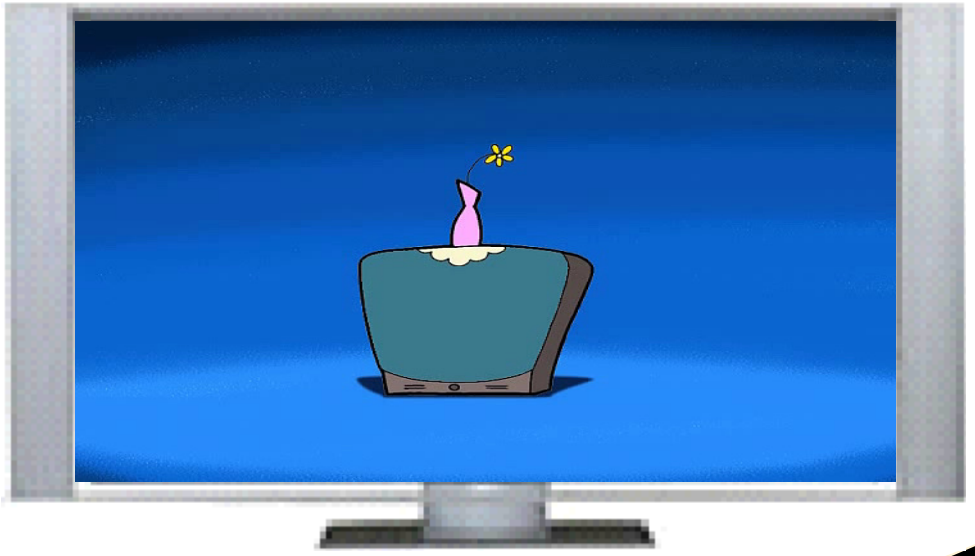
TV Interativa se faz com

Ginga

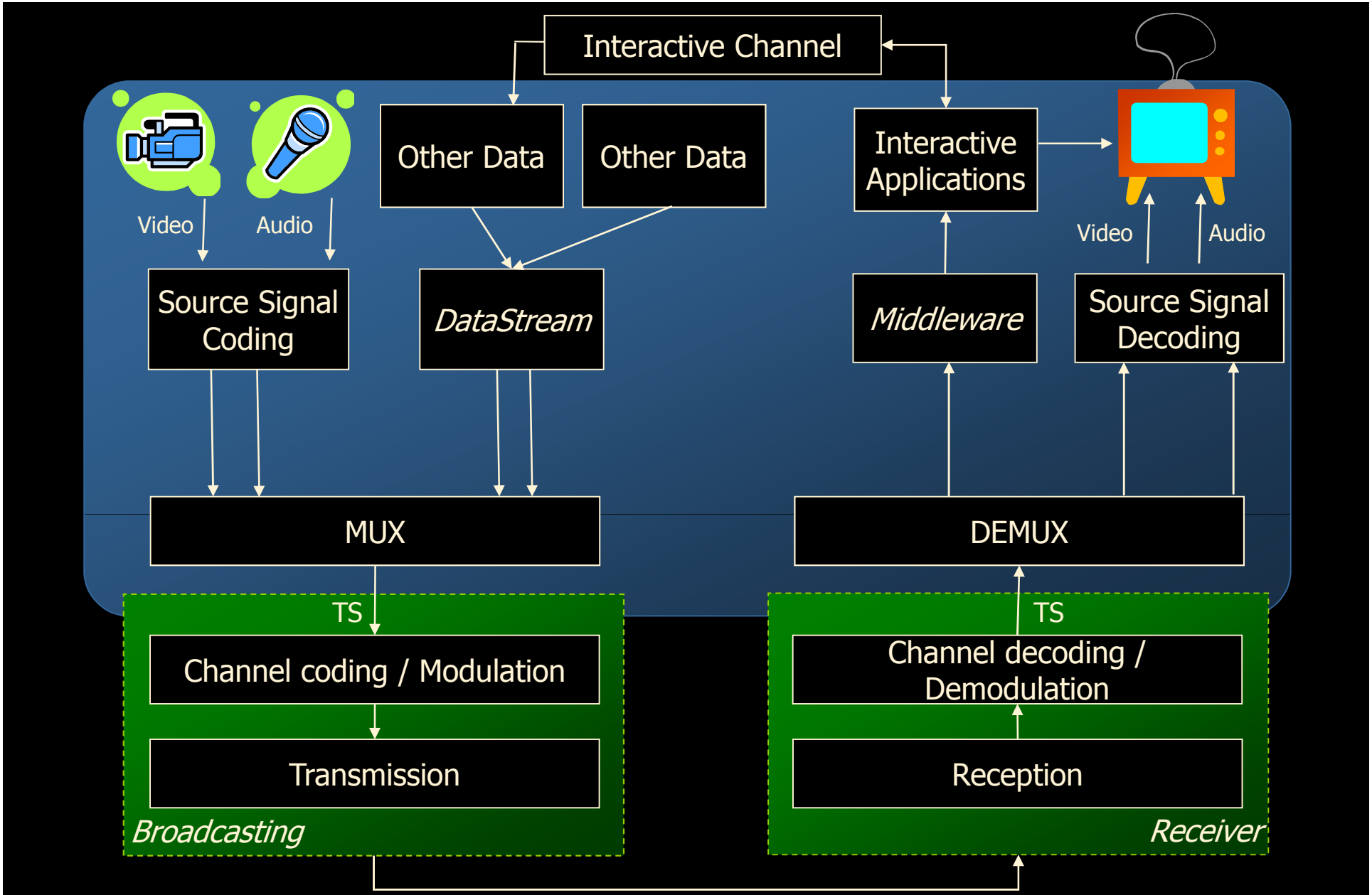


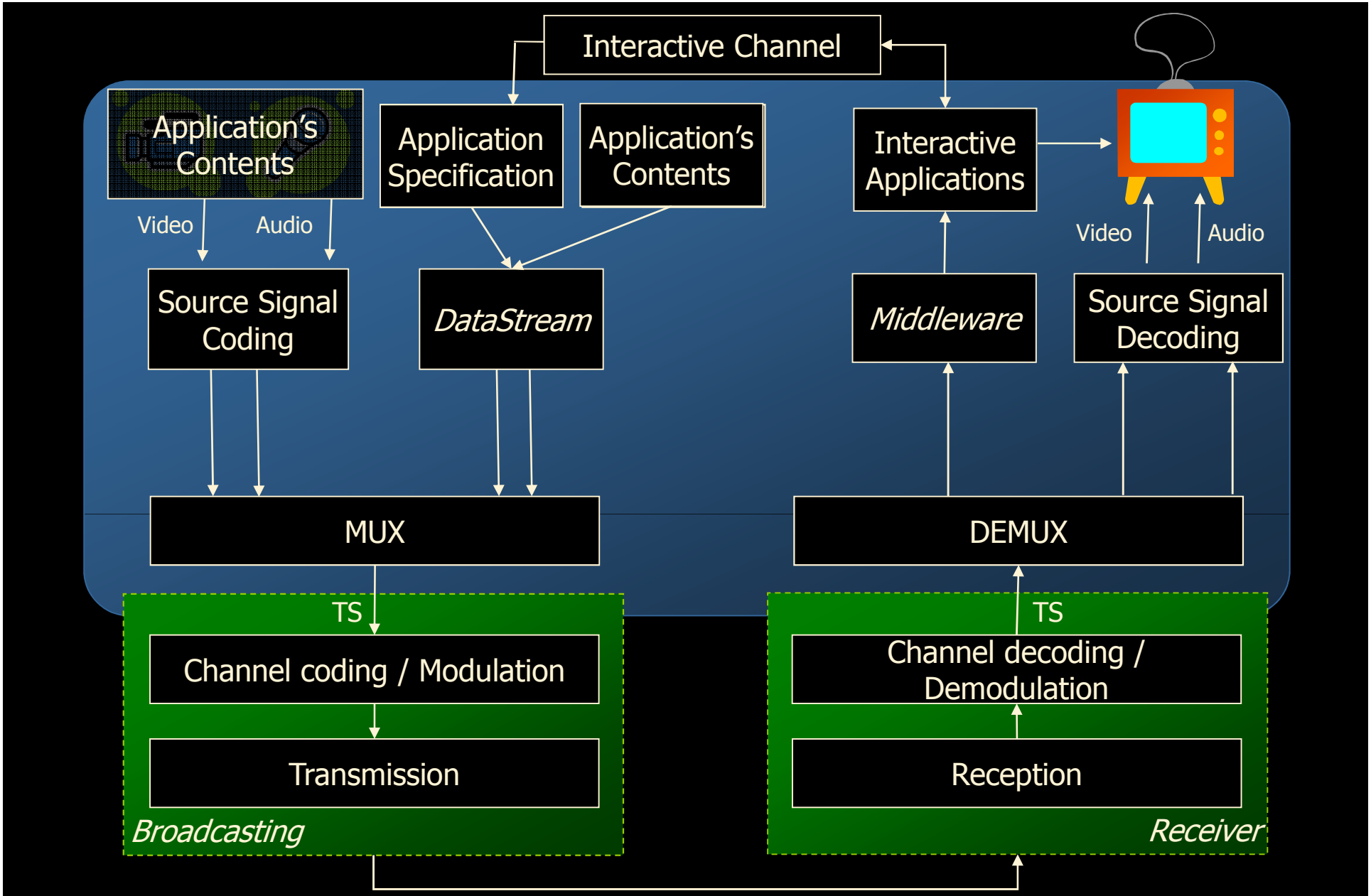
Agenda

- ISDB-T Reference Model and ITU-T Reference Model overview
- Middleware requirements
- Ginga
- Final Remarks

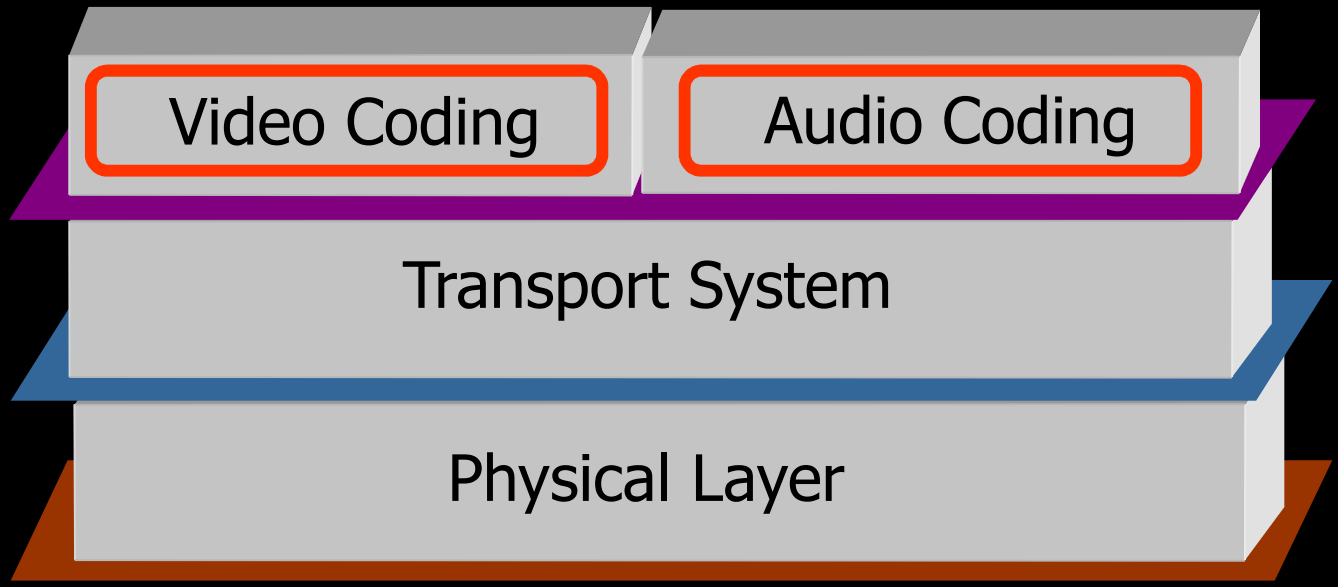
DTV

Reference Model





Reference Model



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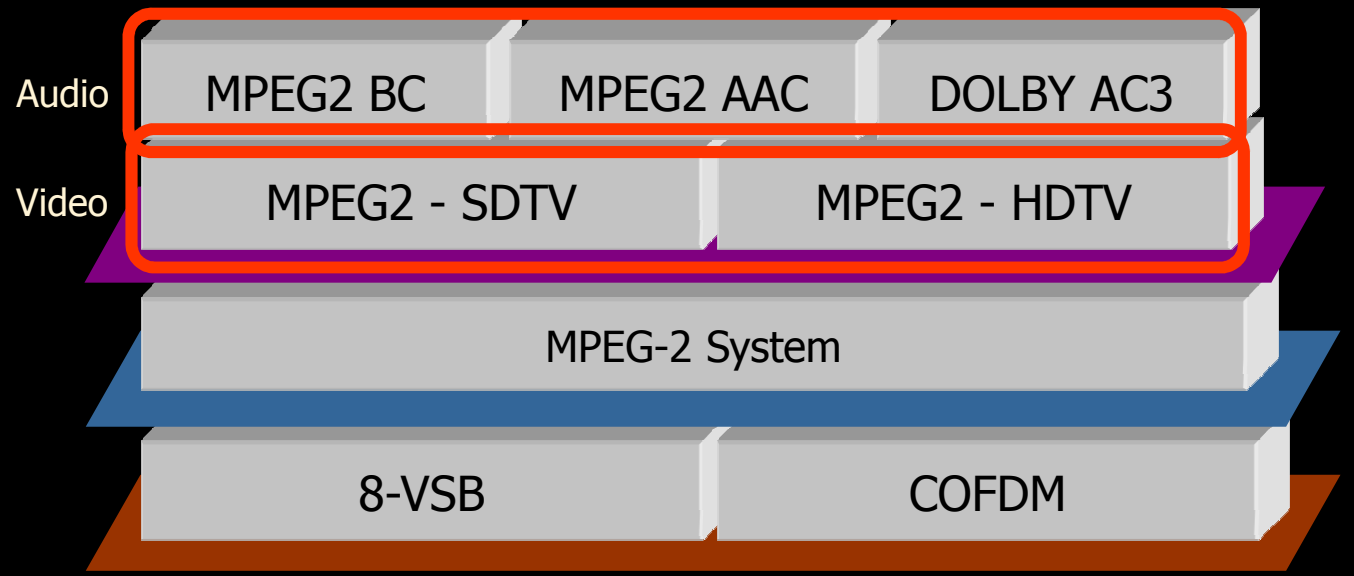

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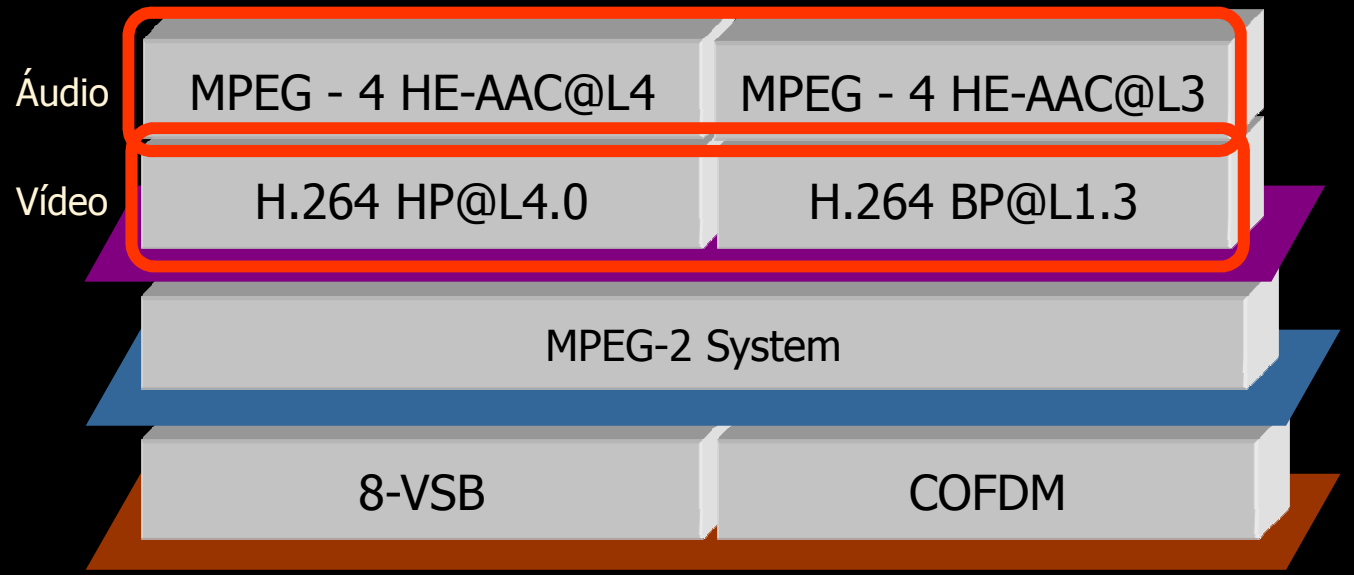

