

TV Interativa se faz com
Ginga



Programando para o Ginga-NCL



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Programando em NCL Modelo Conceitual



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Entidades Básicas

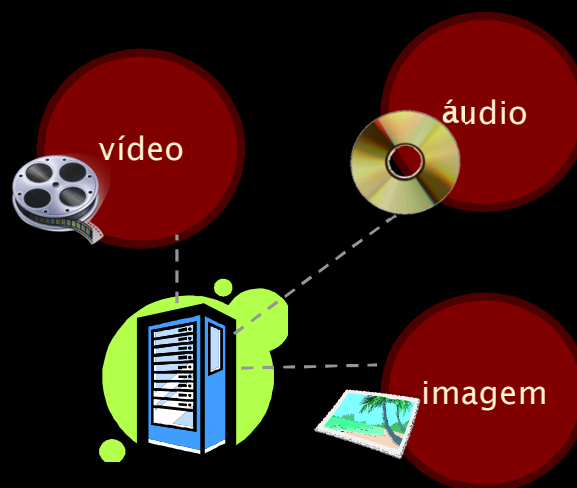
O quê? objetos de mídia

como? propriedades

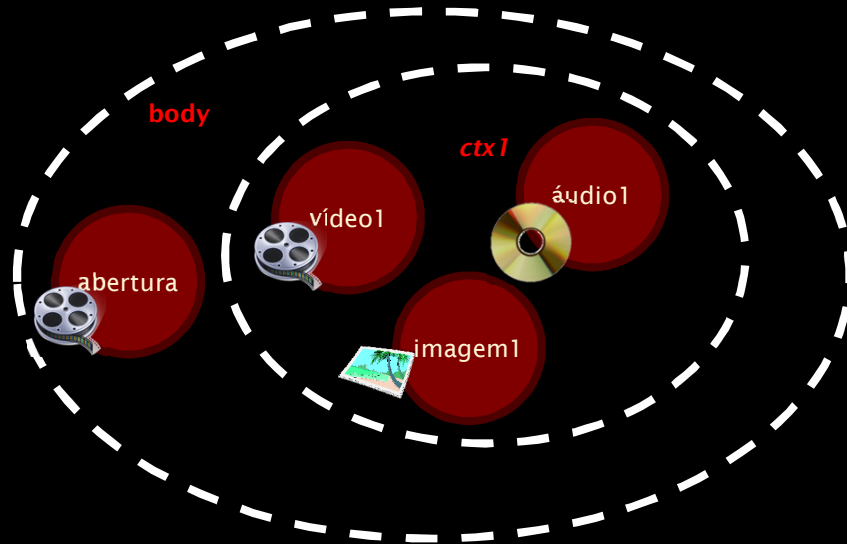
onde? propriedades

quando? relacionamentos e relações

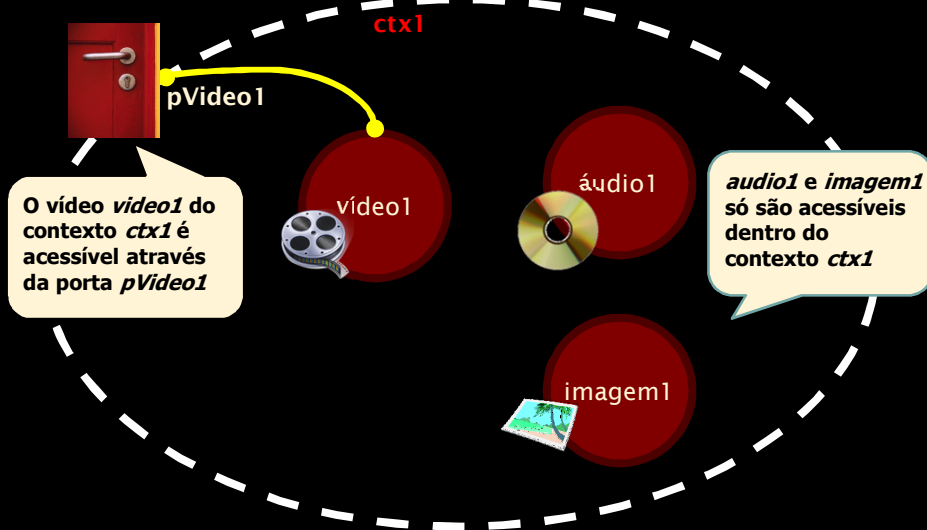
O quê? Objetos de Mídia



Estrutura: contextos

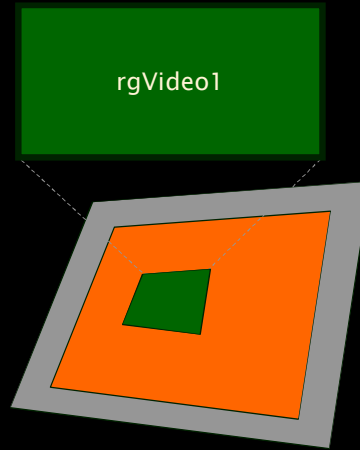


Como acessar um objeto de mídia num contexto? (Como entrar/sair de um contexto?)



Onde?

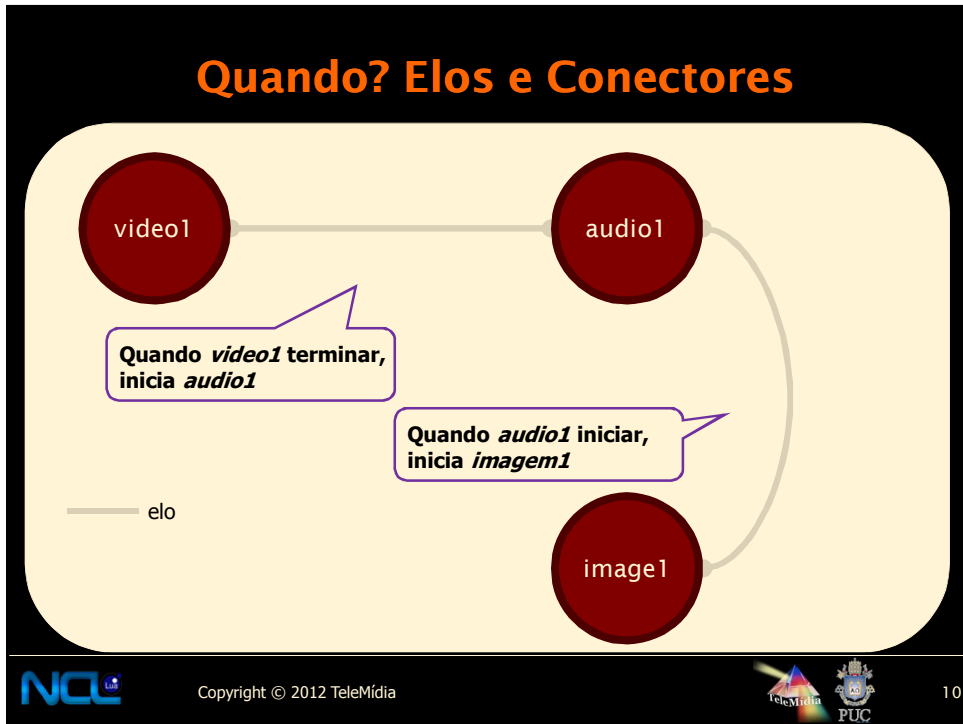
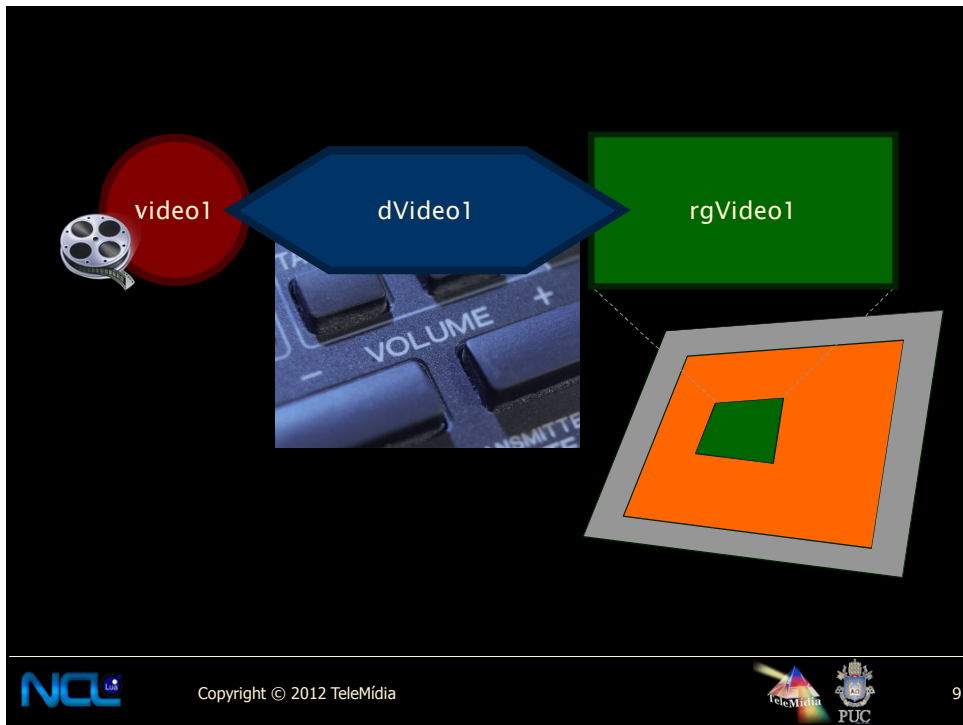
Regiões
em um dispositivo específico



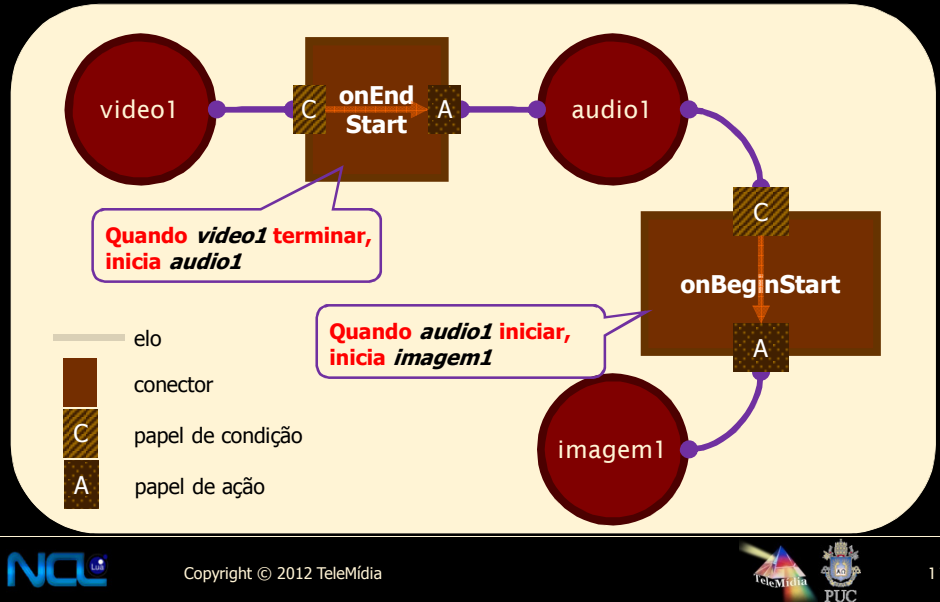
Como?

