

Data Broadcast



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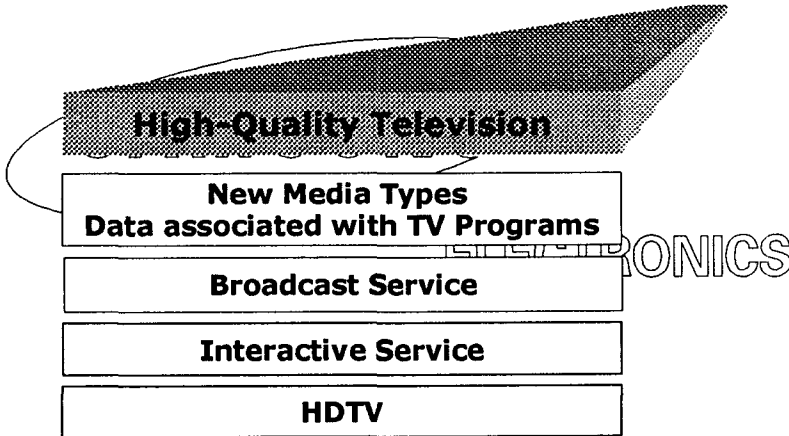
Outline

- Motivation
- Data Service Mechanism
- Data Service Protocols
- S/W Architecture of Data Service Receiver
 - DASE(ATSC T3/S17)
- What's left?

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Motivation

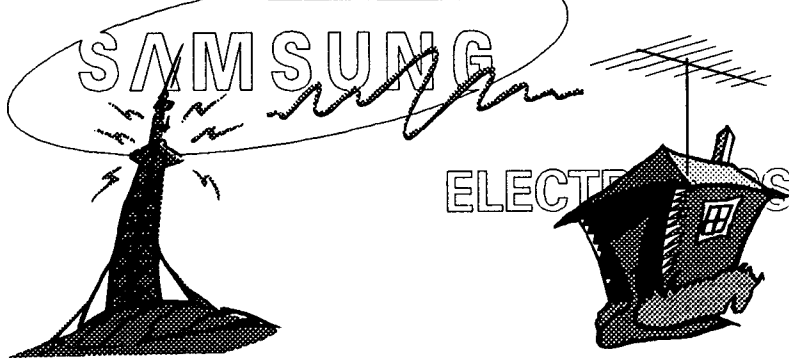
Quick look at what you get



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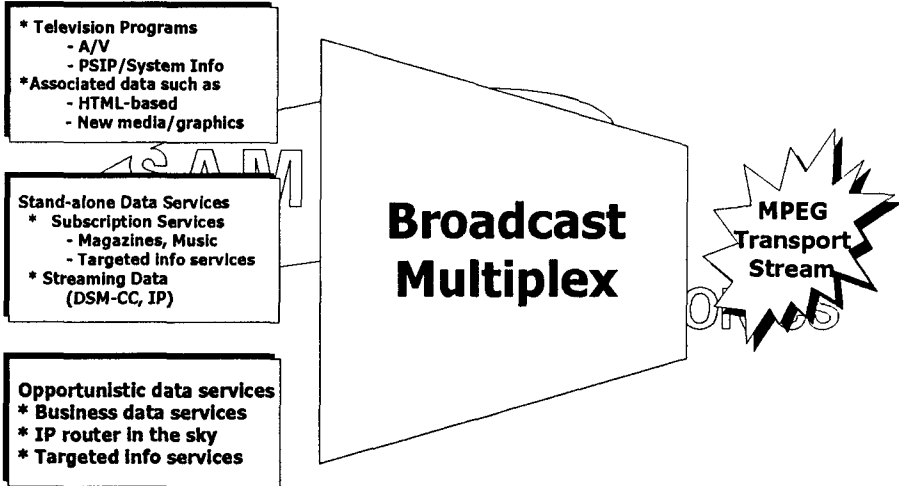
DTV = VIDEO + AUDIO + DATA

- MPEG-2 Transport Streams carrying multiplexed:
 - Service Information (ATSC PSIP + MPEG-2 SI)
 - Audio, video and *data elementary streams*

