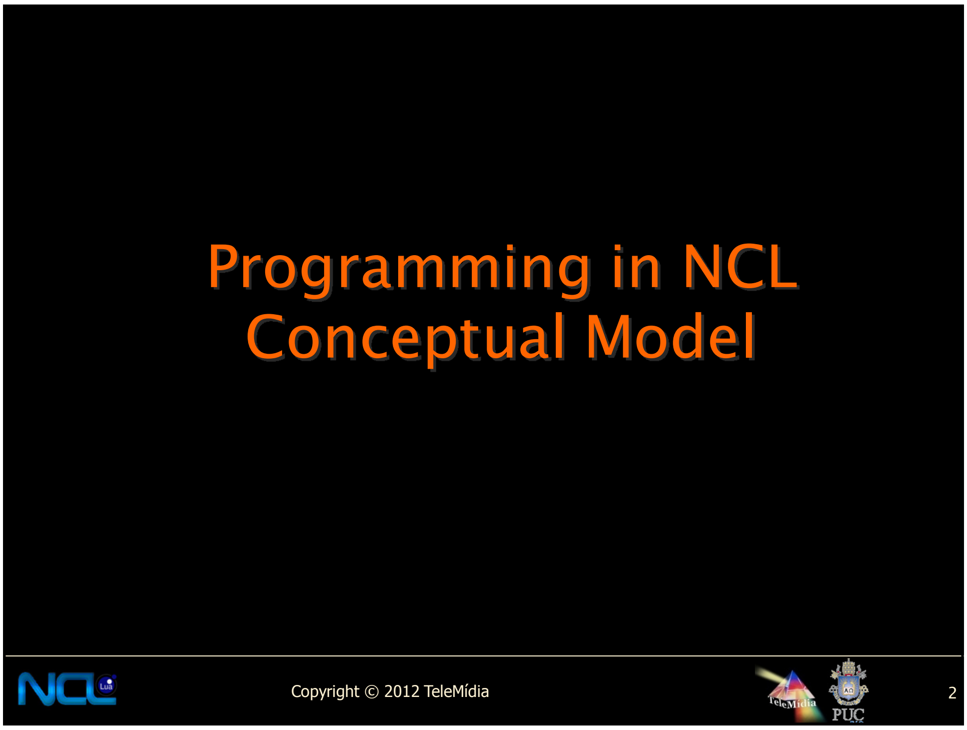
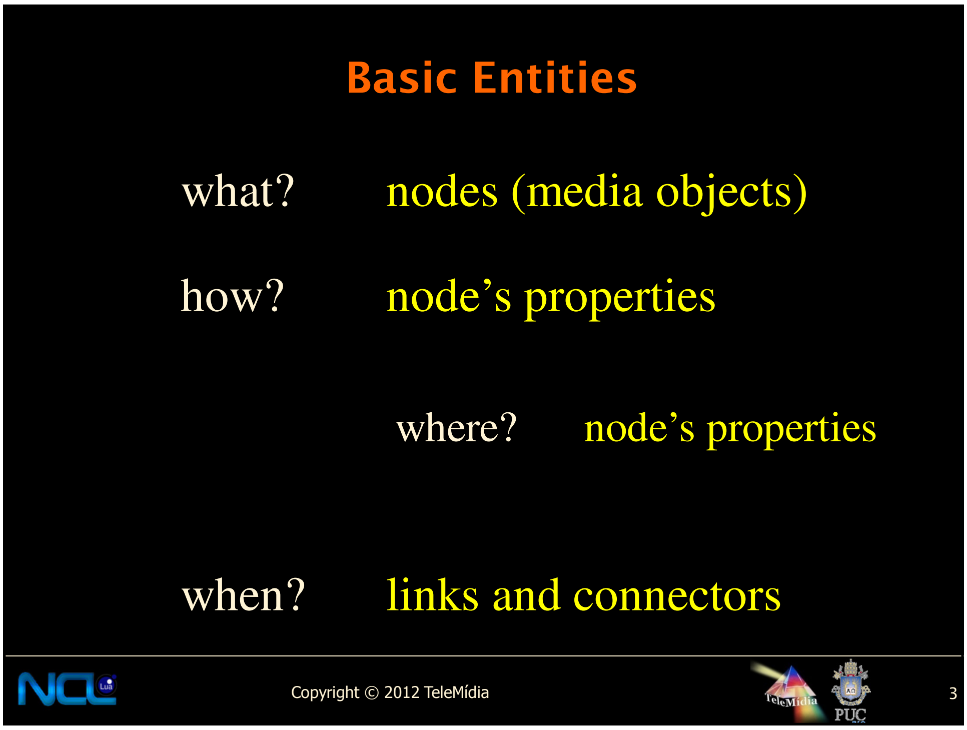
Programming for Ginga-NCL



Programming in NCL Conceptual Model



Basic Entities

what? nodes (media objects)

how? node’s properties

where? node’s properties

when? links and connectors

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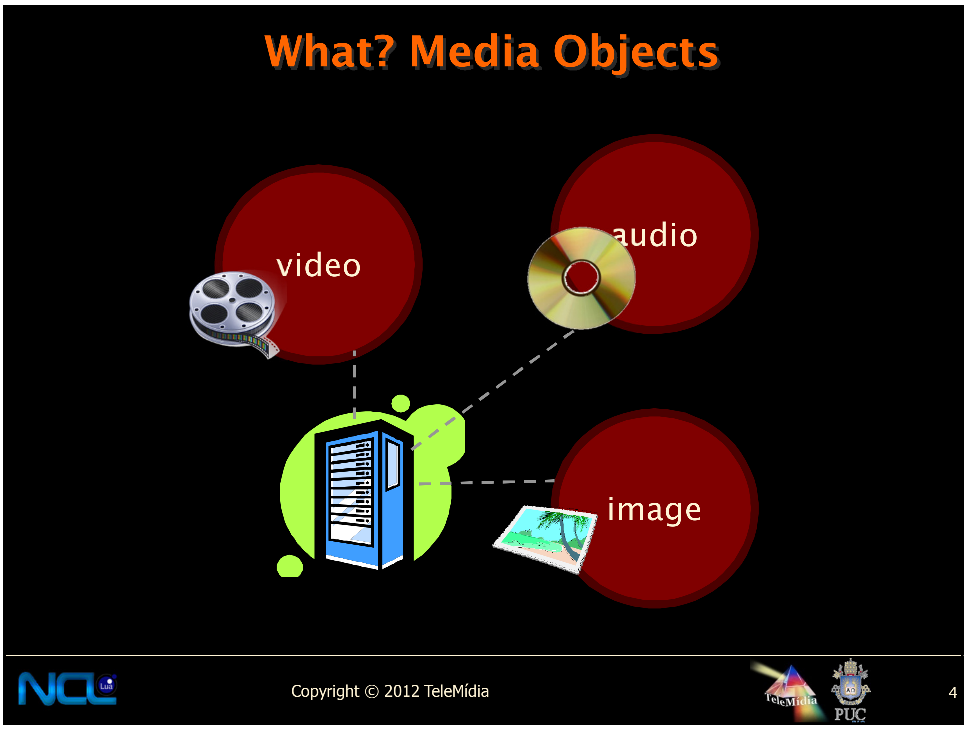

What? Media Objects

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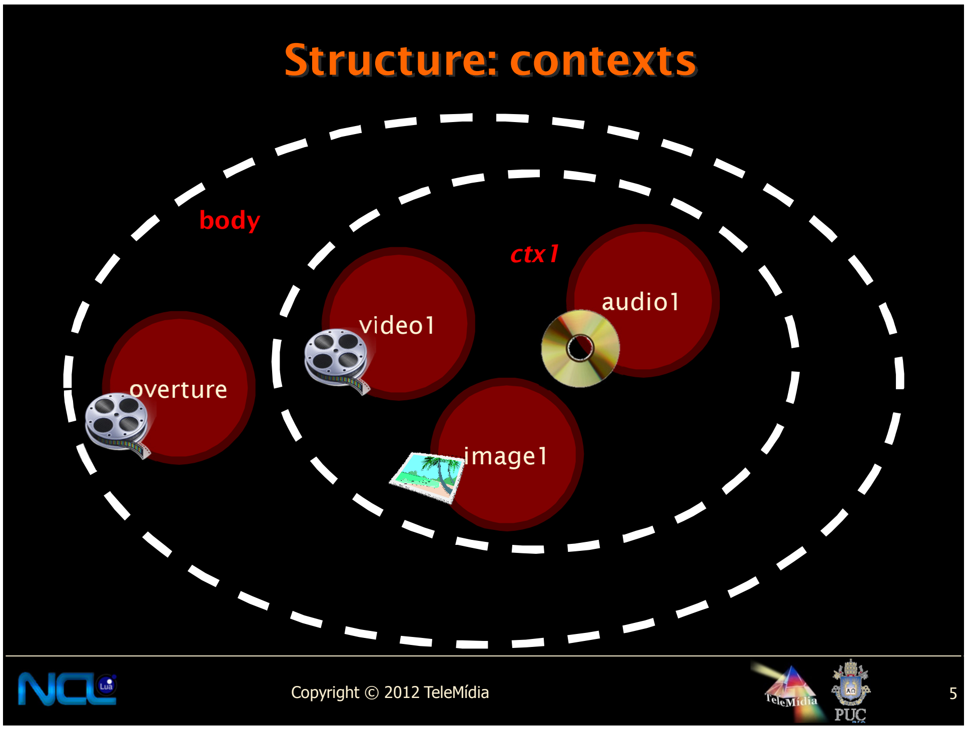

Structure: contexts

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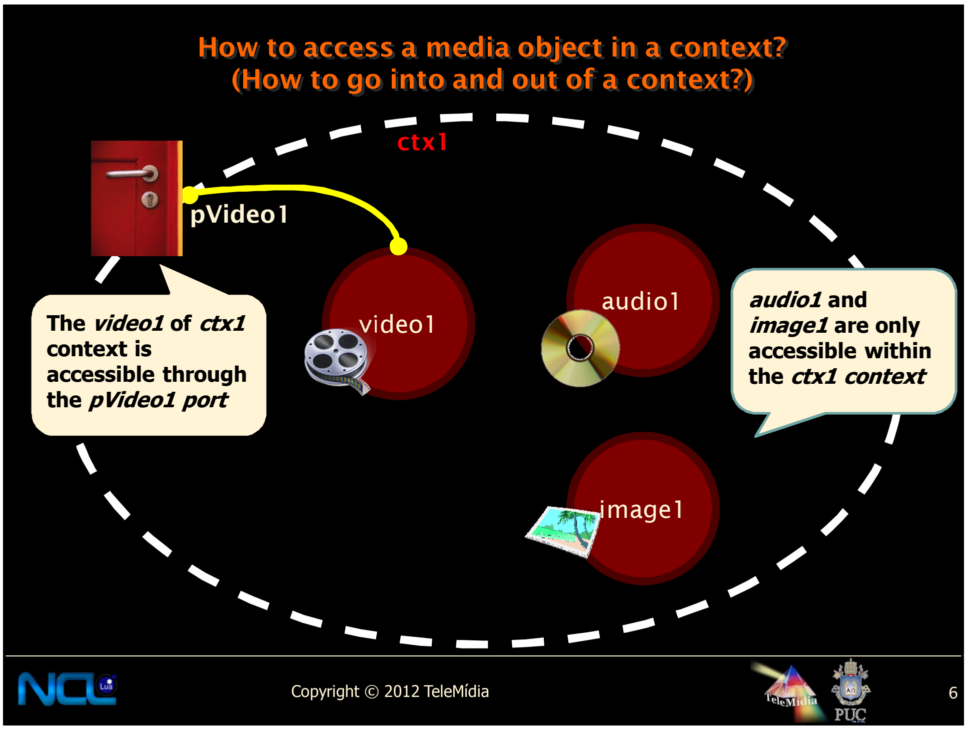

How to access a media object in a context? (How to go into and out of a context?)

The *video1* of *ctx1* context is accessible through the *pVideo1 port*

audio1 and *image1* are only accessible within the *ctx1 context*

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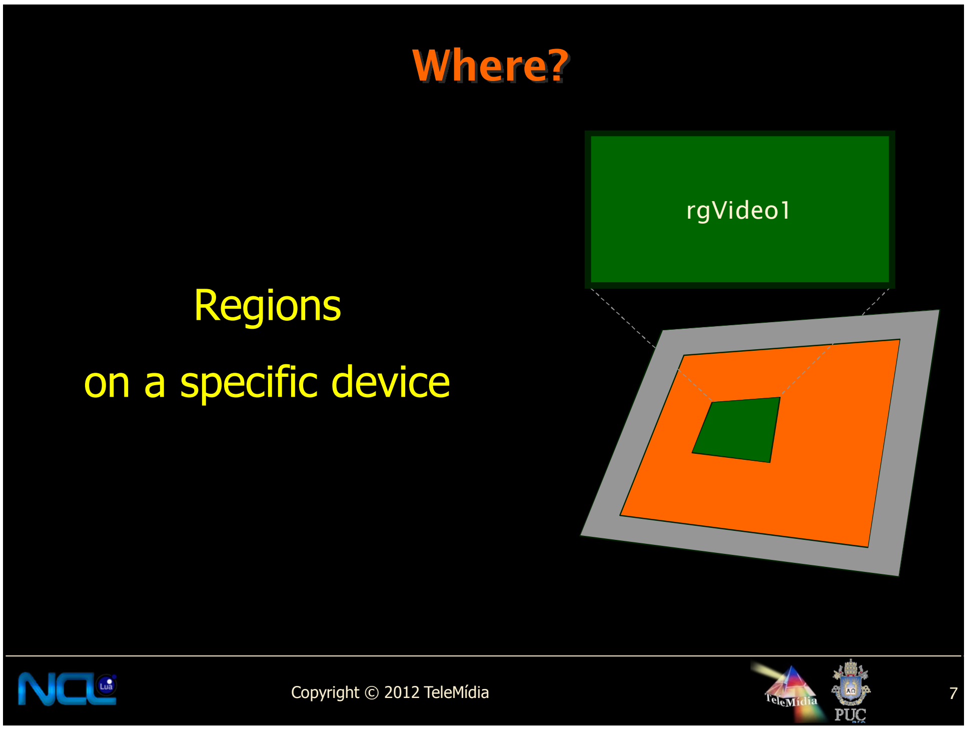
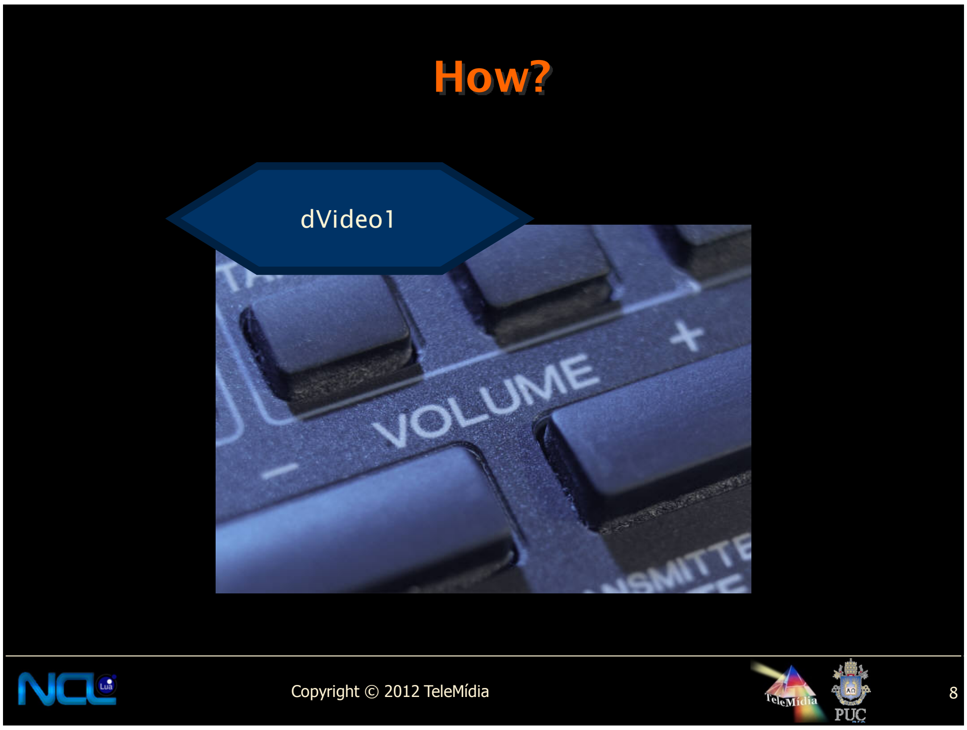


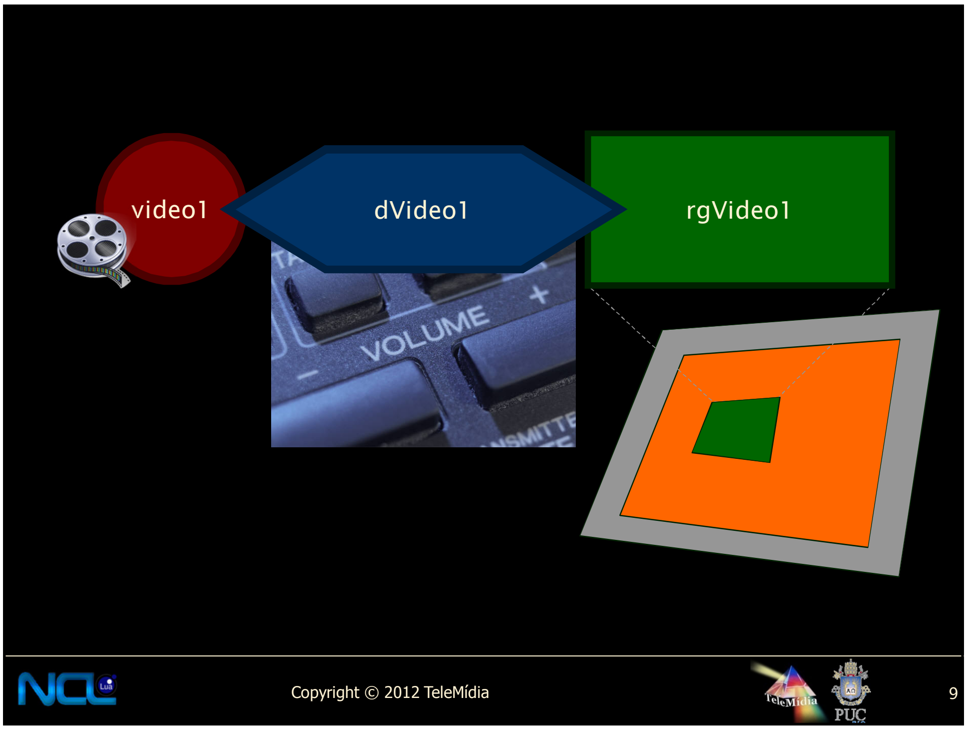
Where?

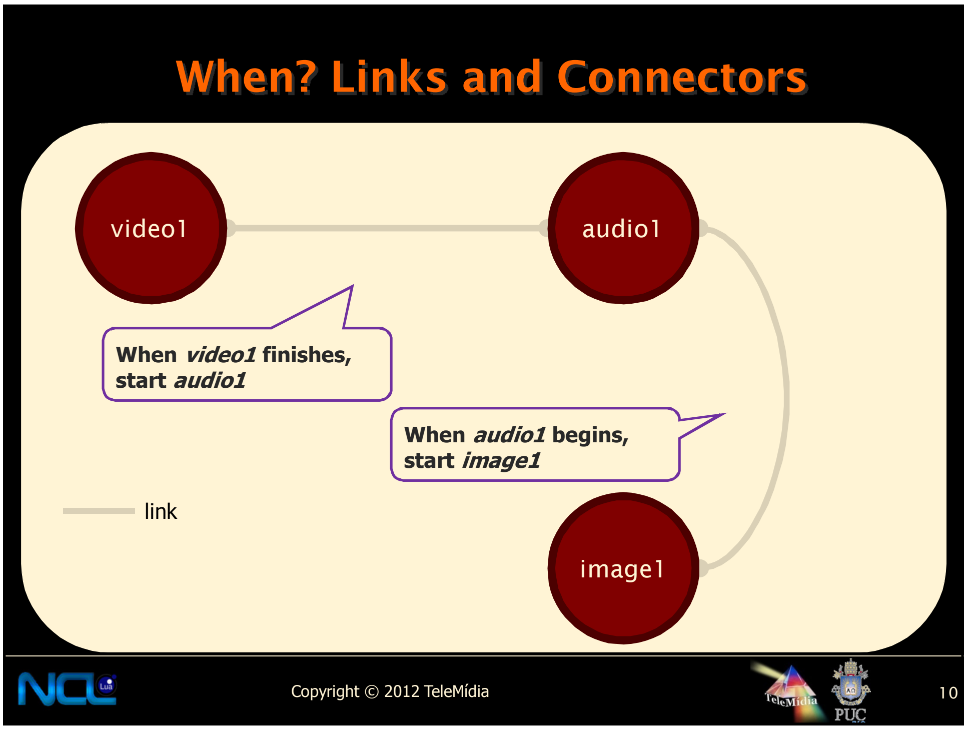
Regions

on a specific device



How?

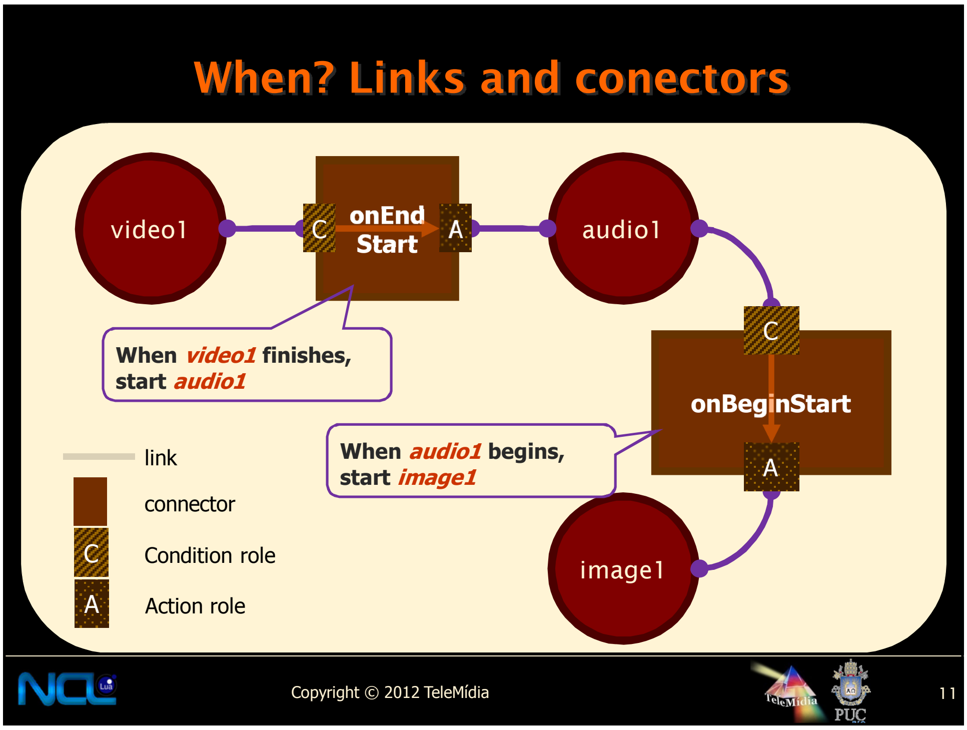




When? Links and Connectors

When *video1* finishes, start *audio1*

When *audio1* begins, start *image1*



When? Links and conectors

video1

C onEnd Start A

audio1

When *video1* finishes, start *audio1*

C

onBeginStart

A

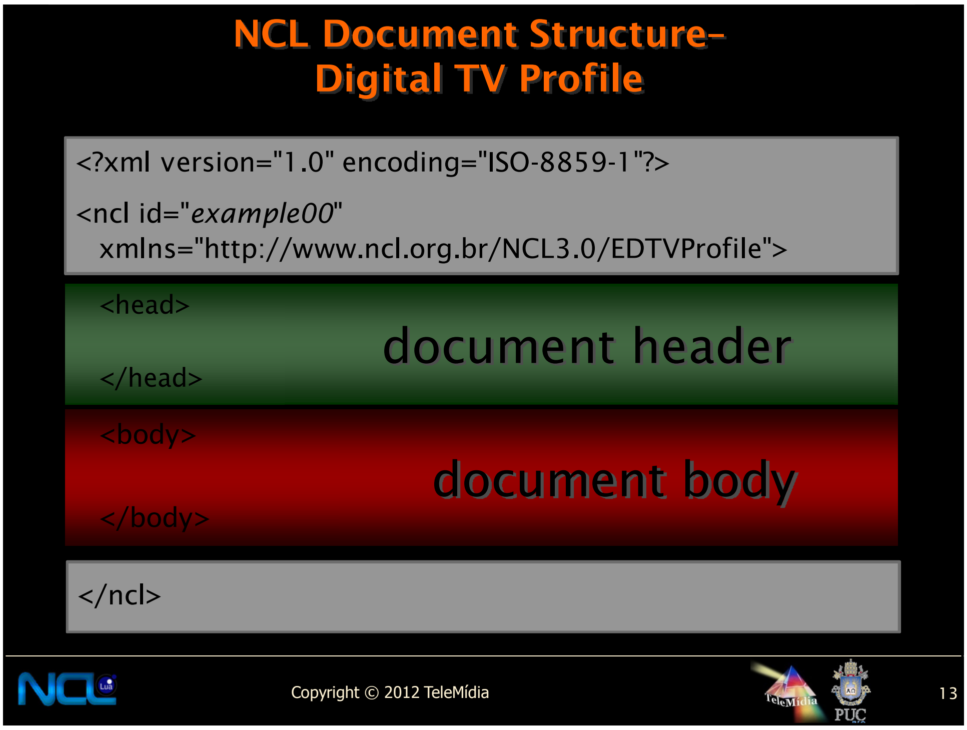
When *audio1* begins, start *image1*

image1

▬	link
■	connector
C	Condition role
A	Action role

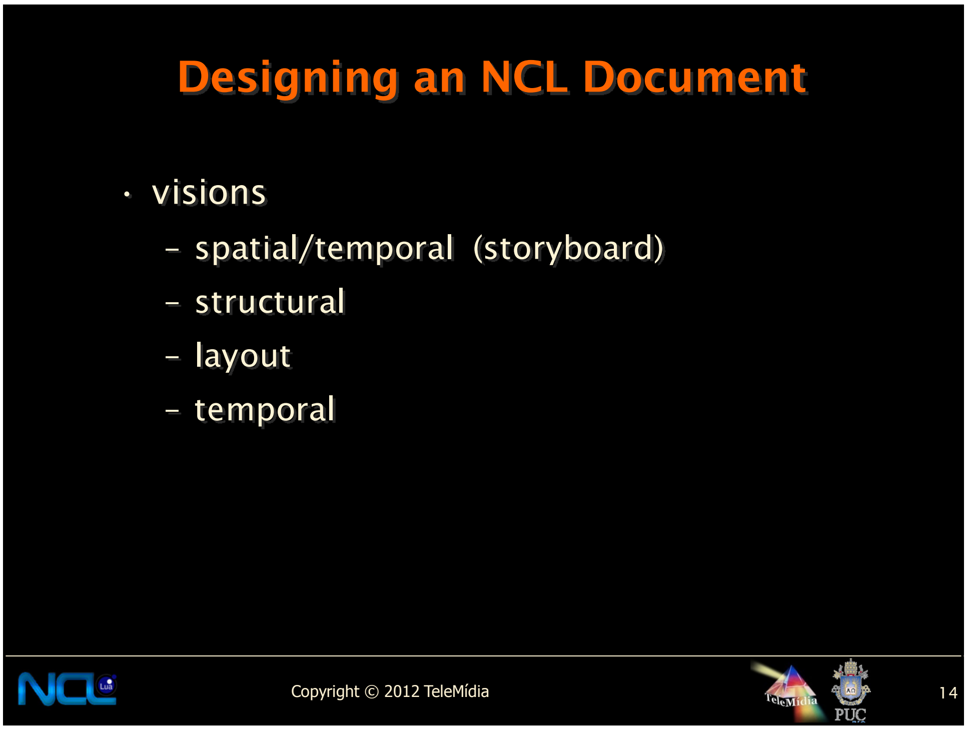
Programming in NCL

The Language



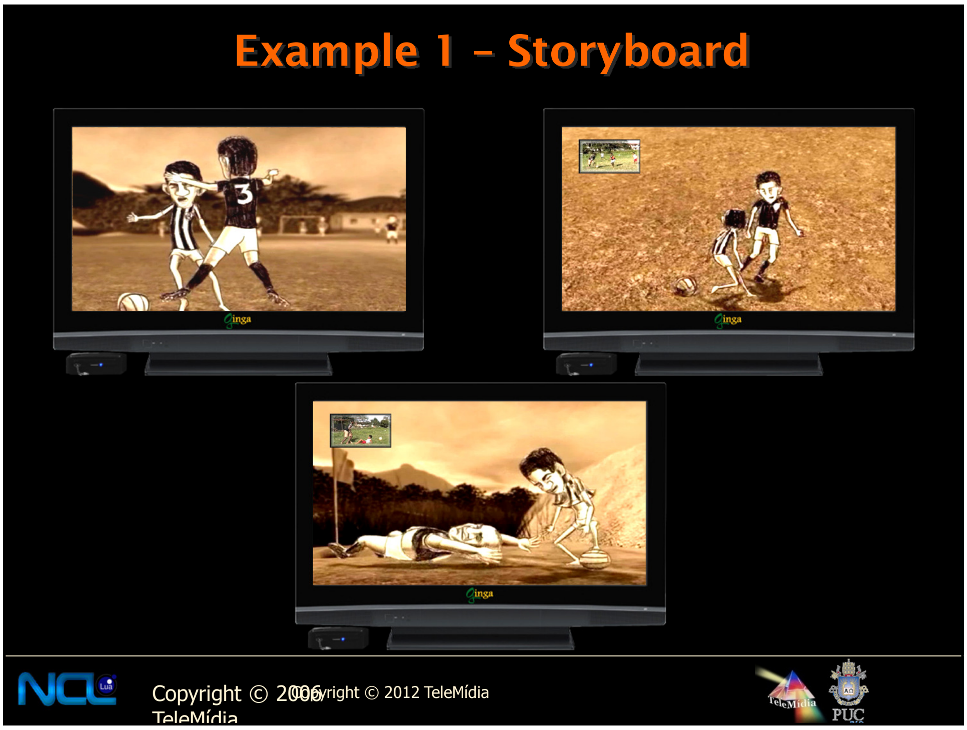
NCL Document Structure– Digital TV Profile

