Residential Broadband Networking and the ATM Warren

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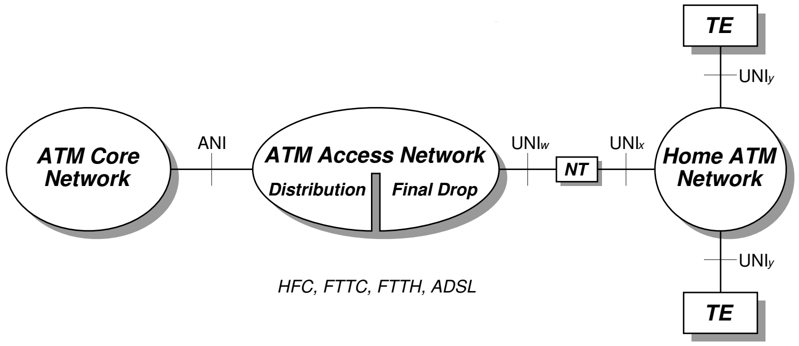
http://www.cl.cam.ac.uk/Research/SRG/HAN/

Introduction

Talk based loosely around the ATM Forum RBB Workgroup model:



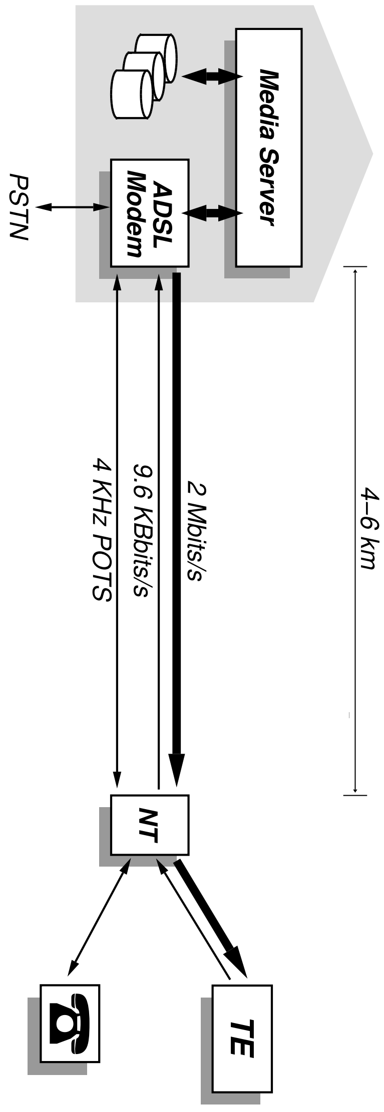
- **Access Networks**.
- **Network Termination**.
- **Home Area Networks**.

1. Access Networks

Concentrating on the fixed wiring technologies, two techniques predominate:

- **Telephone Companies**. Asymmetric Digital Subscriber Loop (*ADSL*).
- **Cable Companies**. Hybrid Fibre–Coaxial (*HFC*).

