Home Systems and International Standards

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What is a Home Network?

The Internet

Service Provider #1

Service Provider #2

Service Provider #3

RG = Residential Gateway

Home Network
A Home Network

External services
Home Control Displays
The Network Interface Card

To external service provider

Residential Gateway

Appliance Network

Network Interface

Refrigerator

Range

Dish Washer

Washer

Boiler

Freezer

Clothes Washer
A single protocol benefits manufacturers and consumers

Trying to corner the market with a network usually fails

“Cooperation in communications; competition in applications”
What are Standards?

A formal set of rules

- How devices communicate on a home network
- How home systems interconnect
  Entertainment ↔ Lighting ↔ Heating ↔ Security
- How a home network connects to the Internet
- Who creates and owns the rules (specifications)
  - **Proprietary** ... Company owned; may be secret
  - **Open** ... Company owned; publicly disclosed
  - **Standard** ... Created by an authorized organization
Home Electronic System

- Created by experts from North America, Europe, & Asia at:
  - ISO / IEC JTC 1: Communications and information standards
  - SC 25: Interconnection of Information Technology

- Initial mission:
  - World appliance
  - Uniform commands
  - Universal Interface
  - Data plug
  - Independent of network

- A neutral forum for convergence
Standards for Home Systems

The Internet

Residential Gateway

Integrated Home Network

Service Provider #1

Service Provider #2

Service Provider #3

RG = Residential Gateway

Product Interoperability

Home Network

Home Wiring
Wiring for Home Networks

- Standards for structured wiring system
- High quality coax cables (2) + twisted-pair wires (8)
- Requires high quality connectors and installation
Wiring Installation

Data wiring

Coaxial cables
HomeGate – Residential Gateway

- WAN Device
- LAN Device
- Public Network
- Home Network
- Remote Management
- Safety Security
- Privacy
- WAN Interface
- WAN ↔ LAN Protocol Translator
- Firewall
- LAN Interface
A HomeGate Example

Service Module
(Applications Support)

Public WAN Media

WAN Interfaces

HomeGate Plug-In Cards

LAN Interfaces

Home LAN Media

- DSL Card
- Satellite Card
- Cable Card
- Power Line Card
- Radio Card
- WiFi Card
- Konnex Card
- Echonet Card
- CEA-709 Card
- ITopHome Card

Gateway Link
Product Interoperability Guidelines

- Facilitates interoperability among products:
  - From different manufacturers
  - Located on different home networks

- Issues: safety, addressing, configuration, lexicon

- Defines application models
  - Lighting
  - Security
  - HVAC control
  - Energy management
  - Audio/Video control
Broadband Home Network

- **Challenges**
  - Deliver multiple HD streams (4-6 @ 20 Mbps)
  - Synchronize audio to < 100 ms delay
  - Avoid jitter (packet losses)

- **Ethernet (IEEE 802.3)**
  - Packet delivery with no time base; no priority
  - Overlay QoS with priority and reservation

- **Firewire (IEEE 1394)**
  - Asynchronous + multiple isochronous channels
  - IEEE 1394b: Extends network from 15 to 300 feet
Home Electronic System Information

- http://hes-standards.org
- Next meeting: September 3-6, 2007 in Korea
- US policy set by Technical Advisory Group
- US delegation accredited by
- One Country / One Vote ⇒ diplomacy & negotiation
Integrated Home Systems

Jeeves
by SmartWorld

- Intuitive to operate
- Adapted to the occupants
- Integrated into the home architecture

“I envision a home system as a substitute for a staff of servants that we can't afford.”