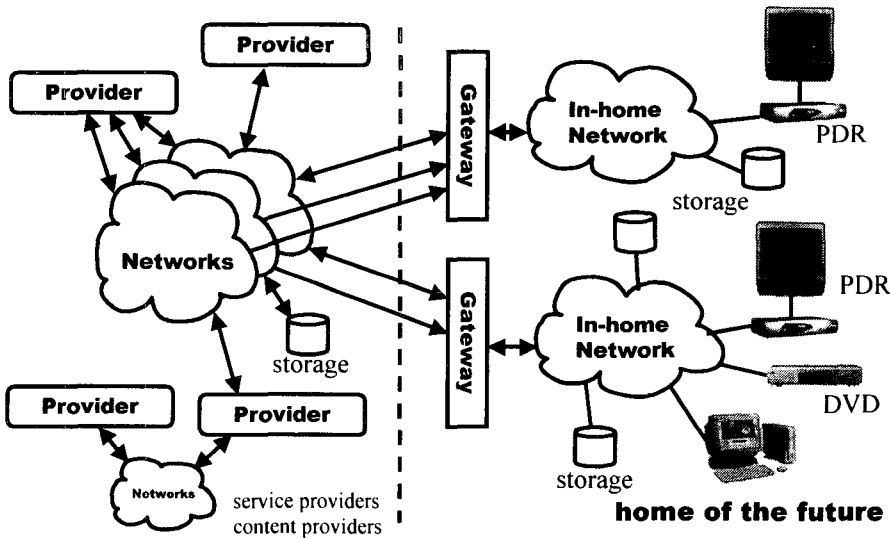


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Phase II: Scaled System



TVA Model

- **Model 1: unidirectional (e.g., broadcast)**

provider → PDR

 - ◆ PDR 내의 agent 에 의한 시청자의 profile/preference 기반 콘텐츠 필터링
- **Model 2: bi-directional (e.g., with a return path)**

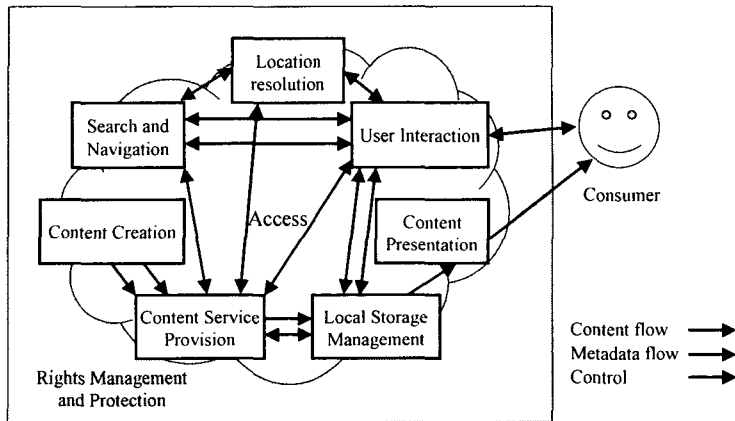
provider ↔ PDR

 - ◆ return path를 통한 시청자 메시지 또는 정보 전달
 - ◆ 프로그램 사이에 소비자가 원하는 광고 삽입 가능
- **Model 3: bi-directional with broadband**