Access Networks: ADSL



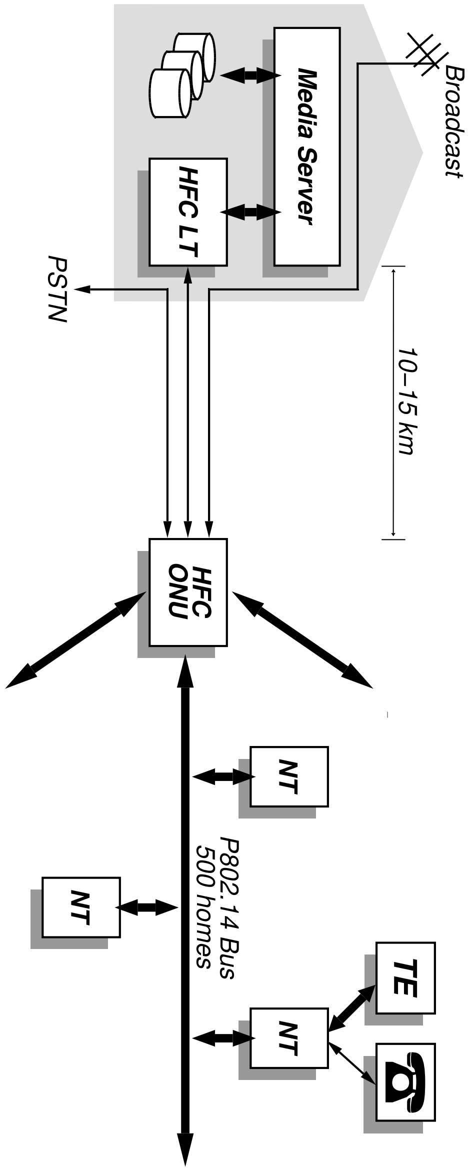
Access Networks: Cable Systems

There is a variation in the installed base of cable systems, some of which are more suitable for use in the delivery of broadband data.

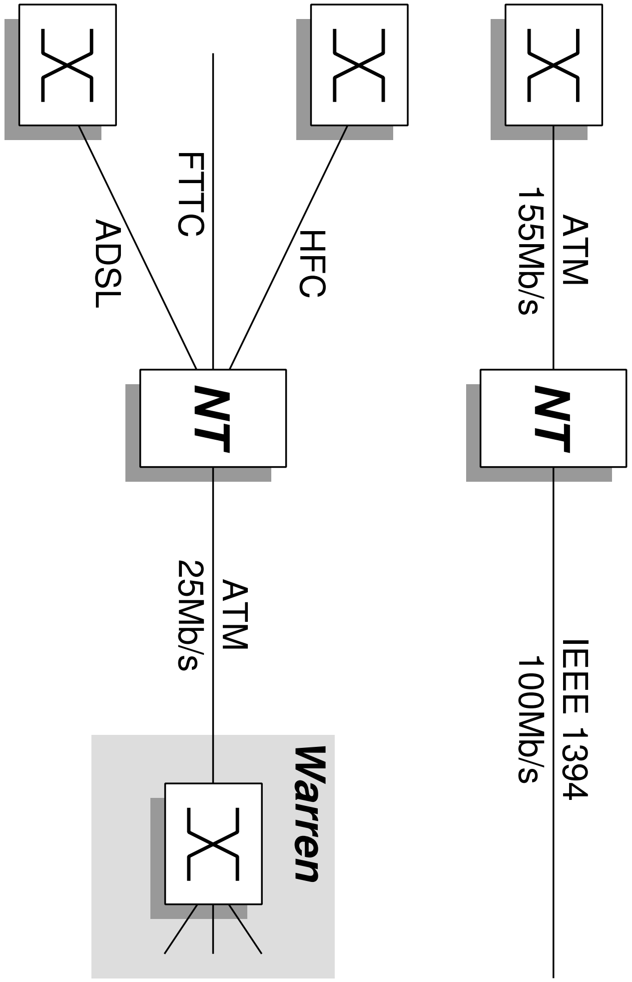
Major parameters:

- **Bandwidth**. In the range 450–750MHz.
- **Unidirectional/bidirectional**.
- **Wiring**. Pure co–axial or hybrid fibre/co–axial.

Access Networks: HFC



2. Network Termination



3. Home Area Networking

Key issues:

- **Cost**. Consumer electronics industry is highly cost-sensitive.
- **Simplicity**. Plug and play. Self-configuring. Simple user interfaces.
- **Interoperability**. Desirable to interoperate with existing standards.
- **Consistency**. Single connector. Single universal control system.

