

The ABC's of Enhanced Television

Bruce Jacobs

Twin Cities Public Television

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Local Enhancement Collaborative



Corporation for Public Broadcasting



KCSM

KCSM - San Mateo



Twin Cities Public Television - St. Paul



Milwaukee Public Television



WGBH - Boston



In collaboration with

PBS

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LEC Mission

Define “Enhanced Television”.

Identify enhanced developments that have certain or potential roles for stations.

Develop practical steps for station involvement.

Enhance local programs

Localize enhancements to national shows

Techniques to pass national enhancements

Tell the world what we learn.

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ETVCookBook.org
First Edition
More Recipes in June

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ETV

ATVEF Spec

ATVEF Execution

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What is ETV?

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In the Beginning, there was “Television”.



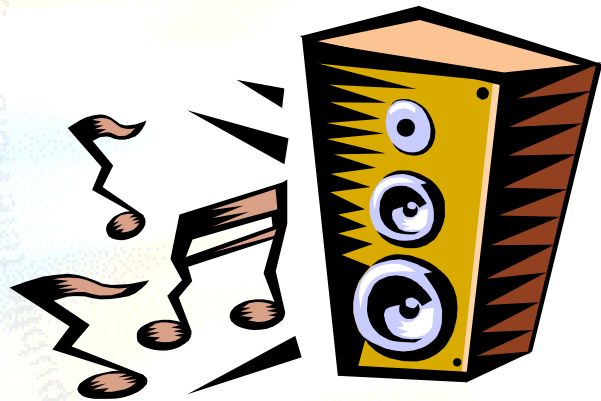
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Then, we “Enhanced” Television.

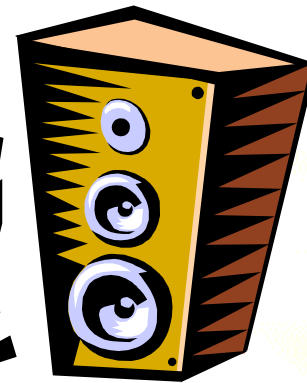
Multi-Channel
Sound



Better Pictures



Multi-Channel
Sound



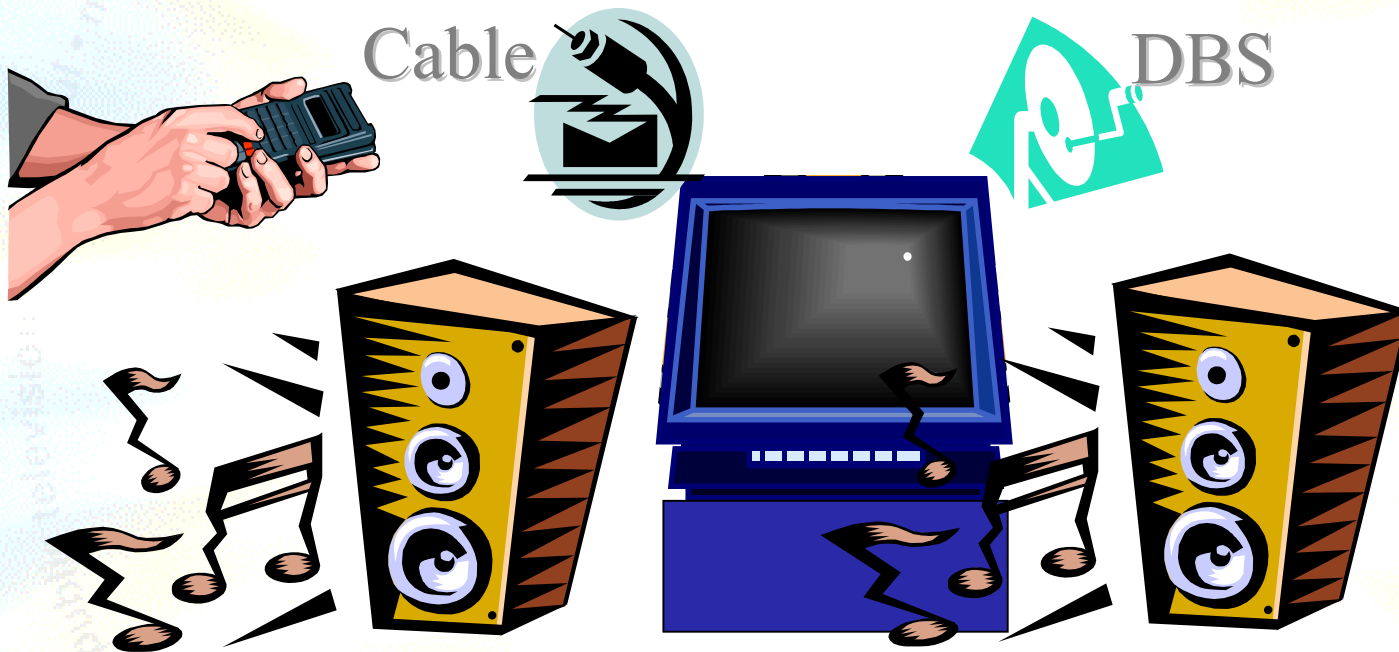
Closed Captioning for the
Hearing Impaired, and for bars.

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We also added lots of “Channels” ...
and we made it “Interactive”.



Closed Captioning for the
Hearing Impaired, and for bars

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This is now *“Normal”* Television, or
Plain Old Television (POT)
We call everything else *“Enhanced”* TV.



Closed Captioning

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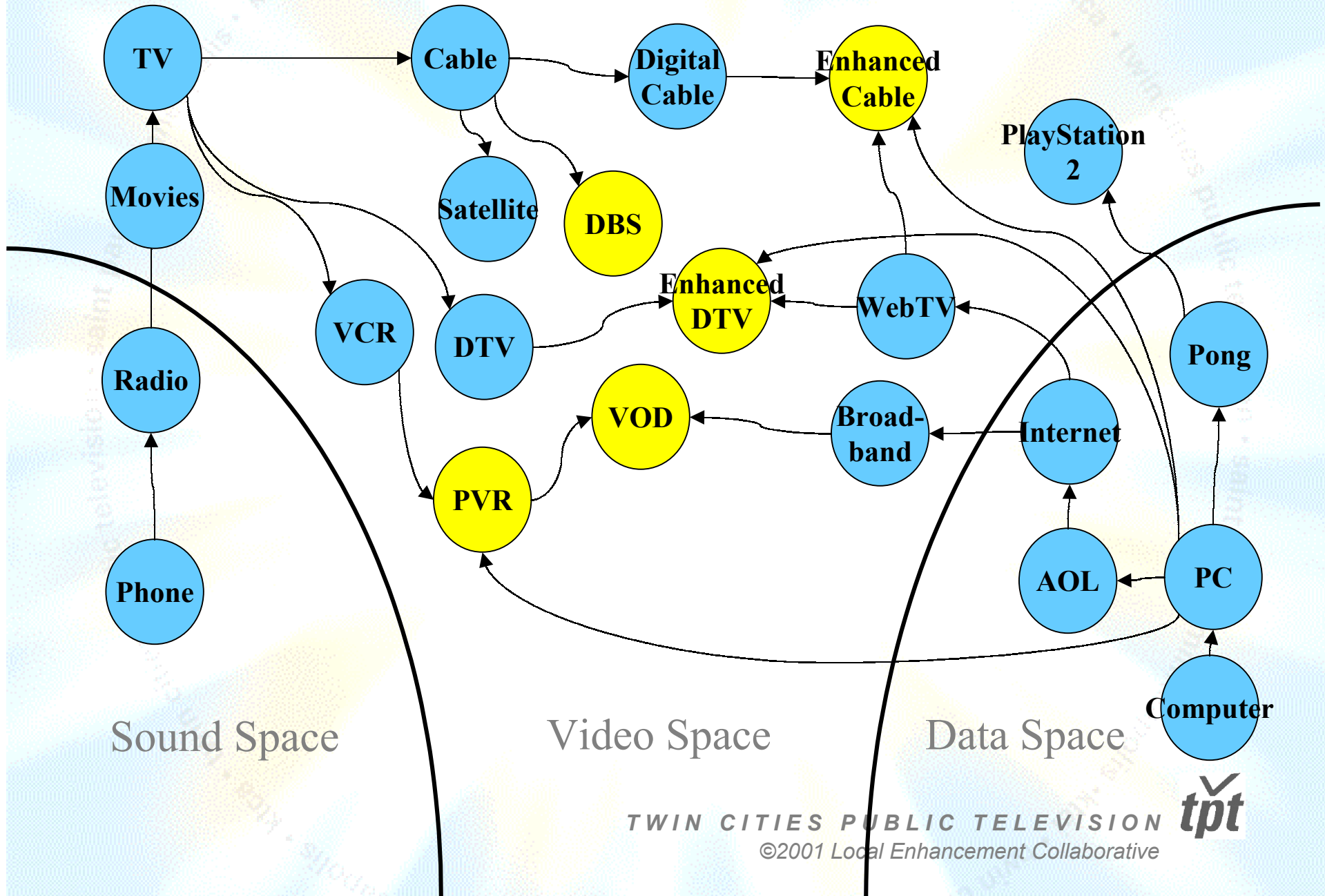
Why ETV Now?