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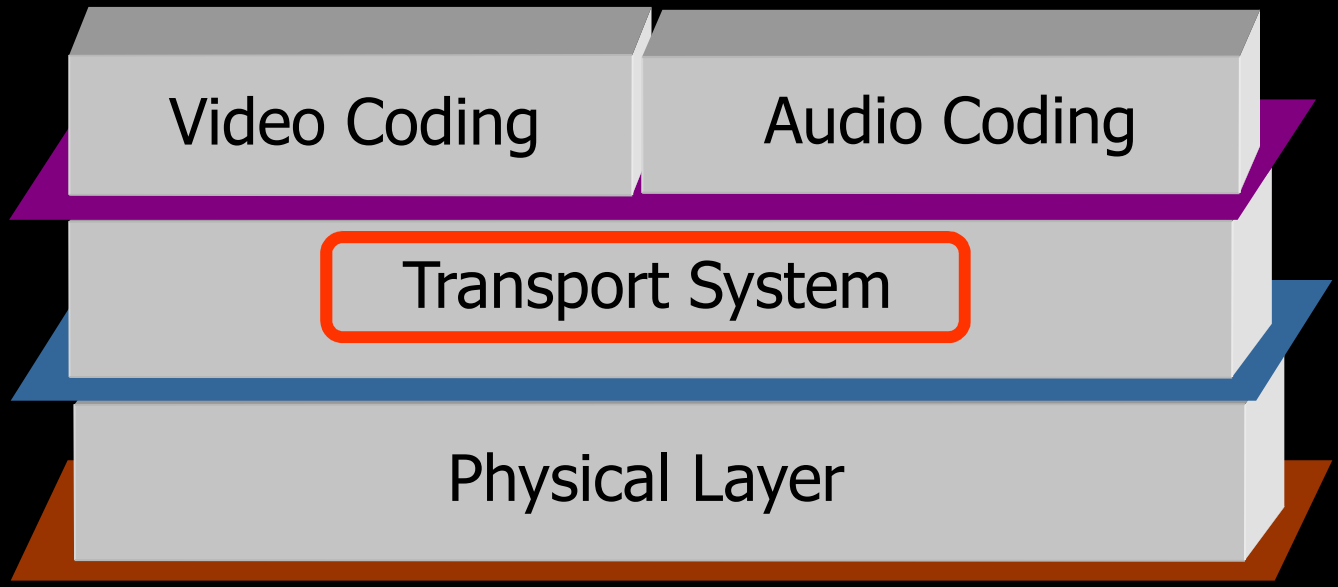

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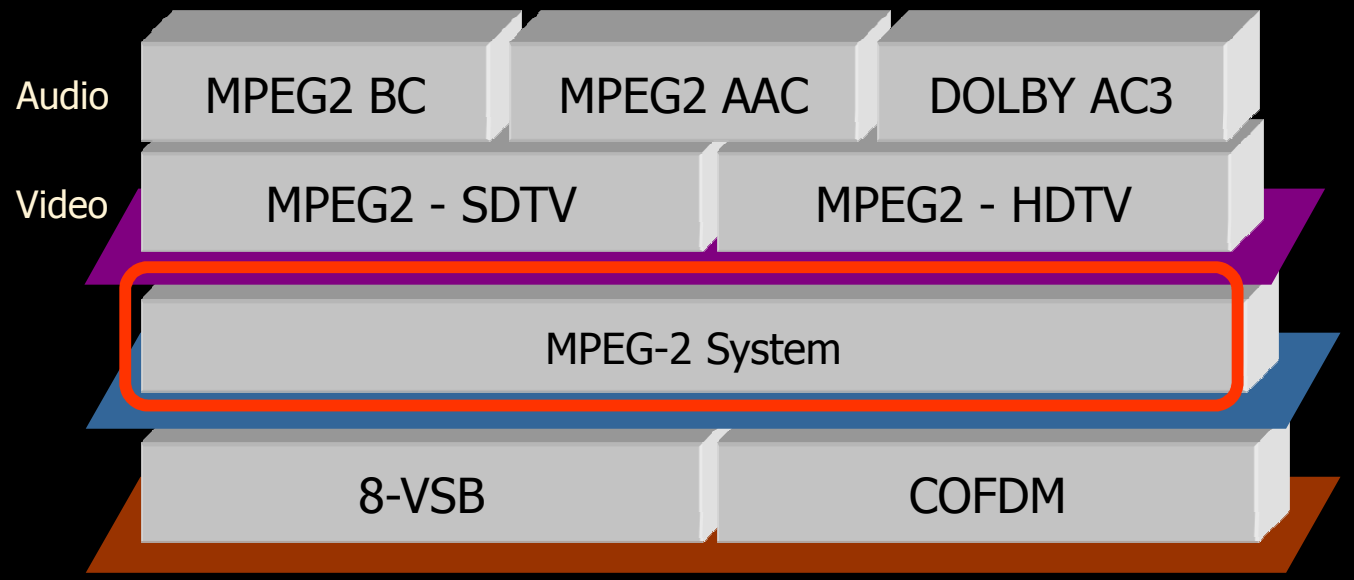

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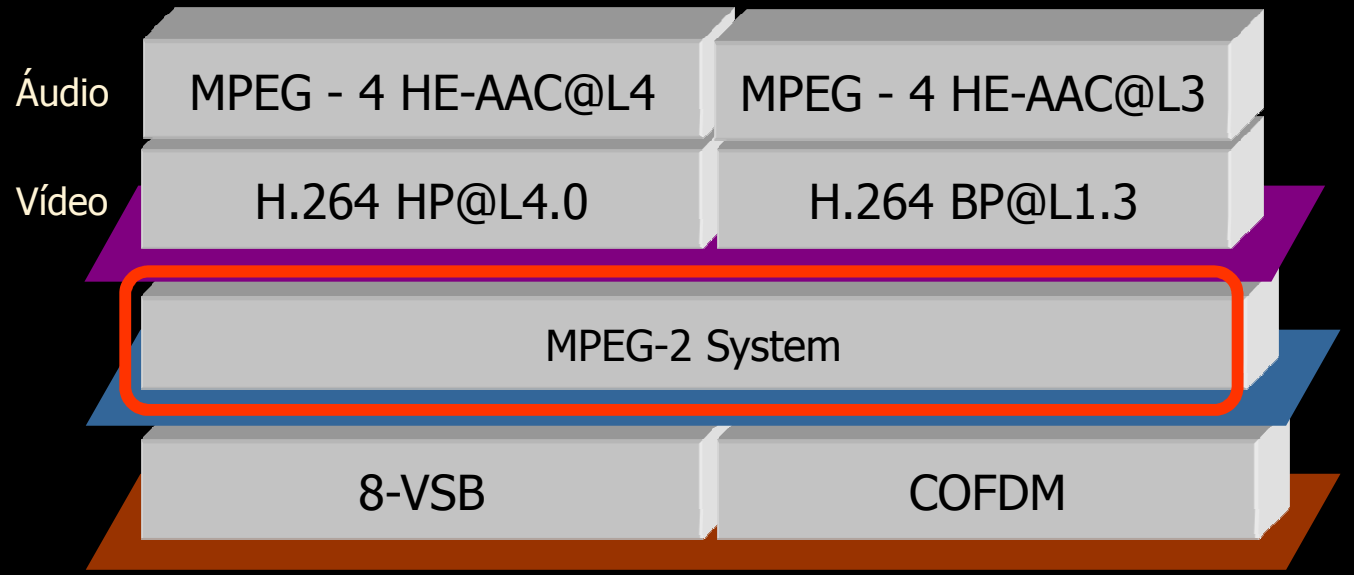
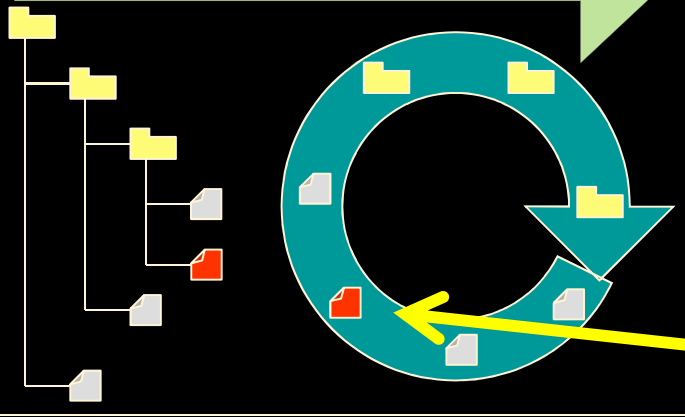


Transport Stream

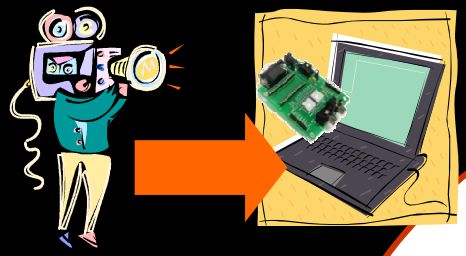
specification language

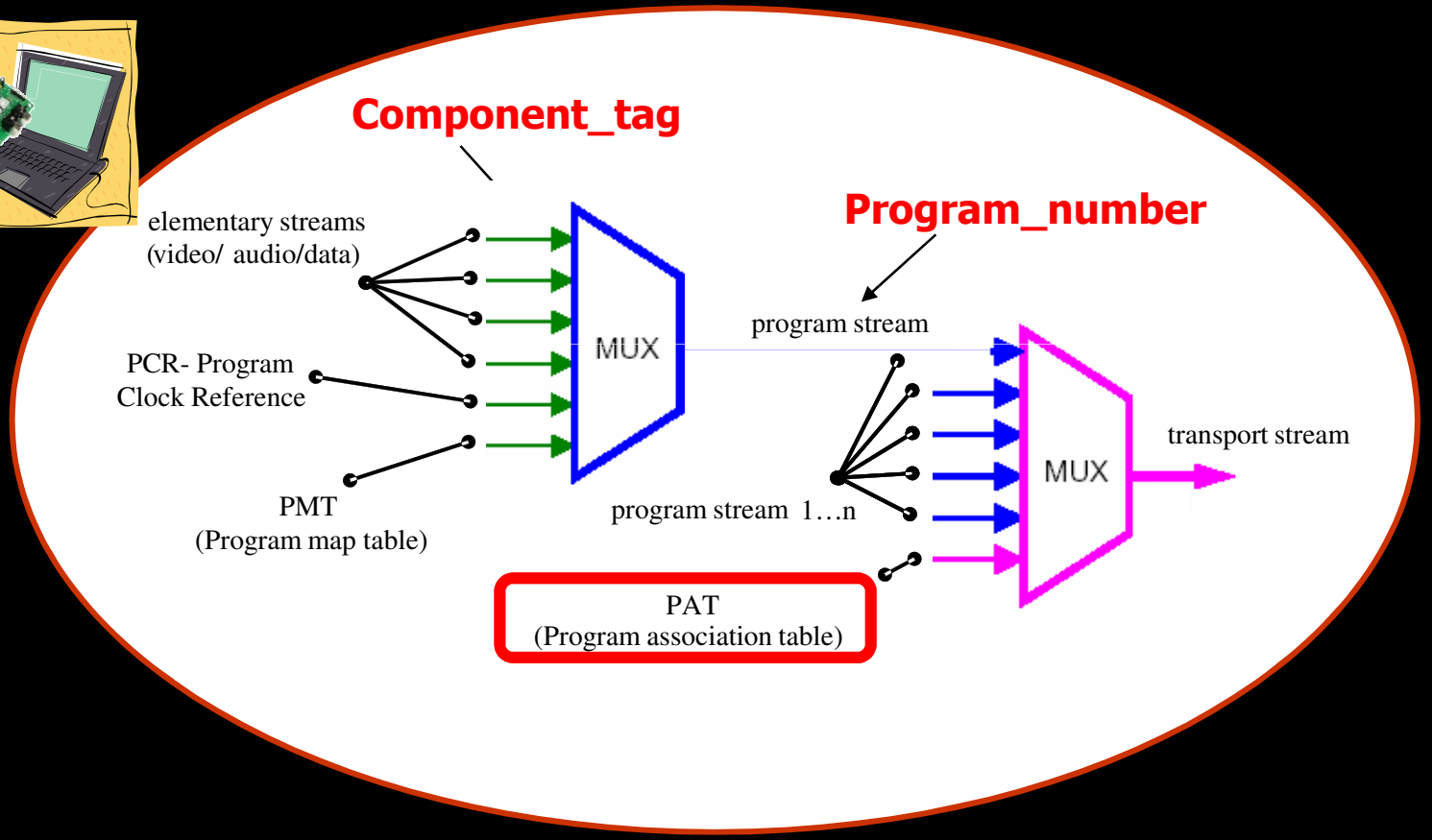
specification interpreter



application specification

MPEG-2 System





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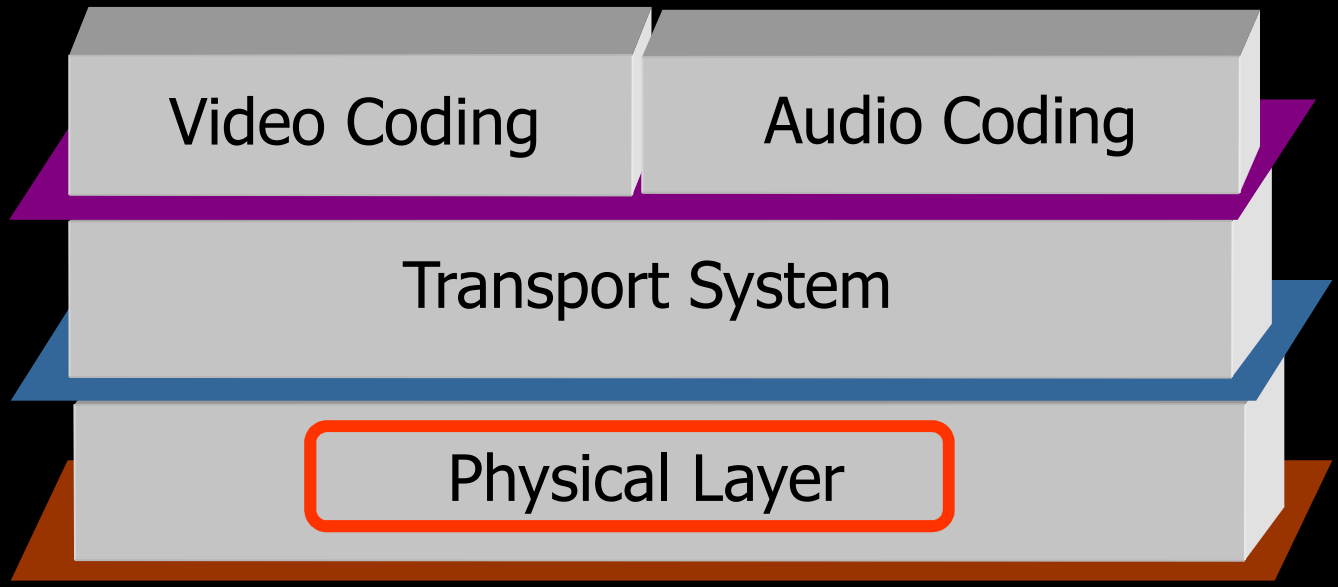

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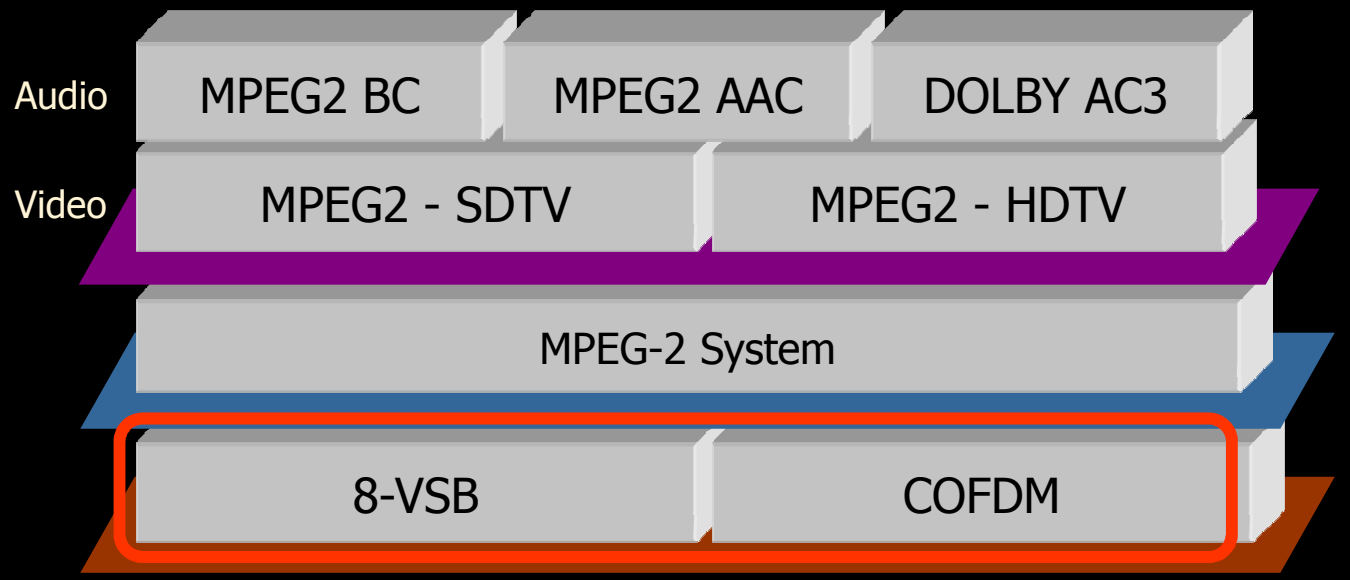