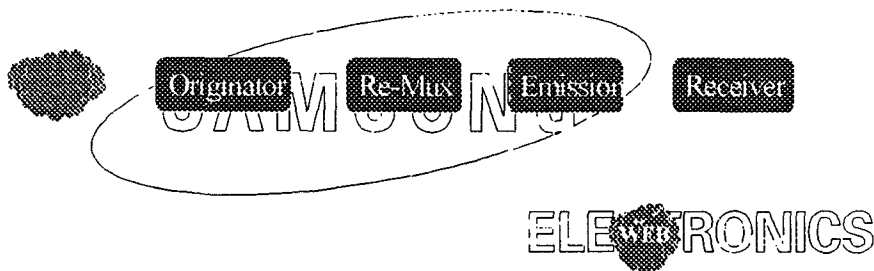


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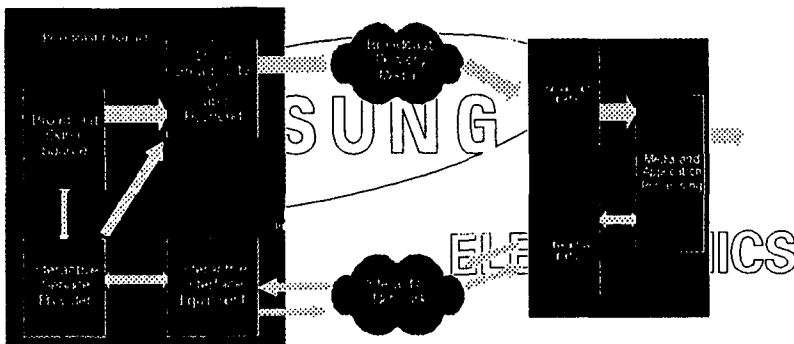
General Picture



Data Service Mechanism



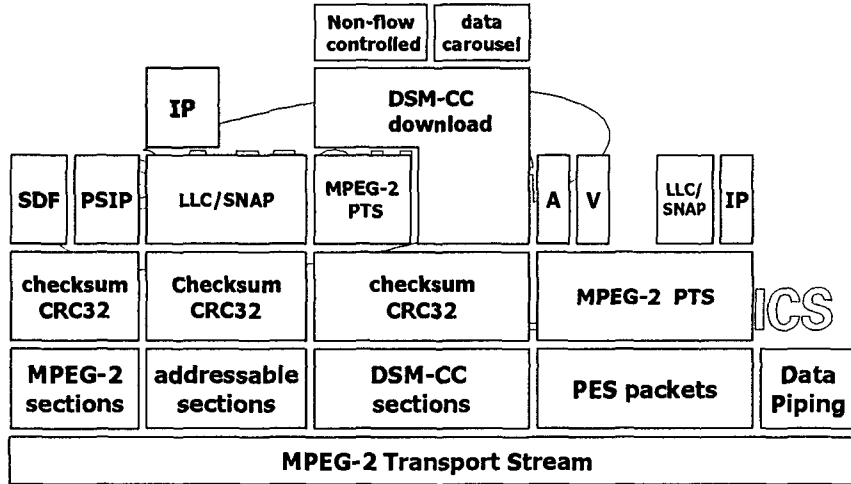
Reference Model for Broadcast/Interactive System



Related Standards(ATSC)

- **T3/S8: PSIP**
- **T3/S13: Data Broadcast**
 - 4 protocols: DSM-CC data download, addressable section, Data pipe, PES
 - final draft released
- **T3/S16: Interactive Service**
 - near to end
- **T3/S17: DASE(DTV Application S/W Environment)**
 - expecting the final draft by the Mid. of November

