

# The Irish Schools Network



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# Outline

- Technical Elements to a schools network
- The Irish School Network
  - Overview
  - Funding
  - Differences
  - Access Network
  - Networking Issues (access, security, network management...)
- Services

# Technical Elements to a schools network

- Connectivity
- Security
- Management/Monitoring of Network.
- Services
- Provisioning

# Quick Facts on The Irish Schools Network

1. Core network (HEAnet), Access Network (Irish Telecoms)
2. 4029 Schools (Primary, Secondary) to connect to Schools Network
3. Free service to Schools
4. Minimum 512k connectivity to 2Mb (12Mbps max)
5. Network maintained by HEAnet
6. Installation of Network to be complete by end 2005
7. Services for Schools to be layered once network is in place.

# Funding

- € 15M over 3 years provided by Irish Telco's industry for access network.
- € 3 over 3 years provided by Dept. of Education for access network.
- Further funding from Dept. of Education and Dept. of Communication.

# Differences between NREN site and Schools Network site

## **NREN**

## **Schools Network**

Small No. of Sites	→	Large No. of Sites
High Bandwidth per site	→	Low Bandwidth per site
Many tech. request per site	→	Less tech. request per site
Dedicated tech. resource	→	No tech. resource on site
Fluid Network	→	Fixed Network
Security policy per site	→	Fixed policy for network
Varied Services per site	→	Fixed pre-defined services
Unique install instance	→	Automation is critical.

