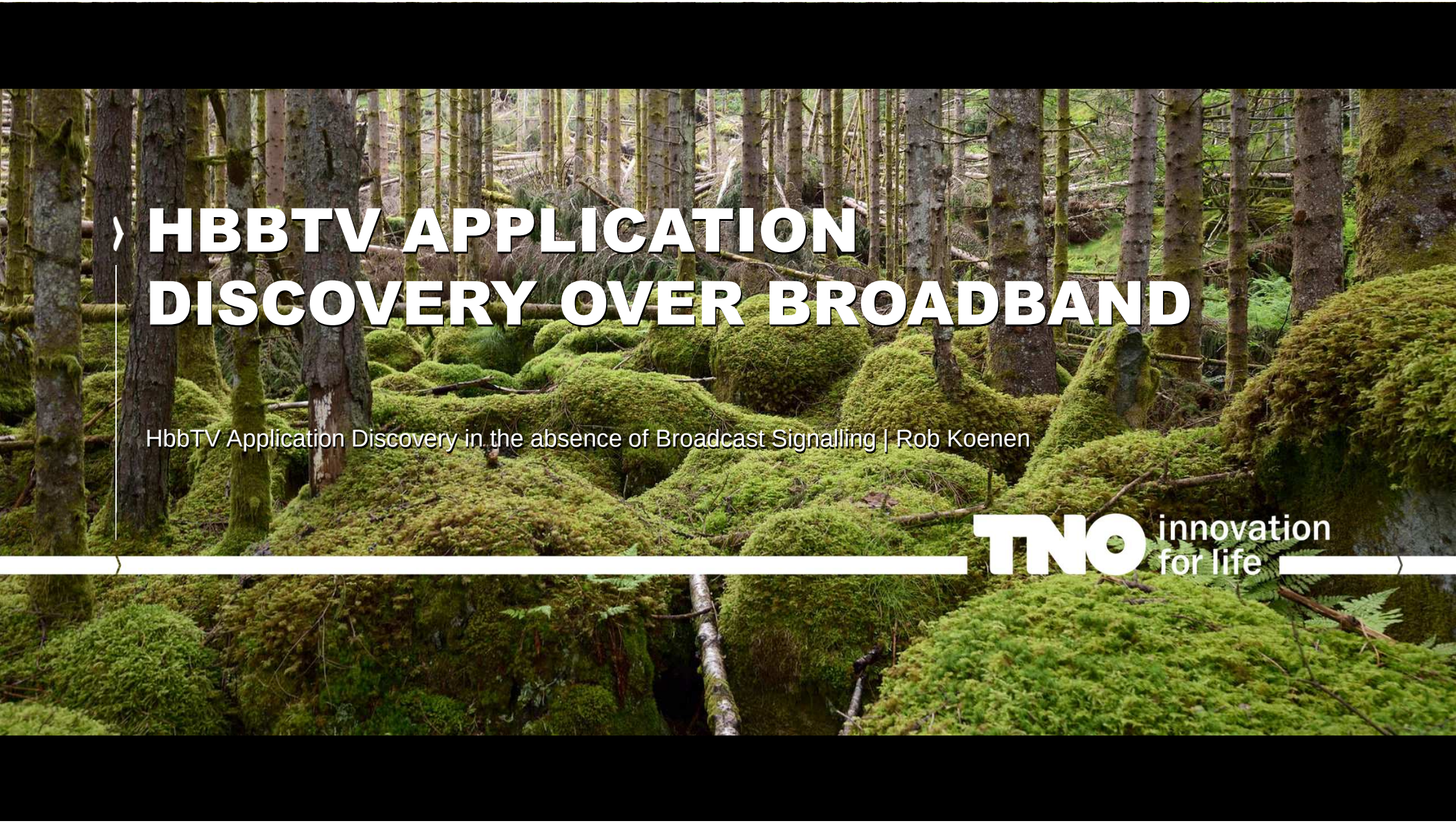