dVideo1





Quando? Elos e Conectores



Programando em NCL A Linguagem

Estrutura de um documento NCL - Perfil TV digital

```
<?xml version="1.0" encoding="ISO-8859-1"?>  
<ncl id="exemplo00"  
  xmlns="http://www.ncl.org.br/NCL3.0/EDTVProfile">
```

```
<head>
```

cabeçalho do documento

```
</head>
```

```
<body>
```

corpo do documento

```
</body>
```

```
</ncl>
```



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Planejando uma aplicação NCL

- visões
 - storyboard
 - estrutural
 - leiaute
 - temporal



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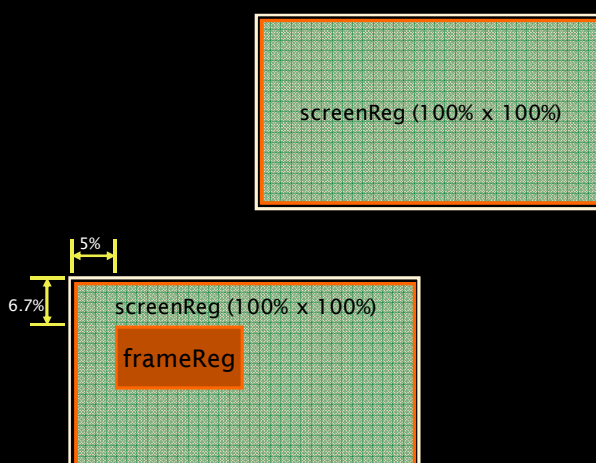
Exemplo 1 - Storyboard



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Exemplo 1 - Visão de Leiaute

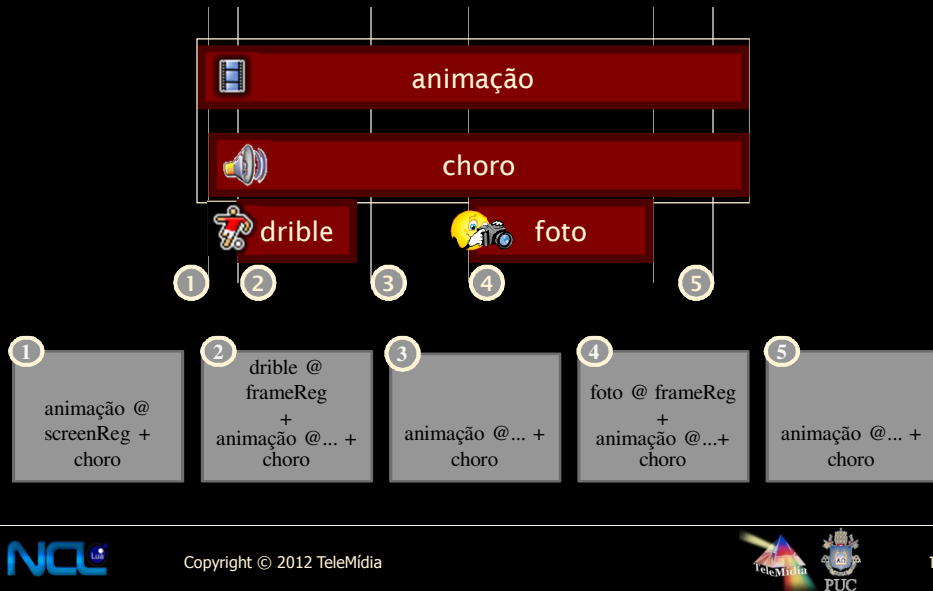


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Exemplo 1 - Visão Temporal

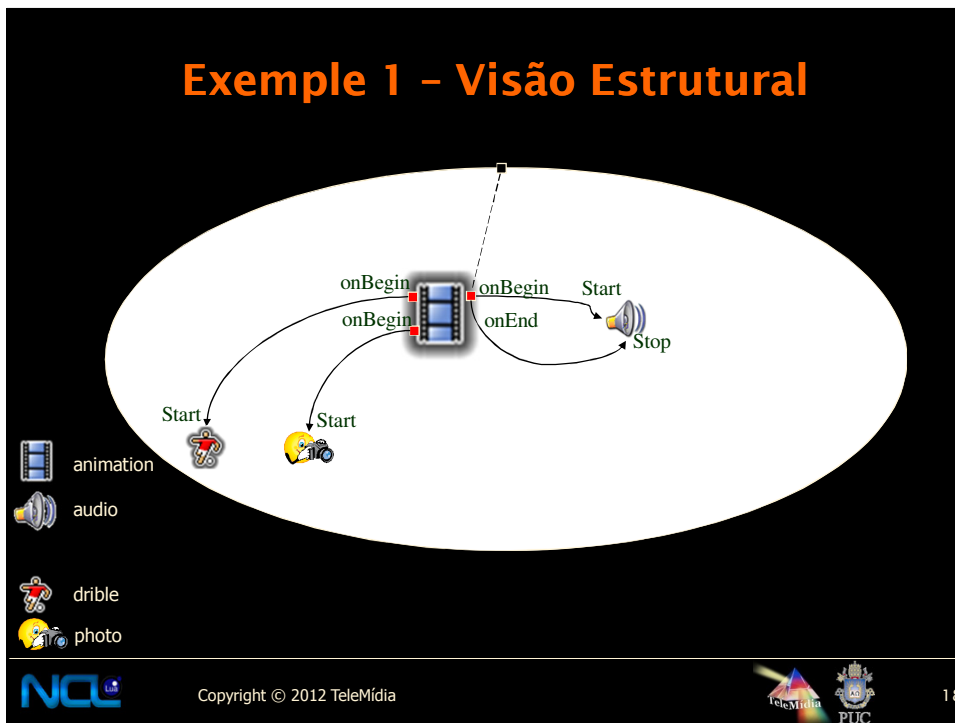


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Exemple 1 - Visão Estrutural

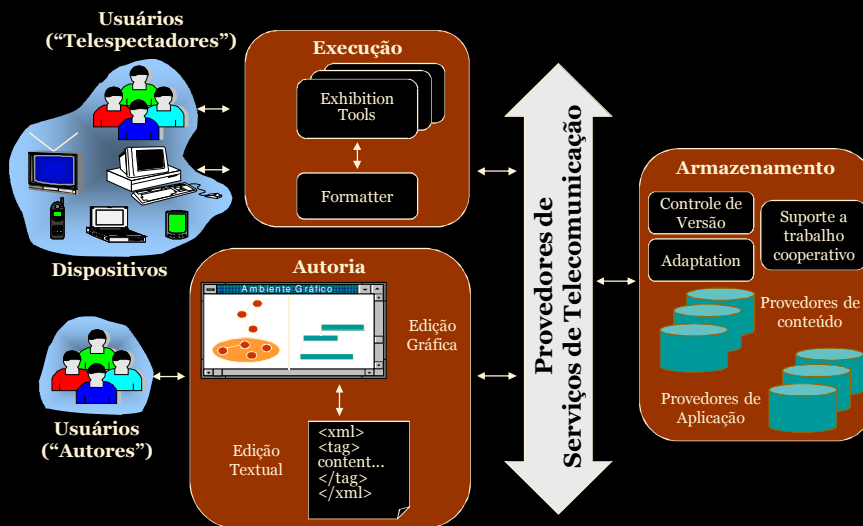


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Ambientes



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NCL Composer

The screenshot shows the NCL Composer interface with the following components:

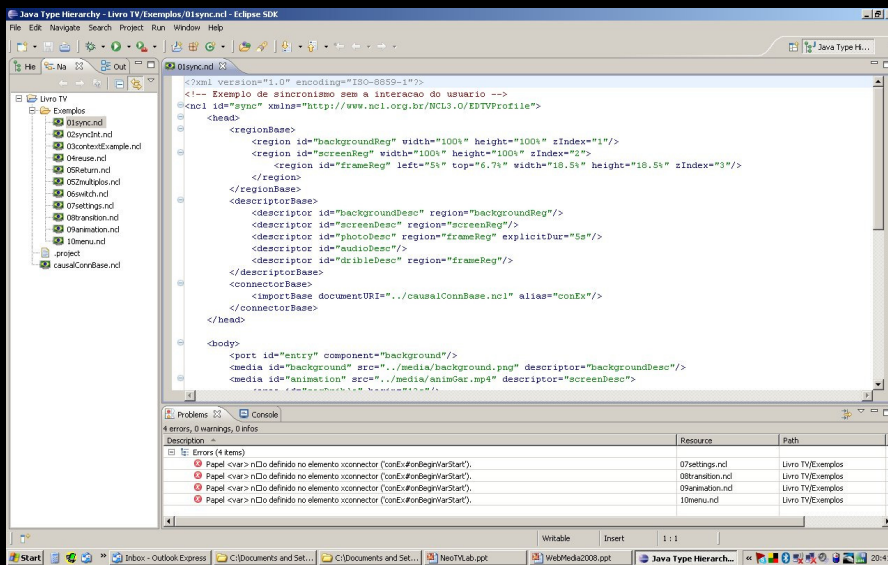
- NCL Textual View**: Displays XML code for a media component, including tags like `<media id="m1" type="video">`.
- Structural View**: Shows a hierarchical tree diagram of the media components and their relationships.
- Outline View**: Lists the components in a tree structure, such as `media (m1)`, `area (area1)`, `link (link1)`, etc.
- Properties View**: Shows the properties for the selected `media:m1` component, including `id`, `instance`, `refer`, `src`, and `type`.
- Layout View**: Shows a visual representation of the components on a page, with labels like `(rg1)`, `(rg2)`, `(rg3)`, and `(rg4)`.
- Validator Plugin**: Shows a list of validation messages, such as "media Invalid data type..."



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NCL Eclipse



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Set-top Box Virtual Ginga-NCL

fedora-fc7-ginga-i386 VMware Player | CD-ROM (IDE 0:0) | Ethernet

NCL
Nested Context Language

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/nc130 directory, via SFTP or SCP
- Use the /misc/launcher.sh script to run your NCL application
Example: /misc/launcher.sh /misc/nc130/sample03/sample03.nc1
- Use the following keypad:
- Have fun!

IP:192.168.127.129

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

middleware
Ginga
TV Interativa se faz com Ginga!