Home Area Networking: Industry standards

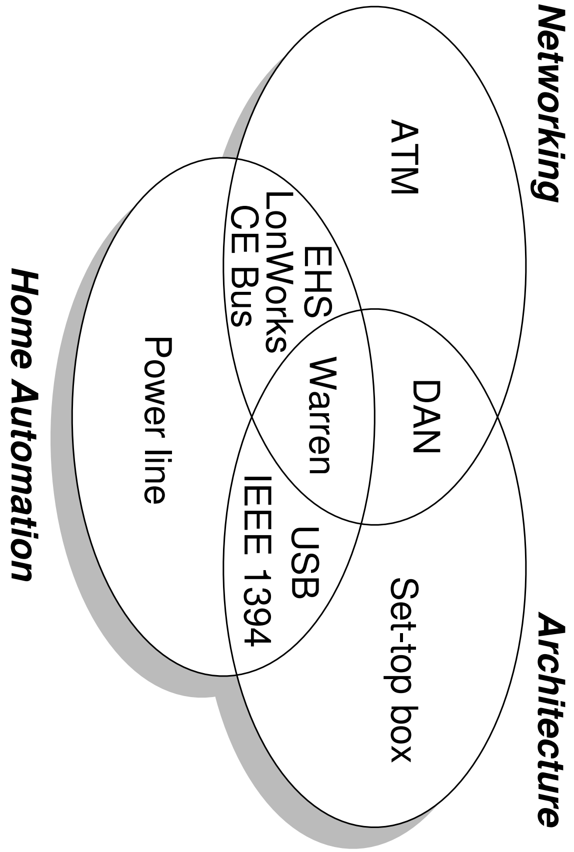
Computer industry standards:

- IEEE 1394 (‘Firewire’).
- Intel *Universal Serial Bus* (USB).

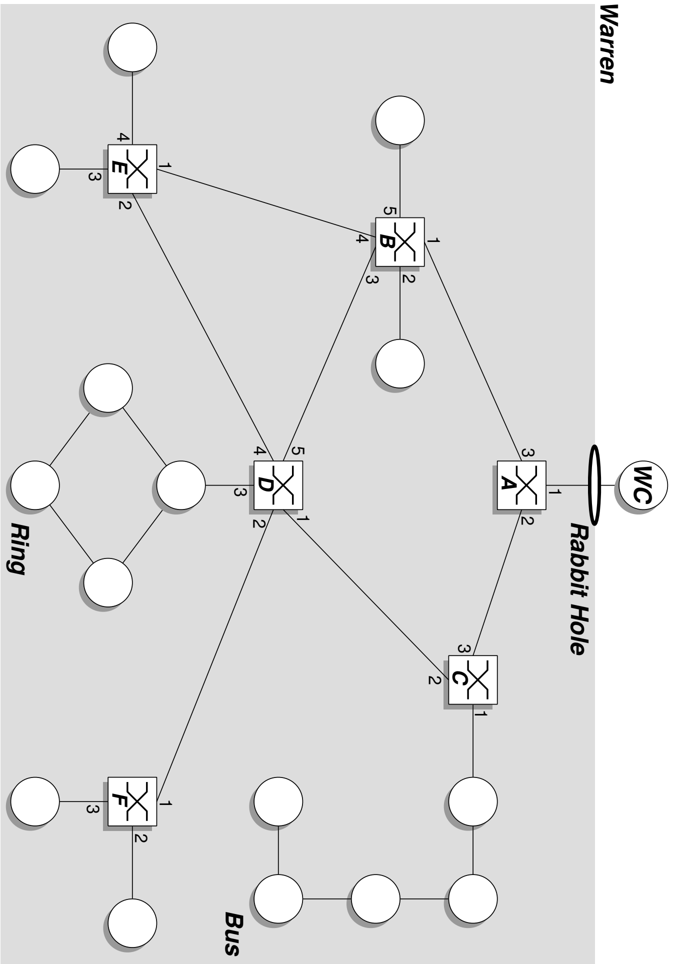
Home automation standards:

- Echelon *LonWorks*.
- Electrical Industries Association *CE Bus*.
- European Home Systems Association *EHS*.

4. The Warren Project



Warren: Architecture



Warren: Reducing the cost

Use of *software* in place of *hardware* represents a major saving.

On a simplistic level, the cost of a switch is determined by two factors:

- **Port controllers**. The faster, the more expensive.
- **Aggregate bandwidth of the fabric**. The faster, the more expensive.

Use of novel topologies such as rings and buses.

Cost of individual devices can also be reduced by careful design.

Warren: Research Problems

The Warren Project aims to tackle the following problems:

- **Plug and Play**. Self configuration of end stations. Software configuration without the need for user intervention.
- **Topology determination**. How can this be automated?
- **User interfaces**. Infra-red control systems. Graphical user interfaces.
- **Application scripting**. Plugging devices together logically.
- **Location**. Active badges. Location-aware devices. Infra-red technology.
- **Security**. Firewalls. Authentication.