Integrate IR Trans with digitalSTROM Developer Days Hackaton (15.10.2015)

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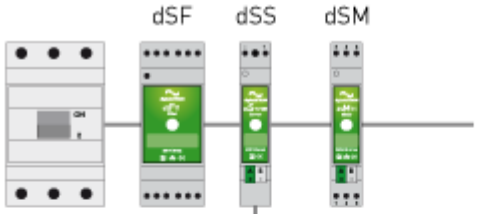
The Goal

- Integrate IR controlled devices such as TV, Radio, Streaming media player with digitalSTROM system
- Play some TV channel / radio station / movie trailer on a scene call in a digitalSTROM equipped apartment

Hardware needed

- digitalSTROM Developer kit
- IR Trans device with Ethernet capability
- Radio controlled devices, in our case
  - Toshiba TV
  - Apple TV
  - Philips Internet Radio
- Small Web Server (which might be later integrated in dSS)
- A router

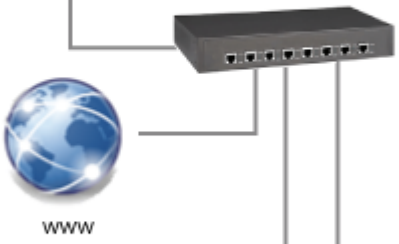
Wiring



Toshiba TV

Apple TV

Internet Radio
Philips NP1100



www

Server

What is IR Trans

- It's a little programmable device that can simulate IR remote control - can send IR commands
- It can learn the IR commands that are usually sent by the remote control, and store them in its internal database
- Features an Ethernet Interface for Network connectivity
- Offers an HTTP API that allows sending commands in format
  http://irtrans.local/send.cgi?
  remote={remoteName}&command={command}

Learning the commands

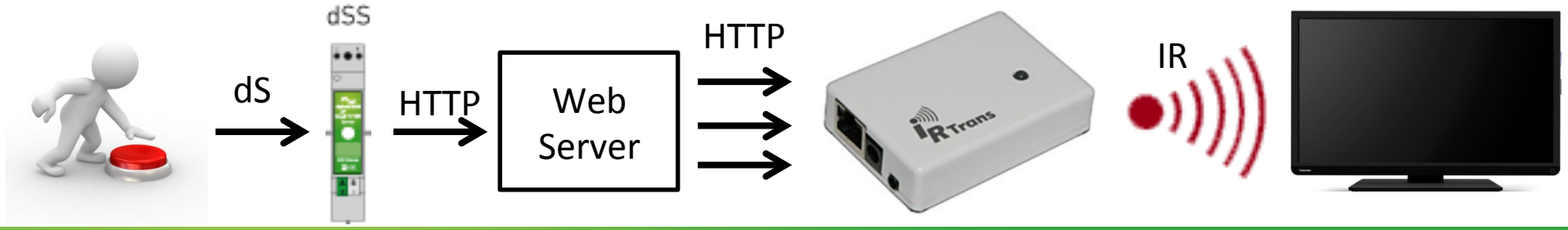
- Use the web interface offered by IR Trans
- For each remote control
  - Give the remote control a name
- For each key:
  - Give the key a name
  - Press the learn button
  - Point the remote control to IR Trans and press the key
  - The code received is shown on the web interface and stored in the internal database

Demo Scenarios

- Light Preset 1 in Room 1
  - Switch TV to channel 3
- Light Preset 2 in Room 1
  - Switch TV to PC input
- Light Preset 3 in Room 1
  - Switch TV to Apple TV input and play the trailer of the top movie of the week
- Light Presets 1, 2, 3 in Room 2
  - Play Internet Radio Station 1, 2, 3 correspondingly

How to Integrate the IR Trans to digitalSTROM

- The easy way is creating a User Defined Action that would call an URL on the IR Trans device
  - Limitation – in order to achieve some action, we usually need to execute a sequence of key presses with some short delay in between
- The flexible way is creating a server app that would handle sending the sequence of commands to IR Trans, and would provide single URL that can be called by a User Defined Action, e.g. http://myServer.local/tvPreset1



Server Implementation (Using python web.py)

```
import web
import requests
import time

baseUrl = 'http://172.16.0.7' #IR Trans URL

#Remote names
toshibaTV = 'Toshiba TV'
philipsRadio = 'Philips Internet Radio'
appleTV = 'Apple TV'

def sendCommand(remote, command):
    url = baseUrl + '/send.cgi?remote=' + str(remote) + '&command=' + str(command)
    requests.get(url)
    time.sleep(0.3)

class radioPreset1:
    def GET(self):
        sendCommand(philipsRadio, "Stop")
        sendCommand(philipsRadio, "Home")

        sendCommand(philipsRadio, "Internet Radio")
        sendCommand(philipsRadio, "OK/Play")
        sendCommand(philipsRadio, "OK/Play")
        return 'ok'
...
```