# Differences between NREN and Schools Network

## **NREN**

Carrier Network

BGP, IS-IS, MPLS, IPv6,  
Multicast

Gigabit Ethernet, 10GE,  
jumbo frames, etc



## **Schools Network**

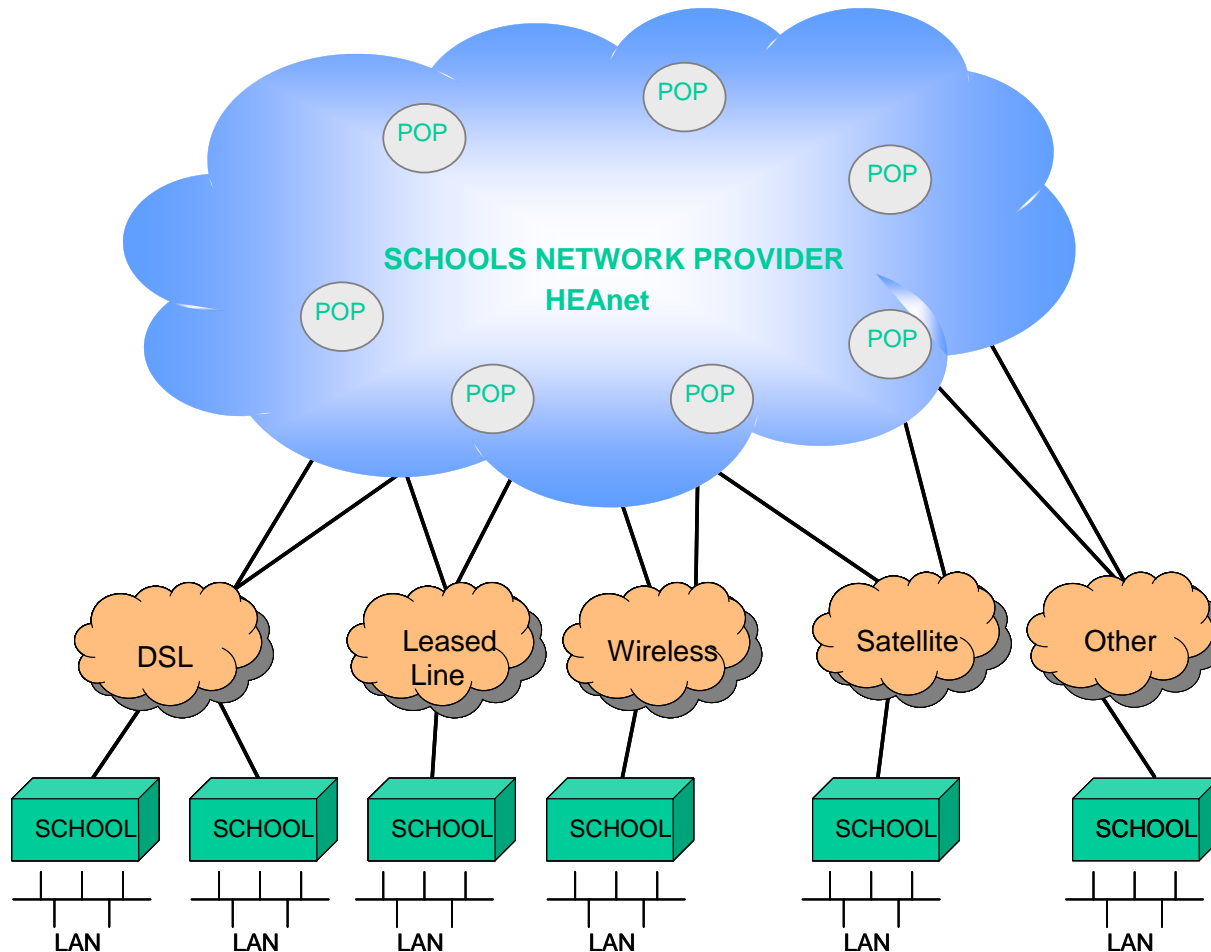
ISP type Network

All these for core +

PPP, RADIUS, LDAP,  
Channelised connections

DSL, Satellite, Wireless

# Schools Network

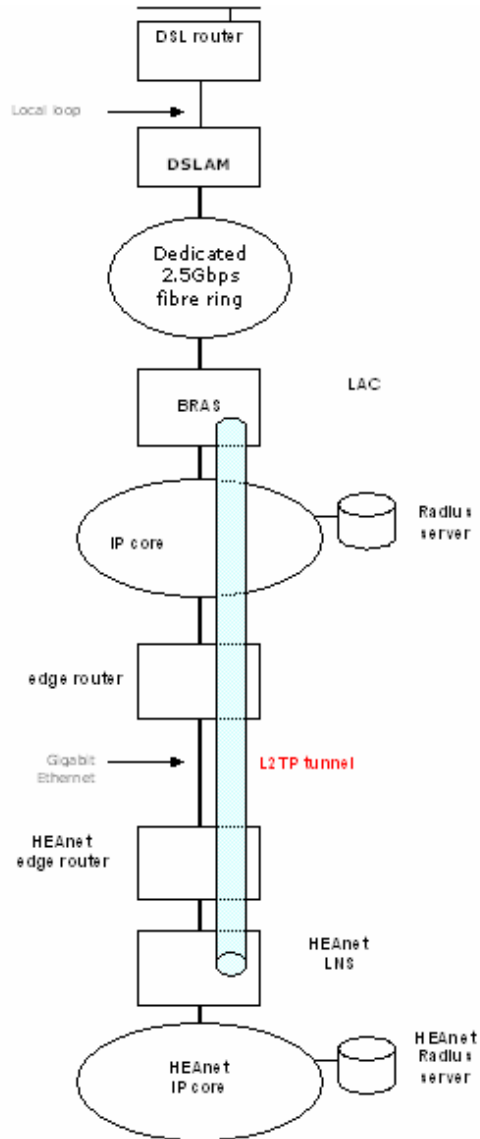


# Access Network

- Public tender process
- Layer 1/2 connectivity to HEAnet PoP.
- 6 winners of tender
  - Fixed line- 845 (ADSL, ADSL2+, SDSL, other)
  - Satellite- 1,343 (Gilat, I-Direct, UDLR)
  - Wireless- 1,767 (3.5GHz, WiMax..no 802.11b)