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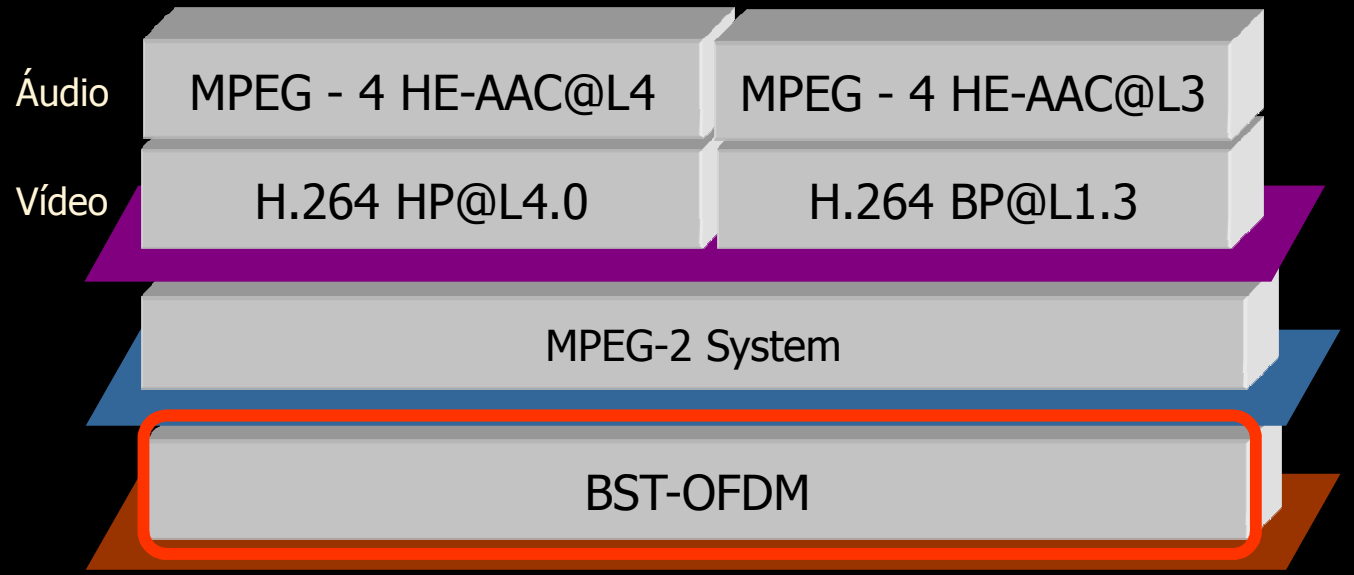