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Convergence or Invasion?



Merger/Investment Mania

AOL <> Time Warner \$184 Billion

AT&T <> MediaOne \$54 Billion

Gemstar <> TV Guide \$9.4 Billion

OpenTV <> Spyglass \$2.1 Billion

Liberate <> MoreCom \$521 Million

Microsoft > AT&T \$5 Billion

AOL > DirecTV \$1.5 Billion

NBC* > Tivo

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**Media Market Profit =
Technology Control +
Content Control +
User Value (Advertiser)**

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Compelling Forces - 3Cs

Captivation

- Surf reduction
- Keep audience glued
- Carry audience through commercials

Commerce

- Sell Pizzas and soap opera clothes

Cultivation

- Educate the audience

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The ETV System

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Types of ETV

New Control, Convenience, Choice - “Appetizers”

- EPG/IPG (DBS, Cable, DTV)
- PVR (Tivo, *Replay*, Cable ...)
- VOD (Cable, Broadband ...)
- Video ala MP3 (VivX, Video Napster)

New “Web” Content *on* the TV - “TV Dinners”

- TV HTML (Cable & DBS Walled Garden)

New “Web” Content *with* TV Shows

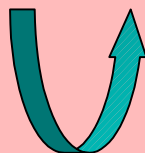
- PC Synchronous (ABC) - “PC Dinners”
- TV Synchronous (Cable) - “TV Dinners”

Provider

User

Author, Network

“TV”