Switch TV to channel 3

- URL: http://myServer.local/tvPreset1
- Assumptions:
  - the TV is already on
- Using TV Remote:
  - Press button 3
  - Press OK //channel 3 selected

Switch TV to input PC

- URL: http://myServer.local/tvPreset2
- Assumptions:
  - the TV is already on
- Using TV remote:
  - Press button 1
  - Press OK //Starting with a clean state, channel 1 selected
  - Press Source select
  - Press Up //Navigate to PC input source
  - Press OK

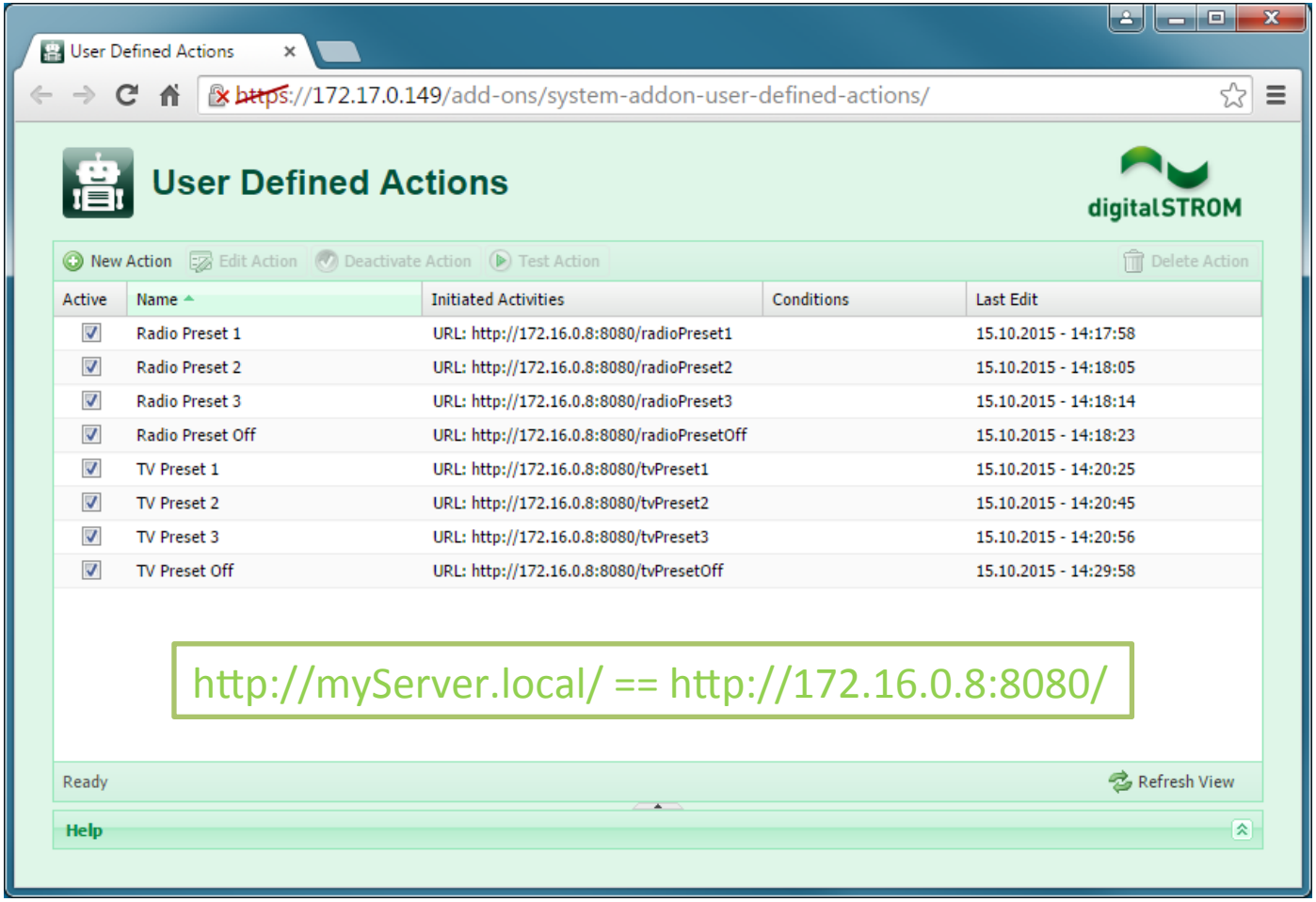
Switch TV to input source Apple TV and play trailer of the movie of the week

- URL: http://myServer.local/tvPreset3
- Assumption: the TV is already on
- Using TV Remote:
  - Press button 1
  - Press OK //Starting with a clean state, channel 1 selected
  - Press Source select
  - Navigate Down x 5 //Navigate to HDMI 1
  - Press OK
- Using Apple TV Remote:
  - Press Menu x 2
  - Press Down x 2
  - Press Menu //Selection is in second row
  - Press Left //Select movies
  - Press Up //Select movie of the week
  - Press Center //Open movie of the week
  - Press Center //Play trailer