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<ncl id="example00"
  xmlns="http://www.ncl.org.br/NCL3.0/EDTVProfile">
  <head>
                        document header
  </head>
  <body>
                        document body
  </body>
</ncl>
```

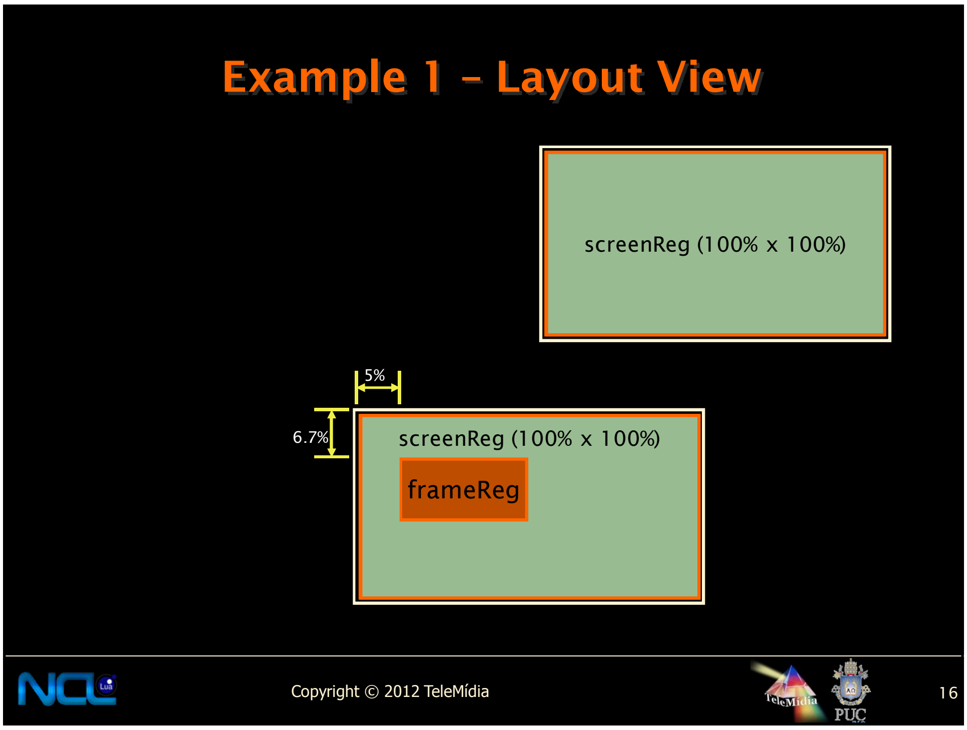


Designing an NCL Document

- visions
  - spatial/temporal (storyboard)
  - structural
  - layout
  - temporal



Example 1 – Storyboard



Example 1 – Layout View

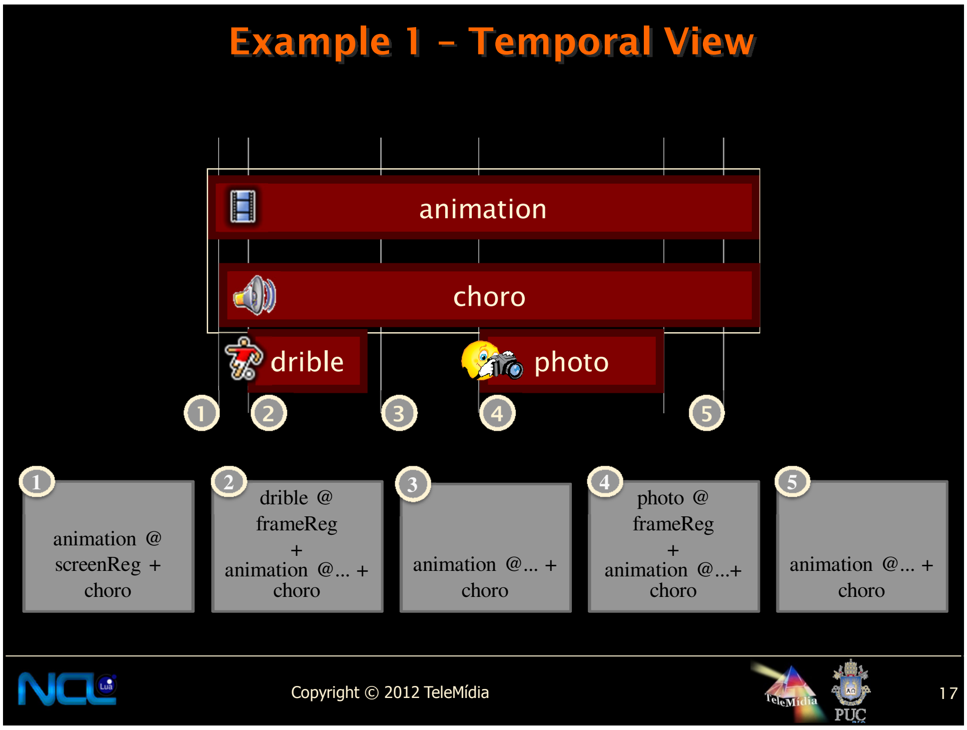
screenReg (100% x 100%)

5%

6.7%

screenReg (100% x 100%)

frameReg



Example 1 – Temporal View

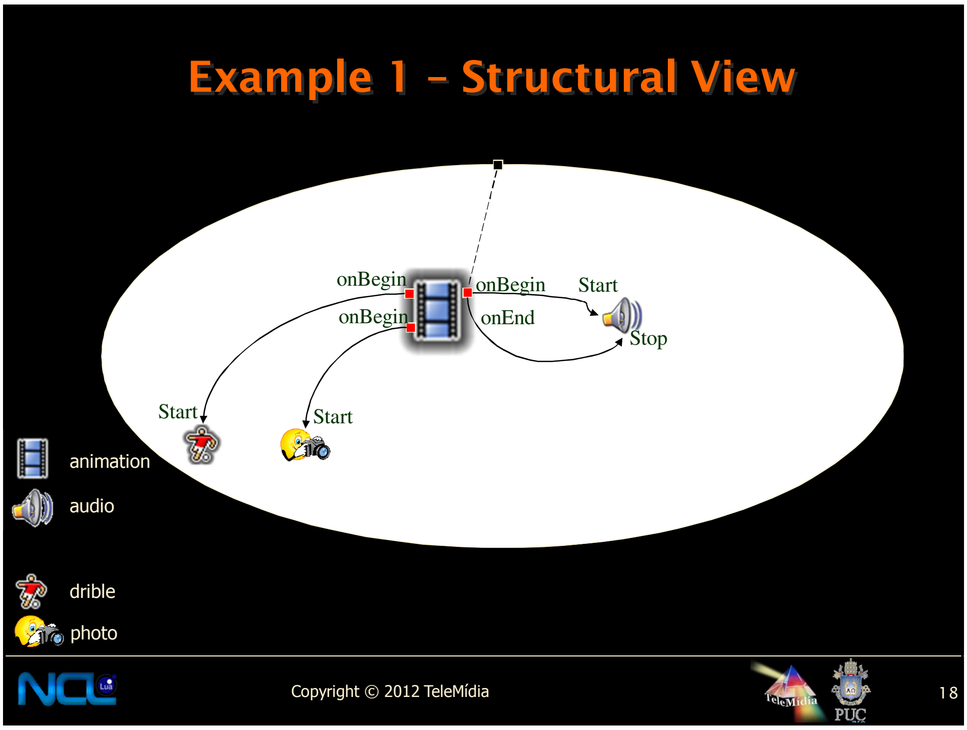
1 animation @ screenReg + choro

2 drible @ frameReg + animation @... + choro

3 animation @... + choro

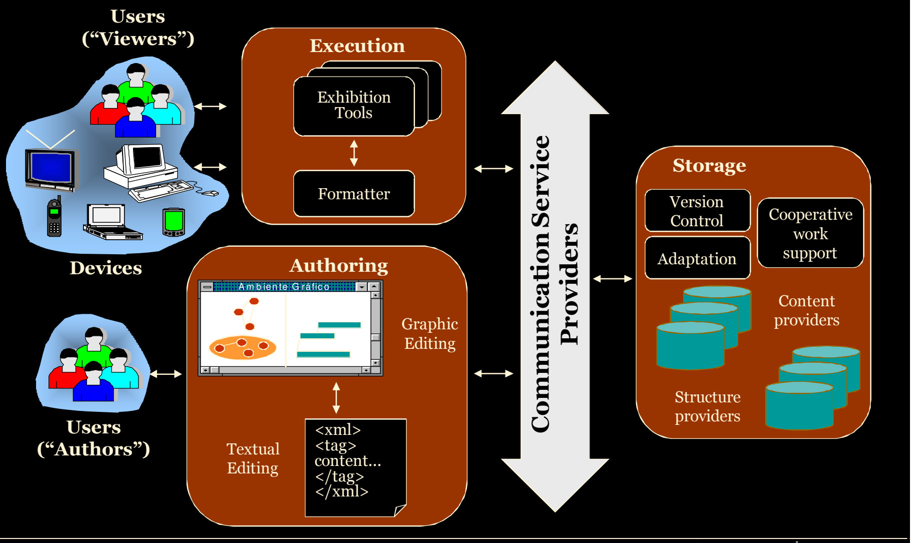
4 photo @ frameReg + animation @...+ choro

5 animation @... + choro

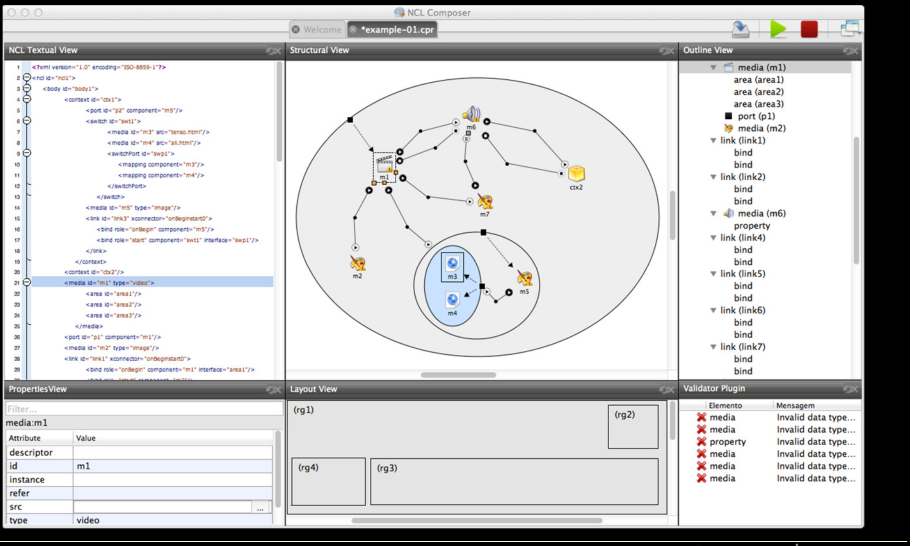


Example 1 – Structural View

Environments



NCL Composer



```
<?xml version="1.0" encoding="ISO-8859-1"?>
<ncl id="ncl1">
    <body id="body1">
            <context id="ctx1">
                    <port id="p2" component="m5"/>
                    <switch id="swt1">
                            <media id="m3" src="tenso.html"/>
                            <media id="m4" src="ali.html"/>
                            <switchPort id="swp1">
                                <mapping component="m3"/>
                                <mapping component="m4"/>
                            </switchPort>
                        </switch>
                    <media id="m5" type="image"/>
                    <link id="link3" xconnector="onBeginstart0">
                        <bind role="onBegin" component="m5"/>
                        <bind role="start" component="swt1" interface="swp1"/>
                    </link>
                </context>
            <context id="ctx2"/>
            <media id="m1" type="video">
                    <area id="area1"/>
                    <area id="area2"/>
                    <area id="area3"/>
                </media>
            <port id="p1" component="m1"/>
            <media id="m2" type="image"/>
            <link id="link1" xconnector="onBeginstart0">
                    <bind role="onBegin" component="m1" interface="area1"/>
```

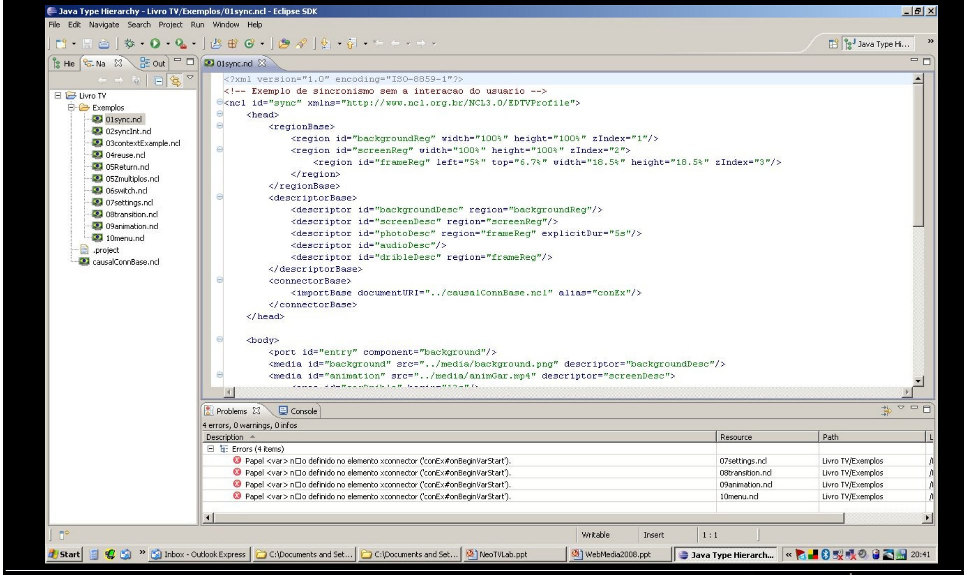
media:m1

Attribute	Value
descriptor	
id	m1
instance	
refer	
src	...
type	video

- media (m1)
  - area (area1)
  - area (area2)
  - area (area3)
- port (p1)
- media (m2)
- link (link1)
  - bind
  - bind
- link (link2)
  - bind
  - bind
- media (m6)
  - property
- link (link4)
  - bind
  - bind
- link (link5)
  - bind
  - bind
- link (link6)
  - bind
  - bind
- link (link7)
  - bind
  - bind

Elemento	Mensagem
media	Invalid data type...
media	Invalid data type...
property	Invalid data type...
media	Invalid data type...
media	Invalid data type...
media	Invalid data type...

NCL Eclipse



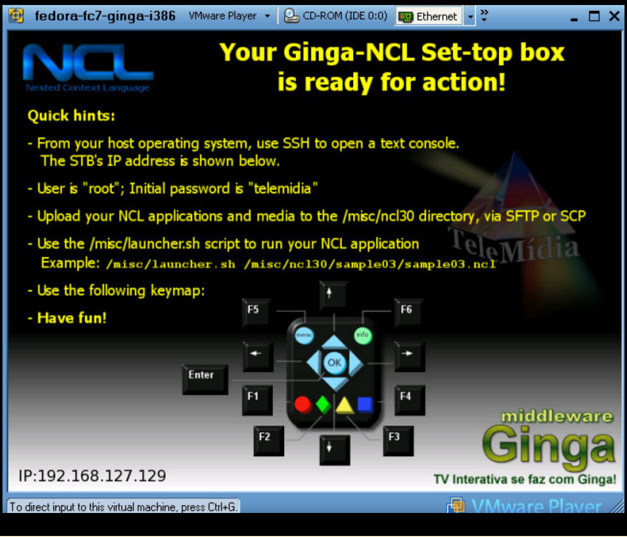
```
<?xml version="1.0" encoding="ISO-8859-1"?>
<!-- Exemplo de sincronismo sem a interacao do usuario -->
<ncl id="sync" xmlns="http://www.ncl.org.br/NCL3.0/EDTVProfile">
    <head>
        <regionBase>
            <region id="backgroundReg" width="100%" height="100%" zIndex="1"/>
            <region id="screenReg" width="100%" height="100%" zIndex="2">
                <region id="frameReg" left="5%" top="6.7%" width="18.5%" height="18.5%" zIndex="3"/>
            </region>
        </regionBase>
        <descriptorBase>
            <descriptor id="backgroundDesc" region="backgroundReg"/>
            <descriptor id="screenDesc" region="screenReg"/>
            <descriptor id="photoDesc" region="frameReg" explicitDur="5s"/>
            <descriptor id="audioDesc"/>
            <descriptor id="dribleDesc" region="frameReg"/>
        </descriptorBase>
        <connectorBase>
            <importBase documentURI="../causalConnBase.ncl" alias="conEx"/>
        </connectorBase>
    </head>

    <body>
        <port id="entry" component="background"/>
        <media id="background" src="../media/background.png" descriptor="backgroundDesc"/>
        <media id="animation" src="../media/animGar.mp4" descriptor="screenDesc">
```

4 errors, 0 warnings, 0 infos

Description	Resource	Path
Errors (4 items)		
Papel <var> n□o definido no elemento xconnector ('conEx#onBeginVarStart').	07settings.ncl	Livro TV/Exemplos
Papel <var> n□o definido no elemento xconnector ('conEx#onBeginVarStart').	08transition.ncl	Livro TV/Exemplos
Papel <var> n□o definido no elemento xconnector ('conEx#onBeginVarStart').	09animation.ncl	Livro TV/Exemplos
Papel <var> n□o definido no elemento xconnector ('conEx#onBeginVarStart').	10menu.ncl	Livro TV/Exemplos

Ginga-NCL Virtual Set-top Box



Your Ginga-NCL Set-top box is ready for action!

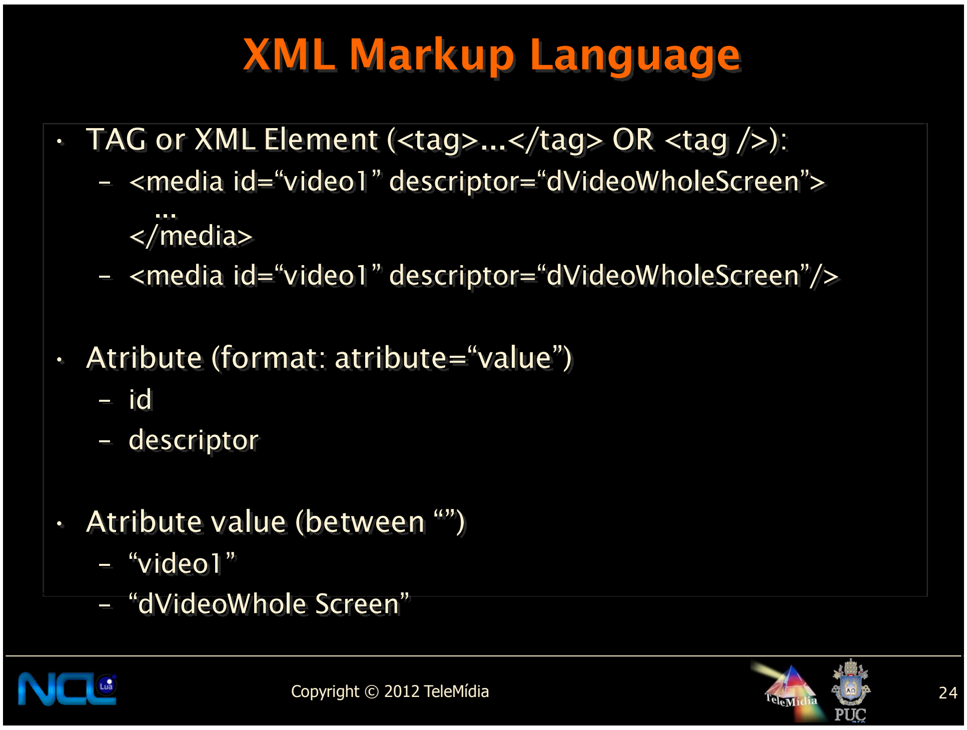
Quick hints:

- From your host operating system, use SSH to open a text console. The STB's IP address is shown below.
- User is "root"; Initial password is "telemidia"
- Upload your NCL applications and media to the /misc/ncl30 directory, via SFTP or SCP
- Use the /misc/launcher.sh script to run your NCL application
  Example: `/misc/launcher.sh /misc/ncl30/sample03/sample03.ncl`
- Use the following keymap:
- Have fun!

IP:192.168.127.129

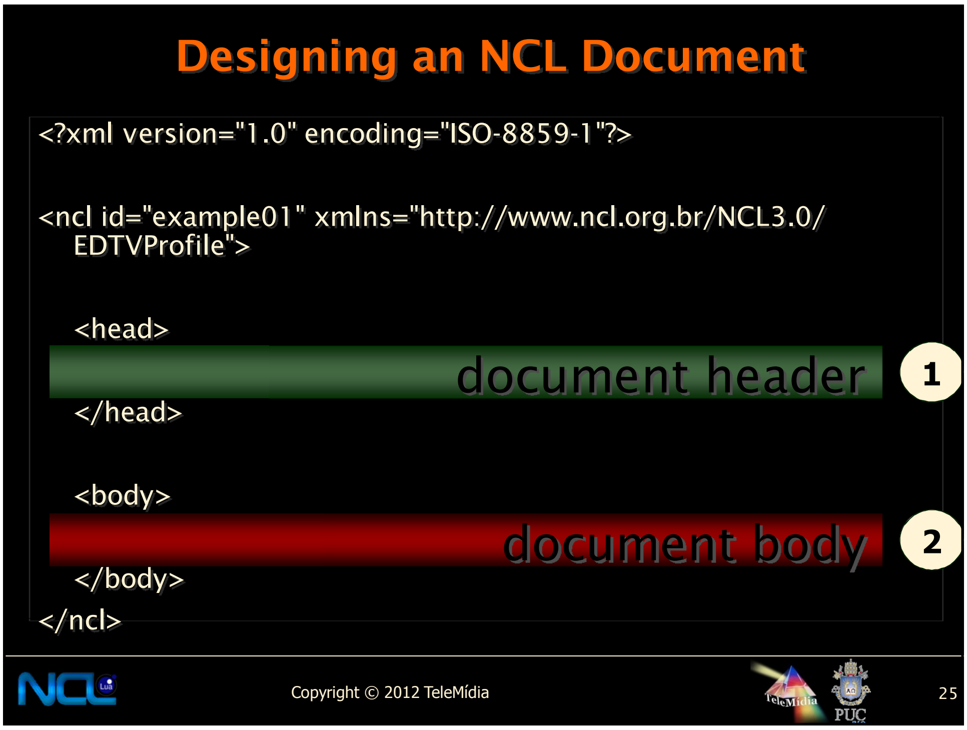
To direct input to this virtual machine, press Ctrl+G.

Ginga4Windows



XML Markup Language

- TAG or XML Element (<tag>…</tag> OR <tag />):
  - <media id="video1" descriptor="dVideoWholeScreen">
    …
    </media>
  - <media id="video1" descriptor="dVideoWholeScreen"/>
- Atribute (format: atribute="value")
  - id
  - descriptor
- Atribute value (between "")
  - "video1"
  - "dVideoWhole Screen"



Designing an NCL Document

```
<?xml version="1.0" encoding="ISO-8859-1"?>

<ncl id="example01" xmlns="http://www.ncl.org.br/NCL3.0/
   EDTVProfile">

   <head>
                              document header      1
   </head>

   <body>
                              document body        2
   </body>
</ncl>
```

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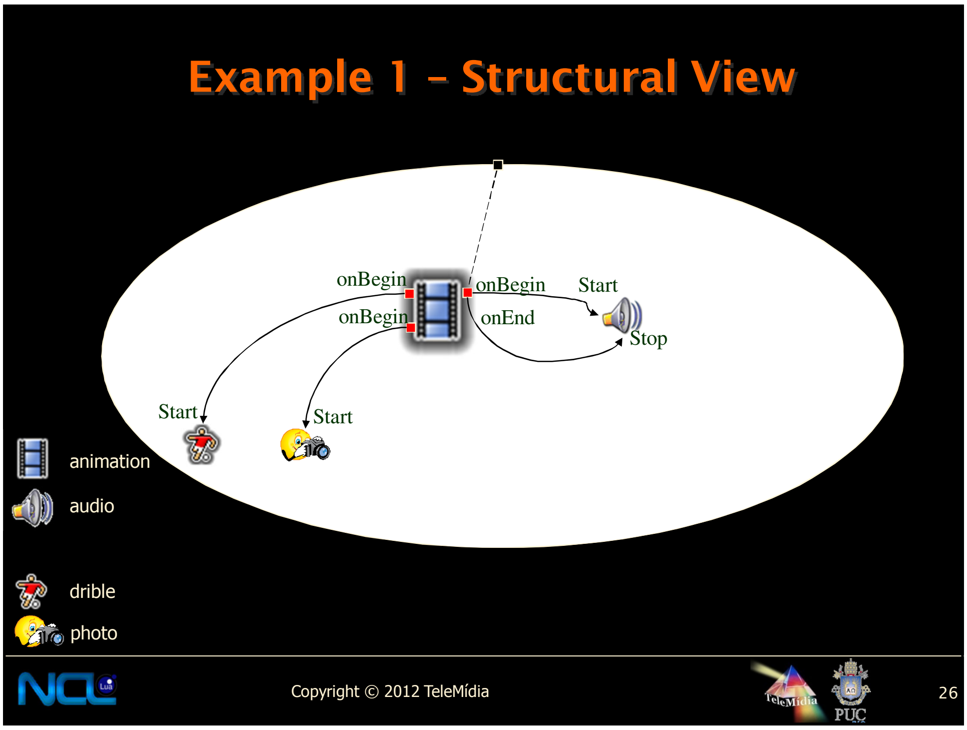

Example 1 – Structural View

animation

audio

drible

photo

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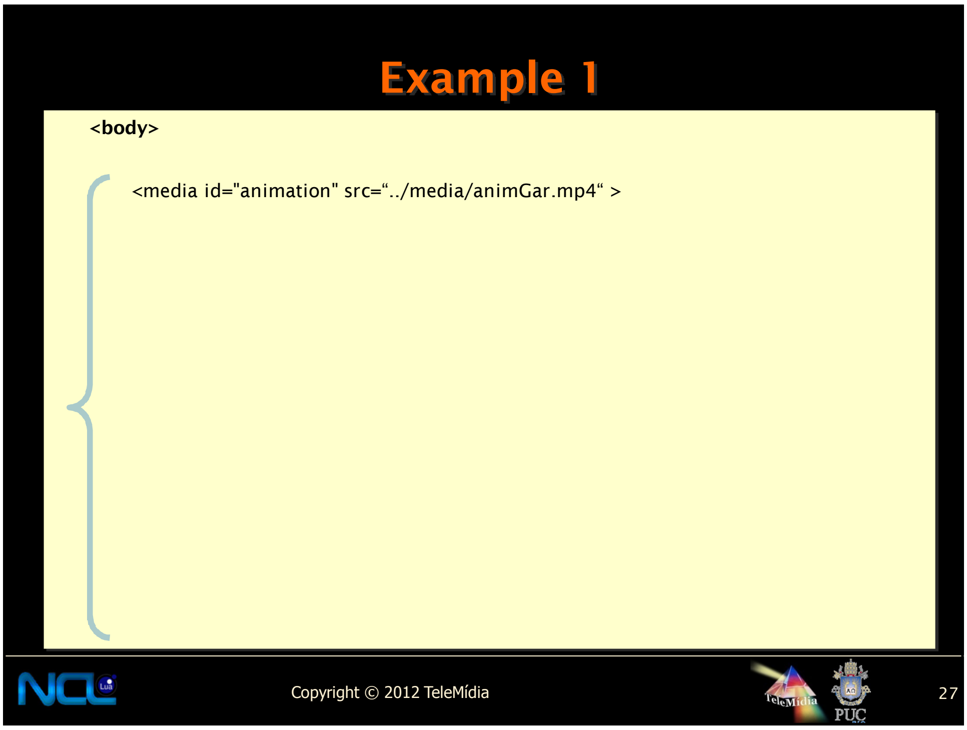
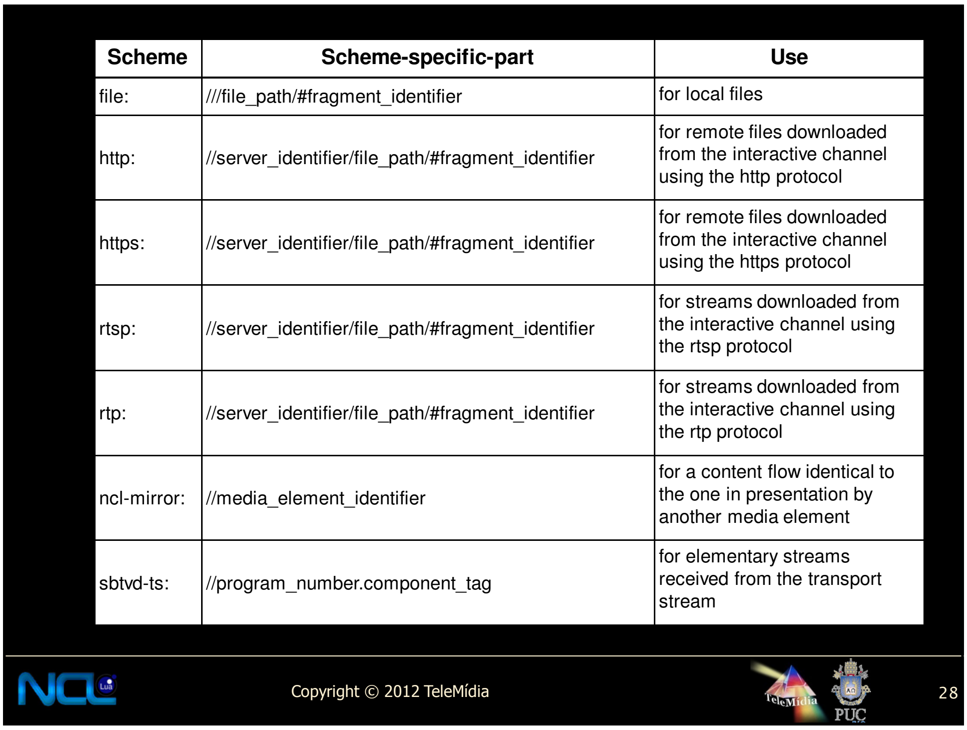


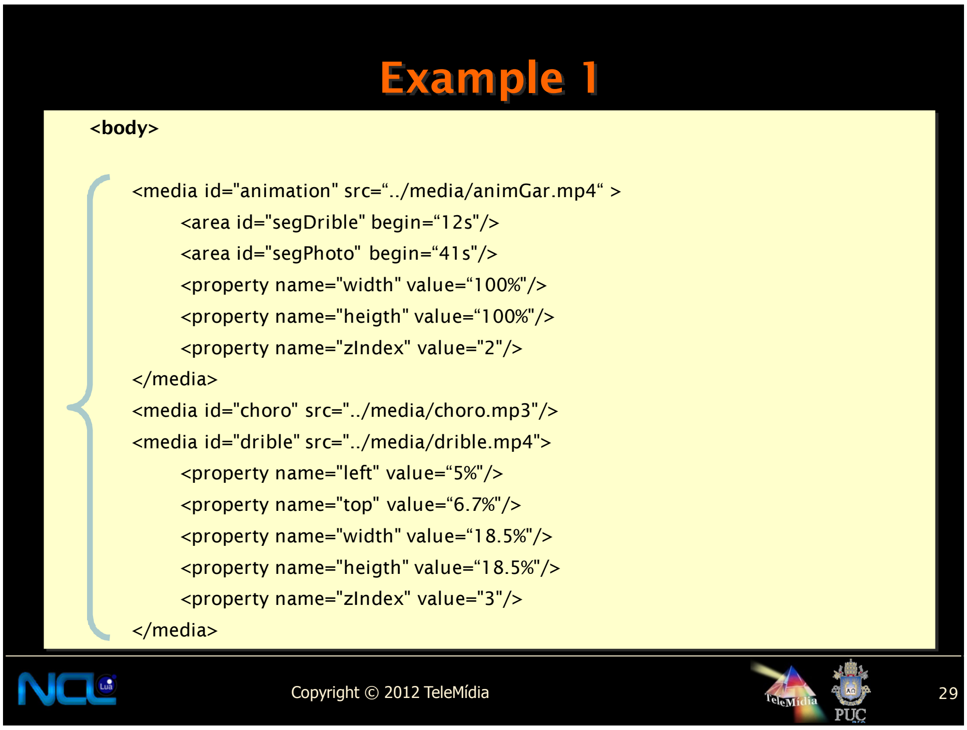
Example 1

```
<body>

   <media id="animation" src="../media/animGar.mp4“ >
```



Scheme	Scheme-specific-part	Use
file:	///file_path/#fragment_identifier	for local files
http:	//server_identifier/file_path/#fragment_identifier	for remote files downloaded from the interactive channel using the http protocol
https:	//server_identifier/file_path/#fragment_identifier	for remote files downloaded from the interactive channel using the https protocol
rtsp:	//server_identifier/file_path/#fragment_identifier	for streams downloaded from the interactive channel using the rtsp protocol
rtp:	//server_identifier/file_path/#fragment_identifier	for streams downloaded from the interactive channel using the rtp protocol
ncl-mirror:	//media_element_identifier	for a content flow identical to the one in presentation by another media element
sbtvd-ts:	//program_number.component_tag	for elementary streams received from the transport stream



Example 1