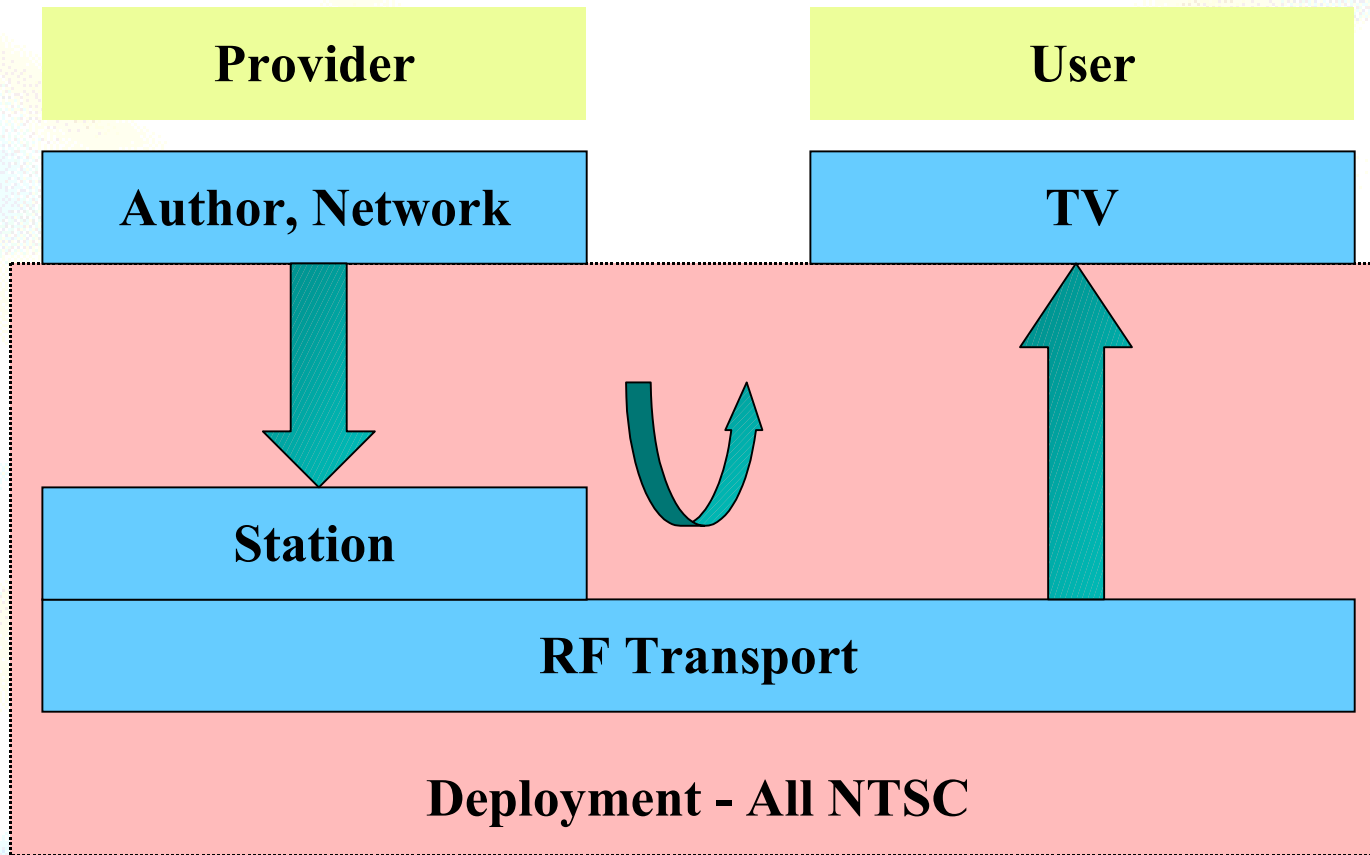


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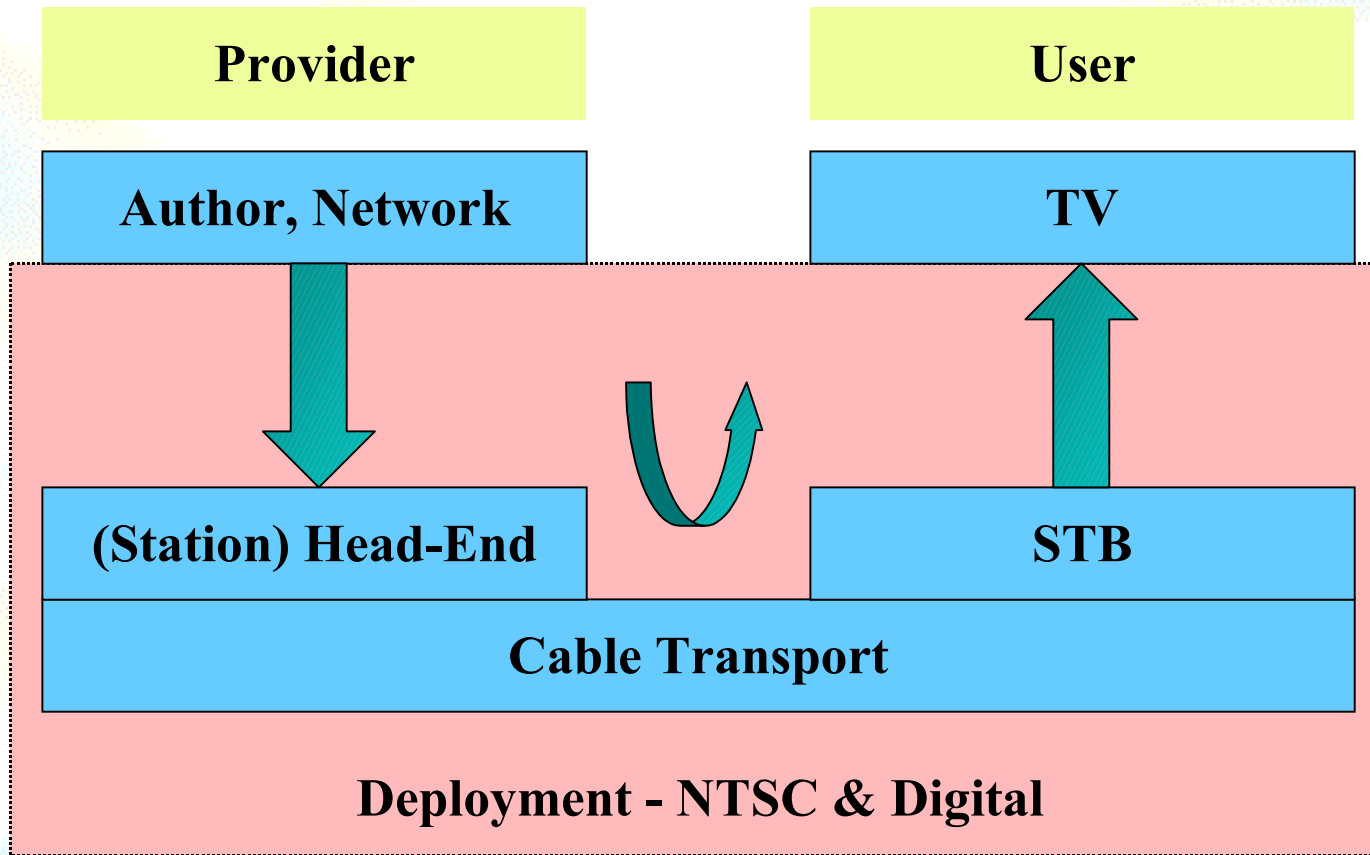
©2001 Local Enhancement Collaborative