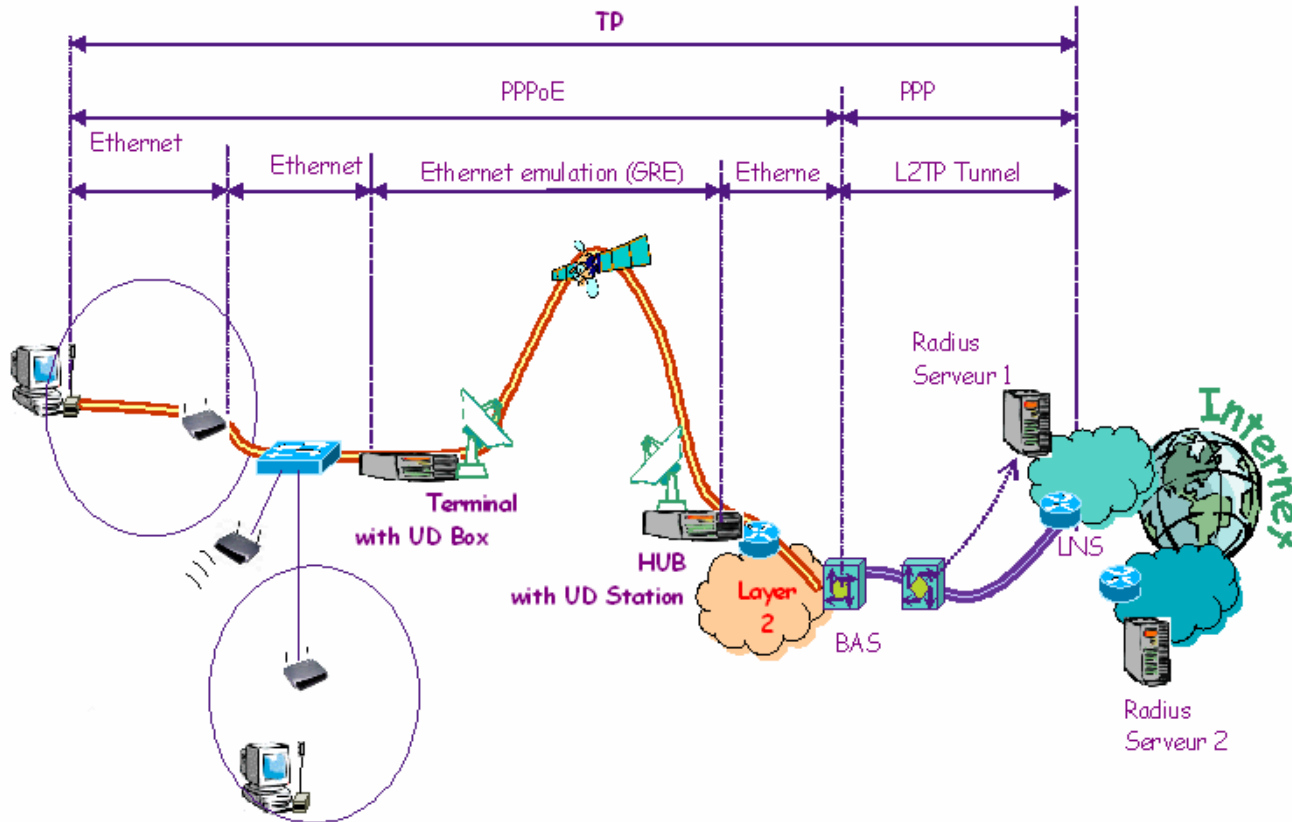
# Networking Principles

- ISP type service
- Layer 2 service from Access Providers
- PPPoE over L2TP with RADIUS database
- VLANs (802.1q) and ATM VC's for remaining schools
- Routed solution does not suit our security solution, or routing policy (HEAnet IP addresses)
- Managed Router in schools (uniform model)
- IPv6 , multicast ?