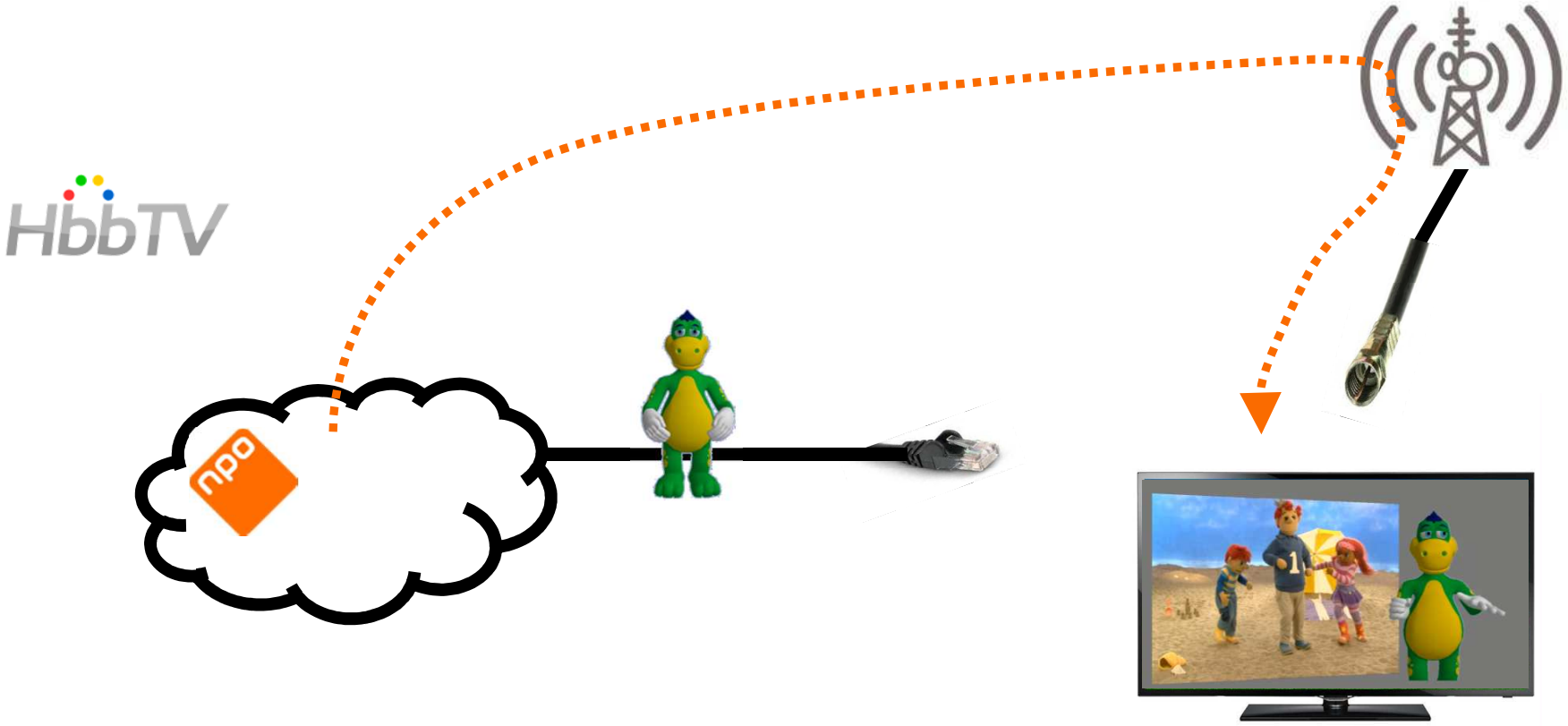