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Ginga4Windows



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Linguagem de Marcação XML

- TAG ou Elemento XML (<tag>...</tag> OU <tag />):
 - <media id="video1" descriptor="dVideoWholeScreen">
...
</media>
 - <media id="video1" descriptor="dVideoWholeScreen" />
- Atributo (formato: atributo="valor")
 - id
 - descriptor
- Valor de atributo (entre aspas "")
 - "video1"
 - "dVideoWhole Screen"



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Construindo uma aplicação NCL

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

```
<ncl id="exemplo00" xmlns="http://www.ncl.org.br/NCL3.0/  
EDTVProfile">
```

```
<head>
```

cabeçalho do documento

1

```
</head>
```

```
<body>
```

corpo do documento

2

```
</body>
```

```
</ncl>
```

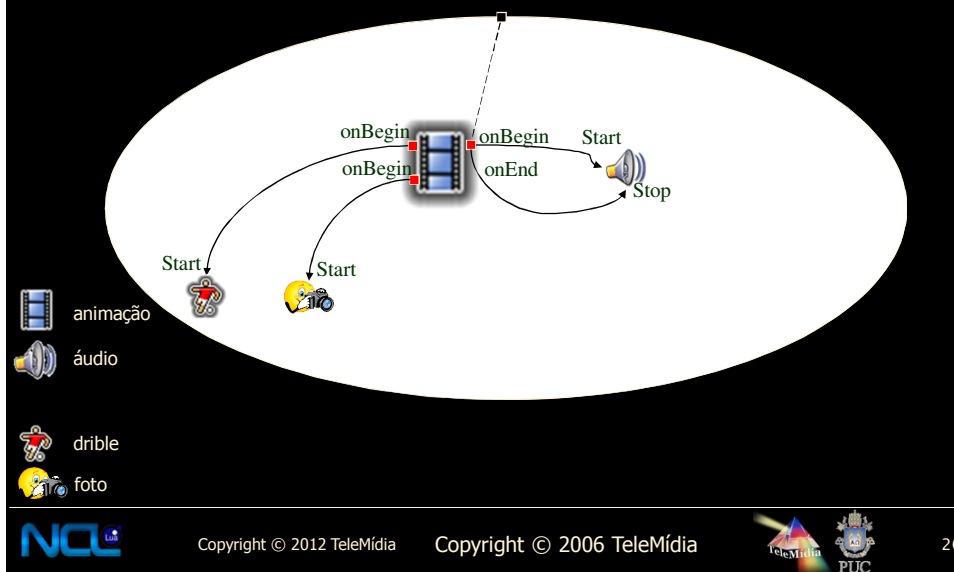


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Exemplo 1 – Visão Estrutural



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Exemplo 1

<body>

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



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Esquema	Parte específica do esquema	Uso
file:	//file_path/#fragment_identifier	Para arquivos locais
http:	//server_identifier/file_path/#fragment_identifier	Para arquivos remotos buscados pelo canal de interatividade usando o protocolo http
https:	//server_identifier/file_path/#fragment_identifier	Para arquivos remotos buscados pelo canal de interatividade usando o protocolo https
rtsp:	//server_identifier/file_path/#fragment_identifier	Para fluxos (<i>streams</i>) obtidos pelo canal de interatividade usando o protocolo rtsp
rtp:	//server_identifier/file_path/#fragment_identifier	Para fluxos (<i>streams</i>) obtidos pelo canal de interatividade usando o protocolo rtp
ncl-mirror:	//media_element_identifier	Para um fluxo de conteúdo idêntico a um que esteja em apresentação por um outro elemento de mídia
sbtvd-ts:	//program_number.component_tag	Para fluxos elementares recebidos pelo fluxo de transporte (TS)



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Exemplo 1

```
<body>

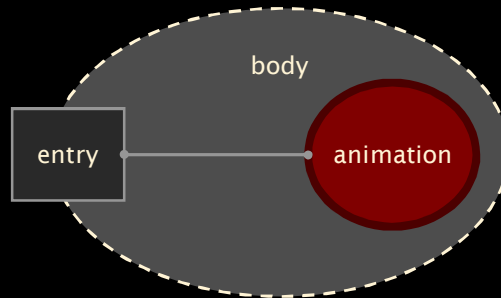
  <media id="animation" src="../media/animGar.mp4" >
    <area id="segDrible" begin="12s"/>
    <area id="segPhoto" begin="41s"/>
    <property name="width" value="100%"/>
    <property name="height" value="100%"/>
    <property name="zIndex" value="2"/>
  </media>
  <media id="choro" src="../media/choro.mp3"/>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

Exemplo 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="height" value="18.5%"/>
  <property name="zIndex" value="3"/>
  <property name="explicitDur" value="5s"/>
</media>
```

Exemplo 1 – Contexto *body* e port

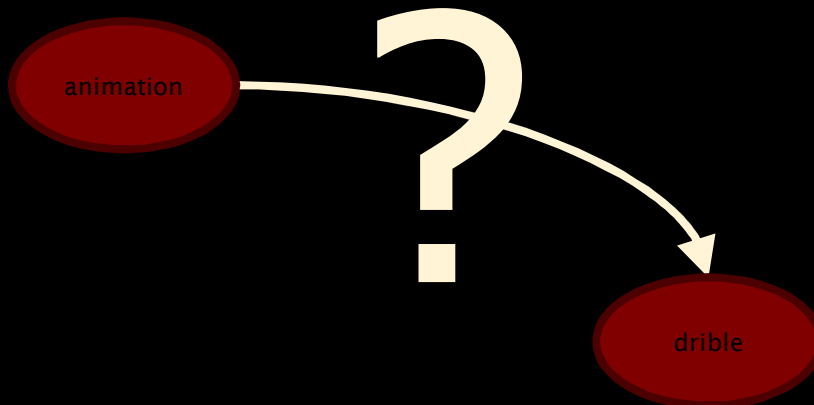
```
<body>
  <port id="entry" component="animation" />
  ...
</body>
```



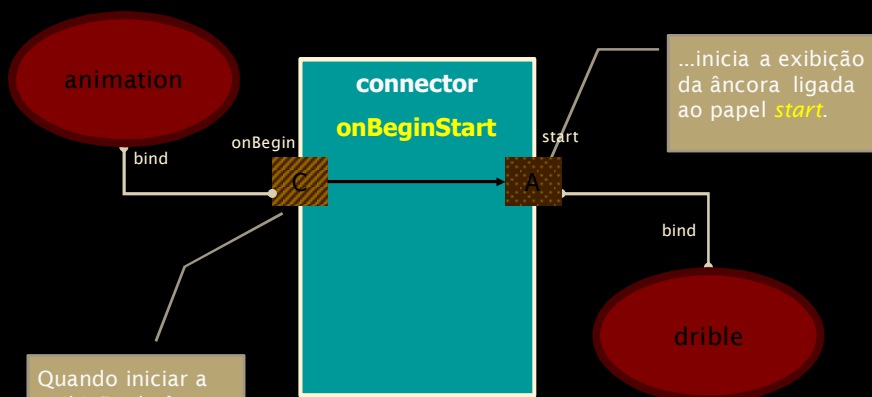
Exemplo 1

```
<body>
  { <port id="entry" component="animation"/>
  { <media id="animation" src="../media/animGar.mp4" >
    <area id="segDrible" begin="12s"/>
    <area id="segPhoto" begin="41s"/>
    <property name="width" value="100%"/>
    <property name="height" 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="height" value="18.5%"/>
    <property name="zIndex" value="3"/>
  </media>
</body>
```


Relacionamento entre Objetos



Connector *onBeginStart*



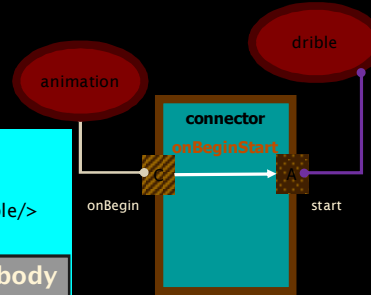
Connector *onBeginStart*

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

Elo que utiliza o conector *onBeginStart*:
Iniciando o vídeo *drible*

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

na seção *body*



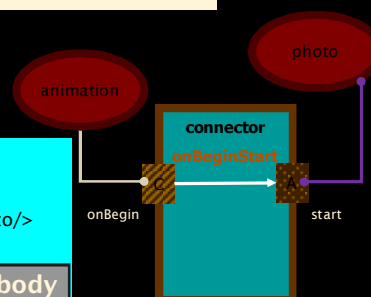
Connector *onBeginStart*

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

Elo que utiliza o conector *onBeginStart*:
Iniciando a imagem da *foto*

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

na seção *body*



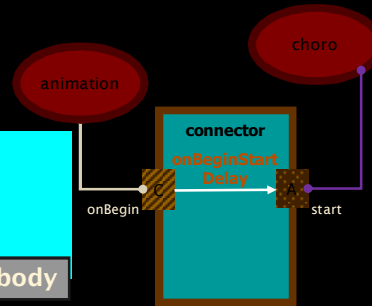
Connector *onBeginStart_delay*

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

Elo que utiliza o conector *onBeginStart*:
Iniciando o áudio *choro*

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

na seção *body*



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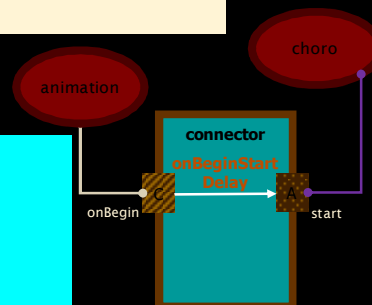
Connector *onBeginStart_delay*

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

Elo que utiliza o conector *onBeginStart*:
Iniciando o áudio *choro*

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

na seção *body*

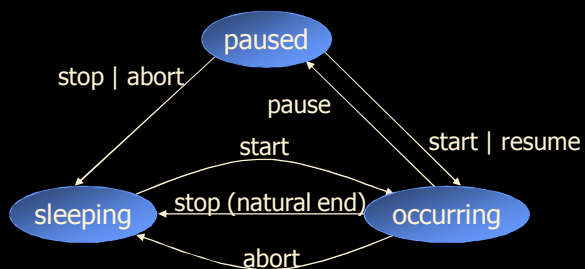


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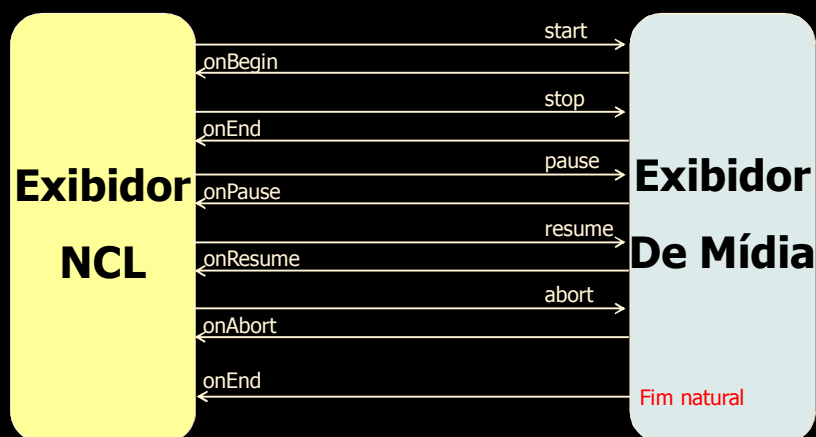
Máquina de Estado de Evento