# Sample ADSL Service

# Sample Satellite Service





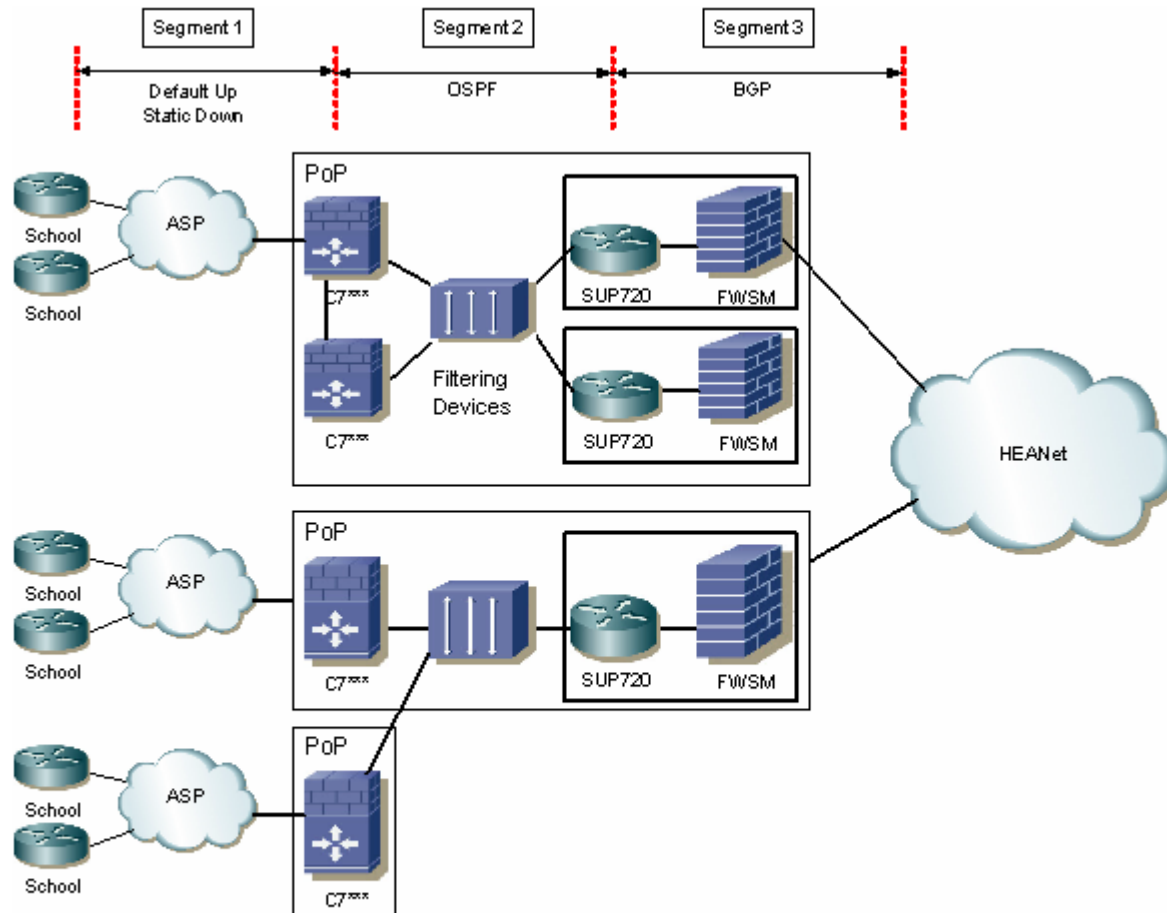
# Network Management / Monitoring

- Pro-Active (we are going to try at least !)
- Nagios
- Smokeping
- MRTG
- Netflow (on a case by case basis).
- Configuration management system unknown,  
IOS upgrades ?
  - Cisco Works / RME?

