



fxdigital

## Testing Beyond the Browser

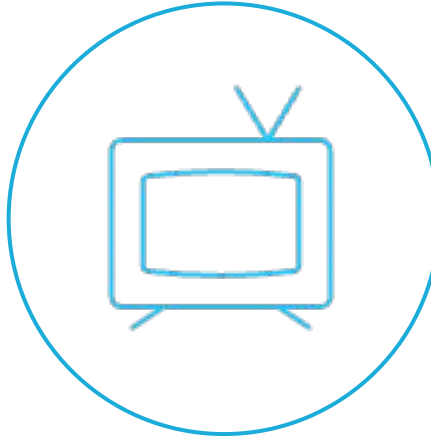
**Mohammad Arif**

Head of Quality Assurance



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Head of Quality Assurance  
FX Digital Ltd



 discovery+

 EUROSPORT

britbox

itvX

 ATP  
MEDIA





Sports



Media



Music

We are a **Connected TV** specialist agency based in London & Barcelona with a team of over 70 people, spread across numerous key disciplines.



Strategy



Project  
Management



Product  
Design



Engineering



Quality  
Assurance



Quality  
Engineering



# Our testing ethos



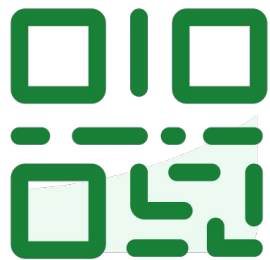
We are **Connected TV first**.  
TV apps are native or  
web based.



We **avoid making  
modifications** to the  
application.