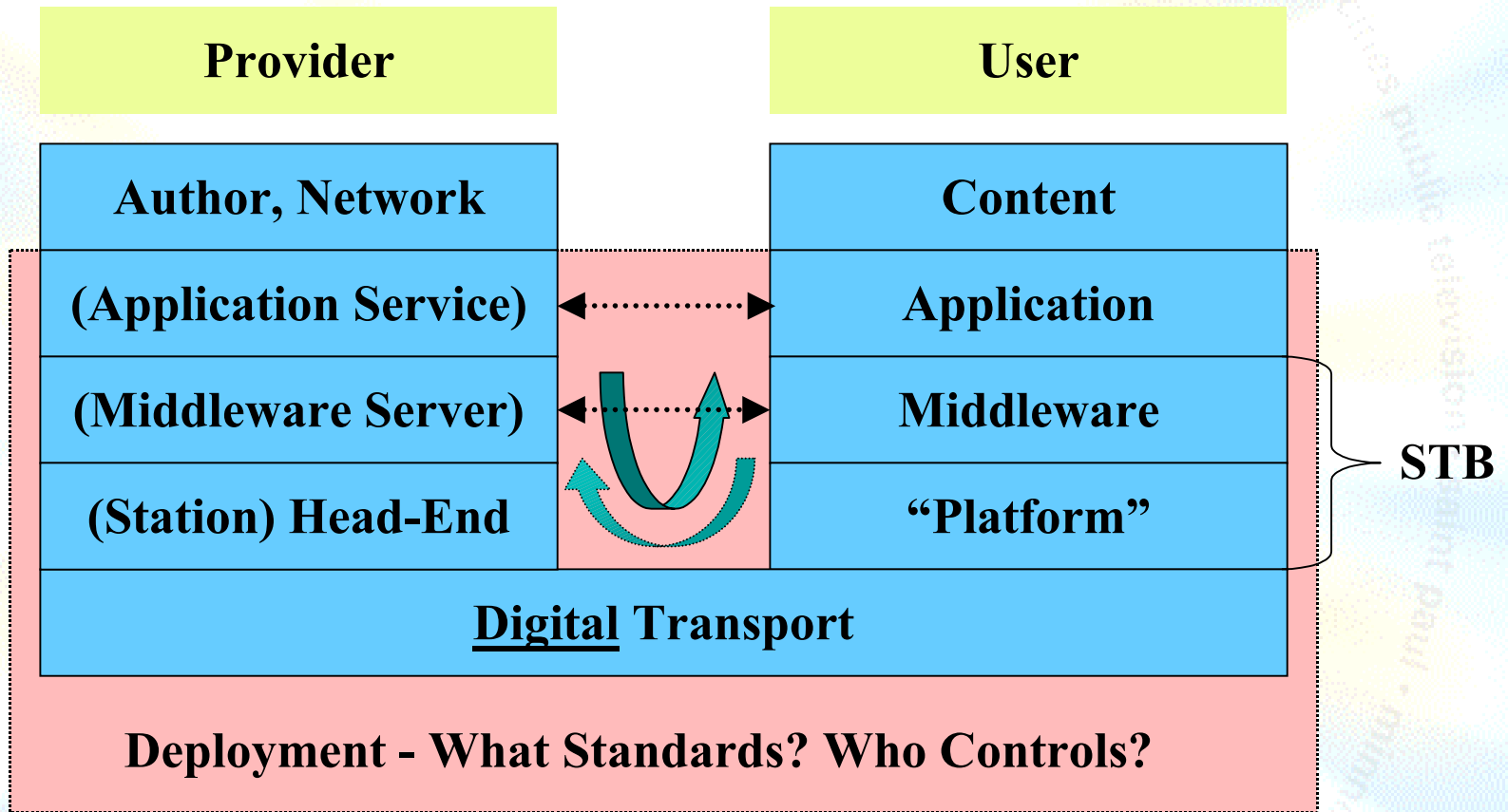
Early Television



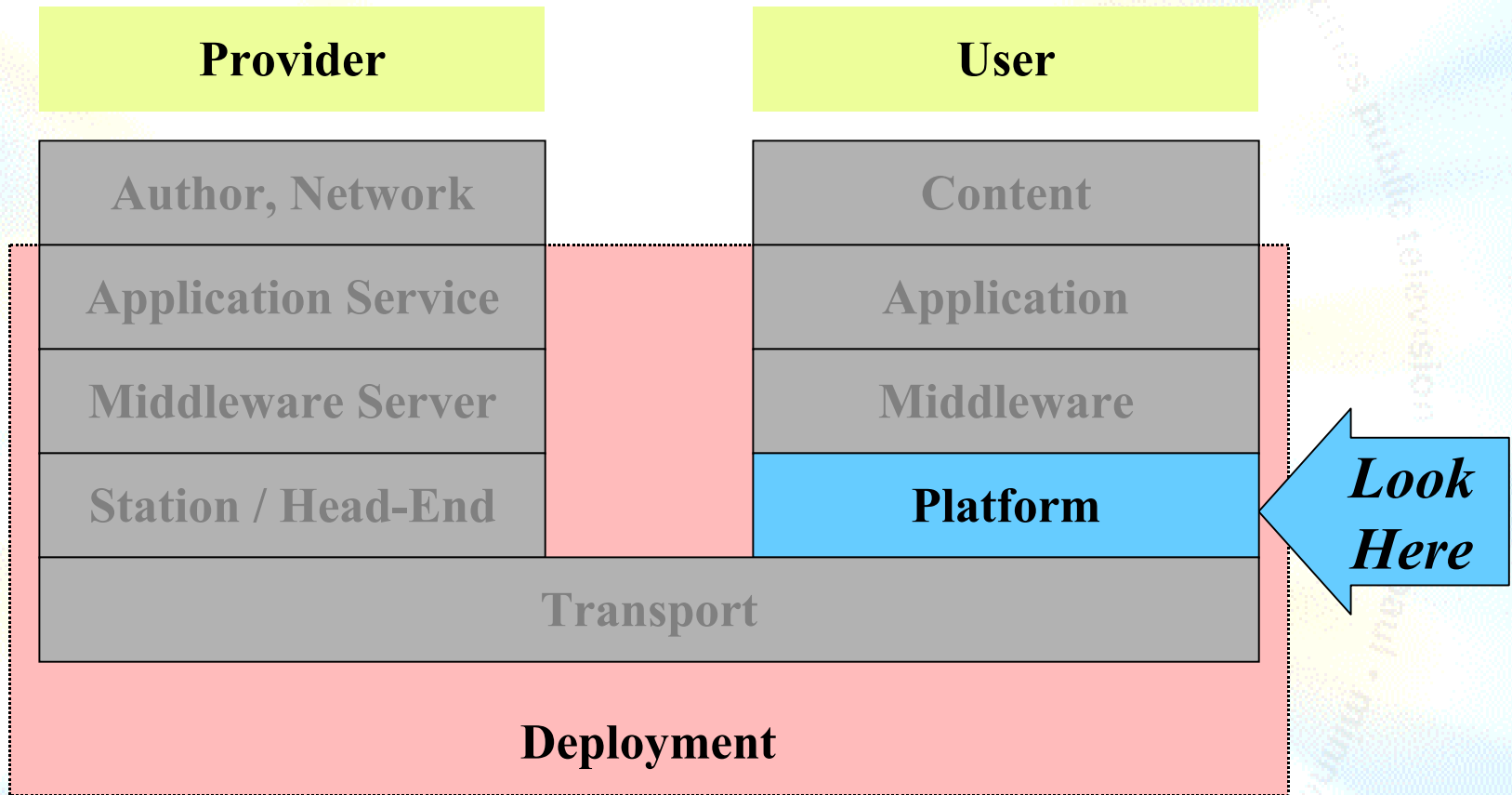
Cable



Enhanced TV



Enhanced TV



Two Main Platforms for ETV



The "Mobile" Experience
Low Detail

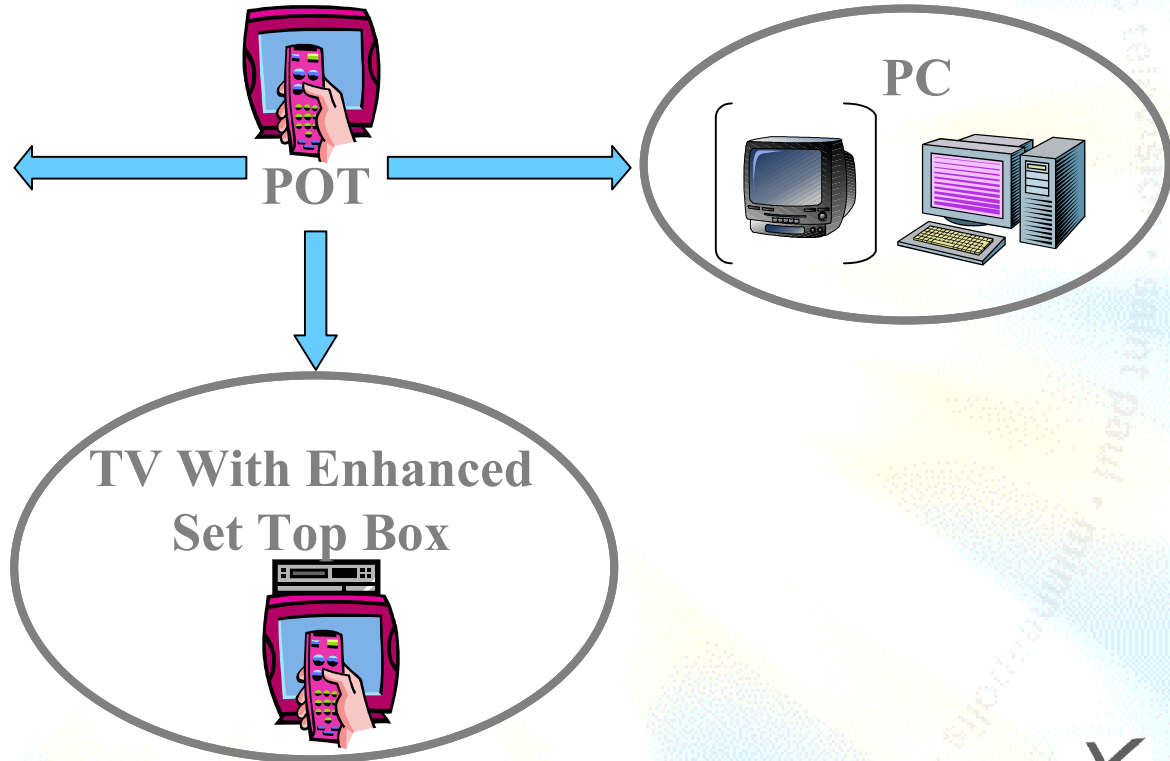
Mobile
Media Device



The "Couch" Experience
Moderate Detail



The "Chair" Experience
High Detail



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Two Screen Enhancements



Regular TV and PC with Internet

Doable Today!

Lots of Type

- Up to 60 rows plus scrolling

Cannot overlay enhancements on video

Requires both boxes to be adjacent

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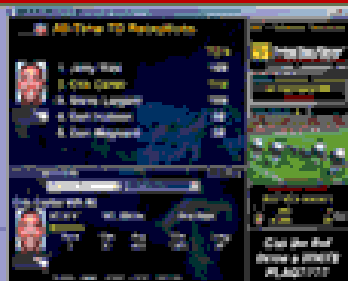
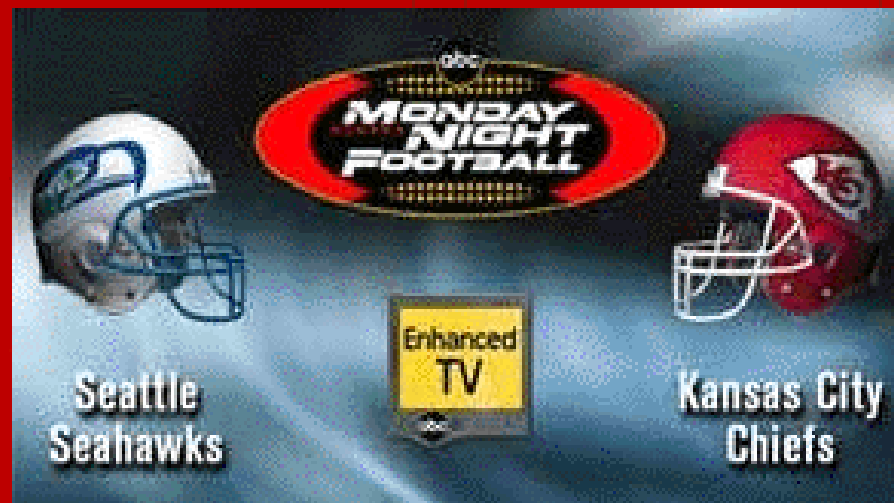
ABC'S ENHANCED TV



- What is Enhanced TV?
- Tour
- Enhanced TV Help
- Winners
- Survey
- Home

JOIN US TONIGHT
9PM ET

SEATTLE SEAHAWKS
VS.
KANSAS CITY CHIEFS



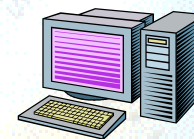
MONDAY
NIGHT
FOOTBALL
ONLINE



.com



PC Enhancements



Eliminate the TV

PC Tuner Card - ATVEF

- Hauppauge
- Broadlogic

Streaming

- QuickTime
- Windows Media Player

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TV Enhancements



POT

Cultivate the “TV” Experience

Not much type

- Up to 20 rows - no scrolling
- 1/10 the information of a PC window

WebTV Plus = 500,000

Other platforms coming

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JEOPARDY!
INTERACTIVE

7400

Quotations

Wager

WATCH & PLAY!
WIN!
SONY
TV & DVDS!



\$ 3700

Mark



\$ 3600

Andrew



\$ 2700

Jenny

Place
your
wager.