```
<body>

    <media id="animation" src=“../media/animGar.mp4“ >
        <area id="segDrible" begin=“12s"/>
        <area id="segPhoto" begin=“41s"/>
        <property name="width" value=“100%"/>
        <property name="heigth" value=“100%"/>
        <property name="zIndex" value="2"/>
    </media>
    <media id="choro" src="../media/choro.mp3"/>
    <media id="drible" src="../media/drible.mp4">
        <property name="left" value=“5%"/>
        <property name="top" value=“6.7%"/>
        <property name="width" value=“18.5%"/>
        <property name="heigth" value=“18.5%"/>
        <property name="zIndex" value="3"/>
    </media>
```

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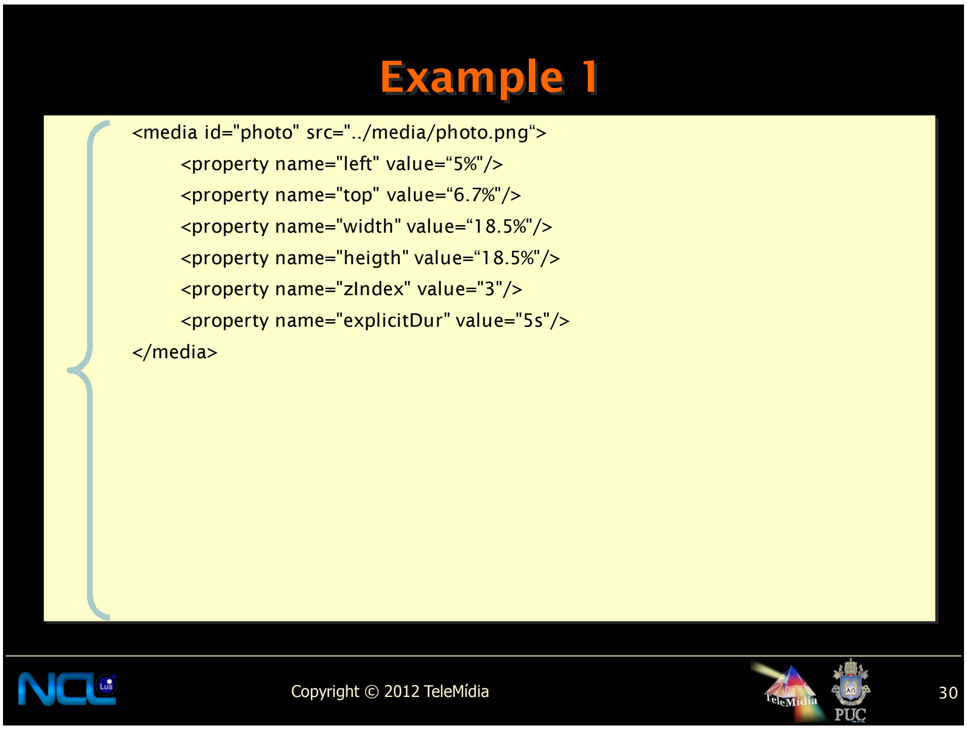

Example 1

```
    <media id="photo" src="../media/photo.png“>
        <property name="left" value=“5%"/>
        <property name="top" value=“6.7%"/>
        <property name="width" value=“18.5%"/>
        <property name="heigth" value=“18.5%"/>
        <property name="zIndex" value="3"/>
        <property name="explicitDur" value="5s"/>
    </media>
```

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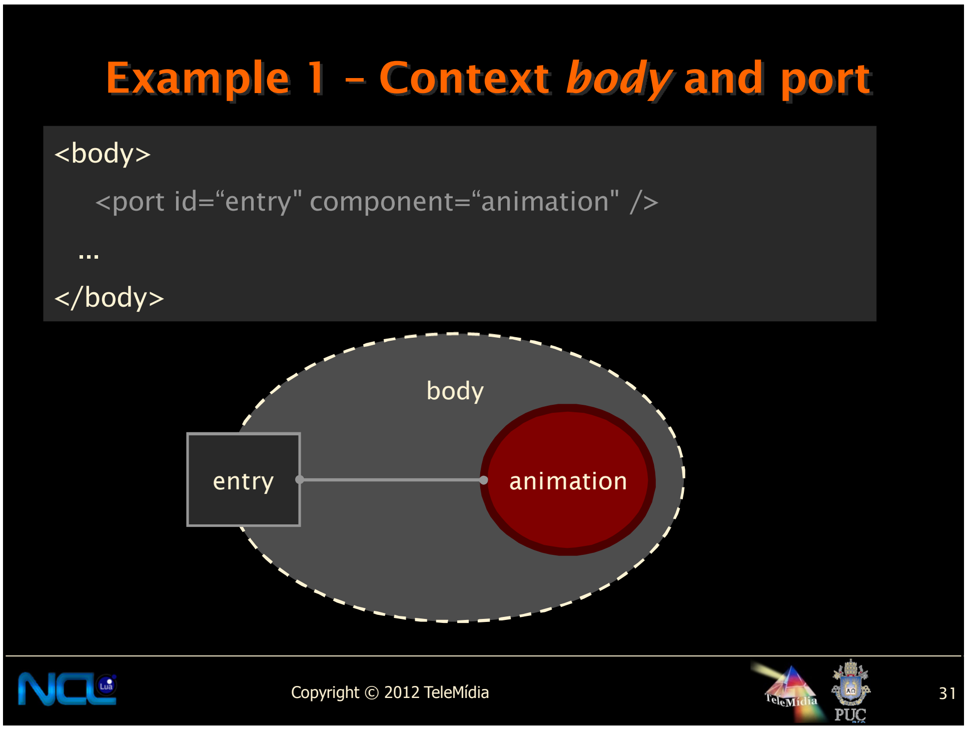
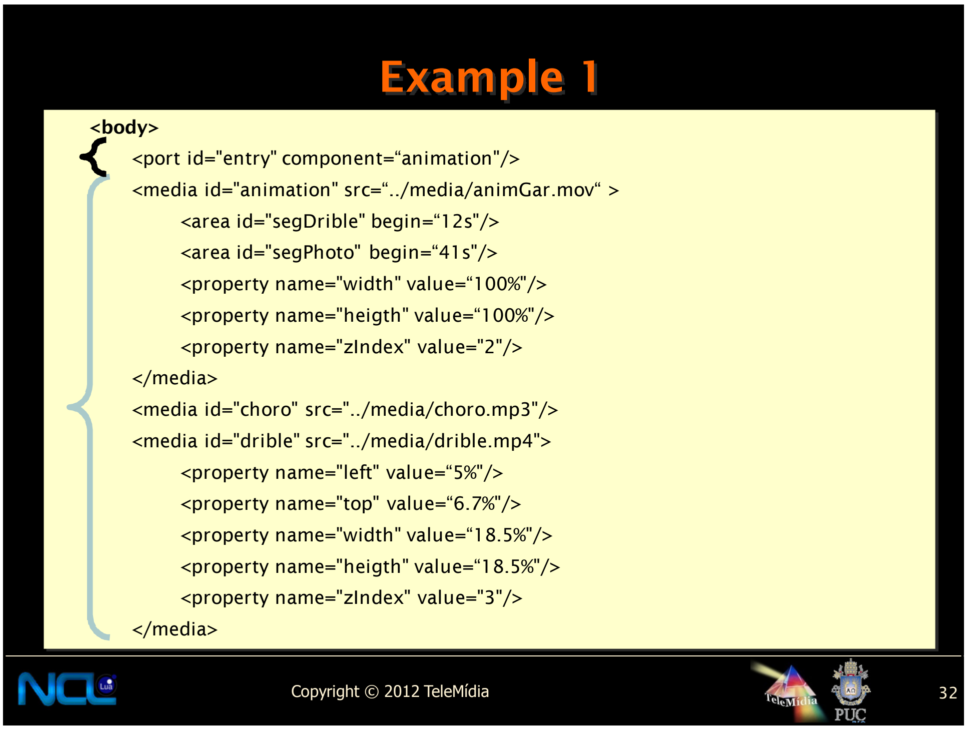


Example 1 – Context *body* and port

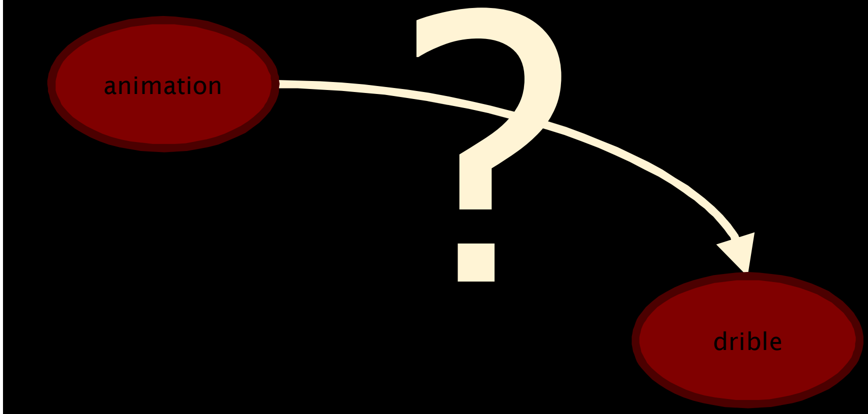
```
<body>
   <port id=“entry" component=“animation"  />
  …
</body>
```



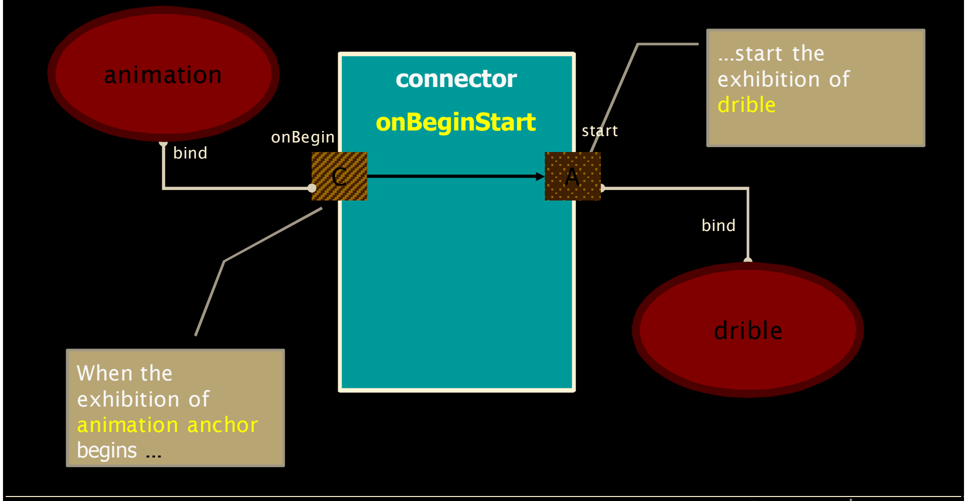
Example 1

```
<body>
    <port id="entry" component=“animation"/>
    <media id="animation" src=“../media/animGar.mov“ >
        <area id="segDrible" begin=“12s"/>
        <area id="segPhoto" begin=“41s"/>
        <property name="width" value=“100%"/>
        <property name="heigth" value=“100%"/>
        <property name="zIndex" value="2"/>
    </media>
    <media id="choro" src="../media/choro.mp3"/>
    <media id="drible" src="../media/drible.mp4">
        <property name="left" value=“5%"/>
        <property name="top" value=“6.7%"/>
        <property name="width" value=“18.5%"/>
        <property name="heigth" value=“18.5%"/>
        <property name="zIndex" value="3"/>
    </media>
```

Relationships Among Nodes

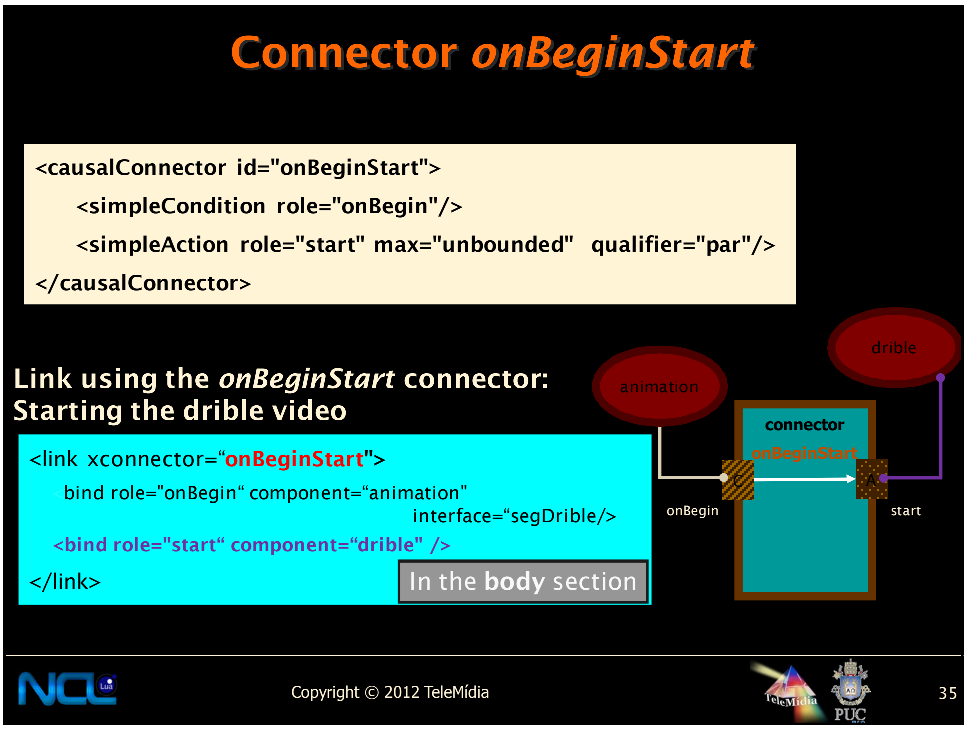


Connector *onBeginStart*



...start the exhibition of drible

When the exhibition of animation anchor begins ...



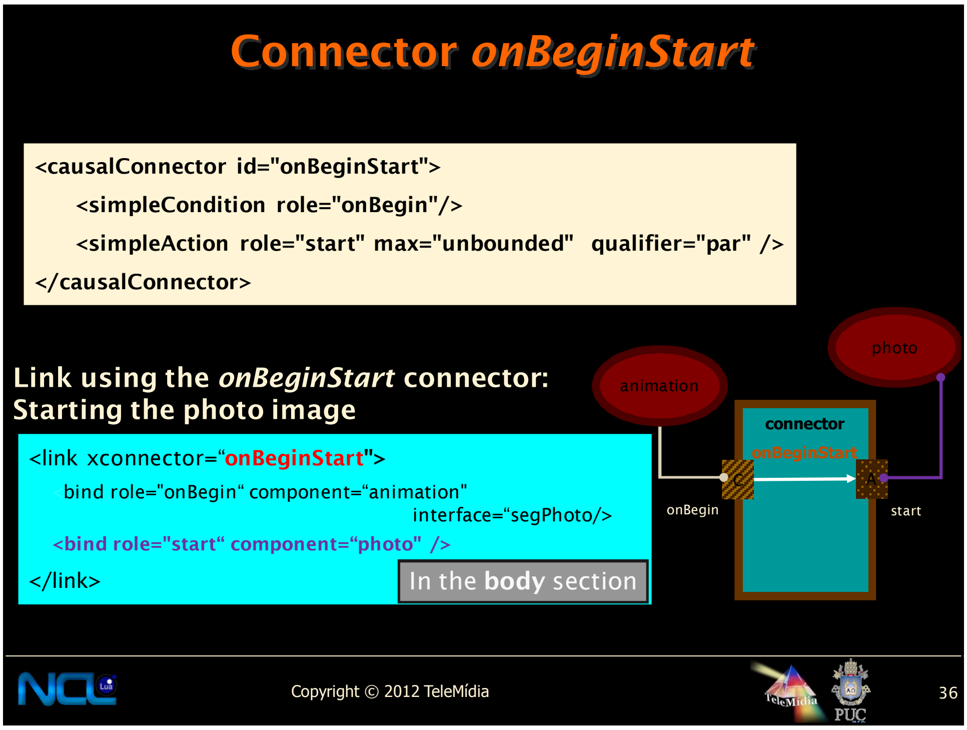
Connector *onBeginStart*

```
<causalConnector id="onBeginStart">
    <simpleCondition role="onBegin"/>
    <simpleAction role="start" max="unbounded"  qualifier="par"/>
</causalConnector>
```

Link using the *onBeginStart* connector: Starting the drible video

```
<link xconnector="onBeginStart">
    bind role="onBegin" component="animation"
                                interface="segDrible/>
   <bind role="start" component="drible" />
</link>
```

In the **body** section



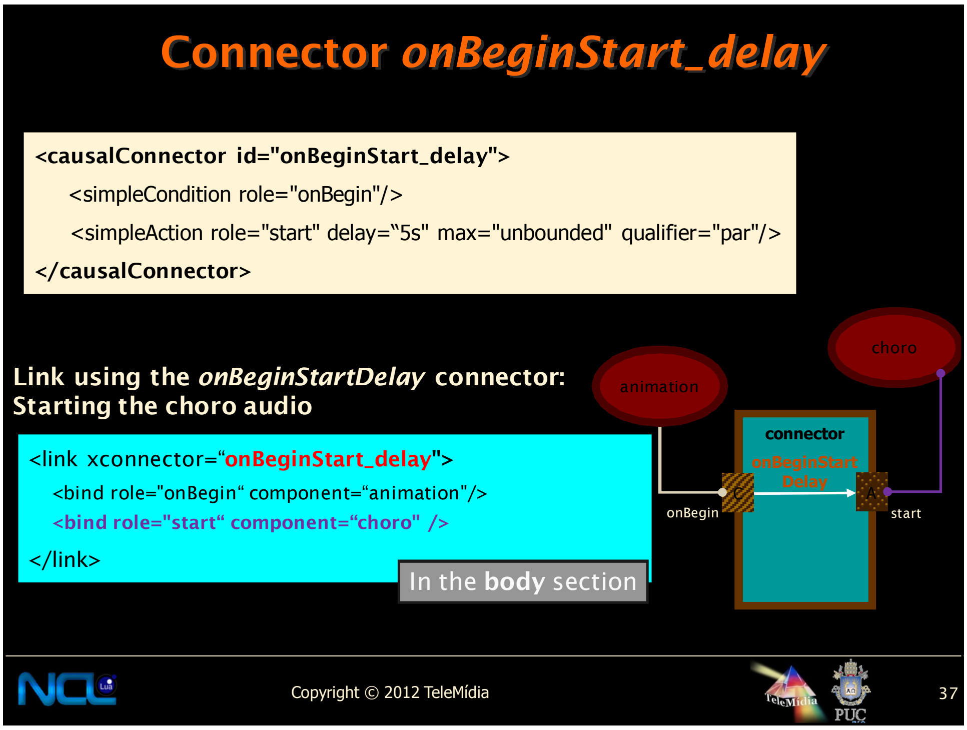
Connector *onBeginStart*

```
<causalConnector id="onBeginStart">
    <simpleCondition role="onBegin"/>
    <simpleAction role="start" max="unbounded"  qualifier="par" />
</causalConnector>
```

Link using the *onBeginStart* connector: Starting the photo image

```
<link xconnector="onBeginStart">
    bind role="onBegin" component="animation"
                                interface="segPhoto/>
   <bind role="start" component="photo" />
</link>
```

In the **body** section



Connector *onBeginStart_delay*

```
<causalConnector id="onBeginStart_delay">
    <simpleCondition role="onBegin"/>
    <simpleAction role="start" delay="5s" max="unbounded" qualifier="par"/>
</causalConnector>
```

Link using the *onBeginStartDelay* connector: Starting the choro audio

```
<link xconnector="onBeginStart_delay">
   <bind role="onBegin" component="animation"/>
   <bind role="start" component="choro" />
</link>
```

In the **body** section

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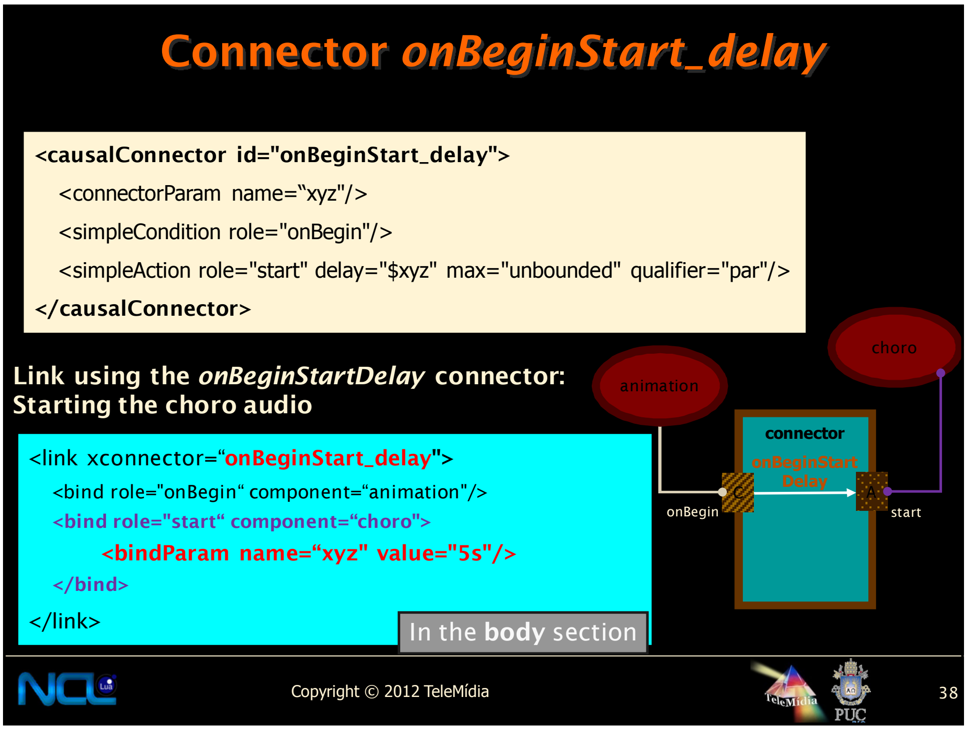

Connector *onBeginStart_delay*

```
<causalConnector id="onBeginStart_delay">
   <connectorParam name="xyz"/>
   <simpleCondition role="onBegin"/>
   <simpleAction role="start" delay="$xyz" max="unbounded" qualifier="par"/>
</causalConnector>
```

Link using the *onBeginStartDelay* connector: Starting the choro audio

```
<link xconnector="onBeginStart_delay">
   <bind role="onBegin" component="animation"/>
   <bind role="start" component="choro">
         <bindParam name="xyz" value="5s"/>
   </bind>
</link>
```

In the **body** section

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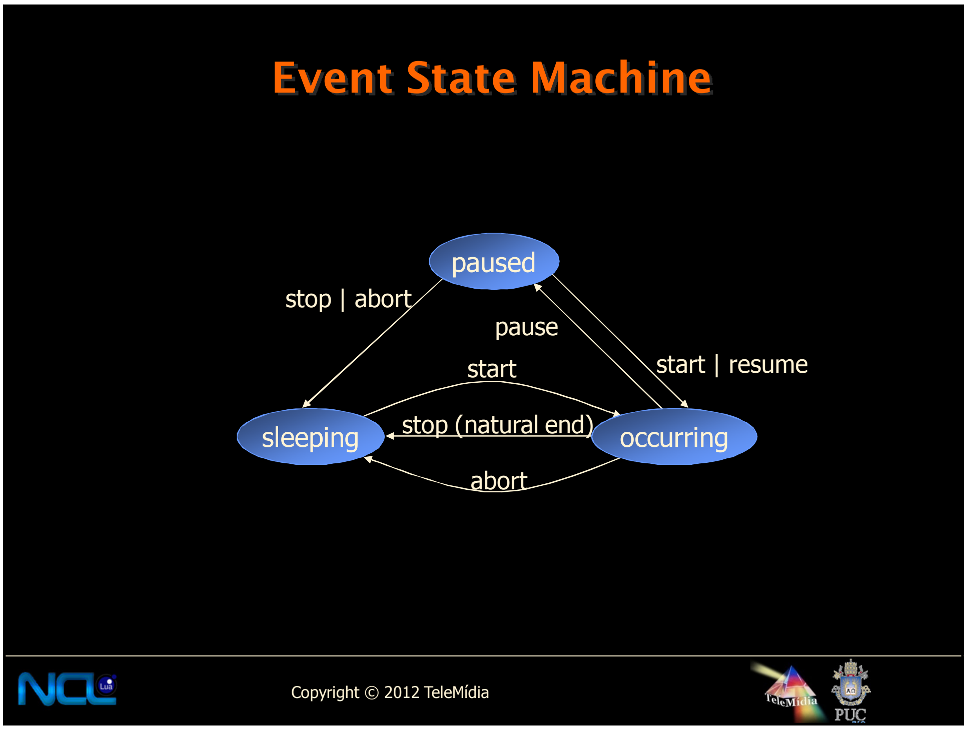
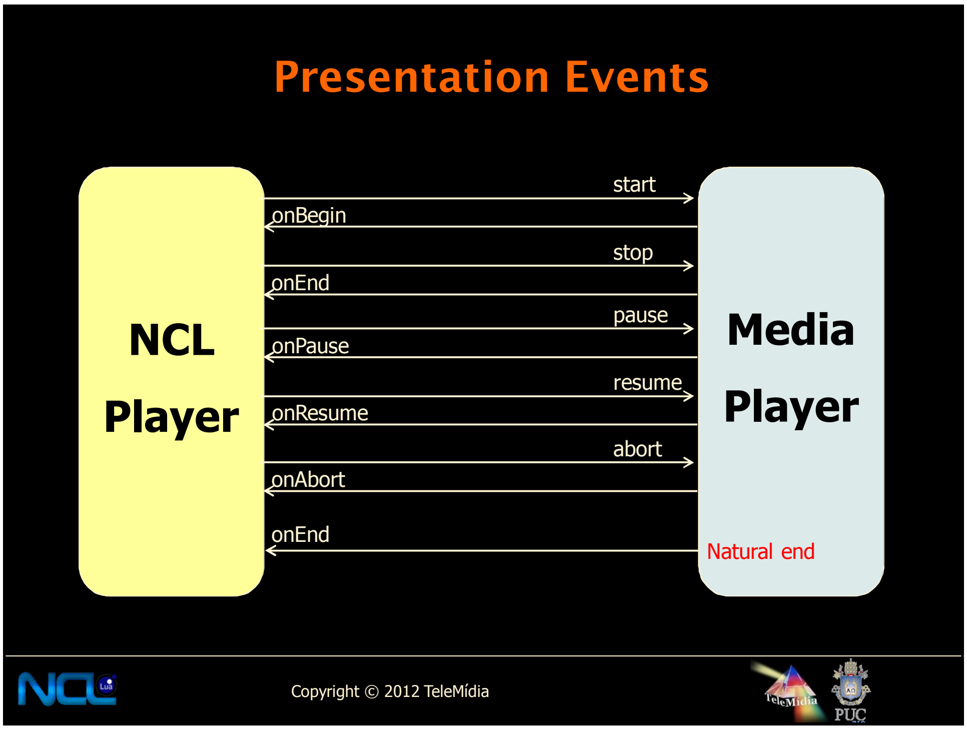
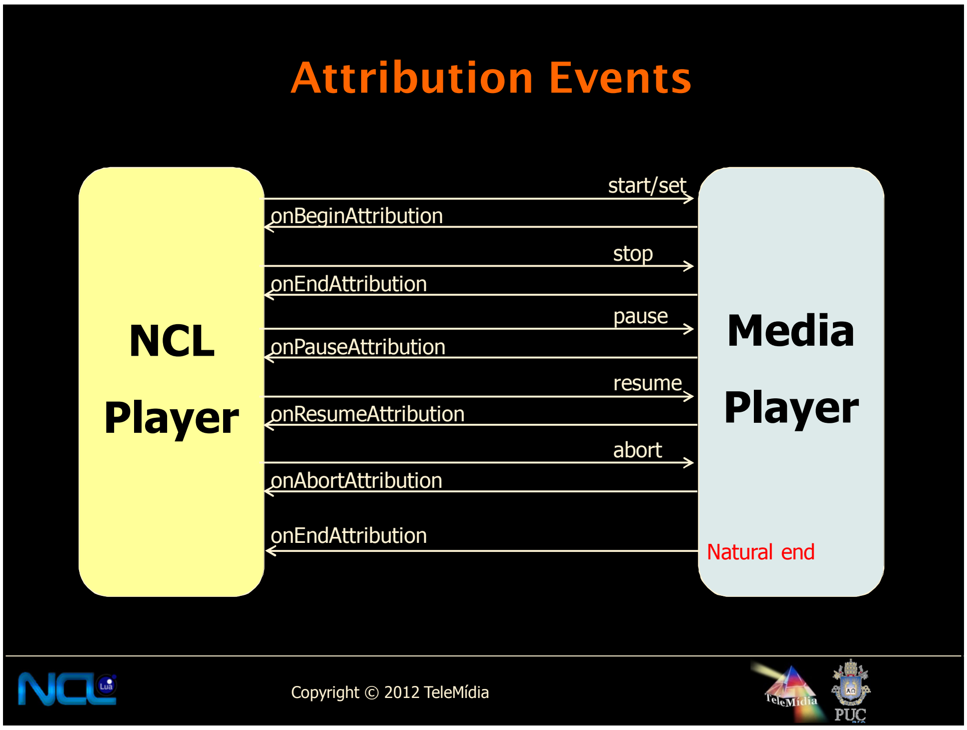


Event State Machine



Presentation Events



Attribution Events

NCL Player

Media Player

start/set

onBeginAttribution

stop

onEndAttribution

pause

onPauseAttribution

resume

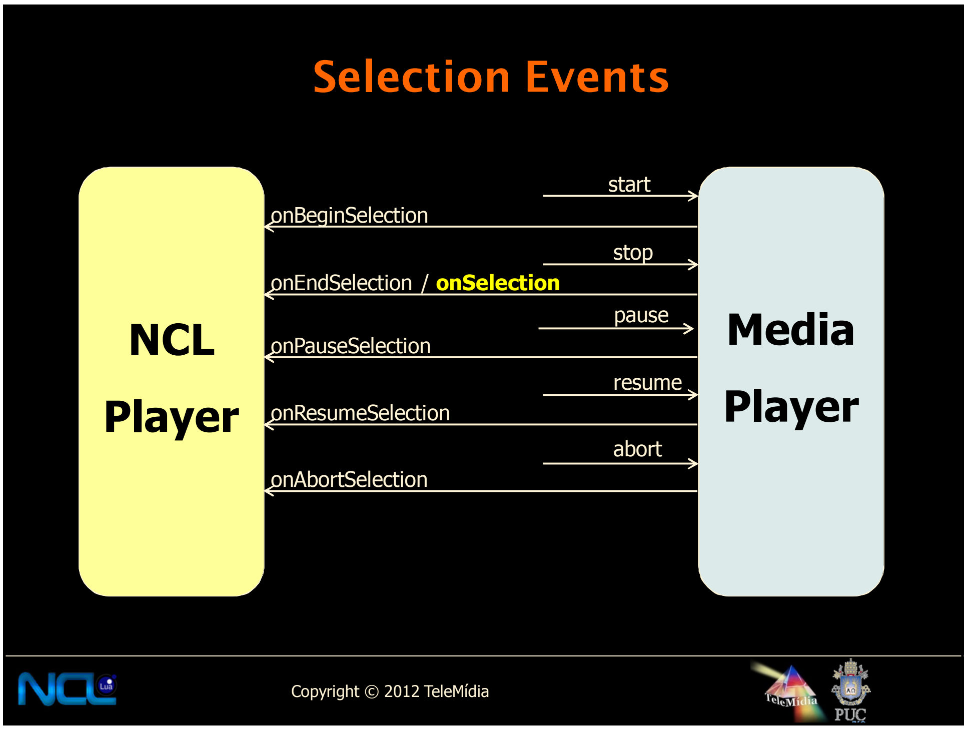
onResumeAttribution

abort

onAbortAttribution

onEndAttribution

Natural end



Selection Events

NCL Player

Media Player

start

onBeginSelection

stop

onEndSelection / **onSelection**

pause

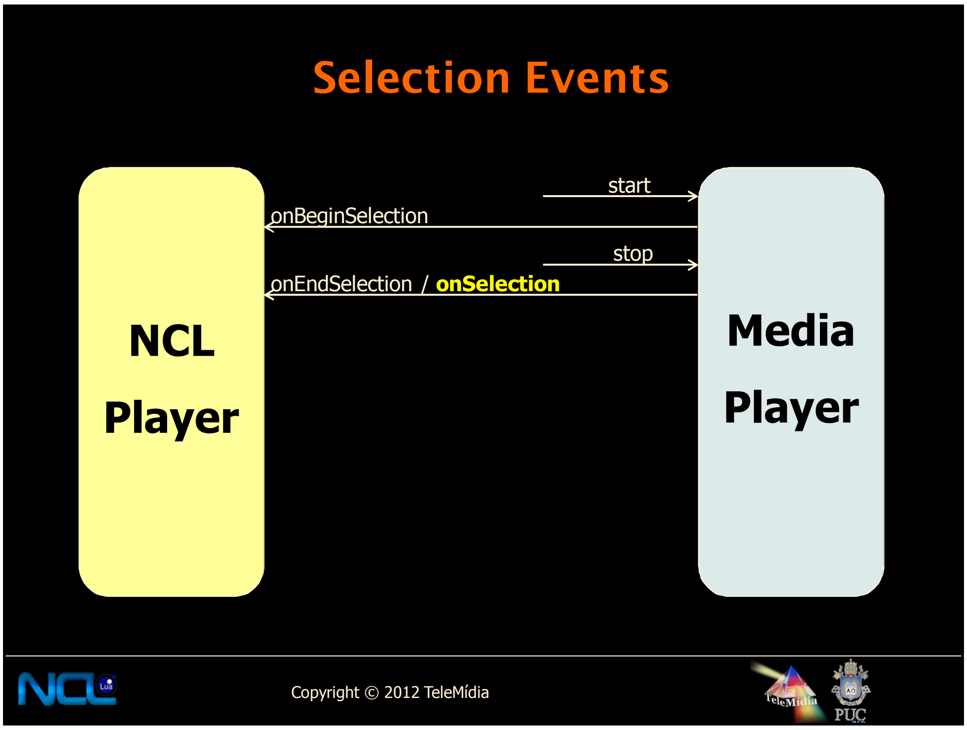
onPauseSelection

resume

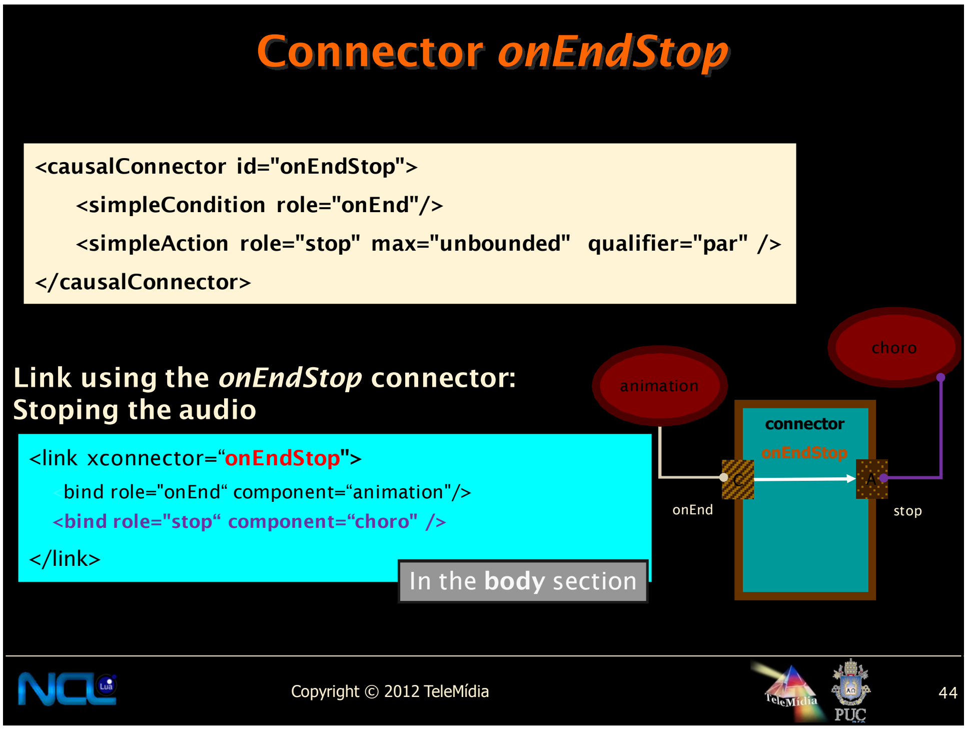
onResumeSelection

abort

onAbortSelection



Selection Events



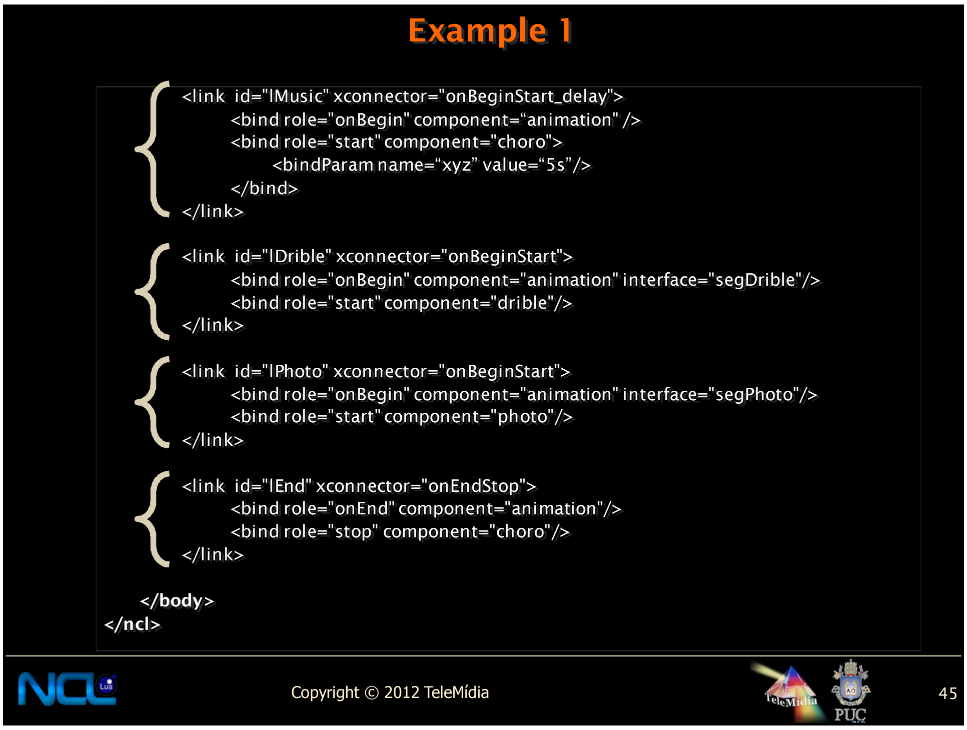
Connector *onEndStop*