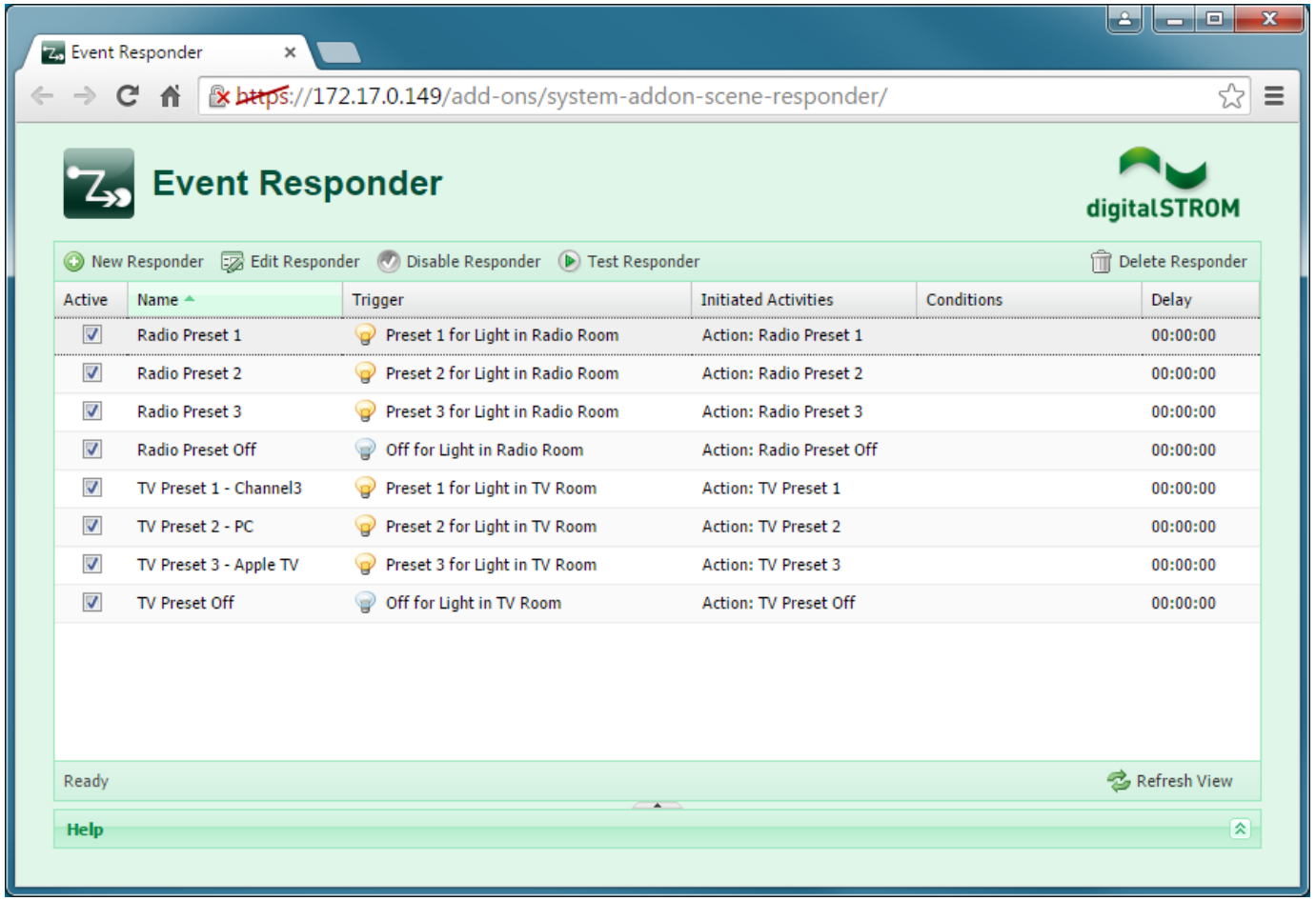
Play Internet Radio Station

- URL: http://myServer.local/tvPreset1 (or 2, or 3)
- Assumptions
  - The Radio is on
  - The favorite station list is already defined
- Using Radio Remote:
  - Press Stop
  - Press Home
  - Press Internet Radio
  - Press OK // Select Favorite stations
  - Press Down // x 0, 1, 2 depending on preset
  - Press OK // Play station

User Defined Actions Configuration



Event Responder Configuration



Problems when automating IR control

- The communication between the Remote Control and the controlled device is usually one way, meaning no feedback is provided to the sender about the success of the command
- For the human beings it's easy to determine the current state of the controlled device, so it's easy to choose the button that should be pressed next
- Automating the sending of IR commands means having no feedback about the current state of the controlled device. This implies that we always have to start with a clean state (e.g. channel 1, home screen) before sending any commands