The Home Area Network Project

University of Cambridge, Computer Laboratory.

Goal
- Develop an architecture for the interconnection of home electronics

- Focus
  - Audio
  - Video
  - Infra-red Control
  - Gateway to non-ATM devices and low rate control networks

- Applications:
  - TV, VOD, Theatre, HiFi, Security
  - Outside world ATM connectivity.

Home Area Network Aarchitecture

Multiple layers:

- Object and type model for HAN devices, streams and configurations.
- Application scripting level.
- Infra-red command control level.
- Stream presentation/encoding syntax level.
- ATM networking level.
- Proxy control protocol level for dumb devices.

Home Area Network Project Work Items

HAN Application Environment.

HAN Security and Authentication Enviromnet.

HAN HiFi Consortium.

The Warren Architecture for Proxy Control of Dumb ATM Devices.

Design of Hardware Description Languages and Protocols for direct implementation of protocols in hardware.

Implementation of Proxy Signalling Entities for regular ATM service over dumb switches.

The ATM Warren

The Warren

- Is a subnetwork of a normal ATM network
- Composed of an arbitrary mesh of very simple ATM switches
- Normal (intelligent) or simple (dumb) end stations

No microprocessors in the Warren, everything uses proxy control.

No unique identifiers in the Warren, everything uses dynamic addresses.

Warren controller is single external computer for the Warren switches.

Dumb devices have proxies on external computers.

Warren Switch

- A normal ATM switch, perhaps 4 or 8 ports of ATM25.6

- Has no microprocessor or unique address

- Implements the Warren Control Protocol on two reserved VCIs

Typical Warren Devices

- Directly attached video display tile
- Directly attached camera
- Directly attached microphone
- Directly attached loudspeaker
- Clock/radio
- Mains controller
- Infrared basestation

Even Simpler Devices and Interconnection Topologies

- Transmit only device

- Receive only device

- Receive only device with daisychain through port

- Algebraic manipulation of cell headers on daisychain

- Devices in a loop hanging off one switch port

Warren Byte Stream Protocol

- Suitable for hardware implementation

- Designed for low rate reliable delivery (e.g. RS232 emulation).

- Uses one byte per cell for data

- Remainder of cell is sequence number and control fields

Fault finding

The idea is you follow a fault back to the Warren Controller, replugging things until it works (as per Sandy Fraser).

- Every switch has an LED indicating that it is happy.

- If one LED is off, then all LEDs are off on switches further away from the Warren Controller.

In addition all Forum ATM O&M procedures apply as usual.