All 7400
 Half 3700
 None 0

Lieberman for Vice President

The
**NEWS
HOUR**
with Jim Lehrer

Political Background

Defeated Lowell
Weicker in 1988

Elected to state
senate in 1970
with volunteer
help from Yale
student Bill
Clinton

[More](#)



Lieberman for VP

Menu

Full Screen



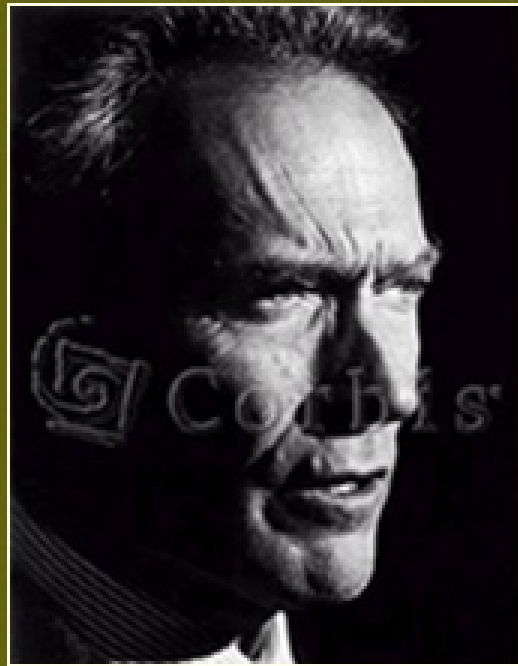
BACK



CLOSE



NEXT



Fact Mimics Fiction

The idea of using brain activity to control machines was dealt with fictionally in the 1982 Clint Eastwood thriller *Firefox*, based on a novel by Craig Thomas. In the film, NATO intelligence forces steal a Russian thought-controlled military aircraft during the cold war.

Photo courtesy Warner Brothers © 2001

Enhancement Standards

but first...

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CONTENT

Essence	Meta-Data
Video	Aspect Ratio...
Audio	Language...
Closed Captions	
SAP	Language...
Enhancements	Standard...

ETV Standards - Two Tracks

Procedural

- XML + Java
- DVB MHP (Europe)
- ATSC DASE (Under Development)
- SCTE ?
- Java Code + Java Author + Java Hardware = \$\$\$

Declarative

- HTML + JavaScript
- ATVEF > SMPTE DDE
- HTML Free + HTML Author + HTML Hardware = \$

Technology	SMPTE	ATSC	DVB	SCTE
Markup Essence	HTML4	XDML	XHTML	
Script Essence	ECMA2	ECMA3	ECMA3	
Host Objects		Navigator, Window, Locator	Navigator, Window, Locator	
Procedural Essence Bridge			Y	
Style Sheet Essence	CSS1	CSS1+	CSS2+	
Active Object Essence		-	-	
JVM		Y	Y	
java.*		Y	Y	
com.sun.util.*		Y	-	
javax.tv.*		Y	Y	
javax.media.*		Y	Y	
org.havi.ui.*		Y	Y	
org.davic.*		Y	Y	
org.atsc.*		Y	-	
org.dvb.*		-	Y	
org.w3c.dom.*		Y	Y	
Graphics Essence	png, jpeg	png, jpeg	gif, png, jpeg mpeg-iframe	
Streaming Video Essence	analog	mpeg	mpeg	
Streaming Audio Essence	analog	ac3	mpeg	
Font Essence		pfr	pfr	
Trigger Essence	tve-trigger	(atsc)	DOM Events	
Naming Model	tv:,lid:	tv:, lid:	tv:, lid:	
Display Model	OSD	OSD w Alpha	OSD w Alpha	
Input Model		Keyb, RC	Keyb, RC	
Transport Assumptions	IP Multicast	ATSC A/90	MHP OC	
Return channel		-	Y	

ATVEF

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ATVEF Founders

CableLabs

CNN Interactive

DIRECTV

Discovery Communications, Inc.

Intel Corporation

Liberate Technologies

Microsoft and WebTV Networks

NBC Multimedia

NDTC Technology, Inc.

Public Broadcasting Service (PBS)

Sony Corporation

Tribune

The Walt Disney Company

Warner Bros.

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ATVEF Platforms

WebTV Plus

- 500,000?
- Soon to add Analog Transport B?

AOL-TV

- ?

Digital Cable?

- X

Transport B TVs?

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ATVEF Tutorial

Content Specification 1.0

- What can I send?

Transport

- Pull (and) or push the content?

Bindings

- How does it work on various networks?

CONTENT SPECIFICATION 1.0

Formats

- HTML 4.0, CSS 1, EcmaScript, DOM 0

Types

- text/..., /png, /jpg (No Flash)

TV Integration

- “tv:” just like any image

Trigger Receiver Object

Trigger

- URL, Name, Script, ...

Local ID Scheme

- “lid:” instead of “http:”

Content Caching

- 1 MB

CONTENT TRANSPORTS

Transport A

- Internet Pull

Transport B

- *Broadcast*

Transport A and Transport B

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CONTENT BINDINGS

NTSC

- Transport A Triggers Via Text Channel 2
- Transport B Data is via IP over VBI (medium speed)

IP

- Announcement notifies receiver of available programming

ATVEF EXECUTION

How do we author it?
How do we get it there?

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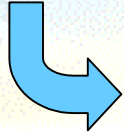
©2001 Local Enhancement Collaborative



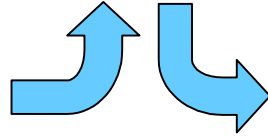
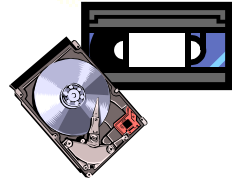
Legacy NTSC