provider ↔ PDR

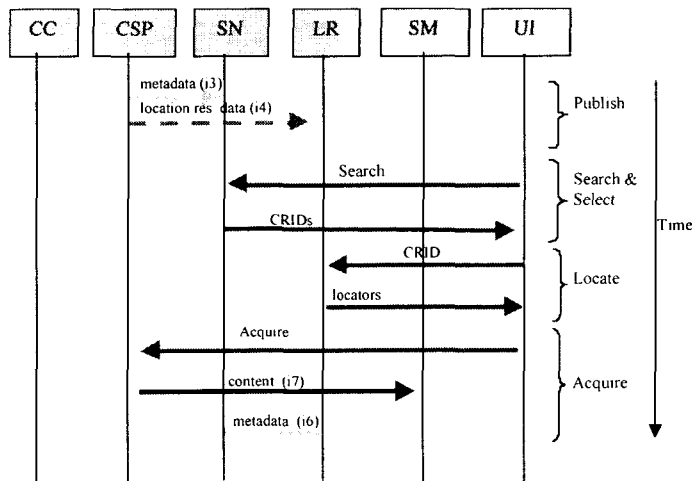
 - ◆ 원하는 콘텐츠의 실시간 전달 가능

TV-Anytime Functional Elements

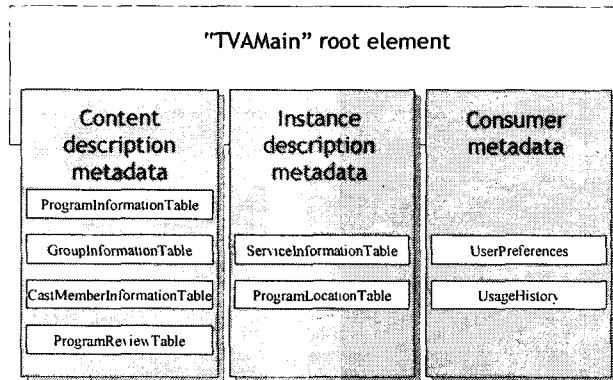


S & T WG defines normative transport requirements for the unidirectional system

Dynamic Behavior of TVA System



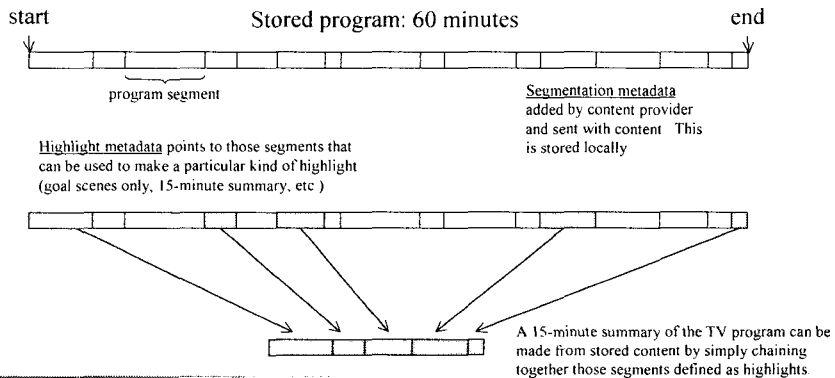
TVA Document Structure



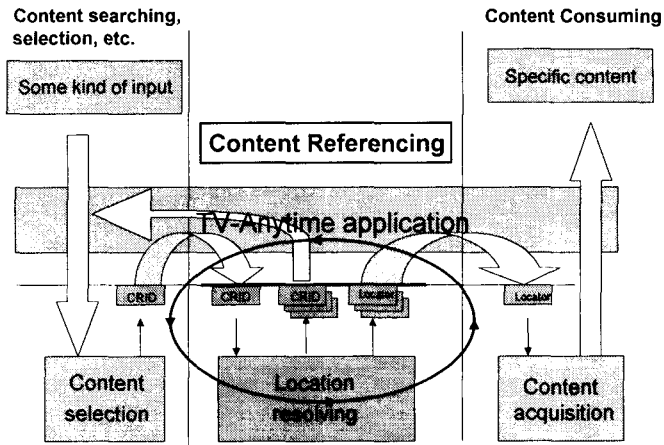
Segmentation Metadata

■ Segmentation metadata

- ◆ restructure and re-purpose for alternative view
 - highlights, bookmaking

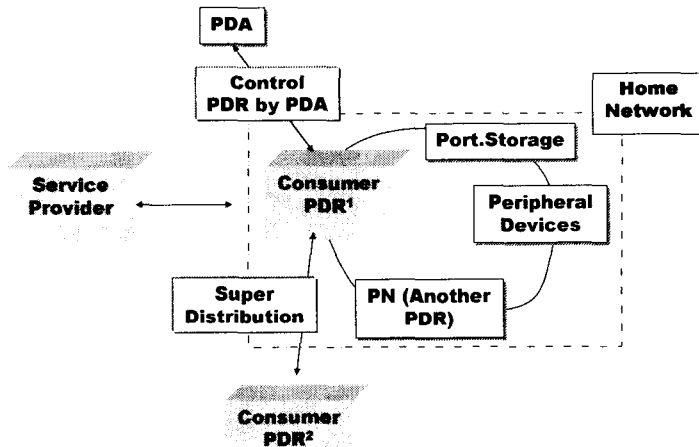


Content Referencing: Environment



The key concept is the separation of the reference to a content item – the CRID – and information that is related to its retrieval.