We test on **real  
devices** always, no  
simulators



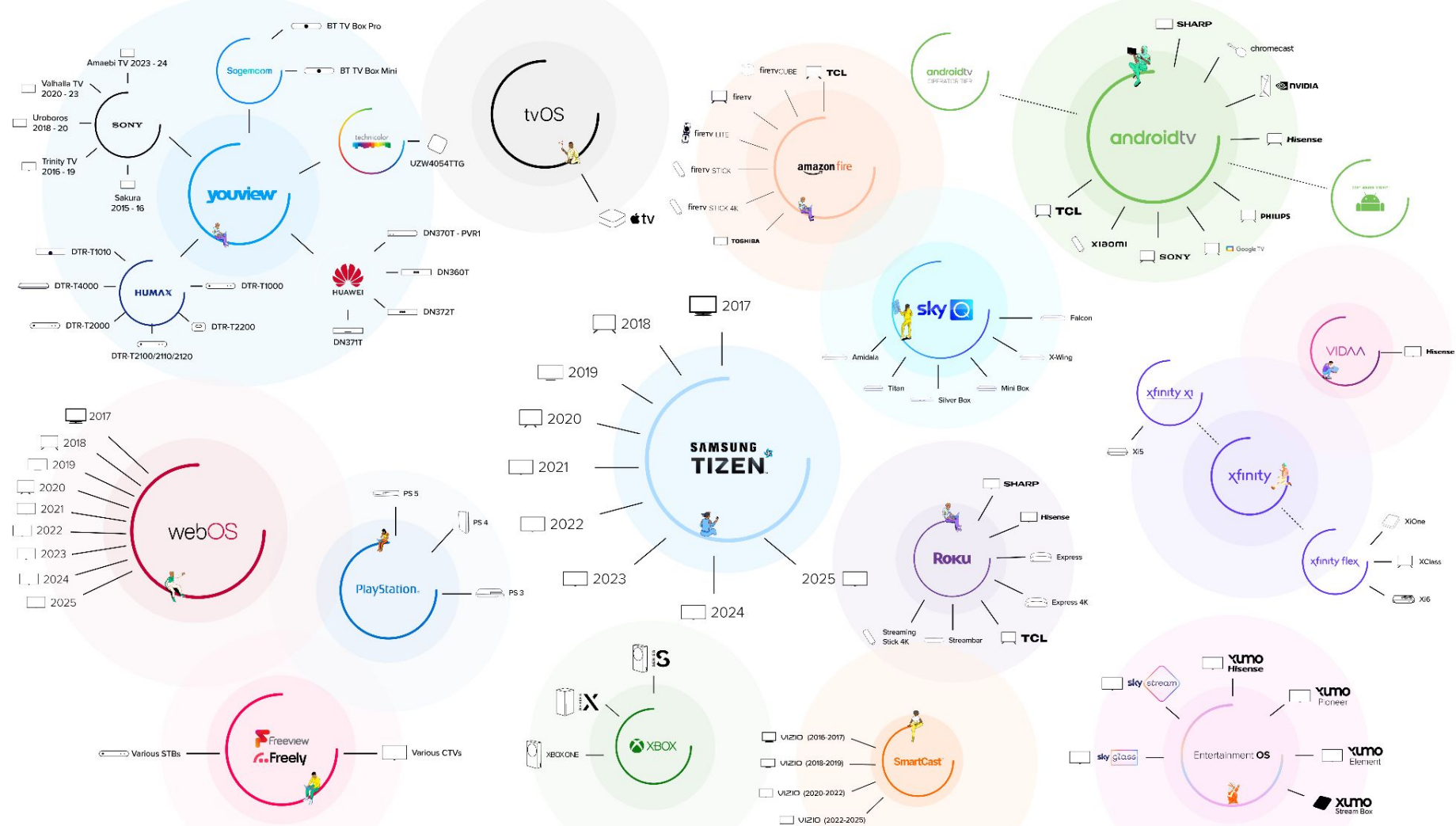
Join at **slido.com**  
**#5499523**





# When was the last time you purchased a new main TV for your living room?







# Fragmentation



# Ensuring quality across CTV is tough



Clients want more platforms supported in a **faster time**



Clients wanted **parity** in feature sets across platforms



Audiences expect applications to be **high quality and available**



# What makes testing on TV different from browser/mobile?

# HTML DOM of website compared to our TV web app

## BBC Website DOM

## TV web app developed with LightningJS

```
<body>
  <div id="root">
    <div class="ssrcss-181c4hk-SectionWrapper eustbbg0"> (flex)
      <div class="ssrcss-1imfos9-PageStack e1k195vp1"> (grid)
        <div> ... </div>
        <div>
          <div class="ssrcss-t9s73x-StandardZone e1k195vp0">
            <main id="main-content" data-testid="main-content" style="height:100%">
              <div class="visually-hidden ssrcss-1f39n02-VisuallyHidden e16en2lz0"> ... </div>
              <div class="ssrcss-9claxl-Container eqfxz1e6">
                <div class="ssrcss-4y0sit-Wrap e42f8511">
                  <div class="ssrcss-yawlqh-GridWrapper eqfxz1e3">
                    <div class="ssrcss-13t2hmk-NoTitlePadding eqfxz1e7"></div>
                    <div class="ssrcss-1fyr2t1-HierarchicalCollectionsWrapper eqfxz1e2">
                      <ul role="list" class="ssrcss-6wu7qa-Grid e12imr580">
                        (grid)
                        <li class="ssrcss-rs7w2i-ListItem e1gp961v0">
                          <div data-testid="promo" type="live" class="ssrcss-1t3sjik-Promo e1vyq2e80">
                            <div class="ssrcss-1wlz3gj-PromoSwitchLayoutAtBreak points et5qct10"> (flex)
                              <div class="ssrcss-83l9lf-PromoContent exn3ah912"> ... </div> (flex)
                              <div class="ssrcss-z60stg-PromoImageContainer en81kx34">
                                ...
                              <div class="ssrcss-17h6w1t-PromoImageContainerInner en81kx32"> ... </div> == $0
                            </div>
                          </li>
                        ...
                      </ul>
                    </div>
                  </div>
                </div>
              </div>
            </main>
          </div>
        </div>
      </div>
    </div>
  </body>
```