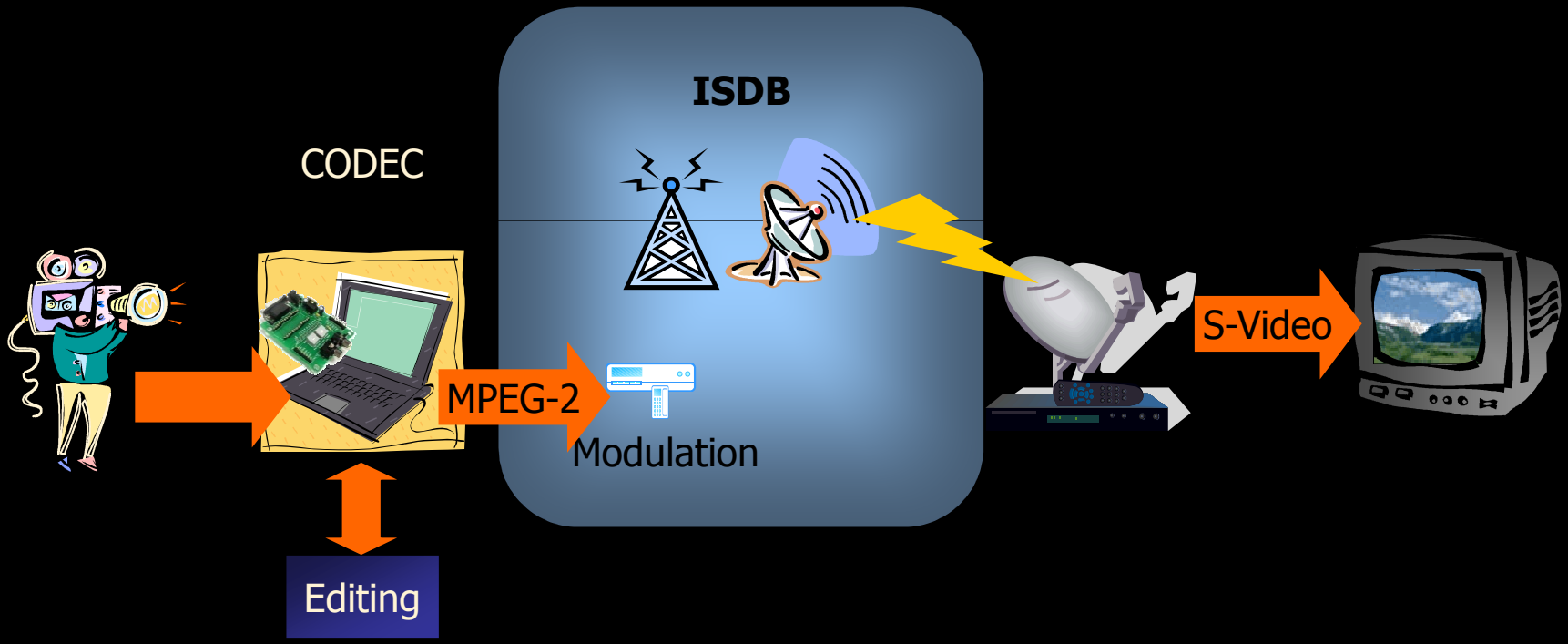

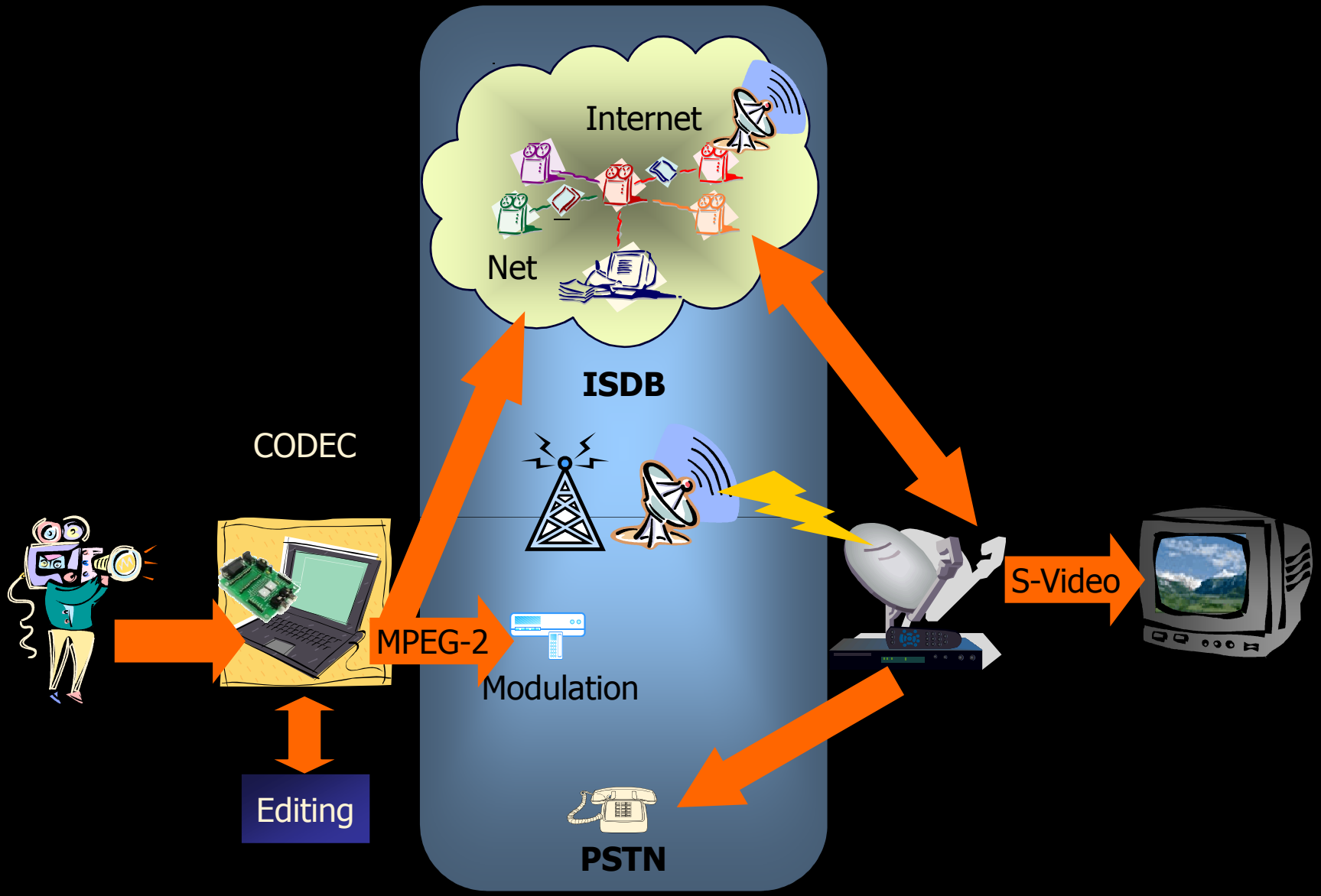

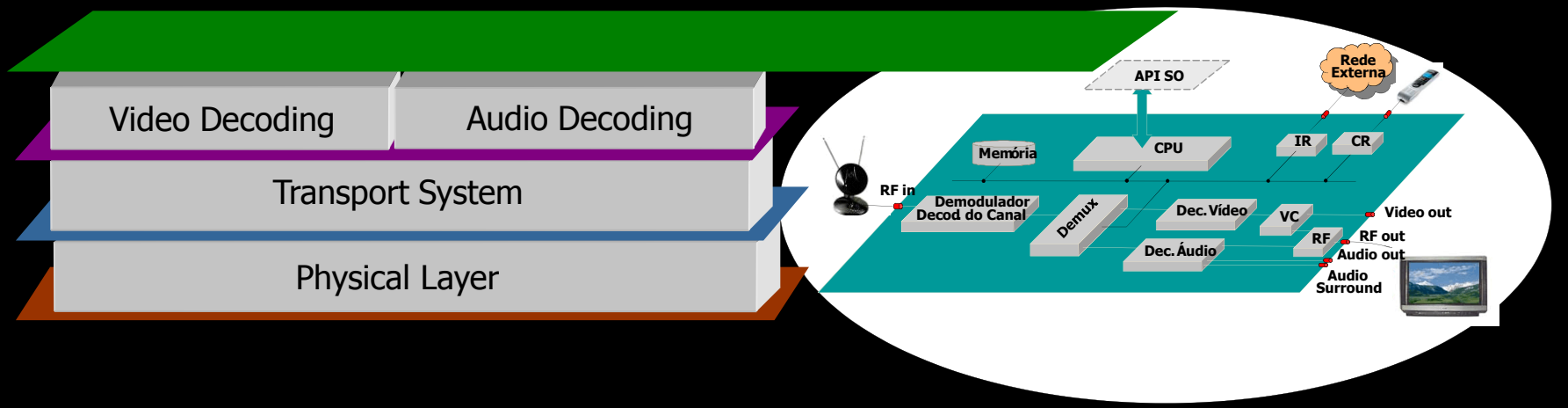

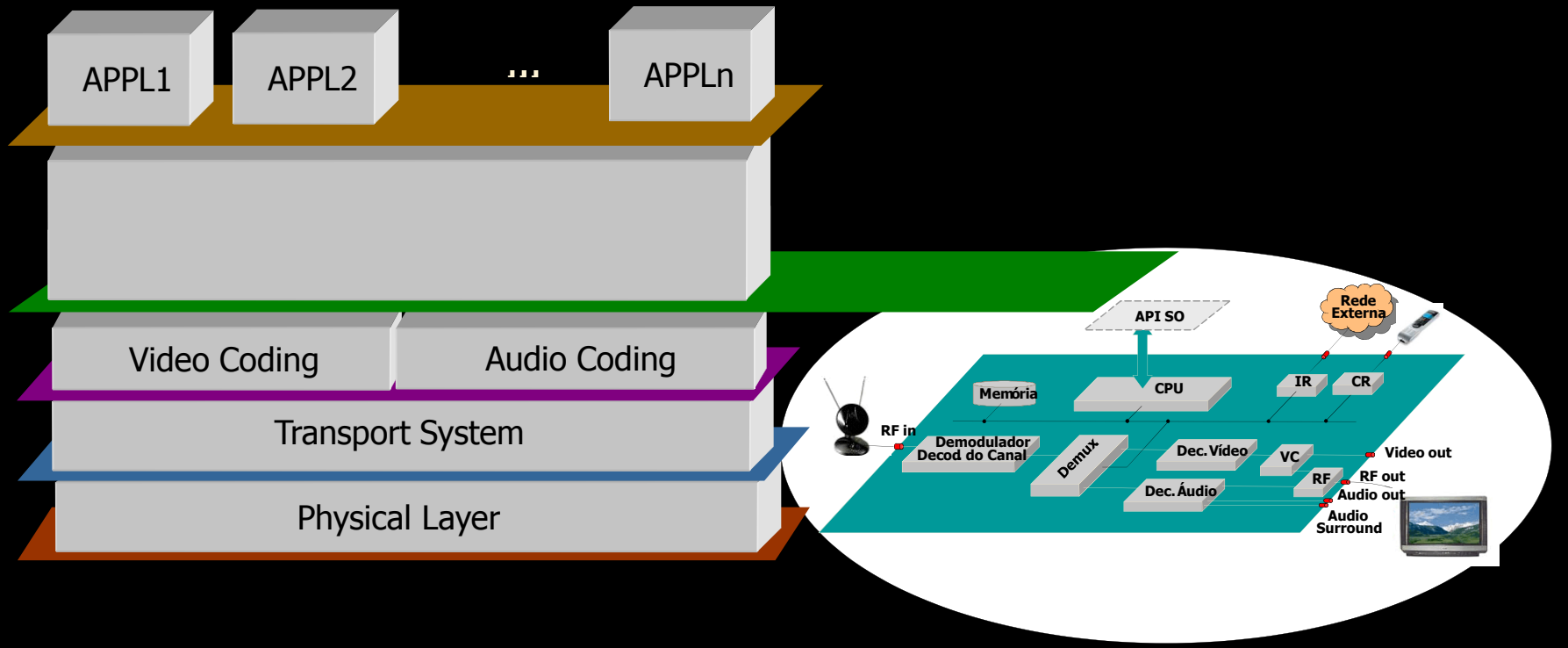

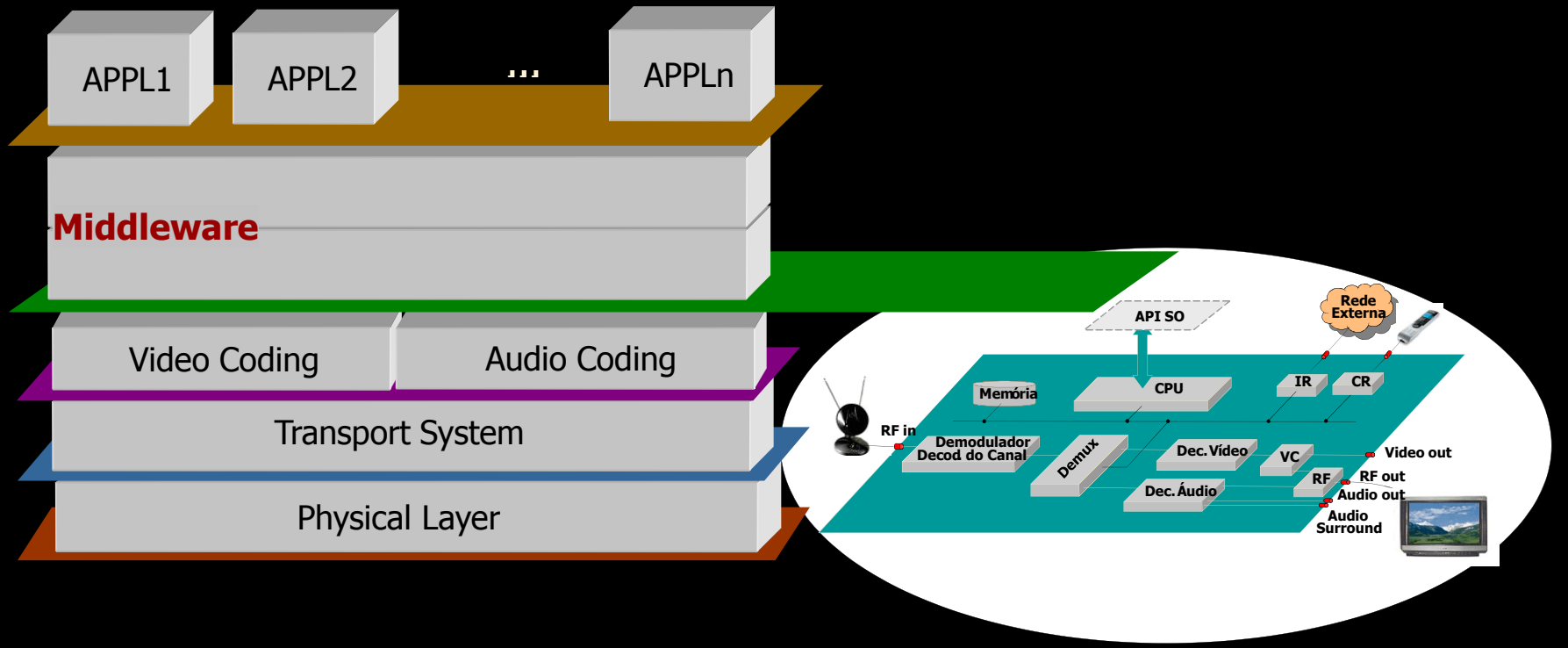

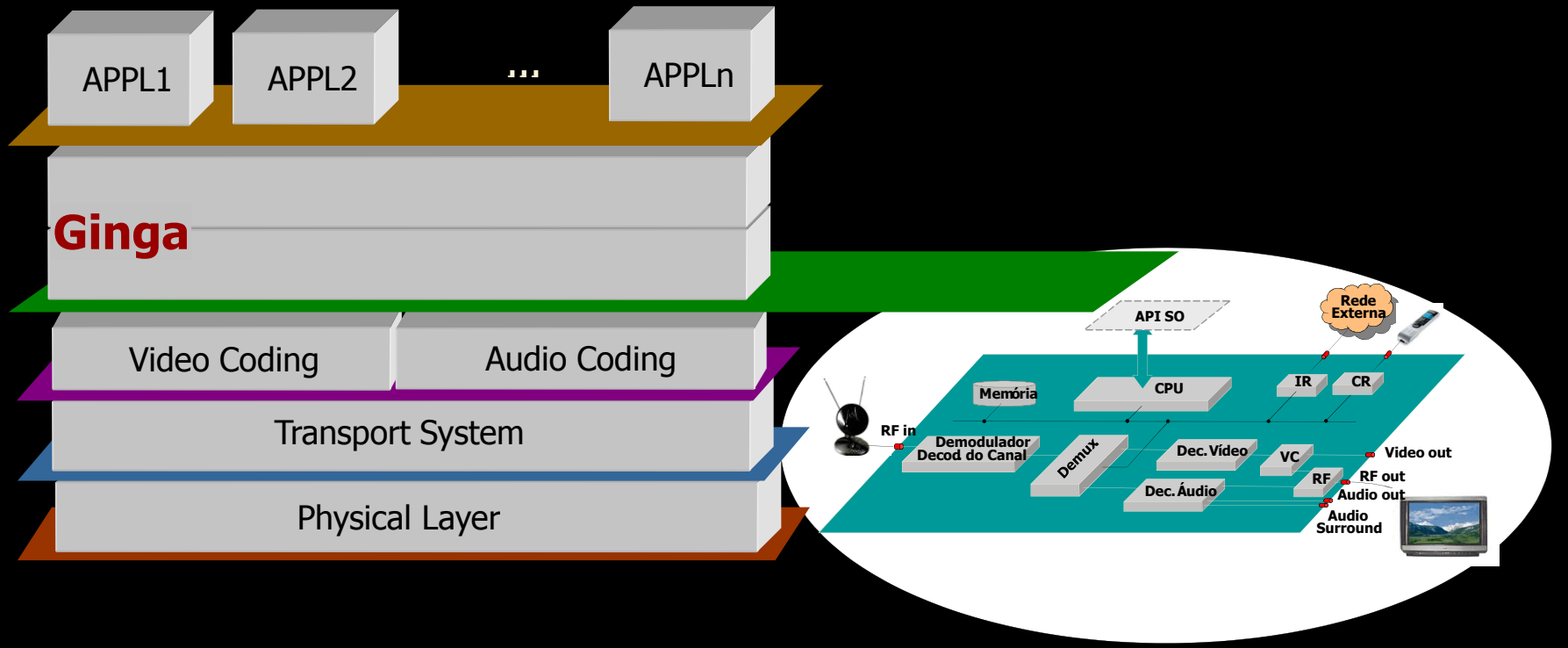

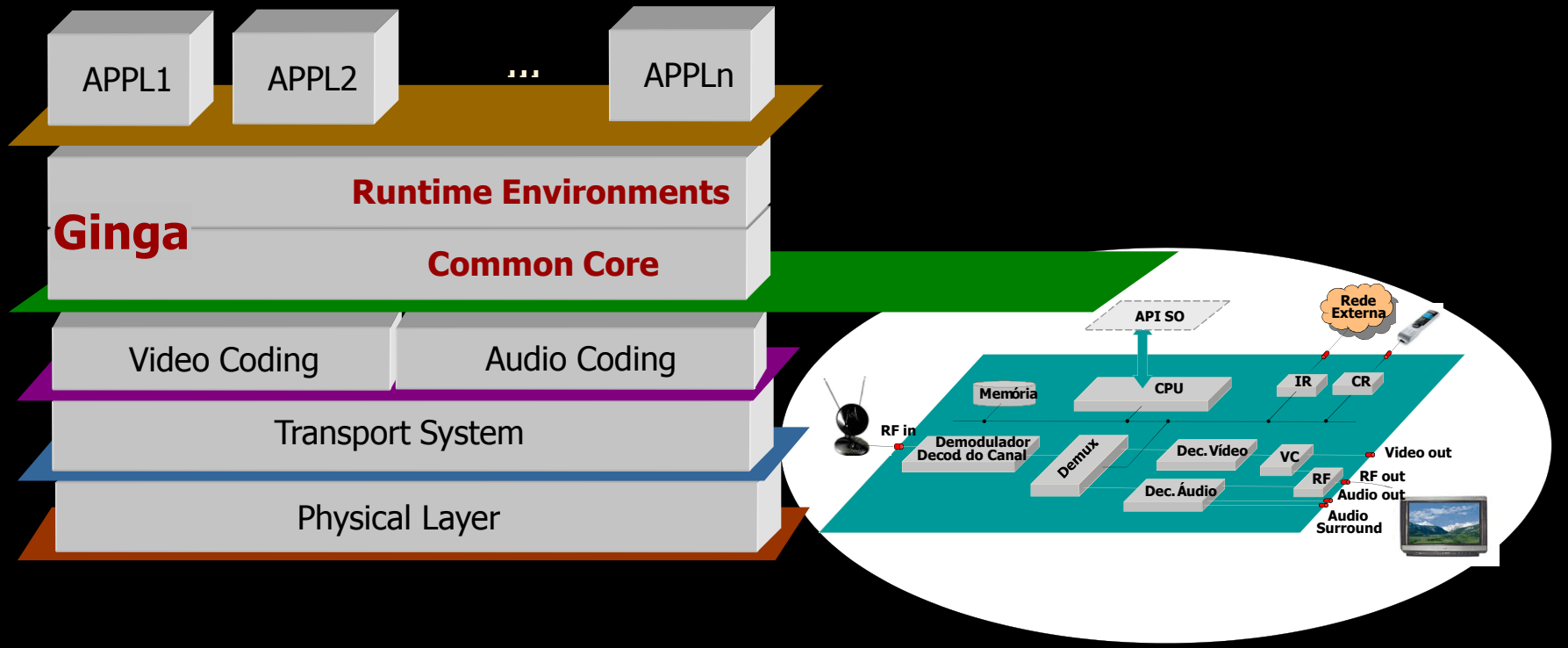

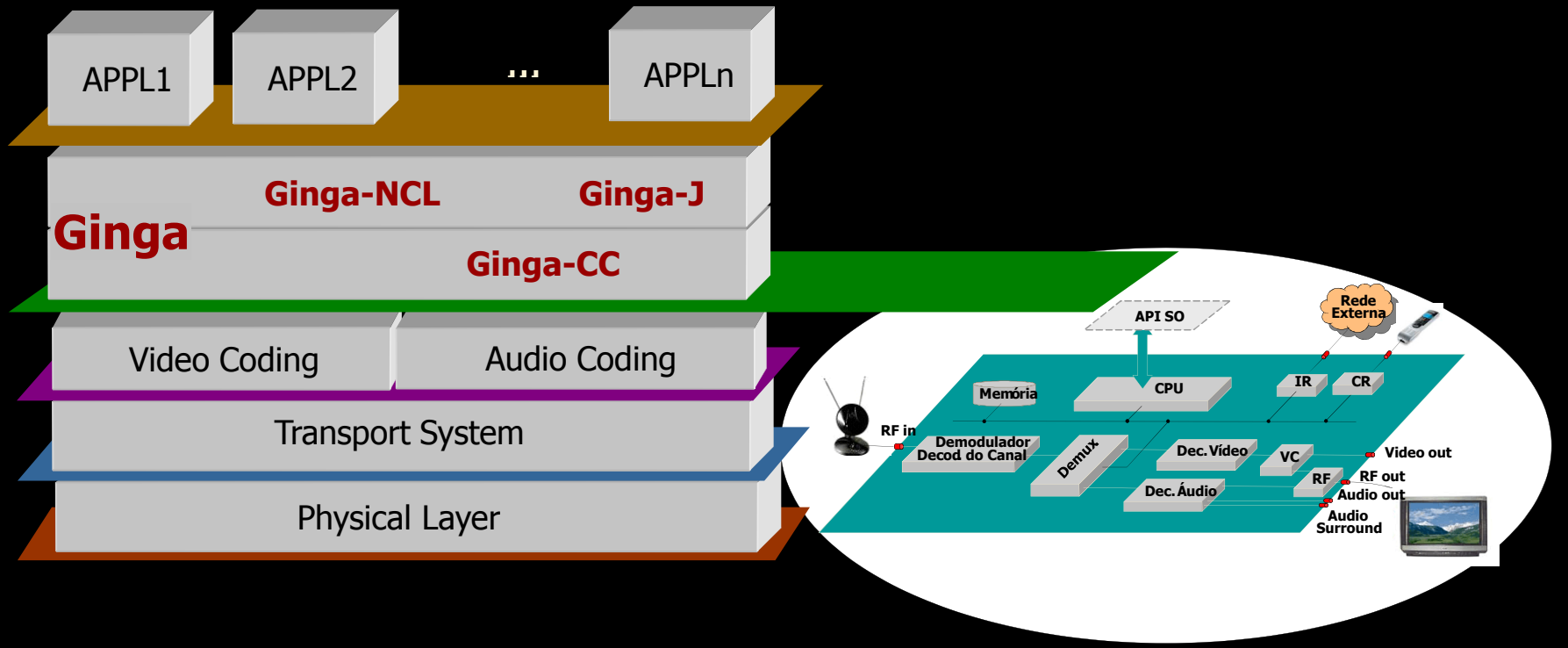

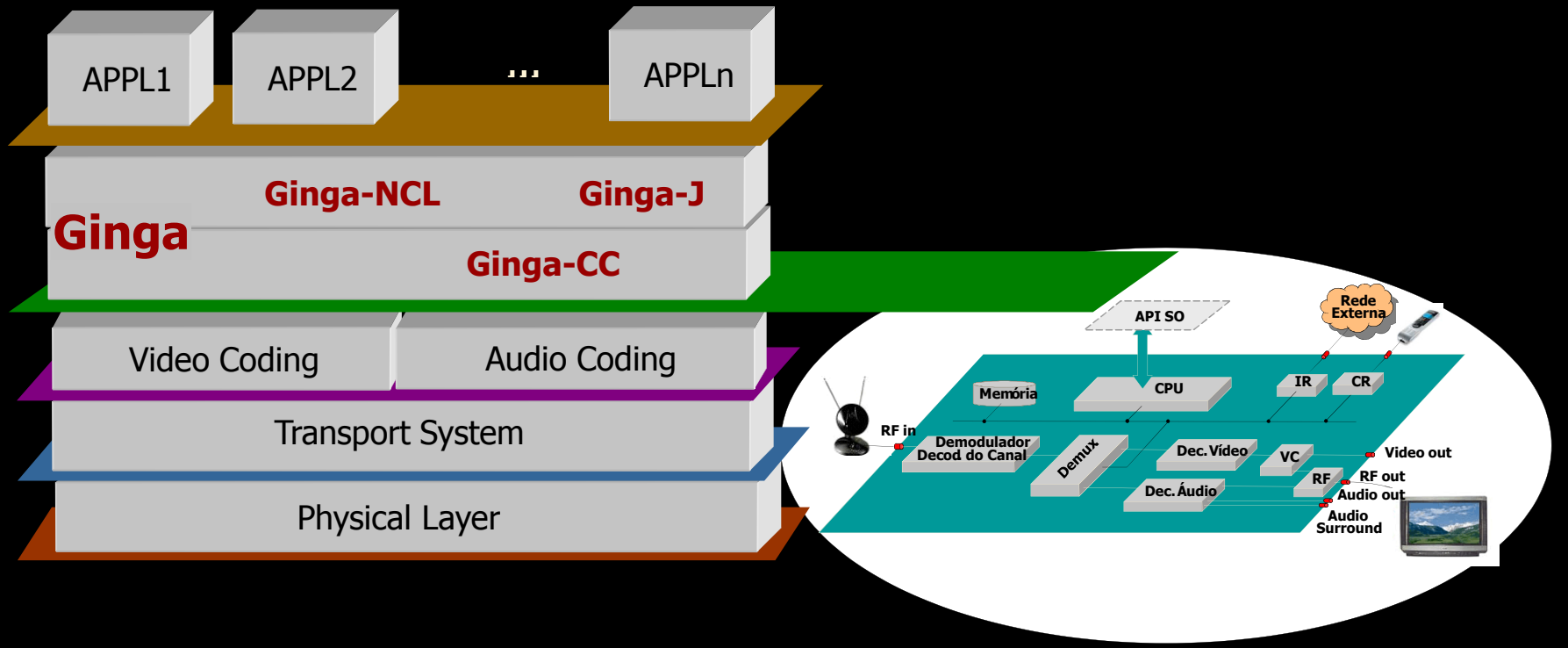

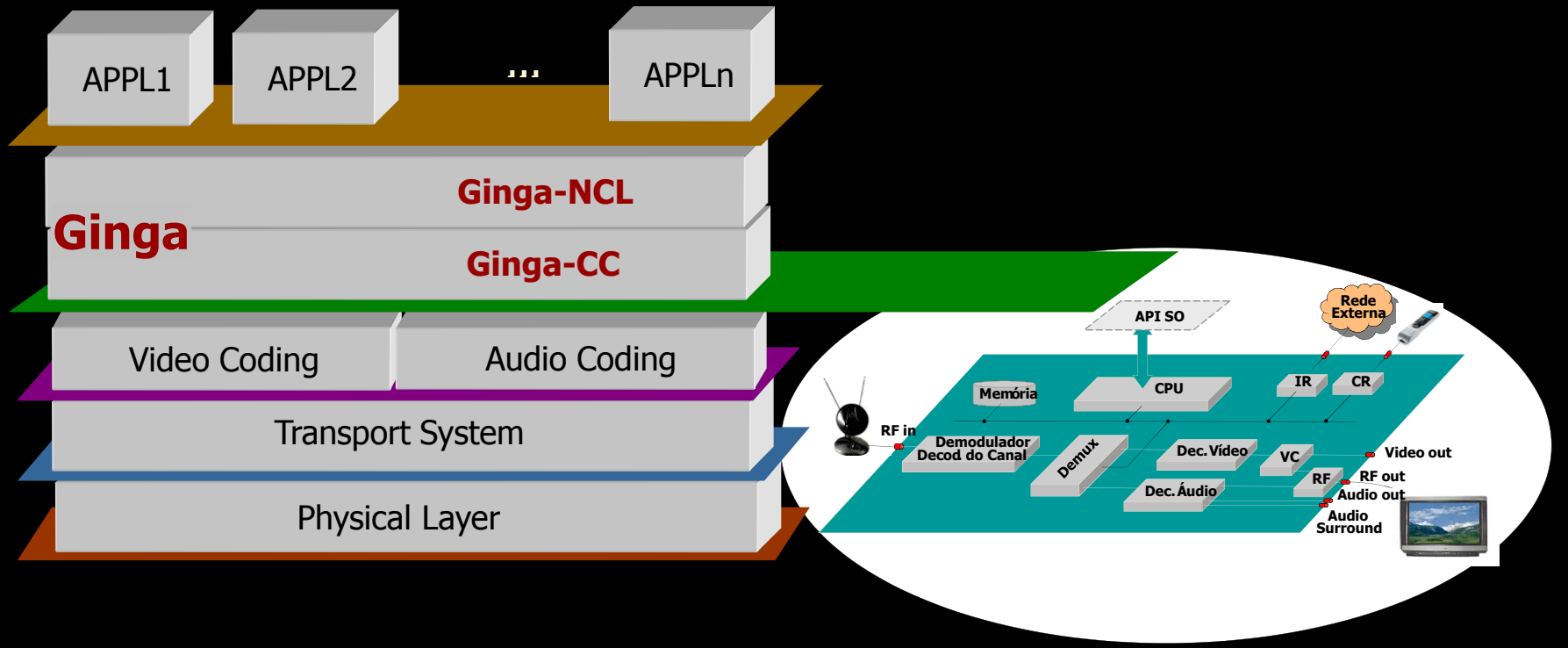

Middleware Requirements


	TV	TV (cable)	Tel. Fixed	Mobile	Mob. + Internet	Computer	Computer + Internet	Has never used a Computer	Have never used the Internet
TOTAL	97%	6%	36%	72%	21%	25%	18%	53%	61%
Urbain Area	98%	7%	40%	76%	23%	28%	20%	49%	57%
Rural Area	91%	1%	15%	72%	9%	8%	4%	75%	82%