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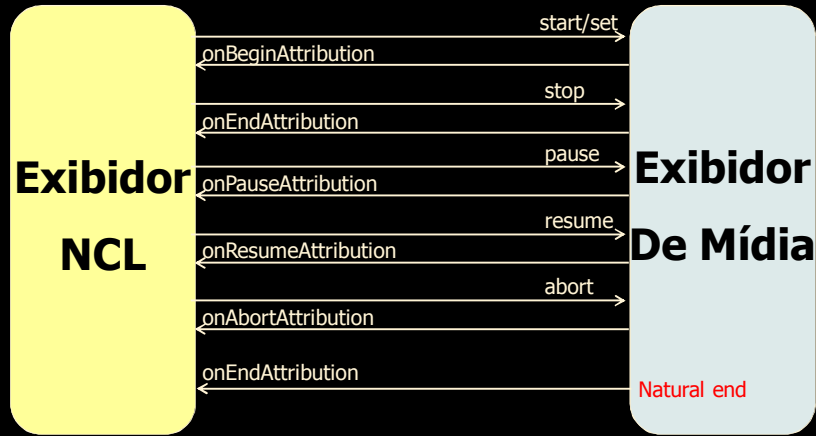
Eventos de Apresentação



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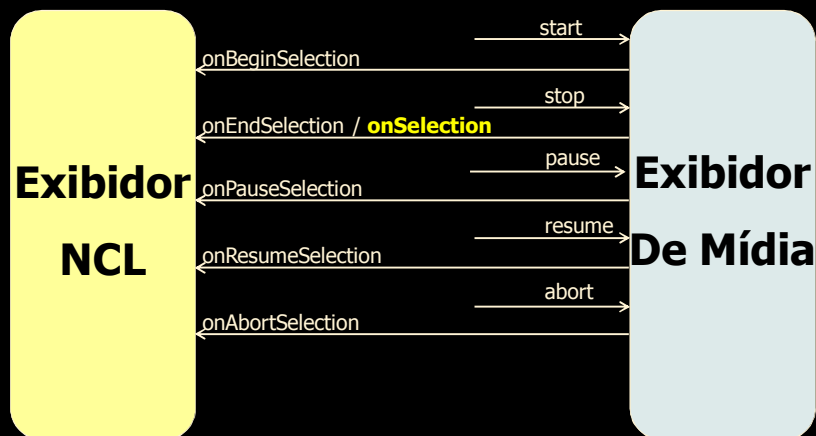
Eventos de Atribuição



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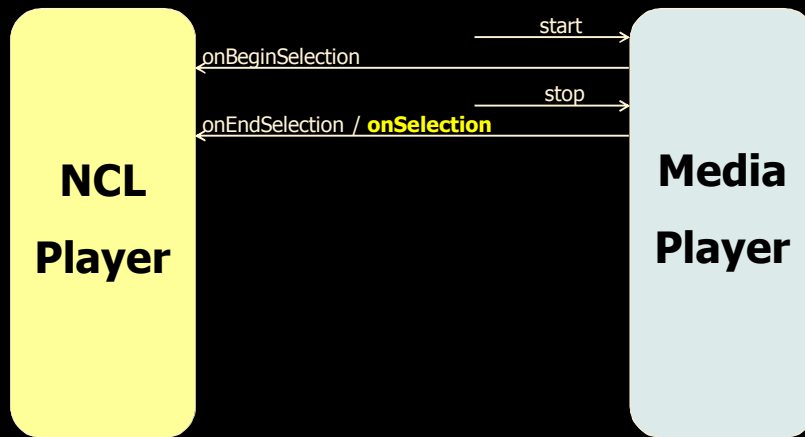
Eventos de Seleção



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Eventos de Seleção



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Connector *onEndStop*

```

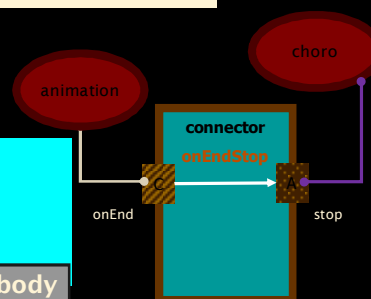
<causalConnector id="onEndStop">
  <simpleCondition role="onEnd"/>
  <simpleAction role="stop" max="unbounded" qualifier="par" />
</causalConnector>
    
```

Elo que utiliza o conector *onBeginStart*:
Terminando o áudio *choro*

```

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

na seção *body*



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Exemplo 1

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

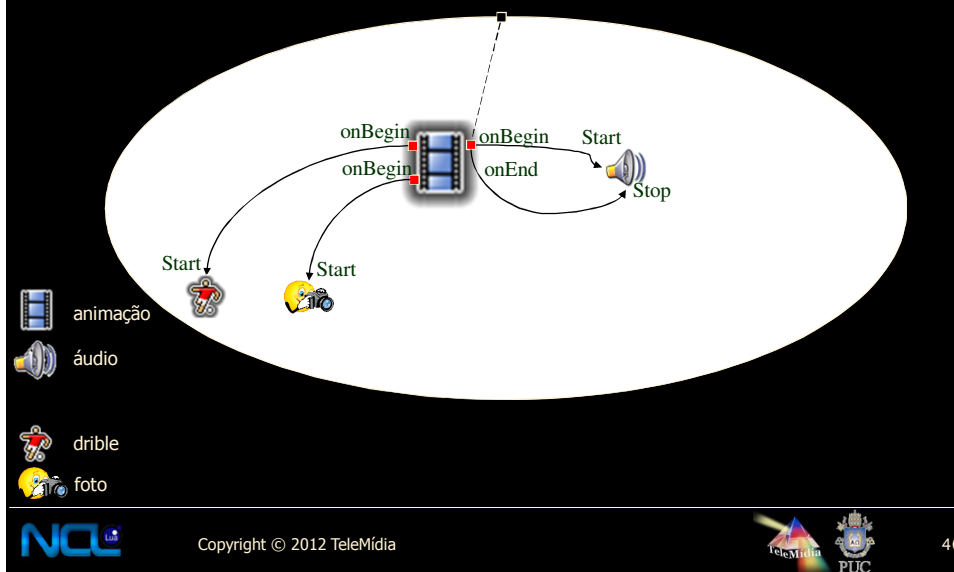
<link id="IDrible" xconnector="onBeginStart">
  <bind role="onBegin" component="animation" interface="segDrible"/>
  <bind role="start" component="drible"/>
</link>

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

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

</body>
</ncl>
```

Exemplo 2 – Visão Estrutural



Entidades Básica

o quê? objetos de mídia

como? propriedades
ou descritores

onde? propriedades
ou regiões

quando? relacionamentos e relações



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cabeçalho 1

```
<head>
```

```
<regionBase>
```

```
...
```

```
</regionBase>
```

regions - *onde*

```
<descriptorBase>
```

```
...
```

```
</descriptorBase>
```

descriptors - *como*

d3

```
<connectorBase>
```

```
...
```

```
</connectorBase>
```

connectors - *quando*

```
</head>
```

corpo 2

```
<body>
```

```
<port id="plnicio" component="video1" />
```

```
<!-- context and media objects -->
```

context e media - *o quê*

```
<!-- elos -->
```

links - *quando*

```
</body>
```



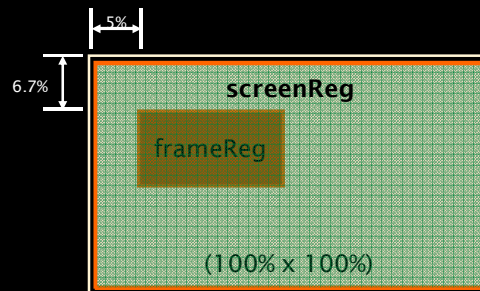
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Regions

```
<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?)

- em que região um objeto será apresentado

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

- por quanto tempo um objeto será apresentado

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

- **Como** um objeto é inicialmente apresentado

- p.ex. volume do áudio (soundLevel),
borda de uma mídia textual (border)

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

Exemplo 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="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>
  </head>
```

Exemplo 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"/>
```

```
<?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="onBeginStartDelay">
        <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>
```