```
<causalConnector id="onEndStop">
    <simpleCondition role="onEnd"/>
    <simpleAction role="stop" max="unbounded" qualifier="par" />
</causalConnector>
```

Link using the *onEndStop* connector: Stoping the audio

```
<link xconnector=“onEndStop">
    bind role="onEnd“ component=“animation"/>
  <bind role="stop“ component=“choro" />
</link>
```

In the **body** section



Example 1

```
<link  id="lMusic" xconnector="onBeginStart_delay">
        <bind role="onBegin" component=“animation” />
        <bind role="start" component="choro">
               <bindParam name=“xyz” value=“5s”/>
        </bind>
</link>

<link  id="lDrible" xconnector="onBeginStart">
        <bind role="onBegin" component="animation" interface="segDrible"/>
        <bind role="start" component="drible"/>
</link>

<link  id="lPhoto" xconnector="onBeginStart">
        <bind role="onBegin" component="animation" interface="segPhoto"/>
        <bind role="start" component="photo"/>
</link>

<link  id="lEnd" xconnector="onEndStop">
        <bind role="onEnd" component="animation"/>
        <bind role="stop" component="choro"/>
</link>

      </body>
</ncl>
```

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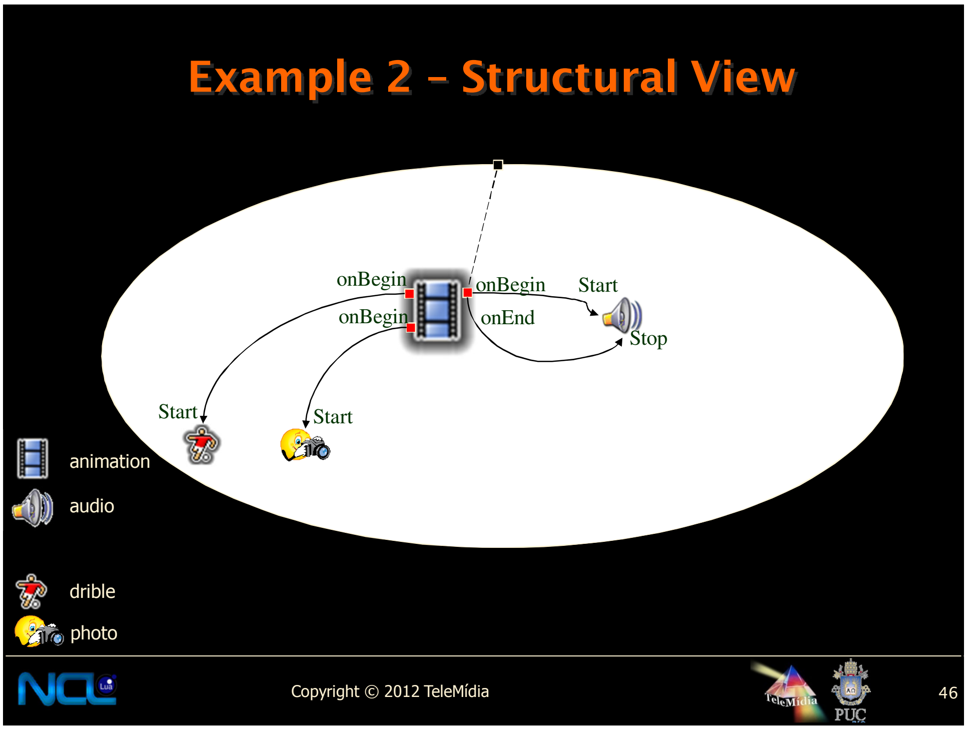

Example 2 – Structural View

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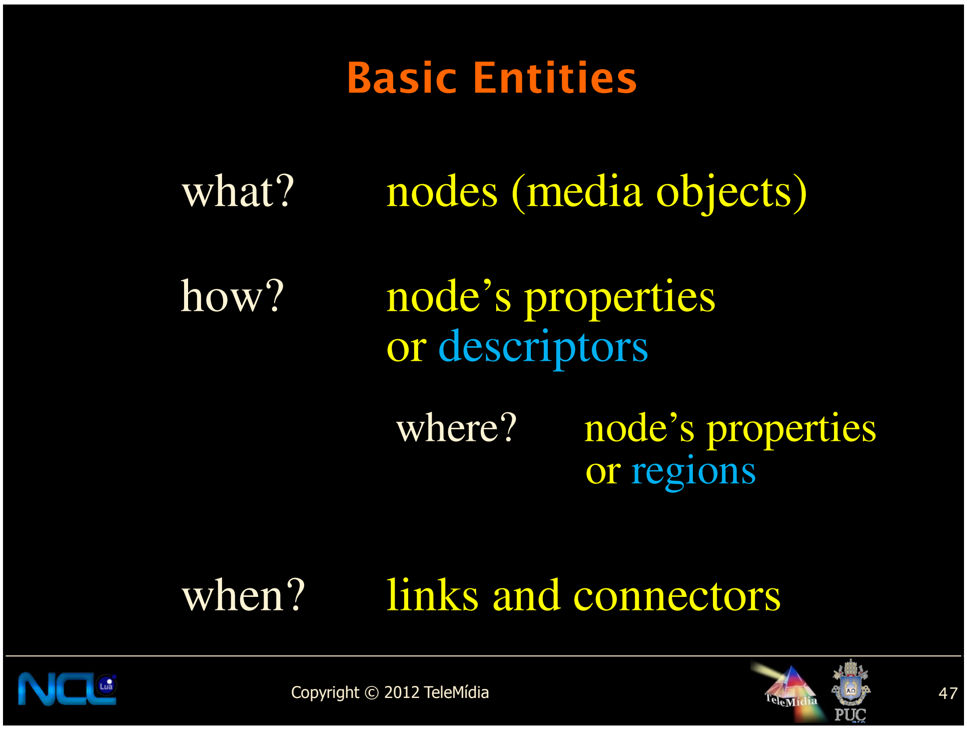

Basic Entities

what? nodes (media objects)

how? node’s properties
or descriptors

where? node’s properties
or regions

when? links and connectors

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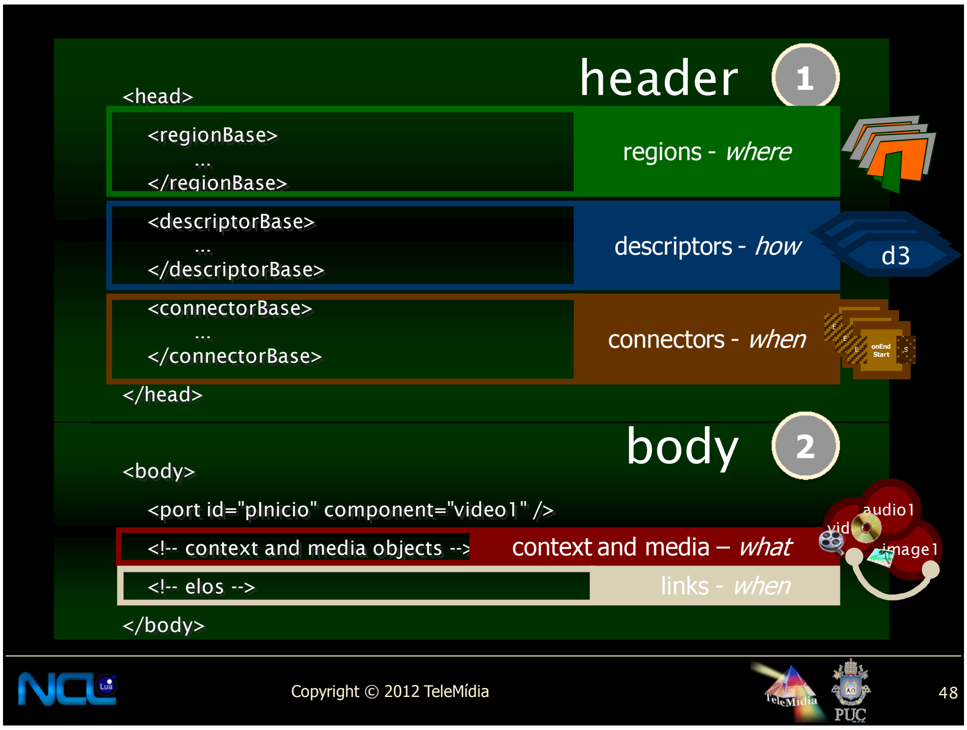

```
<head>
   <regionBase>
       …
   </regionBase>
   <descriptorBase>
       …
   </descriptorBase>
   <connectorBase>
       …
   </connectorBase>
</head>

<body>
   <port id="pInicio" component="video1" />
   <!-- context and media objects -->
   <!-- elos -->
</body>
```

header 1

regions - *where*

descriptors - *how*

connectors - *when*

body 2

context and media – *what*

links - *when*

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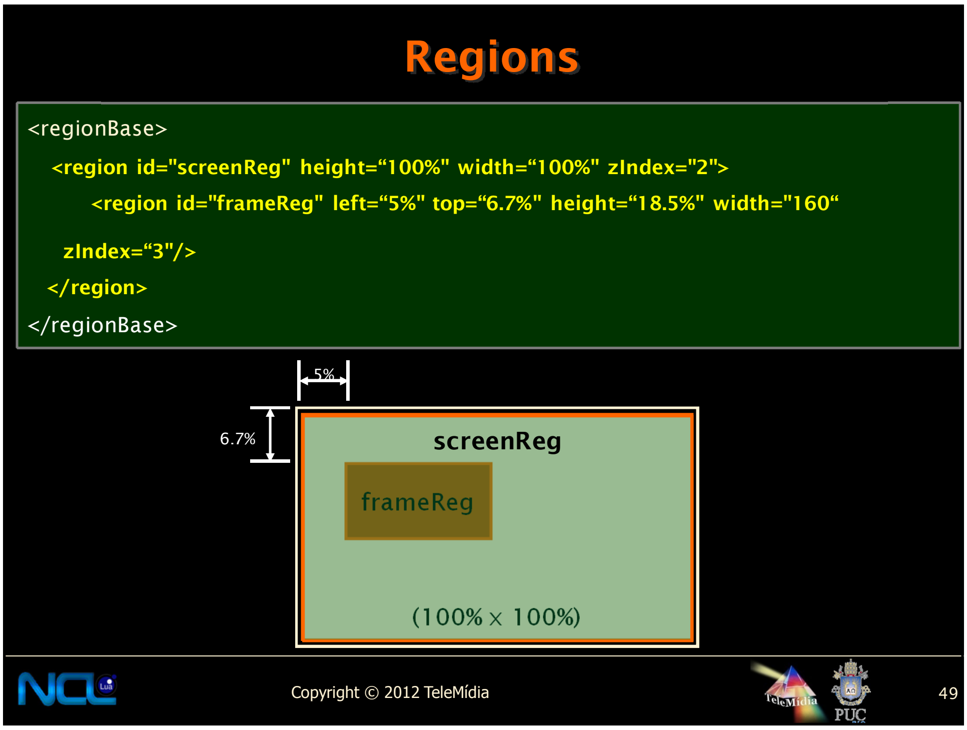
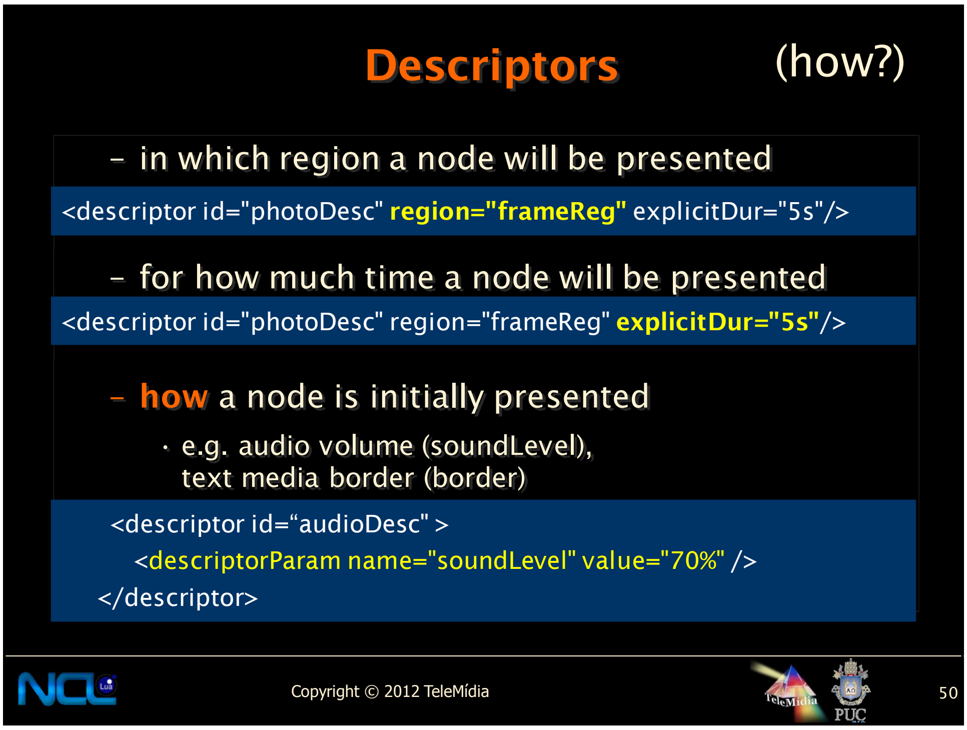


Regions

```
<regionBase>
   <region id="screenReg"  height="100%" width="100%" zIndex="2">
        <region id="frameReg"  left="5%"  top="6.7%"  height="18.5%"  width="160"
     zIndex="3"/>
   </region>
</regionBase>
```



Descriptors (how?)

- in which region a node will be presented

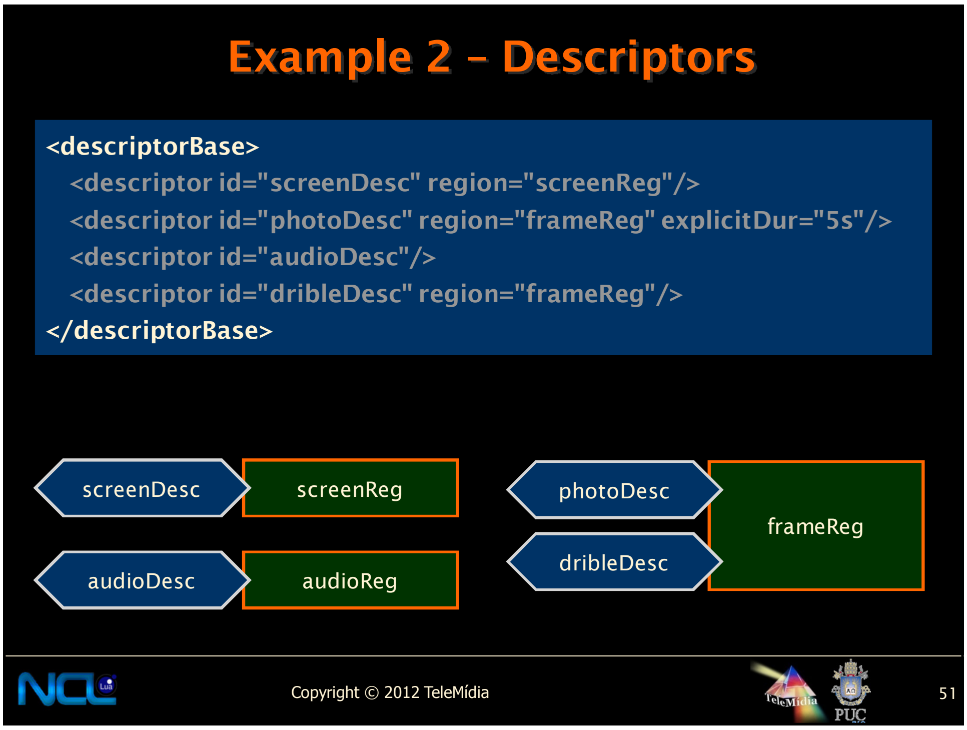
```
<descriptor id="photoDesc" region="frameReg" explicitDur="5s"/>
```

- for how much time a node will be presented

```
<descriptor id="photoDesc" region="frameReg" explicitDur="5s"/>
```

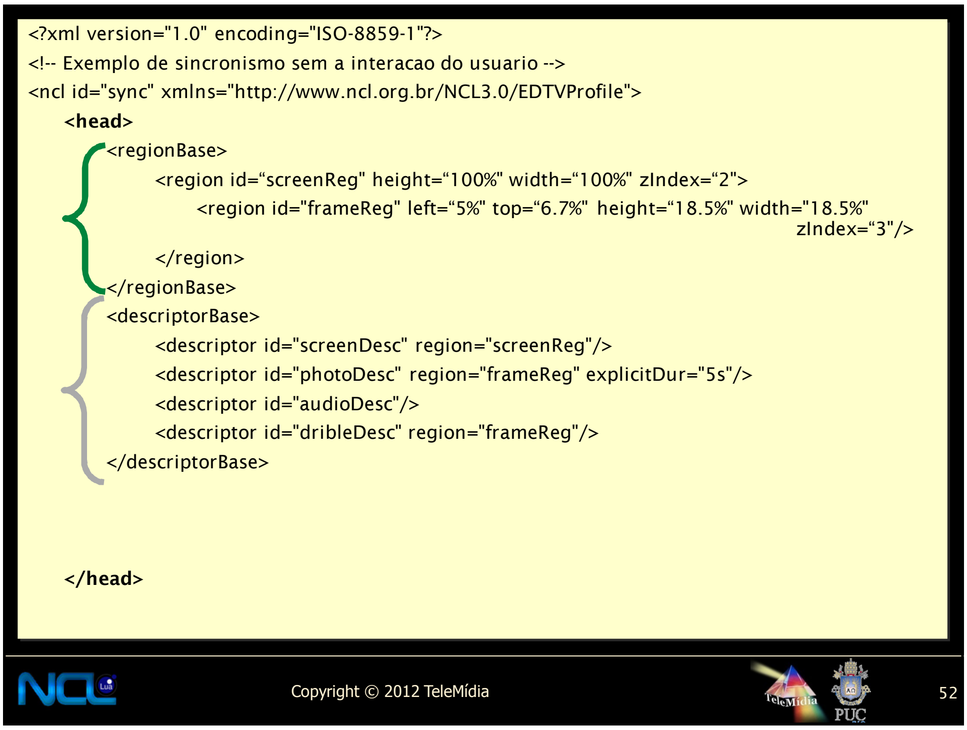
- **how** a node is initially presented
  - e.g. audio volume (soundLevel), text media border (border)

```
    <descriptor id="audioDesc" >
       <descriptorParam name="soundLevel" value="70%" />
  </descriptor>
```



Example 2 – Descriptors

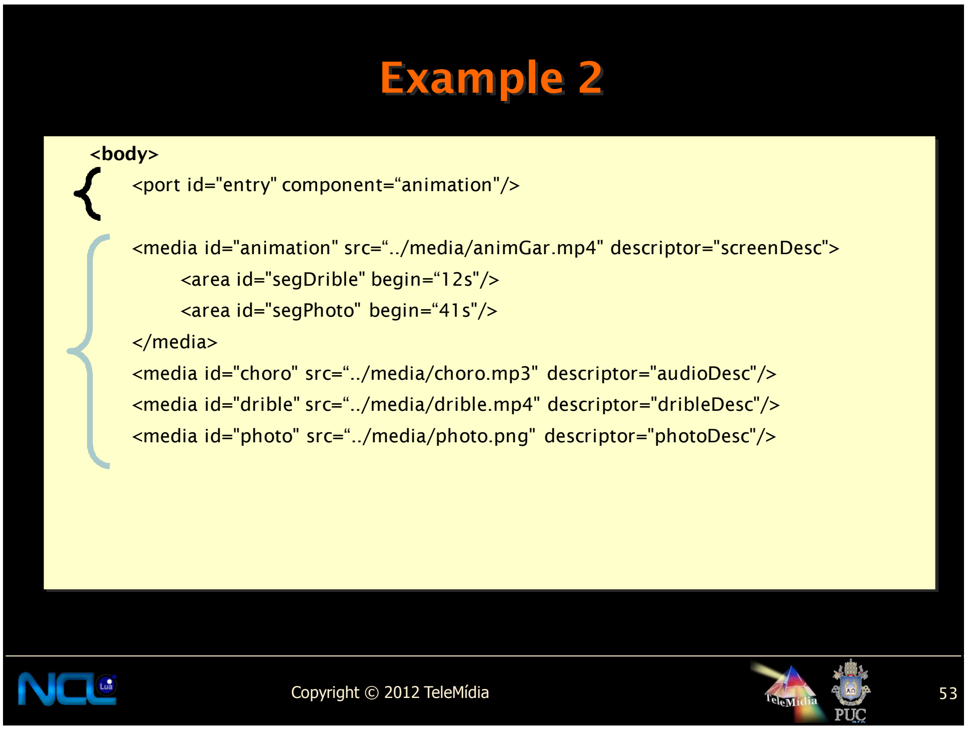
```
<descriptorBase>
  <descriptor id="screenDesc" region="screenReg"/>
  <descriptor id="photoDesc" region="frameReg" explicitDur="5s"/>
  <descriptor id="audioDesc"/>
  <descriptor id="dribleDesc" region="frameReg"/>
</descriptorBase>
```



```
<?xml version="1.0" encoding="ISO-8859-1"?>
<!-- Exemplo de sincronismo sem a interacao do usuario -->
<ncl id="sync" xmlns="http://www.ncl.org.br/NCL3.0/EDTVProfile">
   <head>
      <regionBase>
           <region id=“screenReg" height=“100%" width=“100%" zIndex=“2">
                <region id="frameReg" left=“5%" top=“6.7%" height="18.5%" width="18.5%"
                                                                                zIndex=“3"/>
           </region>
      </regionBase>
      <descriptorBase>
           <descriptor id="screenDesc" region="screenReg"/>
           <descriptor id="photoDesc" region="frameReg" explicitDur="5s"/>
           <descriptor id="audioDesc"/>
           <descriptor id="dribleDesc" region="frameReg"/>
      </descriptorBase>



   </head>
```



Example 2

```
<body>
    <port id="entry" component=“animation"/>

    <media id="animation" src=“../media/animGar.mp4" descriptor="screenDesc">
        <area id="segDrible" begin=“12s"/>
        <area id="segPhoto" begin=“41s"/>
    </media>
    <media id="choro" src=“../media/choro.mp3"  descriptor="audioDesc"/>
    <media id="drible" src=“../media/drible.mp4" descriptor="dribleDesc"/>
    <media id="photo" src=“../media/photo.png"  descriptor="photoDesc"/>
```

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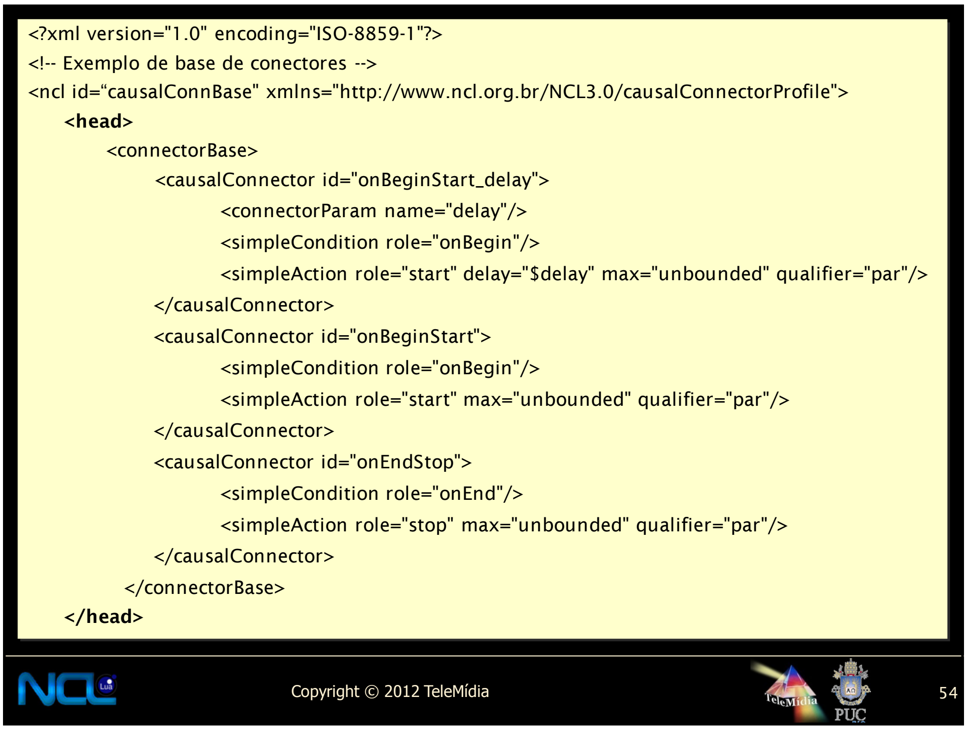

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<!-- Exemplo de base de conectores -->
<ncl id=“causalConnBase" xmlns="http://www.ncl.org.br/NCL3.0/causalConnectorProfile">
   <head>
      <connectorBase>
         <causalConnector id="onBeginStart_delay">
               <connectorParam name="delay"/>
               <simpleCondition role="onBegin"/>
               <simpleAction role="start" delay="$delay" max="unbounded" qualifier="par"/>
         </causalConnector>
         <causalConnector id="onBeginStart">
               <simpleCondition role="onBegin"/>
               <simpleAction role="start" max="unbounded" qualifier="par"/>
         </causalConnector>
         <causalConnector id="onEndStop">
               <simpleCondition role="onEnd"/>
               <simpleAction role="stop" max="unbounded" qualifier="par"/>
         </causalConnector>
       </connectorBase>
   </head>
```

