Wireless at Penn
Things to Know

wireless-help@isc.upenn.edu
http://www.upenn.edu/computing/wireless

Jeff Edwards  
Associate Director, Network Operations  
ISC Networking and Telecommunications

Charles Rumford  
Network Engineer, Network Operations  
ISC Networking and Telecommunications
Points of Interest

• PennNet Policies and you
• AirPennNet Services
• Site Surveys
• Behind the Scenes
• AirPennNet-Guest
PennNet Policies and You
NPC
The Network Policy Committee

- IT Professionals from around the University
- Develop and review network policies
- Recommendations policies for approval

The Process

Identify ➔ Draft ➔ Discuss ➔ Review ➔ Final Draft ➔ Seek Approval

http://www.net.isc.upenn.edu/policy/policy-list.html
Policies for Wireless

- Deployment, Operation, and Registration Requirements for WAPs on PennNet
- Operation of DHCP Servers on PennNet
- Use of PennNet IP Address Space
- Routing Devices on PennNet
- Requirements for Authenticated Access to PennNet
- Installation and Maintenance of Network Wiring
- Troubleshooting charges for PennNet
The Exciting Points

- Register your Aps
- Register your DHCP Servers
- Keep Assignments up to date
- Users Authenticate, not devices
- Access records are maintained for 60 days
Questions? Comments? Concerns?
Getting Service

Request for Service → Site Survey → Equipment Installation → Final Site Survey → Documentation
Getting Service

- Request for Service
- Site Survey
- Equipment Installation
- Final Site Survey
- Documentation
Getting Service
Request for Service

• Email service-requests@isc.upenn.edu

• Include:
  – Location of Service
  – Information on the usage for the area
  – Budget code

• If needed, in-person meeting will be scheduled
Getting Service

Request for Service → Site Survey → Equipment Installation → Final Site Survey → Documentation
Getting Service
Site Survey

- Walk through of the space
- Measure existing AirPennNet service
- Check possible RF propagation is
- Determine possible AP locations
- Surveys are charged by the hour
- Estimate generated for installation
Getting Service
Site Survey
Getting Service

Site Survey
Outside of New Installations

• Can be requested at any time
• Charged per published hourly labor wages
• Email service-requests@isc.upenn.edu
  – Area to be surveyed
  – Budget code
Getting Service

Request for Service → Site Survey → Equipment Installation → Final Site Survey → Documentation
Getting Service
Equipment Installation

- Email service-requests@isc.upenn.edu
- Contractors pull cables and install APs
- No up front costs for APs
- ISC is the owner of equipment
Getting Service

Request for Service → Site Survey → Equipment Installation → Final Site Survey → Documentation
Getting Service
Final Site Survey

• Make sure that everything good
• Possibly adjustments to settings
• Verify HD spaces
• Possible moving of APs
• Included in the installation cost
Getting Service

- Request for Service
- Site Survey
- Equipment Installation
- Final Site Survey
- Documentation
Getting Service

Documentation

• Update internal ISC documentation

• Set up monitoring
  – 24x7
  – On-call support
  – Failure notification
  – Hardware replacement
Some other things

• Fully compliant with polices
  – Central Authentication with PennKey
  – Auth and Access logs retained

• Four year replacement cycle
  – Allows for advancement in technology to be rolled out
Questions? Comments? Concerns?
Behind the Scenes
What makes it tick?
The Stats
October 2013

• Access Points: 3,594
• Wireless Devices: 68,407
• AirPennNet devices/user: 1.94
• AirPennNet-Guest devices/user: 1.49
• TB of Data Transmitted Wirelessly: 345.16
Brace yourselves…
Aruba M3 – will be 7200 (3 per NAP – 2 active, 1 backup (LMS IP backup only)) no VRRP

Airwave Servers

4 servers running 2 instances of FreeRadius = 8 servers

10GB triple redundant services network for DHCP, DNS, RADIUS (not shown here)

Master controller – no backup at this point (config mgmt only)

VAG

MODV

LEVY

HNT

Brocade MLXe16

100GB ring
10GB full mesh core
10GB wireless
1GB building/AP

*L3 at building, routed core. Trunked links to the local controllers bridged to core router (all gateways live on MLXe)
A Deeper Look
AirPennNet

- Primary SSID for Upenn
- Supports 802.11agn
  - 2.4GHz and 5.8GHz
- Speeds up to 150Mbps
- Authenticated with PennKey
  - 802.1x
  - EAP-TTLS/PAP
A Deeper Look
AirPennNet-Help

- Configuration of Devices for AirPennNet
  - XpressConnect
- Captive Portal to instruct users
- Supports a wide range of devices
A Deeper Look
AirPennNet-Guest

- Primarily for guests to campus
  - 802.1x incapable devices also
- Registrations last 1 week
- Protected by PennKey
A Deeper Look
AirPennNet-Guest (cont.)

• Conference Model
  – For large groups, conferences and the such

• Sponsored Guest Access Code
  – For small groups and the such

• Sponsored MAC Address
  – Register device for guest via MAC Address

• Direct PennKey
Coverage

- Aim for 5.8GHz coverage
- High density areas
- Outdoor Coverage
  - Limited, but there
Questions? Comments? Concerns?
Future Developments

• Location Aware Services
• AppleTVs and the such
• Continue to aim for 100% coverage
• Continued improvements for HD spaces
• 802.11AC
• New controllers and code
Questions? Comments? Concerns?
That’s all.