Author

Video + Audio

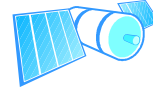


Storage



NTSC Transport

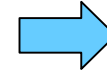
Satellite



Broadcast



Cable



Receive

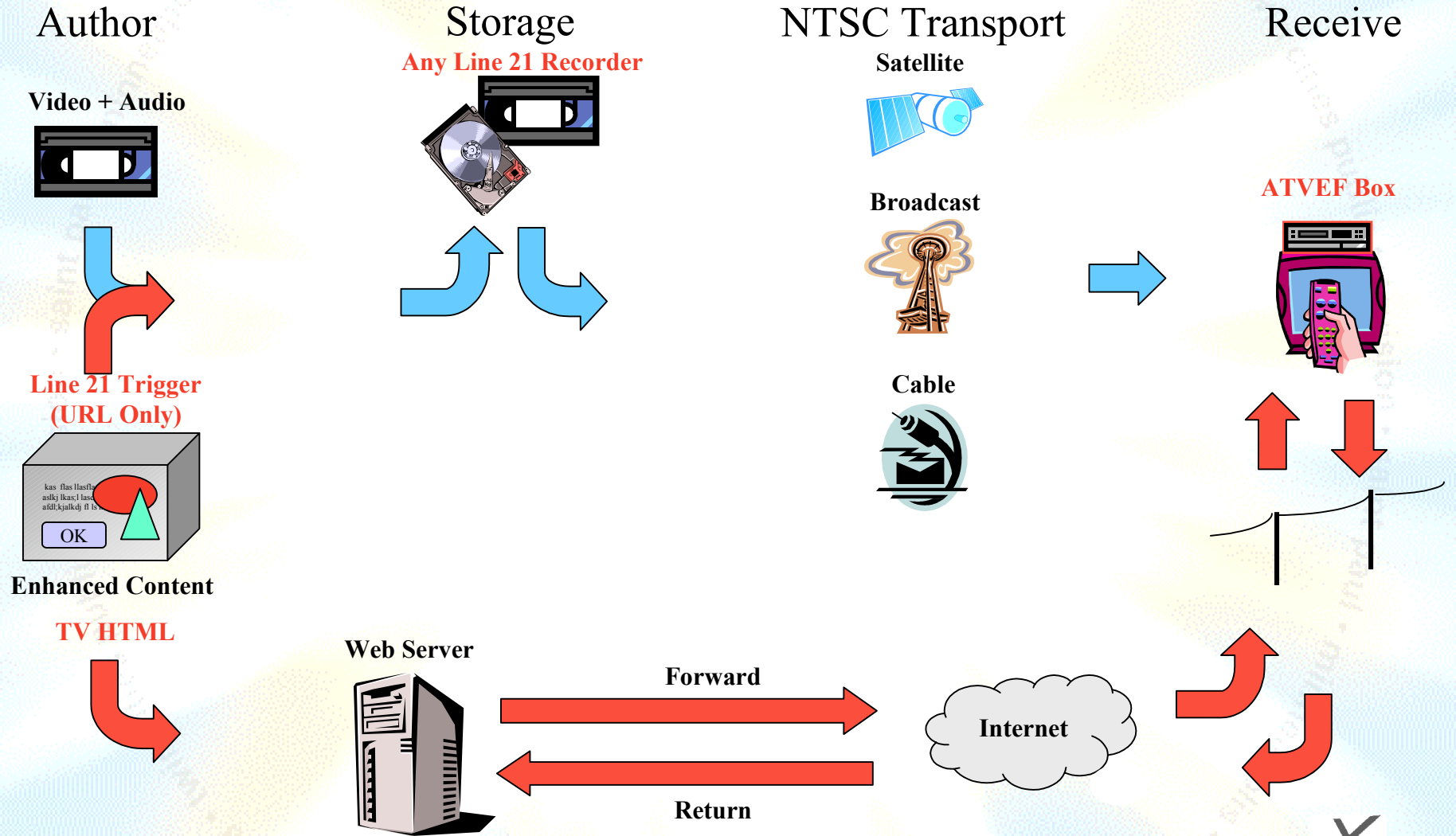


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ATVEF Transport A



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3 Problems With Transport A

Speed

- Critical for TV synchronous enhancements
- Slow backbone
- Slow connection

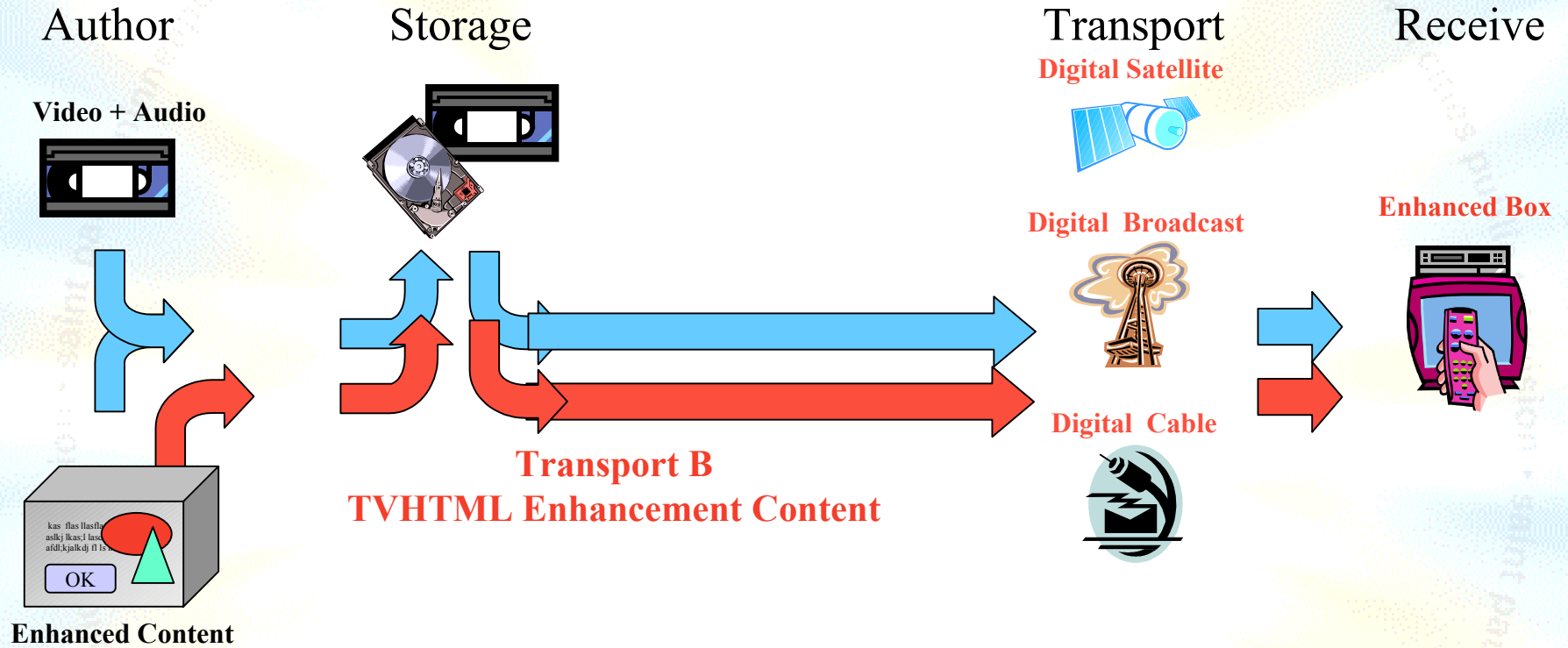
Scalability

- Server crash with millions of simultaneous hits

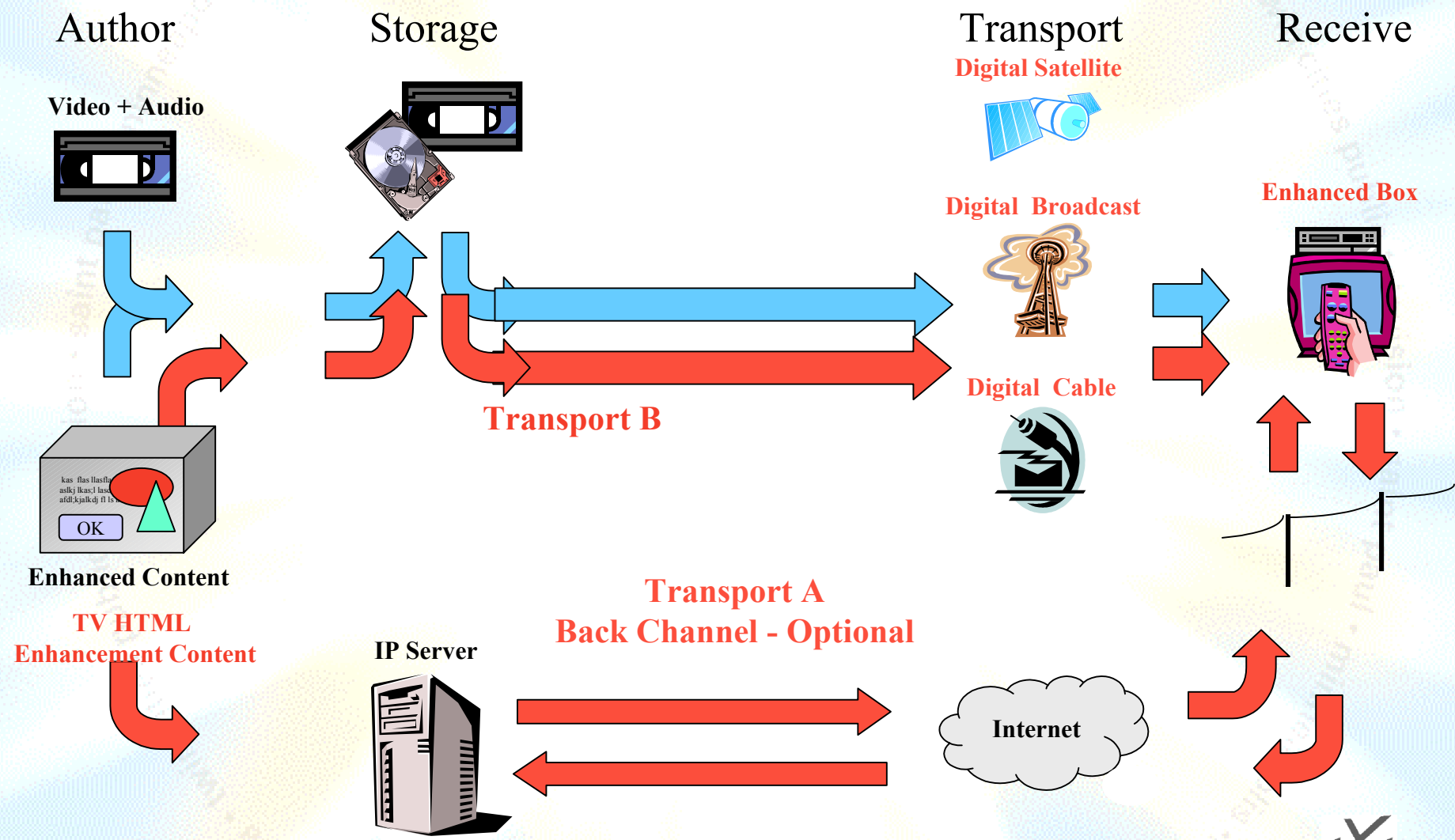
Reach

- No Internet connection to ETV device
- Modem line occupied
- No modem line

ATVEF Transport B



ATVEF Transport B



Transport B: Boon

Speed

- As fast as a DTV channel - 100X?
- Infinite speed, with cache pre-load

Scalability

- Infinite users

Reach

- No Internet needed (transaction-less content)

