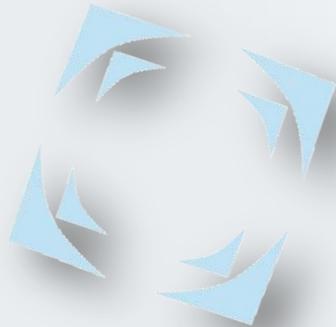


Guaranteeing the Consumer Experience in a CPE-Less Environment

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- **Challenges in a horizontal market**
- **How does testing help?**
- **What needs to be tested?**
- **Conformance regimes**
 - **What testing should the manufacturer and the operator do?**
 - **The different types of manufacturers**
 - **The different approaches to conformance regimes**
 - **The role of logos and white-lists**



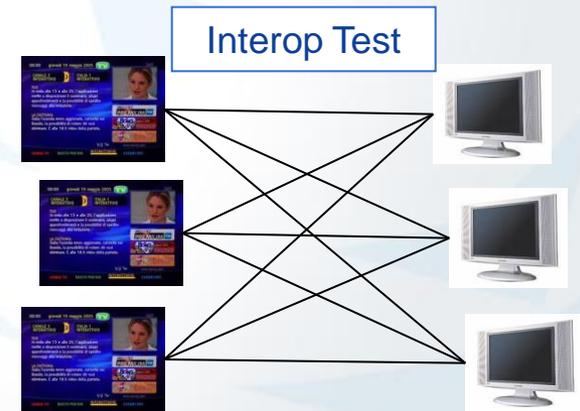
The operator no longer “owns” the CPE, instead the customer has bought the TV in retail



- Operator hopes for as many TV brands as possible to support their service
 - Tier 2/3 brands, even unknown brands, may support the service
 - Inevitably means interoperability problems - issues can range from an application not displaying properly, to the content not being watchable
- What happens if the TV does not work properly?
 - Whose support centre will the customer call?
 - Is it a problem with the service, the CAM or the TV?



- **Quality requires testing**
 - **Enforcing testing, even if it's only partial, promotes a QA mindset which drives out bugs before customers find them**
- **What is the problem of basic interoperability testing: running your app on all the TVs?**
 - **Combinatorial problem. As your number of apps and TVs grows, amount of testing escalates rapidly**
 - **It doesn't help when you introduce new or updated apps**
 - **It doesn't help when new TVs enter the market**
- **Use functional conformance testing of apps and TVs in isolation**
 - **Reduces amount of testing**
 - **Future proofs the platform**
 - **Doesn't replace in network tests entirely**



- **TV testing**

- **CI+ test tool and test regime – CI+ 1.4 in mid-2015**
- **HbbTV/OIPF – check that the HTML environment is compliant using the HbbTV and OIPF test harness approach**
- **Possible extras – IP video streaming via CAM – may or may not be needed depending on what is done elsewhere**

- **Application testing**

- **Basic black box – does app work on all TVs you're targeting?**
- **App conformance – when TVs get updated or new TVs come to market, will your app still work?**
 - **Static analysis and white box testing**

- **CAM testing**

- **Is it compliant with CI+ 1.4?**
- **eCAS/DRM validation when integrating onto CAM**



- **What should the operator test?**
 - **Always has to own app and CAM testing, but what about TV testing?**
- **TV testing. Operator has to strike the balance between:**
 - **Incentivising TV manufacturers to support their service**
 - **Keep manufacturer costs low**
 - **Use standards that are deployed elsewhere**
 - **Ensuring TV manufacturers provide quality products**
 - **Manufacturers must test the product**
 - **Operator must have confidence that product is well tested**
 - **Operator should “hold onto the keys” – e.g. logos, white-lists or device certificates**



■ Angels

- Try to implement the specification
- Have testing expertise
- Have rigorous test processes
- Care about quality and brand
- Continuous quality measurement and feedback loop from the field



■ Devils

- Will do absolute minimum to sell the product
- Will modify product from other geography
- No EU presence - use local agents for cursory testing
- Send engineers to “hack” in the field
- Will only follow specification if have to



**Option 1:
Wild West**



**Do
Minimum**

**Free uncontrolled
market**

Receiver issues in field
Platform brand damage
Inability to add new services
Interactive applications
impossible to write
Lots of receivers
Low cost

**Option 2:
Light Touch**



Self-Cert

**Manufacturer certifies
they conform to spec**

Relies on honesty
Needs a test suite
Audit process?
Variable quality
Manufacturer buy-in