HBBTV APPLICATION DISCOVERY OVER BROADBAND
HbbTV Application Discovery in the absence of Broadcast Signalling | Rob Koenen
TNO innovation for life

TNO Project Supported by NPO, The Dutch Public Broadcasting Organisation

APP DISCOVERY OVER BROADBAND



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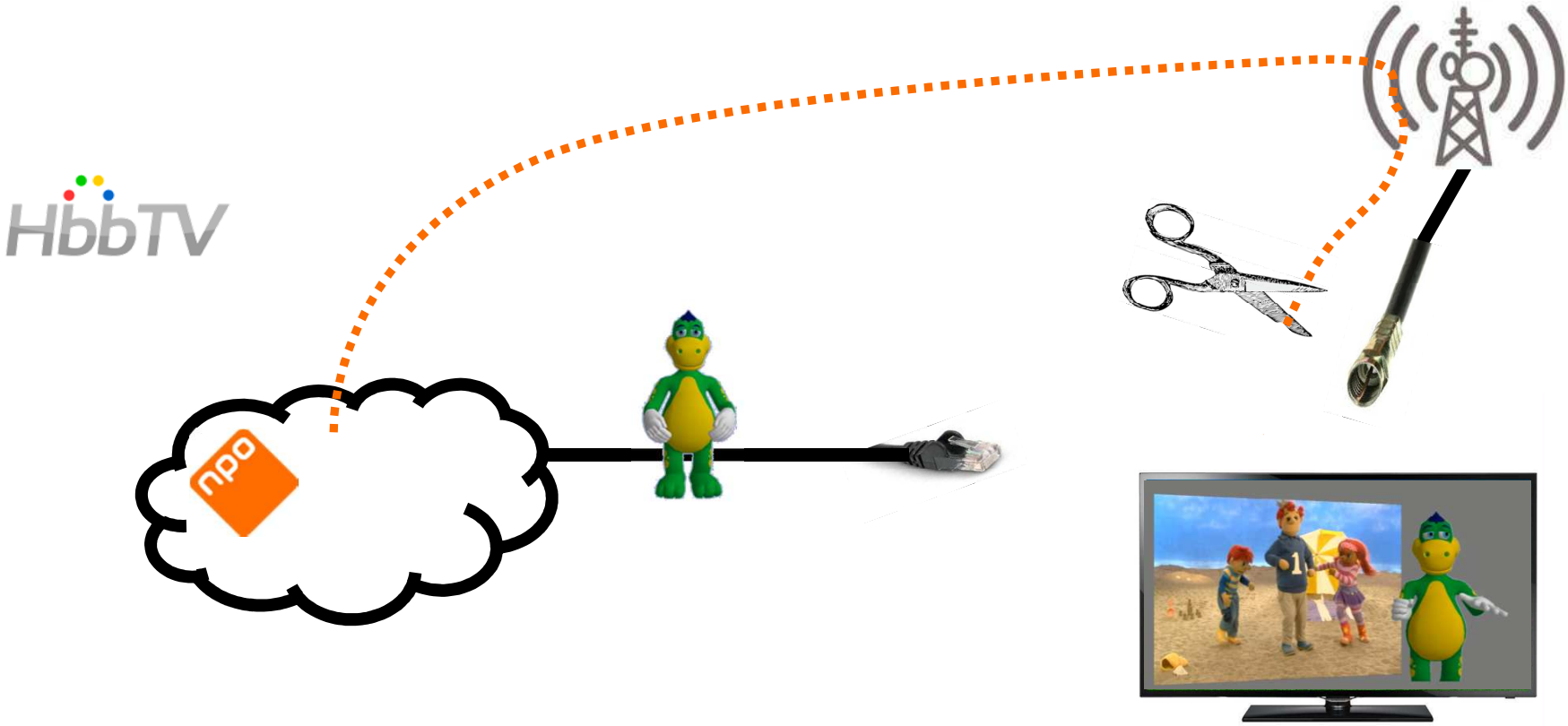

