



Over the Top/Under the Hood OTT Video over IP

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Overview

- Introduction
 - Questions? Perspectives?
- (A little) Background about Penn and PVN
 - Why we chose an OTT solution
- So, what is “OTT”?
 - “And what makes you qualified to talk about it?”
- OTT Examples (Hardware and Interface)
 - Specifics of each option
 - Quality Comparison
- Findings at Penn





Video over IP

- How many of you offer video over IP (streaming, on-demand capacity) on your campus broadband Ethernet network?
- How many of you have a broadband Ethernet network?





How, When, With What

- Even if you don't have “on-demand, video over IP” as a service, students are using your network to watch TV, movies, and more:
 - How they want to watch it
 - When they want to watch it
 - With the device of their choosing





PennNet and PVN

- PennNet: Penn Internet access
 - Wired Ethernet
 - 10Mbps to wallplate (throttled)
 - Wireless issues
- Penn Video Network
 - HFC distribution network on campus (ca 1994)
 - ~8000 drops / ~60 channels / 550MHz
 - Yes to Digital and *some* HD (QAM)



Why OTT at Penn?

- Past “failures”
 - Inuk/Internet 2 project
 - No clear winner in IP Video *for us*
- After 2 years...
 - Why duplicate existing service?
 - Cable TV already successful
 - Supplemental lineup more appealing
 - “Who wants it?”



Over the Top

- (In this case) Set-top box designed for media display using an Internet network input for data/packet retrieval
- Three examples:
 - AppleTV (Apple)
 - Boxee Box (D-Link)
 - Roku HD (Roku)





Long Walks and Cute Animals

- ***Not*** an engineer!
- TV-watching habits
 - I like TV! (But not so much “live”)
 - Media saturation from multiple sources
 - Laptop, smartphone, game systems, TV (sort of)
- Opinionated. Cheap. Impatient.
Me ~ Average student viewer?





Little Bit o'This, Little Bit o'That

AppleTV v. Boxee v. Roku

- Comparison and Findings
 - Connection/Output options
 - All wired connections
 - Hardware design
 - Ease of use
 - *Get ready for some personal bias!*



AppleTV

- Slick design and user interface
- Link to your Apple everything (iTunes, iMovie, etc.)
- Fair number of media apps (Netflix, YouTube, Flickr, iTunes); also rental/purchase
- HDMI out (*rassa-frassa-! No Cable Provided?!*); Optical out
- 720p
- No enterprise wireless



Boxee Box

- Odd design / Big
- Keyboard remote
- HDMI out (cable provided); Optical out
- 1080p and 1080i
- Many, many apps / channels
 - Favor “freebies” like YouTube, TED, Khan Academy
- Essentially designed to replace PC running Boxee software





Roku HD

- Functional design - Streaming Media Player
- Basic remote and Interface
- 720p (later models go to 1080p)
- Most output options (HDMI, S-video, Composite, Component; Optical); basic cables provided
- Mid-range “Channel” options
 - Netflix, Hulu Plus, NHL, MLB, Amazon video
 - Pandora, iTunes
 - Higher-ed-specific (see TelVue)



OTT Baseline Comparison

	AppleTV	Boxee	Roku
Wired	X	X	X
Wireless	X	X	X
Outputs	HDMI; Optical	HDMI; Optical	HDMI, S-video, Composite, Component; Optical
# of Apps	Lowest	Highest	Mid-range
Home Networking	X	X	N/A
Resolution	720p	1080p/i	720p (1080p)
Pricepoint	~\$99	\$150	~\$80-\$130

OTT Biased Comparison

	AppleTV	Boxee	Roku
Hardware	No HDMI cable? <i>Really?</i>	Annoying design	Bare bones
Interface	Pretty, but unintuitive	So. Many. Apps! Remote keyboard unhelpful	Boring
Picture quality	Best	Good	Better
Ease of setup	Good	Better	Best
Home Networking	+	+	-
Recommendation	Personal Preference		



Did You Just Waste My Time?

- All OTTs specializing in digital media reception and streaming do *essentially* the same thing
- AppleTV, Boxee, Chumby, GoogleTV, Orb, PS3, Roku, Wii, XBOX 360 ... !
- Which one best matches your - or your students' - needs and wants?





Penn Findings

- No noticeable blips on network
 - No control group or testing
- Needed to educate students about registration
 - Not exactly as easy as “plug-and-play”
 - Same as any other Internet device
 - Largest percentage of registered “peripheral” Internet devices (not computers) was XBOX 360 @ 30%



All About the Benjamins

...and the Benitas!

- Students want what they want: What's in the box, not the box itself!
 - Students don't think, "I want to watch Showtime tonight!" They think, "I want to watch 'Dexter' tonight!"



K.I.S.S.

- Penn opted for a solution that was *extremely* low-cost - for us, and for them - with OTT recommendations
 - Mom and Dad already have Comcast, Time Warner, FiOS, Dish, DirecTV at home - many are also available to students (remotely)
 - Education issue
 - HBO Go very successful example
 - Talk to your vendors about on-demand options



What is the Answer?

- IP Video *is* the future ...
... But how far away?
 - Over IP? In “The Cloud?”
- Existing OTT services are a stop-gap solution
 - No clear “winner” in the race of which service is best
- If you want to take a cautious approach to Video over IP, OTT is *one* way to do it.



Q & A / Hands-On

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@ the AHECTA booth in the Exhibit
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