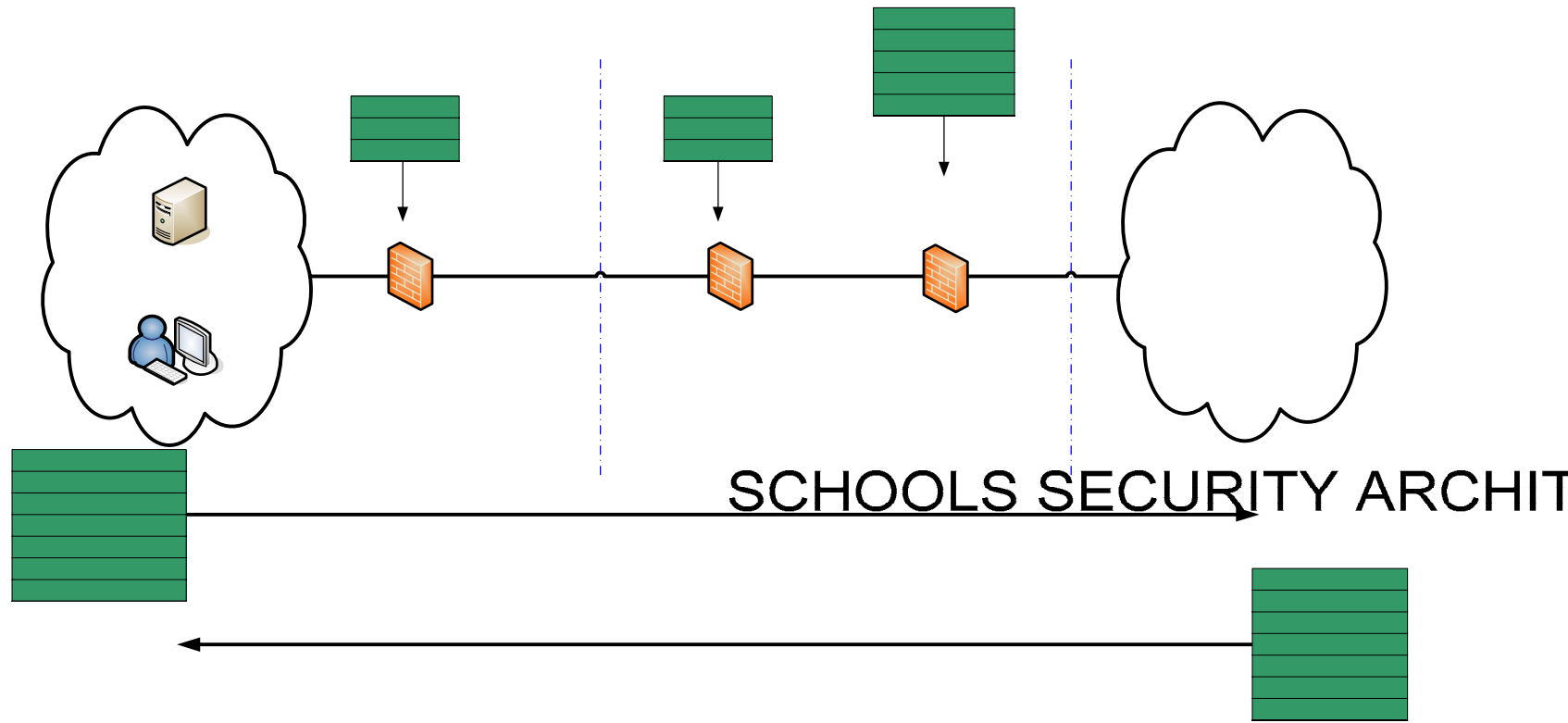
# IP Security

- Centralised security nodes.
- IOS firewall feature set on aggregation router.
- Difficulty in protecting schools from each other.
- Array of filtering servers  
(Content filtering, DansGuardian)
- In line anti virus
- Centralised policy, with option of schools specific policy.

# IP Security



# Strict Schools Policy



# Policy based routing ?

- Force traffic to pass to our centralized security service
- Poor networking design but real service requirement.

# Provisioning System

- To aid workflow procedures
- Automate Services
  - Router
  - Security
  - Email
  - DNS
  - Network Management
- In-house built system, postgres database, perl scripts, web front-end

# Phased Availability of Services

## INITIAL SERVICES

**IP Connectivity to the Schools Network.**

**IP Connectivity to the general Internet**

**IP Connectivity between Schools.**

**Educational/Research Networks Access**

**Controlled Internet access**

**Web-based E-mail**

**Domain Name Registration & DNS**

**2<sup>nd</sup> Line Support to NCTE Service Desk**

**Single Sign-On – PubCookie**

## LATER SERVICES

**Personal disk space**

**IMAP E-mail**

**POP3 E-mail**

**Web Hosting**

**Content Hosting**

**E-Schoolbag.**

**Remote Access.**

**Video Conferencing.**

**Video Streaming.**

**Video Lecture.**

**E-learning (Moodle)**

**Questions / Opinions on  
this presentation ?**





## Add other technical elements to a schools network here :

- Connectivity
  -
- Security
  -
- Management/Monitoring of Network.
  -
- Services
  -
- Provisioning
  -
- Support ?
  -