```

<?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>

```



Exemplo 2

```

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

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

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

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

</body>
</ncl>

```



Exemplo 1 e 2 - Storyboard



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Exemplo 3 - Storyboard

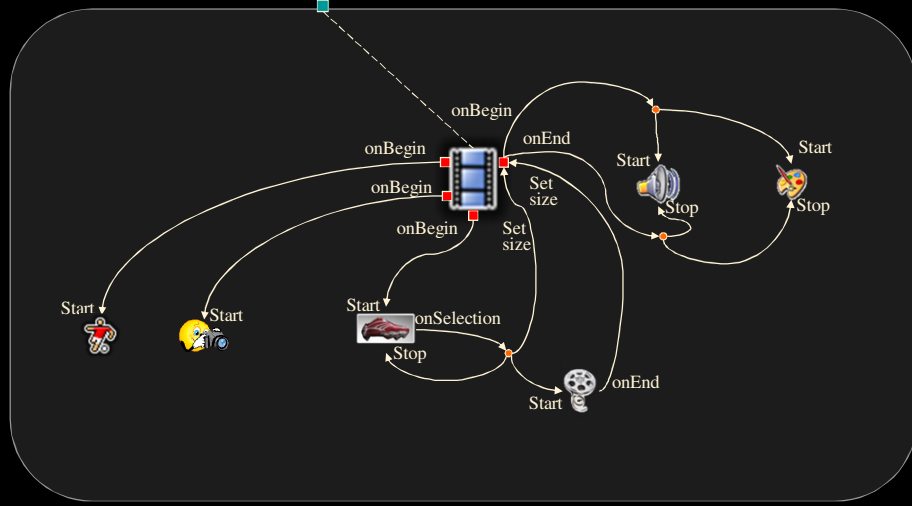


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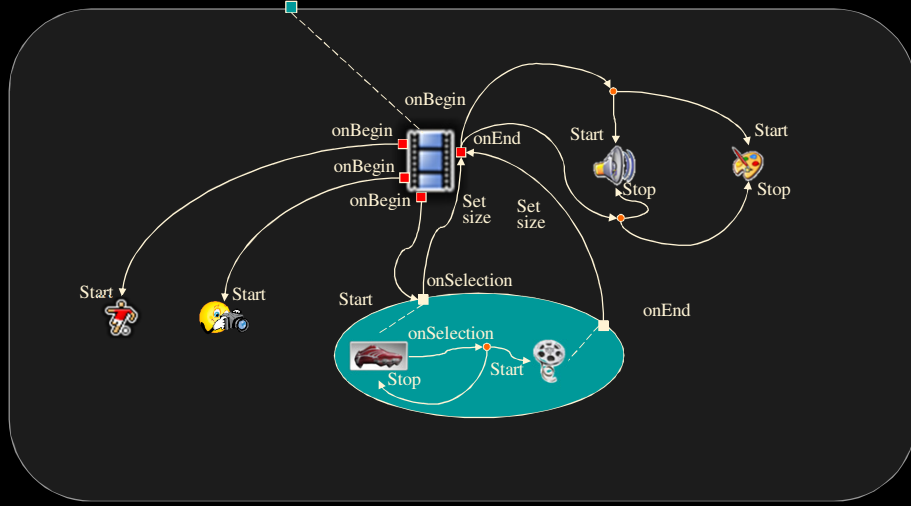
Exemplo 3



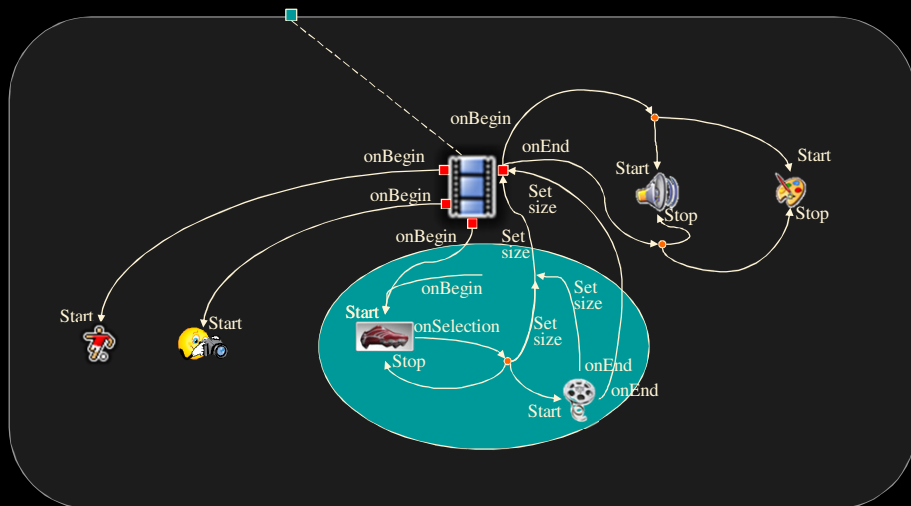
Conector onKeySelectionStopSetStart

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

Exemplo 4



Exemplo 5



Exemplo 4/5 - Storyboard



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Exemplo 6 - Storyboard

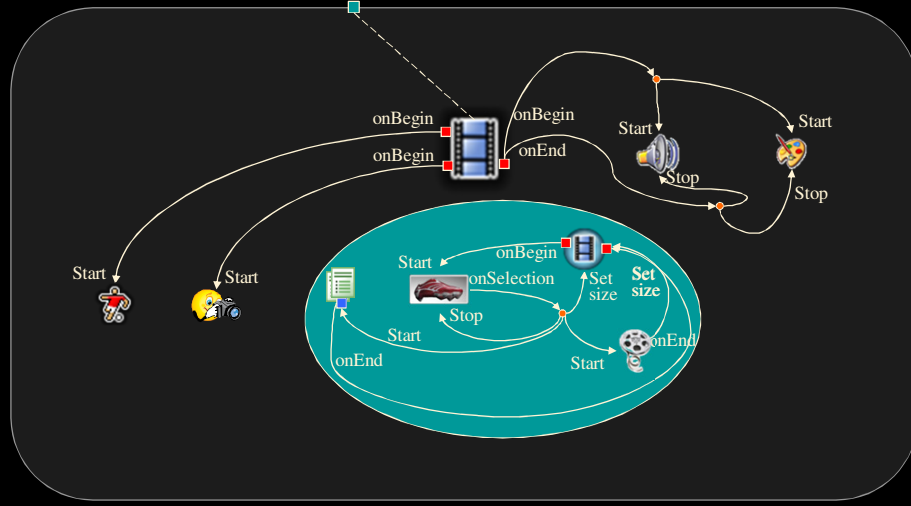


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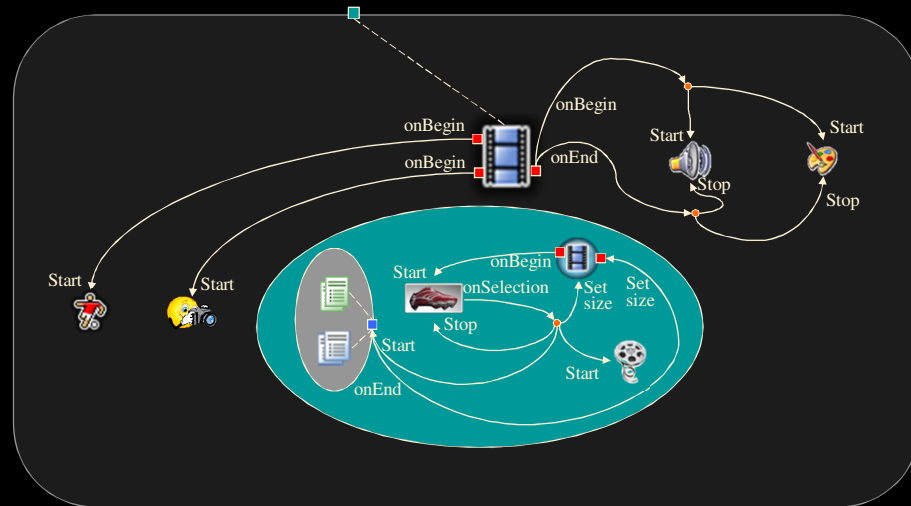


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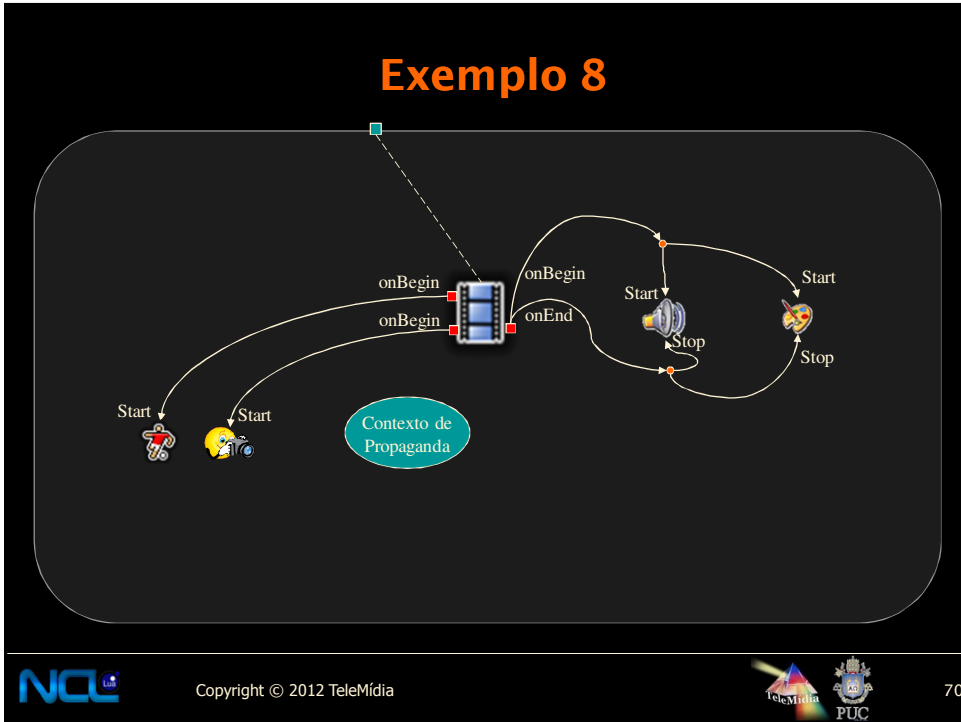
Exemplo 6



Exemplo 7

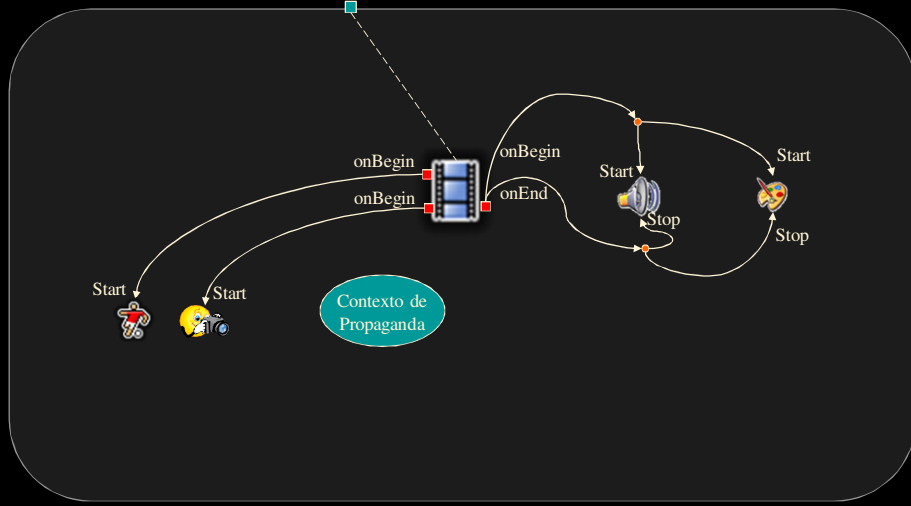




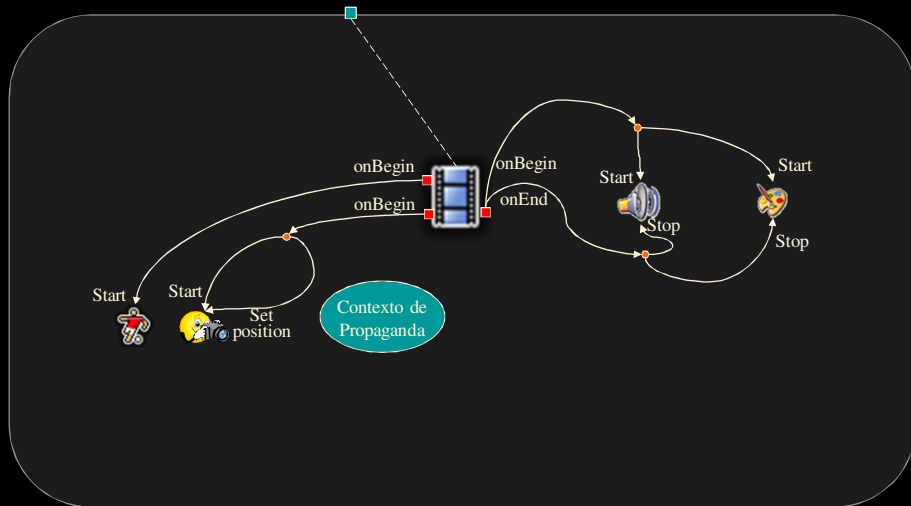




Exemplo 8



Exemplo 9



Exemplo 9 – Storyboard



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Exemplo 9 – Storyboard



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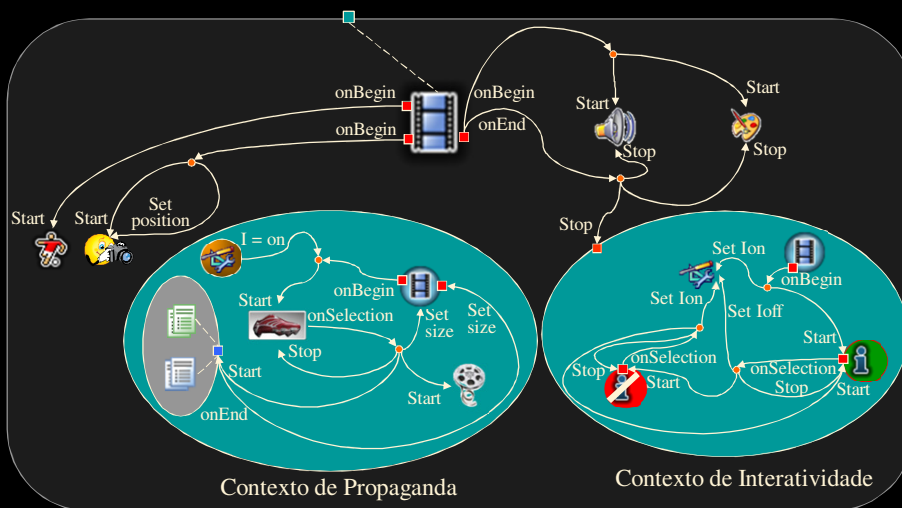


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Example 10 – Storyboard



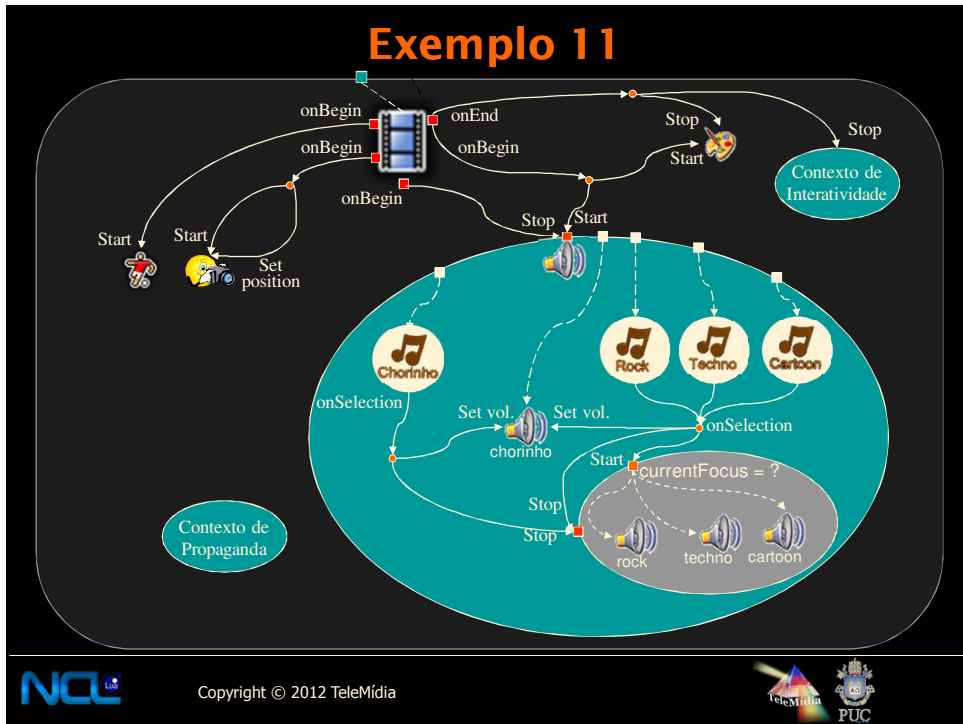
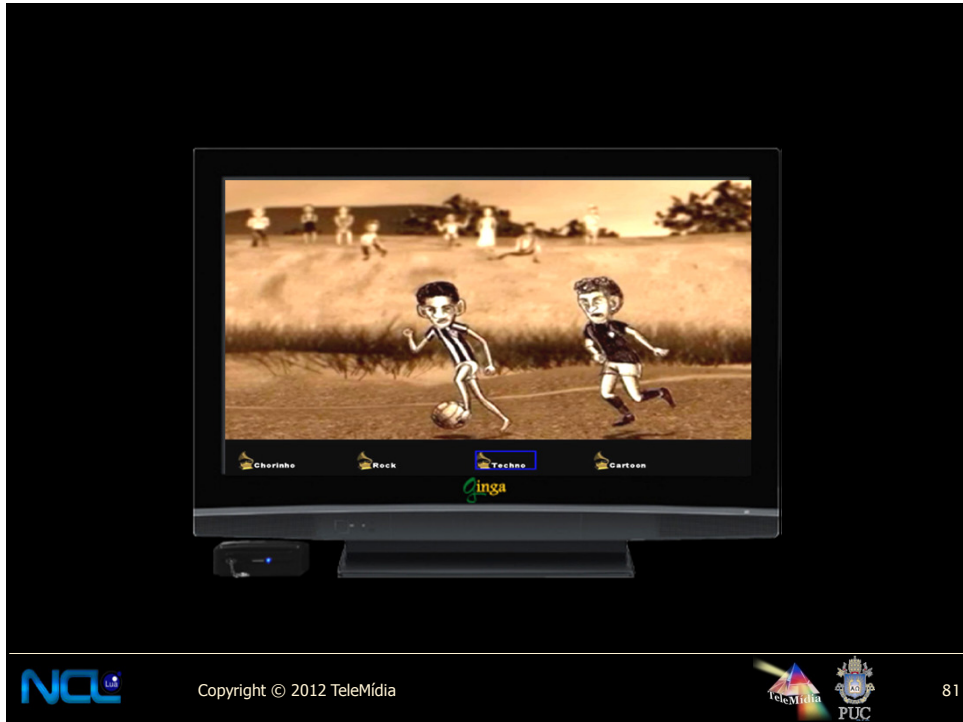
Exemplo 10



Conector *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>
```