Phase 2 Environments



Phase 2 Scenario

Targeting

- ◆ 시청자 프로파일에 따라 선호 프로그램의 자동 추출, 전송해주는 기능
- ◆ 시청자의 프로파일 정보 이용

Redistribution(Super Distribution)

- ◆ Network 기능을 제공하는 PDR
- ◆ Multi-screen, 이동 저장 장치와 같은 networked 장치들이 common PDR(media distribution hub)에 연결
- ◆ Content Sharing, Home Networking

New Content Types(Extended PDR Service)

- ◆ 게임, enhanced TV, 웹 페이지, 음악 파일, 그래픽, 데이터 등의 다양한 콘텐츠를 통한 제공하는 서비스
- ◆ TV는 통합 오락/정보의 gateway
- ◆ 다양한 media format 제공

방송 응용기술 개발 동향

EPG에 의한 프로그램 관련 정보 제공

- ◆ DVB-SI, ATSC-PSIP
 - 단순 타이틀 정보 제공, 비최적화 구조로 통합 디지털 방송에 비효율적
- ◆ Tivo, ReplayTV: PVR을 이용한 EPG 서비스
 - 표준이 아닌 Ad Hoc solution

myTV(IST programme 11702)

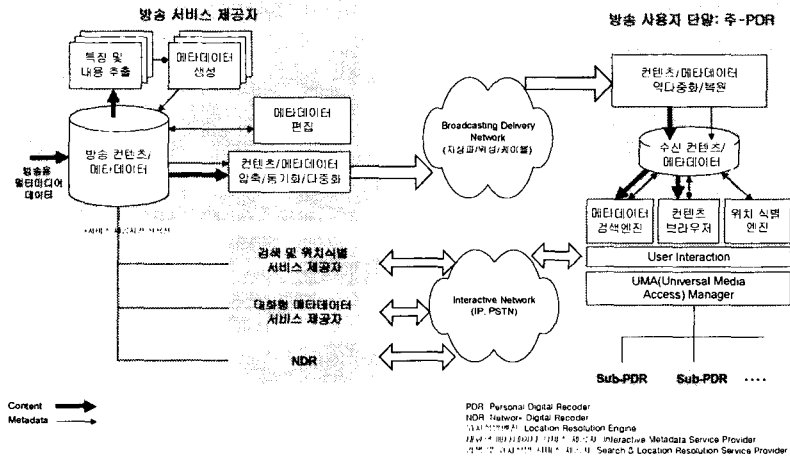
- ◆ 디지털 TV 방송을 위한 맞춤형(personalized) 서비스 제공
 - TV Anytime 저장매체에서 상호운용성이 보장된 DVB-compliant 시스템 개발
- ◆ 새로운 서비스 개발: 비선형 브라우징/네비게이션 및 대화형 광고
- ◆ 후속 프로젝트인 "Share-it" 프로젝트로 연계

NHK의 ISTV(Integrated Service TV)