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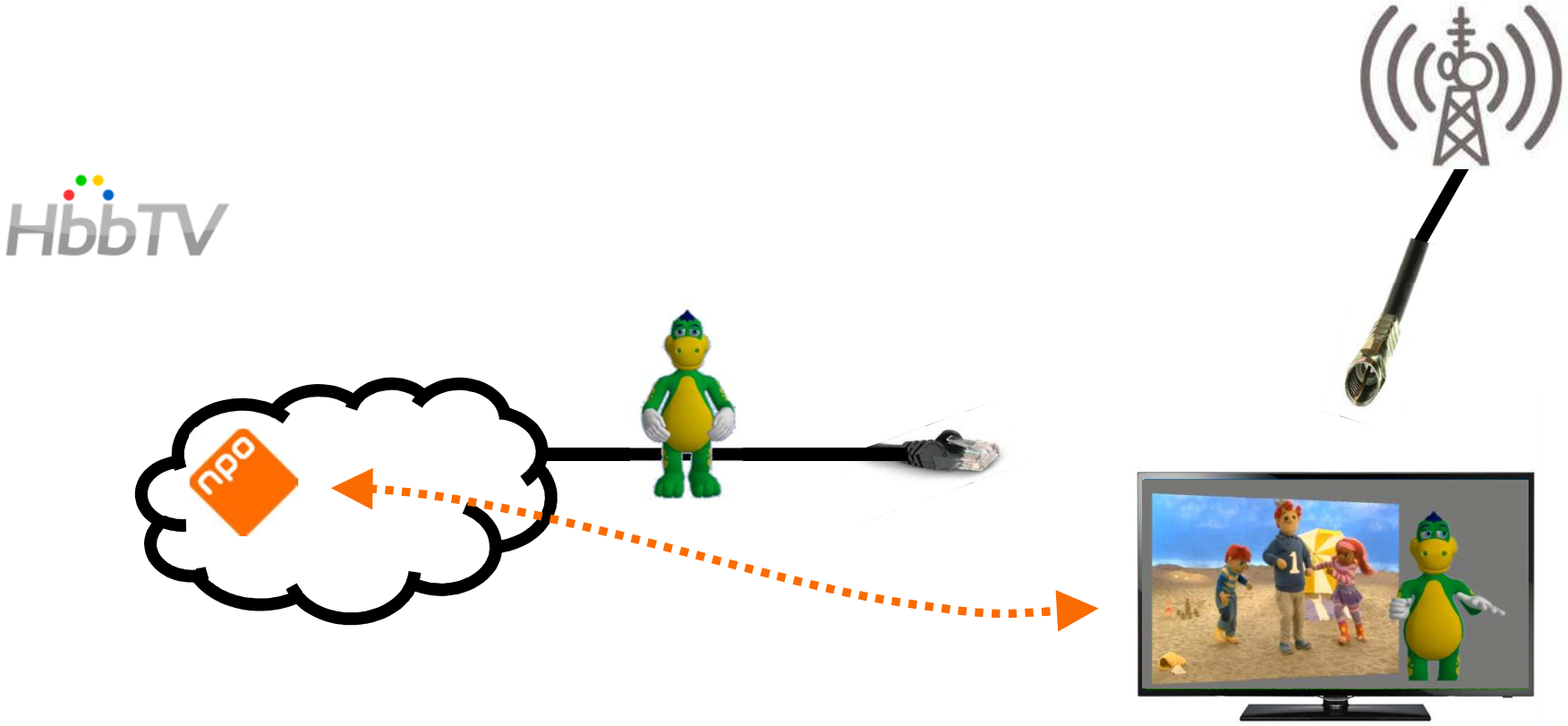


WHY

- HbbTV applications require an AIT (Application Information Table) that is carried in the DVB broadcast

- Virtually all new connected TVs are now HbbTV compliant, but the user may still not be able to use the service, because:
  1. The trigger may not be carried by the operator, or
  2. The TV is connected to an STB using HDMI or SCART, while
     a) There is no AIT in the broadcast
     b) There *is* an AIT in the broadcast, but the STB does not support HbbTV

- Variations of this exist in several European markets, including The Netherlands, parts of the Nordics, Spain, others

WHAT

- New HbbTV Specification that specifies **Application Discovery over Broadband (“ADB”)**
- Two Cases:
  - TV receives a digital (DVB) broadcast including Service Information
  - TV connected to a video input (HDMI, SCART)
- Main Requirements:
  - Backward compatible
  - Don’t rely on regulatory regimes
    - Can rely on some sort of net neutrality though
  - Terminal must know when to invoke the new discovery method
    - and when not to
  - Secure, and respecting of privacy
  - Respect existing App Lifecycle