	TV	TV (cable)	Tel. Fixed	Mobile	Mob. + Internet	Computer	Computer + Internet	Has never used a Computer	Have never used the Internet
TOTAL	97%	6%	36%	72%	21%	25%	18%	53%	61%
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Class A > R$ 4.151,00	100%	53%	90%	97%	58%	95%	91%	7%	10%
Class B	100%	19%	75%	94%	41%	70%	58%	20%	25%
Class C	99%	5%	40%	81%	23%	25%	16%	47%	55%
Class DE < R$ 1.245,00	92%	1%	13%	51%	8%	3%	1%	77%	84%

Data from 2008, published in 2009 by CGI.br

Specification Language

- Simple to be understood and learned
- Lightweight
- Powerful

- Declarative DSL language

Programming Paradigms

- Imperative (procedural)
  - algorithm specification: “how to do”
  - more expressiveness
- Declarative
  - specification: “final intention”
  - highest level specification

NCL
Nested Context Language

- The Brazilian innovation in the ISDB System:
  - NCL (Nested Context Language) declarative language
  - Its script NCLua language
  - Its engine: Ginga-NCL *middleware*.

- ITU-T H.761 Recommendation for IPTV services
- ITU-R BT 1691-1 Recommendation for Terrestrial DTV

Synchronization

Synchronization

Interactivity

Interactivity

TV is not a Computer

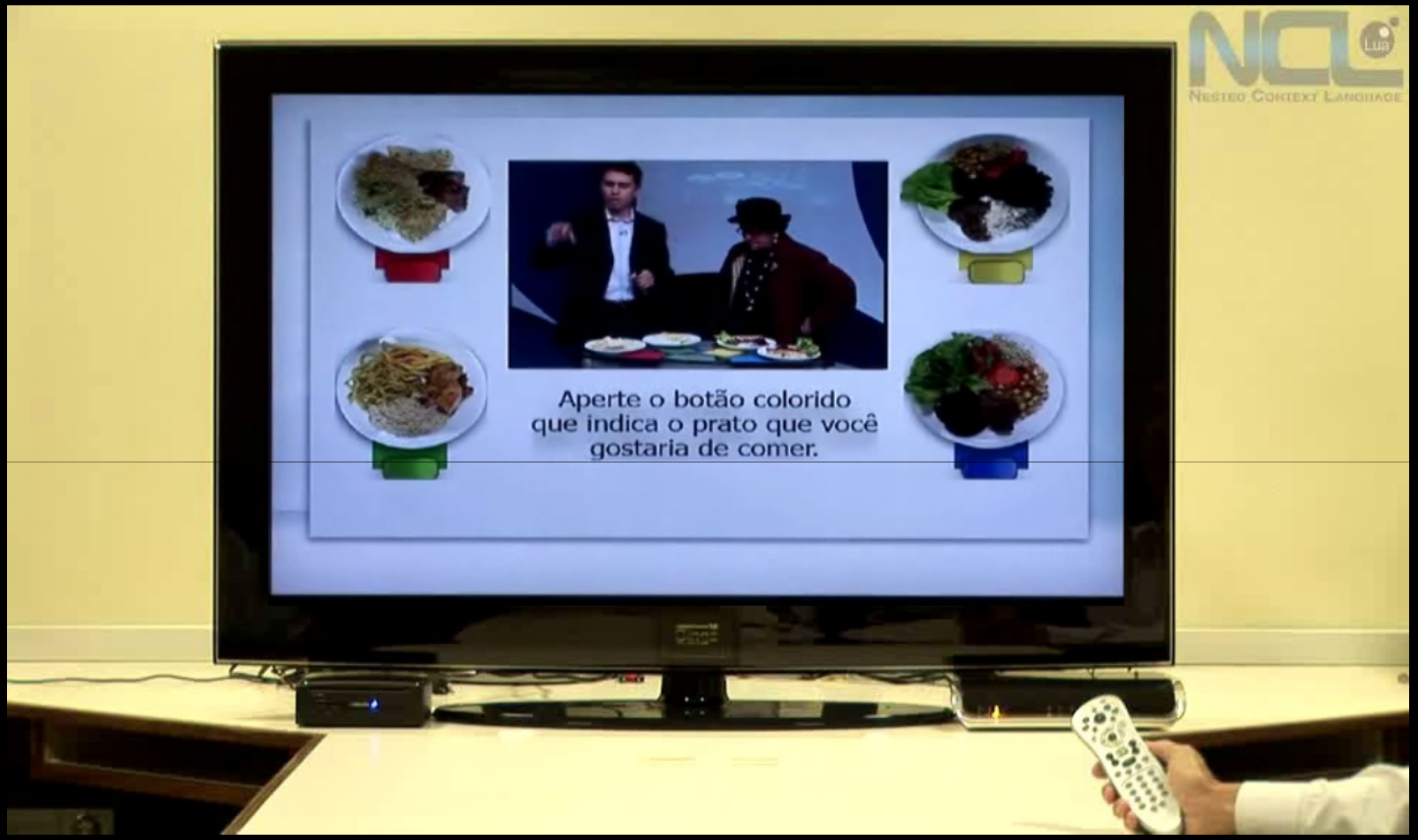
- Broadcast transmission
- Viewers are usually far from the screen and interact via remote control devices
- Usually more than one viewer

Viewer interaction must be treated as just an example of temporal synchronization

TV is not a Computer

- Broadcast transmission
- Viewers are usually far from the screen and interact via remote control devices
- Usually more than one viewer
- Video based applications

Structure-based synchronization



Middleware

Requirements


TV is not a Computer

- Broadcast transmission
- Viewers are usually far from the screen and interact via remote control devices
- Usually more than one viewer
- Video based applications

Multiple Exhibition Devices

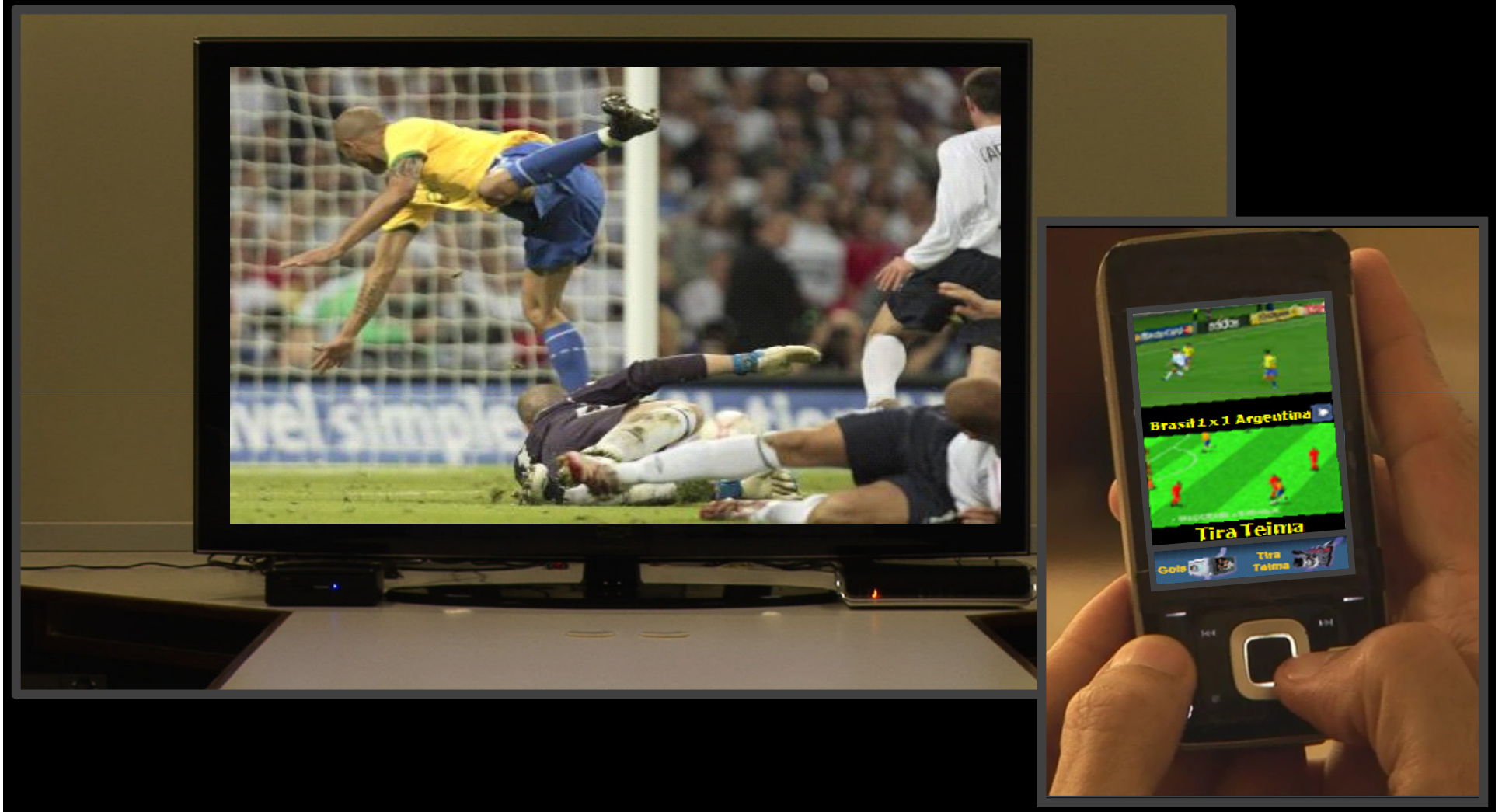
Single Exhibition Device

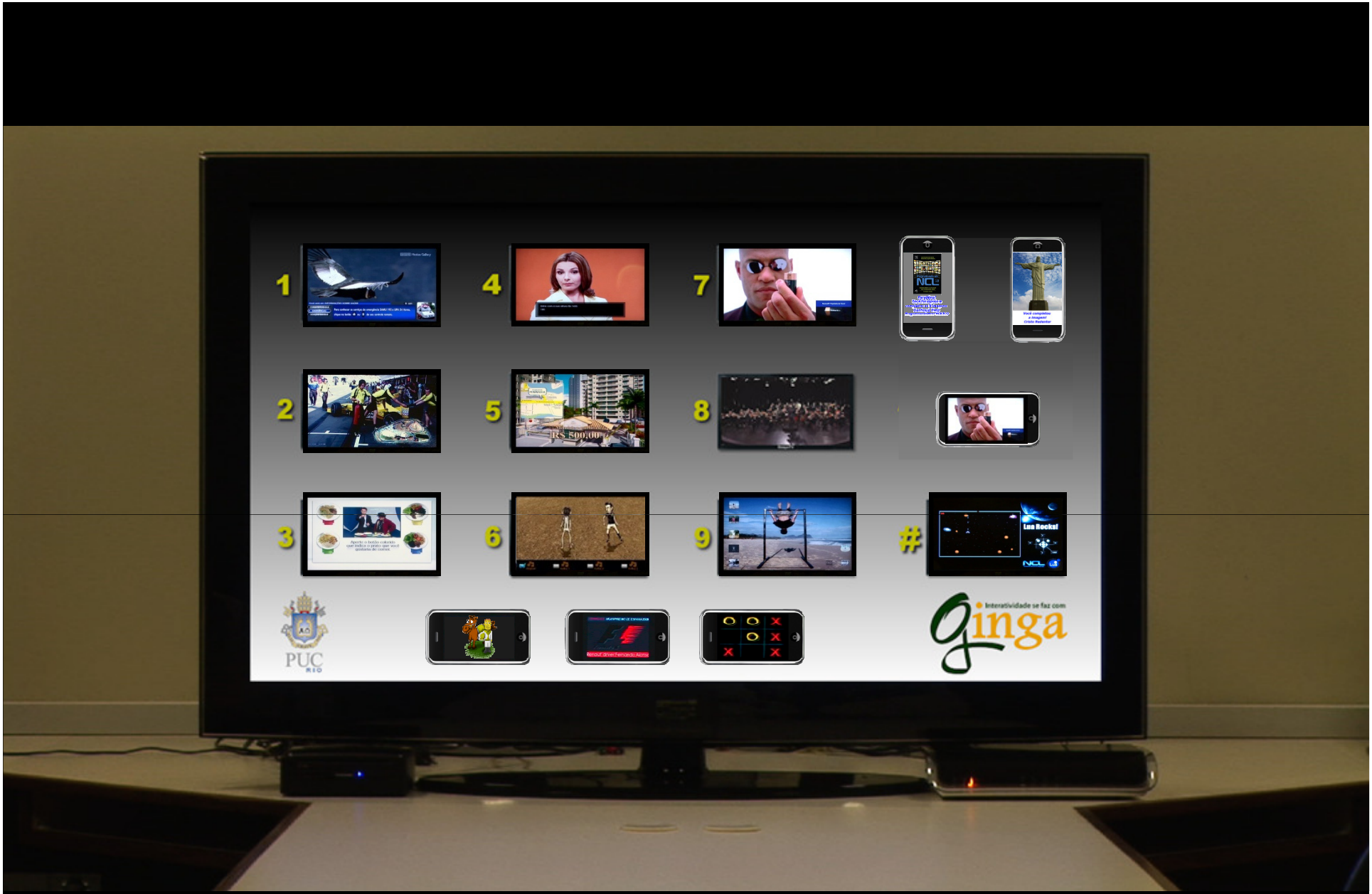
Single Exhibition Device

Single Exhibition Device

Multiple Exhibition Devices

Multiple Exhibition Devices





Adaptation

Adaptation

Adaptation

Adaptation

Content and Presentation Adaptation

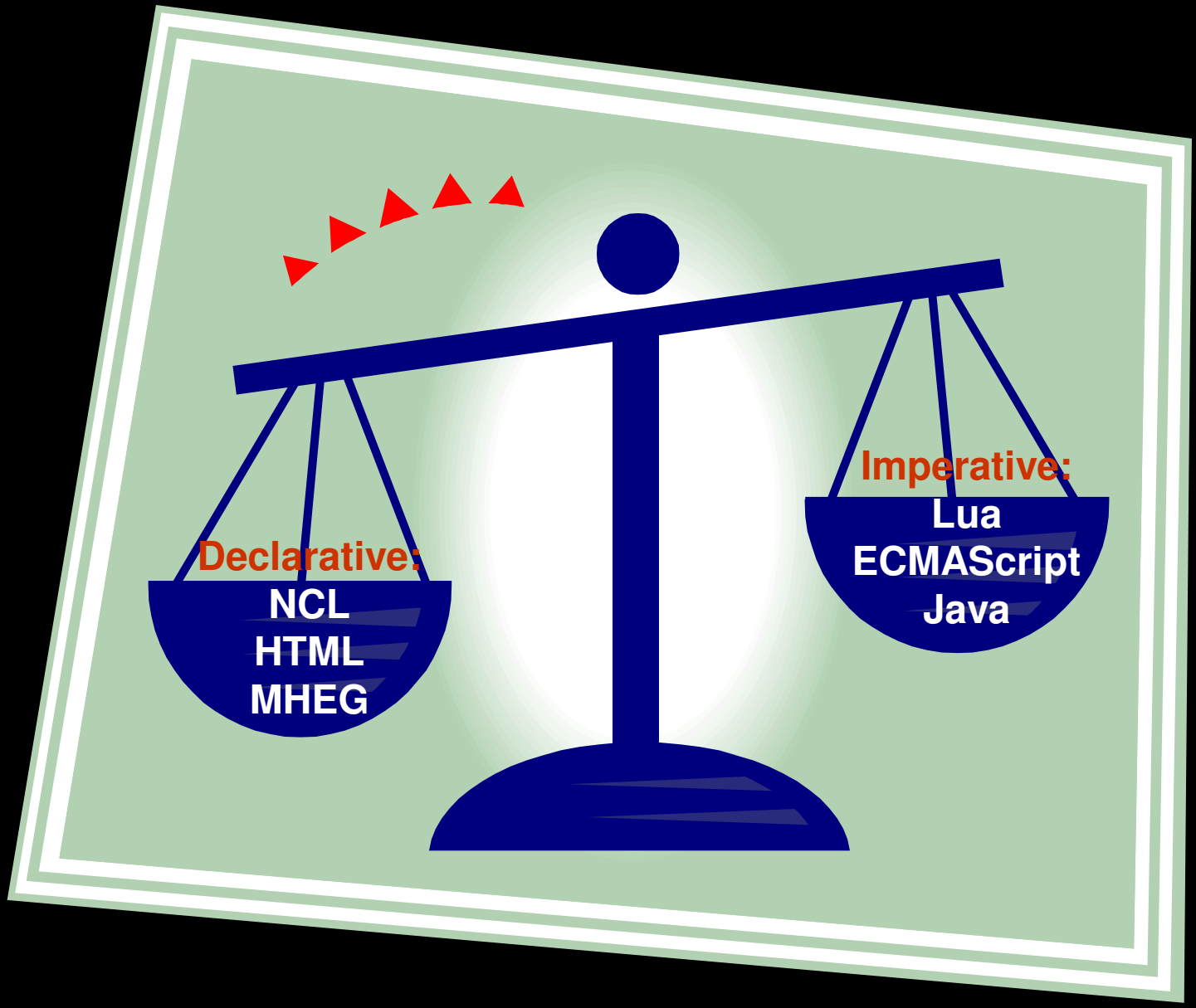
- Presentation device
- User profile
- User location