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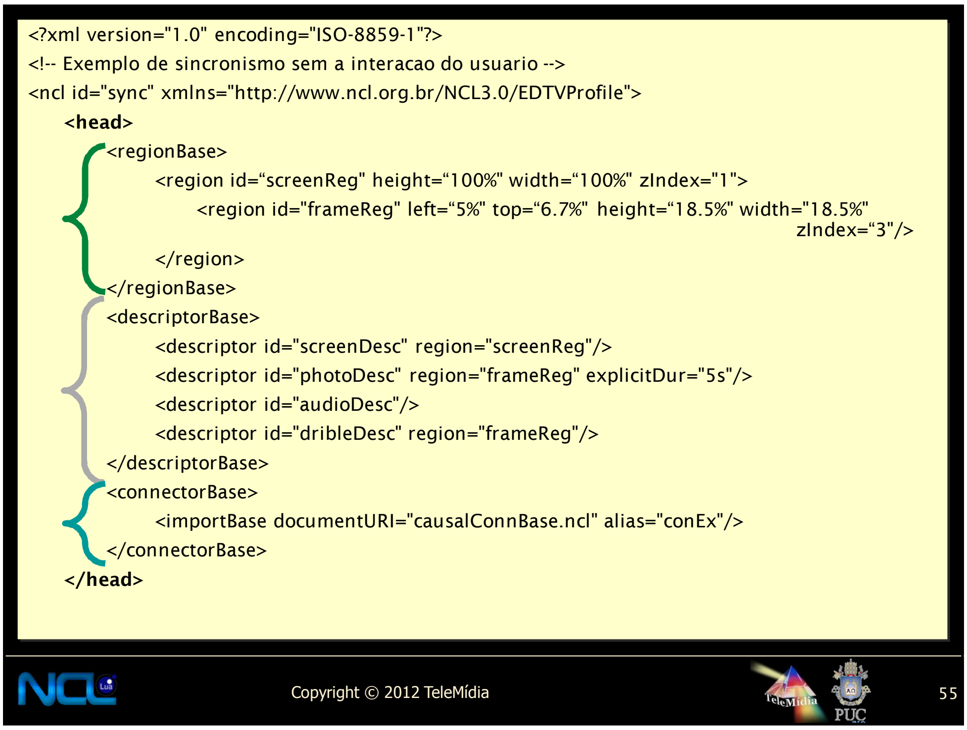
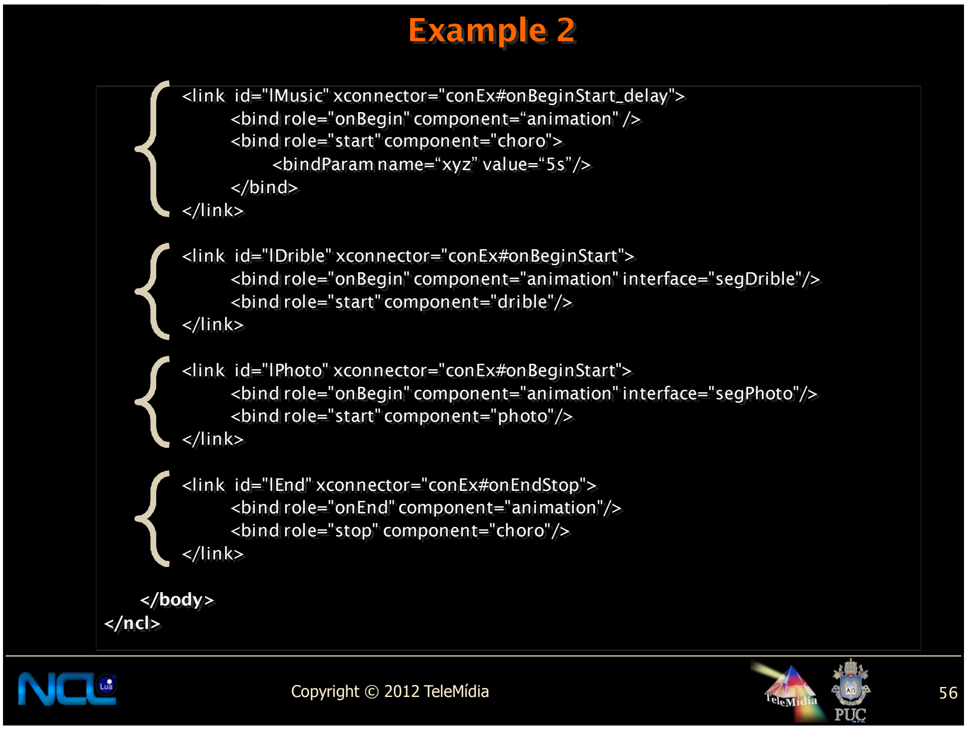


```
<?xml version="1.0" encoding="ISO-8859-1"?>
<!-- Exemplo de sincronismo sem a interacao do usuario -->
<ncl id="sync" xmlns="http://www.ncl.org.br/NCL3.0/EDTVProfile">
    <head>
        <regionBase>
            <region id=“screenReg" height=“100%" width=“100%" zIndex="1">
                <region id="frameReg" left=“5%" top=“6.7%" height=“18.5%" width="18.5%"
                                                                              zIndex=“3"/>
            </region>
        </regionBase>
        <descriptorBase>
            <descriptor id="screenDesc" region="screenReg"/>
            <descriptor id="photoDesc" region="frameReg" explicitDur="5s"/>
            <descriptor id="audioDesc"/>
            <descriptor id="dribleDesc" region="frameReg"/>
        </descriptorBase>
        <connectorBase>
            <importBase documentURI="causalConnBase.ncl" alias="conEx"/>
        </connectorBase>
    </head>
```



Example 2

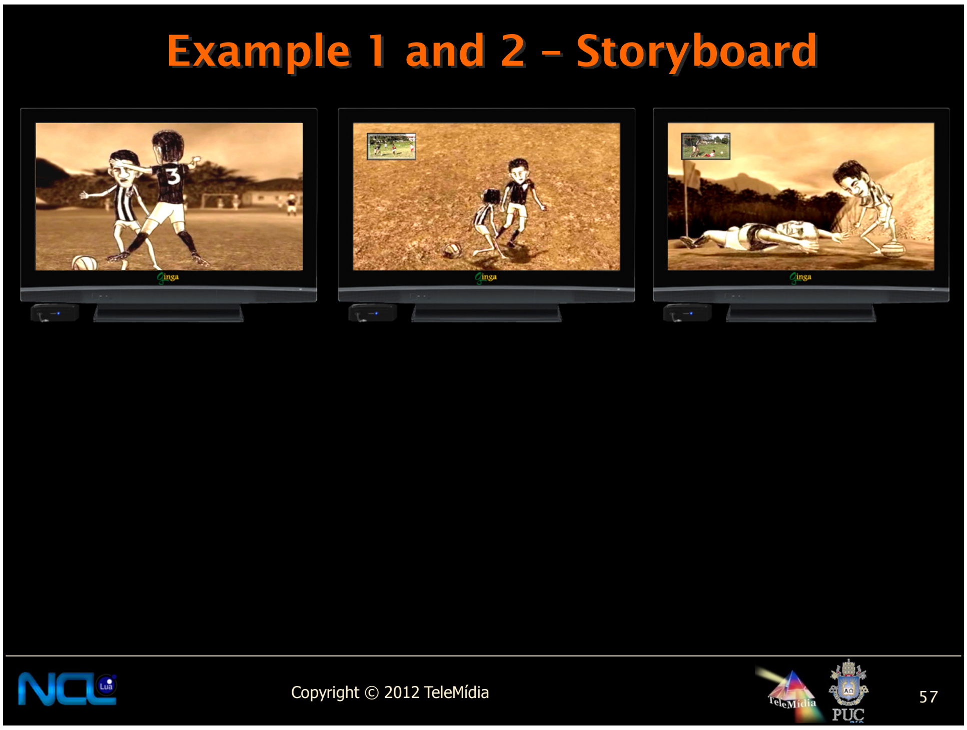
```
        <link  id="lMusic" xconnector="conEx#onBeginStart_delay">
            <bind role="onBegin" component="animation" />
            <bind role="start" component="choro">
                <bindParam name=“xyz” value=“5s”/>
            </bind>
        </link>

        <link  id="lDrible" xconnector="conEx#onBeginStart">
            <bind role="onBegin" component="animation" interface="segDrible"/>
            <bind role="start" component="drible"/>
        </link>

        <link  id="lPhoto" xconnector="conEx#onBeginStart">
            <bind role="onBegin" component="animation" interface="segPhoto"/>
            <bind role="start" component="photo"/>
        </link>

        <link  id="lEnd" xconnector="conEx#onEndStop">
            <bind role="onEnd" component="animation"/>
            <bind role="stop" component="choro"/>
        </link>

    </body>
</ncl>
```



Example 1 and 2 – Storyboard

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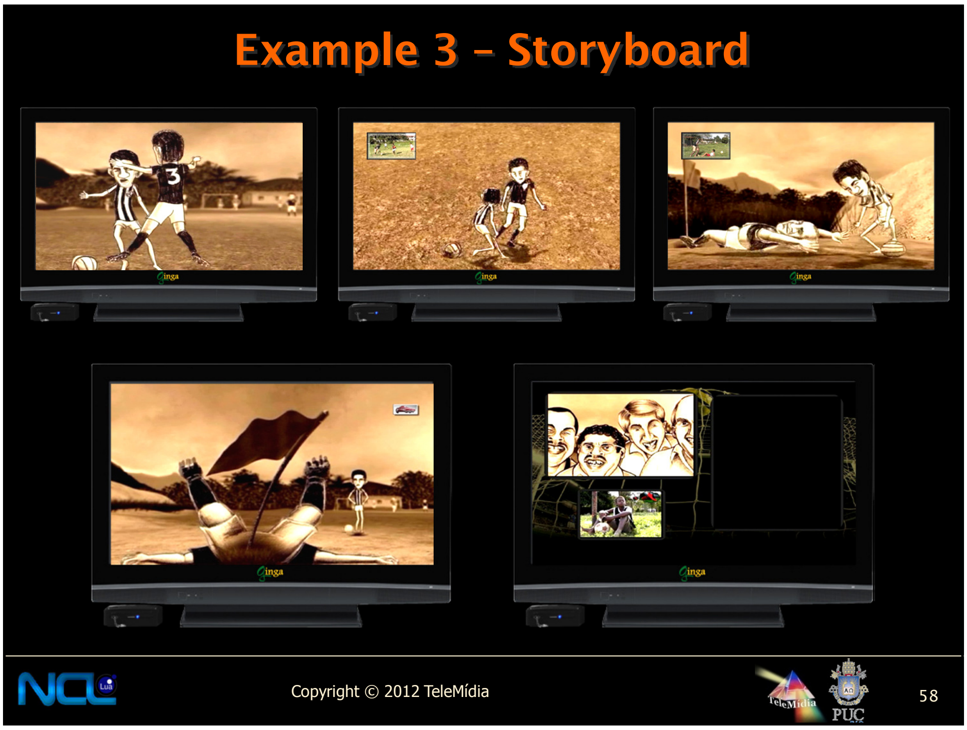

Example 3 – Storyboard

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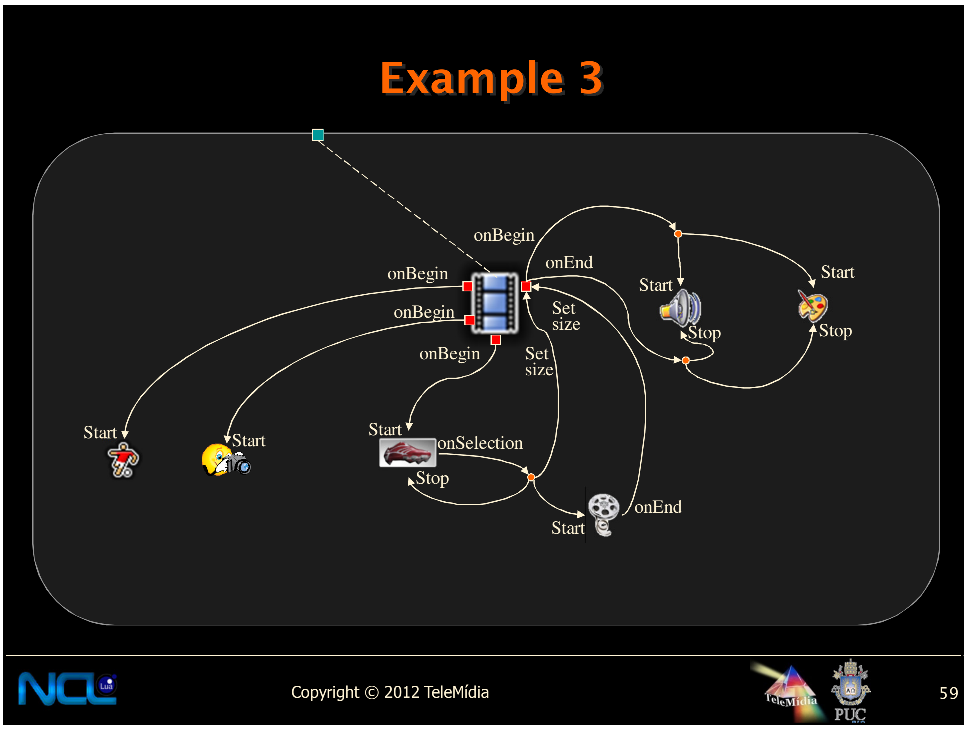
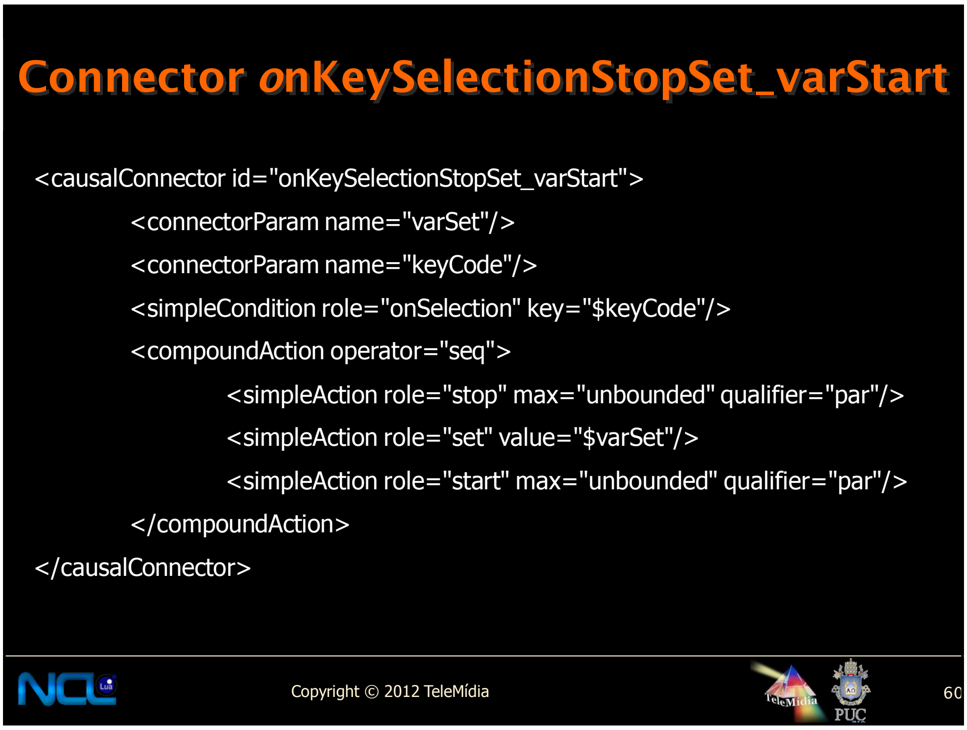


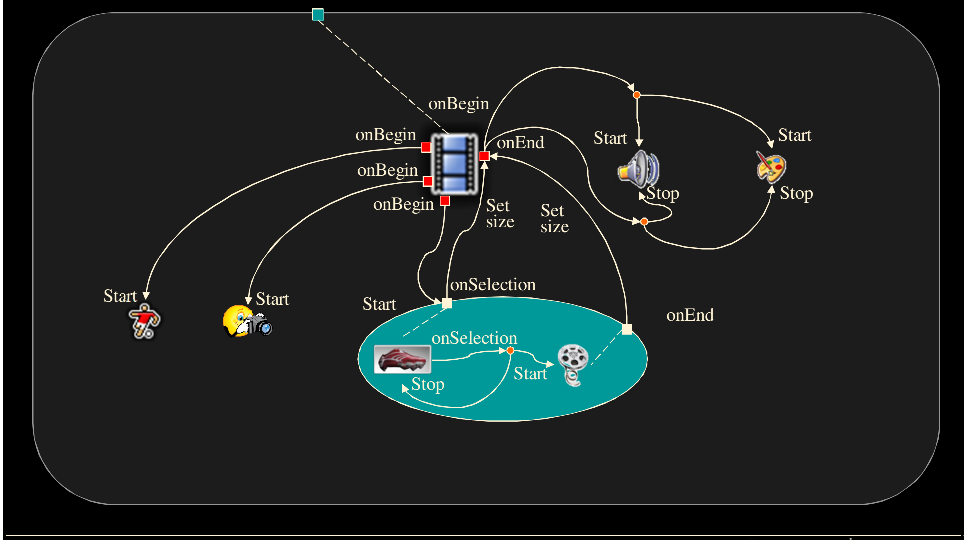
Example 3



Connector *on*KeySelectionStopSet_varStart

```
<causalConnector id="onKeySelectionStopSet_varStart">
        <connectorParam name="varSet"/>
        <connectorParam name="keyCode"/>
        <simpleCondition role="onSelection" key="$keyCode"/>
        <compoundAction operator="seq">
                <simpleAction role="stop" max="unbounded" qualifier="par"/>
                <simpleAction role="set" value="$varSet"/>
                <simpleAction role="start" max="unbounded" qualifier="par"/>
        </compoundAction>
</causalConnector>
```

Example 4



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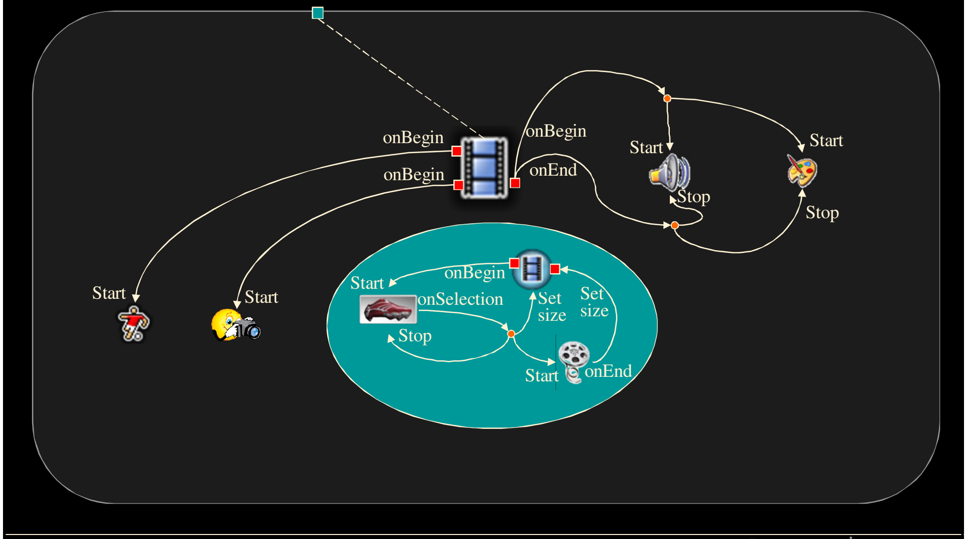
Example 5



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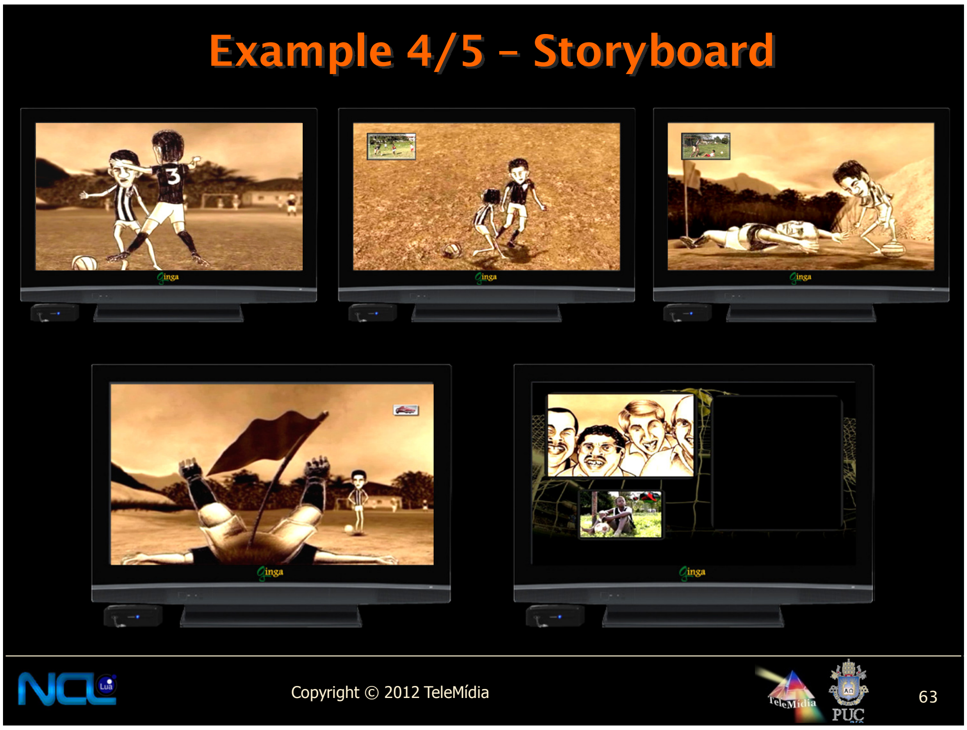

Example 4/5 – Storyboard

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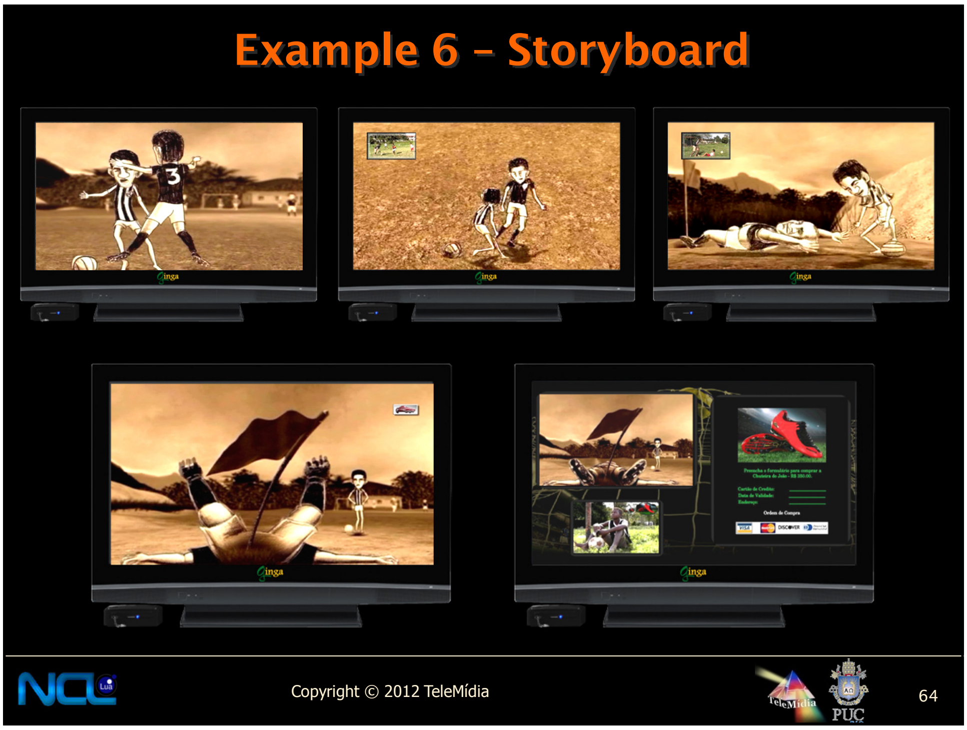

Example 6 – Storyboard

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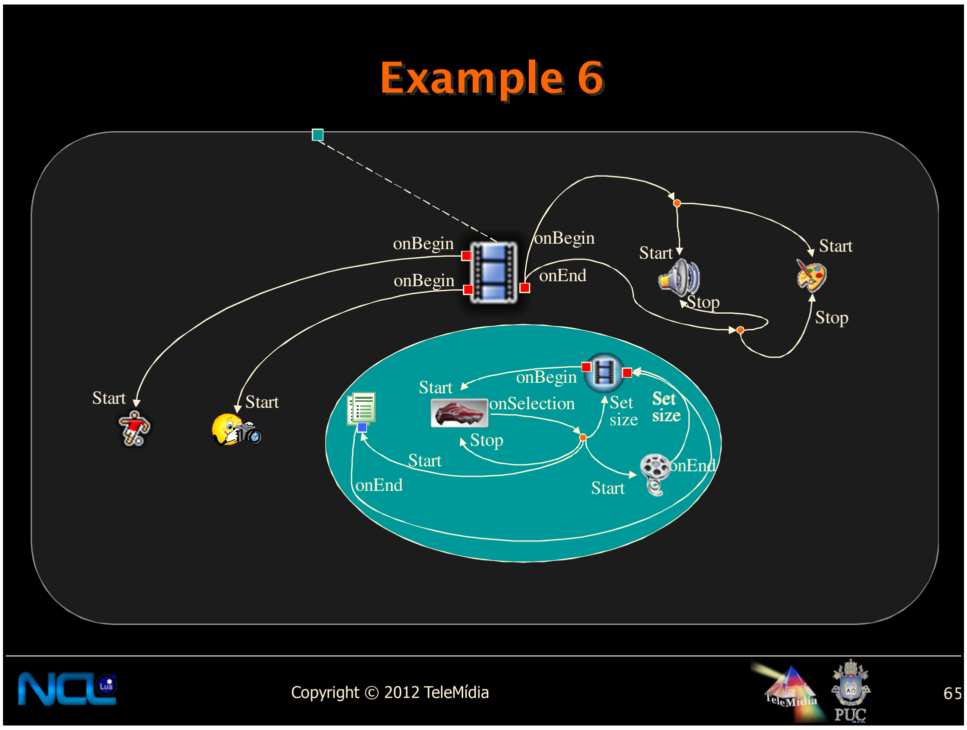
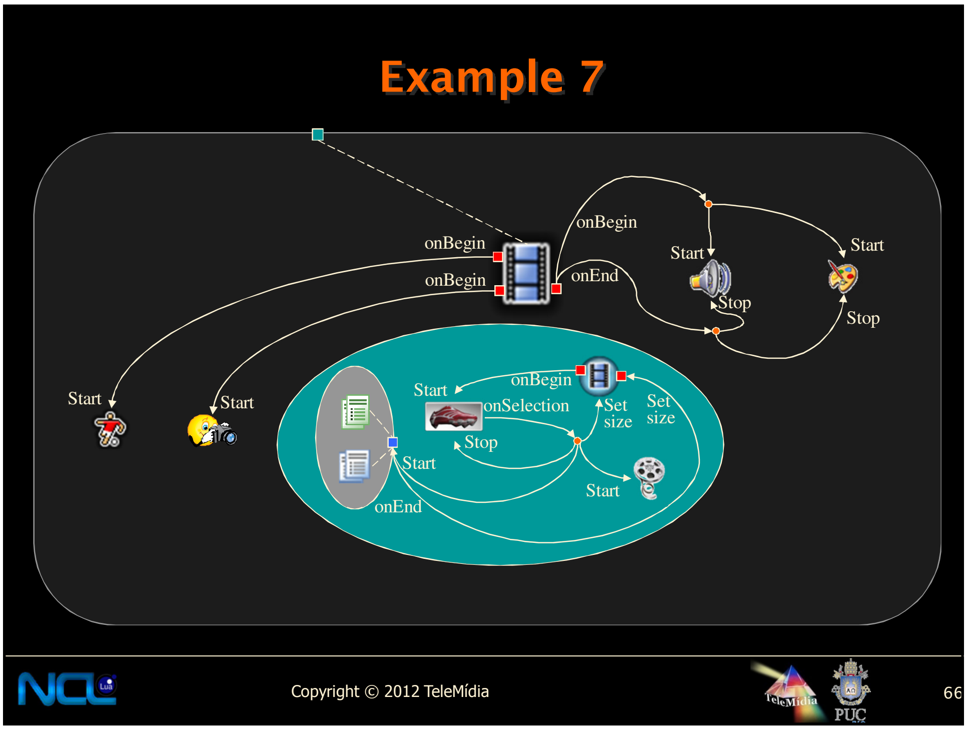


Example 6



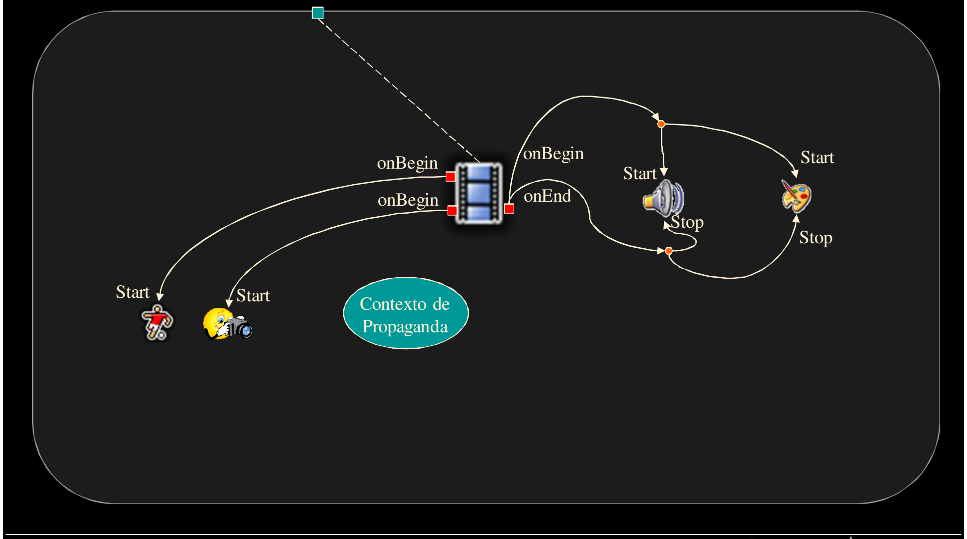
Example 7

ginga

ginga

Ginga

Example 8


onBegin
onBegin
onBegin
onEnd
Start
Start
Start
Stop
Start
Stop
Contexto de Propaganda