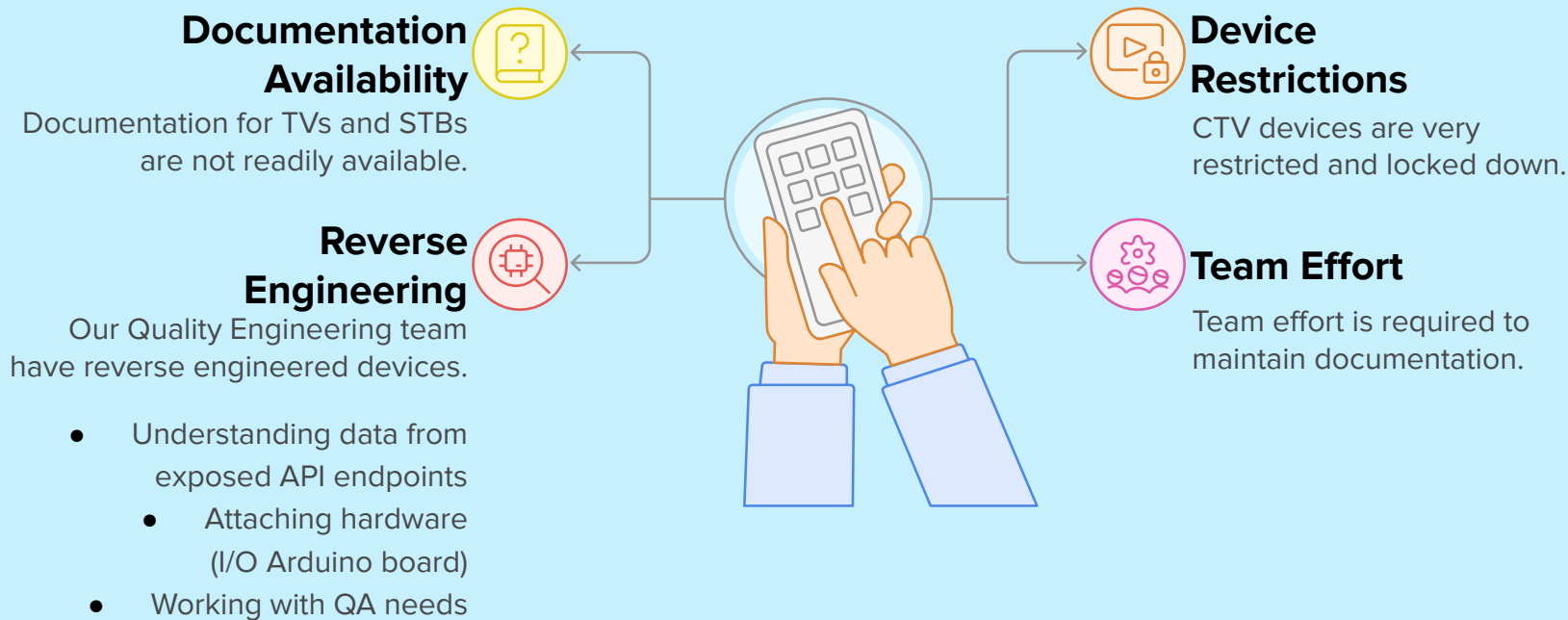
```
<!DOCTYPE html>
<html>
  <head> ... </head>
  <body>
    <script> ... </script>
    ... <canvas id="lng-canvas" width="1920" height="1080"> == $0
    <script async defer src="bundle-build.js"></script>
    <aside id="usercentrics-cmp-ui" data-nosnippet="1" keyboard-...
  </body>
</html>
```

# Keyboard and Mouse VS Remote Controls

- Browser testing allows you to quickly point and click on elements to test
- Steps with a remote are meticulous. To interact with a specific button, you may need to have many prerequisite steps.
- Keyboards are supported on most TVs but we test real user experiences with remote keypresses.
- Keyboard navigator for automation



# Documentation and debugging





**Testing on TV is more physical, more manual  
and less supported**

**Sometimes, we have to build our own solutions**





# How we automated CTV devices

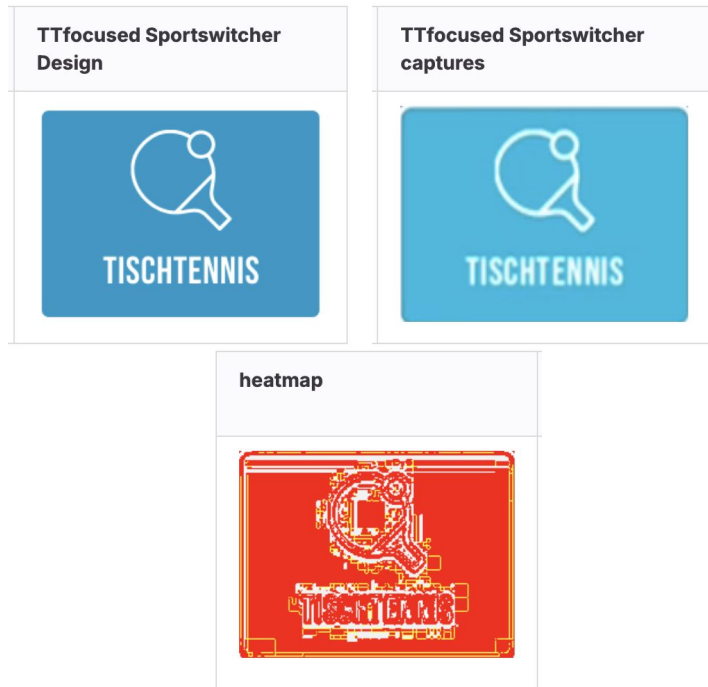


# Visual based automation framework

- Manual testing is still very important in CTV (user experience)
  - Video/Audio sync, playback quality, accessibility (closed captions)
  - Performance: animations, input latency, network
  - But we need a way to be more efficient and streamlined
- We developed our own visual based in house automation framework based on Cucumber with shared steps for parity between all the devices