- ◆ EPG, Anytime 서비스, 메타데이터에 의한 진보된 부가 서비스 개발

메타데이터 기반 방송 응용 시스템

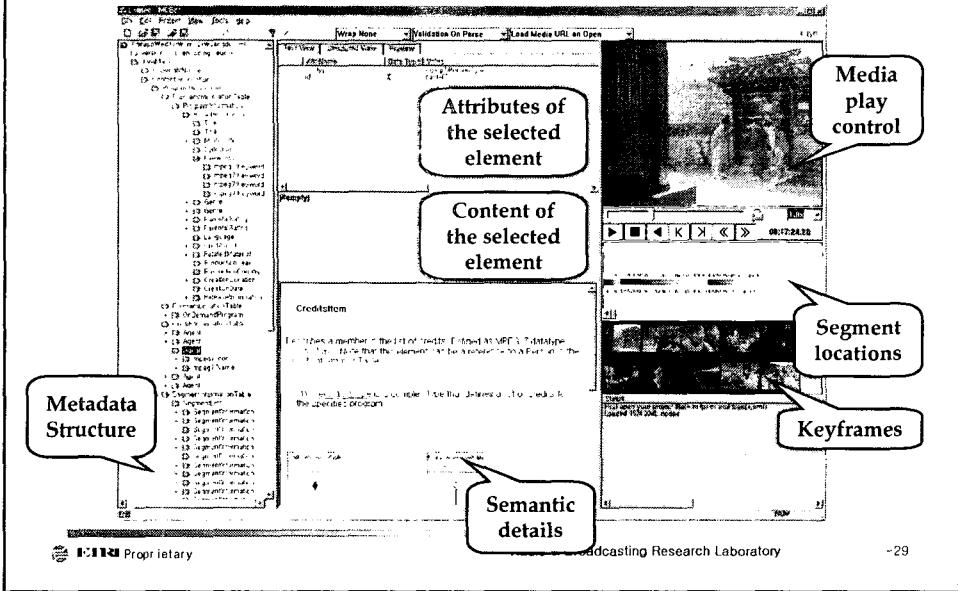
Conceptual View



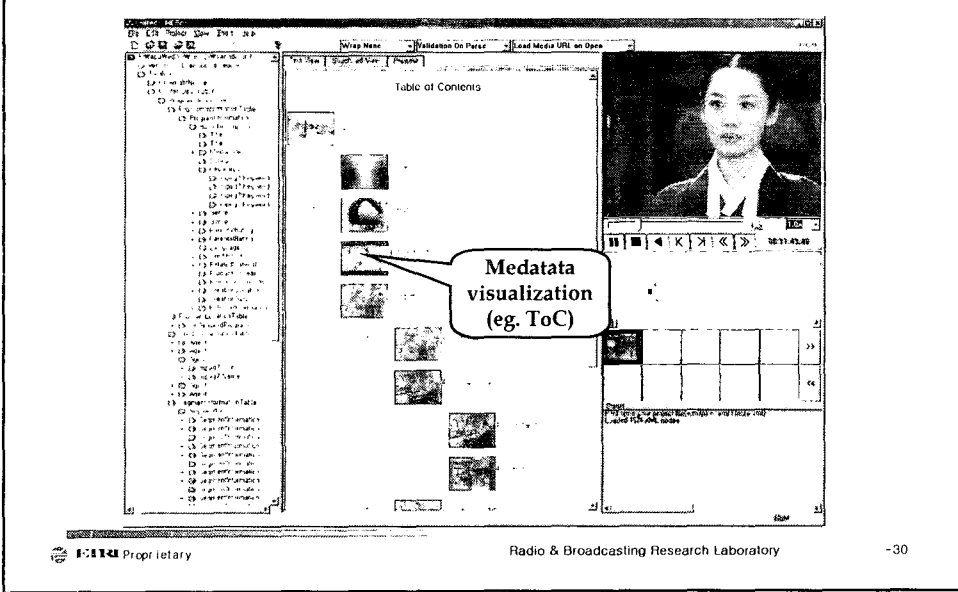
메타데이터 편집 도구: 기능

- Visualization of metadata structure and contents**
 - ◆ Contents visualization and editing of various forms (text, spreadsheet, HTML forms) of XML metadata
- Inter-operation between metadata and media process modules**
 - ◆ By segment locations in time line
- Access to media and continuous play of discontinuous intervals**
 - ◆ Basic VCR functions including random access, play, fast-forward and reverse play
 - ◆ Continuous play of highlights (segments)

메타데이터 편집 도구: UI(1)



메타데이터 편집 도구: UI(2)



메타데이터 방송 단말: ACG

■ ACG (Advanced Contents Guide)

◆ Advanced EPG (electronic program guide)