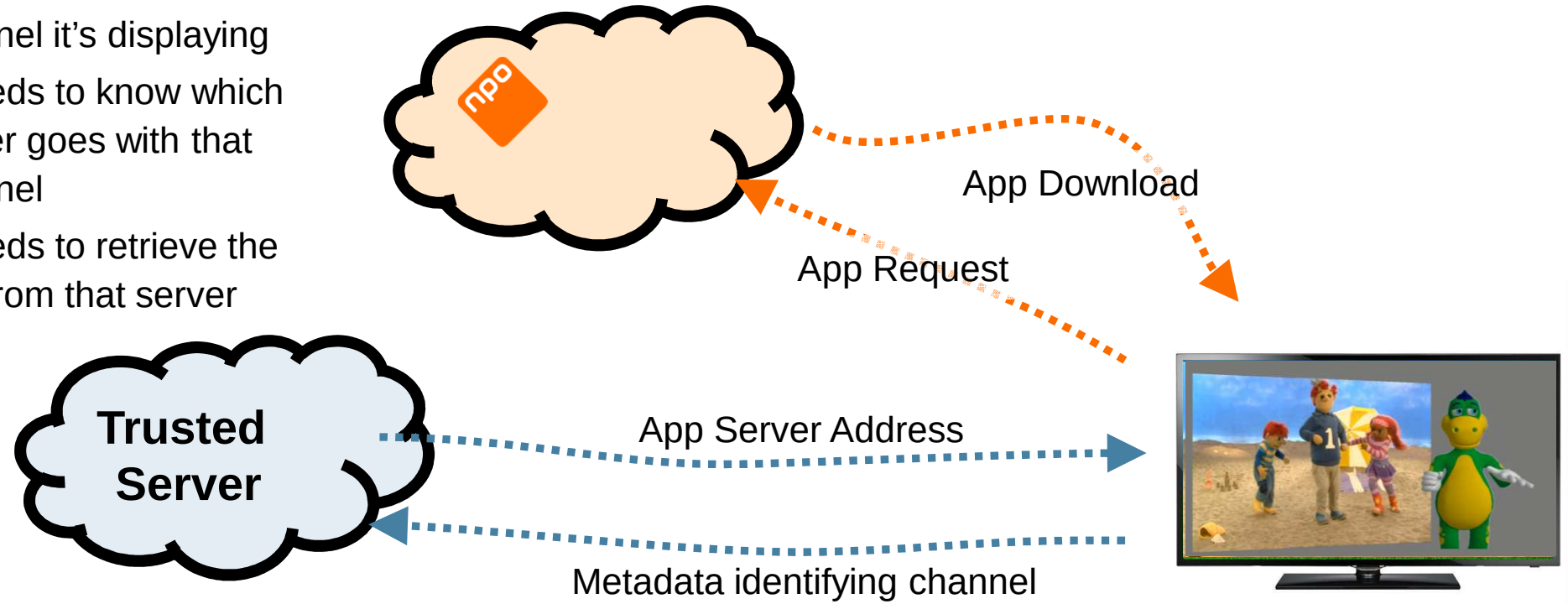
HOW

- Possible approaches:
  1. **Send the AIT** directly in the broadcast (in a way that cannot be removed)
  2. Send an **address for an AIT** server directly in the broadcast
  3. Let the (connected!) TV **discover where to retrieve the app**
     - through some form of **resolution,**
     - … based on knowing the current channel,
     - … looking at metadata that already exists,
     - … and that is always present and reliable.

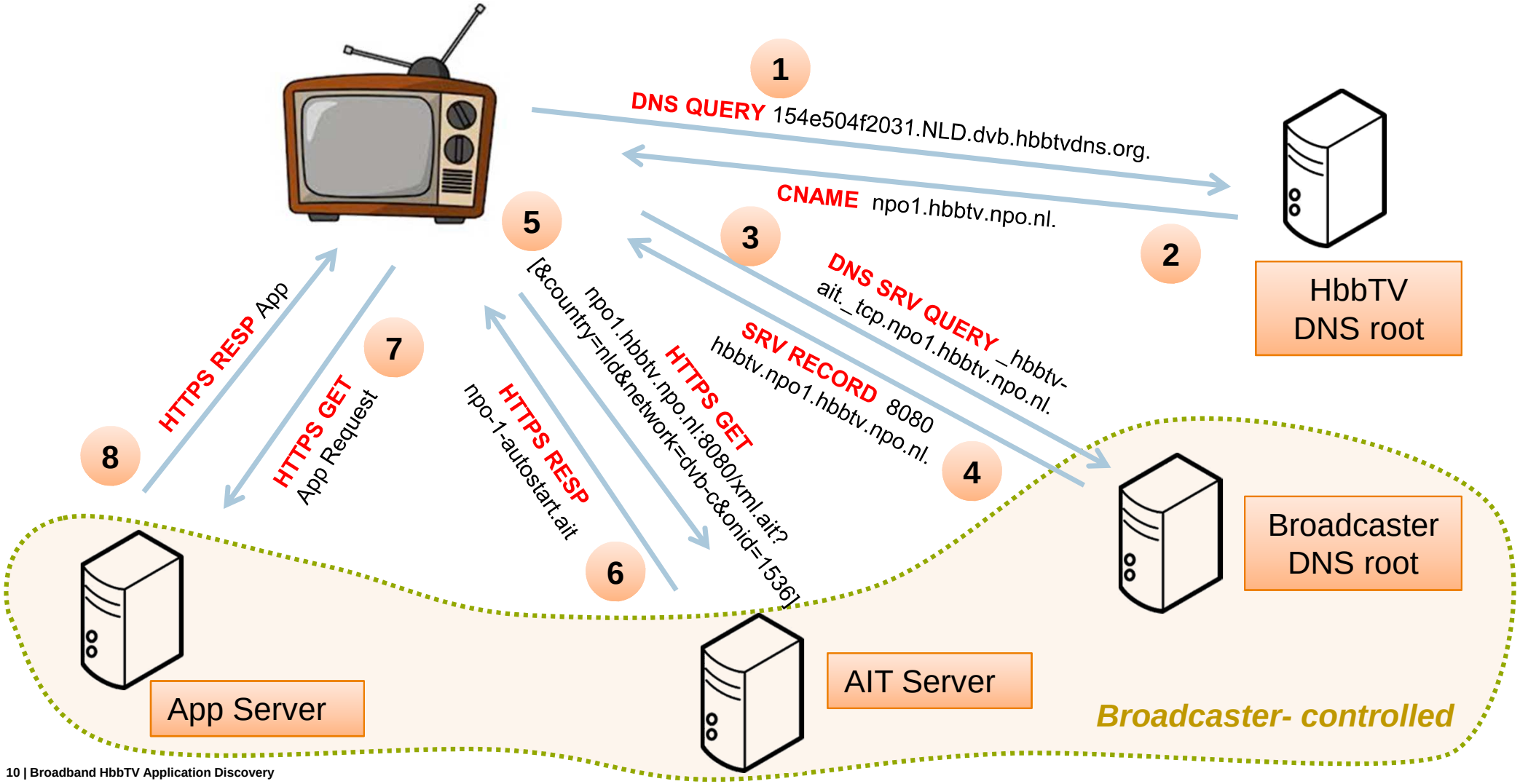
- Selected the third approach
- Modelled the solution after RadioDNS