A Role for DTV!

- No one does it like a digital broadcaster!

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Transport B: Bane in Authoring

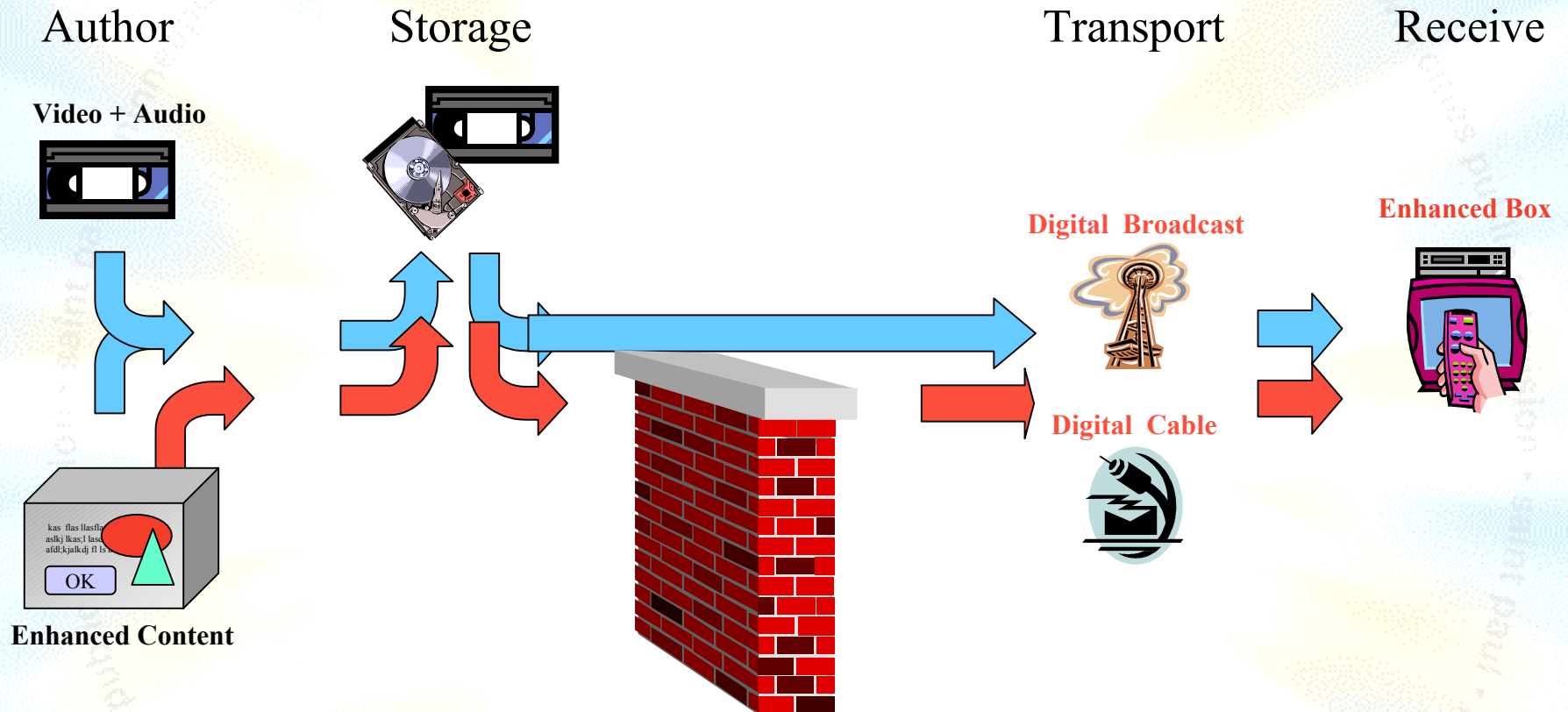
Off-Line Authoring

- Essence must be sent right before access allowed.
- Data bandwidth must be known.
- Requires station/network agreements!

Live Authoring

- Data arrives late, unless bandwidth sufficient
- Anticipate clicks with regular cache load?