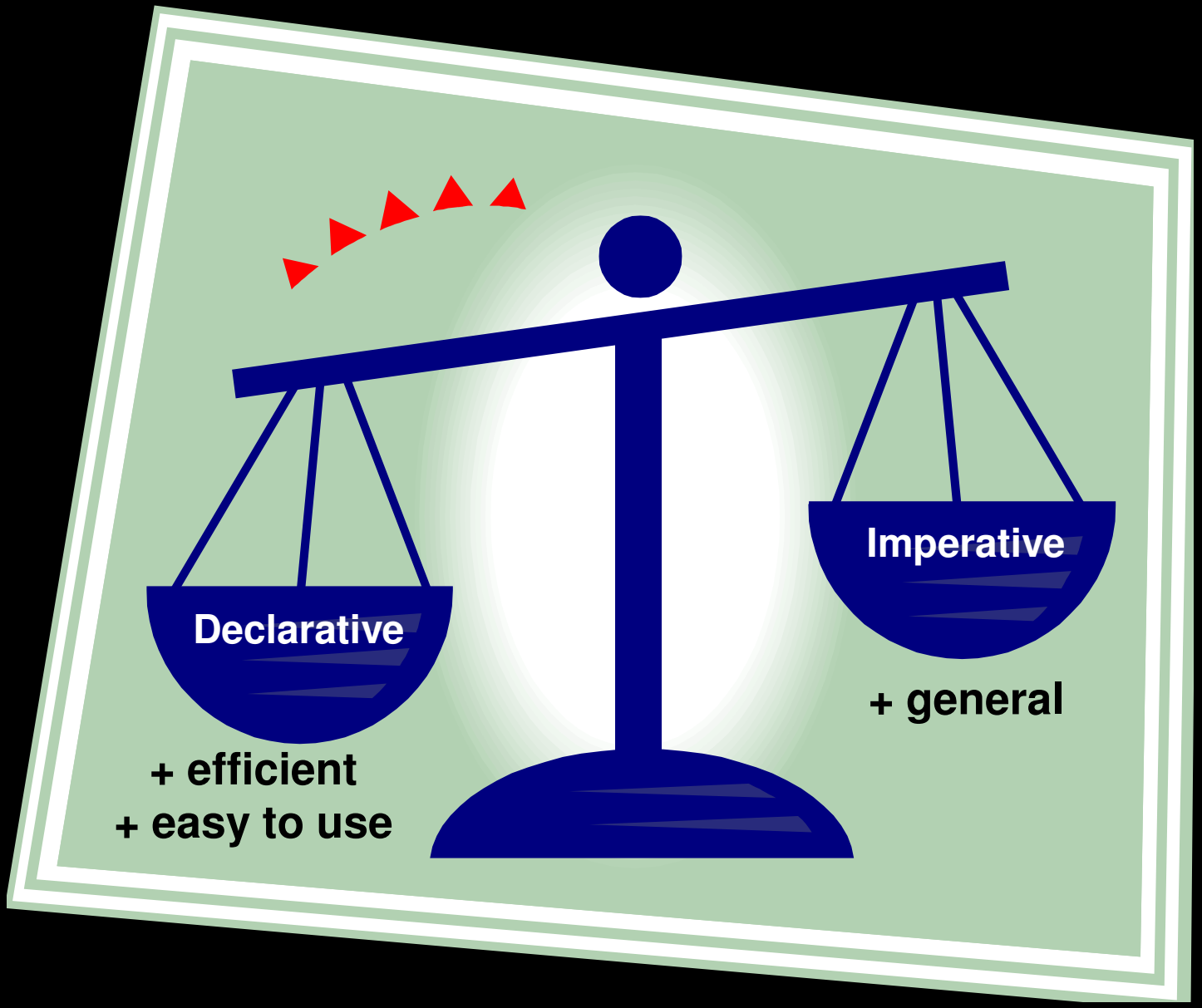
Adaptability

Programming Paradigms

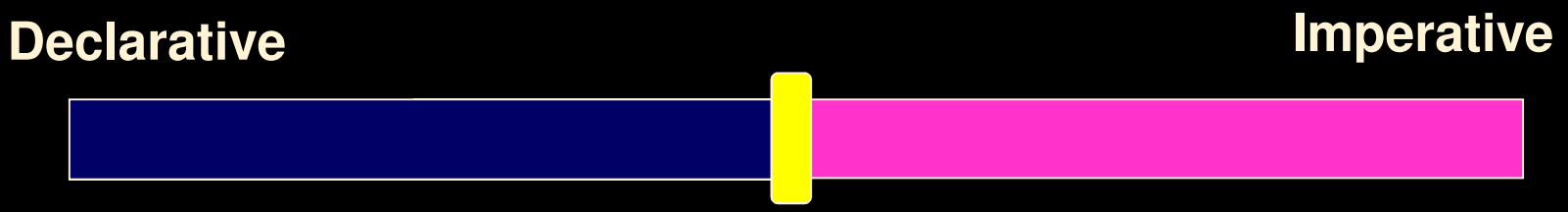
- Imperative (procedural)
  - algorithm specification: “how to do”
  - more expressiviness
- Declarative
  - specification: “final intention”
  - highest level specification

Media synchronization
Adaptability
Multiple devices



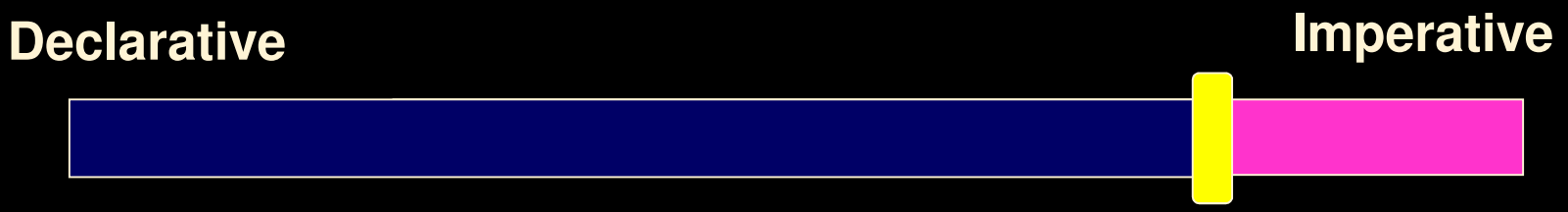


Declarative X Imperative



Declarative X Imperative

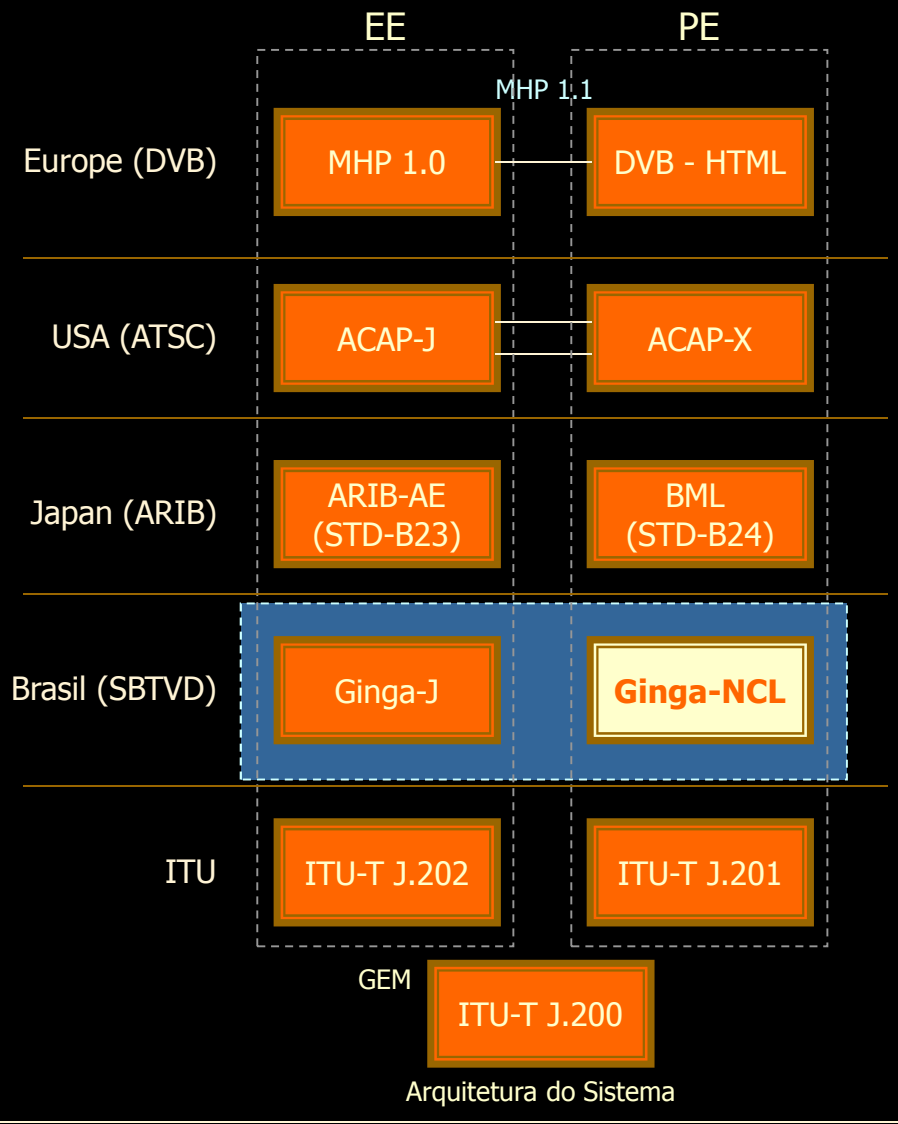
Declarative X Imperative



State of the art – Declarative *Middleware*

- Focus on interactivity
  - Synchronization and adaptability by using scripts (procedural)

DTV Middlewares



Arquitetura do Sistema

- J.200: Worldwide common core – Application environment for digital interactive television services
- J.201: Harmonization of declarative content format for interactive TV applications
- J.202: Harmonization of procedural content formats for interactive TV applications

Declarative X Imperative

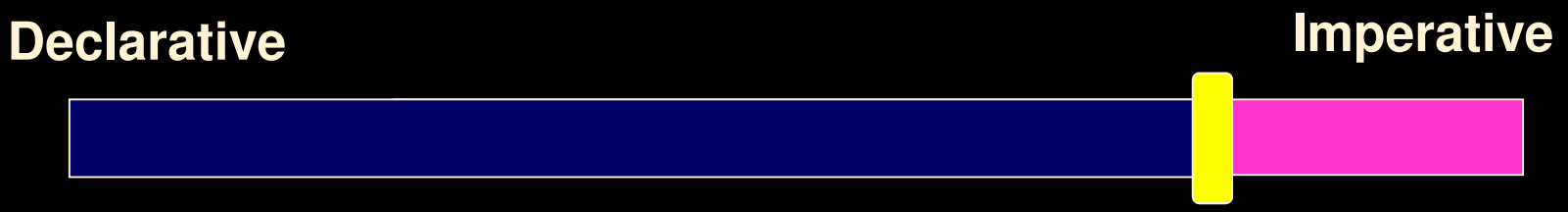
HTML

Why NCL?

NCL – Nested Context Language

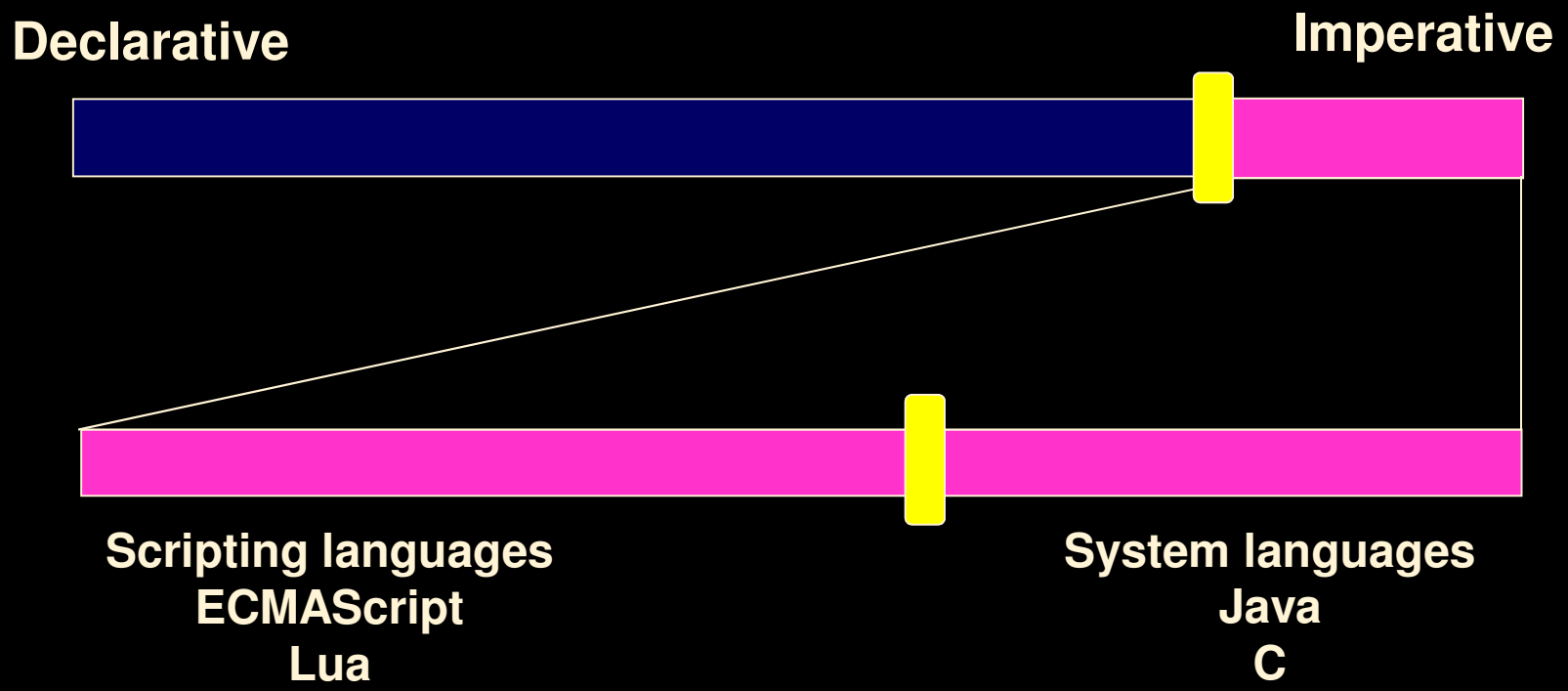
- Synchronization support
  - Structure-based synchronization
  - Interactive channel support
- Multiple device facilities
- Support for content and presentation adaptation
- Live editing support
- NCL is free software