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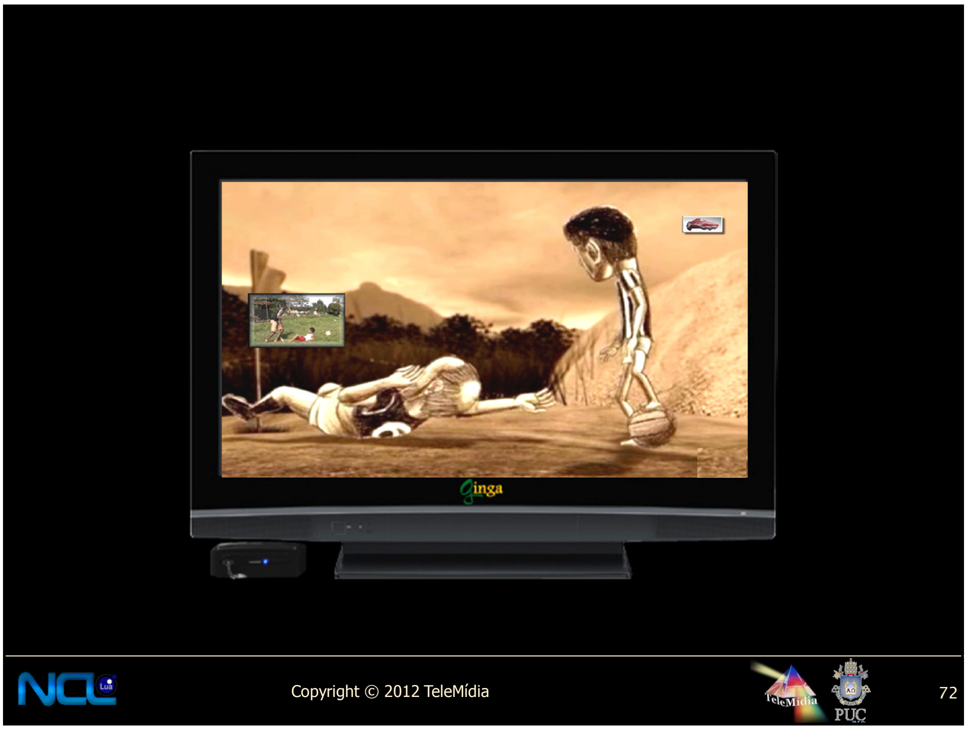
71



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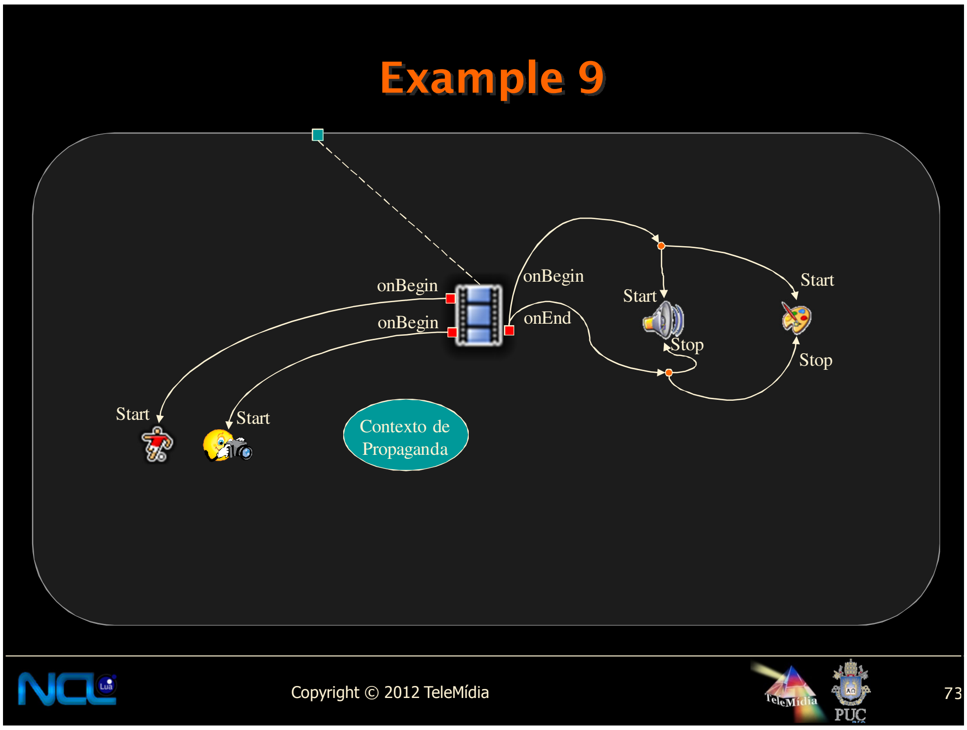

Example 9

onBegin
onBegin
onBegin
onEnd
Start
Start
Start
Stop
Start
Stop
Contexto de Propaganda

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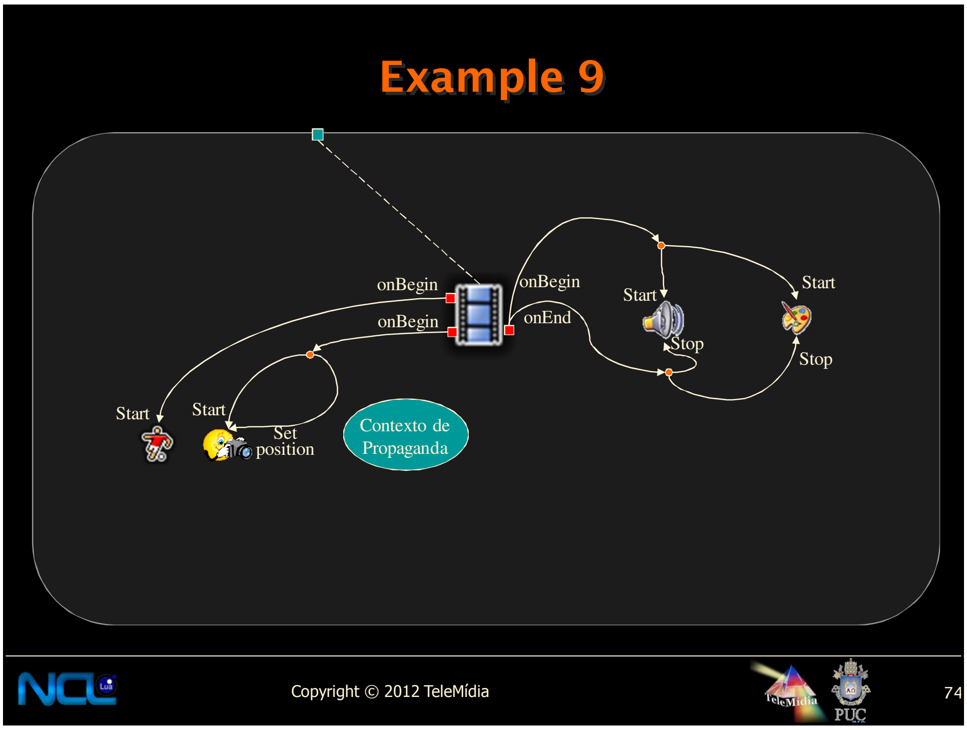

Example 9

onBegin
onBegin
onBegin
onEnd
Start
Start
Set position
Start
Stop
Start
Stop
Contexto de Propaganda

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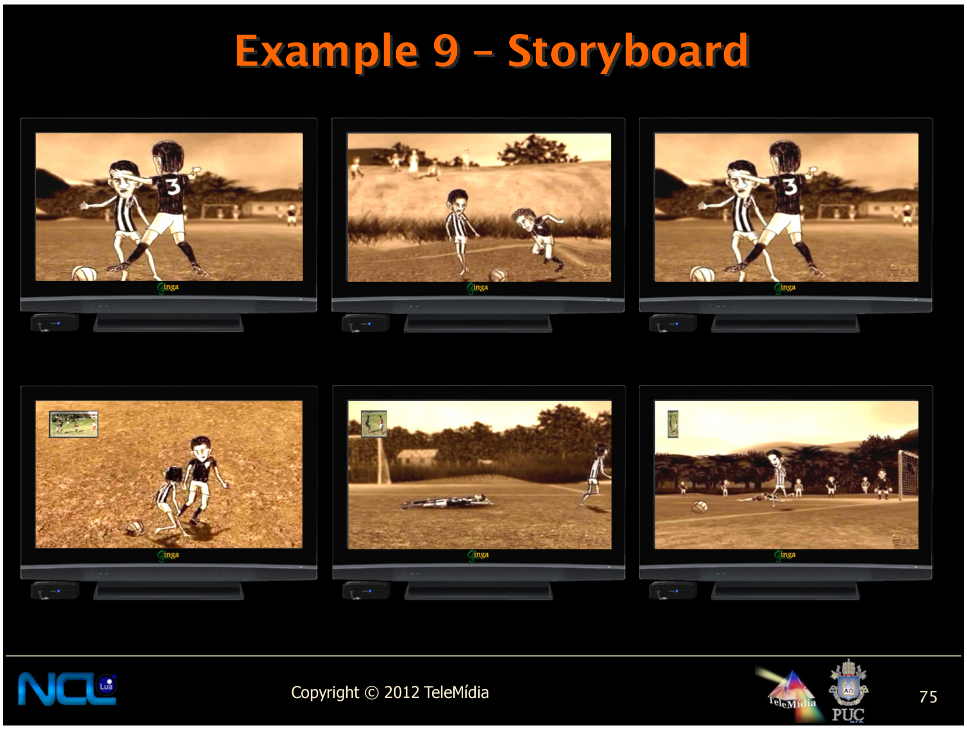

Example 9 – Storyboard

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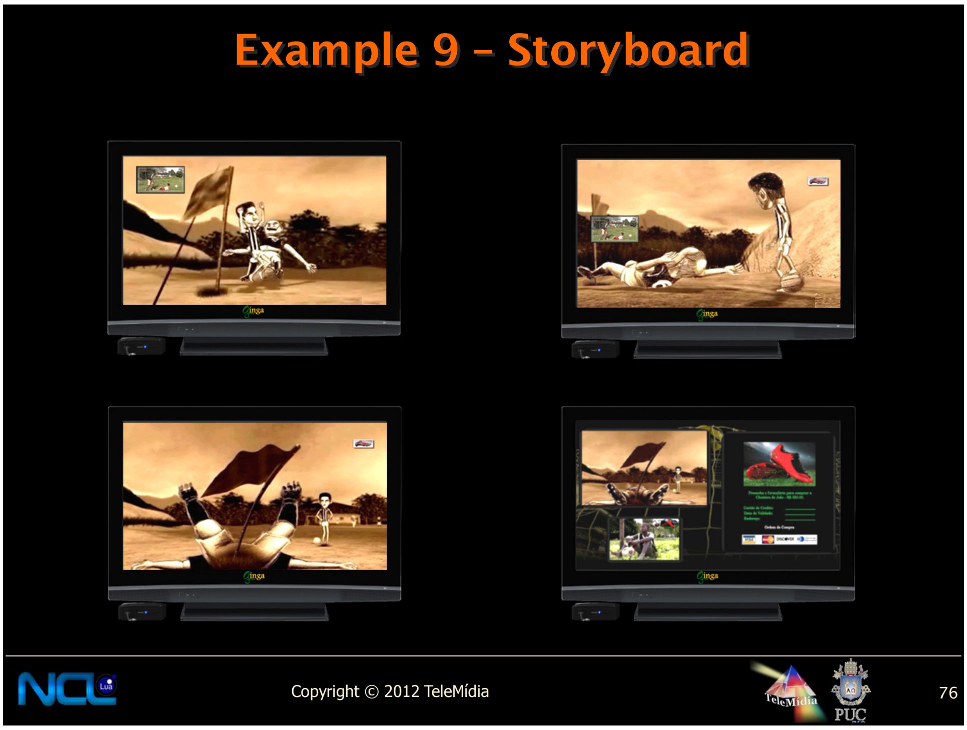

Example 9 – Storyboard

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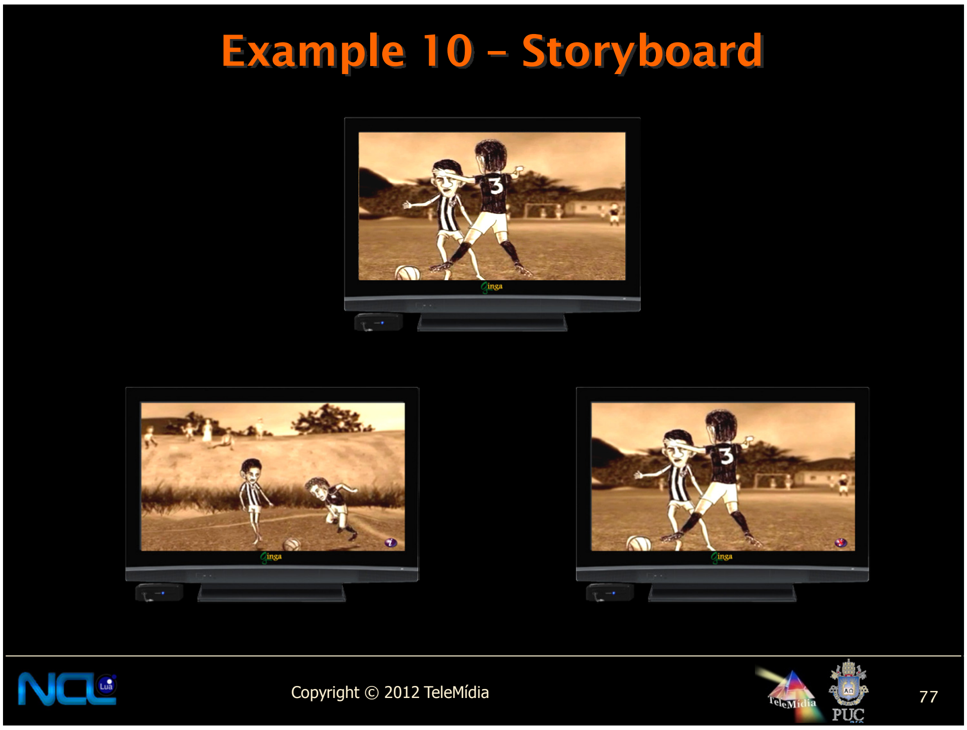

Example 10 – Storyboard

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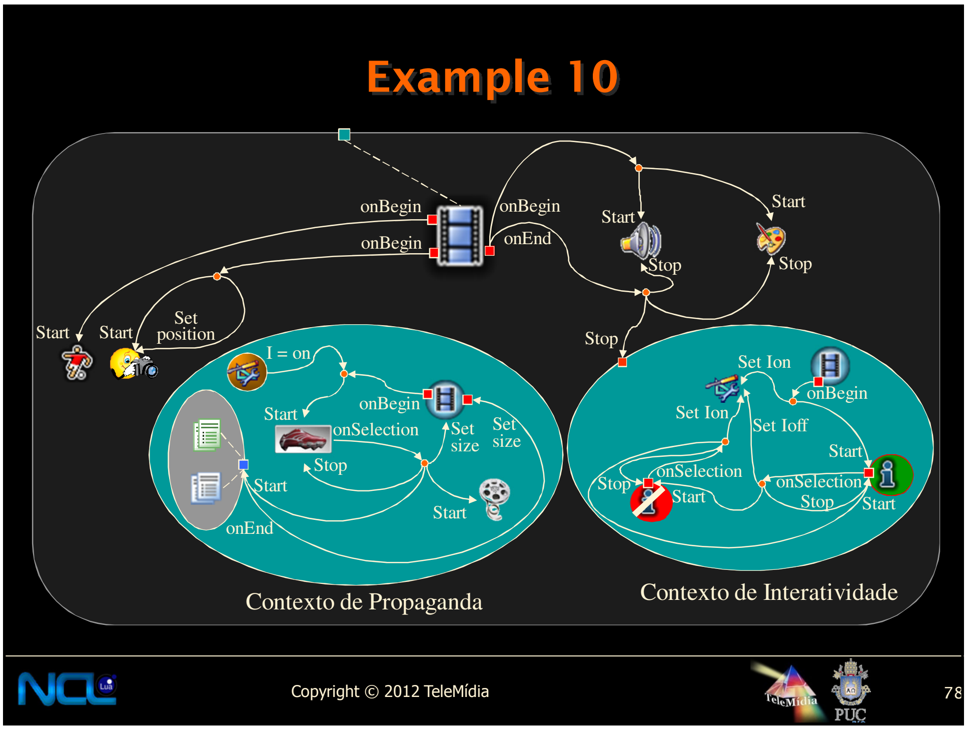

Example 10

onBegin
onBegin
onBegin
onEnd
Start
Stop
Start
Stop
Start
Start
Set position
Stop
I = on
onBegin
Start
onSelection
Set size
Set size
Stop
Start
Start
onEnd
Set Ion
onBegin
Set Ion
Set Ioff
Start
onSelection
Stop
Start
onSelection
Stop
Start

Contexto de Propaganda

Contexto de Interatividade

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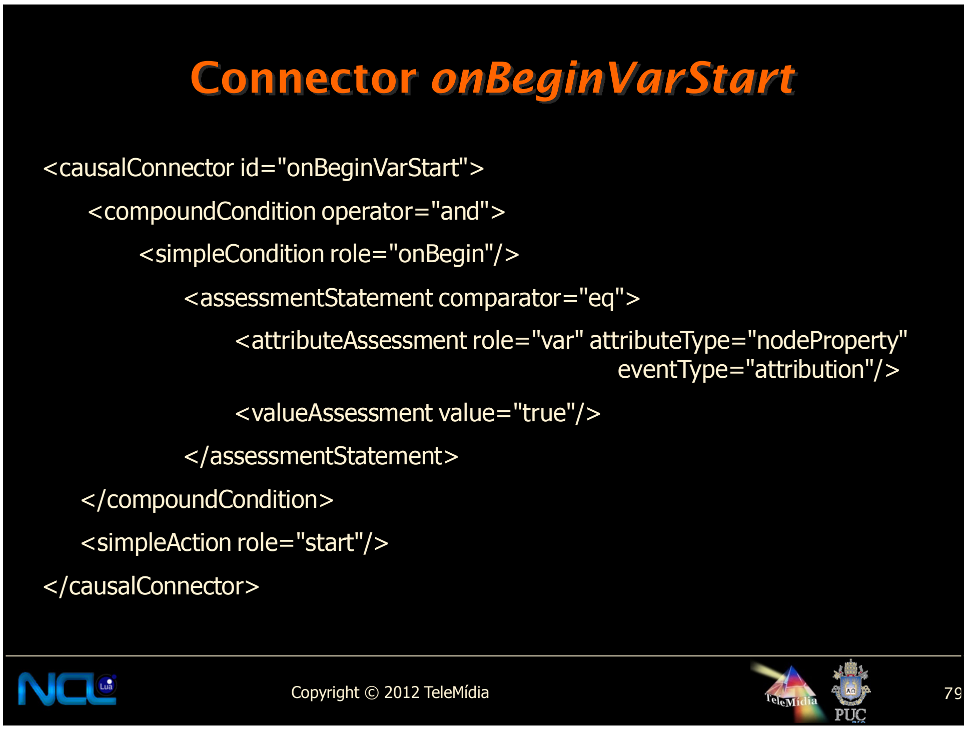
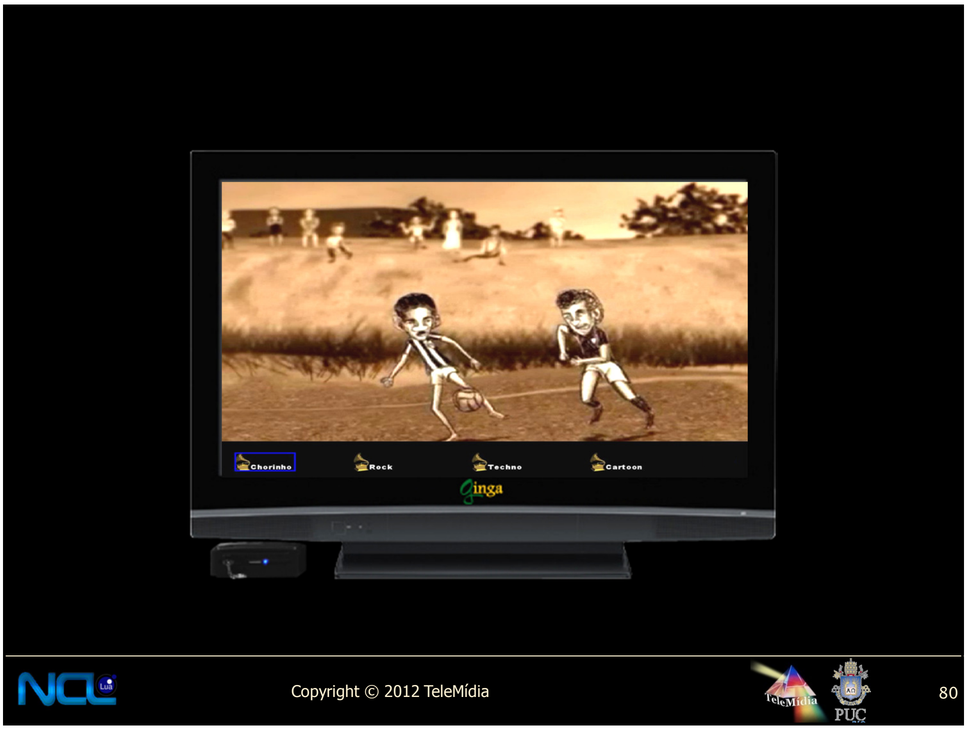
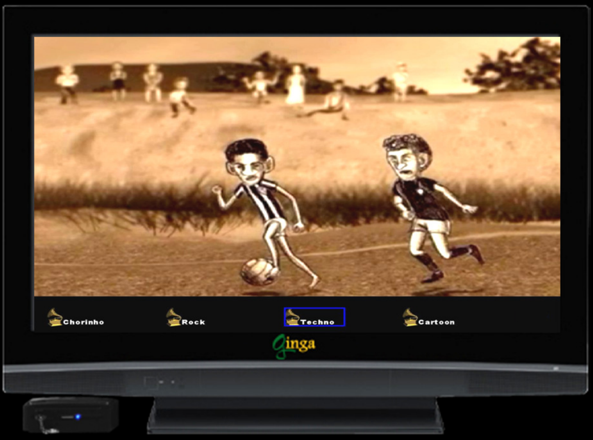


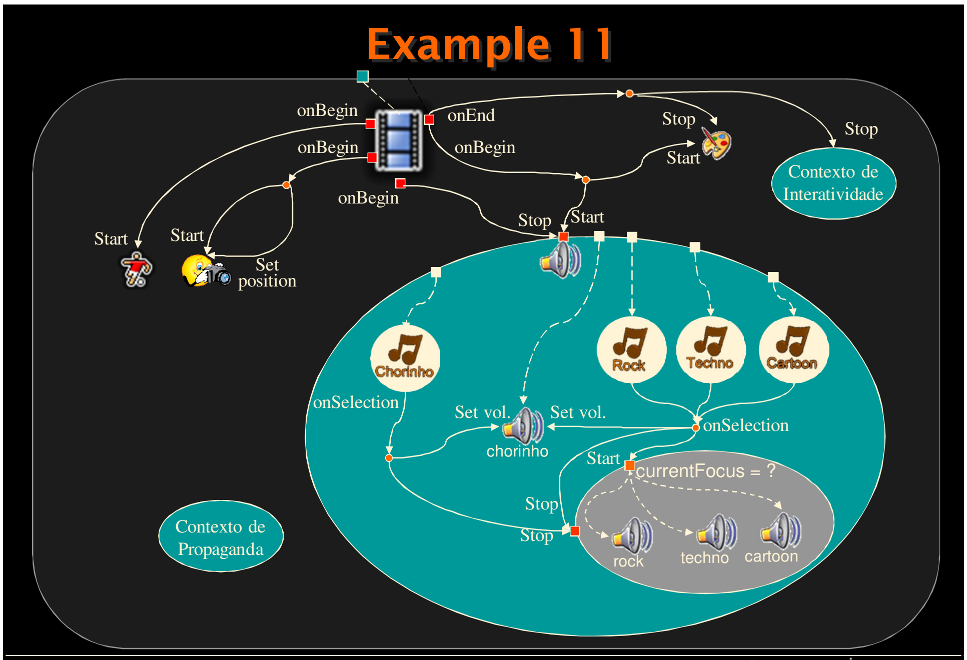
Connector *onBeginVarStart*

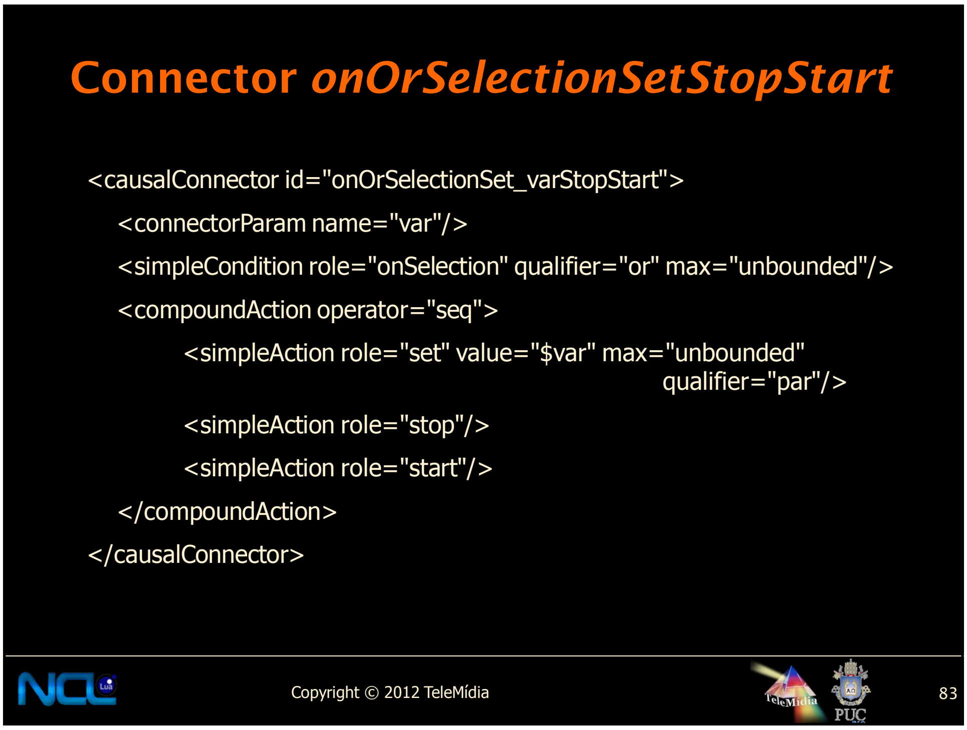
```
<causalConnector id="onBeginVarStart">
    <compoundCondition operator="and">
        <simpleCondition role="onBegin"/>
            <assessmentStatement comparator="eq">
                <attributeAssessment role="var" attributeType="nodeProperty"
                                                   eventType="attribution"/>
                <valueAssessment value="true"/>
            </assessmentStatement>
    </compoundCondition>
    <simpleAction role="start"/>
</causalConnector>
```




Chorinho
Rock
Techno
Cartoon
Ginga

Example 11

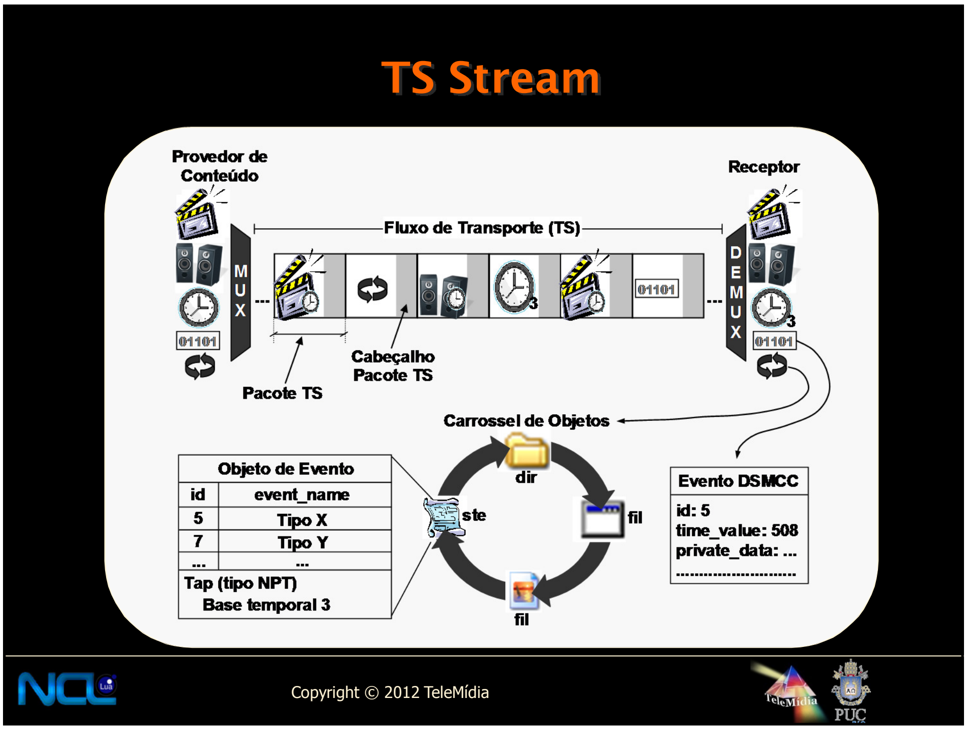

onBegin
onBegin
onEnd
onBegin
Stop
Start
Stop
Contexto de Interatividade
onBegin
Stop
Start
Start
Start
Set position
Chorinho
Rock
Techno
Cartoon
onSelection
Set vol.
Set vol.
chorinho
onSelection
Start
currentFocus = ?
Stop
Stop
rock
techno
cartoon
Contexto de Propaganda



Connector *onOrSelectionSetStopStart*

```
<causalConnector id="onOrSelectionSet_varStopStart">
    <connectorParam name="var"/>
    <simpleCondition role="onSelection" qualifier="or" max="unbounded"/>
    <compoundAction operator="seq">
            <simpleAction role="set" value="$var" max="unbounded"
                                                            qualifier="par"/>
            <simpleAction role="stop"/>
            <simpleAction role="start"/>
    </compoundAction>
</causalConnector>
```

Continuous Media Streaming



TS Stream

Provedor de Conteúdo

Receptor

M U X

D E M U X

Fluxo de Transporte (TS)

Pacote TS

Cabeçalho Pacote TS

Carrossel de Objetos

Objeto de Evento	
id	event_name
5	Tipo X
7	Tipo Y
...	...
Tap (tipo NPT) Base temporal 3	

dir

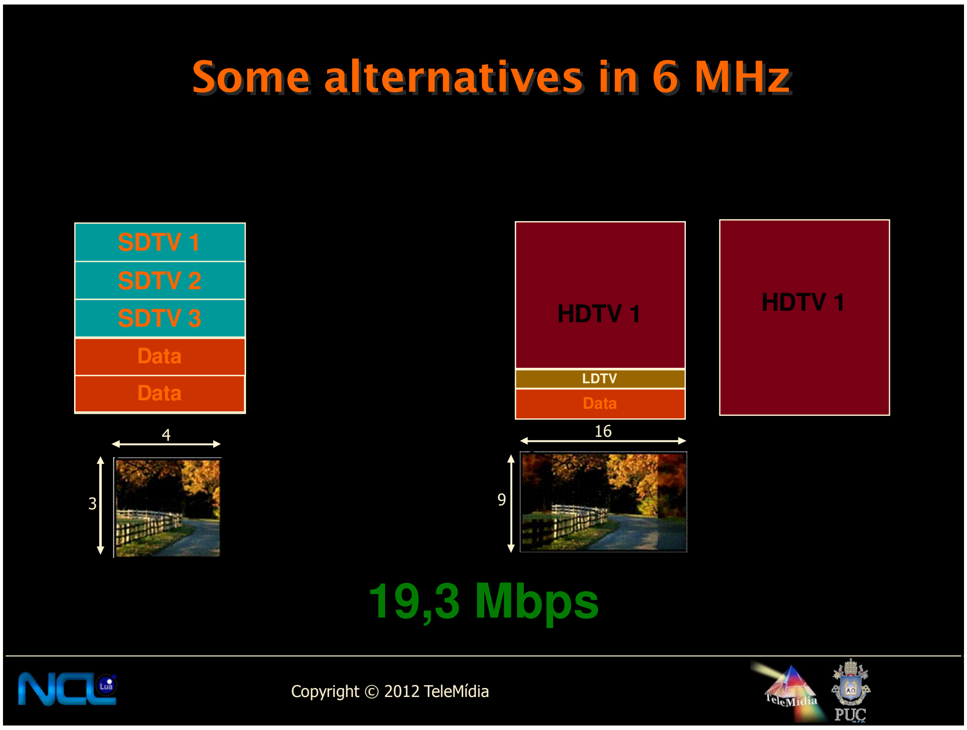
ste

fil

fil

Evento DSMCC

id: 5
time_value: 508
private_data: ...
....



