An overview of Smart TVs

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What we’re going to cover

• Description of smart TV functionality and the smart TV ecosystem
• Highlight some of the consumer protection issues around smart TVs
• OTECH look at smart entertainment devices in the lab
What is a smart entertainment device?

• Something that enables internet connectivity on a large screen format
  – Over-the-top (“OTT”) content
  – Interactivity

• Widespread streaming video content over internet available at least since mid-2000s
  – Gaming consoles among first to bring to TV
Potential benefits of smart TVs

• Access to more and more diverse content on a big screen
• Interactive programming
• Personalized recommendations
• Alternatively:
  – Fewer commercials
  – If ecosystem becomes more ad-supported, potential for lower prices
Data collection on smart TVs

• Delivery
• Research and product improvement
• Measurement and ratings
• Advertising
• Cross-device tracking
Tracking on smart devices
Smart TVs
Smart TVs

“ACR”
Cable providers
Cable providers

“Addressable TV”
Smart peripherals
Applications
Aspirational Lumascape for Smart TVs
What can be collected?

• How to keep state on users?
  – Cookies? Device IDs? IP address?
• Viewing habits
• Voice/camera
• Other nearby devices
• Tie TV viewing to offline data
  – Demographic targeting
  – Attribution
• Data minimization efforts
  – Deidentification/aggregation techniques
  – Data retention limitations
  – User controls
Cross-device tracking

• Also interest in linking smart TVs with other networked devices

• Useful for:
  – Seamless experience
  – Retargeting
  – Purchase attribution
  – Broader behavioral profile

• Can use probabilistic or deterministic methods
  – Probabilistic based on likely shared characteristics (IP)
  – Deterministic based on real-world identifier (email, ultrasonic code)
Transparency and controls

• What are consumer expectations for smart TV privacy?

• How message to consumers?
  – Privacy policy?
  – Stand-alone notice?
  – Standardized notice like AdChoices icon?

• Are there consistent cross-app (or cross-platform) controls?
Security

• Do smart devices get security updates? How regularly? For how long?

• Threat models
  – Can attack the TV/device (Is traffic encrypted?)
  – Can attack other networked devices
  – Can be leveraged to attack others (e.g., DDoS)

• Long-standing area of interest to FTC
  – IoT report
  – 6(b) study of security updates to mobile phones
How long are applications supported?
Legal framework

- Section 5 of the FTC Act
- COPPA
- Cable Act and Communications Act
- VPPA
- ECPA
Our study

• Looked at disclosures, data flows, and controls for three different smart TVs
Transparency and control

• All platforms reserved broad rights to monitor viewing habits
• Defaults always in favor of collection for targeting, but interfaces varied
• All offered controls for device-level targeting, but we didn’t always see a mechanism for controlling third-party apps (and their third parties)
Data collection

• Third-party data sharing not as widespread as on web or mobile
• On two of the three TVs, regular encrypted communication with manufacturer’s servers
• The other TV reserved broad rights, but manufacturer did not appear to engage in regular data collection
• Available controls seemed robust
  – One TV ceased all regular communication, other reduced to minimal traffic
Our findings

• Communications between Smart TV and “acr” server during DVD play
Data collection

• Apps did communicate with third parties on the smart TVs
  – But typically considerably fewer third parties than see on web or mobile
  – One app we looked at connected to more third parties on the TV than either web or mobile
• Did not see controls on how to limit app data collection and sharing practices
• Most app and third party traffic was encrypted
• Often used cookies to keep state on users
  – Possibly because less standardization of device identifiers than on mobile
The future

• Still early days
• May see more data collection if more standardization, more viewing over IP
• Will robust cross-app (or cross-platform) controls emerge? What self-regulatory models will develop?
• Will consumer expectations evolve? Will privacy add-on tools emerge (like we’ve seen with ad- and tracker-blockers)?
• Pay-for-content or ad-supported?
Panel 1: New Frontiers in Media
Panel 2: Consumer Understanding