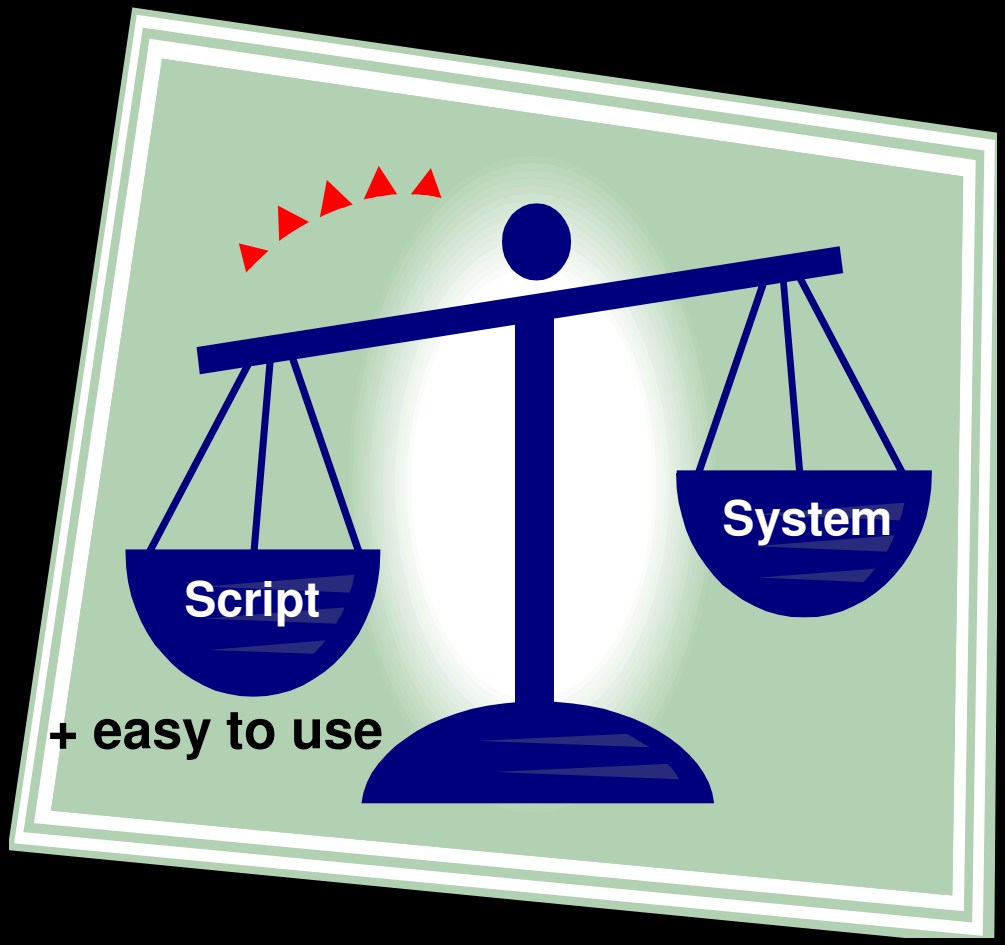
Declarative X Imperative



NCL

Declarative X Imperative



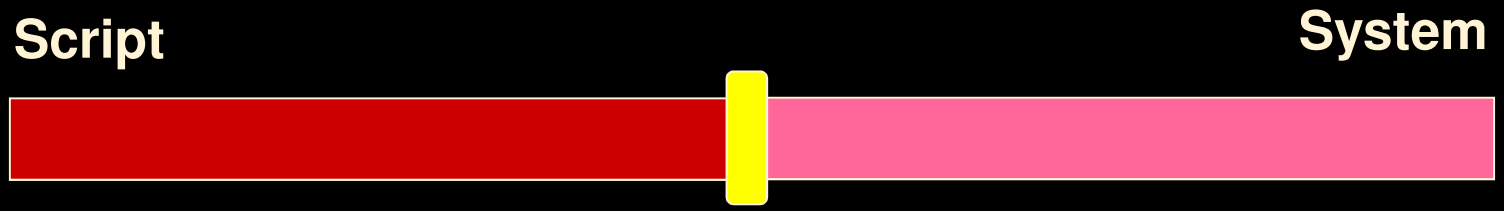


Efficiency?

Footprint?

Problem dependent

Script X System



Script X System

Script X System

Ginga Options

Small to medium complex tasks: Lua

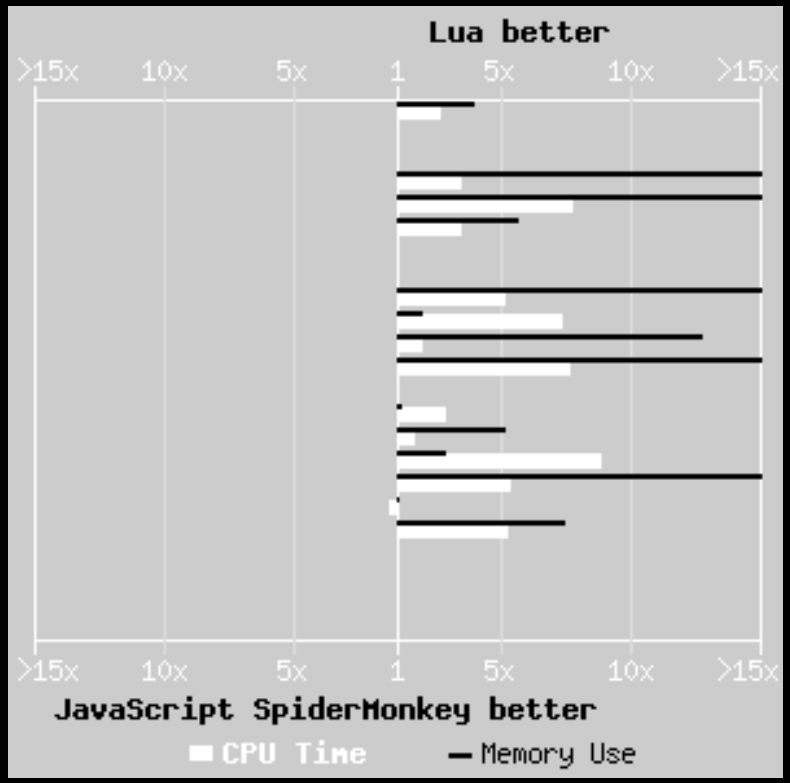
High complex tasks: Java

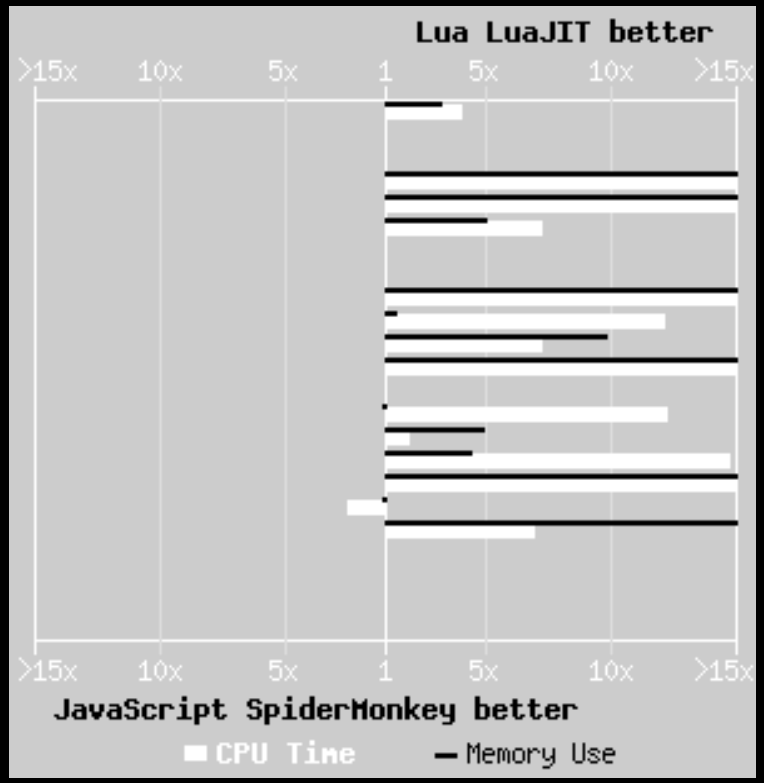
Why Lua?

Why Lua?

- Lua is Simple and Powerful
- Lua is Portable
- Lua is Embeddable
- Lua is Fast
- Lua is Robust
- Lua is Free Software