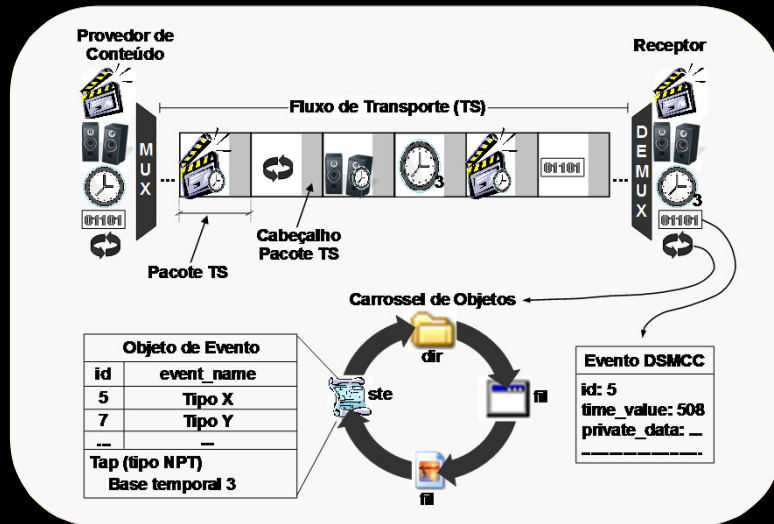


Conector *onSelection_orSet_varStopStart*

```
<causalConnector id="onSelection_orSet_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>
```

Fluxo de Mídia Contínua

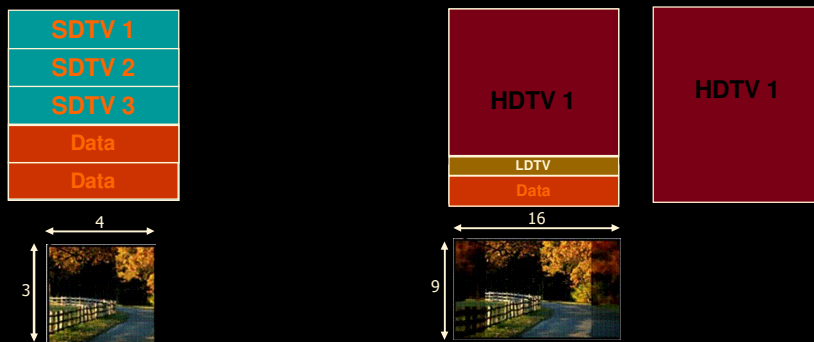
Fluxo TS



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Algumas alternativas em 6 MHz



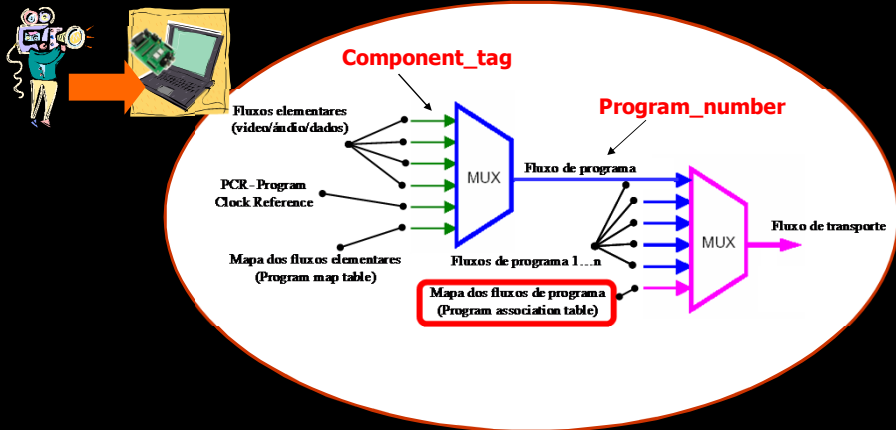
19,3 Mbps



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MPEG-2 System



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Copy right

Streaming

- Como um conteúdo pode ser localizado?
 - programNumber?
 - componentTag?
 - O que mais?



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Copy right

Streaming

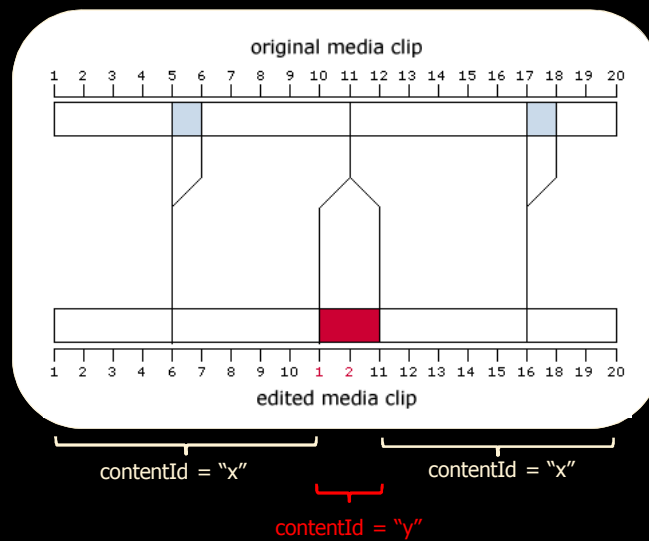
- Como um conteúdo pode ser localizado?
 - programNumber
 - componentTag
 - contentId
 - Como obter o contentId?