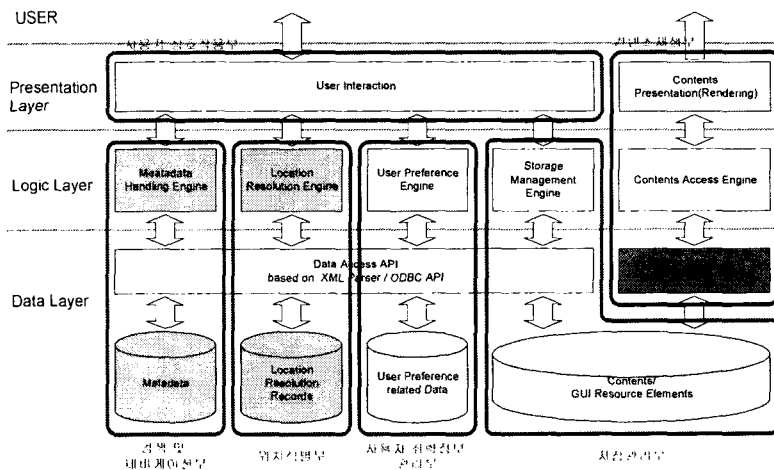
◆ affluent information about program contents

- hierarchical structure of content
- event's or subjects' sequential summary
- segment-based access

◆ recommends user's favorite genres

- based on the user preference calculated by user's behaviors interacting to program.

ACG 기능 블록도



Service example : ECG (3)

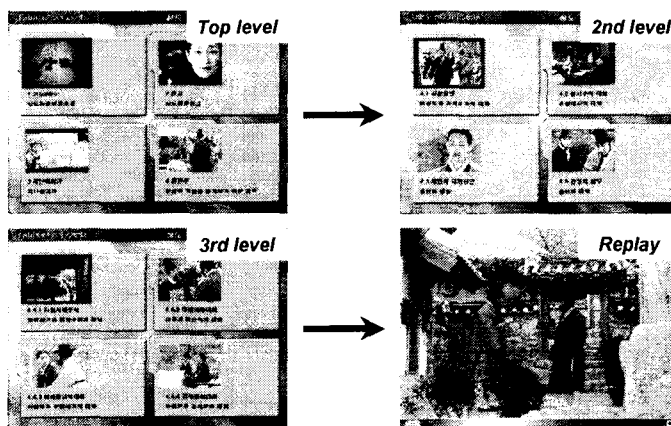
- Genre Recommendation
- When “My favorite” item is chosen in the genre list
 - ◆ Programs of user's favorite top three genres are colored and sorted in the program list
 - ◆ Marked cells by different color

The screenshot shows a program list interface with a grid of colored cells representing program availability. The columns are labeled Sun, Mon, Tue, Wed, Thu, Fri, Sat. The rows represent different programs. The first row is highlighted in red, and the second row is highlighted in blue. The program list is sorted by time, and the first three rows are highlighted in red, indicating they are the user's favorite top three genres.

Ch	Broadcast	Time	Program title	Store
4	MBC	20:55 - 21:50	MBC 뉴스데스크	정
5	SBS	20:55 - 21:50	뉴스데스크	정
7	EBS	20:55 - 21:50	뉴스데스크	정
8	KBS	20:55 - 21:50	뉴스데스크	정
9	MBC	20:55 - 21:50	뉴스데스크	정

Service example : ToC Browser

- Table of Contents (ToC) Browser
- Access/browsing along with hierarchical structure of content



Service example: EbS Browser

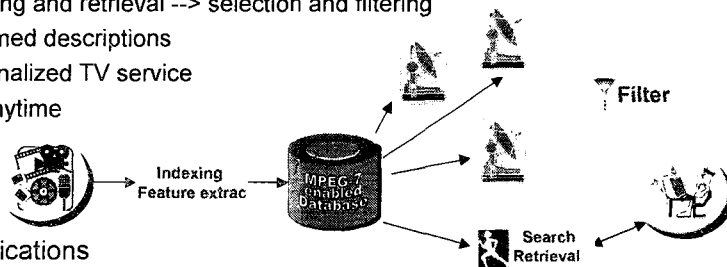
- *Event-based Summary Browser*
- Selected events' or subjects' sequential summary



- ◆ segment-based access for summary segment
- ◆ Each window informs the title of subject, original playing time, summarized playing time, and representative image

메타데이터 응용 및 상용화

- Push applications
 - ◆ broadcasting, web-casting
 - ◆ indexing and retrieval --> selection and filtering
 - ◆ streamed descriptions
 - ◆ personalized TV service
 - ◆ TV-Anytime



- Pull Applications
 - ◆ audio-visual archives, databases, web search
 - ◆ initial motive for MPEG-7
 - AV material "as searchable as text is today"
 - ◆ TV-Anytime

감사합니다.