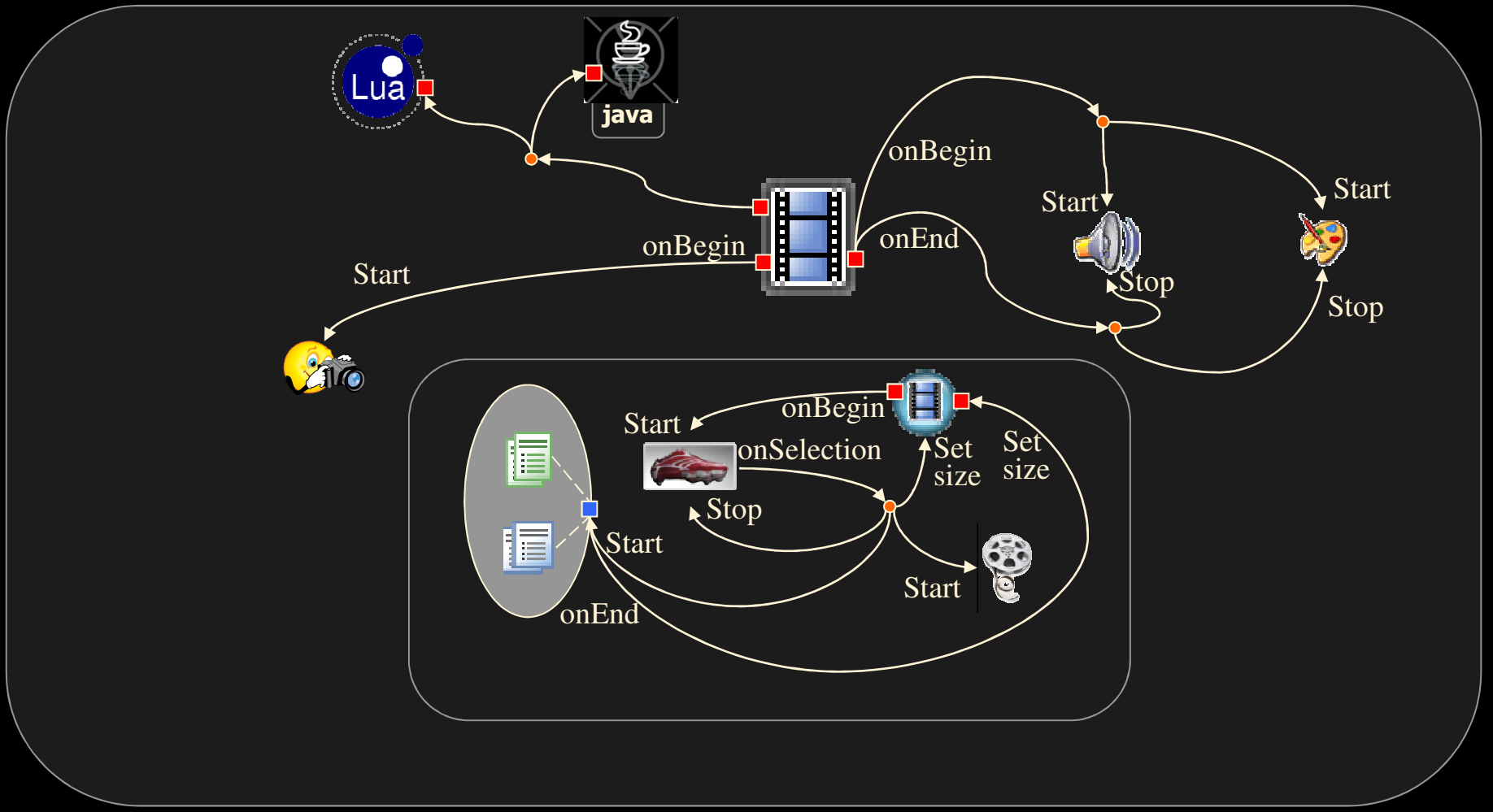
http://shootout.alioth.debian.org/



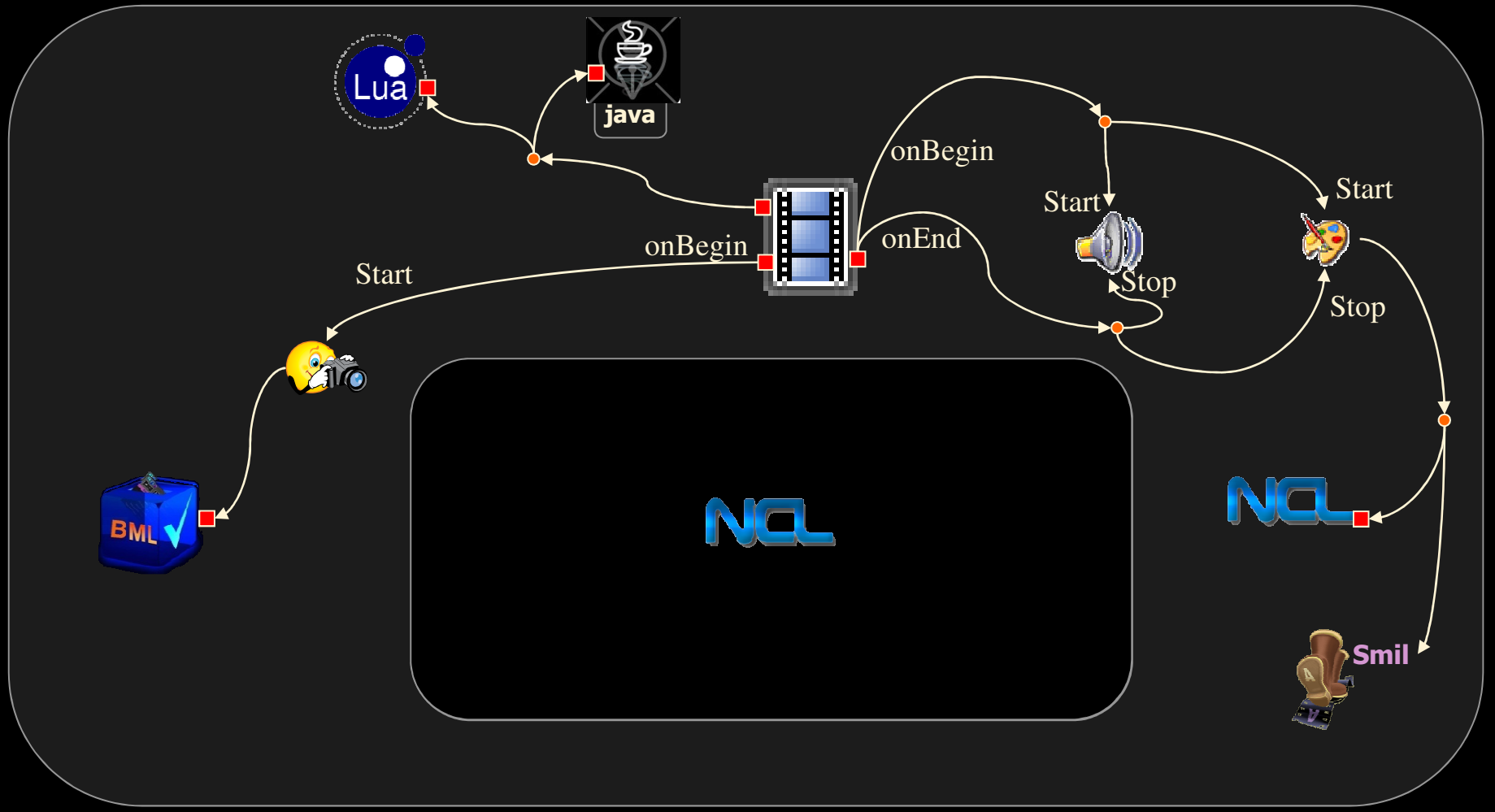


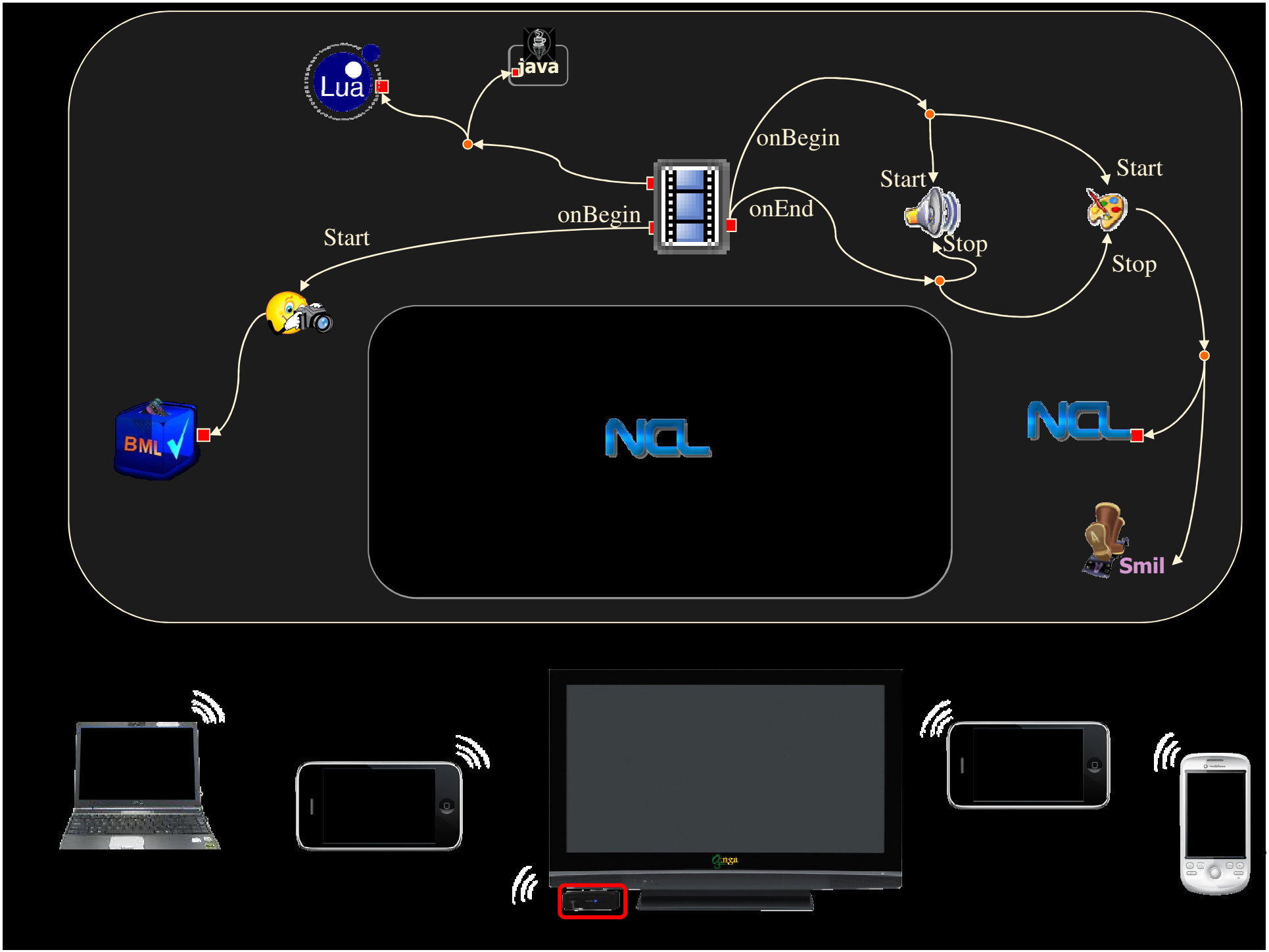
JavaScript SpiderMonkey = 936 Kbytes
Lua = 120 Kbytes
LuaJIT = 150 Kbytes

NCL



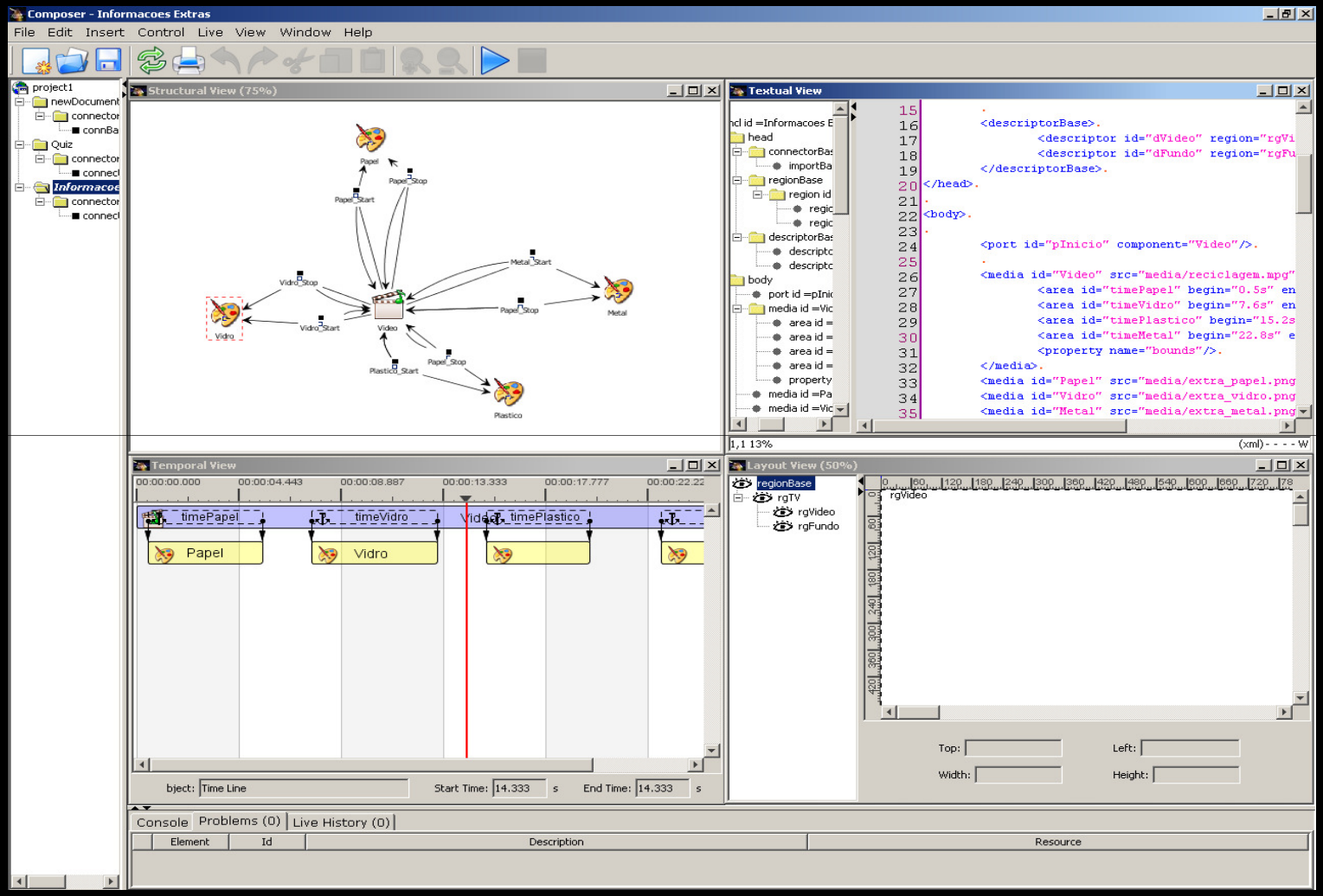
NCL



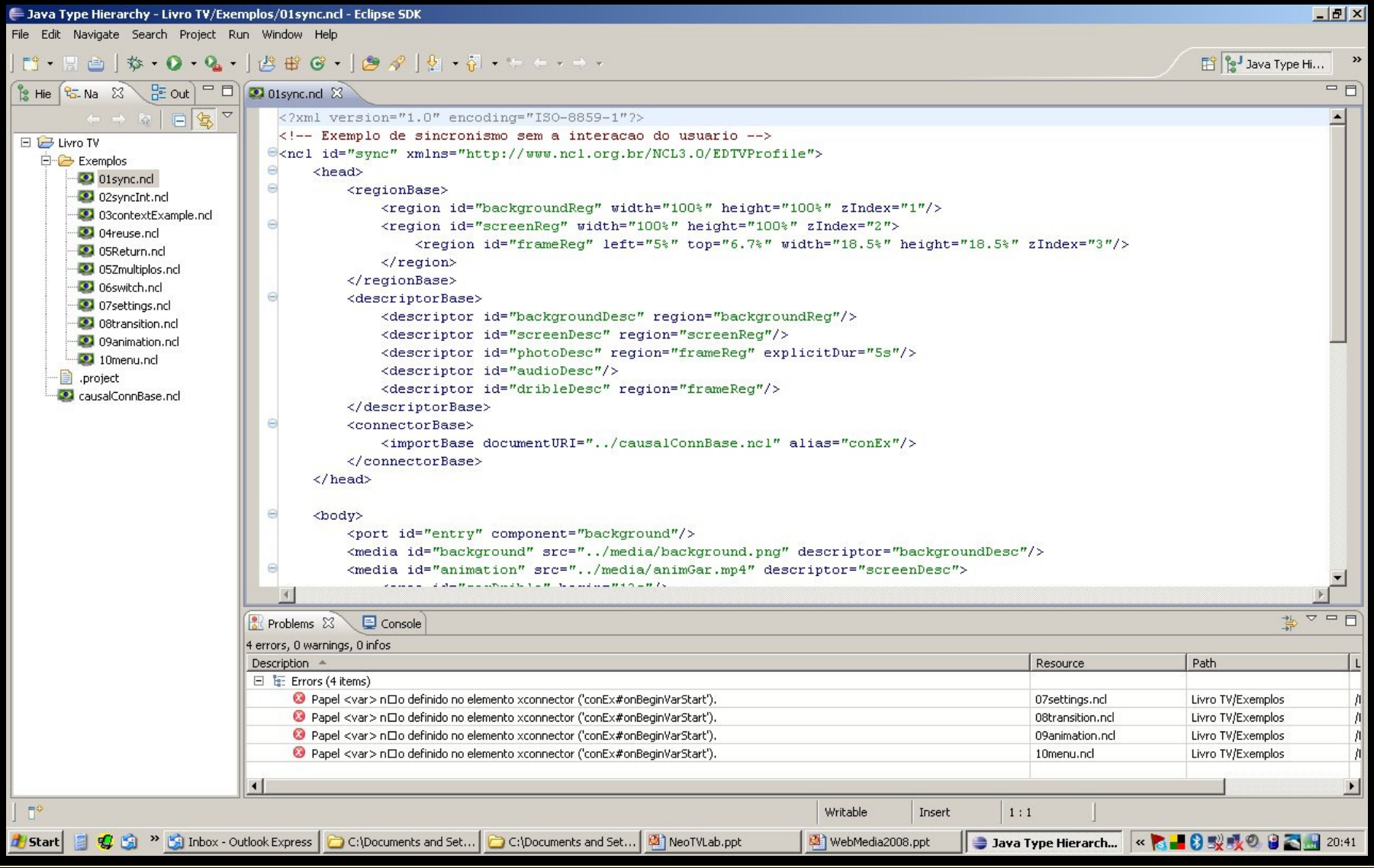

Lua
java
onBegin
Start
Start
onBegin
onEnd
Stop
Stop
Start
BML
NCL
NCL
Smil

Final Remarks


Composer 1.0



NCL Eclipse

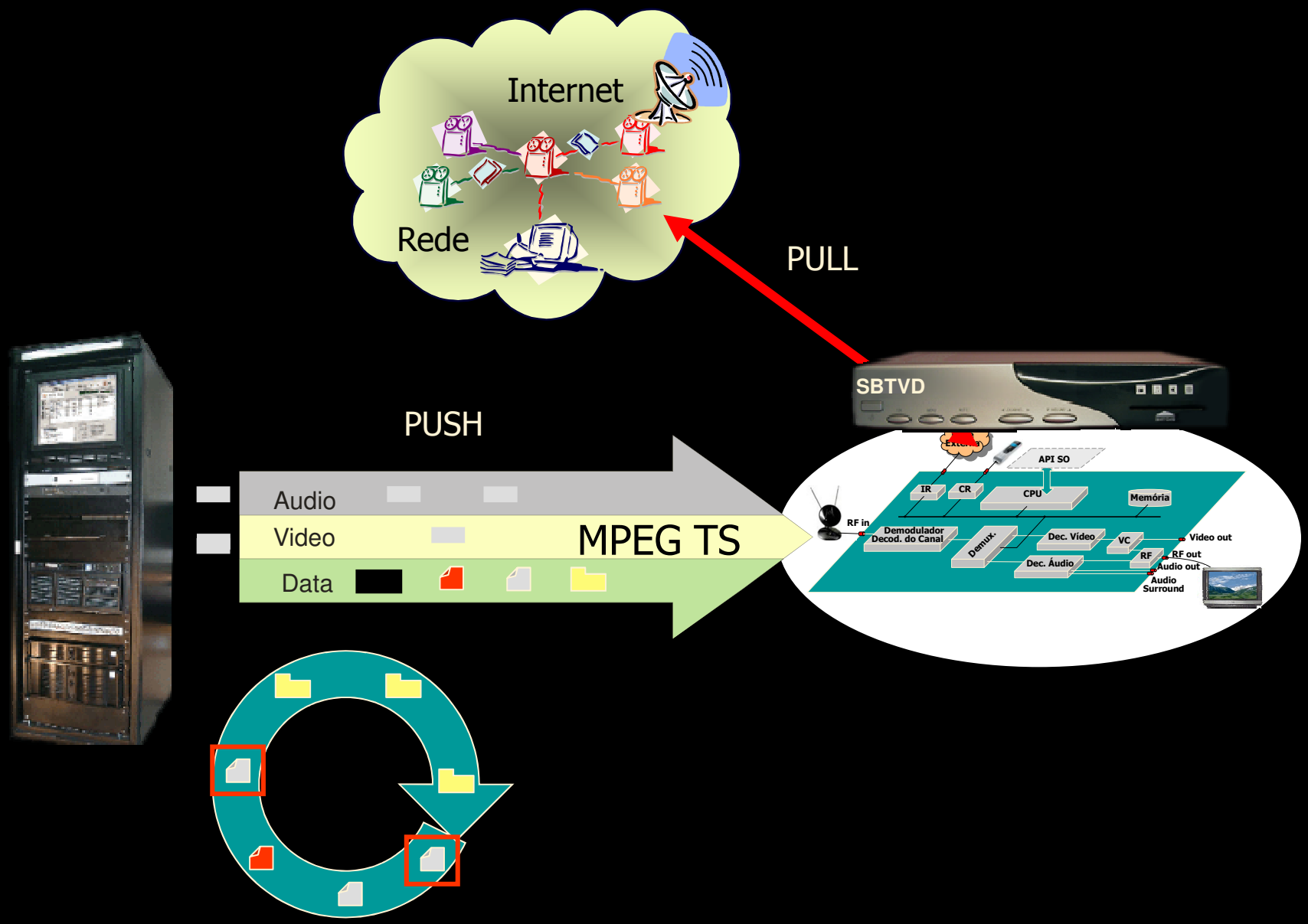


R&D
Ginga at the Content Producer

- Composer 2.0
  - Composer 1.0 + NCL Eclipse facilities
  - Keeps the functional requirements of Composer 1.0 and adds non-functional requirements
  - Integrated with the transmission system
  - Optimized data carousel generation
  - Support to live content production

R&D
Ginga at the Content Producer

- Composer 2.0
  - Based on a micro-kernel that may be extended with plug-ins
  - Each authoring views acts as a plug-in
  - Open-source development, from the first step thought to be extended



R&D
Ginga Authoring in the Client Side

- Composer 2.0
  - Composer 1 + NCL Eclipse facilities
  - Context aware
  - Visions for cooperative authoring

Ginga-NCL Reference Implementation

- C++ Language
  - Linux platform
  - High performance
  - Hard to embed

Ginga-NCL Virtual Set-top Box

Ginga -NCL Live CD

middleware Ginga Live!
http://www.ginga.org.br

Ginga Live CD is a self-contained Linux distribution built to offer a testing environment for declarative applications written in NCL or NCLua. You can run NCL applications found in this CD, published in the NCL Club or stored in your own USB mass storage device.

Play NCL Content from:

Play NCL appplications published in the NCL Club. NCL Club is a public repository where you can get interactive content for fun, information, and learning. Content producers are welcome to share their applications, thoughts and skills.

- This Live CD
- **The NCL Club**
- Your USB Storage
- System Settings
- System Shutdown

SAGGA Project

- SAGGA: Suport for Automatic Generation of Ginga-NCL Applications
- Definition of several templates for application authoring
  - Applications with dynamic content
  - Widgets
  - NCLua lib

Ginga –NCL for IPTV

- IPTV: Recommendation H.761
  - Symbian
  - Android

Ready for ISDB-T

Ginga –NCL for USB ISDB

- 1-seg/ Full-seg USB-SBTVD: PlayTv PixelView, Intera
  - Linux
  - Windows

Your PC with Ginga-NCL interactivity

Ginga –NCL for Windows

- 1-seg/ Full-seg USB-SBTVD
- IPTV
- Broadband TV: plug-in Firefox

Multiple devices

- iPhone (passive)
- Android (passive e active)

NCL Evolution


NCL 3.1 Raw Profile

- A new profile closer to the Ginga-NCL internal data structure
- Completely compatible with NCL 3.1 EDTV profile, but without any “syntactic sugar”
- Player much more simple, efficient and less error-prone
- Player more simple, converter more fancy
- Application much more difficult to be understood and cloned

It is not an authoring language, but a transitional language, close to the NCL engine

NCL Evolution

- TAL 1.0: Template authoring language
- NCL 4.0
  - Better context aware support
  - 3D objects
  - Multiple devices
  - Social networks

NCL Evolution

- TAL 1.0: Template authoring language
- NCL 4.0
  - Better context aware support
  - 3D objects
  - Multiple devices
  - Social networks

Digital TV only if with Ginga

http://www.ncl.org.br

http://www.softwarepublico.gov.br

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