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NPT



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Synchronism

- Controle do NPT
- Controle da aplicação



Applicat Application's object

Application Application's object

NPT de partida ↑



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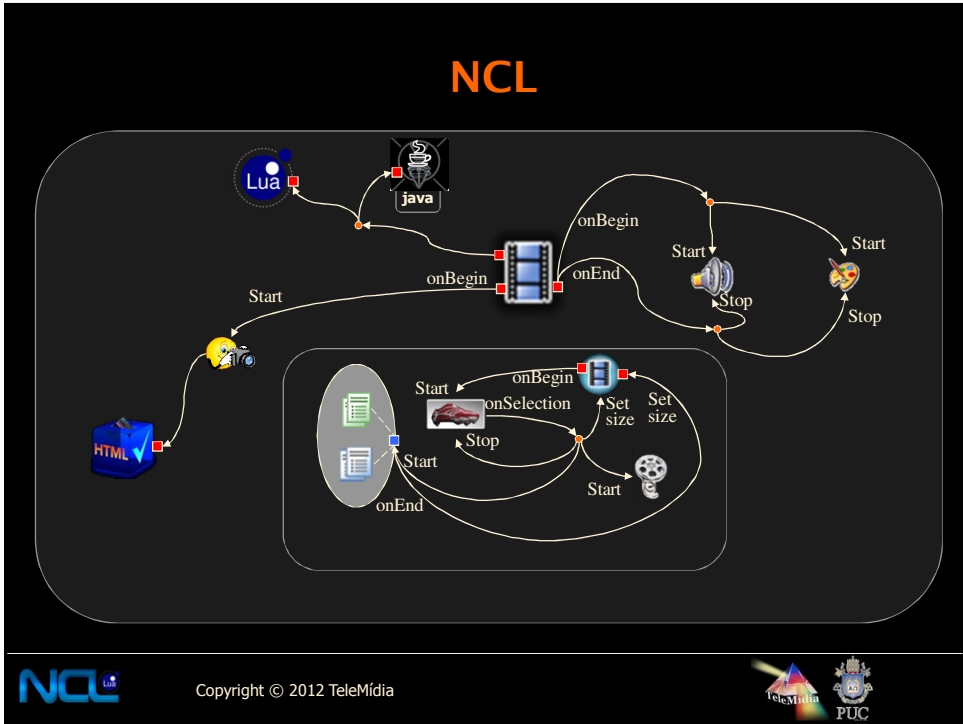
Objetos NCLua Embutidos



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Interfaces

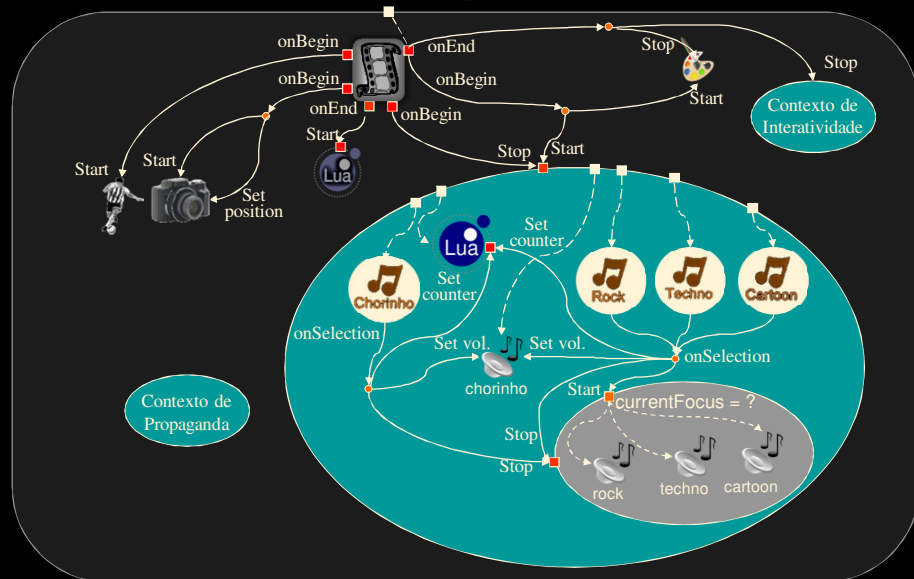
- `<area id="a1" label="função interna">`
- `<property name="função interna" value="parametro">`



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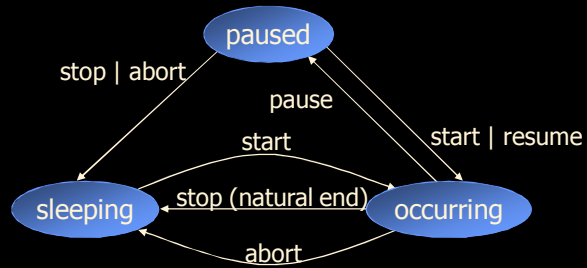
Exemplo 12



