Create the greatest home network of all time in 3 easy steps (and 472 difficult ones)

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Outline

- Design
- Network topology
- Network applications
- Security
- QoS
- VoIP
- Future work
Design

- Initial design came quickly
- Request For Heckles (RFH)
  - Define the standards that allow the network to inter-operate
  - RFH 1, 2 & 3
    1 - WNIC proposed common numbering scheme
    2 - Proposed services for routing and services network
    3 - Telephony systems layout
- Still in place
- Implementation occurs in free time

Network topology

Comprised of:
- FreeBSD 5.3 - 6 routers
- Mixed end hosts
  - FreeBSD, Mac OS X, Windows, Cisco IP phones, Hitachi 802.11b IP phone
- Link layer
  - 802.11g
  - Switched ethernet
  - ADSL
Network topology (Simplified)

Layer 3

Network topology (Swinnet)

SWINNET
(vlan 49)
(DHCP: 136.186.49.x)
Network topology (Swinnet)

Swin Cisco VPN concentrator (136.186.13.6)

INTERNET

Network topology - Law & Shell

802.11g AP

SWINNET (vlan 49)

CAIA lecture series

http://caia.swin.edu.au  (wazz.lastewartj@swin.edu.au  March 22th, 2006  Page 7
Network Topology - Daniel

SWINNET (vlan 49)

Trem

Internet (iinet)
Network topology (Wazz & Mon)
Network topology - Warren

- Good phone...

Network topology - City

- lauren.room52.net
- Mail
- Backup (external people)
- VoIP
- Lawrence major project group
  - CVS
  - plone
- Personal home pages
Network topology - CAIA

- wharrop.caia.swin.edu.au
- lstewart.caia.swin.edu.au
- aenima
  - Completely upgraded ... twice
  - SATA Raid
    - 2 x 80Gig Mirrored - Boot
    - 4 x 250Gig JBOD - Content
So what does it look like when it's all on the same page?
Network Applications

- VoIP
- Mail
- http proxy (Swin)
- DNS
- NTP
- SAMBA file sharing
- rsync (Extensive backups)
- ...

Storage
Storage

- We use HighPoint SATA RAID cards...

Security

- IPSEC (IETF RFC2401)
  - Law & Shell – aenima
  - Daniel - aenima

- VTUN (http://vtun.sourceforge.net/)
  - Used to create and secure an IP over UDP tunnel:
    - Wazz & Mon - aenima
    - lstewart.caia.swin.edu.au – aenima
    - wharrop.caia.swin.edu.au - aenima
    - aenima to lauren.room52.net
QoS

- Lawrence to aenima wireless link
- Diffserv
  - Cisco phone & asterisk both set a code
- pf and altq
- Strict priority
- No other links at this point
  - Over provisioning is working
  - QoS sensitive traffic is generally transferred out of hrs

VolP

Voice over Internet Protocol
VolP using Asterisk

- Asterisk (http://www.asterisk.org/)
  - Platforms
    - Linux, FreeBSD, Mac OS X...
  - Features
    - Trunking between asterisk servers
    - Hardware compatibility
      - Digital: SIP & SKINNY Phones, ISDN line cards, T1/E1 line cards, GSM bridge
      - Analog: Multi port FXO & FXS cards
    - Call waiting, transfer, on hold (mp3s)...
  - There are many more!

VolP network layout

- Extensions 7xx
- "LS/MH"  "city"  engin (PSTN)
- Inet
- IAX trunk
- "aenima"
- Extensions 4xx
- POTS
Our implementation

- FXO

CISCO IP phones
SIP Software Phones

Current capabilities

- Calls between hardware phones
- Calls between software SIP phones
- Calls between hardware and software SIP phones
- Voice mail to email
- Accounts for external people

Free download: http://xten.com/
Current capabilities

- PSTN
  - VoIP
    - engin
    - iiphone
  - WH & MD POTS
- Incoming call routing using menu

Future work

- Lawrence link issues
  - New antenna?
- Routing protocol
  - RIP?
- Scalability?
  - Layer 2
  - More users coming on
- More bandwidth for free – where do we get our next hit?
Questions?