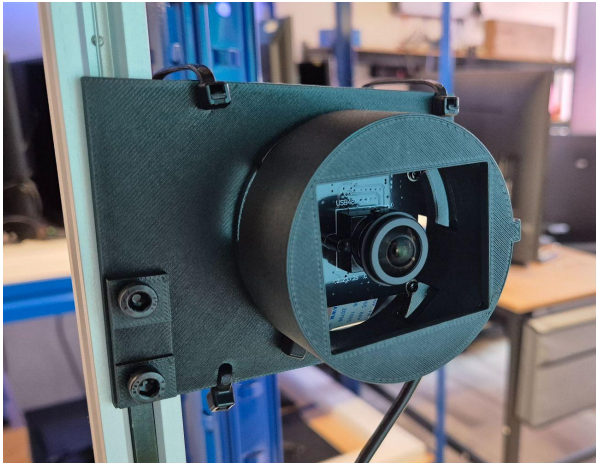
# Screenshot from TVs/STBs

- Most devices are very strict and locked down
- We use reference images from designs to compare with screenshots that we take from real devices - Image Comparison Service (ICS)
- How do you get a screenshot from a device that doesn't have a HDMI output?
  - Our QE engineers found a solution for our TV apps
  - Command Line based
  - Capture Cards for devices with HDMI out



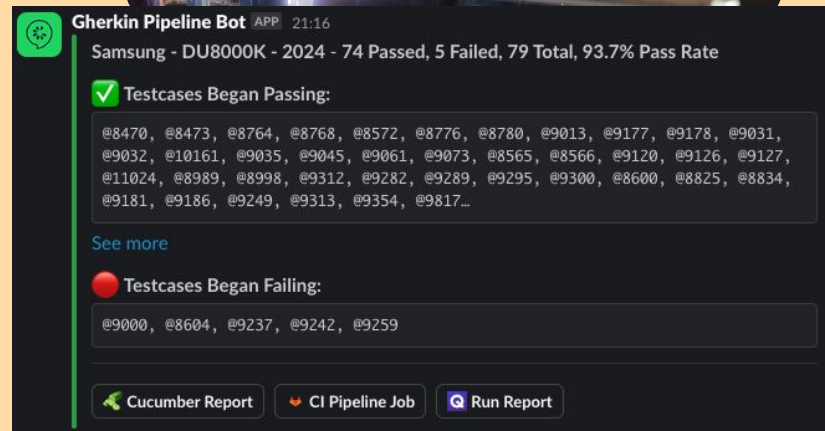
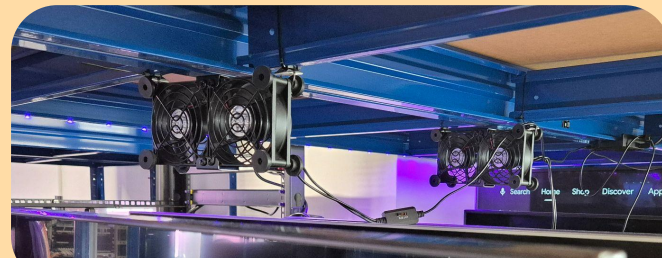
# Video Player Testing

- Using mounted cameras to record content bypassing DRM restrictions with screenshots



# Office Ergonomics to cater for TVs

- TVs are getting bigger!
  - Bigger TVs produce more heat!
  - Air conditioners and backup fans
- For automation, devices need restarting from time to time
  - We added Smart Sockets to all devices that we can power cycle remotely and via CI/CD pipeline
- Monitoring pipelines synced with Slackbots
  - Alerts sent to channels for test failures including temperature spikes



## Total Automation Statistics

**40+**

Devices Tested Daily

**551**

Total QA days saved  
last month

**65% - 75%**

Avg Automation  
Coverage

**250,000+**

Test cases run monthly

britbox

S4C / Clic





# Automation Testing Lab



**Great streaming experiences don't just  
happen...they're engineered!**

**That's the FX Digital touch!**



LinkedIn



*Search for 'Mohammad Arif'  
on LinkedIn to connect*

YouTube



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