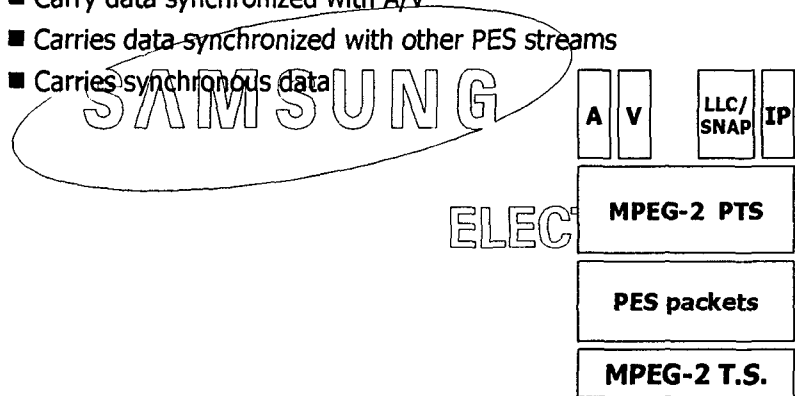
Data Service Protocols



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PES Packets

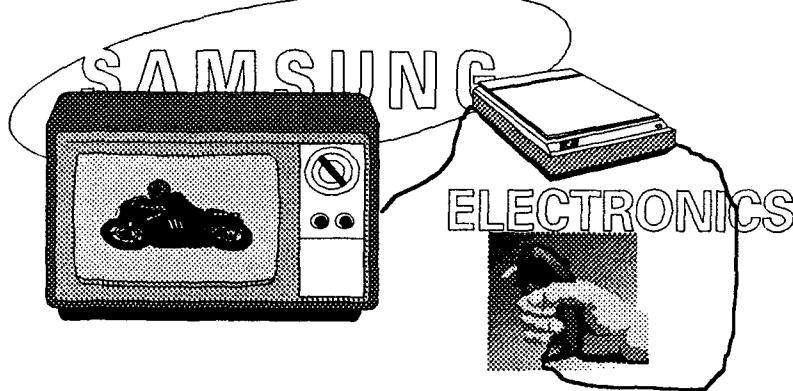
- Carry A/V data
- Carry data synchronized with A/V
- Carries data synchronized with other PES streams
- Carries synchronous data



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EXAMPLE OF PES DATA SERVICES

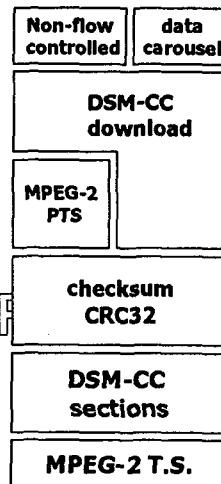
- Video Games based on 2D/3D graphics and image rendering
- Infomercial based on animated computer graphics



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DSM-CC SECTIONS

- carousel scenario = periodic re-transmission of data module (for increased accessibility)
- non-flow controlled scenario = one time download of a data module
- Download protocol follows amendment 1 to DSM-CC for directory message numbering
- The synchronized download protocol offers capability to transmit non-streaming, error-protected, synchronized data



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EXAMPLES OF DSMCC DATA SERVICES (Asynchronous)

- Stock tickers
- Sports statistics
- Weather reports
- Music downloads,...

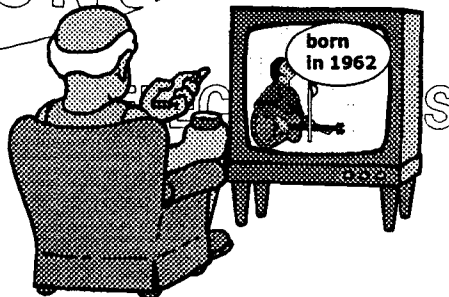


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EXAMPLES OF DSMCC DATA SERVICES (Synchronized)

Just-in-Time transmission of data synchronized with V/A

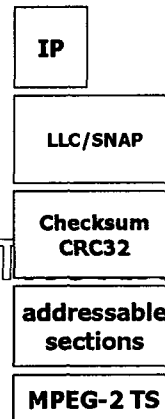
- Pop-up videos
- Hot-spots, URL links in commercials and documentaries
- Evening games
- Triggers



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ADDRESSABLE SECTIONS

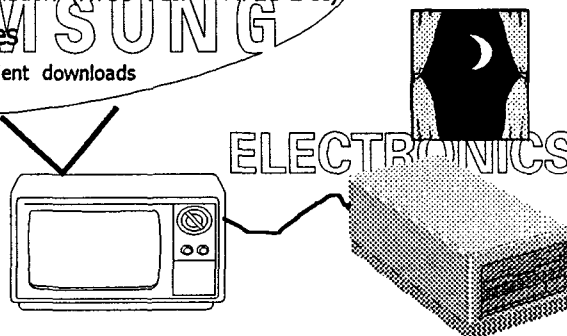
- For tunneling of Internet-Protocol
- Include a 6-byte MAC address
- Default mapping is 28-bit IP multicast address to 23-bit Ethernet MAC multicast address
- Agree with Amendment 1 to DSM-CC
- checksum protection only for backward compatibility with MPEG section parsers