**Option 3:
Full Control**

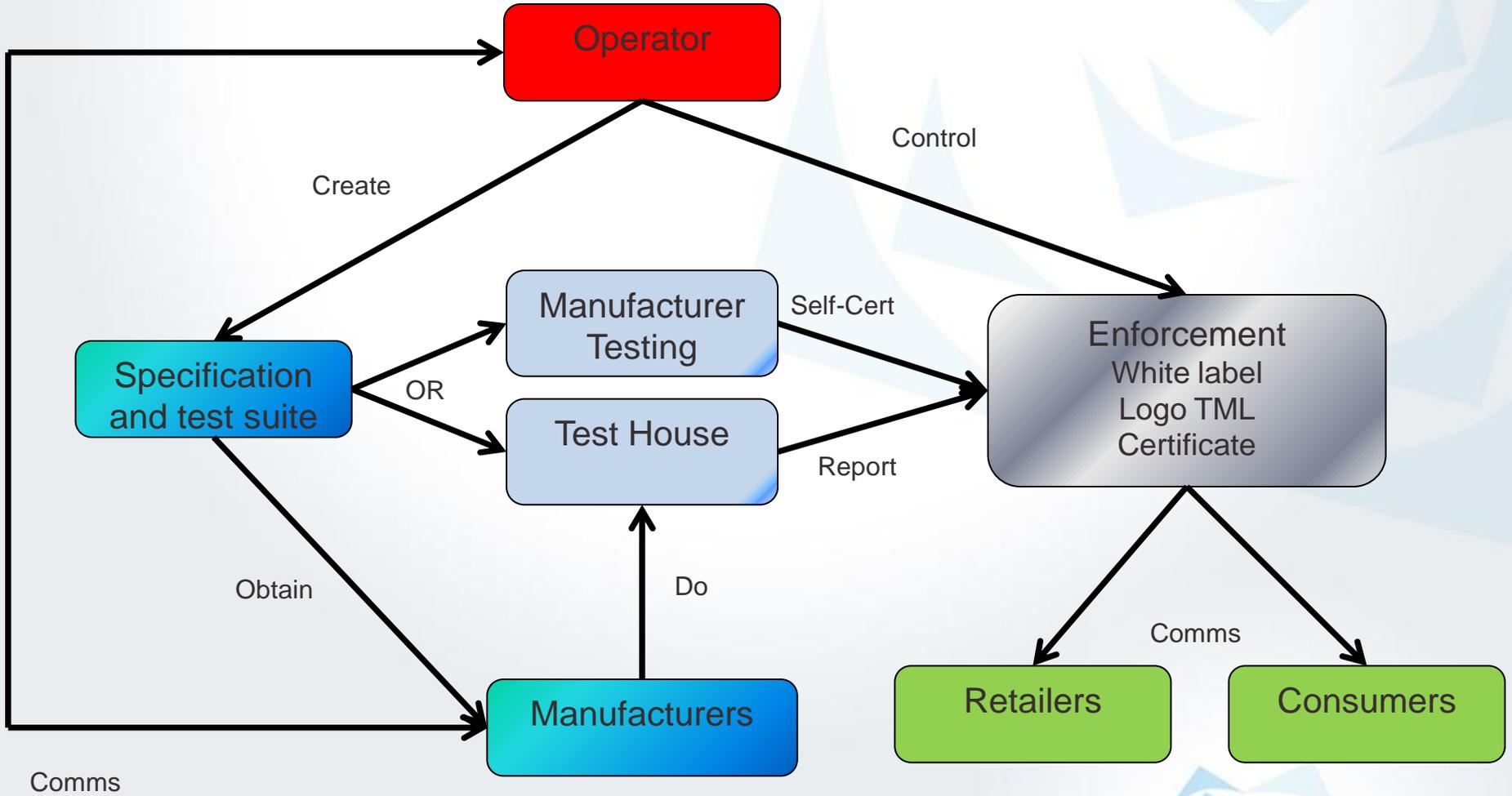


**Test
Centre**

**Manufacturer submits
receiver to test lab**

Ensure quality
Regulate market
Interactive apps work
Good user experience
Fewer receivers
Costs





- What levers does an operator have?
- Commercial/legal enforcement
 - Receivers logos – backed up by a trademark license agreement
 - White-lists of compliant receivers e.g. See Ziggo website
 - These form a part of the communication to consumers and retailers
- Technical enforcement
 - Client device certificates – e.g. TDT Hibrida
 - Monitor
 - Device auditing – pro-active and re-active
 - Mechanisms for resolving interoperability issues found in the field

Suitable devices

Here you will find a list of certified by brand television models that Ziggo

View all devices of a brand



- **A leading digital TV receiver testing company**

- **Founded in 2005 by DVB experts**
- **55 people in UK and Hong Kong**



- **CE Receiver Manufacturers**

- **Test Suites and Tools**
- **Conformance Testing**

- **Operators and Broadcasters**

- **Test Suite + Specification Creation**
- **Set-up of Conformance Regimes**

- **Products relevant to STB-less IPTV. DTVL:**

- **Is the approved test house and test tool provider for CI+**
- **Provides the market leading HbbTV test harness and suite which forms part of the official HbbTV Test Suite**
- **Authored the Open IPTV Forum test suite**
- **Created test suites for TNT2.0 platform in France and TDT Hibrida in Spain**



- **Horizontal CPE-less approach is not a “free lunch”**
 - **Transition to an uncontrolled environment with many devices from a diverse supply chain is challenging**

- **Think carefully about the goals and approach of your conformance regime**
 - **Get the balance right – cost vs quality**
 - **Short term investment in conformance for long term cost reduction**
 - **Leverage existing standard specifications, test suites and test tools wherever possible to reduce operator and manufacturer costs**

- **Communication is key**
 - **Manufacturers**
 - **Retailers**
 - **Consumers**





Any Questions?



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