Some alternatives in 6 MHz

SDTV 1
SDTV 2
SDTV 3
Data
Data

4

3

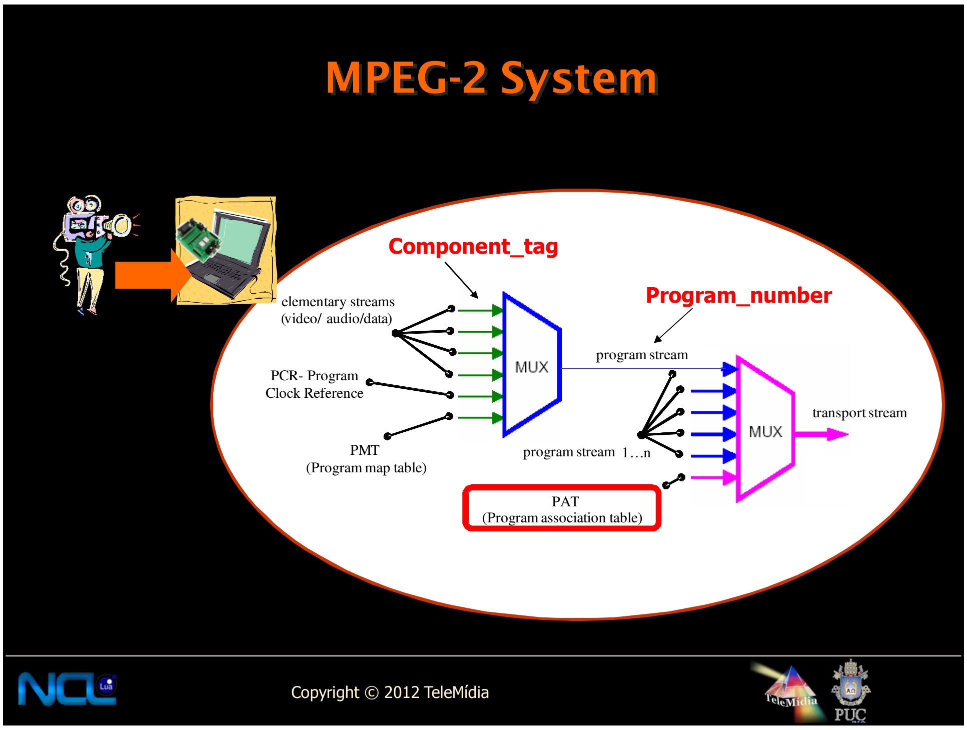
HDTV 1
LDTV
Data

16

9

HDTV 1

19,3 Mbps



MPEG-2 System

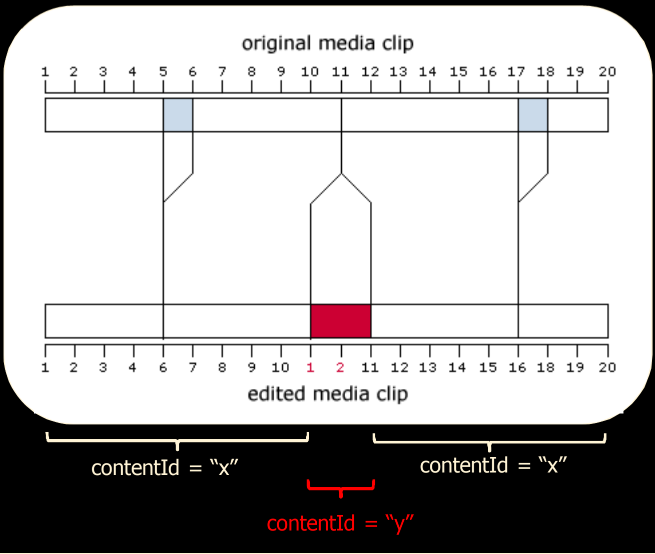
Streaming

- How a content can be located?
  - programNumber?
  - componentTag?
  - What else?

Streaming

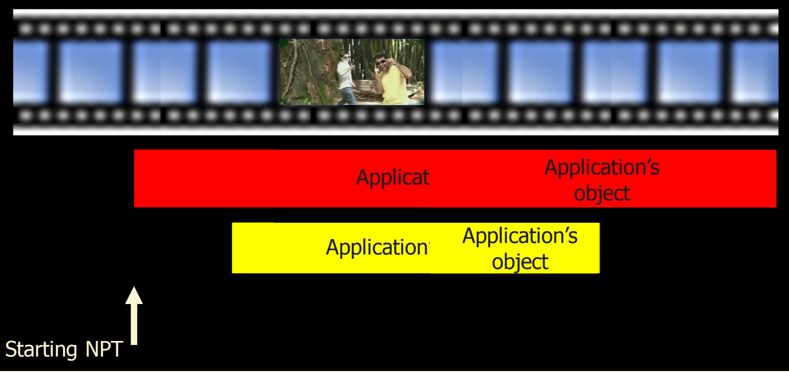
- How a content can be located?
  - programNumber
  - componentTag
  - contentId
  - How to get the contentId?

NPT



Synchronism

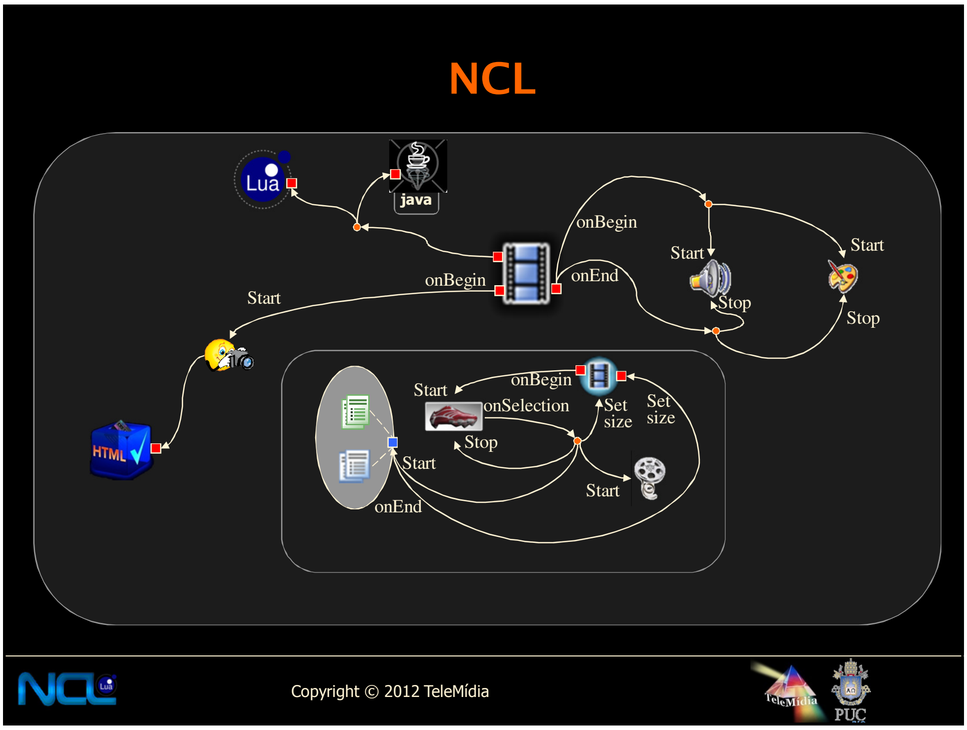
- NPT Control
- Application start point control



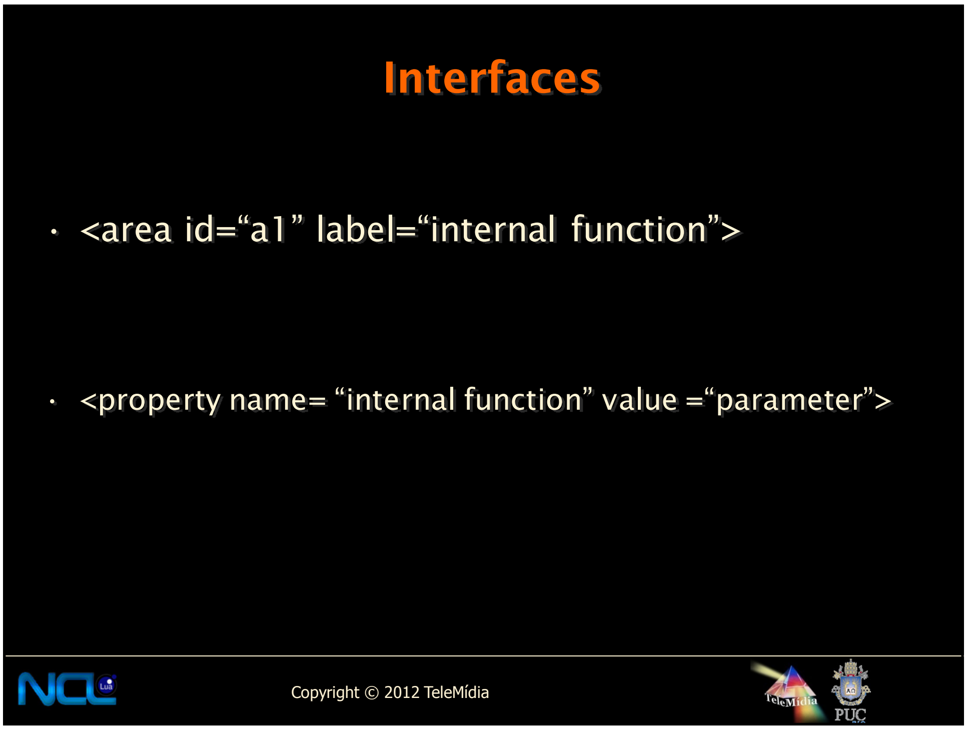
Embedded NCLua Objects

"O Primeiro João"

O número de vezes que você trocou de ritmo foi: 7



NCL



Interfaces

- <area id="a1" label="internal function">
- <property name= "internal function" value ="parameter">

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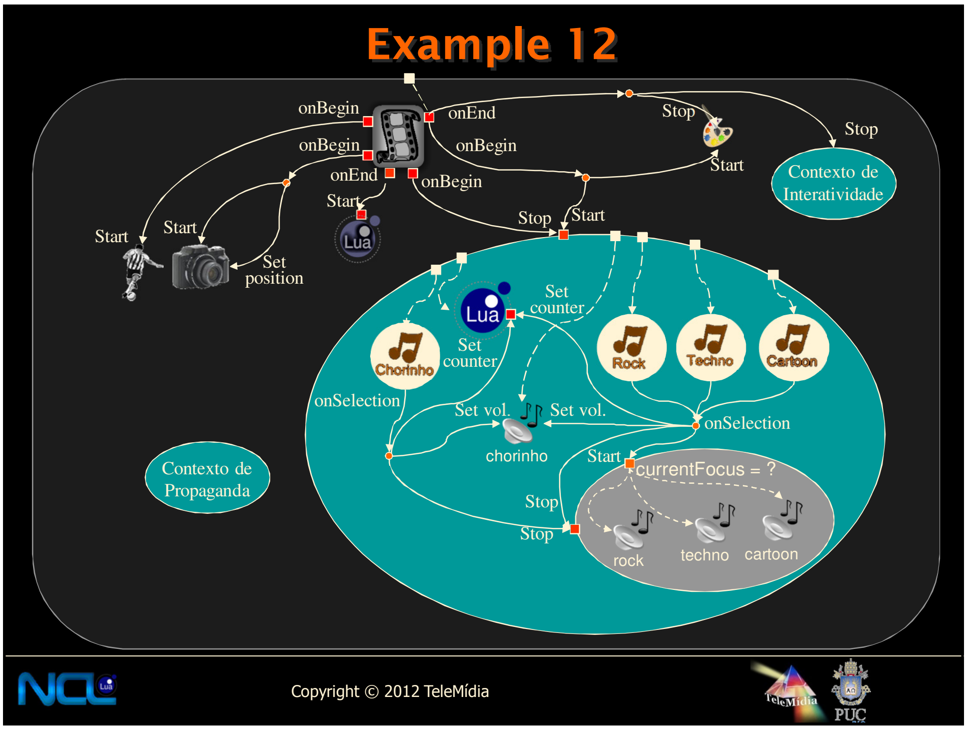

Example 12

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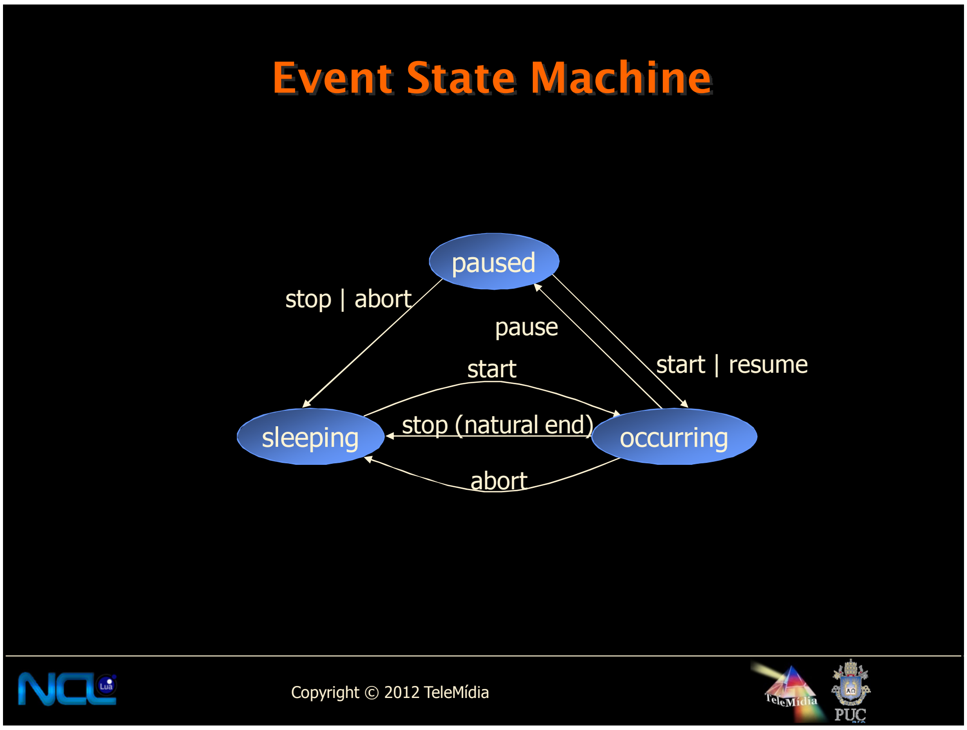


Event State Machine

paused

stop | abort

pause

start | resume

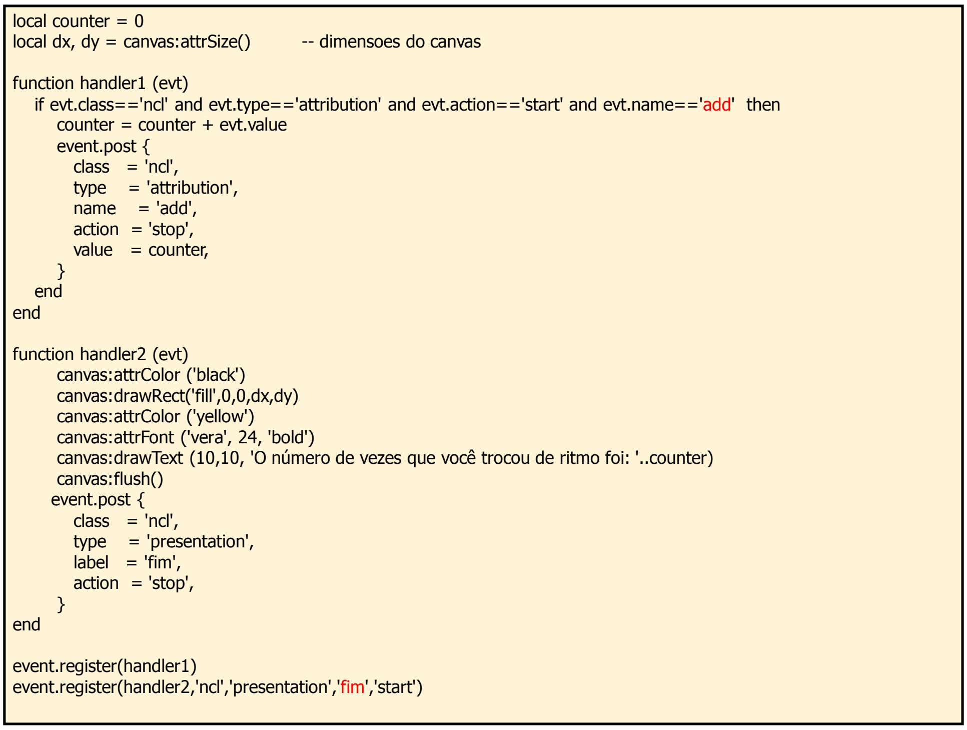
start

sleeping

stop (natural end)

occurring

abort



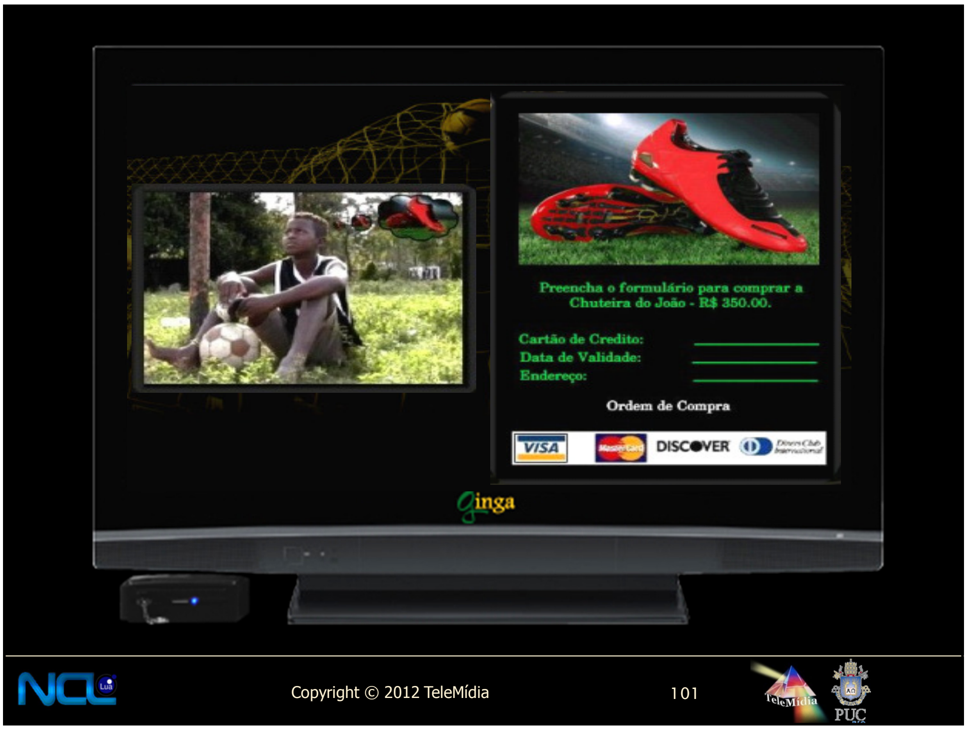
```
local counter = 0
local dx, dy = canvas:attrSize()          -- dimensoes do canvas

function handler1 (evt)
    if evt.class=='ncl' and evt.type=='attribution' and evt.action=='start' and evt.name=='add'  then
        counter = counter + evt.value
        event.post {
           class   = 'ncl',
           type    = 'attribution',
           name    = 'add',
           action  = 'stop',
           value   = counter,
        }
    end
end

function handler2 (evt)
        canvas:attrColor ('black')
        canvas:drawRect('fill',0,0,dx,dy)
        canvas:attrColor ('yellow')
        canvas:attrFont ('vera', 24, 'bold')
        canvas:drawText (10,10, 'O número de vezes que você trocou de ritmo foi: '..counter)
        canvas:flush()
       event.post {
           class   = 'ncl',
           type    = 'presentation',
           label   = 'fim',
           action  = 'stop',
        }
end

event.register(handler1)
event.register(handler2,'ncl','presentation','fim','start')
```

Importing



Preencha o formulário para comprar a Chuteira do João - R$ 350.00.

Cartão de Credito: ______

Data de Validade: ______

Endereço: ______

Ordem de Compra

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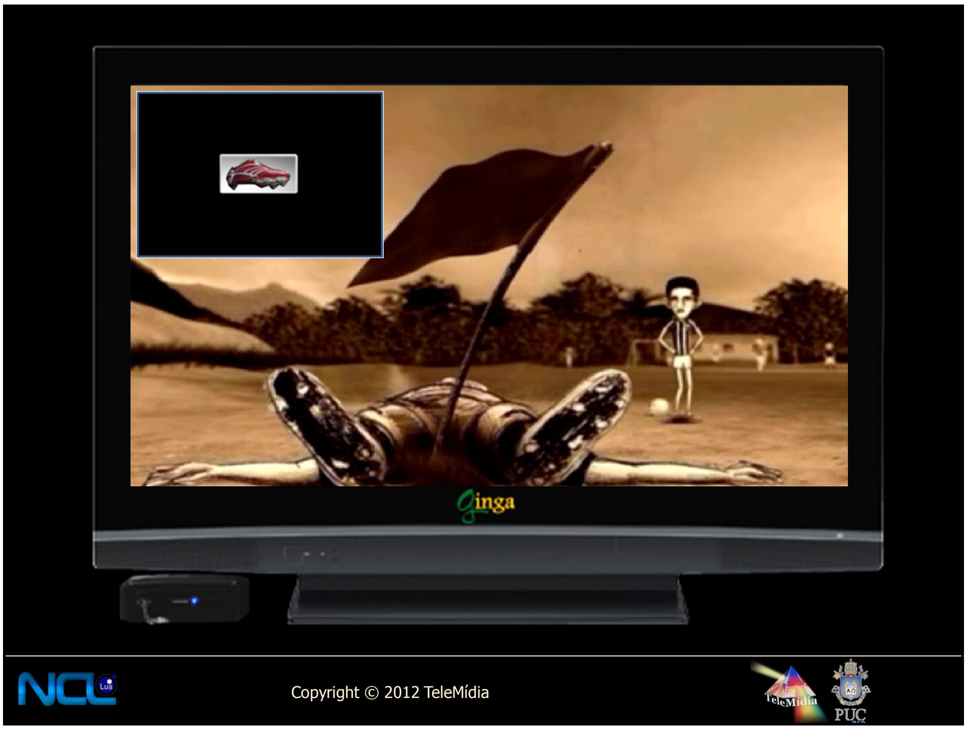
ginga

ginga



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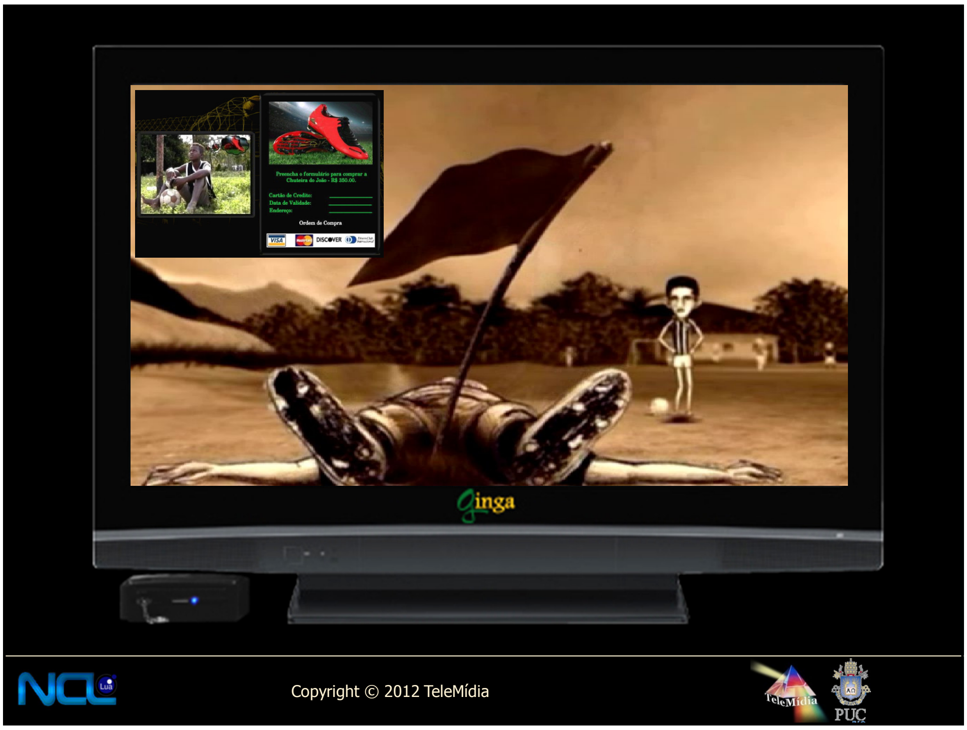

Preencha o formulário para comprar a Chuteira do João - R$ 350.00.

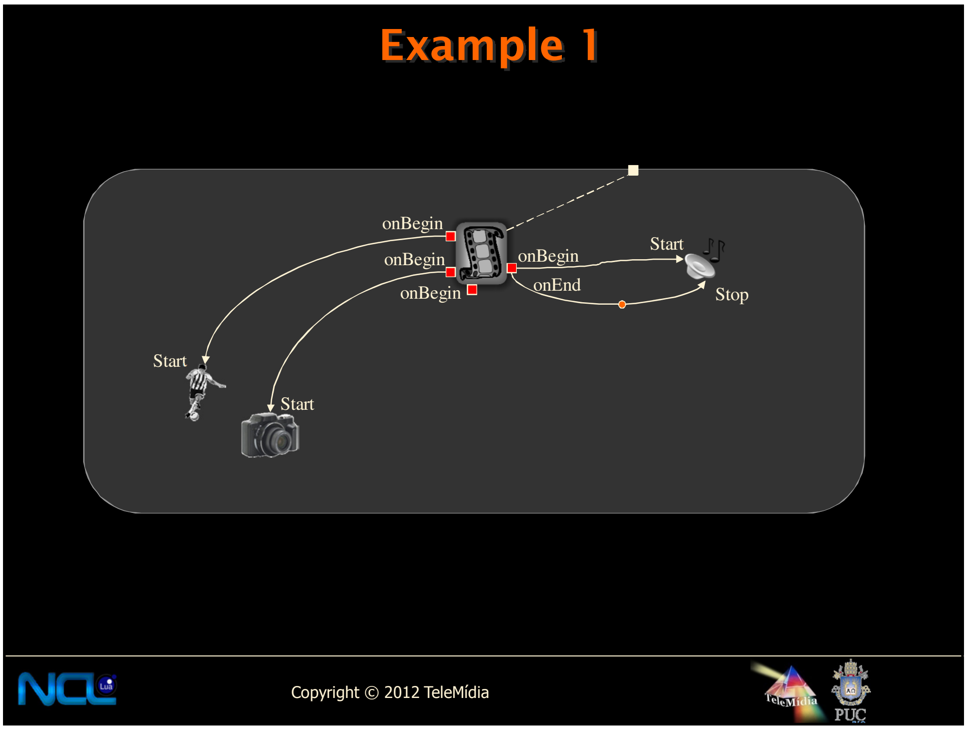
Cartão de Credito: __________

Data de Validade: __________

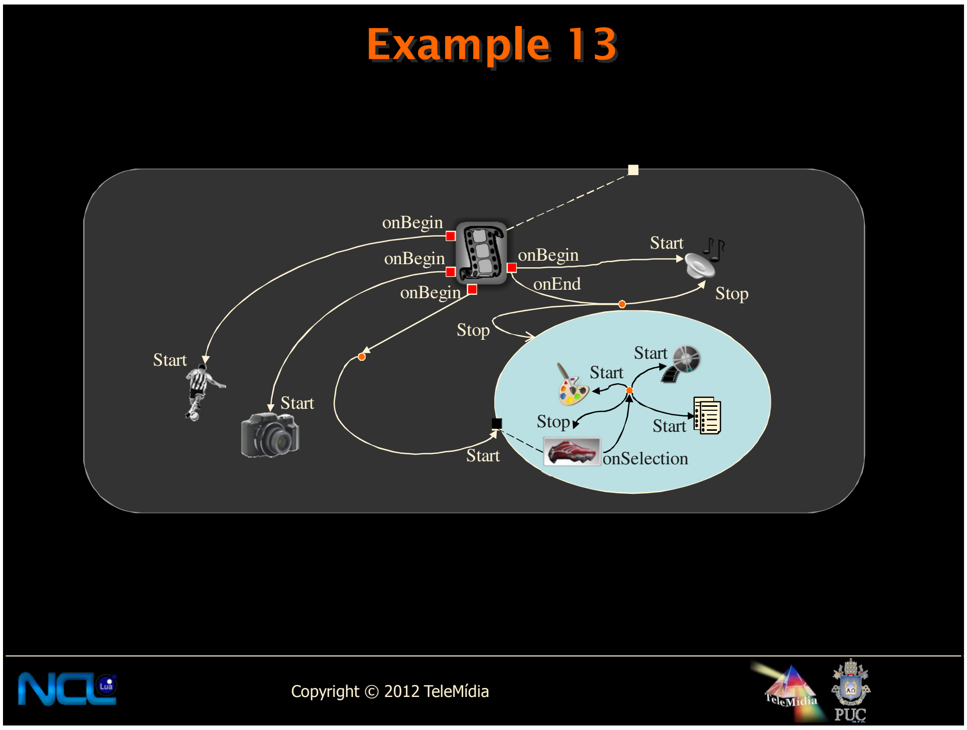
Endereço: __________

Ordem de Compra

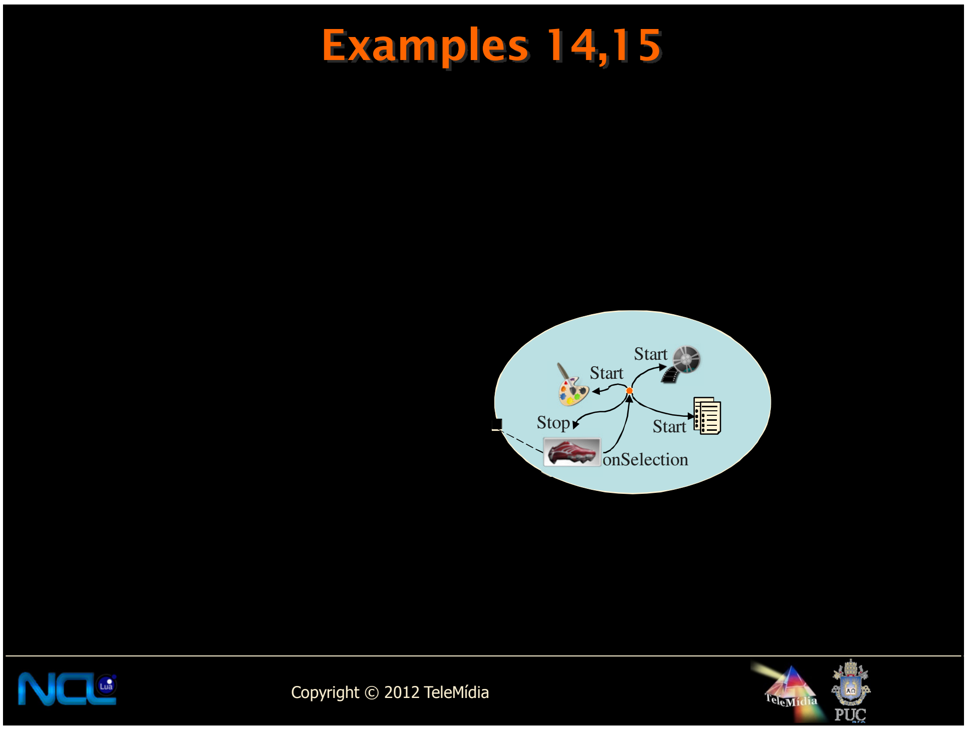
Copyright © 2012 TeleMídia



Example 1



Example 13



Examples 14,15

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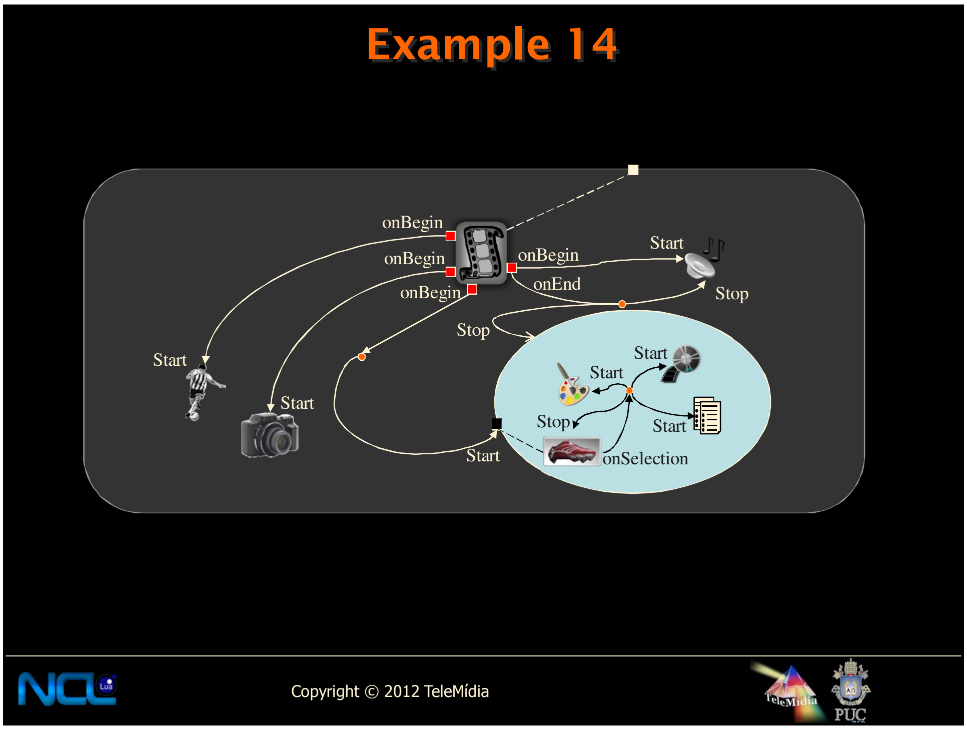