BASIC PRINCIPLES

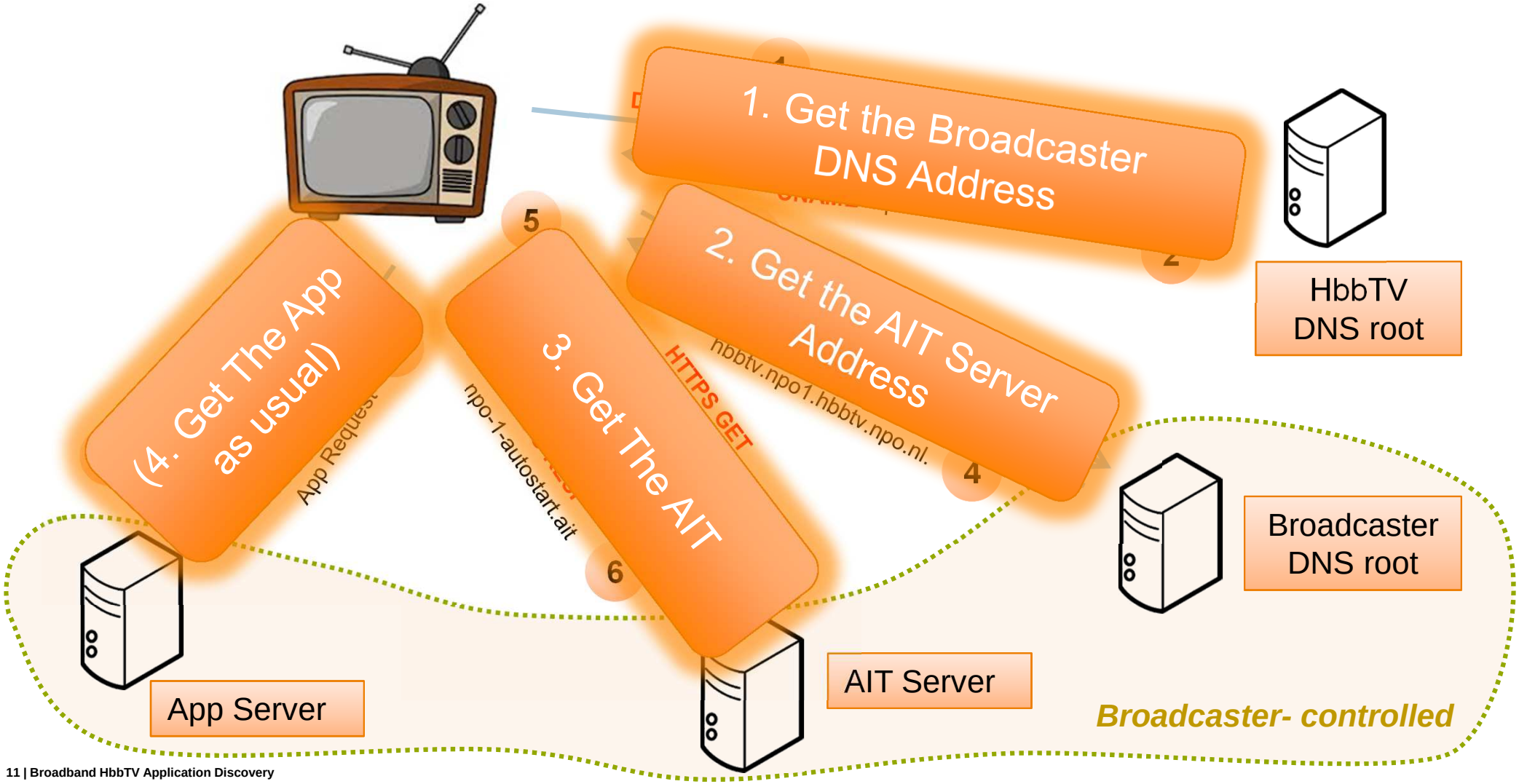
- For the TV to retrieve the App …
  - It needs to know the channel it's displaying
  - It needs to know which server goes with that channel
  - It needs to retrieve the AIT from that server