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EXAMPLES OF ADDRESSABLE SECTION-BASED SERVICES

- Personalized services:
 - Download of software at night
 - Subscription to newspaper service
 - Service Information (ATSC PSIP + MPEG-2 SI)
- Scalable services
 - platform-dependent downloads



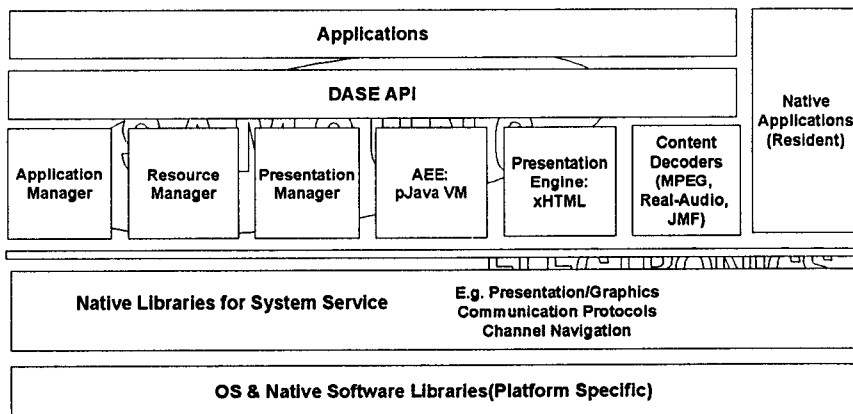
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S/W Architecture of Data Service Receiver

: DASE(DTV Application Software Environment)

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DASE S/W Architecture



DASE Contents

■ Java

- procedural contents
- platform independent via VM concept
- easy local control
- well defined APIs
- good security mechanism

■ HTML

- declarative contents
- platform independent via interpretation
- very popular in Internet and IT community

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DASE Java API

■ Network Communication & PSIP

- input stream delivery, tuning, demux, data/object carousel, return channel, local comm. & home area net, IR output
- Navigation, event information

■ Content Management (JMF)

- audio/video decoder, content storage, content format conversion, content integrity, content version control, media decoder & playback control, decoder/player synchronization

■ Presentation and User Interaction

- video presentation, audio control, graphic presentation, font mgmt., color mgmt., user input, presentation synchronization

DASE Java API (Cont.)

- **Application, System & Event Mgmt.**

- App. Lifecycle, app. Verification, event dispatching, interprocess comm., exception handling, scheduling, utility
- system/user management

- **Resource & Security Mgmt.**

- Resource allocation, resource synchronization
- Authentication, CAS, content control

- **Status**

- direction: Sun JavaTV + Sony HAVI UI + alpha
- final drafting work scheduled on 11/15
- will be submitted to T3 by the end of November

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Application Execution Engine

- **Interpret/decode/execute procedural application content**

- **act as an abstraction of the underlying native system**

- provide system services in a uniform, platform independent manner

- **Current Status**

- Ballot completed in T3
- JavaVM is the AEE

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Presentation Engine/Manager

■ Presentation Engine

- a content decoder for (possibly dynamic) HTML content
- work very closely with AEE
 - via a DOM and Presentation APIs
- cooperate with content decoders via Presentation Manager
 - control of screen composition (layout of elements on screen)
 - temporal control (synchronization) between media elements

■ Presentation Manager

- arbitrate between DASE applications
- responsible for displaying arbitrated content on screen

■ Current Status

- Draft 6.1

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DASE PE vs. ATVEF

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Consensus:

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Application Manager

- Control of an application's lifecycle
- Monitoring of an application's status
- Launching and terminating applications
 - uploading/unloading Java classes
 - removal of system resources

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System Service Lib.

- Native system library to support DASE API
- Includes
 - Presentation/Graphics(Window system)
 - Communication protocols(Protocol engine)
 - Channel navigation

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DASE Reference Applications

■ First Phase

- Interactive advertisement
- Ticker application
- Sports statistics
- viewer-selected camera
 - E.g. Golf game

■ Second Phase

- full-function EPG
- audience measurement

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Current DASE Status

■ Final DASE draft spec.: Mid. November

- T3 Ballot: End December

■ Test Consortium

- initiated and operated by UniSoft
- six companies have signed the contract

■ DASE Reference Implementation & Conformance Test

- (probably) by NIST
- in cooperation with UniSoft

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규격간의(기술적) 상관관계