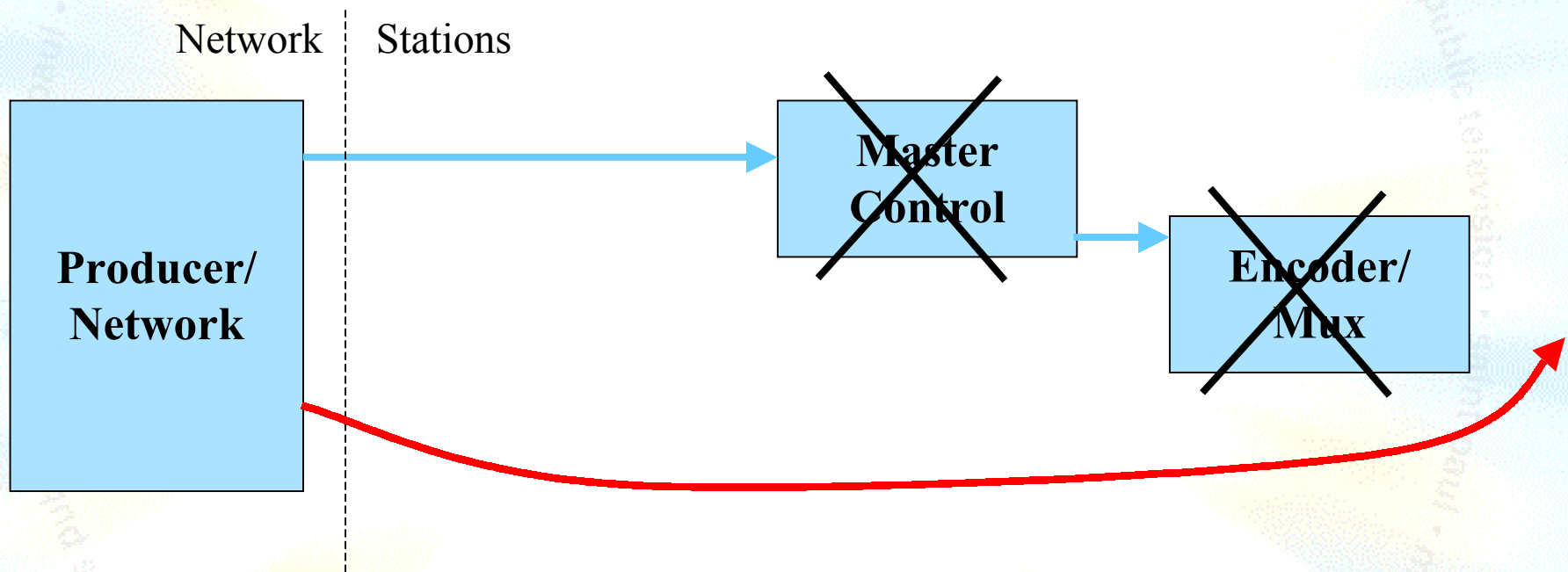
Transport B: Bigger Bane



175 Unique PBS Stations
??? Cable Systems

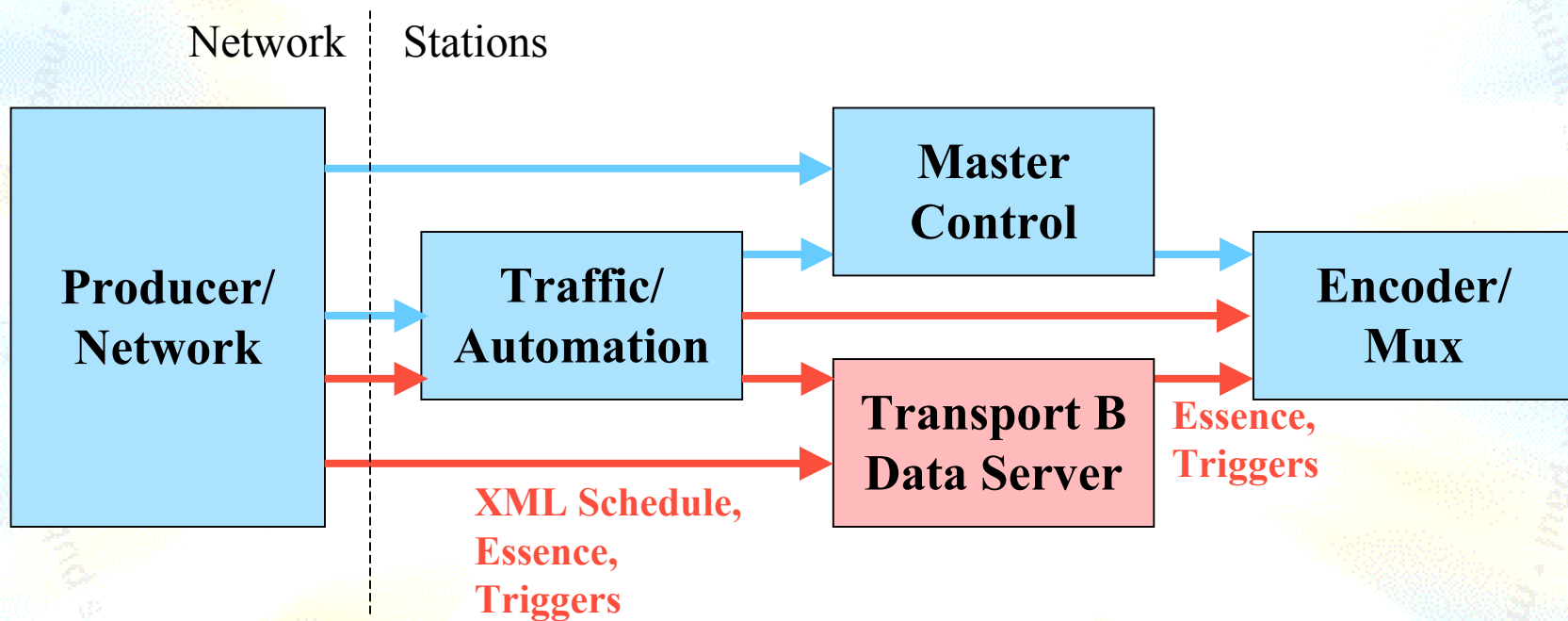
Bypass!

Good for Trial - Unacceptable Long Term!



Station Synchronization

Added Components



Station Synchronization

Advantages

- No change in master control or video network
- Accommodates local enhancements
- Last minute changes
- Pre show cache load possible

Disadvantages

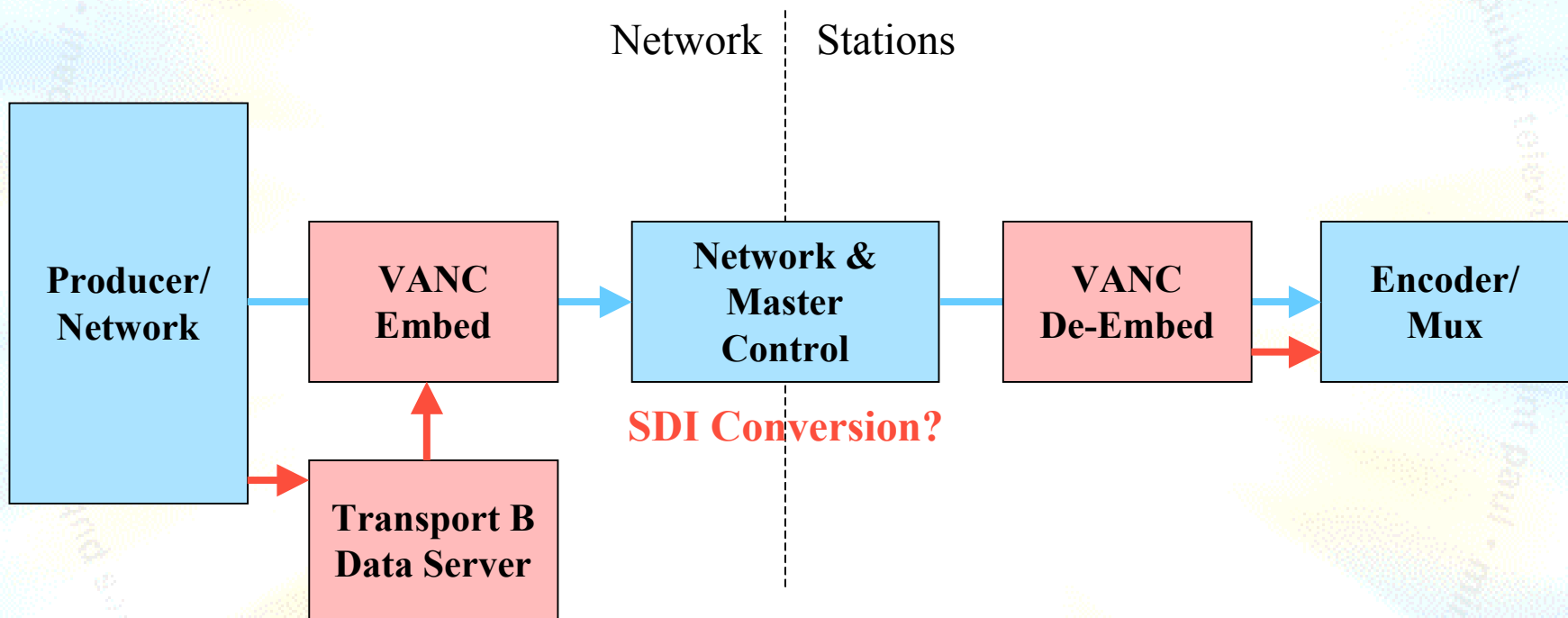
- Complex system at all stations
- High implementation and operating cost
- Enhancements not easily browsed

Challenges

- Numerous standards needed
- New automation systems/features needed

Producer Synchronization

Added Components



Producer Synchronization

Advantages

- Lower cost
- Simpler to operate
- Easy to browse

Disadvantages

- Data rate limited to 300 Kbps (not a problem?)

Challenges

- Recommended practice for use of VANC
- SDI conversion may be required
- No equipment yet available for testing

Which Synchronization?

At Producer

- For start for sure
- For smaller stations

At Station

- For local
- For national later?

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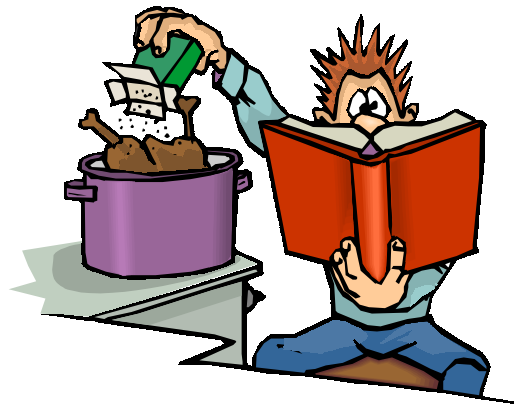
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Conclusion

Lots of work to do.

Should be fun!



ETVCookBook.org

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