ARCHITECTURE & EXAMPLE

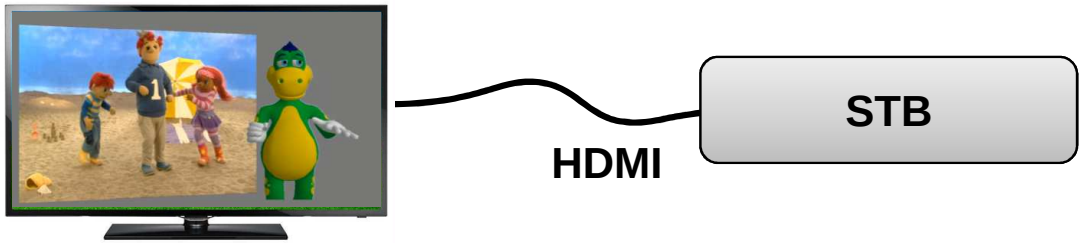


ARCHITECTURE & EXAMPLE



WHEN NO SERVICE INFORMATION AVAILABLE (STB ON HDMI, SCART)

- Need to use a form of Automatic Content Recognition:
- Take **fingerprint** and send to some server
  - Requires many queries; TV doesn't know when channel changes …
- Extract a **watermark** from audio or video
  - Could make HbbTV work even for recorded content … but not a requirement
  - Requires some sort of standardised watermark
  - HbbTV will not standardise watermarking solutions ... But ATSC is doing this for its ATSC 3.0 → see next presentation



PRIVACY CONSIDERATIONS

- Any solution should take **privacy considerations** into account
- Don’t enable third party to learn consumer’s **TV viewing behaviour**
- Pinging some central server with Channel ID on every channel change is **not acceptable**

- Solution: load a bunch of data when a terminal boots for all channels that are available; require that is stays in cache for a few hours
- DNS design inherently makes tracking difficult for third parties

- For the rest, things work the same as broadcast-signalled HbbTV as far as privacy is concerned
  - i.e., be able to show call to action (‘red button’)
  - Then load app when user presses that button

STATUS

- Specification work in HbbTV has finished for the case where we have Service Information
- Publication after Test Assertions ready; work on “Test Assertions” well advanced
- Spec to be published as a document that can be applied to all HbbTV versions
- Liaising with RadioDNS on establishing the required DNS infrastructure

- All HbbTV functionality available for ADB Apps, except for broadcast events / carousel
  - But can use web protocols instead;
  - And can make slightly different apps for broadcast-signalled vs. broadband-discovered

- Open to continuing work for the HDMI (SCART) case when a standardised solution is available that can be referenced


THANK YOU FOR YOUR ATTENTION
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