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Máquina de Estado de Evento



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```
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')
```

Importação



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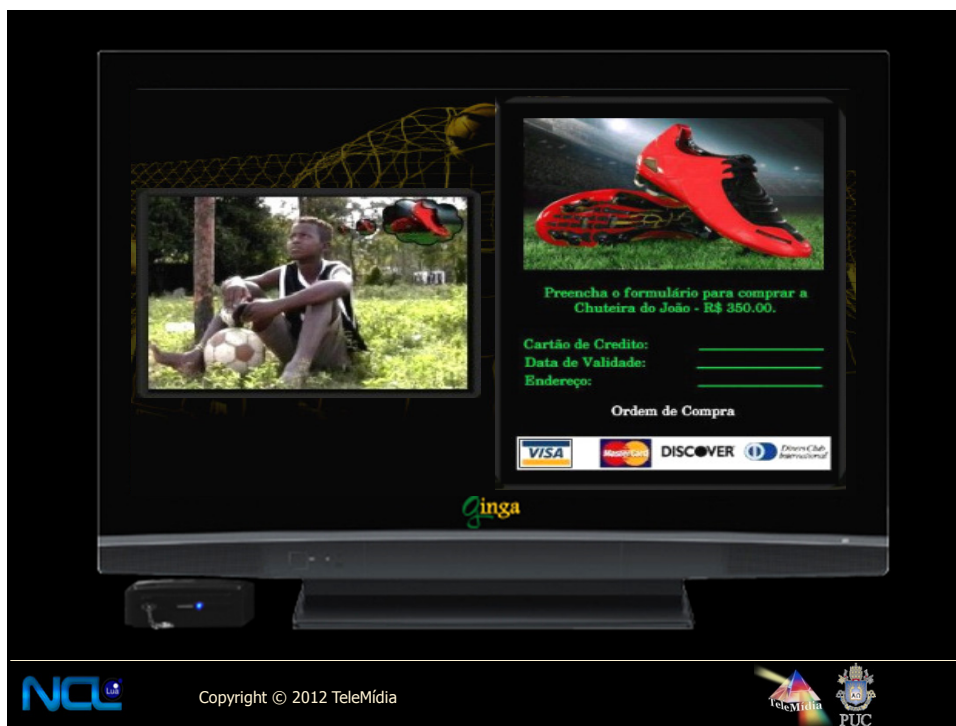


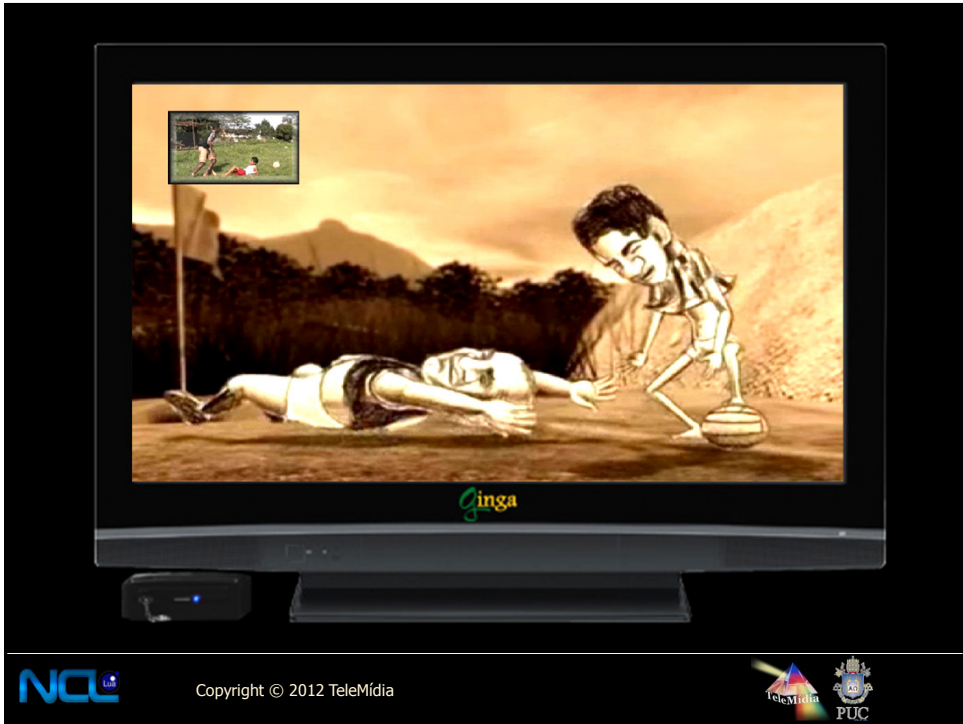
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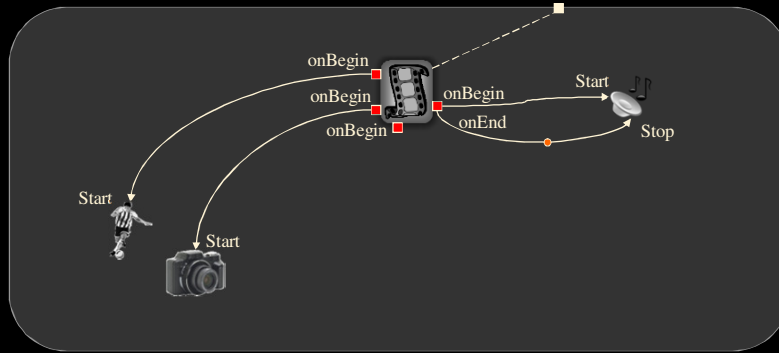








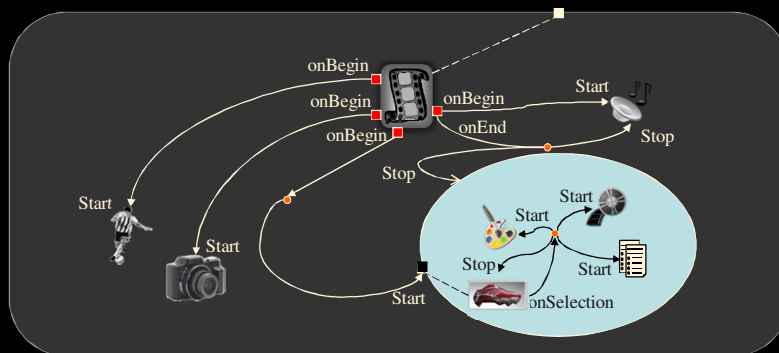
Exemplo 1



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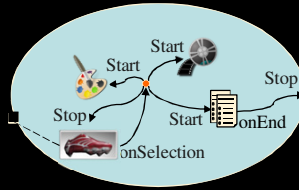
Exemplos 13



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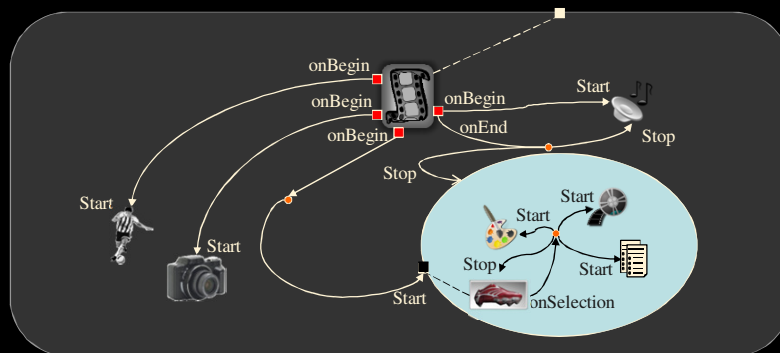
Exemplos 14,15



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Exemplos 14



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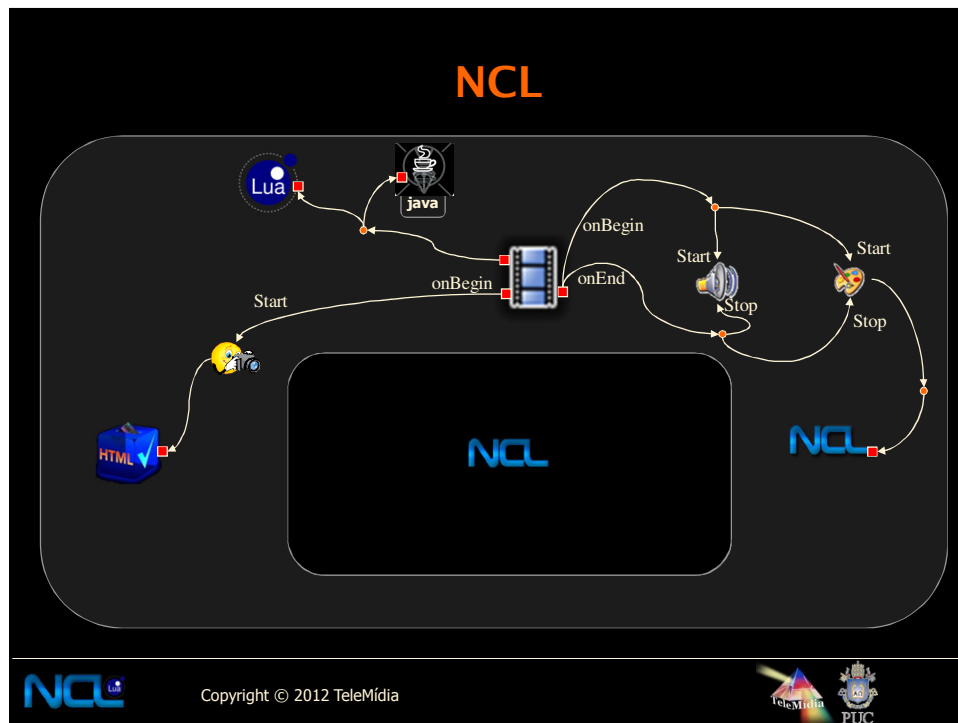
Objetos de Mídia NCL Embutidos



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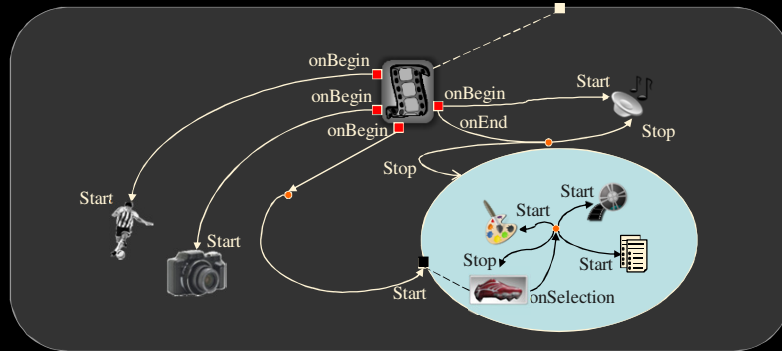
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Exemplos 14



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Interfaces

- `<area id="a1" label="porta interna do body">`
- `<property name="porta interna do body">`



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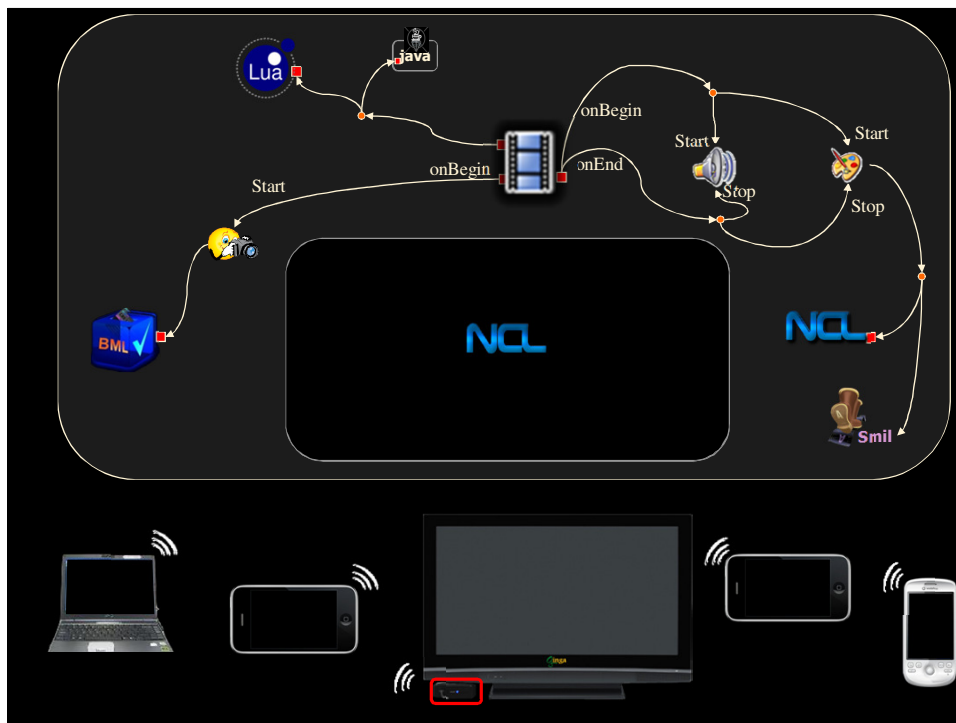
Múltiplos Dispositivos de Exibição



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Modelo Hierárquico de Controle



Aplicações NCL se referem a dispositivos por meio de classes



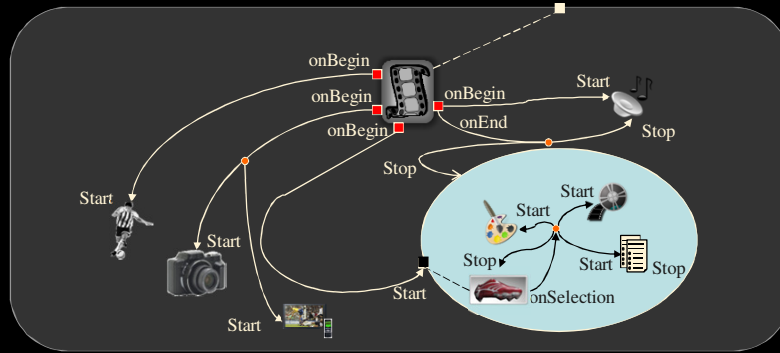
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Exemplo 16



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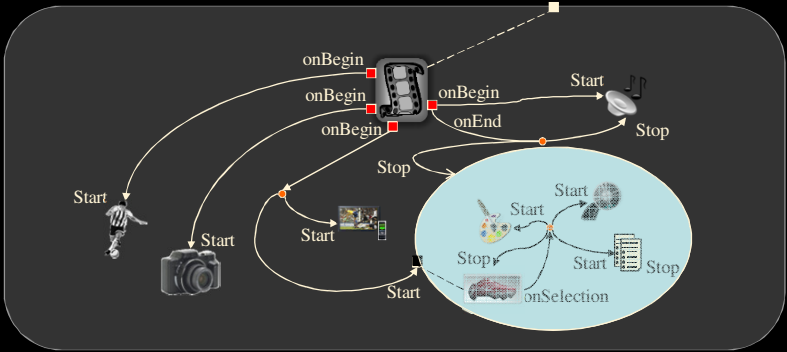


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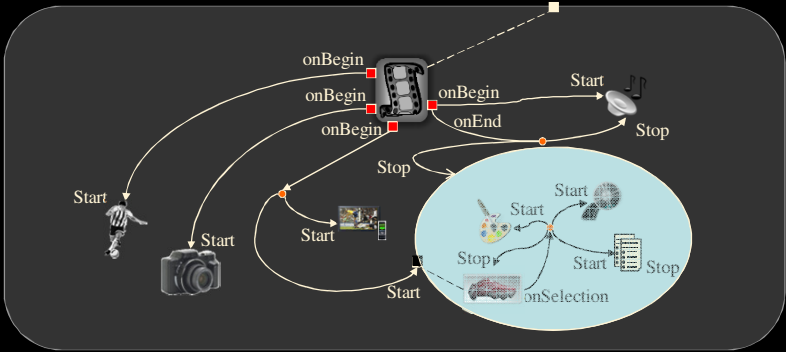


Exemplo 17

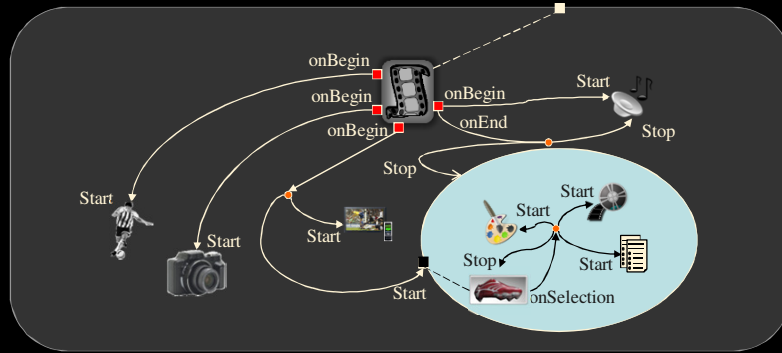




Exemplo 18



Exemplos 19, 20



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Geração do Fluxo TS



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Geração do Fluxo TS

1) Codificação áudio/vídeo:

- Vídeo: H.264 HP L4.0
- Áudio: 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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Geração de Fluxo TS

1. Agregar Fluxos para Interatividade

- NPT
- Ferramenta: Não existe no mundo, apenas por hardware.
- Implementação do TeleMídia será disponibilizada

- Geração do Carrossel
- Ferramenta: dsccc-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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