Example 14

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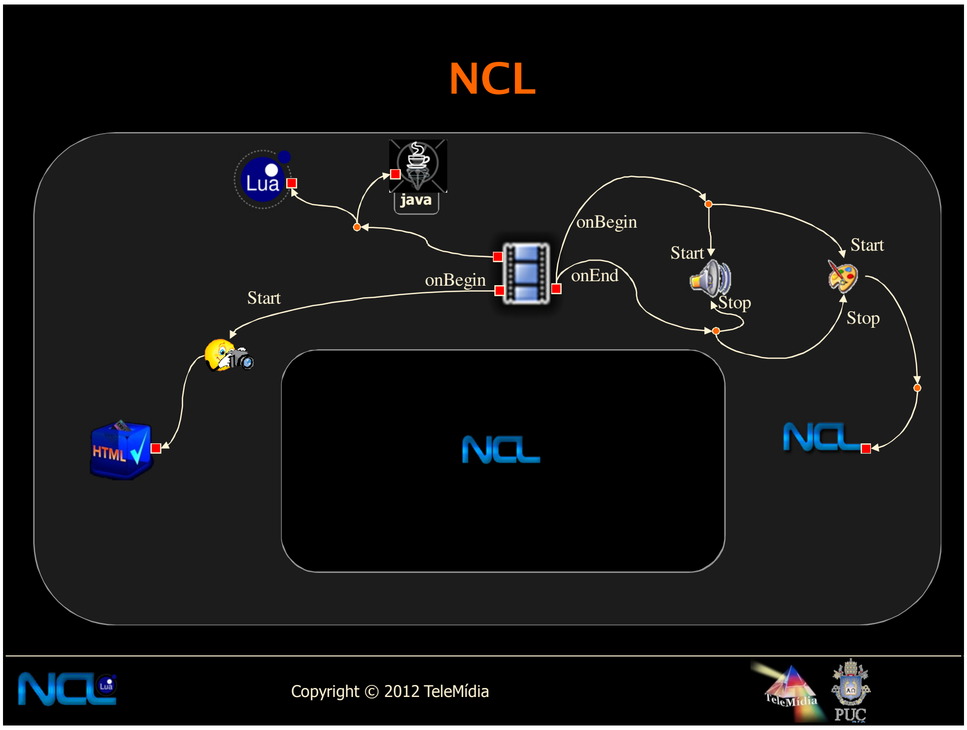
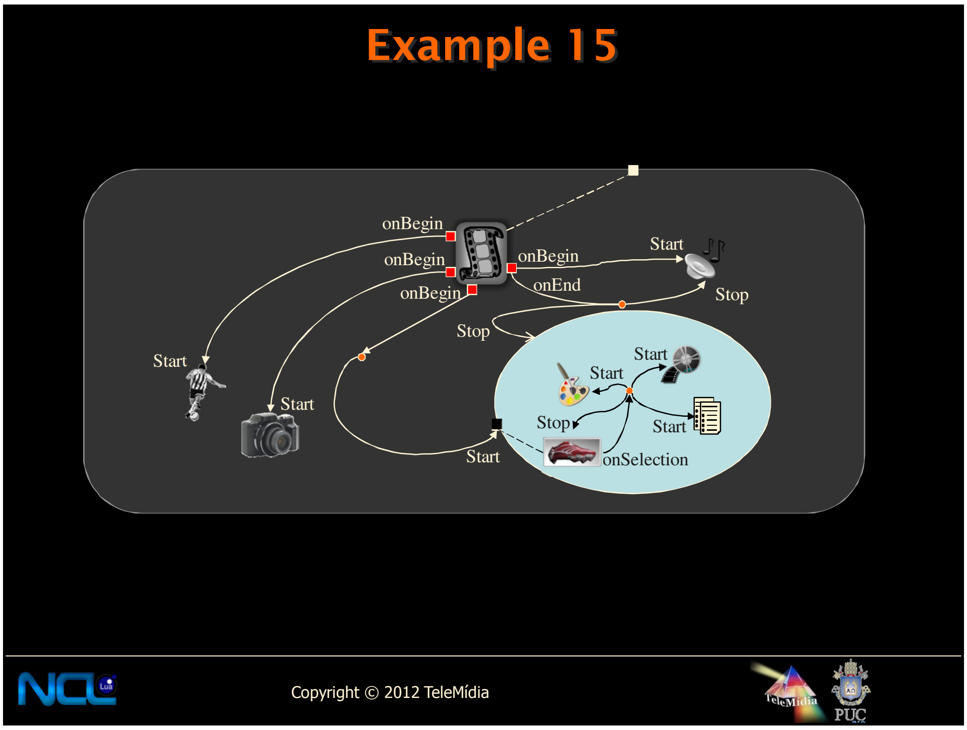
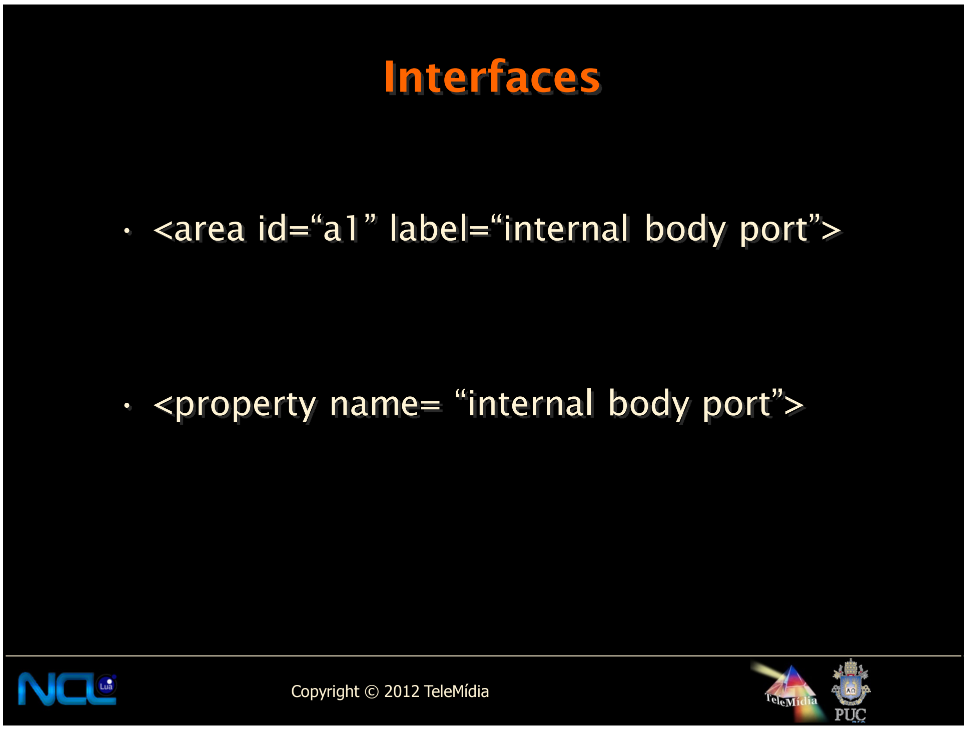
Embedded NCL Media Objects



NCL



Example 15



Interfaces

- <area id=“a1” label=“internal body port”>
- <property name= “internal body port”>

Multiple Exhibition Devices

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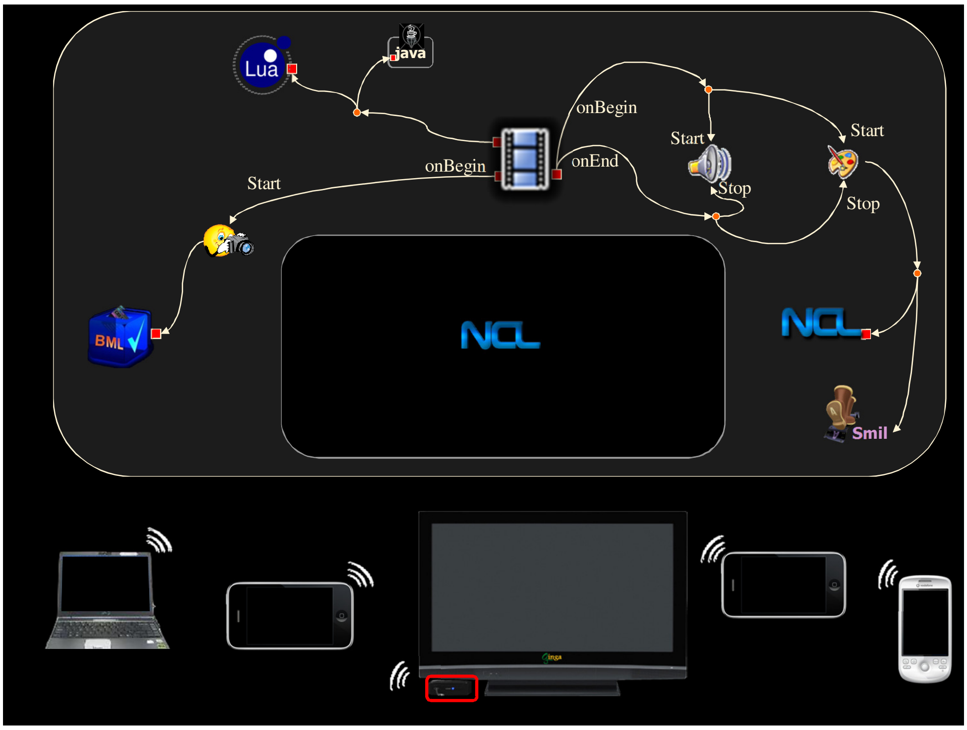
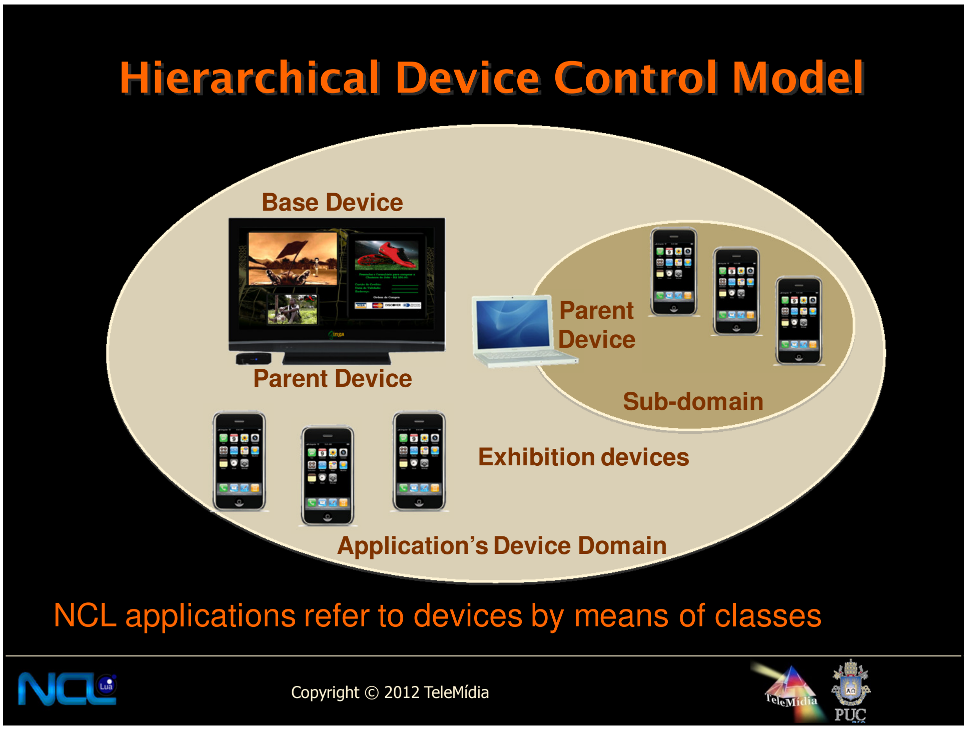




Hierarchical Device Control Model

Base Device

Parent Device

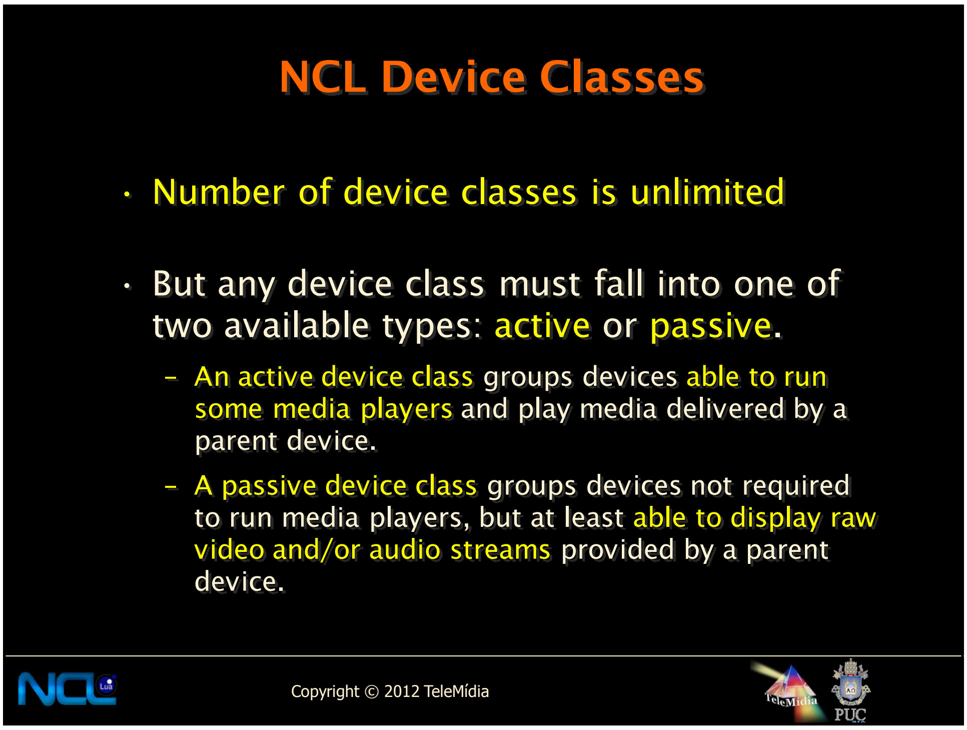
Parent Device

Sub-domain

Exhibition devices

Application's Device Domain

NCL applications refer to devices by means of classes

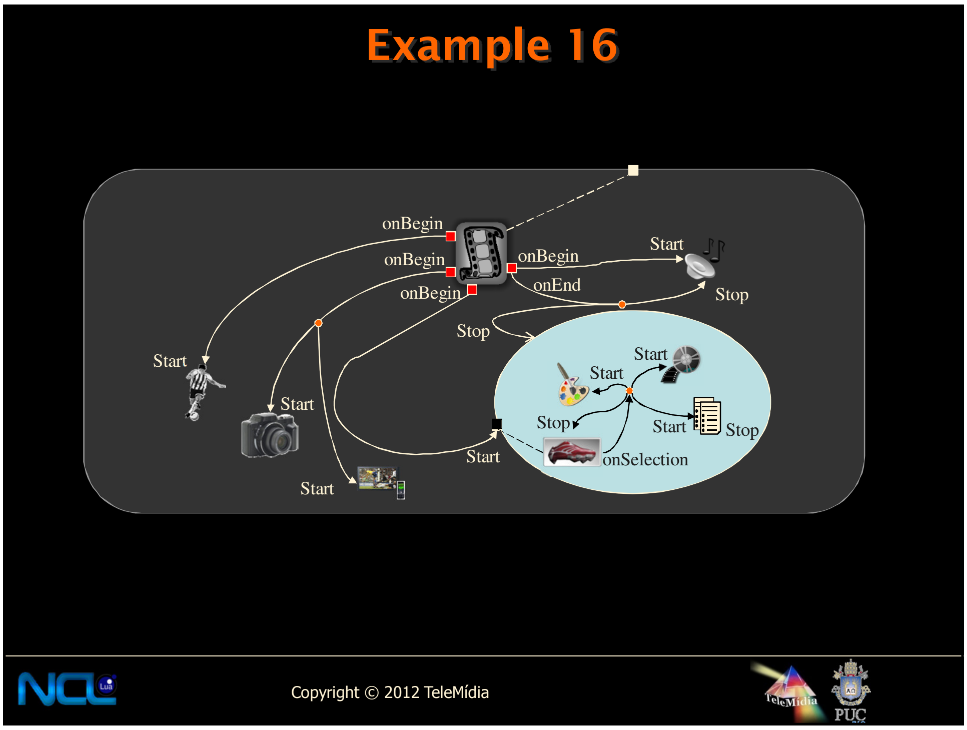


NCL Device Classes

- Number of device classes is unlimited
- But any device class must fall into one of two available types: active or passive.
  - An active device class groups devices able to run some media players and play media delivered by a parent device.
  - A passive device class groups devices not required to run media players, but at least able to display raw video and/or audio streams provided by a parent device.

NCL Device Classes

- An exhibition device can join as many classes as it wants, simultaneously.
- Joining to a class is a task to the middleware and its tools, not to the application.
- The hierarchy is a tree. In a application domain:
  - A device cannot be a descendant of itself.
  - A device in a class can only exhibit media coming from its respective parent device
  - The Base device is the root



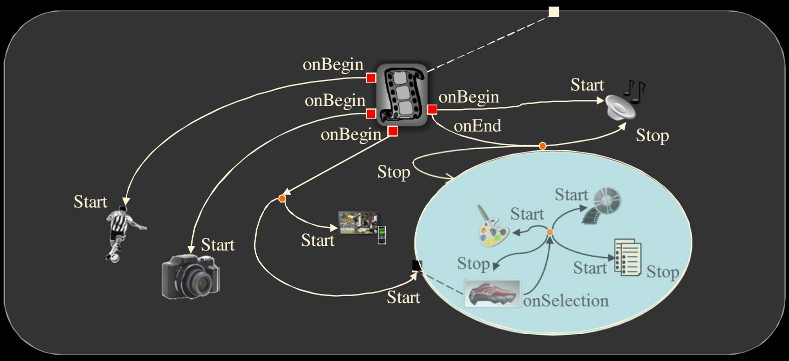
Example 16

onBegin
onBegin
onBegin
onBegin
Start
onEnd
Stop
Start
Stop
Start
Start
Start
Start
Stop
Start
Stop
onSelection
Start
Start

ginga

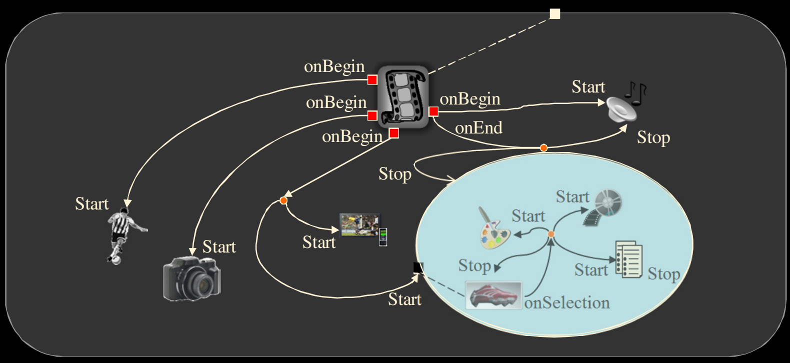
ginga

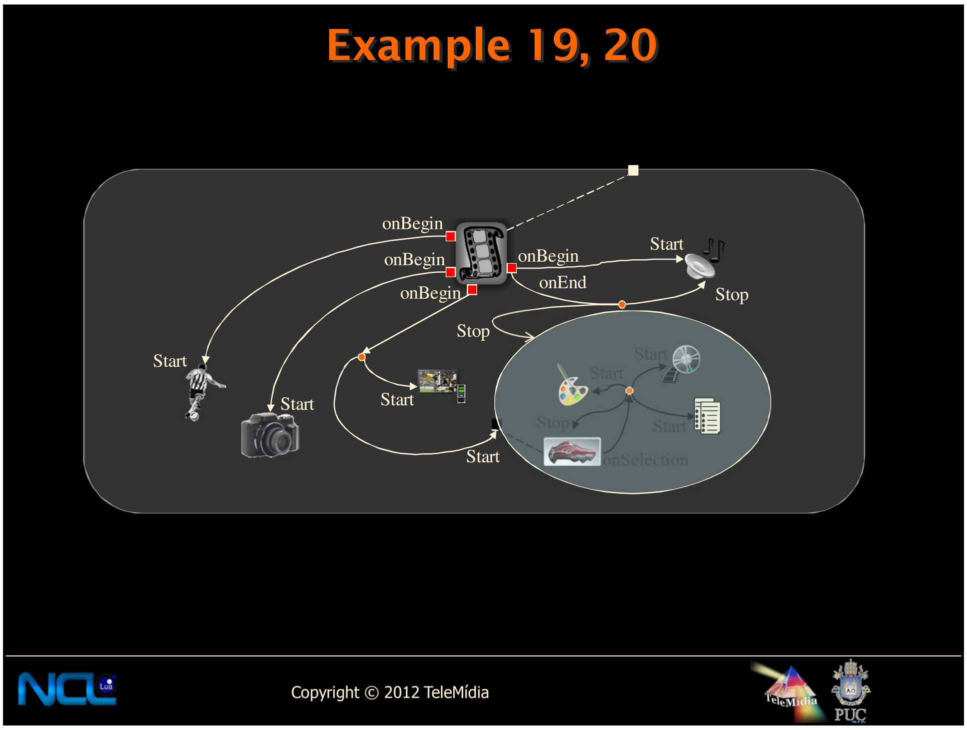
Example 17


onBegin
onBegin
onBegin
onBegin
onEnd
Start
Stop
Stop
Start
Start
Start
Start
Start
Start
Stop
Start
Stop
onSelection
Start

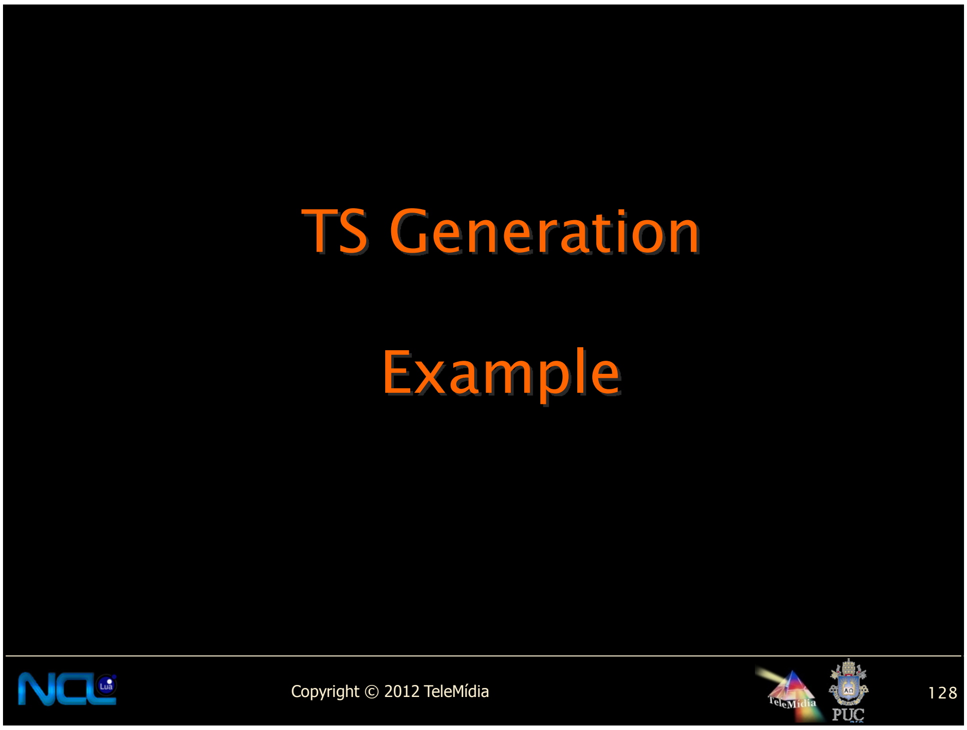
Ginga

Example 18


onBegin
onBegin
onBegin
onBegin
Start
onEnd
Stop
Stop
Start
Start
Start
Start
Start
Stop
Start
Stop
Start
onSelection

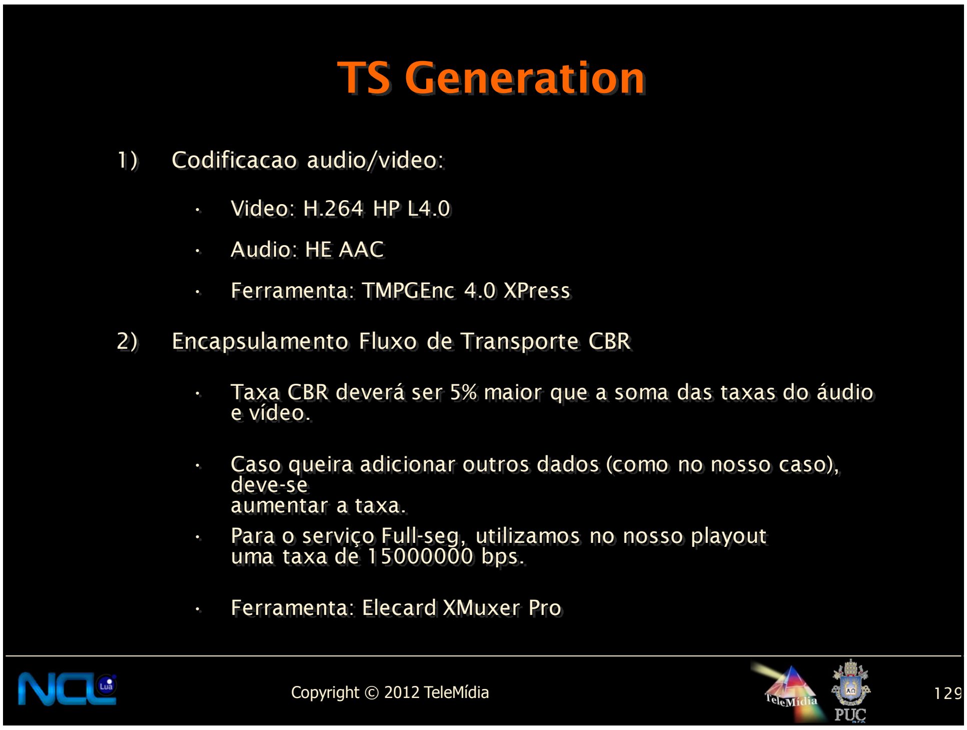


Example 19, 20



TS Generation

Example



TS Generation

1) Codificacao audio/video:
   - Video: H.264 HP L4.0
   - Audio: HE AAC
   - Ferramenta: TMPGEnc 4.0 XPress
2) Encapsulamento Fluxo de Transporte CBR
   - Taxa CBR deverá ser 5% maior que a soma das taxas do áudio e vídeo.
   - Caso queira adicionar outros dados (como no nosso caso), deve-se aumentar a taxa.
   - Para o serviço Full-seg, utilizamos no nosso playout uma taxa de 15000000 bps.
   - Ferramenta: Elecard XMuxer Pro

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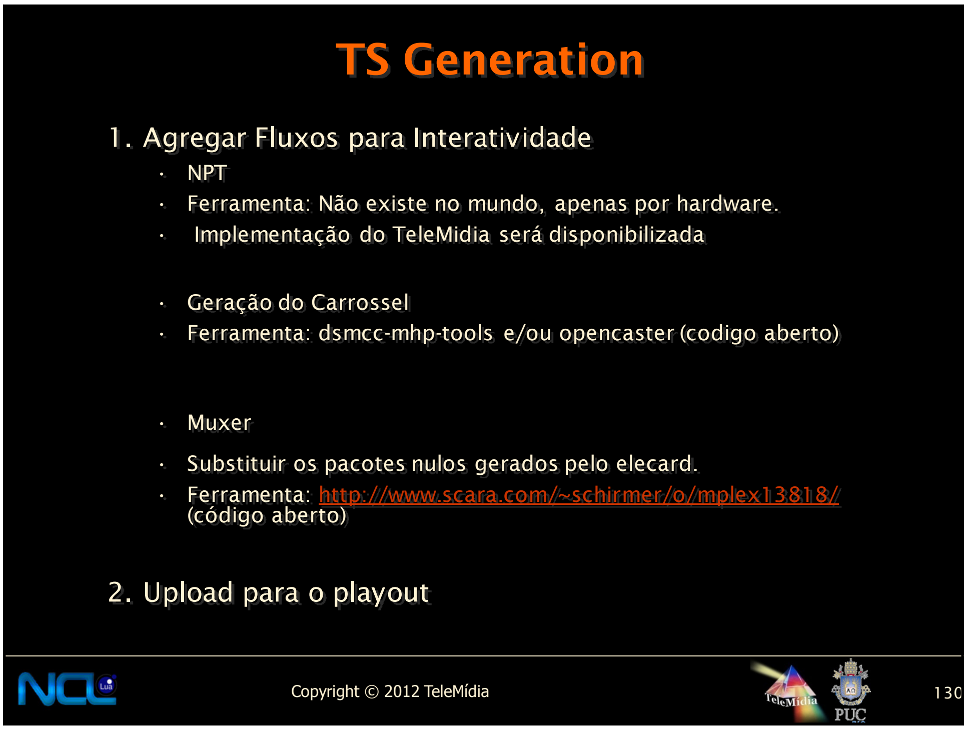

TS Generation

1. Agregar Fluxos para Interatividade
   - NPT
   - Ferramenta: Não existe no mundo, apenas por hardware.
   - Implementação do TeleMidia será disponibilizada
   - Geração do Carrossel
   - Ferramenta: dsmcc-mhp-tools e/ou opencaster (codigo aberto)
   - Muxer
   - Substituir os pacotes nulos gerados pelo elecard.
   - Ferramenta: http://www.scara.com/~schirmer/o/mplex13818/ (código aberto)
2. Upload para o playout

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TV digital se faz com Ginga

- http://www.ncl.org.br
- http://www.ginga.org.br
- http://www.softwarepublico.gov.br
- http://www.telemidia.puc-rio.br

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